

HEATING AND AIR CONDITIONING

SECTION 00
SERVICE INFORMATION

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TROUBLESHOOTING

Heating Cycle Troubleshooting

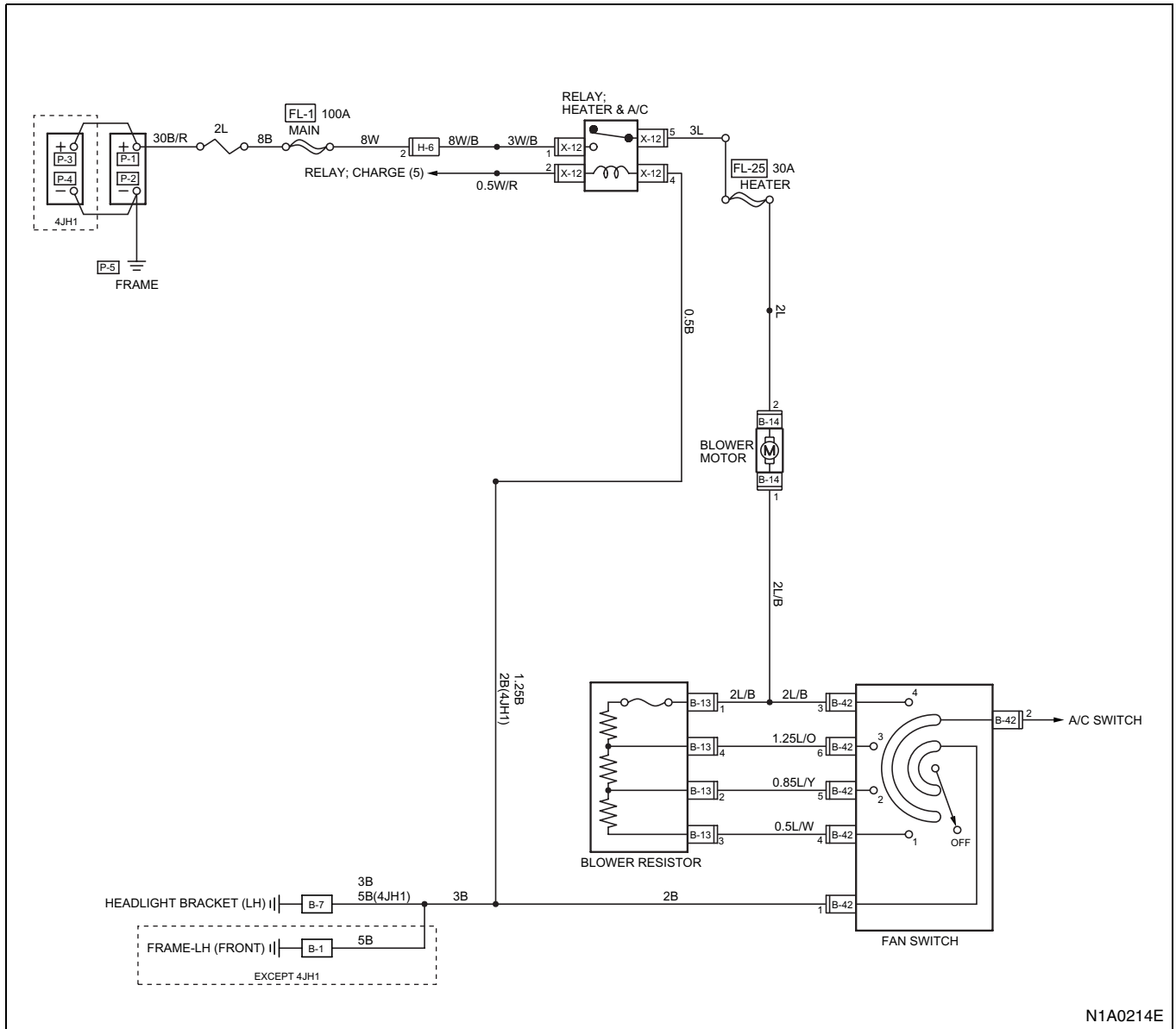
TROUBLE	POSSIBLE CAUSE	CORRECTION
No heating or Insufficient heating.	1. Blower motor does not run, or runs improperly. 2. Engine coolant temperature is low. 3. Insufficient engine coolant. 4. Circulation volume of engine coolant is insufficient. 5. Heater core clogged or collapsed. 6. The heater core is not provided with air sent from the blower motor. 7. Duct connections defective or un-sealing.	• Refer to "Fan Switch Troubleshooting". • Check the engine coolant temperature after warming up the engine and check the thermostat. Replace as necessary. • Add engine coolant as required. • Check if the water hose to the heater core is clogged, collapsed or twisted. Repair or replace as necessary. • Check water pump function. Repair or replace as necessary. • Clean or replace as necessary. • Repair the temperature control link unit or mode doors. • Repair or adjust the control cables. • Repair or replace as necessary.
Control knob moves but mode door does not operate.	1. Cable attaching clip is not correct. 2. Link unit of heater unit or blower assembly defective.	• Repair. • Repair.
The mode door cannot be set to the mode selected.	1. Link unit of heater unit or blower assembly defective. 2. Control cable is not adjusted.	• Repair. • Adjust.

Fan Switch Troubleshooting

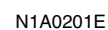
Current flows to the blower motor through the heater & A/C relay X-12 to activate the rotation of the blower motor by turning "ON" the fan switch.

Blower motor speed is controlled in stages by the resistor, by operating the switch from “LOW” to “HIGH.”

