

FOREWORD

This workshop manual has been prepared to provide information regarding repair procedures on Hino Trucks.

Applicable for HINO 155, 155h, 195, 195h series, equipped with J05E engine

When making any repairs on your vehicle, be careful not to be injured through improper procedures.

As for maintenance items, refer to the Owner's Manual.

All information and specifications in this manual are based upon the latest product information available at the time of printing.

Hino Motors Sales U.S.A., Inc. reserves the right to make changes at any time without prior notice.

Please note that the publications below have also been prepared as relevant workshop manuals for the components and systems in these vehicles.

Manual Name	Pub. No.
Chassis Workshop Manual	S1-LXJE03A S1-LXJE03A EWD
J05E Engine Workshop Manual	S5-LJ05E04A
Trouble shooting Workshop Manual	S7-LXJE03C 1/7 S7-LXJE03C 2/7 S7-LXJE03C 3/7 S7-LXJE03C 5/7 S7-LXJE03C 6/7 S7-LXJE03C 7/7

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CHAPTER REFERENCES REGARDING THIS WORKSHOP MANUAL

Use this chart to the appropriate chapter numbers for servicing your particular vehicle.

CHAPTER	MANUAL No.	S7-LXJE03C 4/7 (U.S.A.), S7-LXJE04C 4/7 (CANADA)
	MODELS	HINO 155, 155h, 195, 195h
	Production Code	XFC710, XFC720, XFC740, XJC700, XJC710, XJC720, XJC740
HYBRID		3-001

HINO

WORKSHOP MANUAL

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BODY INSIDE ACCESSORY

BODY OUTSIDE ACCESSORY

AIR BAG AND SEAT BELT

HEATER AND AIR CONDITIONER

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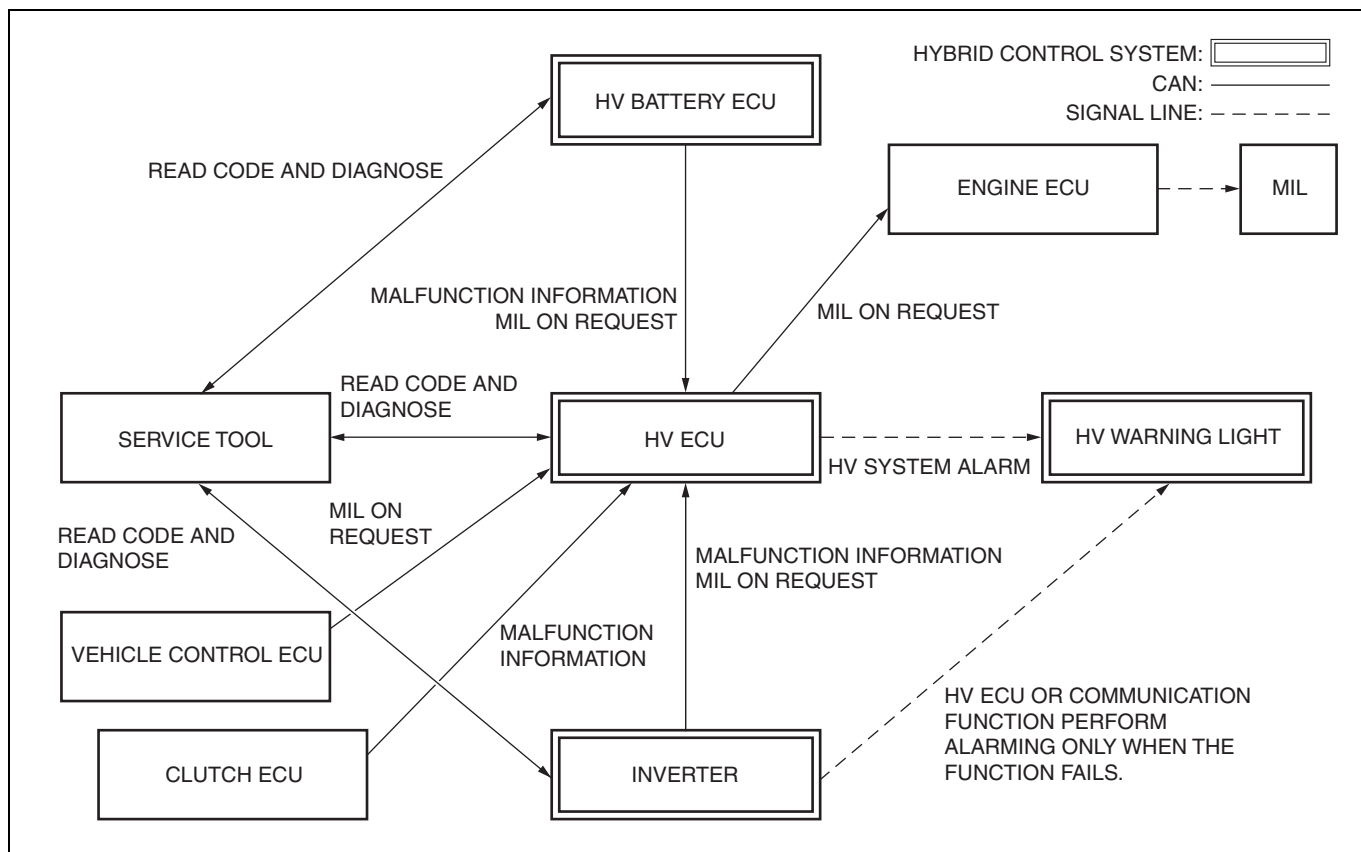
TROUBLE SHOOTING

HYBRID CONTROL SYSTEM

TROUBLE SHOOTING STEPS FOR HYBRID SYSTEM

EN01H03ZZZ030602002001

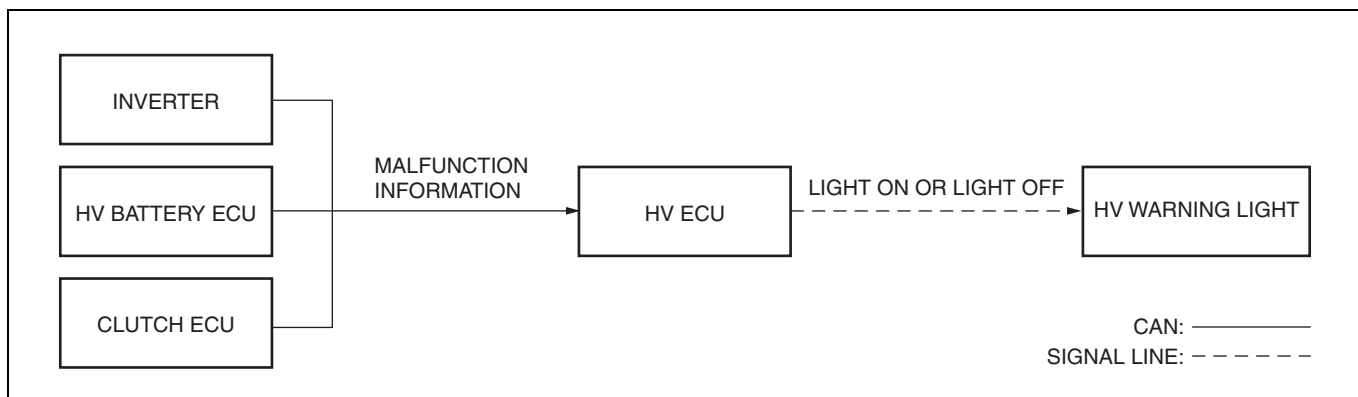
CONFIGURATION DIAGRAM OF HYBRID TROUBLE SHOOTING SYSTEM



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1. HV WARNING LIGHT LIGHTING PROCESS

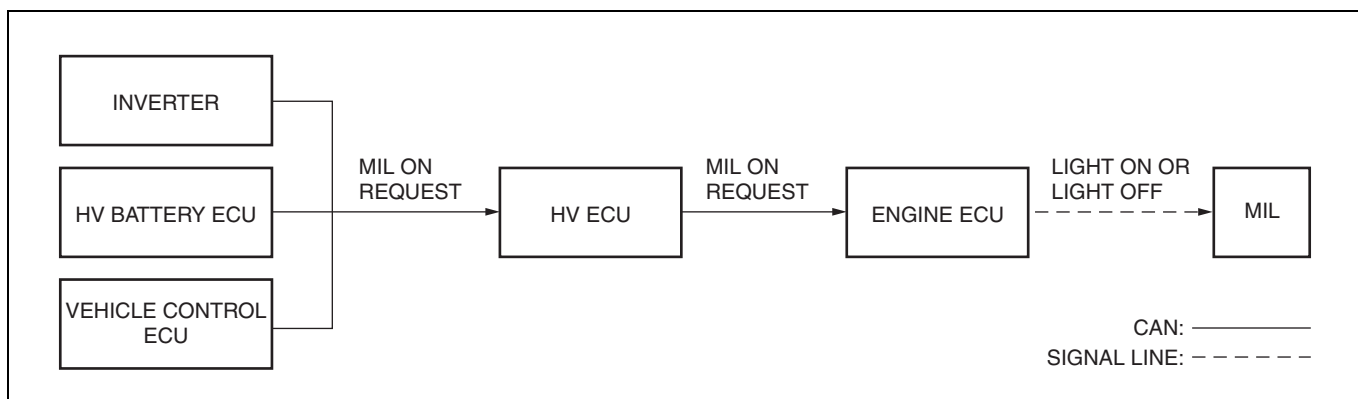
- (1) The HV ECU controls the HV warning light.
- (2) The HV warning light turns on in case of malfunction of the HV ECU, the HV battery ECU, the inverter, or the clutch ECU.
- (3) The HV ECU receives information regarding malfunction of the HV battery ECU, the inverter, and the clutch ECU via CAN.



SHTS03ZZZ0300002

2. ABOUT MIL

- (1) The engine ECU controls whether to turn on or turn off MIL.
- (2) When a malfunction relevant to emission occurs in the HV system or vehicle control ECU, the MIL light ON request is sent from the HV ECU to the engine ECU using CAN.
- (3) HV battery ECU, inverter and vehicle control ECU send the MIL light ON request to the engine ECU using CAN via HV ECU.

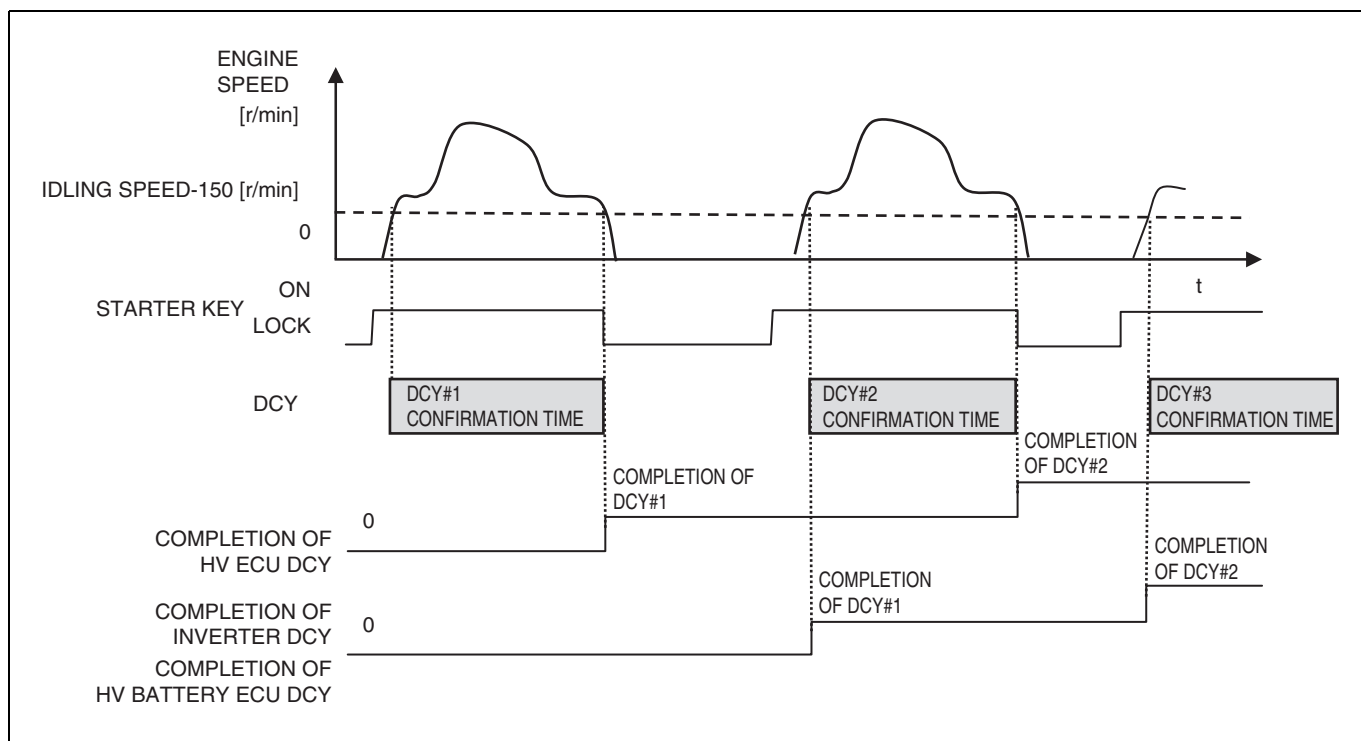


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3. DEFINITION OF MALFUNCTION

(1) Driving cycle

The driving cycle (hereinafter referred to as "DCY") is confirmed when the engine revolution becomes equal to or more than the value calculated using the following formula [idling speed minus 150 r/min] after the starter key is turned to the "ON" position. DCY is completed when the starter key is turned to the "LOCK" position.



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*** Completion of DCY is the timing to delete the Permanent diagnosis code and Pending diagnosis code.**

(2) Definition of diagnosis code

The following table shows malfunctions that are displayed on the service tool.

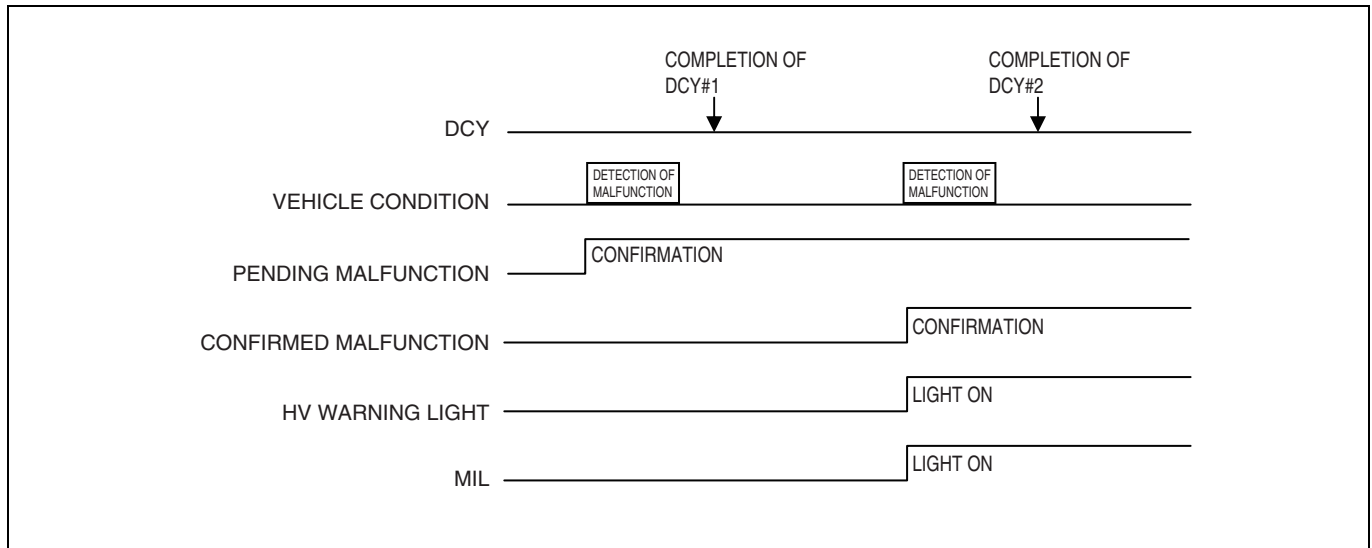
Code name	Definition of diagnosis code	HV warning light	MIL	Effect on vehicle
Pending diagnosis code	Diagnosis code that is being detected (malfunction is not confirmed).	Light OFF	Light OFF	Normal control
Confirmed diagnosis code	Diagnosis code in which the malfunction is confirmed	Light ON	Light ON *1	Failsafe control *2
Permanent diagnosis code	Stored diagnosis code	Light OFF	Light OFF	Normal control

***1 This light lights for malfunctions relevant to emission.**

***2 If a malfunction is recovered, control is switched from failsafe control to normal control; however the Confirmed diagnosis code is not deleted.**

(3) Pending diagnosis code

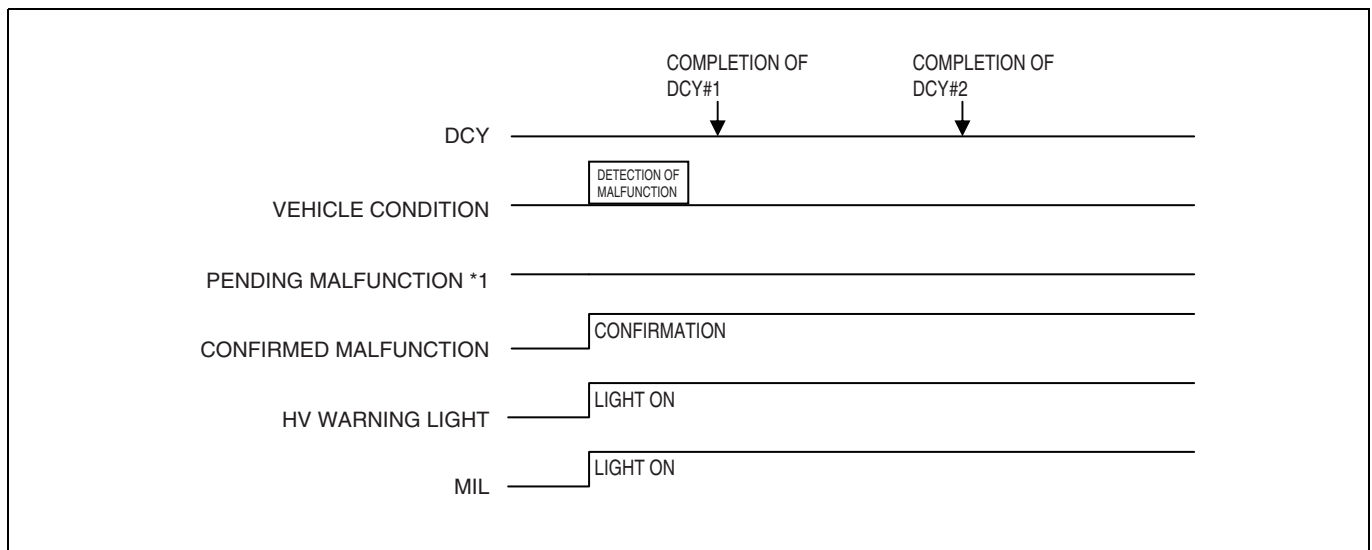
Represents the diagnosis code in which the malfunction is confirmed by detecting the malfunction in 2DCY or more. The following table shows examples in which the malfunction is confirmed in 2DCY.



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(4) Confirmed diagnosis code

Represents the diagnosis code in which the malfunction is confirmed by detecting the malfunction in 1DCY.

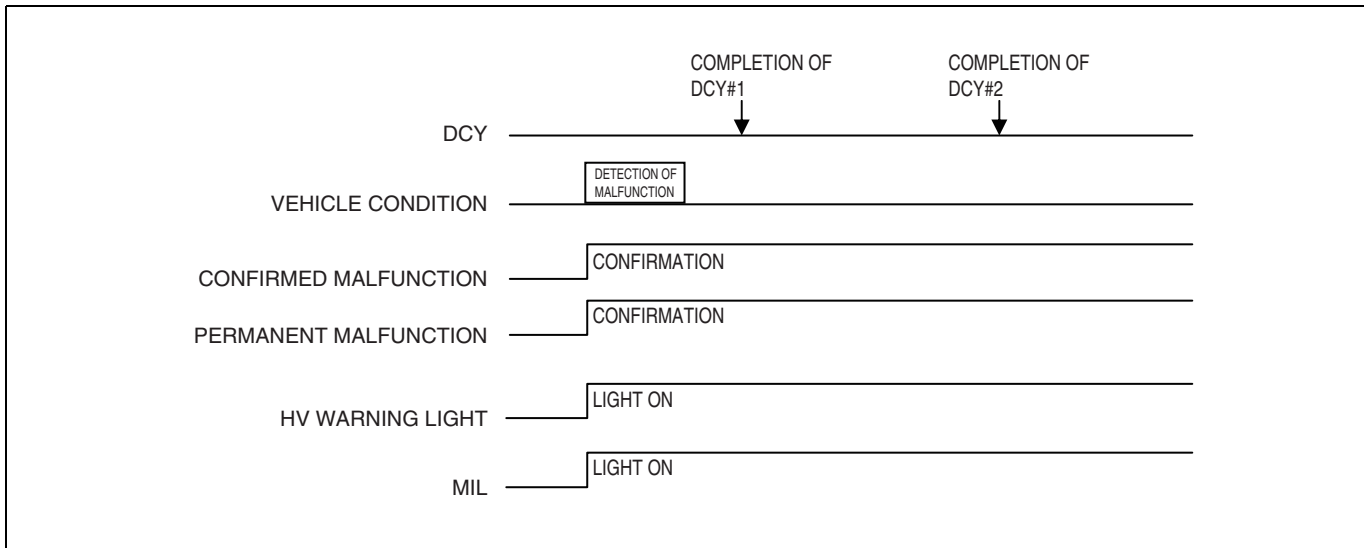


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***1 For the malfunction in which the Confirmed malfunction is confirmed in DCY, the Pending malfunction is not confirmed.**

(5) Permanent diagnosis code

Permanent malfunction is confirmed by confirming the Confirmed malfunction.



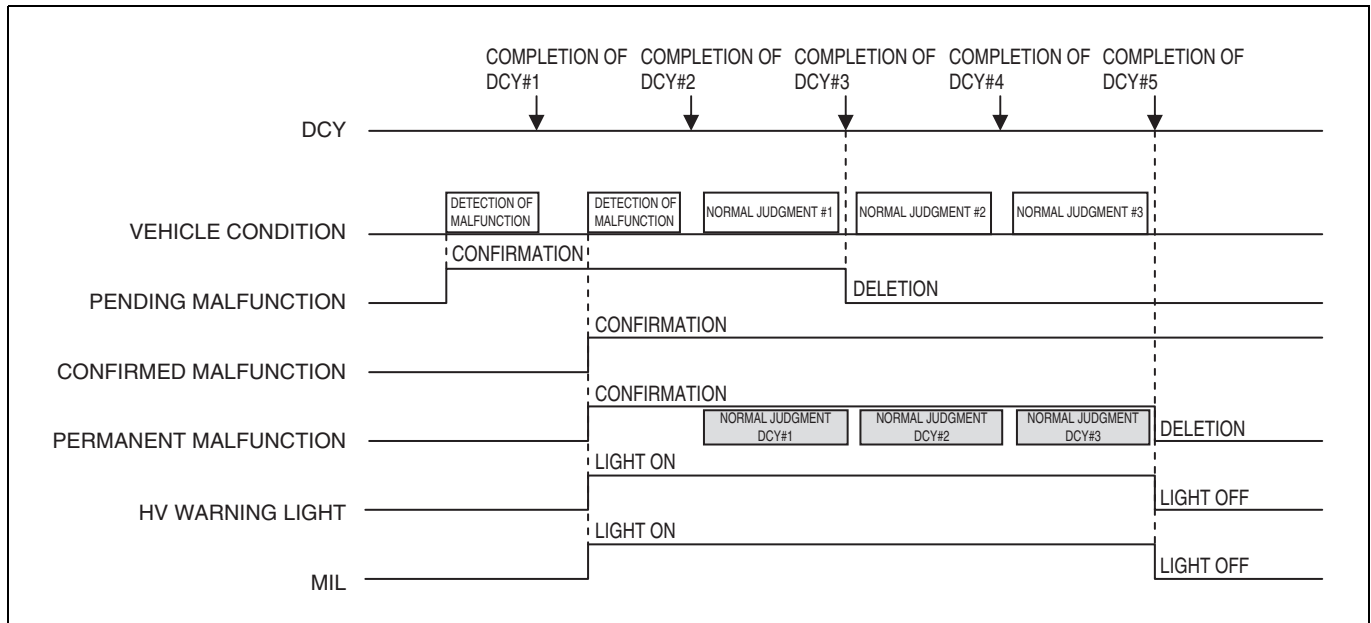
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(6) Deletion of diagnosis code

Code name	Deletion from vehicle condition	Deletion using the service tool
Pending diagnosis code	This code is deleted when condition to be judged normal is satisfied and malfunction detection condition is not satisfied in 1DCY	Instant deletion
Confirmed diagnosis code	None	Instant deletion
Permanent diagnosis code	This code is deleted when condition to be judged normal is satisfied in 3DCY. *1	This code is deleted after performing the predetermined operation when condition to be judged normal is satisfied and malfunction detection condition is not satisfied in 1DCY after deleting the diagnosis code using the service tool. *1

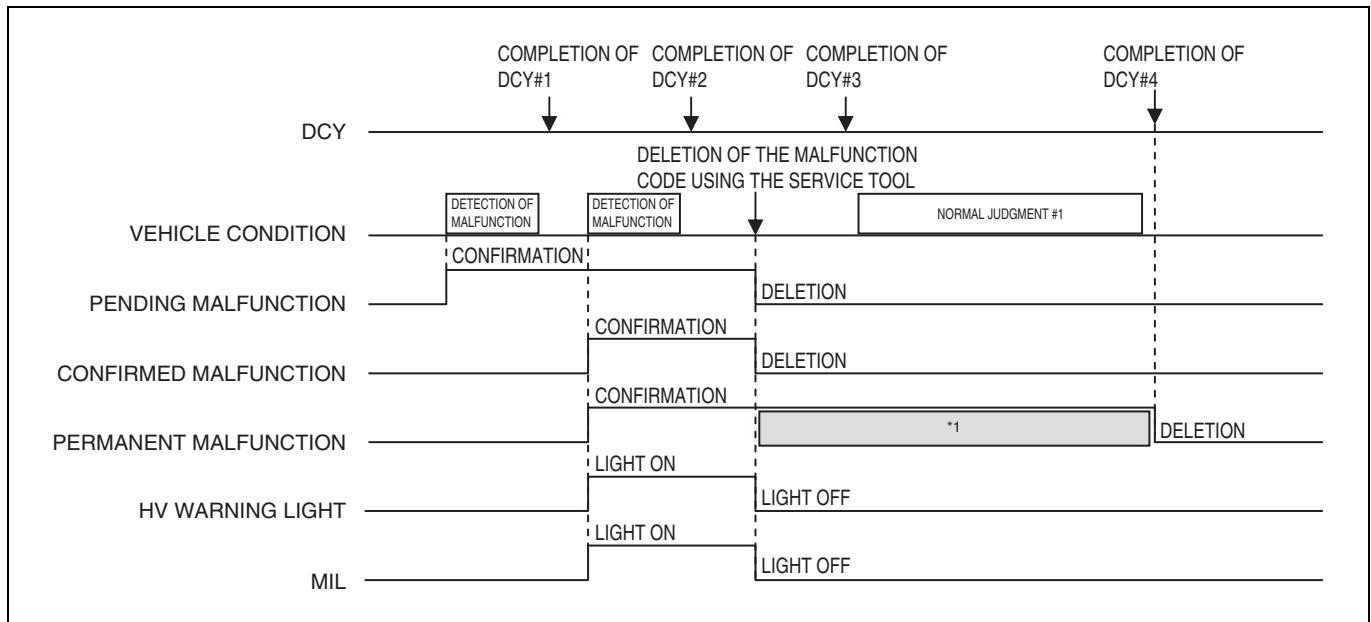
*1 Refer to the following figure and 4. Procedure for deleting the Permanent malfunction for details.

- The following figure shows deletion of the Pending diagnosis code and deletion of the Permanent diagnosis code in 3DCY.



SHTS03ZZZ0300008

- The following figure shows clearing of Pending malfunction code, Confirmed malfunction code, and Permanent malfunction code by using the service tool.



SHTS03ZZZ0300009

***1 Refer to 4. Procedure for deleting the Permanent malfunction (1).**

4. PROCEDURE FOR DELETING THE PERMANENT MALFUNCTION

There are two procedures for deleting the Permanent diagnosis code.

Confirmed diagnosis code	Permanent diagnosis code	Deletion procedure
None	Present	Deletion using the procedure (1)
Present	Present	Deletion using the procedure (1) or (2)
Present	None	—

- (1) Procedure for deleting the Permanent diagnosis code after deleting the diagnosis code using the service tool
- Turn the starter key "ON".
 - Delete the diagnosis codes using the service tool.
 - Delete diagnosis codes from the following systems.
 - ECU of the HV system in which the Permanent diagnosis code is occurring.
(Deletion of engine ECU must be performed after performing deletion in the order of HV battery ECU → Inverter → HV ECU.)
 - Engine ECU
 - Set the starter key to the "LOCK" position and wait for 30 seconds or more.
 - Turn the starter key "ON".
 - Start the engine.
 - Idle the engine for 6 minutes or more.
 - Keep the engine revolution at 1,150 r/min or more for 6 minutes or longer.
 - Set the starter key to the "LOCK" position and wait for 30 seconds or more.
 - Turn the starter key "ON".
 - Start the engine.
 - Wait for 30 seconds or more.
 - Set the starter key to the "LOCK" position.

⚠ CAUTION

- Trouble shooting the malfunction is conducted before following the above procedure, therefore the malfunction does not occur or the malfunction does not occur while following the above procedure.
- The HV warning light must turn off when the diagnosis code is deleted at (b).
When the HV warning light turns off, it is possible to check that there is no malfunction in the HV system.
- Condition to be judged normal for the malfunction occurred in the above steps (d) to (g) must be satisfied.
Condition to be judged normal varies depending on malfunction.

- (2) Procedure for deleting the Permanent diagnosis code in 3DCY

- Turn the starter key "ON".
- Start the engine.
- Idle the engine for 2 minutes or more.
- Set the starter key to the "LOCK" position.
- Wait for 30 seconds or more.
- Repeat the steps from (a) to (e) for 3 times in total (3DCY).
- Turn the starter key "ON".
- Start the engine.
- Wait for 30 seconds or more.
- Set the starter key to the "LOCK" position.

⚠ CAUTION

- The above procedure is satisfied when making normal driving operation; therefore the Permanent diagnosis code may be deleted when making similar driving operation if the malfunction is recovered.
- Trouble shooting the malfunction is conducted before following the above procedure, therefore the malfunction does not occur or the malfunction does not occur while following the above procedure.
- Condition to be judged normal for the malfunction occurred in the above steps (a) to (d) must be satisfied.
Condition to be judged normal varies depending on malfunction.

5. TROUBLE SHOOTING PROCEDURE

- (1) Trouble shooting procedure (when using genuine Hino service tool)
 - a. Check the DTC of the HV ECU using the service tool (trouble shooting tool).
 - b. Record the DTC and TC No. (detailed DTC) of freeze frame data.
 - c. Perform trouble shooting for the relevant DTC. For an inverter/HV battery line malfunction, read the DTC of each ECU for trouble shooting according to the HV ECU diagnostic chart.
 - d. After trouble shooting, delete the DTC of each ECU using the service tool and conduct a trial running to check that the malfunction does not recur.

CAUTION

- When inspecting the high voltage line, wear insulating gloves because of a risk of electrical shock. Before performing inspection, be sure to remove the service plug after the starter key is turned to the "LOCK" position. When inspecting the HV battery, wear safety glasses. Do not touch the terminals of the high voltage line for 7 minutes after removing the service plug.
- One diagnosis code (DTC) may contain more than 1 malfunction. Read TC No. (detailed DTC) of freeze frame data with the trouble shooting tool and perform trouble shooting according to the relevant trouble shooting chart.
- When inspecting the harness, first check the connector for fitting looseness, and the fitting surface for entry of foreign matters.
- There may be irregular contact or temporary noise due to partial fitting of the connector if parts are returned to normal without repairing or replacing parts using the diagnostic chart.
- The service tool or trouble shooting tool described in the trouble shooting chart indicates the genuine Hino service tool.
- If the starter key is turned "ON" in the state that connectors, etc. are disconnected while performing the trouble shooting chart, the malfunction may be recorded due to disconnection of a connector. In such case, be sure to delete the diagnosis code using the trouble shooting tool.

HINT

If there is no malfunction and the engine does not stop with the idling stop function, the following cases are conceivable.

- A vehicle is not running at vehicle speed of 5 km/h or more from the last idling stop.
- The change lever is located at a position other than "D" and "4".
- When the turn signal light and the hazard light are ON. (Even if the turn signal light switch signal and the hazard light switch signal transmitted to the HV ECU are Low, the engine does not stop automatically by use of the idling stop function.)
- When a vehicle stopped on a sloped road.
- While PTO is operating.
- While DPR is operating.
- Capacity of the HV battery is low.
- Engine coolant temperature is low.
- The engine is still running. (The engine is running at approximately 1 km/h or more.)
- When the status of the idling stop cancel switch is "ON".
- Brake vacuum pressure is low. (Even if the low brake vacuum pressure switch signal transmitted to the HV ECU becomes Low, the engine does not stop automatically by use of the idling stop function.)

SAFETY MEASURES FOR HIGH-VOLTAGE WORK

EN01H03ZZZ030602002002

1. CAUTIONS ON INSPECTION OF HYBRID CONTROL SYSTEM

- (1) To inspect the high-voltage system or disconnect the low-voltage connector in the PCU box, be sure to take actions to prevent electric shocks, i.e. wearing insulated gloves and disconnection of service plug. Removed service plug should be put in a pocket so as to prevent other engineers from using it by mistake during work.

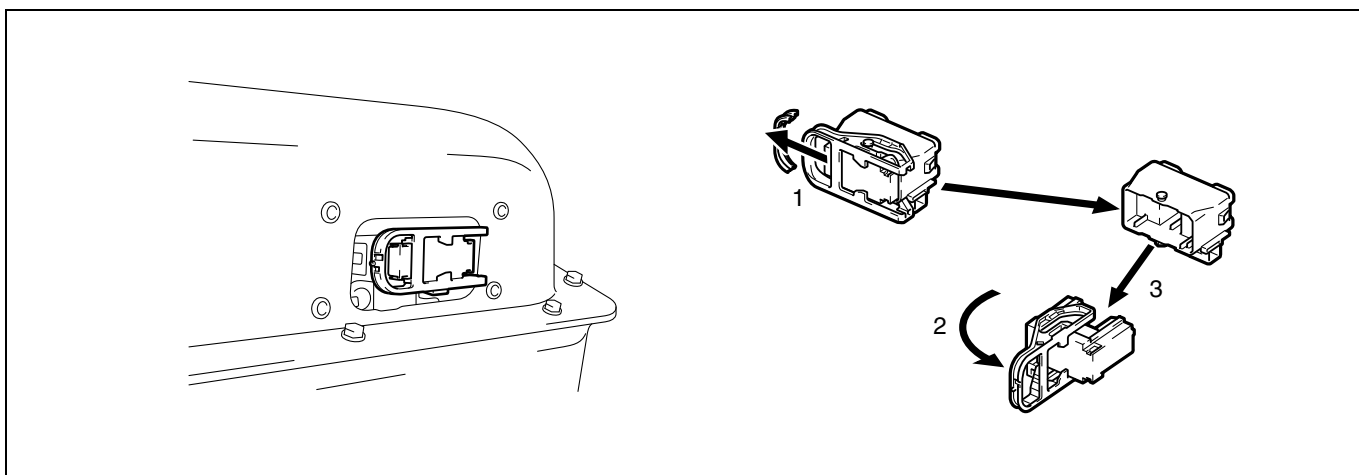
WARNING

Note that the SMR is turned "ON" and high-voltage circuit is activated when the starter key is turned to "ON."

CAUTION

Since any failure may occur when the starter key is turned to "ON" with the service plug removed, never turn the starter key to "ON" unless otherwise instructed in this document.

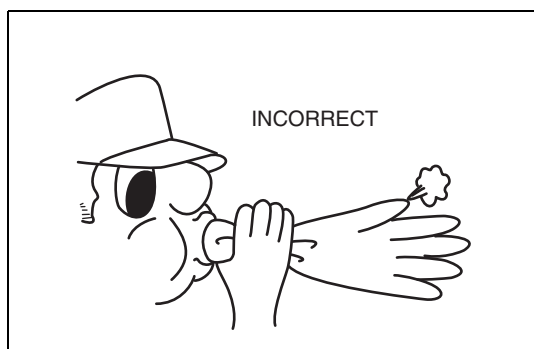
- (2) All wire harness connectors for the high-voltage circuit are orange colored. Further, "HIGH VOLTAGE" caution label is attached to high-voltage components such as the hybrid battery. Do not touch these wiring and components unnecessarily.
- (3) Turn the starter key "LOCK" and remove the service plug. Then wait for at least 7 minutes before starting the work.



SHTS03ZZZ0300010

NOTICE

In the 7 minutes the high-voltage capacitor in the inverter discharges.



SHTS03ZZZ0300011

- (4) Check the insulated gloves for damage such as cracks and break before use. Also, do not use wet insulated gloves.
- (5) Do not carry on any metal product such as a pen and scale which may fall to cause short circuit while working.
- (6) Be sure to wear insulated gloves when it is necessary to touch any high-voltage terminal without insulating coating.
- (7) After disconnecting high-voltage connectors and terminals, insulate them with insulator tape without delay.
- (8) After working on high-voltage components, check for any component or tool left, tightening condition of high-voltage terminals and connector conditions again before connecting the service plug.
- (9) Do not reserve the hybrid battery.
- (10) Do not disassemble the hybrid battery.

! CAUTION

High voltage is applied to the hybrid battery even when the service plug is disconnected. Further, high-alkaline electrolyte is used.

- (11) Make sure to use the insulated tools.
Recommended tools: FACON's Facom-quality insulated tools
- (12) Turn the starter key to "LOCK" for resistance inspection.
- (13) Turn the starter key to "LOCK" before removing/installing connectors.
- (14) Alert other workers with indication such as "High-voltage work. Don't touch" on the vehicle during works on high-voltage components.
(The next page is an example of the indication. You may copy and use it.)

In charge

**DON'T TOUCH!
HIGH VOLTAGE.**

**HIGH VOLTAGE.
DON'T TOUCH!**

In charge

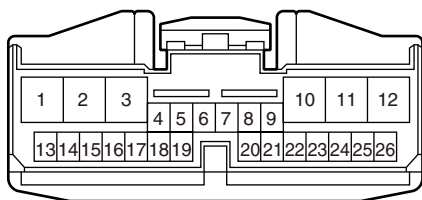
Make a copy and fold it to post in a prominent place
in the vehicle during work.

LIST OF CONNECTOR SYMBOLS

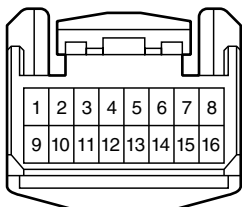
EN01H03ZZZ030602002003

A BATTERY ECU (CAN)

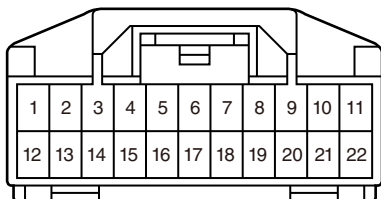
WHITE

**B BATTERY ECU (TEMPERATURE MONITORING)**

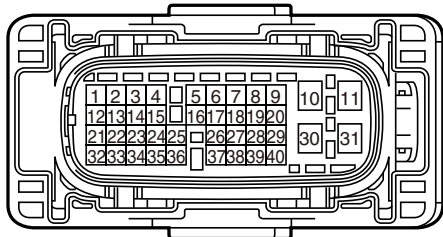
WHITE

**C BATTERY ECU (VOLTAGE MONITORING)**

ORANGE

**D INVERTER**

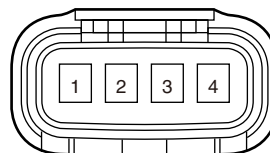
BLACK

**E INVERTER COOLING RADIATOR FAN**

BLACK

**F INVERTER COOLING WATER PUMP**

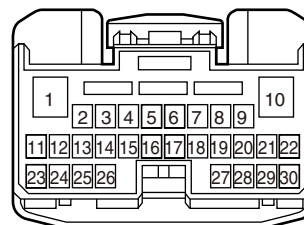
BLACK

**G J/C DIAG CAN**

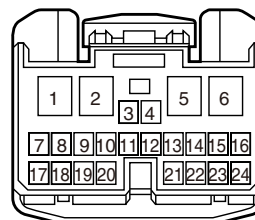
DARK GRAY

**H HV ECU1**

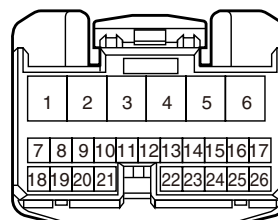
WHITE

**I HV ECU2**

WHITE

**J HV ECU3**

WHITE



SHTS03ZZZ0300013

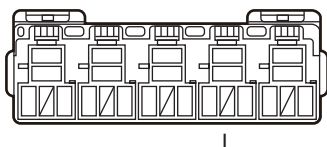
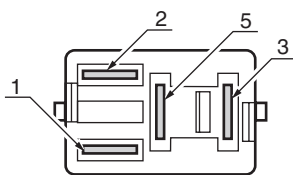
K COOLANT TEMPERATURE SENSOR

GRAY

**L INVERTER START RELAY**

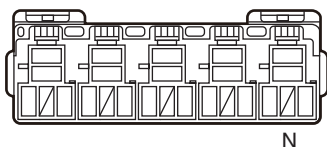
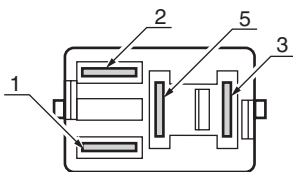
(COMPONENT SIDE)

(RELAY BLOCK SIDE)

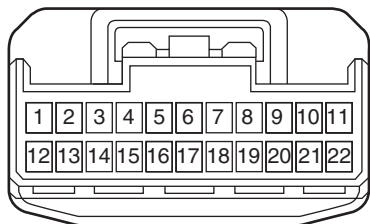
**N HV BATTERY START RELAY**

(COMPONENT SIDE)

(RELAY BLOCK SIDE)

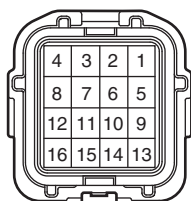
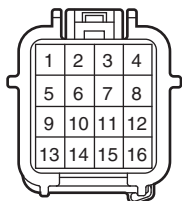
**O J/C CTRL CAN**

WHITE

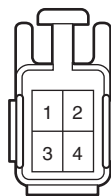
**P PCU HARNESS 16-PIN**

BLACK

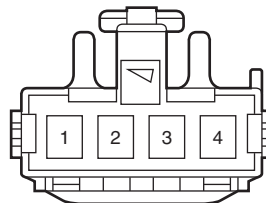
BLACK

**R HV BATTERY COOLING FAN**

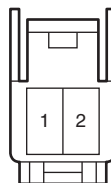
BLACK

**S SMR DRIVE**

WHITE

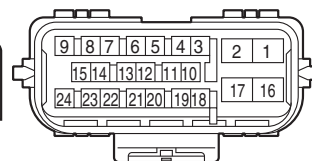
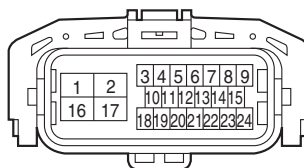
**T SERVICE PLUG SWITCH**

WHITE

**X PCU HARNESS 24-PIN**

BLACK

BLACK

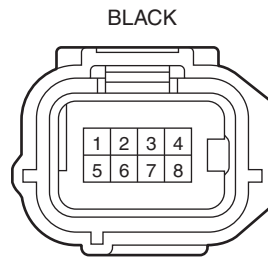
**Y PCU HARNESS 12-PIN**

BLACK

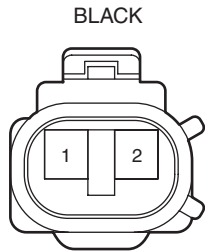
BLACK



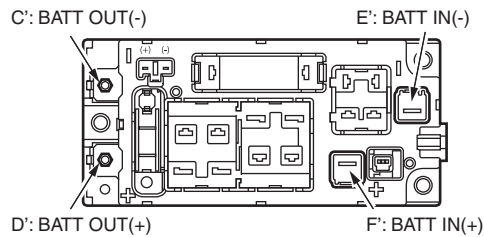
A' RESOLVER



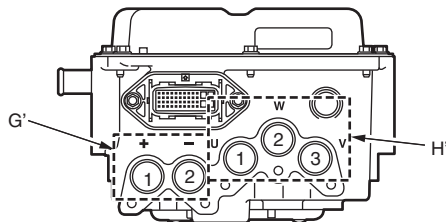
B' ROTATION MACHINE TEMPERATURE SENSOR



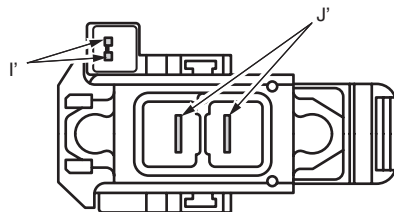
C' D' E' F' HIGH VOLTAGE J/B (IN BATTERY PACK)



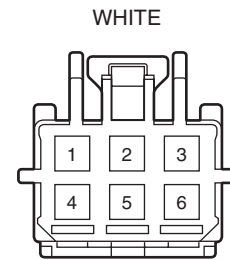
G' H' INVERTER HIGH VOLTAGE



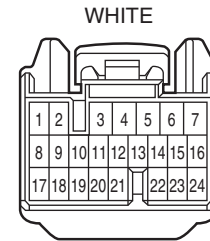
I' J' SERVICE PLUG



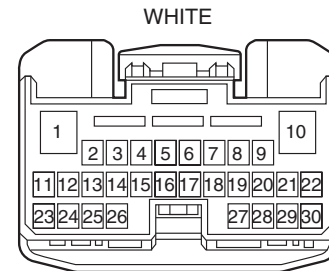
a STARTER SWITCH



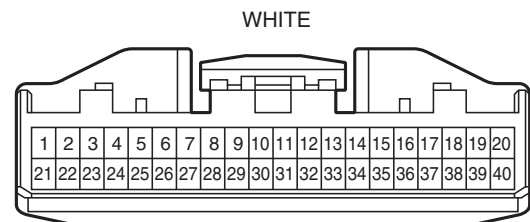
b AT ECU



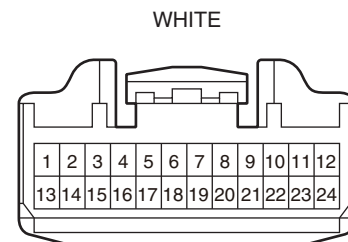
c VEHICLE CONTROL ECU



d-1 METER 1

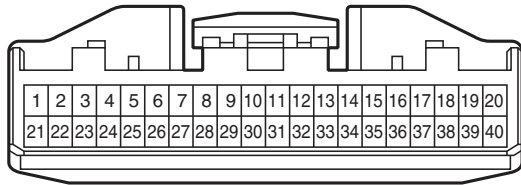


d-2 METER 2

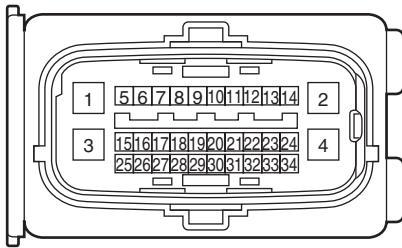


e CLUTCH ECU

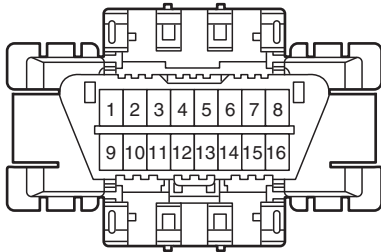
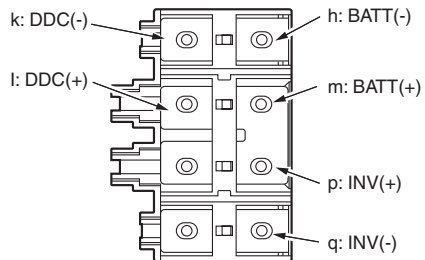
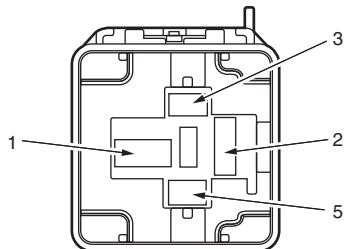
BLACK

**f ABS ECU**

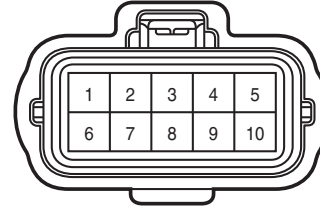
BLACK

**h DLC3**

BLACK

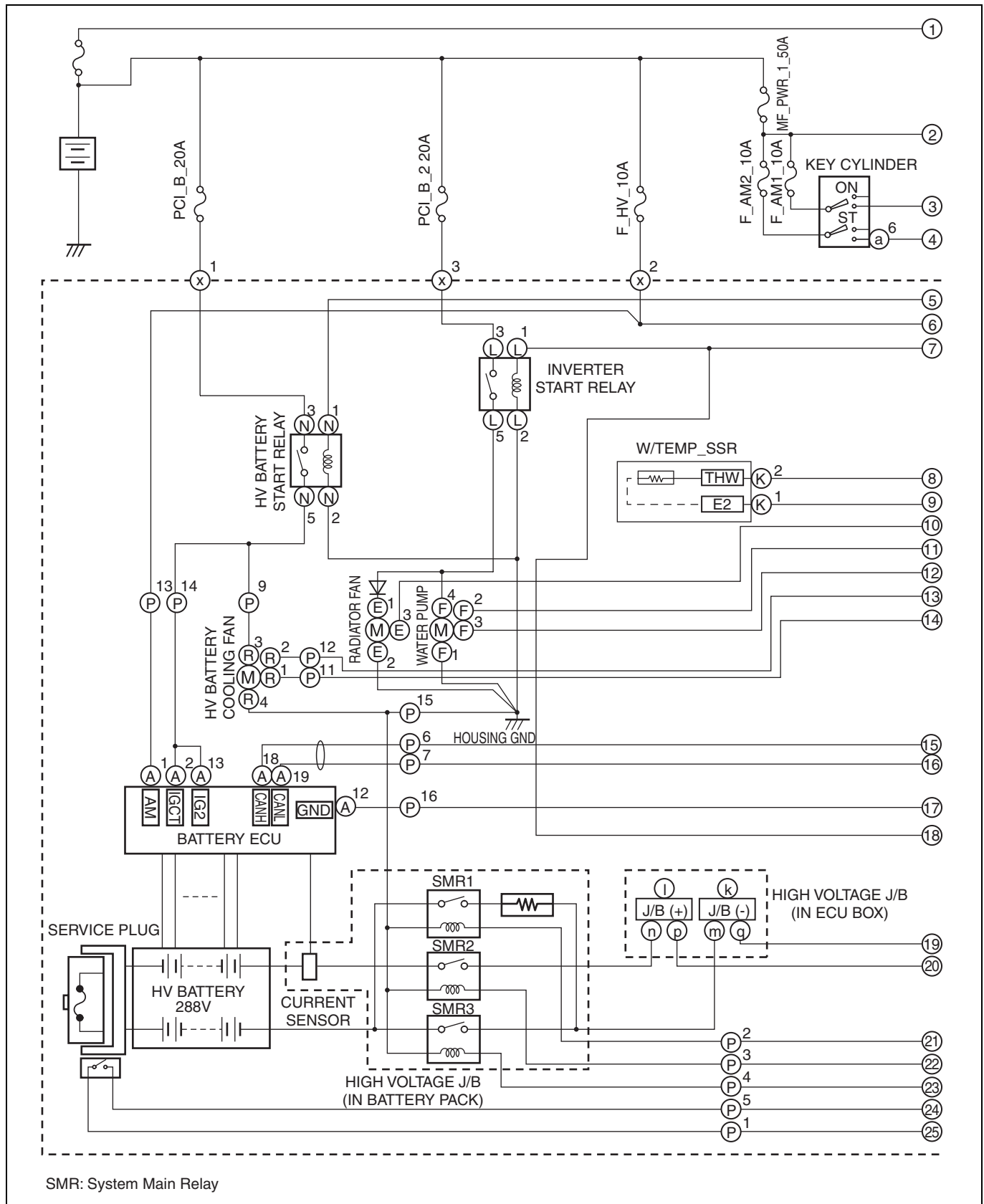
**k, l, m, n, p, q HIGH VOLTAGE J/B (IN ECU-BOX)****r IG1-1 RELAY****t NEUTRAL SWITCH**

BLACK

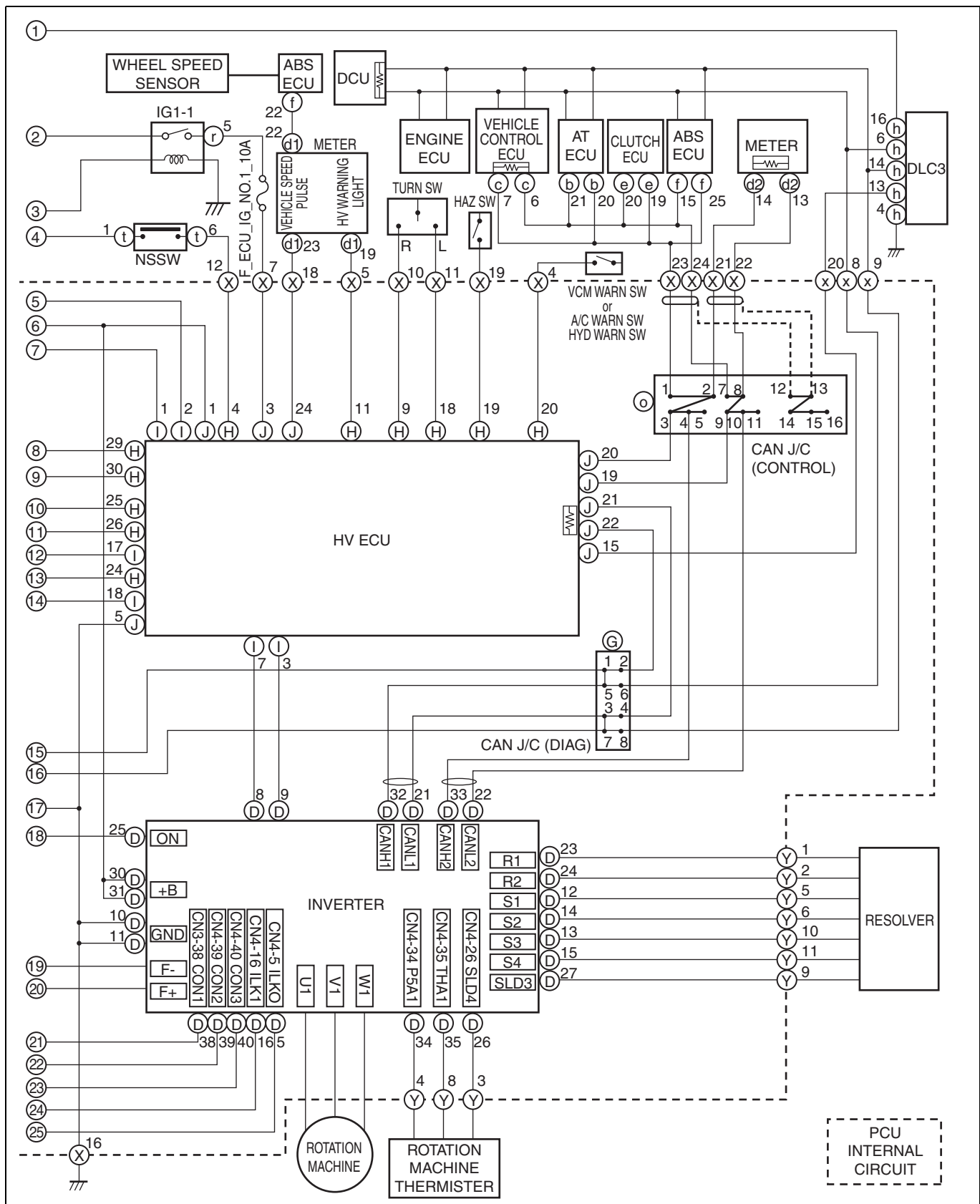


HV SYSTEM WIRING DIAGRAM

EN01H03ZZZ030602002004



SHTS03ZZZ0300017



SHTS03ZZZ0300018

NOTICE

For connector symbols, refer to "List of connector symbols."

Reference: HYBRID, TROUBLE SHOOTING, HYBRID CONTROL SYSTEM, LIST OF CONNECTOR SYMBOLS (Page 3-15)

HEARING SHEET

EN01H03ZZZ030602002005

1. HEARING OF REQUESTS FROM CUSTOMER

- (1) As the steps of trouble shooting are advanced, hear requests from customer without fault by referring this hearing sheet.

Details of the vehicle	Vehicle type		Date of occurrence		Travel distance	Km	
	Frame No.		Warehousing date		Registration date		
	Unit No. or the like		(Scheduled) delivery date of the vehicle				
	Option	Cold area Others ()					
Result of interview	Details of interview (Please describe the situation prior to the occurrence and before and after the occurrence in a time-series manner as much as possible.)					Characteristic of the customer	
						Sex	☐ Male ☐ Female
						Age	Age group
						Occupation	
						Previous vehicle	
						Main place for use	☐ Urban area ☐ Suburb ☐ Mountain ☐ Others ()
						Frequency of use	Frequency / date / week month
						Others	
	Running condition	Road surface state	Vehicle state			Others	
	Vehicle speed ____ [km/h] ☐ When starting ☐ During acceleration ☐ During steady running ☐ During deceleration ☐ During braking ☐ During stoppage ☐ During parking ☐ During turning ☐ During ABS operation ☐ Others ()	☐ Flat (horizontal) road ☐ Upward ° Downward Inclination ____ ° .% Distance ____ km ☐ Dry paved road ☐ Wet paved road ☐ Rough paved road ☐ Unpaved road ☐ Snow road, compressed snow road, frozen road ☐ Uneven road, curbstone ☐ Others ()	☐ At start ☐ Immediately after the start ☐ After ____ minutes after the start ☐ After ____ minutes after the start of running ☐ At the stoppage of the system Engine status ☐ During engine stoppage ☐ During engine start ☐ During engine rotation	Shift position (display) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ R ☐ ____ → ____ at operation A/C status ☐ A/C ☐ FULL ☐ OFF ☐ Unknown	Lighting of warning light ☐ Yes ☐ No ☐ Charge ☐ Engine ☐ Others ()	Weather: ____ Air temperature: ____ °C Amount of remaining fuel (fuel gauge) Remaining amount ____ Brake operation ☐ Gradual braking ☐ Sudden braking ☐ Operation by left foot Frequency of occurrence ☐ Always ☐ Sometimes ☐ Only one time	
Confirmation result of warning lamp			Confirmation result of diagnosis code				
☐ Yes ☐ No ☐ Engine ☐ Charge ☐ Brake ☐ ABS ☐ Brake ☐ HV ☐ Others ()			Engine				
			HV				

SHTS03ZZZ0300019

HYBRID ECU

DIAGNOSIS CODE TABLE

EN01H03ZZZ030602003001

Symbol	Lighting pattern
☆	Light is turned on when any fault occurs, and off when the fault is resolved

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P0500	Abnormality in vehicle speed sensor	51	No vehicle speed signal input	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P0501	Abnormality in characteristics of vehicle speed sensor	5B	Abnormality in characteristics of the vehicle speed sensor	Idling stop is not working.	1	☆	☆
P0562	Abnormality in power supply voltage	71	Control power supply voltage reduction	HV system stop Since the hybrid system stops, the following symptom occur. - The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. - Idling stop is not working. - Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P060B	Abnormality in A/D converter	B2	Abnormality in the A/D converter	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P0617	Malfunction of starter switch	59	Sticking the starter signal circuit to High	Idling stop is not working.	1	☆	☆
P062F	Abnormality in EEPROM	B3	EEPROM abnormality	Recording a diagnosis code may not be available.	1	☆	☆
P0810	Abnormality in clutch system (idling stop inhibited)	9C	Abnormality in the clutch ECU (idling stop is prohibited.)	Idling stop may not work.	1	☆	

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P0810	Abnormality in clutch system (idling stop available)	9D	Abnormality in the clutch ECU (idling stop is available.)	Idling stop may not work.	1	☆	
P0A01	Abnormality in characteristics of inverter coolant temperature sensor	7B	Abnormality in characteristics of the inverter coolant temperature sensor	Behavior of vehicle does not vary.	2	☆	☆
P0A02	Coolant temperature sensor Low abnormality	78	GND short circuit of the inverter coolant temperature sensor circuit	Behavior of vehicle does not vary.	1	☆	☆
P0A03	Coolant temperature sensor High abnormality	79	Inverter coolant temperature sensor circuit disconnected or power supply (positive side) shorted	Behavior of vehicle does not vary.	1	☆	☆
P0A06	HV water pump drive signal Low abnormality	7F	Disconnection or GND short circuit of the HV water pump drive signal circuit	Behavior of vehicle does not vary.	1	☆	☆
P0A07	HV water pump drive signal High abnormality	7E	HV water pump drive signal circuit power supply (positive side) shorted	Behavior of vehicle does not vary.	1	☆	☆
P0A0F	Engine system abnormality	31	Engine misfire	The engine does not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working.	1		
P0A1D	Abnormality in HV ECU function	12	Sticking of the control CAN register	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function. CHG, AST, ECO and SOC lights may turn off.	1	☆	☆

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P0A1D	Abnormality in HV ECU function	17	Sticking of the DIAG CAN register	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function. CHG, AST, ECO and SOC lights may turn off.	1	☆	☆
P0A78	Abnormality in the inverter	21	Serious abnormality in the inverter	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop may not work. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P0A78	Abnormality in the inverter	22	Slight abnormality in the inverter	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop may not work. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P0A7E	Abnormality in high temperature of HV battery	48	Abnormally high temperature of the HV battery	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P0A82	Abnormality in function of HV battery cooling fan	67	Abnormality in the HV battery cooling FAN function	Behavior of vehicle does not vary.	2	☆	☆
P0A84	Abnormality in HV battery cooling fan drive signal Low	66	Disconnection or GND short circuit of the HV battery cooling FAN drive signal circuit	Behavior of vehicle does not vary.	1	☆	☆
P0A85	Abnormality in HV battery cooling fan drive signal High	65	HV battery cooling fan drive signal circuit power supply (positive side) shorted	Behavior of vehicle does not vary.	1	☆	☆

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P0A90	Abnormality in motor function	2A	Abnormality in the motor function	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P0A92	Abnormality in charging performance	29	Abnormality in HV battery charging power	Behavior of vehicle does not vary.	2	☆	☆
P0A93	Abnormality in inverter cooling system	7A	Abnormally high temperature of the inverter coolant	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P0AFD	Abnormality in low temperature of HV battery	6B	Abnormally low temperature of the HV battery	Idling stop is not working.	2	☆	☆
P0BCA	Abnormality in HV battery cooling fan revolving number signal High	68	HV battery cooling fan speed signal circuit power supply (positive side) shorted	Behavior of vehicle does not vary.	1	☆	☆
P0C73	Abnormality in HV water pump function	80	Abnormality in the HV water pump function	Behavior of vehicle does not vary.	2	☆	☆
P3000	Abnormality in status of HV battery ECU IG signal	42	Abnormality in the HV battery ECU IG signal status	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	41	Abnormality in the HV battery ECU memory system	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P3001	Abnormality in HV battery line	43	Abnormality in the HV battery system	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	44	Abnormality in the HV battery system	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	45	Disconnection of the HV battery high voltage fuse	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	46	Request for stopping discharge of the HV battery	- The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. - Idling stop is not working. - Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	47	Auxiliary charge request for the HV battery	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P3001	Abnormality in HV battery line	4A	Abnormal external overload in the HV battery	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	4B	Abnormality in the HV battery voltage detection circuit	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3001	Abnormality in HV battery line	4C	Stoppage of the regeneration function according to request for stopping charge	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
P3009	Abnormality in leakage	49	Electrical leakage	Behavior of vehicle does not vary.	1		
P3128	Abnormality in HV radiator fan revolution number Low	7D	HV radiator fan revolution signal Low failure	Behavior of vehicle does not vary.	2	☆	☆
P3129	Abnormality in HV radiator fan revolution number High	7C	HV radiator fan revolution signal High failure	Behavior of vehicle does not vary.	2	☆	☆
P314C	Abnormality in HV water pump revolution number signal Low	82	GND short circuit of the HV water pump revolution signal circuit	Behavior of vehicle does not vary.	1	☆	☆

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
P314D	Abnormality in HV water pump revolution number signal High	81	Disconnection of the HV water pump revolution signal circuit	Behavior of vehicle does not vary.	1	☆	☆
P324B	Abnormality in inverter start relay Low	62	GND short circuit of the inverter start relay excitation circuit	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P324C	Abnormality in inverter start relay High	61	Inverter actuate relay excitation circuit disconnected or power supply (positive side) shorted	The engine may not start running. However, the engine starts up by the starter for starter-equipped vehicles. Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P33B1	Abnormality in HV battery ECU start relay Low	64	GND short circuit of the HV battery ECU start relay excitation circuit	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
P33B2	Abnormality in HV battery ECU start relay High	63	The HV battery ECU start relay excitation circuit disconnected or power supply (positive side) shorted	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
U0073	Abnormality in CAN communication with HV ECU (control CAN)	11	Control CAN communication disabled due to bus off	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function. CHG, AST, ECO, SOC light turns off.	1	☆	☆
U0074	Abnormality in CAN communication with HV ECU (DIAG CAN)	16	DIAG CAN communication disabled due to bus off	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆

DTC No.	Diagnosis code name	TC No.	Description of malfunction	Vehicle behavior for occurrence of malfunction	Number of malfunction confirmation DCY	HV Warning Light	MIL
U0100	Engine ECU CAN communication blackout	13	Engine ECU CAN communication blackout	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
U0101	TCM ECU CAN communication blackout	18	AT ECU CAN communication blackout	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	
U0110	Inverter CAN communication blackout	14	Inverter CAN communication blackout	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
U0111	HV battery ECU CAN communication blackout	15	HV battery ECU CAN communication blackout	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	☆
U0121	ABS ECU CAN communication blackout	24	ABS ECU CAN communication blackout	Idling stop is not working.	1	☆	
U0155	Meter ECU CAN communication blackout	25	Meter ECU CAN communication blackout	Idling stop is not working.	1	☆	
U110A	Vehicle control ECU CAN communication blackout	26	Vehicle control ECU CAN communication blackout	Idling stop is not working.	1	☆	
U1136	Clutch ECU CAN communication blackout	27	Clutch ECU CAN communication blackout	Idling stop is not working. Lowering the speed during deceleration may decrease to deactivate the regeneration function.	1	☆	

FREEZE FRAME DATA LIST

EN01H03ZZZ030602003002

Item	Description	Display range	Unit
TC No.	Detailed code of DTC No.	00 - \$FF	—
Stop light switch (CAN reception)	Represents brake pedal communication input status. Pedal ON = 1 / Pedal OFF = 0	0 - 1	—
DPR regenerating signal (CAN reception)	Received from the engine during DPR regenerating. ON = 1 / OFF = 0	0 - 1	—
Idling stop authorized state (CAN reception)	Received from the engine when enabling idling stop (ON = 1 / OFF = 0).	0 - 1	—
Idling stop request signal	Sent to the engine for auto stop of idling stop. ON = 1 / OFF = 0	0 - 1	—
Driver request torque rate	Ratio of torque based on accelerator pedal opening to standard engine torque	-128 - 127	%
Engine torque rate	Ratio of torque based on fuel injection quantity to standard engine torque	-128 - 127	%
Standard engine torque	Engine torque to be a standard	0 - 1,000	Nm
Accelerator pedal opening (CAN reception)	Represents the accelerator pedal opening.	0 - 100	%
Engine revolution (CAN reception)	Represents the engine revolution.	0 - 4,000	r/min
Engine control request mode	Represents the operation request to the engine. 0 = No request, 1 = Rotational request, 2 = Rotational restriction, 3 = Torque limiting, Torque instruction = 4	0 - 4	—
Required engine torque limiting value	Ratio of limiting request torque to the engine to standard engine torque	-128 - 127	%
Specified value of motor torque	Represents a torque command value to the inverter.	-32,768 - 32,767	Nm
Effective motor torque value	Torque calculated from actual current id, iq	-32,768 - 32,767	Nm
Actual motor torque value	Represents the motor output torque.	-32,768 - 32,767	Nm
Vehicle speed	Represents a vehicle speed.	0 - 200	km/h
Motor revolution	Represents the motor revolution.	-32,768 - 32,767	r/min
HV battery voltage	Represents the HV battery DC voltage.	0 - 600	V
HV battery current	Represents HV battery DC current.	-500 - 500	A
Power supply voltage	Represents the HV ECU power supply voltage.	0 - 40	V
HV battery capacity (SOC)	Represents the HV battery capacity (SOC).	0 - 100	%
Maximum temperature of HV battery	Represents the maximum temperature of the HV battery.	-128 - 127	°C
Minimum temperature of HV battery	Represents the minimum temperature the HV battery.	-128 - 127	°C
HV battery discharge limit value	Represents the HV battery discharge limit value.	0 - 200	kW

Item	Description	Display range	Unit
HV battery charge limit value	Represents the HV battery charge limit value.	0 - 200	kW
Gear position (CAN reception)	Represents the judged value of gear position. Neutral = 0 / 1st gear = 1 / 2nd gear = 2 / 3rd gear = 3 / 4th gear = 4 / 5th gear = 5 / 6th gear = 6 / R = 10	0 - 10	—
HV warning light	Represents the HV warning light output status. ON = 1 / OFF = 0	0 - 1	—
Inverter start relay	Represents the inverter start relay output status. ON = 1 / OFF = 0	0 - 1	—
HV battery ECU start relay	Represents the HV battery ECU start relay output status. ON = 1 / OFF = 0	0 - 1	—
Engine intake air temperature	Represents the engine intake air temperature.	-40 - 210	°C
Starter signal	Represents the starter signal input status. ON = 1 / OFF = 0	0 - 1	—
Idling stop cancel switch (CAN reception)	Represents the idling stop cancel switch signal input status. Idling stop cancel status ON = ON. ON = 1 / OFF = 0	0 - 1	—
ABS activation signal (CAN reception)	Represents the ABS activation signal input status. ON = 1 / OFF = 0	0 - 1	—
Exhaust brake switch (CAN reception)	Represents the retarder lever signal input status. ON = 1 / OFF = 0	0 - 1	—
HV control mode information	Represents the operating condition of the HV system. 0 = OFF 1 = Engine startup 2 = At acceleration by motor 3 = Deceleration by motor + retarder 4 = Deceleration by motor or foot brake 5 = Battery charging 6 = Engine stop 7 = Forced battery charging 8 = At manufacturing inspection 9 = At EV 10 = At gear shifting	0 - 15	—
Engine loss torque rate	Represents the engine loss torque rate.	-128 - 127	%
Required engine revolution value	Required revolution to engine	0 - 4,000	r/min
Instruction of motor revolution	Instructed revolution to motor	-32,768 - 32,767	r/min
Motor temperature	Motor temperature	0 - 200	°C
Inverter internal temperature	Inverter internal temperature	0 - 200	°C
Starter key	Starter key status ON = 1 / OFF = 0	0 - 1	—
System main relay 3 (SMR3) state	Represents the system main relay 3 (SMR3) output state. ON = 1 / OFF = 0	0 - 1	—
Clutch operation permission signal	Represents the clutch operation permission state sent from the clutch ECU. Prohibit = 0 / Enable = 1	0 - 1	—
HV battery leakage crest value	HV battery leakage crest value	0 - 4.995	V

Item	Description	Display range	Unit
Select lever position (CAN reception)	Select lever position AT-P = 0 / AT-RL = 1 / AT-N = 2 / AT-D = 3 / AT-4 range = 4 / AT-3 range = 5 / AT-Others = 6	0 - 255	—
Clutch state (CAN reception)	Clutch state Engaged = 0 / partial clutch = 1 / disengaged = 2 / unknown = 3	0 - 3	—
Shift transmission condition (CAN reception)	Shift transmission condition OFF = 0 / UP = 1 / DOWN = 2 / Changing gear = 3 HINT The indication of "UP" means "Charging gear".	0 - 3	—
Vehicle driving mode	Vehicle driving mode Normal = 0, ECO = 1, PWR = 2	0 - 2	—
System required torque	System required torque	-32,768 - 32,767	Nm
Turn signal light actuation signal	Turn signal light actuation signal OFF = 0, Right turn = 1, Left turn = 2, Hazard = 3	0 - 3	—
Clutch oil temperature	Clutch oil temperature	-40 - 215	°C
HV system coolant temperature	HV system coolant temperature	-128 - 127	°C
HV battery cooling FAN drive request Duty	HV battery cooling FAN drive request Duty	0 - 100	%
HV battery cooling FAN drive request revolution	HV battery cooling FAN drive request revolution	0 - 10,000	r/min
HV battery cooling FAN revolution	HV battery cooling FAN revolution HINT Even if the HV battery cooling FAN drive request revolution is 0 r/min, 0-100 r/min appears.	0 - 10,000	r/min
HV battery cooling FAN revolution voltage	HV battery cooling FAN revolution voltage	0 - 5	V
HV radiator fan revolution	HV radiator fan revolution	0 - 10,000	r/min
HV water pump drive request Duty	HV water pump drive request Duty	0 - 100	%
HV water pump drive request revolution	HV water pump drive request revolution	0 - 10,000	r/min
HV water pump revolution	HV water pump revolution HINT Even if the HV water pump drive request revolution is 0 r/min, approximately 0-480 r/min appears.	0 - 10,000	r/min
HV system coolant temperature sensor voltage	HV system coolant temperature sensor voltage	0 - 5	V

LIST OF DATA MONITOR ITEMS

EN01H03ZZ030602003003

Item	Description	Display range	Unit
Number of diagnosis codes	Number of recorded diagnosis codes	0 - 255	Codes
Stop light switch (CAN reception)	Represents the brake pedal communication input status. Pedal ON = 1 / Pedal OFF = 0	0 - 1	—
DPR regenerating signal (CAN reception)	Received from the engine during DPR regenerating. ON = 1 / OFF = 0	0 - 1	—
Idling stop authorized state (CAN reception)	Received from the engine when enabling idling stop (ON = 1 / OFF = 0).	0 - 1	—
Idling stop request signal	Sent to the engine for auto stop of idling stop. ON = 1 / OFF = 0	0 - 1	—
Accelerator pedal opening (CAN reception)	Represents the accelerator pedal opening.	0 - 100	%
Engine revolution (CAN reception)	Represents the engine revolution.	0 - 4,000	r/min
Vehicle speed	Represents a vehicle speed.	0 - 200	km/h
Motor revolution	Represents the motor revolution.	-32,768 - 32,767	r/min
HV battery voltage	Represents the HV battery DC voltage.	0 - 600	V
HV battery current	Represents the HV battery DC current.	-500 - 500	A
Power supply voltage	Represents the HV ECU power supply voltage.	0 - 40	V
HV battery capacity (SOC)	Represents the HV battery capacity (SOC).	0 - 100	%
Maximum temperature of the HV battery	Represents the maximum temperature of the HV battery.	-128 - 127	°C
Minimum temperature of the HV battery	Represents the minimum temperature the HV battery.	-128 - 127	°C
HV battery discharge limit value	Represents the HV battery discharge limit value.	0 - 200	kW
HV battery charge limit value	Represents the HV battery charge limit value.	0 - 200	kW
Gear position (CAN reception)	Represents the judged value of gear position. Neutral = 0 / 1st gear = 1 / 2nd gear = 2 / 3rd gear = 3 / 4th gear = 4 / 5th gear = 5 / 6th gear = 6 / R = 10	0 - 10	—
HV warning light	Represents the HV warning light output status. ON = 1 / OFF = 0	0 - 1	—
Inverter start relay	Represents the inverter start relay output status. ON = 1 / OFF = 0	0 - 1	—
HV battery ECU start relay	Represents the HV battery ECU start relay output status. ON = 1 / OFF = 0	0 - 1	—
Engine intake air temperature	Represents the engine intake air temperature.	-40 - 210	°C
Starter signal	Represents starter signal input status. ON = 1 / OFF = 0	0 - 1	—

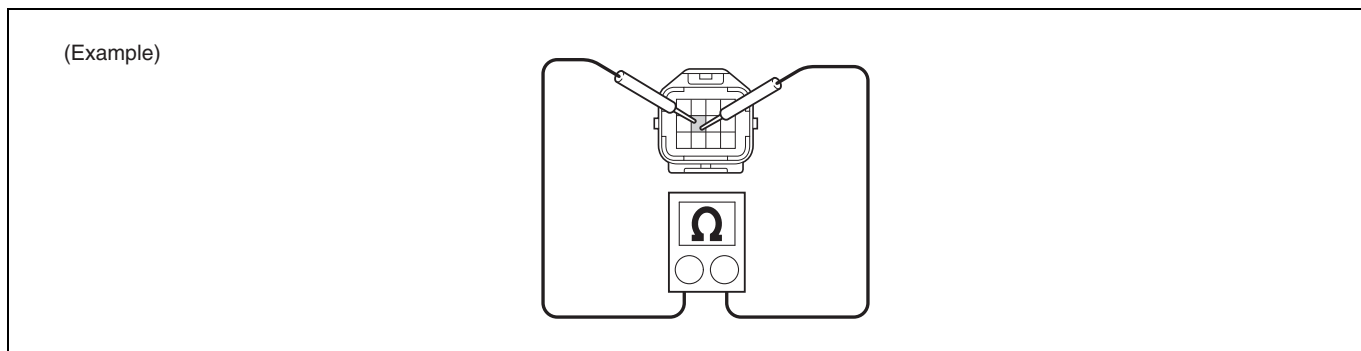
Item	Description	Display range	Unit
Idling stop cancel switch (CAN reception)	Represents the idling stop cancel switch signal input status. Idling stop cancel status ON = ON. ON = 1 / OFF = 0	0 - 1	—
ABS activation signal (CAN reception)	Represents the ABS activation signal input status. ON = 1 / OFF = 0	0 - 1	—
Exhaust brake switch (CAN reception)	Represents the retarder lever signal input status. ON = 1 / OFF = 0	0 - 1	—
Motor temperature	Motor temperature	0 - 200	°C
Inverter internal temperature	Inverter internal temperature	0 - 200	°C
Starter key	Starter key status ON = 1 / OFF = 0	0 - 1	—
System main relay 3 (SMR3) state	Represents the system main relay 3 (SMR3) output state. ON = 1 / OFF = 0	0 - 1	—
Clutch operation permission signal	Represents the clutch operation permission state sent from the clutch ECU. Prohibit = 0 / Enable = 1	0 - 1	—
HV battery leakage crest value	HV battery leakage crest value	0 - 4.995	V
Select lever position (CAN reception)	Select lever position AT-P = 0 / AT-RL = 1 / AT-N = 2 / AT-D = 3 / AT-4 range = 4 / AT-3 range = 5 / AT-Others = 6	0 - 255	—
Clutch state (CAN reception)	Clutch state Engaged = 0 / partial clutch = 1 / disengaged = 2 / unknown = 3	0 - 3	—
Shift transmission condition (CAN reception)	Shift transmission condition OFF = 0 / UP = 1 / DOWN = 2 / Changing gear = 3 HINT The indication of "UP" means "Charging gear".	0 - 3	—
Vehicle driving mode	Vehicle driving mode Normal = 0, ECO = 1, PWR = 2	0 - 2	—
System required torque	System required torque	-32,768 - 32,767	Nm
Turn signal light actuation signal	Turn signal light actuation signal OFF = 0, Right turn = 1, Left turn = 2, Hazard = 3	0 - 3	—
Clutch oil temperature	Clutch oil temperature	-40 - 215	°C
HV system coolant temperature	HV system coolant temperature	-128 - 127	°C
HV battery cooling FAN drive request duty	HV battery cooling FAN drive request duty	0 - 100	%
HV battery cooling FAN drive request revolution	HV battery cooling FAN drive request revolution	0 - 10,000	r/min
HV battery cooling FAN revolution	HV battery cooling FAN revolution HINT Even if the HV battery cooling FAN drive request revolution is 0 r/min, 0-100 r/min appears.	0 - 10,000	r/min
HV battery cooling FAN revolution voltage	HV battery cooling FAN revolution voltage	0 - 5	V

Item	Description	Display range	Unit
HV radiator fan revolution	HV radiator fan revolution	0 - 10,000	r/min
HV water pump drive request duty	HV water pump drive request duty	0 - 100	%
HV water pump drive request revolution	HV water pump drive request revolution	0 - 10,000	r/min
HV water pump revolution	HV water pump revolution HINT Even if the HV water pump drive request revolution is 0 r/min, approximately 0-480 r/min appears.	0 - 10,000	r/min
HV system coolant temperature sensor voltage	HV system coolant temperature sensor voltage	0 - 5	V

COMMON INSPECTION CHART

EN01H03ZZZ030602003004

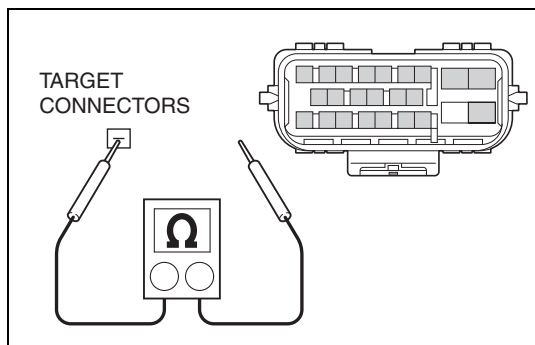
- If common inspection requirements are described in the trouble shooting chart, conduct inspection using the common inspection chart.
 1. Chart for inspection of the signal line at the PCU lower side wire harness for short circuit
 2. Chart for inspection of the signal line at the PCU upper side wire harness for short circuit
- Target connector terminals described in the common inspection chart represent terminals of connectors specified in the trouble shooting chart.
- As shown in the following figure, if measurement of resistance of the terminal is required on the common inspection chart, do not determine the terminal as "NG" and proceed to measurement of the next terminal.



SHTS03ZZZ0300020

(1) CHART FOR INSPECTION OF THE SIGNAL LINE AT THE PCU LOWER SIDE WIRE HARNESS FOR SHORT CIRCUIT

1	Inspection of the signal line to the PCU harness 24-pin connector at the PCU lower side wire harness for short circuit
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SHTS03ZZZ0300021

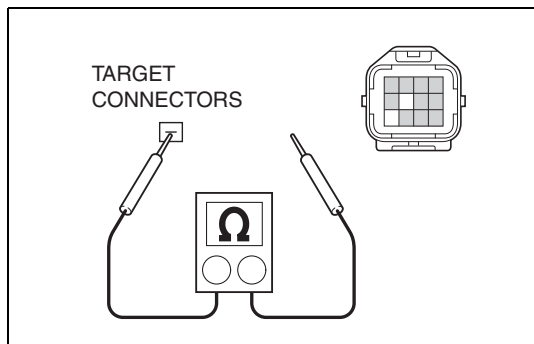
1. Set the starter key to the "LOCK" position and remove the PCU harness 24-pin connector and the PCU harness 16-pin connector.
2. Measure resistance between the connector terminal specified in the trouble shooting chart and the PCU harness 24-pin connector (PCU lower harness side).
Target connectors ↔ 1st to 24th (except 17th)

Standard value: 10 kΩ or more

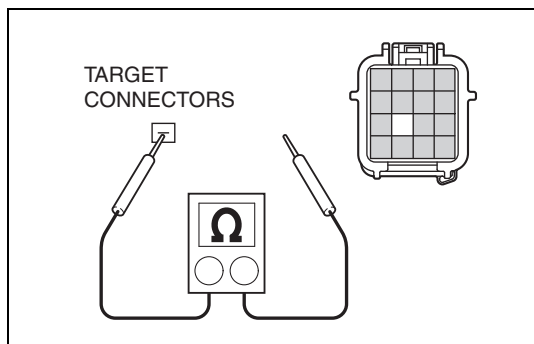
NO

Common inspection NG

YES

2 Inspection of the signal line to the PCU harness 12-pin connector at the PCU lower side wire harness for short circuit

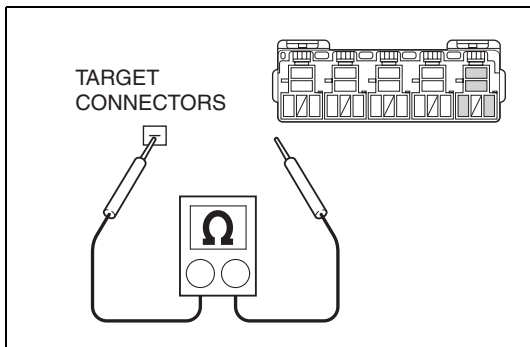
1. Set the starter key to the "LOCK" position and remove the PCU harness 12-pin connector.
2. Measure resistance between the connector terminal specified in the trouble shooting chart and the PCU harness 12-pin connector (PCU lower harness side).
Target connectors ↔ 1st to 11th (except 7th and 12th)

Standard value: 10 kΩ or more**NO****Common inspection NG****YES****3 Inspection of the signal line to the PCU harness 16-pin connector at the PCU lower side wire harness for short circuit**

1. Set the starter key to the "LOCK" position.
2. Measure resistance between the connector terminal specified in the trouble shooting chart and the PCU harness 16-pin connector (PCU lower harness side).
Target connectors ↔ 1st to 16th (except 10th)

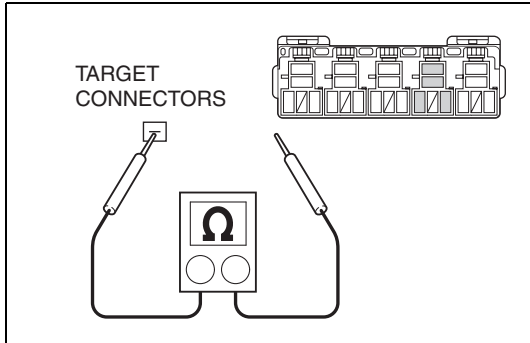
Standard value: 10 kΩ or more**NO****Common inspection NG****YES****4 Inspection of the signal line at the PCU lower side wire harness for short circuit**

1. Set the starter key to the "LOCK" position.
2. Disconnect the following connectors.
 - Inverter start relay
 - HV battery start relay
 - Inverter cooling radiator fan connector
 - Inverter cooling water pump connector
 - Coolant temperature sensor connector
 - Inverter connector



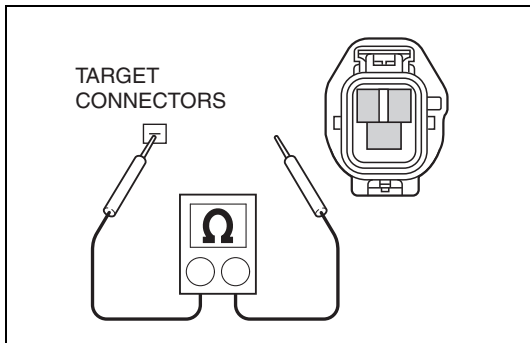
SHTS03ZZZ0300024

3. Measure resistance between the connector terminal specified in the trouble shooting chart and the HV battery start relay (relay block side).
Target connectors ↔ 1st to 5th (except 4th)



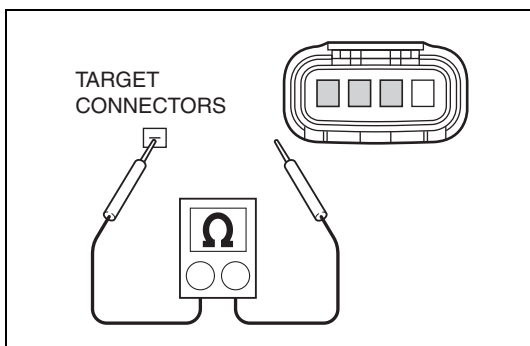
SHTS03ZZZ0300025

4. Measure resistance between the connector terminal specified in the trouble shooting chart and the inverter start relay (relay block side).
Target connectors ↔ 1st to 5th (except 4th)



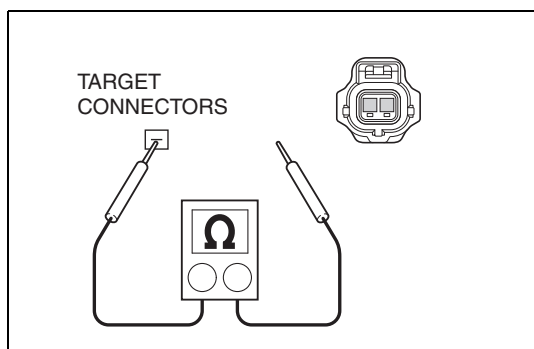
SHTS03ZZZ0300026

5. Measure resistance between the connector terminal specified in the trouble shooting chart and the inverter cooling radiator fan connector (PCU lower harness side).
Target connectors ↔ 1st to 3rd



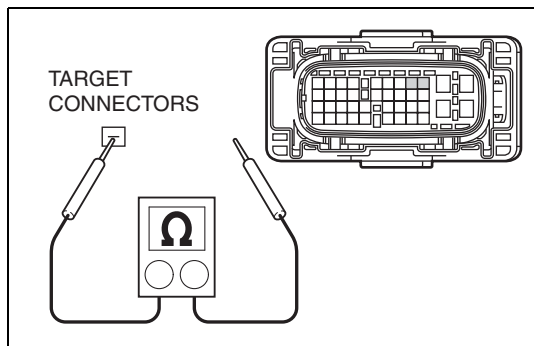
SHTS03ZZZ0300027

6. Measure resistance between the connector terminal specified in the trouble shooting chart and the inverter cooling water pump connector (PCU lower harness side).
Target connectors ↔ 1st to 3rd



SHTS03ZZZ0300028

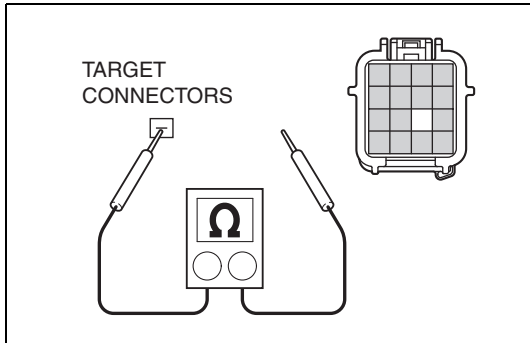
7. Measure resistance between the connector terminal specified in the trouble shooting chart and the coolant temperature sensor connector (PCU lower harness side).
Target connectors ↔ 1st and 2nd



SHTS03ZZZ0300029

8. Measure resistance between the connector terminal specified in the trouble shooting chart and the inverter connector (PCU lower harness side).
Target connectors ↔ 8th and 9th

Standard value: 10 kΩ or more**YES****NO****Common inspection NG****Common inspection OK**

(2) CHART FOR INSPECTION OF THE SIGNAL LINE AT THE PCU UPPER SIDE WIRE HARNESS FOR SHORT CIRCUIT**1****Inspection of the signal line to the PCU harness 16-pin connector at the PCU upper side wire harness for short circuit**

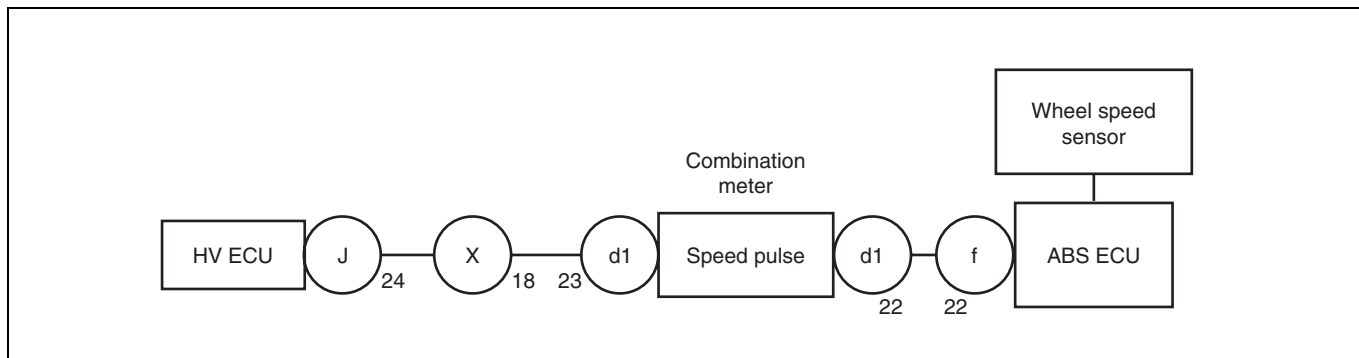
SHTS03ZZZ0300030

1. Set the starter key to the "LOCK" position.
2. Disconnect the following connectors.
 - PCU harness 16-pin connector
 - HV battery cooling fan connector
 - Battery ECU (CAN) connector
3. Measure resistance between the connector terminal specified in the trouble shooting chart and the PCU harness 16-pin connector (PCU upper harness side).
Target connectors ↔ 1st to 16th (except 10th)

Standard value: 10 kΩ or more**NO****Common inspection NG****YES****Common inspection OK**

DTC: P0500 (TC51)

EN01H03ZZZ030602003005

DTC: P0500 (TC51) Abnormality in vehicle speed sensor
INFORMATION

SHTS03ZZZ0300031

1. Technical description

- –

<Description of malfunction>

- The signal from the vehicle speed sensor cannot be detected.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The number of the motor revolution is 1000 r/min or more.
- The motor revolution sensor shows no abnormality.
- Vehicle speed information from the vehicle control ECU is 3 mph or more.
- The vehicle speed sensor of vehicle control ECU shows no abnormality.
- The accelerator opening is 5% or more.
- The accelerator sensor shows no abnormality.

(2) Judgement criteria

- The signal input of vehicle speed sensor remains 0 Hz for 10 seconds or more.

3. Reset condition

- The signal input of vehicle speed sensor remains 3 mph or more for 10 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

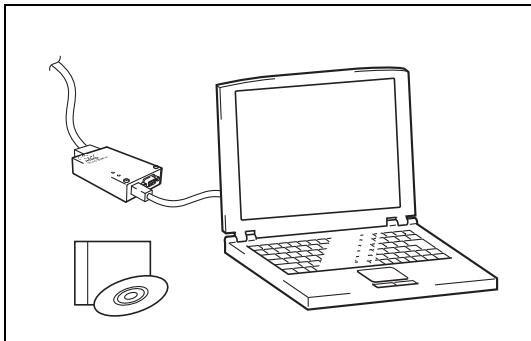
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

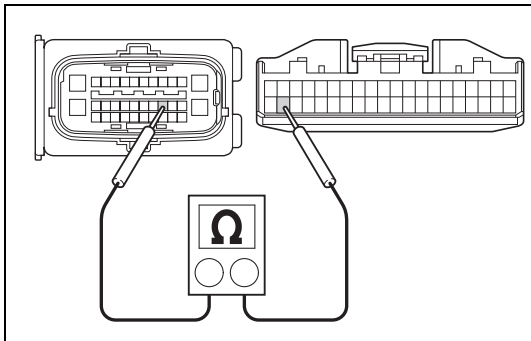
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of vehicle speed sensor
- Malfunction of HV ECU
- Malfunction of ABS ECU
- Malfunction of meter ECU

INSPECTION PROCEDURE: P0500 (TC51)**1 Inspecting the ABS ECU [HINO-DX]**

SHTS03ZZZ0300032

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Select [Brake] on the diagnosis tool screen.
5. In [Fault Information], check if any DTC related to the vehicle speed sensor system is detected.

Is any DTC detected from the ABS?**YES****Perform troubleshooting for each DTC of ABS ECU.****NO****Go to step 2.****2 Inspecting the continuity of vehicle wire harness (between ABS ECU and the combination meter)**

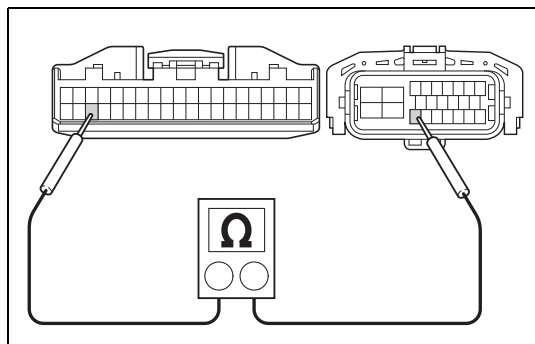
SHTS03ZZZ0300033

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of ABS ECU and combination meter (40P).
3. Using the electrical tester, measure the resistance between the ABS ECU vehicle-side connector and the terminal of combination meter (40P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	ABS ECU vehicle-side connector – Combination meter (40P) vehicle-side connector 22nd terminal – 22nd terminal	Less than 1 Ω

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Repair or replace the vehicle wire harness (between the ABS ECU and the combination meter).**

3 Inspecting the continuity of vehicle wire harness (between the combination meter and the PCU harness vehicle-side connector)



SHTS03ZZZ0300034

1. Disconnect the PCU harness (24P) connector.
2. Using the electrical tester, measure the resistance between the vehicle-side connector of combination meter (40P) and the vehicle-side connector terminal of PCU harness (24P).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Combination meter (40P) vehicle-side connector – PCU harness (24P) vehicle side-connector 23rd terminal – 18th terminal	Less than 1 Ω

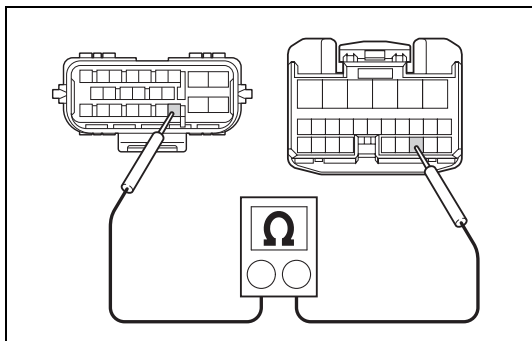
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Repair or replace the vehicle wire harness (between the combination meter and the PCU harness connector).

4 Inspecting the continuity of PCU wire harness (lower side)

1. Disconnect the HV ECU3 connector.
2. Using the electrical tester, measure the resistance between the lower-side connector of PCU harness (24P) and the HV ECU3 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector – HV ECU3 connector 18th terminal – 24th terminal	Less than 1 Ω

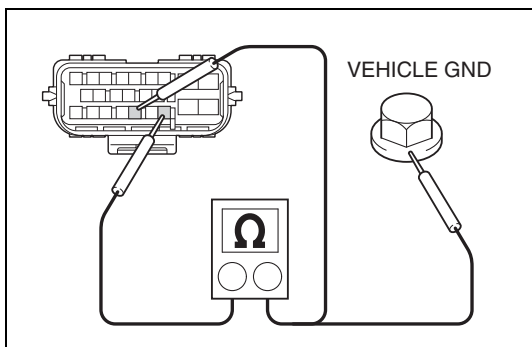
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the PCU wire harness (lower side).

5 Inspecting the PCU wire harness (lower side) for short circuit

1. Using the electrical tester, measure the resistance between the lower-side connector terminals of PCU harness (24P).
2. Using the electrical tester, measure the resistance between the lower-side connector 18th terminal of PCU harness (24P) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 18th terminal – 24th terminal 18th terminal – GND	10 kΩ or more

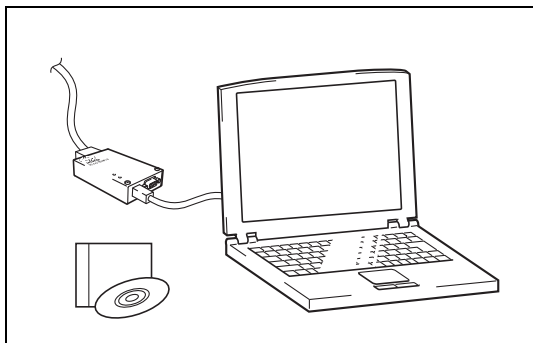
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the engine ECU [HINO-DX]

SHTS03ZZZ0300037

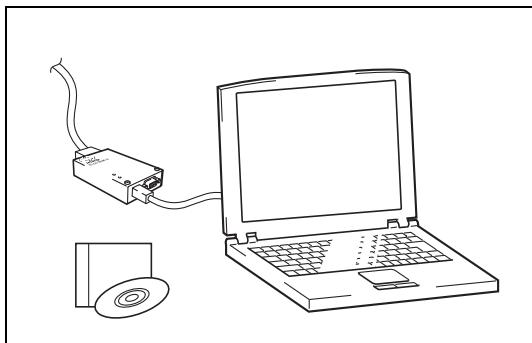
1. Connect the diagnosis tool (HINO-DX) to the vehicle.
2. Set the starter key to the "ON" position.
3. Select [Engine] on the diagnosis tool screen.
4. In [Fault Information], check if any DTC related to the vehicle speed signal system is detected.

Is any DTC detected from the engine ECU?**YES****Inspect the combination meter.****NO****Go to step 7.****7 Inspecting the PCU wire harness signal line for short circuit**

1. Set the starter key to the "LOCK" position.
2. For the 18th terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 18th terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Go to step 8.**

8 **Reproduction check [HINO-DX]**

SHTS03ZZZ0300038

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (For 1 minutes at the vehicle speed of 10 km/h or more)
6. In [Fault Information] on the diagnosis tool screen, check if P0500-51 is detected.

Is DTC P0500-51 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.(If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)**

CHECKLIST: P0500 (TC51)

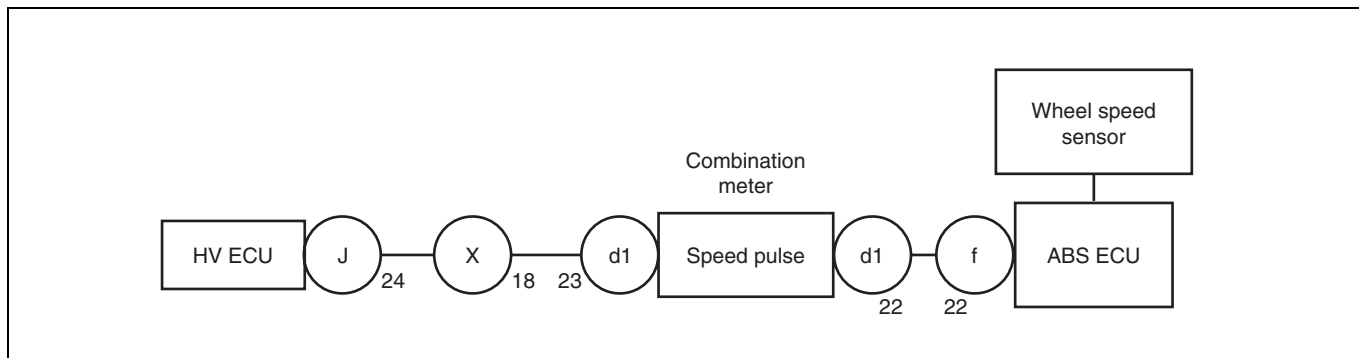
P0500 (TC51)		Abnormality in vehicle speed sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the ABS ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Select [Brake] on the diagnosis tool screen. 5. In [Fault Information], check if any DTC related to the vehicle speed sensor system is detected.	DTC is detected from the ABS: Go to YES. DTC is not detected from the ABS: Go to NO.		Perform troubleshooting for each DTC of ABS ECU.	Go to step 2.
2	Inspecting the continuity of vehicle wire harness (between ABS ECU and the combination meter)	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of ABS ECU and combination meter (40P). 3. Using the electrical tester, measure the resistance between the ABS ECU vehicle-side connector and the terminal of combination meter (40P) vehicle-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> ABS ECU vehicle-side connector – Combination meter (40P) vehicle-side connector 22nd terminal – 22nd terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Repair or replace the vehicle wire harness (between the ABS ECU and the combination meter).
3	Inspecting the continuity of vehicle wire harness (between the combination meter and the PCU harness vehicle-side connector)	1. Disconnect the PCU harness (24P) connector. 2. Using the electrical tester, measure the resistance between the vehicle-side connector of combination meter (40P) and the vehicle-side connector terminal of PCU harness (24P). <Measurement conditions> Starter key: LOCK <Tester connections> Combination meter (40P) vehicle-side connector – PCU harness (24P) vehicle side-connector 23rd terminal – 18th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Repair or replace the vehicle wire harness (between the combination meter and the PCU harness connector).

P0500 (TC51)		Abnormality in vehicle speed sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the continuity of PCU wire harness (lower side)	1. Disconnect the HV ECU3 connector. 2. Using the electrical tester, measure the resistance between the lower-side connector of PCU harness (24P) and the HV ECU3 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector – HV ECU3 connector 18th terminal – 24th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).
5	Inspecting the PCU wire harness (lower side) for short circuit	1. Using the electrical tester, measure the resistance between the lower-side connector terminals of PCU harness (24P). 2. Using the electrical tester, measure the resistance between the lower-side connector 18th terminal of PCU harness (24P) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 18th terminal – 24th terminal 18th terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the engine ECU [HINO-DX]	1. Connect the diagnosis tool (HINO-DX) to the vehicle. 2. Set the starter key to the "ON" position. 3. Select [Engine] on the diagnosis tool screen. 4. In [Fault Information], check if any DTC related to the vehicle speed signal system is detected.	DTC is detected from the engine ECU: Go to YES. DTC is not detected from the engine ECU: Go to NO.		Inspect the combination meter.	Go to step 7.

P0500 (TC51)		Abnormality in vehicle speed sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the PCU wire harness signal line for short circuit	1. Set the starter key to the "LOCK" position. 2. For the 18th terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 18th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 8.
8	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (For 1 minutes at the vehicle speed of 10 km/h or more) 6. In [Fault Information] on the diagnosis tool screen, check if P0500-51 is detected.	DTC P0500-51 is detected: Go to YES. DTC P0500-51 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

DTC: P0501 (TC5B)

EN01H03ZZZ030602003006

DTC: P0501 (TC5B) Abnormality in characteristics of vehicle speed sensor
INFORMATION

SHTS03ZZZ0300039

1. Technical description

- –

<Description of malfunction>

- Detected the abnormality in the vehicle speed sensor. (Abnormality in characteristics of vehicle speed sensor)

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10V or more.

(2) Judgement criteria

- The signal input of vehicle speed sensor remains 112 mph or more for 10 seconds or more.

3. Reset condition

- The signal input of vehicle speed sensor remains less than 112 mph for 10 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.

6. Pre-inspection work

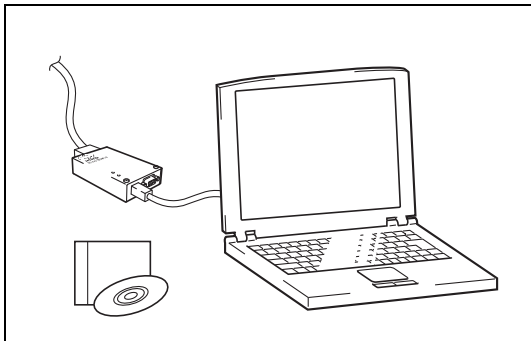
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of vehicle speed sensor
- Malfunction of HV ECU
- Malfunction of ABS ECU
- Malfunction of meter ECU

INSPECTION PROCEDURE: P0501 (TC5B)**1 Inspecting the ABS ECU [HINO-DX]**

SHTS03ZZZ0300040

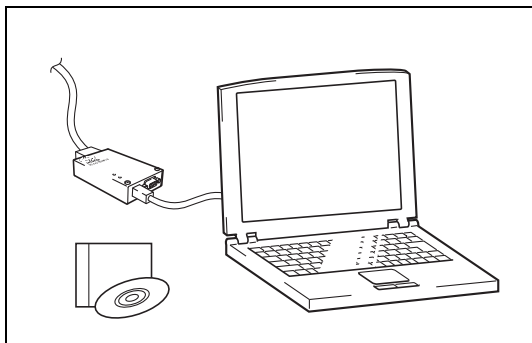
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Select [Brake] on the diagnosis tool screen.
5. In [Fault Information], check if any DTC related to the vehicle speed sensor system is detected.

Is any DTC detected from the ABS?**YES****Perform troubleshooting for each DTC of ABS ECU.****NO****Go to step 2.****2 Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Set the starter key to the "LOCK" position.
2. Disconnect the HV ECU3 connector.
3. For the 18th terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 18th terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Go to step 3.**

3 Inspecting the engine ECU [HINO-DX]

SHTS03ZZZ0300041

1. Set the starter key to the "ON" position.
2. Select [Engine] on the diagnosis tool screen.
3. Select [Data Monitor] and monitor [Vehicle speed] while driving at the speed of 20 km/h.

Measurement conditions	Measured item	Standard values
• Starter key: ON • Drive at the vehicle speed of 20 km/h.	Vehicle speed	The monitored vehicle speed is approximately the same as the driving speed.

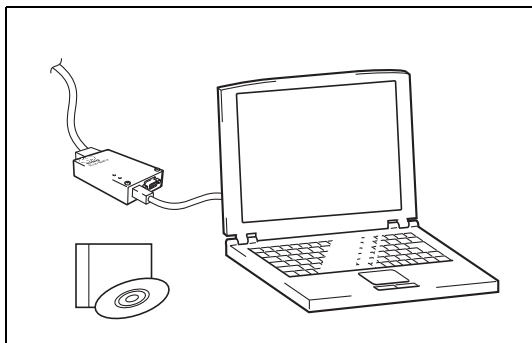
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Inspect the vehicle-side wire harness related to vehicle speed signals and the combination meter.

4 Reproduction check [HINO-DX]

SHTS03ZZZ0300042

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (For 1 minutes at the vehicle speed of 10 km/h or more)
6. In [Fault Information] on the diagnosis tool screen, check if P0501-5B is detected.

Is DTC P0501-5B detected?

YES

Replace the HV ECU.

NO

The inspection is completed.(If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

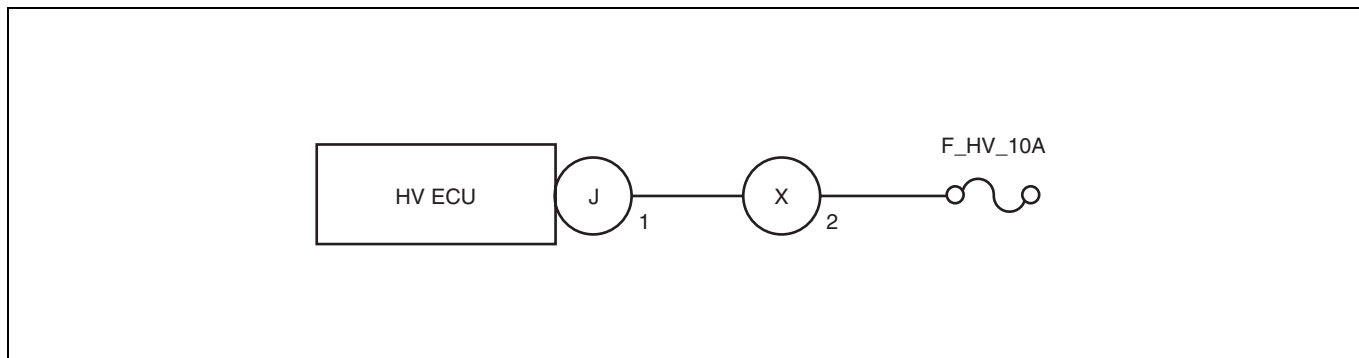
CHECKLIST: P0501 (TC5B)

P0501 (TC5B)		Abnormality in characteristics of vehicle speed sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the ABS ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Select [Brake] on the diagnosis tool screen. 5. In [Fault Information], check if any DTC related to the vehicle speed sensor system is detected.	DTC is detected from the ABS: Go to YES. DTC is not detected from the ABS: Go to NO.		Perform troubleshooting for each DTC of ABS ECU.	Go to step 2.
2	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the HV ECU3 connector. 3. For the 18th terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 18th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 3.
3	Inspecting the engine ECU [HINO-DX]	1. Set the starter key to the "ON" position. 2. Select [Engine] on the diagnosis tool screen. 3. Select [Data Monitor] and monitor [Vehicle speed] while driving at the speed of 20 km/h. <Measurement conditions> • Starter key: ON • Drive at the vehicle speed of 20 km/h. <Measured item> Vehicle speed 18th terminal – Each signal line <Standard values> The monitored vehicle speed is approximately the same as the driving speed.	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Inspect the vehicle-side wire harness related to vehicle speed signals and the combination meter.

P0501 (TC5B)		Abnormality in characteristics of vehicle speed sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (For 1 minutes at the vehicle speed of 10 km/h or more) 6. In [Fault Information] on the diagnosis tool screen, check if P0501-5B is detected.	DTC P0501-5B is detected: Go to YES. DTC P0501-5B is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

DTC: P0562 (TC71)

EN01H03ZZZ030602003007

DTC: P0562 (TC71) Abnormality in power supply voltage
INFORMATION

SHTS03ZZZ0300043

1. Technical description

- –

<Description of malfunction>

- Detected a reduction in 12 V line battery voltage (control power supply voltage).

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
- (2) Judgement criteria
 - The control power supply voltage remains less than 8 V for 3 seconds or more.

3. Reset condition

- The control power supply voltage remains more than 10 V for 5 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The hybrid system stops, causing the following phenomena:
 - The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
 - Idling stop becomes unavailable.
 - The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

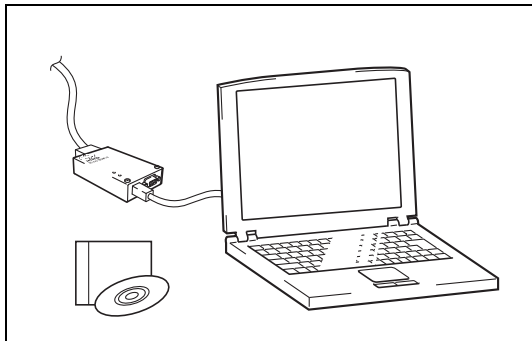
7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

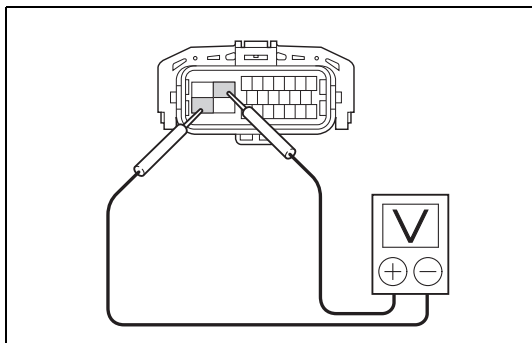
- Capacity reduction of 12 V battery
- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0562 (TC71)

1 Reading the DTC [HINO-DX]

SHTS03ZZZ0300044

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P060B-B2 other than P0562-71 is detected.

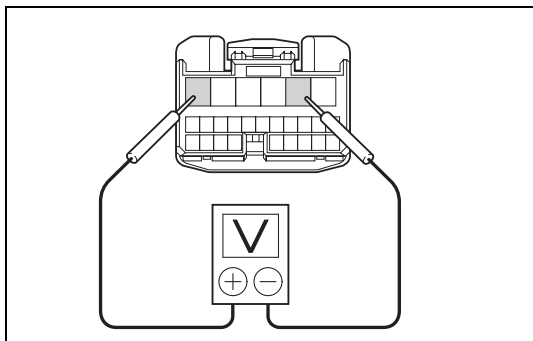
Is DTC P060B-B2 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the vehicle wire harness**

SHTS03ZZZ0300045

1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (24P) connector.
3. Using the electrical tester, measure the voltage between the vehicle-side connector terminals of PCU harness (24P).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) vehicle-side connector 2nd terminal – 16th terminal	10 – 16 V

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Inspect the power supply circuit ([HV 10 A] fuse and wire harness).**

3 Inspecting the PCU wire harness (lower side)

SHTS03ZZZ0300046

1. Connect the PCU harness (24P) connector.
2. Disconnect the HV ECU3 connector.
3. Using the electrical tester, measure the voltage between the HV ECU3 connector terminals.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV ECU3 connector 1st terminal – 5th terminal	10 – 16 V

Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the PCU wire harness (lower side).

4 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. Disconnect the PCU harness (24P) connector.
2. For the 2nd terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 2nd terminal – Each signal line	10 k Ω or more

Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Go to step 5.

5 Inspecting the signal line of PCU wire harness (upper side) for short circuit

1. Disconnect the connectors of PCU harness (16P) and battery ECU (26P).
2. For the 13th terminal of PCU harness (16P) connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 16th terminal – Each signal line	10 kΩ or more

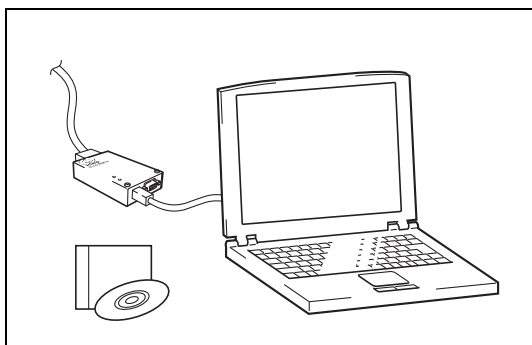
Is any defect found?

YES

NO

Replace the PCU wire harness (upper side).

Go to step 6.

6 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300047

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Select [Data Monitor] on the diagnosis tool screen and monitor [Power supply voltage] of HV ECU.

Measurement conditions	Measured item	Standard values
Starter key: ON	Power supply voltage	10 – 16 V

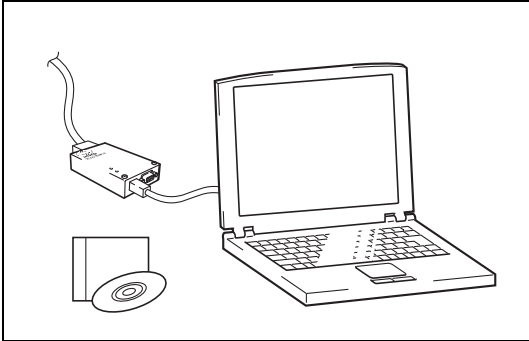
Is the measured value within the range of standard value?

YES

NO

Go to step 7.

Replace the HV ECU.

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300048

1. Clear the malfunction history.
2. Set the starter key to the "ON" position and wait for 1 minute.
3. In [Fault Information] on the diagnosis tool screen, check if DTC P0562-71 is detected.

Is DTC P0562-71 detected?**YES****Re-inspect the 12 V battery and power supply circuit.****NO****The inspection is completed.**

CHECKLIST: P0562 (TC71)

P0562 (TC71)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P060B-B2 other than P0562-71 is detected.	DTC P060B-B2 is detected: Go to YES. DTC P060B-B2 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the vehicle wire harness	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (24P) connector. 3. Using the electrical tester, measure the voltage between the vehicle-side connector terminals of PCU harness (24P). <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) vehicle-side connector 2nd terminal – 16th terminal <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Inspect the power supply circuit ([HV 10 A] fuse and wire harness).
3	Inspecting the PCU wire harness (lower side)	1. Connect the PCU harness (24P) connector. 2. Disconnect the HV ECU3 connector. 3. Using the electrical tester, measure the voltage between the HV ECU3 connector terminals. <Measurement conditions> Starter key: LOCK <Tester connections> HV ECU3 connector 1st terminal – 5th terminal <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the PCU wire harness (lower side).

P0562 (TC71)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Disconnect the PCU harness (24P) connector. 2. For the 2nd terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 2nd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 5.
5	Inspecting the signal line of PCU wire harness (upper side) for short circuit	1. Disconnect the connectors of PCU harness (16P) and battery ECU (26P). 2. For the 13th terminal of PCU harness (16P) connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: ON <Tester connections> PCU harness (16P) upper-side connector 16th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (upper side).	Go to step 6.
6	Inspecting the HV ECU [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Select [Data Monitor] on the diagnosis tool screen and monitor [Power supply voltage] of HV ECU. <Measurement conditions> Starter key: ON <Measured item> Power supply voltage <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the HV ECU.

P0562 (TC71)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "ON" position and wait for 1 minute. 3. In [Fault Information] on the diagnosis tool screen, check if DTC P0562-71 is detected.	DTC P0562-71 is detected: Go to YES. DTC P0562-71 is not detected: Go to NO.		Re-inspect the 12 V battery and power supply circuit.	The inspection is completed.

DTC: P060B (TCB2)

EN01H03ZZZ030602003008

DTC: P060B (TCB2) Abnormality in A/D converter INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality of A/D converter in the HV ECU.

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
- (2) Judgement criteria
 - A/D conversion failed 3 times successively.

3. Reset condition

- A/D conversion is successfully completed 3 times successively.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

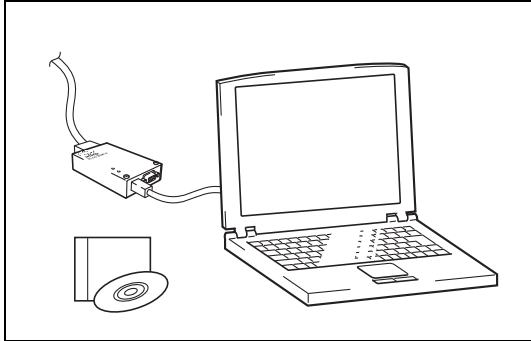
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV ECU

INSPECTION PROCEDURE: P060B (TCB2)**1****Reproduction check [HINO-DX]**

SHTS03ZZZ0300049

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Start the engine and keep it idling for 1 minute.
6. In [Fault Information] on the diagnosis tool screen, check if P060B-B2 is detected.

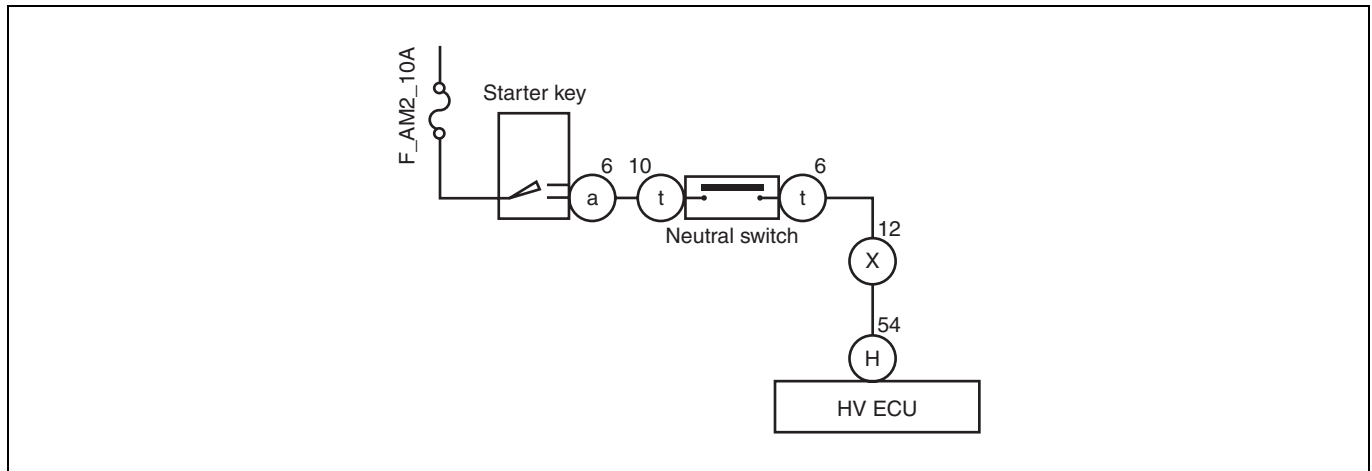
Is DTC P060B-B2 detected?**YES****Replace the HV ECU.****NO****The inspection is completed. (The abnormality may have been caused by a temporary factor such as noise.)**

CHECKLIST: P060B (TCB2)

P060B (TCB2)		Abnormality in A/D converter		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Start the engine and keep it idling for 1 minute. 6. In [Fault Information] on the diagnosis tool screen, check if P060B-B2 is detected.	DTC P060B-B2 is detected: Go to YES. DTC P060B-B2 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (The abnormality may have been caused by a temporary factor such as noise.)

DTC: P0617 (TC59)

EN01H03ZZZ030602003009

DTC: P0617 (TC59) Malfunction of starter switch
INFORMATION

SHTS03ZZZ0300050

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the starter key (starter signal circuit is stuck to High).

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The vehicle speed is 12 mph or more.
- The number of the motor revolution is 1000 r/min or more.
- The motor revolution sensor shows no abnormality.

(2) Judgement criteria

- The starter signal remains ON for 20 seconds or more.

3. Reset condition

- The starter signal remains OFF for 0.1 second or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.

6. Pre-inspection work

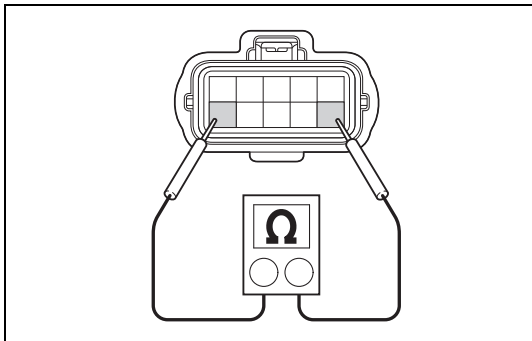
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

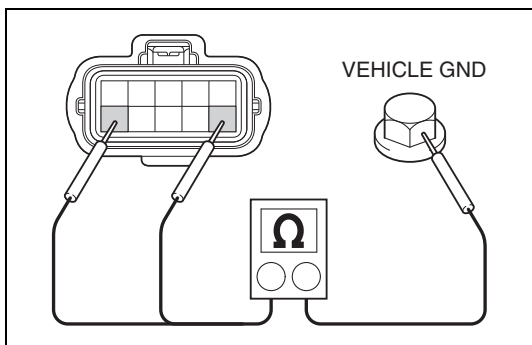
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of starter key
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0617 (TC59)**1 Inspecting the neutral switch 1**

1. Set the starter key to the "LOCK" position.
2. Disconnect the neutral switch connector.
3. Set the starter key to the "ON" position.
4. Set the shift lever to the N position.
5. Using the electrical tester, measure the resistance between the neutral switch connector terminals.

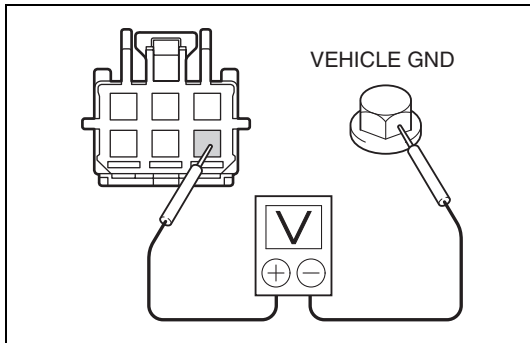
Measurement conditions	Tester connections	Standard values
Starter key: ON Shift lever: N position	Neutral switch connector 6th terminal – 10th terminal	Less than 3 Ω

Is the measured value within the range of standard value?**YES****Go to step 2.****NO****Replace the neutral switch.****2 Inspecting the neutral switch 2**

1. Using the electrical tester, measure the resistance between each terminal of neutral switch connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON Shift lever: N position	Neutral switch connector 6th terminal – GND 10th terminal – GND	10 kΩ or more

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the neutral switch.**

3 Inspecting the vehicle wire harness for short circuit 1 (starter key signal circuit)

SHTS03ZZZ0300053

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of starter key and PCU harness (24P).
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the 6th terminal of starter key vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Starter key vehicle-side connector 6th terminal – GND	Less than 1 V

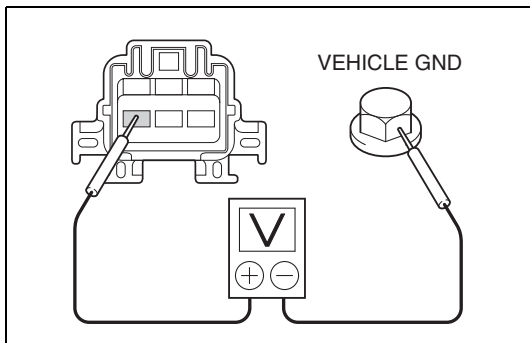
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Repair or replace the wire harness.(Starter key signal circuit)

4 Inspecting the key cylinder

SHTS03ZZZ0300054

1. Using the electrical tester, measure the voltage between the 6th terminal of key cylinder connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Key cylinder connector 6th terminal – GND	Less than 1 V

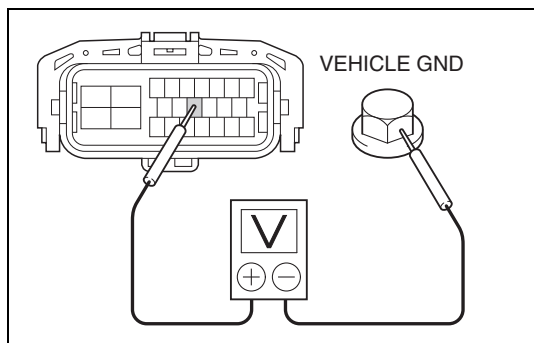
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

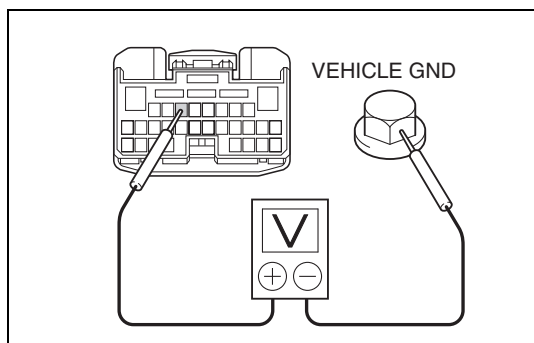
Replace the key cylinder.

5 Inspecting the vehicle wire harness for short circuit 2 (starter key signal circuit)

SHTS03ZZZ0300055

1. Using the electrical tester, measure the voltage between the 12th terminal of PCU harness (24P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle-side connector 12th terminal – GND	Less than 1 V

Is the measured value within the range of standard value?**YES****Go to step 6.****NO****Repair or replace the wire harness.
(Starter key signal circuit)****6 Inspecting the PCU wire harness (lower side) for short circuit**

SHTS03ZZZ0300056

1. Set the starter key to the "LOCK" position.
2. Connect the PCU harness (24P) connector.
3. Disconnect the HV ECU1 connector.
4. Set the starter key to the "ON" position.
5. Using the electrical tester, measure the voltage between the 54th terminal of HV ECU1 connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	HV ECU1 connector 4th terminal – GND	Less than 1 V

Is the measured value within the range of standard value?**YES****Go to step 7.****NO****Replace the PCU wire harness (lower side).**

7 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. Set the starter key to the "LOCK" position.
2. For the 12th terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 12th terminal – Each signal line	10 kΩ or more

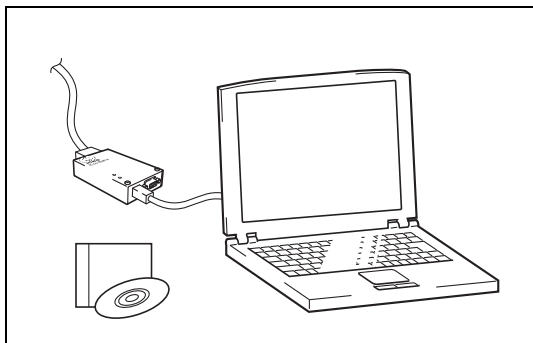
Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Go to step 8.

8 Reproduction check [HINO-DX]

SHTS03ZZZ0300057

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (The vehicle speed and the engine speed remain at 25 km/h or more and 1500 r/min or more, respectively, for 30 seconds or more.)
6. In [Fault Information] on the diagnosis tool screen, check if P0617-59 is detected.

Is DTC P0617-59 detected?

YES

Replace the HV ECU.

NO

The inspection is completed.
(If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

CHECKLIST: P0617 (TC59)

P0617 (TC59)		Malfunction of starter switch		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the neutral switch 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the neutral switch connector. 3. Set the starter key to the "ON" position. 4. Set the shift lever to the N position. 5. Using the electrical tester, measure the resistance between the neutral switch connector terminals. <Measurement conditions> Starter key: ON Shift lever: N position <Tester connections> Neutral switch connector 6th terminal – 10th terminal <Standard values> Less than 3 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the neutral switch.
2	Inspecting the neutral switch 2	1. Using the electrical tester, measure the resistance between each terminal of neutral switch connector and the ground. <Measurement conditions> Starter key: ON Shift lever: N position <Tester connections> Neutral switch connector 6th terminal – GND 10th terminal – GND <Standard values> 10 kΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the neutral switch.

P0617 (TC59)		Malfunction of starter switch		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the vehicle wire harness for short circuit 1 (starter key signal circuit)	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of starter key and PCU harness (24P). 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the 6th terminal of starter key vehicle-side connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> Starter key vehicle-side connector 6th terminal – GND <Standard values> Less than 1 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Repair or replace the wire harness. (Starter key signal circuit)
4	Inspecting the key cylinder	1. Using the electrical tester, measure the voltage between the 6th terminal of key cylinder connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> Key cylinder connector 6th terminal – GND <Standard values> Less than 1 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the key cylinder.
5	Inspecting the vehicle wire harness for short circuit 2 (starter key signal circuit)	1. Using the electrical tester, measure the voltage between the 12th terminal of PCU harness (24P) vehicle-side connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle-side connector 12th terminal – GND <Standard values> Less than 1 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Repair or replace the wire harness. (Starter key signal circuit)

P0617 (TC59)		Malfunction of starter switch		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Inspecting the PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Connect the PCU harness (24P) connector. 3. Disconnect the HV ECU1 connector. 4. Set the starter key to the "ON" position. 5. Using the electrical tester, measure the voltage between the 54th terminal of HV ECU1 connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> HV ECU1 connector 4th terminal – GND <Standard values> Less than 1 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. For the 12th terminal of PCU harness (24P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 12th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 8.
8	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (The vehicle speed and the engine speed remain at 25 km/h or more and 1500 r/min or more, respectively, for 30 seconds or more.) 6. In [Fault Information] on the diagnosis tool screen, check if P0617-59 is detected.	DTC P0617-59 is detected: Go to YES. DTC P0617-59 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

DTC: P062F (TCB3)

EN01H03ZZZ030602003010

DTC: P062F (TCB3) Abnormality in EEPROM INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality of EEPROM in the HV ECU.

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
 - The control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - Failure of access to EEPROM

3. Reset condition

- Successful access to EEPROM

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- Recording of malfunction code (DTC) may become unavailable.

6. Pre-inspection work

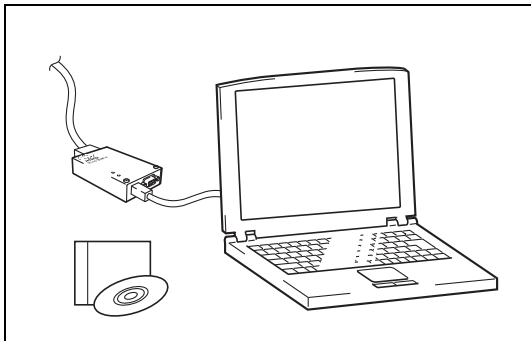
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

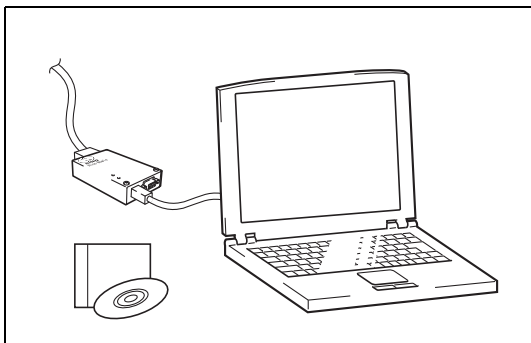
8. Estimated failure factors

- Malfunction of HV ECU

INSPECTION PROCEDURE: P062F (TCB3)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300058

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P0562-71 other than P062F-B3 is detected.

Is DTC P0562-71 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300059

1. Clear the malfunction history.
2. Set the starter key to the "ON" position and wait for 1 minute.
3. In [Fault Information] on the diagnosis tool screen, check if P062F-B3 is detected.

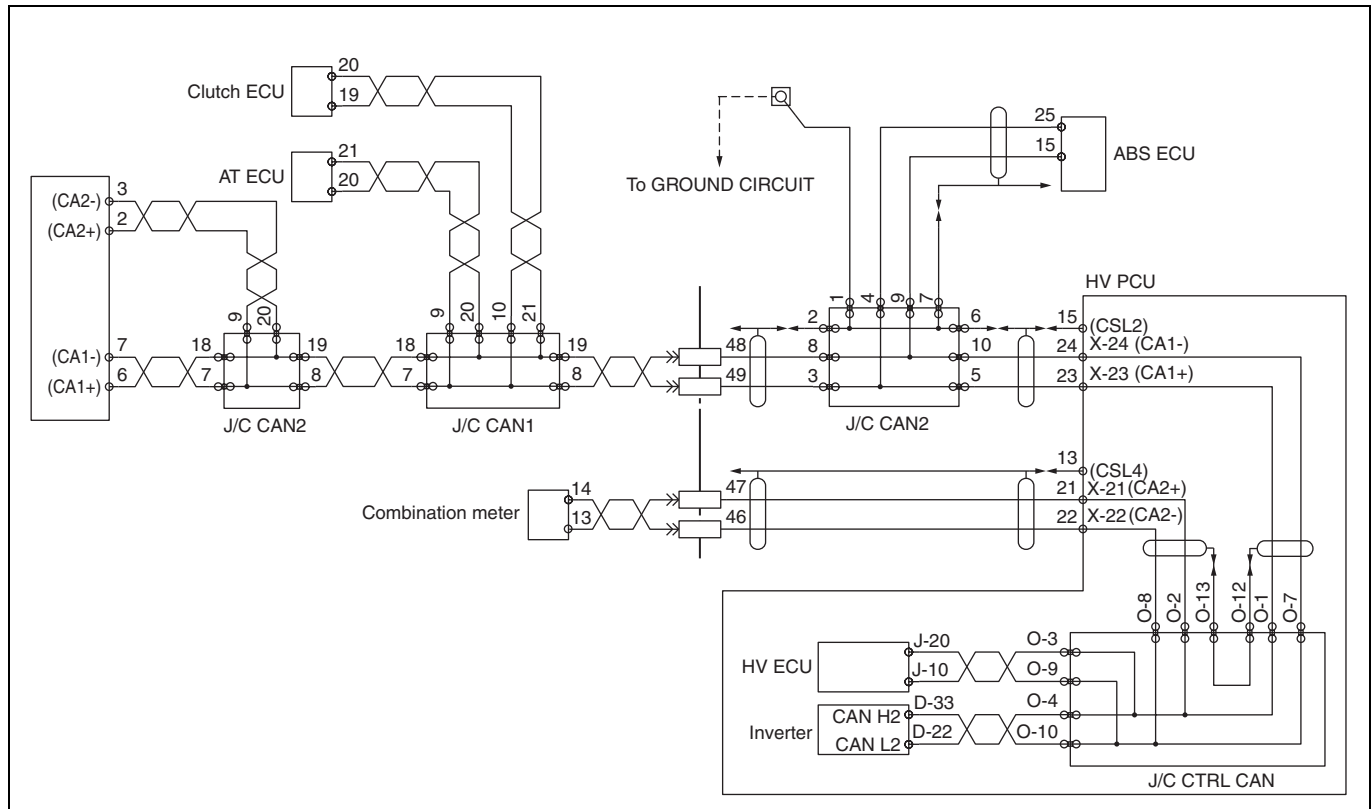
Is DTC P062F-B3 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.
(The abnormality may have been caused by a temporary factor such as noise.)**

CHECKLIST: P062F (TCB3)

P062F (TCB3)		Abnormality in EEPROM		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P0562-71 other than P062F-B3 is detected.	DTC P0562-71 is detected: Go to YES. DTC P0562-71 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "ON" position and wait for 1 minute. 3. In [Fault Information] on the diagnosis tool screen, check if P062F-B3 is detected.	DTC P062F-B3 is detected: Go to YES. DTC P062F-B3 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (The abnormality may have been caused by a temporary factor such as noise.)

DTC: P0810 (TC9C)

EN01H03ZZZ030602003011

DTC: P0810 (TC9C) Abnormality in clutch system (idling stop inhibited)**INFORMATION**

SHTS03ZZZ0300060

1. Technical description

- —

<Description of malfunction>

- Detected an abnormality in the clutch system.

2. DTC set condition**(1) DTC detection condition**

- CAN communication with the clutch ECU is normal.

(2) Judgement criteria

- When any of the following abnormality is received from the clutch ECU:
 - Notification of power supply abnormality
 - Notification of oil temperature sensor abnormality
 - Notification of solenoid abnormality
 - Notification that receiving from AT ECU is unavailable and that the communication has been disrupted
 - Notification of abnormality in electric oil pump for the clutch
 - Notification of clutch disengagement abnormality
 - Notification of clutch slip abnormality
 - Notification of clutch revolution alignment abnormality
 - Notification that the HV damper friction material is worn

3. Reset condition

- When the notification that there is none of the following abnormality is received from the clutch ECU:
 - Notification of power supply abnormality
 - Notification of oil temperature sensor abnormality
 - Notification of solenoid abnormality
 - Notification that receiving from AT ECU is unavailable and that the communication has been disrupted
 - Notification of abnormality in electric oil pump for the clutch
 - Notification of clutch disengagement abnormality
 - Notification of clutch slip abnormality
 - Notification of clutch revolution alignment abnormality
 - Notification that the HV damper friction material is worn

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function may become inoperative.

6. Pre-inspection work

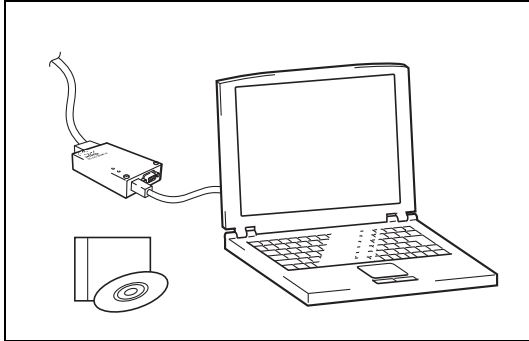
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunctioning of clutch system

INSPECTION PROCEDURE: P0810 (TC9C)**1****Reading the DTC [HINO-DX]**

SHTS03ZZZ0300061

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0810-9C is detected.

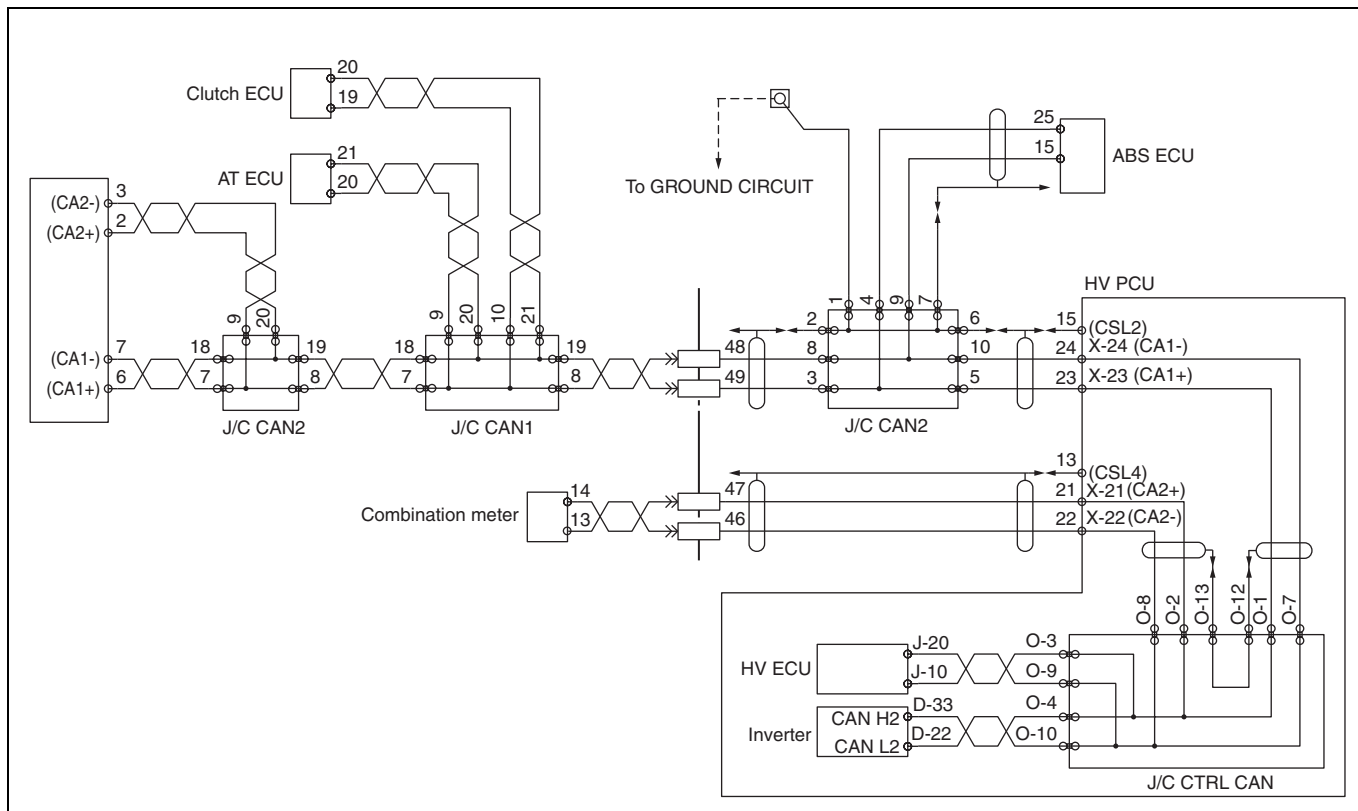
Is any DTC other than P0810-9C detected?**YES****Perform troubleshooting for each of related DTC.****NO****Perform troubleshooting of the clutch ECU.**

CHECKLIST: P0810 (TC9C)

P0810 (TC9C)		Abnormality in clutch system (idling stop inhibited)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0810-9C is detected.	DTC other than P0810-9C is detected: Go to YES. DTC other than P0810-9C is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Perform troubleshooting of the clutch ECU.

DTC: P0810 (TC9D)

EN01H03ZZZ030602003012

DTC: P0810 (TC9D) Abnormality in clutch system (idling stop available)**INFORMATION**

SHTS03ZZZ0300062

1. Technical description

- —

<Description of malfunction>

- Detected an abnormality in the clutch system.

2. DTC set condition**(1) DTC detection condition**

- CAN communication with the clutch ECU is normal.

(2) Judgement criteria

- When any of the following abnormality is received from the clutch ECU:
 - Notification that the electric oil pump power supply relay for the clutch is stuck to ON
 - Notification that the clutch ECU power supply is stuck
 - Notification that the clutch ECU starter key signal is stuck

3. Reset condition

- When the notification that there is none of the following abnormality is received from the clutch ECU:
 - Notification that the electric oil pump power supply relay for the clutch is stuck to ON
 - Notification that the clutch ECU power supply is stuck
 - Notification that the clutch ECU starter key signal is stuck

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function may become inoperative.

6. Pre-inspection work

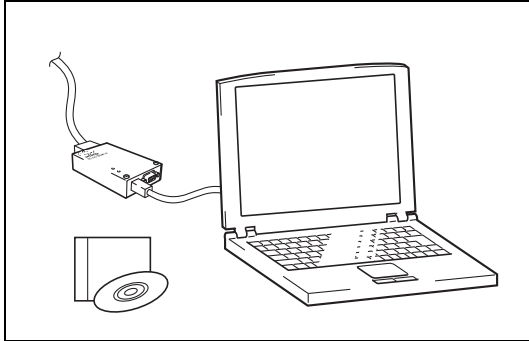
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that any DTC will not be detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunctioning of clutch system

INSPECTION PROCEDURE: P0810 (TC9D)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300063

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0810-9D is detected.

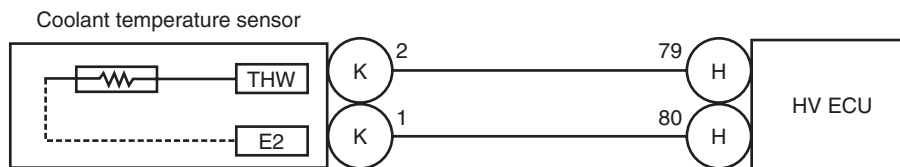
Is any DTC other than P0810-9D detected?**YES****Perform troubleshooting for each of related DTC.****NO****Perform troubleshooting of the clutch ECU.**

CHECKLIST: P0810 (TC9D)

P0810 (TC9D)		Abnormality in clutch system (idling stop available)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0810-9D is detected.	DTC other than P0810-9D is detected: Go to YES. DTC other than P0810-9D is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Perform troubleshooting of the clutch ECU.

DTC: P0A01 (TC7B)

EN01H03ZZZ030602003013

DTC: P0A01 (TC7B) Abnormality in characteristics of inverter coolant temperature sensor
INFORMATION

SHTS03ZZZ0300064

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter cooling circuit (abnormality in the characteristics of inverter coolant temperature sensor).

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The drive duty of HV water pump is 40% or more.
- The drive duty of HV water pump is 60% or less.
- The square sum of motor current for 20 seconds is 200,000 A² or more.
- The motor current sensor shows no abnormality.
- The output of inverter start relay is ON.

(2) Judgement criteria

- The difference in the inverter coolant temperature (Max-Min) for 20 seconds is less than 0.5 °C {32.9 °F}.

3. Reset condition

- The difference in the inverter coolant temperature (Max-Min) for 20 seconds is 0.5° C {32.9 °F} or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Malfunction of inverter cooling circuit
- Malfunction of inverter coolant temperature sensor
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A01 (TC7B)

1	Inspecting the coolant line route
----------	--

1. Check the coolant line route (radiator, inverter, and hose) for any damage or water leakage.

Is any defect found?

YES

**Repair or replace the defective part.
After repair/replacement, perform the inspection again.**

NO

Go to step 2.

2	Inspecting the coolant level
----------	-------------------------------------

1. Remove the radiator cap and check the height from the coolant level to the filling port.

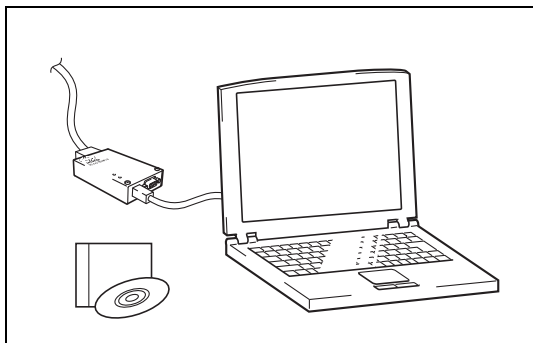
Is the coolant level about 10 mm from the filling port?

YES

Go to step 3.

NO

**Add coolant. (See "Adding coolant.")
After adding coolant, perform the inspection again.**

3 Reading the DTC [HINO-DX]

SHTS03ZZZ0300065

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any other coolant temperature sensor system DTC (listed below) is detected.
 - P060B-B2, P0A02-78, P0A03-79, P0A06-7F, P0A07-7E, P0A93-7A, P0C73-80, P314C-82, P314D-81

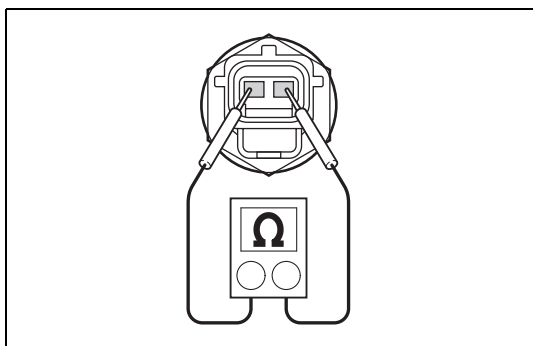
Is any DTC other than P0A01-7B detected?

YES

Perform troubleshooting for each of related DTC.

NO

Go to step 4.

4 Inspecting the coolant temperature sensor

SHTS03ZZZ0300066

1. Set the starter key to the "LOCK" position.
2. Disconnect the connector of coolant temperature sensor.
3. Using the electrical tester, measure the resistance between the terminals of coolant temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector (sensor side)	0 °C {32 °F}: 5.3 k – 6.2 kΩ
		20 °C {68 °F}: 2.3 k – 2.6 kΩ
	1st terminal –	30 °C {86 °F}: 1.5 k – 1.8 kΩ
	2nd terminal	

Is the measured value within the range of standard value?

YES

Go to step 5.

NO

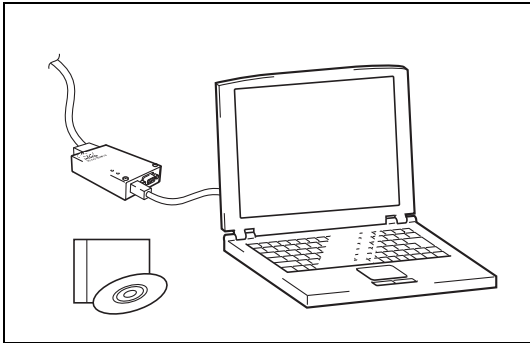
Replace the coolant temperature sensor.

5**Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Set the starter key to the "LOCK" position.
2. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector 2nd terminal – Each signal line	10 k Ω or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Go to step 6.**

6 Reproduction check [HINO-DX]

SHTS03ZZZ0300067

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. In [Data Monitor] on the diagnosis tool screen, measure [HV system coolant temperature].

Measurement conditions	Measured item	Standard values
Starter key: ON	HV system coolant temperature	Equivalent to ambient temperature

Is the measured value within the range of standard value?

YES

Replace the HV ECU.

NO

The inspection is completed.
(If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

CHECKLIST: P0A01 (TC7B)

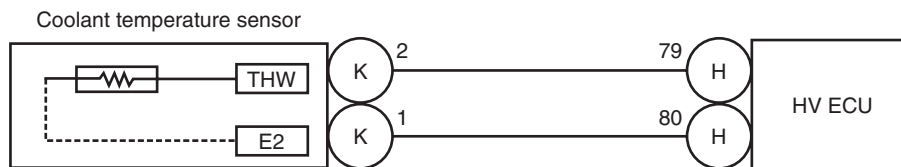
P0A01 (TC7B)		Abnormality in characteristics of inverter coolant temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the coolant line route	1. Check the coolant line route (radiator, inverter, and hose) for any damage or water leakage.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the defective part. After repair/replacement, perform the inspection again.	Go to step 2.
2	Inspecting the coolant level	1. Remove the radiator cap and check the height from the coolant level to the filling port.	Coolant level is about 10 mm from the filling port: Go to YES. Coolant level is not about 10 mm from the filling port: Go to NO.		Go to step 3.	Add coolant. (See "Adding coolant.") After adding coolant, perform the inspection again.
3	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any other coolant temperature sensor system DTC (listed below) is detected. • P060B-B2, P0A02-78, P0A03-79, P0A06-7F, P0A07-7E, P0A93-7A, P0C73-80, P314C-82, P314D-81	DTC other than P0A01-7B is detected: Go to YES. DTC other than P0A01-7B is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 4.

P0A01 (TC7B)		Abnormality in characteristics of inverter coolant temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the coolant temperature sensor	1. Set the starter key to the "LOCK" position. 2. Disconnect the connector of coolant temperature sensor. 3. Using the electrical tester, measure the resistance between the terminals of coolant temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 0 °C {32 °F}: 5.3 k – 6.2 kΩ 20 °C {68 °F}: 2.3 k – 2.6 kΩ 30 °C {86 °F}: 1.5 k – 1.8 kΩ	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the coolant temperature sensor.
5	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector 2nd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 6.

P0A01 (TC7B)		Abnormality in characteristics of inverter coolant temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. In [Data Monitor] on the diagnosis tool screen, measure [HV system coolant temperature]. <Measurement conditions> Starter key: ON <Measured item> HV system coolant temperature <Standard values> Equivalent to ambient temperature	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV ECU.	The inspection is completed. (If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

DTC: P0A02 (TC78)

EN01H03ZZZ030602003014

DTC: P0A02 (TC78) Coolant temperature sensor Low abnormality
INFORMATION

SHTS03ZZZ0300068

1. Technical description

- –

<Description of malfunction>

- Detected a GND short circuit in the inverter coolant temperature sensor.

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
 - The control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - The voltage of inverter coolant temperature sensor remains less than 0.2 V for 10 seconds or more.

3. Reset condition

- The voltage of inverter coolant temperature sensor remains at 0.5 V or more for 10 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

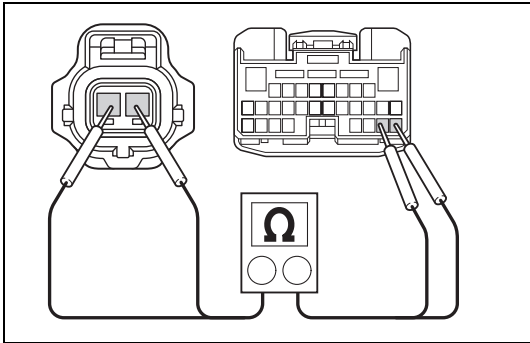
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of inverter coolant temperature sensor
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A02 (TC78)**1 Inspecting the continuity of PCU wire harness (lower side)**

SHTS03ZZZ0300069

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of coolant temperature sensor and HV ECU1.
3. Using the electrical tester, measure the resistance between the coolant temperature sensor connector and the HV ECU1 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector – HV ECU1 connector 1st terminal – 30th terminal 2nd terminal – 29th terminal	Less than 1 Ω

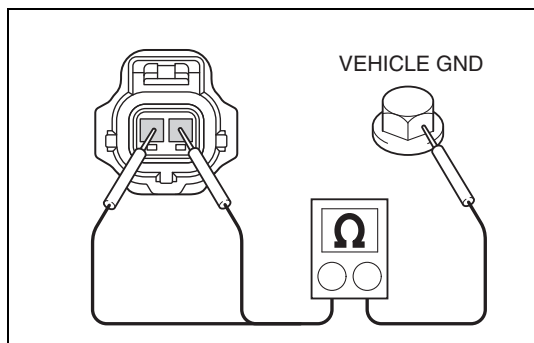
Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the PCU wire harness (lower side).

2 Inspecting the PCU wire harness (lower side) for short circuit 1

SHTS03ZZZ0300070

- Using the electrical tester, measure the resistance between each terminal of coolant temperature sensor connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector 1st terminal – GND 2nd terminal – GND	10 k Ω or more

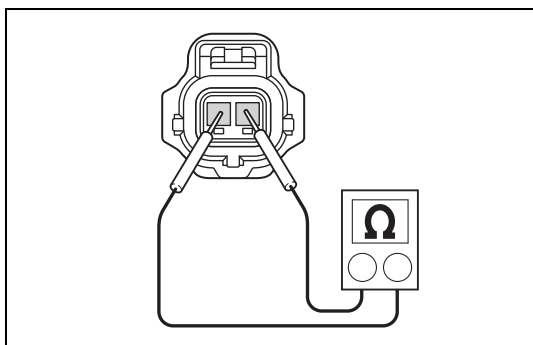
Is the measured value within the range of standard value?

YES

NO

Go to step 3.

Replace the PCU wire harness (lower side).

3 Inspecting the PCU wire harness (lower side) for short circuit 2

SHTS03ZZZ0300071

- Using the electrical tester, measure the resistance between the terminals of coolant temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector 1st terminal – 2nd terminal	10 k Ω or more

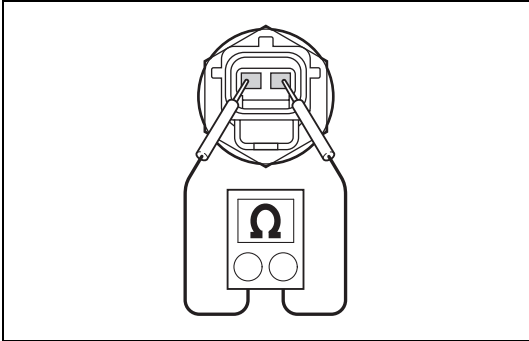
Is the measured value within the range of standard value?

YES

NO

Go to step 4.

Replace the PCU wire harness (lower side).

4 Inspecting the coolant temperature sensor

SHTS03ZZZ0300072

- Using the electrical tester, measure the resistance of coolant temperature sensor.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal	0 °C {32 °F}: 5.3 k – 6.2 kΩ 20 °C {68 °F}: 2.3 k – 2.6 kΩ 30 °C {86 °F}: 1.5k – 1.8 kΩ

Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the coolant temperature sensor.

5 Inspecting the signal line of PCU wire harness (lower side) for short circuit

- Set the starter key to the "LOCK" position.
- For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector 2nd terminal – Each signal line	10 kΩ or more

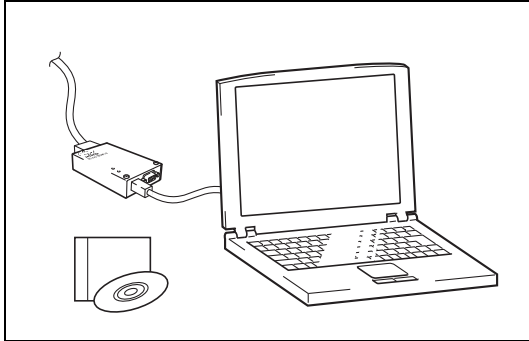
Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Go to step 6.

6**Reproduction check [HINO-DX]**

SHTS03ZZZ0300073

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. In [Data Monitor] on the diagnosis tool screen, measure [HV system coolant temperature].

Measurement conditions	Measured item	Standard values
Starter key: ON	HV system coolant temperature	Equivalent to ambient temperature

Is the measured value within the range of standard value?**YES****Replace the HV ECU.****NO****The inspection is completed.
(If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)**

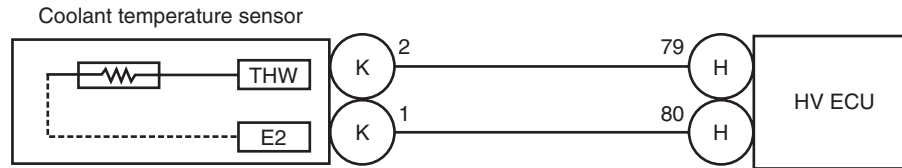
CHECKLIST: P0A02 (TC78)

P0A02 (TC78)		Coolant temperature sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of coolant temperature sensor and HV ECU1. 3. Using the electrical tester, measure the resistance between the coolant temperature sensor connector and the HV ECU1 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector – HV ECU1 connector 1st terminal – 30th terminal 2nd terminal – 29th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the PCU wire harness (lower side) for short circuit 1	1. Using the electrical tester, measure the resistance between each terminal of coolant temperature sensor connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector 1st terminal – GND 2nd terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the PCU wire harness (lower side) for short circuit 2	1. Using the electrical tester, measure the resistance between the terminals of coolant temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector 1st terminal – 2nd terminal <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the PCU wire harness (lower side).

P0A02 (TC78)		Coolant temperature sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the coolant temperature sensor	1. Using the electrical tester, measure the resistance of coolant temperature sensor. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 0 °C {32 °F}: 5.3 k – 6.2 kΩ 20 °C {68 °F}: 2.3 k – 2.6 kΩ 30 °C {86 °F}: 1.5k – 1.8 kΩ	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the coolant temperature sensor.
5	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector 2nd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 6.
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. In [Data Monitor] on the diagnosis tool screen, measure [HV system coolant temperature]. <Measurement conditions> Starter key: ON <Tester connections> HV system coolant temperature <Standard values> Equivalent to ambient temperature	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV ECU.	The inspection is completed. (If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

DTC: P0A03 (TC79)

EN01H03ZZZ030602003015

DTC: P0A03 (TC79) Coolant temperature sensor High abnormality
INFORMATION

SHTS03ZZZ0300074

1. Technical description

- –

<Description of malfunction>

- Detected the disconnection or power supply (positive side) short circuit in the inverter coolant temperature sensor.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The engine intake air temperature is -10 °C {14 °F} or more.
- The engine intake air temperature sensor shows no abnormality.
- The engine speed remains at 600 r/min or more for 60 seconds or more.
- The vehicle speed remains at 12.4 mph or more for 30 seconds or more.

(2) Judgement criteria

- The voltage of inverter coolant temperature sensor remains above 4.8 V for 10 seconds or more.

3. Reset condition

- The voltage of inverter coolant temperature sensor remains at 4.5 V or less for 10 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

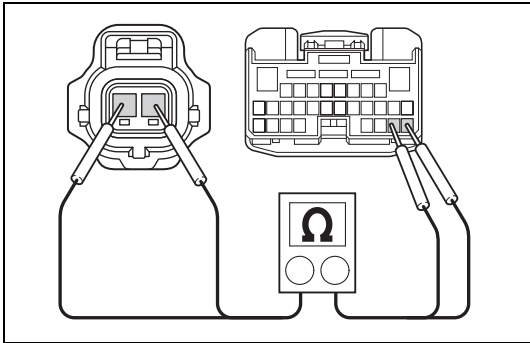
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of inverter coolant temperature sensor
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A03 (TC79)**1 Inspecting the continuity of PCU wire harness (lower side)**

SHTS03ZZZ0300075

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of coolant temperature sensor and HV ECU1.
3. Using the electrical tester, measure the resistance between the coolant temperature sensor connector and the HV ECU1 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector – HV ECU1 connector 1st terminal – 30th terminal 2nd terminal – 29th terminal	Less than 1 Ω

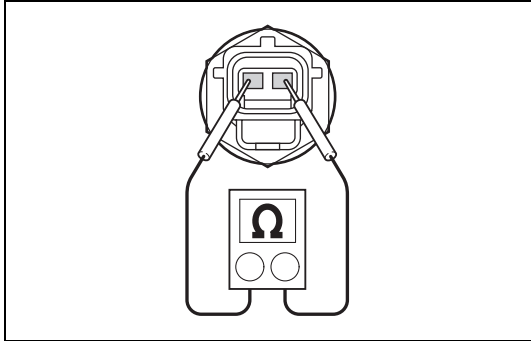
Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the PCU wire harness (lower side).

2 Inspecting the coolant temperature sensor

SHTS03ZZZ0300076

1. Using the electrical tester, measure the resistance of coolant temperature sensor.

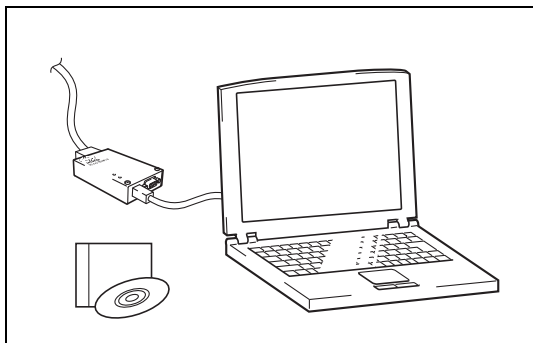
Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal	0 °C {32 °F}: 5.3 k – 6.2 kΩ 20 °C {68 °F}: 2.3 k – 2.6 kΩ 30 °C {86 °F}: 1.5 k – 1.8 kΩ

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the coolant temperature sensor.****3 Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Set the starter key to the "LOCK" position.
2. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector 2nd terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Go to step 4.**

4 Reproduction check [HINO-DX]

SHTS03ZZZ0300077

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. In [Data Monitor] on the diagnosis tool screen, measure [HV system coolant temperature].

Measurement conditions	Tester connections	Standard values
Starter key: ON	HV system coolant temperature	Equivalent to ambient temperature

Is the measured value within the range of standard value?

YES

Replace the HV ECU.

NO

The inspection is completed.
(If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

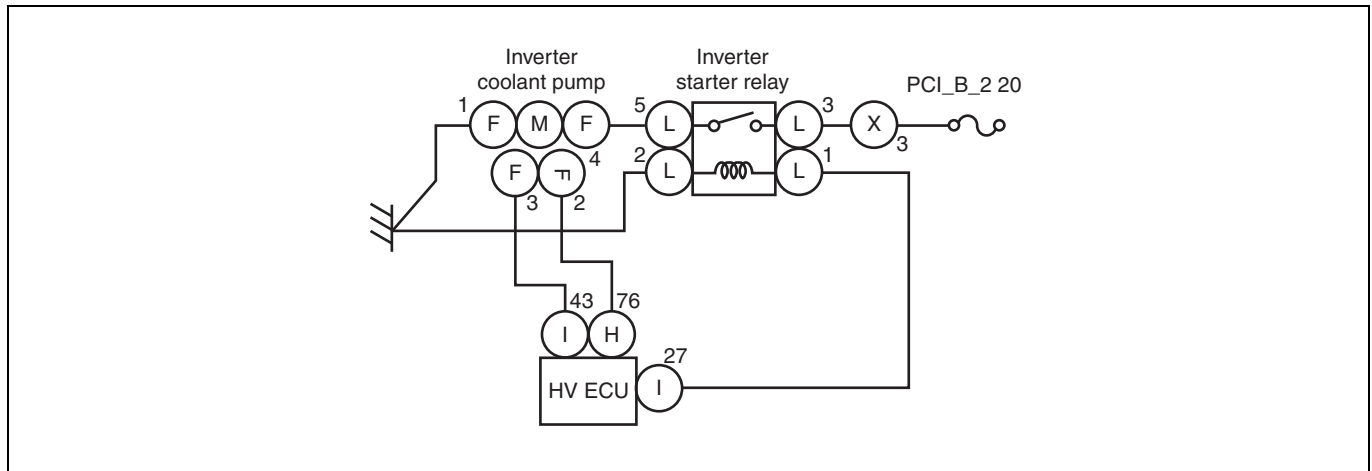
CHECKLIST: P0A03 (TC79)

P0A03 (TC79)		Coolant temperature sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of coolant temperature sensor and HV ECU1. 3. Using the electrical tester, measure the resistance between the coolant temperature sensor connector and the HV ECU1 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector – HV ECU1 connector 1st terminal – 30th terminal 2nd terminal – 29th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the coolant temperature sensor	1. Using the electrical tester, measure the resistance of coolant temperature sensor. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 0 °C {32 °F}: 5.3 k – 6.2 k Ω 20 °C {68 °F}: 2.3 k – 2.6 k Ω 30 °C {86 °F}: 1.5 k – 1.8 k Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the coolant temperature sensor.
3	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector 2nd terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 4.

P0A03 (TC79)		Coolant temperature sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. In [Data Monitor] on the diagnosis tool screen, measure [HV system coolant temperature]. <Measurement conditions> Starter key: ON <Tester connections> HV system coolant temperature <Standard values> Equivalent to ambient temperature	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV ECU.	The inspection is completed. (If no repair or parts replacement is performed, there may be an improper contact due to connector disconnection.)

DTC: P0A06 (TC7F)

EN01H03ZZZ030602003016

DTC: P0A06 (TC7F) HV water pump drive signal Low abnormality
INFORMATION

SHTS03ZZZ0300078

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or GND short circuit in the HV water pump drive signal circuit.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The requested drive duty of HV water pump is 0% or more.
- The output of inverter start relay is ON.

(2) Judgement criteria

- One of the conditions below is met continuously for 0.5 second or more:
 - Input signal for monitoring HV water pump drive signal is 0 Hz.
 - Input signal for monitoring HV water pump drive signal is less than 0.2 V.

3. Reset condition

- Input signal for monitoring HV water pump drive signal remains at 1 Hz or more for 5 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

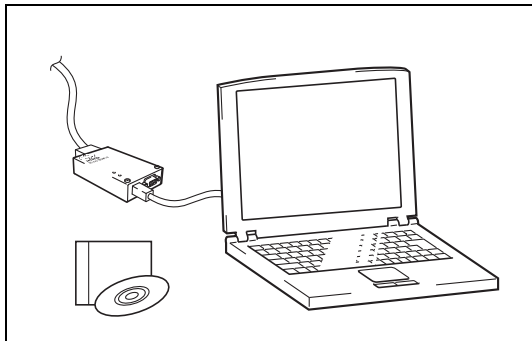
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

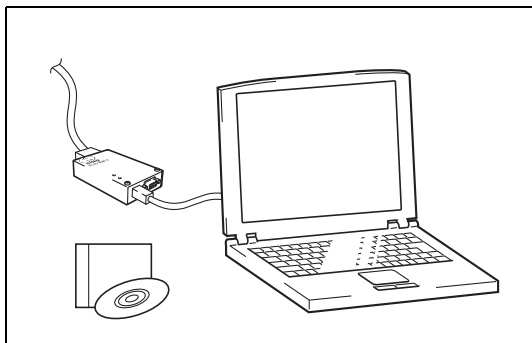
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector contact or fitting
- Malfunction of HV water pump
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A06 (TC7F)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300079

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P324B-62 or P324C-61 is detected.

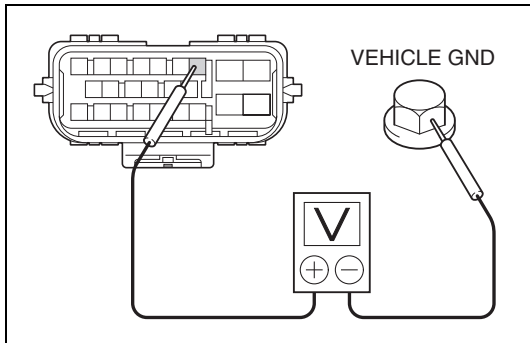
Is DTC P324B-62 or P324C-61 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Checking the activation of inverter cooling pump [HINO-DX]**

SHTS03ZZZ0300080

1. In [Activation Test] on the diagnosis tool screen, select [HV water pump drive duty value].
2. Run the inverter cooling pump at a duty value of 90% to check that the cooling fan is rotating.

Measurement conditions	Measured item	Standard values
Starter key: ON	HV water pump drive duty value	The cooling fan is running (rotating).

Is the cooling fan running?**YES****Go to step 6.****NO****Go to step 3.**

3 Inspecting the voltage of vehicle wire harness

SHTS03ZZZ0300081

1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (24P) connector.
3. Using the electrical tester, measure the voltage between the 3rd terminal of PCU harness (24P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) vehicle-side connector 3rd terminal – GND	9 V or more

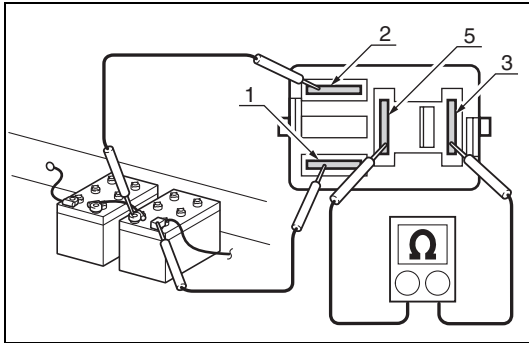
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Inspect the power supply circuit ([PCU-B2 20A] fuse and wire harness).

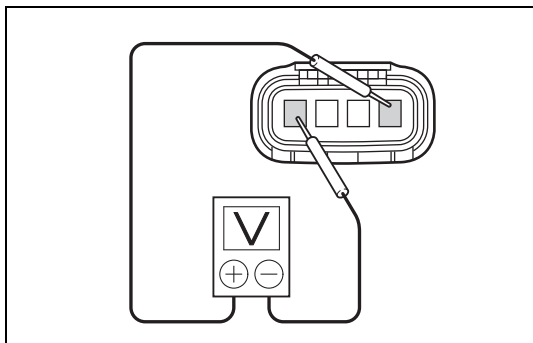
4 Inspecting the inverter start relay

SHTS03ZZZ0300082

1. Set the starter key to the "LOCK" position.
2. Remove the inverter start relay.
3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of inverter start relay. (With no voltage applied)
4. Apply the voltage of 12 V between the 1st and 2nd terminals of inverter start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay 3rd terminal – 5th terminal	Without voltage: 10 k Ω or more With voltage: less than 1 Ω

Is the measured value within the range of standard value?**YES****Go to step 5.****NO****Replace the inverter start relay.**

5 Inspecting the voltage of PCU wire harness (lower side)

SHTS03ZZZ0300083

1. Set the starter key to the "LOCK" position.
2. Connect the PCU harness (24P) connector and the inverter start relay.
3. Disconnect the inverter cooling pump connector.
4. Set the starter key to the "ON" position.
5. Using the electrical tester, measure the voltage between the connector terminals of inverter cooling pump.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Inverter cooling pump connector 1st terminal – 4th terminal	9 V or more

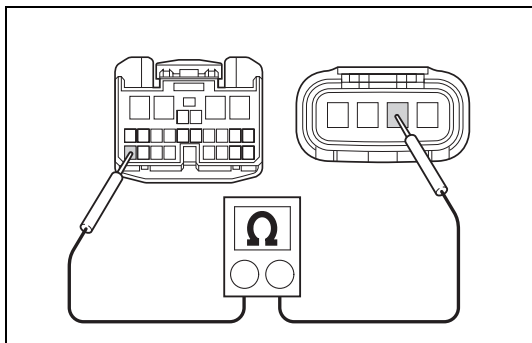
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the continuity of PCU wire harness (lower side)

SHTS03ZZZ0300084

1. Set the starter key to the "LOCK" position.
2. Disconnect the HV ECU2 connector.
3. Using the electrical tester, measure the resistance between the inverter cooling pump connector and the HV ECU2 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector – HV ECU2 connector 3rd terminal – 17th terminal	Less than 1 Ω

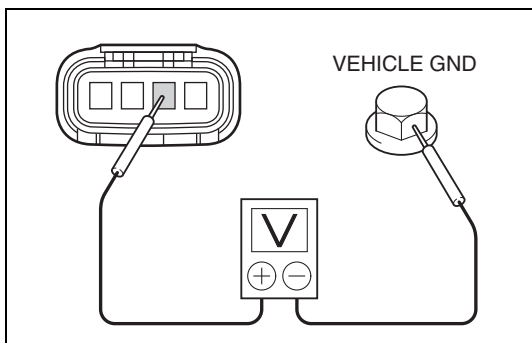
Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Replace the PCU wire harness (lower side).

7 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300085

1. Using the electrical tester, measure the resistance between the 3rd terminal of inverter cooling pump connector and GND.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 3rd terminal – GND	10 kΩ or more

Is the measured value within the range of standard value?

YES

Go to step 8.

NO

Replace the PCU wire harness (lower side).

8 Inspecting the signal line of PCU wire harness (lower side) for short circuit

- For the 3rd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

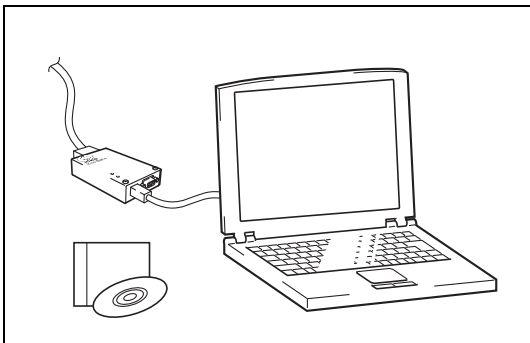
Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 3rd terminal – Each signal line	10 k Ω or more

Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Replace the inverter cooling pump.
After replacement, go to step 9.**9 Reproduction check [HINO-DX]**

SHTS03ZZZ0300086

- Connect all the connectors that have been disconnected to restore the system.
- Connect the diagnosis tool (HINO-DX) to the vehicle.
- Set the starter key to the "ON" position.
- Clear the malfunction history.
- Set the starter key to the "ON" position and wait for 1 minute.
- In [Fault Information] on the diagnosis tool screen, check if P0A06-7F is detected.

Is DTC P0A06-7F detected?

YES

Replace the HV ECU.

NO

The inspection is completed.

CHECKLIST: P0A06 (TC7F)

P0A06 (TC7F)		HV water pump drive signal Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P324B-62 or P324C-61 is detected.	DTC P324B-62 or P324C-61 is detected: Go to YES. DTC P324B-62 or P324C-61 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Checking the activation of inverter cooling pump [HINO-DX]	1. In [Activation Test] on the diagnosis tool screen, select [HV water pump drive duty value]. 2. Run the inverter cooling pump at a duty value of 90% to check that the cooling fan is rotating. <Measurement conditions> Starter key: ON <Measured item> HV water pump drive duty value <Standard values> The cooling fan is running (rotating).	Cooling fan is running: Go to YES. Cooling fan is not running: Go to NO.		Go to step 6.	Go to step 3.
3	Inspecting the voltage of vehicle wire harness	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (24P) connector. 3. Using the electrical tester, measure the voltage between the 3rd terminal of PCU harness (24P) vehicle-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) vehicle-side connector 3rd terminal – GND <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Inspect the power supply circuit ([PCU-B2 20A] fuse and wire harness).

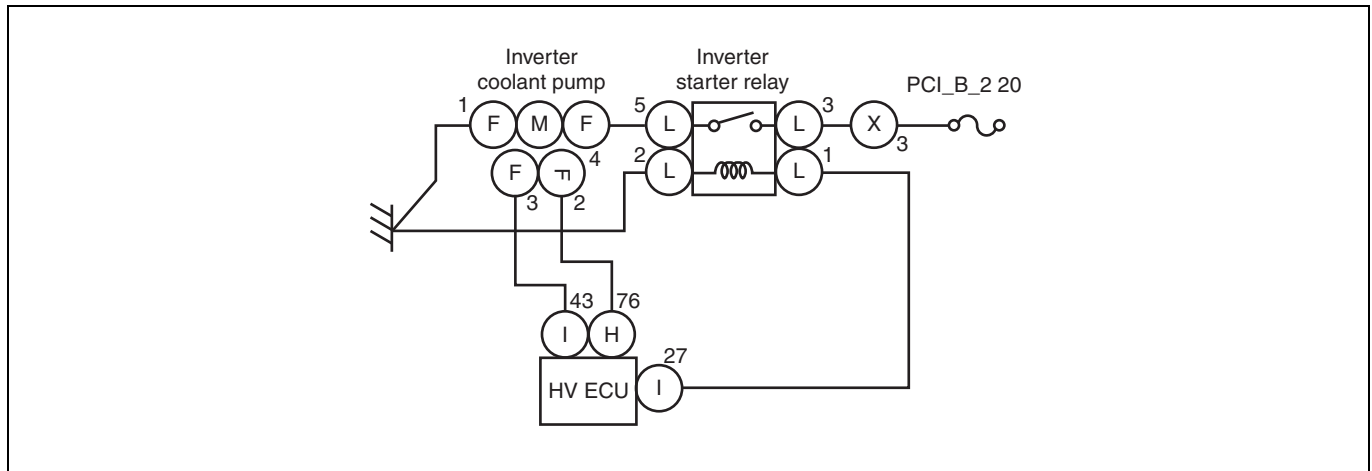
P0A06 (TC7F)		HV water pump drive signal Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the inverter start relay	1. Set the starter key to the "LOCK" position. 2. Remove the inverter start relay. 3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of inverter start relay. (With no voltage applied) 4. Apply the voltage of 12 V between the 1st and 2nd terminals of inverter start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied) <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay 3rd terminal – 5th terminal <Standard values> Without voltage: 10 kΩ or more With voltage: less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the inverter start relay.
5	Inspecting the voltage of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Connect the PCU harness (24P) connector and the inverter start relay. 3. Disconnect the inverter cooling pump connector. 4. Set the starter key to the "ON" position. 5. Using the electrical tester, measure the voltage between the connector terminals of inverter cooling pump. <Measurement conditions> Starter key: ON <Tester connections> Inverter cooling pump connector 1st terminal – 4th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).

P0A06 (TC7F)		HV water pump drive signal Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the HV ECU2 connector. 3. Using the electrical tester, measure the resistance between the inverter cooling pump connector and the HV ECU2 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector – HV ECU2 connector 3rd terminal – 17th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Inspecting the PCU wire harness (lower side) for short circuit	1. Using the electrical tester, measure the resistance between the 3rd terminal of inverter cooling pump connector and GND. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 3rd terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the PCU wire harness (lower side).
8	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 3rd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 3rd terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the inverter cooling pump. After replacement, go to step 9.

P0A06 (TC7F)		HV water pump drive signal Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
9	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "ON" position and wait for 1 minute. 6. In [Fault Information] on the diagnosis tool screen, check if P0A06-7F is detected.	DTC P0A06-7F is detected: Go to YES. DTC P0A06-7F is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0A07 (TC7E)

EN01H03ZZZ030602003017

DTC: P0A07 (TC7E) HV water pump drive signal High abnormality
INFORMATION

SHTS03ZZZ0300087

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or power supply (positive side) short circuit in the HV water pump drive signal circuit.

2. DTC set condition**(1) DTC detection condition****<Condition 1>**

- The starter key is set to the ON position.
- The control power supply voltage is 8 V or more.
- HV ECU runs within 0.5 second.

<Condition 2>

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The requested drive duty of HV water pump is above 0%.
- The output of inverter start relay is ON.

(2) Judgement criteria

- When one of the following conditions is met:

<Condition 1>

- Input signal for monitoring HV water pump drive signal remains above 4.6 V for 0.1 second or more.

<Condition 2>

The following conditions are met continuously for 0.5 second or more:

- Input signal for monitoring HV water pump drive signal is 0 Hz.
- The condition that input signal for monitoring HV water pump drive signal is above 4.6 V.

3. Reset condition

- When the following conditions are met:

<Condition 1>

- Input signal for monitoring HV water pump drive signal remains 4.6 V or less for 0.1 second or more.

<Condition 2>

- Input signal for monitoring HV water pump drive signal remains at 1 Hz or more for 5 second or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

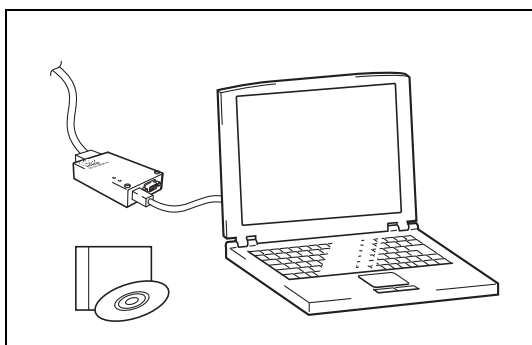
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of HV water pump
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A07 (TC7E)**1 Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Set the starter key to the "LOCK" position.
2. Disconnect the inverter cooling pump and the HV ECU2 connectors.
3. For the 3rd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 3rd terminal – Each signal line	10 k Ω or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the inverter cooling pump.
After replacement, go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300088

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "LOCK" position and wait for 1 minute.
6. Set the starter key to the "ON" position and wait for 1 minute.
7. In [Fault Information] on the diagnosis tool screen, check if P0A07-7E is detected.

Is DTC P0A07-7E detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P0A07 (TC7E)

P0A07 (TC7E)		HV water pump drive signal High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the inverter cooling pump and the HV ECU2 connectors. 3. For the 3rd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 3rd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the inverter cooling pump. After replacement, go to step 2.
2	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "LOCK" position and wait for 1 minute. 6. Set the starter key to the "ON" position and wait for 1 minute. 7. In [Fault Information] on the diagnosis tool screen, check if P0A07-7E is detected.	DTC P0A07-7E is detected: Go to YES. DTC P0A07-7E is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0A0F (TC31)

EN01H03ZZZ030602003018

DTC: P0A0F (TC31) Engine system abnormality INFORMATION

1. Technical description

- –

<Description of malfunction>

- Cranking was performed but the engine did not start. (Engine misfire)

2. DTC set condition

(1) DTC detection condition

- The starter key is set to the ON position.
- HV battery capacity (SOC) is 25% or less.
- There is no abnormality in the inverter.
- The engine speed is 100 r/min or more.
- HV control mode information = "When starting the engine"

(2) Judgement criteria

- HV control mode information = "When starting the engine" continues for the following time:
 - The engine coolant temperature or HV battery minimum temperature remains at -10 °C {14 °F} or more for 4 seconds or more.
 - The engine coolant temperature or HV battery minimum temperature remains below -10 °C {14 °F} for 8 seconds or more.

3. Reset condition

- V control mode information is not "When starting the engine."
- The engine speed remains at 650 r/min or more for 1 second or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: OFF

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine cannot be started. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.

6. Pre-inspection work

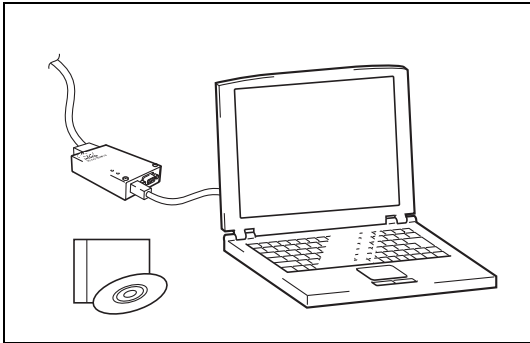
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Reduced fuel level
- Abnormality in the engine system

INSPECTION PROCEDURE: P0A0F (TC31)**1 Inspecting the engine ECU [HINO-DX]**

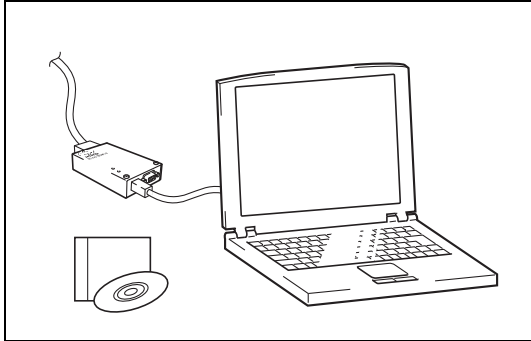
SHTS03ZZZ0300089

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any engine system DTC is detected.

Is any DTC detected from the engine ECU?**YES****Perform troubleshooting for each DTC of engine ECU.****NO****Go to step 2.****2 Inspecting the fuel level**

1. Check the fuel meter (in the combination meter) to make sure that the fuel level is Lo level or above.

Is the fuel level at Lo level or above?**YES****Go to step 3.****NO****Fill the fuel and go to step 3.**

3**Reproduction check [HINO-DX]**

SHTS03ZZZ0300090

1. In the [Data Monitor] on the diagnosis tool screen, select [HV battery minimum temperature] to read the HV battery temperature.
2. Continue cranking for 5 seconds if [HV battery minimum temperature] is -10°C $\{14^{\circ}\text{F}\}$ or more and for 8 seconds if below -10°C $\{14^{\circ}\text{F}\}$ to check that the engine starts.

Did the engine start?**YES****The inspection is completed.****NO****Inspect the engine ECU.**

CHECKLIST: P0A0F (TC31)

P0A0F (TC31)		Engine system abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the engine ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any engine system DTC is detected.	DTC is detected from the engine ECU: Go to YES. DTC is not detected from the engine ECU: Go to NO.		Perform troubleshooting for each DTC of engine ECU.	Go to step 2.
2	Inspecting the fuel level	1. Check the fuel meter (in the combination meter) to make sure that the fuel level is Lo level or above.	Fuel level is Lo level or above: Go to YES. Fuel level is not Lo level or above: Go to NO.		Go to step 3.	Fill the fuel and go to step 3.
3	Reproduction check [HINO-DX]	1. In the [Data Monitor] on the diagnosis tool screen, select [HV battery minimum temperature] to read the HV battery temperature. 2. Continue cranking for 5 seconds if [HV battery minimum temperature] is -10 °C {14 °F} or more and for 8 seconds if below -10 °C {14 °F} to check that the engine starts.	Engine started: Go to YES. Engine did not start: Go to NO.		The inspection is completed.	Inspect the engine ECU.

DTC: P0A1D (TC12)

EN01H03ZZZ030602003019

DTC: P0A1D (TC12) Abnormality in HV ECU function INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected the abnormality in the CAN communication circuit in the HV ECU. (Control CAN register stuck)

2. DTC set condition

(1) DTC detection condition

- The starter key is set to the ON position.
- HV ECU runs within 0.5 second.

(2) Judgement criteria

- When an abnormality occurs in reading or writing of the control CAN controller ID/message register

3. Reset condition

- When reading and writing of the control CAN controller ID/message register are normally executed

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- Diag lamp: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.
- The CHG, AST, ECO, and SOC lamp may go off.

6. Pre-inspection work

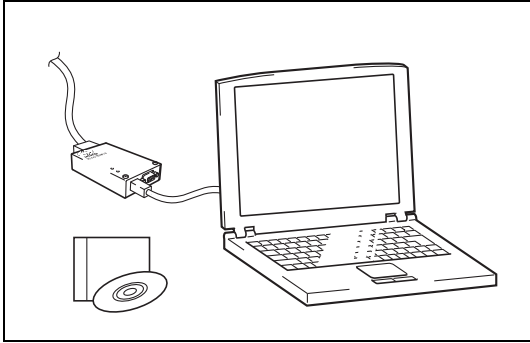
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A1D (TC12)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300091

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "LOCK" position and wait for 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1D-12 is detected.

Is DTC P0A1D-12 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A1D (TC12)

P0A1D (TC12)		Abnormality in HV ECU function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "LOCK" position and wait for 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1D-12 is detected.	DTC P0A1D-12 is detected: Go to YES. DTC P0A1D-12 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1D (TC17)

DTC: P0A1D (TC17) Abnormality in HV ECU function INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the CAN communication circuit in the HV ECU. (DIAG CAN register stuck)

2. DTC set condition

(1) DTC detection condition

- The starter key is set to the ON position.
- HV ECU runs within 0.5 second.

(2) Judgement criteria

- When an abnormality occurs in reading or writing of the DIAG CAN controller ID/message register

3. Reset condition

- When reading and writing of the DIAG CAN controller ID/message register are normally executed

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.
- The CHG, AST, ECO, and SOC lamp may go off.

6. Pre-inspection work

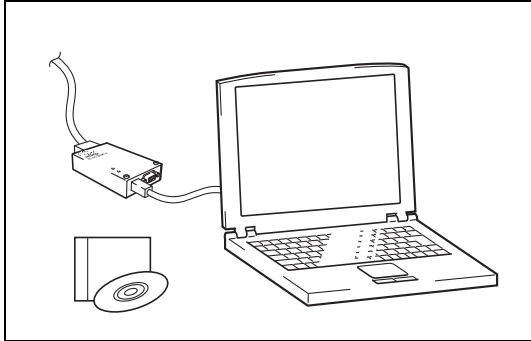
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A1D (TC17)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300092

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "LOCK" position and wait for 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1D-17 is detected.

Is DTC P0A1D-17 detected?**YES**

Replace the HV ECU.
(Take the same steps when communication with the diagnosis tool is not available.)

NO

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0A1D (TC17)

P0A1D (TC17)		Abnormality in HV ECU function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "LOCK" position and wait for 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1D-17 is detected.	DTC P0A1D-17 is detected: Go to YES. DTC P0A1D-17 is not detected: Go to NO.		Replace the HV ECU. (Take the same steps when communication with the diagnosis tool is not available.)	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A78 (TC21)

EN01H03ZZZ030602003021

DTC: P0A78 (TC21) Abnormality in the inverter INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter or HV motor (critical abnormality of inverter).

2. DTC set condition

(1) DTC detection condition

- CAN communication with the inverter is normal.

(2) Judgement criteria

- When critical abnormality information is received from the inverter through CAN communication

3. Reset condition

- No critical abnormality information is received from the inverter through CAN communication.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

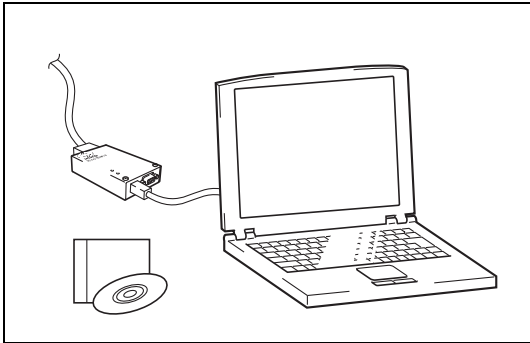
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

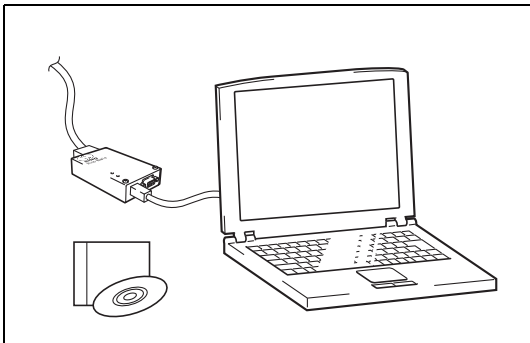
8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A78 (TC21)**1 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300093

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300094

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Perform a test run for approximately 1 hour. (Replace the inverter if starting fails.)
4. In [Fault Information] on the diagnosis tool screen, check if P0A78-21 is detected.

Is DTC P0A78-21 detected?**YES****Replace the inverter.****NO****The inspection is completed.**

CHECKLIST: P0A78 (TC21)

P0A78 (TC21)		Abnormality in the inverter		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Perform a test run for approximately 1 hour. (Replace the inverter if starting fails.) 4. In [Fault Information] on the diagnosis tool screen, check if P0A78-21 is detected.	DTC P0A78-21 is detected: Go to YES. DTC P0A78-21 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A78 (TC22)

EN01H03ZZZ030602003022

DTC: P0A78 (TC22) Abnormality in the inverter INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter or HV motor (minor abnormality of inverter).

2. DTC set condition

- (1) DTC detection condition
 - CAN communication with the inverter is normal.
- (2) Judgement criteria
 - When minor abnormality information is received from the inverter through CAN communication

3. Reset condition

- No minor abnormality information is received from the inverter through CAN communication.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration

6. Pre-inspection work

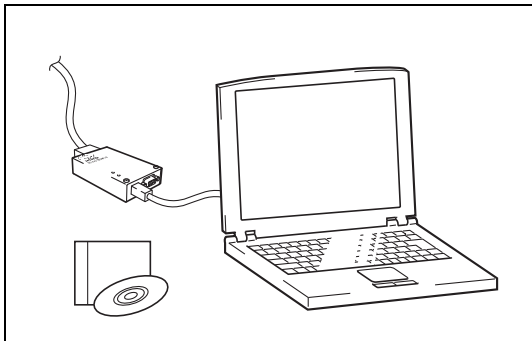
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

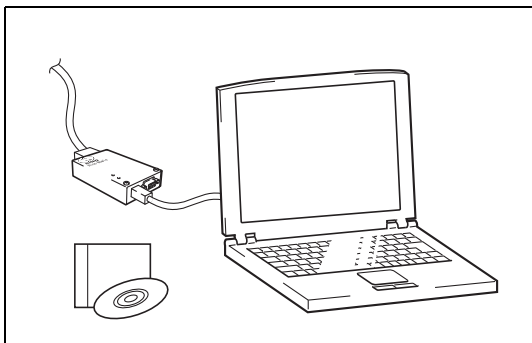
8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A78 (TC22)**1 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300095

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300096

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Perform a test run for approximately 1 hour. (Replace the inverter if starting fails.)
4. In [Fault Information] on the diagnosis tool screen, check if P0A78-22 is detected.

Is DTC P0A78-22 detected?**YES****Replace the inverter.****NO****The inspection is completed.**

CHECKLIST: P0A78 (TC22)

P0A78 (TC22)		Abnormality in the inverter		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Perform a test run for approximately 1 hour. (Replace the inverter if starting fails.) 4. In [Fault Information] on the diagnosis tool screen, check if P0A78-22 is detected.	DTC P0A78-22 is detected: Go to YES. DTC P0A78-22 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A7E (TC48)

EN01H03ZZZ030602003023

DTC: P0A7E (TC48) Abnormality in high temperature of HV battery INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected the high temperature abnormality in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The starter key is set to the ON position.
- Control power supply voltage remains at 10 V or more for 0.5 second or more.
- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- When the HV battery temperature continues to be out of the standard range

3. Reset condition

- When the HV battery temperature continues to be within the standard range

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of HV battery line
- Malfunction of HV battery cooling fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A7E (TC48)**1 Inspecting the blower duct**

1. Check that the cooling fan and duct are free from damage and clogging.

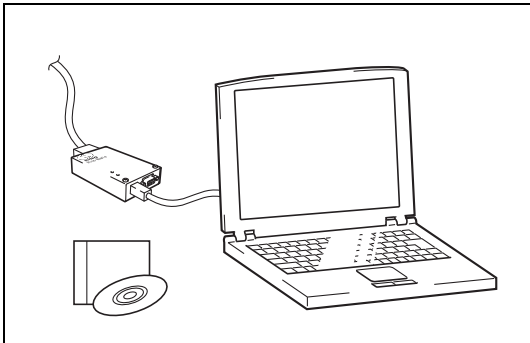
Is any defect found?

YES

Replace the blower duct.
After replacement, go to step 2.

NO

Go to step 2.

2 Reading the DTC [HINO-DX]

SHTS03ZZZ0300097

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of HV battery cooling fan is detected.
 - P0A84-66, P0A65-65, P0BCA-68, P0A82-67

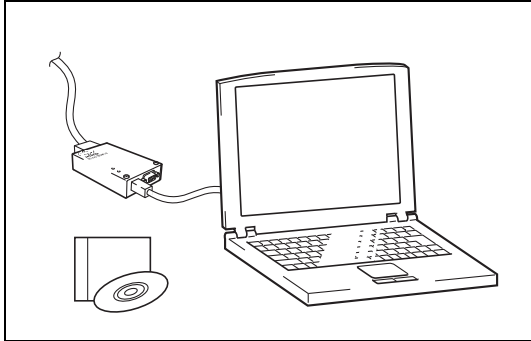
Is any DTC other than P0A7E-48 detected?

YES

Perform troubleshooting for each of related DTC.

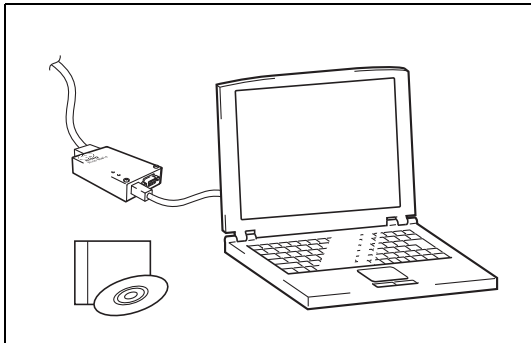
NO

Go to step 3.

3 Inspecting the HV battery ECU [HINO-DX]

SHTS03ZZZ0300098

1. Select [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery temperature sensor is detected in the HV battery ECU.

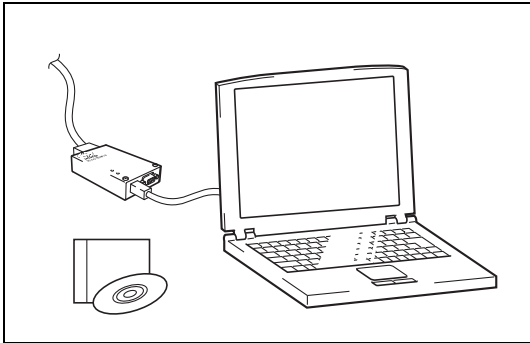
Is any DTC related to the HV battery temperature sensor detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 4.****4 Inspecting the operation of HV battery cooling fan [HINO-DX]**

SHTS03ZZZ0300099

1. In [Activation Test] on the diagnosis tool screen, select [HV battery cooling fan duty value].
2. Run the HV battery cooling fan at the duty value of 90% to check that the cooling fan is rotating.

Measurement conditions	Measured item	Standard values
Starter key: ON	HV battery cooling fan duty value	The cooling fan is running (rotating).

Is the cooling fan running?**YES****Go to step 5.****NO****Replace the HV battery cooling fan.**

5 Inspecting the HV battery temperature sensor [HINO-DX]

SHTS03ZZZ0300100

1. Set the starter key to the "LOCK" position.
2. Leave (cool) the vehicle for approximately 1 hour.
3. Start and then idle the engine.
4. In [Data Monitor] on the diagnosis tool screen, monitor [Maximum temperature of HV battery].

Measurement conditions	Measured item	Standard values
Starter key: ON After cooling, idling state	Maximum temperature of HV battery	Less than 80 °C {176 °F}

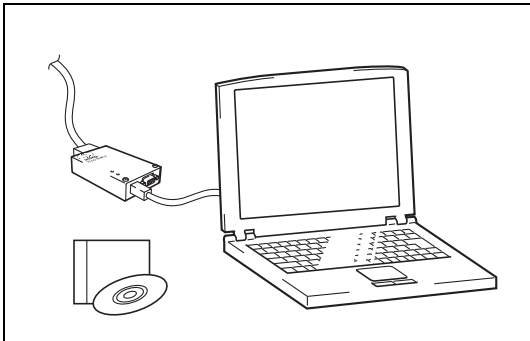
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the HV battery ECU.
After replacement, go to step 6.

6 Reproduction check [HINO-DX]

SHTS03ZZZ0300101

1. Restore the system.
2. Clear the malfunction history.
3. Perform a test run for approximately 1 hour.
4. In [Fault Information] on the diagnosis tool screen, check if P0A7E-48 is detected.

Is DTC P0A7E-48 detected?

YES

Replace the HV battery.

NO

The inspection is completed.(If no repair or parts replacement is performed, there may be a temporary temperature increase due to clogging of blower duct.)

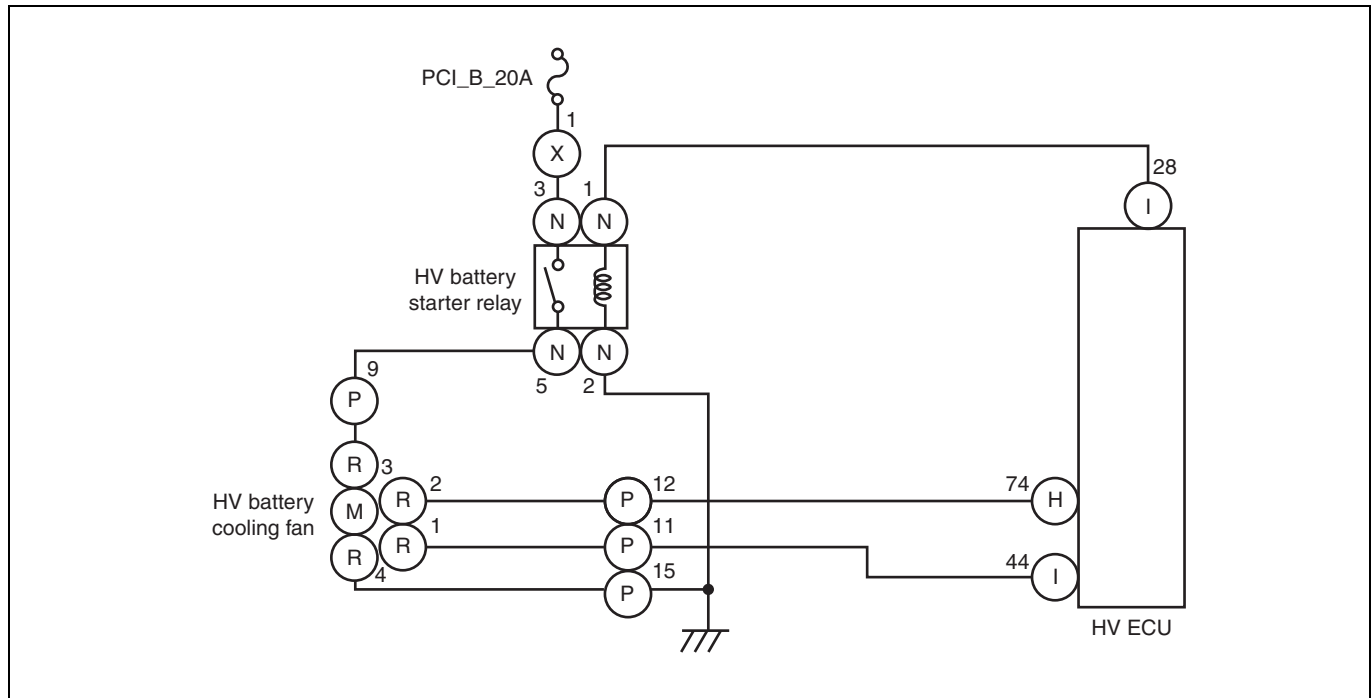
CHECKLIST: P0A7E (TC48)

P0A7E (TC48)		Abnormality in high temperature of HV battery		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the blower duct	1. Check that the cooling fan and duct are free from damage and clogging.	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the blower duct. After replacement, go to step 2.	Go to step 2.
2	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of HV battery cooling fan is detected. • P0A84-66, P0A65-65, P0BCA-68, P0A82-67	DTC other than P0A7E-48 is detected: Go to YES. DTC other than P0A7E-48 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the HV battery ECU [HINO-DX]	1. Select [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery temperature sensor is detected in the HV battery ECU.	DTC related to the HV battery temperature sensor is detected: Go to YES. DTC related to the HV battery temperature sensor is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 4.
4	Inspecting the operation of HV battery cooling fan [HINO-DX]	1. In [Activation Test] on the diagnosis tool screen, select [HV battery cooling fan duty value]. 2. Run the HV battery cooling fan at the duty value of 90% to check that the cooling fan is rotating. <Measurement conditions> Starter key: ON <Measured item> HV battery cooling fan duty value <Standard values> The cooling fan is running (rotating).	Cooling fan is running: Go to YES. Cooling fan is not running: Go to NO.		Go to step 5.	Replace the HV battery cooling fan.

P0A7E (TC48)		Abnormality in high temperature of HV battery		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the HV battery temperature sensor [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Leave (cool) the vehicle for approximately 1 hour. 3. Start and then idle the engine. 4. In [Data Monitor] on the diagnosis tool screen, monitor [Maximum temperature of HV battery]. <Measurement conditions> Starter key: ON After cooling, idling state <Measured item> Maximum temperature of HV battery <Standard values> Less than 80 °C {176 °F}	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the HV battery ECU. After replacement, go to step 6.
6	Reproduction check [HINO-DX]	1. Restore the system. 2. Clear the malfunction history. 3. Perform a test run for approximately 1 hour. 4. In [Fault Information] on the diagnosis tool screen, check if P0A7E-48 is detected.	DTC P0A7E-48 is detected: Go to YES. DTC P0A7E-48 is not detected: Go to NO.		Replace the HV battery.	The inspection is completed. (If no repair or parts replacement is performed, there may be a temporary temperature increase due to clogging of blower duct.)

DTC: P0A82 (TC67)

EN01H03ZZZ030602003024

DTC: P0A82 (TC67) Abnormality in function of HV battery cooling fan
INFORMATION

SHTS03ZZZ0300102

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the function of HV battery cooling fan.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The drive duty of HV battery cooling fan is 20% or more.
- The drive duty of HV battery cooling fan is 90% or less.
- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- One of the conditions below is met continuously for 10 seconds or more.
 - The number of revolution of the HV battery cooling fan is higher than the upper limit.
 - The number of revolution of the HV battery cooling fan is lower than the lower limit.(For the upper and lower limits, see below.)

<Lower limit>

HV battery cooling fan drive duty of 20%: 252.0 r/min
HV battery cooling fan drive duty of 30%: 595.0 r/min
HV battery cooling fan drive duty of 40%: 892.0 r/min
HV battery cooling fan drive duty of 50%: 1150.0 r/min
HV battery cooling fan drive duty of 60%: 1391.0 r/min
HV battery cooling fan drive duty of 70%: 1609.0 r/min
HV battery cooling fan drive duty of 80%: 1802.0 r/min
HV battery cooling fan drive duty of 90%: 1976.0 r/min

<Upper limit>

HV battery cooling fan drive duty of 20%: 1416.7 r/min
 HV battery cooling fan drive duty of 30%: 1886.3 r/min
 HV battery cooling fan drive duty of 40%: 2317.8 r/min
 HV battery cooling fan drive duty of 50%: 2697.9 r/min
 HV battery cooling fan drive duty of 60%: 3014.0 r/min
 HV battery cooling fan drive duty of 70%: 3291.9 r/min
 HV battery cooling fan drive duty of 80%: 3522.8 r/min
 HV battery cooling fan drive duty of 90%: 3742.8 r/min

3. Reset condition

- One of the following conditions is met continuously for 10 seconds or more:
 - The number of revolutions of the HV battery fan is lower than or equal to the upper limit.
 - The number of revolutions of the HV battery fan is higher than or equal to the lower limit
 (For the upper and lower limits, see below.)

<Lower limit>

HV battery cooling fan drive duty of 20%: 252.0 r/min
 HV battery cooling fan drive duty of 30%: 595.0 r/min
 HV battery cooling fan drive duty of 40%: 892.0 r/min
 HV battery cooling fan drive duty of 50%: 1150.0 r/min
 HV battery cooling fan drive duty of 60%: 1391.0 r/min
 HV battery cooling fan drive duty of 70%: 1609.0 r/min
 HV battery cooling fan drive duty of 80%: 1802.0 r/min
 HV battery cooling fan drive duty of 90%: 1976.0 r/min

<Upper limit>

HV battery cooling fan drive duty of 20%: 1416.7 r/min
 HV battery cooling fan drive duty of 30%: 1886.3 r/min
 HV battery cooling fan drive duty of 40%: 2317.8 r/min
 HV battery cooling fan drive duty of 50%: 2697.9 r/min
 HV battery cooling fan drive duty of 60%: 3014.0 r/min
 HV battery cooling fan drive duty of 70%: 3291.9 r/min
 HV battery cooling fan drive duty of 80%: 3522.8 r/min
 HV battery cooling fan drive duty of 90%: 3742.8 r/min

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV battery cooling fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A82 (TC67)**1 Inspecting the blower duct**

1. Check that the cooling fan and duct are free from damage and clogging.

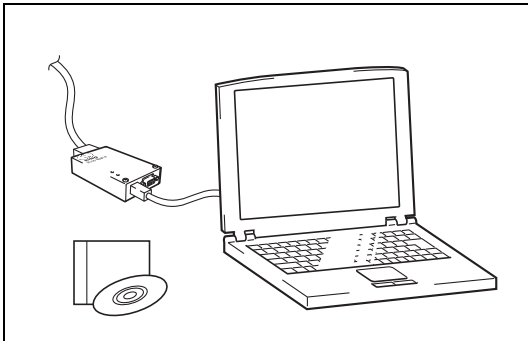
Is any defect found?

YES

Replace the blower duct.
After replacement, go to step 2.

NO

Go to step 2.

2 Reading the DTC [HINO-DX]

SHTS03ZZZ0300103

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of HV battery cooling fan is detected.
 - P0A84-66, P0A65-65, P0BCA-68

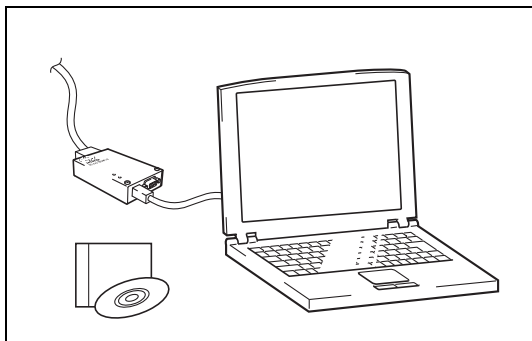
Is any DTC other than P0A82-67 detected?

YES

Perform troubleshooting for each of related DTC.

NO

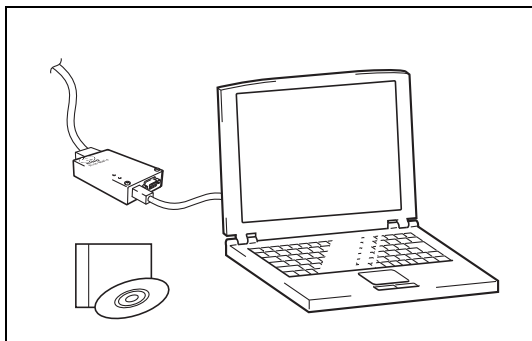
Go to step 3.

3 Inspecting the operation of HV battery cooling fan [HINO-DX]

SHTS03ZZZ0300104

1. From [Activation Test] on the diagnosis tool screen, select [HV battery cooling fan duty value].
2. Run the HV battery cooling fan at the duty value of 90% to check that the cooling fan is rotating.

Measurement conditions	Measured item	Standard values
Starter key: ON	HV battery cooling fan duty value	The cooling fan is running (rotating).

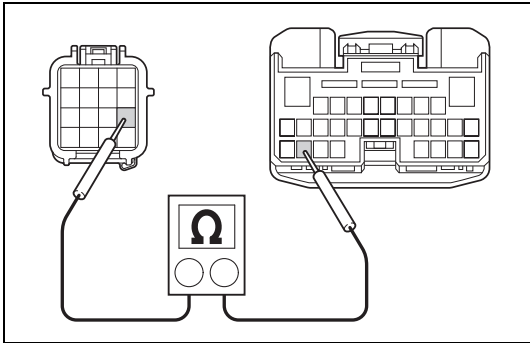
Is the cooling fan running?**YES****Go to step 4.****NO****Replace the HV battery cooling fan.****4 Checking the number of revolutions of HV battery cooling fan [HINO-DX]**

SHTS03ZZZ0300105

1. In [Activation Test] on the diagnosis tool screen, change the operation duty value of HV battery cooling fan to 20 and 90%.
2. In the [Data Monitor] on the diagnosis tool screen, select [Number of revolutions of HV battery cooling fan] and read the number of revolutions at each duty value.

Measurement conditions	Measured item	Standard values
Starter key: ON	Number of revolutions of HV battery cooling fan	Duty value (20%): 1416 r/min or lower Duty value (90%): 3742 r/min or lower

Is the measured value within the range of standard value?**YES****Go to step 5.****NO****Replace the HV battery cooling fan.**

5 Inspecting the continuity of PCU wire harness (lower side)

SHTS03ZZZ0300106

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of HV ECU1 and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the HV ECU1 connector and the lower-side connector terminal of PCU harness (16P).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV ECU1 connector – PCU harness (16P) lower-side connector 24th terminal – 12th terminal	Less than 1 Ω

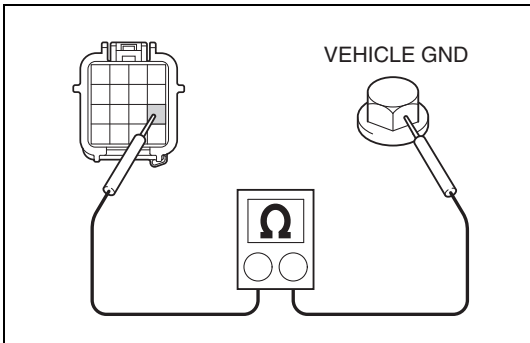
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300107

1. Using the electrical tester, measure the resistance between the lower-side connector 12th terminal of PCU harness (16P) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 12th terminal – GND	10 kΩ or more

Is the measured value within the range of standard value?

YES

Go to step 7.

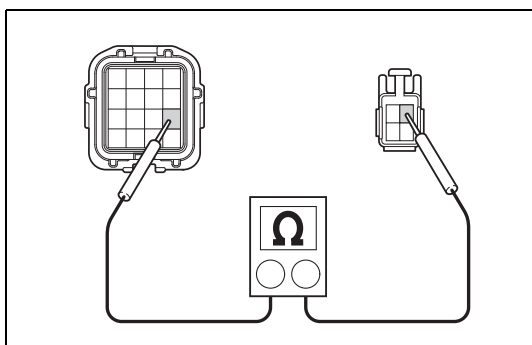
NO

Replace the PCU wire harness (lower side).

7 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. For the 12th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 12th terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Go to step 8.****8 Inspecting the continuity of PCU wire harness (upper side)**

1. Disconnect the connector of HV battery cooling fan.
2. Using the electrical tester, measure the resistance between the upper-side connector of PCU harness (16P) and the connector terminal of HV battery cooling fan.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector – HV battery cooling fan connector 12th terminal – 2nd terminal	Less than 1 Ω

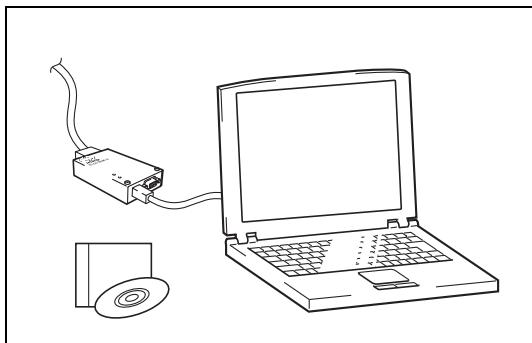
Is the measured value within the range of standard value?**YES****Go to step 9.****NO****Replace the PCU wire harness (upper side).**

9**Inspecting the signal line of PCU wire harness (upper side) for short circuit**

1. For the 12th terminal of PCU harness (16P) upper-side connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 12th terminal – Each signal line	10 k Ω or more

Is any defect found?**YES****Replace the PCU wire harness (upper side).****NO****Replace the HV battery cooling fan.
After replacement, go to step 10.**

10 **Reproduction check [HINO-DX]**

SHTS03ZZZ0300109

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Clear the malfunction history.
4. In [Activation Test] on the diagnosis tool screen, select [HV battery cooling fan duty value].
5. Run the HV battery cooling fan at the duty value of 20% for 1 minute.
6. Run the HV battery cooling fan at the duty value of 90% for 1 minute.
7. Set the starter key to the "LOCK" position and wait for 1 minute.
8. Set the starter key to the "ON" position.
9. Run the HV battery cooling fan at the duty value of 20% for 1 minute.
10. Run the HV battery cooling fan at the duty value of 90% for 1 minute.
11. In [Fault Information] on the diagnosis tool screen, check if P0A82-67 is detected.

Is DTC P0A82-67 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P0A82 (TC67)

P0A82 (TC67)		Abnormality in function of HV battery cooling fan		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the blower duct	1. Check that the cooling fan and duct are free from damage and clogging.	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the blower duct. After replacement, go to step 2.	Go to step 2.
2	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of HV battery cooling fan is detected. • P0A84-66, P0A65-65, P0BCA-68	DTC other than P0A82-67 is detected: Go to YES. DTC other than P0A82-67 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the operation of HV battery cooling fan [HINO-DX]	1. From [Activation Test] on the diagnosis tool screen, select [HV battery cooling fan duty value]. 2. Run the HV battery cooling fan at the duty value of 90% to check that the cooling fan is rotating. <Measurement conditions> Starter key: ON <Measured item> HV battery cooling fan duty value <Standard values> The cooling fan is running (rotating).	Cooling fan is running: Go to YES. Cooling fan is not running: Go to NO.		Go to step 4.	Replace the HV battery cooling fan.

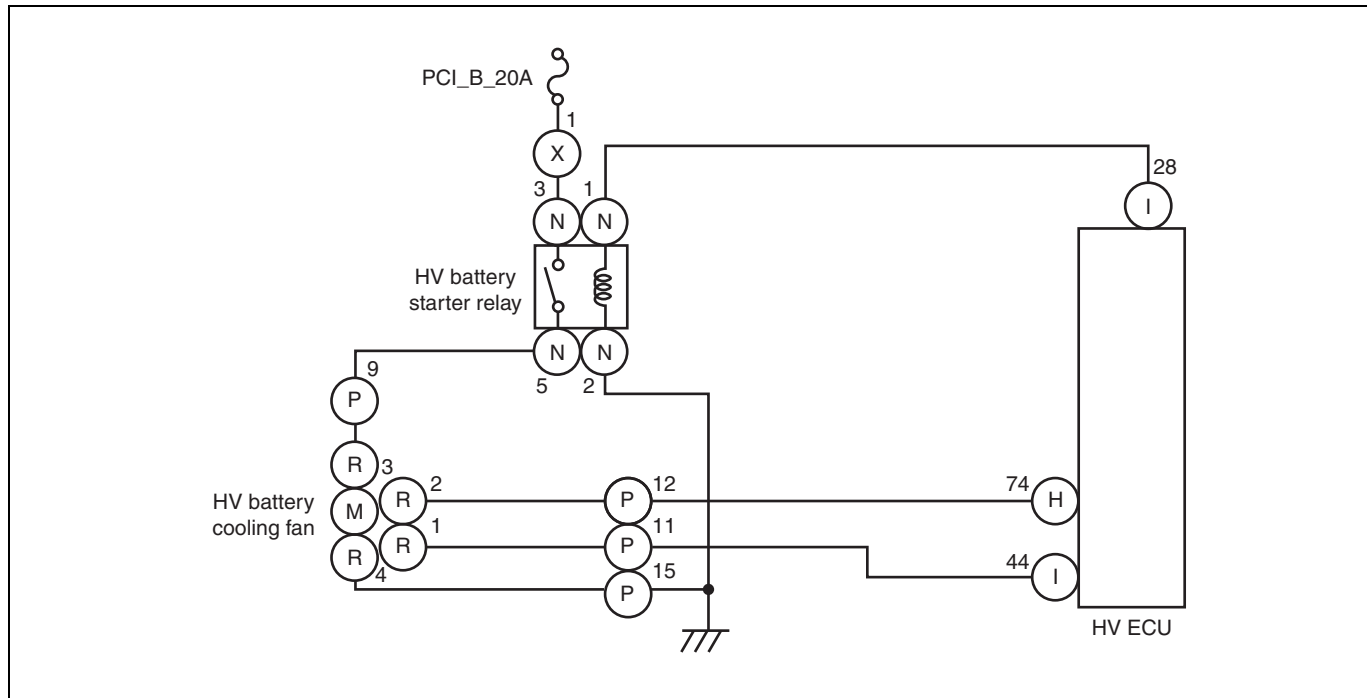
P0A82 (TC67)		Abnormality in function of HV battery cooling fan		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Checking the number of revolutions of HV battery cooling fan [HINO-DX]	1. In [Activation Test] on the diagnosis tool screen, change the operation duty value of HV battery cooling fan to 20 and 90%. 2. In the [Data Monitor] on the diagnosis tool screen, select [Number of revolutions of HV battery cooling fan] and read the number of revolutions at each duty value. <Measurement conditions> Starter key: ON <Measured item> Number of revolutions of HV battery cooling fan <Standard values> Duty value (20%) : 1416 r/min or lower Duty value (90%) : 3742 r/min or lower	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the HV battery cooling fan.
5	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of HV ECU1 and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the HV ECU1 connector and the lower-side connector terminal of PCU harness (16P). <Measurement conditions> Starter key: LOCK <Tester connections> HV ECU1 connector – PCU harness (16P) lower-side connector 24th terminal – 12th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for short circuit	1. Using the electrical tester, measure the resistance between the lower-side connector 12th terminal of PCU harness (16P) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 12th terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).

P0A82 (TC67)		Abnormality in function of HV battery cooling fan		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 12th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 12th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 8.
8	Inspecting the continuity of PCU wire harness (upper side)	1. Disconnect the connector of HV battery cooling fan. 2. Using the electrical tester, measure the resistance between the upper-side connector of PCU harness (16P) and the connector terminal of HV battery cooling fan. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector – HV battery cooling fan connector 12th terminal – 2nd terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the PCU wire harness (upper side).
9	Inspecting the signal line of PCU wire harness (upper side) for short circuit	1. For the 12th terminal of PCU harness (16P) upper-side connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 12th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (upper side).	Replace the HV battery cooling fan. After replacement, go to step 10.

P0A82 (TC67)		Abnormality in function of HV battery cooling fan		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
10	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Clear the malfunction history. 4. In [Activation Test] on the diagnosis tool screen, select [HV battery cooling fan duty value]. 5. Run the HV battery cooling fan at the duty value of 20% for 1 minute. 6. Run the HV battery cooling fan at the duty value of 90% for 1 minute. 7. Set the starter key to the "LOCK" position and wait for 1 minute. 8. Set the starter key to the "ON" position. 9. Run the HV battery cooling fan at the duty value of 20% for 1 minute. 10. Run the HV battery cooling fan at the duty value of 90% for 1 minute. 11. In [Fault Information] on the diagnosis tool screen, check if P0A82-67 is detected.	DTC P0A82-67 is detected: Go to YES. DTC P0A82-67 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0A84 (TC66)

EN01H03ZZZ030602003025

DTC: P0A84 (TC66) Abnormality in HV battery cooling fan drive signal Low
INFORMATION

SHTS03ZZZ0300110

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or GND short circuit in the HV battery cooling fan drive signal circuit.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- The following conditions are met continuously for 0.5 second or more:
Input signal for monitoring HV battery cooling fan drive signal is 0 Hz.
Input signal for monitoring HV battery cooling fan drive signal is less than 0.2V.

3. Reset condition

- Input signal for monitoring HV battery cooling fan drive signal remains at 1 Hz or more for 5 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

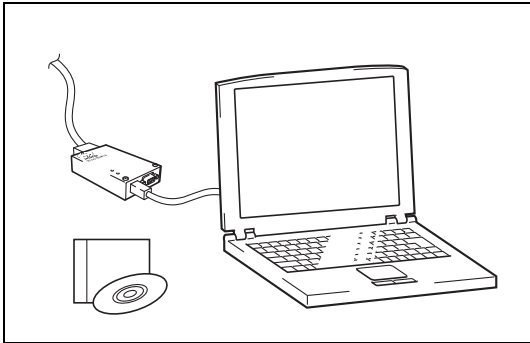
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

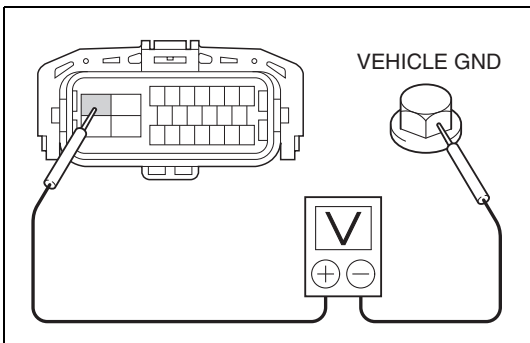
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV battery cooling fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A84 (TC66)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300111

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of HV battery start relay is detected.
 - P33B1-64, P33B2-63

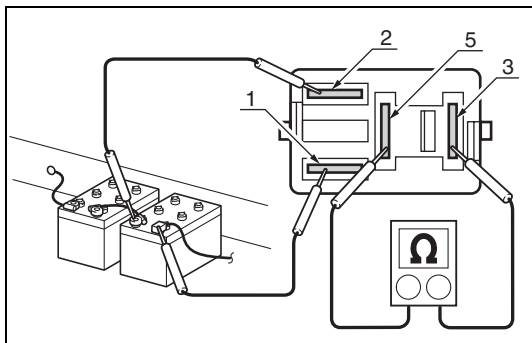
Is any DTC other than P0A84-66 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the voltage of vehicle wire harness**

SHTS03ZZZ0300112

1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (24P) connector.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the 1st terminal of PCU harness (24P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle-side connector 1st terminal – GND	9 V or more

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Inspect the power supply circuit ([PCI-B 20A] fuse and wire harness).**

3 Inspecting the HV battery start relay

1. Set the starter key to the "LOCK" position.
2. Remove the HV battery start relay.
3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of HV battery start relay. (With no voltage applied)
4. Apply the voltage of 12 V between the 1st and 2nd terminals of HV battery start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV battery start relay 3rd terminal – 5th terminal	Without voltage: 10 k Ω or more With voltage: less than 1 Ω

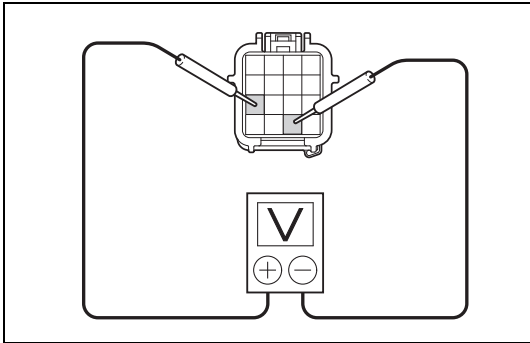
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the HV battery start relay.

4 Inspecting the voltage of PCU wire harness (lower side)

1. Connect the PCU harness (24P) connector and the HV battery start relay.
2. Disconnect the PCU harness (16P) connector.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the lower-side connector terminals of PCU harness (16P).

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (16P) lower-side connector 9th terminal – 15th terminal	9 V or more

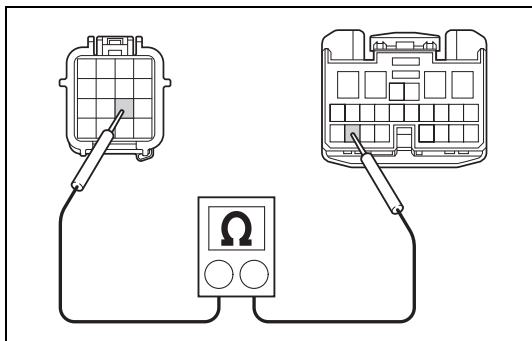
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the PCU wire harness (lower side).

5 Inspecting the continuity of PCU wire harness (lower side)

SHTS03ZZZ0300115

1. Set the starter key to the "LOCK" position.
2. Disconnect the HV ECU2 connector.
3. Using the electrical tester, measure the resistance between the lower-side connector terminal of PCU harness (16P) and the HV ECU2 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector – HV ECU2 connector 11th terminal – 18th terminal	Less than 1 Ω

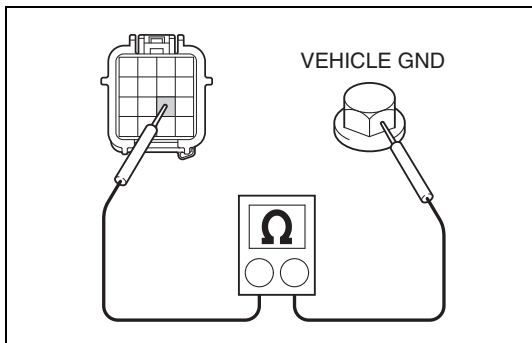
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300116

1. Using the electrical tester, measure the resistance between the lower-side connector 11th terminal of PCU harness (16P) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 11th terminal – GND	10 kΩ or more

Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Replace the PCU wire harness (lower side).