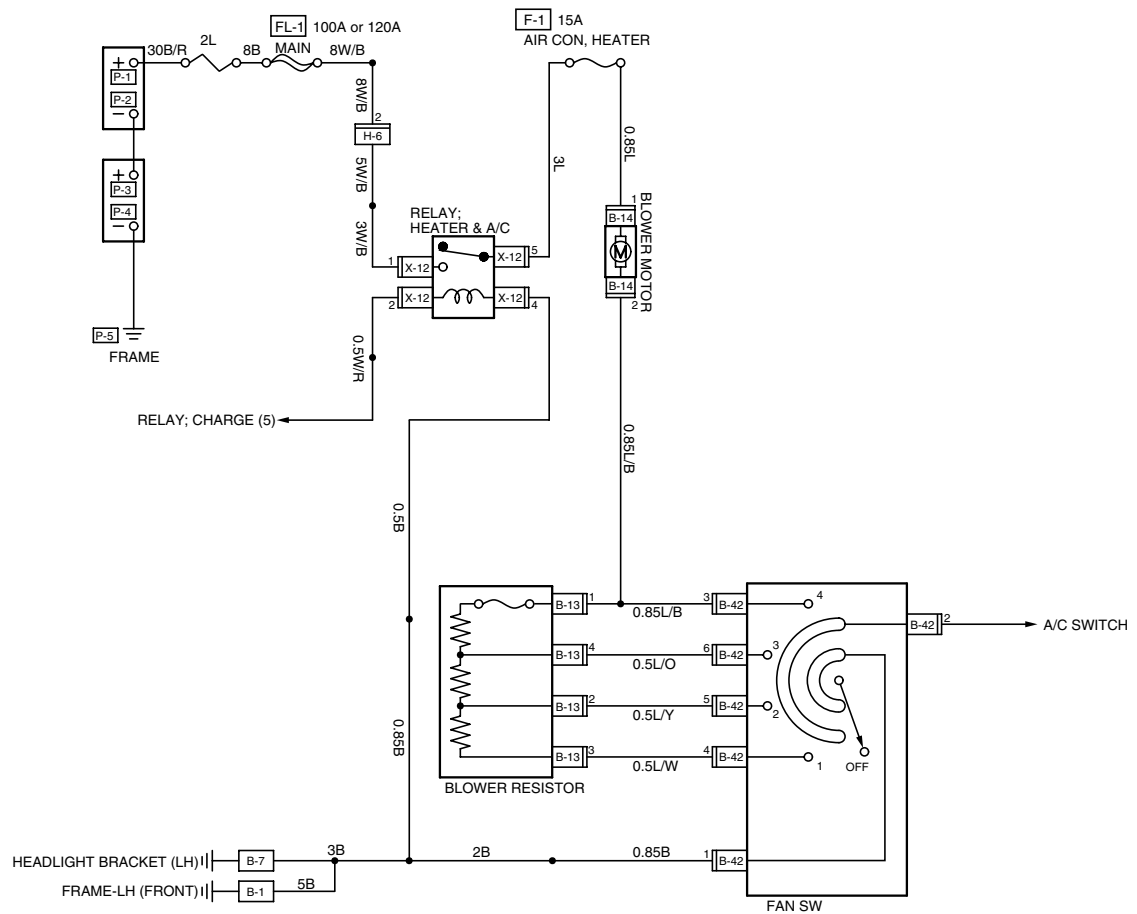
For 12 Volt (LHD Model)



For 12 Volt (RHD Model)



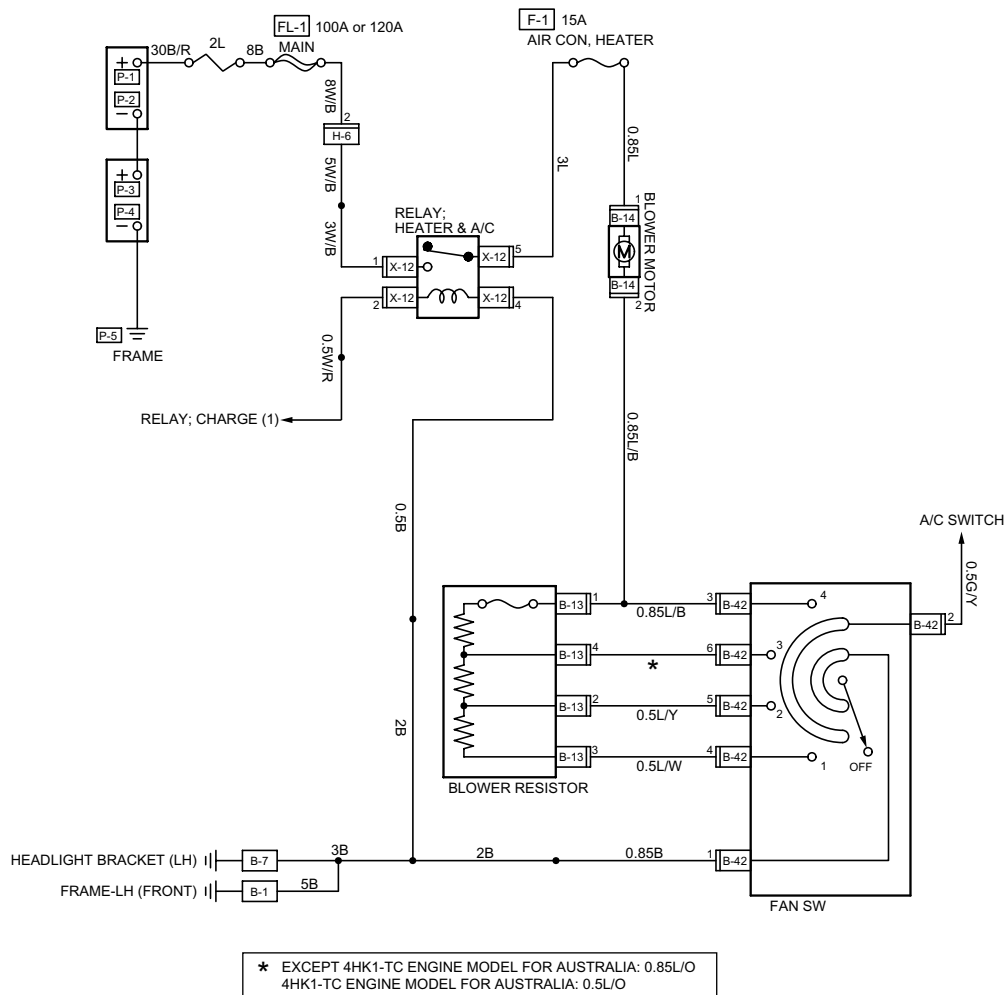
For 24 Volt (LHD Model)