7 Inspecting the signal line of PCU wire harness (lower side) for short circuit

- For the 11th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 11th terminal – Each signal line	10 kΩ or more

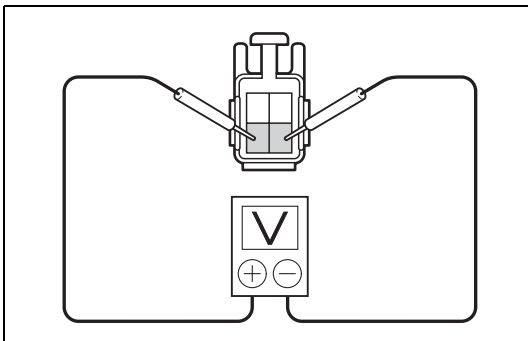
Is any defect found?

YES

NO

Replace the PCU wire harness (lower side).

Go to step 8.

8 Inspecting the voltage of PCU wire harness (upper side)

SHTS03ZZZ0300117

- Set the starter key to the "LOCK" position.
- Connect all the connectors that have been disconnected.
- Disconnect the connector of HV battery cooling fan.
- Set the starter key to the "ON" position.
- Using the electrical tester, measure the voltage between the connector terminals of HV battery cooling fan.

Measurement conditions	Tester connections	Standard values
Starter key: ON	HV battery cooling fan connector 3rd terminal – 4th terminal	9 V or more

Is the measured value within the range of standard value?

YES

NO

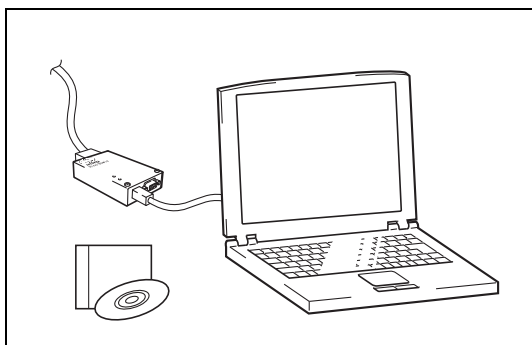
Go to step 9.

Replace the PCU wire harness (upper side).

9 Inspecting the signal line of PCU wire harness (upper side) for short circuit

1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (16P) connector.
3. For the 11th terminal of PCU upper-side wire harness connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 11th terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (upper side).****NO****Replace the HV battery cooling fan.
After replacement, go to step 10.****10 Reproduction check [HINO-DX]**

SHTS03ZZZ0300118

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "LOCK" position.
3. Connect the diagnosis tool (HINO-DX) to the vehicle.
4. Set the starter key to the "ON" position.
5. Clear the malfunction history.
6. Set the starter key to the "LOCK" position and wait for 1 minute.
7. Set the starter key to the "ON" position.
8. In [Fault Information] on the diagnosis tool screen, check if P0A84-66 is detected.

Is DTC P0A84-66 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P0A84 (TC66)

P0A84 (TC66)		Abnormality in HV battery cooling fan drive signal Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of HV battery start relay is detected. • P33B1-64, P33B2-63	DTC other than P0A84-66 is detected: Go to YES. DTC other than P0A84-66 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the voltage of vehicle wire harness	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (24P) connector. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the 1st terminal of PCU harness (24P) vehicle-side connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle-side connector 1st terminal – GND <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Inspect the power supply circuit ([PCI-B 20A] fuse and wire harness).

P0A84 (TC66)		Abnormality in HV battery cooling fan drive signal Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the HV battery start relay	1. Set the starter key to the "LOCK" position. 2. Remove the HV battery start relay. 3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of HV battery start relay. (With no voltage applied) 4. Apply the voltage of 12 V between the 1st and 2nd terminals of HV battery start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied) <Measurement conditions> Starter key: LOCK <Tester connections> HV battery start relay 3rd terminal – 5th terminal <Standard values> Without voltage: 10 kΩ or more With voltage: less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the HV battery start relay.
4	Inspecting the voltage of PCU wire harness (lower side)	1. Connect the PCU harness (24P) connector and the HV battery start relay. 2. Disconnect the PCU harness (16P) connector. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the lower-side connector terminals of PCU harness (16P). <Measurement conditions> Starter key: ON <Tester connections> PCU harness (16P) lower-side connector 9th terminal – 15th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).

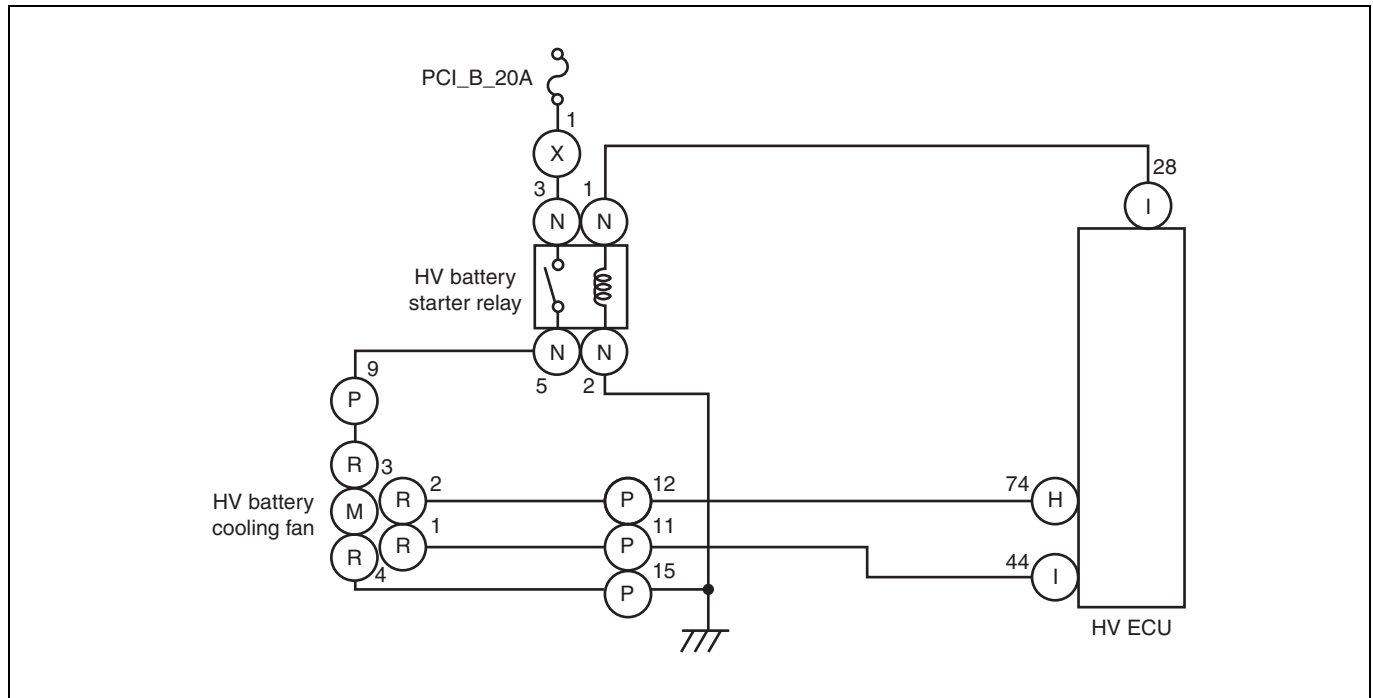
P0A84 (TC66)		Abnormality in HV battery cooling fan drive signal Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the HV ECU2 connector. 3. Using the electrical tester, measure the resistance between the lower-side connector terminal of PCU harness (16P) and the HV ECU2 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector – HV ECU2 connector 11th terminal – 18th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for short circuit	1. Using the electrical tester, measure the resistance between the lower-side connector 11th terminal of PCU harness (16P) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 11th terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 11th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 11th terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 8.

P0A84 (TC66)		Abnormality in HV battery cooling fan drive signal Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
8	Inspecting the voltage of PCU wire harness (upper side)	1. Set the starter key to the "LOCK" position. 2. Connect all the connectors that have been disconnected. 3. Disconnect the connector of HV battery cooling fan. 4. Set the starter key to the "ON" position. 5. Using the electrical tester, measure the voltage between the connector terminals of HV battery cooling fan. <Measurement conditions> Starter key: ON <Tester connections> HV battery cooling fan connector 3rd terminal – 4th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the PCU wire harness (upper side).
9	Inspecting the signal line of PCU wire harness (upper side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (16P) connector. 3. For the 11th terminal of PCU upper-side wire harness connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 11th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (upper side).	Replace the HV battery cooling fan. After replacement, go to step 10.

P0A84 (TC66)		Abnormality in HV battery cooling fan drive signal Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
10	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "LOCK" position. 3. Connect the diagnosis tool (HINO-DX) to the vehicle. 4. Set the starter key to the "ON" position. 5. Clear the malfunction history. 6. Set the starter key to the "LOCK" position and wait for 1 minute. 7. Set the starter key to the "ON" position. 8. In [Fault Information] on the diagnosis tool screen, check if P0A84-66 is detected.	DTC P0A84-66 is detected: Go to YES. DTC P0A84-66 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0A85 (TC65)

EN01H03ZZZ030602003026

DTC: P0A85 (TC65) Abnormality in HV battery cooling fan drive signal High
INFORMATION

SHTS03ZZZ0300119

1. Technical description

- –

<Description of malfunction>

- Detected a power supply (positive side) short circuit in the HV battery cooling fan drive signal circuit.

2. DTC set condition

- (1) DTC detection condition

<Condition A>

- The starter key is set to the ON position.
- The control power supply voltage is 8 V or more.
- HV ECU runs within 0.5 second.

<Condition B>

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.

- (2) Judgement criteria

- When one of the following conditions is met:

<Condition A>

Input signal for monitoring HV battery cooling fan drive signal remains higher than 3.6 V for 0.1 second or more.

<Condition B>

The following conditions are met continuously for 0.5 second or more:

- Input signal for monitoring HV battery cooling fan drive signal is 0 Hz.
- Input signal for monitoring HV battery cooling fan drive signal is higher than 3.6 V.

3. Reset condition

- When the following conditions are met:
<Condition A>
Input signal for monitoring HV battery cooling fan drive signal remains at 3.6 V or less for 0.1 second or more.
<Condition B>
Input signal for monitoring HV battery cooling fan drive signal remains at 1 Hz or more for 0.5 second or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of HV battery ECU start relay
- Malfunction of HV battery cooling fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A85 (TC65)

1	Inspecting the signal line of PCU wire harness (lower side) for short circuit
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1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (16P) connector and the HV ECU2 connector.
3. For the 11th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 11th terminal – Each signal line	10 k Ω or more

Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Go to step 2.

2 Inspecting the signal line of PCU wire harness (upper side) for short circuit

- For the 11th terminal of PCU harness (16P) upper-side connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 11th terminal – Each signal line	10 kΩ or more

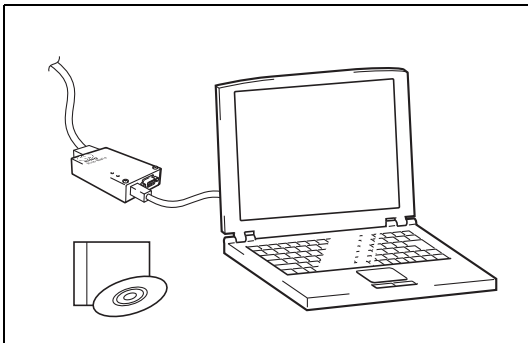
Is any defect found?

YES

Replace the PCU wire harness (upper side).

NO

Replace the HV battery cooling fan and go to step 3.

3 Reproduction check [HINO-DX]

SHTS03ZZZ0300120

- Connect all the connectors that have been disconnected to restore the system.
- Set the starter key to the "LOCK" position.
- Connect the diagnosis tool (HINO-DX) to the vehicle.
- Set the starter key to the "ON" position.
- Clear the malfunction history.
- Set the starter key to the "LOCK" position and wait for 1 minute.
- Set the starter key to the "ON" position.
- In [Fault Information] on the diagnosis tool screen, check if P0A85-65 is detected.

Is DTC P0A85-65 detected?

YES

Replace the HV ECU.

NO

The inspection is completed.

CHECKLIST: P0A85 (TC65)

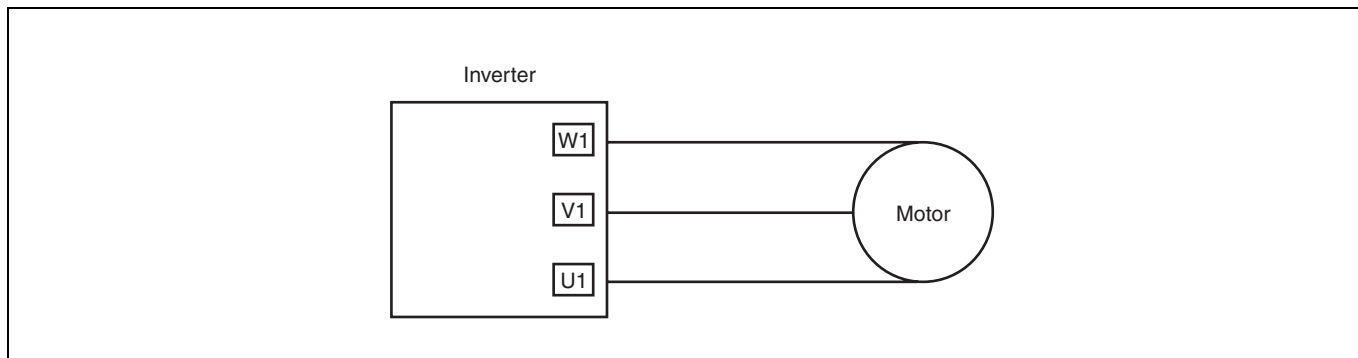
P0A85 (TC65)		Abnormality in HV battery cooling fan drive signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (16P) connector and the HV ECU2 connector. 3. For the 11th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 11th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 2.
2	Inspecting the signal line of PCU wire harness (upper side) for short circuit	1. For the 11th terminal of PCU harness (16P) upper-side connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 11th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (upper side).	Replace the HV battery cooling fan and go to step 3.

P0A85 (TC65)		Abnormality in HV battery cooling fan drive signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "LOCK" position. 3. Connect the diagnosis tool (HINO-DX) to the vehicle. 4. Set the starter key to the "ON" position. 5. Clear the malfunction history. 6. Set the starter key to the "LOCK" position and wait for 1 minute. 7. Set the starter key to the "ON" position. 8. In [Fault Information] on the diagnosis tool screen, check if P0A85-65 is detected.	DTC P0A85-65 is detected: Go to YES. DTC P0A85-65 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0A90 (TC2A)

EN01H03ZZZ030602003027

DTC: P0A90 (TC2A) Abnormality in motor function INFORMATION



SHTS03ZZZ0300121

1. Technical description

- –

<Description of malfunction>

- Detected the functional abnormality in the inverter or HV motor.

2. DTC set condition

(1) DTC detection condition

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The output of inverter start relay is ON.
- GATE is ON.
- The motor torque is higher than 100 Nm.
- No SMR OFF is requested.
- No GATE is requested.
- SMR#1 is OFF.
- SMR#2 is ON.
- SMR#3 is ON.

(2) Judgement criteria

- The following condition occurs twice during 1 DCY:
 - The difference between the requested torque and the effective torque remains larger than 100 Nm for 3 seconds.

3. Reset condition

- The difference between the requested torque and the effective torque remains at 100 Nm or less for 3 seconds.
- Once the abnormality is confirmed, after the HV ECU is actuated next.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

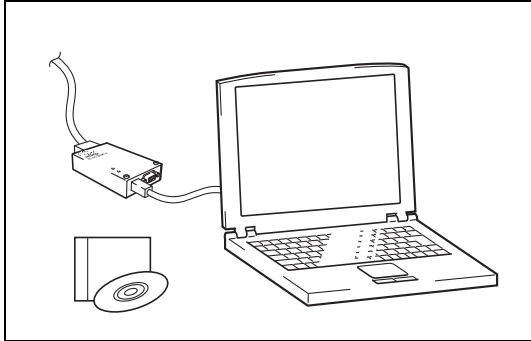
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of three-phase cable
- Malfunction of inverter
- Malfunction of HV motor

INSPECTION PROCEDURE: P0A90 (TC2A)**1 Inspecting the inverter [HINO-DX]**

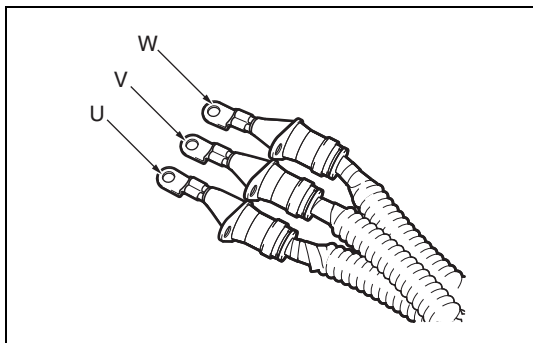
SHTS03ZZZ0300122

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Preparation for inspection**

1. Set the starter key to the "LOCK" position.
2. Disconnect the service plug and wait for 7 minutes or more.

Is the inspection preparation completed?**YES****Go to step 3.****NO****Perform the inspection preparation again.**

3 Inspecting the continuity of three-phase cable 1

SHTS03ZZZ0300123

1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter and HV motor.
2. Using the electrical tester, measure the resistance between the terminals of both ends of the three-phase cable.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable U terminal – U terminal V terminal – V terminal W terminal – W terminal	Less than 1 Ω

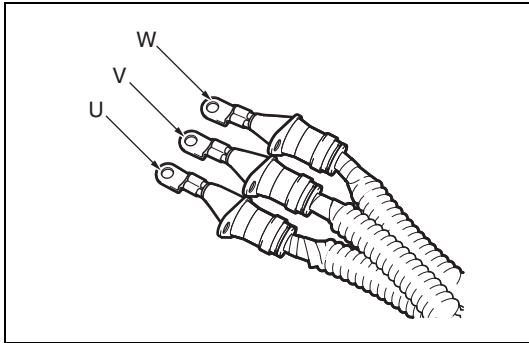
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

- When the central terminal block is provided: Go to step 7.
- When no central terminal block is provided: Replace the three-phase cable.

4**Inspecting the insulation resistance of three-phase cable 1**

SHTS03ZZZ0300124

1. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable.

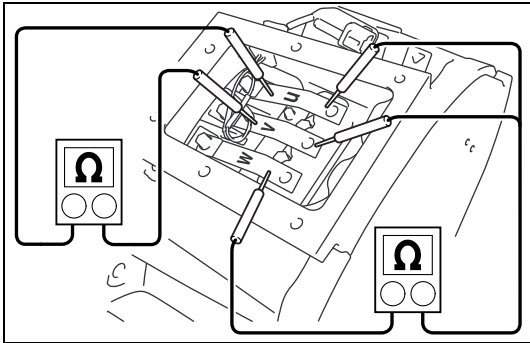
⚠ CAUTION**Terminals must be insulated to avoid contact.**

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 5.****NO**

- When the central terminal block is provided: Go to step 8.
- When no central terminal block is provided: Replace the three-phase cable.

5 Inspecting the resistance between the HV motor phases



SHTS03ZZZ0300125

1. Using the electrical tester, measure the resistance between the HV motor terminals.

HINT

If the motor temperature is too high, the resistance will change largely. Therefore, measure the resistance at least 8 hours after the vehicle has stopped.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK (8 hours after the vehicle has stopped)	HV motor U terminal – V terminal V terminal – W terminal W terminal – U terminal	38.2 – 40.5 MΩ (30 – 15 °C {86 – 59 °F})

Is the measured value within the range of standard value?

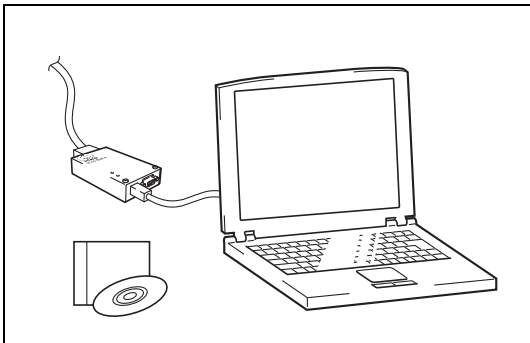
YES

Go to step 6.

NO

Replace the HV motor.

6 Reproduction check [HINO-DX]



SHTS03ZZZ0300126

1. Connect all the connectors that have been disconnected to restore the system. (Insert the service plug last.)
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (Repeat the following cycle 10 times or more: Stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.)
6. In [Fault Information] on the diagnosis tool screen, check if P0A90-2A is detected.

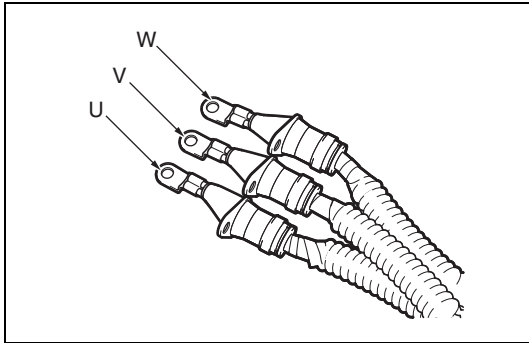
Is DTC P0A90-2A detected?

YES

Replace the inverter.

NO

The inspection is completed.

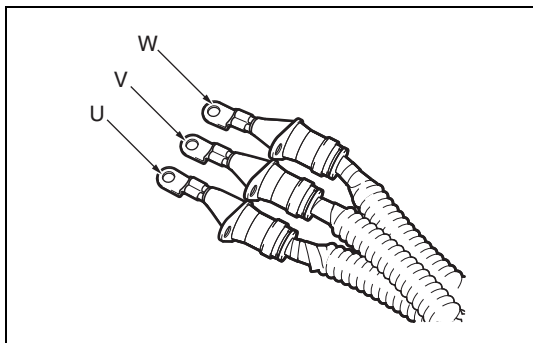
7 Inspecting the continuity of three-phase cable 2

SHTS03ZZZ0300127

1. Disconnect the three-phase cable (U, V, and W terminals) from the relay terminal block.
2. Using the electrical tester, measure the resistance between the terminals of both ends of the three-phase cable on the HV motor side.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable on the HV motor side U terminal – U terminal V terminal – V terminal W terminal – W terminal	Less than 1 Ω

Is the measured value within the range of standard value?**YES****Replace the three-phase cable on the inverter side.****NO****Replace the three-phase cable on the HV motor side.**

8 Inspecting the insulation resistance of three-phase cable 2

SHTS03ZZZ0300128

1. Disconnect the three-phase cable (U, V, and W terminals) from the relay terminal block.
2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable.

⚠ CAUTION
Terminals must be insulated to avoid contact.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable on the HV motor side U terminal – V terminal V terminal – W terminal W terminal – U terminal	10 MΩ or more

Is the measured value within the range of standard value?

YES

Replace the three-phase cable on the inverter side.

NO

Replace the three-phase cable on the HV motor side.

CHECKLIST: P0A90 (TC2A)

P0A90 (TC2A)		Abnormality in motor function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Preparation for inspection	1. Set the starter key to the "LOCK" position. 2. Disconnect the service plug and wait for 7 minutes or more.	Inspection preparation is completed: Go to YES. Inspection preparation is not completed: Go to NO.		Go to step 3.	Perform the inspection preparation again.
3	Inspecting the continuity of three-phase cable 1	1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter and HV motor. 2. Using the electrical tester, measure the resistance between the terminals of both ends of the three-phase cable. <Measurement conditions> Starter key: LOCK <Tester connections> Three-phase cable U terminal – U terminal V terminal – V terminal W terminal – W terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	- When the central terminal block is provided: Go to step 7. - When no central terminal block is provided: Replace the three-phase cable.

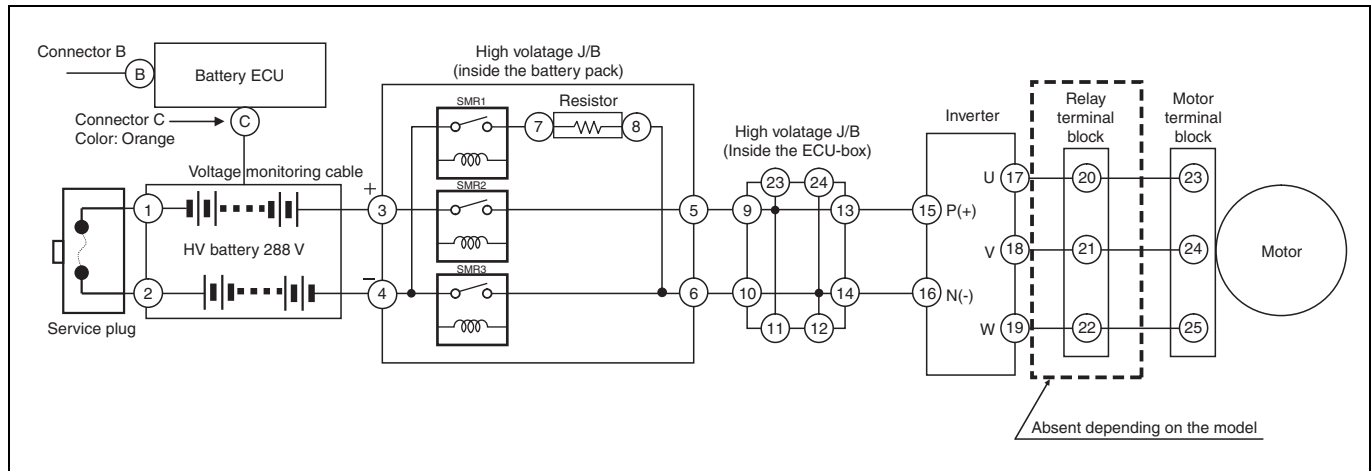
P0A90 (TC2A)		Abnormality in motor function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the insulation resistance of three-phase cable 1	1. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable. ⚠ CAUTION Terminals must be insulated to avoid contact. <Measurement conditions> Starter key: LOCK <Tester connections> Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	- When the central terminal block is provided: Go to step 8. - When no central terminal block is provided: Replace the three-phase cable.
5	Inspecting the resistance between the HV motor phases	1. Using the electrical tester, measure the resistance between the HV motor terminals. HINT If the motor temperature is too high, the resistance will change largely. Therefore, measure the resistance at least 8 hours after the vehicle has stopped. <Measurement conditions> Starter key: LOCK (8 hours after the vehicle has stopped) <Tester connections> HV motor U terminal – V terminal V terminal – W terminal W terminal – U terminal <Standard values> 38.2 – 40.5 MΩ (30 – 15 °C {86 – 59 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the HV motor.

P0A90 (TC2A)		Abnormality in motor function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. (Insert the service plug last.) 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (Repeat the following cycle 10 times or more: Stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.) 6. In [Fault Information] on the diagnosis tool screen, check if P0A90-2A is detected.	DTC P0A90-2A is detected: Go to YES. DTC P0A90-2A is not detected: Go to NO.		Replace the inverter.	The inspection is completed.
7	Inspecting the continuity of three-phase cable 2	1. Disconnect the three-phase cable (U, V, and W terminals) from the relay terminal block. 2. Using the electrical tester, measure the resistance between the terminals of both ends of the three-phase cable on the HV motor side. <Measurement conditions> Starter key: LOCK <Tester connections> Three-phase cable on the HV motor side U terminal – U terminal V terminal – V terminal W terminal – W terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the three-phase cable on the inverter side.	Replace the three-phase cable on the HV motor side.

P0A90 (TC2A)		Abnormality in motor function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
8	Inspecting the insulation resistance of three-phase cable 2	1. Disconnect the three-phase cable (U, V, and W terminals) from the relay terminal block. 2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable. ⚠ CAUTION Terminals must be insulated to avoid contact. <Measurement conditions> Starter key: LOCK (8 hours after the vehicle has stopped) <Tester connections> Three-phase cable on the HV motor side U terminal – V terminal V terminal – W terminal W terminal – U terminal <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the three-phase cable on the inverter side.	Replace the three-phase cable on the HV motor side.

DTC: P0A92 (TC29)

EN01H03ZZZ030602003028

DTC: P0A92 (TC29) Abnormality in charging performance
INFORMATION

SHTS03ZZZ0300129

1. Technical description

- —

<Description of malfunction>

- Detected an abnormality in the charging function of inverter or HV battery.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The output of HV battery ECU start relay is ON.
- The control power supply voltage is 10 V or more.
- The specified power generation is -7 kW or less.
- HV control mode information is one of the following:
 - 4: When decelerating with the motor or foot brake
 - 3: When decelerating with the motor and retarder
 - 5: When charging the battery
- The HV battery current sensor shows no abnormality.
- The HV battery voltage detection circuit has no abnormality.
- GATE is ON.
- The output of inverter start relay is ON.
- No SMR OFF is requested.
- No GATE is requested.
- SMR#1 is OFF.
- SMR#2 is ON.
- SMR#3 is ON.

(2) Judgement criteria

- The state in which one of the following conditions is met continuously for 3 seconds or more occurs twice in 1 DCY:
 - Charging power/generated power is less than 0.50.
 - Charging power/generated power is more than 1.50.

3. Reset condition

- The following conditions are met continuously for 3 seconds or more:
 - Charging power/generated power is 0.50 or more.
 - Charging power/generated power is 1.50 or less.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

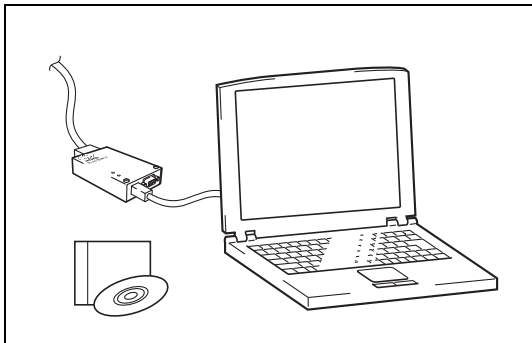
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

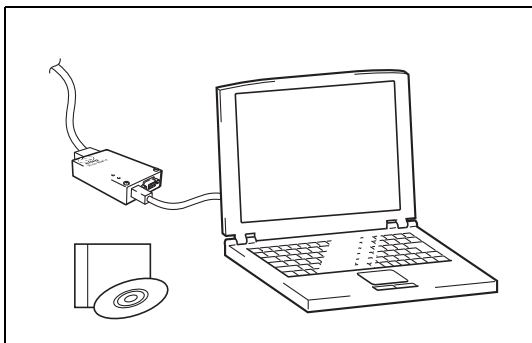
8. Estimated failure factors

- Malfunction of inverter line
- Malfunction of HV battery line
- Malfunction of DC voltage cable line

INSPECTION PROCEDURE: P0A92 (TC29)**1 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300130

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300131

1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3 Preparation for inspection

1. Set the starter key to the "LOCK" position.
2. Disconnect the service plug and wait for 7 minutes or more.
3. Disconnect the 16 P and 22 P connectors of HV battery ECU.

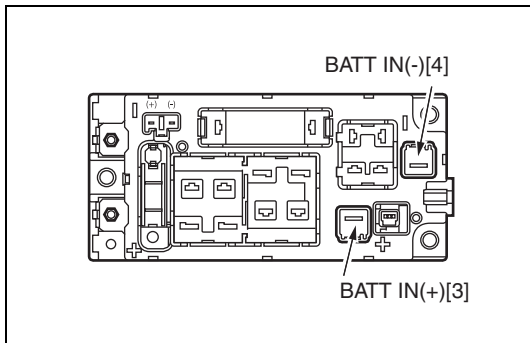
Is the inspection preparation completed?

YES

Go to step 4.

NO

Perform the inspection preparation again.

4 Inspecting the HV battery

SHTS03ZZZ0300132

1. Disconnect the BATT IN (+) [3] and BATT IN (-) [4] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between each terminal of high-voltage J/B (in the battery pack) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in battery pack) BATT IN (+) [3] terminal – GND BATT IN (-) [4] terminal – GND	10 MΩ or more

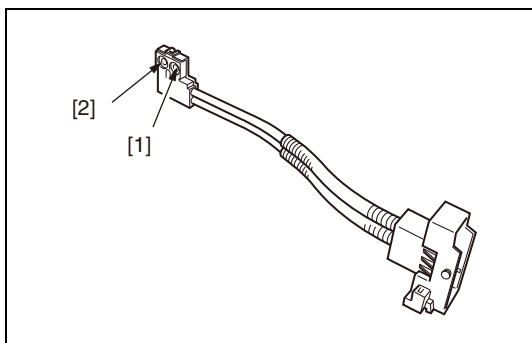
Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Go to step 5.

5 Inspecting the service plug 1

SHTS03ZZZ0300133

1. Disconnect the 1st and 2nd terminals from the HV battery and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between each terminal of frame wire and the ground. (Do not install the service plug.)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 1st terminal – GND 2nd terminal – GND	10 MΩ or more

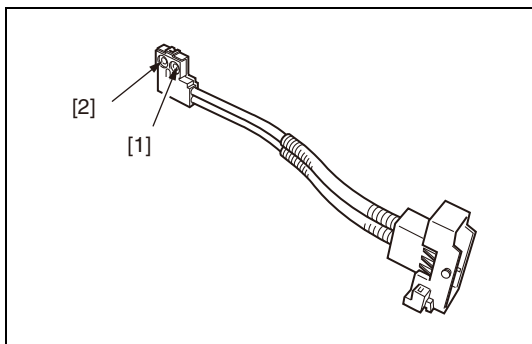
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replacing the frame wire (with a service plug socket).

6 Inspecting the service plug 2

SHTS03ZZZ0300134

1. Connect the 1st and 2nd terminals to the HV battery and then install the frame wire.
2. Using the electrical tester, measure the insulation resistance between each terminal of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 1st terminal – GND 2nd terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?

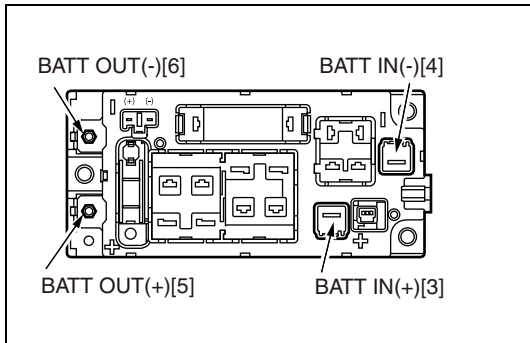
YES

Replace the HV battery.

NO

Replace the service plug.

7 Inspecting the insulation resistance of high-voltage J/B (in the battery pack)



SHTS03ZZZ0300135

1. Disconnect the BATT OUT (+) [5] and BATT OUT (-) [6] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the battery pack) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in the battery pack) 3rd terminal – 4th terminal – 5th terminal – 6th terminal – 3rd terminal – 6th terminal – 4th terminal – 5th terminal – 3rd terminal – GND 4th terminal – GND 5th terminal – GND 6th terminal – GND	10 MΩ or more

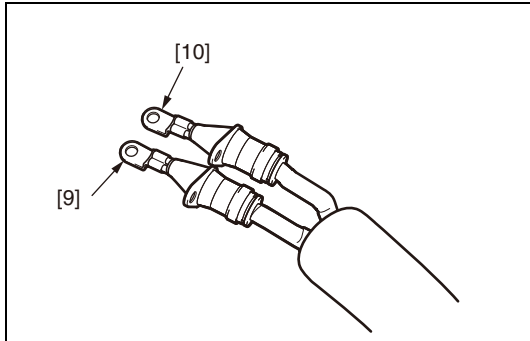
Is the measured value within the range of standard value?

YES

Go to step 8.

NO

Replace the high-voltage J/B (in the battery pack).

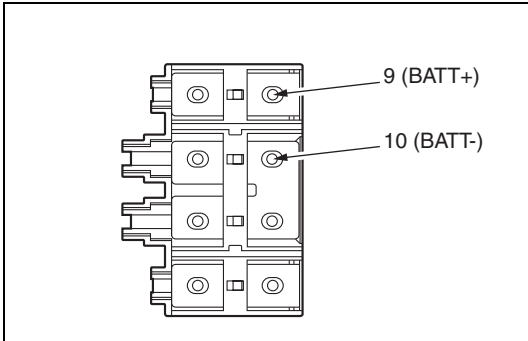
8**Inspecting the insulation resistance of frame wire (to the high-voltage J/B)**

SHTS03ZZZ0300136

1. Disconnect the 9th and 10th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 9th terminal – 10th terminal 9th terminal – GND 10th terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 9.****NO****Replace the frame wire.**

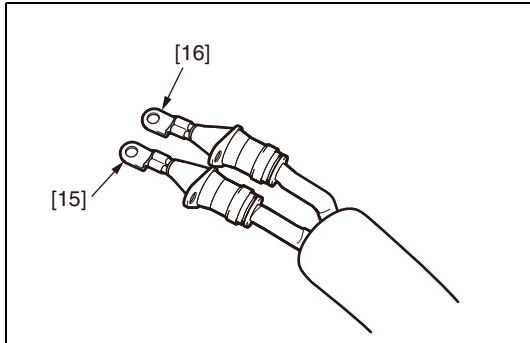
9**Inspecting the insulation resistance of high-voltage J/B (in the ECU box)**

SHTS03ZZZ0300137

1. Disconnect the 13th and 14th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the ECU box) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in the ECU box) 9th terminal – 10th terminal 9th terminal – GND 10th terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 10.****NO****Replace the high-voltage J/B (in the ECU box).**

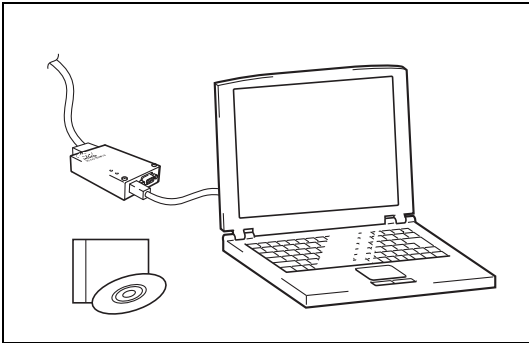
10**Inspecting the insulation resistance of frame wire (between the high-voltage J/B (in the ECU box) and the inverter)**

SHTS03ZZZ0300138

1. Disconnect the 15th and 16th terminals from the inverter and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 15th terminal – 16th terminal 15th terminal – GND 16th terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?**YES****Replace the HV battery pack.
After replacement, go to step 11.****NO****Replace the frame wire.**

11**Reproduction check [HINO-DX]**

SHTS03ZZZ0300139

1. Connect all the connectors that have been disconnected to restore the system. (Insert the service plug last.)
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (Repeat the following cycle 10 times or more: Stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.)
6. After the vehicle has stopped, set the starter key to the "LOCK" position and wait for 1 minute.
7. Perform a test run. (Repeat the following cycle 10 times or more: Stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.)
8. In [Fault Information] on the diagnosis tool screen, check if P0A92-29 is detected.

Is DTC P0A92-29 detected?**YES****Replace the inverter.****NO****The inspection is completed.**

CHECKLIST: P0A92 (TC29)

P0A92 (TC29)		Abnormality in charging performance		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the HV battery ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Preparation for inspection	1. Set the starter key to the "LOCK" position. 2. Disconnect the service plug and wait for 7 minutes or more. 3. Disconnect the 16 P and 22 P connectors of HV battery ECU.	Inspection preparation is completed: Go to YES. Inspection preparation is not completed: Go to NO.		Go to step 4.	Perform the inspection preparation again.
4	Inspecting the HV battery	1. Disconnect the BATT IN (+) [3] and BATT IN (-) [4] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between each terminal of high-voltage J/B (in the battery pack) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in battery pack) BATT IN (+) [3] terminal – GND BATT IN (-) [4] terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Go to step 5.

P0A92 (TC29)		Abnormality in charging performance		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the service plug 1	1. Disconnect the 1st and 2nd terminals from the HV battery and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between each terminal of frame wire and the ground. (Do not install the service plug.) <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 1st terminal – GND 2nd terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replacing the frame wire (with a service plug socket).
6	Inspecting the service plug 2	1. Connect the 1st and 2nd terminals to the HV battery and then install the frame wire. 2. Using the electrical tester, measure the insulation resistance between each terminal of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 1st terminal – GND 2nd terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV battery.	Replace the service plug.

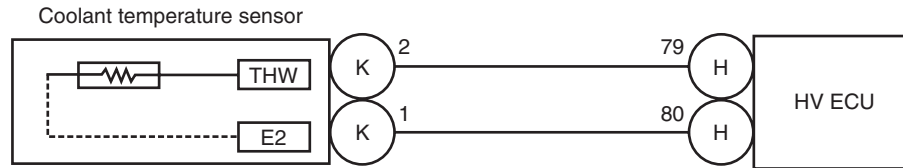
P0A92 (TC29)		Abnormality in charging performance		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the insulation resistance of high-voltage J/B (in the battery pack)	1. Disconnect the BATT OUT (+) [5] and BATT OUT (-) [6] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the battery pack) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in the battery pack) 3rd terminal – 4th terminal 5th terminal – 6th terminal 3rd terminal – 6th terminal 4th terminal – 5th terminal 3rd terminal – GND 4th terminal – GND 5th terminal – GND 6th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the high-voltage J/B (in the battery pack).
8	Inspecting the insulation resistance of frame wire (to the high-voltage J/B)	1. Disconnect the 9th and 10th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 9th terminal – 10th terminal 9th terminal – GND 10th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the frame wire.

P0A92 (TC29)		Abnormality in charging performance		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
9	Inspecting the insulation resistance of high-voltage J/B (in the ECU box)	1. Disconnect the 13th and 14th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the ECU box) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in the ECU box) 9th terminal – 10th terminal 9th terminal – GND 10th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 10.	Replace the high-voltage J/B (in the ECU box).
10	Inspecting the insulation resistance of frame wire (between the high-voltage J/B (in the ECU box) and the inverter)	1. Disconnect the 15th and 16th terminals from the inverter and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 15th terminal – 16th terminal 15th terminal – GND 16th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV battery pack. After replacement, go to step 11.	Replace the frame wire.

P0A92 (TC29)		Abnormality in charging performance		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
11	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. (Insert the service plug last.) 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (Repeat the following cycle 10 times or more: Stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.) 6. After the vehicle has stopped, set the starter key to the "LOCK" position and wait for 1 minute. 7. Perform a test run. (Repeat the following cycle 10 times or more: Stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.) 8. In [Fault Information] on the diagnosis tool screen, check if P0A92-29 is detected.	DTC P0A92-29 is detected: Go to YES. DTC P0A92-29 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A93 (TC7A)

EN01H03ZZZ030602003029

DTC: P0A93 (TC7A) Abnormality in inverter cooling system
INFORMATION

SHTS03ZZZ0300140

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in high temperature of inverter coolant.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 8 V or more.

(2) Judgement criteria

- The HV system coolant temperature remains more than 70 °C {158 °F} for 15 seconds or more.

3. Reset condition

- The HV system coolant temperature remains at 70 °C {158 °F} or less for 15 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of inverter cooling circuit
- Malfunction of inverter coolant temperature sensor
- Malfunction of HV water pump
- Malfunction of HV radiator fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A93 (TC7A)**1 Inspecting the coolant system route**

1. Check the coolant system route (radiator, inverter, and hose) for any damage or water leakage.

Is any defect found?**YES**

**Repair or replace the defective part.
After repair/replacement, perform the inspection again.**

NO

Go to step 2.

2 Inspecting the coolant level

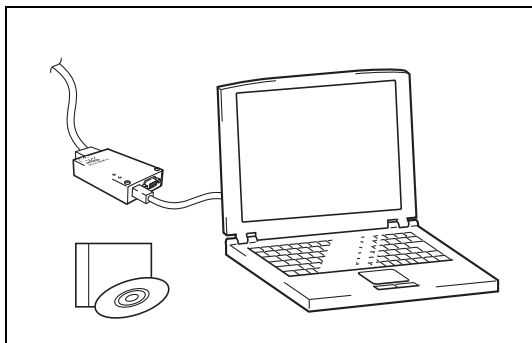
1. Remove the radiator cap and check the height from the coolant level to the filling port.

Is the coolant level about 10 mm from the filling port?**YES**

Go to step 3.

NO

**Add coolant. (See "Adding coolant.")
After adding coolant, perform the inspection again.**

3 Reading the DTC [HINO-DX]

SHTS03ZZZ0300141

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any other coolant temperature sensor system DTC (listed below) is detected.
 - P0A02-78, P0A03-79, P0A06-7F, P0A07-7E, P0C73-80, P3128-7D, P3129-7C, P314C-82, P314D-81

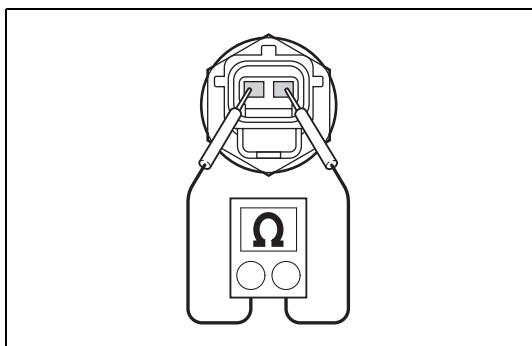
Is any DTC other than P0A93-7A detected?

YES

Perform troubleshooting for each of related DTC.

NO

Go to step 4.

4 Inspecting the coolant temperature sensor

SHTS03ZZZ0300142

1. Set the starter key to the "LOCK" position.
2. Disconnect the connector of coolant temperature sensor.
3. Using the electrical tester, measure the resistance between the terminals of coolant temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal	0 °C {32 °F}: 5.3 k – 6.2 kΩ
		20 °C {68 °F}: 2.3 k – 2.6 kΩ
		30 °C {86 °F}: 1.5 k – 1.8 kΩ

Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the coolant temperature sensor.

5 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Coolant temperature sensor connector 2nd terminal – Each signal line	10 kΩ or more

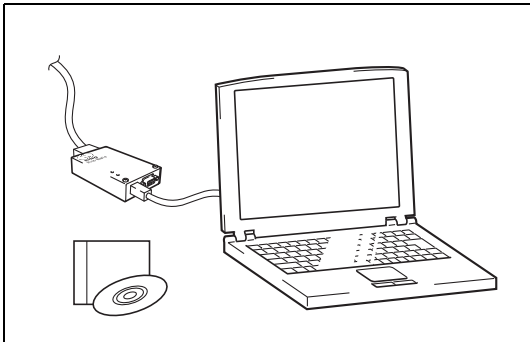
Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Go to step 6.

6 Reproduction check [HINO-DX]

SHTS03ZZZ0300143

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run for approximately 30 minutes.
6. In [Fault Information] on the diagnosis tool screen, check if P0A93-7A is detected.

Is DTC P0A93-7A detected?

YES

Replace the HV ECU.

NO

The inspection is completed.

CHECKLIST: P0A93 (TC7A)

P0A93 (TC7A)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the coolant system route	1. Check the coolant system route (radiator, inverter, and hose) for any damage or water leakage.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the defective part. After repair/replacement, perform the inspection again.	Go to step 2.
2	Inspecting the coolant level	1. Remove the radiator cap and check the height from the coolant level to the filling port.	Coolant level is about 10 mm from the filling port: Go to YES. Coolant level is not about 10 mm from the filling port: Go to NO.		Go to step 3.	Add coolant. (See "Adding coolant.") After adding coolant, perform the inspection again.
3	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any other coolant temperature sensor system DTC (listed below) is detected. • P0A02-78, P0A03-79, P0A06-7F, P0A07-7E, P0C73-80, P3128-7D, P3129-7C, P314C-82, P314D-81	DTC other than P0A93-7A is detected: Go to YES. DTC other than P0A93-7A is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 4.

P0A93 (TC7A)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the coolant temperature sensor	1. Set the starter key to the "LOCK" position. 2. Disconnect the connector of coolant temperature sensor. 3. Using the electrical tester, measure the resistance between the terminals of coolant temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 0 °C {32 °F}: 5.3 k – 6.2 kΩ 20 °C {68 °F}: 2.3 k – 2.6 kΩ 30 °C {86 °F}: 1.5 k – 1.8 kΩ	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the coolant temperature sensor.
5	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 2nd terminal of coolant temperature sensor connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Coolant temperature sensor connector 2nd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 6.
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run for approximately 30 minutes. 6. In [Fault Information] on the diagnosis tool screen, check if P0A93-7A is detected.	DTC P0A93-7A is detected: Go to YES. DTC P0A93-7A is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0AFD (TC6B)

EN01H03ZZZ030602003030

DTC: P0AFD (TC6B) Abnormality in low temperature of HV battery INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected the low temperature abnormality in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The engine intake air temperature sensor shows no abnormality.
- The HV battery current sensor shows no abnormality.
- The HV battery temperature sensor shows no abnormality.
- The engine intake air temperature is -10 °C {14 °F} or more.
- The engine speed remains at 600 r/min or more for 60 second or more.
- The output of HV battery ECU start relay is ON.
- The vehicle speed remains at 12.4 mph or more for 30 seconds or more.
- The square sum of HV battery current for 1800 seconds is 200,000 A² or more.

(2) Judgement criteria

- The HV battery temperature remains less than -30 °C {-22 °F} for 10 seconds or more.

3. Reset condition

- The HV battery temperature remains at -30 °C {-22 °F} or more for 10 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.

6. Pre-inspection work

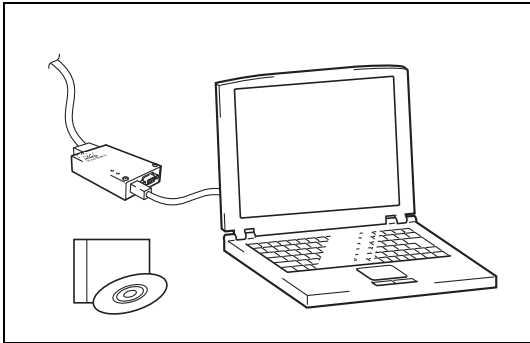
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

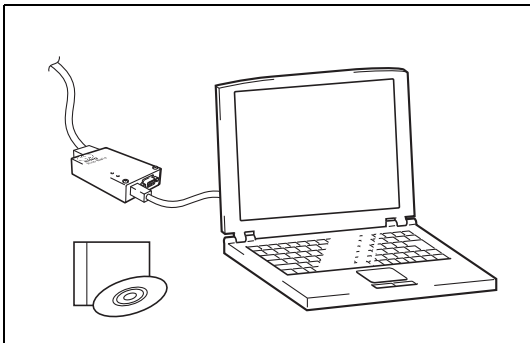
8. Estimated failure factors

- Ice buildup on the HV battery
- Malfunction of HV battery temperature sensor circuit
- Malfunction of HV battery ECU

INSPECTION PROCEDURE: P0AFD (TC6B)**1 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300144

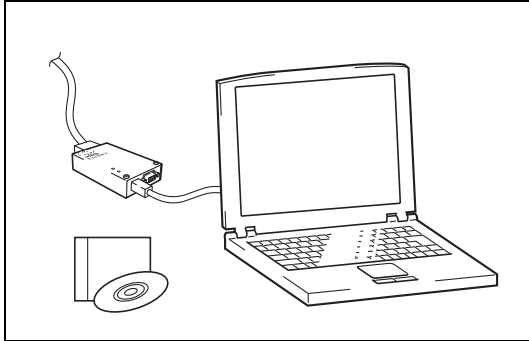
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300145

1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3**Inspecting the HV battery temperature [HINO-DX]**

SHTS03ZZZ0300146

1. Select [Data Monitor] on the diagnosis tool screen and monitor [HV battery minimum temperature].

Measurement conditions	Tester connections	Standard values
Starter key: ON	HV battery minimum temperature	HV battery minimum temperature: -30 °C {-22 °F} or more

Is the measured value within the range of standard value?**YES**

The inspection is completed.
(An abnormally low temperature of HV battery may occur due to the outside temperature.)

NO

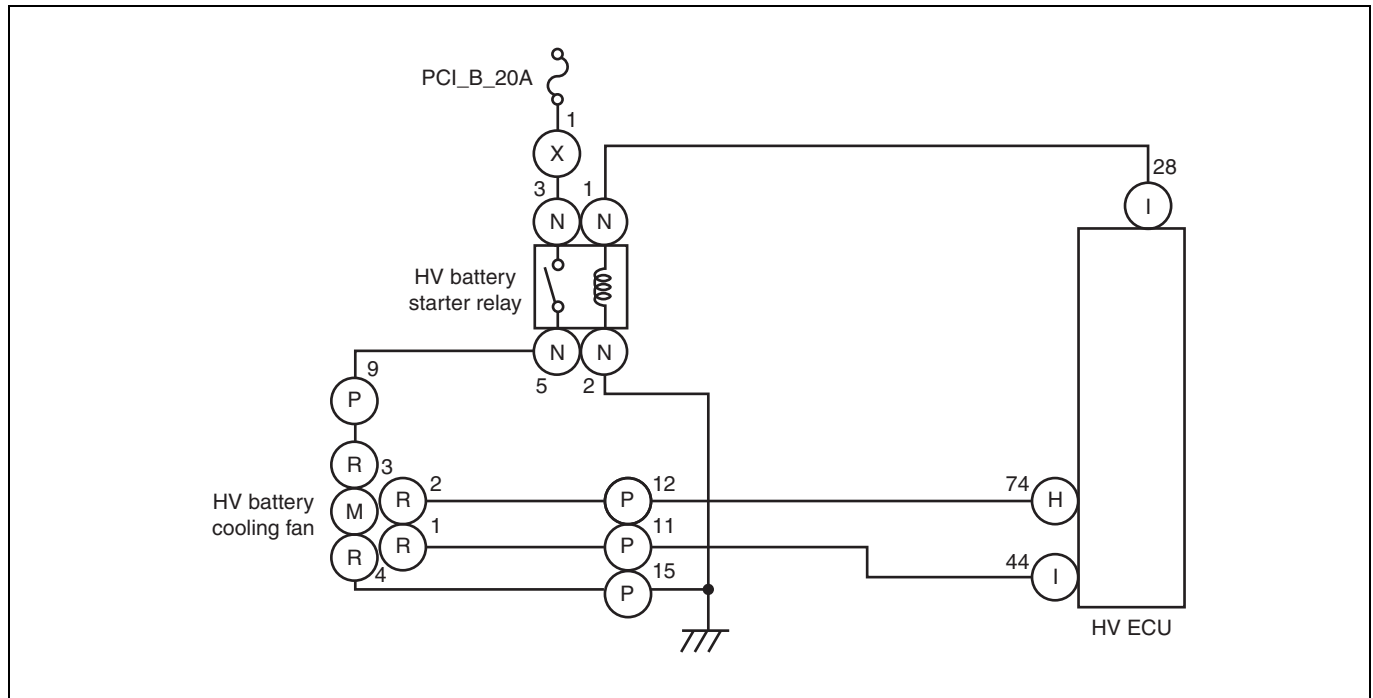
Replace the battery ECU.

CHECKLIST: P0AFD (TC6B)

P0AFD (TC6B)		Abnormality in low temperature of HV battery		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the HV battery ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the HV battery temperature [HINO-DX]	1. Select [Data Monitor] on the diagnosis tool screen and monitor [HV battery minimum temperature]. <Measurement conditions> Starter key: ON <Tester connections> HV battery minimum temperature <Standard values> HV battery minimum temperature : -30 °C {-22 °F} or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		The inspection is completed. (An abnormally low temperature of HV battery may occur due to the outside temperature.)	Replace the battery ECU.

DTC: P0BCA (TC68)

EN01H03ZZZ030602003031

DTC: P0BCA (TC68) Abnormality in HV battery cooling fan revolving number signal High INFORMATION

SHTS03ZZZ0300147

1. Technical description

- –

<Description of malfunction>

- Detected a power supply (positive side) short circuit in the HV battery cooling fan revolving number signal circuit.

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
 - The control power supply voltage is 10 V or more.
- (2) Judgement criteria
 - The HV battery cooling fan revolving number voltage remains more than 4.8 V for 1 second or more.

3. Reset condition

- The HV battery cooling fan revolving number voltage remains at 4.8 V or less for 1 second or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

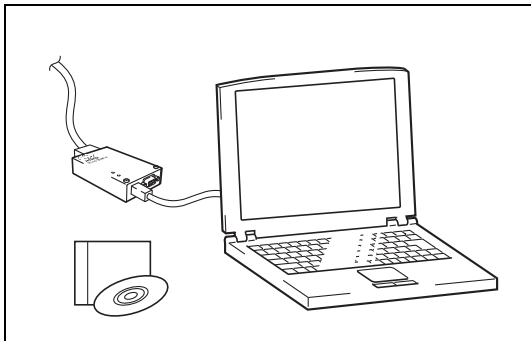
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV battery cooling fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0BCA (TC68)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300148

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if P060B-B2 is detected.

Is DTC P060B-B2 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Disconnect the connectors of PCU harness (16P) and HV ECU1.
2. For the 12th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

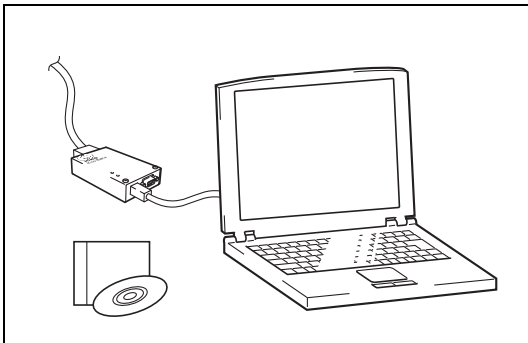
Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 12th terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Go to step 3.**

3 Inspecting the signal line of PCU wire harness (upper side) for short circuit

1. Disconnect the connector of HV battery cooling fan.
2. For the 12th terminal of PCU harness (16P) upper-side connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 12th terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (upper side).****NO****Replace the HV battery cooling fan.
After replacement, go to step 4.****4 Reproduction check [HINO-DX]**

SHTS03ZZZ0300149

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Clear the malfunction history.
4. Set the starter key to the "LOCK" position and wait for 1 minute.
5. Set the starter key to the "ON" position.
6. In [Fault Information] on the diagnosis tool screen, check if P0BCA-68 is detected.

Is DTC P0BCA-68 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

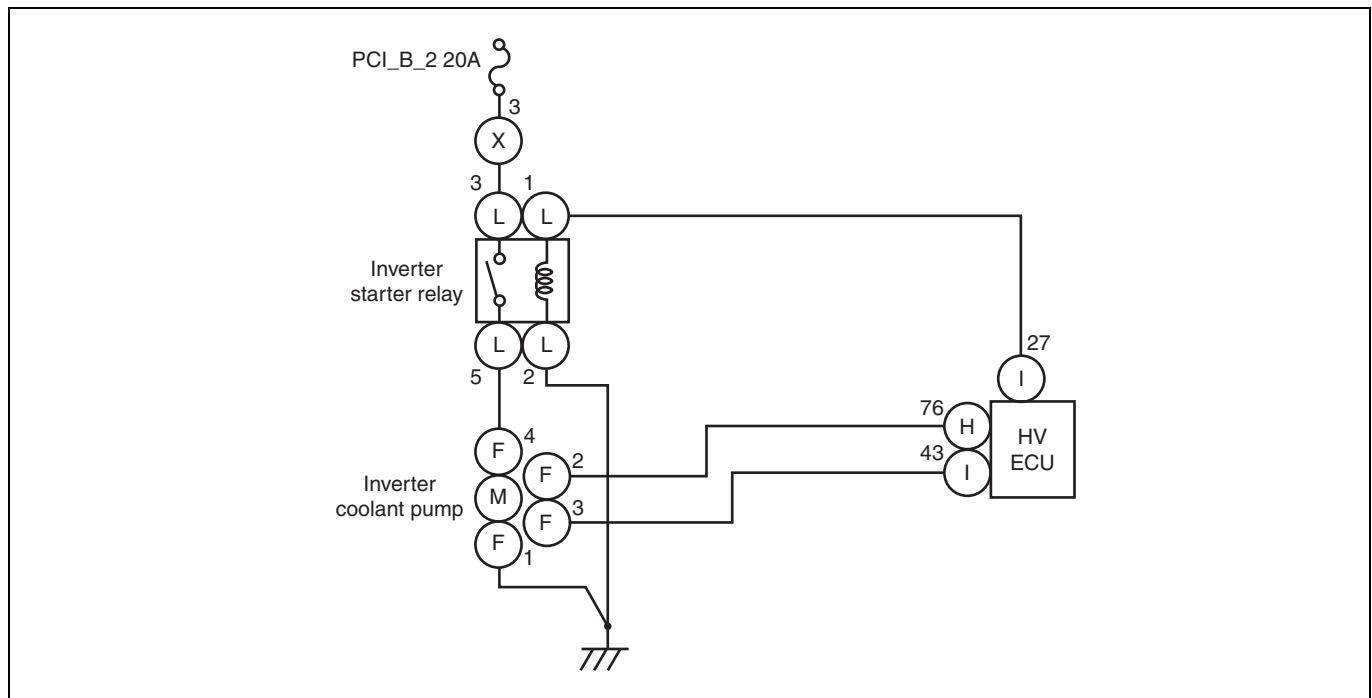
CHECKLIST: P0BCA (TC68)

P0BCA (TC68)		Abnormality in HV battery cooling fan revolving number signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if P060B-B2 is detected.	DTC P060B-B2 is detected: Go to YES. DTC P060B-B2 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Disconnect the connectors of PCU harness (16P) and HV ECU1. 2. For the 12th terminal of PCU harness (16P) lower-side connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 12th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 3.
3	Inspecting the signal line of PCU wire harness (upper side) for short circuit	1. Disconnect the connector of HV battery cooling fan. 2. For the 12th terminal of PCU harness (16P) upper-side connector, inspect the signal line of PCU wire harness (upper side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 12th terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (upper side).	Replace the HV battery cooling fan. After replacement, go to step 4.

P0BCA (TC68)		Abnormality in HV battery cooling fan revolving number signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Clear the malfunction history. 4. Set the starter key to the "LOCK" position and wait for 1 minute. 5. Set the starter key to the "ON" position. 6. In [Fault Information] on the diagnosis tool screen, check if P0BCA-68 is detected.	DTC P0BCA-68 is detected: Go to YES. DTC P0BCA-68 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P0C73 (TC80)

EN01H03ZZZ030602003032

DTC: P0C73 (TC80) Abnormality in HV water pump function
INFORMATION

SHTS03ZZZ0300150

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the HV water pump function.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control supply voltage is 10 V or more.
- The drive duty of HV water pump is 61% or less.
- The drive duty of HV water pump is 40% or more.
- The output of inverter start relay is ON.
- The vehicle speed remains at 12.4 mph for 30 seconds or more.
- The engine intake air temperature sensor shows no abnormality.
- The engine intake air temperature is -10 °C {-14 °F} or more.
- The HV system coolant temperature is -20 °C {-4 °F} or more.

(2) Judgement criteria

- One of the conditions below is met continuously for 10 seconds or more.
 - The number of revolutions of the HV water pump is higher than the upper limit.
 - The number of revolutions of the HV water pump is lower than the lower limit.
 (For upper and lower limits, see below.)

<Lower limit>

When HV water pump drive duty is 40%: 1273.0 r/min

When HV water pump drive duty is 50%: 1806.0 r/min

When HV water pump drive duty is 61%: 2319.7 r/min

<Upper limit>

When HV water pump drive duty is 40%: 2473.2 r/min

When HV water pump drive duty is 50%: 3206.0 r/min

When HV water pump drive duty is 61%: 3939.7 r/min

3. Reset condition

- One of the conditions below is met continuously for 10 seconds or more.
 - The number of revolutions of the HV water pump is lower than or equal to the upper limit.
 - The number of revolutions of the HV water pump is higher than or equal to the lower limit.
 (For upper and lower limits, see below.)

<Lower limit>

When HV water pump drive duty is 40%: 1273.0 r/min

When HV water pump drive duty is 50%: 1806.0 r/min

When HV water pump drive duty is 61%: 2319.7 r/min

<Upper limit>

When HV water pump drive duty is 40%: 2473.2 r/min

When HV water pump drive duty is 50%: 3206.0 r/min

When HV water pump drive duty is 61%: 3939.7 r/min

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

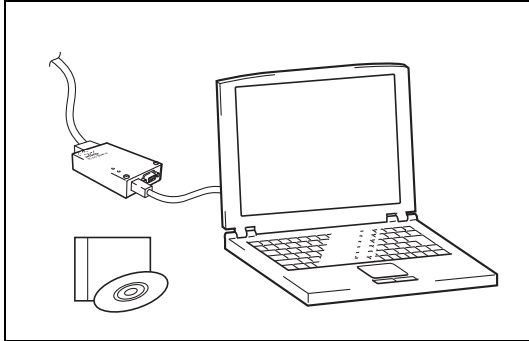
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV water pump
- Malfunction of inverter cooling circuit
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0C73 (TC80)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300151

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P314C-82, P314D-81, P324B-62, P324C-61, P0A06-7F, P0A07-7E

Is any DTC other than P0C73-80 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the coolant system route**

1. Check the coolant system route (radiator, inverter, and hose) for any damage or water leakage.

Is any defect found?**YES****Repair or replace the defective part.
After repair/replacement, perform the inspection again.****NO****Go to step 3.**

3 Inspecting the coolant level

1. Remove the radiator cap and check the height from the coolant level to the filling port.

Is the coolant level about 10 mm from the filling port?

YES

Go to step 4.

NO

**Add coolant. (See "Adding coolant.")
After adding coolant, perform the inspection again.**

4 Inspecting the signal line of PCU wire harness (lower side) for short circuit 1

1. Set the starter key to the "LOCK" position.
2. Disconnect the inverter cooling pump and the HV ECU2 connectors.
3. For the 3rd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 3rd terminal – Each signal line	10 kΩ or more

Is any defect found?

YES

Replace the PCU wire harness (lower side).

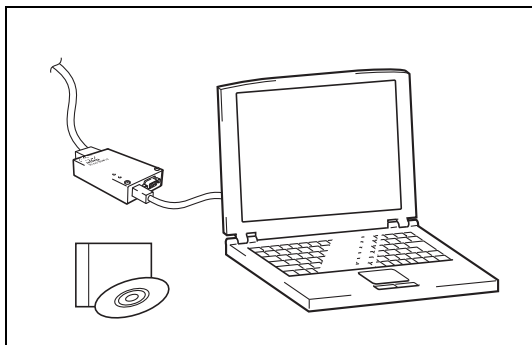
NO

Go to step 5.

5 Inspecting the signal line of PCU wire harness (lower side) for short circuit 2

1. Disconnect the HV ECU1 connector.
2. For the 2nd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 2nd terminal – Each signal line	10 k Ω or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the inverter cooling pump.
After replacement, go to step 6.****6 Reproduction check [HINO-DX]**

SHTS03ZZZ0300152

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Clear the malfunction history.
4. Perform a test run. (For 1 minutes at the vehicle speed of 30 km/h or more)
5. Set the starter key to the "LOCK" position and wait for 1 minute.
6. Perform a test run. (For 1 minutes at the vehicle speed of 30 km/h or more)
7. Set the starter key to the "ON" position.
8. In [Fault Information] on the diagnosis tool screen, check if P0C73-80 is detected.

Is DTC P0C73-80 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

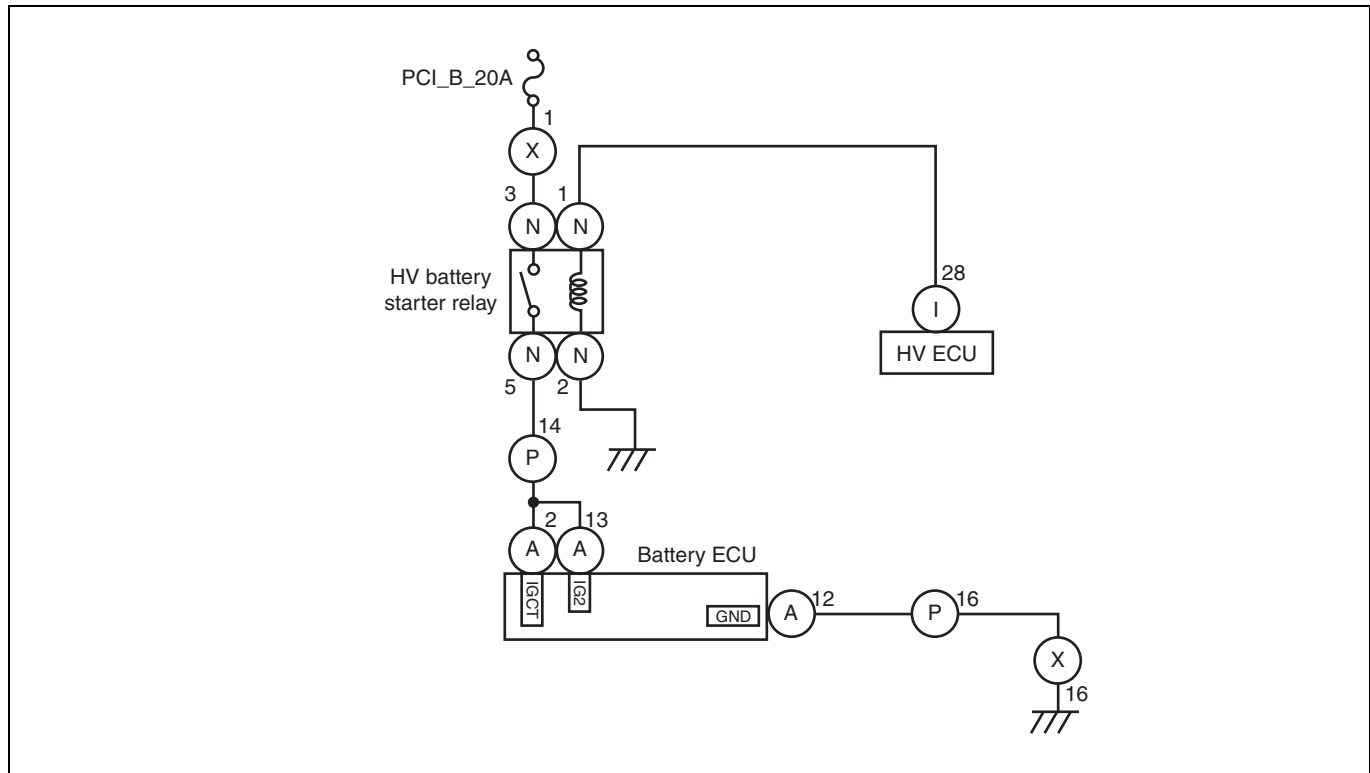
CHECKLIST: P0C73 (TC80)

P0C73 (TC80)		Abnormality in HV water pump function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. P314C-82, P314D-81, P324B-62, P324C-61, P0A06-7F, P0A07-7E	DTC other than P0C73-80 is detected: Go to YES. DTC other than P0C73-80 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the coolant system route	1. Check the coolant system route (radiator, inverter, and hose) for any damage or water leakage.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the defective part. After repair/replacement, perform the inspection again.	Go to step 3.
3	Inspecting the coolant level	Remove the radiator cap and check the height from the coolant level to the filling port.	Coolant level is about 10 mm from the filling port: Go to YES. Coolant level is not about 10 mm from the filling port: Go to NO.		Go to step 4.	Add coolant. (See "Adding coolant.") After adding coolant, perform the inspection again.
4	Inspecting the signal line of PCU wire harness (lower side) for short circuit 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the inverter cooling pump and the HV ECU2 connectors. 3. For the 3rd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 3rd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Go to step 5.

P0C73 (TC80)		Abnormality in HV water pump function		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the signal line of PCU wire harness (lower side) for short circuit 2	1. Disconnect the HV ECU1 connector. 2. For the 2nd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 2nd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the inverter cooling pump. After replacement, go to step 6.
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Clear the malfunction history. 4. Perform a test run. (For 1 minutes at the vehicle speed of 30 km/h or more) 5. Set the starter key to the "LOCK" position and wait for 1 minute. 6. Perform a test run. (For 1 minutes at the vehicle speed of 30 km/h or more) 7. Set the starter key to the "ON" position. 8. In [Fault Information] on the diagnosis tool screen, check if P0C73-80 is detected.	DTC P0C73-80 is detected: Go to YES. DTC P0C73-80 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P3000 (TC42)

EN01H03ZZZ030602003033

DTC: P3000 (TC42) Abnormality in status of HV battery ECU IG signal
INFORMATION

SHTS03ZZZ0300153

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the HV battery IG signal circuit (status abnormality).

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
 - The control power supply voltage is 10 V or more.
 - The output of HV battery ECU start relay is ON.
- (2) Judgement criteria
 - The output of HV battery ECU start relay and the IG2 status of CAN data remain unmatched for 2 seconds or more.

3. Reset condition

- The output of HV battery ECU start relay and the IG2 status of CAN data are matched.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

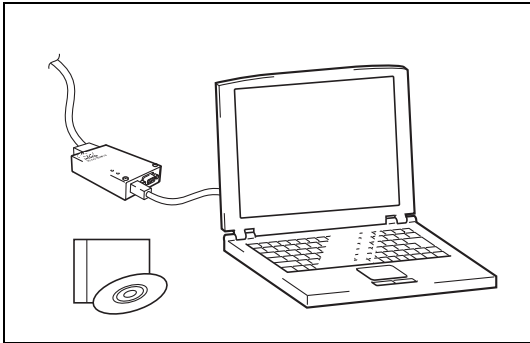
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that any DTC will not be detected after test-driving the vehicle.

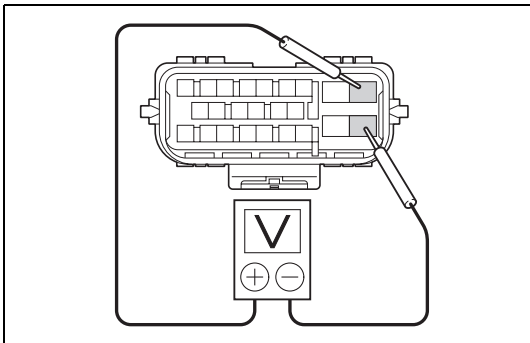
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of battery ECU
- Malfunction of HV ECU

INSPECTION PROCEDURE: P3000 (TC42)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300154

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P33B1-64 or P33B2-63 related to malfunctioning of HV battery ECU start relay circuit is detected.

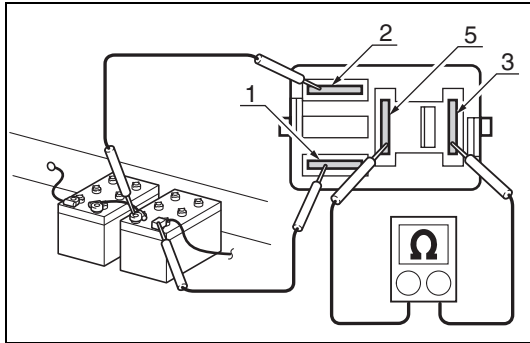
Is DTC P33B1-64 or P33B2-63 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the power supply of vehicle wire harness**

SHTS03ZZZ0300155

1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (24P) connector.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the vehicle-side connector terminals of PCU harness (24P).

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle-side connector 1st terminal – 16th terminal	9 V or more

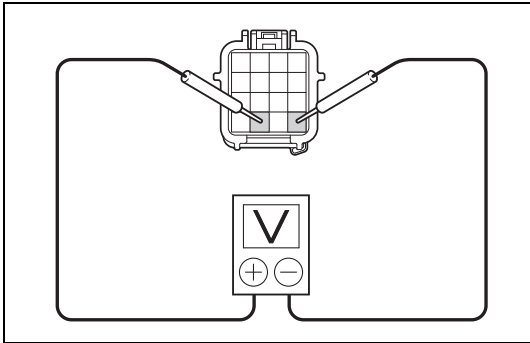
Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Inspect the power supply circuit ([PCI-B 20A] fuse and wire harness).**

3 Inspecting the HV battery start relay

1. Set the starter key to the "LOCK" position.
2. Remove the HV battery start relay.
3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of HV battery start relay. (With no voltage applied)
4. Apply the voltage of 12 V between the 1st and 2nd terminals of HV battery start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV battery start relay 3rd terminal – 5th terminal	Without voltage: 10 kΩ or more With voltage: less than 1 Ω

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the HV battery start relay.**

4 Inspecting the PCU wire harness (lower side)

1. Connect the HV battery start relay and PCU harness (24P) connectors.
2. Disconnect the PCU harness (16P) connector.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the lower-side connector terminals of PCU harness (16P).

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (16P) lower-side connector 14th terminal – 16th terminal	9 V or more

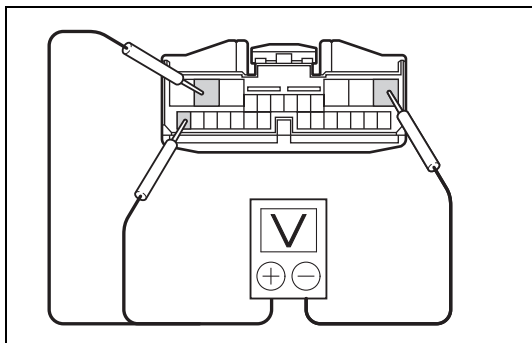
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the PCU wire harness (lower side).

5 Inspecting the PCU wire harness (upper side)

1. Set the starter key to the "LOCK" position.
2. Connect the PCU harness (16P) connector.
3. Disconnect the PCU harness (26P) connector.
4. Set the starter key to the "ON" position.
5. Using the electrical tester, measure the voltage between the battery ECU (26P) connector terminals.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Battery ECU (26P) connector 2nd terminal – 12th terminal 13th terminal – 12th terminal	9 V or more

Is the measured value within the range of standard value?

YES

Replace the HV battery ECU.

NO

Replace the PCU wire harness (upper side).

CHECKLIST: P3000 (TC42)

P3000 (TC42)		Abnormality in status of HV battery ECU IG signal		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P33B1-64 or P33B2-63 related to malfunctioning of HV battery ECU start relay circuit is detected.	DTC P33B1-64 or P33B2-63 is detected: Go to YES. DTC P33B1-64 or P33B2-63 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the power supply of vehicle wire harness	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (24P) connector. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the vehicle-side connector terminals of PCU harness (24P). <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle-side connector 1st terminal – 16th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Inspect the power supply circuit ([PCI-B 20A] fuse and wire harness).

P3000 (TC42)		Abnormality in status of HV battery ECU IG signal		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the HV battery start relay	1. Set the starter key to the "LOCK" position. 2. Remove the HV battery start relay. 3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of HV battery start relay. (With no voltage applied) 4. Apply the voltage of 12 V between the 1st and 2nd terminals of HV battery start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied) <Measurement conditions> Starter key: LOCK <Tester connections> HV battery start relay 3rd terminal – 5th terminal <Standard values> Without voltage: 10 kΩ or more With voltage: less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the HV battery start relay.
4	Inspecting the PCU wire harness (lower side)	1. Connect the HV battery start relay and PCU harness (24P) connectors. 2. Disconnect the PCU harness (16P) connector. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the lower-side connector terminals of PCU harness (16P). <Measurement conditions> Starter key: ON <Tester connections> PCU harness (16P) lower-side connector 14th terminal – 16th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).

P3000 (TC42)		Abnormality in status of HV battery ECU IG signal		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the PCU wire harness (upper side)	1. Set the starter key to the "LOCK" position. 2. Connect the PCU harness (16P) connector. 3. Disconnect the PCU harness (26P) connector. 4. Set the starter key to the "ON" position. 5. Using the electrical tester, measure the voltage between the battery ECU (26P) connector terminals. <Measurement conditions> Starter key: ON <Tester connections> Battery ECU (26P) connector 2nd terminal – 12th terminal 13th terminal – 12th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV battery ECU.	Replace the PCU wire harness (upper side).

DTC: P3001 (TC41)

EN01H03ZZZ030602003034

DTC: P3001 (TC41) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (abnormality in ECU memory line) in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- HV battery ECU CAN received data BMEM = 1 (abnormality in ROM/RAM)

3. Reset condition

- HV battery ECU CAN received data BMEM = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

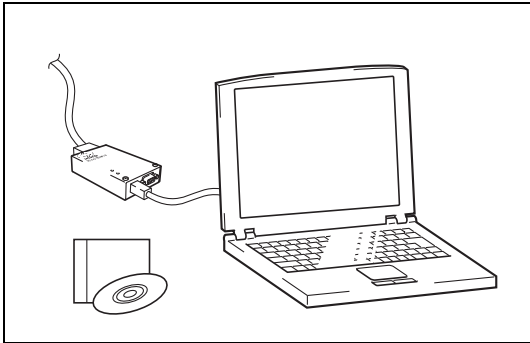
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

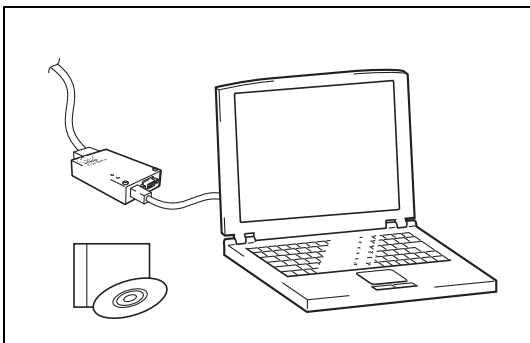
8. Estimated failure factors

- Malfunction of HV battery system

INSPECTION PROCEDURE: P3001 (TC41)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300159

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****(If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300160

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position and wait for 1 minute.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C

Is DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) detected?**YES****Replace the HV battery ECU.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC41)

P3001 (TC41)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position and wait for 1 minute. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. • P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C	DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is detected: Go to YES. DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3001 (TC43)

DTC: P3001 (TC43) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The output of HV battery ECU start relay is ON.
- Win/Wout limitless result (BTER0) has the following conditions:
 - During forced leakage and when 60 seconds have passed since completion of forced leakage
 - The output of HV battery ECU start relay is ON.
 - Since the output of HV battery ECU start relay is turned ON, 60 seconds have passed.

(2) Judgement criteria

- One of the following conditions is met:
 - HV battery ECU CAN received data BTER0 = 1 (Win/Wout limitless result)
 - HV battery ECU CAN received data BTER1 = 1 (Win/Wout limitless result)
 - HV battery ECU CAN received data BTER2 = 1 (abnormality in current detection line)

3. Reset condition

- HV battery ECU CAN received data BTER0 = 0
- HV battery ECU CAN received data BTER1 = 0
- HV battery ECU CAN received data BTER2 = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

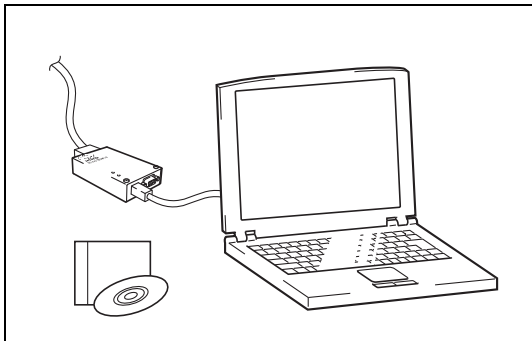
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV battery system

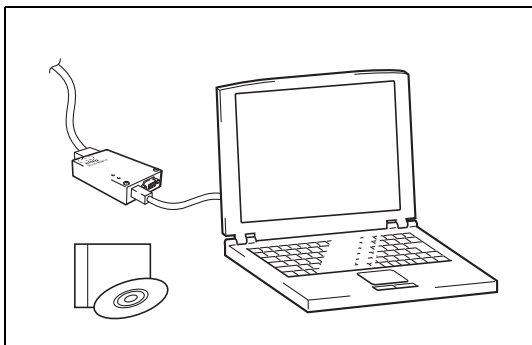
INSPECTION PROCEDURE: P3001 (TC43)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300161

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES**

Perform troubleshooting for each of related DTC.
(If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)

NO**Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300162

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position and wait for 1 minute.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C

Is DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) detected?**YES****Replace the HV battery ECU.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC43)

P3001 (TC43)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position and wait for 1 minute. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. • P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C	DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is detected: Go to YES. DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3001 (TC44)

EN01H03ZZZ030602003036

DTC: P3001 (TC44) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the HV battery system.

2. DTC set condition

(1) DTC detection condition

- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- HV battery ECU CAN received data BTEG $\neq$ 0 (HV battery system fatal error)

3. Reset condition

- HV battery ECU CAN received data BTEG = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

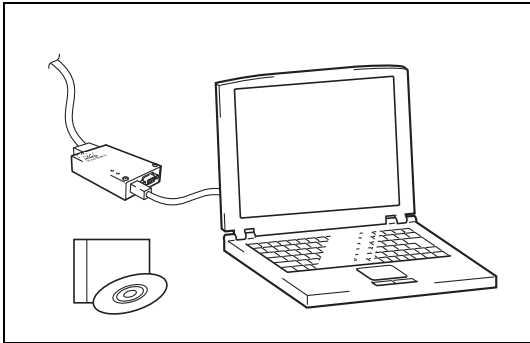
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV battery system

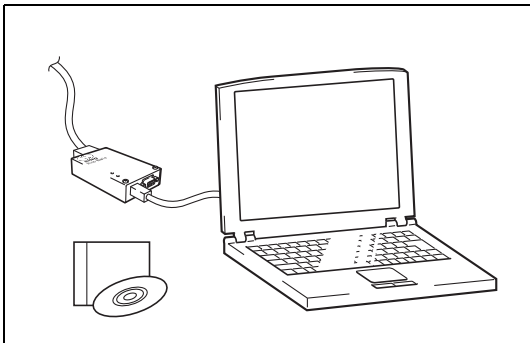
INSPECTION PROCEDURE: P3001 (TC44)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300163

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES**

Perform troubleshooting for each of related DTC.
 (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)

NO**Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300164

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position and wait for 1 minute.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C

Is DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) detected?**YES****Replace the HV battery ECU.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC44)

P3001 (TC44)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position and wait for 1 minute. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. • P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C	DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is detected: Go to YES. DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3001 (TC45)

EN01H03ZZZ030602003037

DTC: P3001 (TC45) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (disconnection of high-voltage fuse) in the HV battery.

2. DTC set condition

- (1) DTC detection condition
 - The output of HV battery ECU start relay is ON.
- (2) Judgement criteria
 - HV battery ECU CAN received data FUSE = 1 (Disconnected high-voltage fuse)

3. Reset condition

- HV battery ECU CAN received data FUSE = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

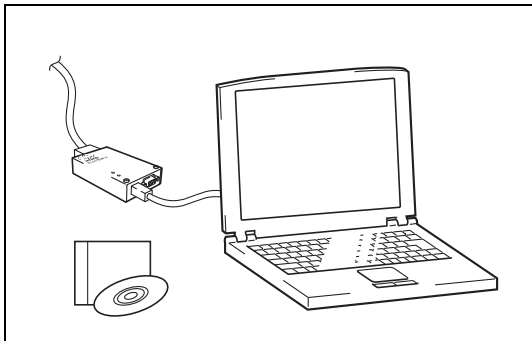
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV battery system

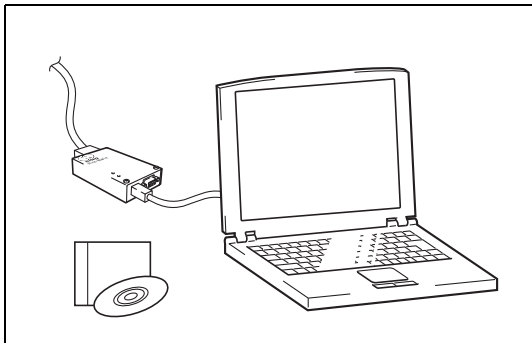
INSPECTION PROCEDURE: P3001 (TC45)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300165

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES**

Perform troubleshooting for each of related DTC.
(If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)

NO**Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300166

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position and wait for 1 minute.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C

Is DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) detected?**YES****Replace the HV battery ECU.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC45)

P3001 (TC45)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position and wait for 1 minute. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. • P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C	DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is detected: Go to YES. DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3001 (TC46)

EN01H03ZZZ030602003038

DTC: P3001 (TC46) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (request for stopping discharge) in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- HV battery ECU CAN received data DCIH = 1 (request for stopping discharge)

3. Reset condition

- HV battery ECU CAN received data DCIH = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

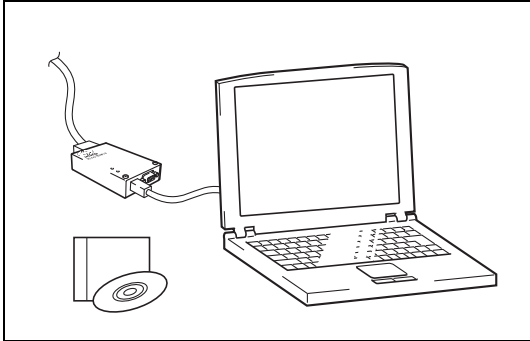
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

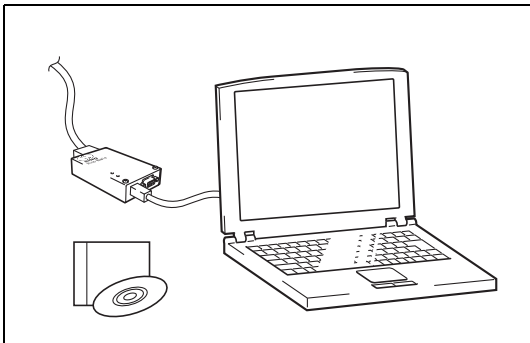
8. Estimated failure factors

- Malfunction of HV battery system

INSPECTION PROCEDURE: P3001 (TC46)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300167

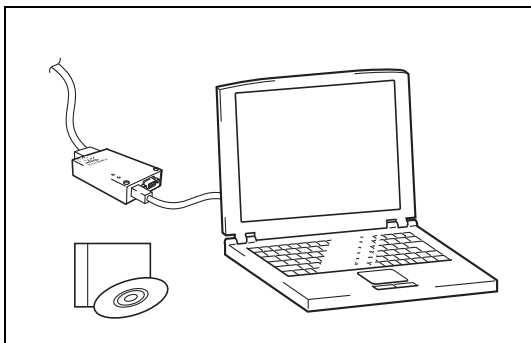
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than the following is detected:
 - P3001-46, P3001-47, P3001-4A

Is any DTC other than P3001-46, P3001-47, or P3001-4A detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300168

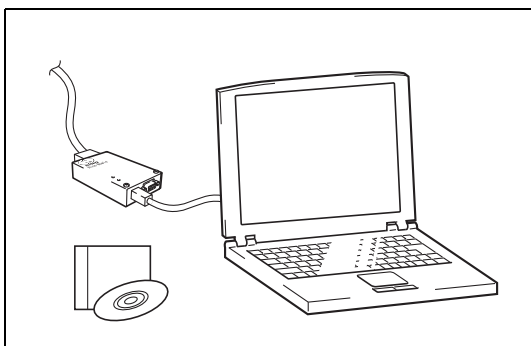
1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3 Inspecting the HV battery ECU [HINO-DX]

SHTS03ZZZ0300169

1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 4.****4 Reproduction check [HINO-DX]**

SHTS03ZZZ0300170

1. Clear the malfunction history.
2. Perform a test run. (Repeat the following cycle 5 times or more: After warm-up, stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.)
3. In [Fault Information] on the diagnosis tool screen, check if DTC P3001-46 is detected.

Is DTC P3001-46 detected?**YES****Replace the HV battery.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC46)

P3001 (TC46)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than the following is detected: P3001-46, P3001-47, P3001-4A	DTC other than P3001-46, P3001-47, or P3001-4A is detected: Go to YES. DTC other than P3001-46, P3001-47, or P3001-4A is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the inverter [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the HV battery ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC	Go to step 4.
4	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Perform a test run. (Repeat the following cycle 5 times or more: After warm-up, stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.) 3. In [Fault Information] on the diagnosis tool screen, check if DTC P3001-46 is detected.	DTC P3001-46 is detected: Go to YES. DTC P3001-46 is not detected: Go to NO.		Replace the HV battery.	The inspection is completed.

DTC: P3001 (TC47)

EN01H03ZZZ030602003039

DTC: P3001 (TC47) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (auxiliary charge request) in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- HV battery ECU CAN received data BLOW = 1 (auxiliary charge request)

3. Reset condition

- HV battery ECU CAN received data BLOW = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

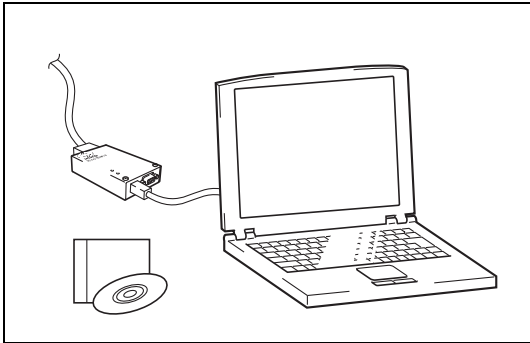
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

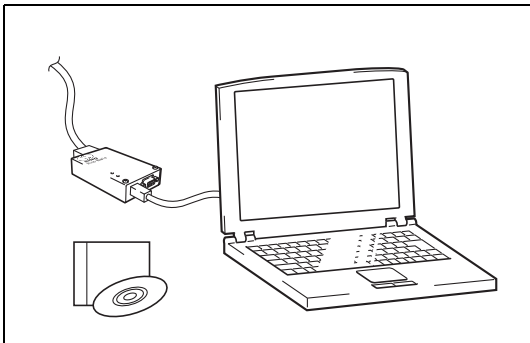
8. Estimated failure factors

- Malfunction of HV battery system

INSPECTION PROCEDURE: P3001 (TC47)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300171

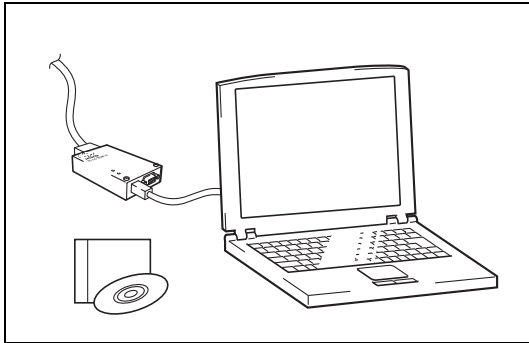
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than the following is detected:
 - P3001-46, P3001-47, P3001-4A

Is any DTC other than P3001-46, P3001-47, or P3001-4A detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300172

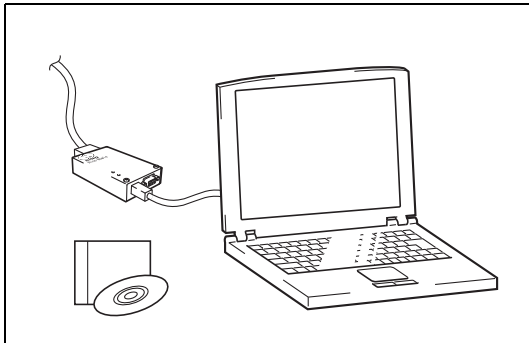
1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3 Inspecting the HV battery ECU [HINO-DX]

SHTS03ZZZ0300173

1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 4.****4 Reproduction check [HINO-DX]**

SHTS03ZZZ0300174

1. Clear the malfunction history.
2. Perform a test run. (Repeat the following cycle 5 times or more: After warm-up, stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.)
3. In [Fault Information] on the diagnosis tool screen, check if DTC P3001-47 is detected.

Is DTC P3001-47 detected?**YES****Replace the HV battery.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC47)

P3001 (TC47)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than the following is detected: • P3001-46, P3001-47, P3001-4A	DTC other than P3001-46, P3001-47, or P3001-4A is detected: Go to YES. DTC other than P3001-46, P3001-47, or P3001-4A is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the inverter [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the HV battery ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 4.
4	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Perform a test run. (Repeat the following cycle 5 times or more: After warm-up, stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.) 3. In [Fault Information] on the diagnosis tool screen, check if DTC P3001-47 is detected.	DTC P3001-47 is detected: Go to YES. DTC P3001-47 is not detected: Go to NO.		Replace the HV battery.	The inspection is completed.

DTC: P3001 (TC4A)

EN01H03ZZZ030602003040

DTC: P3001 (TC4A) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an external overload abnormality in the HV battery.

2. DTC set condition

(1) DTC detection condition

- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- HV battery ECU CAN received data OVLD = 1 (external overload abnormality)

3. Reset condition

- HV battery ECU CAN received data OVLD = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

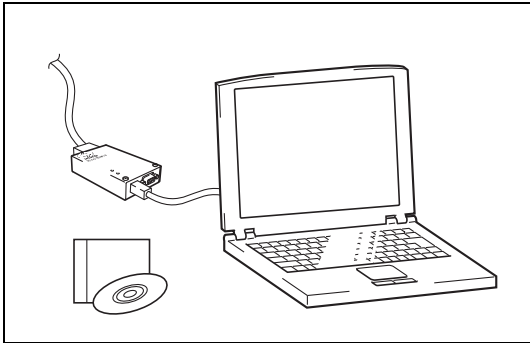
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

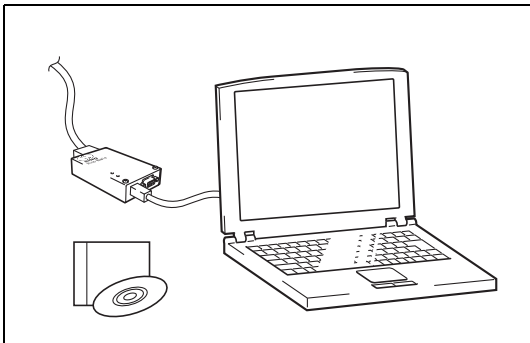
8. Estimated failure factors

- Malfunction of HV battery system

INSPECTION PROCEDURE: P3001 (TC4A)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300175

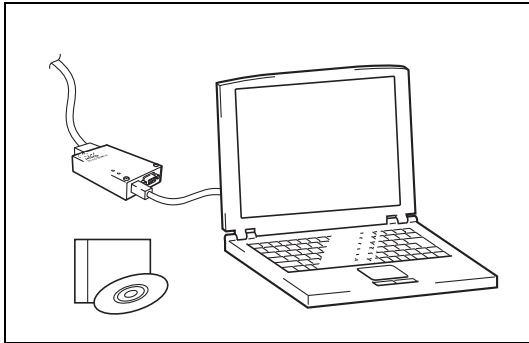
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than the following is detected.
 - P3001-46, P3001-47, P3001-4A

Is any DTC other than P3001-46, P3001-47, or P3001-4A detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the inverter [HINO-DX]**

SHTS03ZZZ0300176

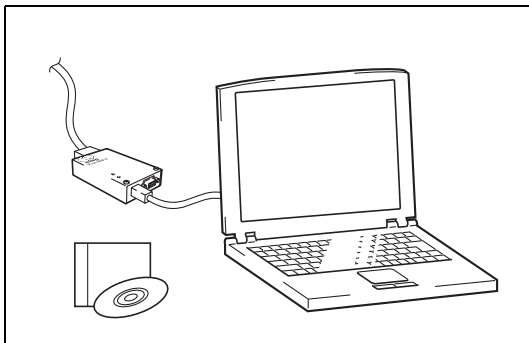
1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.

Is any DTC related to the inverter line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3 Inspecting the HV battery ECU [HINO-DX]

SHTS03ZZZ0300177

1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 4.****4 Reproduction check [HINO-DX]**

SHTS03ZZZ0300178

1. Clear the malfunction history.
2. Perform a test run. (Repeat the following cycle 5 times or more: After warm-up, stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.)
3. In [Fault Information] on the diagnosis tool screen, check if DTC P3001-4A is detected.

Is DTC P3001-4A detected?**YES****Replace the HV battery.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC4A)

P3001 (TC4A)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than the following is detected. • P3001-46, P3001-47, P3001-4A	DTC other than P3001-46, P3001-47, or P3001-4A is detected: Go to YES. DTC other than P3001-46, P3001-47, or P3001-4A is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the inverter [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the inverter line is detected.	DTC related to the inverter line is detected: Go to YES. DTC related to the inverter line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the HV battery ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 4.
4	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Perform a test run. (Repeat the following cycle 5 times or more: After warm-up, stop the vehicle. → Acceleration to 40 km/h. → Deceleration → Stop the vehicle.) 3. In [Fault Information] on the diagnosis tool screen, check if DTC P3001-4A is detected.	DTC P3001-4A is detected: Go to YES. DTC P3001-4A is not detected: Go to NO.		Replace the HV battery.	The inspection is completed.

DTC: P3001 (TC4B)

EN01H03ZZZ030602003041

DTC: P3001 (TC4B) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the HV battery voltage detection circuit.

2. DTC set condition

- (1) DTC detection condition
 - The output of HV battery ECU start relay is ON.
- (2) Judgement criteria
 - HV battery ECU CAN received data BTER4 = 1 (voltage detection line abnormality)

3. Reset condition

- HV battery ECU CAN received data BTER4 = 0

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

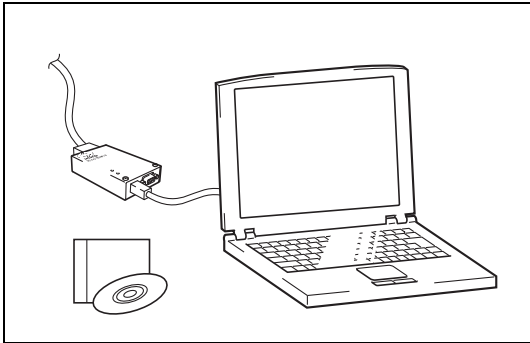
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

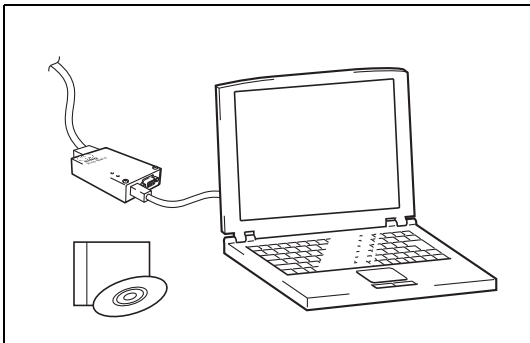
8. Estimated failure factors

- Malfunction of HV battery system

INSPECTION PROCEDURE: P3001 (TC4B)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300179

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****(If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300180

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position and wait for 1 minute.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C

Is DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) detected?**YES****Replace the HV battery ECU.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC4B)

P3001 (TC4B)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position and wait for 1 minute. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. • P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C	DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is detected: Go to YES. DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3001 (TC4C)

EN01H03ZZZ030602003042

DTC: P3001 (TC4C) Abnormality in HV battery line INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (request for stopping charge) in the HV battery.

2. DTC set condition

- (1) DTC detection condition
 - The output of HV battery ECU start relay is ON.
- (2) Judgement criteria
 - HV battery ECU CAN received data BHI = 1 (request for stopping charge)

3. Reset condition

- HV battery ECU CAN received data BHI = 0
- The vehicle speed is 3 mph or less.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop may become unavailable.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

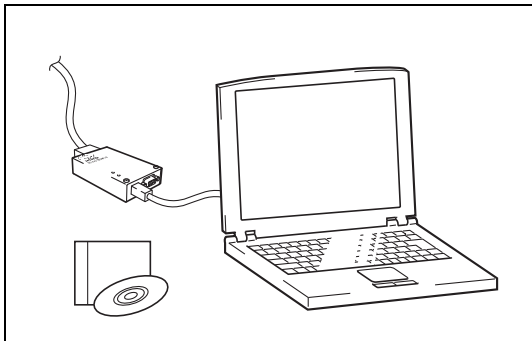
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV battery system

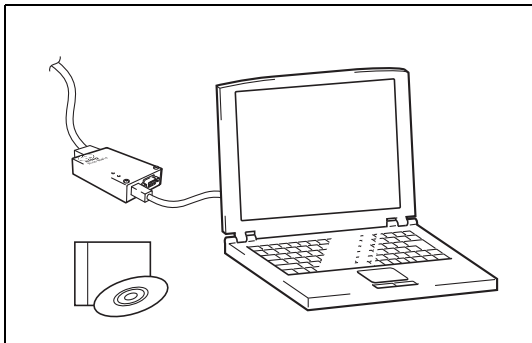
INSPECTION PROCEDURE: P3001 (TC4C)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300181

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES**

Perform troubleshooting for each of related DTC.
(If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)

NO**Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300182

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position and wait for 1 minute.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected.
 - P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C

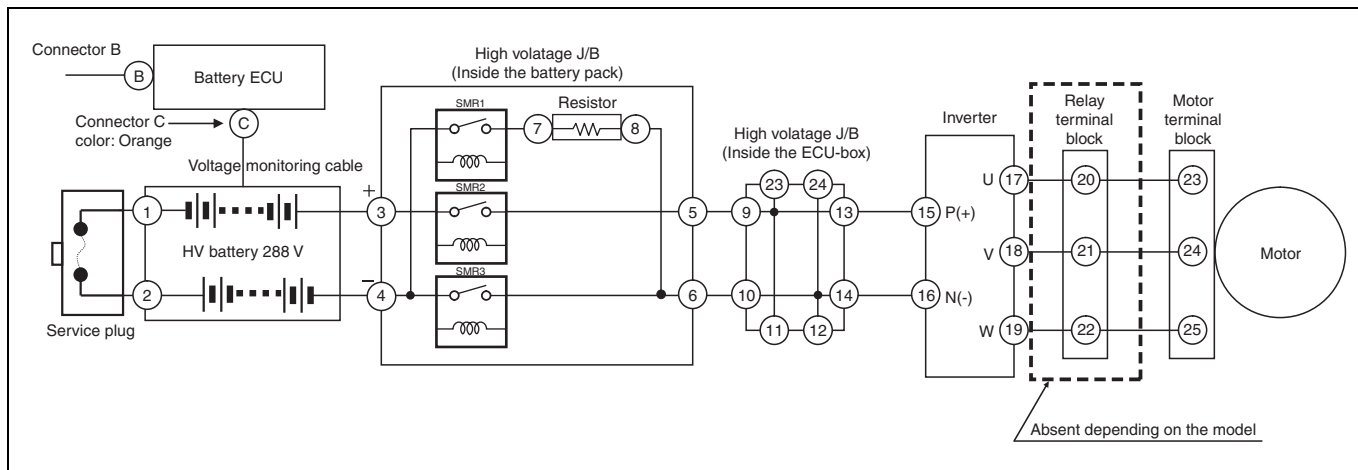
Is DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) detected?**YES****Replace the HV battery ECU.****NO****The inspection is completed.**

CHECKLIST: P3001 (TC4C)

P3001 (TC4C)		Abnormality in HV battery line		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (If communication between the diagnosis tool and the HV battery ECU is not available, replace the HV battery ECU.)	Go to step 2.
2	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position and wait for 1 minute. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC is detected. • P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, P3001-4C	DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is detected: Go to YES. DTC (P3001-41, P3001-43, P3001-44, P3001-45, P3001-4B, or P3001-4C) is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3009 (TC49)

EN01H03ZZZ030602003043

**DTC: P3009 (TC49) Abnormality in leakage
INFORMATION**

SHTS03ZZZ0300183

1. Technical description

- —

<Description of malfunction>

- Detected an abnormality in leakage of the HV system high-voltage line.

2. DTC set condition**(1) DTC detection condition**

- The control power supply voltage is 10 V or more.
- The output of HV battery ECU start relay is ON.

(2) Judgement criteria

- When it is detected that the leakage detection high threshold remains greater than the leakage crest value of the HV battery ECU CAN data for 3 minutes

3. Reset condition

- After return to normal

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: OFF

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- —

<Symptoms on the vehicle due to malfunction>

- —

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

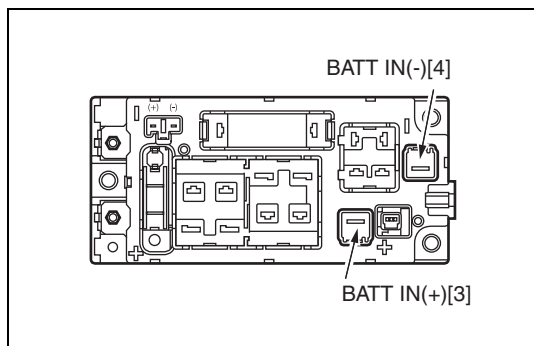
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of high-voltage circuit
- Malfunction of HV battery

INSPECTION PROCEDURE: P3009 (TC49)**1 Preparation for inspection**

1. Set the starter key to the "LOCK" position.
2. Disconnect the service plug and wait for 7 minutes or more.
3. Disconnect the 16P and 22 P connectors of battery ECU.

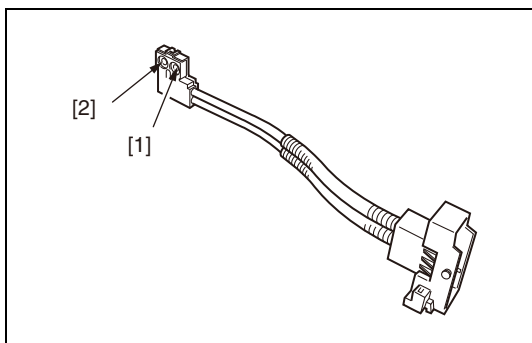
Is the inspection preparation completed?**YES****Go to step 2.****NO****Perform the inspection preparation again.****2 Inspection of HV battery**

SHTS03ZZZ0300184

1. Disconnect the BATT IN (+) [3] and BATT IN (-) [4] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the battery pack) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in battery pack) BATT IN (+) [3] terminal – GND BATT IN (-) [4] terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 5.****NO****Go to step 3.**

3 Inspecting the service plug 1

SHTS03ZZZ0300185

1. Disconnect the 1st and 2nd terminals from the HV battery and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. (Do not install the service plug.)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 1st terminal – GND 2nd terminal – GND	10 MΩ or more

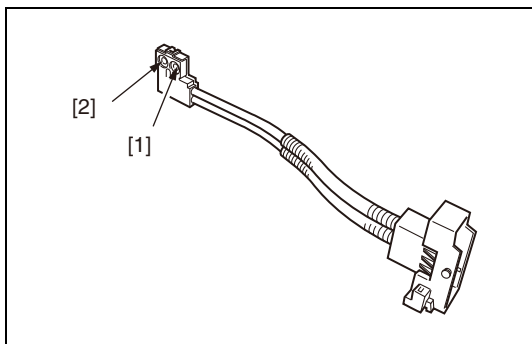
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replacing the frame wire (with the service plug socket).

4 Inspecting the service plug 2

SHTS03ZZZ0300186

1. Install a service plug to the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 1st terminal – GND 2nd terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?

YES

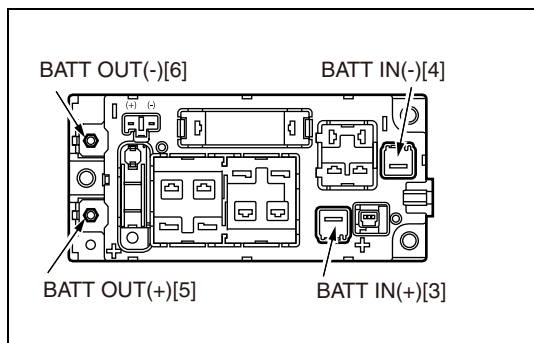
Replace the HV battery.

NO

Replace the service plug.

5

Inspecting the insulation resistance of high-voltage J/B (in the battery pack)



SHTS03ZZZ0300187

1. Disconnect the BATT OUT (+) [5] and BATT OUT (-) [6] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the battery pack) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in the battery pack) 3rd terminal – GND 4th terminal – GND 5th terminal – GND 6th terminal – GND	10 MΩ or more

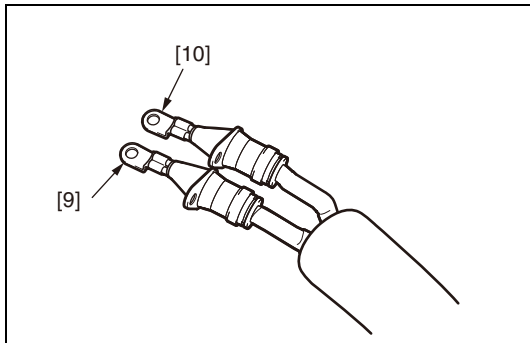
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the high-voltage J/B (in the battery pack).

6 Inspecting the insulation resistance of frame wire (to the high-voltage J/B)

SHTS03ZZZ0300188

1. Disconnect the 9th and 10th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 9th terminal – GND 10th terminal – GND	10 MΩ or more

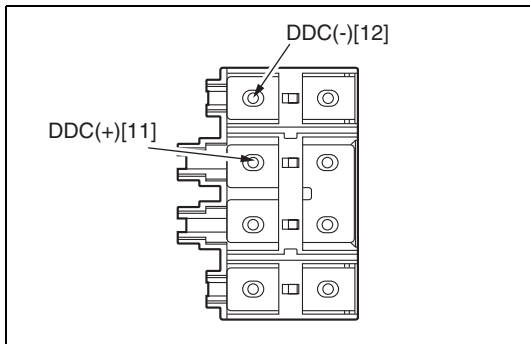
Is the measured value within the range of standard value?

YES

NO

Go to step 7.

Replace the frame wire.

7 Inspecting the insulation resistance of high-voltage J/B (in the ECU box)

SHTS03ZZZ0300189

1. Disconnect the 13th and 14th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the ECU box) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in the ECU box) 11th terminal – GND 12th terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?

YES

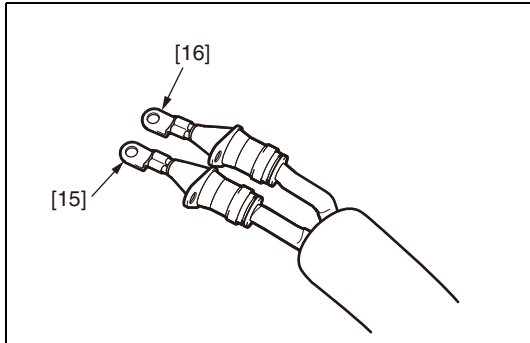
NO

Go to step 8.

Replace the high-voltage J/B (in the ECU box).

8

Inspecting the insulation resistance of frame wire (between the high-voltage J/B (in the ECU box) and the inverter)



SHTS03ZZZ0300190

1. Disconnect the 15th and 16th terminals from the inverter and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 15th terminal – GND 16th terminal – GND	10 MΩ or more

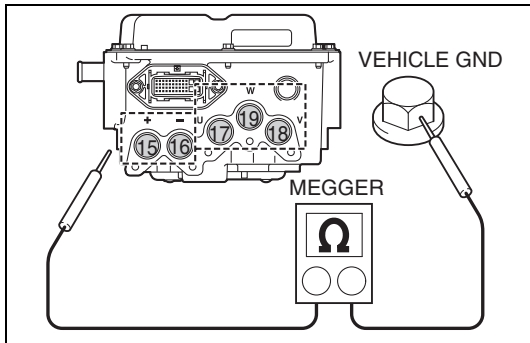
Is the measured value within the range of standard value?

YES

Go to step 9.

NO

Replace the frame wire.

9 Inspecting the insulation resistance of inverter

SHTS03ZZZ0300191

1. Disconnect the 17th, 18th, and 19th terminals from the inverter and then remove the frame wire.
2. Using the electrical tester, measure the insulation resistance between the terminals of inverter and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter 15th terminal – GND 16th terminal – GND 17th terminal – GND 18th terminal – GND 19th terminal – GND	3 MΩ or more

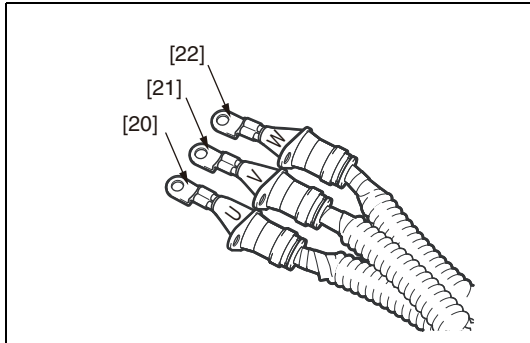
Is the measured value within the range of standard value?

YES

Go to step 10.

NO

Replace the inverter.

10 Inspecting the insulation resistance of frame wire (between the inverter and the relay terminal block)

SHTS03ZZZ0300192

1. Disconnect the frame wires of 20th, 21st, and 22nd terminals from the relay terminal block.
2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 20th terminal – GND 21st terminal – GND 22nd terminal – GND	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 11.
(For vehicles with no relay terminal block, go to step 12.)****NO****Replace the relay terminal block.**

11 Inspecting the insulation resistance of relay terminal block

- Using the electrical tester, measure the insulation resistance between the relay terminal block side terminals and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Relay terminal block 20th terminal – GND 21st terminal – GND 22nd terminal – GND	10 MΩ or more

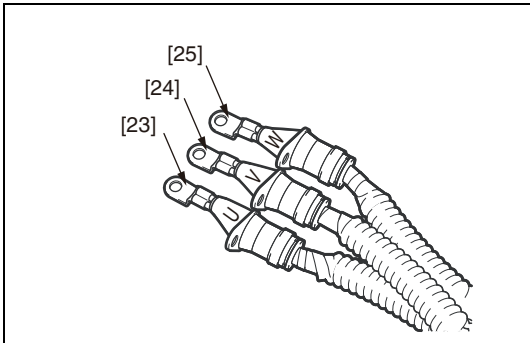
Is the measured value within the range of standard value?

YES

Go to step 12.

NO

Replace the relay terminal block.