N1A0216E

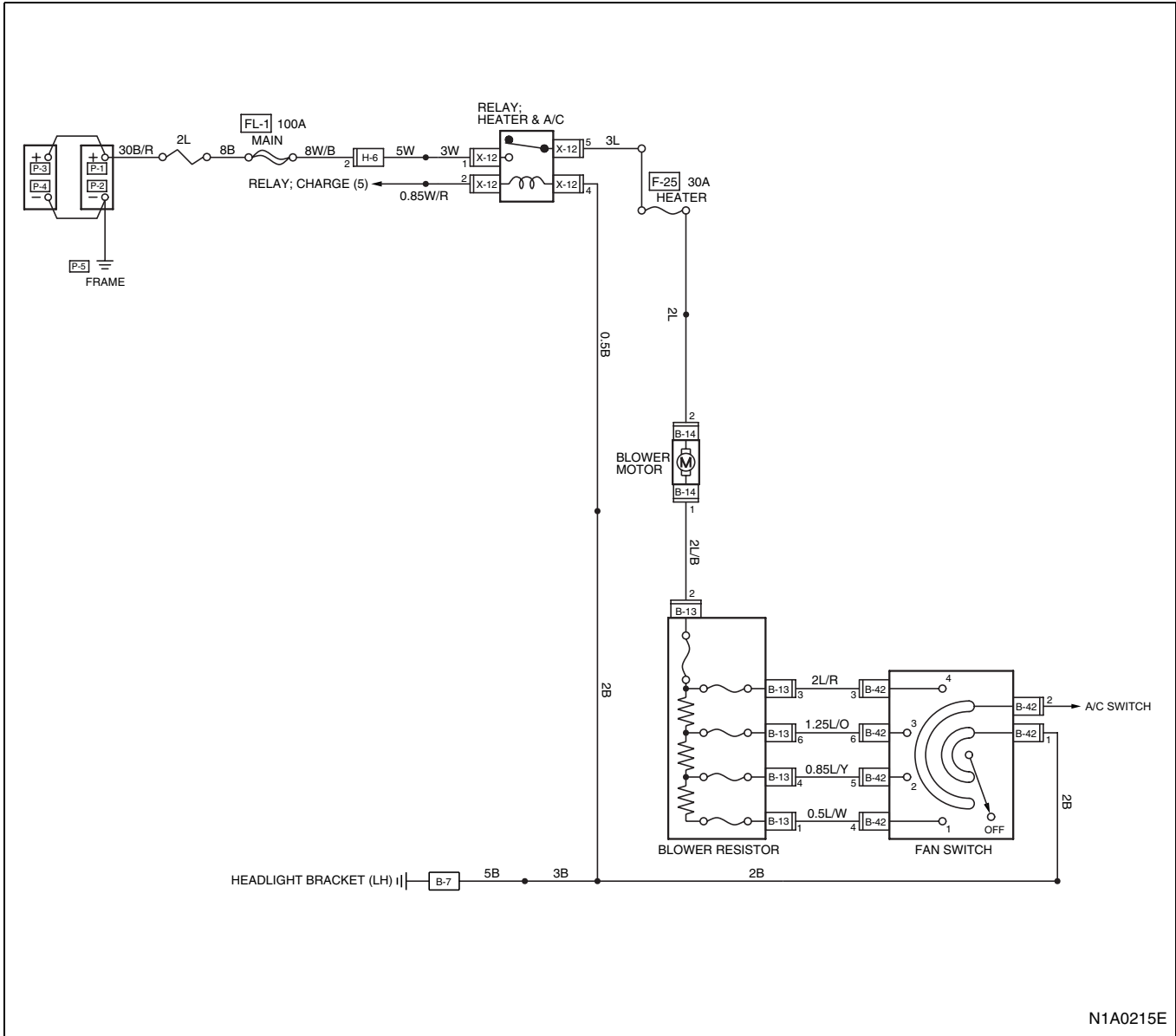
00-6 SERVICE INFORMATION

For 24 Volt (RHD Model)



N1A0202E

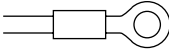
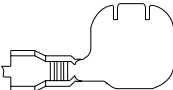
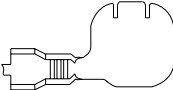
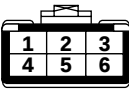
For Taiwan

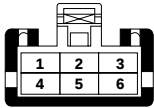
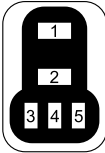
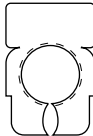
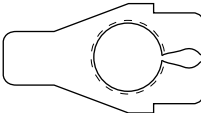
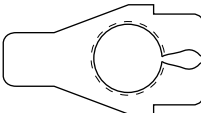


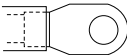
N1A0215E

00-8 SERVICE INFORMATION

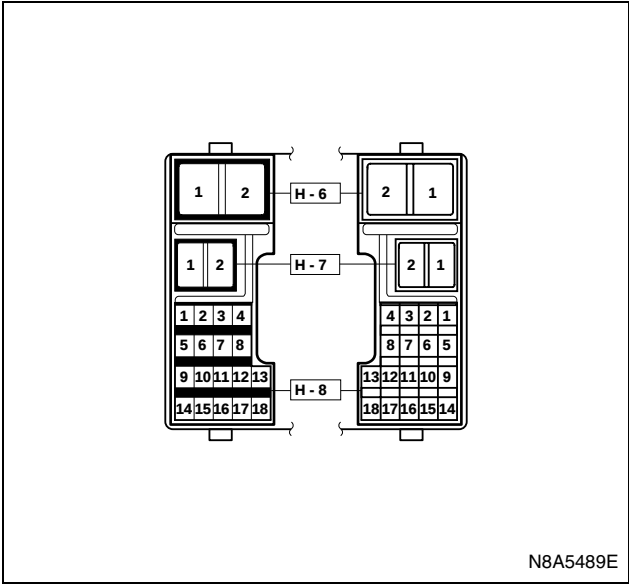
Connector List

No.	Connector Face
B-1	 000-001
B-2	 000-012
B-7	 000-012
B-13	 004-010
B-13	 006-010
B-14	 002-009
X-12	 005-001

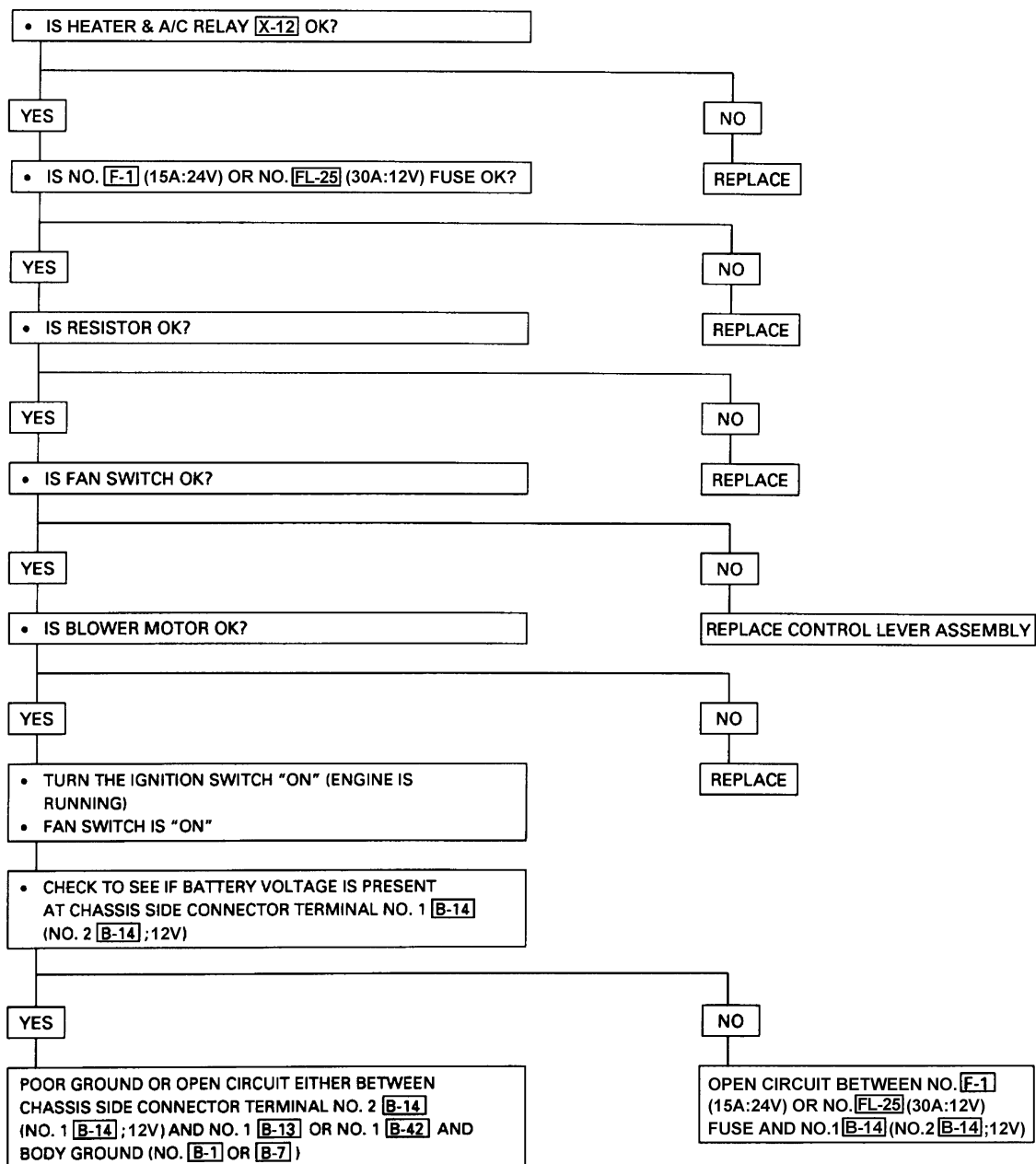
No.	Connector Face
B-42	 006-001
B-42	 005-006
P-1 (12 V)	 000-003
P-2 (12 V)	 000-004
P-1 (24 V)	 000-004
P-4	 000-004
P-2 (24 V)	 000-006
P-3	 000-006