12 Inspecting the insulation resistance of frame wire (between the inverter and the HV motor)

SHTS03ZZZ0300193

- Disconnect the frame wires of 23rd, 24th, and 25th terminals from the HV motor terminal block.
- Using the electrical tester, measure the insulation resistance between the terminals of frame wire side and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Frame wire 23rd terminal – GND 24th terminal – GND 25th terminal – GND	10 MΩ or more

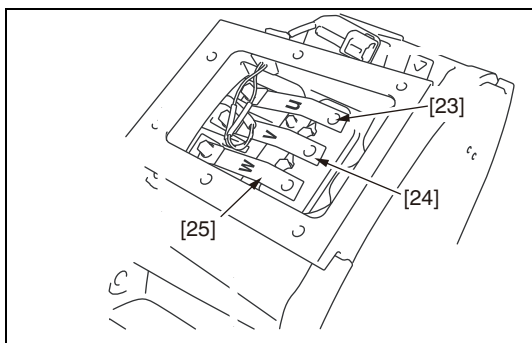
Is the measured value within the range of standard value?

YES

Go to step 13.

NO

Replace the frame wire.

13 Inspecting the insulation resistance of HV motor

SHTS03ZZZ0300194

- Using the electrical tester, measure the insulation resistance between the terminals of HV motor side and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV motor 23rd terminal – GND 24th terminal – GND 25th terminal – GND	5 MΩ or more

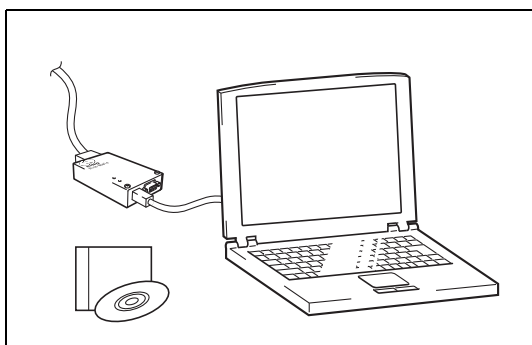
Is the measured value within the range of standard value?

YES

Go to step 14.

NO

Replace the HV motor.

14 Reproduction check [HINO-DX]

SHTS03ZZZ0300195

- Connect all the cables and connectors that have been disconnected to restore the system.
- Set the starter key to the "LOCK" position.
- Connect the diagnosis tool (HINO-DX) to the vehicle.
- Set the starter key to the "ON" position.
- Clear the malfunction history.
- Perform a test run. (For 30 minutes or more)
- In [Fault Information] on the diagnosis tool screen, check if P3009-49 is detected.

Is DTC P3009-49 detected?

YES

Replace the HV battery ECU.

NO

The inspection is completed.

CHECKLIST: P3009 (TC49)

P3009 (TC49)		Abnormality in leakage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Preparation for inspection	1. Set the starter key to the "LOCK" position. 2. Disconnect the service plug and wait for 7 minutes or more. 3. Disconnect the 16P and 22 P connectors of battery ECU.	Inspection preparation is completed: Go to YES. Inspection preparation is not completed: Go to NO.		Go to step 2.	Perform the inspection preparation again.
2	Inspection of HV battery	1. Disconnect the BATT IN (+) [3] and BATT IN (-) [4] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the battery pack) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in battery pack) BATT IN (+) [3] terminal – GND BATT IN (-) [4] terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Go to step 3.
3	Inspecting the service plug 1	1. Disconnect the 1st and 2nd terminals from the HV battery and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. (Do not install the service plug.) <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 1st terminal – GND 2nd terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replacing the frame wire (with the service plug socket).

P3009 (TC49)		Abnormality in leakage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the service plug 2	1. Install a service plug to the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 1st terminal – GND 2nd terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the HV battery.	Replace the service plug.
5	Inspecting the insulation resistance of high-voltage J/B (in the battery pack)	1. Disconnect the BATT OUT (+) [5] and BATT OUT (-) [6] terminals from the high-voltage J/B (in the battery pack), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the battery pack) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in the battery pack) 3rd terminal – GND 4th terminal – GND 5th terminal – GND 6th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the high-voltage J/B (in the battery pack).
6	Inspecting the insulation resistance of frame wire (to the high-voltage J/B)	1. Disconnect the 9th and 10th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 9th terminal – GND 10th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the frame wire.

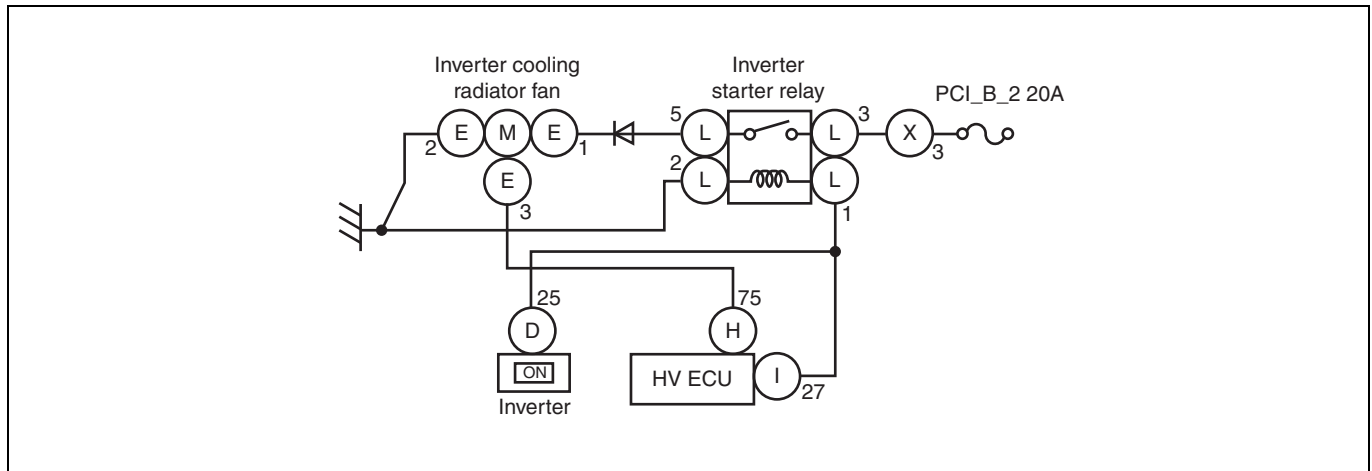
P3009 (TC49)		Abnormality in leakage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the insulation resistance of high-voltage J/B (in the ECU box)	1. Disconnect the 13th and 14th terminals from the high-voltage J/B (in the ECU box), and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of high-voltage J/B (in the ECU box) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in the ECU box) 11th terminal – GND 12th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the high-voltage J/B (in the ECU box).
8	Inspecting the insulation resistance of frame wire (between the high-voltage J/B (in the ECU box) and the inverter)	1. Disconnect the 15th and 16th terminals from the inverter and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 15th terminal – GND 16th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the frame wire.
9	Inspecting the insulation resistance of inverter	1. Disconnect the 17th, 18th, and 19th terminals from the inverter and then remove the frame wire. 2. Using the electrical tester, measure the insulation resistance between the terminals of inverter and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter 15th terminal – GND 16th terminal – GND 17th terminal – GND 18th terminal – GND 19th terminal – GND <Standard values> 3 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 10.	Replace the inverter.

P3009 (TC49)		Abnormality in leakage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
10	Inspecting the insulation resistance of frame wire (between the inverter and the relay terminal block)	1. Disconnect the frame wires of 20th, 21st, and 22nd terminals from the relay terminal block. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 20th terminal – GND 21st terminal – GND 22nd terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 11. (For vehicles with no relay terminal block, go to step 12.)	Replace the relay terminal block.
11	Inspecting the insulation resistance of relay terminal block	1. Using the electrical tester, measure the insulation resistance between the relay terminal block side terminals and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Relay terminal block 20th terminal – GND 21st terminal – GND 22nd terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 12.	Replace the relay terminal block.
12	Inspecting the insulation resistance of frame wire (between the inverter and the HV motor)	1. Disconnect the frame wires of 23rd, 24th, and 25th terminals from the HV motor terminal block. 2. Using the electrical tester, measure the insulation resistance between the terminals of frame wire side and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Frame wire 23rd terminal – GND 24th terminal – GND 25th terminal – GND <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 13.	Replace the frame wire.

P3009 (TC49)		Abnormality in leakage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
13	Inspecting the insulation resistance of HV motor	1. Using the electrical tester, measure the insulation resistance between the terminals of HV motor side and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> HV motor 23rd terminal – GND 24th terminal – GND 25th terminal – GND <Standard values> 5 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 14.	Replace the HV motor.
14	Reproduction check [HINO-DX]	1. Connect all the cables and connectors that have been disconnected to restore the system. 2. Set the starter key to the "LOCK" position. 3. Connect the diagnosis tool (HINO-DX) to the vehicle. 4. Set the starter key to the "ON" position. 5. Clear the malfunction history. 6. Perform a test run. (For 30 minutes or more) 7. In [Fault Information] on the diagnosis tool screen, check if P3009-49 is detected.	DTC P3009-49 is detected: Go to YES. DTC P3009-49 is not detected: Go to NO.		Replace the HV battery ECU.	The inspection is completed.

DTC: P3128 (TC7D)

EN01H03ZZZ030602003044

DTC: P3128 (TC7D) Abnormality in HV radiator fan revolution number Low
INFORMATION

SHTS03ZZZ0300196

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in low number of revolutions of HV radiator fan.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- Since the inverter start relay is turned ON, 1 second has passed.

(2) Judgement criteria

- The number of revolutions of the HV radiator fan remains less than 2500 r/min for 10 seconds or more.

3. Reset condition

- The number of revolutions of the HV radiator fan remains 2500 r/min or more for 10 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

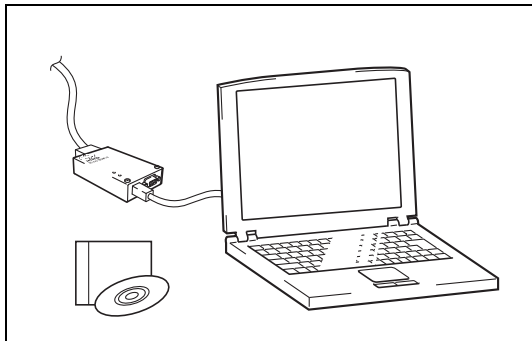
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV radiator fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P3128 (TC7D)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300197

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Select [Hybrid] on the diagnosis tool screen.
5. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of inverter start relay is detected:
 - P324B-62, P324C-61

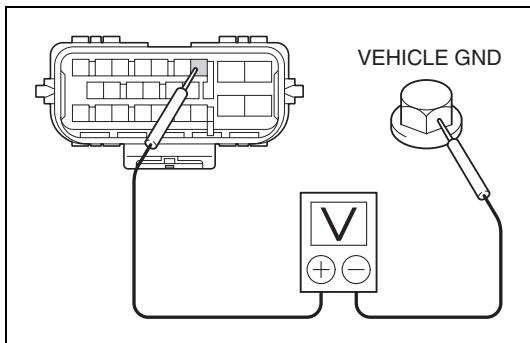
Is DTC P324B-62 or P324C-61 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the HV radiator**

1. Check that the HV radiator and the inverter cooling radiator fan have no damage or clogging.

Is any defect found?**YES****Repair (clean) or replace the defective part.****NO****Go to step 3.****3 Checking the inverter cooling radiator fan**

1. Set the starter key to the "ON" position.
2. Check that the inverter cooling radiator fan is running.

Is the inverter cooling radiator fan running?**YES****Go to step 7.****NO****Go to step 4.**

4 Inspecting the voltage of vehicle wire harness

SHTS03ZZZ0300198

1. Set the starter key to the "LOCK" position.
2. Disconnect the PCU harness (24P) connector.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the 3rd terminal of PCU harness (24P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle-side connector 3rd terminal – GND	9 V or more

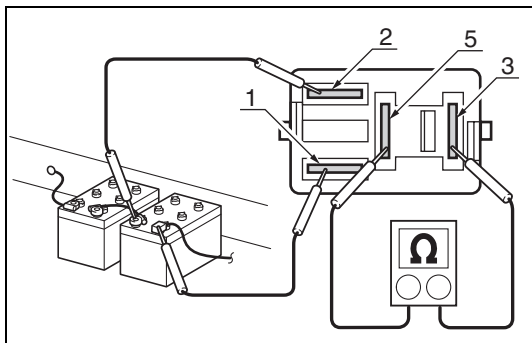
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Inspect the power supply circuit ([PCI-B 20A] fuse and wire harness).

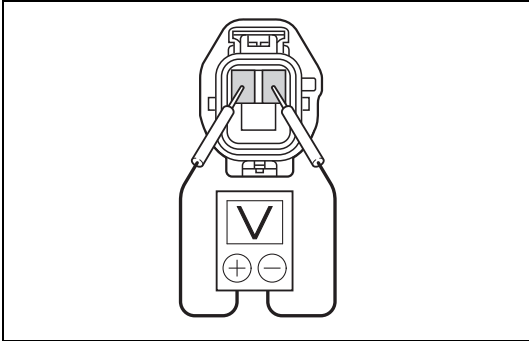
5 Inspecting the inverter start relay

SHTS03ZZZ0300199

1. Set the starter key to the "LOCK" position.
2. Remove the inverter start relay.
3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of inverter start relay. (With no voltage applied)
4. Apply the voltage of 12 V between the 1st and 2nd terminals of inverter start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay 3rd terminal – 5th terminal	Without voltage: 10 k Ω or more With voltage: less than 1 Ω

Is the measured value within the range of standard value?**YES****Go to step 6.****NO****Replace the inverter start relay.**

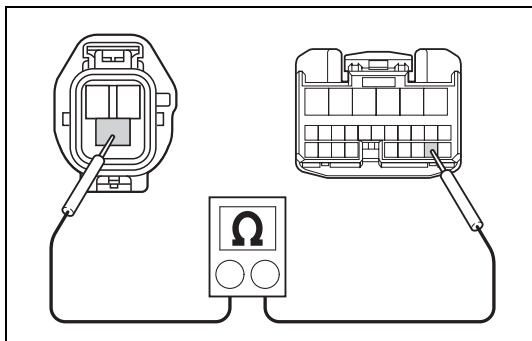
6 Inspecting the voltage of PCU wire harness (lower side)

SHTS03ZZZ0300200

1. Connect the PCU harness (24P) connector and the inverter start relay.
2. Disconnect the connector of inverter cooling radiator fan.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the connector terminals of inverter cooling radiator fan.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Inverter cooling radiator fan connector 1st terminal – 2nd terminal	9 V or more

Is the measured value within the range of standard value?**YES****Go to step 7.****NO****Replace the PCU wire harness (lower side).**

7 Inspecting the continuity of PCU wire harness (lower side)

1. Set the starter key to the "LOCK" position.
2. Disconnect the HV ECU1 connector.
3. Using the electrical tester, measure the resistance between the connector terminal of inverter cooling radiator fan and the HV ECU1 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling radiator fan connector to HV ECU1 connector 3rd terminal – 25th terminal	Less than 1 Ω

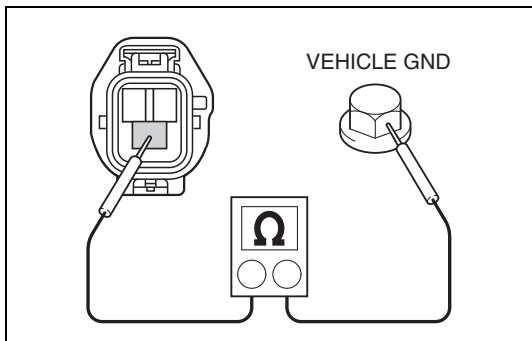
Is the measured value within the range of standard value?

YES

Go to step 8.

NO

Replace the PCU wire harness (lower side).

8 Inspecting the PCU wire harness (lower side) for short circuit

1. Using the electrical tester, measure the resistance between the 3rd terminal of inverter cooling radiator fan connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling radiator fan connector 3rd terminal – GND	10 kΩ or more

Is the measured value within the range of standard value?

YES

Go to step 9.

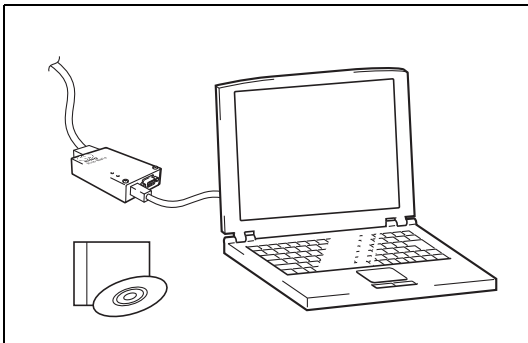
NO

Replace the PCU wire harness (lower side).

9 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. For the 3rd terminal of inverter cooling radiator fan connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling radiator fan connector 3rd terminal – Each signal line	10 kΩ or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the inverter cooling radiator fan.
After replacement, go to step 10.****10 Reproduction check [HINO-DX]**

SHTS03ZZZ0300203

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "LOCK" position.
3. Connect the diagnosis tool (HINO-DX) to the vehicle.
4. Set the starter key to the "ON" position.
5. Clear the malfunction history.
6. Set the starter key to the "ON" position and wait for 1 minute.
7. Set the starter key to the "LOCK" position and wait for 1 minute.
8. Set the starter key to the "ON" position and wait for 1 minute.
9. In [Fault Information] on the diagnosis tool screen, check if P3128-7D is detected.

Is DTC P3128-7D detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P3128 (TC7D)

P3128 (TC7D)		Abnormality in HV radiator fan revolution number Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Select [Hybrid] on the diagnosis tool screen. 5. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC related to malfunction of inverter start relay is detected: • P324B-62, P324C-61	DTC P324B-62 or P324C-61 is detected: Go to YES. DTC P324B-62 or P324C-61 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the HV radiator	1. Check that the HV radiator and the inverter cooling radiator fan have no damage or clogging.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair (clean) or replace the defective part.	Go to step 3.
3	Checking the inverter cooling radiator fan	1. Set the starter key to the "ON" position. 2. Check that the inverter cooling radiator fan is running.	Inverter cooling radiator fan is running: Go to YES. Inverter cooling radiator fan is not running: Go to NO.		Go to step 7.	Go to step 4.
4	Inspecting the voltage of vehicle wire harness	1. Set the starter key to the "LOCK" position. 2. Disconnect the PCU harness (24P) connector. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the 3rd terminal of PCU harness (24P) vehicle-side connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle-side connector 3rd terminal – GND <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Inspect the power supply circuit ([PCI-B 20A] fuse and wire harness).

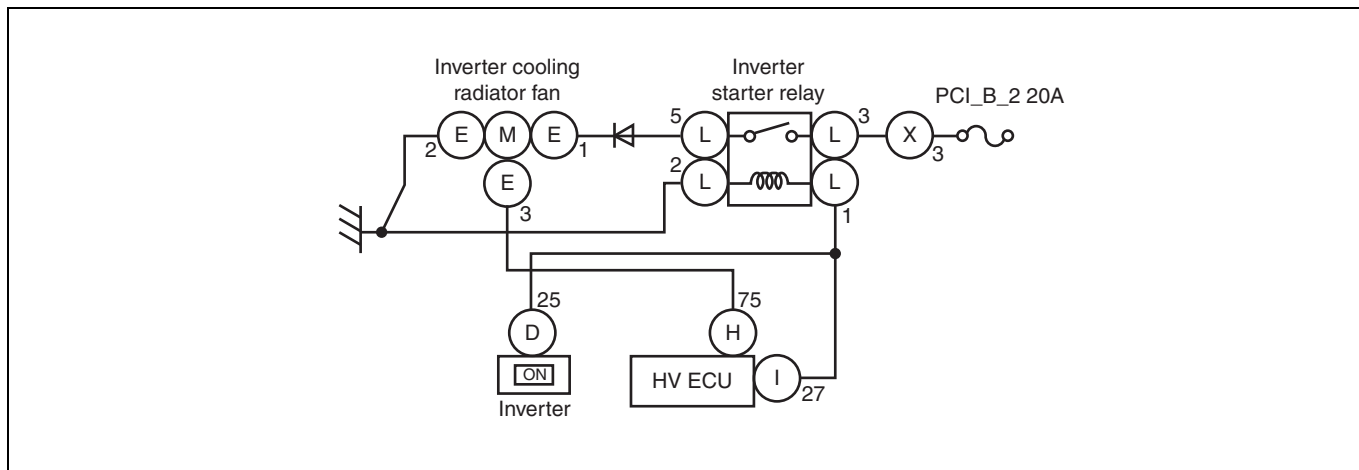
P3128 (TC7D)		Abnormality in HV radiator fan revolution number Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the inverter start relay	1. Set the starter key to the "LOCK" position. 2. Remove the inverter start relay. 3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of inverter start relay. (With no voltage applied) 4. Apply the voltage of 12 V between the 1st and 2nd terminals of inverter start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied) <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay 3rd terminal – 5th terminal <Standard values> Without voltage: 10 k Ω or more With voltage: less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the inverter start relay.
6	Inspecting the voltage of PCU wire harness (lower side)	1. Connect the PCU harness (24P) connector and the inverter start relay. 2. Disconnect the connector of inverter cooling radiator fan. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the connector terminals of inverter cooling radiator fan. <Measurement conditions> Starter key: ON <Tester connections> Inverter cooling radiator fan connector 1st terminal – 2nd terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).

P3128 (TC7D)		Abnormality in HV radiator fan revolution number Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the HV ECU1 connector. 3. Using the electrical tester, measure the resistance between the connector terminal of inverter cooling radiator fan and the HV ECU1 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling radiator fan connector to HV ECU1 connector 3rd terminal – 25th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the PCU wire harness (lower side).
8	Inspecting the PCU wire harness (lower side) for short circuit	1. Using the electrical tester, measure the resistance between the 3rd terminal of inverter cooling radiator fan connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling radiator fan connector 3rd terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the PCU wire harness (lower side).
9	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 3rd terminal of inverter cooling radiator fan connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling radiator fan connector 3rd terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	After replacement, go to step 10.

P3128 (TC7D)		Abnormality in HV radiator fan revolution number Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
10	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "LOCK" position. 3. Connect the diagnosis tool (HINO-DX) to the vehicle. 4. Set the starter key to the "ON" position. 5. Clear the malfunction history. 6. Set the starter key to the "ON" position and wait for 1 minute. 7. Set the starter key to the "LOCK" position and wait for 1 minute. 8. Set the starter key to the "ON" position and wait for 1 minute. 9. In [Fault Information] on the diagnosis tool screen, check if P3128-7D is detected.	DTC P3128-7D is detected: Go to YES. DTC P3128-7D is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P3129 (TC7C)

EN01H03ZZZ030602003045

DTC: P3129 (TC7C) Abnormality in HV radiator fan revolution number High
INFORMATION

SHTS03ZZZ0300204

1. Technical description

- –

<Description of malfunction>

- Detected an abnormally high number of revolutions of the HV radiator fan.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- Since the inverter start relay output is turned ON, 1 second has passed.

(2) Judgement criteria

- The number of revolutions of the HV radiator fan remains less than 4500 r/min for 10 seconds or more.

3. Reset condition

- The number of revolutions of the HV radiator fan remains 4500 r/min or more for 10 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV radiator fan
- Malfunction of HV ECU

INSPECTION PROCEDURE: P3129 (TC7C)**1 Inspecting the inverter cooling radiator fan**

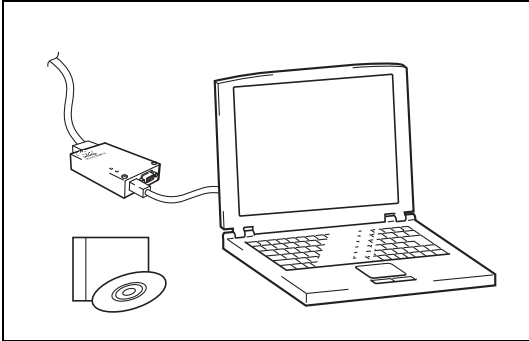
1. Check that the inverter cooling radiator fan is free from damage.

Is any defect found?**YES****Replace the inverter cooling radiator fan.****NO****Go to step 2.****2 Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of HV ECU1 and inverter cooling radiator fan.
3. For the 3rd terminal of inverter cooling radiator fan connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling radiator fan connector 3rd terminal – Each signal line	10 k Ω or more

Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the inverter cooling radiator fan.
After replacement, go to step 3.**

3 Reproduction check [HINO-DX]

SHTS03ZZZ0300205

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "LOCK" position.
3. Connect the diagnosis tool (HINO-DX) to the vehicle.
4. Set the starter key to the "ON" position.
5. Clear the malfunction history.
6. Set the starter key to the "ON" position and wait for 1 minute.
7. Set the starter key to the "LOCK" position and wait for 1 minute.
8. Set the starter key to the "ON" position and wait for 1 minute.
9. In [Fault Information] on the diagnosis tool screen, check if P3129-7C is detected.

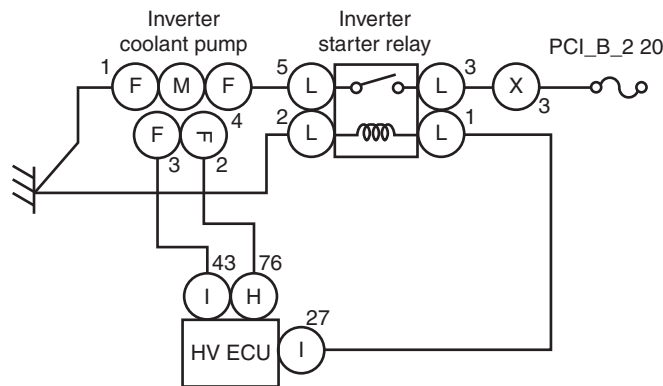
Is DTC P3129-7C detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P3129 (TC7C)

P3129 (TC7C)		Abnormality in HV radiator fan revolution number High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter cooling radiator fan	1. Check that the inverter cooling radiator fan is free from damage.	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the inverter cooling radiator fan.	Go to step 2.
2	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of HV ECU1 and inverter cooling radiator fan. 3. For the 3rd terminal of inverter cooling radiator fan connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling radiator fan connector 3rd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the inverter cooling radiator fan. After replacement, go to step 3.
3	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "LOCK" position. 3. Connect the diagnosis tool (HINO-DX) to the vehicle. 4. Set the starter key to the "ON" position. 5. Clear the malfunction history. 6. Set the starter key to the "ON" position and wait for 1 minute. 7. Set the starter key to the "LOCK" position and wait for 1 minute. 8. Set the starter key to the "ON" position and wait for 1 minute. 9. In [Fault Information] on the diagnosis tool screen, check if P3129-7C is detected.	DTC P3129-7C is detected: Go to YES. DTC P3129-7C is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P314C (TC82)

EN01H03ZZZ030602003046

DTC: P314C (TC82) Abnormality in HV water pump revolution number signal Low
INFORMATION

SHTS03ZZZ0300206

1. Technical description

- –

<Description of malfunction>

- Detected a GND short circuit in the HV water pump revolution number signal circuit.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The output of inverter start relay is ON.

(2) Judgement criteria

- The following conditions are met continuously for 1 second or more:
 - The HV water pump revolution number signal is 0 Hz.
 - The HV water pump revolution number signal is OFF.

3. Reset condition

- The HV water pump revolution number signal remains higher than 1 Hz for 5 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

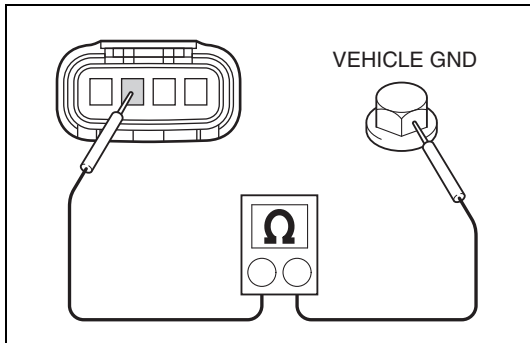
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of HV water pump
- Malfunction of HV ECU

INSPECTION PROCEDURE: P314C (TC82)**1 Inspecting the PCU wire harness (lower side) for short circuit**

SHTS03ZZZ0300207

1. Set the starter key to the "LOCK" position.
2. Disconnect the inverter cooling pump and the HV ECU1 connector.
3. Using the electrical tester, measure the resistance between the 2nd terminal of inverter cooling pump connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 2nd terminal – GND	10 k Ω or more

Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the PCU wire harness (lower side).

2 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. For the 2nd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 2nd terminal – Each signal line	10 k Ω or more

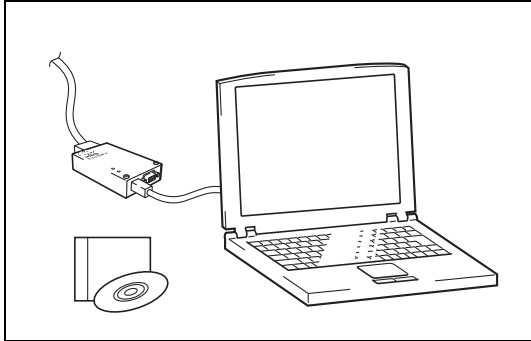
Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Replace the inverter cooling pump.
After replacement, go to step 3.

3**Reproduction check [HINO-DX]**

SHTS03ZZZ0300208

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "ON" position and wait for 1 minute.
6. In [Fault Information] on the diagnosis tool screen, check if P314C-82 is detected.

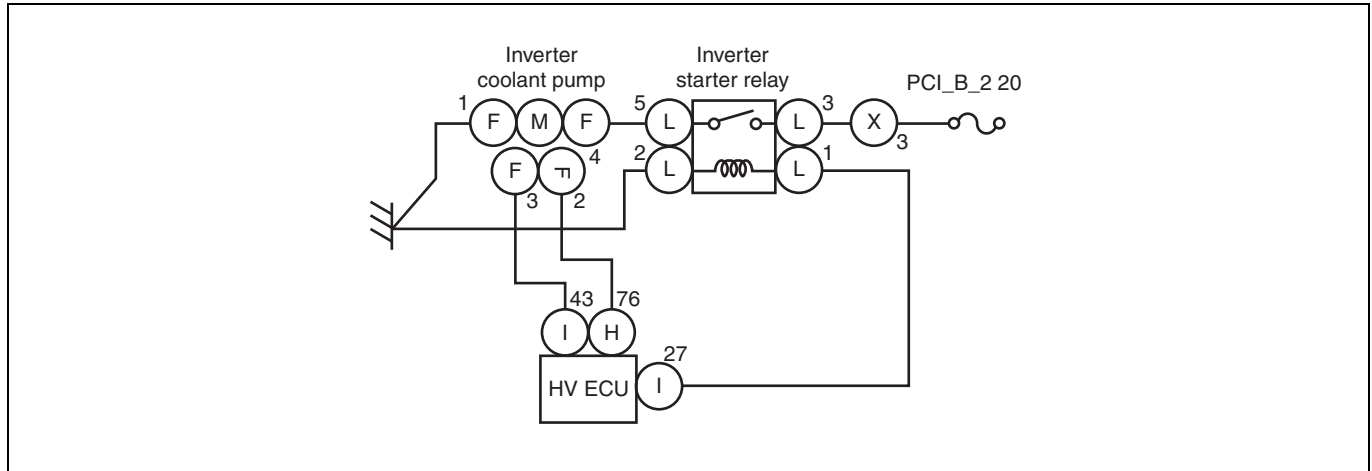
Is DTC P314C-82 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P314C (TC82)

P314C (TC82)		Abnormality in HV water pump revolution number signal Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the inverter cooling pump and the HV ECU1 connector. 3. Using the electrical tester, measure the resistance between the 2nd terminal of inverter cooling pump connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 2nd terminal – GND <Standard values> 10 kΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 2nd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 2nd terminal – Each signal line <Standard values> 10 kΩ or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the inverter cooling pump. After replacement, go to step 3.
3	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "ON" position and wait for 1 minute. 6. In [Fault Information] on the diagnosis tool screen, check if P314C-82 is detected.	DTC P314C-82 is detected: Go to YES. DTC P314C-82 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P314D (TC81)

EN01H03ZZZ030602003047

DTC: P314D (TC81) Abnormality in HV water pump revolution number signal High
INFORMATION

SHTS03ZZZ0300209

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection in the HV water pump revolution number signal circuit.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 10 V or more.
- The output of inverter start relay is ON.

(2) Judgement criteria

- The following conditions are met continuously for 1 second or more:
 - The HV water pump revolution number signal is 0 Hz.
 - The HV water pump revolution number signal is ON.

3. Reset condition

- The HV water pump revolution number signal remains higher than 1 Hz for 5 seconds or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

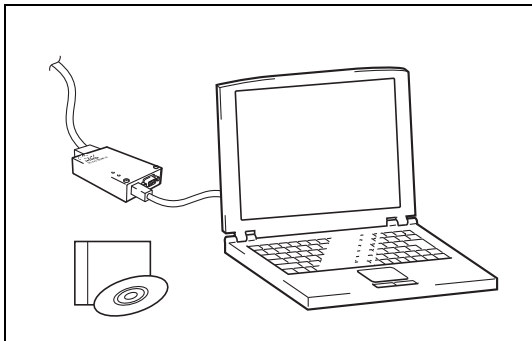
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper contact or fitting of connector
- Malfunction of HV water pump
- Malfunction of HV ECU

INSPECTION PROCEDURE: P314D (TC81)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300210

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P324B-62 or P324C-61 is detected.

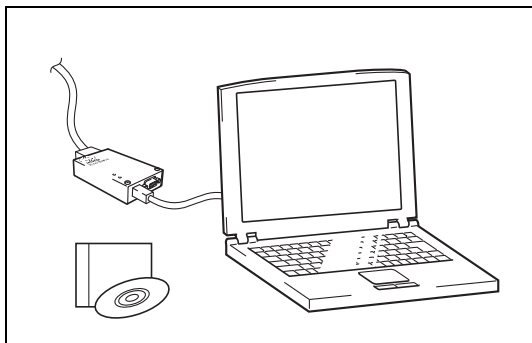
Is DTC P324B-62 or P324C-61 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the coolant system route**

1. Check the coolant system route (radiator, inverter, and hose) for any damage or water leakage.

Is any defect found?**YES****Repair or replace the defective part.****NO****Go to step 3.****3 Inspecting the coolant level**

1. Remove the radiator cap and check the height from the coolant level to the filling port.

Is the coolant level about 10 mm from the filling port?**YES****Go to step 4.****NO****Add coolant. (See "Adding coolant.")
After adding coolant, perform the inspection again.**

4 Checking the activation of inverter cooling pump [HINO-DX]

SHTS03ZZZ0300211

1. In [Activation Test] on the diagnosis tool screen, select [HV water pump drive duty value].
2. Activate the HV water pump at the duty value of 60% and feel the hose to make sure that the water pump is running.

Measurement conditions	Measured item	Standard values
Starter key: ON	HV water pump drive duty value	Activation of water pump

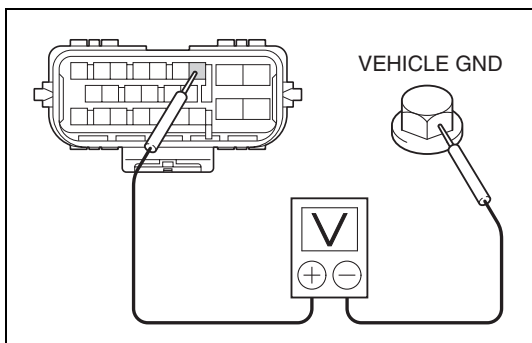
Is the activation of water pump confirmed?

YES

NO

Go to step 8.

Go to step 5.

5 Inspecting the vehicle wire harness

SHTS03ZZZ0300212

1. Disconnect the PCU harness (24P) connector.
2. Using the electrical tester, measure the voltage between the vehicle-side connector of PCU harness (24P) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) vehicle-side connector 3rd terminal – GND	9 V or more

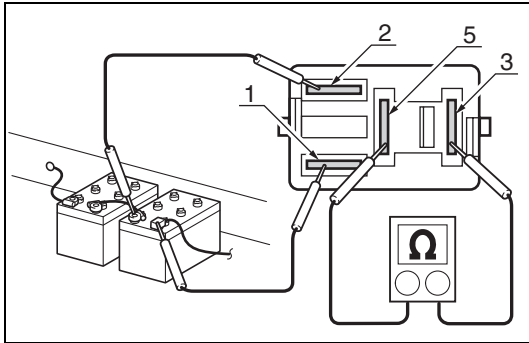
Is the measured value within the range of standard value?

YES

NO

Go to step 6.

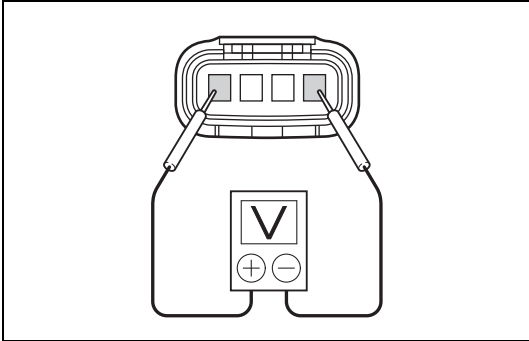
Inspect the power supply circuit ([PCU-B2 20A] fuse and wire harness).

6 Inspecting the inverter start relay

1. Set the starter key to the "LOCK" position.
2. Remove the inverter start relay.
3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of inverter start relay. (With no voltage applied)
4. Apply the voltage of 12 V between the 1st and 2nd terminals of inverter start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied)

Measurement conditions	Tester connections	Standard values
Starter key: ON	Inverter start relay 3rd terminal – 5th terminal	Without voltage: 10 k Ω or more With voltage: less than 1 Ω

Is the measured value within the range of standard value?**YES****Go to step 7.****NO****Replace the inverter start relay.**

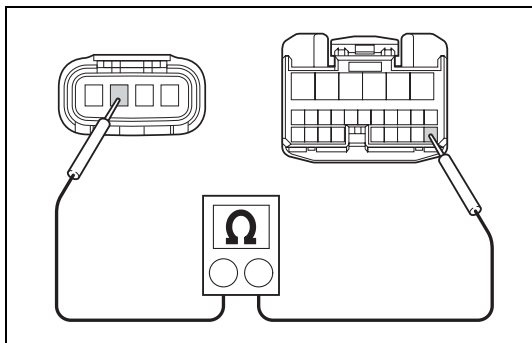
7 Inspecting the voltage of PCU wire harness (lower side)

SHTS03ZZZ0300214

1. Connect the inverter start relay and PCU harness (24P) connectors.
2. Disconnect the inverter cooling pump connector.
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the connector terminals of inverter cooling pump.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Inverter cooling pump connector 1st terminal – 4th terminal	9 V or more

Is the measured value within the range of standard value?**YES****Go to step 8.****NO****Replace the PCU wire harness (lower side).**

8 Inspecting the continuity of PCU wire harness (lower side)

1. Set the starter key to the "LOCK" position.
2. Disconnect the HV ECU1 connector.
3. Using the electrical tester, measure the resistance between the inverter cooling pump connector and the HV ECU1 connector terminal.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector – HV ECU1 connector 2nd terminal – 26th terminal	Less than 1 Ω

Is the measured value within the range of standard value?

YES

Go to step 9.

NO

Replace the PCU wire harness (lower side).

9 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. For the 2nd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector 2nd terminal – Each signal line	10 k Ω or more

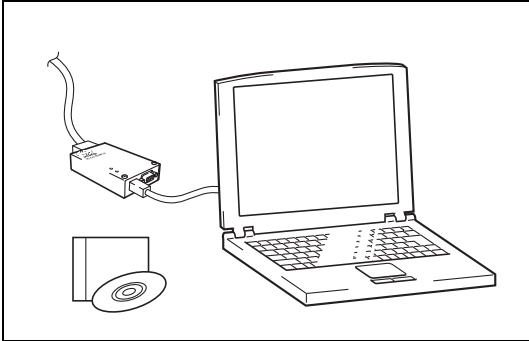
Is any defect found?

YES

Replace the PCU wire harness (lower side).

NO

Replace the inverter cooling pump.
After replacement, go to step 10.

10**Reproduction check [HINO-DX]**

SHTS03ZZZ0300216

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Clear the malfunction history.
4. Set the starter key to the "ON" position and wait for 1 minute.
5. In [Fault Information] on the diagnosis tool screen, check if P314D-81 is detected.

Is DTC P314D-81 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.**

CHECKLIST: P314D (TC81)

P314D (TC81)		Abnormality in HV water pump revolution number signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P324B-62 or P324C-61 is detected.	DTC P324B-62 or P324C-61 is detected: Go to YES. DTC P324B-62 or P324C-61 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the coolant system route	1. Check the coolant system route (radiator, inverter, and hose) for any damage or water leakage.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the defective part.	Go to step 3.
3	Inspecting the coolant level	1. Remove the radiator cap and check the height from the coolant level to the filling port.	Coolant level is about 10 mm from the filling port: Go to YES. Coolant level is not about 10 mm from the filling port: Go to NO.		Go to step 4.	Add coolant. (See "Adding coolant.") After adding coolant, perform the inspection again.
4	Checking the activation of inverter cooling pump [HINO-DX]	1. In [Activation Test] on the diagnosis tool screen, select [HV water pump drive duty value]. 2. Activate the HV water pump at the duty value of 60% and feel the hose to make sure that the water pump is running. <Measurement conditions> Starter key: ON <Measured item> HV water pump drive duty value <Standard values> Activation of water pump	Activation of water pump is confirmed: Go to YES. Activation of water pump is not confirmed: Go to NO.		Go to step 8.	Go to step 5.

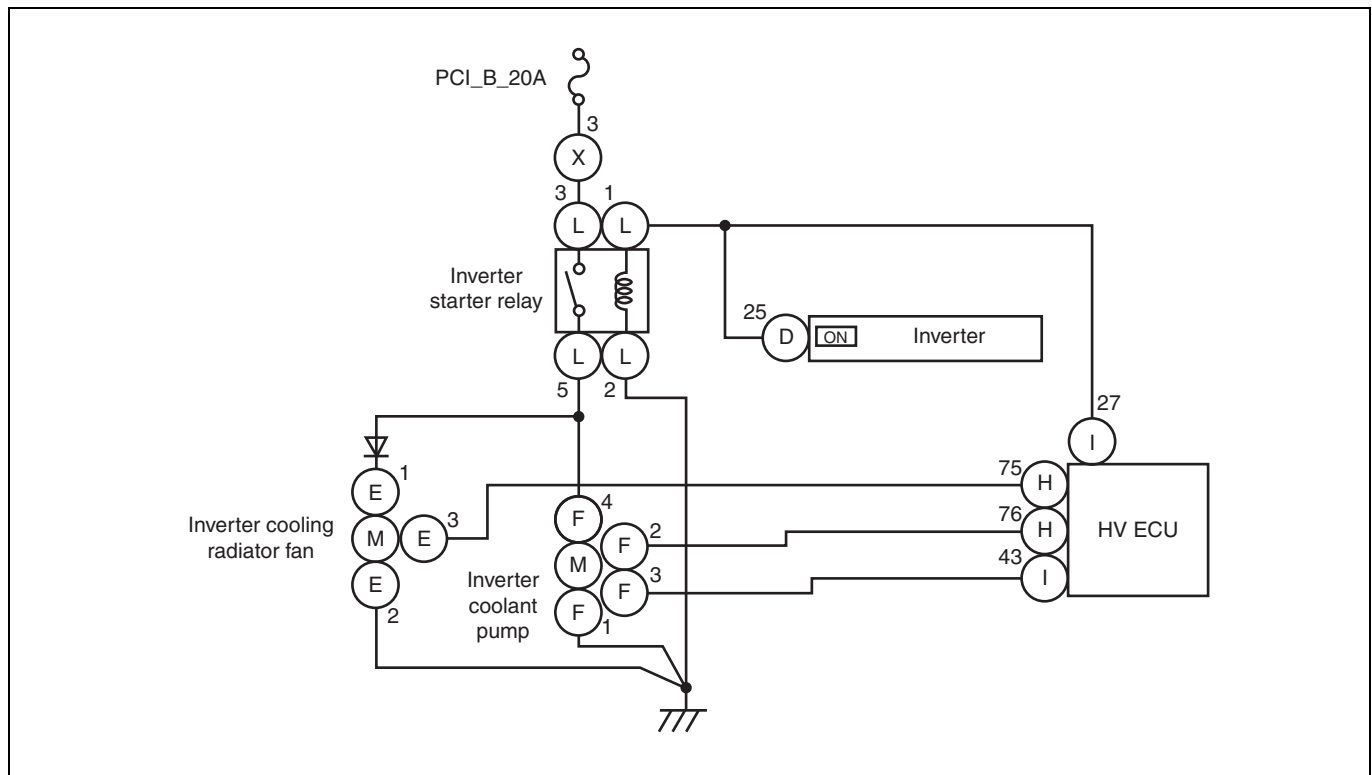
P314D (TC81)		Abnormality in HV water pump revolution number signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the vehicle wire harness	1. Disconnect the PCU harness (24P) connector. 2. Using the electrical tester, measure the voltage between the vehicle-side connector of PCU harness (24P) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) vehicle-side connector 3rd terminal – GND <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Inspect the power supply circuit ([PCU-B2 20A] fuse and wire harness).
6	Inspecting the inverter start relay	1. Set the starter key to the "LOCK" position. 2. Remove the inverter start relay. 3. Using the electrical tester, measure the resistance between the 3rd and 5th terminals of inverter start relay. (With no voltage applied) 4. Apply the voltage of 12 V between the 1st and 2nd terminals of inverter start relay and measure the resistance between the 3rd and 5th terminals. (With voltage applied) <Measurement conditions> Starter key: ON <Tester connections> Inverter start relay 3rd terminal – 5th terminal <Standard values> Without voltage: 10 k Ω or more With voltage: less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the inverter start relay.

P314D (TC81)		Abnormality in HV water pump revolution number signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the voltage of PCU wire harness (lower side)	1. Connect the inverter start relay and PCU harness (24P) connectors. 2. Disconnect the inverter cooling pump connector. 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the connector terminals of inverter cooling pump. <Measurement conditions> Starter key: ON <Tester connections> Inverter cooling pump connector 1st terminal – 4th terminal <Standard values> 9 V or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the PCU wire harness (lower side).
8	Inspecting the continuity of PCU wire harness (lower side)	1. Set the starter key to the "LOCK" position. 2. Disconnect the HV ECU1 connector. 3. Using the electrical tester, measure the resistance between the inverter cooling pump connector and the HV ECU1 connector terminal. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector – HV ECU1 connector 2nd terminal – 26th terminal <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the PCU wire harness (lower side).
9	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 2nd terminal of inverter cooling pump connector, inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector 2nd terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the inverter cooling pump. After replacement, go to step 10.

P314D (TC81)		Abnormality in HV water pump revolution number signal High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
10	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Clear the malfunction history. 4. Set the starter key to the "ON" position and wait for 1 minute. 5. In [Fault Information] on the diagnosis tool screen, check if P314D-81 is detected.	DTC P314D-81 is detected: Go to YES. DTC P314D-81 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed.

DTC: P324B (TC62)

EN01H03ZZZ030602003048

DTC: P324B (TC62) Abnormality in inverter start relay Low
INFORMATION

SHTS03ZZZ0300217

1. Technical description

- –

<Description of malfunction>

- Detected a GND short circuit in the inverter start relay energized circuit.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 8 V or more.

(2) Judgement criteria

- The following conditions are met continuously for 0.1 second or more:
 - The output of inverter start relay is ON.
 - The feedback signal of inverter start relay is OFF.

3. Reset condition

- The following conditions are met continuously for 0.1 second or more:
 - The output of inverter start relay is ON.
 - The feedback signal of inverter start relay is ON.

Once the abnormality is confirmed, after the HV ECU is actuated next.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine cannot be started. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

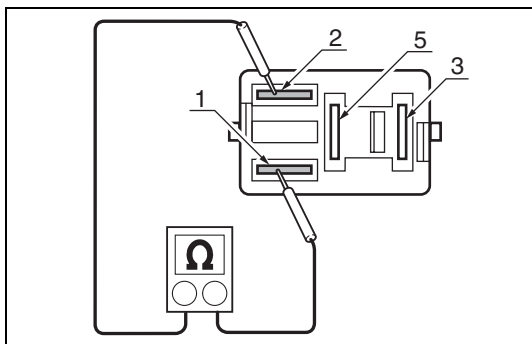
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

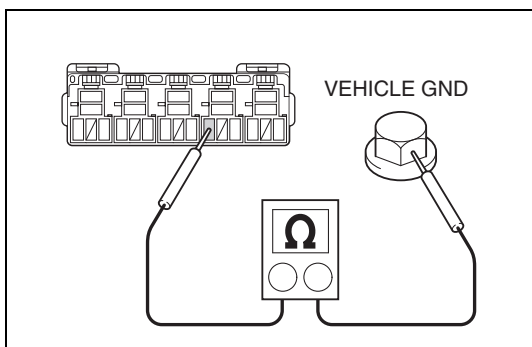
8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter start relay
- Malfunction of HV ECU

INSPECTION PROCEDURE: P324B (TC62)**1 Inspecting the inverter start relay**

1. Set the starter key to the "LOCK" position.
2. Remove the inverter start relay from the relay block.
3. Using the electrical tester, measure the resistance between the inverter start relay terminals.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay (relay side) 1st terminal – 2nd terminal	95 – 125 Ω

Is the measured value within the range of standard value?**YES****Go to step 2.****NO****Replace the inverter start relay.****2 Inspecting the PCU wire harness (lower side) for short circuit**

1. Disconnect the HV ECU2 and inverter connectors.
2. Using the electrical tester, measure the resistance between the inverter start relay connector (relay block) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector 1st terminal – GND	10 kΩ or more

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the PCU wire harness (lower side).**

3 Inspecting the signal line of PCU wire harness (lower side) for short circuit

1. For the 1st terminal of inverter start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector 1st terminal – Each signal line	10 k Ω or more

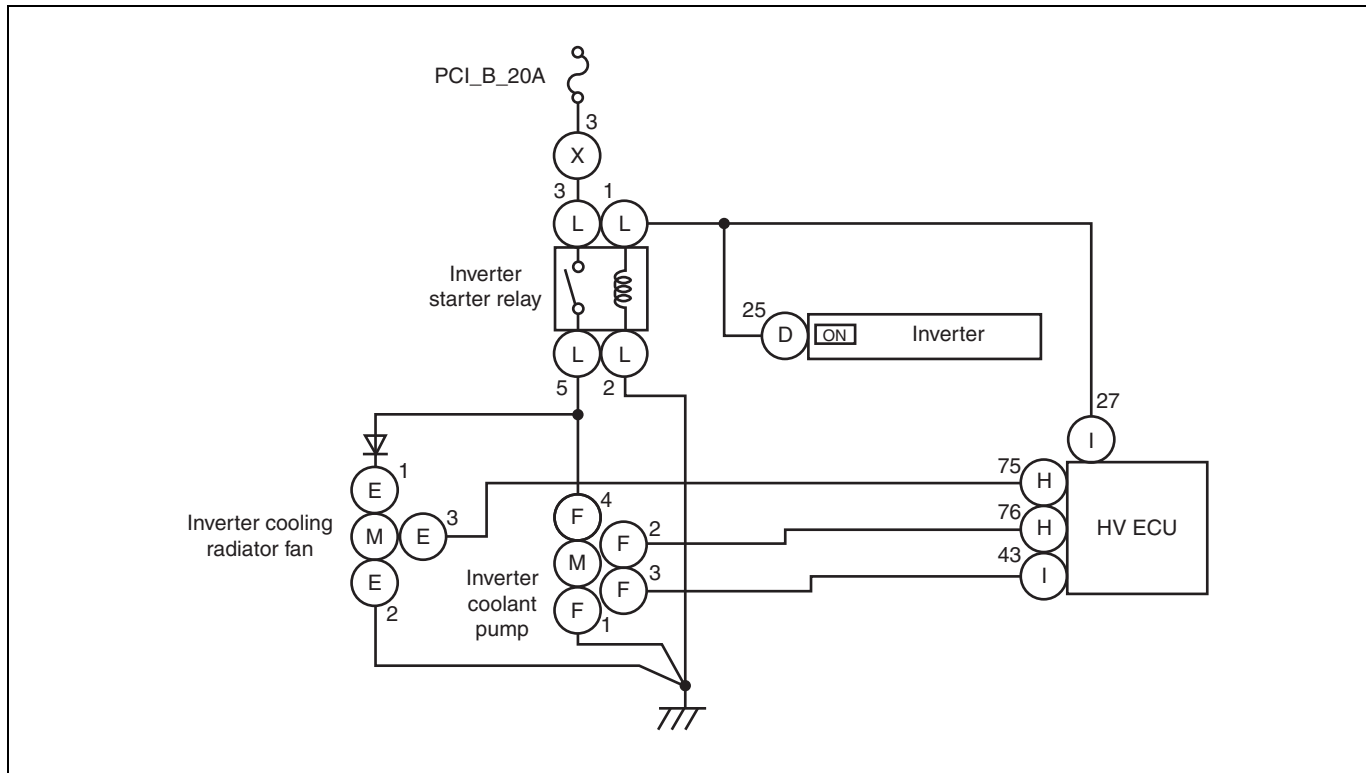
Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the HV ECU.**

CHECKLIST: P324B (TC62)

P324B (TC62)		Abnormality in inverter start relay Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter start relay	1. Set the starter key to the "LOCK" position. 2. Remove the inverter start relay from the relay block. 3. Using the electrical tester, measure the resistance between the inverter start relay terminals. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay (relay side) 1st terminal – 2nd terminal <Standard values> 95 – 125 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the inverter start relay.
2	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the HV ECU2 and inverter connectors. 2. Using the electrical tester, measure the resistance between the inverter start relay connector (relay block) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector 1st terminal – GND <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 1st terminal of inverter start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector 1st terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the HV ECU.

DTC: P324C (TC61)

EN01H03ZZZ030602003049

DTC: P324C (TC61) Abnormality in inverter start relay High
INFORMATION

SHTS03ZZZ0300220

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or power supply (positive side) short circuit in the inverter start relay energized circuit.

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
 - The control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - The following conditions are met continuously for 0.1 second or more:
 - The output of inverter start relay is OFF.
 - The feedback signal of inverter start relay is ON.

3. Reset condition

- The following conditions are met continuously for 0.1 second or more:
 - The output of inverter start relay is OFF.
 - The feedback signal of inverter start relay is OFF.
- Once the abnormality is confirmed, after the HV ECU is actuated next.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine cannot be started. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

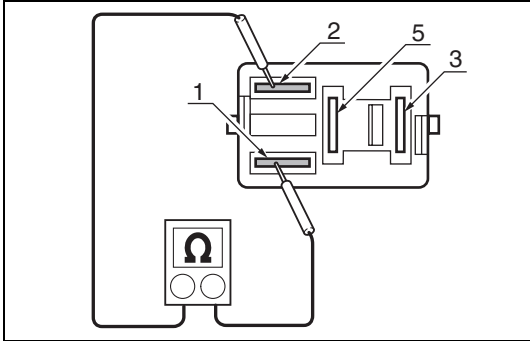
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter start relay
- Malfunction of HV ECU

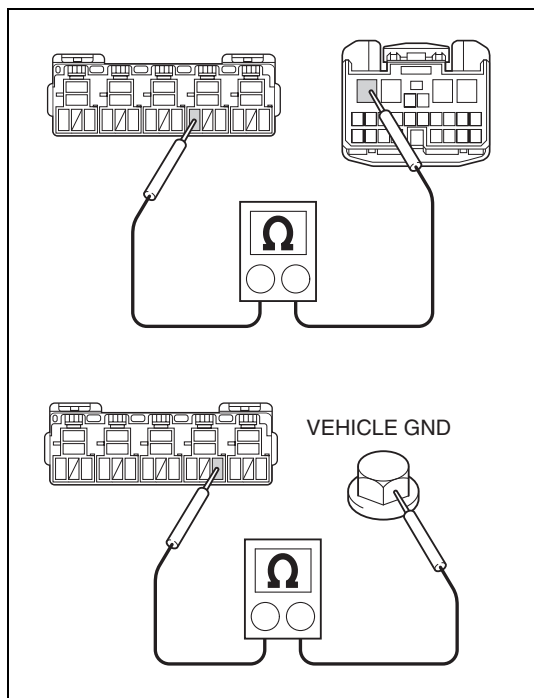
INSPECTION PROCEDURE: P324C (TC61)**1 Inspecting the inverter start relay**

SHTS03ZZZ0300221

1. Set the starter key to the "LOCK" position.
2. Remove the inverter start relay from the relay block.
3. Using an electrical tester, measure the resistance between the inverter start relay terminals.

Measurement conditions	Tester connections	Standard values
—	Inverter start relay (relay side) 1st terminal – 2nd terminal	95 – 125 Ω

Is the measured value within the range of standard value?**YES****Go to step 2.****NO****Replace the inverter start relay.**

2 Inspecting the continuity of PCU wire harness (lower side)

SHTS03ZZZ0300222

1. Disconnect the HV ECU2 and inverter connectors.
2. Using an electrical tester, measure the resistance from the inverter start relay connector (relay block) to the HV ECU2 connector terminal and to the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector – HV ECU2 connector 1st terminal – 1st terminal	Less than 1 Ω
	Inverter start relay connector 2nd terminal – GND	

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the PCU wire harness (lower side).**

3**Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. For the 1st terminal of inverter start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector 1st terminal – Each signal line	10 k Ω or more

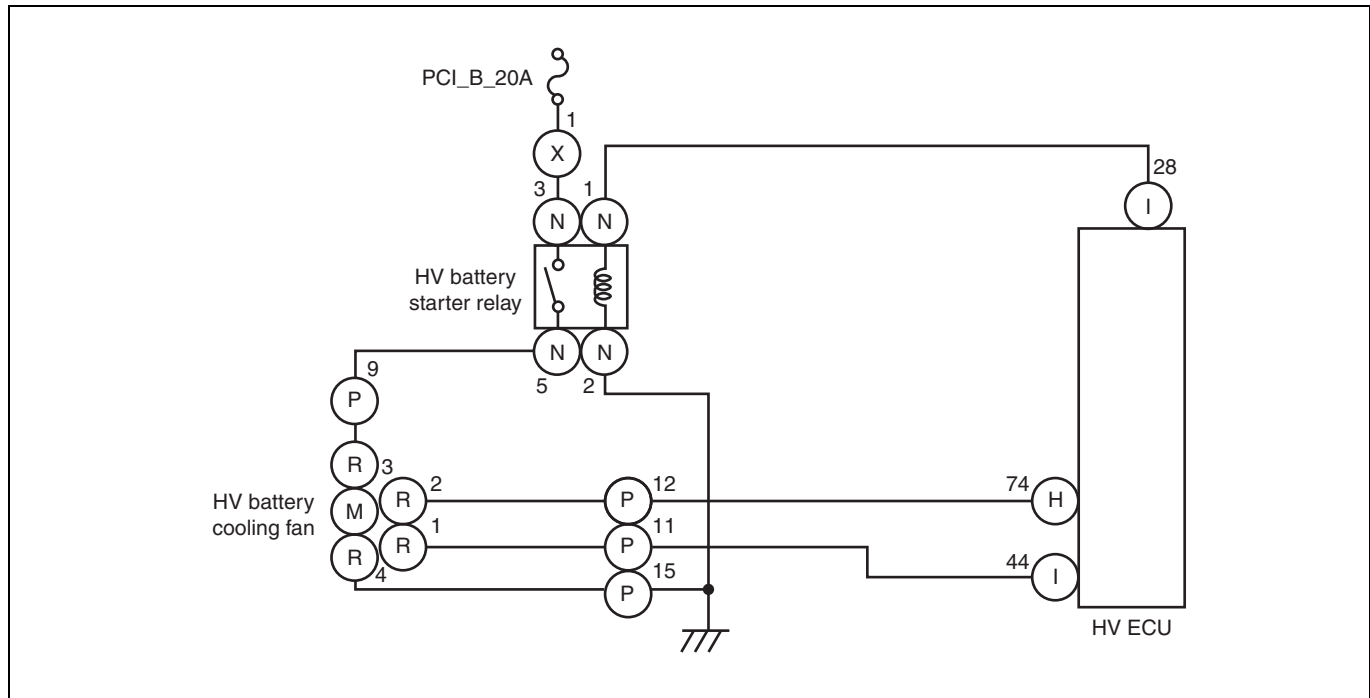
Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the HV ECU.**

CHECKLIST: P324C (TC61)

P324C (TC61)		Abnormality in inverter start relay High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the inverter start relay	1. Set the starter key to the "LOCK" position. 2. Remove the inverter start relay from the relay block. 3. Using an electrical tester, measure the resistance between the inverter start relay terminals. <Measurement conditions> — <Tester connections> Inverter start relay (relay side) 1st terminal – 2nd terminal <Standard values> 95 – 125 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the inverter start relay.
2	Inspecting the continuity of PCU wire harness (lower side)	1. Disconnect the HV ECU2 and inverter connectors. 2. Using an electrical tester, measure the resistance from the inverter start relay connector (relay block) to the HV ECU2 connector terminal and to the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector – HV ECU2 connector 1st terminal – 1st terminal Inverter start relay connector 2nd terminal – GND <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 1st terminal of inverter start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector 1st terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the HV ECU.

DTC: P33B1 (TC64)

EN01H03ZZZ030602003050

DTC: P33B1 (TC64) Abnormality in HV battery ECU start relay Low
INFORMATION

SHTS03ZZZ0300223

1. Technical description

- –

<Description of malfunction>

- Detected a GND short circuit in the energized circuit of HV battery ECU start relay.

2. DTC set condition

- (1) DTC detection condition
 - The starter key is set to the ON position.
 - The control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - The following conditions are met continuously for 0.1 second or more:
 - The output of HV battery ECU start relay is ON.
 - The feedback signal of HV battery ECU start relay is OFF.

3. Reset condition

- The following conditions are met continuously for 0.1 second or more:
 - The output of HV battery ECU start relay is ON.
 - The feedback signal of HV battery ECU start relay is ON.
- Once the abnormality is confirmed, after the HV ECU is actuated next.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

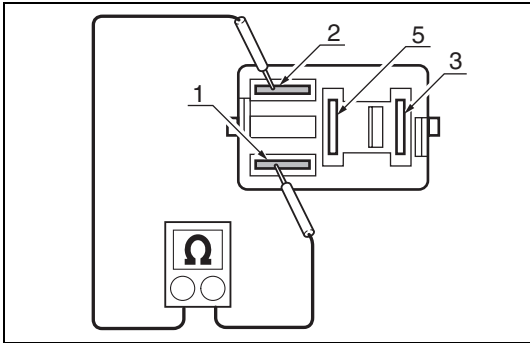
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that any DTC is not detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV battery ECU start relay
- Malfunction of HV ECU

INSPECTION PROCEDURE: P33B1 (TC64)**1 Inspecting the HV battery start relay**

SHTS03ZZZ0300224

1. Set the starter key to the "LOCK" position.
2. Remove the HV battery start relay from the relay block.
3. Using the electrical tester, measure the resistance between the HV battery start relay terminals.

Measurement conditions	Tester connections	Standard values
—	HV battery start relay (relay side) 1st terminal – 2nd terminal	95 – 125 Ω

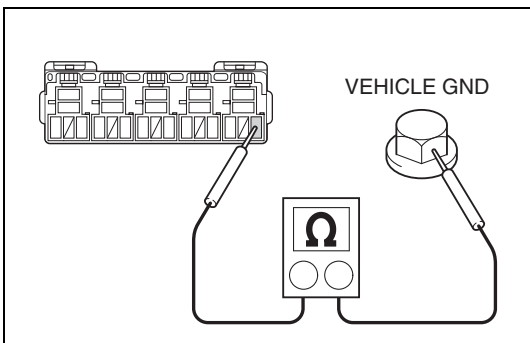
Is the measured value within the range of standard value?

YES

NO

Go to step 2.

Replace the HV battery start relay.

2 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300225

1. Using the electrical tester, measure the resistance between the HV battery start relay connector (relay block) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV battery start relay connector 1st terminal – Ground	10 k Ω or more

Is the measured value within the range of standard value?

YES

NO

Go to step 3.

Replace the PCU wire harness (lower side).

3**Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. Disconnect the HV ECU2 connector.
2. For the 1st terminal of HV battery start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV battery start relay connector 1st terminal – Each signal line	10 k Ω or more

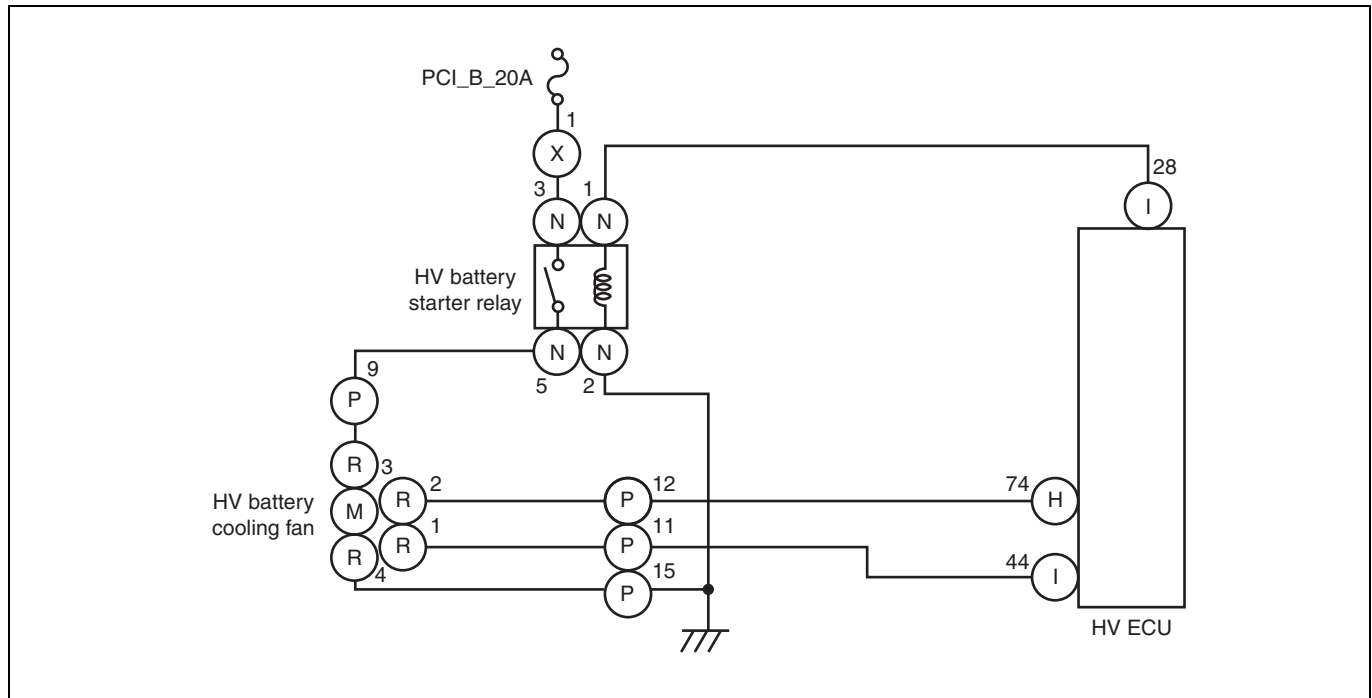
Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the HV ECU.**

CHECKLIST: P33B1 (TC64)

P33B1 (TC64)		Abnormality in HV battery ECU start relay Low		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery start relay	1. Set the starter key to the "LOCK" position. 2. Remove the HV battery start relay from the relay block. 3. Using the electrical tester, measure the resistance between the HV battery start relay terminals. <Measurement conditions> — <Tester connections> HV battery start relay (relay side) 1st terminal – 2nd terminal <Standard values> 95 – 125 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the HV battery start relay.
2	Inspecting the PCU wire harness (lower side) for short circuit	1. Using the electrical tester, measure the resistance between the HV battery start relay connector (relay block) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> HV battery start relay connector 1st terminal – Ground <Standard values> 10 k Ω or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. Disconnect the HV ECU2 connector. 2. For the 1st terminal of HV battery start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> HV battery start relay connector 1st terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the HV ECU.

DTC: P33B2 (TC63)

EN01H03ZZZ030602003051

DTC: P33B2 (TC63) Abnormality in HV battery ECU start relay High
INFORMATION

SHTS03ZZZ0300226

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or power supply (positive side) short circuit in the energized circuit of HV battery ECU start relay.

2. DTC set condition**(1) DTC detection condition**

- The starter key is set to the ON position.
- The control power supply voltage is 8 V or more.

(2) Judgement criteria

- The following conditions are met continuously for 0.1 second or more:
 - The output of HV battery ECU start relay is OFF.
 - The feedback signal of HV battery ECU start relay is ON.

3. Reset condition

- The following conditions are met continuously for 0.1 second or more:
 - The output of HV battery ECU start relay is OFF.
 - The feedback signal of HV battery ECU start relay is OFF.
 Once the abnormality is confirmed, after the HV ECU is actuated next.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

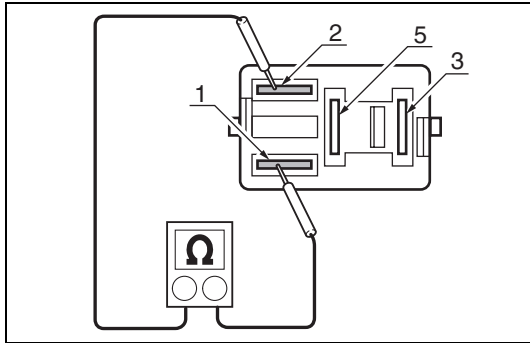
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV battery ECU start relay
- Malfunction of HV ECU

INSPECTION PROCEDURE: P33B2 (TC63)**1 Inspecting the HV battery start relay**

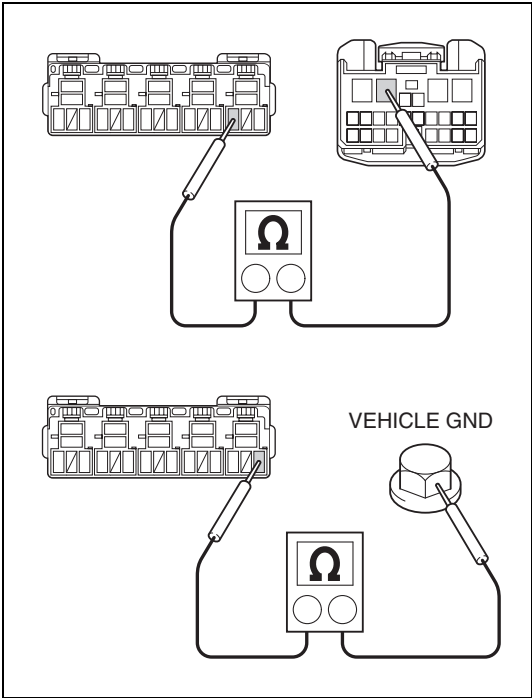
SHTS03ZZZ0300227

1. Set the starter key to the "LOCK" position.
2. Remove the HV battery start relay from the relay block.
3. Using the electrical tester, measure the resistance between the HV battery start relay terminals.

Measurement conditions	Tester connections	Standard values
—	HV battery start relay (relay side) 1st terminal – 2nd terminal	95 – 125 Ω

Is the measured value within the range of standard value?**YES****Go to step 2.****NO****Replace the HV battery start relay.**

2 Inspecting the continuity of PCU wire harness (lower side)



SHTS03ZZZ0300228

- 1. Disconnect the HV ECU2 connector.
- 2. Using the electrical tester, measure the resistance from the HV battery start relay connector (relay block) to the HV ECU2 connector terminal and to the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV battery start relay connector – HV ECU2 connector 1st terminal – 2nd terminal	Less than 1 Ω
	HV battery start relay connector 2nd terminal – GND	

Is the measured value within the range of standard value?

YES

NO

Go to step 3.

Replace the PCU wire harness (lower side).

3**Inspecting the signal line of PCU wire harness (lower side) for short circuit**

1. For the 1st terminal of HV battery start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.")

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	HV battery start relay connector 1st terminal – Each signal line	10 k Ω or more

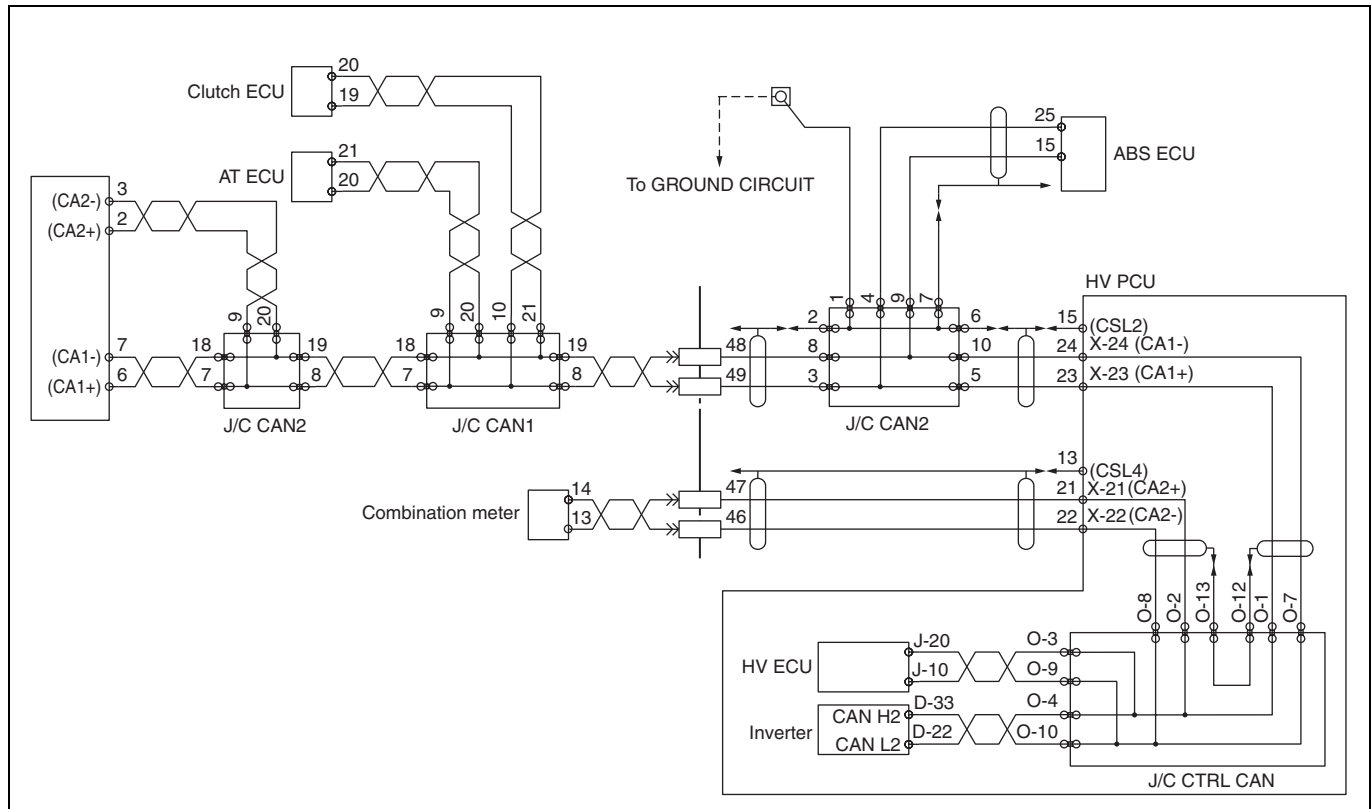
Is any defect found?**YES****Replace the PCU wire harness (lower side).****NO****Replace the HV ECU.**

CHECKLIST: P33B2 (TC63)

P33B2 (TC63)		Abnormality in HV battery ECU start relay High		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery start relay	1. Set the starter key to the "LOCK" position. 2. Remove the HV battery start relay from the relay block. 3. Using the electrical tester, measure the resistance between the HV battery start relay terminals. <Measurement conditions> — <Tester connections> HV battery start relay (relay side) 1st terminal – 2nd terminal <Standard values> 95 – 125 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the HV battery start relay.
2	Inspecting the continuity of PCU wire harness (lower side)	1. Disconnect the HV ECU2 connector. 2. Using the electrical tester, measure the resistance from the HV battery start relay connector (relay block) to the HV ECU2 connector terminal and to the ground. <Measurement conditions> Starter key: LOCK <Tester connections> HV battery start relay connector – HV ECU2 connector 1st terminal – 2nd terminal HV battery start relay connector 2nd terminal – GND <Standard values> Less than 1 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the signal line of PCU wire harness (lower side) for short circuit	1. For the 1st terminal of HV battery start relay connector (relay block), inspect the signal line of PCU wire harness (lower side) for short circuit. (See "Inspecting the PCU harness signal line for short circuit.") <Measurement conditions> Starter key: LOCK <Tester connections> HV battery start relay connector 1st terminal – Each signal line <Standard values> 10 k Ω or more	Defect is found: Go to YES. Defect is not found: Go to NO.		Replace the PCU wire harness (lower side).	Replace the HV ECU.

DTC: U0073 (TC11)

EN01H03ZZZ030602003052

DTC: U0073 (TC11) Abnormality in CAN communication with HV ECU (control CAN)
INFORMATION

SHTS03ZZZ0300229

1. Technical description

- —

<Description of malfunction>

- Detected the abnormality in the control CAN communication. (Stop of control CAN communication due to bus off)

2. DTC set condition**(1) DTC detection condition**

- Since the starter key is set to the ON position, 1 second or more has passed.
- Control power supply voltage remains at 9 V or more for 1 second or more.

(2) Judgement criteria

- Detection of control CAN bus off continues for 0.5 second or more in total.
(If normal time continues for 5 seconds, the accumulated time shall be reset.)

3. Reset condition

- A state in which no control CAN bus off is detected continues for 0.5 second or more.
- Once the abnormality is confirmed, the following conditions are included:
 - HV ECU runs within 0.5 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.
- The CHG, AST, ECO, and SOC lamp go off.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

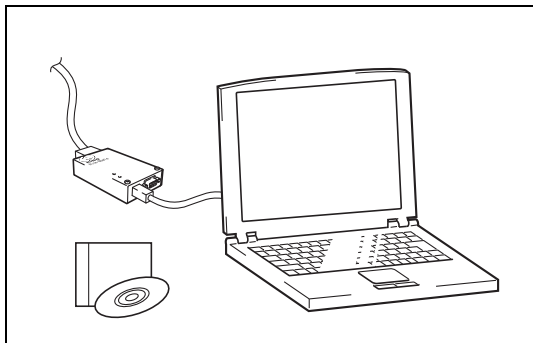
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U0073 (TC11)**1 Implementation of common inspection items**

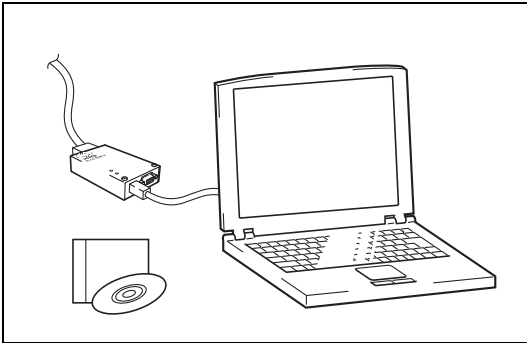
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300230

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and inverter.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0073-11 is detected.

Is DTC U0073-11 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the inverter [HINO-DX]

SHTS03ZZZ0300231

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-91 is detected in the inverter.

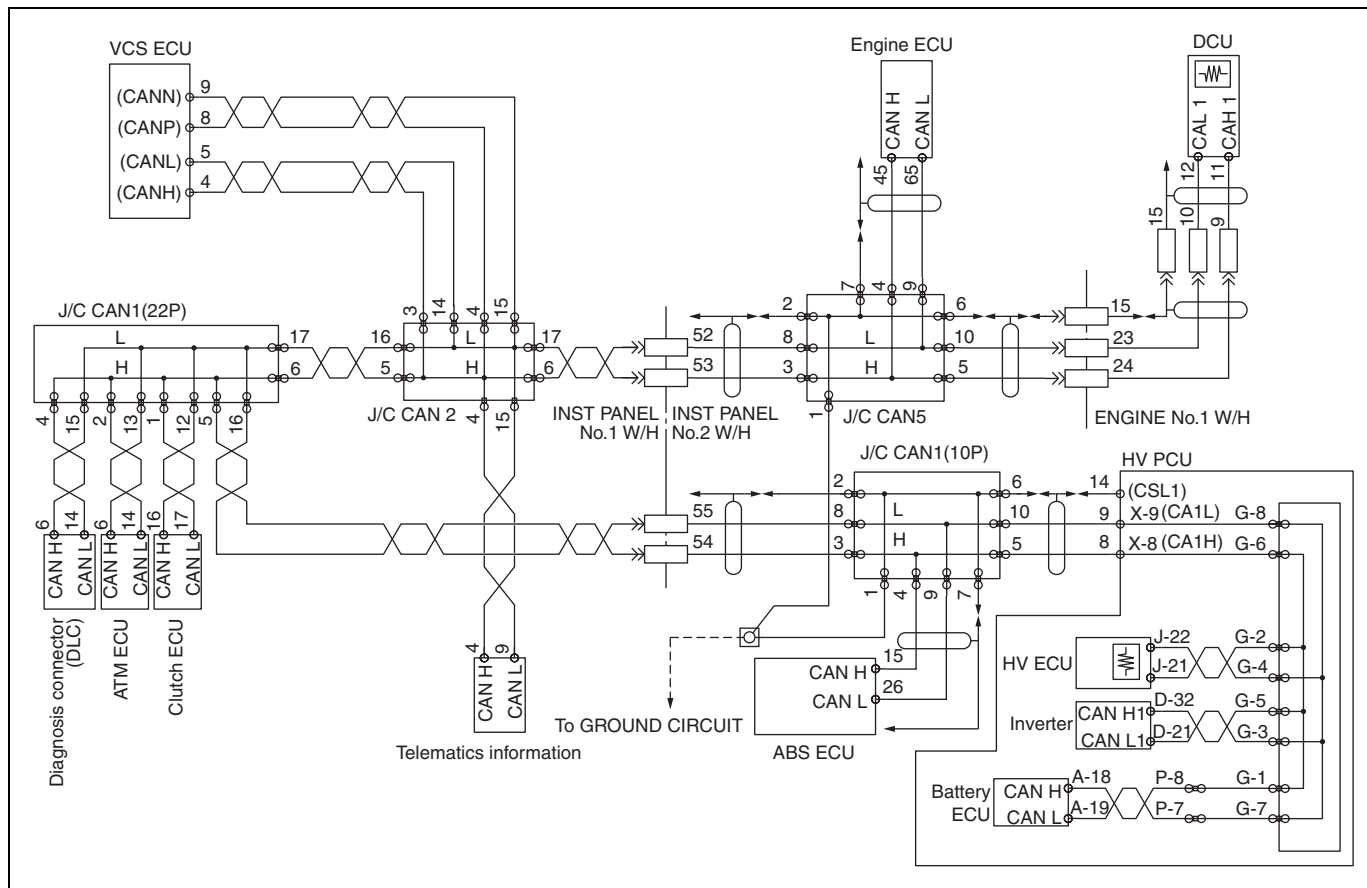
Is DTC U0073-91 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

CHECKLIST: U0073 (TC11)

U0073 (TC11)		Abnormality in CAN communication with HV ECU (control CAN)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and inverter. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0073-11 is detected.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the inverter [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-91 is detected in the inverter.	DTC U0073-91 is detected: Go to YES. DTC U0073-91 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.

EN01H03ZZ030602003053

DTC: U0074 (TC16) Abnormality in CAN communication with HV ECU (DIAG CAN)



SHTS03ZZZ0300232

1. Technical description

● —

<Description of malfunction>

- The HV ECU detected the communication abnormality in the DIAG CAN. (Stop of DIAG CAN communication due to bus off)

2. DTC set condition

- (1) DTC detection condition
 - Since the starter key is set to the ON position, 1 second or more has passed.
 - Control power supply voltage remains at 9 V or more for 1 second or more.
- (2) Judgement criteria
 - Detection of DIAG CAN bus off continues for 0.5 second or more in total.
(If normal time continues for 5 seconds or more, the accumulated time will be reset.)

3. Reset condition

- A state in which no DIAG CAN bus off is detected continues for 0.5 second or more.
- Once the abnormality is confirmed, the following conditions are included:
 - HV ECU runs within 0.5 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV ECU
- Malfunction of DIAG CAN connection ECU

INSPECTION PROCEDURE: U0074 (TC16)**1 Implementation of common inspection items**

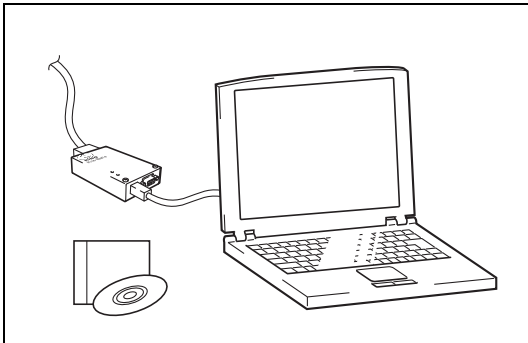
1. Perform the basic inspection items for abnormality of the HV DIAG CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES**

Repair or replace the malfunctioning part detected by the common inspection items.

NO

Go to step 2.

2 Reproduction check [HINO-DX]

SHTS03ZZZ0300233

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0074-16 is detected.

Is DTC U0074-16 detected?**YES**

Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

NO

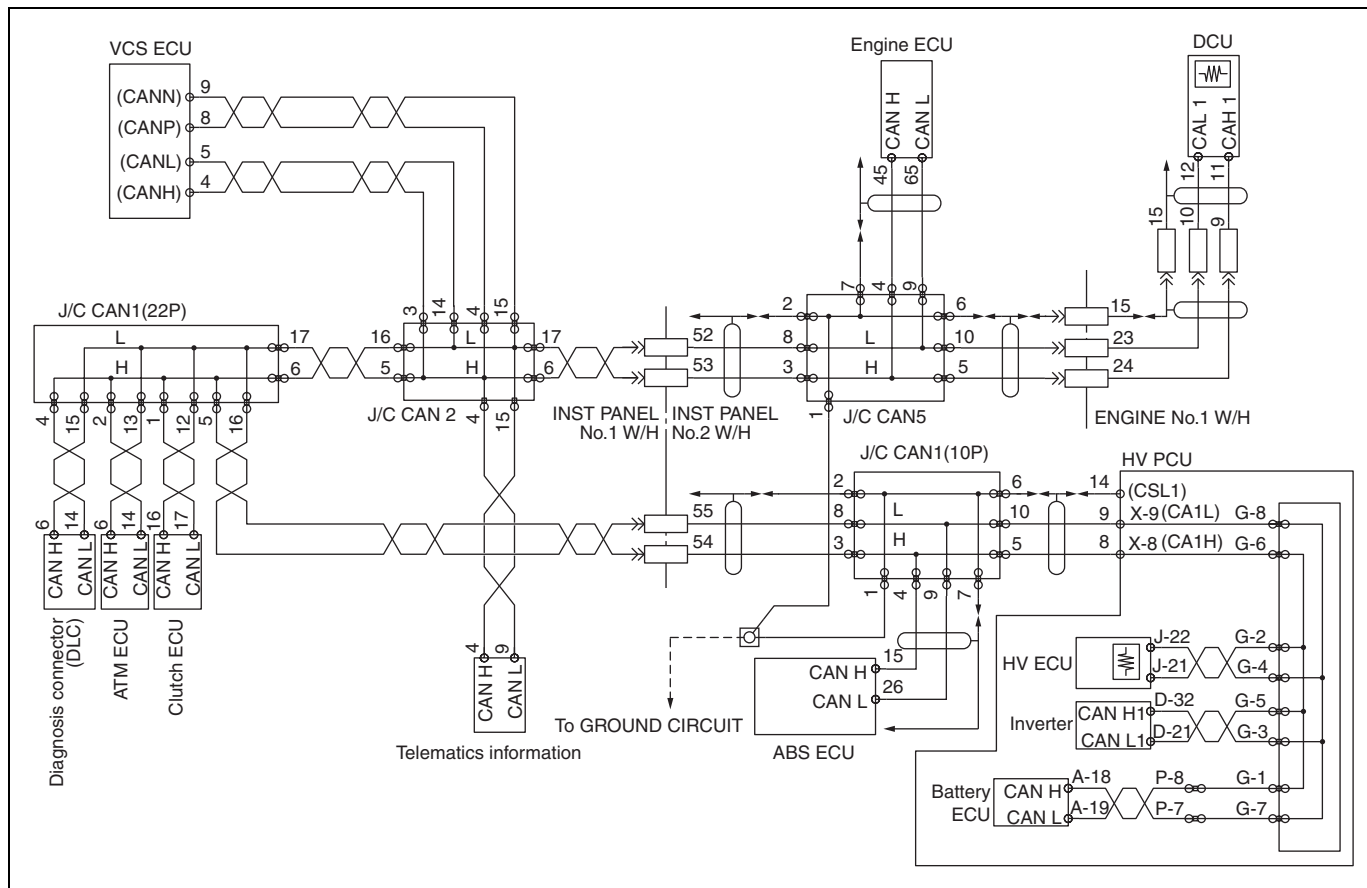
**The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

CHECKLIST: U0074 (TC16)

U0074 (TC16)		Abnormality in CAN communication with HV ECU (DIAG CAN)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV DIAG CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0074-16 is detected.	DTC U0074-16 is detected: Go to YES. DTC U0074-16 is not detected: Go to NO.		Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)

EN01H03ZZ030602003054

DTC: U0100 (TC13) Engine ECU CAN communication blackout



SHTS03ZZZ0300234

1. Technical description

● —

<Description of malfunction>

- A blackout occurred in the CAN communication from the engine ECU. (Engine ECU CAN communication blackout)

2. DTC set condition

- (1) DTC detection condition
 - Since the starter key is set to the ON position, 1 second or more has passed.
 - Control power supply voltage remains at 9 V or more for 1 second or more.
- (2) Judgement criteria
 - When a state in which no CAN frame is received from the engine ECU continues for 0.8 seconds or more.

3. Reset condition

- When all frames from the engine ECU are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

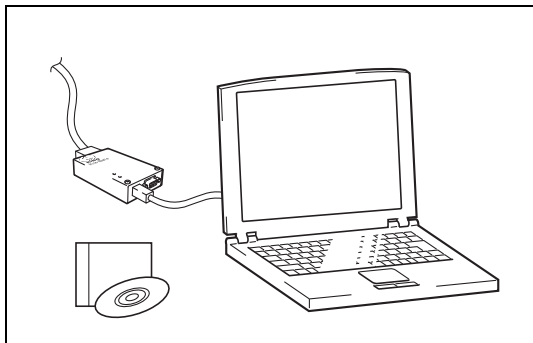
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of engine ECU
- Malfunction of HV ECU
- Malfunction of DIAG CAN connection ECU

INSPECTION PROCEDURE: U0100 (TC13)**1 Implementation of common inspection items**

1. Perform the basic inspection items for abnormality of the HV DIAG CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300235

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0100-13 is detected.

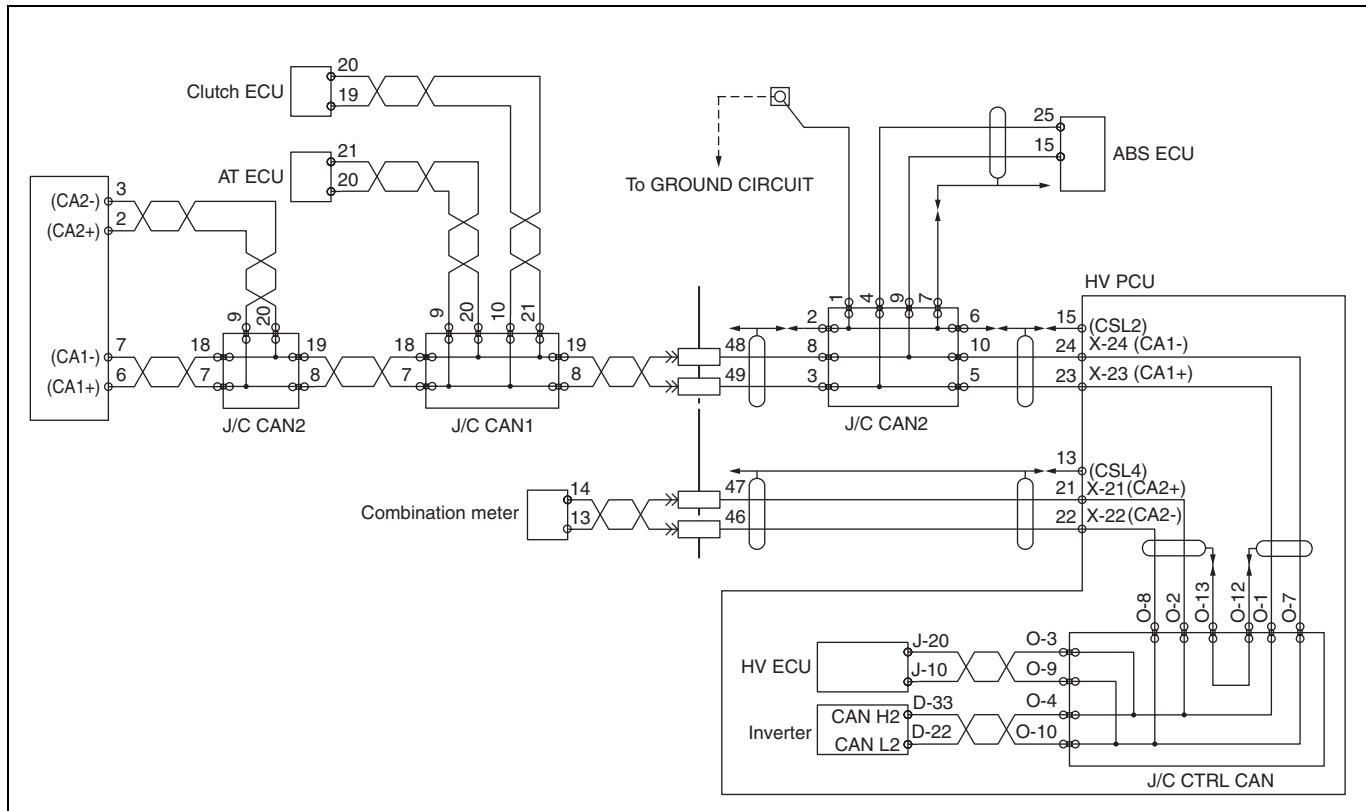
Is DTC U0100-13 detected?**YES****Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

CHECKLIST: U0100 (TC13)

U0100 (TC13)		Engine ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementation of common inspection items	1. Perform the basic inspection items for abnormality of the HV DIAG CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0100-13 is detected.	DTC U0100-13 is detected: Go to YES. DTC U0100-13 is not detected: Go to NO.		Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)

DTC: U0101 (TC18)

EN01H03ZZZ030602003055

DTC: U0101 (TC18) TCM ECU CAN communication blackout
INFORMATION

SHTS03ZZZ0300236

1. Technical description

- –

<Description of malfunction>

- A blackout occurred in the CAN communication from the AT ECU.

2. DTC set condition

- (1) DTC detection condition
 - Since the starter key is set to the ON position, 1 second or more has passed.
 - Control power supply voltage remains at 9 V or more for 1 second or more.
- (2) Judgement criteria
 - When a state in which no CAN frame is received from the AT ECU continues for 0.7 seconds or more.

3. Reset condition

- When all frames from the AT ECU are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

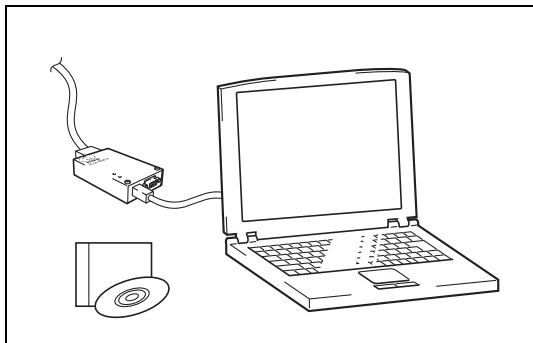
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of AT ECU
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U0101 (TC18)**1 Implementation of common inspection items**

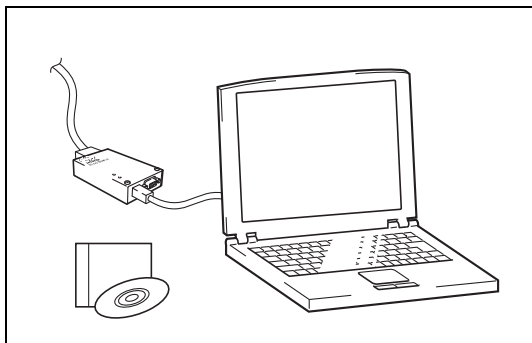
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300237

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0101-18 is detected.

Is DTC U0101-18 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300238

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Reading the DTC [HINO-DX]

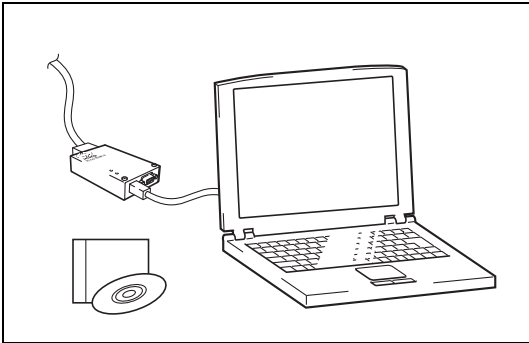
1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0101-18 in the HV ECU.
 - [U110A] Vehicle control ECU CAN communication blackout
 - [U1136] Clutch ECU CAN communication blackout
 - [U0121] ABS ECU CAN communication blackout
 - [U0110] Inverter CAN communication blackout
 - [U0155] Meter CAN communication blackout

Are all communication blackout DTCs detected?**YES**

**Go to step 5.
(All communication blackouts have been generated.)**

NO

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

5 Inspecting the vehicle control ECU [HINO-DX]

SHTS03ZZZ0300239

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0101 (AT ECU communication blackout) is detected in the vehicle control ECU.

Is DTC U0101 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

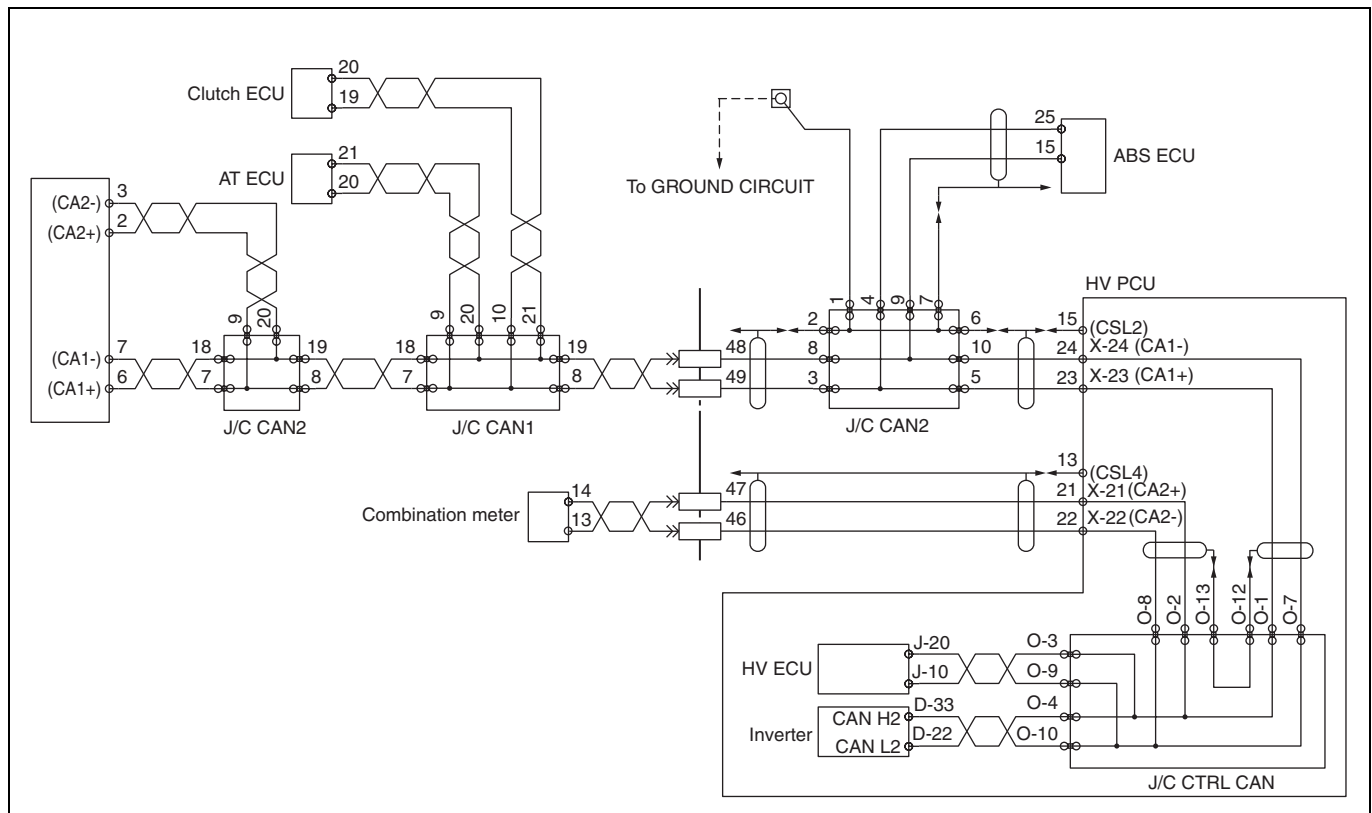
CHECKLIST: U0101 (TC18)

U0101 (TC18)		TCM ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and vehicle control ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0101-18 is detected.	DTC U0101-18 is detected: Go to YES. DTC U0101-18 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.

U0101 (TC18)		TCM ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0101-18 in the HV ECU. • [U110A] Vehicle control ECU CAN communication blackout • [U1136] Clutch ECU CAN communication blackout • [U0121] ABS ECU CAN communication blackout • [U0110] Inverter CAN communication blackout • [U0155] Meter CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 5. (All communication blackouts have been generated.)	Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".
5	Inspecting the vehicle control ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0101 (AT ECU communication blackout) is detected in the vehicle control ECU.	DTC U0101 is detected: Go to YES. DTC U0101 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.

DTC: U0110 (TC14)

EN01H03ZZZ030602003056

**DTC: U0110 (TC14) Inverter CAN communication blackout
INFORMATION**

SHTS03ZZZ0300240

1. Technical description

- —

<Description of malfunction>

- A blackout occurred in the CAN communication from the inverter.

2. DTC set condition**(1) DTC detection condition**

- Since the starter key is set to the ON position, 1 second or more has passed.
- Control power supply voltage remains at 9 V or more for 1 second or more.
- The output of inverter start relay is ON.
- Since the output of inverter start relay is turned ON, 1 second or more has passed.

(2) Judgement criteria

- When a state in which no CAN frame is received from the inverter continues for 0.68 second or more.

3. Reset condition

- When all frames from the inverter are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

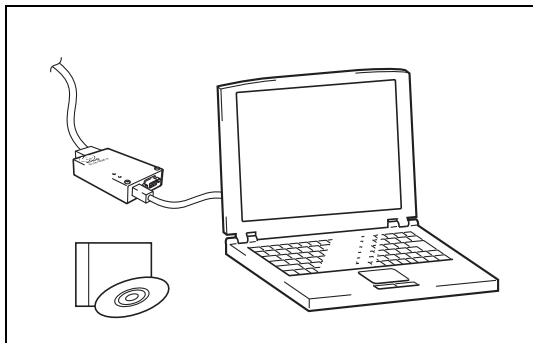
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U0110 (TC14)**1 Implementation of common inspection items**

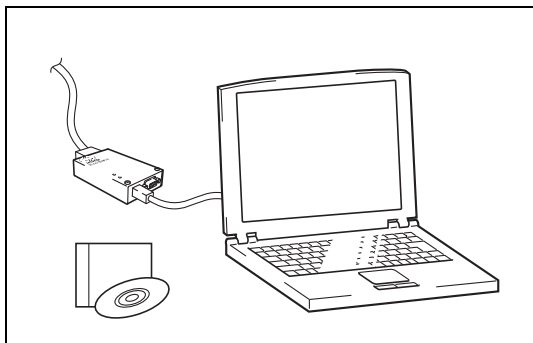
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300241

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU, inverter, and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if DTC U0110-14 is detected.

Is DTC U0110-14 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300242

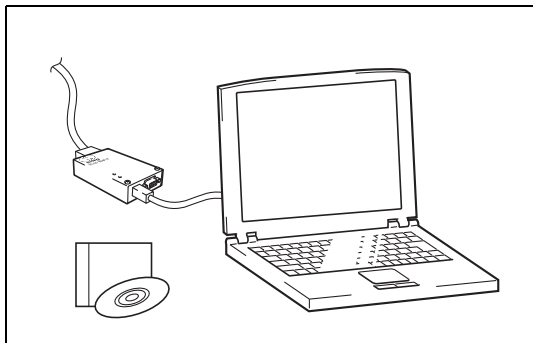
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Inspecting the inverter 1 [HINO-DX]

SHTS03ZZZ0300243

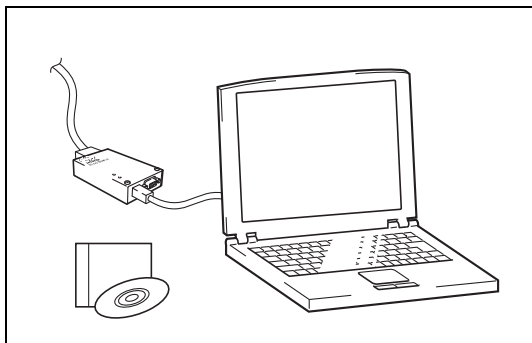
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-91 (Control CAN abnormality) is detected in the inverter.

Is DTC U0073-91 detected?**YES**

Replace the inverter.

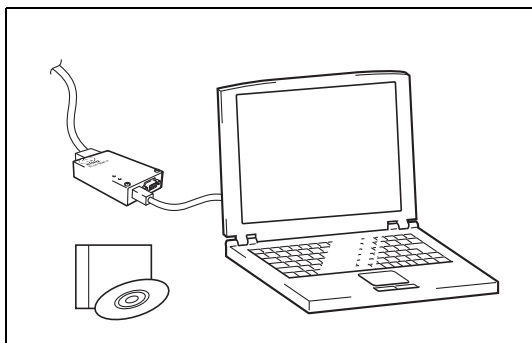
NO

Go to step 5.

5 Inspecting the inverter 2 [HINO-DX]

SHTS03ZZZ0300244

1. In [Fault Information] on the diagnosis tool screen, check if DTC P0A1B-92 (Stuck control CAN register) is detected in the inverter.

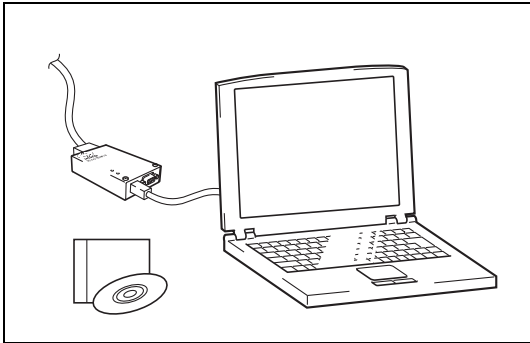
Is DTC P0A1B-92 detected?**YES****Replace the inverter.****NO****Go to step 6.****6 Reading the DTC 1 [HINO-DX]**

SHTS03ZZZ0300245

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0110-14 in the HV ECU.

- [U110A] Vehicle control ECU CAN communication blackout
- [U0101] AT ECU CAN communication blackout
- [U1136] Clutch ECU CAN communication blackout
- [U0121] ABS ECU CAN communication blackout
- [U0155] Meter CAN communication blackout

Are all communication blackout DTCs detected?**YES****Go to step 7.
(All communication blackouts have been generated.)****NO****Go to step 8.**

7 Inspecting the vehicle control ECU [HINO-DX]

SHTS03ZZZ0300246

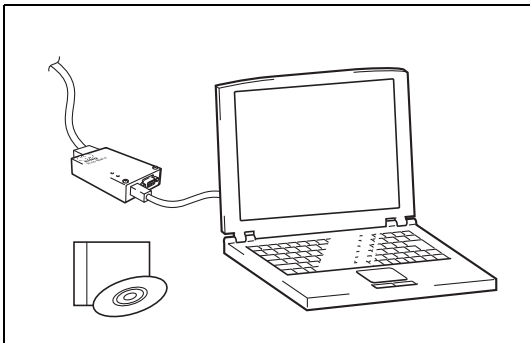
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0155 (Meter CAN communication blackout) is detected in the vehicle control ECU.

Is DTC U0155 detected?**YES**

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

NO

Replace the HV ECU.

8 Reading the DTC 2 [HINO-DX]

SHTS03ZZZ0300247

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0110-14 in the HV ECU.

- [U110A] Vehicle control ECU CAN communication blackout
- [U0101] AT ECU CAN communication blackout
- [U1136] Clutch ECU CAN communication blackout
- [U0121] ABS ECU CAN communication blackout
- [U0155] Meter CAN communication blackout

Is any DTC other than U0110-14 detected?**YES**

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

NO

Replace the inverter.
(Because blackout has occurred only in the inverter CAN communication, it is likely that there is an abnormality in the inverter CAN circuit.)

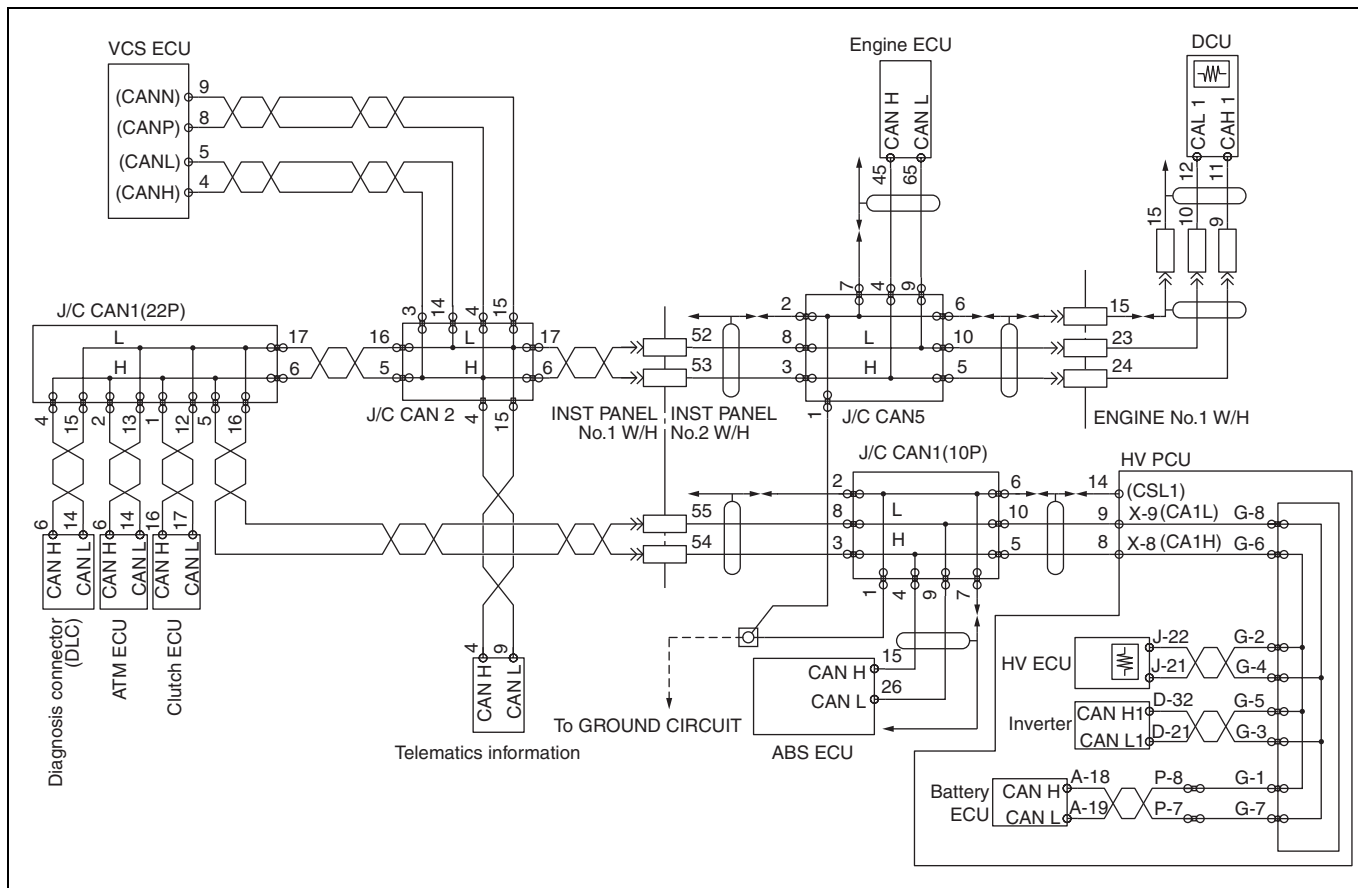
CHECKLIST: U0110 (TC14)

U0110 (TC14)		Inverter CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementation of common inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU, inverter, and vehicle control ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if DTC U0110-14 is detected.	DTC U0110-14 is detected: Go to YES. DTC U0110-14 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.
4	Inspecting the inverter 1 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-91 (control CAN abnormality) is detected in the inverter.	DTC U0073-91 is detected: Go to YES. DTC U0073-91 is not detected: Go to NO.		Replace the inverter.	Go to step 5.
5	Inspecting the inverter 2 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC P0A1B-92 (Stuck control CAN register) is detected in the inverter.	DTC P0A1B-92 is detected: Go to YES. DTC P0A1B-92 is not detected: Go to NO.		Replace the inverter.	Go to step 6.

U0110 (TC14)		Inverter CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Reading the DTC 1 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0110-14 in the HV ECU. • [U110A] Vehicle control ECU CAN communication blackout • [U0101] AT ECU CAN communication blackout • [U1136] Clutch ECU CAN communication blackout • [U0121] ABS ECU CAN communication blackout • [U0155] Meter CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 7. (All communication blackouts have been generated.)	Go to step 8.
7	Inspecting the vehicle control ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0155 (Meter CAN communication blackout) is detected in the vehicle control ECU.	DTC U0155 is detected: Go to YES. DTC U0155 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.
8	Reading the DTC 2 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0110-14 in the HV ECU. • [U110A] Vehicle control ECU CAN communication blackout • [U0101] AT ECU CAN communication blackout • [U1136] Clutch ECU CAN communication blackout • [U0121] ABS ECU CAN communication blackout • [U0155] Meter CAN communication blackout	DTC other than U0110-14 is detected: Go to YES. DTC other than U0110-14 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the inverter. (Because blackout has occurred only in the inverter CAN communication, it is likely that there is an abnormality in the inverter CAN circuit.)

DTC: U0111 (TC15)

EN01H03ZZZ030602003057

**DTC: U0111 (TC15) HV battery ECU CAN communication blackout
INFORMATION**

SHTS03ZZZ0300248

1. Technical description

- -

<Description of malfunction>

- A blackout occurred in the CAN communication from the HV battery ECU.

2. DTC set condition**(1) DTC detection condition**

- Since the starter key is set to the ON position, 1 second or more has passed.
- Control power supply voltage remains at 9 V or more for 1 second or more.
- The output of HV battery ECU start relay is ON.
- Since the output of HV battery ECU start relay is turned ON, 1 second or more has passed.

(2) Judgement criteria

- When a state in which no CAN frame is received from the HV battery ECU continues for 0.68 second or more.

3. Reset condition

- When all frames from the HV battery ECU are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

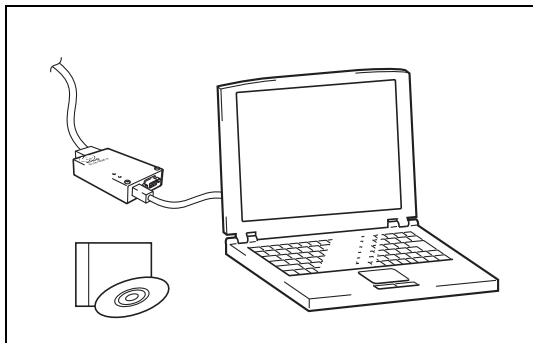
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of HV battery ECU
- Malfunction of HV ECU
- Malfunction of HV battery ECU
- Malfunction of DIAG CAN connection ECU

INSPECTION PROCEDURE: U0111 (TC15)**1 Implementation of common inspection items**

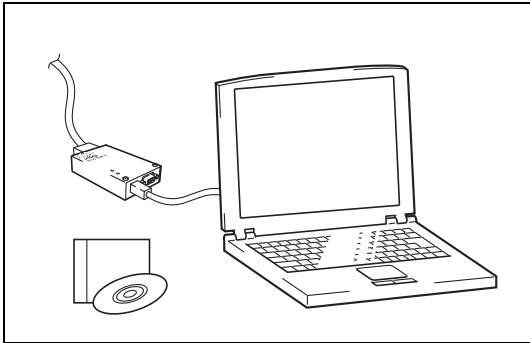
1. Perform the basic inspection items for abnormality of the HV DIAG CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300249

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if DTC U0111-15 is detected.