No.	Connector Face
P-5 (12 V)	 000-007
P-5 (24 V)	 000-002

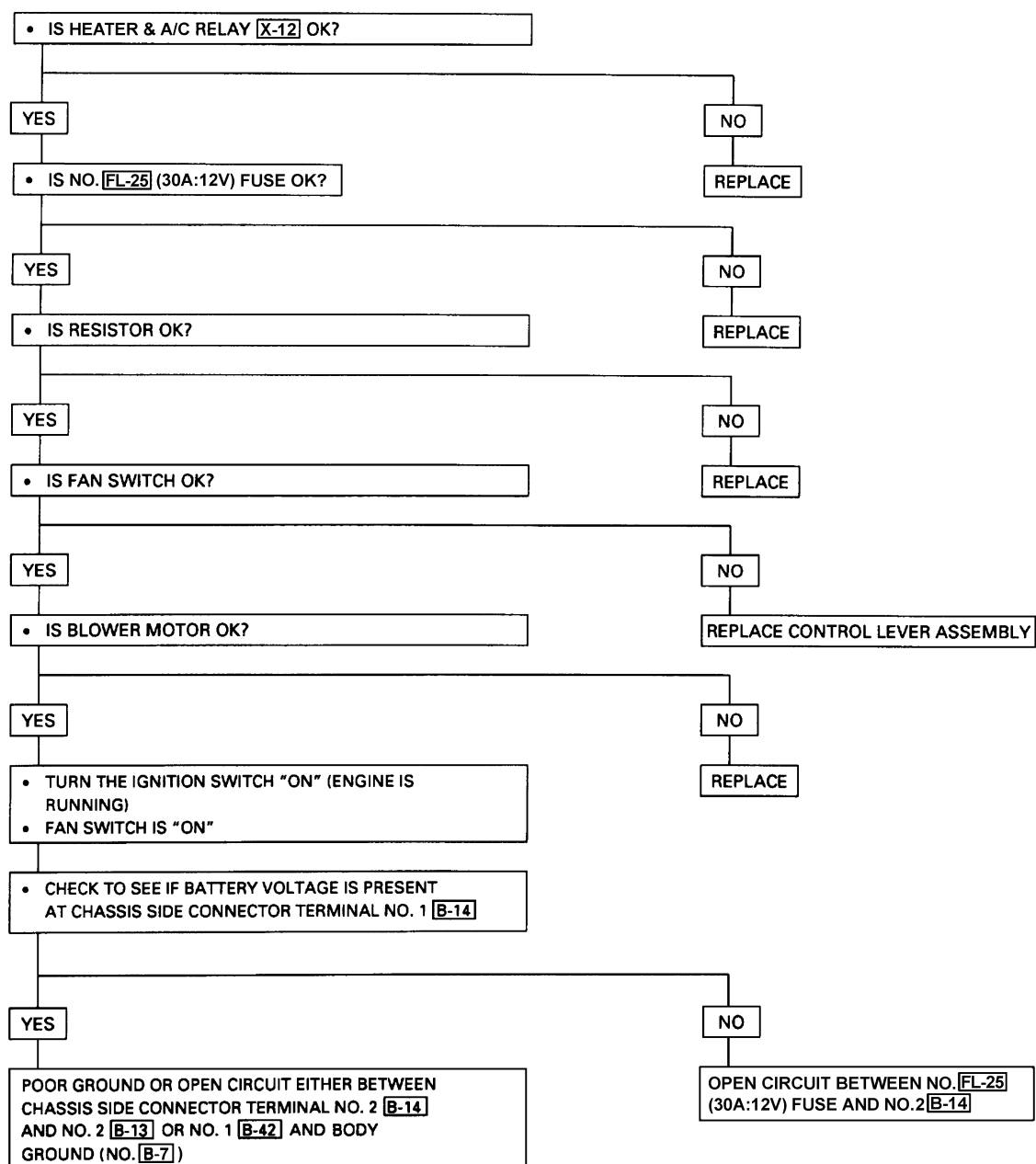
H-6

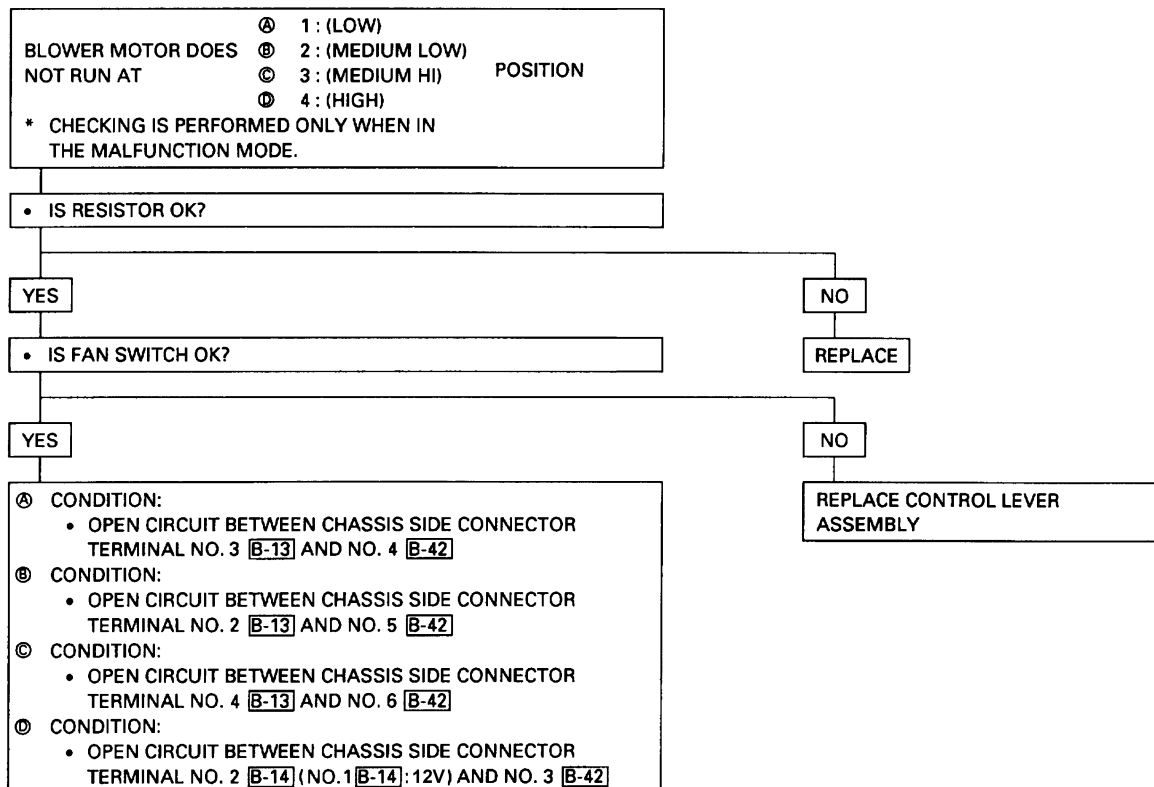


Blower Motor Does Not Run Except Taiwan

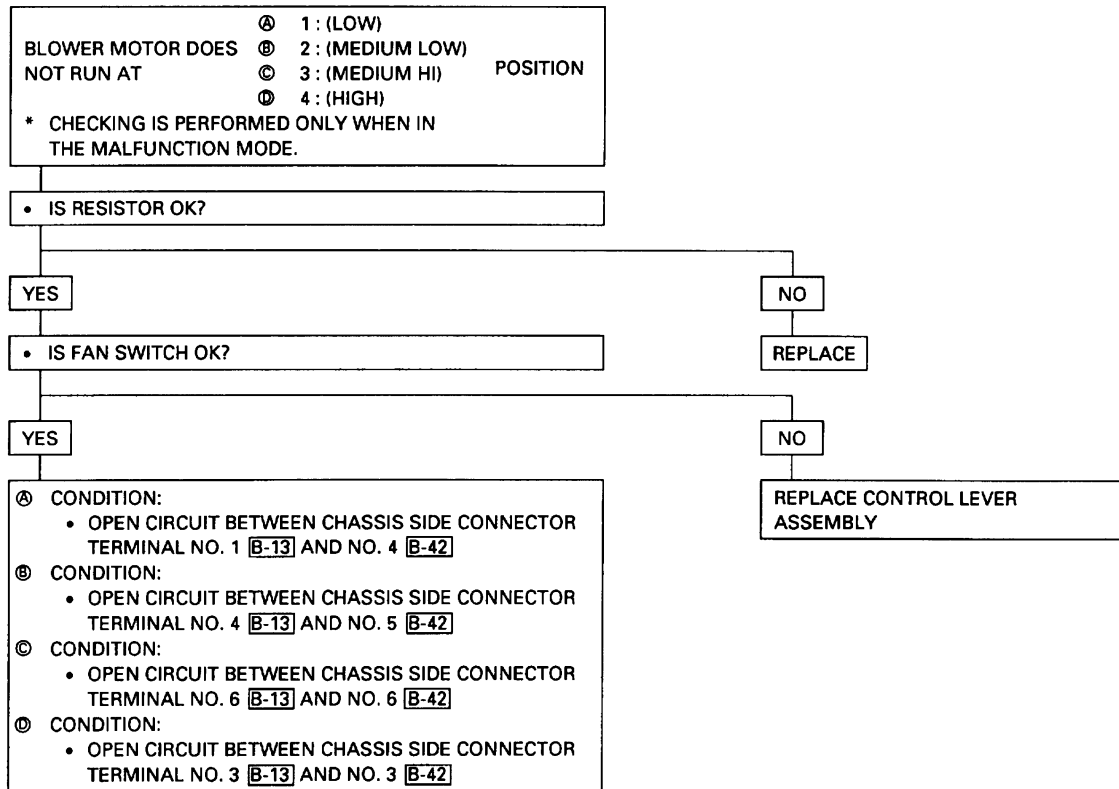


For Taiwan

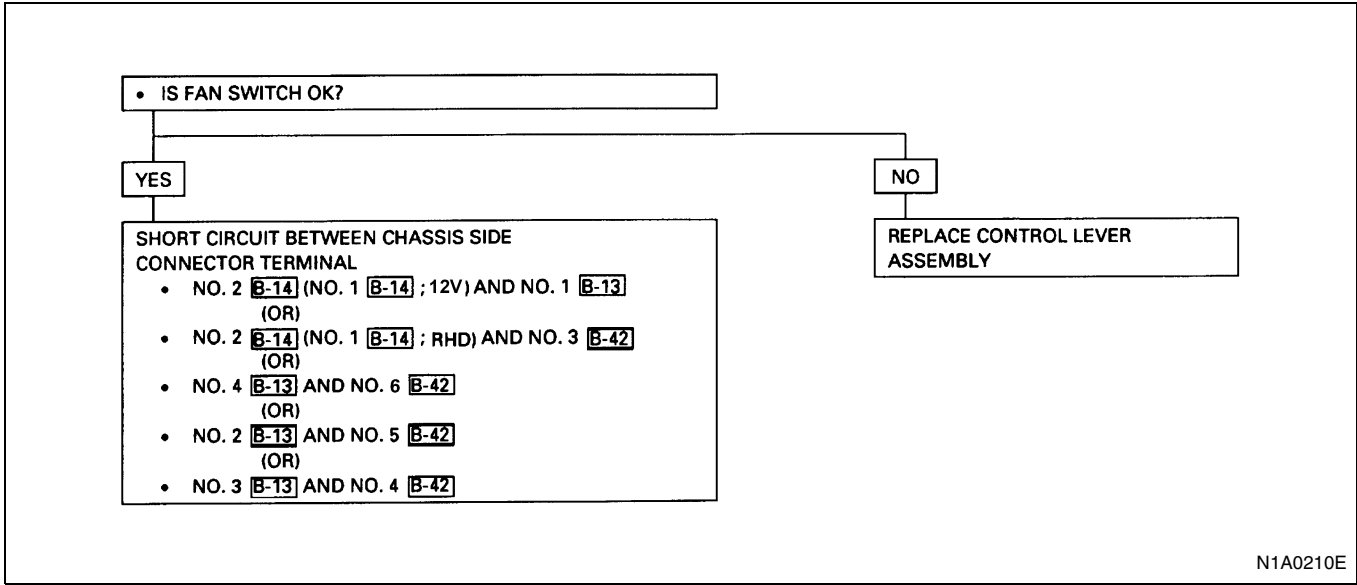


**Blower Motor Does Not Run in Certain Position
Except Taiwan**

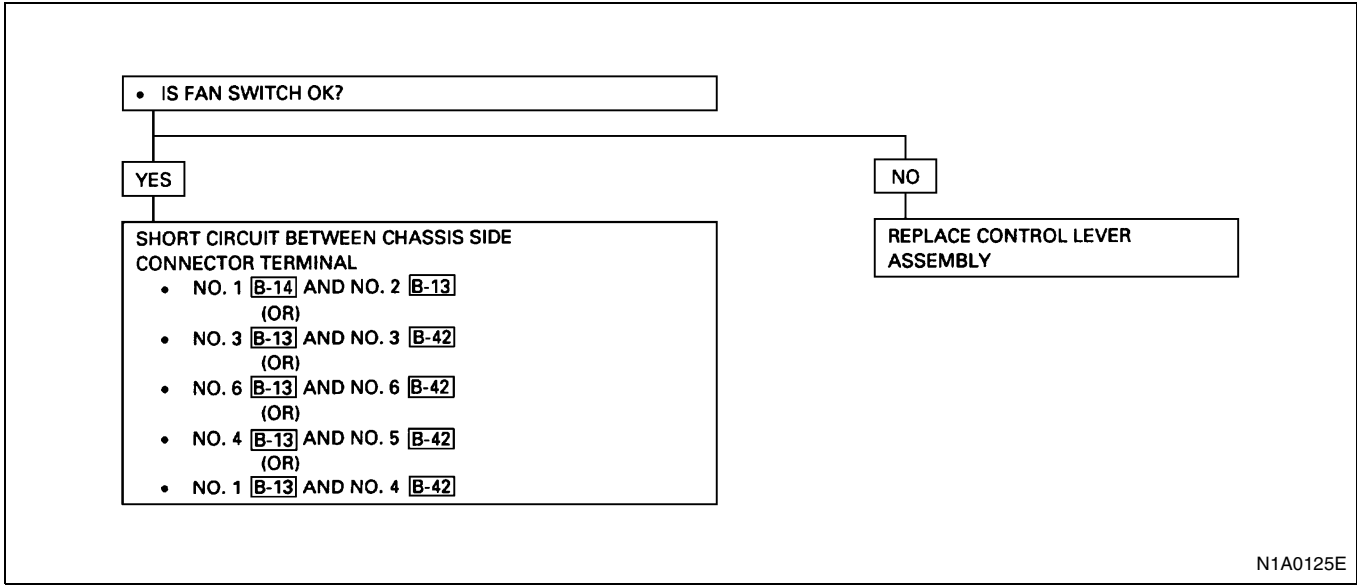
For Taiwan



Blower Motor Does Not Stop at “OFF” Position
Except Taiwan



For Taiwan



Air Conditioning Cycle Troubleshooting

TROUBLE	POSSIBLE CAUSE	CORRECTION
No cooling or insufficient cooling	1. Magnetic clutch does not run 2. Compressor is not rotating properly • Drive belt loosened or broken • Magnetic clutch face is not clean and slips • Incorrect clearance between