Is DTC U0111-15 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300250

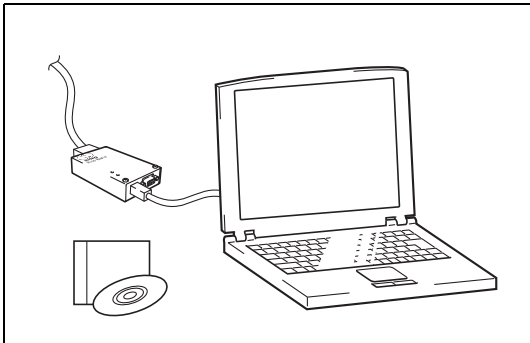
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Inspecting the HV battery ECU [HINO-DX]

SHTS03ZZZ0300251

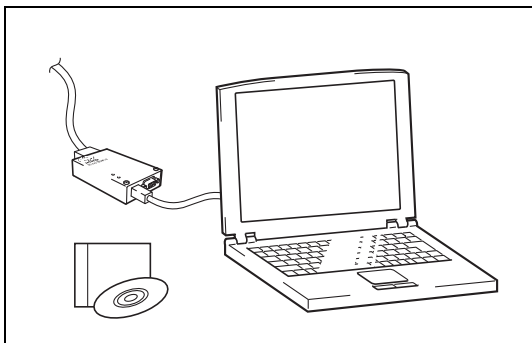
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0074 (CAN transmission abnormality) is detected in the HV battery ECU.

Is DTC U0074 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0074 Step 2 and onward.)**

NO

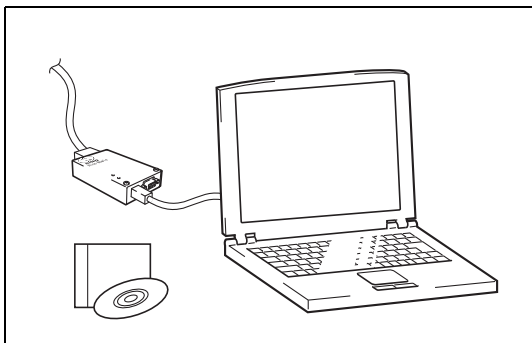
Go to step 5.

5 Reading the DTC 1 [HINO-DX]

SHTS03ZZZ0300252

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0111-15 in the HV ECU.

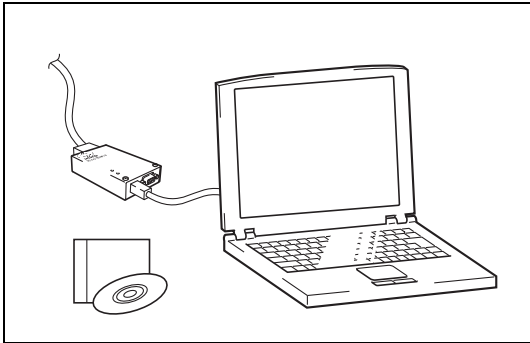
- [U0100] Engine ECU CAN communication blackout
- [U110A] Vehicle control ECU CAN communication blackout

Are all communication blackout DTCs detected?**YES****Go to step 6.
(All communication blackouts have been generated.)****NO****Go to step 7.****6 Inspecting the vehicle control ECU [HINO-DX]**

SHTS03ZZZ0300253

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0105 (Engine ECU communication blackout) is detected in the vehicle control ECU.

Is DTC U0105 detected?**YES****Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

7 Reading the DTC 2 [HINO-DX]

SHTS03ZZZ0300254

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0111-15 in the HV ECU.

- [U0100] Engine ECU CAN communication blackout
- [U110A] Vehicle control ECU CAN communication blackout

Is any DTC other than U0111-15 detected?**YES**

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

NO

Replace the HV battery ECU.
(Because blackout has occurred only in the HV battery ECU CAN communication, it is likely that there is an abnormality in the HV battery ECU CAN circuit.)

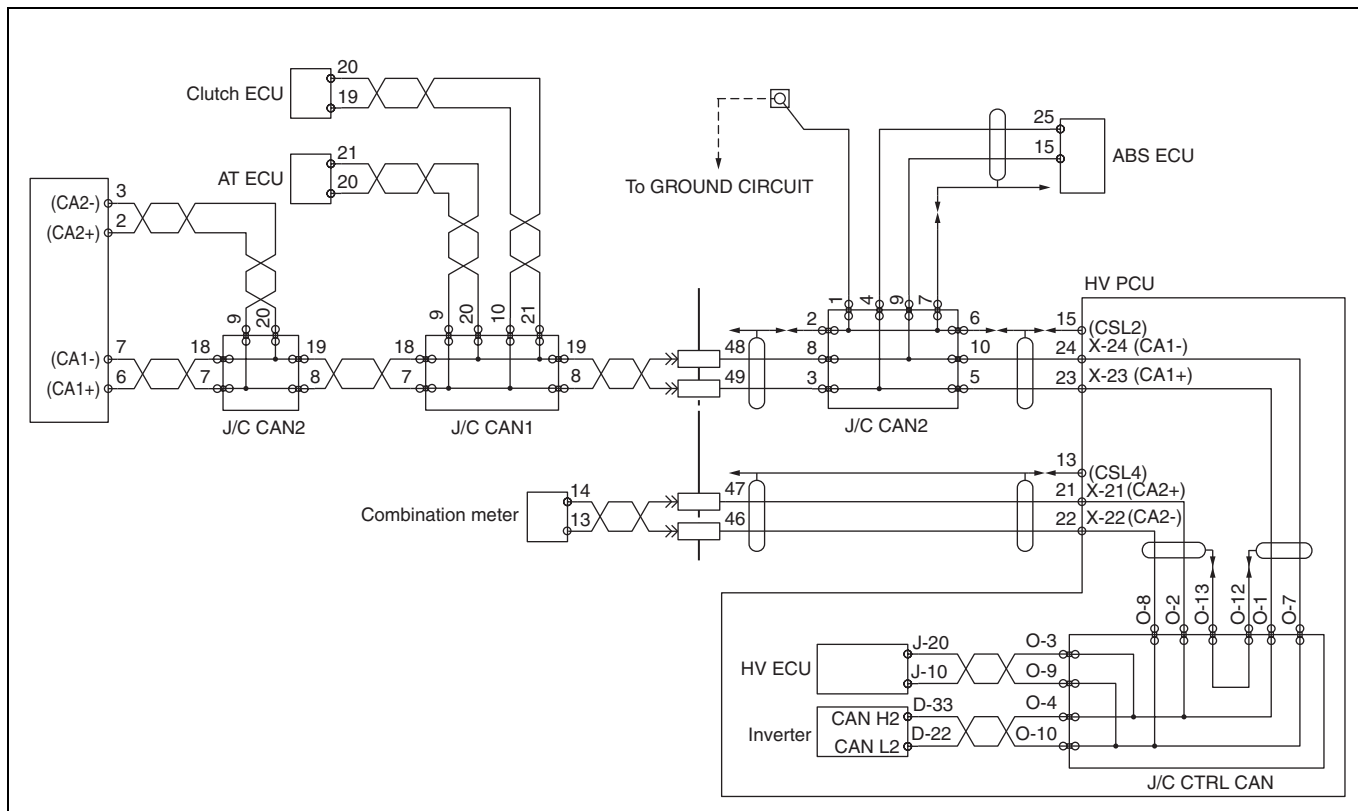
CHECKLIST: U0111 (TC15)

U0111 (TC15)		HV battery ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV DIAG CAN system. Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and vehicle control ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if DTC U0111-15 is detected.	DTC U0111-15 is detected: Go to YES. DTC U0111-15 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.
4	Inspecting the HV battery ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0074 (CAN transmission abnormality) is detected in the HV battery ECU.	DTC U0074 is detected: Go to YES. DTC U0074 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0074 Step 2 and onward.)	Go to step 5.

U0111 (TC15)		HV battery ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Reading the DTC 1 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0111-15 in the HV ECU. • [U0100] Engine ECU CAN communication blackout • [U110A] Vehicle control ECU CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 6. (All communication blackouts have been generated.)	Go to step 7.
6	Inspecting the vehicle control ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0105 (Engine ECU communication blackout) is detected in the vehicle control ECU.	DTC U0105 is detected: Go to YES. DTC U0105 is not detected: Go to NO.		Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.
7	Reading the DTC 2 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0111-15 in the HV ECU. • [U0100] Engine ECU CAN communication blackout • [U110A] Vehicle control ECU CAN communication blackout	DTC other than U0111-15 is detected: Go to YES. DTC other than U0111-15 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV battery ECU. (Because blackout has occurred only in the HV battery ECU CAN communication, it is likely that there is an abnormality in the HV battery ECU CAN circuit.)

DTC: U0121 (TC24)

EN01H03ZZZ030602003058

DTC: U0121 (TC24) ABS ECU CAN communication blackout
INFORMATION

SHTS03ZZZ0300255

1. Technical description

- —

<Description of malfunction>

- A blackout occurred in the CAN communication from the ABS ECU.

2. DTC set condition**(1) DTC detection condition**

- Since the starter key is set to the ON position, 1 second or more has passed.
- Control power supply voltage remains at 9 V or more for 1 second or more.

(2) Judgement criteria

- When a state in which no CAN frame is received from the ABS ECU continues for 0.72 second or more.

3. Reset condition

- When all frames from the ABS ECU are normally received twice

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

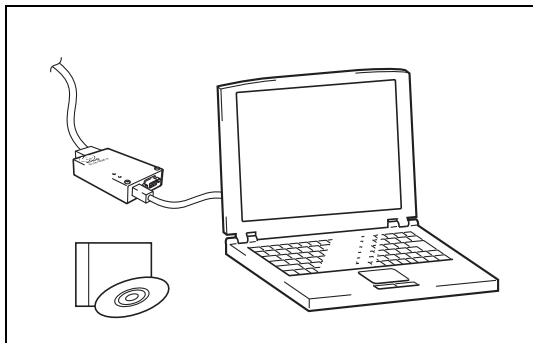
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of ABS ECU
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U0121 (TC24)**1 Implementation of common inspection items**

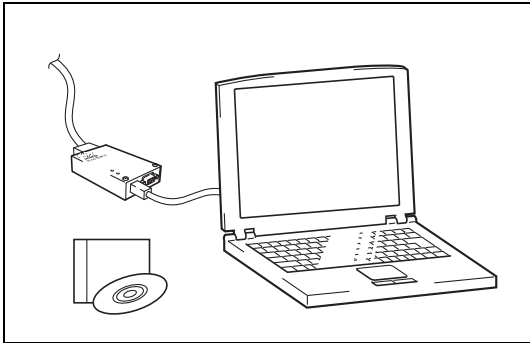
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300256

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0121-24 is detected.

Is DTC U0121-24 detected?**YES****Go to step 3.****NO****The inspection is completed
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300257

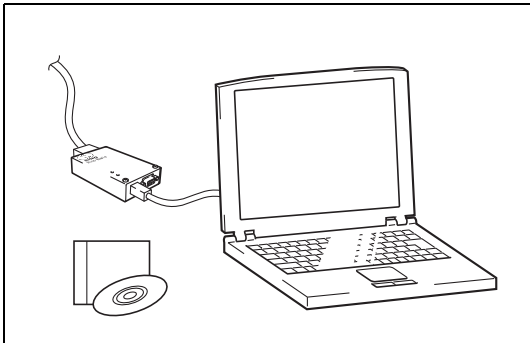
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Reading the DTC [HINO-DX]

SHTS03ZZZ0300258

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0121-24 in the HV ECU.

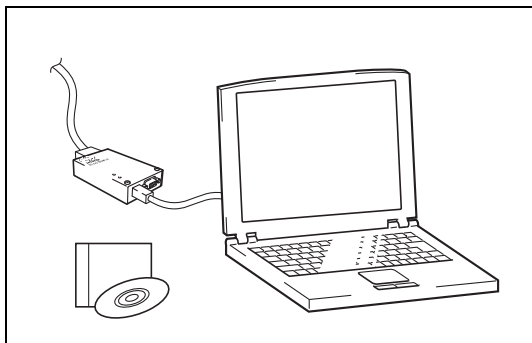
- [U110A] Vehicle control ECU CAN communication blackout
- [U0101] AT ECU CAN communication blackout
- [U1136] Clutch ECU CAN communication blackout
- [U0110] Inverter CAN communication blackout
- [U0155] Meter CAN communication blackout

Are all communication blackout DTCs detected?**YES**

**Go to step 5.
(All communication blackouts have been generated.)**

NO

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

5 Inspecting the vehicle control ECU [HINO-DX]

SHTS03ZZZ0300259

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0121 (ABS ECU communication blackout) is detected in the vehicle control ECU.

Is DTC U0121 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

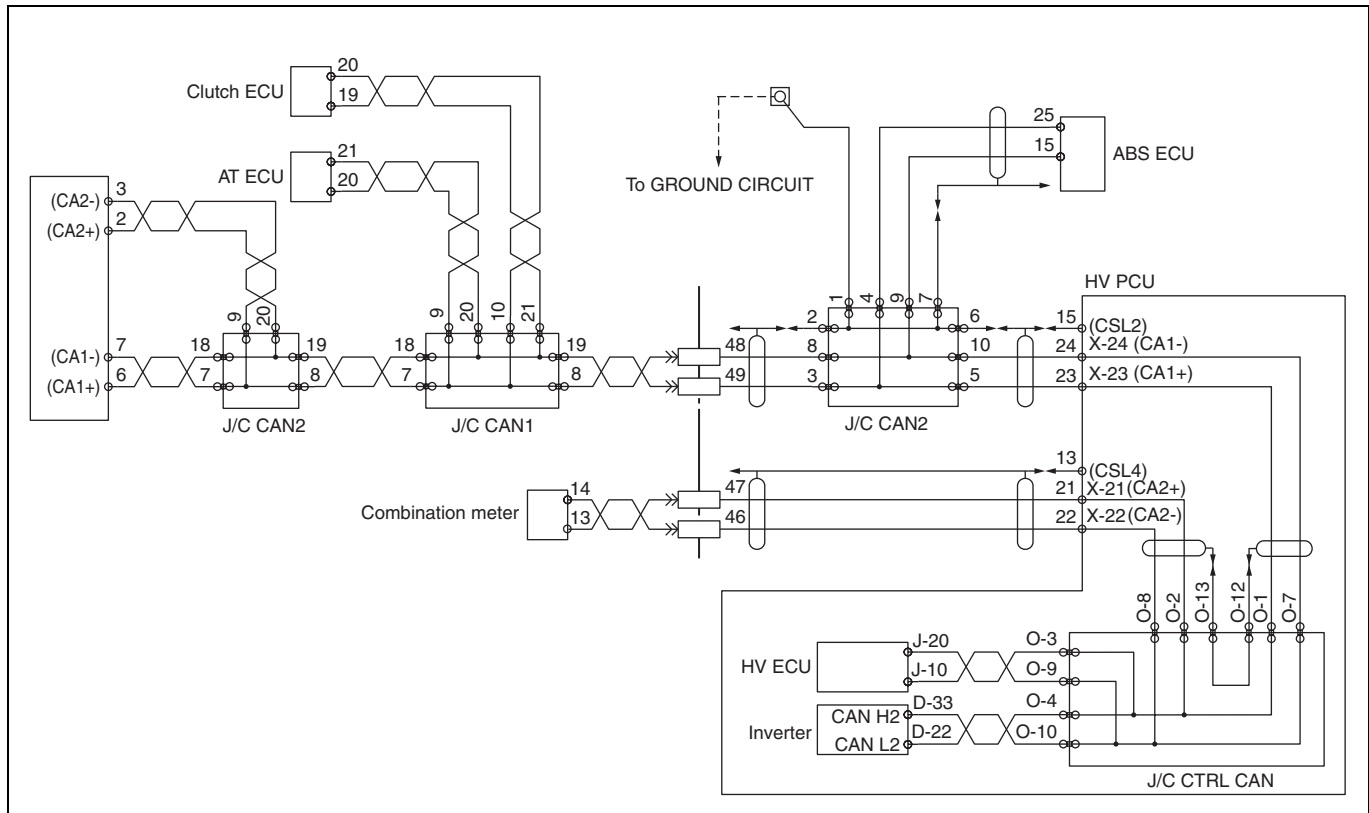
CHECKLIST: U0121 (TC24)

U0121 (TC24)		ABS ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and vehicle control ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0121-24 is detected.	DTC U0121-24 is detected: Go to YES. DTC U0121-24 is not detected: Go to NO.		Go to step 3.	The inspection is completed (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.

U0121 (TC24)		ABS ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0121-24 in the HV ECU. • [U110A] Vehicle control ECU CAN communication blackout • [U0101] AT ECU CAN communication blackout • [U1136] Clutch ECU CAN communication blackout • [U0110] Inverter CAN communication blackout • [U0155] Meter CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 5. (All communication blackouts have been generated.)	Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".
5	Inspecting the vehicle control ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0121 (ABS ECU communication blackout) is detected in the vehicle control ECU.	DTC U0121 is detected: Go to YES. DTC U0121 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.

DTC: U0155 (TC25)

EN01H03ZZZ030602003059

DTC: U0155 (TC25) Meter ECU CAN communication blackout
INFORMATION

SHTS03ZZZ0300260

1. Technical description

- —

<Description of malfunction>

- A blackout occurred in the CAN communication from the meter ECU.

2. DTC set condition

- (1) DTC detection condition
 - Since the starter key is set to the ON position, 1 second or more has passed.
 - Control power supply voltage remains at 9 V or more for 1 second or more.
- (2) Judgement criteria
 - When a state in which no CAN frame is received from the meter ECU continues for 1.6 seconds or more.

3. Reset condition

- When all frames from the meter ECU are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

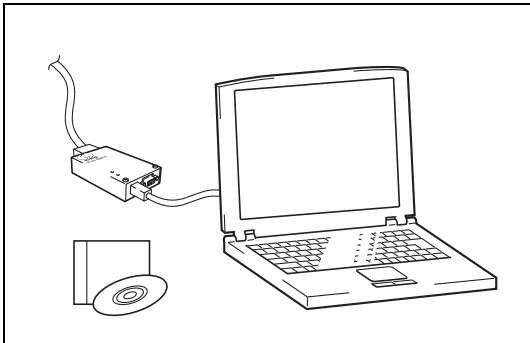
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of meter ECU
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U0155 (TC25)**1 Implementation of common inspection items**

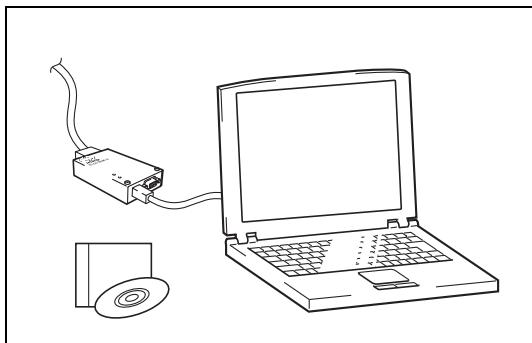
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300261

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0155-25 is detected.

Is DTC U0155-25 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300262

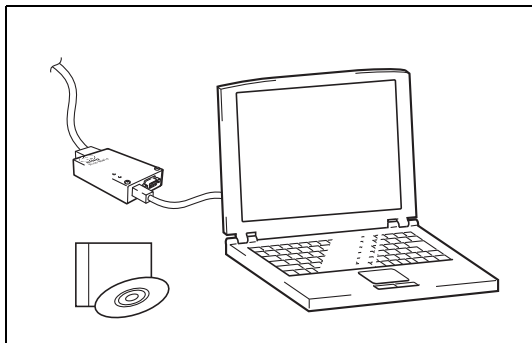
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Reading the DTC [HINO-DX]

SHTS03ZZZ0300263

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0155-25 in the HV ECU.

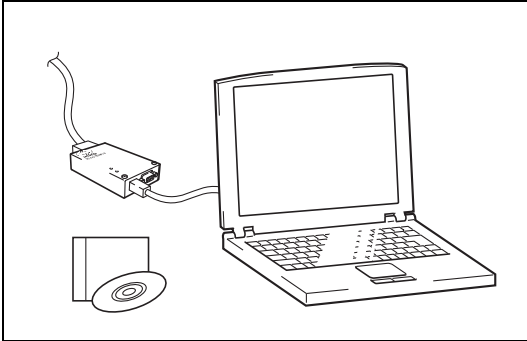
- [U110A] Vehicle control ECU CAN communication blackout
- [U0101] AT ECU CAN communication blackout
- [U1136] Clutch ECU CAN communication blackout
- [U0121] ABS CAN communication blackout
- [U0110] Inverter CAN communication blackout

Are all communication blackout DTCs detected?**YES**

**Go to step 5.
(All communication blackouts have been generated.)**

NO

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

5 Inspecting the vehicle control ECU [HINO-DX]

SHTS03ZZZ0300264

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0155 (Meter ECU communication blackout) is detected in the vehicle control ECU.

Is DTC U0155 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

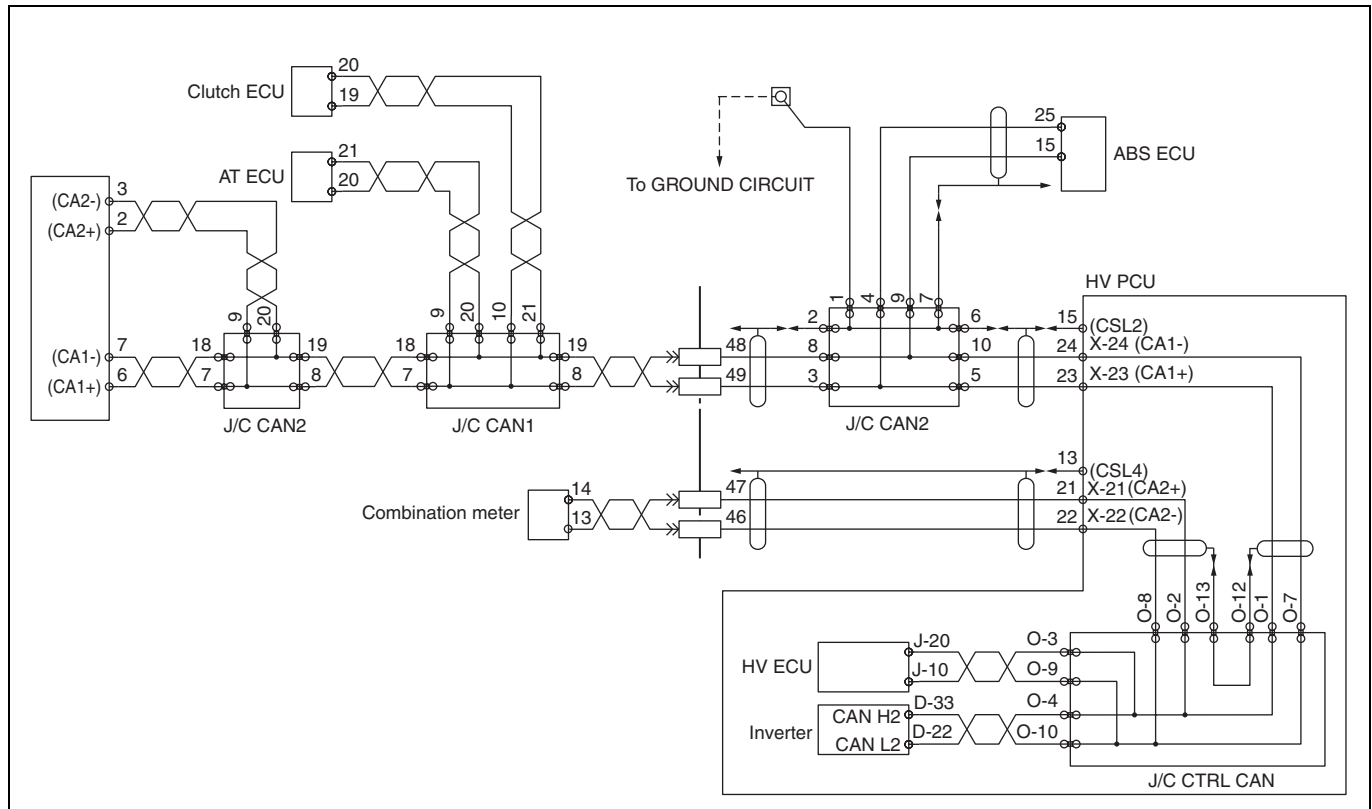
CHECKLIST: U0155 (TC25)

U0155 (TC25)		Meter ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementation of common inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and vehicle control ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0155-25 is detected.	DTC U0155-25 is detected: Go to YES. DTC U0155-25 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.

U0155 (TC25)		Meter ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U0155-25 in the HV ECU. • [U110A] Vehicle control ECU CAN communication blackout • [U0101] AT ECU CAN communication blackout • [U1136] Clutch ECU CAN communication blackout • [U0121] ABS CAN communication blackout • [U0110] Inverter CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 5. (All communication blackouts have been generated.)	Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".
5	Inspecting the vehicle control ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0155 (Meter ECU communication blackout) is detected in the vehicle control ECU.	DTC U0155 is detected: Go to YES. DTC U0155 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.

DTC: U110A (TC26)

EN01H03ZZZ030602003060

DTC: U110A (TC26) Vehicle control ECU CAN communication blackout
INFORMATION

SHTS03ZZZ0300265

1. Technical description

- —

<Description of malfunction>

- A blackout occurred in the CAN communication from the vehicle control ECU.

2. DTC set condition**(1) DTC detection condition**

- Since the starter key is set to the ON position, 1 second or more has passed.
- Control power supply voltage remains at 9 V or more for 1 second or more.

(2) Judgement criteria

- When a state in which no CAN frame is received from the vehicle control ECU continues for 0.68 second or more.

3. Reset condition

- When all frames from the vehicle control ECU are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

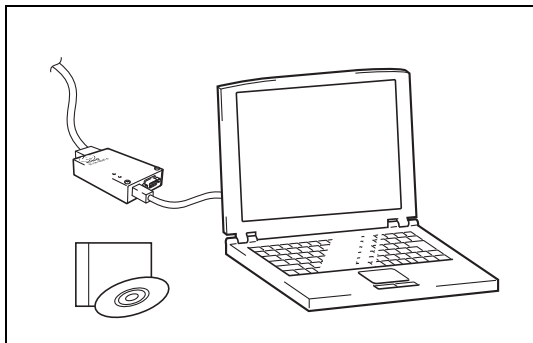
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of vehicle control ECU
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U110A (TC26)**1 Implementation of common inspection items**

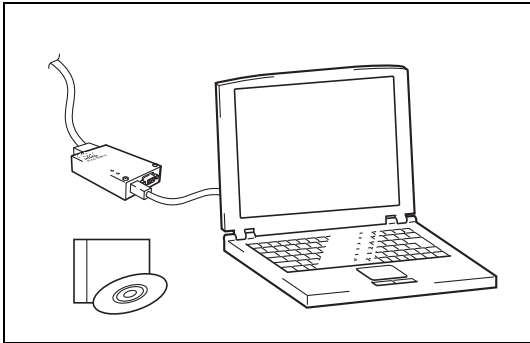
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300266

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and engine ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U110A-26 is detected.

Is DTC U110A-26 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300267

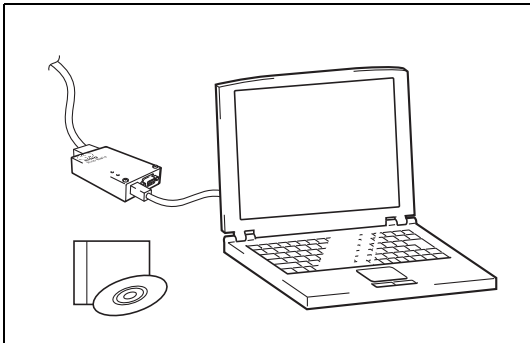
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Reading the DTC [HINO-DX]

SHTS03ZZZ0300268

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U110A-26 in the HV ECU.

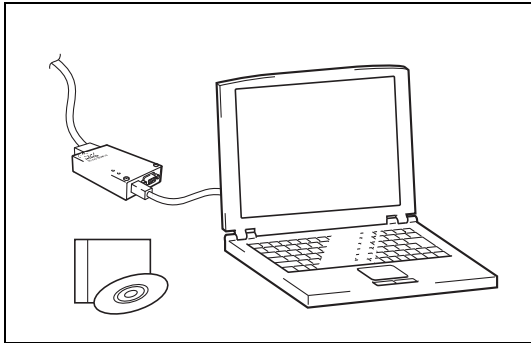
- [U0101] AT ECU CAN communication blackout
- [U1136] clutch ECU CAN communication blackout
- [U0121] ABS ECU CAN communication blackout
- [U0110] inverter CAN communication blackout
- [U0155] meter CAN communication blackout

Are all communication blackout DTCs detected?**YES**

**Go to step 5.
(All communication blackouts have been generated.)**

NO

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

5**Inspecting the engine ECU [HINO-DX]**

SHTS03ZZZ0300269

1. In [Fault Information] on the diagnosis tool screen, check if DTC U110A (vehicle control ECU communication blackout) is detected in the engine ECU.

Is DTC U110A detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

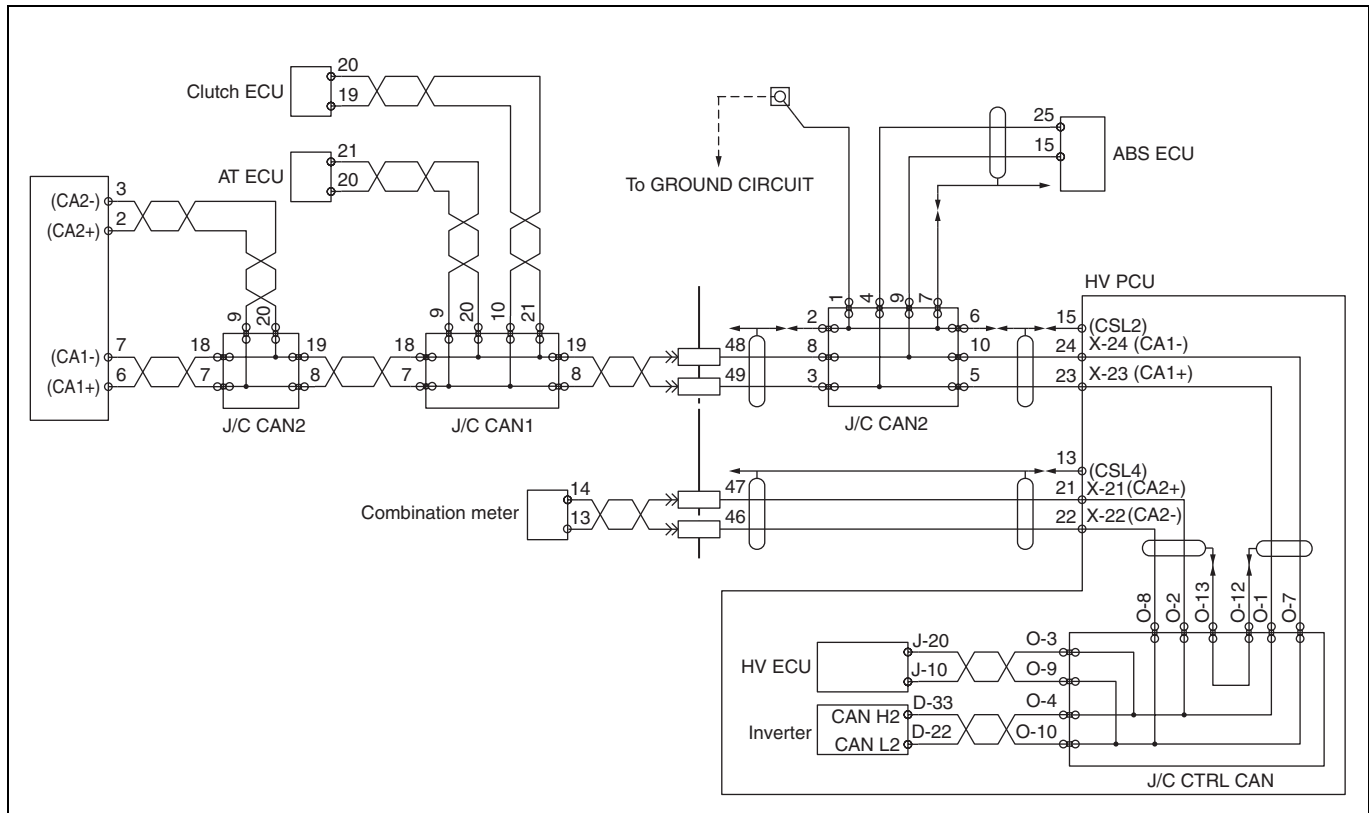
CHECKLIST: U110A (TC26)

U110A (TC26)		Vehicle control ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and engine ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U110A-26 is detected.	DTC U110A-26 is detected: Go to YES. DTC U110A-26 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.

U110A (TC26)		Vehicle control ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U110A-26 in the HV ECU. • [U0101] AT ECU CAN communication blackout • [U1136] clutch ECU CAN communication blackout • [U0121] ABS ECU CAN communication blackout • [U0110] inverter CAN communication blackout • [U0155] meter CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 5. (All communication blackouts have been generated.)	Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".
5	Inspecting the engine ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U110A (vehicle control ECU communication blackout) is detected in the engine ECU.	DTC U110A is detected: Go to YES. DTC U110A is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.

DTC: U1136 (TC27)

EN01H03ZZZ030602003061

DTC: U1136 (TC27) Clutch ECU CAN communication blackout
INFORMATION

SHTS03ZZZ0300270

1. Technical description

- –

<Description of malfunction>

- A blackout occurred in the CAN communication from the clutch ECU.

2. DTC set condition**(1) DTC detection condition**

- Since the starter key is set to the ON position, 1 second or more has passed.
- Control power supply voltage remains at 9 V or more for 1 second or more.

(2) Judgement criteria

- When a state in which no CAN frame is received from the clutch ECU continues for 0.68 second or more.

3. Reset condition

- When all frames from the clutch ECU are normally received twice.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The idling stop function becomes inoperative.
- The regeneration function stops, which may reduce the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

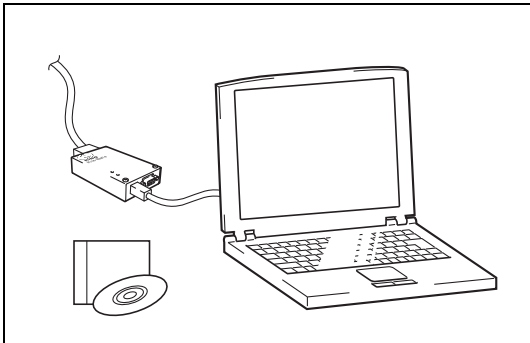
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of clutch ECU
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U1136 (TC27)**1 Implementation of common inspection items**

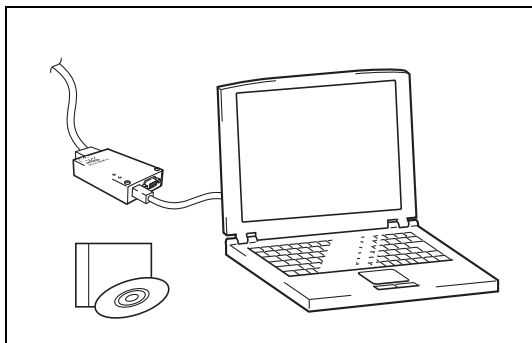
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items.****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300271

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U1136-27 is detected.

Is DTC U1136-27 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300272

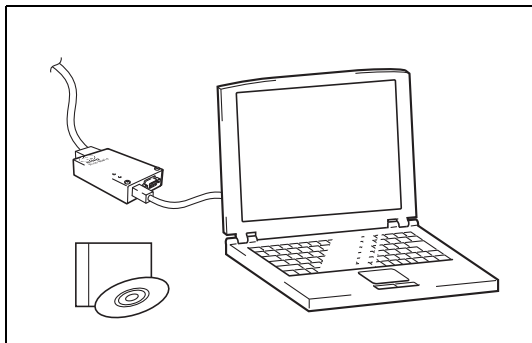
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 4.

4 Reading the DTC [HINO-DX]

SHTS03ZZZ0300273

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U1136-27 in the HV ECU.

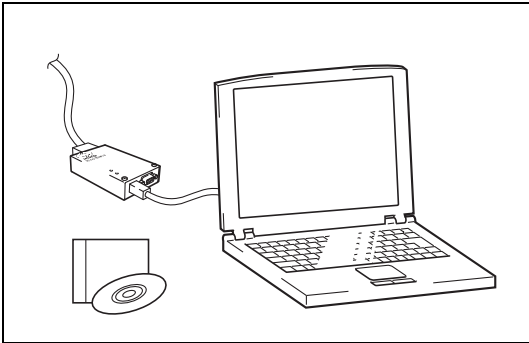
- [U110A] vehicle control ECU CAN communication blackout
- [U0101] AT ECU CAN communication blackout
- [U0121] ABS CAN communication blackout
- [U0110] inverter CAN communication blackout
- [U0155] meter ECU CAN communication blackout

Are all communication blackout DTCs detected?**YES**

**Go to step 5.
(All communication blackouts have been generated.)**

NO

Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".

5 Inspecting the vehicle control ECU [HINO-DX]

SHTS03ZZZ0300274

1. In [Fault Information] on the diagnosis tool screen, check if DTC U1136 (clutch ECU communication blackout) is detected in the vehicle control ECU.

Is DTC U1136 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.**

CHECKLIST: U1136 (TC27)

U1136 (TC27)		Clutch ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementa- tion of com- mon inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items.	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and vehicle control ECU. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U1136-27 is detected.	DTC U1136-27 is detected: Go to YES. DTC U1136-27 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 4.

U1136 (TC27)		Clutch ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN system ECU communication blackout is detected other than U1136-27 in the HV ECU. • [U110A] vehicle control ECU CAN communication blackout • [U0101] AT ECU CAN communication blackout • [U0121] ABS CAN communication blackout • [U0110] inverter CAN communication blackout • [U0155] meter ECU CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 5. (All communication blackouts have been generated.)	Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".
5	Inspecting the vehicle control ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U1136 (clutch ECU communication blackout) is detected in the vehicle control ECU.	DTC U1136 is detected: Go to YES. DTC U1136 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.

INVERTER

DIAGNOSIS CODE TABLE

EN01H03ZZZ030602004001

Symbol	HV warning light lighting timing
☆	Always the light is lighting when confirmed
×	No light on

DTC	Name of malfunction	Description of malfunction	TC	Control for occurrence of malfunction	HV warning light	MIL	HV ECU recognition DTC-TC
P0562	Abnormality in power supply voltage	Abnormality in +12V power supply	96	Gate block, SMR off	☆	×	P0A78-21
P0562	Abnormality in power supply voltage	Abnormal control power supply voltage	A0	Gate block, SMR off	☆	×	P0A78-21
P0604	Abnormality in internal element for control (abnormality in RAM)	RAM abnormality control microprocessor	18	Gate block, SMR off	☆	☆	P0A78-21
P0604	Abnormality in internal element for control (abnormality in RAM)	RAM abnormality diagnosis microprocessor	D2	Normal control	☆	☆	P0A78-22
P0605	Abnormality in internal element for control (abnormality in ROM)	ROM abnormality control microprocessor	17	Gate block, SMR off	☆	☆	P0A78-21
P0605	Abnormality in internal element for control (abnormality in ROM)	ROM abnormality diagnosis microprocessor	D1	Normal control	☆	☆	P0A78-22
P060B	Abnormality in internal element for control (abnormality in AD converter)	Abnormality in the A/D converter	1A	Gate block, SMR off	☆	☆	P0A78-21
P060C	Abnormality in internal element for control (abnormality in diagnosis microprocessor)	Abnormal diagnosis microprocessor due to run pulse monitoring	1C	Normal control	☆	☆	P0A78-22
P062F	Abnormality in inverter (abnormality in memory)	Abnormality in memory access	41	Normal control	☆	☆	P0A78-22

DTC	Name of malfunction	Description of malfunction	TC	Control for occurrence of malfunction	HV warning light	MIL	HV ECU recognition DTC-TC
P0A0D	Abnormality in ILK input	Service plug not locked	20	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Abnormal main circuit element	16	Gate block (except at 3-phase ON control), SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Sticking of the control CAN register (CAN2)	92	Gate block, SMR off (except at EMG start), SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in the inverter (ECU system)	ALU abnormality control microprocessor	97	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Sticking of the DIAG CAN register (CAN1)	3F	Normal control	☆	☆	P0A78-22
P0A1B	Abnormality in inverter (ECU system)	Abnormal microprocessor power supply voltage (5 V)	A1	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Resolver REF signal oscillation stop abnormality	A2	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Resolver REF signal cycle abnormality	A3	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	R/D converter resolver angle abnormality	A4	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	R/D converter NM stop abnormality	A5	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	R/D converter serial communication time-out abnormality	A6	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	R/D converter serial communication deviation abnormality	A7	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	DC voltage sensor Low failure	A8	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	DC voltage sensor High failure	A9	Gate block, SMR off	☆	☆	P0A78-21

DTC	Name of malfunction	Description of malfunction	TC	Control for occurrence of malfunction	HV warning light	MIL	HV ECU recognition DTC-TC
P0A1B	Abnormality in inverter (ECU system)	Main circuit element short circuit abnormality	AA	3-phase ON control, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Abnormality in +26V power supply	BB	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Abnormality in +15V power supply	BC	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Abnormality in +2.5V power supply	BD	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Abnormality in -5V power supply	BE	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	Abnormality in +5 VD power supply	BF	Gate block, SMR off	☆	☆	P0A78-21
P0A1B	Abnormality in inverter (ECU system)	ALU abnormality diagnosis microprocessor	D3	Normal control	☆	☆	P0A78-22
P0A1B	Abnormality in inverter (ECU system)	CPU communication abnormality control microprocessor	D4	Normal control	☆	☆	P0A78-22
P0A1B	Abnormality in inverter (ECU system)	CPU communication abnormality diagnosis microprocessor	D5	Normal control	☆	☆	P0A78-22
P0A1D	HV ECU abnormality	HV ECU operation state abnormality	21	Gate block, SMR off	☆	☆	P0A78-21
P0A2B	Abnormality in characteristics of motor temperature sensor	Abnormality in characteristics of the motor temperature (Low failure)	E9	Normal control	☆	☆	P0A78-22
P0A2B	Abnormality in characteristics of motor temperature sensor	Abnormality in characteristics of the motor temperature (High failure)	ED	Normal control	☆	☆	P0A78-22
P0A2C	Motor temperature sensor Low abnormality	Low failure on the motor high temperature side	DA	Normal control	☆	☆	P0A78-22
P0A2D	Motor temperature sensor High abnormality	High failure on the motor low temperature side	DB	Normal control	☆	☆	P0A78-22

DTC	Name of malfunction	Description of malfunction	TC	Control for occurrence of malfunction	HV warning light	MIL	HV ECU recognition DTC-TC
P0A2F	Abnormality in motor temperature	Motor overheating	33	Normal control	☆	☆	P0A78-22
P0A3C	Abnormality in inverter cooling system	Main circuit element temperature rise	34	Normal control	☆	☆	P0A78-22
P0A3F	Short-circuit abnormality between resolver phases	Resolver inter-phase short circuit	B7	Gate block, SMR off	☆	☆	P0A78-21
P0A41	Resolver range Low abnormality	Out of resolver range (Low failure)	C0	Gate block, SMR off	☆	☆	P0A78-21
P0A42	Resolver range High abnormality	Out of resolver range (High failure)	C1	Gate block, SMR off	☆	☆	P0A78-21
P0A51	Abnormality in inverter (current sensor)	Abnormality in the high-resolution circuit (V phase)	D6	Normal control	☆	×	P0A78-22
P0A51	Abnormality in inverter (current sensor)	Abnormality in the high-resolution circuit (W phase)	D7	Normal control	☆	×	P0A78-22
P0A78	Abnormality in inverter system	DC voltage excessively low	13	Gate block, SMR off	☆	☆	P0A78-21
P0A78	Abnormality in inverter system	DC voltage excessively high	14	Gate block, SMR off	☆	☆	P0A78-21
P0A78	Abnormality in inverter system	Motor over current	15	Gate block (except at 3-phase ON control), SMR off	☆	☆	P0A78-21
P0AA1	SMR#2 (positive side) contact sticking	Contact sticking	D8	Normal control	☆	☆	P0A78-22
P0AA4	SMR#1 and 3 (negative side) contact sticking	Contact sticking	D9	Normal control	☆	☆	P0A78-22
P0ADB	SMR#2 (positive side) Low abnormality	Low failure	1F	Gate block, SMR off	☆	☆	P0A78-21
P0ADC	SMR#2 (positive side) High abnormality	High failure	93	Gate block, SMR off	☆	☆	P0A78-21
P0ADF	SMR#3 (negative side) Low abnormality	Low failure	1E	Gate block, SMR off	☆	☆	P0A78-21
P0AE0	SMR#3 (negative side) High abnormality	High failure	95	Gate block, SMR off	☆	☆	P0A78-21

DTC	Name of malfunction	Description of malfunction	TC	Control for occurrence of malfunction	HV warning light	MIL	HV ECU recognition DTC-TC
P0AE6	SMR#1 (negative side) Low abnormality	Low failure	1D	Gate block, SMR off	☆	☆	P0A78-21
P0AE7	SMR#1 (negative side) High abnormality	High failure	94	Gate block, SMR off	☆	☆	P0A78-21
P0AEE	Abnormality in characteristics of inverter temperature sensor	Abnormality in characteristics of the main circuit element temperature (Low failure)	22	Gate block, SMR off	☆	☆	P0A78-21
P0AEE	Abnormality in characteristics of inverter temperature sensor	Abnormality in characteristics of the main circuit element temperature (High failure)	23	Gate block, SMR off	☆	☆	P0A78-21
P0AEF	Inverter temperature sensor Low abnormality	Abnormality in the main circuit element temperature sensor (Low failure)	24	Gate block, SMR off	☆	☆	P0A78-21
P0AF0	Inverter temperature sensor High abnormality	Abnormality in the main circuit element temperature sensor (High failure)	25	Gate block, SMR off	☆	☆	P0A78-21
P0BEA	Abnormality in V-phase current sensor characteristics	Offset abnormality	B3	Gate block, SMR off	☆	☆	P0A78-21
P0BEA	Abnormality in V-phase current sensor characteristics	Deviation abnormality	B4	Gate block, SMR off	☆	☆	P0A78-21
P0BEB	V-phase current sensor Low abnormality	Out of range Low failure	9A	Gate block, SMR off	☆	☆	P0A78-21
P0BEC	V-phase current sensor High abnormality	Out of range High failure	9B	Gate block, SMR off	☆	☆	P0A78-21
P0BEE	Abnormality in W-phase current sensor characteristics	Offset abnormality	B5	Gate block, SMR off	☆	☆	P0A78-21
P0BEE	Abnormality in W-phase current sensor characteristics	Deviation abnormality	B6	Gate block, SMR off	☆	☆	P0A78-21
P0BEF	W-phase current sensor Low abnormality	Out of range Low failure	9C	Gate block, SMR off	☆	☆	P0A78-21

DTC	Name of malfunction	Description of malfunction	TC	Control for occurrence of malfunction	HV warning light	MIL	HV ECU recognition DTC-TC
P0BF0	W-phase current sensor High abnormality	Out of range High failure	9D	Gate block, SMR off	☆	☆	P0A78-21
P3126	Abnormality in inverter system (only during cranking)	DC voltage excessively low (only at cranking)	12	Gate block, SMR off	☆	×	P0A78-21
U0073	Abnormality in CAN communication with inverter (control CAN)	Communication disabled due to control CAN bus off	91	Gate block, SMR off (except at EMG start)	☆	☆	P0A78-21
U0074	Abnormality in CAN communication with inverter (DIAG CAN)	Communication disabled due to DIAG CAN bus off	3E	Normal control	☆	×	P0A78-22
U0293	HV ECU CAN communication black-out	HV ECU CAN communication black-out	31	Gate block, SMR off (except at EMG start)	☆	☆	P0A78-21

FREEZE FRAME DATA LIST

EN01H03ZZZ030602004002

Item	Description	Display range	Unit
TC No.	Detailed code of DTC No.	00 - \$FF (Hex)	—
Specified value of motor torque	Represents a torque command value to the inverter.	-32,768 - 32,767	Nm
Actual motor torque value	Represents the motor output torque.	-32,768 - 32,767	Nm
Effective motor torque value	Effective motor torque value (Torque calculated from actual current id, iq)	-32,768 - 32,767	Nm
Motor revolution	Represents the motor revolution.	0 - 4,000	r/min
DC voltage	Represents the inverter DC voltage.	0 - 600	V
Motor temperature	Represents the motor temperature.	0 - 200	°C
Inverter internal temperature	Represents the main circuit element temperature (INV temperature).	0 - 200	°C
HV control mode information	Represents the operating condition of the HV system. OFF = 0 Engine startup = 1 At acceleration by motor = 2 Deceleration by motor + retarder or foot brake = 3 Deceleration by motor = 4 HV battery charging = 5 Engine stop = 6 Forced HV battery charging = 7 At manufacturing inspection = 8 At EV = 9 At gear shifting = 10 Not defined = 11 to 15	0 - 15	—
Motor control mode information	Indicates a motor operating state. 0 = Shutdown 1 = Torque control 2 = Discharge preparation 3 = Discharge 4 = Revolution control	0 - 15	—
Inverter control mode information	Represents the operation status of the inverter. 0 = Initialization 1 = Pre-charge standby 2 = At pre-charge 3 = At normal operation 4 = Waiting for discharge permission 5 = At SMR off 6 = At discharge command 7 = At discharge completion 8 = At emergency start (pre-charge) 9 = At emergency start	0 - 15	—
HV battery voltage	Indicates HV battery voltage.	0 - 600	V
Difference voltage not satisfied	Represents the unsatisfied difference voltage count.	0 - 255	Times
Motor current effective value (RMS)	Motor current RMS	-3,276.8 - 3,276.7	A

Item	Description	Display range	Unit
Motor discharge allowable torque	MG discharge allowable torque	0 - 65,535	Nm
Motor charge allowable torque	MG charge allowable torque	0 - 65,535	Nm
Motor required revolution	Required revolution	-32,768 - 32,767	r/min
Torque/revolution control status	0: Torque, 1: Revolution	0, 1	—
Gate control (HV ECU instruction)	0: OFF, 1: ON	0, 1	—
System main relay (SMR) off request	0: No request, 1: Requested	0, 1	—
Service plug lock	0: Lock (ON), 1: Unlock (OFF)	0, 1	—
Inverter stop (FINV)	0: OFF, 1: ON	0, 1	—
Inverter overvoltage (OVINV)	0: OFF, 1: ON	0, 1	—
Gate state	0: Normal, 1: Shutoff	0, 1	—
System main relay 2 (SMR2)	0: OFF, 1: ON	0, 1	—
System main relay 3 (SMR3)	0: OFF, 1: ON	0, 1	—
System main relay 1 (SMR1)	0: OFF, 1: ON	0, 1	—
Motor control mode	0: Sine wave, 1: Overmodulation, 2: Square wave	0 - 2	—
Carrier frequency	0: 5 kHz, 1: 2.5 kHz, 2: 1.25 kHz	0 - 2	—
Emergency start request	0: Without, 1: With	0, 1	—
Power supply voltage	+B power supply	0 - 40	V
Inverter start signal voltage	ON signal voltage	0 - 40	V
System main relay (SMR) drive 12V voltage	SMR drive 12 V voltage	0 - 20	V
Current crowding judgment	0: Without crowding judgment, 1: With crowding judgment	0, 1	—
Engine intake air temperature	Engine intake air temperature	-40 - 210	°C
Inverter short circuit (without phase judgment)	0: Normal, 1: Abnormality	0, 1	—
Inverter short circuit (with phase judgment)	0: Normal, 1: Abnormality	0, 1	—
Shorted phase (1 phase/multiple phases)	0: Not detected, 1: 1 phase, 2: Multiple phases	0 - 2	—
Shorted phase (U phase, V phase, W phase)	0: U phase, 1: V phase, 2: W phase	0 - 2	—
Shorted phase (upper arm/ lower arm)	0: Not detected, 1: Upper arm, 2: Lower arm	0 - 2	—

DATA MONITOR ITEM LIST

EN01H03ZZ030602004003

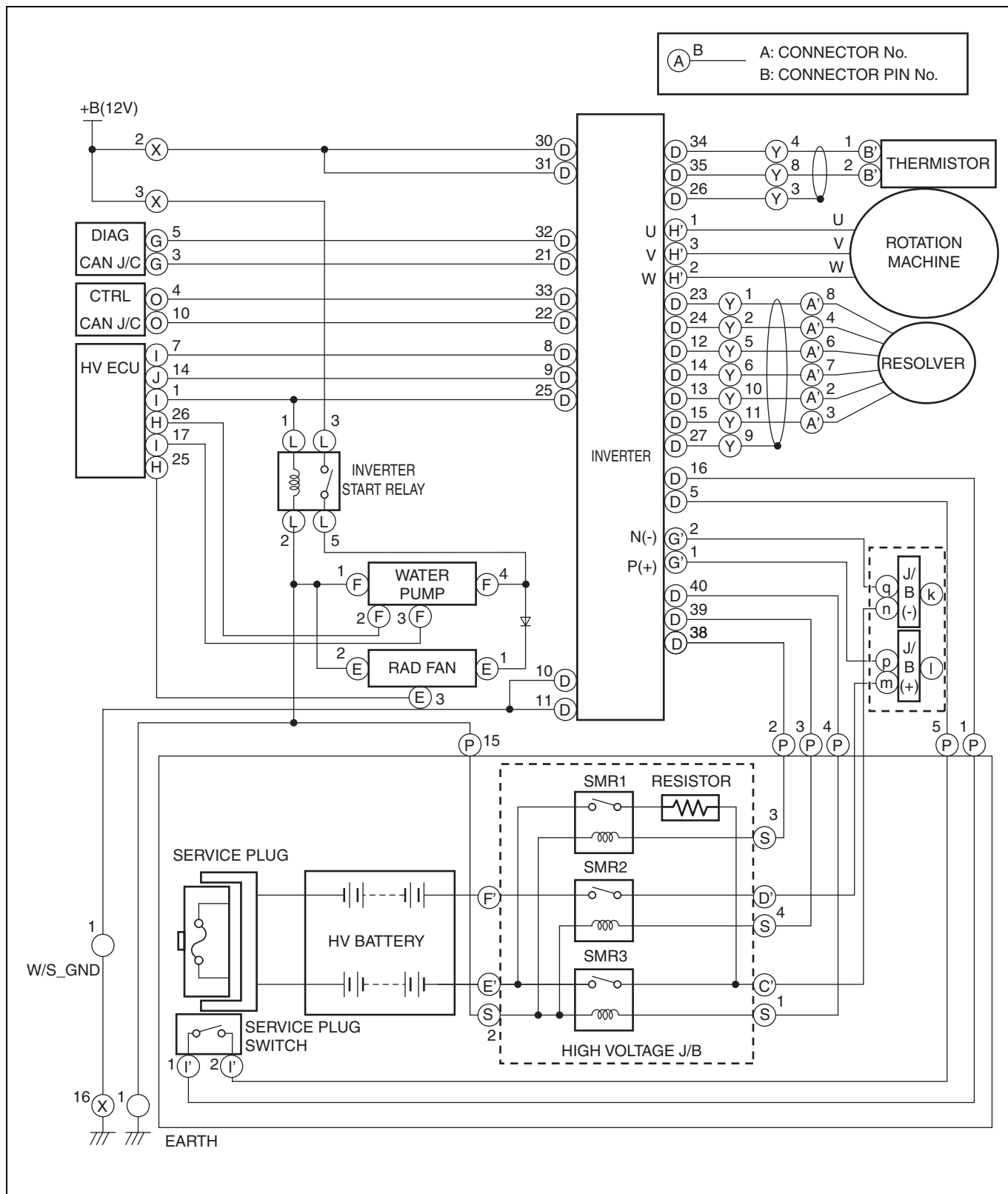
Item	Description	Display range	Unit
TC No.	Detailed code of DTC No.	00 - \$FF (Hex)	—
Specified value of motor torque	Represents the torque command value to the inverter.	-32,768 - 32,767	Nm
Actual motor torque value	Represents motor output torque.	-32,768 - 32,767	Nm
Effective motor torque value	Effective motor torque value (Torque calculated from actual current id, iq)	-32,768 - 32,767	Nm
Motor revolution	Represents the motor revolution.	0 - 4,000	r/min
DC voltage	Represents the inverter DC voltage.	0 - 600	V
Motor temperature	Represents the motor temperature.	0 - 200	°C
Inverter internal temperature	Represents the main circuit element temperature (INV temperature).	0 - 200	°C
HV control mode information	Represents the operating condition of the HV system. OFF = 0 Engine startup = 1 At acceleration by motor = 2 Deceleration by motor + retarder or foot brake = 3 Deceleration by motor = 4 HV battery charging = 5 Engine stop = 6 Forced HV battery charging = 7 At manufacturing inspection = 8 At EV = 9 At gear shifting = 10 Not defined = 11 to 15	0 - 15	—
Motor control mode information	Indicates a motor operating state. 0 = Shutdown 1 = Torque control 2 = Discharge preparation 3 = Discharge 4 = Revolution control	0 - 15	—
Inverter control mode information	Represents the operation status of the inverter. 0 = Initialization 1 = Pre-charge standby 2 = At pre-charge 3 = At normal operation 4 = Waiting for discharge permission 5 = At SMR off 6 = At discharge command 7 = At discharge completion 8 = At emergency start (pre-charge) 9 = At emergency start	0 - 15	—
HV battery voltage	Indicates HV battery voltage.	0 - 600	V

Item	Description	Display range	Unit
Difference voltage not satisfied	Represents the unsatisfied difference voltage count.	0 - 255	Times
Motor current effective value (RMS)	Motor current RMS	-3,276.8 - 3,276.7	A
Motor discharge allowable torque	MG discharge allowable torque	0 - 65,535	Nm
Motor charge allowable torque	MG charge allowable torque	0 - 65,535	Nm
Motor required revolution	Required revolution	-32,768 - 32,767	r/min
Torque/revolution control status	0: Torque, 1: Revolution	0, 1	—
Gate control (HV ECU instruction)	0: OFF, 1: ON	0, 1	—
System main relay (SMR) off request	0: No request, 1: Requested	0, 1	—
Service plug lock	0: Lock (ON), 1: Unlock (OFF)	0, 1	—
Inverter stop (FINV)	0: OFF, 1: ON	0, 1	—
Inverter overvoltage (OVINV)	0: OFF, 1: ON	0, 1	—
Gate state	0: Normal, 1: Shutoff	0, 1	—
System main relay 2 (SMR2)	0: OFF, 1: ON	0, 1	—
System main relay 3 (SMR3)	0: OFF, 1: ON	0, 1	—
System main relay 1 (SMR1)	0: OFF, 1: ON	0, 1	—
Motor control mode	0: Sine wave, 1: Overmodulation, 2: Square wave	0 - 2	—
Carrier frequency	0: 5 kHz, 1: 2.5 kHz, 2: 1.25 kHz	0 - 2	—
Emergency start request	0: Without, 1: With	0, 1	—
Power supply voltage	+B power supply	0 - 40	V
Inverter start signal voltage	ON signal voltage	0 - 40	V
System main relay (SMR) drive 12V voltage	SMR drive 12 V voltage	0 - 20	V
Current crowding judgment	0: Without crowding judgment, 1: With crowding judgment	0, 1	—
Engine intake air temperature	Engine intake air temperature	-40 - 210	°C
Inverter short circuit (without phase judgment)	0: Normal, 1: Abnormality	0, 1	—
Inverter short circuit (with phase judgment)	0: Normal, 1: Abnormality	0, 1	—
Shorted phase (1 phase/multiple phases)	0: Not detected, 1: 1 phase, 2: Multiple phases	0 - 2	—
Shorted phase (U phase, V phase, W phase)	0: U phase, 1: V phase, 2: W phase	0 - 2	—

Item	Description	Display range	Unit
Shorted phase (upper arm/ lower arm)	0: Not detected, 1: Upper arm, 2: Lower arm	0 - 2	—

CONNECTION DIAGRAM

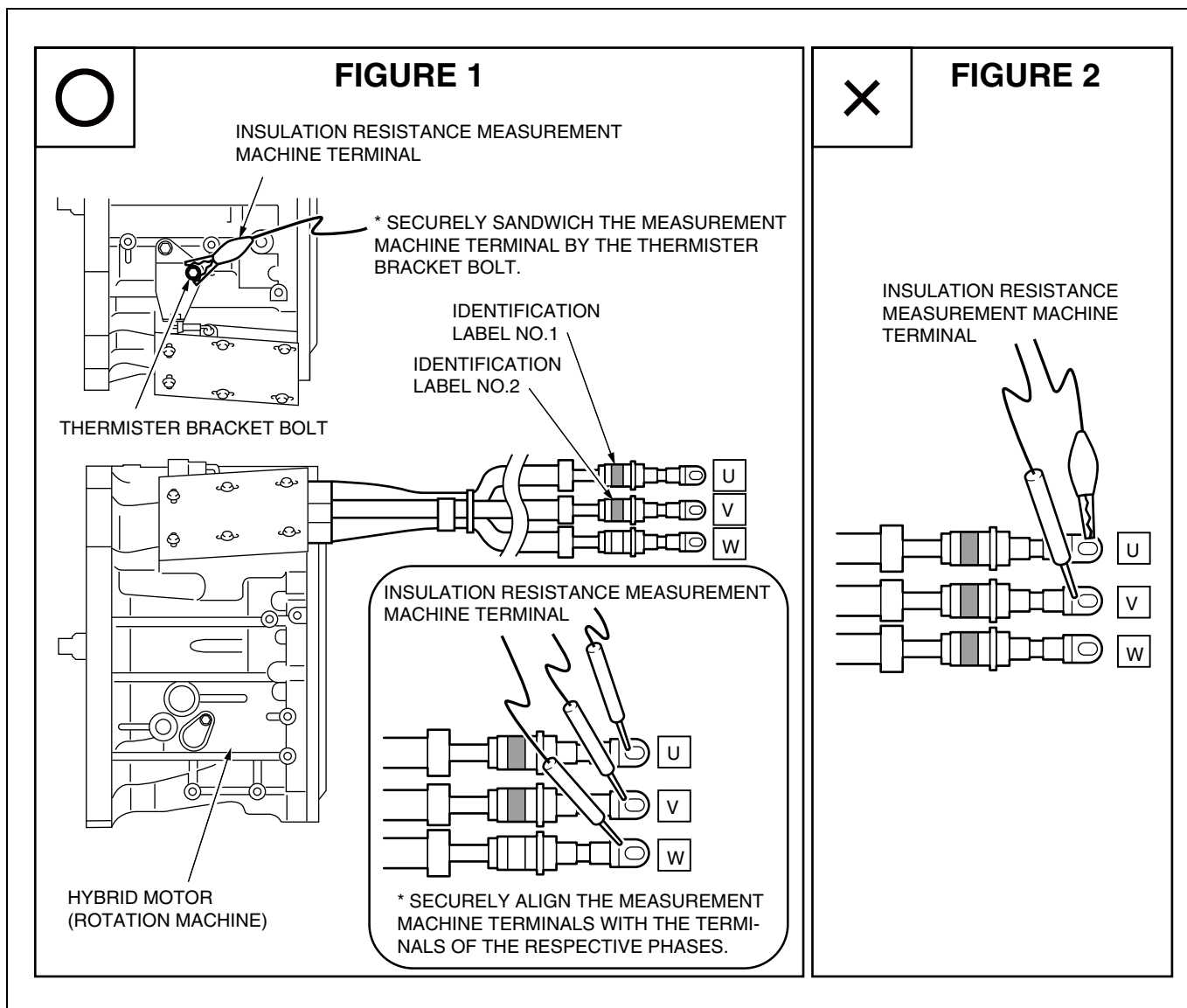
EN01H03ZZZ030602004004



SHTS03ZZZ0300275

INSULATION RESISTANCE MEASUREMENT PROCEDURE FOR HYBRID MOTOR [ROTATION MACHINE]

EN01H03ZZZ030602004005



SHTS03ZZZ0300276

⚠ CAUTION

- Make it sure to wear insulation glove during inspection for safety.
- Pay attention to risk of electric shock during measurement.

1. MEASURE INSULATION RESISTANCE BETWEEN "U PHASE - ROTOR TEMPERATURE SENSOR BRACKET FIXING BOLT", "V PHASE - ROTOR TEMPERATURE SENSOR BRACKET FIXING BOLT" AND "W PHASE - ROTOR TEMPERATURE SENSOR BRACKET FIXING BOLT" USING INSULATION RESISTOR. (REFER TO FIGURE 1)

⚠ CAUTION

- Inspect in the state that engine and hybrid motor (rotor) are completely assembled.
- Never measure between each phase (U,V,W) terminal of three-phase of three-phase cable connector side. (Refer to Figure 2)

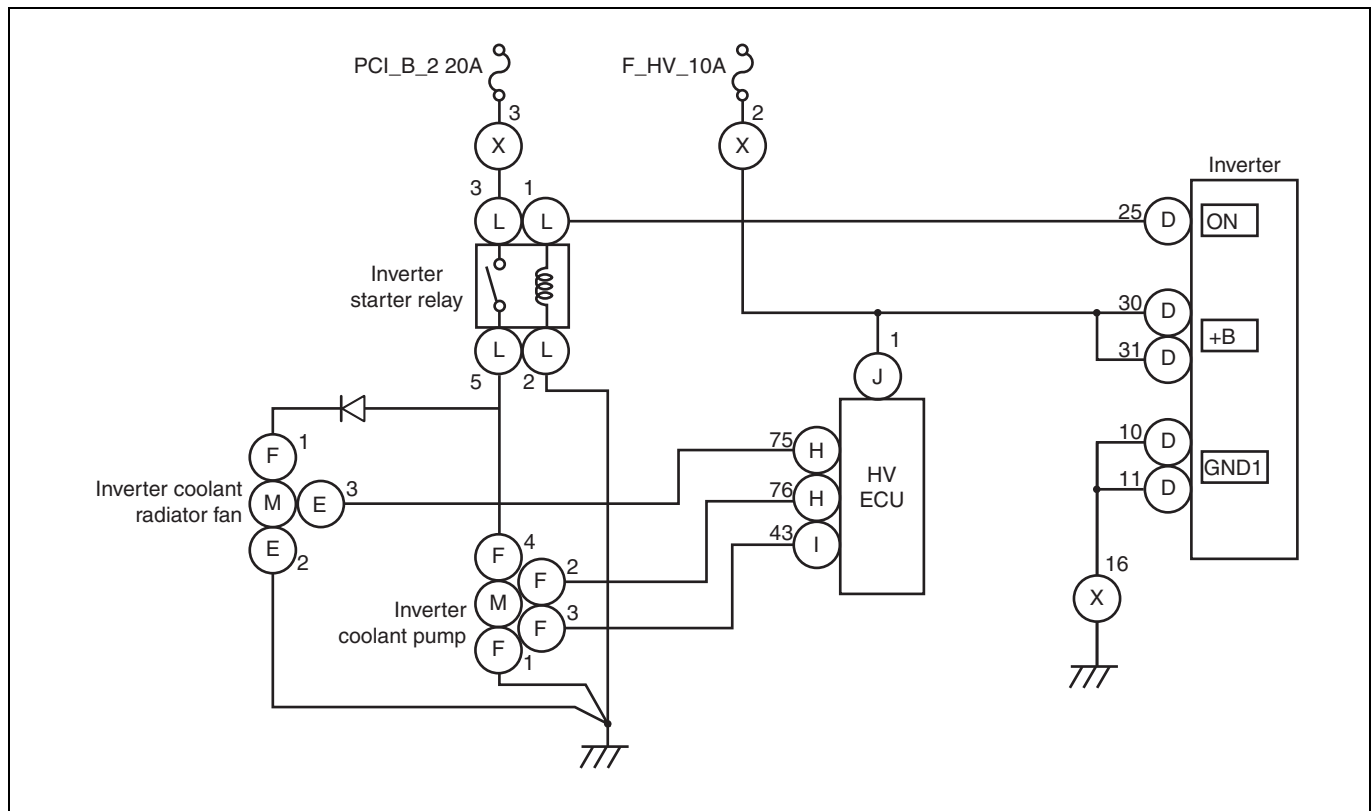
2. MAKE SURE THAT MEASUREMENT VOLTAGE IS DC500V AND INSULATION RESISTANCE IS 5M Ω OR MORE.
3. IN THE CASE THAT IT IS OUT OF STANDARD, LEAVE FOR ONE HOUR IN DRY PLACE AND MEASURE AGAIN. DO NOT USE IF IT IS OUT OF STANDARD AGAIN AS A RESULT OF RE-MEASUREMENT.

**CAUTION**

- Do not touch the terminals for three minutes after measurement.
- Do not damage connector part of wire assembly (high voltage three-phase cable).

DTC: P0562 (TC96)

EN01H03ZZZ030602004006

DTC: P0562 (TC96) Abnormality in power supply voltage
INFORMATION

SHTS03ZZZ0300277

1. Technical description

- –

<Description of malfunction>

- Detected a voltage abnormality in the SMR power supply.

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - The state in which SMR power supply voltage is less than 7.5 V is detected continuously for 0.05 second.

3. Reset condition

- The state in which SMR power supply voltage is 7.5 V or more and 16.5 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

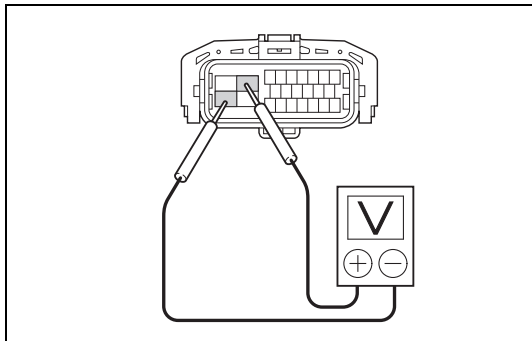
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of 12 V line battery
- Malfunction of inverter

INSPECTION PROCEDURE: P0562 (TC96)**1 Inspecting the voltage of 12 V battery**

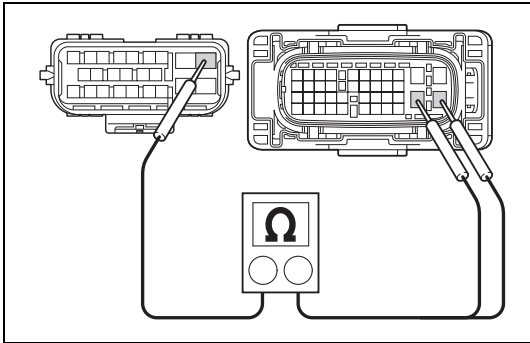
SHTS03ZZZ0300278

1. Set the starter key to the "LOCK" position.
2. Disconnect the connector of PCU harness (24P).
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the terminals of PCU harness (24P) vehicle connector.

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle connector 2nd terminal – 16th terminal	10 – 16 V

Is the measured value within the range of standard value?**YES****Go to step 2.****NO**

**Inspect the 12 V battery and charge or replace if necessary.
When the battery is normal, inspect the vehicle wire harness (12 V power supply circuit).**

2 Inspecting the PCU wire harness (lower side) for continuity 1

SHTS03ZZZ0300279

1. Set the starter key to the "LOCK" position.
2. Disconnect the inverter connector.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector – inverter connector 2nd terminal – 30th terminal 2nd terminal – 31st terminal	1 Ω or less (With continuity)

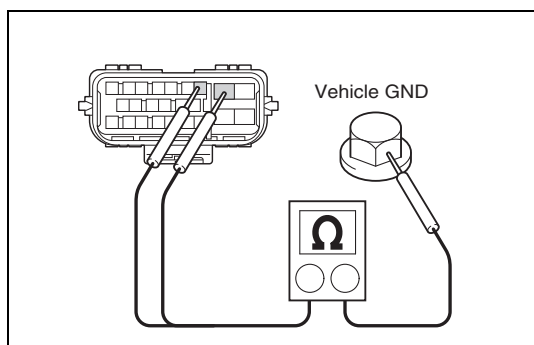
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the PCU wire harness (lower side).

3 Inspecting the PCU wire harness (lower side) for short circuit 1

- Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 2nd terminal – GND 3rd terminal – GND	10 k Ω or more (No continuity)

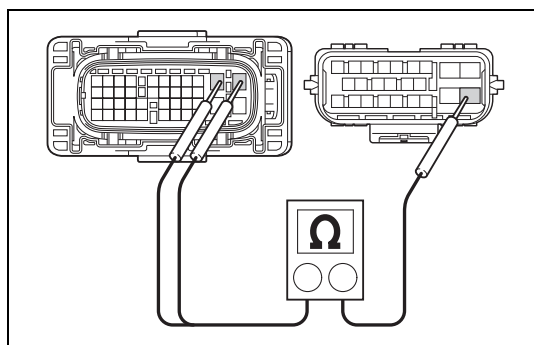
Is the measured value within the range of standard value?

YES

NO

Go to step 4.

Replace the PCU wire harness (lower side).

4 Inspecting the PCU wire harness (lower side) for continuity 2

- Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (24P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector – PCU harness (24P) lower-side connector 10th terminal – 16th terminal 11th terminal – 16th terminal	1 Ω or less (With continuity)

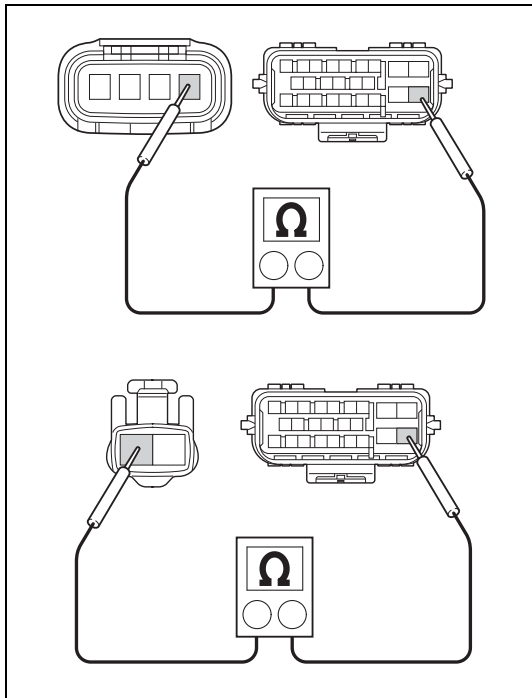
Is the measured value within the range of standard value?

YES

NO

Go to step 5.

Replace the PCU wire harness (lower side).

5 Inspecting the inverter cooling pump and inverter cooling radiator fan for short circuit

SHTS03ZZZ0300282

1. Using the electrical tester, measure the resistance between the terminals of inverter cooling pump connector and PCU harness (24P) lower-side connector.
2. Using the electrical tester, measure the resistance between the terminals of inverter cooling radiator fan connector and PCU harness (24P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector – PCU harness (24P) lower-side connector 4th terminal – 16th terminal Inverter cooling radiator fan connector – PCU harness (24P) lower-side connector 1st terminal – 16th terminal	10 k Ω or more (No continuity)

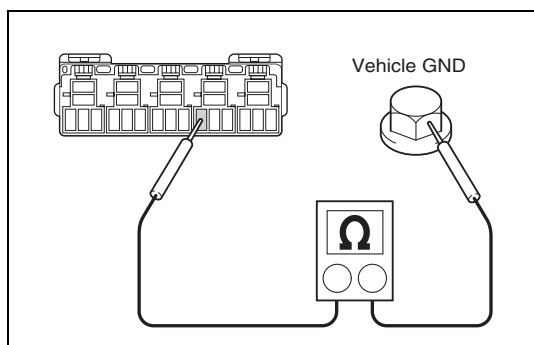
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the inverter cooling pump or inverter cooling radiator fan.

6 Inspecting the PCU wire harness (lower side) for short circuit 2

SHTS03ZZZ0300283

1. Remove the inverter start relay.
2. Using the electrical tester, measure the resistance between the 1st terminal of inverter start relay connector (relay block side) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector (relay block side) 1st terminal – GND	10 kΩ or more (No continuity)

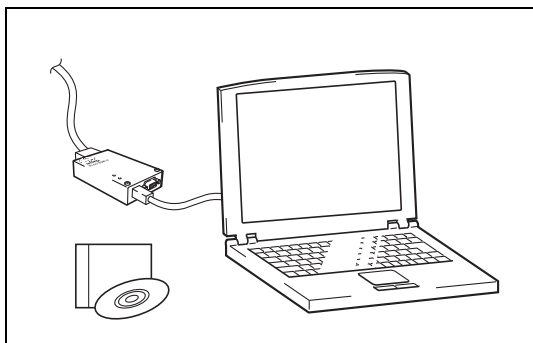
Is the measured value within the range of standard value?

YES

NO

Go to step 7.

Replace the PCU wire harness (lower side).

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300284

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0562-96 is detected.

Is DTC P0562-96 detected?

YES

NO

Replace the inverter.

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0562 (TC96)

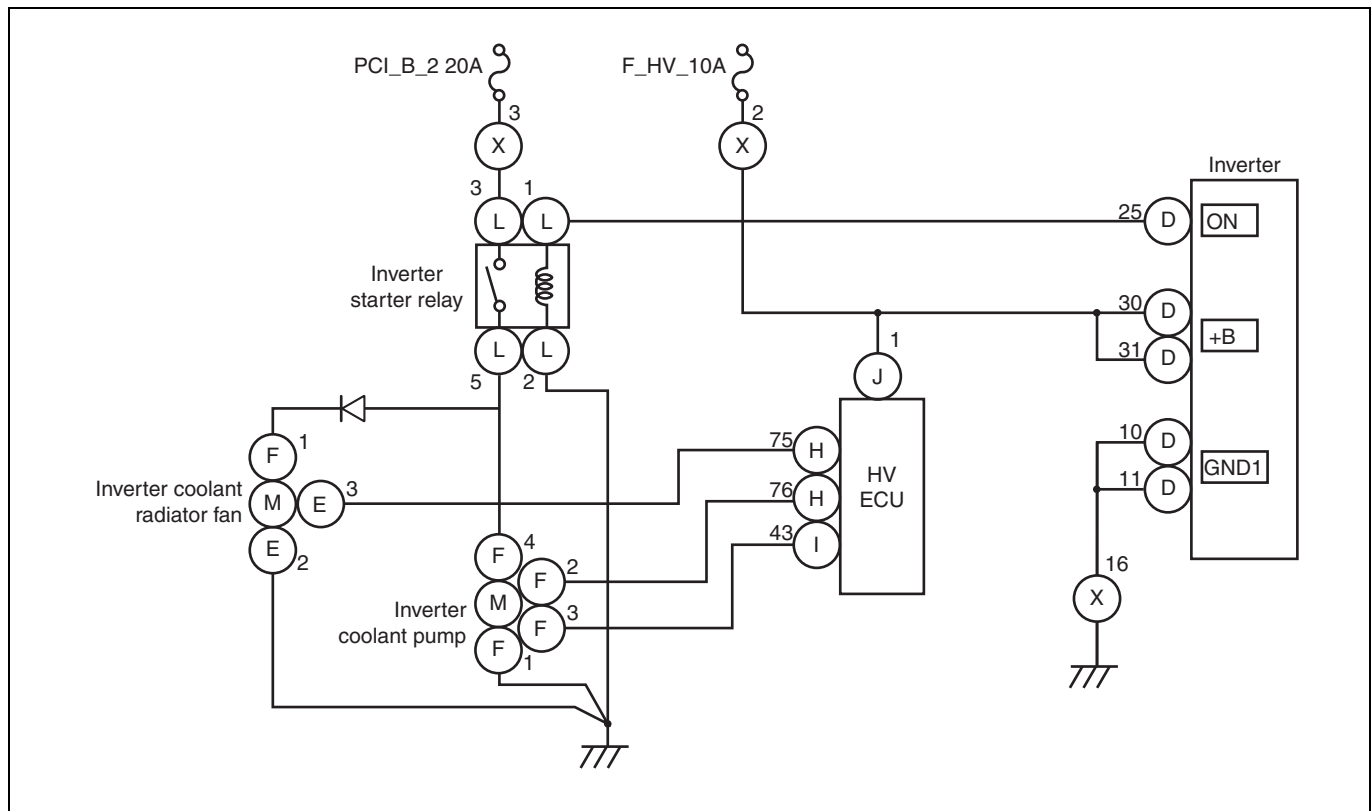
P0562 (TC96)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the voltage of 12 V battery	1. Set the starter key to the "LOCK" position. 2. Disconnect the connector of PCU harness (24P). 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the terminals of PCU harness (24P) vehicle connector. <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle connector 2nd terminal – 16th terminal <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Inspect the 12 V battery and charge or replace if necessary. When the battery is normal, inspect the vehicle wire harness (12 V power supply circuit).
2	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the inverter connector. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and inverter connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector – inverter connector 2nd terminal – 30th terminal 2nd terminal – 31st terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the PCU wire harness (lower side) for short circuit 1	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 2nd terminal – GND 3rd terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the PCU wire harness (lower side).

P0562 (TC96)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the PCU wire harness (lower side) for continuity 2	1. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (24P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector to PCU harness (24P) lower-side connector 10th terminal – 16th terminal 11th terminal – 16th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).
5	Inspecting the inverter cooling pump and inverter cooling radiator fan for short circuit	1. Using the electrical tester, measure the resistance between the terminals of inverter cooling pump connector and PCU harness (24P) lower-side connector. 2. Using the electrical tester, measure the resistance between the terminals of inverter cooling radiator fan connector and PCU harness (24P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector – PCU harness (24P) lower-side connector 4th terminal – 16th terminal Inverter cooling radiator fan connector – PCU harness (24P) lower-side connector 1st terminal – 16th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the inverter cooling pump or inverter cooling radiator fan.
6	Inspecting the PCU wire harness (lower side) for short circuit 2	1. Remove the inverter start relay. 2. Using the electrical tester, measure the resistance between the 1st terminal of inverter start relay connector (relay block side) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector (relay block side) 1st terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).

P0562 (TC96)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0562-96 is detected.	DTC P0562-96 is detected: Go to YES. DTC P0562-96 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0562 (TCA0)

EN01H03ZZZ030602004007

DTC: P0562 (TCA0) Abnormality in power supply voltage
INFORMATION

SHTS03ZZZ0300285

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in control power supply voltage of SMR.

2. DTC set condition**(1) DTC detection condition**

- Since the embedded IC is activated, 0.1 second or more has passed.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which control power supply voltage is less than 7.5 V is detected continuously for 1 second.

3. Reset condition

- The state in which control power supply voltage is 7.5 V or more is detected continuously for 3 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

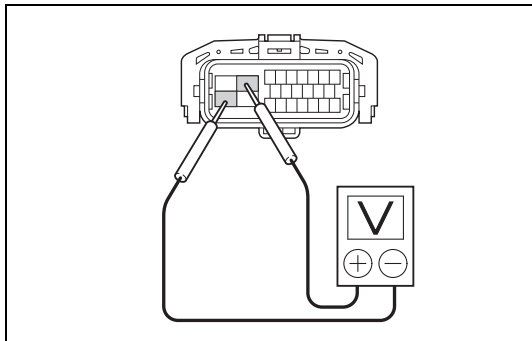
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of 12 V line battery
- Malfunction of inverter

INSPECTION PROCEDURE: P0562 (TCA0)**1 Inspecting the voltage of 12 V battery**

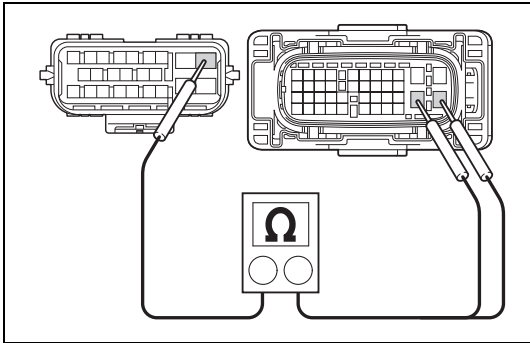
SHTS03ZZZ0300286

1. Set the starter key to the "LOCK" position.
2. Disconnect the connector of PCU harness (24P).
3. Set the starter key to the "ON" position.
4. Using the electrical tester, measure the voltage between the terminals of PCU harness (24P) vehicle connector.

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle connector 2nd terminal – 16th terminal	10 – 16 V

Is the measured value within the range of standard value?**YES****Go to step 2.****NO**

Inspect the 12 V battery and charge or replace if necessary.
When the battery is normal, inspect the vehicle wire harness (12 V power supply circuit).

2 Inspecting the PCU wire harness (lower side) for continuity 1

SHTS03ZZZ0300287

1. Set the starter key to the "LOCK" position.
2. Disconnect the inverter connector.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector – Inverter connector 2nd terminal – 30th terminal 2nd terminal – 31st terminal	1 Ω or less (With continuity)

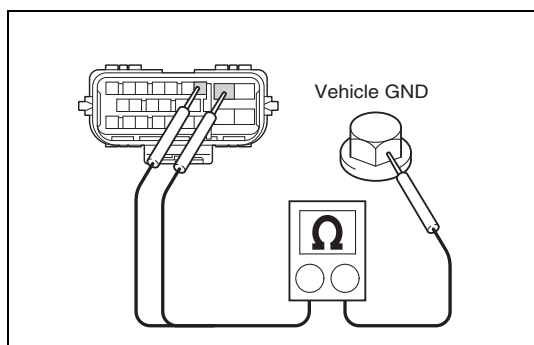
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the PCU wire harness (lower side).

3 Inspecting the PCU wire harness (lower side) for short circuit 1

SHTS03ZZZ0300288

- Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector 2nd terminal – GND 3rd terminal – GND	10 kΩ or more (No continuity)

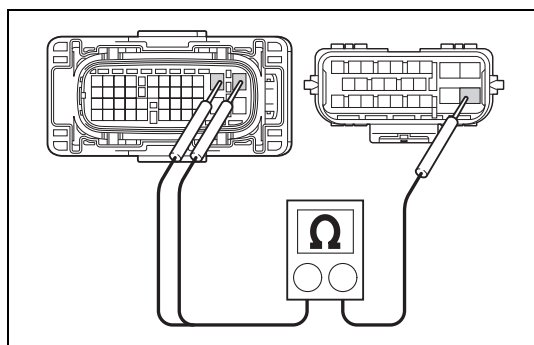
Is the measured value within the range of standard value?

YES

NO

Go to step 4.

Replace the PCU wire harness (lower side).

4 Inspecting the PCU wire harness (lower side) for continuity 2

SHTS03ZZZ0300289

- Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (24P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector to PCU harness (24P) lower-side connector 10th terminal – 16th terminal 11th terminal – 16th terminal	1 Ω or less (With continuity)

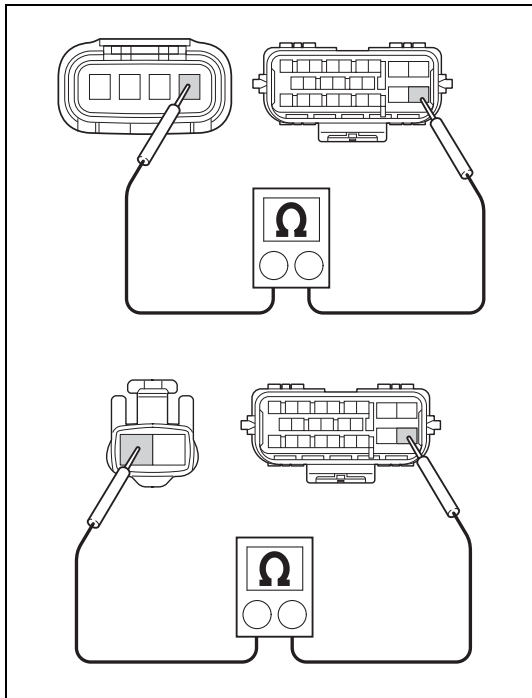
Is the measured value within the range of standard value?

YES

NO

Go to step 5.

Replace the PCU wire harness (lower side).

5 Inspecting the inverter cooling pump and inverter cooling radiator fan for short circuit

SHTS03ZZZ0300290

1. Using the electrical tester, measure the resistance between the terminals of inverter cooling pump connector and PCU harness (24P) lower-side connector.
2. Using the electrical tester, measure the resistance between the terminals of inverter cooling radiator fan connector and PCU harness (24P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector – PCU harness (24P) lower-side connector 4th connector – 16th connector Inverter cooling radiator fan connector – PCU harness (24P) lower-side connector 1st terminal – 16th terminal	10 k Ω or more (No continuity)

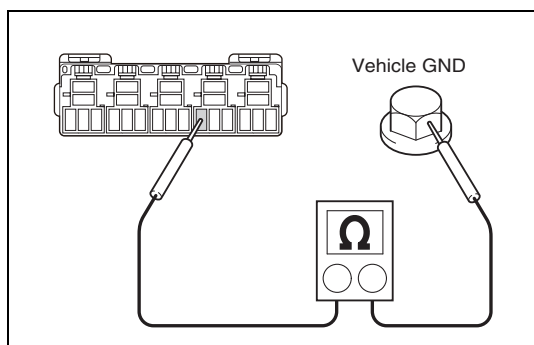
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the inverter cooling pump or inverter cooling radiator fan.

6 Inspecting the PCU wire harness (lower side) for short circuit 2

SHTS03ZZZ0300291

1. Remove the inverter start relay.
2. Using the electrical tester, measure the resistance between the 1st terminal of inverter start relay connector (relay block side) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector (relay block side) 1st terminal – GND	10 kΩ or more (No continuity)

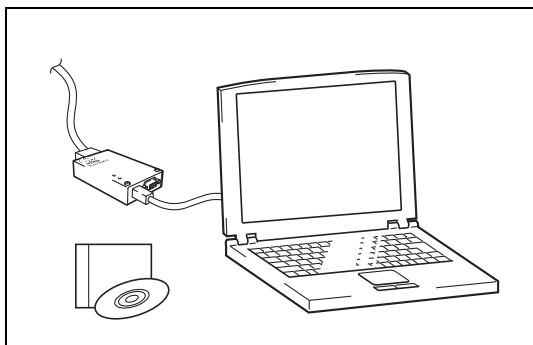
Is the measured value within the range of standard value?

YES

NO

Go to step 7.

Replace the PCU wire harness (lower side).

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300292

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0562-A0 is detected.

Is DTC P0562-A0 detected?

YES

NO

Replace the inverter.

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0562 (TCA0)

P0562 (TCA0)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the voltage of 12 V battery	1. Set the starter key to the "LOCK" position. 2. Disconnect the connector of PCU harness (24P). 3. Set the starter key to the "ON" position. 4. Using the electrical tester, measure the voltage between the terminals of PCU harness (24P) vehicle connector. <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle connector 2nd terminal – 16th terminal <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Inspect the 12 V battery and charge or replace if necessary. When the battery is normal, inspect the vehicle wire harness (12 V power supply circuit).
2	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the inverter connector. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and inverter connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector – Inverter connector 2nd terminal – 30th terminal 2nd terminal – 31st terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the PCU wire harness (lower side) for short circuit 1	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector 2nd terminal – GND 3rd terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the PCU wire harness (lower side).

P0562 (TCA0)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the PCU wire harness (lower side) for continuity 2	1. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (24P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector to PCU harness (24P) lower-side connector 10th terminal – 16th terminal 11th terminal – 16th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).
5	Inspecting the inverter cooling pump and inverter cooling radiator fan for short circuit	1. Using the electrical tester, measure the resistance between the terminals of inverter cooling pump connector and PCU harness (24P) lower-side connector. 2. Using the electrical tester, measure the resistance between the terminals of inverter cooling radiator fan connector and PCU harness (24P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector – PCU harness (24P) lower-side connector 4th connector – 16th connector Inverter cooling radiator fan connector – PCU harness (24P) lower-side connector 1st terminal – 16th terminal <Standard values> 10 k Ω or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the inverter cooling pump or inverter cooling radiator fan.
6	Inspecting the PCU wire harness (lower side) for short circuit 2	1. Remove the inverter start relay. 2. Using the electrical tester, measure the resistance between the 1st terminal of inverter start relay connector (relay block side) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector (relay block side) 1st terminal – GND <Standard values> 10 k Ω or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).

P0562 (TCA0)		Abnormality in power supply voltage		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0562-A0 is detected.	DTC P0562-A0 is detected: Go to YES. DTC P0562-A0 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0604 (TC18)

EN01H03ZZZ030602004008

DTC: P0604 (TC18) Abnormality in internal element for control (abnormality in RAM) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the RAM (control microprocessor) in the inverter.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- (Write value of all memory region data ≠ Read value) is detected 3 times successively (immediately).

3. Reset condition

- (Write value of all memory region data = Read value) is detected 3 times successively (immediately).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

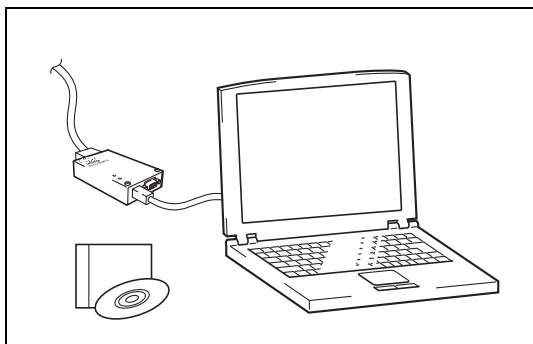
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0604 (TC18)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300293

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0604-18 is detected.

Is DTC P0604-18 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0604 (TC18)

P0604 (TC18)		Abnormality in internal element for control (abnormality in RAM)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0604-18 is detected.	DTC P0604-18 is detected: Go to YES. DTC P0604-18 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0604 (TCD2)

EN01H03ZZZ030602004009

DTC: P0604 (TCD2) Abnormality in internal element for control (abnormality in RAM) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the RAM (diagnosis microprocessor) in the inverter.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- (Write value of all memory region data ≠ Read value) is detected 3 times successively (immediately).

3. Reset condition

- (Write value of all memory region data = Read value) is detected 3 times successively (immediately).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

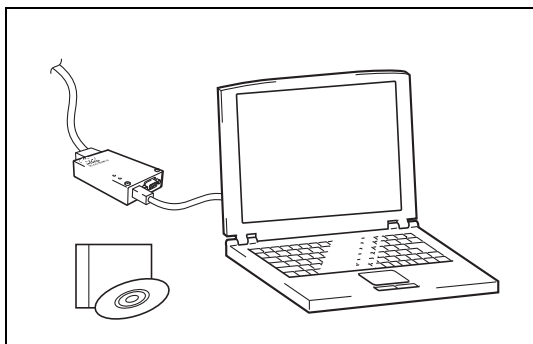
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0604 (TCD2)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300294

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0604-D2 is detected.

Is DTC P0604-D2 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0604 (TCD2)

P0604 (TCD2)		Abnormality in internal element for control (abnormality in RAM)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0604-D2 is detected.	DTC P0604-D2 is detected: Go to YES. DTC P0604-D2 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0605 (TC17)

EN01H03ZZZ030602004010

DTC: P0605 (TC17) Abnormality in internal element for control (abnormality in ROM) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the ROM (control microprocessor) in the inverter.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- (Two-byte additional value of all memory region data ≠ Specified value [(AA55) hex]) is detected 3 times successively (immediately).

3. Reset condition

- (Two-byte additional value of all ROM region data = Specified value [(AA55) hex]) is detected 3 times successively (immediately).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

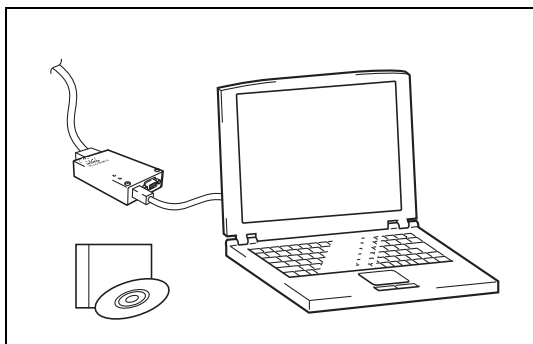
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0605 (TC17)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300295

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0605-17 is detected.

Is DTC P0605-17 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0605 (TC17)

P0605 (TC17)		Abnormality in internal element for control (abnormality in ROM)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Restoration check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0605-17 is detected.	DTC P0605-17 is detected: Go to YES. DTC P0605-17 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0605 (TCD1)

EN01H03ZZZ030602004011

DTC: P0605 (TCD1) Abnormality in internal element for control (abnormality in ROM) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the ROM (diagnosis microprocessor) in the inverter.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- (Two-byte additional value of all memory region data ≠ Specified value [(AA55) hex]) is detected 3 times successively (immediately).

3. Reset condition

- (Two-byte additional value of all ROM region data = Specified value [(AA55) hex]) is detected 3 times successively (immediately).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

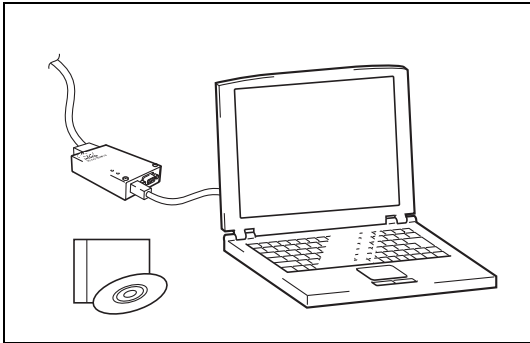
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0605 (TCD1)**1 Restoration check [HINO-DX]**

SHTS03ZZZ0300296

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0605-D1 is detected.

Is DTC P0605-D1 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0605 (TCD1)

P0605 (TCD1)		Abnormality in internal element for control (abnormality in ROM)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Restoration check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0605-D1 is detected.	DTC P0605-D1 is detected: Go to YES. DTC P0605-D1 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P060B (TC1A)

EN01H03ZZZ030602004012

DTC: P060B (TC1A)

Abnormality in internal element for control (abnormality in AD converter)

INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the AD converter in the inverter.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

In addition to the above:

- Control mode = Rectangular wave mode
- The number of motor revolutions is 300 r/min or more.

(2) Judgement criteria

- When one of the following conditions continues for 0.05 second:
 - Voltage of AD converter is less than 4.04 V.
 - Voltage of AD converter is larger than 5.95 V.
 - A/D conversion completion interrupt has not occurred.

3. Reset condition

- The following condition continues for 0.2 second:
 - Voltage of AD converter is 4.04 V or more.
 - Voltage of AD converter is 5.95 V or less.
 - A/D conversion completion interrupt has occurred.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

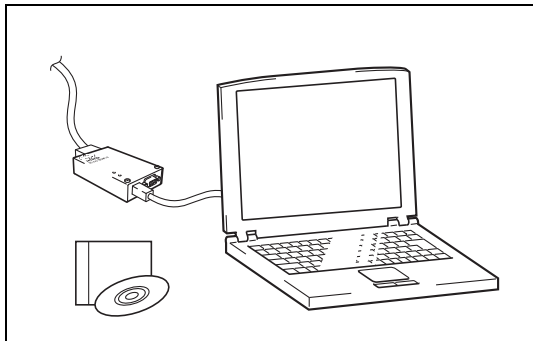
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P060B (TC1A)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300297

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P060B-1A is detected.

Is DTC P060B-1A detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P060B (TC1A)**

P060B (TC1A)		Abnormality in internal element for control (abnormality in AD converter)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P060B-1A is detected.	DTC P060B-1A is detected: Go to YES. DTC P060B-1A is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P060C (TC1C)

EN01H03ZZZ030602004013

DTC: P060C (TC1C)

Abnormality in internal element for control (abnormality in diagnosis microprocessor) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the diagnosis microprocessor (due to run pulse monitoring) in the inverter.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since reset is directed to the diagnosis microprocessor, 0.1 second has passed.

(2) Judgement criteria

- Immediately when one of the following conditions is met:
 - The run pulse has stopped, or the run pulse signal width is less than 0.001.
 - After the run pulse signal width of 0.003 second or more continues for 0.05 second, reset is performed once but it is detected again.

3. Reset condition

- When the following conditions continue for 0.1 second:
 - The run pulse signal is present.
 - The run pulse signal width is larger than 1.0 ms.
 - The run pulse signal width is smaller than 3.0 ms.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

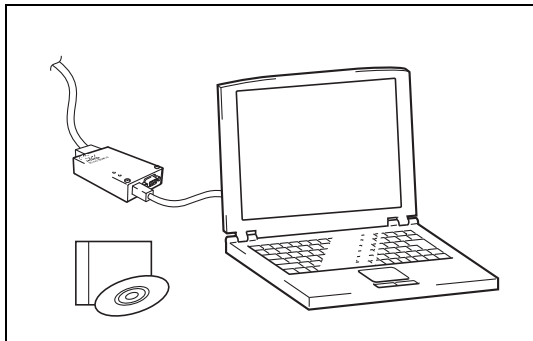
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P060C (TC1C)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300298

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P060C-1C is detected.

Is DTC P060C-1C detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P060C (TC1C)**

P060C (TC1C)		Abnormality in internal element for control (abnormality in diagnosis microprocessor)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P060C-1C is detected.	DTC P060C-1C is detected: Go to YES. DTC P060C-1C is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P062F (TC41)

DTC: P062F (TC41) Abnormality in inverter (abnormality in memory) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the memory in the inverter (memory access abnormality).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - When access to the memory is not available (immediately)

3. Reset condition

- When access to the memory is become available (immediately)

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

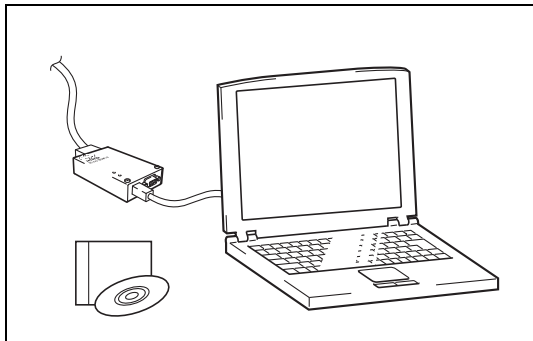
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P062F (TC41)

1	Reproduction check [HINO-DX]
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SHTS03ZZ0300299

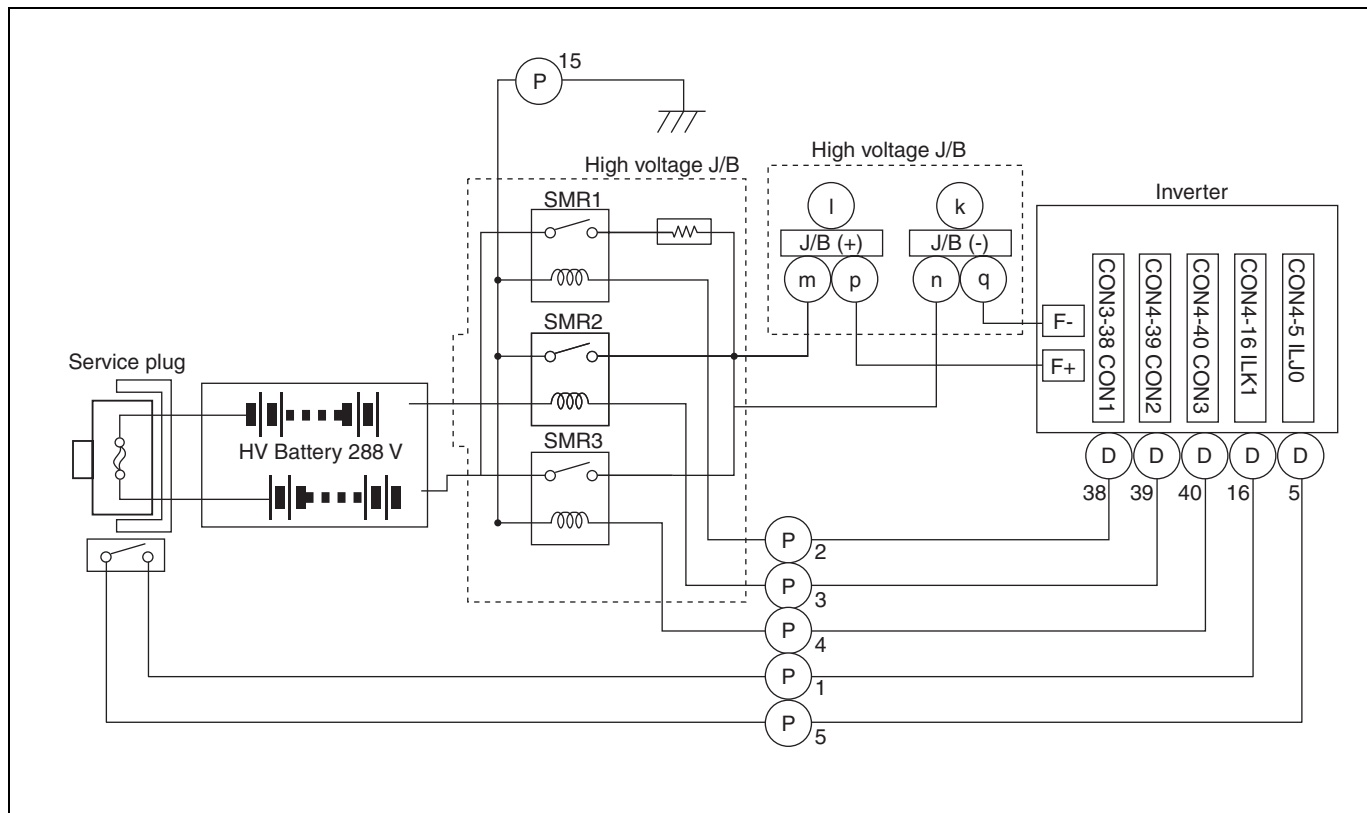
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P062F-41 is detected.

Is DTC P062F-41 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P062F (TC41)**

P062F (TC41)		Abnormality in inverter (abnormality in memory)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P062F-41 is detected.	DTC P062F-41 is detected: Go to YES. DTC P062F-41 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A0D (TC20)

EN01H03ZZZ030602004015

**DTC: P0A0D (TC20) Abnormality in ILK input
INFORMATION**

SHTS03ZZZ0300300

1. Technical description

- –

<Description of malfunction>

- Detected that the service plug is not inserted or unlocked.

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When the inverter is actuated, uninserted or unlocked service plug, or disconnection is detected continuously for 0.04 second.

3. Reset condition

- Presence of service plug signal is detected continuously for 0.08 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Disengagement of service plug
- Malfunction of service plug
- Malfunction of inverter

INSPECTION PROCEDURE: P0A0D (TC20)**1 Inspecting the service plug**

1. Check that the service plug is inserted and securely locked.

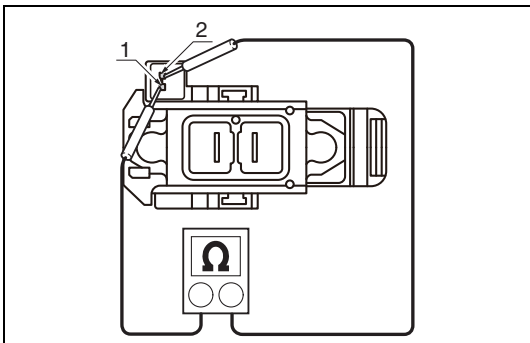
Is any defect found?

YES

Insert the service plug and lock it securely.

NO

Go to step 2.

2 Inspecting the continuity of service plug

SHTS03ZZZ0300301

1. Set the starter key to the "LOCK" position.
2. Remove the service plug.
3. Using the electrical tester, measure the resistance between the service plug connector terminals.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Service plug connector 1st terminal – 2nd terminal	1 Ω or less (With continuity)

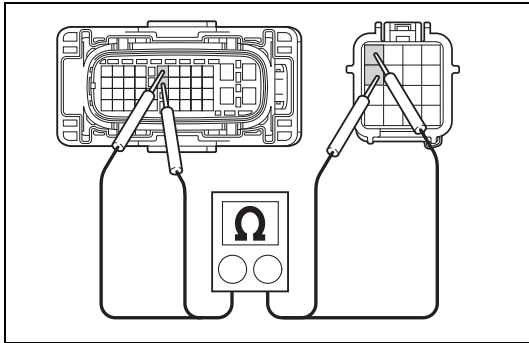
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the service plug.

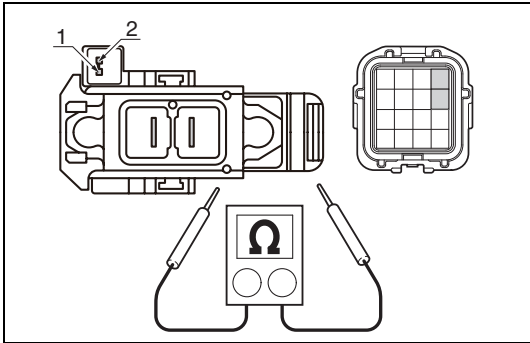
3**Inspecting the PCU wire harness (lower side) for continuity**

SHTS03ZZZ0300302

1. Disconnect the connectors of inverter and PCU harness (16P).
2. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector – PCU harness (16P) lower-side connector 5th terminal – 5th terminal 16th terminal – 1st terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the PCU wire harness (lower side).**

4 Inspecting the PCU wire harness (upper side) for continuity

SHTS03ZZZ0300303

1. Using the electrical tester, measure the resistance between the terminals of service plug connector and PCU harness (16P) upper-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Service plug connector – PCU harness (16P) connector 1st terminal – 1st terminal 2nd terminal – 5th terminal	1 Ω or less (With continuity)

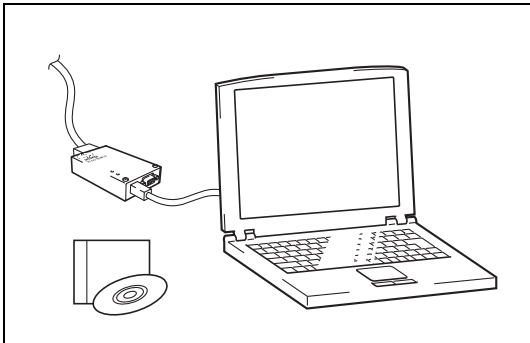
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the main wire harness in the HV battery.

5 Reproduction check [HINO-DX]

SHTS03ZZZ0300304

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history and set the starter key to the "LOCK" position.
5. Set the starter key to the "ON" position again.
6. In [Fault Information] on the diagnosis tool screen, check if P0A0D-20 is detected.

Is DTC P0A0D-20 detected?

YES

Replace the inverter.

NO

The inspection is completed.

CHECKLIST: P0A0D (TC20)

P0A0D (TC20)		Abnormality in ILK input		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the service plug	1. Check that the service plug is inserted and securely locked.	Defect is found: Go to YES. Defect is not found: Go to NO.		Insert the service plug and lock it securely.	Go to step 2.
2	Inspecting the continuity of service plug	1. Set the starter key to the "LOCK" position. 2. Remove the service plug. 3. Using the electrical tester, measure the resistance between the service plug connector terminals. <Measurement conditions> Starter key: LOCK <Tester connections> Service plug connector 1st terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the service plug.
3	Inspecting the PCU wire harness (lower side) for continuity	1. Disconnect the connectors of inverter and PCU harness (16P). 2. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector – PCU harness (16P) lower-side connector 5th terminal – 5th terminal 16th terminal – 1st terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the PCU wire harness (lower side).

P0A0D (TC20)		Abnormality in ILK input		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the PCU wire harness (upper side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of service plug connector and PCU harness (16P) upper-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Service plug connector – PCU harness (16P) connector 1st terminal – 1st terminal 2nd terminal – 5th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the main wire harness in the HV battery.
5	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history and set the starter key to the "LOCK" position. 5. Set the starter key to the "ON" position again. 6. In [Fault Information] on the diagnosis tool screen, check if P0A0D-20 is detected.	DTC P0A0D-20 is detected: Go to YES. DTC P0A0D-20 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A1B (TC16)

EN01H03ZZZ030602004016

DTC: P0A1B (TC16) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (abnormality in the main circuit element).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which abnormality signal from the drive circuit is ON is detected continuously for 0.08 second.

3. Reset condition

- The following condition continues for 0.16 second:
 - When the abnormality is not confirmed, the state in which abnormality signal from the drive circuit is ON is not detected.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

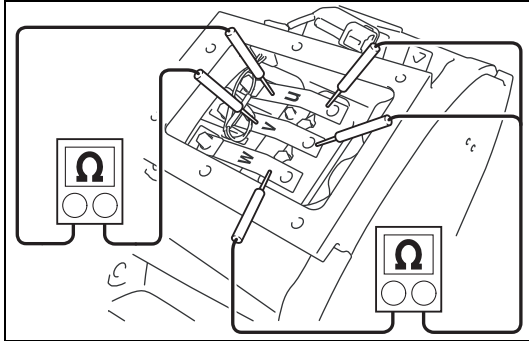
INSPECTION PROCEDURE: P0A1B (TC16)**1 Inspecting the three-phase cable 1**

1. Check the three-phase cable connector (inverter-side) for failing connection (looseness, wear, or melting damage).

Is any defect found?**YES****Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.****NO****Go to step 2.****2 Inspecting the three-phase cable 2**

1. Check the ring tongue terminals of three-phase cable (motor side) for failing connection (looseness, wear, or melting damage).

Is any defect found?**YES****Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.****NO****Go to step 3.**

3 Inspecting resistance between HV motor phases

1. Set the starter key to the "LOCK" position.
2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor.
3. Using the electrical tester, measure the resistance between the HV motor terminals.

HINT

If the motor temperature is too high, the resistance largely varies. Therefore, measure the resistance at least 8 hours after the vehicle has stopped.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK (8 hours after the vehicle has stopped)	HV motor U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal	38.2 – 40.5 M Ω (15 – 30 °C {59 – 86 °F})

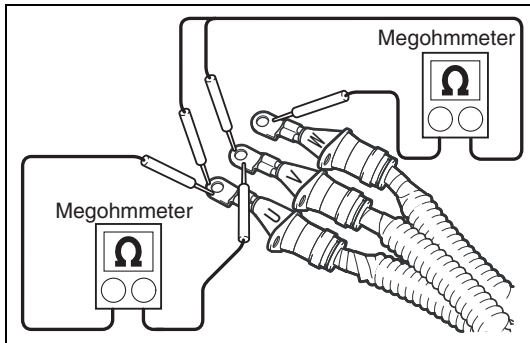
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the HV motor.

4 Inspecting the three-phase cable 3

SHTS03ZZZ0300306

1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter.
2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable.

**CAUTION****Terminals must be insulated to avoid contact.**

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 5.****NO****Replace the three-phase cable.****5 Inspecting the inverter radiator**

1. Remove the bottom cover of the PCU.
2. Check the inverter radiator, inverter cooling radiator fan, and the hose for water leakage or clogging.
3. Check that the coolant level is appropriate.

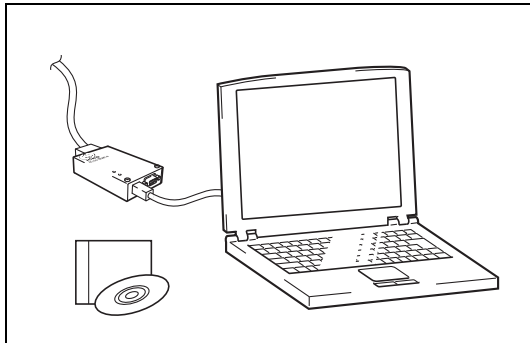
Is any defect found?**YES**

Repair or replace the defective part.
After repair or replacement, add coolant and go to step 6.

NO**Go to step 6.**

6 Inspecting the inverter cooling radiator fan and inverter cooling pump

1. Set the starter key to the "ON" position.
2. Check the operating sound of inverter cooling radiator fan and inverter cooling pump.

Can the operating sound be checked?**YES****Go to step 7.****NO****Replace the inverter cooling radiator fan or inverter cooling pump.
After replacement, go to step 7.****7 Reproduction check [HINO-DX]**

SHTS03ZZZ0300307

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A1B-16 is detected.

Is DTC P0A1B-16 detected?**YES****Replace the inverter.****NO****The inspection is completed.**

P0A1B (TC16)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the three-phase cable 1	1. Check the three-phase cable connector (inverter-side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 2.
2	Inspecting the three-phase cable 2	1. Check the ring tongue terminals of three-phase cable (motor side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 3.
3	Inspecting resistance between HV motor phases	1. Set the starter key to the "LOCK" position. 2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor. 3. Using the electrical tester, measure the resistance between the HV motor terminals. HINT If the motor temperature is too high, the resistance largely varies. Therefore, measure the resistance at least 8 hours after the vehicle has stopped. <Measurement conditions> Starter key: LOCK (8 hours after the vehicle has stopped) <Tester connections> HV motor U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal <Standard values> 38.2 – 40.5 MΩ (15 – 30 °C {59 – 86 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the HV motor.

P0A1B (TC16)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the three-phase cable 3	1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter. 2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable. ⚠ CAUTION Terminals must be insulated to avoid contact. <Measurement conditions> Starter key: LOCK <Tester connections> Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the three-phase cable.
5	Inspecting the inverter radiator	1. Remove the bottom cover of the PCU. 2. Check the inverter radiator, inverter cooling radiator fan, and the hose for water leakage or clogging. 3. Check that the coolant level is appropriate.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the defective part. After repair or replacement, add coolant and go to step 6.	Go to step 6.
6	Inspecting the inverter cooling radiator fan and inverter cooling pump	1. Set the starter key to the "ON" position. 2. Check the operating sound of inverter cooling radiator fan and inverter cooling pump.	Operating sound is checked: Go to YES. Operating sound is not checked: Go to NO.		Go to step 7.	Replace the inverter cooling radiator fan or inverter cooling pump. After replacement, go to step 7.
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A1B-16 is detected.	DTC P0A1B-16 is detected: Go to YES. DTC P0A1B-16 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A1B (TC92)

DTC: P0A1B (TC92) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (control CAN register stuck (CAN2)).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Within 0.3 second after the embedded IC is activated.