magnetic drive plate and pulley • Compressor oil leaks from shaft seal or shell • Compressor seized 3. Insufficient or excessive charge of refrigerant 4. Leaks in the refrigerant system 5. Condenser clogged or insufficient radiation 6. Temperature control link unit of the heater unit defective 7. Unsteady operation due to foreign substance in expansion valve 8. Poor operation of electronic thermostat	• Refer to "MAGNETIC CLUTCH TROUBLESHOOTING" • Adjust the drive belt to the specified tension or replace the drive belt • Clean the magnetic clutch face or replace • Adjust the clearance (Refer to Section 1D "COMPRESSOR OVERHAUL") • Replace the compressor • Replace the compressor • Discharge and recover refrigerant. Recharge to specified amount. • Check refrigerant system for leaks and repair as necessary. Discharge and recover refrigerant. Recharge to specified amount. • Clean the condenser or replace as necessary • Check radiator or condenser fan function • Repair the link unit • Replace the expansion valve • Check electronic thermostat and replace as necessary
Insufficient velocity of cooling air	1. Evaporator clogged or frosted 2. Air leaking from cooling unit or air duct 3. Blower motor does not rotate properly	• Check evaporator core and replace or clean the core • Check evaporator and duct connection, then repair as necessary • Refer to "FAN SWITCH TROUBLESHOOTING"

* For the execution of the charging and discharging operation in the table above, refer to the "RECOVERY, RECYCLING, EVACUATION AND CHARGING" in section 1B.