(2) Judgement criteria

- When the ID register or message register has failed to be read or written normally during initialization (immediately)

3. Reset condition

- When the ID register or message register is read or written normally during initialization after ECU activation (immediately)

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

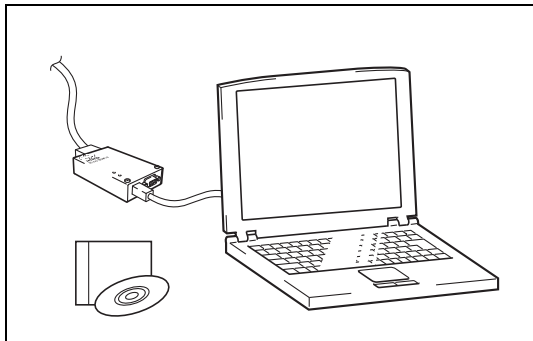
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TC92)

1	Reproduction check [HINO-DX]
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1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-92 is detected.

Is DTC P0A1B-92 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TC92)**

P0A1B (TC92)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-92 is detected.	DTC P0A1B-92 is detected: Go to YES. DTC P0A1B-92 is not detected: Go to NO.		Replace the inverter.	The inspec- tion is com- pleted. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TC97)

DTC: P0A1B (TC97) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (ALU abnormality, control microprocessor).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- ALU calculation result ≠ Correct value [(CE) hex] is detected 5 times successively (immediately)

3. Reset condition

- ALU calculation result = Correct value [(CE) hex] is detected 100 times successively (immediately).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

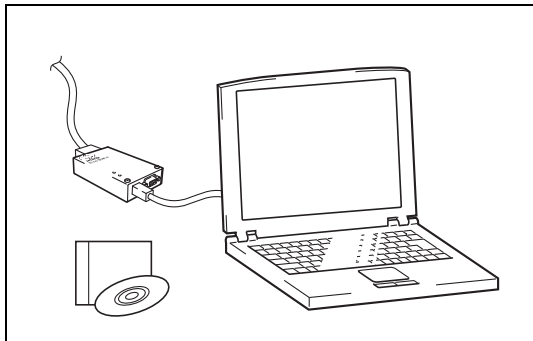
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TC97)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300309

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-97 is detected.

Is DTC P0A1B-97 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TC97)**

P0A1B (TC97)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-97 is detected.	DTC P0A1B-97 is detected: Go to YES. DTC P0A1B-97 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TC3F)

DTC: P0A1B (TC3F) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (DIAG CAN register stuck (CAN1)).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Within 0.3 second after the embedded IC is activated.

(2) Judgement criteria

- When the ID register or message register has failed to be read or written normally during initialization (immediately)

3. Reset condition

- When the ID register or message register is read or written normally during initialization after ECU activation (immediately)

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

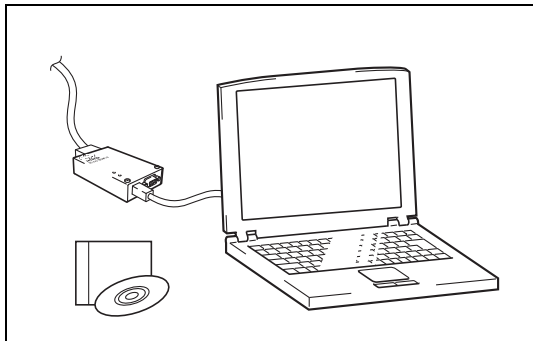
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TC3F)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300310

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-3F is detected.

Is DTC P0A1B-3 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TC3F)**

P0A1B (TC3F)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-3F is detected.	DTC P0A1B-3 is detected: Go to YES. DTC P0A1B-3 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA1)

DTC: P0A1B (TCA1) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (abnormality in microprocessor power supply voltage).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.04 second:
 - Microprocessor power supply voltage is less than 4.04 V.
 - Microprocessor power supply voltage is more than 5.95 V.

3. Reset condition

- The state in which microprocessor power supply voltage is 4.04 V or more and 5.95 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

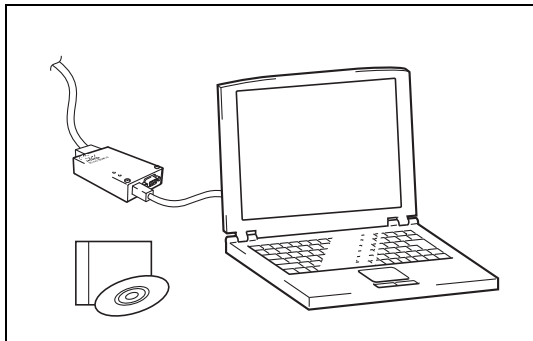
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA1)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300311

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A1 is detected.

Is DTC P0A1B-A1 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA1)**

P0A1B (TCA1)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A1 is detected.	DTC P0A1B-A1 is detected: Go to YES. DTC P0A1B-A1 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA2)

EN01H03ZZZ030602004021

DTC: P0A1B (TCA2) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (resolver REF signal oscillation stop abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which falling edge of REF oscillation pulse is not detected is detected continuously for 0.096 second.

3. Reset condition

- The state in which falling edge of REF oscillation pulse is present is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

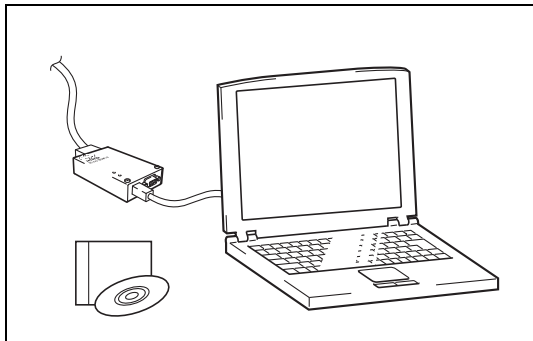
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA2)

1	Reproduction check [HINO-DX]
----------	-------------------------------------



SHTS03ZZZ0300312

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A2 is detected.

Is DTC P0A1B-A2 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA2)**

P0A1B (TCA2)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A2 is detected.	DTC P0A1B-A2 is detected: Go to YES. DTC P0A1B-A2 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA3)

DTC: P0A1B (TCA3) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (resolver REF signal cycle abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.096 second:
 - REF signal frequency is less than 8.7 kHz.
 - REF signal frequency is more than 11.1 kHz.

3. Reset condition

- The state in which REF signal frequency is 8.7 kHz or more and 11.1 kHz or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

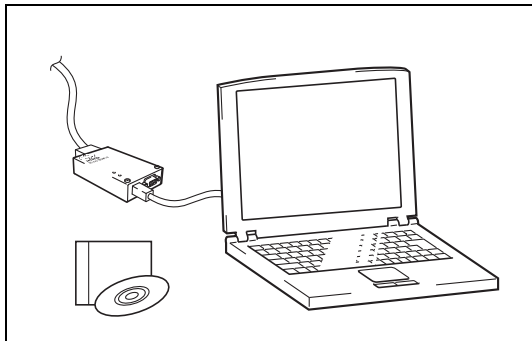
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA3)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300313

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A3 is detected.

Is DTC P0A1B-A3 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA3)**

P0A1B (TCA3)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A3 is detected.	DTC P0A1B-A3 is detected: Go to YES. DTC P0A1B-A3 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA4)

DTC: P0A1B (TCA4) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (R/D converter resolver angle abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- Immediately when one of the following conditions is met:
 - Continuous abnormality confirmation flag = ON
 - Building-up abnormality confirmation flag = ON

3. Reset condition

- Immediately when the following conditions are met:
 - Continuous normal confirmation flag = ON
 - Building-up normal confirmation flag = ON

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

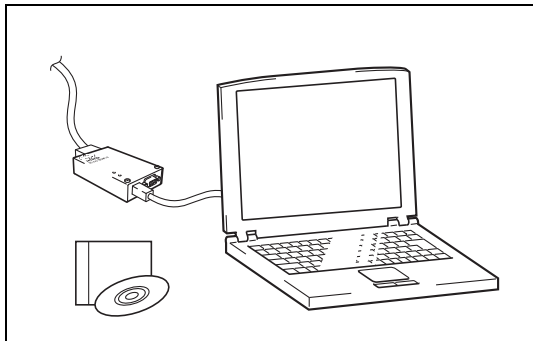
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA4)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300314

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A4 is detected.

Is DTC P0A1B-A4 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA4)**

P0A1B (TCA4)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A4 is detected.	DTC P0A1B-A4 is detected: Go to YES. DTC P0A1B-A4 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA5)

DTC: P0A1B (TCA5) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (R/D converter NM stop abnormality, angle abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- The number of motor revolutions is 100 r/min or more.

(2) Judgement criteria

- The state in which no NM signal is present is detected continuously for 4 seconds within 0.2 second of the abnormality timer counter (0.008 second of monitoring).

3. Reset condition

- If the following condition continues for 4 seconds:
 - The NM signal is detected within 0.2 second of the abnormality timer counter (0.008 second of monitoring).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

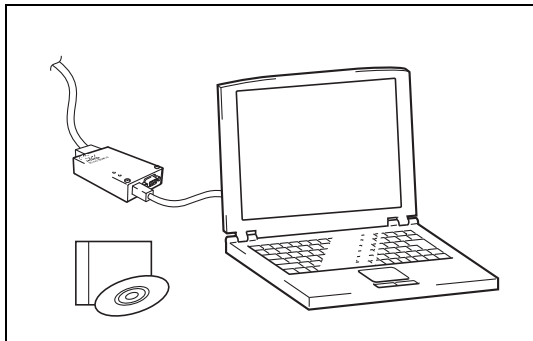
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA5)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300315

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A5 is detected.

Is DTC P0A1B-A5 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA5)**

P0A1B (TCA5)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A5 is detected.	DTC P0A1B-A5 is detected: Go to YES. DTC P0A1B-A5 is not detected: Go to NO.		Replace the inverter.	The inspec- tion is com- pleted. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA6)

DTC: P0A1B (TCA6) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (R/D converter serial communication timeout abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- Communication completion wait timeout (100 μ sec) is detected continuously for 0.056 second.

3. Reset condition

- No communication completion wait timeout (100 μ sec) is detected continuously for 0.104 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

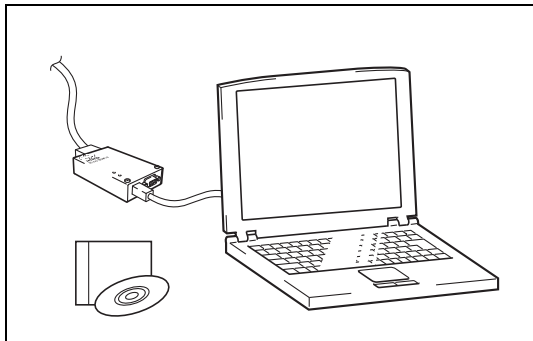
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA6)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300316

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A6 is detected.

Is DTC P0A1B-A6 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA6)**

P0A1B (TCA6)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A6 is detected.	DTC P0A1B-A6 is detected: Go to YES. DTC P0A1B-A6 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA7)

DTC: P0A1B (TCA7) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (R/D converter serial communication deviation abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- The number of motor revolution is 120 r/min or less.

(2) Judgement criteria

- The state in which (Encoder pulse counter – Resolver angle of received data) is larger than 6° is detected continuously for 0.056 second.

3. Reset condition

- A state in which (Encoder pulse counter – Resolver angle of received data) is 6° or less is detected continuously for 0.104 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

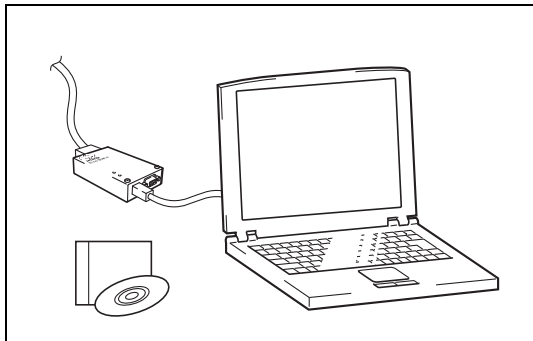
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA7)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300317

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A7 is detected.

Is DTC P0A1B-A7 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA7)**

P0A1B (TCA7)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A7 is detected.	DTC P0A1B-A7 is detected: Go to YES. DTC P0A1B-A7 is not detected: Go to NO.		Replace the inverter.	The inspec- tion is com- pleted. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA8)

DTC: P0A1B (TCA8) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (VIN V signal Low abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which inverter DC voltage is less than 11.25 V is detected continuously for 0.1 second.

3. Reset condition

- The state in which input voltage is 11.25 V or more and 450 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

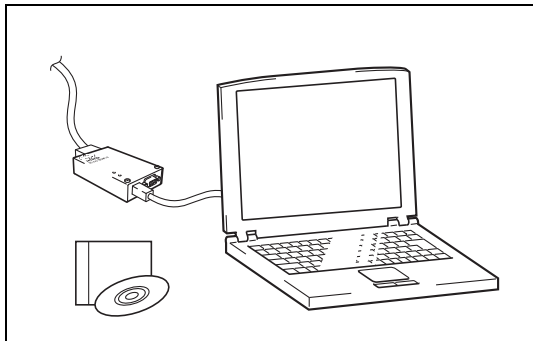
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA8)

1	Reproduction check [HINO-DX]
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SHTS03ZZZ0300318

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A8 is detected.

Is DTC P0A1B-A8 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA8)**

P0A1B (TCA8)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A8 is detected.	DTC P0A1B-A8 is detected: Go to YES. DTC P0A1B-A8 is not detected: Go to NO.		Replace the inverter.	The inspec- tion is com- pleted. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCA9)

DTC: P0A1B (TCA9) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (VIN V signal High abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the over voltage signal from the drive circuit is turned ON, 0.05 second or more has passed.

(2) Judgement criteria

- The state in which inverter DC voltage is more than 450 V is detected continuously for 0.1 second.

3. Reset condition

- The state in which input voltage is 11.25 V or more and 450 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

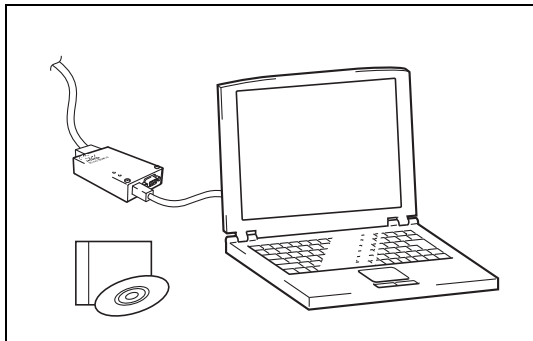
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCA9)

1	Reproduction check [HINO-DX]
----------	-------------------------------------



SHTS03ZZZ0300319

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A9 is detected.

Is DTC P0A1B-A95 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCA9)**

P0A1B (TCA9)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO- DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-A9 is detected.	DTC P0A1B-A95 is detected: Go to YES. DTC P0A1B-A95 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCAA)

DTC: P0A1B (TCAA) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (short circuit abnormality in the main circuit element).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- Immediately when one of the following conditions is met:
 - Inverter short-circuit (without phase judgment) is confirmed.
 - Inverter short-circuit (with phase judgment) is confirmed.

3. Reset condition

- Immediately when the following conditions are met:
 - When the abnormality is not confirmed, inverter short-circuit (without phase judgment) is not confirmed.
 - When the abnormality is not confirmed, inverter short-circuit (with phase judgment) is not confirmed.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCAA)

1	Inspecting the three-phase cable 1
----------	---

1. Check the ring tongue terminals of three-phase cable (motor side) for failing connection (looseness, wear, or melting damage).

Is any defect found?

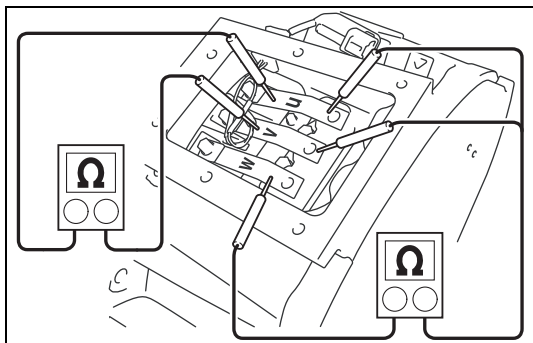
YES

**Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.**

NO

Go to step 2.

2 Inspecting resistance between the HV motor phases



SHTS03ZZZ0300320

1. Set the starter key to the "LOCK" position.
2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor.
3. Using the megohm tester (500 V range), measure the insulation resistance between the HV motor terminals and the housing. (For the measurement procedure, see "HV motor insulation resistance measurement procedure.")
4. Using the electrical tester, measure the resistance between the HV motor terminals.

HINT

If the motor temperature is too high, the resistance largely varies. Therefore, measure the resistance at least 8 hours after the vehicle has stopped.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK (8 hours after the vehicle has stopped)	Insulation resistance U-phase terminal – Housing V-phase terminal – Housing W-phase terminal – Housing	Insulation resistance: See "HV motor insulation resistance measurement procedure."
	Interphase resistance U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal	Interphase resistance: 38.2 – 40.5 MΩ (30 – 15 °C {86 – 59 °F})

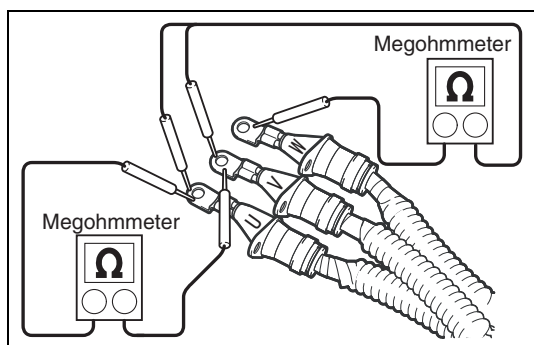
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the HV motor.
After replacement, go to step 2.

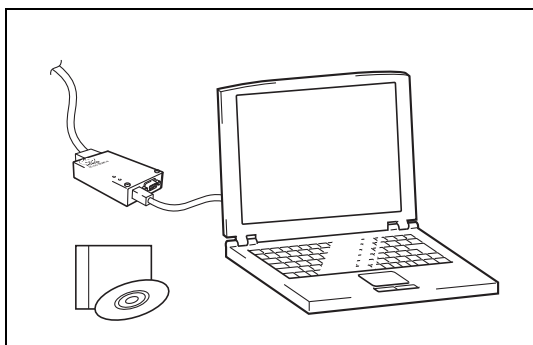
3 Inspecting the three-phase cable 2

SHTS03ZZZ0300321

1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter.
2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable.

⚠ CAUTION**Terminals must be insulated to avoid contact.**

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the three-phase cable.****4 Reproduction check [HINO-DX]**

SHTS03ZZZ0300322

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A1B-AA is detected.

Is DTC P0A1B-AA detected?**YES****Replace the inverter.****NO****The inspection is completed.**

CHECKLIST: P0A1B (TCAA)

P0A1B (TCAA)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the three-phase cable 1	1. Check the ring tongue terminals of three-phase cable (motor side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 2.

P0A1B (TCAA)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
2	Inspecting resistance between the HV motor phases	1. Set the starter key to the "LOCK" position. 2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor. 3. Using the megohm tester (500 V range), measure the insulation resistance between the HV motor terminals and the housing. (For the measurement procedure, see "HV motor insulation resistance measurement procedure.") 4. Using the electrical tester, measure the resistance between the HV motor terminals. HINT If the motor temperature is too high, the resistance largely varies. Therefore, measure the resistance at least 8 hours after the vehicle has stopped. <Measurement conditions> Starter key: LOCK (8 hours after the vehicle has stopped) <Tester connections> Insulation resistance U-phase terminal – Housing V-phase terminal – Housing W-phase terminal – Housing Interphase resistance U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal <Standard values> Insulation resistance: See "HV motor insulation resistance measurement procedure." Interphase resistance: 38.2 – 40.5 MΩ (30 – 15 °C {86 – 59 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the HV motor. After replacement, go to step 2.

P0A1B (TCAA)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the three-phase cable 2	1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter. 2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable. <Measurement conditions> Starter key: LOCK <Tester connections> Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the three-phase cable.
4	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A1B-AA is detected.	DTC P0A1B-AA is detected: Go to YES. DTC P0A1B-AA is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A1B (TCBB)

EN01H03ZZZ030602004030

DTC: P0A1B (TCBB) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (resolver excitation power supply voltage abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.06 second:
 - Resolver excitation power supply voltage is less than 21.0 V.
 - Resolver excitation power supply voltage is more than 30.5 V.

3. Reset condition

- The state in which resolver excitation power supply voltage is 21.0 V or more and 30.5 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

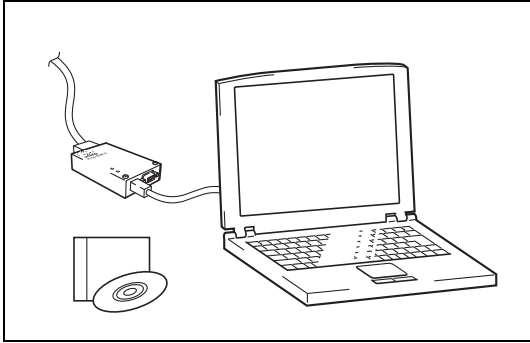
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCBB)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300323

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BB is detected.

Is DTC P0A1B-BB detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0A1B (TCBB)

P0A1B (TCBB)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BB is detected.	DTC P0A1B-BB is detected: Go to YES. DTC P0A1B-BB is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCBC)

EN01H03ZZZ030602004031

DTC: P0A1B (TCBC) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (current sensor power supply (P side) voltage abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.06 second:
 - Current sensor power supply (P side) voltage is less than 12.2 V.
 - Current sensor power supply (P side) voltage is more than 17.7 V.

3. Reset condition

- The state in which current sensor power supply (P side) voltage is 12.2 V or more and 17.7 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

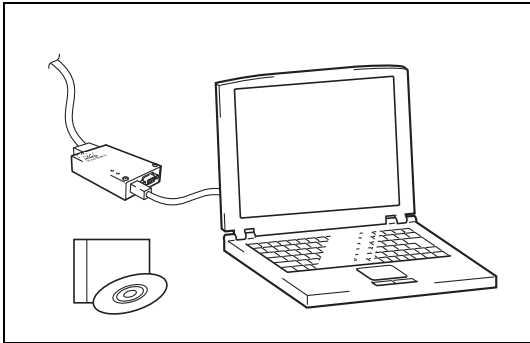
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCBC)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300324

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BC is detected.

Is DTC P0A1B-BC detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCBC)**

P0A1B (TCBC)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BC is detected.	DTC P0A1B-BC is detected: Go to YES. DTC P0A1B-BC is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCBD)

EN01H03ZZZ030602004032

DTC: P0A1B (TCBD) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (internal standard power supply voltage abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.06 second:
 - Internal standard power supply voltage is less than 2.0 V.
 - Internal standard power supply voltage is more than 3.0 V.

3. Reset condition

- The state in which internal standard power supply voltage is 2.0 V or more and 3.0 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

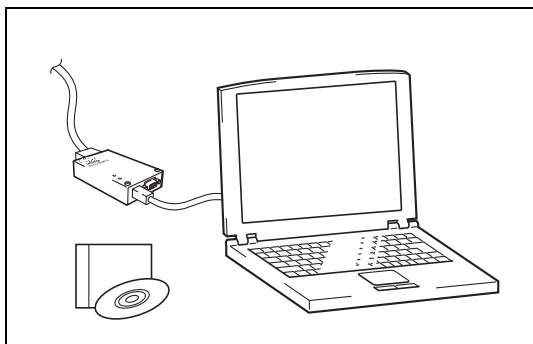
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCBD)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300325

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BD is detected.

Is DTC P0A1B-BD detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0A1B (TCBD)

P0A1B (TCBD)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BD is detected.	DTC P0A1B-BD is detected: Go to YES. DTC P0A1B-BD is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCBE)

EN01H03ZZZ030602004033

DTC: P0A1B (TCBE) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (current sensor power supply (N side) voltage abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.06 second:
 - Current sensor power supply (N side) voltage is less than -7.2 V.
 - Current sensor power supply (N side) voltage is more than -2.82 V.

3. Reset condition

- The state in which current sensor power supply (N side) voltage is -7.2 V or more and -2.82 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

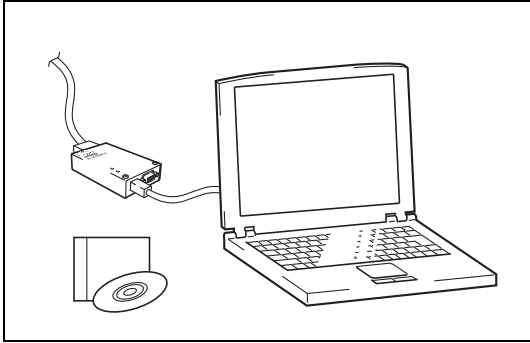
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCBE)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300326

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BE is detected.

Is DTC P0A1B-BE detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCBE)**

P0A1B (TCBE)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BE is detected.	DTC P0A1B-BE is detected: Go to YES. DTC P0A1B-BE is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCBF)

EN01H03ZZZ030602004034

DTC: P0A1B (TCBF) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (photo coupler power supply abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.06 second:
 - Photo coupler power supply voltage is less than 4.04 V.
 - Photo coupler power supply voltage is more than 5.95 V.

3. Reset condition

- The state in which photo coupler power supply voltage is 4.04 V or more and 5.95 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

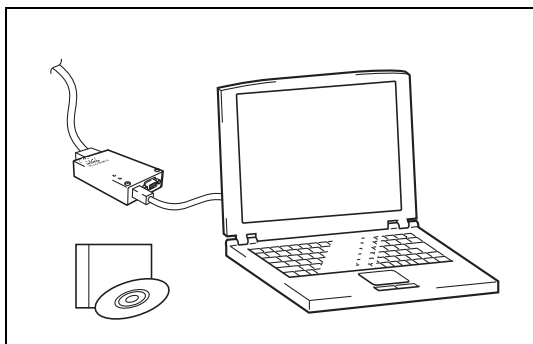
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCBF)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300327

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BF is detected.

Is DTC P0A1B-BF detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0A1B (TCBF)

P0A1B (TCBF)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-BF is detected.	DTC P0A1B-BF is detected: Go to YES. DTC P0A1B-BF is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCD3)

EN01H03ZZZ030602004035

DTC: P0A1B (TCD3) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (ALU abnormality, diagnosis microprocessor).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since reset is directed to the diagnosis microprocessor, 0.1 second has passed.

(2) Judgement criteria

- After ALU calculation result $\neq$ Correct value [(CE) hex] is met 5 times successively, perform reset once and then re-detection (immediately).

3. Reset condition

- ALU calculation result = Correct value [(CE) hex] is detected 100 times successively (immediately).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

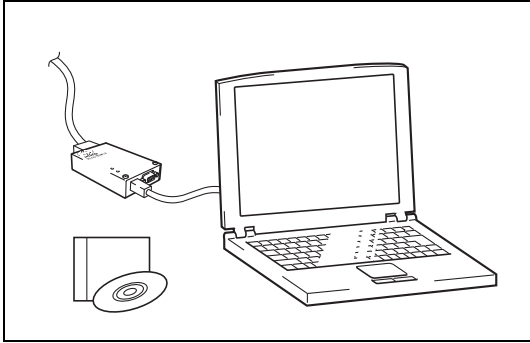
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCD3)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300328

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-D3 is detected.

Is DTC P0A1B-D3 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)****CHECKLIST: P0A1B (TCD3)**

P0A1B (TCD3)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-D3 is detected.	DTC P0A1B-D3 is detected: Go to YES. DTC P0A1B-D3 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCD4)

EN01H03ZZZ030602004036

DTC: P0A1B (TCD4) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (communication abnormality between CPUs, control microprocessor).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.06 second:
 - A receive error has occurred (communication is not working properly).
 - A sum error has occurred (received data are not valid).

3. Reset condition

- The following condition continues for 0.2 second:
 - No receive error has occurred (communication is working properly).
 - No sum error has occurred (received data are valid).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

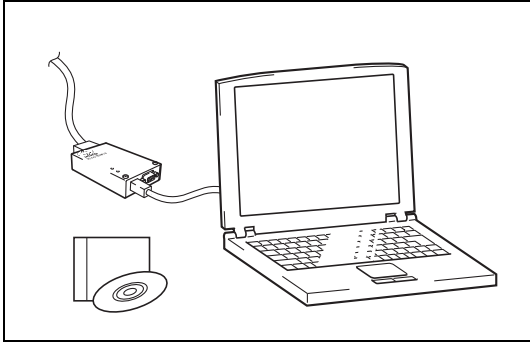
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCD4)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300329

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-D4 is detected.

Is DTC P0A1B-D4 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0A1B (TCD4)

P0A1B (TCD4)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-D4 is detected.	DTC P0A1B-D4 is detected: Go to YES. DTC P0A1B-D4 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1B (TCD5)

EN01H03ZZZ030602004037

DTC: P0A1B (TCD5) Abnormality in inverter (ECU system) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (communication abnormality between CPUs, diagnosis microprocessor).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When one of the following conditions continues for 0.6 second:
 - A receive error has occurred (communication is not working properly).
 - A sum error has occurred (received data are not valid).
 - There is no request for communication interrupt.

3. Reset condition

- The following conditions continue for 0.2 second:
 - No receive error has occurred (communication is working properly).
 - No sum error has occurred (received data are valid).

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.
- Once stopped, the vehicle may become unable to drive.

6. Pre-inspection work

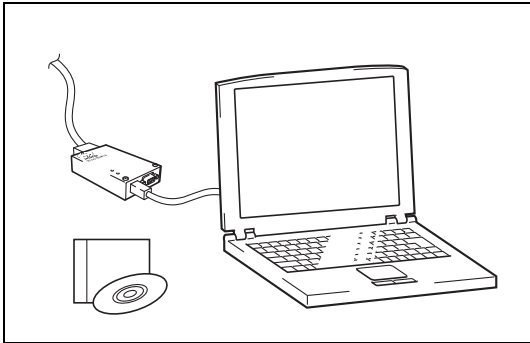
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A1B (TCD5)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300330

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-D5 is detected.

Is DTC P0A1B-D5 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function
due to external noise)

CHECKLIST: P0A1B (TCD5)

P0A1B (TCD5)		Abnormality in inverter (ECU system)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A1B-D5 is detected.	DTC P0A1B-D5 is detected: Go to YES. DTC P0A1B-D5 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A1D (TC21)

EN01H03ZZZ030602004038

DTC: P0A1D (TC21) HV ECU abnormality INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the HV ECU (abnormality in the HV ECU operation state).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- When HV ECU CAN communication is normal, and there are no changes in 0.008-second cycle inversion signals (sync task signals) from the HV ECU 40 times successively (immediately)

3. Reset condition

- When 0.008-second cycle inversion signals from the HV ECU are normal 80 times successively (immediately)

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

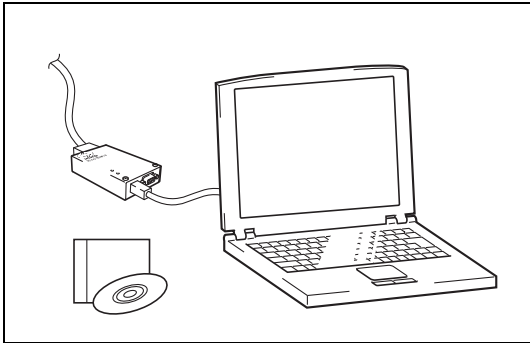
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

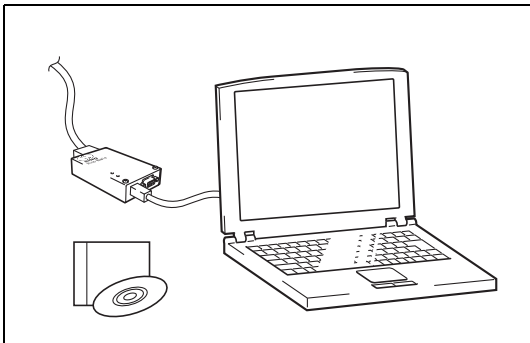
8. Estimated failure factors

- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A1D (TC21)**1 Reading the DTC (other system) [HINO-DX]**

SHTS03ZZZ0300331

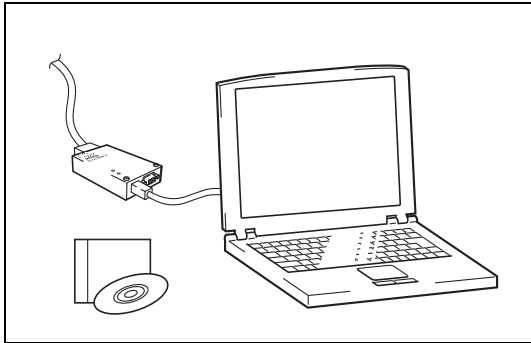
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] of other system, check if any DTC related to the CAN communication system is detected.

Is any DTC related to the CAN communication system detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Reading the DTC (HV system) [HINO-DX]**

SHTS03ZZZ0300332

1. Check that reading of DTC is available and that no DTC is detected in [Fault Information] on the diagnosis tool screen.

Is any DTC other than P0A1D-21 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3**Reproduction check [HINO-DX]**

SHTS03ZZZ0300333

1. Clear the malfunction history.
2. Set the starter key to the "LOCK" position and wait for 1 minute.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if P0A1D-21 is detected.

Is DTC P0A1D-21 detected?**YES****Replace the HV ECU.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

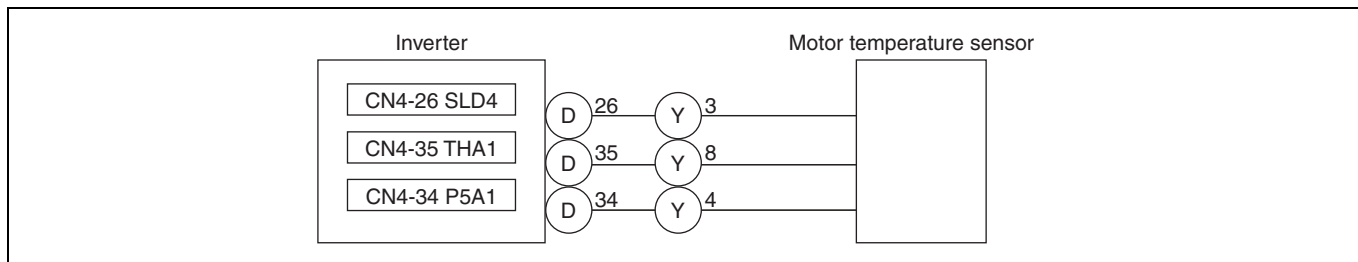
CHECKLIST: P0A1D (TC21)

P0A1D (TC21)		HV ECU abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC (other system) [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] of other system, check if any DTC related to the CAN communication system is detected.	DTC related to the CAN communication system is detected: Go to YES. DTC related to the CAN communication system is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Reading the DTC (HV system) [HINO-DX]	1. Check that reading of DTC is available and that no DTC is detected in [Fault Information] on the diagnosis tool screen.	DTC other than P0A1D-21 is detected: Go to YES. DTC other than P0A1D-21 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Set the starter key to the "LOCK" position and wait for 1 minute. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if P0A1D-21 is detected.	DTC P0A1D-21 is detected: Go to YES. DTC P0A1D-21 is not detected: Go to NO.		Replace the HV ECU.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A2B (TCE9)

EN01H03ZZZ030602004039

DTC: P0A2B (TCE9) Abnormality in characteristics of motor temperature sensor INFORMATION



SHTS03ZZZ0300334

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the characteristics (Low abnormality) of the motor temperature detecting sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the engine speed reaches 600 r/min or more, 180 seconds or more have passed.
- The engine intake air temperature is -10 °C {14 °F} or more.
- No abnormality is detected in the engine intake air temperature sensor.
- A state in which the square sum of motor current for 120 seconds is 400,000 [A²·s] is detected twice.

(2) Judgement criteria

- The motor coil temperature deviation (Max - Min) of 2.0 °C {35.6 °F} or less is met twice in 480 seconds.

3. Reset condition

- The motor coil temperature deviation (Max - Min) of more than 2.0 °C {35.6 °F} is met twice in 480 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

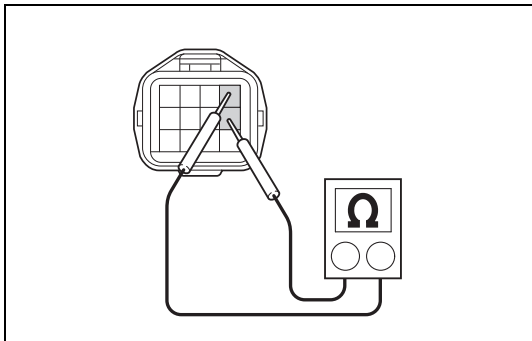
7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A2B (TCE9)

1 Inspecting the vehicle wire harness

SHTS03ZZZ0300335

1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature)
2. Disconnect the PCU harness (12P) connector.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
• Starter key: LOCK • Motor temperature: equivalent to the ambient temperature	PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal	16.18 – 184.1 kΩ (0 – 50 °C {32-122 °F})

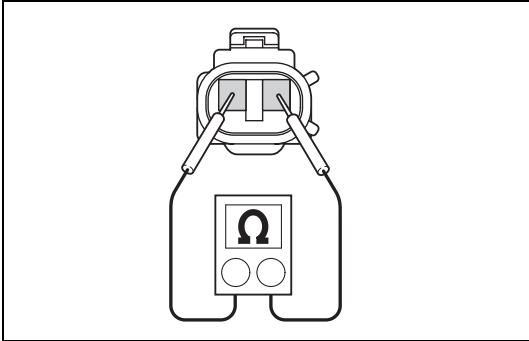
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Go to step 2.

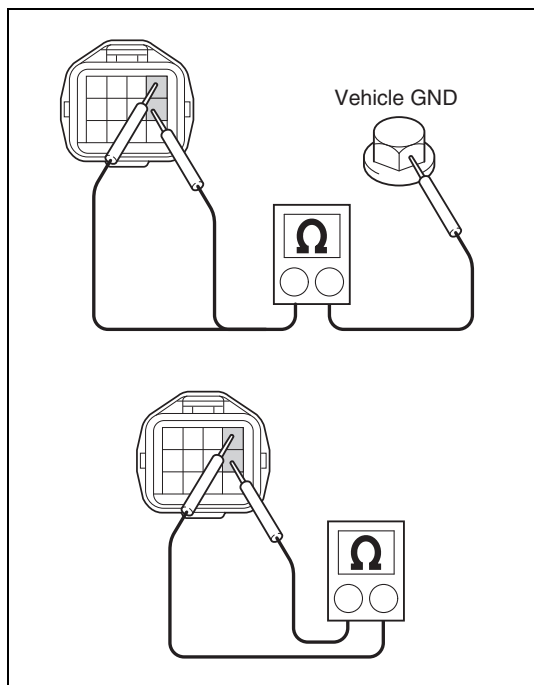
2 Inspecting the motor temperature sensor

SHTS03ZZZ0300336

1. Disconnect the connector of motor temperature sensor.
2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal	16.18 – 184.1 kΩ (0 – 50 °C {32-122 °F})

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the HV motor.**

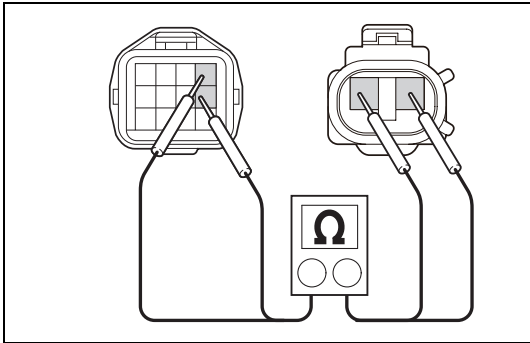
3 Inspecting the vehicle wire harness for short circuit

SHTS03ZZZ0300337

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 kΩ or more (No continuity)

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the vehicle wire harness.**

4 Inspecting the vehicle wire harness for continuity

SHTS03ZZZ0300338

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector – motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

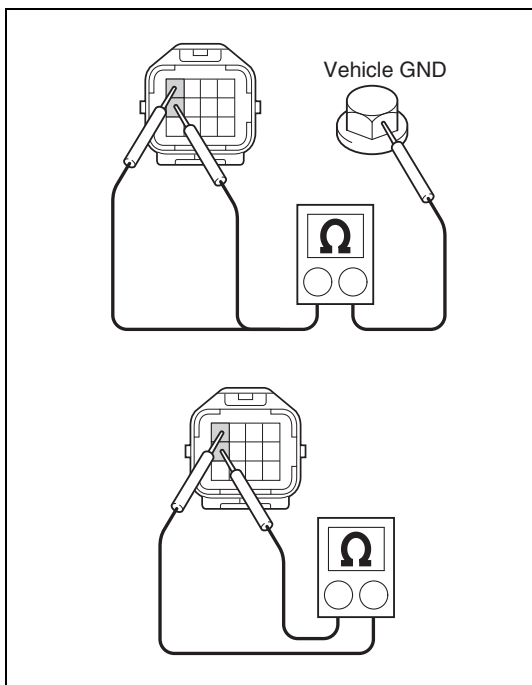
Go to step 5.

NO

Replace the vehicle wire harness.

5

Inspecting the PCU wire harness (lower side) for short circuit



SHTS03ZZZ0300339

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 k Ω or more (No continuity)

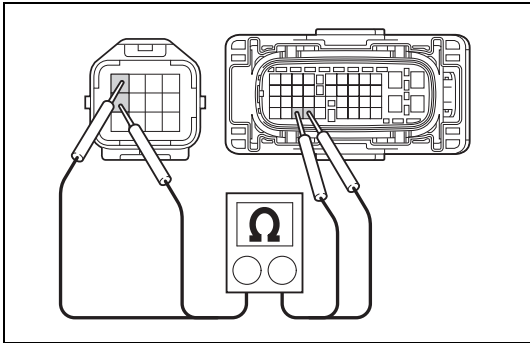
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the PCU wire harness (lower side) for continuity

SHTS03ZZZ0300340

- Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector – inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal	1 Ω or less (With continuity)

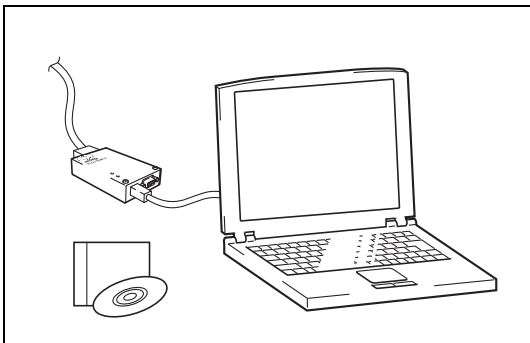
Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Replace the PCU wire harness (lower side).

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300341

- Connect all the connectors that have been disconnected to restore the system.
- Connect the diagnosis tool (HINO-DX) to the vehicle.
- Set the starter key to the "ON" position.
- Clear the malfunction history.
- Perform a test run. (accelerate and decelerate running for approximately 1 hour).
- In [Fault Information] on the diagnosis tool screen, check if P0A2B-E9 is detected.

Is DTC P0A2B-E9 detected?

YES

Replace the inverter.

NO

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0A2B (TCE9)

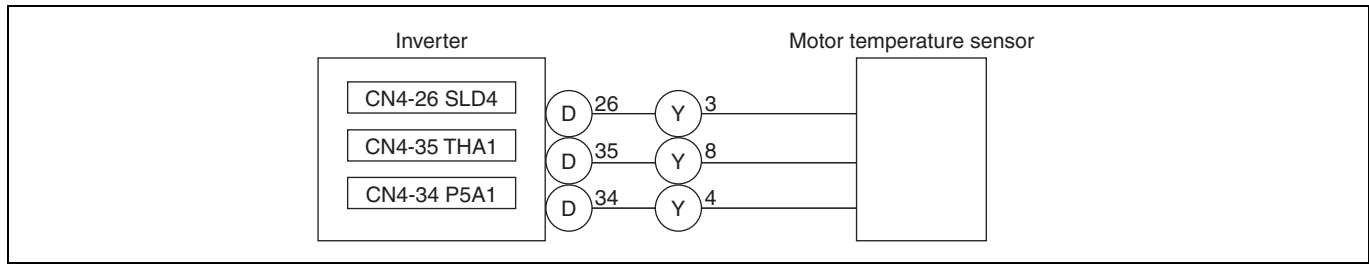
P0A2B (TCE9)		Abnormality in characteristics of motor temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the vehicle wire harness	1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature) 2. Disconnect the PCU harness (12P) connector. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> • Starter key: LOCK • Motor temperature: Equivalent to the ambient temperature <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32-122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Go to step 2.
2	Inspecting the motor temperature sensor	1. Disconnect the connector of motor temperature sensor. 2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the HV motor.

P0A2B (TCE9)		Abnormality in characteristics of motor temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the vehicle wire harness for short circuit	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the vehicle wire harness.
4	Inspecting the vehicle wire harness for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector – Motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the vehicle wire harness.

P0A2B (TCE9)		Abnormality in characteristics of motor temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 k Ω or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector – inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A2B-ED is detected.	DTC P0A2B-E9 is detected: Go to YES. DTC P0A2B-E9 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A2B (TCED)

EN01H03ZZZ030602004040

DTC: P0A2B (TCED) Abnormality in characteristics of motor temperature sensor
INFORMATION

SHTS03ZZZ0300342

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the characteristics of motor temperature detecting sensor (High abnormality).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the engine speed reaches 600 r/min or more, 180 seconds or more have passed.
- The engine intake air temperature is -10 °C {14 °F} or more.
- No abnormality is detected in the engine intake air temperature sensor.
- The state in which the square sum of motor current for 120 seconds is 50,000 [A²·s] is detected twice.

(2) Judgement criteria

- The motor coil temperature deviation (Max - Min) of 16.0 °C {60.8 °F} or more is met twice when 480 seconds have passed.

3. Reset condition

- The motor coil temperature deviation (Max - Min) of less than 16.0 °C {60.8 °F} is met twice when 480 seconds have passed.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

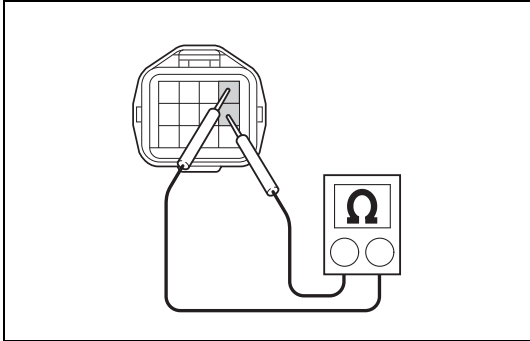
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A2B (TCED)**1 Inspecting the vehicle wire harness**

SHTS03ZZZ0300343

1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature)
2. Disconnect the PCU harness (12P) connector.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
• Starter key: LOCK • Motor temperature: equivalent to the ambient temperature	PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal	16.18 – 184.1 kΩ (0 – 50 °C {32 – 122 °F})

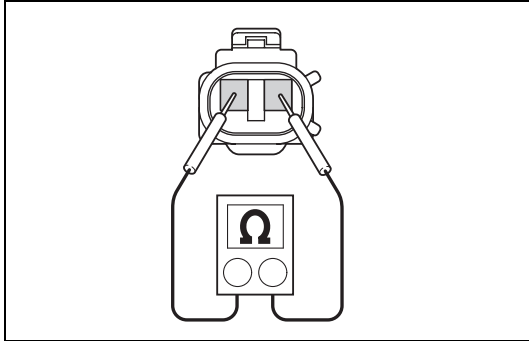
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Go to step 2.

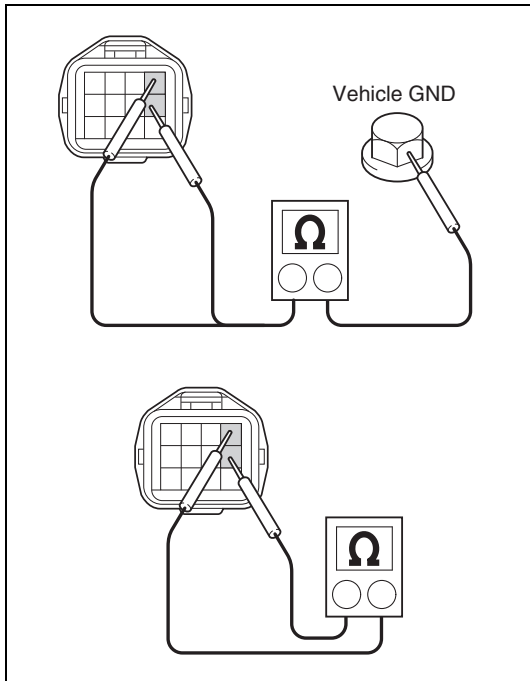
2**Inspecting the motor temperature sensor**

SHTS03ZZZ0300344

1. Disconnect the connector of motor temperature sensor.
2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal	16.18 – 184.1 kΩ (0 – 50 °C {32 – 122 °F})

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the HV motor.**

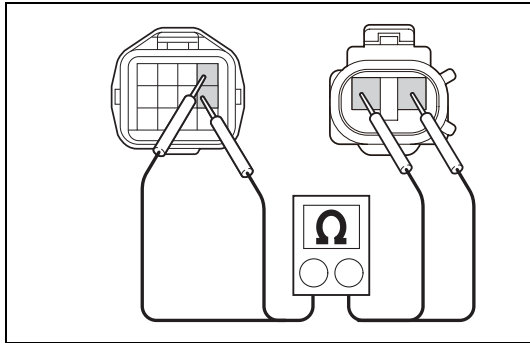
3 Inspecting the vehicle wire harness for short circuit

SHTS03ZZZ0300345

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 kΩ or more (No continuity)

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the vehicle wire harness.**

4 Inspecting the vehicle wire harness for continuity

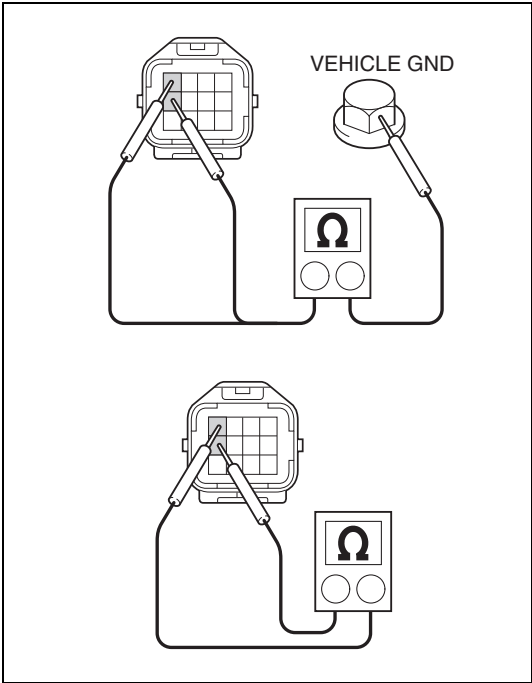
SHTS03ZZZ0300346

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector – motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 5.****NO****Replace the vehicle wire harness.**

5 Inspecting the PCU wire harness (lower side) for short circuit



SHTS03ZZZ0300347

- 1. Disconnect the inverter connector.
- 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.
- 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 kΩ or more (No continuity)

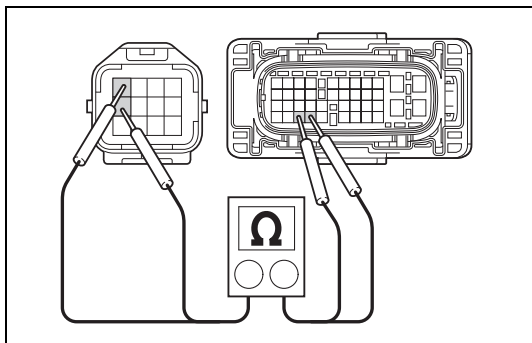
Is the measured value within the range of standard value?

YES

NO

Go to step 6.

Replace the PCU wire harness (lower side).

6 Inspecting the PCU wire harness (lower side) for continuity

SHTS03ZZZ0300348

- Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector – inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal	1 Ω or less (With continuity)

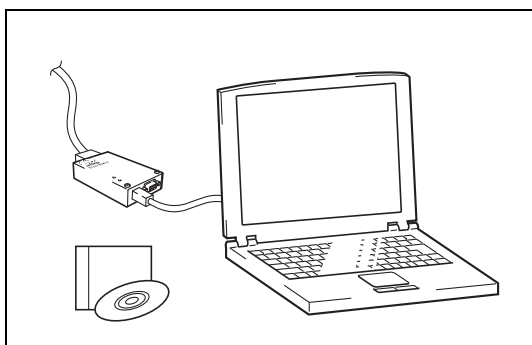
Is the measured value within the range of standard value?

YES

NO

Go to step 7.

Replace the PCU wire harness (lower side).

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300349

- Connect all the connectors that have been disconnected to restore the system.
- Connect the diagnosis tool (HINO-DX) to the vehicle.
- Set the starter key to the "ON" position.
- Clear the malfunction history.
- Perform a test run. (accelerate and decelerate running for approximately 1 hour).
- In [Fault Information] on the diagnosis tool screen, check if P0A2B-ED is detected.

Is DTC P0A2B-ED detected?

YES

NO

Replace the inverter.

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0A2B (TCED)

P0A2B (TCED)		Abnormality in characteristics of motor temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the vehicle wire harness	1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature) 2. Disconnect the PCU harness (12P) connector. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> • Starter key: LOCK • Motor temperature: Equivalent to the ambient temperature <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Go to step 2.
2	Inspecting the motor temperature sensor	1. Disconnect the connector of motor temperature sensor. 2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the HV motor.

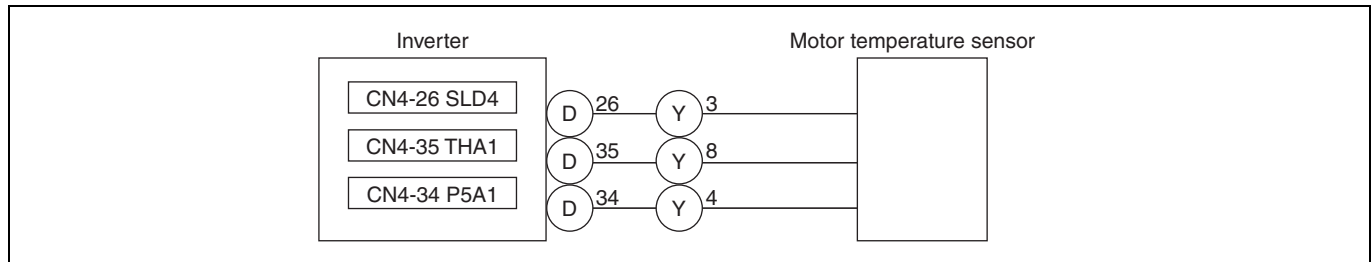
P0A2B (TCED)		Abnormality in characteristics of motor temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the vehicle wire harness for short circuit	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the vehicle wire harness.
4	Inspecting the vehicle wire harness for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector – Motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the vehicle wire harness.

P0A2B (TCED)		Abnormality in characteristics of motor temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector – Inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A2C-DA is detected.	DTC P0A2B-ED is detected: Go to YES. DTC P0A2B-ED is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A2C (TCDA)

EN01H03ZZZ030602004041

DTC: P0A2C (TCDA) Motor temperature sensor Low abnormality INFORMATION



SHTS03ZZZ0300350

1. Technical description

- –

<Description of malfunction>

- Detected a Low abnormality in the motor temperature sensor (high temperature side of the motor).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
 - Inverter start signal is ON.
- (2) Judgement criteria
 - Motor temperature thermistor voltage remains at 0.19 V or less (ground fault) for 2 seconds.

3. Reset condition

- Motor temperature thermistor voltage remains at 0.19 V or more and 4.86 V or less for 4 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- Idling stop does not start.

6. Pre-inspection work

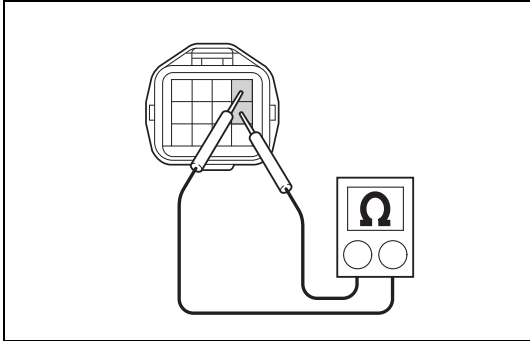
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of motor temperature sensor
- Malfunction of inverter

INSPECTION PROCEDURE: P0A2C (TCDA)**1 Inspecting the vehicle wire harness**

SHTS03ZZZ0300351

1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature)
2. Disconnect the PCU harness (12P) connector.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
• Starter key: LOCK • Motor temperature: Equivalent to the ambient temperature	PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal	16.18 – 184.1 kΩ (0 – 50 °C {32 – 122 °F})

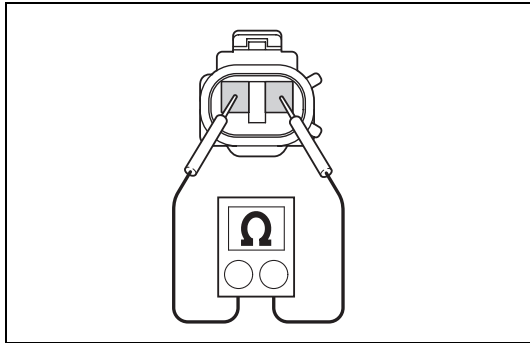
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Go to step 2.

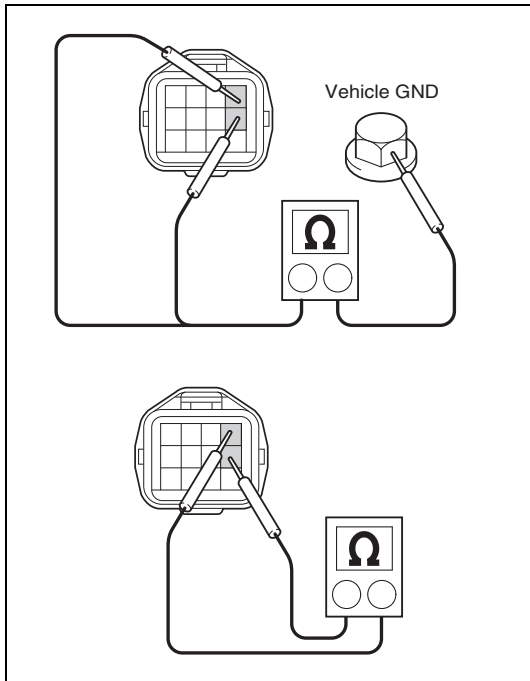
2 Inspecting the motor temperature sensor

SHTS03ZZZ0300352

1. Disconnect the connector of motor temperature sensor.
2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal	16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the HV motor.**

3 Inspecting the vehicle wire harness for short circuit

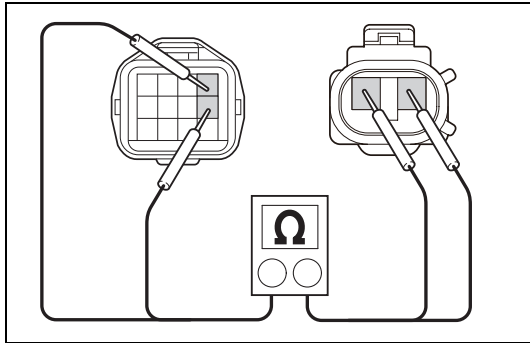
SHTS03ZZZ0300353

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 kΩ or more (No continuity)

Is the measured value within the range of standard value?
YES
Go to step 4.
NO
Replace the vehicle wire harness.

4 Inspecting the vehicle wire harness for continuity



- Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector – motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal	1 Ω or less (With continuity)

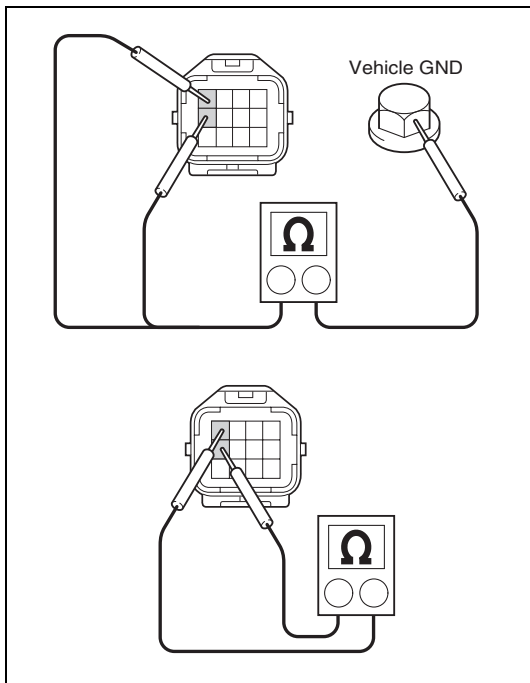
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the vehicle wire harness.

5 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300355

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 kΩ or more (No continuity)

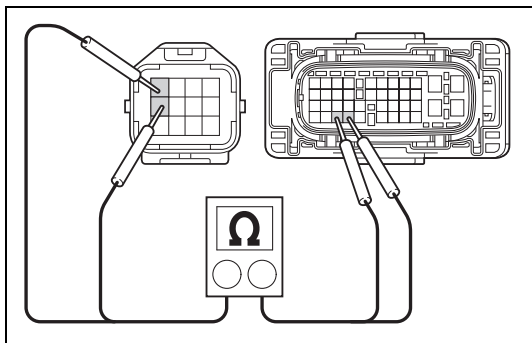
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the PCU wire harness (lower side) for continuity

SHTS03ZZZ0300356

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector – inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal	1 Ω or less (With continuity)

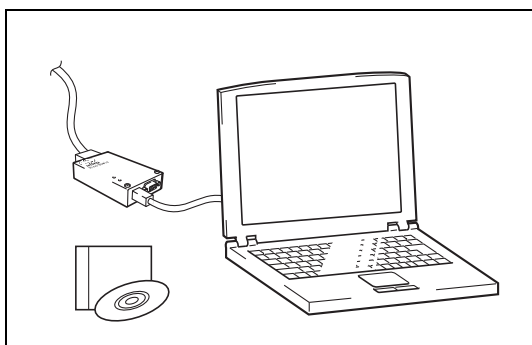
Is the measured value within the range of standard value?

YES

NO

Go to step 7.

Replace the PCU wire harness (lower side).

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300357

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A2C-DA is detected.

Is DTC P0A2C-DA detected?

YES

NO

Replace the inverter.

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0A2C (TCDA)

P0A2C (TCDA)		Motor temperature sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the vehicle wire harness	1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature) 2. Disconnect the PCU harness (12P) connector. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> • Starter key: LOCK • Motor temperature: Equivalent to the ambient temperature <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Go to step 2.
2	Inspecting the motor temperature sensor	1. Disconnect the connector of motor temperature sensor. 2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the HV motor.

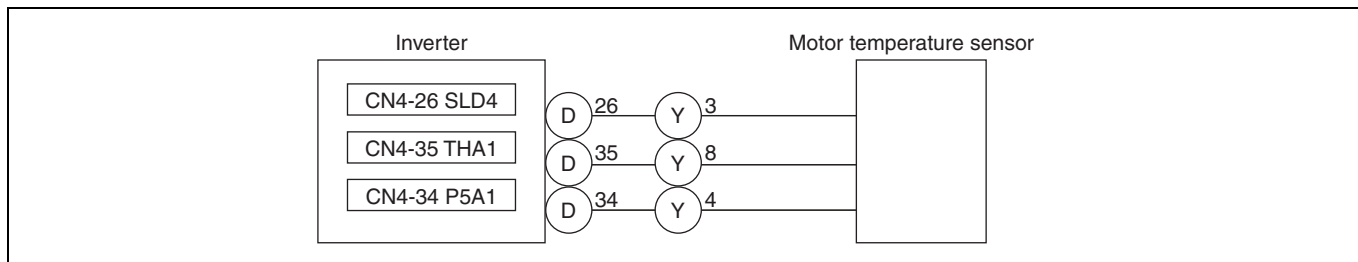
P0A2C (TCDA)		Motor temperature sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the vehicle wire harness for short circuit	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 k Ω or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the vehicle wire harness.
4	Inspecting the vehicle wire harness for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector – Motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the vehicle wire harness.

P0A2C (TCDA)		Motor temperature sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector – Inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A2D-DB is detected.	DTC P0A2C-DA is detected: Go to YES. DTC P0A2C-DA is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A2D (TCDB)

EN01H03ZZZ030602004042

DTC: P0A2D (TCDB) Motor temperature sensor High abnormality INFORMATION



SHTS03ZZZ0300358

1. Technical description

- –

<Description of malfunction>

- Detected a High abnormality in the motor temperature sensor (low temperature side of the motor).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the engine speed reaches 600 r/min or more, 180 seconds or more have passed.
- The engine intake air temperature is -10 °C {14 °F} or more.
- No abnormality is detected in the engine intake air temperature sensor.

(2) Judgement criteria

- Motor temperature thermistor voltage remains at 4.86 V or more (short circuit or disconnection of control power supply) for 2 seconds.

3. Reset condition

- Motor temperature thermistor voltage remains at 0.19 V or more and 4.86 V or less for 4 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- Idle up does not take place.

6. Pre-inspection work

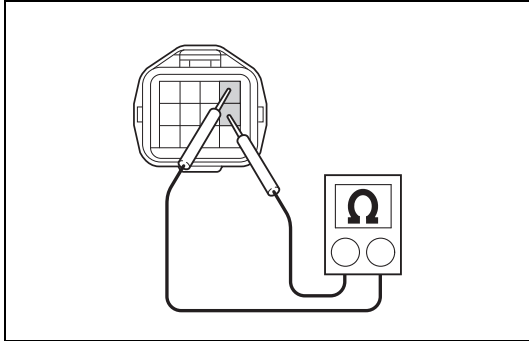
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of motor temperature sensor
- Malfunction of inverter

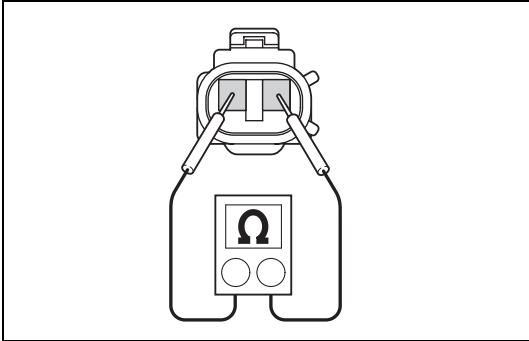
INSPECTION PROCEDURE: P0A2D (TCDB)**1 Inspecting the vehicle wire harness**

SHTS03ZZZ0300359

1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature)
2. Disconnect the PCU harness (12P) connector.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
• Starter key: LOCK • Motor temperature: Equivalent to the ambient temperature	PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal	16.18 – 184.1 kΩ (0 – 50 °C {32 – 122 °F})

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Go to step 2.**

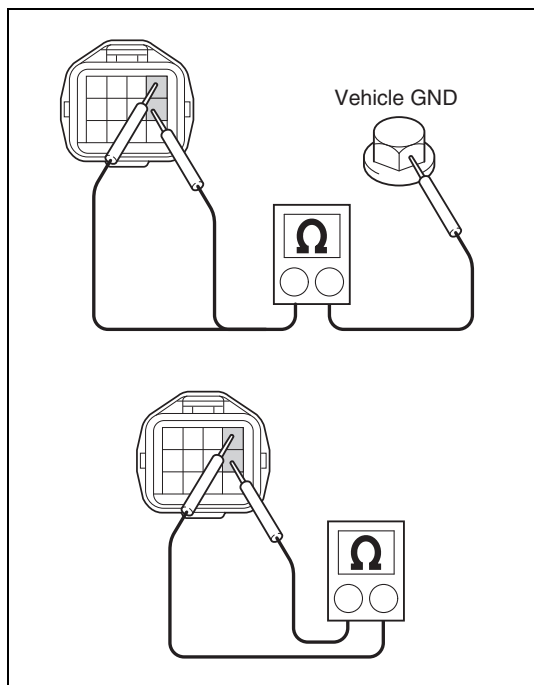
2 Inspecting the motor temperature sensor

SHTS03ZZZ0300360

1. Disconnect the connector of motor temperature sensor.
2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal	16.18 – 184.1 kΩ (0 – 50 °C {32 – 122 °F})

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the HV motor.**

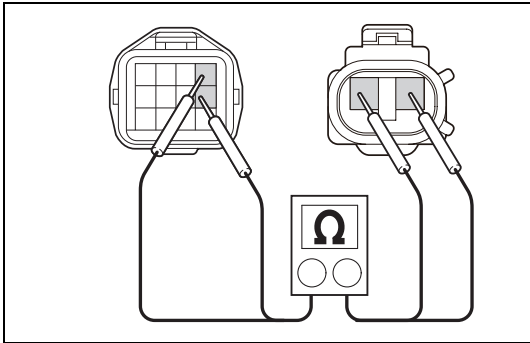
3 Inspecting the vehicle wire harness for short circuit

SHTS03ZZZ0300361

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 kΩ or more (No continuity)

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the vehicle wire harness.**

4 Inspecting the vehicle wire harness for continuity

SHTS03ZZZ0300362

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector – motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal	1 Ω or less (With continuity)

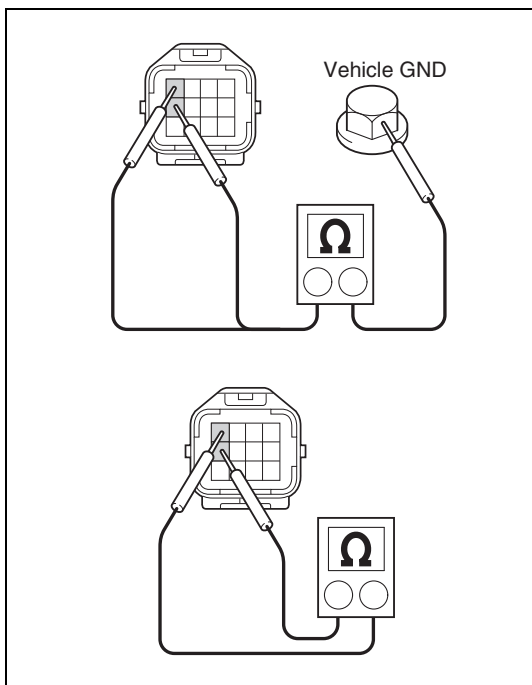
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the vehicle wire harness.

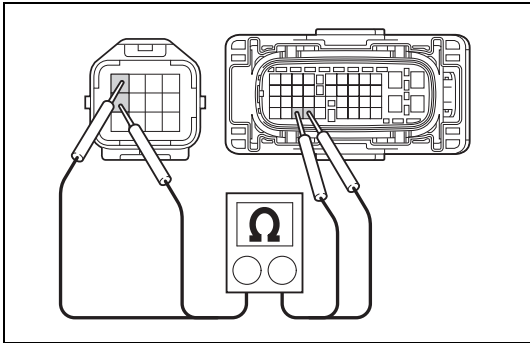
5 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300363

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal	10 k Ω or more (No continuity)

Is the measured value within the range of standard value?**YES****Go to step 6.****NO****Replace the PCU wire harness (lower side).**

6 Inspecting the PCU wire harness (lower side) for continuity

SHTS03ZZZ0300364

- Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector – inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal	1 Ω or less (With continuity)

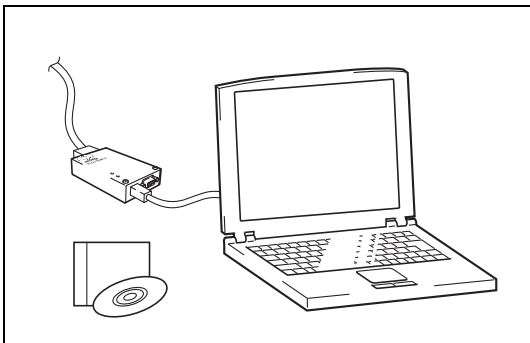
Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Replace the PCU wire harness (lower side).

7 Reproduction check [HINO-DX]

SHTS03ZZZ0300365

- Connect all the connectors that have been disconnected to restore the system.
- Connect the diagnosis tool (HINO-DX) to the vehicle.
- Set the starter key to the "ON" position.
- Clear the malfunction history.
- Perform a test run. (accelerate and decelerate running for approximately 1 hour).
- In [Fault Information] on the diagnosis tool screen, check if P0A2D-DB is detected.

Is DTC P0A2D-DB detected?

YES

Replace the inverter.

NO

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0A2D (TCDB)

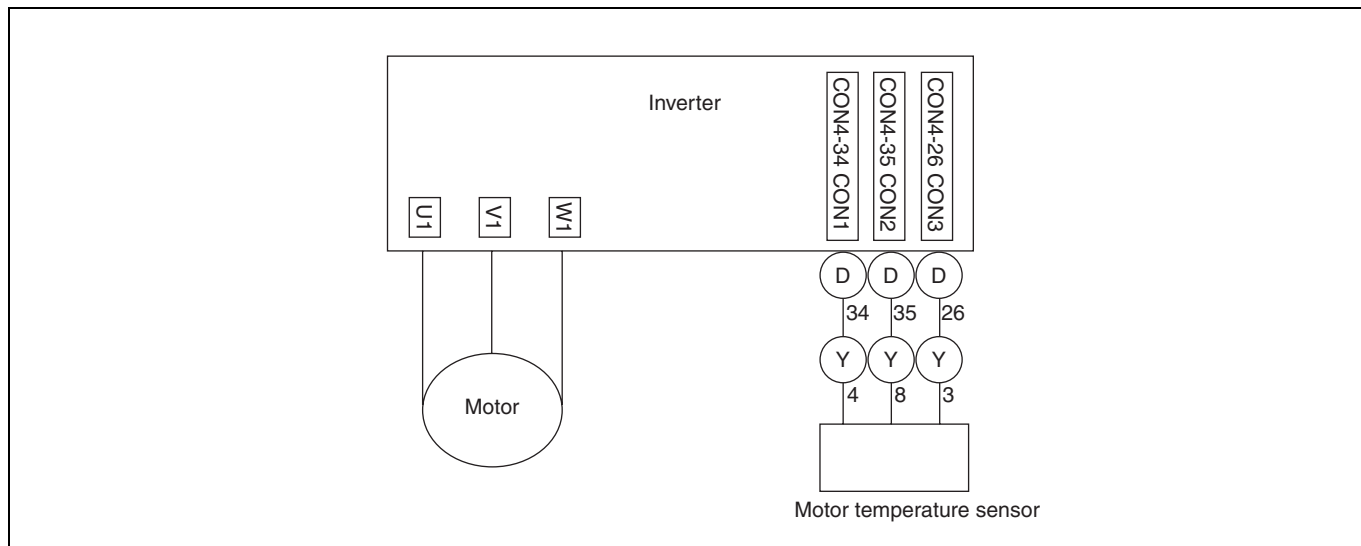
P0A2D (TCDB)		Motor temperature sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the vehicle wire harness	1. Set the starter key to the "LOCK" position and wait for approximately 3 hours. (To make the motor temperature equivalent to the ambient temperature) 2. Disconnect the PCU harness (12P) connector. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> • Starter key: LOCK • Motor temperature: Equivalent to the ambient temperature <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – 8th terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Go to step 2.
2	Inspecting the motor temperature sensor	1. Disconnect the connector of motor temperature sensor. 2. Using the electrical tester, measure the resistance between the terminals of motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> Motor temperature sensor connector (sensor side) 1st terminal – 2nd terminal <Standard values> 16.18 – 184.1 k Ω (0 – 50 °C {32 – 122 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the HV motor.

P0A2D (TCDB)		Motor temperature sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the vehicle wire harness for short circuit	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the vehicle wire harness.
4	Inspecting the vehicle wire harness for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and motor temperature sensor connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector – Motor temperature sensor connector 4th terminal – 1st terminal 8th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the vehicle wire harness.

P0A2D (TCDB)		Motor temperature sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 4th terminal – GND 8th terminal – GND 4th terminal – 8th terminal <Standard values> 10 k Ω or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector – Inverter connector 4th terminal – 34th terminal 8th terminal – 35th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A2D-DB is detected.	DTC P0A2D-DB is detected: Go to YES. DTC P0A2D-DB is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A2F (TC33)

EN01H03ZZZ030602004043

**DTC: P0A2F (TC33) Abnormality in motor temperature
INFORMATION**

SHTS03ZZZ0300366

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in HV motor temperature (motor overheat).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which the HV motor coil temperature is 140 °C {284 °F} or more is detected continuously for 5 seconds.

3. Reset condition

- The state in which the HV motor coil temperature is less than 140 °C {284 °F} is detected continuously for 10 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- Idling stop does not start.

6. Pre-inspection work

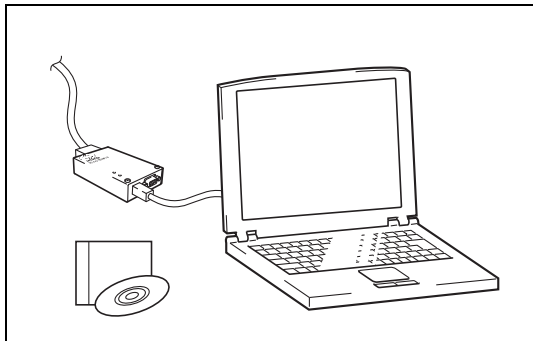
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV motor

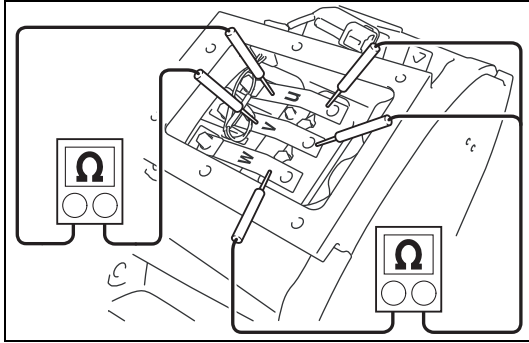
INSPECTION PROCEDURE: P0A2F (TC33)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300367

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC other than P0A2F-33 is detected:
 - P0A2C, P0A2D

Is any DTC other than P0A2F-33 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.**

2 Inspecting resistance between the HV motor phases



1. Set the starter key to the "LOCK" position.
2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor.
3. Using the electrical tester, measure the resistance between the HV motor terminals.

HINT

If the motor temperature is too high, the resistance will largely vary. Therefore, measure the resistance at least 8 hours after the vehicle has stopped.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK (8 hours after the vehicle has stopped)	HV motor U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal	38.2 – 40.5 MΩ (30 – 15 °C {86 – 59 °F})

Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the HV motor.

3 Inspecting the HV motor

1. Set the starter key to the "ON" position.
2. Check the operating sound of HV motor.

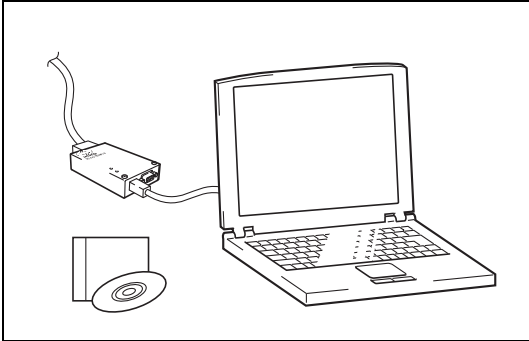
Is any abnormal noise heard?

YES

Inspect the HV motor and repair or replace if necessary.
After repair or replacement, go to step 4.

NO

Go to step 4.

4**Reproduction check [HINO-DX]**

SHTS03ZZZ0300369

1. Set the starter key to the "LOCK" position.
2. Connect all the connectors that have been disconnected to restore the system.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A2F-33 is detected.

HINT

Monitor [Motor temperature] on the data monitor to check that the temperature is less than 100 °C {212 °F}.

Is DTC P0A2F-33 detected?**YES****Replace the inverter.****NO****The inspection is completed.**

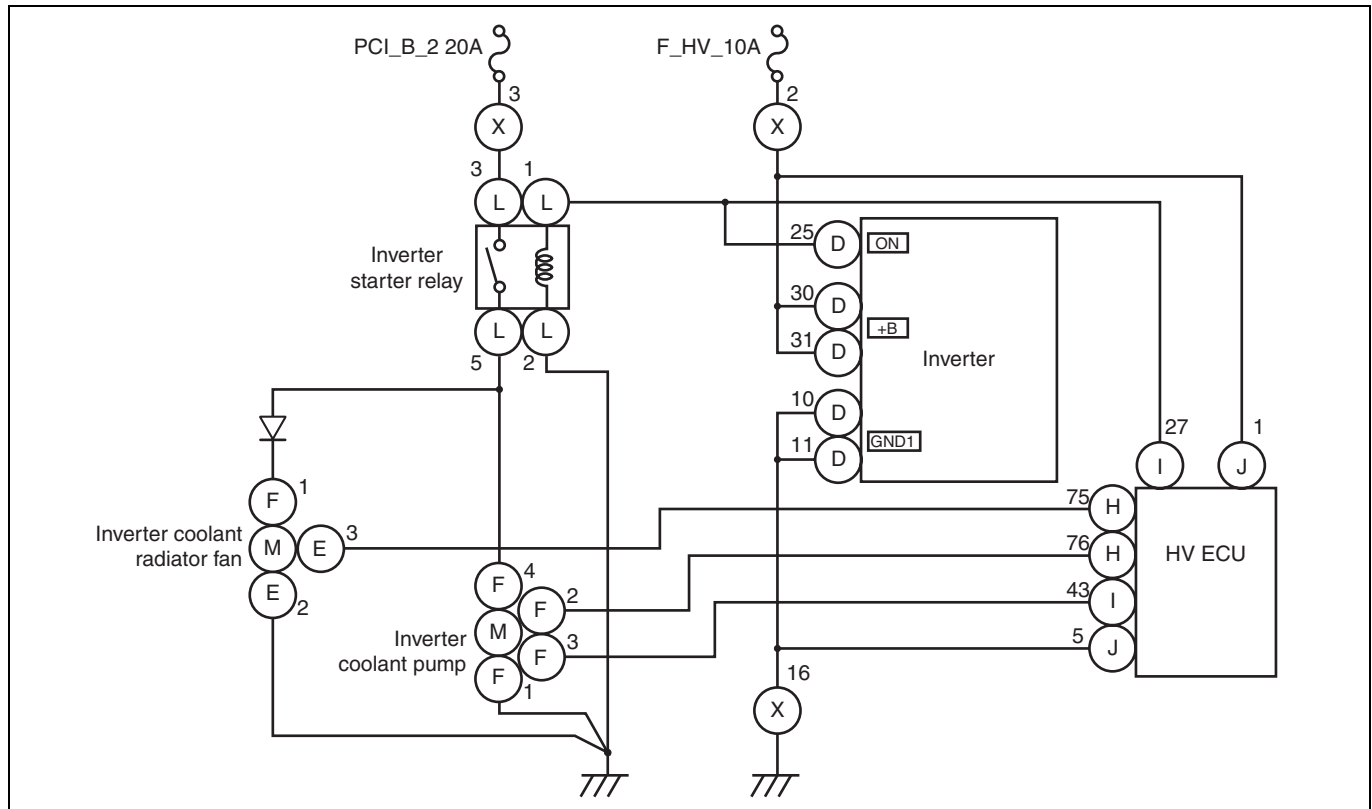
CHECKLIST: P0A2F (TC33)

P0A2F (TC33)		Abnormality in motor temperature		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC other than P0A2F-33 is detected: • P0A2C, P0A2D	DTC other than P0A2F-33 is detected: Go to YES. DTC other than P0A2F-33 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting resistance between the HV motor phases	1. Set the starter key to the "LOCK" position. 2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor. 3. Using the electrical tester, measure the resistance between the HV motor terminals. HINT If the motor temperature is too high, the resistance will largely vary. Therefore, measure the resistance at least 8 hours after the vehicle has stopped. <Measurement conditions> Starter key: LOCK (8 hours after the vehicle has stopped) <Tester connections> HV motor U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal <Standard values> 38.2 – 40.5 MΩ (30 – 15 °C {86 – 59 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the HV motor.
3	Inspecting the HV motor	1. Set the starter key to the "ON" position. 2. Check the operating sound of HV motor.	Abnormal noise is heard: Go to YES. Abnormal noise is not heard: Go to NO.		Inspect the HV motor and repair or replace if necessary. After repair or replacement, go to step 4.	Go to step 4.

P0A2F (TC33)		Abnormality in motor temperature		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect all the connectors that have been disconnected to restore the system. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A2F-33 is detected. HINT Monitor [Motor temperature] on the data monitor to check that the temperature is less than 100 °C {212 °F}.	DTC P0A2F-33 is detected: Go to YES. DTC P0A2F-33 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0A3C (TC34)

EN01H03ZZZ030602004044

DTC: P0A3C (TC34) Abnormality in inverter cooling system
INFORMATION

SHTS03ZZZ0300370

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in temperature increase in the inverter cooling system (temperature increase in the main circuit element).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which the main circuit element temperature is 122 °C {251.6 °F} or more is detected continuously for 0.2 second.

3. Reset condition

- The state in which the main circuit element temperature is less than 122 °C {251.6 °F} is detected continuously for 0.4 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- Idling stop does not start.

6. Pre-inspection work

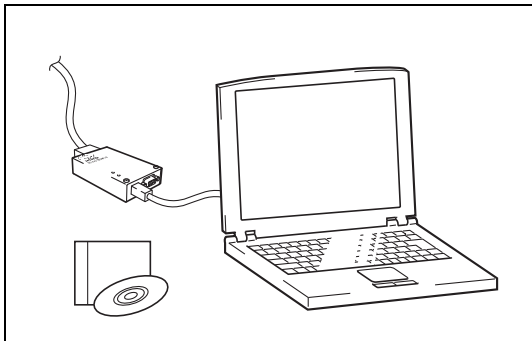
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter cooling radiator fan
- Malfunction of water pump
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Insufficient coolant or clogging
- Malfunction of HV ECU

INSPECTION PROCEDURE: P0A3C (TC34)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300371

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC other than P03AC-34 is detected:
 - P0A01, P0A02, P0A03, P0A06, P0A07, P0A93, P0C73, P3128, P3129, P314C, P314D

Is any DTC other than P03AC-34 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the inverter radiator**

1. Remove the bottom cover of the PCU.
2. Check the inverter radiator, inverter cooling radiator fan, and the hose for water leakage or clogging.
3. Check that the coolant level is appropriate.

Is any defect found?**YES****Repair or replace the defective part.
After repair or replacement, add coolant and go to step 3.****NO****Go to step 3.**

3 Inspecting the inverter cooling radiator fan 1

1. Set the starter key to the "ON" position.
2. Check the operating sound of inverter cooling radiator fan.

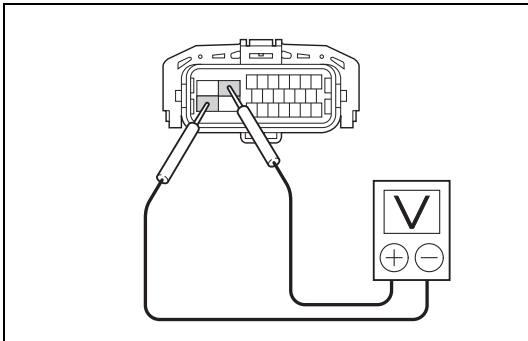
Can the operating sound be checked?

YES

Go to step 4.

NO

Replace the inverter cooling radiator fan.
After replacement, go to step 4.

4 Inspecting the voltage of 12 V battery

SHTS03ZZZ0300372

1. Set the starter key to the "ON" position.
2. Disconnect the connector of PCU harness (24P).
3. Using the electrical tester, measure the voltage between the terminals of PCU harness (24P) vehicle connector.

Measurement conditions	Tester connections	Standard values
Starter key: ON	PCU harness (24P) vehicle connector 2nd terminal – 16th terminal	10 – 16 V

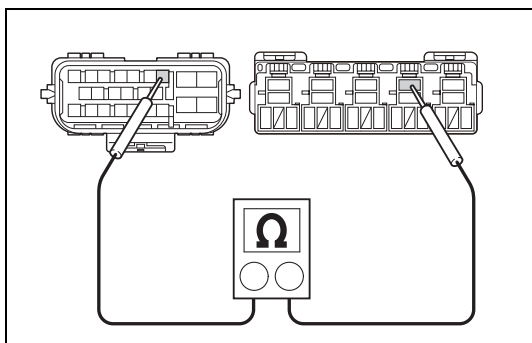
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Inspect the 12 V battery and charge or replace if necessary.
When the battery is normal, inspect the vehicle wire harness (12 V power supply circuit).

5 Inspecting the PCU wire harness (lower side) for continuity 1

SHTS03ZZZ0300373

1. Set the starter key to the "LOCK" position.
2. Remove the inverter start relay.
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) connector and inverter start relay connector (relay block side).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (24P) lower-side connector – Inverter start relay connector (relay block side) 3rd terminal – 3rd terminal	1 Ω or less (With continuity)

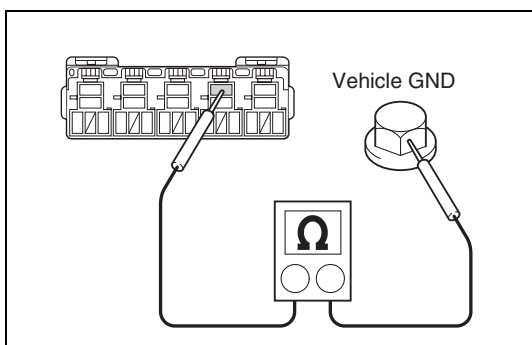
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6 Inspecting the PCU wire harness (lower side) for short circuit 1

SHTS03ZZZ0300374

1. Using the electrical tester, measure the resistance between the 3rd terminal of inverter start relay connector (relay block side) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector (relay block side) 3rd terminal – GND	10 k Ω or more (No continuity)

Is the measured value within the range of standard value?

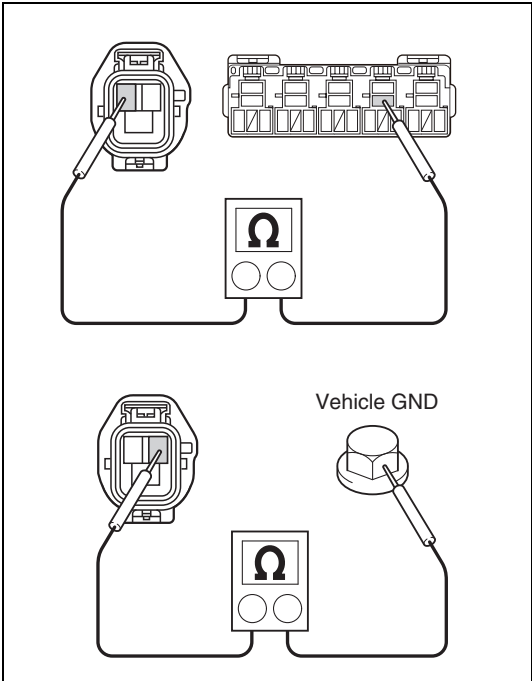
YES

Go to step 7.

NO

Replace the PCU wire harness (lower side).

7 Inspecting the PCU wire harness (lower side) for continuity 2



SHTS03ZZZ0300375

- 1. Disconnect the connectors of inverter cooling radiator fan, inverter cooling pump, inverter, and HV ECU2.
- 2. Using the electrical tester, measure the resistance between the terminals of inverter cooling radiator fan connector and inverter start relay connector (relay block side).
- 3. Using the electrical tester, measure the resistance between the 2nd terminal of inverter cooling radiator fan connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling radiator fan connector – Inverter start relay connector (relay block side) 1st terminal – 5th terminal	1 Ω or less (With continuity)
	Inverter cooling radiator fan connector 2nd terminal – GND	

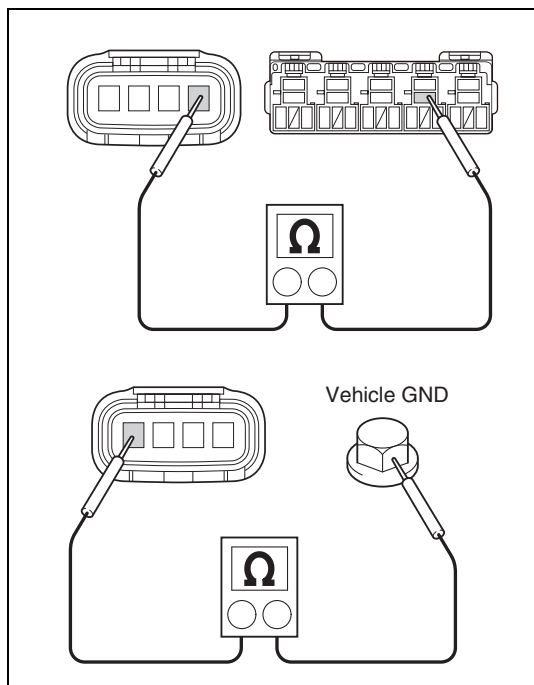
Is the measured value within the range of standard value?

YES

NO

Go to step 8.

Replace the PCU wire harness (lower side).

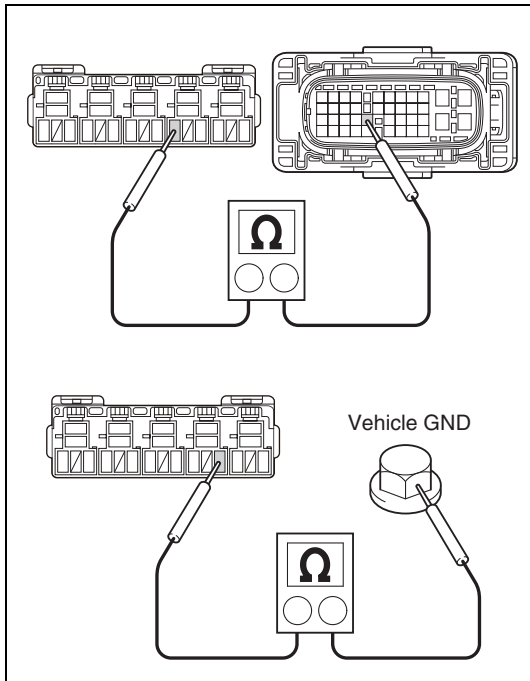
8 Inspecting the PCU wire harness (lower side) for continuity 3

SHTS03ZZZ0300376

1. Using then electrical tester, measure the resistance between the terminals of inverter cooling pump connector and inverter start relay connector (relay block side).
2. Using the electrical tester, measure the resistance between the 1st terminal of inverter cooling pump connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector – Inverter start relay connector (relay block side) 4th terminal – 5th terminal Inverter cooling pump connector 1st terminal – GND	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 9.****NO****Replace the PCU wire harness (lower side).**

9 Inspecting the PCU wire harness (lower side) for continuity 4

SHTS03ZZZ0300377

1. Using the electrical tester, measure the resistance between the terminals of inverter start relay connector (relay block side) and inverter connector.
2. Using the electrical tester, measure the resistance between the 2nd terminal of inverter start relay connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector (relay block side) – Inverter connector 1st terminal – 25th terminal	1 Ω or less (With continuity)
	Inverter start relay connector 2nd terminal – GND	

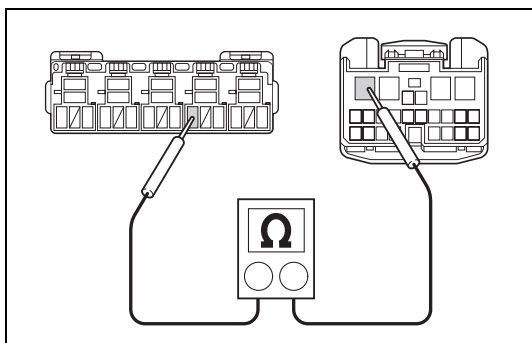
Is the measured value within the range of standard value?

YES

Go to step 10.

NO

Replace the PCU wire harness (lower side).

10 Inspecting the PCU wire harness (lower side) for continuity 5

SHTS03ZZZ0300378

- Using the electrical tester, measure the resistance between the terminals of inverter start relay connector (relay block side) and HV ECU2 connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector (relay block side) – HV ECU2 connector 1st terminal – 27th terminal	1 Ω or less (With continuity)

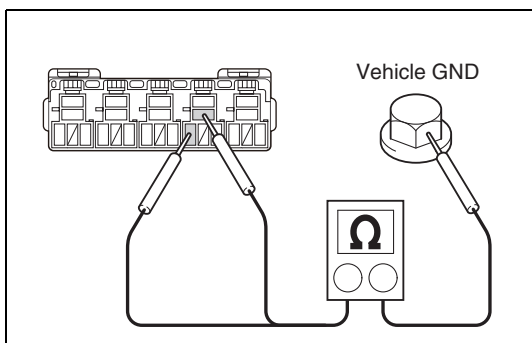
Is the measured value within the range of standard value?

YES

NO

Go to step 11.

Replace the PCU wire harness (lower side).

11 Inspecting the PCU wire harness (lower side) for short circuit 2

SHTS03ZZZ0300379

- Using the electrical tester, measure the resistance between the terminals of inverter start relay connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter start relay connector 1st terminal – GND 5th terminal – GND	10 k Ω or more (No continuity)

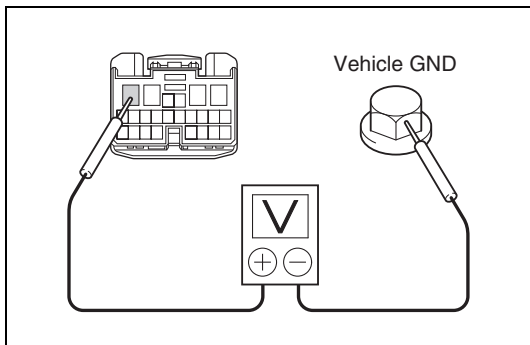
Is the measured value within the range of standard value?

YES

NO

Go to step 12.

Replace the PCU wire harness (lower side).

12 Inspecting the exciting voltage of inverter start relay

SHTS03ZZZ0300380

1. Connect all the connectors that have been disconnected.
2. Set the starter key to the "ON" position.
3. Using the electrical tester, measure the voltage between the 27th terminal of HV ECU2 connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	HV ECU2 connector 27th terminal – GND	10 – 16 V

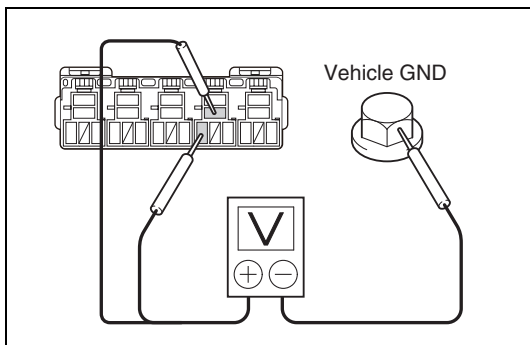
Is the measured value within the range of standard value?

YES

Go to step 13.

NO

Replace the HV ECU.
After replacement, go to step 13.

13 Inspecting the inverter start relay

SHTS03ZZZ0300381

1. Using the electrical tester, measure the voltage between the terminals of inverter start relay connector (relay block side) and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: ON	Inverter start relay connector (relay block side) 1st terminal – GND 5th terminal – GND	10 – 16 V

Is the measured value within the range of standard value?

YES

Go to step 14.

NO

Replace the inverter start relay.
After replacement, go to step 14.

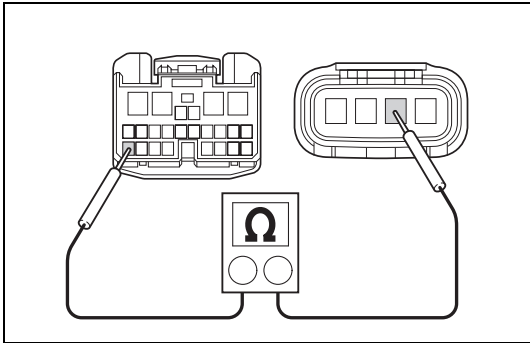
14 Inspecting the inverter cooling radiator fan 2

1. Set the starter key to the "LOCK" position.
2. Set the starter key to the "ON" position and check the operating sound of inverter cooling radiator fan.

Can the operating sound be checked?**YES****Go to step 15.****NO****Replace the inverter cooling radiator fan.
After replacement, go to step 15.****15 Inspecting the inverter cooling pump 1**

1. Set the starter key to the "LOCK" position.
2. Set the starter key to the "ON" position and check the operating sound of inverter cooling pump.

Can the operating sound be checked?**YES****Go to step 16.****NO****Replace the inverter cooling pump.
After replacement, go to step 16.**

16 Inspecting the PCU wire harness (lower side) for continuity

SHTS03ZZZ0300382

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter cooling pump and HV ECU2.
3. Using the electrical tester, measure the resistance between the terminals of inverter cooling pump connector and HV ECU2 connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter cooling pump connector – HV ECU2 connector 3rd terminal – 43rd terminal	1 Ω or less (With continuity)

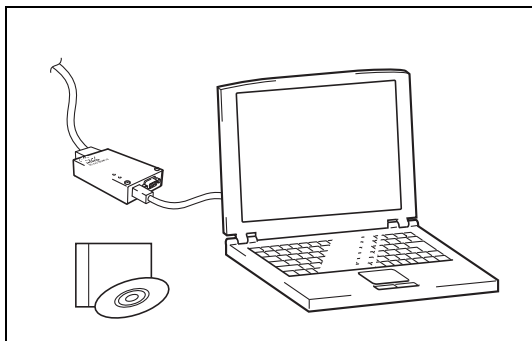
Is the measured value within the range of standard value?

YES

Go to step 17.

NO

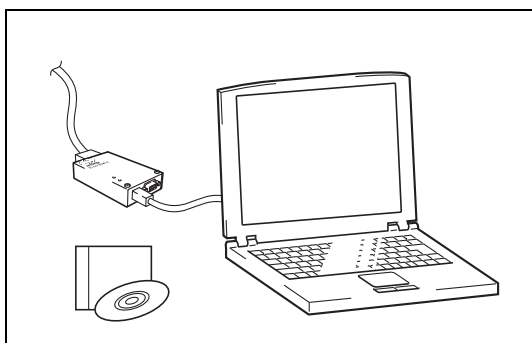
Replace the PCU wire harness (lower side).

17 Inspecting the inverter cooling pump 2 [HINO-DX]

SHTS03ZZZ0300383

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. In [Activation Test] on the diagnosis tool screen, select [HV water pump drive duty value].
4. Change the operation duty value of inverter cooling pump to check that the water pump is running (i.e. the number of revolutions of the fan is changing).

Measurement conditions	Measured item	Standard values
Starter key: ON	HV water pump drive duty value	There shall be no intermittent operation or halt.

Is any defect found?**YES****Go to step 18.****NO****Replace the inverter cooling pump.****18 Reproduction check [HINO-DX]**

SHTS03ZZZ0300384

1. Set the starter key to the "ON" position.
2. Using the diagnosis tool, clear the malfunction history.
3. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
4. In [Fault Information] on the diagnosis tool screen, check if P0A3C-34 is detected.

HINT

In [Data Monitor], monitor [Coolant temperature] and [Internal temperature of inverter] to check that there is no abnormality.

Is DTC P0A3C-34 detected?**YES****Replace the inverter.****NO**

The inspection is completed.
(Temporary actuation of protection function due to external noise)

CHECKLIST: P0A3C (TC34)

P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC other than P03AC-34 is detected: P0A01, P0A02, P0A03, P0A06, P0A07, P0A93, P0C73, P3128, P3129, P314C, P314D	DTC other than P03AC-34 is detected: Go to YES. DTC other than P03AC-34 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the inverter radiator	1. Remove the bottom cover of the PCU. 2. Check the inverter radiator, inverter cooling radiator fan, and the hose for water leakage or clogging. 3. Check that the coolant level is appropriate.	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the defective part. After repair or replacement, add coolant and go to step 3.	Go to step 3.
3	Inspecting the inverter cooling radiator fan 1	1. Set the starter key to the "ON" position. 2. Check the operating sound of inverter cooling radiator fan.	Operating sound is checked: Go to YES. Operating sound is not checked: Go to NO.		Go to step 4.	Replace the inverter cooling radiator fan. After replacement, go to step 4.
4	Inspecting the voltage of 12 V battery	1. Set the starter key to the "ON" position. 2. Disconnect the connector of PCU harness (24P). 3. Using the electrical tester, measure the voltage between the terminals of PCU harness (24P) vehicle connector. <Measurement conditions> Starter key: ON <Tester connections> PCU harness (24P) vehicle connector 2nd terminal – 16th terminal <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Inspect the 12 V battery and charge or replace if necessary. When the battery is normal, inspect the vehicle wire harness (12 V power supply circuit).

P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Remove the inverter start relay. 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (24P) connector and inverter start relay connector (relay block side). <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (24P) lower-side connector – Inverter start relay connector (relay block side) 3rd terminal – 3rd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).
6	Inspecting the PCU wire harness (lower side) for short circuit 1	1. Using the electrical tester, measure the resistance between the 3rd terminal of inverter start relay connector (relay block side) and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector (relay block side) 3rd terminal – GND <Standard values> 10 k Ω or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the PCU wire harness (lower side).

P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the PCU wire harness (lower side) for continuity 2	1. Disconnect the connectors of inverter cooling radiator fan, inverter cooling pump, inverter, and HV ECU2. 2. Using the electrical tester, measure the resistance between the terminals of inverter cooling radiator fan connector and inverter start relay connector (relay block side). 3. Using the electrical tester, measure the resistance between the 2nd terminal of inverter cooling radiator fan connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling radiator fan connector – Inverter start relay connector (relay block side) 1st terminal – 5th terminal Inverter cooling radiator fan connector 2nd terminal – GND <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the PCU wire harness (lower side).
8	Inspecting the PCU wire harness (lower side) for continuity 3	1. Using then electrical tester, measure the resistance between the terminals of inverter cooling pump connector and inverter start relay connector (relay block side). 2. Using the electrical tester, measure the resistance between the 1st terminal of inverter cooling pump connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector – Inverter start relay connector (relay block side) 4th terminal – 5th terminal Inverter cooling pump connector 1st terminal – GND <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the PCU wire harness (lower side).

P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
9	Inspecting the PCU wire harness (lower side) for continuity 4	1. Using the electrical tester, measure the resistance between the terminals of inverter start relay connector (relay block side) and inverter connector. 2. Using the electrical tester, measure the resistance between the 2nd terminal of inverter start relay connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector (relay block side) – Inverter connector 1st terminal – 25th terminal Inverter start relay connector 2nd terminal – GND <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 10.	Replace the PCU wire harness (lower side).
10	Inspecting the PCU wire harness (lower side) for continuity 5	1. Using the electrical tester, measure the resistance between the terminals of inverter start relay connector (relay block side) and HV ECU2 connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector (relay block side) – HV ECU2 connector 1st terminal – 27th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 11.	Replace the PCU wire harness (lower side).
11	Inspecting the PCU wire harness (lower side) for short circuit 2	1. Using the electrical tester, measure the resistance between the terminals of inverter start relay connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter start relay connector 1st terminal – GND 5th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 12.	Replace the PCU wire harness (lower side).

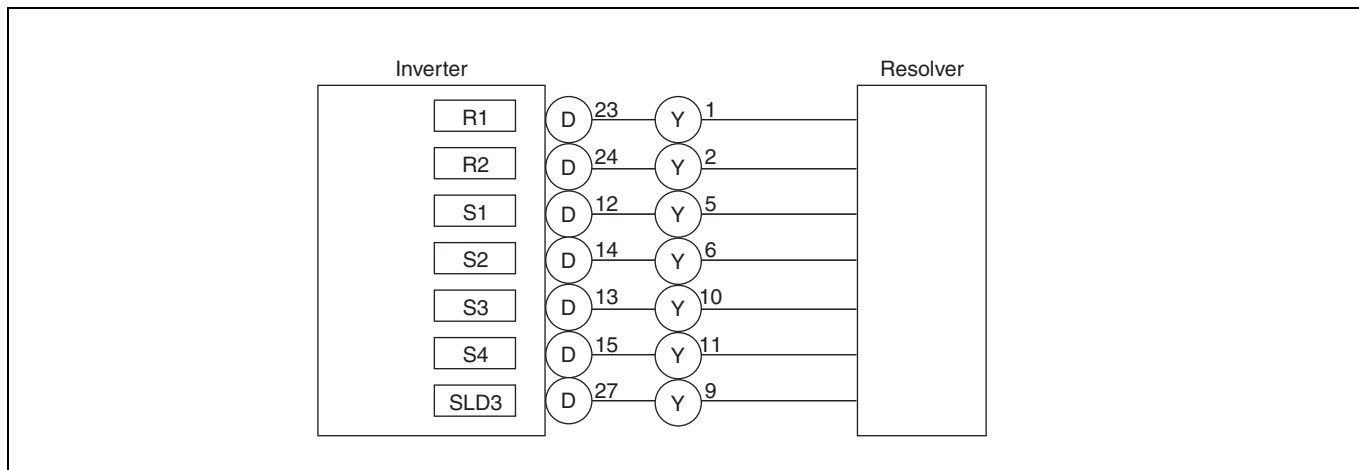
P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
12	Inspecting the exciting voltage of inverter start relay	1. Connect all the connectors that have been disconnected. 2. Set the starter key to the "ON" position. 3. Using the electrical tester, measure the voltage between the 27th terminal of HV ECU2 connector and the ground. <Measurement conditions> Starter key: ON <Tester connections> HV ECU2 connector 27th terminal – GND <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 13.	Replace the HV ECU. After replacement, go to step 13.
13	Inspecting the inverter start relay	1. Using the electrical tester, measure the voltage between the terminals of inverter start relay connector (relay block side) and the ground. <Measurement conditions> Starter key: ON <Tester connections> Inverter start relay connector (relay block side) 1st terminal – GND 5th terminal – GND <Standard values> 10 – 16 V	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 14.	Replace the inverter start relay. After replacement, go to step 14.
14	Inspecting the inverter cooling radiator fan 2	1. Set the starter key to the "LOCK" position. 2. Set the starter key to the "ON" position and check the operating sound of inverter cooling radiator fan.	Operating sound is checked: Go to YES. Operating sound is not checked: Go to NO.		Go to step 15.	Replace the inverter cooling radiator fan. After replacement, go to step 15.
15	Inspecting the inverter cooling pump 1	1. Set the starter key to the "LOCK" position. 2. Set the starter key to the "ON" position and check the operating sound of inverter cooling pump.	Operating sound is checked: Go to YES. Operating sound is not checked: Go to NO.		Go to step 16.	Replace the inverter cooling pump. After replacement, go to step 16.

P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
16	Inspecting the PCU wire harness (lower side) for continuity	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter cooling pump and HV ECU2. 3. Using the electrical tester, measure the resistance between the terminals of inverter cooling pump connector and HV ECU2 connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter cooling pump connector – HV ECU2 connector 3rd terminal – 43rd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 17.	Replace the PCU wire harness (lower side).
17	Inspecting the inverter cooling pump 2 [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. In [Activation Test] on the diagnosis tool screen, select [HV water pump drive duty value]. 4. Change the operation duty value of inverter cooling pump to check that the water pump is running (i.e. the number of revolutions of the fan is changing). <Measurement conditions> Starter key: ON <Measured item> HV water pump drive duty value <Standard values> There shall be no intermittent operation or halt.	Defect is found: Go to YES. Defect is not found: Go to NO.		Go to step 18.	Replace the inverter cooling pump.

P0A3C (TC34)		Abnormality in inverter cooling system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
18	Reproduction check [HINO-DX]	1. Set the starter key to the "ON" position. 2. Using the diagnosis tool, clear the malfunction history. 3. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 4. In [Fault Information] on the diagnosis tool screen, check if P0A3C-34 is detected. HINT In [Data Monitor], monitor [Coolant temperature] and [Internal temperature of inverter] to check that there is no abnormality.	DTC P0A3C-34 is detected: Go to YES. DTC P0A3C-34 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A3F (TCB7)

EN01H03ZZZ030602004045

DTC: P0A3F (TCB7) Short-circuit abnormality between resolver phases
INFORMATION

SHTS03ZZZ0300385

1. Technical description

- –

<Description of malfunction>

- Detected the phase-to-phase short circuit in the resolver (position detector).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- Insulation resistance drop signal = Lo is detected continuously for 0.1 second.

3. Reset condition

- Insulation resistance drop signal = High is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

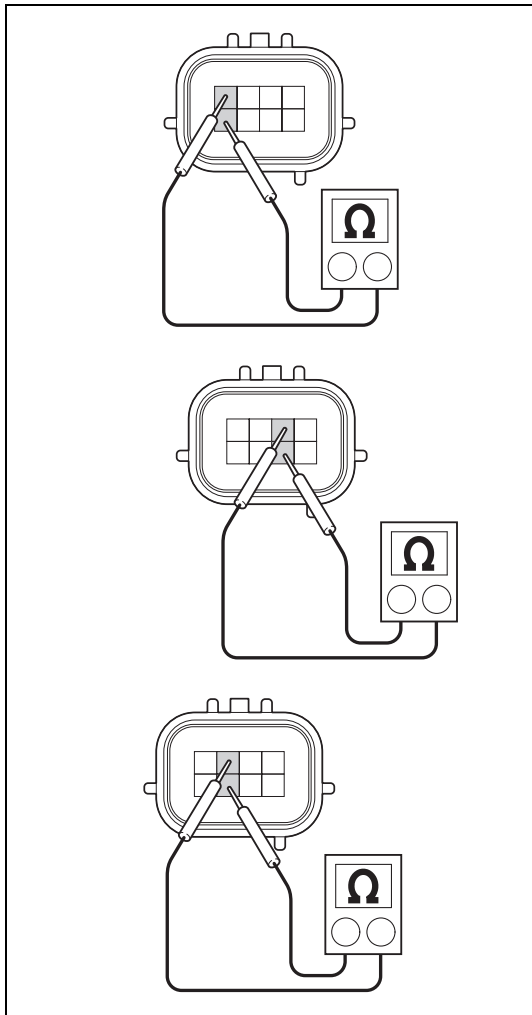
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of resolver (position detector)
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter

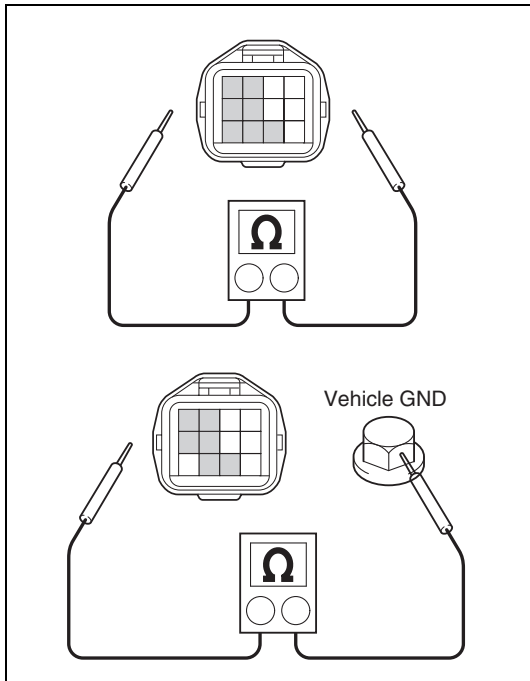
INSPECTION PROCEDURE: P0A3F (TCB7)**1 Inspecting the resolver (sensor)**

SHTS03ZZZ0300386

1. Set the starter key to the "LOCK" position.
2. Disconnect the resolver connector.
3. Using the electrical tester, measure the resistance between the terminals of resolver connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Resolver connector	(All are equivalent to ambient temperature 25 °C {77 °F}.)
	8th terminal – 4th terminal	$7.2 \pm 1.44 \Omega$
	6th terminal – 2nd terminal	$26.8 \pm 5.36 \Omega$
	7th terminal – 3rd terminal	$28.5 \pm 5.7 \Omega$

Is the measured value within the range of standard value?**YES****Go to step 2.****NO****Replace the HV motor.**

2 Inspecting the vehicle wire harness for short circuit

SHTS03ZZZ0300387

1. Disconnect the PCU harness (12P) connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal	10 k Ω or more (No continuity)
	PCU harness (12P) vehicle-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND	

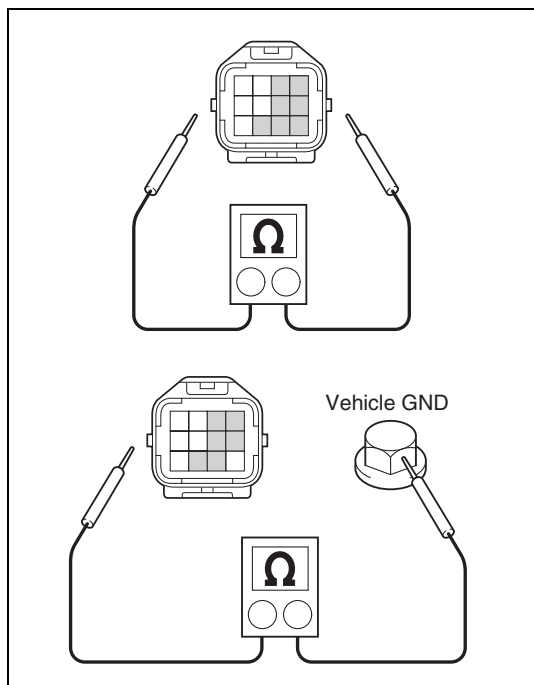
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the vehicle wire harness.

3 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300388

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal	10 k Ω or more (No continuity)
	PCU harness (12P) lower-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND	

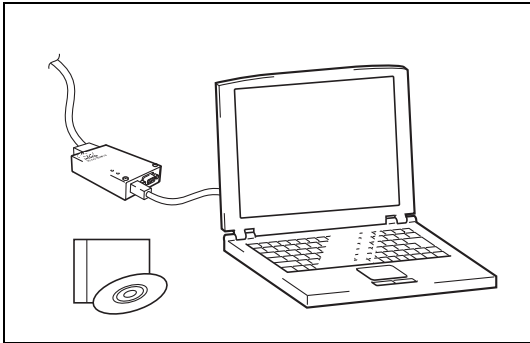
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the PCU wire harness (lower side).

4**Reproduction check [HINO-DX]**

SHTS03ZZZ0300389

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A3F-B7 is detected.

Is DTC P0A3F-B7 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A3F (TCB7)

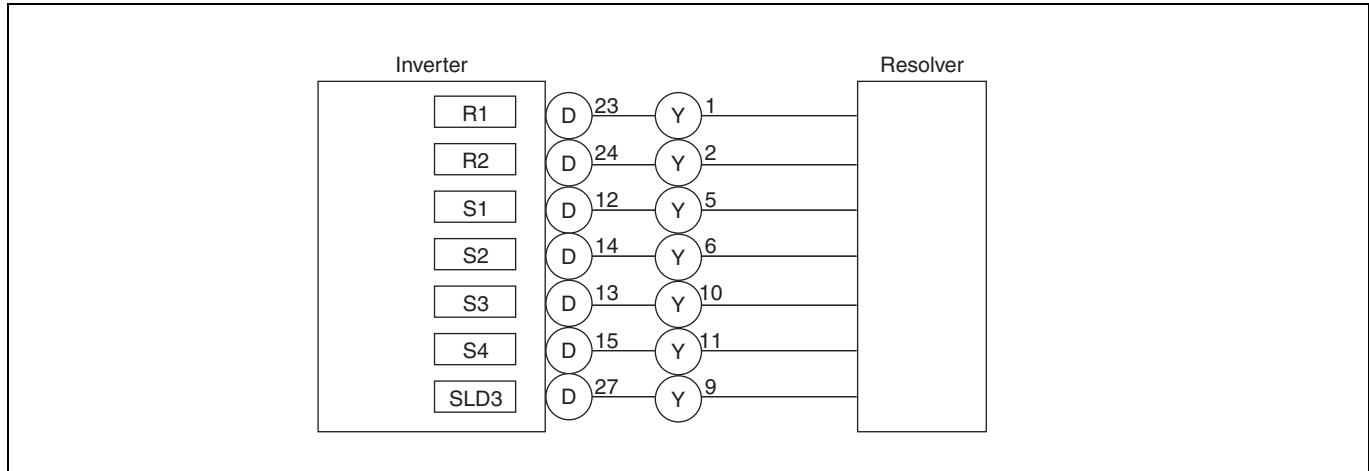
P0A3F (TCB7)		Short-circuit abnormality between resolver phases		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the resolver (sensor)	1. Set the starter key to the "LOCK" position. 2. Disconnect the resolver connector. 3. Using the electrical tester, measure the resistance between the terminals of resolver connector. <Measurement conditions> Starter key: LOCK <Tester connections> Resolver connector (1) 8th terminal – 4th terminal (2) 6th terminal – 2nd terminal (3) 7th terminal – 3rd terminal <Standard values> (All are equivalent to ambient temperature 25 °C {77 °F}.) (1) $7.2 \pm 1.44 \Omega$ (2) $26.8 \pm 5.36 \Omega$ (3) $28.5 \pm 5.7 \Omega$	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the HV motor.

P0A3F (TCB7)		Short-circuit abnormality between resolver phases		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
2	Inspecting the vehicle wire harness for short circuit	1. Disconnect the PCU harness (12P) connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal PCU harness (12P) vehicle-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the vehicle wire harness.

P0A3F (TCB7)		Short-circuit abnormality between resolver phases		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
3	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal PCU harness (12P) lower-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the PCU wire harness (lower side).
4	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A3F-B7 is detected.	DTC P0A3F-B7 is detected: Go to YES. DTC P0A3F-B7 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A41 (TCC0)

EN01H03ZZZ030602004046

DTC: P0A41 (TCC0) Resolver range Low abnormality
INFORMATION

SHTS03ZZZ0300390

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or short circuit (Low abnormality) in the resolver (position detector).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more
 - Inverter start signal is ON.
- (2) Judgement criteria
 - When the determination condition ($\cos^2 + \sin^2 < 1.378V^2$) is met in a control cycle (T_s) ms, the 2 ms counter is incremented.
 - When the counter exceeds 30 times successively, the abnormality is confirmed.

3. Reset condition

- When the following conditions continue for 3 seconds:
 - $\cos^2 + \sin^2 \geq 1.378V^2$
 - $\cos^2 + \sin^2 \leq 8.511V^2$
 - Smoothed absolute revolution value for determining recovery of resolver diagnosis > Revolution of 40 r/min

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

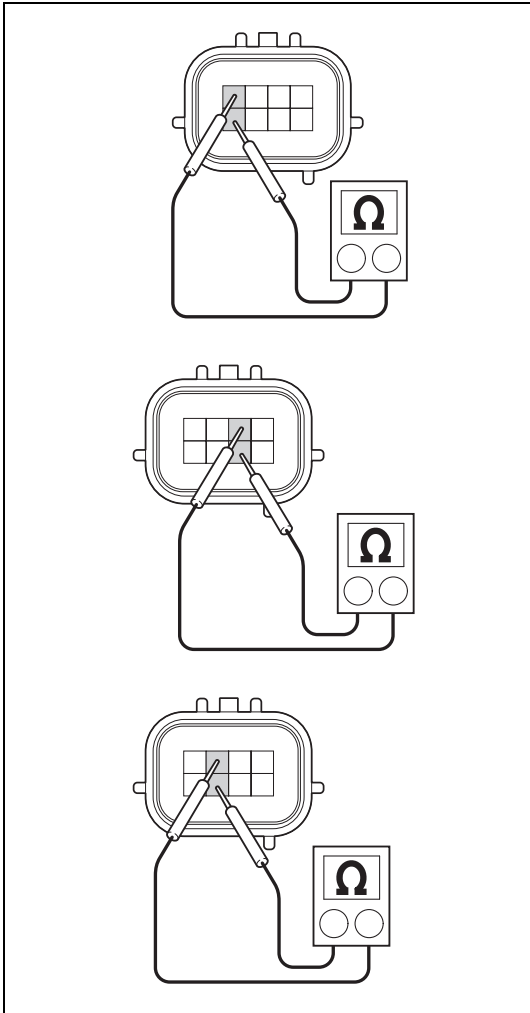
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of resolver (position detector)
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter

INSPECTION PROCEDURE: P0A41 (TCC0)**1 Inspecting the resolver (sensor)**

SHTS03ZZZ0300391

1. Set the starter key to the "LOCK" position.
2. Disconnect the resolver connector.
3. Using the electrical tester, measure the resistance between the terminals of resolver connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Resolver connector	(All are equivalent to ambient temperature 25 °C {77 °F}.)
	8th terminal – 4th terminal	$7.2 \pm 1.44 \, \Omega$
	6th terminal – 2nd terminal	$26.8 \pm 5.36 \, \Omega$
	7th terminal – 3rd terminal	$28.5 \pm 5.7 \, \Omega$

Is the measured value within the range of standard value?

YES

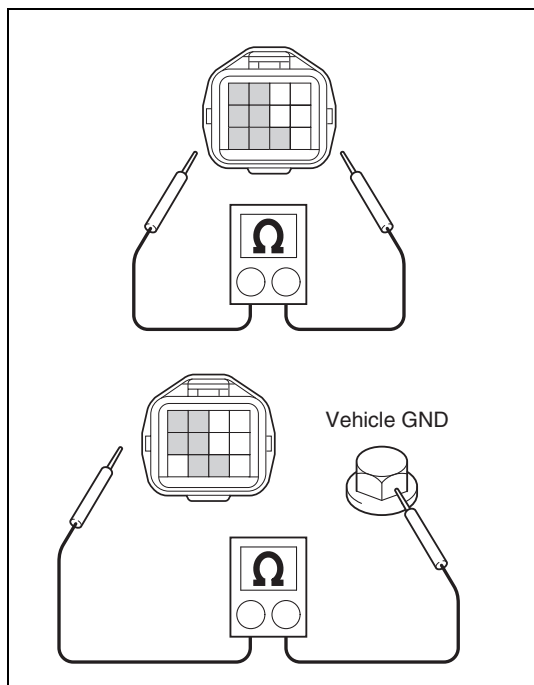
Go to step 2.

NO

Replace the HV motor.

2

Inspecting the vehicle wire harness for short circuit



SHTS03ZZZ0300392

1. Disconnect the PCU harness (12P) connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal	10 k Ω or more (No continuity)
	PCU harness (12P) vehicle-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND	

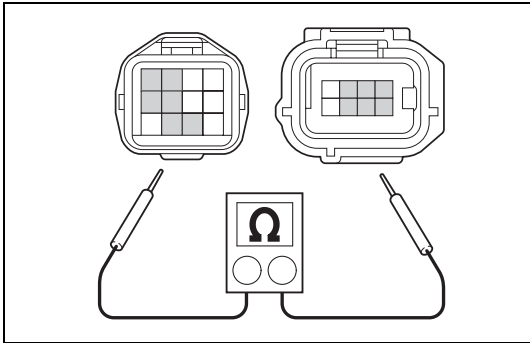
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the vehicle wire harness.

3 Inspecting the vehicle wire harness for continuity

SHTS03ZZZ0300393

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and resolver connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector – resolver connector 1st terminal – 8th terminal 2nd terminal – 4th terminal 5th terminal – 6th terminal 6th terminal – 7th terminal 10th terminal – 2nd terminal 11th terminal – 3rd terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

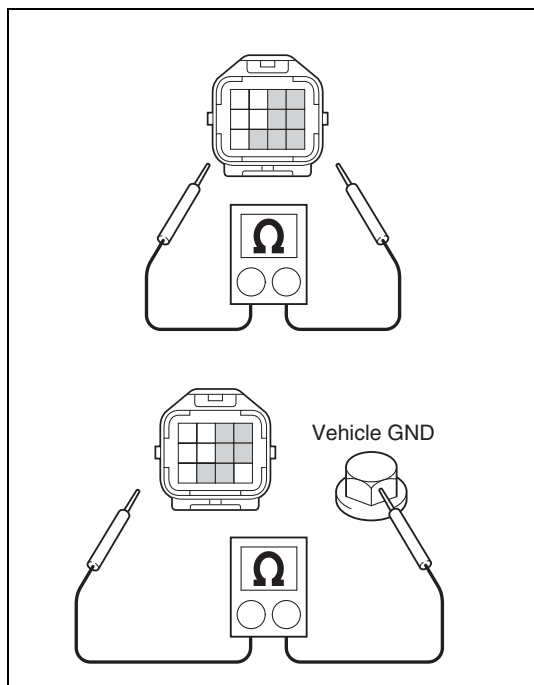
YES

Go to step 4.

NO

Replace the vehicle wire harness.

4 Inspecting the PCU wire harness (lower side) for short circuit



SHTS03ZZZ0300394

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal	10 k Ω or more (No continuity)
	PCU harness (12P) lower-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND	

Is the measured value within the range of standard value?

YES

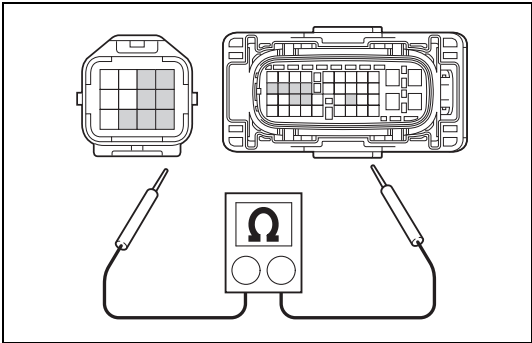
Go to step 5.

NO

Replace the PCU wire harness (lower side).

5

Inspecting the PCU wire harness (lower side) for continuity



SHTS03ZZZ0300395

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
—	PCU harness (12P) lower-side connector – Inverter 1st terminal – 23rd terminal 2nd terminal – 24th terminal 5th terminal – 12th terminal 6th terminal – 14th terminal 10th terminal – 13th terminal 11th terminal – 15th terminal 9th terminal – 27th terminal	1 Ω or less (With continuity)

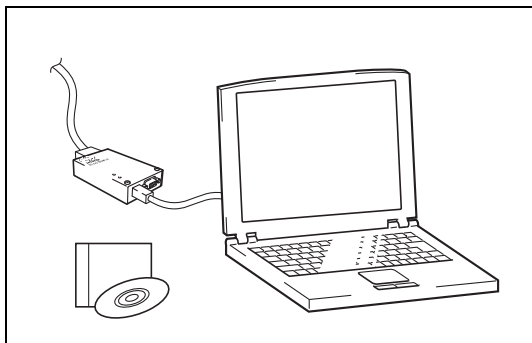
Is the measured value within the range of standard value?

YES

NO

Go to step 6.

Replace the PCU wire harness (lower side).

6 **Reproduction check [HINO-DX]**

SHTS03ZZZ0300396

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A41-C0 is detected.

Is DTC P0A41-C0 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A41 (TCC0)

P0A41 (TCC0)		Resolver range Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the resolver (sensor)	1. Set the starter key to the "LOCK" position. 2. Disconnect the resolver connector. 3. Using the electrical tester, measure the resistance between the terminals of resolver connector. <Measurement conditions> Starter key: LOCK <Tester connections> Resolver connector (1) 8th terminal – 4th terminal (2) 6th terminal – 2nd terminal (3) 7th terminal – 3rd terminal <Standard values> (All are equivalent to ambient temperature 25 °C {77 °F}.) (1) $7.2 \pm 1.44 \Omega$ (2) $26.8 \pm 5.36 \Omega$ (3) $28.5 \pm 5.7 \Omega$	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the HV motor.

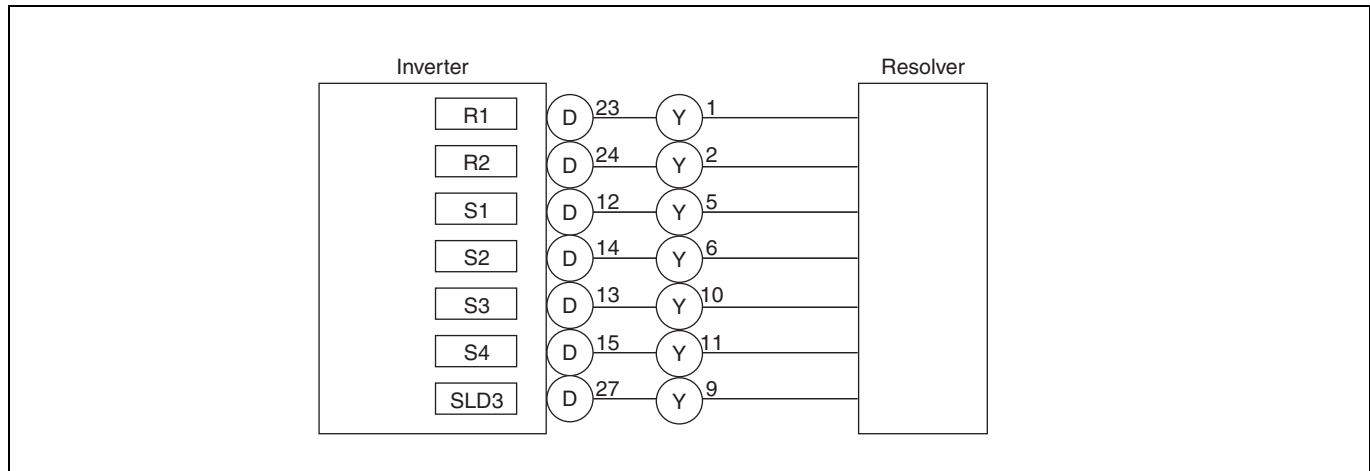
P0A41 (TCC0)		Resolver range Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
2	Inspecting the vehicle wire harness for short circuit	1. Disconnect the PCU harness (12P) connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal PCU harness (12P) vehicle-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the vehicle wire harness.
3	Inspecting the vehicle wire harness for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and resolver connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector – resolver connector 1st terminal – 8th terminal 2nd terminal – 4th terminal 5th terminal – 6th terminal 6th terminal – 7th terminal 10th terminal – 2nd terminal 11th terminal – 3rd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the vehicle wire harness.

P0A41 (TCC0)		Resolver range Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal PCU harness (12P) lower-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).
5	Inspecting the PCU wire harness (lower side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector. <Measurement conditions> — <Tester connections> PCU harness (12P) lower-side connector – Inverter 1st terminal – 23rd terminal 2nd terminal – 24th terminal 5th terminal – 12th terminal 6th terminal – 14th terminal 10th terminal – 13th terminal 11th terminal – 15th terminal 9th terminal – 27th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).

P0A41 (TCC0)		Resolver range Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A41-C0 is detected.	DTC P0A41-C0 is detected: Go to YES. DTC P0A41-C0 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A42 (TCC1)

EN01H03ZZZ030602004047

DTC: P0A42 (TCC1) Resolver range High abnormality
INFORMATION

SHTS03ZZZ0300397

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection or short circuit (High abnormality) in the resolver (position detector).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
 - Inverter start signal is ON.
- (2) Judgement criteria
 - When the determination condition ($\cos^2 + \sin^2 > 8.511V^2$) is met in the control cycle (T_s) ms, the 2 ms counter is incremented.
 - When the counter exceeds 30 times successively, the abnormality is confirmed.

3. Reset condition

- When the following conditions continue for 3 seconds:
 - $\cos^2 + \sin^2 \geq 1.378V^2$
 - $\cos^2 + \sin^2 \leq 8.511V^2$
 - Smoothed absolute revolution value for determining recovery of resolver diagnosis > Revolution of 40 r/min

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

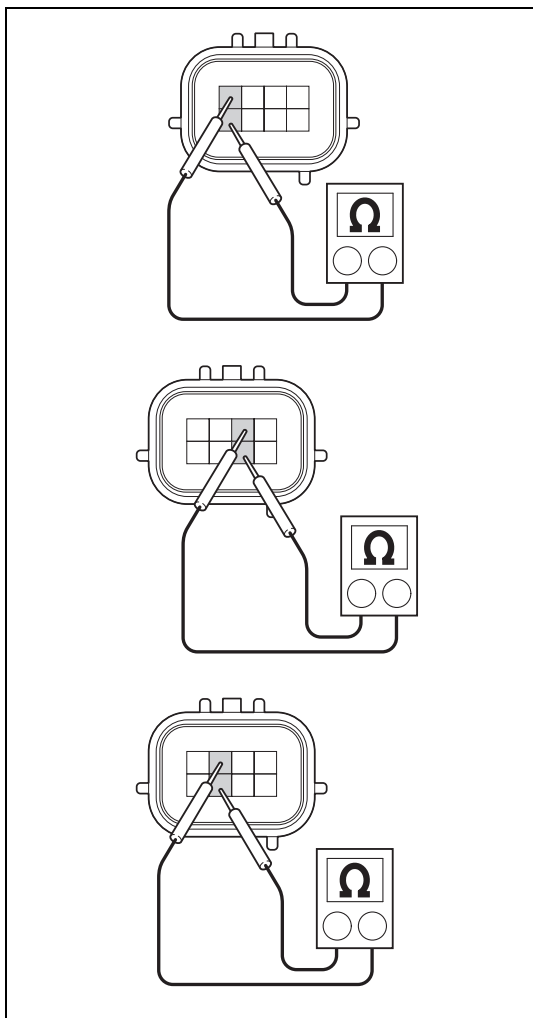
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected

8. Estimated failure factors

- Malfunction of resolver (position detector)
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter

INSPECTION PROCEDURE: P0A42 (TCC1)**1 Inspecting the resolver (sensor)**

SHTS03ZZZ0300398

1. Set the starter key to the "LOCK" position.
2. Disconnect the resolver connector.
3. Using the electrical tester, measure the resistance between the terminals of resolver connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Resolver connector	(All are equivalent to ambient temperature 25 °C {77 °F}.)
	8th terminal – 4th terminal	$7.2 \pm 1.44 \, \Omega$
	6th terminal – 2nd terminal	$26.8 \pm 5.36 \, \Omega$
	7th terminal – 3rd terminal	$28.5 \pm 5.7 \, \Omega$

Is the measured value within the range of standard value?

YES

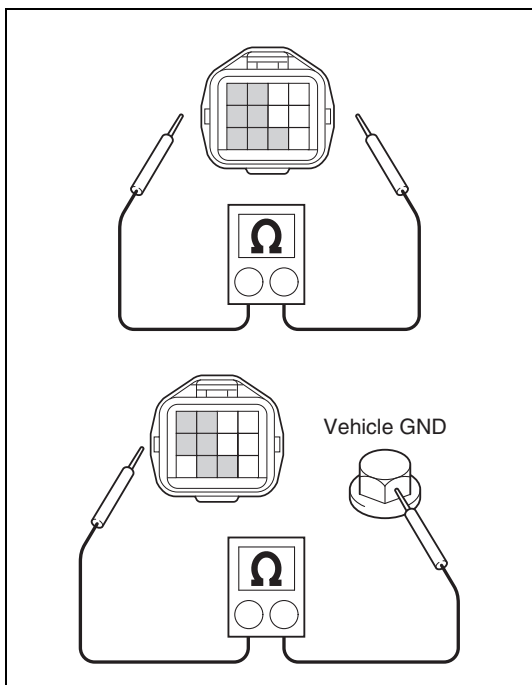
NO

Go to step 2.

Replace the HV motor.

2

Inspecting the vehicle wire harness for short circuit



SHTS03ZZZ0300399

1. Disconnect the PCU harness (12P) connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal	10 k Ω or more (No continuity)
	PCU harness (12P) vehicle-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND	

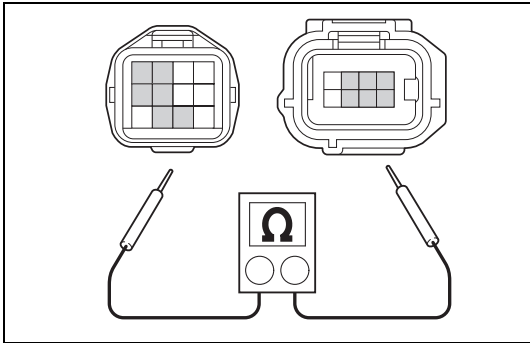
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the vehicle wire harness.

3 Inspecting the vehicle wire harness for continuity

SHTS03ZZZ0300400

1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and resolver connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) vehicle-side connector – Resolver connector 1st terminal – 8th terminal 2nd terminal – 4th terminal 5th terminal – 6th terminal 6th terminal – 7th terminal 10th terminal – 2nd terminal 11th terminal – 3rd terminal	1 Ω or less (With continuity)

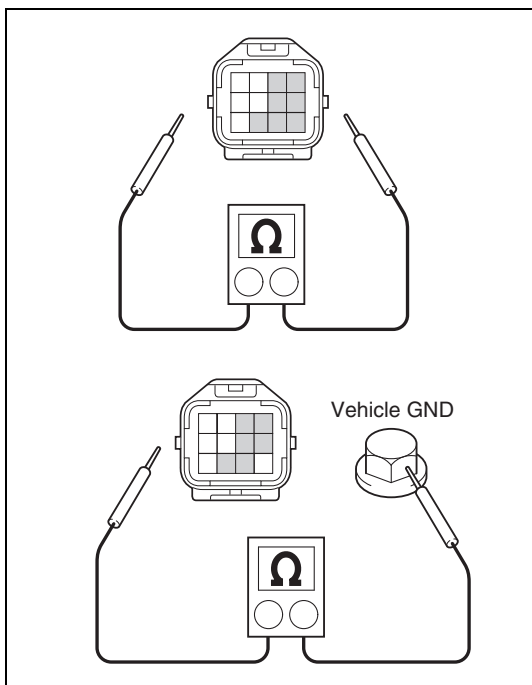
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the vehicle wire harness.

4 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300401

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (12P) lower-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal	10 k Ω or more (No continuity)
	PCU harness (12P) lower-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND	

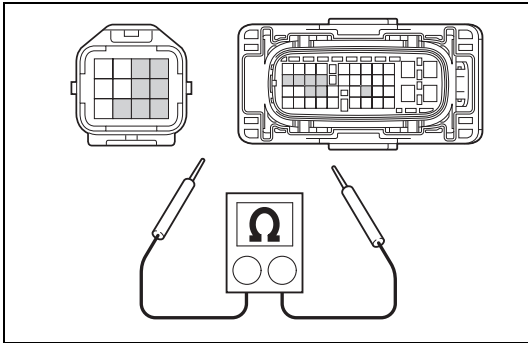
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the PCU wire harness (lower side).

5 Inspecting the PCU wire harness (lower side) for continuity

SHTS03ZZZ0300402

- Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector.

Measurement conditions	Tester connections	Standard values
—	PCU harness (12P) lower-side connector – Inverter 1st terminal – 23rd terminal 2nd terminal – 24th terminal 5th terminal – 12th terminal 6th terminal – 14th terminal 10th terminal – 13th terminal 11th terminal – 15th terminal 9th terminal – 27th terminal	1 Ω or less (With continuity)

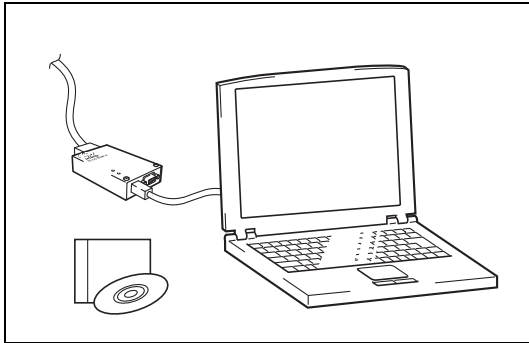
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the PCU wire harness (lower side).

6**Reproduction check [HINO-DX]**

SHTS03ZZZ0300403

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A42-C1 is detected.

Is DTC P0A42-C1 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A42 (TCC1)

P0A42 (TCC1)		Resolver range High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the resolver (sensor)	1. Set the starter key to the "LOCK" position. 2. Disconnect the resolver connector. 3. Using the electrical tester, measure the resistance between the terminals of resolver connector. <Measurement conditions> Starter key: LOCK <Tester connections> Resolver connector (1) 8th terminal – 4th terminal (2) 6th terminal – 2nd terminal (3) 7th terminal – 3rd terminal <Standard values> (All are equivalent to ambient temperature 25 °C {77 °F}.) (1) $7.2 \pm 1.44 \Omega$ (2) $26.8 \pm 5.36 \Omega$ (3) $28.5 \pm 5.7 \Omega$	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the HV motor.

P0A42 (TCC1)		Resolver range High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
2	Inspecting the vehicle wire harness for short circuit	1. Disconnect the PCU harness (12P) connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal PCU harness (12P) vehicle-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the vehicle wire harness.
3	Inspecting the vehicle wire harness for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) vehicle-side connector and resolver connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) vehicle-side connector – Resolver connector 1st terminal – 8th terminal 2nd terminal – 4th terminal 5th terminal – 6th terminal 6th terminal – 7th terminal 10th terminal – 2nd terminal 11th terminal – 3rd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the vehicle wire harness.

P0A42 (TCC1)		Resolver range High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the PCU wire harness (lower side) for short circuit	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (12P) lower-side connector 1st terminal – 2nd, 5th, 6th, 9th, 10th, 11th terminal 2nd terminal – 1st, 5th, 6th, 8th, 10th, 11th terminal 5th terminal – 1st, 2nd, 6th, 9th, 10th, 11th terminal 6th terminal – 1st, 2nd, 5th, 9th, 10th, 11th terminal 10th terminal – 1st, 2nd, 5th, 6th, 9th, 11th terminal 11th terminal – 1st, 2nd, 5th, 6th, 9th, 10th terminal PCU harness (12P) lower-side connector – GND 1st terminal – GND 2nd terminal – GND 5th terminal – GND 6th terminal – GND 10th terminal – GND 11th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the PCU wire harness (lower side).
5	Inspecting the PCU wire harness (lower side) for continuity	1. Using the electrical tester, measure the resistance between the terminals of PCU harness (12P) lower-side connector and inverter connector. <Measurement conditions> — <Tester connections> PCU harness (12P) lower-side connector – Inverter 1st terminal – 23rd terminal 2nd terminal – 24th terminal 5th terminal – 12th terminal 6th terminal – 14th terminal 10th terminal – 13th terminal 11th terminal – 15th terminal 9th terminal – 27th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the PCU wire harness (lower side).

P0A42 (TCC1)		Resolver range High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A42-C1 is detected.	DTC P0A42-C1 is detected: Go to YES. DTC P0A42-C1 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A51 (TCD6)

DTC: P0A51 (TCD6) Abnormality in inverter (current sensor) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected a high resolution signal abnormality in the motor V-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- V-phase current value (low resolution) is less than 175 A.

(2) Judgement criteria

- When one of the following conditions continues for 0.1 second:
 - V-phase current sensor value (high resolution) is less than 0.30 V.
 - V-phase current sensor value (high resolution) is more than 4.40 V.
 - The difference of (V-phase current value [low resolution] - V-phase current value [high resolution]) is more than 75 A.

3. Reset condition

- The following conditions continue for 0.2 second:
 - V-phase current sensor value (high resolution) is 0.30 V or more.
 - V-phase current sensor value (high resolution) is 4.40 V or less.
 - (V-phase current value [low resolution] - V-phase current value [high resolution]) is 75 A or less.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

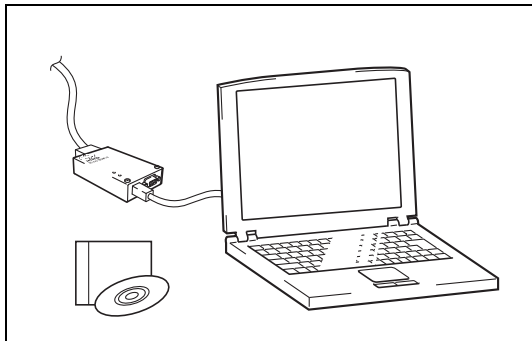
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A51 (TCD6)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300404

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A51-D6 is detected.

Is DTC P0A51-D6 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A51 (TCD6)

P0A51 (TCD6)		Abnormality in inverter (current sensor)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A51-D6 is detected.	DTC P0A51-D6 is detected: Go to YES. DTC P0A51-D6 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A51 (TCD7)

EN01H03ZZZ030602004049

DTC: P0A51 (TCD7) Abnormality in inverter (current sensor) INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected a high resolution signal abnormality in the motor W-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- W-phase current value (low resolution) is less than 175 A.

(2) Judgement criteria

- When one of the following conditions continues for 0.1 second:
 - W-phase current sensor value (high resolution) is less than 0.30 V.
 - W-phase current sensor value (high resolution) is more than 4.40 V.
 - The difference of (W-phase current value [low resolution] - W-phase current value [high resolution]) is more than 75 A.

3. Reset condition

- The following conditions continue for 0.2 second:
 - W-phase current sensor value (high resolution) is 0.30 V or more.
 - W-phase current sensor value (high resolution) is 4.40 V or less.
 - (W-phase current value [low resolution] - W-phase current value [high resolution]) is 75 A or less.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

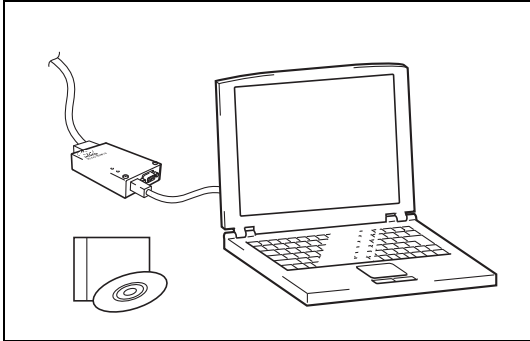
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0A51 (TCD7)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300405

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0A51-D7 is detected.

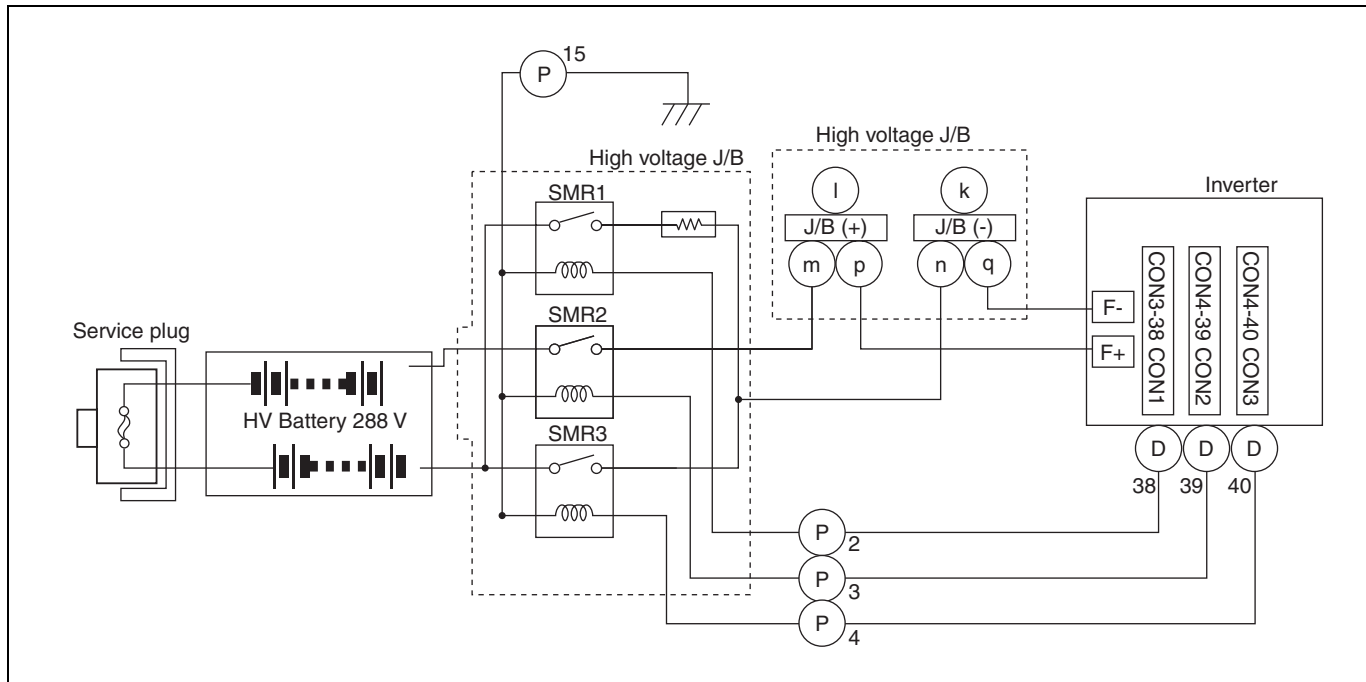
Is DTC P0A51-D7 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A51 (TCD7)

P0A51 (TCD7)		Abnormality in inverter (current sensor)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0A51-D7 is detected.	DTC P0A51-D7 is detected: Go to YES. DTC P0A51-D7 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A78 (TC13)

EN01H03ZZZ030602004050

DTC: P0A78 (TC13) Abnormality in inverter system
INFORMATION

SHTS03ZZZ0300406

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (excessively low DC voltage).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the engine starts, 10 seconds or more have passed.
- SMR#2-side control signal is ON.
- SMR#3-side control signal is ON.
- Since the SMR#3 side is turned ON, 260 seconds or more have passed.
- SMR#1-side control signal is ON.

(2) Judgement criteria

- The state in which the inverter DC voltage is less than 100 V is detected continuously for 0.2 second.

3. Reset condition

- When the abnormality is not confirmed, the state in which the inverter DC voltage is 100 V or more is detected continuously for 0.4 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

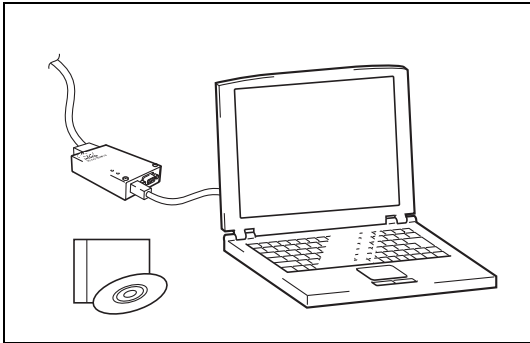
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

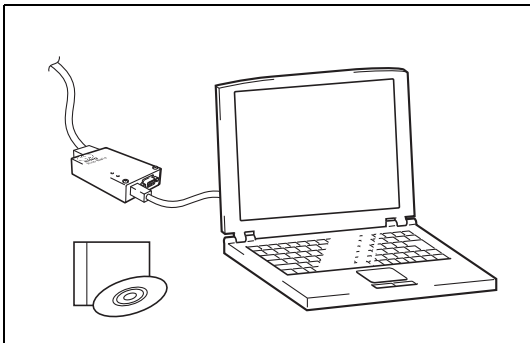
8. Estimated failure factors

- Malfunction of HV motor
- Malfunction of three-phase cable
- Malfunction of SMR#1
- Malfunction of SMR#2
- Malfunction of SMR#3
- Blown fuse
- Disconnection of DC high-voltage cable

INSPECTION PROCEDURE: P0A78 (TC13)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300407

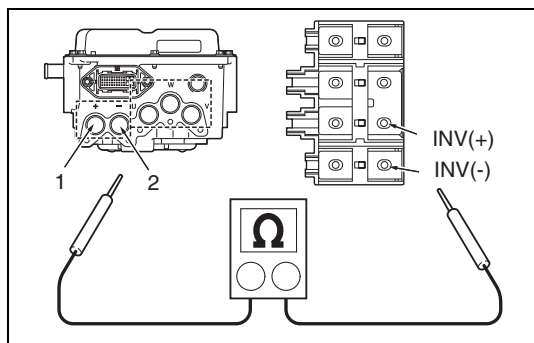
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P0A95 related to the HV battery line is detected.

Is DTC P0A95 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300408

1. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC other than P0A78-13 is detected:
 - P0ADC, P0ADB, P0AE7, P0AE0, P0AE6, P0ADF

Is any DTC other than P0A78-13 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3 Inspecting the DC high-voltage cable for continuity 1

SHTS03ZZZ0300409

1. Set the starter key to the "LOCK" position.
2. Remove the inverter terminal block cover and the ECU box terminal block cover.
3. Using the electrical tester, measure the resistance between the terminals of inverter and high-voltage J/B (in the ECU box).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter (high-voltage terminal) – high-voltage J/B (in ECU box) P(1) terminal – INV(+) terminal N(2) terminal – INV(-) terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the DC high-voltage cable between the terminals of inverter and high-voltage J/B (in the ECU box).

4 Inspecting the DC high-voltage cable

1. Check the P(+) and N(-) terminals of DC high-voltage cable (inverter side) for failing connection (looseness, wear, or melting damage).

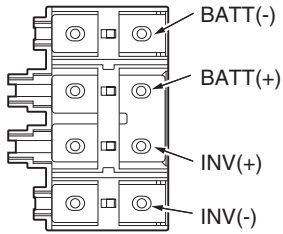
Is any defect found?

YES

Retighten the terminals.
Replace the terminals if abnormal wear or melting damage is detected.

NO

Go to step 5.

5 Inspecting the high-voltage J/B (in the ECU box)

SHTS03ZZZ0300410

1. Check the high-voltage J/B (in the ECU box) for failing connection (looseness, wear, or melting damage).

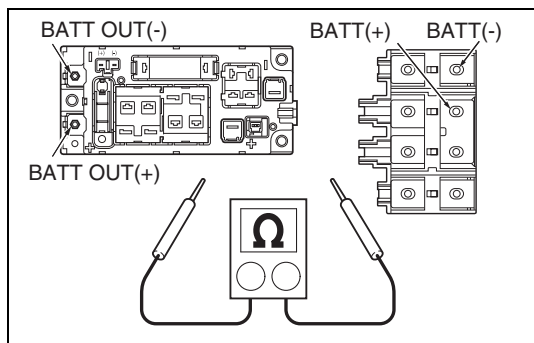
- BATT(+) terminal
- BATT(-) terminal
- INV(+) terminal
- INV(-) terminal

Is any defect found?**YES**

**Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.**

NO

Go to step 6.

6 Inspecting the DC high-voltage cable for continuity 2

SHTS03ZZZ0300411

1. Remove the HV battery terminal block cover.
2. Using the electrical tester, measure the resistance between the terminals of high voltage J/B (in the battery pack) and high-voltage J/B (in the ECU box).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in battery pack) – High-voltage J/B (in ECU box) BATT OUT(+) terminal – BATT(+) terminal BATT OUT(-) terminal – BATT(-) terminal	1 Ω or less (With continuity)

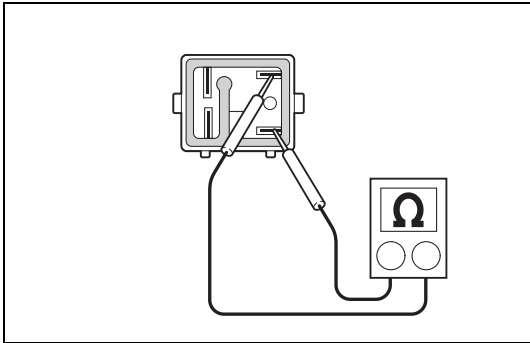
Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Replace the DC high-voltage cable between the high-voltage J/B (in the battery pack) and the high-voltage J/B (in the ECU box).

7 Inspecting the SMR#1

SHTS03ZZZ0300412

1. Remove the SMR#1 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#1 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#1 terminal (switch side) 3rd terminal – 5th terminal	10 kΩ or more (No continuity)

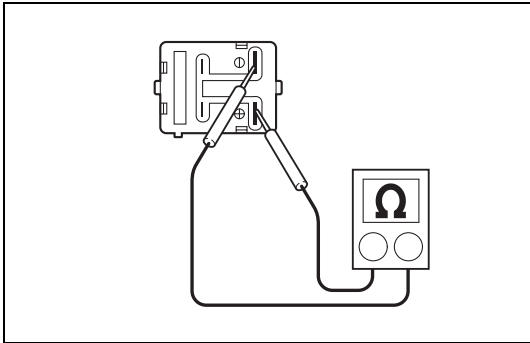
Is the measured value within the range of standard value?

YES

Go to step 8.

NO

Replace the SMR#1.
After replacement, go to step 8.

8 Inspecting the SMR#2

SHTS03ZZZ0300413

1. Remove the SMR#2 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#2 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#2 terminal (switch side) 3rd terminal – 5th terminal	10 kΩ or more (No continuity)

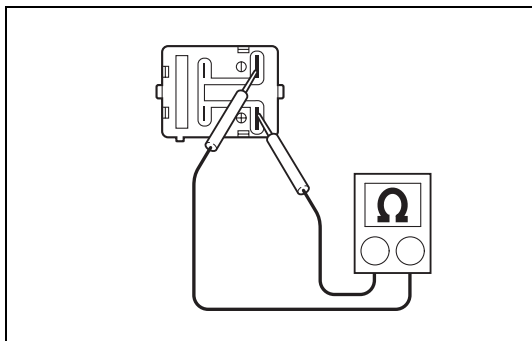
Is the measured value within the range of standard value?

YES

Go to step 9.

NO

Replace the SMR#2.
After replacement, go to step 9.

9 Inspecting the SMR#3

SHTS03ZZZ0300414

1. Remove the SMR#3 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#3 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#3 terminal (switch side) 3rd terminal – 5th terminal	10 k Ω or more (No continuity)

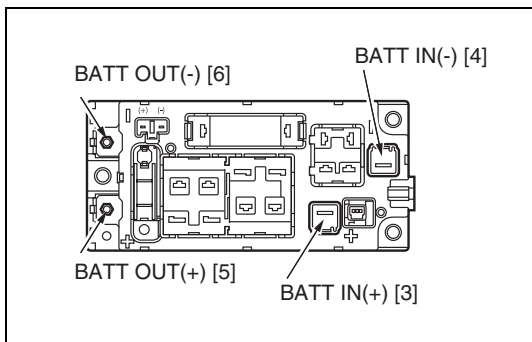
Is the measured value within the range of standard value?

YES

NO

Go to step 10.

Replace the SMR#3.
After replacement, go to step 10.

10 Checking the high-voltage J/B (in the battery pack) for short circuit

SHTS03ZZZ0300415

1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack) (with SMR#1, 2, and 3 removed).

Measurement conditions	Tester connections	Standard values
—	High-voltage J/B (in battery pack) BATT IN(-) terminal – BATT OUT(-) terminal BATT IN(+) terminal – BATT OUT(+) terminal	10 k Ω or more (No continuity)

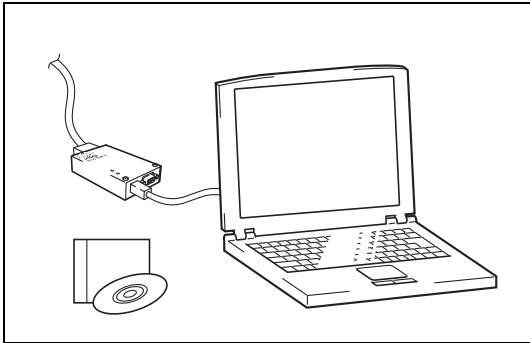
Is the measured value within the range of standard value?

YES

NO

Go to step 11.

Replace the high-voltage J/B (in the battery pack).

11 Reproduction check [HINO-DX]

SHTS03ZZZ0300416

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if DTC P0A78-13 is detected.

HINT**Monitor [DC voltage] on the data monitor.****Is DTC P0A78-13 detected?****YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A78 (TC13)

P0A78 (TC13)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P0A95 related to the HV battery line is detected.	DTC P0A95 is detected: Go to YES. DTC P0A95 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any of the following DTC other than P0A78-13 is detected: • P0ADC, P0ADB, P0AE7, P0AE0, P0AE6, P0ADF	DTC other than P0A78-13 is detected: Go to YES. DTC other than P0A78-13 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the DC high-voltage cable for continuity 1	1. Set the starter key to the "LOCK" position. 2. Remove the inverter terminal block cover and the ECU box terminal block cover. 3. Using the electrical tester, measure the resistance between the terminals of inverter and high-voltage J/B (in the ECU box). <Measurement conditions> Starter key: LOCK <Tester connections> Inverter (high-voltage terminal) – High-voltage J/B (in ECU box) P(1) terminal – INV(+) terminal N(2) terminal – INV(-) terminal <Standard values> 1 W or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the DC high-voltage cable between the terminals of inverter and high-voltage J/B (in the ECU box).
4	Inspecting the DC high-voltage cable	1. Check the P(+) and N(-) terminals of DC high-voltage cable (inverter side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 5.

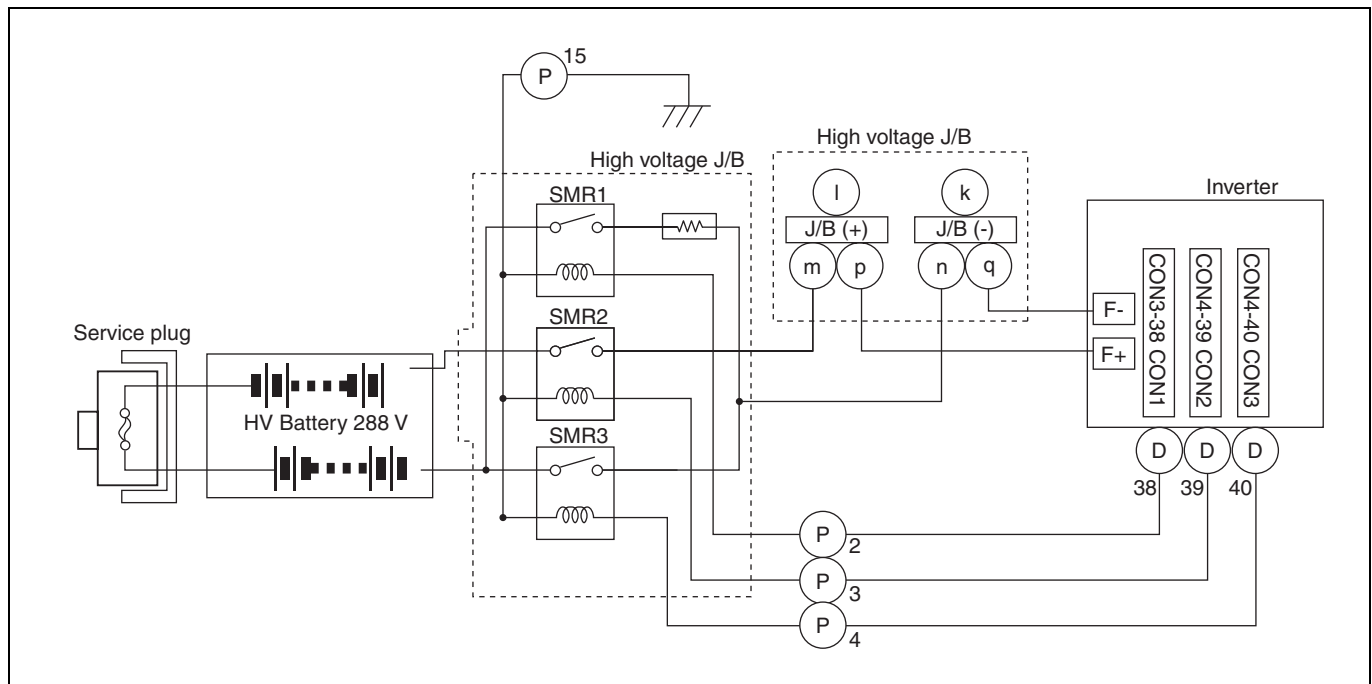
P0A78 (TC13)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the high-voltage J/B (in the ECU box)	1. Check the high-voltage J/B (in the ECU box) for failing connection (looseness, wear, or melting damage). • BATT(+) terminal • BATT(-) terminal • INV(+) terminal • INV(-) terminal	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 6.
6	Inspecting the DC high-voltage cable for continuity 2	1. Remove the HV battery terminal block cover. 2. Using the electrical tester, measure the resistance between the terminals of high voltage J/B (in the battery pack) and high-voltage J/B (in the ECU box). <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in battery pack) – High-voltage J/B (in ECU box) BATT OUT(+) terminal – BATT(+) terminal BATT OUT(-) terminal – BATT(-) terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the DC high-voltage cable between the high-voltage J/B (in the battery pack) and the high-voltage J/B (in the ECU box).
7	Inspecting the SMR#1	1. Remove the SMR#1 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> —. <Tester connections> SMR#1 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the SMR#1. After replacement, go to step 8.

P0A78 (TC13)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
8	Inspecting the SMR#2	1. Remove the SMR#2 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#2 terminals. <Measurement conditions> — <Tester connections> SMR#2 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the SMR#2. After replacement, go to step 9.
9	Inspecting the SMR#3	1. Remove the SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#3 terminals. <Measurement conditions> — <Tester connections> SMR#3 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 10.	Replace the SMR#3. After replacement, go to step 10.
10	Checking the high-voltage J/B (in the battery pack) for short circuit	1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack) (with SMR#1, 2, and 3 removed). <Measurement conditions> — <Tester connections> High-voltage J/B (in battery pack) BATT IN (-) terminal – BATT OUT (-) terminal BATT IN (+) terminal – BATT OUT (+) terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 11.	Replace the high-voltage J/B (in the battery pack).

P0A78 (TC13)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
11	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if DTC P0A78-13 is detected. HINT Monitor [DC voltage] on the data monitor.	DTC P0A78-13 is detected: Go to YES. DTC P0A78-13 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A78 (TC14)

EN01H03ZZZ030602004051

DTC: P0A78 (TC14) Abnormality in inverter system
INFORMATION

SHTS03ZZZ0300417

1. Technical description

- —

<Description of malfunction>

- Detected an abnormality in the inverter (excessively high DC voltage).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- "Over voltage signal from the drive circuit ON (DC voltage) $\geq$ typ.439 V" is detected continuously for 0.07 second.

3. Reset condition

- The following condition continues for 0.14 second:
 - When the abnormality is not confirmed, over voltage signal from the drive circuit ON is not detected.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

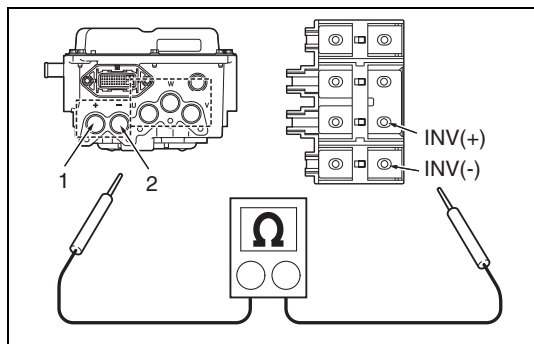
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV motor
- Malfunction of three-phase cable
- Malfunction of SMR#1
- Malfunction of SMR#2
- Malfunction of SMR#3
- Blown fuse
- Disconnection of DC high-voltage cable

INSPECTION PROCEDURE: P0A78 (TC14)**1 Inspecting the DC high-voltage cable for continuity 1**

SHTS03ZZZ0300418

1. Set the starter key to the "LOCK" position.
2. Remove the inverter terminal block cover and the ECU box terminal block cover.
3. Using the electrical tester, measure the resistance between the terminals of inverter and high-voltage J/B (in the ECU box).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter (high-voltage terminal) – High-voltage J/B (in ECU box) P(1) terminal – INV(+) terminal N(2) terminal – INV(-) terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the DC high-voltage cable between the terminals of inverter and high-voltage JB (in the ECU box).

2 Inspecting the DC high-voltage cable 1

1. Check the P(+) and N(-) terminals of DC high-voltage cable (inverter side) for failing connection (looseness, wear, or damage).

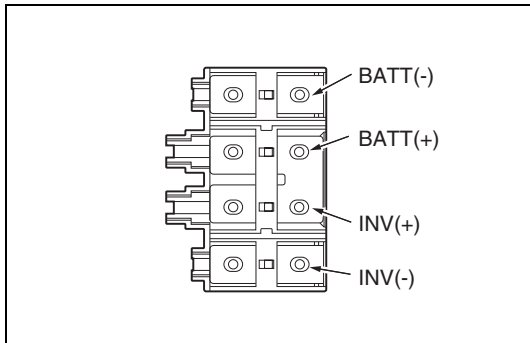
Is any defect found?

YES

Retighten the terminals.
Replace the terminals if abnormal wear or melting damage is detected.

NO

Go to step 3.

3 Inspecting the high-voltage J/B (in the ECU box)

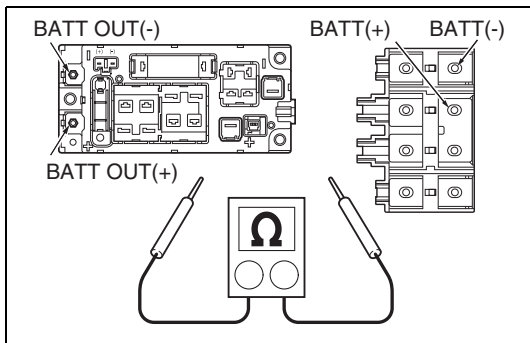
SHTS03ZZZ0300419

1. Check the high-voltage J/B terminals (in the ECU box) for failing connection (looseness, wear, or damage).

- BATT(+) terminal
- BATT(-) terminal
- INV(+) terminal
- INV(-) terminal

Is any defect found?**YES**

Retighten the terminals.
Replace the terminals if abnormal wear or melting damage is detected.

NO**Go to step 4.****4 Inspecting the DC high-voltage cable for continuity 2**

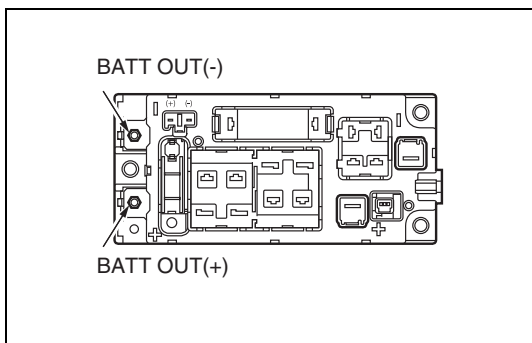
SHTS03ZZZ0300420

1. Remove the HV battery terminal block cover.
2. Using the electrical tester, measure the resistance between the terminals of high voltage J/B (in the battery pack) and high-voltage J/B (in the ECU box).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in battery pack) – High-voltage J/B (in ECU box) BATT OUT(+) terminal – BATT(+) terminal BATT OUT(-) terminal – BATT(-) terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 5.****NO**

Replace the DC high-voltage cable between the high-voltage J/B (in the battery pack) and the high-voltage J/B (in the ECU box).

5 Inspecting the DC high-voltage cable 2

SHTS03ZZZ0300421

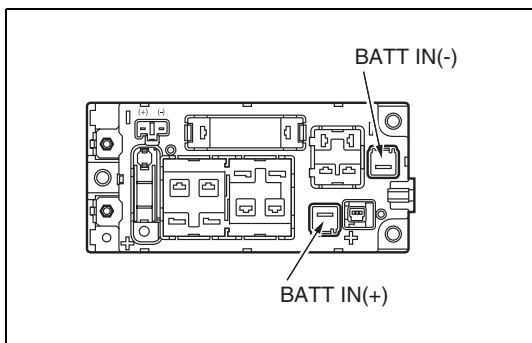
1. Check the BATT OUT(+) terminal and BATT OUT(-) terminal of the high-voltage J/B (in the battery pack) for failing connection (looseness, wear, or damage).

Is any defect found?**YES**

**Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.**

NO

Go to step 6.

6 Inspecting the DC high-voltage cable 3

SHTS03ZZZ0300422

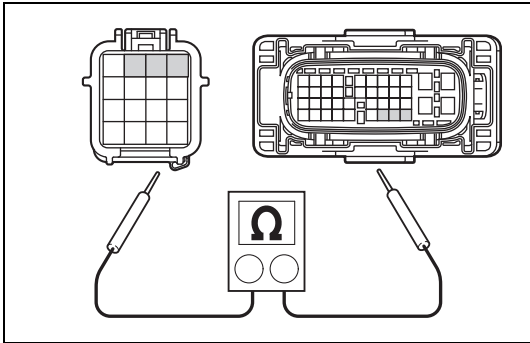
1. Remove the PCU top cover.
2. Check the BATT IN(+) terminal and BATT IN(-) terminal of the high-voltage J/B (in the battery pack) for failing connection (looseness, wear, or damage).

Is any defect found?**YES**

**Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.**

NO

Go to step 7.

7 Inspecting the PCU wire harness (lower side) for continuity 1

SHTS03ZZZ0300423

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector – PCU harness (16P) lower-side connector 38th terminal – 2nd terminal 39th terminal – 3rd terminal 40th terminal – 4th terminal	1 Ω or less (With continuity)

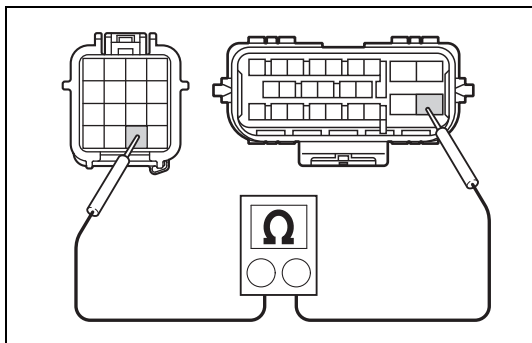
Is the measured value within the range of standard value?

YES

Go to step 8.

NO

Replace the PCU wire harness (lower side).

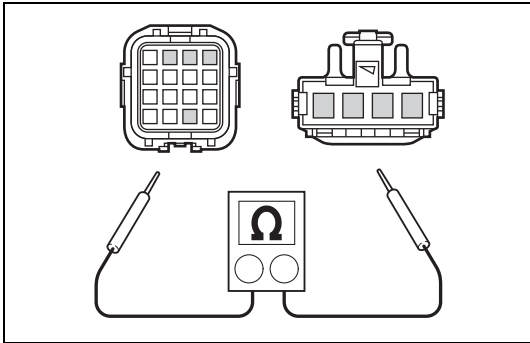
8 Inspecting the PCU wire harness (lower side) for continuity 2

SHTS03ZZZ0300424

1. Disconnect the connector of PCU harness (24P).
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) lower-side connector and PCU harness (24P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector – PCU harness (24P) lower-side connector 15th terminal – 16th terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 9.****NO****Replace the PCU wire harness (lower side).**

9 Inspecting the wire harness in the HV battery for continuity

SHTS03ZZZ0300425

1. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector – SMR drive connector 2nd terminal – 3rd terminal: SMR#1 3rd terminal – 4th terminal: SMR#2 4th terminal – 1st terminal: SMR#3 15th terminal – 2nd terminal	1 Ω or less (With continuity)

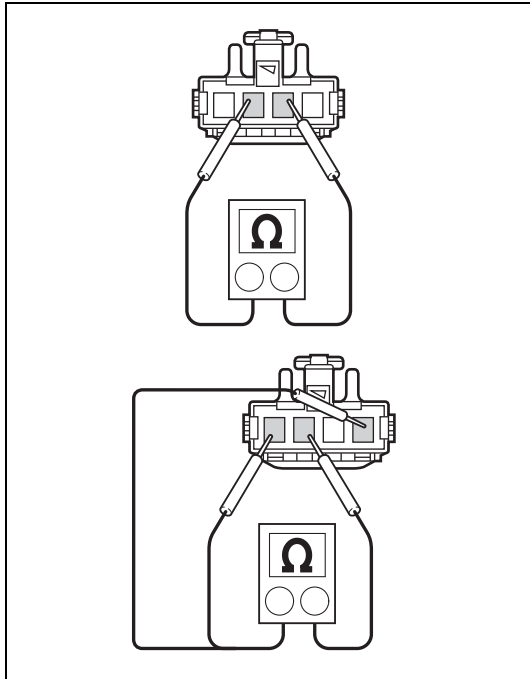
Is the measured value within the range of standard value?

YES

Go to step 10.

NO

Replace the main wire harness in the HV battery.
After replacement, go to step 10.

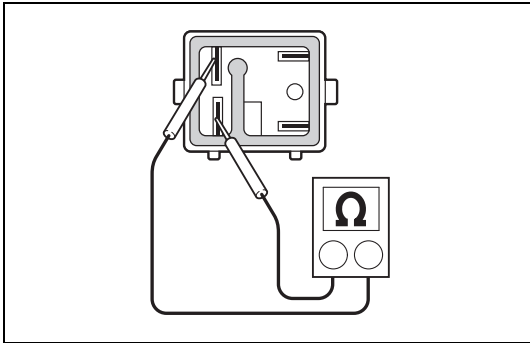
10 Inspecting the high-voltage J/B

SHTS03ZZZ0300426

1. Using the electrical tester, measure the resistance between the SMR drive connector terminals.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	SMR drive connector 3rd terminal – 2nd terminal: SMR#1 4th terminal – 2nd terminal: SMR#2 1st terminal – 2nd terminal: SMR#3	SMR#1: 70 – 190 Ω SMR#2, SMR#3: 19 – 50 Ω

Is the measured value within the range of standard value?**YES****Go to step 14.****NO****Go to step 11.**

11 Inspecting the SMR#1

SHTS03ZZZ0300427

1. Remove the SMR#1 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#1 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#1 1st terminal – 2nd terminal	70 – 190 Ω

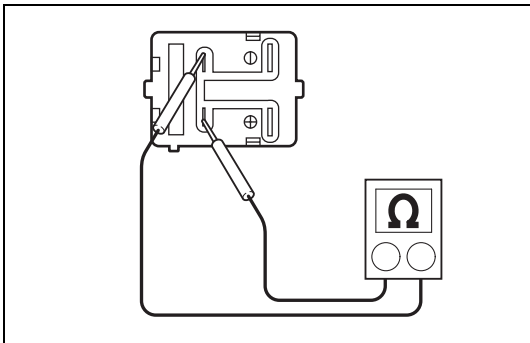
Is the measured value within the range of standard value?

YES

Go to step 12.

NO

Replace the SMR#1.
After replacement, go to step 12.

12 Inspecting the SMR#2

SHTS03ZZZ0300428

1. Remove the SMR#2 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#2 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#2 1st terminal – 2nd terminal	19 – 50 Ω

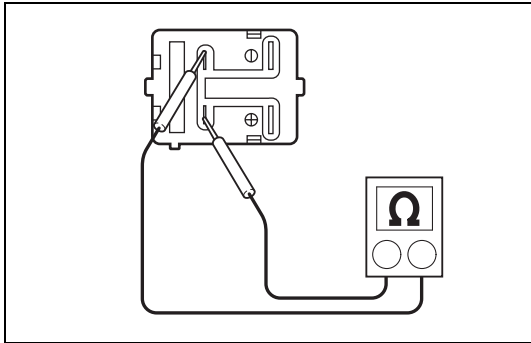
Is the measured value within the range of standard value?

YES

Go to step 13.

NO

Replace the SMR#2.
After replacement, go to step 13.

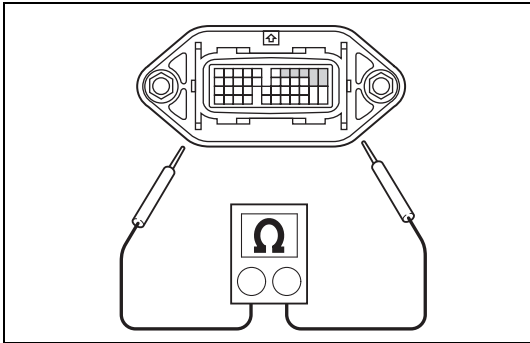
13 Inspecting the SMR#3

SHTS03ZZZ0300429

1. Remove the SMR#3 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#3 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#3 1st terminal – 2nd terminal	19 – 50 Ω

Is the measured value within the range of standard value?**YES****Go to step 14.****NO****Replace the SMR#3.
After replacement, go to step 14.**

14 Inspecting the inverter

SHTS03ZZZ0300430

1. Disconnect the inverter connector.
2. Using the electrical tester, measure the resistance between the terminals of inverter (unit side) connector.

Measurement conditions	Tester connections	Standard values
—	Inverter connector (unit side) 38th terminal – 30th terminal 39th terminal – 30th terminal 40th terminal – 30th terminal 38th terminal – 31st terminal 39th terminal – 31st terminal 40th terminal – 31st terminal	4.0 – 6.2 kΩ

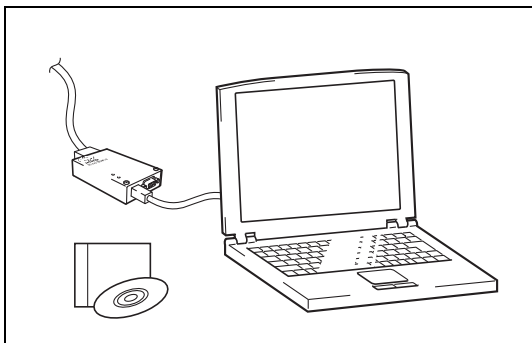
Is the measured value within the range of standard value?

YES

Go to step 15.

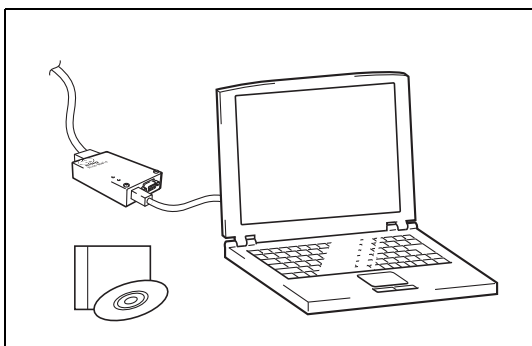
NO

Replace the inverter.

15 Inspecting the HV battery ECU [HINO-DX]

SHTS03ZZZ0300431

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.

Is any DTC related to the HV battery line detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 16.****16 Reproduction check [HINO-DX]**

SHTS03ZZZ0300432

1. Clear the malfunction history.
2. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
3. In [Fault Information] on the diagnosis tool screen, check if P0A78-14 is detected.

HINT**Monitor [DC voltage] on the data monitor.****Is DTC P0A78-14 detected?****YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0A78 (TC14)

P0A78 (TC14)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the DC high-voltage cable for continuity 1	1. Set the starter key to the "LOCK" position. 2. Remove the inverter terminal block cover and the ECU box terminal block cover. 3. Using the electrical tester, measure the resistance between the terminals of inverter and high-voltage J/B (in the ECU box). <Measurement conditions> Starter key: LOCK <Tester connections> Inverter (high-voltage terminal) – High-voltage J/B (in ECU box) P(1) terminal – INV(+) terminal N(2) terminal – INV(-) terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the DC high-voltage cable between the terminals of inverter and high-voltage JB (in the ECU box).
2	Inspecting the DC high-voltage cable 1	1. Check the P(+) and N(-) terminals of DC high-voltage cable (inverter side) for failing connection (looseness, wear, or damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 3.
3	Inspecting the high-voltage J/B (in the ECU box)	1. Check the high-voltage J/B terminals (in the ECU box) for failing connection (looseness, wear, or damage). • BATT(+) terminal • BATT(-) terminal • INV(+) terminal • INV(-) terminal	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 4.

P0A78 (TC14)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the DC high-voltage cable for continuity 2	1. Remove the HV battery terminal block cover. 2. Using the electrical tester, measure the resistance between the terminals of high voltage J/B (in the battery pack) and high-voltage J/B (in the ECU box). <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in battery pack) – High-voltage J/B (in ECU box) BATT OUT(+) terminal – BATT(+) terminal BATT OUT(-) terminal – BATT(-) terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the DC high-voltage cable between the high-voltage J/B (in the battery pack) and the high-voltage J/B (in the ECU box).
5	Inspecting the DC high-voltage cable 2	1. Check the BATT OUT(+) terminal and BATT OUT(-) terminal of the high-voltage J/B (in the battery pack) for failing connection (looseness, wear, or damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 6.
6	Inspecting the DC high-voltage cable 3	1. Remove the PCU top cover. 2. Check the BATT IN(+) terminal and BATT IN(-) terminal of the high-voltage J/B (in the battery pack) for failing connection (looseness, wear, or damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 7.

P0A78 (TC14)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector – PCU harness (16P) lower-side connector 38th terminal – 2nd terminal 39th terminal – 3rd terminal 40th terminal – 4th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the PCU wire harness (lower side).
8	Inspecting the PCU wire harness (lower side) for continuity 2	1. Disconnect the connector of PCU harness (24P). 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) lower-side connector and PCU harness (24P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector – PCU harness (24P) lower-side connector 15th terminal – 16th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the PCU wire harness (lower side).

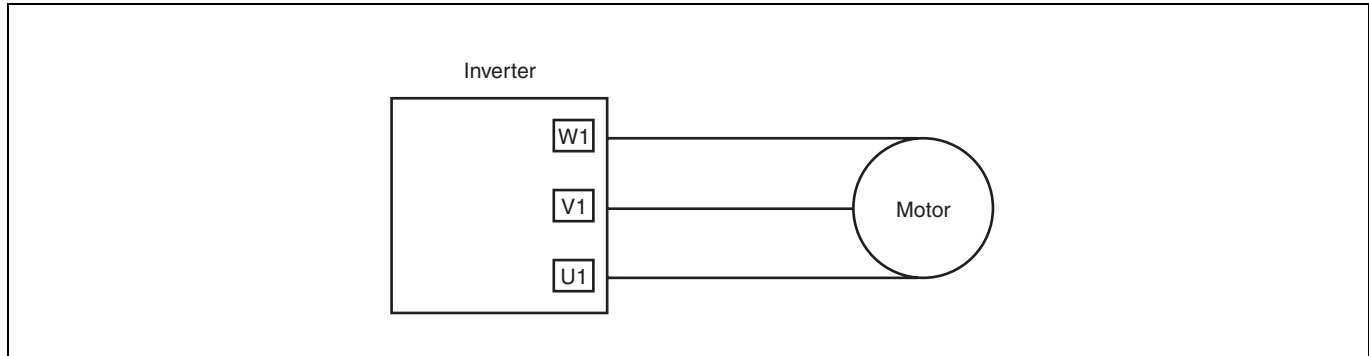
P0A78 (TC14)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
9	Inspecting the wire harness in the HV battery for continuity	1. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector – SMR drive connector 2nd terminal – 3rd terminal: SMR#1 3rd terminal – 4th terminal: SMR#2 4th terminal – 1st terminal: SMR#3 15th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 10.	Replace the main wire harness in the HV battery. After replacement, go to step 10.
10	Inspecting the high-voltage J/B	1. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> Starter key: LOCK <Tester connections> SMR drive connector 3rd terminal – 2nd terminal: SMR#1 4th terminal – 2nd terminal: SMR#2 1st terminal – 2nd terminal: SMR#3 <Standard values> SMR#1: 70 – 190 Ω SMR#2, SMR#3: 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 14.	Go to step 11.
11	Inspecting the SMR#1	1. Remove the SMR#1 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> — <Tester connections> SMR#1 1st terminal – 2nd terminal <Standard values> 70 – 190 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 12.	Replace the SMR#1. After replacement, go to step 12.

P0A78 (TC14)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
12	Inspecting the SMR#2	1. Remove the SMR#2 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#2 terminals. <Measurement conditions> — <Tester connections> SMR#2 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 13.	Replace the SMR#2. After replacement, go to step 13.
13	Inspecting the SMR#3	1. Remove the SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#3 terminals. <Measurement conditions> — <Tester connections> SMR#3 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 14.	Replace the SMR#3. After replacement, go to step 14.
14	Inspecting the inverter	1. Disconnect the inverter connector. 2. Using the electrical tester, measure the resistance between the terminals of inverter (unit side) connector. <Measurement conditions> — <Tester connections> Inverter connector (unit side) 38th terminal – 30th terminal 39th terminal – 30th terminal 40th terminal – 30th terminal 38th terminal – 31st terminal 39th terminal – 31st terminal 40th terminal – 31st terminal <Standard values> 4.0 – 6.2 kΩ	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 15.	Replace the inverter.

P0A78 (TC14)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
15	Inspecting the HV battery ECU [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC related to the HV battery line is detected.	DTC related to the HV battery line is detected: Go to YES. DTC related to the HV battery line is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 16.
16	Reproduction check [HINO-DX]	1. Clear the malfunction history. 2. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 3. In [Fault Information] on the diagnosis tool screen, check if P0A78-14 is detected. HINT Monitor [DC voltage] on the data monitor.	DTC P0A78-14 is detected: Go to YES. DTC P0A78-14 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0A78 (TC15)

EN01H03ZZZ030602004052

DTC: P0A78 (TC15) Abnormality in inverter system
INFORMATION

SHTS03ZZZ0300433

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the inverter (motor overcurrent).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Three-phase ON control request flag = OFF
- The motor speed is 375 r/min or more.

(2) Judgement criteria

- The state in which the phase currents monitored in control cycles are higher than 415 A is detected continuously for 0.08 seconds.

3. Reset condition

- The state in which the phase currents monitored in control cycles are 415 A or less is detected continuously for 0.16 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of HV motor
- Malfunction of three-phase cable
- Malfunction of SMR#1
- Malfunction of SMR#2
- Malfunction of SMR#3
- Blown fuse
- Disconnection of DC high-voltage cable

INSPECTION PROCEDURE: P0A78 (TC15)**1 Inspecting the three-phase cable 1**

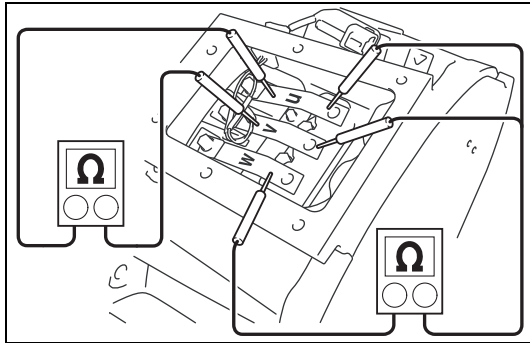
1. Check the three-phase cable connector (inverter-side) for failing connection (looseness, wear, or melting damage).

Is any defect found?**YES****Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.****NO****Go to step 2.****2 Inspecting the three-phase cable 2**

1. Check the ring tongue terminals of three-phase cable (motor side) for failing connection (looseness, wear, or melting damage).

Is any defect found?**YES****Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.****NO****Go to step 3.**

3 Inspecting resistance between HV motor phases



1. Set the starter key to the "LOCK" position.
2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor.
3. Using the electrical tester, measure the resistance between the HV motor terminals.

HINT

If the motor temperature is too high, the resistance largely varies. Therefore, measure the resistance at least 8 hours after the vehicle has stopped.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK (8 hours after the vehicle has stopped)	HV motor U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal	38.2 – 40.5 MΩ (15 – 30 °C {59 – 86 °F})

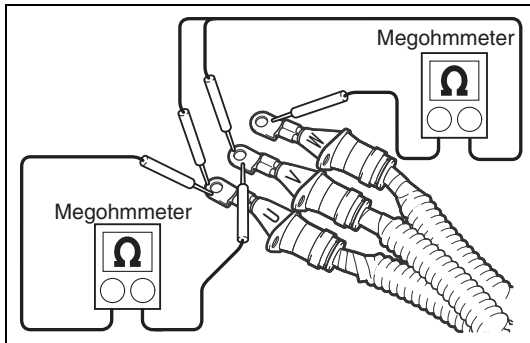
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the HV motor.

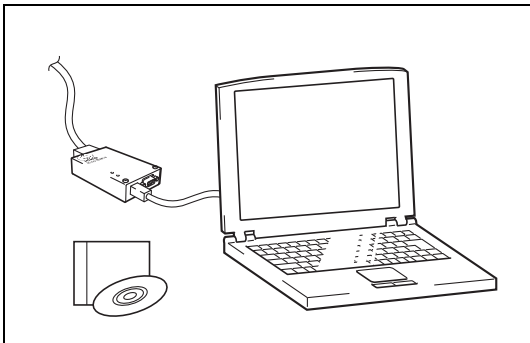
4 Inspecting the three-phase cable 3

SHTS03ZZZ0300435

1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter.
2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable.

⚠ CAUTION**Terminals must be insulated to avoid contact.**

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal	10 MΩ or more

Is the measured value within the range of standard value?**YES****Go to step 5.****NO****Replace the three-phase cable.****5 Reproduction check [HINO-DX]**

SHTS03ZZZ0300436

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0A78-15 is detected.

Is DTC P0A78-15 detected?**YES****Replace the inverter.****NO****The inspection is completed.**

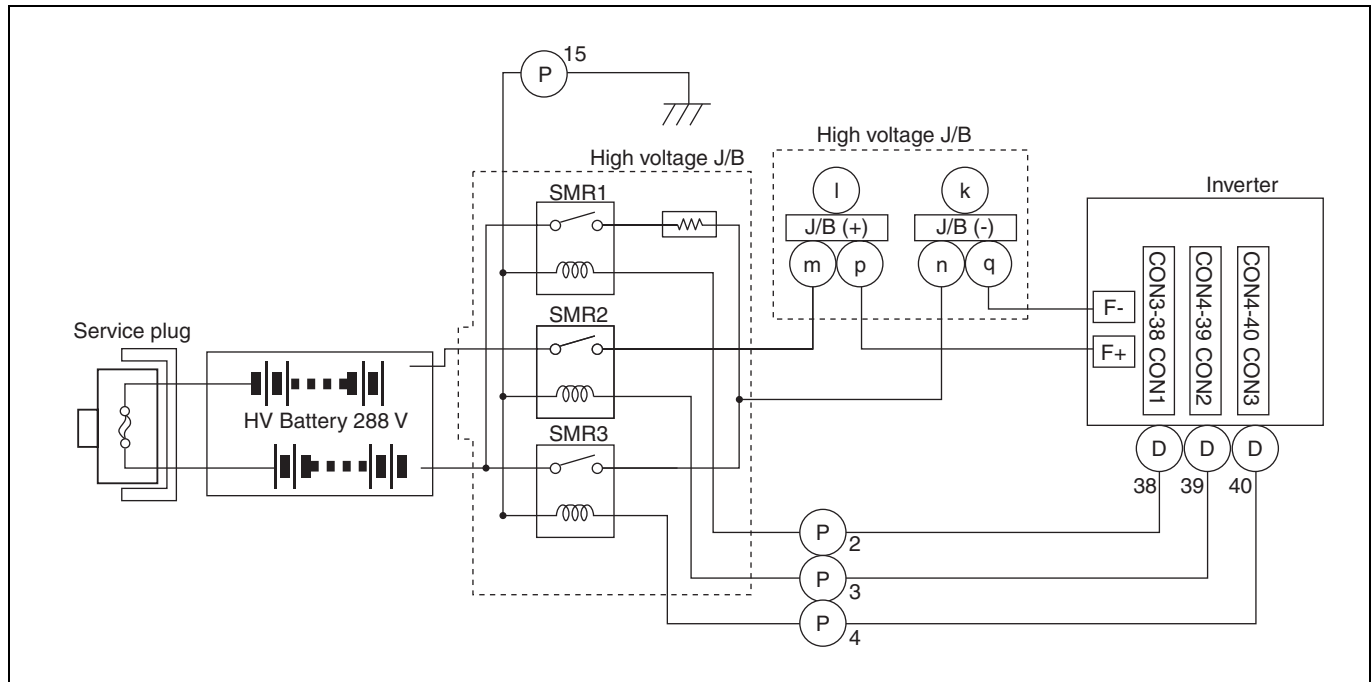
CHECKLIST: P0A78 (TC15)

P0A78 (TC15)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the three-phase cable 1	1. Check the three-phase cable connector (inverter-side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 2.
2	Inspecting the three-phase cable 2	1. Check the ring tongue terminals of three-phase cable (motor side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 3.
3	Inspecting resistance between HV motor phases	1. Set the starter key to the "LOCK" position. 2. Disconnect the three-phase cable (U, V, and W terminals) from the HV motor. 3. Using the electrical tester, measure the resistance between the HV motor terminals. HINT If the motor temperature is too high, the resistance largely varies. Therefore, measure the resistance at least 8 hours after the vehicle has stopped. <Measurement conditions> Starter key: LOCK (8 hours after the vehicle has stopped) <Tester connections> HV motor U-phase terminal – V-phase terminal U-phase terminal – W-phase terminal V-phase terminal – W-phase terminal <Standard values> 38.2 – 40.5 MΩ (15 – 30 °C {59 – 86 °F})	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the HV motor.

P0A78 (TC15)		Abnormality in inverter system		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the three-phase cable 3	1. Disconnect the three-phase cable (U, V, and W terminals) from the inverter. 2. Using the megohm tester (500 V range), measure the insulation resistance between the terminals of three-phase cable. ⚠ CAUTION Terminals must be insulated to avoid contact. <Measurement conditions> Starter key: LOCK <Tester connections> Three-phase cable U terminal – V terminal V terminal – W terminal W terminal – U terminal <Standard values> 10 MΩ or more	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the three-phase cable.
5	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0A78-15 is detected.	DTC P0A78-15 is detected: Go to YES. DTC P0A78-15 is not detected: Go to NO.		Replace the inverter.	The inspection is completed.

DTC: P0AA1 (TCD8)

EN01H03ZZZ030602004053

DTC: P0AA1 (TCD8) SMR#2 (positive side) contact sticking
INFORMATION

SHTS03ZZZ0300437

1. Technical description

- —

<Description of malfunction>

- Detected a contact sticking in the SMR#2 (positive side terminal).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Since the starter key is set to the OFF position, 1.2 seconds or more have passed.

(2) Judgement criteria

- When DC voltage does not drop to 100 V or less even after 1 second has passed since discharge is started (= timeout occurs).

3. Reset condition

- Immediately when discharge is successfully completed

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- —

<Symptoms on the vehicle due to malfunction>

- —

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

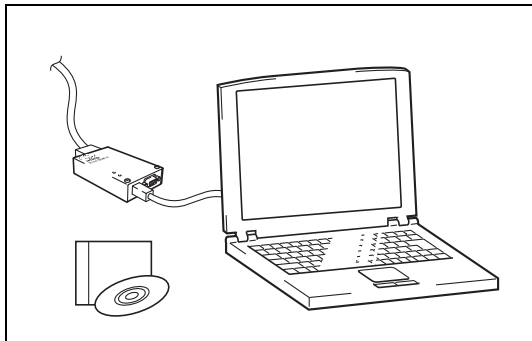
7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of SMR#2 (positive terminal side)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0AA1 (TCD8)

1 Reading the DTC [HINO-DX]

SHTS03ZZZ0300438

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0AA1-D8 is detected:

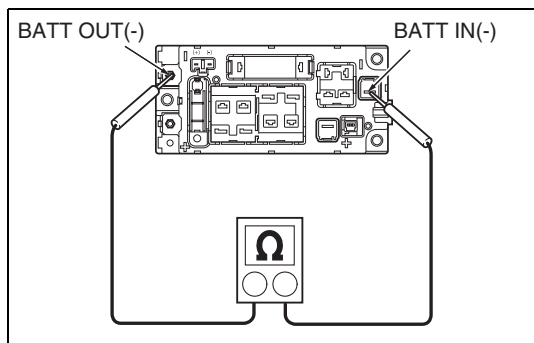
Is any DTC other than P0AA1-D8 detected?

YES

Perform troubleshooting for each of related DTC.

NO

Go to step 2.

2 Inspecting the PN cable for short circuit

SHTS03ZZZ0300439

1. Set the starter key to the "LOCK" position.
2. Disconnect the service plug and wait for 7 minutes or more.
3. Remove the PCU top cover.
4. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack)

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal	10 kΩ or more (No continuity)

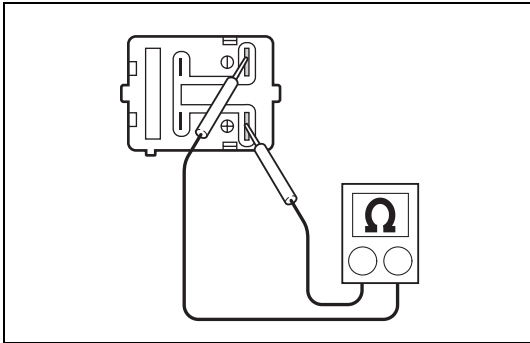
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Go to step 3.

3 Inspecting the SMR#2

SHTS03ZZZ0300440

1. Remove the SMR#2 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#2 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#2 terminal (switch side) 3rd terminal – 5th terminal	10 kΩ or more (No continuity)

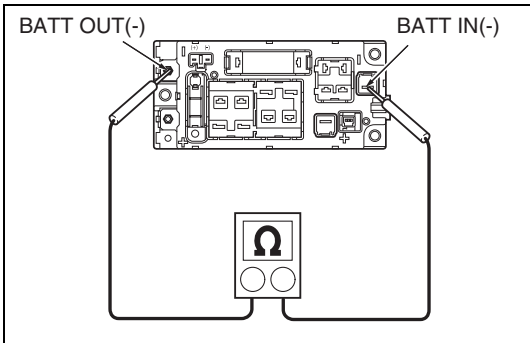
Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the SMR#2.
After replacement, go to step 4.

4 Inspecting the high-voltage J/B (in the battery pack)

SHTS03ZZZ0300441

1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). (with SMR#2 removed).

Measurement conditions	Tester connections	Standard values
—	High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal	10 kΩ or more (No continuity)

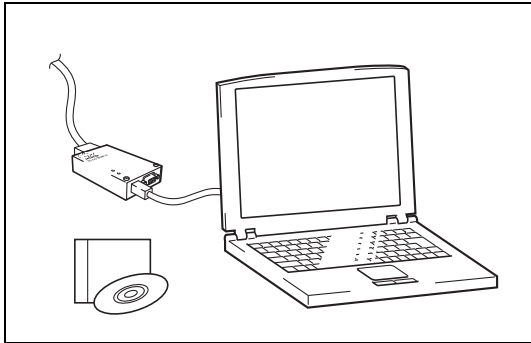
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 5.

5**Restoration check [HINO-DX]**

SHTS03ZZZ0300442

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Clear the malfunction history.
4. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
5. In [Fault Information] on the diagnosis tool screen, check if P0AA1-D8 is detected.

Is DTC P0AA1-D8 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

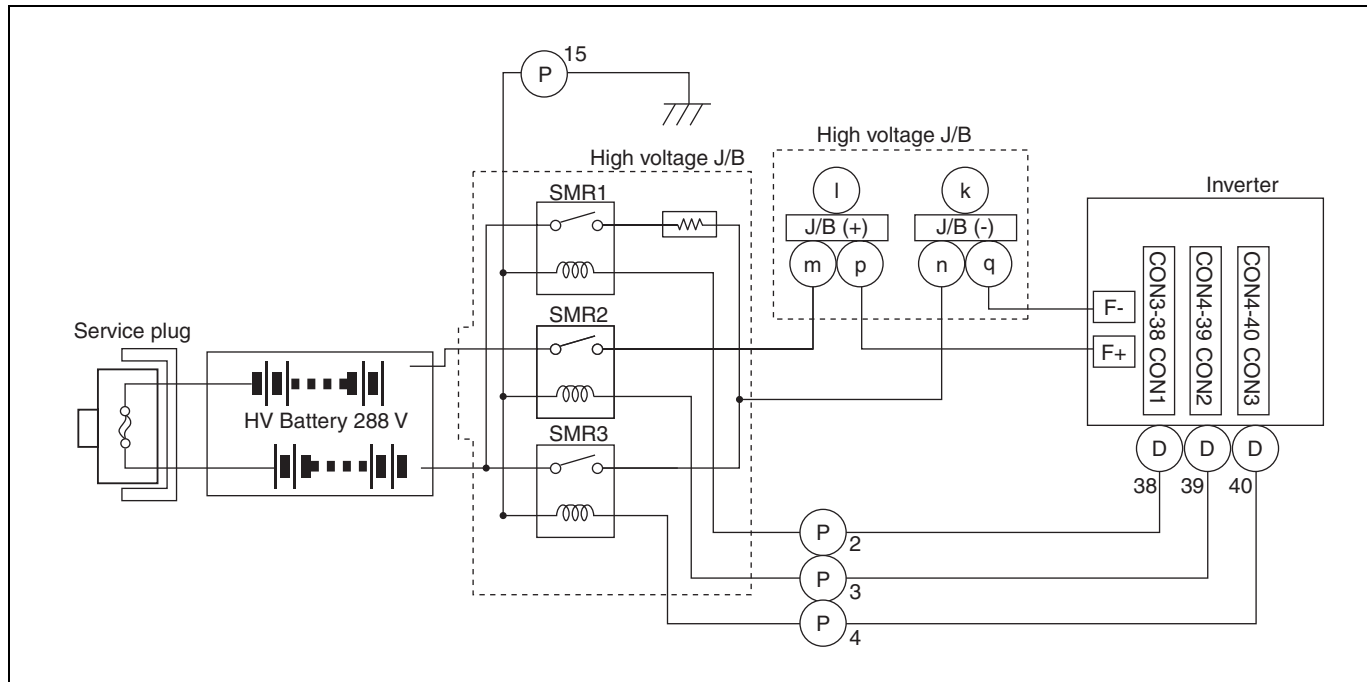
CHECKLIST: P0AA1 (TCD8)

P0AA1 (TCD8)		SMR#2 (positive side) contact sticking		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0AA1-D8 is detected:	DTC other than P0AA1-D8 is detected: Go to YES. DTC other than P0AA1-D8 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the PN cable for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the service plug and wait for 7 minutes or more. 3. Remove the PCU top cover. 4. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack) <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Go to step 3.
3	Inspecting the SMR#2	1. Remove the SMR#2 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#2 terminals. <Measurement conditions> — <Tester connections> SMR#2 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the SMR#2. After replacement, go to step 4.

P0AA1 (TCD8)		SMR#2 (positive side) contact sticking		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the high-voltage J/B (in the battery pack)	1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). (with SMR#2 removed). <Measurement conditions> — <Tester connections> High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Replace the high-voltage J/B (in the battery pack). After replacement, go to step 5.
5	Restoration check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Clear the malfunction history. 4. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 5. In [Fault Information] on the diagnosis tool screen, check if P0AA1-D8 is detected.	DTC P0AA1-D8 is detected: Go to YES. DTC P0AA1-D8 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AA4 (TCD9)

EN01H03ZZZ030602004054

DTC: P0AA4 (TCD9) SMR#1 and 3 (negative side) contact sticking
INFORMATION

SHTS03ZZZ0300443

1. Technical description

- –

<Description of malfunction>

- Detected a contact sticking in the SMR#1 (precharge) and SMR#3 (negative side terminal).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- The motor revolution is 500 r/min or less.

(2) Judgement criteria

- DC voltage > [DC voltage (value obtained at the timing of SMR#2 being turned ON) + 30 V] is detected continuously for 0.01 second.

3. Reset condition

- DC voltage ≤ [DC voltage (value obtained at the timing of SMR#2 being turned ON) + Threshold value (30 V)] is detected continuously for 0.01 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

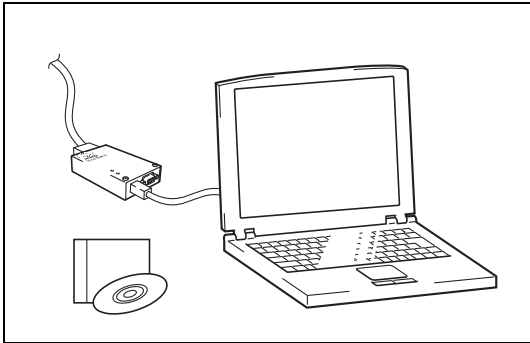
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

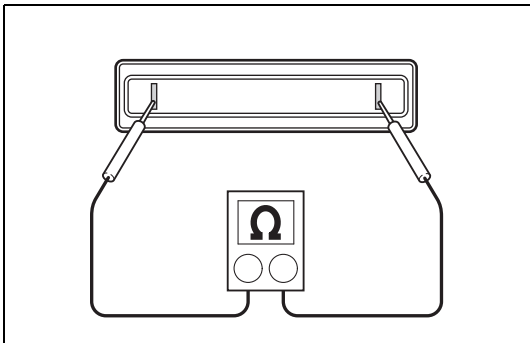
8. Estimated failure factors

- Malfunction of SMR#1 (precharge)
- Malfunction of SMR#3 (negative terminal side)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0AA4 (TCD9)**1 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300444

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0AA4-D9 is detected:

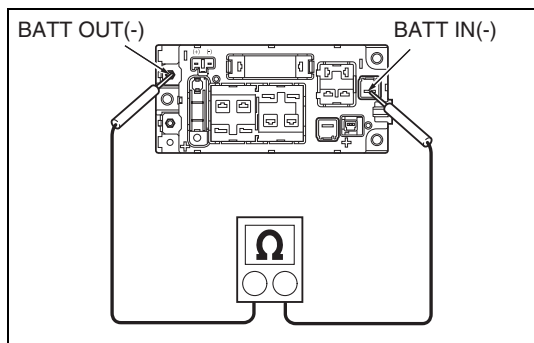
Is any DTC other than P0AA4-D9 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Inspecting the system main resistor**

SHTS03ZZZ0300445

1. Set the starter key to the "LOCK" position.
2. Disconnect the service plug and wait for 7 minutes or more.
3. Remove the PCU top cover.
4. Remove the system main resistor.
5. Using the electrical tester, measure the resistance between the terminals of system main resistor.

Measurement conditions	Tester connections	Standard values
—	Between the terminals of system main resistor	29.5 – 30.5 Ω

Is the measured value within the range of standard value?**YES****Go to step 3.****NO****Replace the system main resistor.
After replacement, go to step 3.**

3 Inspecting the PN cable for short circuit

SHTS03ZZZ0300446

1. Install the system main resistor.
2. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack)

Measurement conditions	Tester connections	Standard values
—	High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal	29.5 – 30.5 Ω

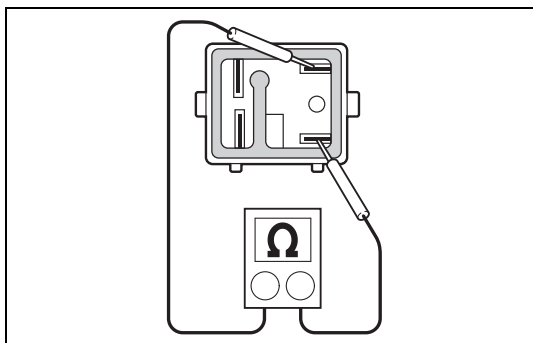
Is the measured value within the range of standard value?

YES

NO

Go to step 4.

Go to step 5.

4 Inspecting the SMR#1

SHTS03ZZZ0300447

1. Remove the SMR#1 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#1 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#1 terminal (switch side) 3rd terminal – 5th terminal	10 kΩ or more (No continuity)

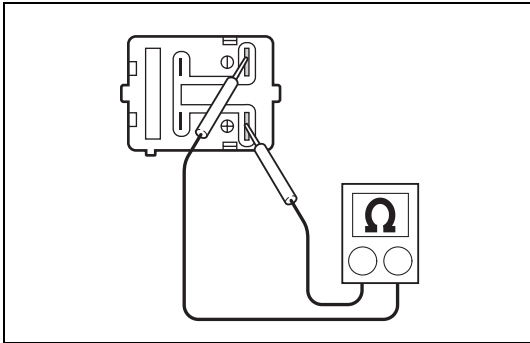
Is the measured value within the range of standard value?

YES

NO

Go to step 6.

Replace the SMR#1.
After replacement, go to step 6.

5 Inspecting the SMR#3

SHTS03ZZZ0300448

1. Remove the SMR#3 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#3 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#3 terminal (switch side) 3rd terminal – 5th terminal	10 k Ω or more (No continuity)

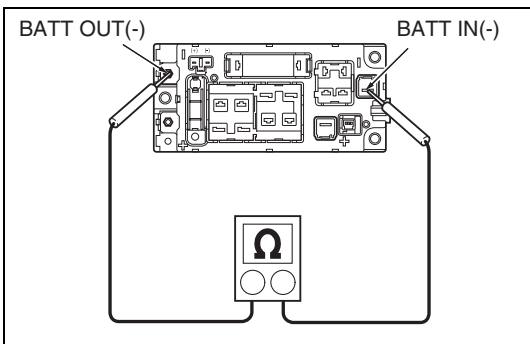
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Replace the SMR#3.
After replacement, go to step 6.

6 Inspecting the high-voltage J/B (in the battery pack)

SHTS03ZZZ0300449

1. Remove SMR#1 or SMR#3 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack).

Measurement conditions	Tester connections	Standard values
—	High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal	10 k Ω or more (No continuity)

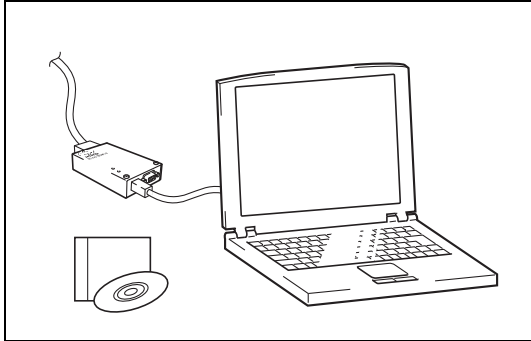
Is the measured value within the range of standard value?

YES

Go to step 7.

NO

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 7.

7**Reproduction check [HINO-DX]**

SHTS03ZZZ0300450

1. Connect all the connectors that have been disconnected to restore the system.
2. Set the starter key to the "ON" position.
3. Clear the malfunction history.
4. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
5. In [Fault Information] on the diagnosis tool screen, check if P0AA4-D9 is detected.

Is DTC P0AA4-D9 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0AA4 (TCD9)

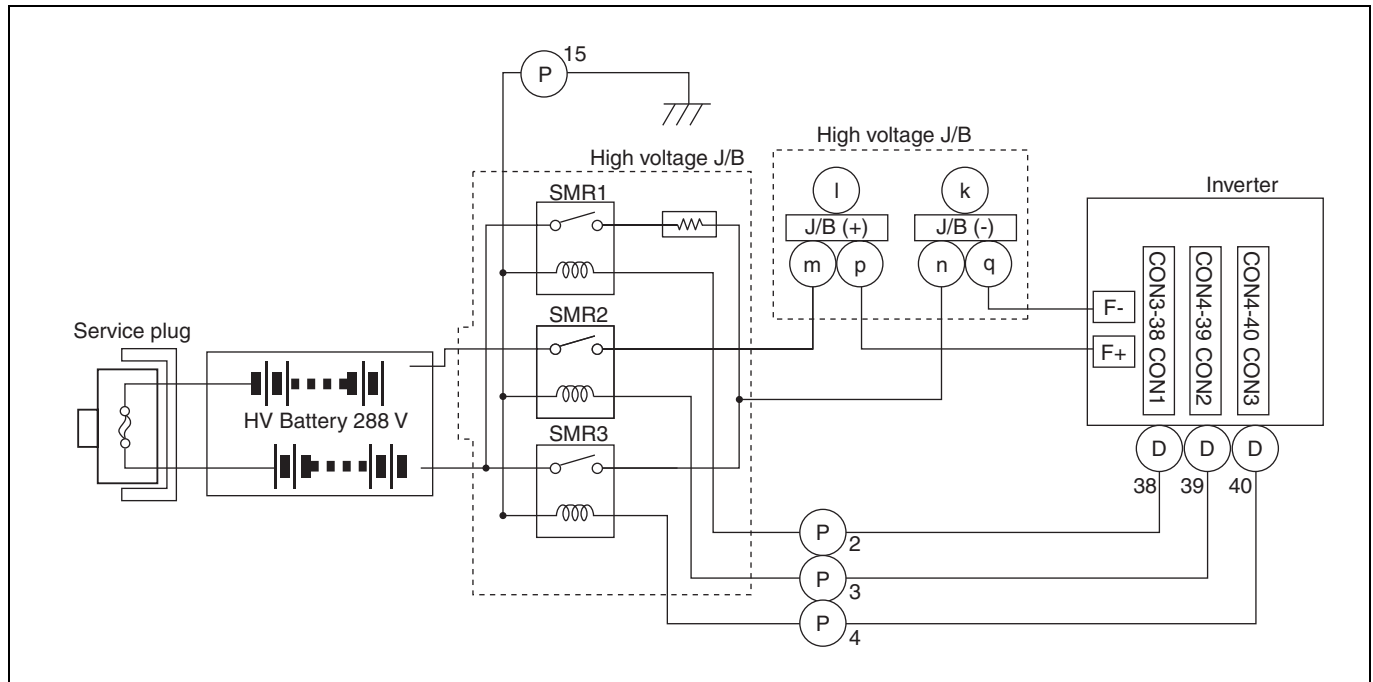
P0AA4 (TCD9)		SMR#1 and 3 (negative side) contact sticking		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reading the DTC [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if any DTC other than P0AA4-D9 is detected:	DTC other than P0AA4-D9 is detected: Go to YES. DTC other than P0AA4-D9 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Inspecting the system main resistor	1. Set the starter key to the "LOCK" position. 2. Disconnect the service plug and wait for 7 minutes or more. 3. Remove the PCU top cover. 4. Remove the system main resistor. 5. Using the electrical tester, measure the resistance between the terminals of system main resistor. <Measurement conditions> — <Tester connections> Between the terminals of system main resistor <Standard values> 29.5 – 30.5 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the system main resistor. After replacement, go to step 3.
3	Inspecting the PN cable for short circuit	1. Install the system main resistor. 2. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack) <Measurement conditions> — <Tester connections> High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal <Standard values> 29.5 – 30.5 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Go to step 5.

P0AA4 (TCD9)		SMR#1 and 3 (negative side) contact sticking		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR#1	1. Remove the SMR#1 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> — <Tester connections> SMR#1 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the SMR#1. After replacement, go to step 6.
5	Inspecting the SMR#3	1. Remove the SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#3 terminals. <Measurement conditions> — <Tester connections> SMR#3 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Replace the SMR#3. After replacement, go to step 6.
6	Inspecting the high-voltage J/B (in the battery pack)	1. Remove SMR#1 or SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). <Measurement conditions> — <Tester connections> High-voltage J/B (in battery pack) BATT OUT(-) terminal – BATT IN(-) terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the high-voltage J/B (in the battery pack). After replacement, go to step 7.

P0AA4 (TCD9)		SMR#1 and 3 (negative side) contact sticking		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
7	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Set the starter key to the "ON" position. 3. Clear the malfunction history. 4. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 5. In [Fault Information] on the diagnosis tool screen, check if P0AA4-D9 is detected.	DTC P0AA4-D9 is detected: Go to YES. DTC P0AA4-D9 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0ADB (TC1F)

EN01H03ZZZ030602004055

DTC: P0ADB (TC1F) SMR#2 (positive side) Low abnormality
INFORMATION

SHTS03ZZZ0300451

1. Technical description

- —

<Description of malfunction>

- Detected a load short (Low abnormality) in the SMR#2 (positive side terminal).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - A load short in the SMR#2 signal line is detected continuously for 0.06 seconds.

3. Reset condition

- Normal output of SMR#2 is detected continuously for 0.06 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

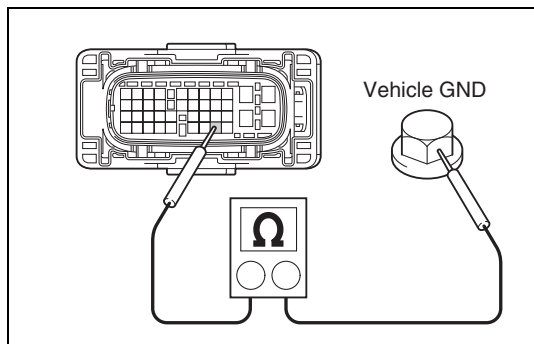
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

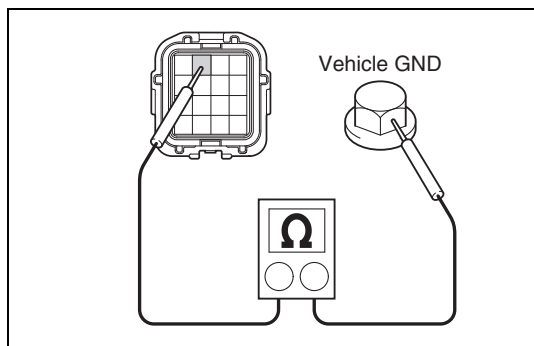
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of SMR#2 (positive terminal)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0ADB (TC1F)**1 Inspecting the PCU wire harness (lower side) for short circuit**

SHTS03ZZZ0300452

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the 39th terminal of inverter connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector 39th terminal – GND	10 kΩ or more (No continuity)

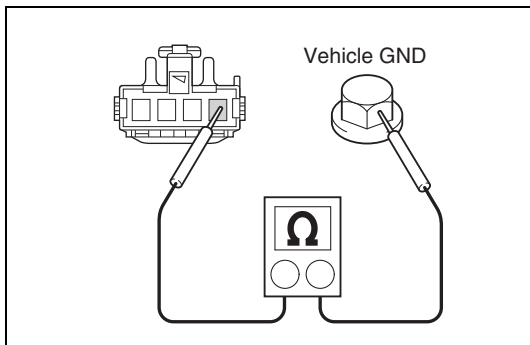
Is the measured value within the range of standard value?**YES****NO****Go to step 2.****Replace the PCU wire harness (lower side).****2 Inspecting the wire harness in the HV battery for short circuit**

SHTS03ZZZ0300453

1. Remove the PCU top cover.
2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
3. Using the electrical tester, measure the resistance between the 3rd terminal of PCU harness (16P) upper-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 3rd terminal – GND	10 kΩ or more (No continuity)

Is the measured value within the range of standard value?**YES****NO****Go to step 3.****Replace the PCU wire harness (upper side).**

3 Inspecting the high-voltage J/B (in the battery pack) for short circuit

SHTS03ZZZ0300454

- Using the electrical tester, measure the resistance between the 4th terminal of SMR drive connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	SMR drive connector 4th terminal – GND	10 k Ω or more (No continuity)

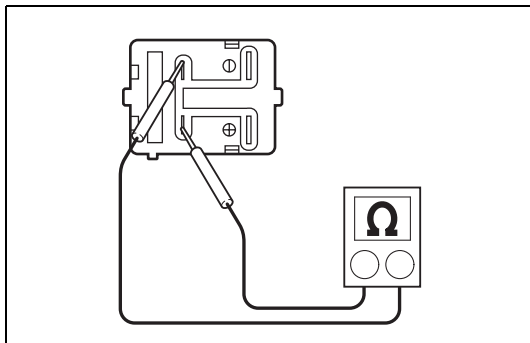
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Go to step 4.

4 Inspecting the SMR#2

SHTS03ZZZ0300455

- Remove the SMR#2 from the high-voltage J/B (in the battery pack).
- Using the electrical tester, measure the resistance between the SMR#2 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#2 terminal (exciting coil side) 1st terminal – 2nd terminal	19 – 50 Ω

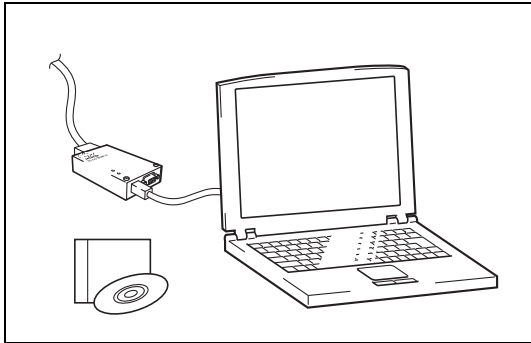
Is the measured value within the range of standard value?

YES

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 5.

NO

Replace the SMR#2.
After replacement, go to step 5.

5**Reproduction check [HINO-DX]**

SHTS03ZZZ0300456

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0ADB-1F is detected.

Is DTC P0ADB-1F detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

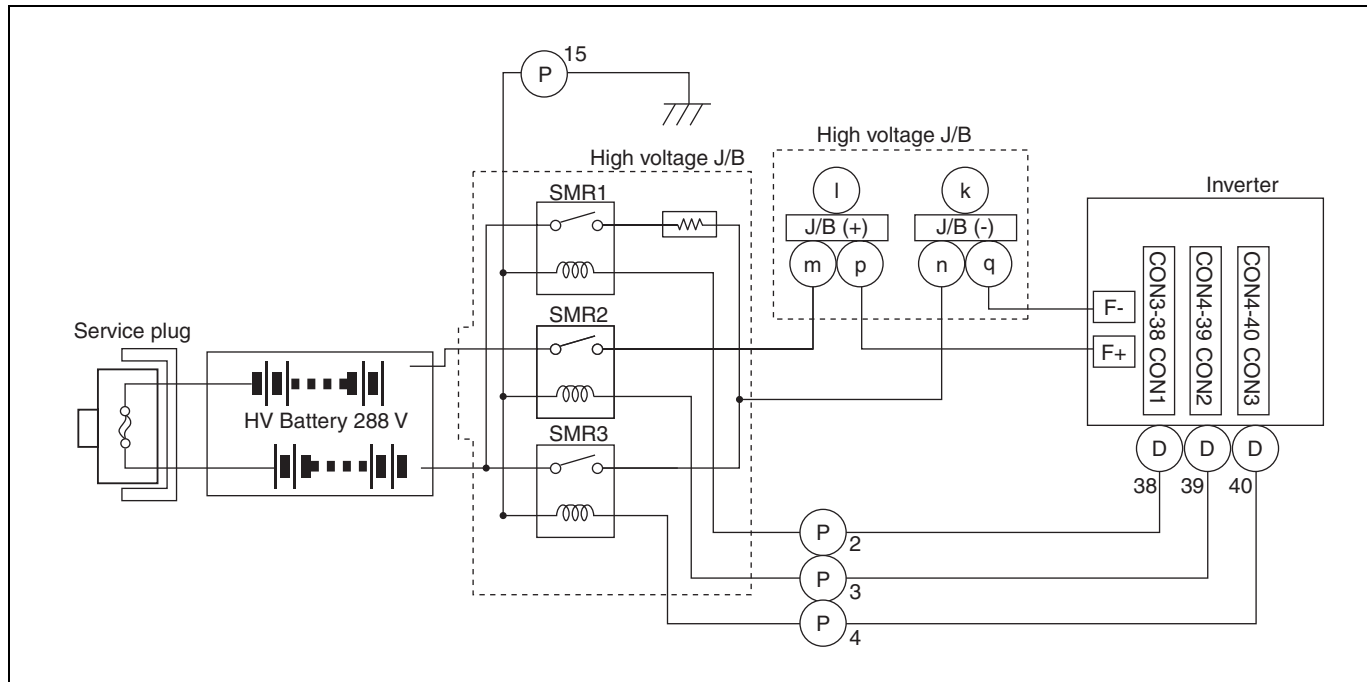
CHECKLIST: P0ADB (TC1F)

P0ADB (TC1F)		SMR#2 (positive side) Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the 39th terminal of inverter connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector 39th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the wire harness in the HV battery for short circuit	1. Remove the PCU top cover. 2. Disconnect the SMR drive connector from the high-voltage J/ B (in the battery pack). 3. Using the electrical tester, measure the resistance between the 3rd terminal of PCU harness (16P) upper-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 3rd terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (upper side).
3	Inspecting the high-voltage J/ B (in the battery pack) for short circuit	1. Using the electrical tester, measure the resistance between the 4th terminal of SMR drive connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> SMR drive connector 4th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Go to step 4.

P0ADB (TC1F)		SMR#2 (positive side) Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR#2	1. Remove the SMR#2 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#2 terminals. <Measurement conditions> — <Tester connections> SMR#2 terminal (exciting coil side) 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the high-voltage J/B (in the battery pack). After replacement, go to step 5.	Replace the SMR#2. After replacement, go to step 5.
5	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0ADB-1F is detected.	DTC P0ADB-1F is detected: Go to YES. DTC P0ADB-1F is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0ADC (TC93)

EN01H03ZZZ030602004056

DTC: P0ADC (TC93) SMR#2 (positive side) High abnormality
INFORMATION

SHTS03ZZZ0300457

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection (High abnormality) in the SMR#2 (positive side terminal).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - A disconnection in SMR#2 output is detected continuously for 0.06 seconds.

3. Reset condition

- Normal output of SMR#2 is detected continuously for 0.06 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

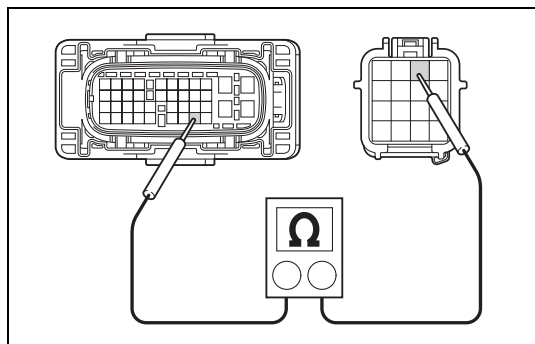
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of SMR#2 (positive terminal)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0ADC (TC93)**1 Inspecting the PCU wire harness (lower side) for continuity 1**

SHTS03ZZZ0300458

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector – PCU harness (16P) lower-side connector 39th terminal – 3rd terminal	1 Ω or less (With continuity)

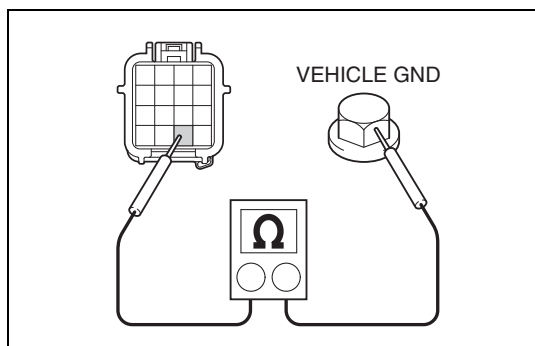
Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the PCU wire harness (lower side).

2 Inspecting the PCU wire harness (lower side) for continuity 2

SHTS03ZZZ0300459

1. Using the electrical tester, measure the resistance between the 15th terminal of PCU harness (16P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 15th terminal – GND	1 Ω or less (With continuity)

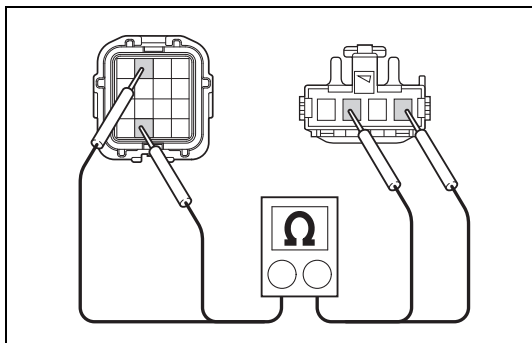
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the PCU wire harness (lower side).

3 Inspecting the wire harness in the HV battery for continuity

SHTS03ZZZ0300460

1. Remove the PCU top cover.
2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector – SMR drive connector 3rd terminal – 4th terminal 15th terminal – 2nd terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 4.****NO****Replace the main wire harness in the HV battery.
After replacement, go to step 4.**

4 Inspecting the SMR drive

- Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack).

Measurement conditions	Tester connections	Standard values
—	SMR drive connector (high-voltage J/B side) 4th terminal – 2nd terminal	19 – 50 Ω

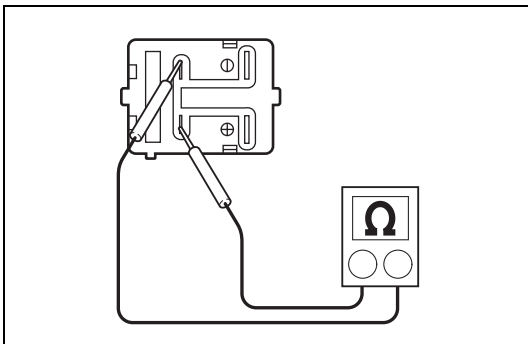
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Go to step 5.

5 Inspecting the SMR#2

SHTS03ZZZ0300461

- Remove the SMR#2 from the high-voltage J/B (in the battery pack).
- Using the electrical tester, measure the resistance between the SMR#2 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#2 terminal (exciting coil side) 1st terminal – 2nd terminal	19 – 50 Ω

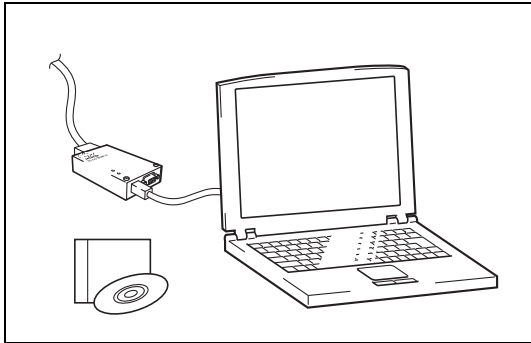
Is the measured value within the range of standard value?

YES

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 6.

NO

Replace the SMR#2.
After replacement, go to step 6.

6**Reproduction check [HINO-DX]**

SHTS03ZZZ0300462

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0ADC-93 is detected.

Is DTC P0ADC-93 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

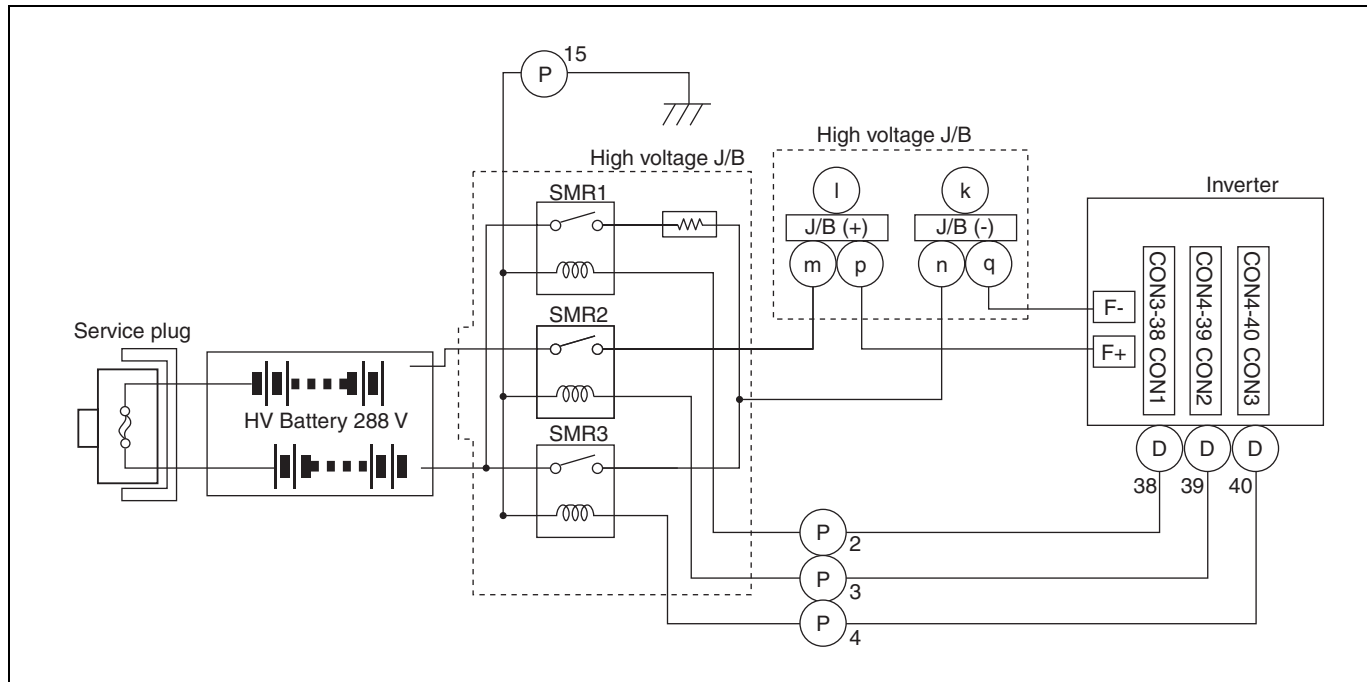
CHECKLIST: P0ADC (TC93)

P0ADC (TC93)		SMR#2 (positive side) High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector – PCU harness (16P) lower-side connector 39th terminal – 3rd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the PCU wire harness (lower side) for continuity 2	1. Using the electrical tester, measure the resistance between the 15th terminal of PCU harness (16P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 15th terminal – GND <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the wire harness in the HV battery for continuity	1. Remove the PCU top cover. 2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack). 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector – SMR drive connector 3rd terminal – 4th terminal 15th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the main wire harness in the HV battery. After replacement, go to step 4.

P0ADC (TC93)		SMR#2 (positive side) High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR drive	1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). <Measurement conditions> — <Tester connections> SMR drive connector (high-voltage J/B side) 4th terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Go to step 5.
5	Inspecting the SMR#2	1. Remove the SMR#2 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#2 terminals. <Measurement conditions> — <Tester connections> SMR#2 terminal (exciting coil side) 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the high-voltage J/B (in the battery pack). After replacement, go to step 6.	Replace the SMR#2. After replacement, go to step 6.
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0ADC-93 is detected.	DTC P0ADC-93 is detected: Go to YES. DTC P0ADC-93 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0ADF (TC1E)

EN01H03ZZZ030602004057

DTC: P0ADF (TC1E) SMR#3 (negative side) Low abnormality
INFORMATION

SHTS03ZZZ0300463

1. Technical description

- —

<Description of malfunction>

- Detected a load short circuit (Low abnormality) in the SMR#3 (negative side terminal).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - A load short circuit in the SMR#3 signal line is detected continuously for 0.06 seconds.

3. Reset condition

- Normal output of SMR#3 is detected continuously for 0.06 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

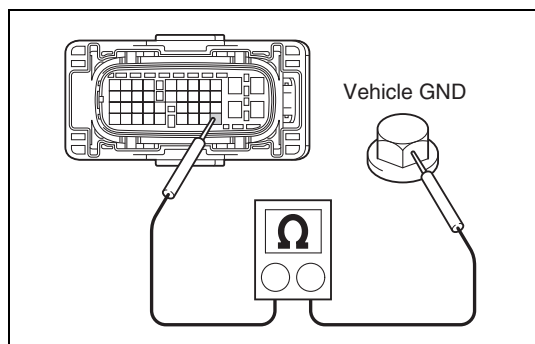
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of SMR#3 (negative terminal)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0ADF (TC1E)**1 Inspecting the PCU wire harness (lower side) for short circuit**

SHTS03ZZZ0300464

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the 40th terminal of inverter connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector 40th terminal – GND	10 kΩ or more (No continuity)

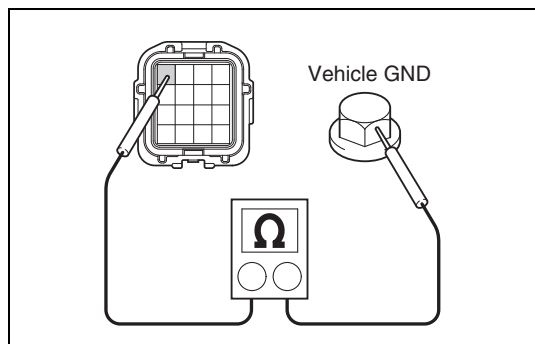
Is the measured value within the range of standard value?

YES

NO

Go to step 2.

Replace the PCU wire harness (lower side).

2 Inspecting the wire harness in the HV battery for short circuit

SHTS03ZZZ0300465

1. Remove the PCU top cover.
2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
3. Using the electrical tester, measure the resistance between the 4th terminal of PCU harness (16P) upper-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 4th terminal – GND	10 kΩ or more (No continuity)

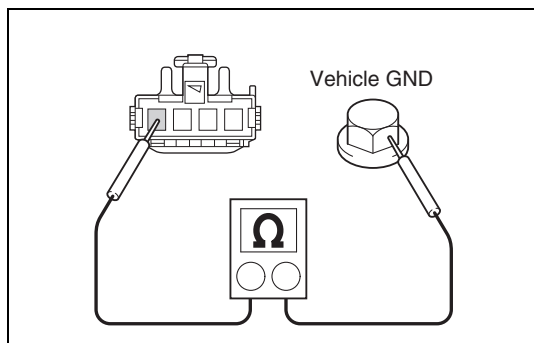
Is the measured value within the range of standard value?

YES

NO

Go to step 3.

Replace the PCU wire harness (upper side).

3 Inspecting the high-voltage J/B (in the battery pack) for short circuit

SHTS03ZZZ0300466

- Using the electrical tester, measure the resistance between the 1st terminal of SMR drive connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	SMR drive connector 1st terminal – GND	10 k Ω or more (No continuity)

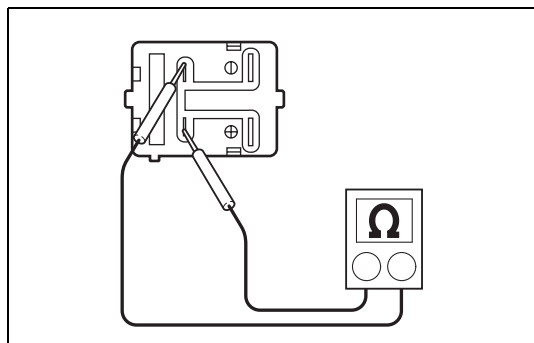
Is the measured value within the range of standard value?

YES

NO

Go to step 5.

Go to step 4.

4 Inspecting the SMR#3

SHTS03ZZZ0300467

- Remove the SMR#3 from the high-voltage J/B (in the battery pack).
- Using the electrical tester, measure the resistance between the SMR#3 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#3 terminal (exciting coil side) 1st terminal – 2nd terminal	19 – 50 Ω

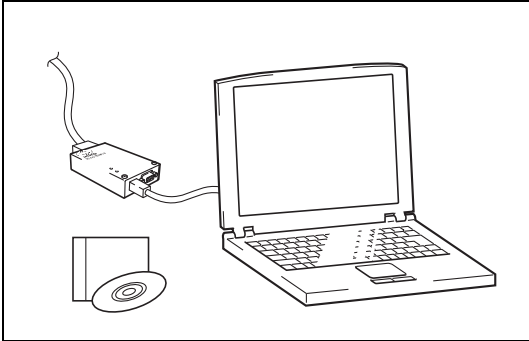
Is the measured value within the range of standard value?

YES

NO

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 5.

Replace the SMR#3.
After replacement, go to step 5.

5 Reproduction check [HINO-DX]

SHTS03ZZZ0300468

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0ADF-1E is detected.

Is DTC P0ADF-1E detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

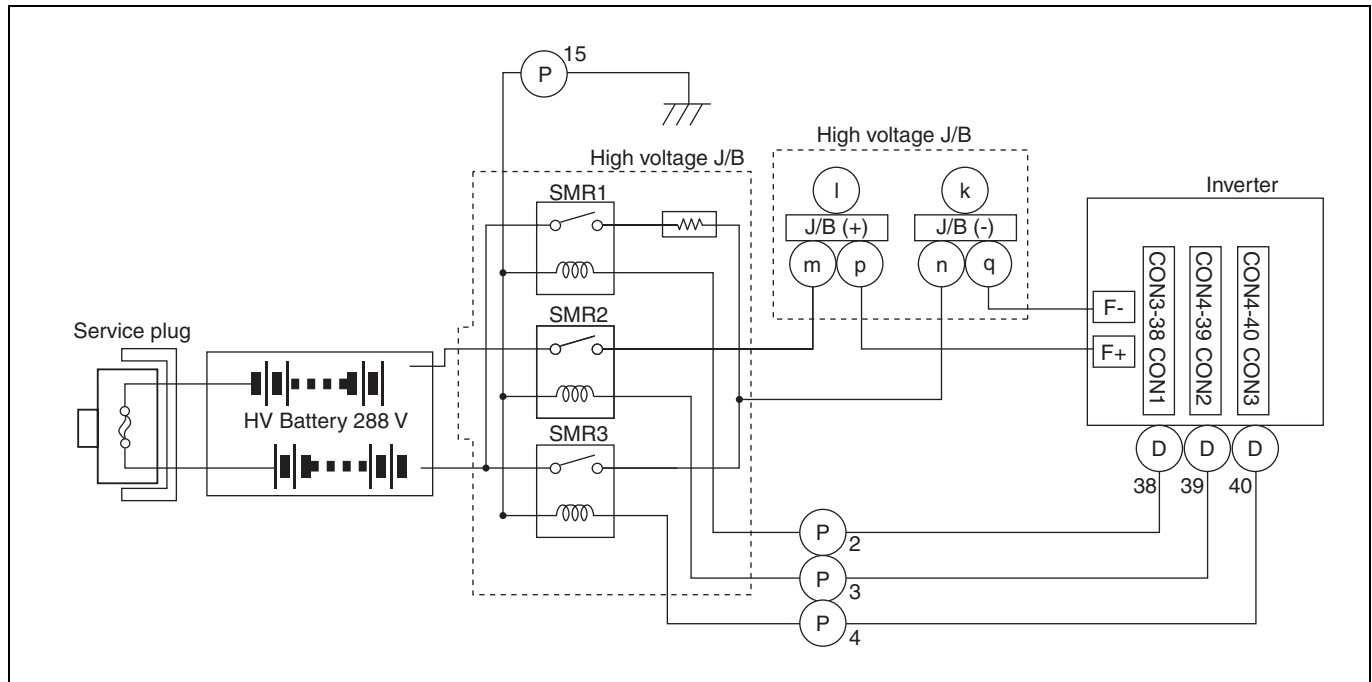
CHECKLIST: P0ADF (TC1E)

P0ADF (TC1E)		SMR#3 (negative side) Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the 40th terminal of inverter connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector 40th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the wire harness in the HV battery for short circuit	1. Remove the PCU top cover. 2. Disconnect the SMR drive connector from the high-voltage J/ B (in the battery pack). 3. Using the electrical tester, measure the resistance between the 4th terminal of PCU harness (16P) upper-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 4th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (upper side).
3	Inspecting the high-voltage J/ B (in the battery pack) for short circuit	1. Using the electrical tester, measure the resistance between the 1st terminal of SMR drive connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 1st terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Go to step 4.

P0ADF (TC1E)		SMR#3 (negative side) Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR#3	1. Remove the SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#3 terminals. <Measurement conditions> — <Tester connections> SMR#3 terminal (exciting coil side) 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the high-voltage J/B (in the battery pack). After replacement, go to step 5.	Replace the SMR#3. After replacement, go to step 5.
5	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0ADF-1E is detected.	DTC P0ADF-1E is detected: Go to YES. DTC P0ADF-1E is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AE0 (TC95)

EN01H03ZZZ030602004058

DTC: P0AE0 (TC95) SMR#3 (negative side) High abnormality
INFORMATION

SHTS03ZZZ0300469

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection (High abnormality) in the SMR#3 (negative side terminal).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - A disconnection in SMR#3 output is detected continuously for 0.06 seconds.

3. Reset condition

- Normal output of SMR#3 is detected continuously for 0.06 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

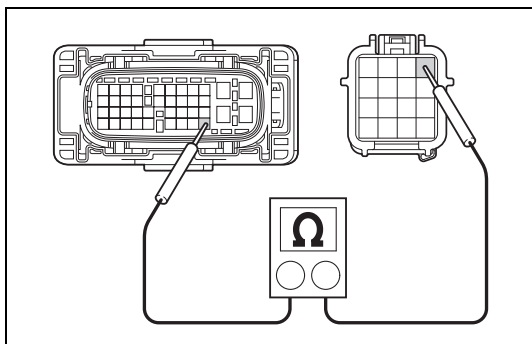
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of SMR#3 (negative terminal)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0AE0 (TC95)**1 Inspecting the PCU wire harness (lower side) for continuity 1**

SHTS03ZZZ0300470

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector – PCU harness (16P) lower-side connector 40th terminal – 4th terminal	1 Ω or less (With continuity)

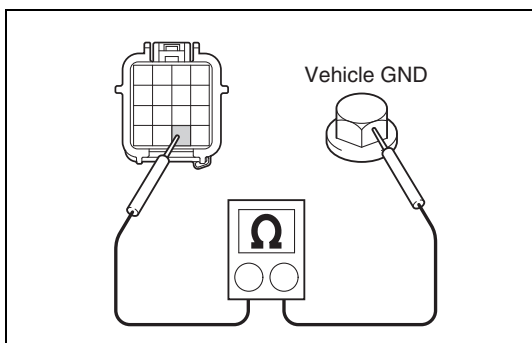
Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the PCU wire harness (lower side).

2 Inspecting the PCU wire harness (lower side) for continuity 2

SHTS03ZZZ0300471

1. Using the electrical tester, measure the resistance between the 15th terminal of PCU harness (16P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 15th terminal – GND	1 Ω or less (With continuity)

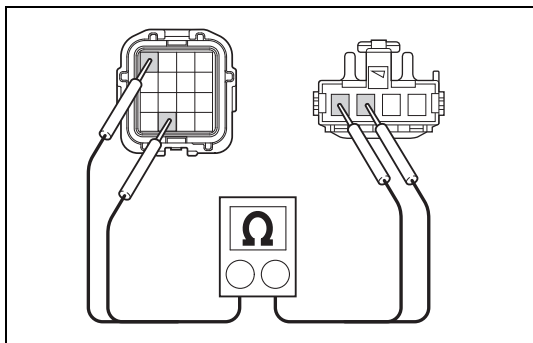
Is the measured value within the range of standard value?

YES

Go to step 3.

NO

Replace the PCU wire harness (lower side).

3 Inspecting the wire harness in the HV battery for continuity

SHTS03ZZZ0300472

1. Remove the PCU top cover.
2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector – SMR drive connector 4th terminal – 1st terminal 15th terminal – 2nd terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the main wire harness in the HV battery.
After replacement, go to step 4.

4 Inspecting the SMR drive

1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack).

Measurement conditions	Tester connections	Standard values
—	SMR drive connector (high-voltage J/B side) 1st terminal – 2nd terminal	19 – 50 Ω

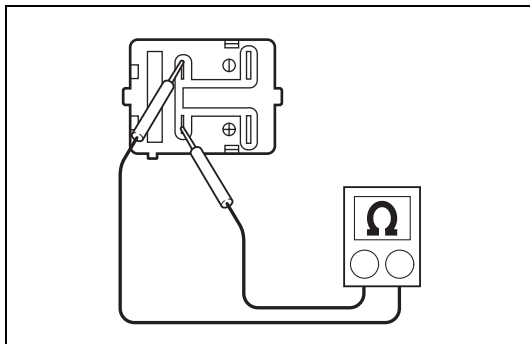
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Go to step 5.

5 Inspecting the SMR#3

1. Remove the SMR#3 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#3 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#3 terminal (exciting coil side) 1st terminal – 2nd terminal	19 – 50 Ω

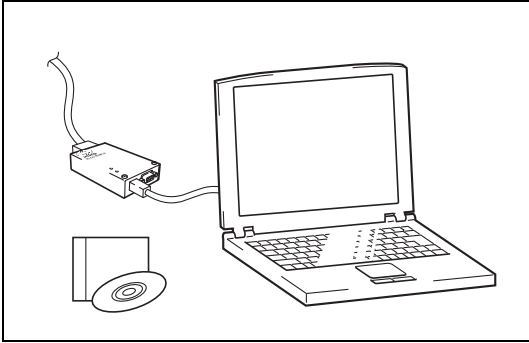
Is the measured value within the range of standard value?

YES

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 6.

NO

Replace the SMR#3.
After replacement, go to step 6.

6 Reproduction check [HINO-DX]

SHTS03ZZZ0300474

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0AE0-95 is detected.

Is DTC P0AE0-95 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

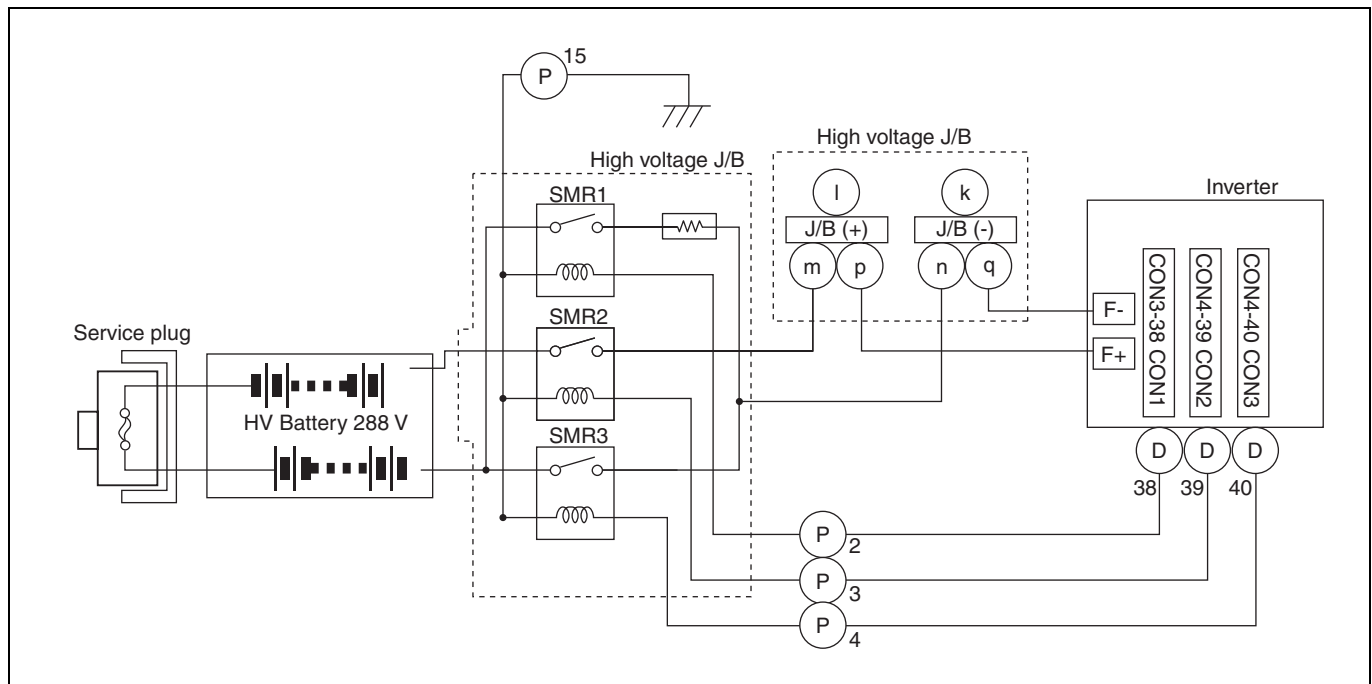
CHECKLIST: P0AE0 (TC95)

P0AE0 (TC95)		SMR#3 (negative side) High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector – PCU harness (16P) lower-side connector 40th terminal – 4th terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the PCU wire harness (lower side) for continuity 2	1. Using the electrical tester, measure the resistance between the 15th terminal of PCU harness (16P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 15th terminal – GND <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the wire harness in the HV battery for continuity	1. Remove the PCU top cover. 2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack). 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector – SMR drive connector 4th terminal – 1st terminal 15th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the main wire harness in the HV battery. After replacement, go to step 4.

P0AE0 (TC95)		SMR#3 (negative side) High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR drive	1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). <Measurement conditions> — <Tester connections> SMR drive connector (high-voltage J/B side) 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Go to step 5.
5	Inspecting the SMR#3	1. Remove the SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#3 terminals. <Measurement conditions> — <Tester connections> SMR#3 terminal (exciting coil side) 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the high-voltage J/B (in the battery pack). After replacement, go to step 6.	Replace the SMR#3. After replacement, go to step 6.
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0AE0-95 is detected.	DTC P0AE0-95 is detected: Go to YES. DTC P0AE0-95 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AE6 (TC1D)

EN01H03ZZZ030602004059

DTC: P0AE6 (TC1D) SMR#1 (negative side) Low abnormality
INFORMATION

SHTS03ZZZ0300475

1. Technical description

- –

<Description of malfunction>

- Detected a load short circuit (Low abnormality) in the SMR#1 (precharge).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - A load short circuit in the SMR#1 signal line is detected continuously for 0.06 seconds.

3. Reset condition

- Normal output of SMR#1 is detected continuously for 0.06 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

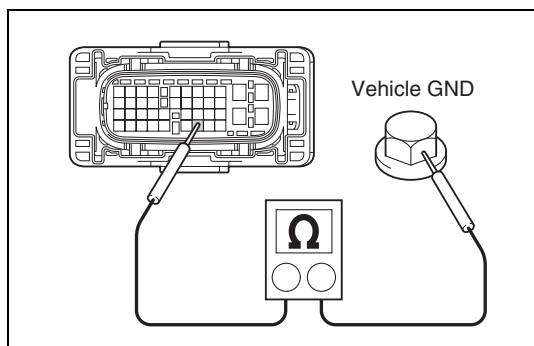
7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of SMR#1 (precharge)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0AE6 (TC1D)

1 Inspecting the PCU wire harness (lower side) for short circuit

SHTS03ZZZ0300476

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the 38th terminal of inverter connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector 38th terminal – GND	10 kΩ or more (No continuity)

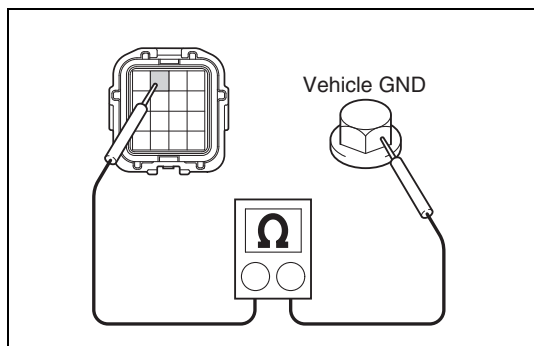
Is the measured value within the range of standard value?

YES

NO

Go to step 2.

Replace the PCU wire harness (lower side).

2 Inspecting the wire harness in the HV battery for short circuit

SHTS03ZZZ0300477

1. Remove the PCU top cover.
2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
3. Using the electrical tester, measure the resistance between the 2nd terminal of PCU harness (16P) upper-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector 2nd terminal – GND	10 kΩ or more (No continuity)

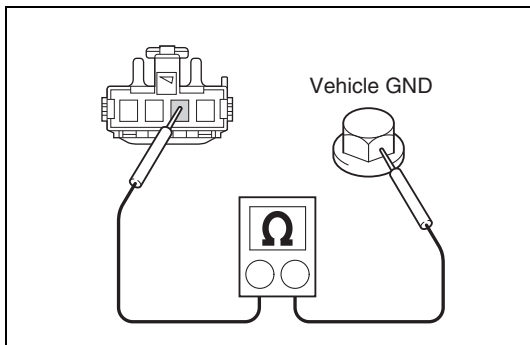
Is the measured value within the range of standard value?

YES

NO

Go to step 3.

Replace the PCU wire harness (upper side).

3 Inspecting the high-voltage J/B (in the battery pack) for short circuit

SHTS03ZZZ0300478

- Using the electrical tester, measure the resistance between the 3rd terminal of SMR drive connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	SMR drive connector 3rd terminal – GND	10 k Ω or more (No continuity)

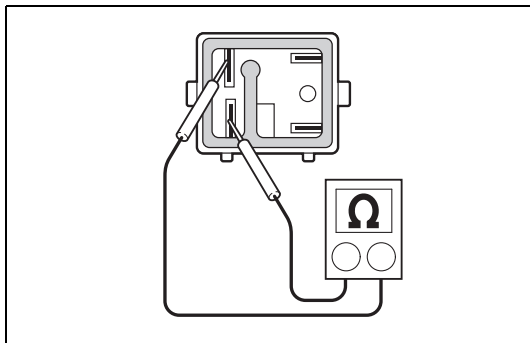
Is the measured value within the range of standard value?

YES

Go to step 5.

NO

Go to step 4.

4 Inspecting the SMR#1

SHTS03ZZZ0300479

- Remove the SMR#1 from the high-voltage J/B (in the battery pack).
- Using the electrical tester, measure the resistance between the SMR#1 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#1 terminal (exciting coil side) 1st terminal – 2nd terminal	70 – 190 Ω

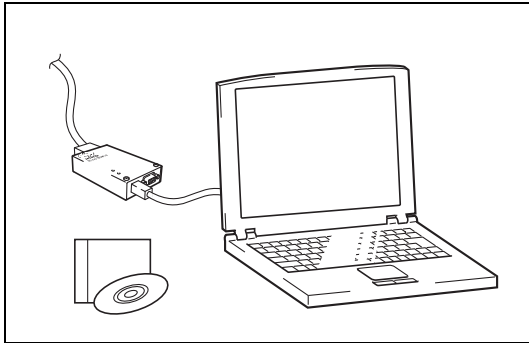
Is the measured value within the range of standard value?

YES

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 5.

NO

Replace the SMR#1.
After replacement, go to step 5.

5**Reproduction check [HINO-DX]**

SHTS03ZZZ0300480

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0AE6-1D is detected.

Is DTC P0AE6-1D detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

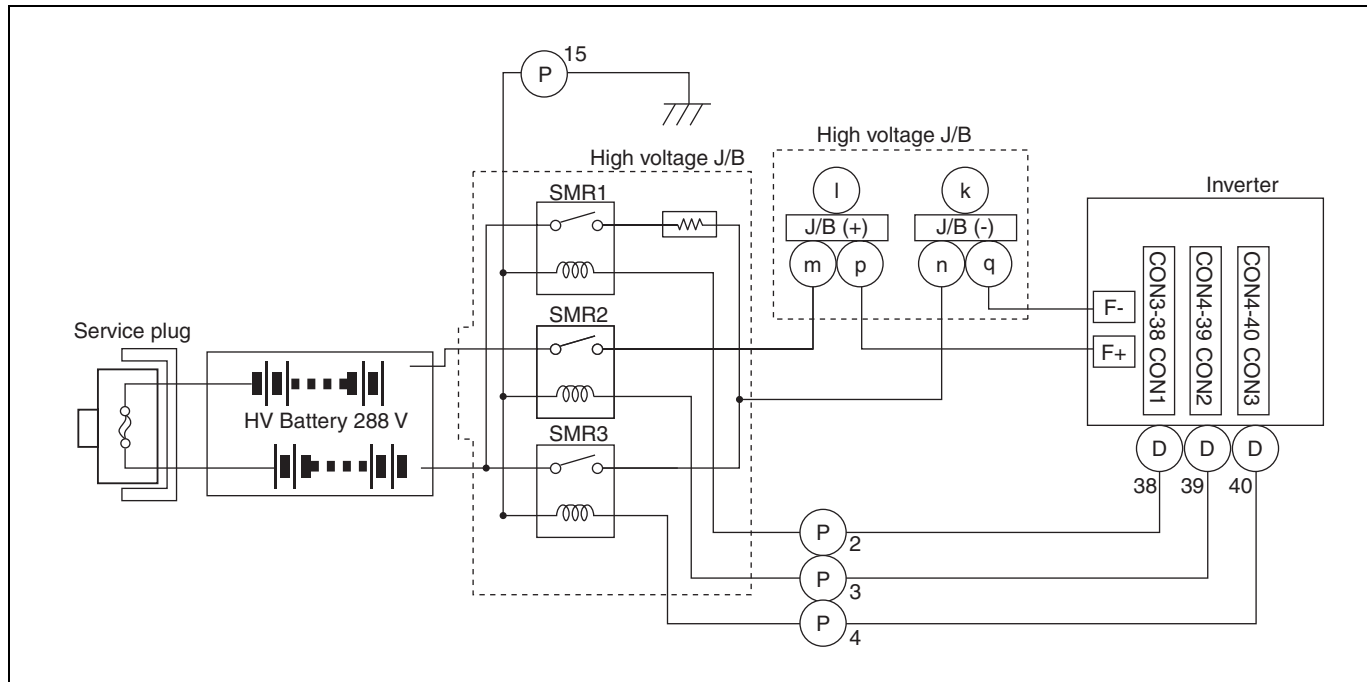
CHECKLIST: P0AE6 (TC1D)

P0AE6 (TC1D)		SMR#1 (negative side) Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for short circuit	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the 38th terminal of inverter connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector 38th terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the wire harness in the HV battery for short circuit	1. Remove the PCU top cover. 2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack). 3. Using the electrical tester, measure the resistance between the 2nd terminal of PCU harness (16P) upper-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 2nd terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (upper side).
3	Inspecting the high-voltage J/B (in the battery pack) for short circuit	1. Using the electrical tester, measure the resistance between the 3rd terminal of SMR drive connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector 3rd terminal – GND <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 5.	Go to step 4.

P0AE6 (TC1D)		SMR#1 (negative side) Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR#1	1. Remove the SMR#1 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> — <Tester connections> SMR#1 terminal (exciting coil side) 1st terminal – 2nd terminal <Standard values> 70 – 190 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the high-voltage J/B (in the battery pack). After replacement, go to step 5.	Replace the SMR#1. After replacement, go to step 5.
5	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0AE6-1D is detected.	DTC P0AE6-1D is detected: Go to YES. DTC P0AE6-1D is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AE7 (TC94)

EN01H03ZZZ030602004060

DTC: P0AE7 (TC94) SMR#1 (negative side) High abnormality
INFORMATION

SHTS03ZZZ0300481

1. Technical description

- –

<Description of malfunction>

- Detected a disconnection (High abnormality) in the SMR#1 (precharge).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
- (2) Judgement criteria
 - A disconnection in SMR#1 output is detected continuously for 0.06 seconds.

3. Reset condition

- Normal output of SMR#1 is detected continuously for 0.06 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

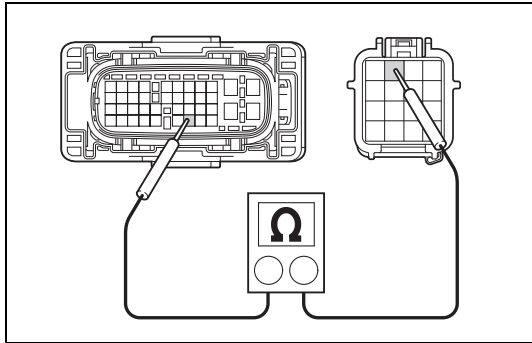
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of SMR#1 (precharge)
- Malfunction of high-voltage J/B
- Malfunction of inverter

INSPECTION PROCEDURE: P0AE7 (TC94)**1 Inspecting the PCU wire harness (lower side) for continuity 1**

SHTS03ZZZ0300482

1. Set the starter key to the "LOCK" position.
2. Disconnect the connectors of inverter and PCU harness (16P).
3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter connector – PCU harness (16P) lower-side connector 38th terminal – 2nd terminal	1 Ω or less (With continuity)

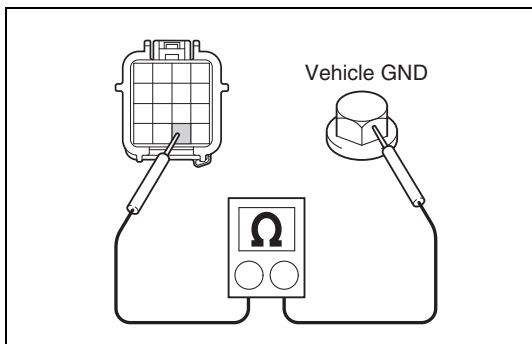
Is the measured value within the range of standard value?

YES

Go to step 2.

NO

Replace the PCU wire harness (lower side).

2 Inspecting the PCU wire harness (lower side) for continuity 2

SHTS03ZZZ0300483

1. Using the electrical tester, measure the resistance between the 15th terminal of PCU harness (16P) lower-side connector and the ground.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) lower-side connector 15th terminal – GND	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

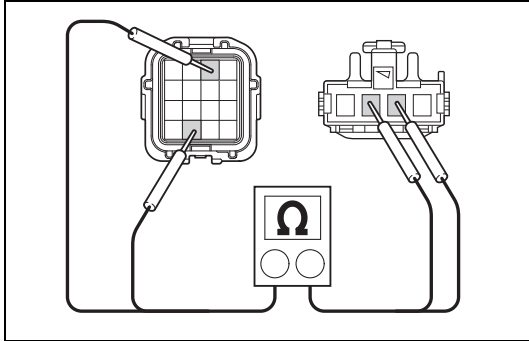
Go to step 3.

NO

Replace the PCU wire harness (lower side).

3

Inspecting the wire harness in the HV battery for continuity



SHTS03ZZZ0300484

1. Remove the PCU top cover.
2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack).
3. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector.

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	PCU harness (16P) upper-side connector – SMR drive connector 2nd terminal – 3rd terminal 15th terminal – 2nd terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the main wire harness in the HV battery.
After replacement, go to step 4.

4 Inspecting the SMR drive

- Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack).

Measurement conditions	Tester connections	Standard values
—	SMR drive connector (high-voltage J/B side) 3rd terminal – 2nd terminal	19 – 50 Ω

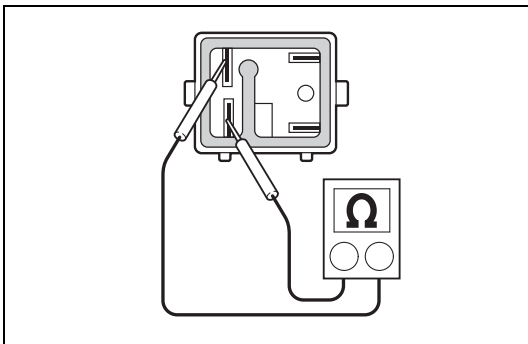
Is the measured value within the range of standard value?

YES

Go to step 6.

NO

Go to step 5.

5 Inspecting the SMR#1

SHTS03ZZZ0300485

- Remove the SMR#1 from the high-voltage J/B (in the battery pack).
- Using the electrical tester, measure the resistance between the SMR#1 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#1 terminal (exciting coil side) 1st terminal – 2nd terminal	19 – 50 Ω

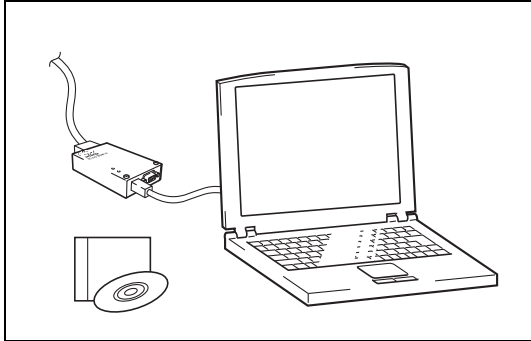
Is the measured value within the range of standard value?

YES

Replace the high-voltage J/B (in the battery pack).
After replacement, go to step 6.

NO

Replace the SMR#1.
After replacement, go to step 6.

6**Reproduction check [HINO-DX]**

SHTS03ZZZ0300486

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if P0AE7-94 is detected.

Is DTC P0AE7-94 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0AE7 (TC94)

P0AE7 (TC94)		SMR#1 (negative side) High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the PCU wire harness (lower side) for continuity 1	1. Set the starter key to the "LOCK" position. 2. Disconnect the connectors of inverter and PCU harness (16P). 3. Using the electrical tester, measure the resistance between the terminals of inverter connector and PCU harness (16P) lower-side connector. <Measurement conditions> Starter key: LOCK <Tester connections> Inverter connector – PCU harness (16P) lower-side connector 38th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 2.	Replace the PCU wire harness (lower side).
2	Inspecting the PCU wire harness (lower side) for continuity 2	1. Using the electrical tester, measure the resistance between the 15th terminal of PCU harness (16P) lower-side connector and the ground. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) lower-side connector 15th terminal – GND <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 3.	Replace the PCU wire harness (lower side).
3	Inspecting the wire harness in the HV battery for continuity	1. Remove the PCU top cover. 2. Disconnect the SMR drive connector from the high-voltage J/B (in the battery pack). 3. Using the electrical tester, measure the resistance between the terminals of PCU harness (16P) upper-side connector and SMR drive connector. <Measurement conditions> Starter key: LOCK <Tester connections> PCU harness (16P) upper-side connector – SMR drive connector 2nd terminal – 3rd terminal 15th terminal – 2nd terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the main wire harness in the HV battery. After replacement, go to step 4.

P0AE7 (TC94)		SMR#1 (negative side) High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
4	Inspecting the SMR drive	1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/ B (in the battery pack). <Measurement conditions> — <Tester connections> SMR drive connector (high-voltage J/B side) 3rd terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 6.	Go to step 5.
5	Inspecting the SMR#1	1. Remove the SMR#1 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> — <Tester connections> SMR#1 terminal (exciting coil side) 1st terminal – 2nd terminal <Standard values> 19 – 50 Ω	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Replace the high-voltage J/ B (in the battery pack). After replacement, go to step 6.	Replace the SMR#1. After replacement, go to step 6.
6	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if P0AE7-94 is detected.	DTC P0AE7-94 is detected: Go to YES. DTC P0AE7-94 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AEE (TC22)

DTC: P0AEE (TC22) Abnormality in characteristics of inverter temperature sensor INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the characteristics of main circuit element temperature detecting sensor (Low abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the engine speed reaches 600 r/min or more, 180 seconds or more have passed.
- The engine intake air temperature is -10 °C {14 °F} or more.
- No abnormality is detected in the engine intake air temperature sensor.
- A state in which the square sum of motor current for 20 seconds $\geq 350,000 [A^2 \cdot s]$ is detected 3 times (engine intake air temperature $\leq 20 \text{ °C}$ {68 °F}).
- A state in which the square sum of motor current for 20 seconds $\geq 100,000 [A^2 \cdot s]$ is detected 3 times (engine intake air temperature $> 20 \text{ °C}$ {68 °F}).

(2) Judgement criteria

- A state in which the deviation (Max - Min) of main circuit element temperature $\leq 2.0 \text{ °C}$ {35.6 °F} is met 3 times in 120 seconds.

3. Reset condition

- When the abnormality is not confirmed, a state in which the deviation (Max - Min) of variable (main circuit element temperature) $> 2.0 \text{ °C}$ {35.6 °F} is met 3 times in 120 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

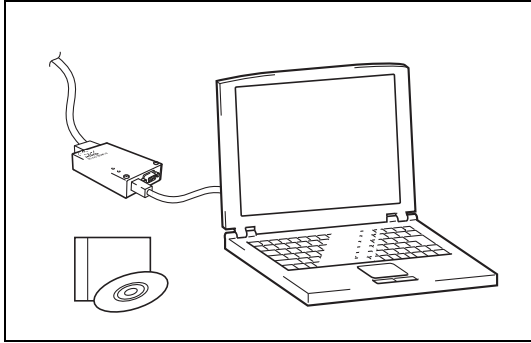
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0AEE (TC22)**1****Reproduction check [HINO-DX]**

SHTS03ZZZ0300487

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0AEE-22 is detected.

Is DTC P0AEE-22 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0AEE (TC22)

P0AEE (TC22)		Abnormality in characteristics of inverter temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0AEE-22 is detected.	DTC P0AEE-22 is detected: Go to YES. DTC P0AEE-22 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AEE (TC23)

EN01H03ZZZ030602004062

DTC: P0AEE (TC23) Abnormality in characteristics of inverter temperature sensor INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality in the characteristics of main circuit element temperature detecting sensor (High abnormality).

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Since the engine speed reaches 600 r/min or more, 180 seconds or more have passed.
- The engine intake air temperature is -10 °C {14 °F} or more.
- No abnormality is detected in the engine intake air temperature sensor.
- The state in which the square sum of motor current for 20 seconds $\leq 50,000 [A^2 \cdot s]$ is detected 3 times.

(2) Judgement criteria

- The state in which the deviation (Max - Min) of main circuit element temperature $< 18.0 \text{ }^{\circ}\text{C}$ {64.4 °F} is met 3 times in 120 seconds.

3. Reset condition

- When the abnormality is not confirmed, the state in which the deviation (Max - Min) of variable (main circuit element temperature) $< 18.0 \text{ }^{\circ}\text{C}$ {64.4 °F} is met 3 times in 120 seconds.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

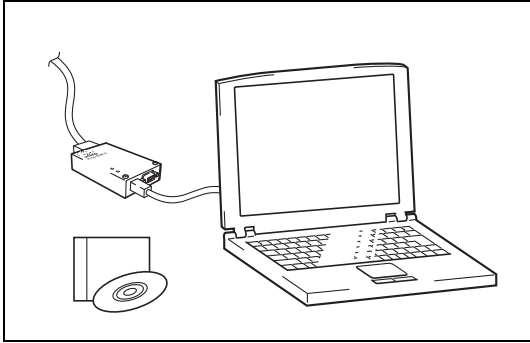
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0AEE (TC23)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300488

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0AEE-23 is detected.

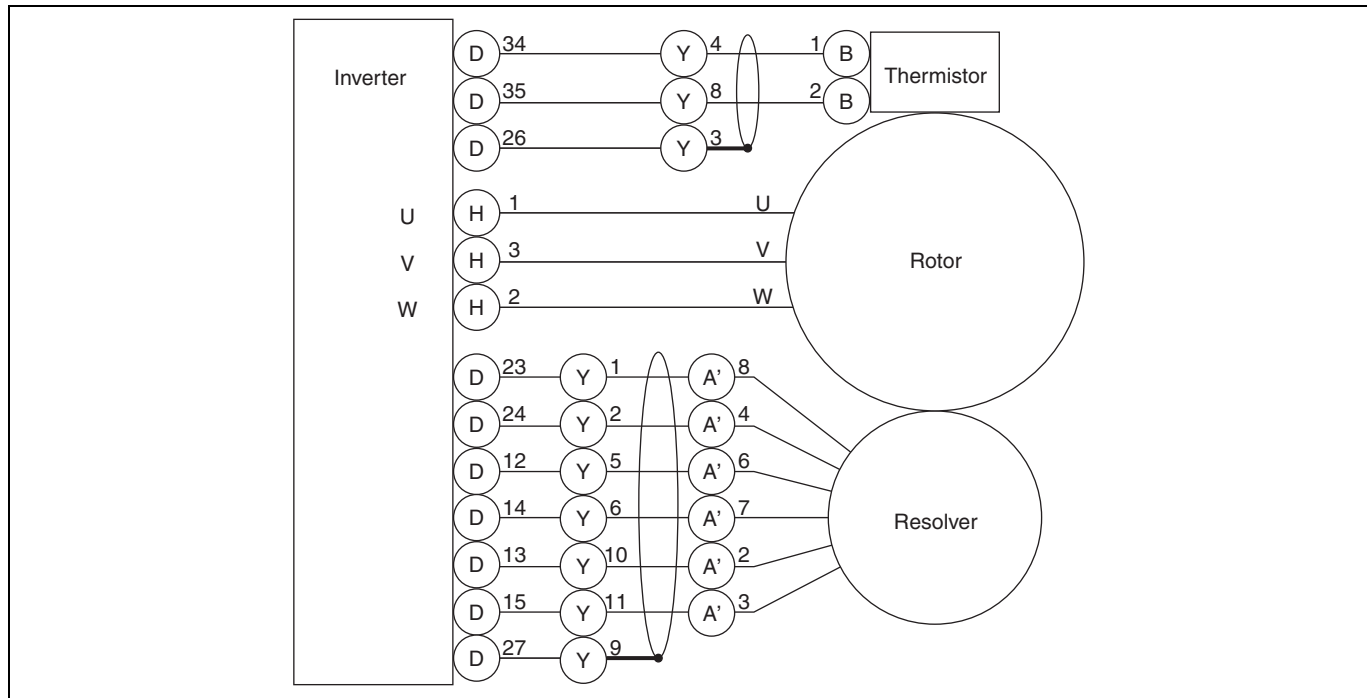
Is DTC P0AEE-23 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0AEE (TC23)

P0AEE (TC23)		Abnormality in characteristics of inverter temperature sensor		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0AEE-23 is detected.	DTC P0AEE-23 is detected: Go to YES. DTC P0AEE-23 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AEF (TC24)

EN01H03ZZZ030602004063

DTC: P0AEF (TC24) Inverter temperature sensor Low abnormality
INFORMATION

SHTS03ZZZ0300489

1. Technical description

- –

<Description of malfunction>

- Detected a Low abnormality in the temperature sensor in the inverter (main circuit element temperature sensor).

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 8 V or more.
 - Inverter start signal is ON.
- (2) Judgement criteria
 - A state in which input voltage is less than 0.19 V is detected continuously for 0.1 second.

3. Reset condition

- A state in which input voltage is 0.19 V or more and 4.86 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

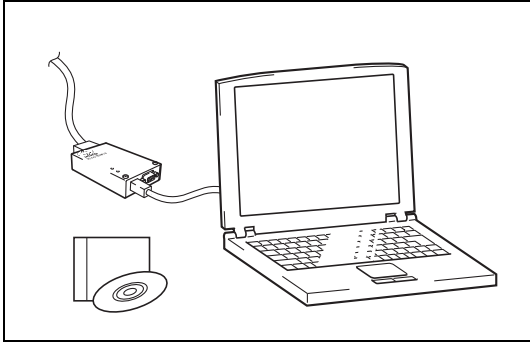
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0AEF (TC24)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300490

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0AEF-24 is detected.

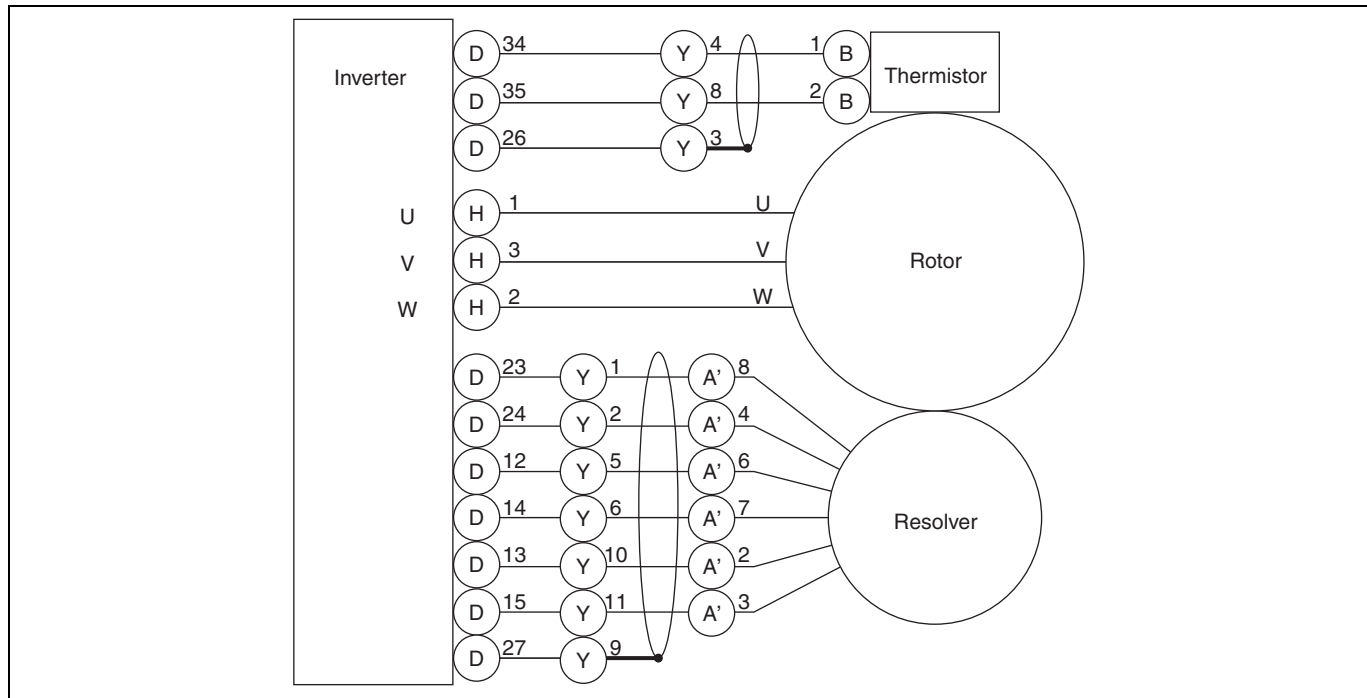
Is DTC P0AEF-24 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0AEF (TC24)

P0AEF (TC24)		Inverter temperature sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0AEF-24 is detected.	DTC P0AEF-24 is detected: Go to YES. DTC P0AEF-24 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0AF0 (TC25)

EN01H03ZZZ030602004064

DTC: P0AF0 (TC25) Inverter temperature sensor High abnormality
INFORMATION

SHTS03ZZZ0300491

1. Technical description

- –

<Description of malfunction>

- Detected a High abnormality in the temperature sensor in the inverter (main circuit element temperature sensor).

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which the voltage of main circuit element temperature sensor is more than 4.86 V is detected for 0.1 second or more.

3. Reset condition

- The state in which the voltage of main circuit element temperature sensor is 0.19 V or more and 4.86 V or less is detected continuously for 0.2 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

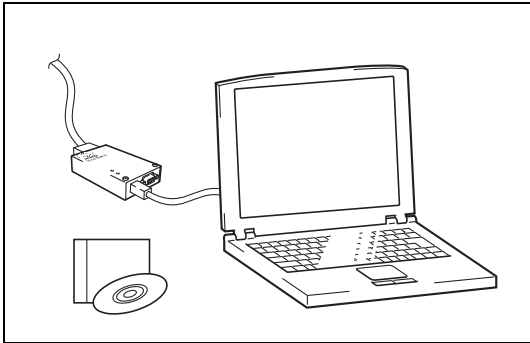
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0AF0 (TC25)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300492

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0AF0-25 is detected.

Is DTC P0AF0-25 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0AF0 (TC25)

P0AF0 (TC25)		Inverter temperature sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0AF0-25 is detected.	DTC P0AF0-25 is detected: Go to YES. DTC P0AF0-25 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEA (TCB3)

DTC: P0BEA (TCB3) Abnormality in V-phase current sensor characteristics INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (offset abnormality) in the motor V-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- (DC voltage - Reverse voltage for determining malfunction of inverter gate blocking function) is larger than 20 V.

(2) Judgement criteria

- When one of the following conditions continues for 0.2 second:
 - V-phase current sensor value (low resolution Ach or Bch) is larger than 539 LSB.
 - V-phase current sensor value (low resolution Ach or Bch) is less than 482 LSB.

3. Reset condition

- When one of the following conditions continues for 0.4 second:
 - V-phase current sensor value (low resolution Ach or Bch) is 539 LSB or less.
 - V-phase current sensor value (low resolution Ach or Bch) is 482 LSB or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

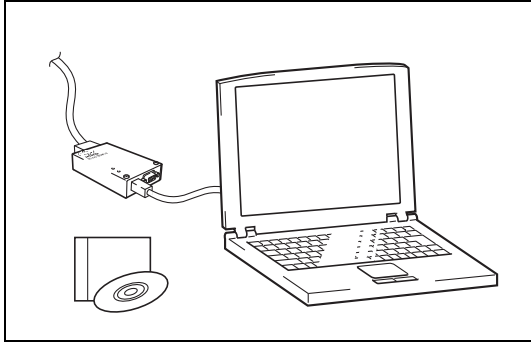
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEA (TCB3)**1****Reproduction check [HINO-DX]**

SHTS03ZZZ0300493

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEA-B3 is detected.

Is DTC P0BEA-B3 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEA (TCB3)

P0BEA (TCB3)		Abnormality in V-phase current sensor characteristics		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEA-B3 is detected.	DTC P0BEA-B3 is detected: Go to YES. DTC P0BEA-B3 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEA (TCB4)

EN01H03ZZZ030602004066

DTC: P0BEA (TCB4) Abnormality in V-phase current sensor characteristics INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (deviation abnormality) in the motor V-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which the value after V-phase current deviation absolute value filtering is larger than (Deviation threshold [torque dependent] + Revolution correction item - Offset) is detected continuously for 0.15 seconds.

3. Reset condition

- The following condition continues for 0.3 second:
 - The value after V-phase current deviation absolute value filtering is (Deviation threshold + Revolution correction item - Offset) or less.
- At the same time, the final torque command value is less than 111.2 Nm.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

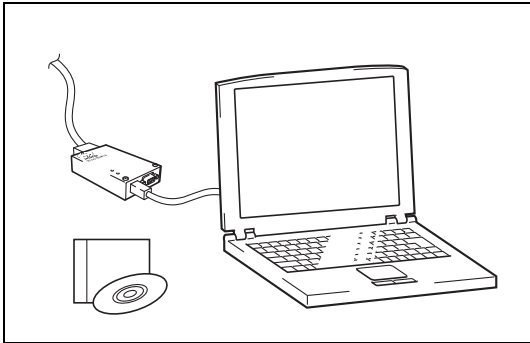
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEA (TCB4)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300494

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEA-B4 is detected.

Is DTC P0BEA-B4 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEA (TCB4)

P0BEA (TCB4)		Abnormality in V-phase current sensor characteristics		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEA-B4 is detected.	DTC P0BEA-B4 is detected: Go to YES. DTC P0BEA-B4 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEB (TC9A)

DTC: P0BEB (TC9A) V-phase current sensor High abnormality INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (out-of-range Low abnormality) in the motor V-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Three-phase ON control request flag = OFF

(2) Judgement criteria

- The state in which V-phase input voltage (low resolution Ach or Bch) is less than 0.29 V is detected continuously for 0.06 second for each ch.

3. Reset condition

- The state in which V-phase input voltage (low resolution Ach or Bch) is 0.29 V or more and 4.71 V or less is detected continuously for 0.2 second for each ch.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

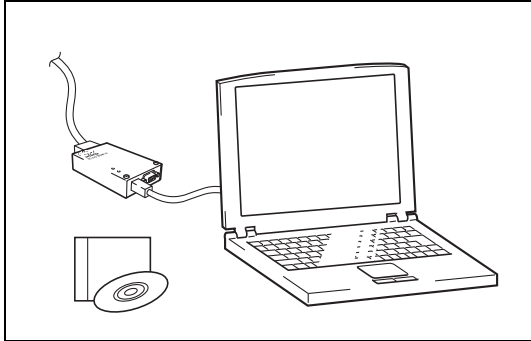
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEB (TC9A)**1****Reproduction check [HINO-DX]**

SHTS03ZZZ0300495

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEB-9A is detected.

Is DTC P0BEB-9A detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEB (TC9A)

P0BEB (TC9A)		V-phase current sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEB-9A is detected.	DTC P0BEB-9A is detected: Go to YES. DTC P0BEB-9A is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEC (TC9B)

EN01H03ZZZ030602004068

DTC: P0BEC (TC9B) V-phase current sensor High abnormality INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (out-of-range High abnormality) in the motor V-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Three-phase ON control request flag = OFF

(2) Judgement criteria

- The state in which V-phase input voltage (low resolution Ach or Bch) is larger than 4.71 V is detected continuously for 0.06 second for each ch.

3. Reset condition

- The state in which V-phase input voltage (low resolution Ach or Bch) is 0.29 V or more and 4.71 V or less is detected continuously for 0.2 second for each ch.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

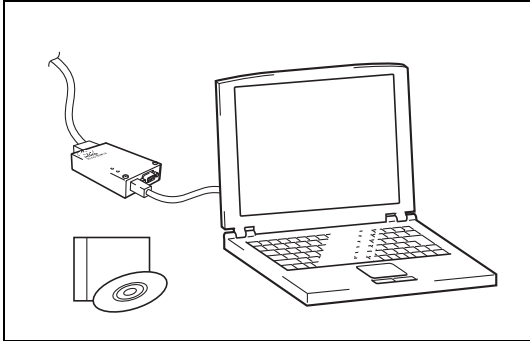
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEC (TC9B)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300496

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEC-9B is detected.

Is DTC P0BEC-9B detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEC (TC9B)

P0BEC (TC9B)		V-phase current sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEC-9B is detected.	DTC P0BEC-9B is detected: Go to YES. DTC P0BEC-9B is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEE (TCB5)

DTC: P0BEE (TCB5) Abnormality in W-phase current sensor characteristics INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (offset abnormality) in the motor W-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- (DC voltage - Reverse voltage for determining malfunction of inverter gate blocking function) is larger than 20 V.

(2) Judgement criteria

- When one of the following conditions continues for 0.2 second:
 - W-phase current sensor value (low resolution Ach or Bch) is larger than 539 LSB.
 - W-phase current sensor value (low resolution Ach or Bch) is less than 482 LSB.

3. Reset condition

- When one of the following conditions continues for 0.4 second:
 - W-phase current sensor value (low resolution Ach or Bch) is 539 LSB or less.
 - W-phase current sensor value (low resolution Ach or Bch) is 482 LSB or more.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

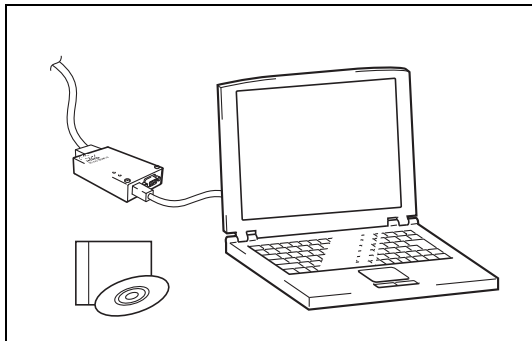
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEE (TCB5)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300497

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEE-B5 is detected.

Is DTC P0BEE-B5 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEE (TCB5)

P0BEE (TCB5)		Abnormality in W-phase current sensor characteristics		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEE-B5 is detected.	DTC P0BEE-B5 is detected: Go to YES. DTC P0BEE-B5 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEE (TCB6)

EN01H03ZZZ030602004070

DTC: P0BEE (TCB6) Abnormality in W-phase current sensor characteristics INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (deviation abnormality) in the motor W-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.

(2) Judgement criteria

- The state in which the value after W-phase current deviation absolute value filtering is larger than (Deviation threshold value [torque dependent] + Revolution correction item - Offset) is detected continuously for 0.15 second.

3. Reset condition

- The following condition continues for 0.3 second:
 - When the abnormality is not confirmed, the value after W-phase current deviation absolute value filtering is (Deviation threshold value + Revolution correction item - Offset) or less.At the same time, the final torque command value is less than 111.2 Nm.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

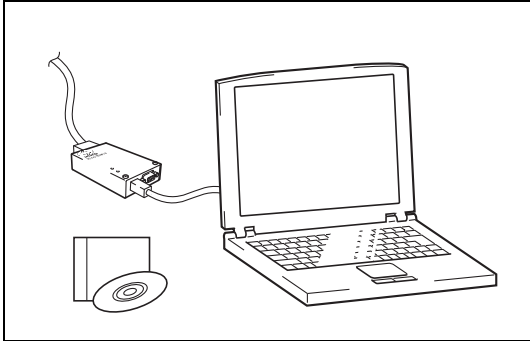
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEE (TCB6)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300498

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEE-B6 is detected.

Is DTC P0BEE-B6 detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEE (TCB6)

P0BEE (TCB6)		Abnormality in W-phase current sensor characteristics		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEE-B6 is detected.	DTC P0BEE-B6 is detected: Go to YES. DTC P0BEE-B6 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BEF (TC9C)

EN01H03ZZZ030602004071

DTC: P0BEF (TC9C) W-phase current sensor Low abnormality INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (out-of-range Low) in the motor W-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Three-phase ON control request flag = OFF

(2) Judgement criteria

- The state in which W-phase input voltage (low resolution Ach or Bch) is less than 0.29 V is detected continuously for 0.06 second for each ch.

3. Reset condition

- The state in which W-phase input voltage (low resolution Ach or Bch) is 0.29 V or more and 4.71 V or less is detected continuously for 0.2 second for each ch.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

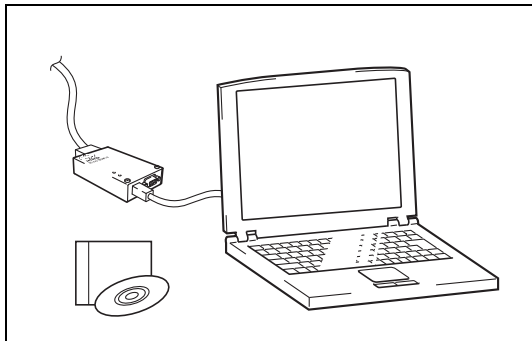
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BEF (TC9C)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300499

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BEF-9C is detected.

Is DTC P0BEF-9C detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BEF (TC9C)

P0BEF (TC9C)		W-phase current sensor Low abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BEF-9C is detected.	DTC P0BEF-9C is detected: Go to YES. DTC P0BEF-9C is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P0BF0 (TC9D)

EN01H03ZZZ030602004072

DTC: P0BF0 (TC9D) W-phase current sensor High abnormality INFORMATION

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (out-of-range High abnormality) in the motor W-phase current sensor.

2. DTC set condition

(1) DTC detection condition

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Three-phase ON control request flag = OFF

(2) Judgement criteria

- The state in which W-phase input voltage (low resolution Ach or Bch) is larger than 4.71 V is detected continuously for 0.06 second for each ch.

3. Reset condition

- The state in which W-phase input voltage (low resolution Ach or Bch) is 0.29 V or more and 4.71 V or less is detected continuously for 0.2 second for each ch.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

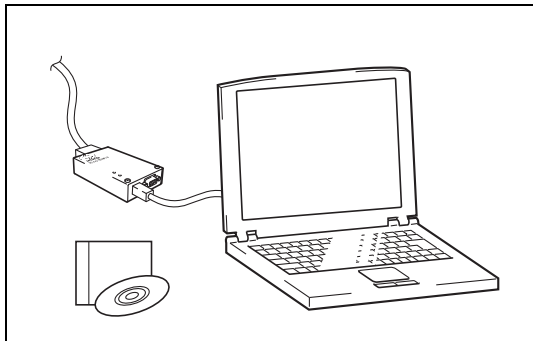
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Malfunction of inverter

INSPECTION PROCEDURE: P0BF0 (TC9D)**1 Reproduction check [HINO-DX]**

SHTS03ZZZ0300500

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if P0BF0-9D is detected.

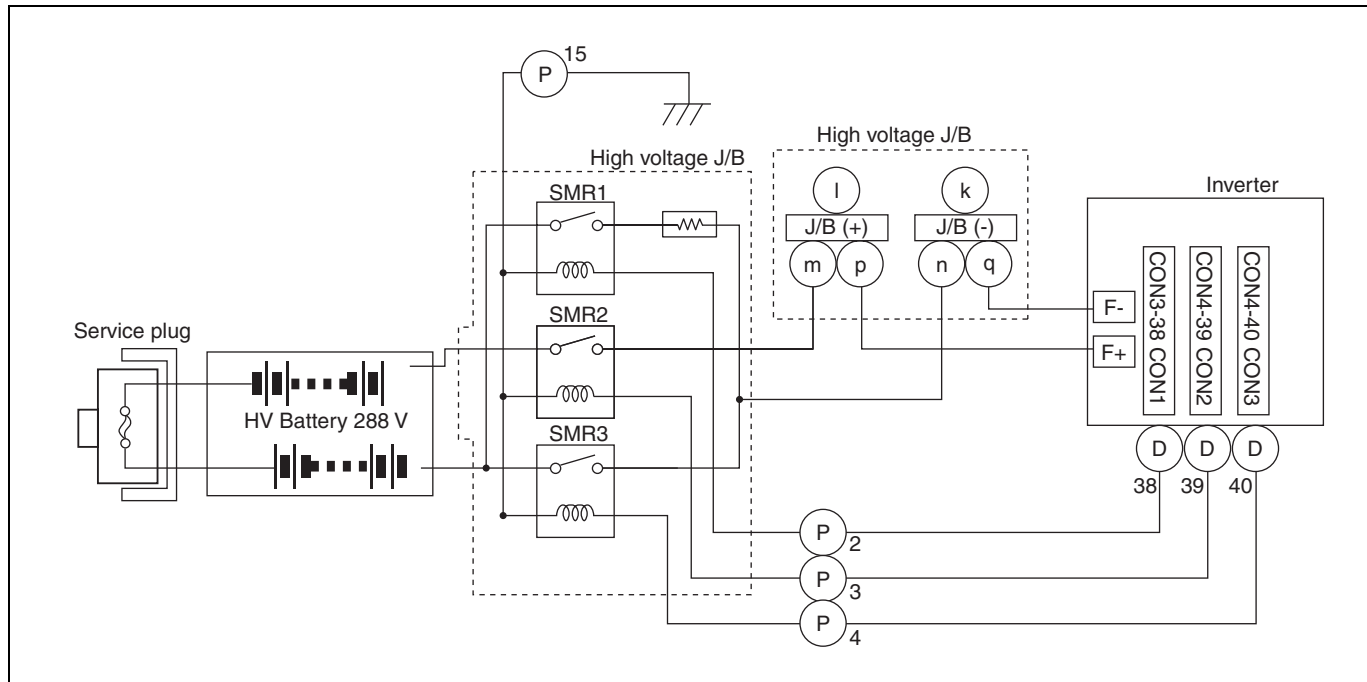
Is DTC P0BF0-9D detected?**YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P0BF0 (TC9D)

P0BF0 (TC9D)		W-phase current sensor High abnormality		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if P0BF0-9D is detected.	DTC P0BF0-9D is detected: Go to YES. DTC P0BF0-9D is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: P3126 (TC12)

EN01H03ZZZ030602004073

DTC: P3126 (TC12) Abnormality in inverter system (only during cranking)**INFORMATION**

SHTS03ZZZ0300501

1. Technical description

- –

<Description of malfunction>

- Detected an abnormality (excessively low DC voltage) in the inverter during cranking.

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 8 V or more.
- Inverter start signal is ON.
- Within 10 seconds after engine start
- SMR#2-side control signal is ON.
- SMR#3-side control signal is ON.
- Since the SMR#3 side is turned ON, 260 seconds or more have passed.
- SMR#1-side control signal is ON.

(2) Judgement criteria

- The state in which the inverter DC voltage is less than 100 V is detected continuously for 0.2 second.

3. Reset condition

- When the abnormality is not confirmed, the state in which the inverter DC voltage is 100 V or more is detected continuously for 0.4 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

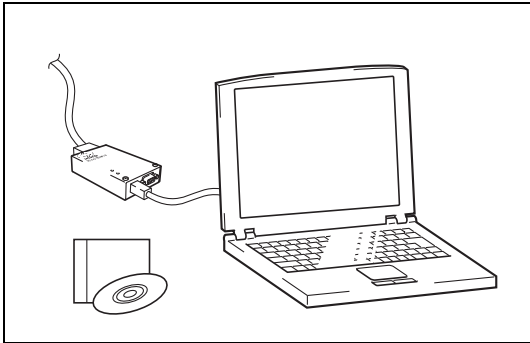
- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

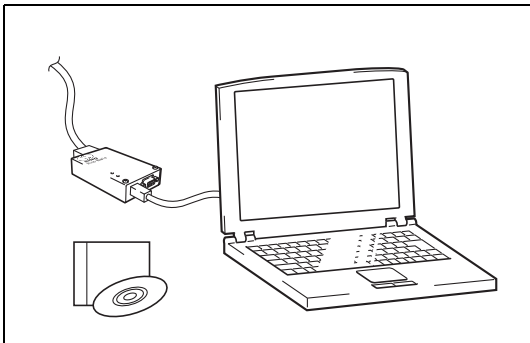
8. Estimated failure factors

- Reduction in HV battery voltage

INSPECTION PROCEDURE: P3126 (TC12)**1 Inspecting the HV battery ECU [HINO-DX]**

SHTS03ZZZ0300502

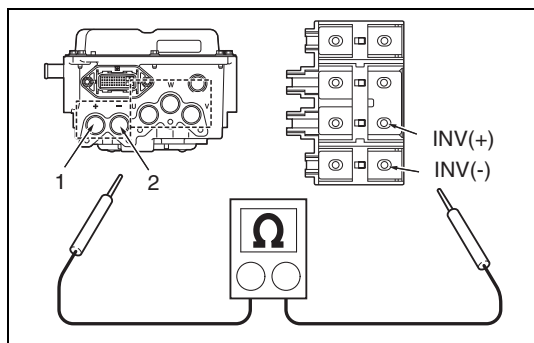
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. In [Fault Information] on the diagnosis tool screen, check if DTC P0A95 related to the HV battery line is detected.

Is DTC P0A95 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 2.****2 Reading the DTC [HINO-DX]**

SHTS03ZZZ0300503

1. In [Fault Information] on the diagnosis tool screen, check if any of the following DTCs other than P3126-12 is detected:
 - P0ADC, P0ADB, P0AE7, P0AE0, P0AE6, P0ADF

Is any DTC other than P3126-12 detected?**YES****Perform troubleshooting for each of related DTC.****NO****Go to step 3.**

3 Inspecting the DC high-voltage cable for continuity 1

1. Set the starter key to the "LOCK" position.
2. Remove the inverter terminal block cover and the ECU box terminal block cover.
3. Using the electrical tester, measure the resistance between the terminals of inverter and high-voltage J/B (in the ECU box).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	Inverter (high-voltage terminal) – High-voltage J/B (in ECU box) P(1) terminal – INV(+) terminal N(2) terminal – INV(-) terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?

YES

Go to step 4.

NO

Replace the DC high-voltage cable between the terminals of inverter and high-voltage JB (in the ECU box).

4 Inspecting the DC high-voltage cable

1. Check the P(+) and N(-) terminals of DC high-voltage cable (inverter side) for failing connection (looseness, wear, or melting damage).

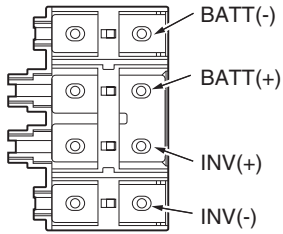
Is any defect found?

YES

Retighten the terminals.
Replace the terminals if abnormal wear or melting damage is detected.

NO

Go to step 5.

5 Inspecting the high-voltage J/B (in the ECU box)

SHTS03ZZZ0300505

1. Check the terminals of the high-voltage J/B (in the ECU box) for failing connection (looseness, wear, or melting damage).

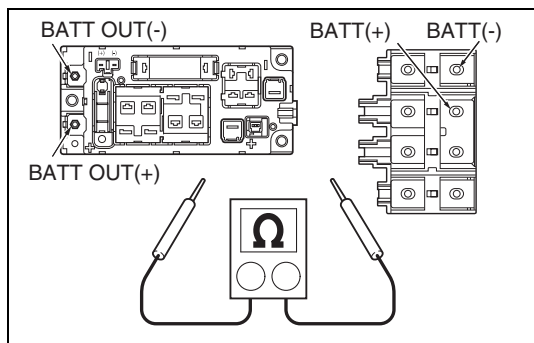
- BATT(+) terminal
- BATT(-) terminal
- INV(+) terminal
- INV(-) terminal

Is any defect found?**YES**

**Retighten the terminals.
Replace the terminals if abnormal wear or
melting damage is detected.**

NO

Go to step 6.

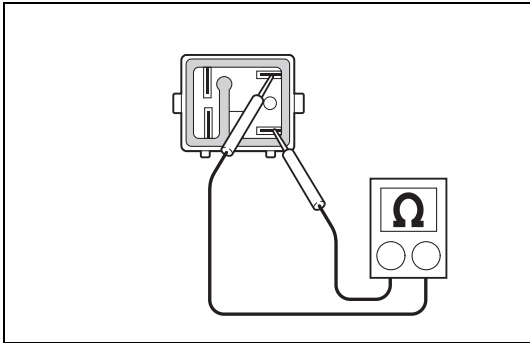
6 Inspecting the DC high-voltage cable for continuity 2

SHTS03ZZZ0300506

1. Remove the HV battery terminal block cover.
2. Using the electrical tester, measure the resistance between the terminals of high voltage J/B (in the battery pack) and high-voltage J/B (in the ECU box).

Measurement conditions	Tester connections	Standard values
Starter key: LOCK	High-voltage J/B (in battery pack) – High-voltage J/B (in ECU box) BATT OUT(+) terminal – BATT(+) terminal BATT OUT(-) terminal – BATT(-) terminal	1 Ω or less (With continuity)

Is the measured value within the range of standard value?**YES****Go to step 7.****NO****Replace the DC high-voltage cable between the high-voltage J/B (in the battery pack) and the high-voltage J/B (in the ECU box).**

7 Inspecting the SMR#1

SHTS03ZZZ0300507

1. Remove the SMR#1 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#1 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#1 terminal (switch side) 3rd terminal – 5th terminal	10 k Ω or more (No continuity)

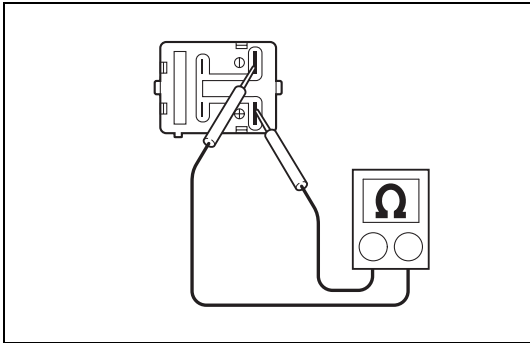
Is the measured value within the range of standard value?

YES

Go to step 8.

NO

Replace the SMR#1.
After replacement, go to step 8.

8 Inspecting the SMR#2

SHTS03ZZZ0300508

1. Remove the SMR#2 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#2 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#2 terminal (switch side) 3rd terminal – 5th terminal	10 k Ω or more (No continuity)

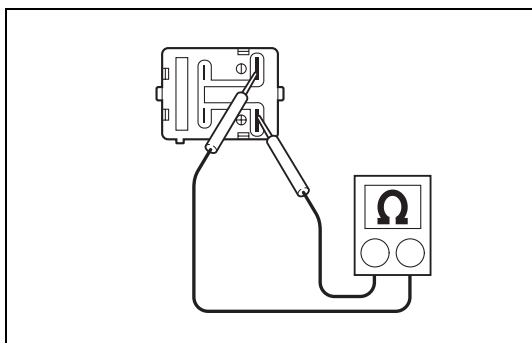
Is the measured value within the range of standard value?

YES

Go to step 9.

NO

Replace the SMR#2.
After replacement, go to step 9.

9 Inspecting the SMR#3

SHTS03ZZZ0300509

1. Remove the SMR#3 from the high-voltage J/B (in the battery pack).
2. Using the electrical tester, measure the resistance between the SMR#3 terminals.

Measurement conditions	Tester connections	Standard values
—	SMR#3 terminal (switch side) 3rd terminal – 5th terminal	10 k Ω or more (No continuity)

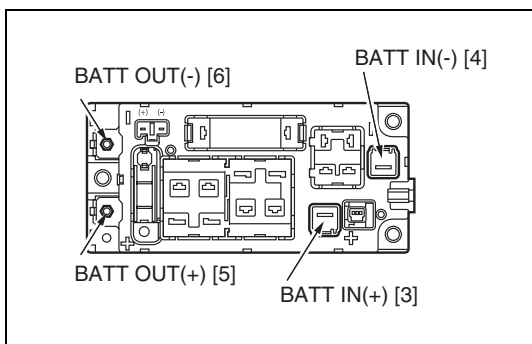
Is the measured value within the range of standard value?

YES

NO

Go to step 10.

Replace the SMR#3.
After replacement, go to step 10.

10 Checking the high-voltage J/B (in the battery pack) for short circuit

SHTS03ZZZ0300510

1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). (with SMR#1, 2, and 3 removed).

Measurement conditions	Tester connections	Standard values
—	High-voltage J/B (in battery pack) BATT IN(-) terminal – BATT OUT(-) terminal BATT IN(+) terminal – BATT OUT(+) terminal	10 k Ω or more (No continuity)

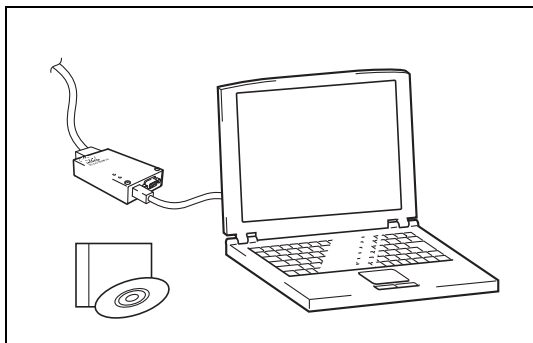
Is the measured value within the range of standard value?

YES

NO

Go to step 11.

Replace the high-voltage J/B (in the battery pack).

11 Reproduction check [HINO-DX]

SHTS03ZZZ0300511

1. Connect all the connectors that have been disconnected to restore the system.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Perform a test run. (accelerate and decelerate running for approximately 1 hour).
6. In [Fault Information] on the diagnosis tool screen, check if DTC P3126-12 is detected.

HINT**Monitor [DC voltage] on the data monitor.****Is DTC P3126-12 detected?****YES****Replace the inverter.****NO****The inspection is completed.
(Temporary actuation of protection function
due to external noise)**

CHECKLIST: P3126 (TC12)

P3126 (TC12)		Abnormality in inverter system (only during cranking)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Inspecting the HV battery ECU [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. In [Fault Information] on the diagnosis tool screen, check if DTC P0A95 related to the HV battery line is detected.	DTC P0A95 is detected: Go to YES. DTC P0A95 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 2.
2	Reading the DTC [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any of the following DTCs other than P3126-12 is detected: • P0ADC, P0ADB, P0AE7, P0AE0, P0AE6, P0ADF	DTC other than P3126-12 is detected: Go to YES. DTC other than P3126-12 is not detected: Go to NO.		Perform troubleshooting for each of related DTC.	Go to step 3.
3	Inspecting the DC high-voltage cable for continuity 1	1. Set the starter key to the "LOCK" position. 2. Remove the inverter terminal block cover and the ECU box terminal block cover. 3. Using the electrical tester, measure the resistance between the terminals of inverter and high-voltage J/B (in the ECU box). <Measurement conditions> Starter key: LOCK <Tester connections> Inverter (high-voltage terminal) – High-voltage J/B (in ECU box) P(1) terminal – INV(+) terminal N(2) terminal – INV(-) terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 4.	Replace the DC high-voltage cable between the terminals of inverter and high-voltage JB (in the ECU box).
4	Inspecting the DC high-voltage cable	1. Check the P(+) and N(-) terminals of DC high-voltage cable (inverter side) for failing connection (looseness, wear, or melting damage).	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 5.

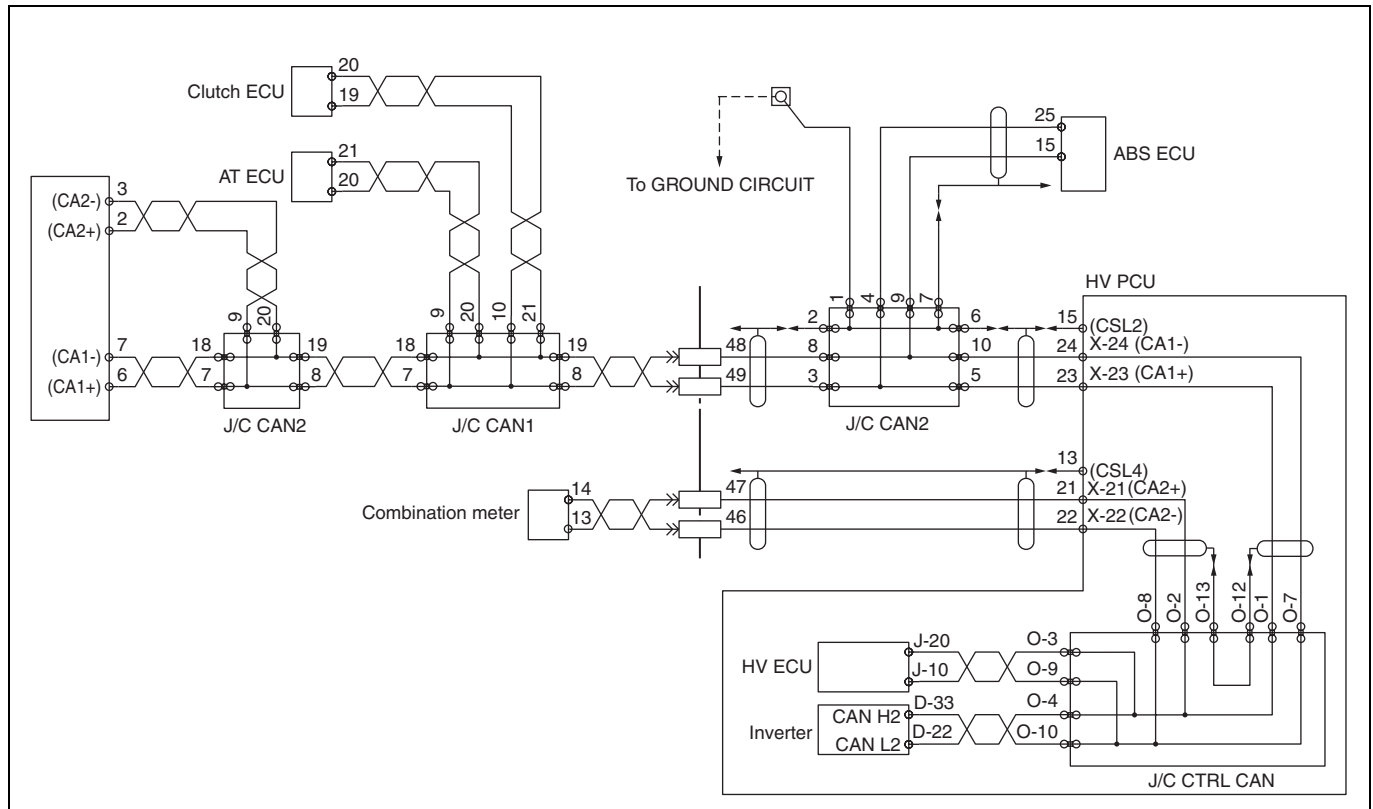
P3126 (TC12)		Abnormality in inverter system (only during cranking)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
5	Inspecting the high-voltage J/B (in the ECU box)	1. Check the terminals of the high-voltage J/B (in the ECU box) for failing connection (looseness, wear, or melting damage). • BATT(+) terminal • BATT(-) terminal • INV(+) terminal • INV(-) terminal	Defect is found: Go to YES. Defect is not found: Go to NO.		Retighten the terminals. Replace the terminals if abnormal wear or melting damage is detected.	Go to step 6.
6	Inspecting the DC high-voltage cable for continuity 2	1. Remove the HV battery terminal block cover. 2. Using the electrical tester, measure the resistance between the terminals of high voltage J/B (in the battery pack) and high-voltage J/B (in the ECU box). <Measurement conditions> Starter key: LOCK <Tester connections> High-voltage J/B (in battery pack) – High-voltage J/B (in ECU box) BATT OUT(+) terminal – BATT(+) terminal BATT OUT(-) terminal – BATT(-) terminal <Standard values> 1 Ω or less (With continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 7.	Replace the DC high-voltage cable between the high-voltage J/B (in the battery pack) and the high-voltage J/B (in the ECU box).
7	Inspecting the SMR#1	1. Remove the SMR#1 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#1 terminals. <Measurement conditions> — <Tester connections> SMR#1 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 8.	Replace the SMR#1. After replacement, go to step 8.

P3126 (TC12)		Abnormality in inverter system (only during cranking)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
8	Inspecting the SMR#2	1. Remove the SMR#2 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#2 terminals. <Measurement conditions> — <Tester connections> SMR#2 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 9.	Replace the SMR#2. After replacement, go to step 9.
9	Inspecting the SMR#3	1. Remove the SMR#3 from the high-voltage J/B (in the battery pack). 2. Using the electrical tester, measure the resistance between the SMR#3 terminals. <Measurement conditions> — <Tester connections> SMR#3 terminal (switch side) 3rd terminal – 5th terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 10.	Replace the SMR#3. After replacement, go to step 10.
10	Checking the high-voltage J/B (in the battery pack) for short circuit	1. Using the electrical tester, measure the resistance between the terminals of high-voltage J/B (in the battery pack). (with SMR#1, 2, and 3 removed). <Measurement conditions> — <Tester connections> High-voltage J/B (in battery pack) BATT IN(-) terminal – BATT OUT(-) terminal BATT IN(+) terminal – BATT OUT(+) terminal <Standard values> 10 kΩ or more (No continuity)	The measured value is within the range of standard value: Go to YES. The measured value is not within the range of standard value: Go to NO.		Go to step 11.	Replace the high-voltage J/B (in the battery pack).

P3126 (TC12)		Abnormality in inverter system (only during cranking)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
11	Reproduction check [HINO-DX]	1. Connect all the connectors that have been disconnected to restore the system. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history. 5. Perform a test run. (accelerate and decelerate running for approximately 1 hour). 6. In [Fault Information] on the diagnosis tool screen, check if DTC P3126-12 is detected. HINT Monitor [DC voltage] on the data monitor.	DTC P3126-12 is detected: Go to YES. DTC P3126-12 is not detected: Go to NO.		Replace the inverter.	The inspection is completed. (Temporary actuation of protection function due to external noise)

DTC: U0073 (TC91)

EN01H03ZZZ030602004074

DTC: U0073 (TC91) Abnormality in CAN communication with inverter (control CAN)
INFORMATION

SHTS03ZZZ0300512

1. Technical description

- —

<Description of malfunction>

- The inverter detected the communication abnormality in the control CAN. (Stop of control CAN communication due to bus off)

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 9 V or more.
- Since the inverter start signal is turned ON, 1 second or more has passed.

(2) Judgement criteria

- Detection of control CAN bus off continues for 0.5 second in total.

3. Reset condition

- A communication available state continues for 1 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

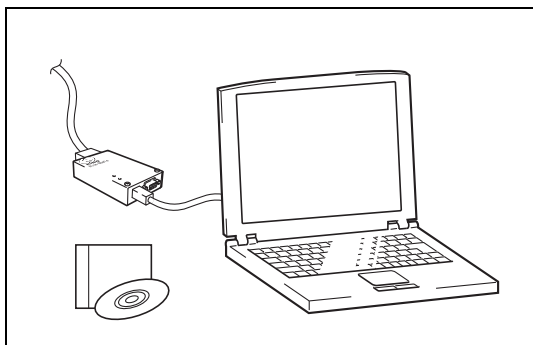
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter
- Malfunction of ECU connected with control CAN

INSPECTION PROCEDURE: U0073 (TC91)**1 Implementing common inspection items**

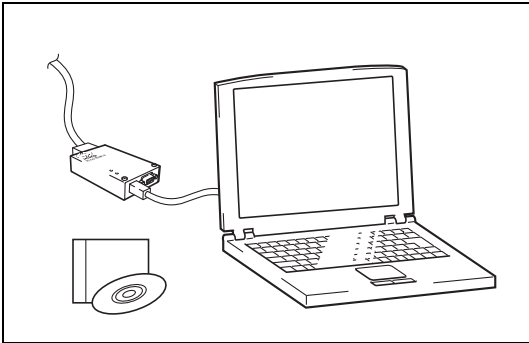
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300513

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU and inverter.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0073-91 is detected.

Is DTC U0073-91 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU [HINO-DX]

SHTS03ZZZ0300514

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 (abnormality in control CAN communication) is detected in the HV ECU.

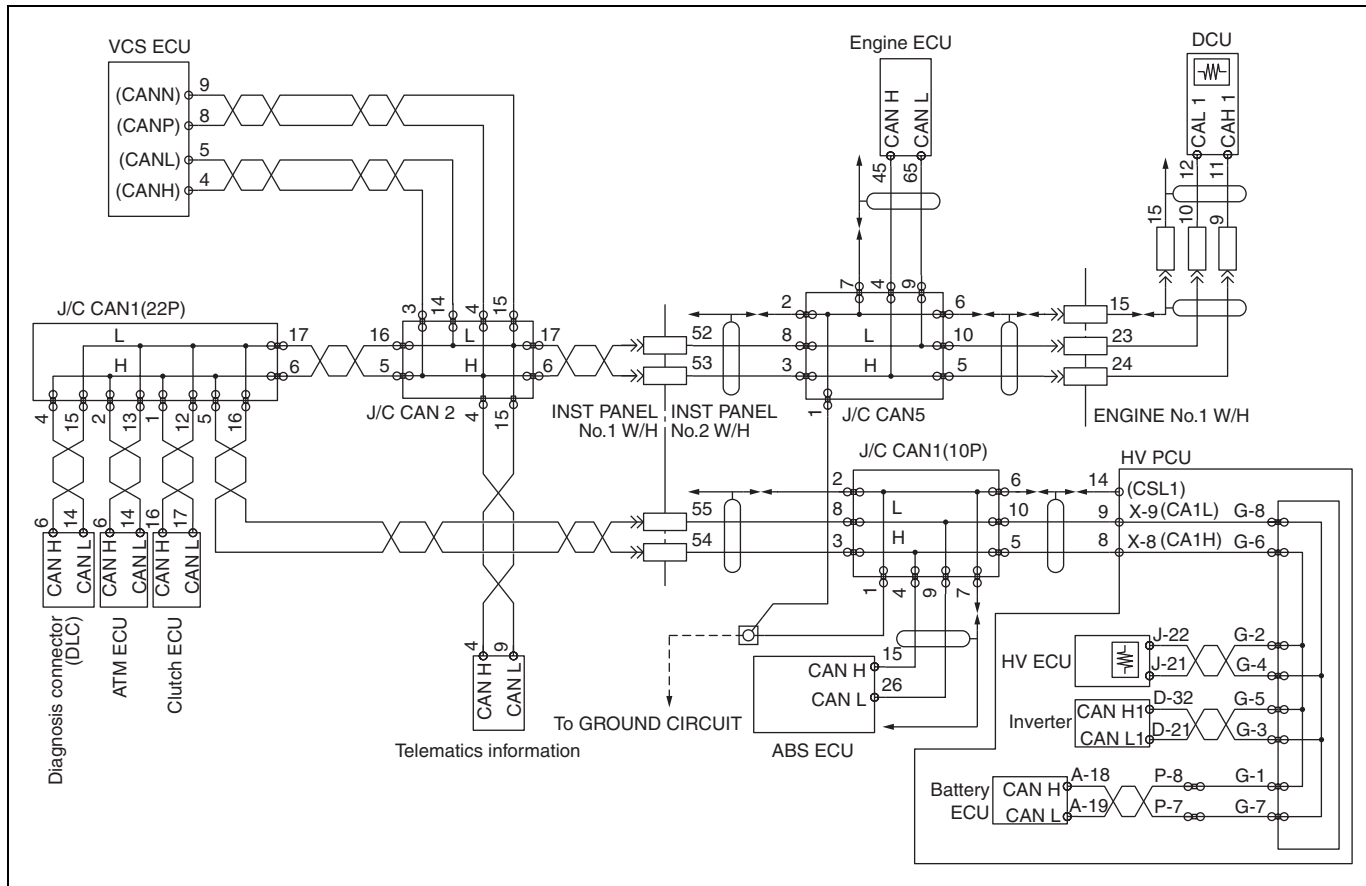
Is DTC U0073-11 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the inverter.**

CHECKLIST: U0073 (TC91)

U0073 (TC91)		Abnormality in CAN communication with inverter (control CAN)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementing common inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and inverter. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0073-91 is detected.	DTC U0073-91 is detected: Go to YES. DTC U0073-91 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 (abnormality in control CAN communication) is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the inverter.

DTC: U0074 (TC3E)

EN01H03ZZZ030602004075

DTC: U0074 (TC3E) Abnormality in CAN communication with inverter (DIAG CAN)
INFORMATION

SHTS03ZZZ0300515

1. Technical description

• —

<Description of malfunction>

- The inverter detected a communication abnormality in the DIAG CAN. (Stop of DIAG CAN communication due to bus off)

2. DTC set condition

- (1) DTC detection condition
 - Control power supply voltage is 9 V or more.
 - Since the inverter start signal is turned ON, 1 second or more has passed.
- (2) Judgement criteria
 - Detection of DIAG CAN bus off continues for 0.5 second in total.

3. Reset condition

- A communication available state continues for 1 second.

4. Indication, warning or system control regulation when the DTC is set.

- MIL: OFF
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set**<Symptoms on the vehicle due to backup control (fail safe)>**

- –

<Symptoms on the vehicle due to malfunction>

- –

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

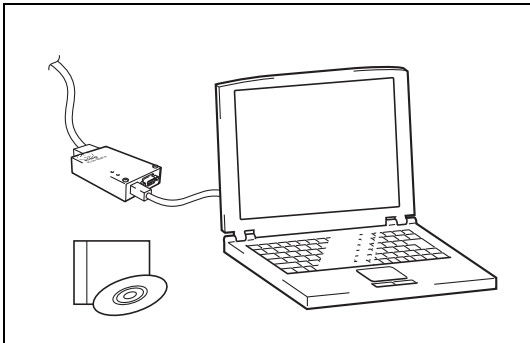
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter
- Malfunction of ECU connected with DIAG CAN

INSPECTION PROCEDURE: U0074 (TC3E)**1 Implementing common inspection items**

1. Perform the basic inspection items for abnormality of the HV DIAG CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300516

1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if U0074-3E is detected.

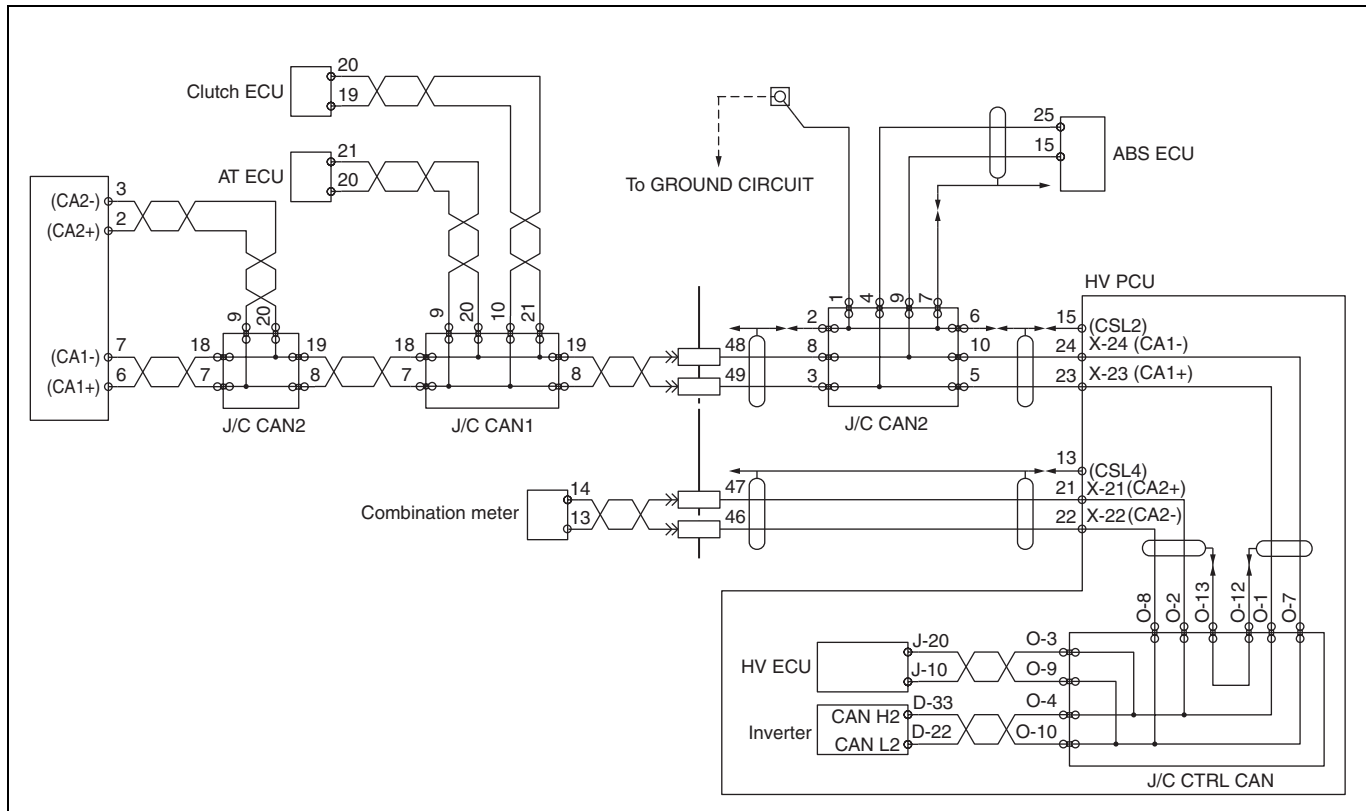
Is DTC U0074-3E detected?**YES****Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

CHECKLIST: U0074 (TC3E)

U0074 (TC3E)		Abnormality in CAN communication with inverter (DIAG CAN)		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementing common inspection items	1. Perform the basic inspection items for abnormality of the HV DIAG CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and inverter. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0074-3E is detected.	DTC U0074-3E is detected: Go to YES. DTC U0074-3E is not detected: Go to NO.		Refer to the "DIAGNOSIS CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)

DTC: U0293 (TC31)

EN01H03ZZZ030602004076

DTC: U0293 (TC31) HV ECU CAN communication blackout
INFORMATION

SHTS03ZZZ0300517

1. Technical description

- –

<Description of malfunction>

- A blackout occurred in the CAN communication from the HV ECU. (HV ECU CAN communication blackout)

2. DTC set condition**(1) DTC detection condition**

- Control power supply voltage is 9 V or more.
- Since the inverter start signal is turned ON, 1 second or more has passed.

(2) Judgement criteria

- When communication from the HV ECU cannot be received continuously for the following invalid communication judgment time (0.6 second + Reception cycle × 10):
 - In case of command value information → Continuously for 0.68 second
 - In case of sync task signal → Continuously for 1.1 second

3. Reset condition

- Immediately when all frames from the HV ECU are normally received twice

4. Indication, warning or system control regulation when the DTC is set.

- MIL: ON
- HV warning light: ON

5. Symptoms on the vehicle when the DTC is set

<Symptoms on the vehicle due to backup control (fail safe)>

- –

<Symptoms on the vehicle due to malfunction>

- The engine may become unable to start. (Note, however, that vehicles equipped with a starter will be started with the starter.)
- Idling stop is not available.
- The regeneration function stops, reducing the feeling of deceleration during deceleration.

6. Pre-inspection work

- Check the battery voltage to make sure that there is no abnormality.

7. After-inspection work

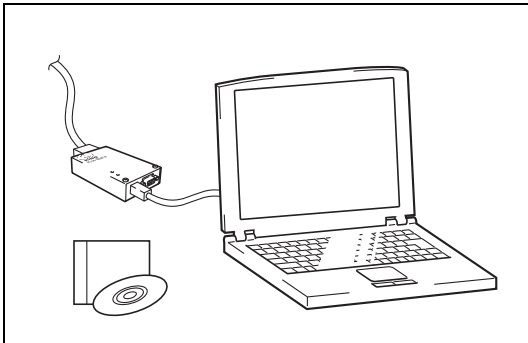
- Clear the recorded DTC.
- Check that no DTC is detected after test-driving the vehicle.

8. Estimated failure factors

- Temporary communication blackout due to noise
- Disconnection or short circuit of harness
- Improper connector connection or fitting
- Malfunction of inverter
- Malfunction of HV ECU
- Malfunction of control CAN connection ECU

INSPECTION PROCEDURE: U0293 (TC31)**1 Implementing common inspection items**

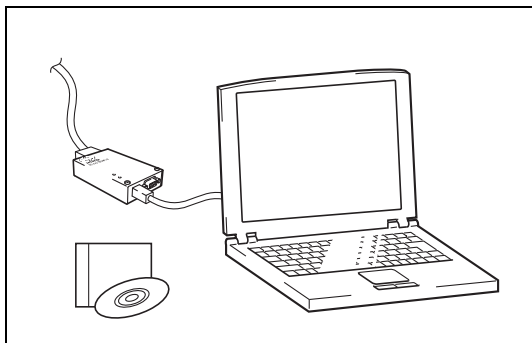
1. Perform the basic inspection items for abnormality of the HV control CAN system.
- Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".

Is any defect found?**YES****Repair or replace the malfunctioning part detected by the common inspection items****NO****Go to step 2.****2 Reproduction check [HINO-DX]**

SHTS03ZZZ0300518

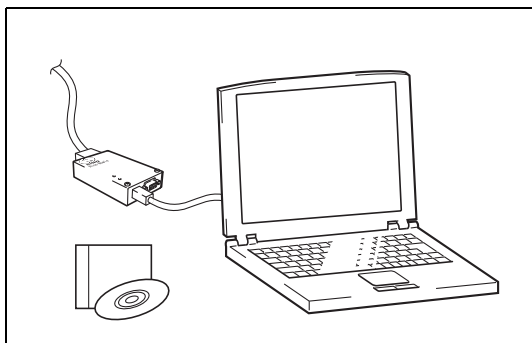
1. Set the starter key to the "LOCK" position.
2. Connect the diagnosis tool (HINO-DX) to the vehicle.
3. Set the starter key to the "ON" position.
4. Clear the malfunction history of the HV ECU, inverter, and vehicle control ECU.
5. Set the starter key to the "LOCK" position and wait for approximately 1 minute.
6. Set the starter key to the "ON" position.
7. In [Fault Information] on the diagnosis tool screen, check if DTC U0293-31 is detected.

Is DTC U0293-31 detected?**YES****Go to step 3.****NO****The inspection is completed.
(Temporary actuation of protection function due to external noise or connector terminal contact resistance return)**

3 Inspecting the HV ECU (CAN register) [HINO-DX]

SHTS03ZZZ0300519

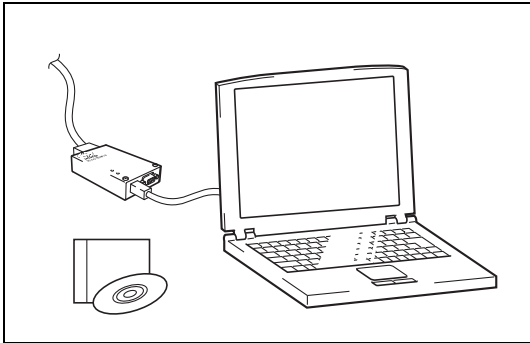
1. In [Fault Information] on the diagnosis tool screen, check if DTC P0A1D-12 (Control CAN register stuck) is detected in the HV ECU.

Is DTC P0A1D-12 detected?**YES****Replace the HV ECU.****NO****Go to step 4.****4 Inspecting the inverter (CAN register) [HINO-DX]**

SHTS03ZZZ0300520

1. In [Fault Information] on the diagnosis tool screen, check if P0A1B-92 (Control CAN register stuck) is detected in the inverter.

Is DTC P0A1B-92 detected?**YES****Replace the inverter.****NO****Go to step 5.**

5 Inspecting the HV ECU (communication abnormality) [HINO-DX]

SHTS03ZZZ0300521

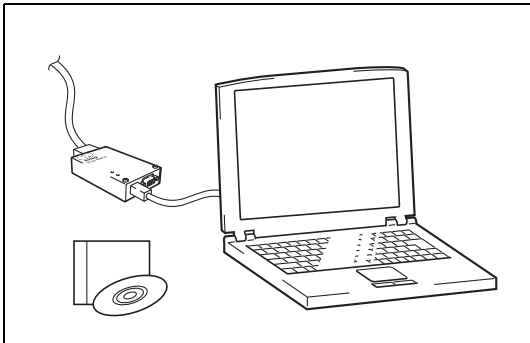
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 (Abnormality in control CAN communication) is detected in the HV ECU.

Is DTC U0073-11 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-11 Step 2 and onward.)**

NO

Go to step 6.

6 Inspecting the inverter (communication abnormality) [HINO-DX]

SHTS03ZZZ0300522

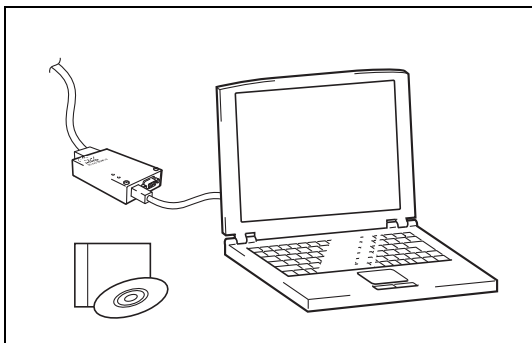
1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-91 (Abnormality in control CAN communication) is detected in the inverter.

Is DTC U0073-91 detected?**YES**

**Perform troubleshooting for each of related DTC.
(Perform troubleshooting of U0073-91 Step 2 and onward.)**

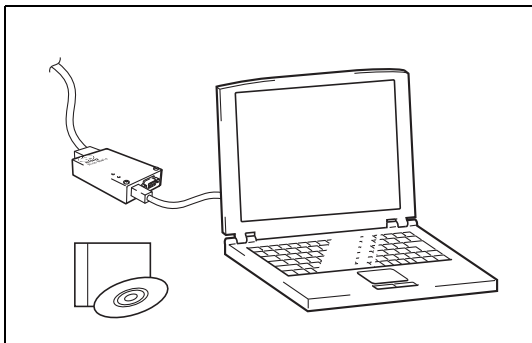
NO

Go to step 7.

7 Inspecting the HV ECU (communication blackout) [HINO-DX]

SHTS03ZZZ0300523

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0110-14 (Inverter CAN communication blackout) is detected in the HV ECU.

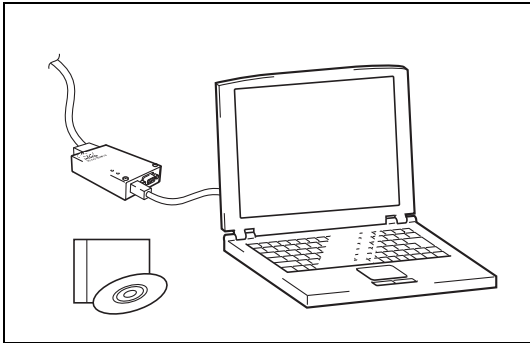
Is DTC U0110-14 detected?**YES****Go to step 8.****NO****Go to step 10.****8 Reading the DTC 1 [HINO-DX]**

SHTS03ZZZ0300524

1. In [Fault Information] on the diagnosis tool screen, check if any control CAN-related ECU communication blackout is detected other than Inverter CAN blackout (U0110-14) in the HV ECU.

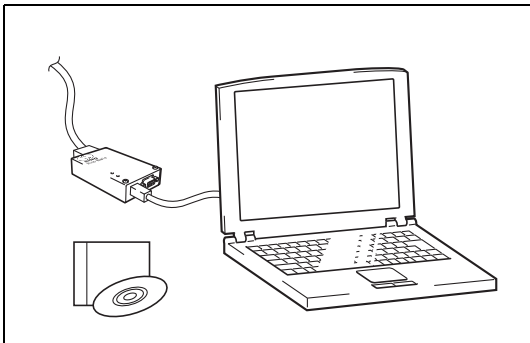
- [U110A] Vehicle control ECU CAN communication blackout
- [U0101] AT ECU CAN communication blackout
- [U1136] Clutch ECU CAN communication blackout
- [U0121] ABS ECU CAN communication blackout
- [U0155] Meter CAN communication blackout

Are all communication blackout DTCs detected?**YES****Go to step 9. (All communication blackouts have been occurred.)****NO****Go to step 10.**

9 Inspecting the vehicle control ECU 1 [HINO-DX]

SHTS03ZZZ0300525

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0155 (Meter CAN communication blackout) is detected in the vehicle control ECU.

Is DTC U0155 detected?**YES****Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".****NO****Replace the HV ECU.****10 Inspecting the vehicle control ECU 2 [HINO-DX]**

SHTS03ZZZ0300526

1. In [Fault Information] on the diagnosis tool screen, check if DTC U0293 (HV ECU CAN communication blackout) is detected in the vehicle control ECU.

Is DTC U0293 detected?**YES****Replace the HV ECU.****NO****Replace the inverter.**

CHECKLIST: U0293 (TC31)

U0293 (TC31)		HV ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
1	Implementing common inspection items	1. Perform the basic inspection items for abnormality of the HV control CAN system. • Refer to the "CAN COMMUNICATION (HYBRID SYSTEM)" in the chapter "CONTROL SYSTEM".	Defect is found: Go to YES. Defect is not found: Go to NO.		Repair or replace the malfunctioning part detected by the common inspection items	Go to step 2.
2	Reproduction check [HINO-DX]	1. Set the starter key to the "LOCK" position. 2. Connect the diagnosis tool (HINO-DX) to the vehicle. 3. Set the starter key to the "ON" position. 4. Clear the malfunction history of the HV ECU and inverter. 5. Set the starter key to the "LOCK" position and wait for approximately 1 minute. 6. Set the starter key to the "ON" position. 7. In [Fault Information] on the diagnosis tool screen, check if U0293-31 is detected.	DTC U0293-31 is detected: Go to YES. DTC U0293-31 is not detected: Go to NO.		Go to step 3.	The inspection is completed. (Temporary actuation of protection function due to external noise or connector terminal contact resistance return)
3	Inspecting the HV ECU (CAN register) [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC P0A1D-12 (Control CAN register stuck) is detected in the HV ECU	DTC P0A1D-12 is detected: Go to YES. DTC P0A1D-12 is not detected: Go to NO.		Replace the HV ECU.	Go to step 4.
4	Inspecting the inverter (CAN register) [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if P0A1B-92 (Control CAN register stuck) is detected in the inverter.	DTC P0A1B-92 is detected: Go to YES. DTC P0A1B-92 is not detected: Go to NO.		Replace the inverter.	Go to step 5.
5	Inspecting the HV ECU (communication abnormality) [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-11 (Abnormality in control CAN communication) is detected in the HV ECU.	DTC U0073-11 is detected: Go to YES. DTC U0073-11 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-11 Step 2 and onward.)	Go to step 6.

U0293 (TC31)		HV ECU CAN communication blackout		Inspection Procedure		
Step	Action	Description	Judgement	Check (Yes/No)	Yes	No
6	Inspecting the inverter (communication abnormality) [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0073-91 (Abnormality in control CAN communication) is detected in the inverter.	DTC U0073-91 is detected: Go to YES. DTC U0073-91 is not detected: Go to NO.		Perform troubleshooting for each of related DTC. (Perform troubleshooting of U0073-91 Step 2 and onward.)	Go to step 7.
7	Inspecting the HV ECU (communication blackout) [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0110-14 (Inverter CAN communication blackout) is detected in the HV ECU.	DTC U0110-14 is detected: Go to YES. DTC U0110-14 is not detected: Go to NO.		Go to step 8.	Go to step 10.
8	Reading the DTC 1 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if any control CAN-related ECU communication blackout is detected other than inverter CAN blackout (U0110-14) in the HV ECU. • [U110A] Vehicle control ECU CAN communication blackout • [U0101] AT ECU CAN communication blackout • [U1136] Clutch ECU CAN communication blackout • [U0121] ABS ECU CAN communication blackout • [U0155] Meter CAN communication blackout	All communication blackout DTCs are detected: Go to YES. All communication blackout DTCs are not detected: Go to NO.		Go to step 9. (All communication blackouts have been occurred.)	Go to step 10.
9	Inspecting the vehicle control ECU 1 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0155 (Meter CAN communication blackout) is detected in the vehicle control ECU.	DTC U0155 is detected: Go to YES. DTC U0155 is not detected: Go to NO.		Refer to the "CONTROL CAN COMMUNICATION LINE (HYBRID)" in the chapter "CONTROL SYSTEM".	Replace the HV ECU.
10	Inspecting the vehicle control ECU 2 [HINO-DX]	1. In [Fault Information] on the diagnosis tool screen, check if DTC U0293 (HV ECU CAN communication blackout) is detected in the vehicle control ECU.	DTC U0293 is detected: Go to YES. DTC U0293 is not detected: Go to NO.		Replace the HV ECU.	Replace the inverter.

Hino Motors Sales U.S.A., Inc.

41180 Bridge Street, Novi, MI 48375

Telephone: (248) 699-9300

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