Checking Refrigerant System with Manifold Gauge

Conditions;

- Ambient temperature at approx. 30 — 35°C (86 — 95°F)
- Run the engine at 1,500 rpm
- A/C switch is "ON"
- Run the blower motor at "4" (high) position
- Temperature control lever sets at "MAX COLD"
- Air source selector lever at "CIRC"
- Open then the all doors and engine hood

Normal pressures kPa (kg·cm²/PSI)

- Low-pressure side: Approx. 127 — 245 (1.3 — 2.5/ 18 — 36)
- High-pressure side: Approx. 1373 — 1667 (14 — 17/199 — 242)

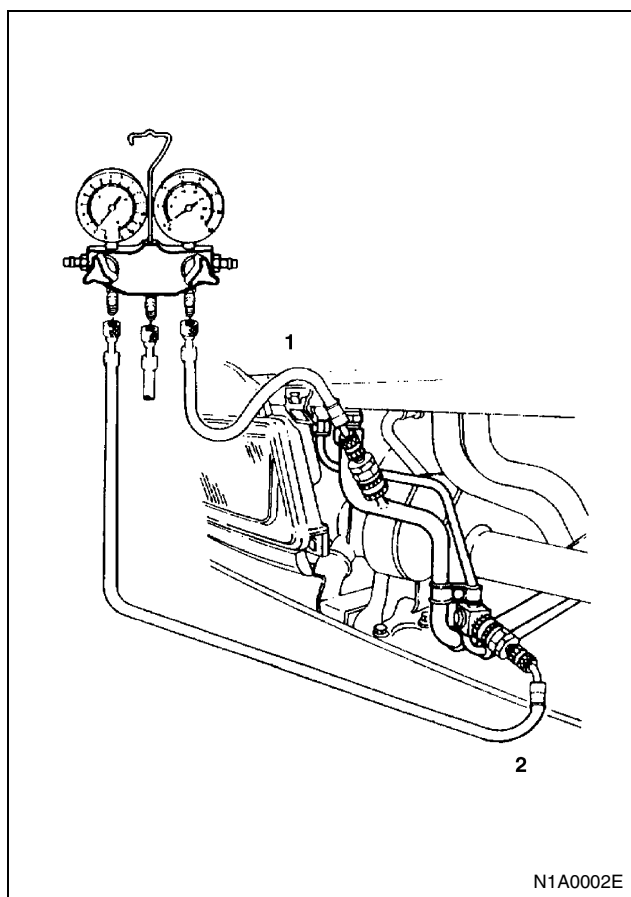
Connect the manifold gauge

Low-pressure hose (LOW) - Suction side (1)

High-pressure hose (HI) - Discharge side (2)

Caution:

Vehicles that use Refrigerant-134a (R-134a) is used in the air conditioning system, be sure to use manifold gauges, charging hoses and other air conditioning service tools for R-134a when checking the refrigerant system. (Refer to "ON VEHICLE SERVICE" for Precautions for R-134a Air Conditioning System in section 1B.)



Legend

1. Low side
2. High side

RESULT	SYMPTOM	TROUBLE CAUSE	CORRECTION
Discharge (High) pressure gauge abnormally high	Reduced or no air flow through the condenser	- Condenser clogged or dirty - Radiator (condenser) fan does not operate properly	- Clean - Check cooling fan operation
	No bubbles in sight glass when condenser is cooled by water (Insufficient cooling)	Excessive refrigerant in system	- Check sight glass. (See "Reading Sight Glass") - Discharge and recover refrigerant. Recharge to specified amount
	After stopping air conditioning, pressure drops approx. 196 kPa (2.0 kg·cm ² /28 PSI) quickly	Air in system	Evacuate and charge refrigerant system
Discharge (High) pressure gauge abnormally low	Insufficient cooling and excessive bubbles in the sight glass	Insufficient refrigerant in system	- Check sight glass. (See "Reading Sight Glass") - Check for leaks - Discharge and recover refrigerant. Recharge to specified amount
	Low pressure gauge indicates vacuum	Clogged or defective expansion valve	Replace the expansion valve
	Frost or dew on refrigerant line before and after receiver/ drier or expansion valve, and low pressure gauge indicates vacuum	Restriction caused by debris or moisture in receiver/ drier	Check system for restriction and replace receiver/drier
	After turning off air conditioning, high and low pressure gauge balanced quickly	- Compressor seal defective - Poor compression due to defective compressor gasket	Replace or repair compressor
Suction (Low) pressure gauge abnormally high	Low pressure gauge is lowered after condenser is cooled by water	Excessive refrigerant in system	Discharge and recover refrigerant. Recharge to specified amount
	Low pressure hose temperature around the compressor refrigerant line connector is lower than around evaporator	- Unsatisfactory valve operation due to defective temperature sensor of expansion valve - Expansion valve opens too long	Replace the expansion valve
	After turning off air conditioning, high and low pressure gauge is balanced quickly	Compressor gasket is defective	Replace
	Air conditioning turns off before passenger compartment is sufficiently cool	Electronic thermostat defective	Check the electronic thermostat and replace as necessary

* For the charging and discharging operations in the table above, refer to "RECOVERY, RECYCLING, EVACUATION AND CHARGING" in section 1B.

00-18 SERVICE INFORMATION

RESULT	SYMPTOM	TROUBLE CAUSE	CORRECTION
Suction (Low) pressure abnormally low	Condenser is not hot and excessive bubble in sight glass	Insufficient refrigerant	- Check sight glass. (See "Reading Sight Glass") - Check for leaks - Discharge and recover refrigerant. Recharge to specified amount
	Frost on the expansion valve inlet line	Expansion valve clogged	Replace the expansion valve
	A distinct difference in temperature between the inlet and outlet refrigerant lines of the receiver/drier	Receiver/drier clogged	Replace the receiver/drier
	Expansion valve outlet refrigerant line is not cold and low-pressure gauge indicates vacuum	The temperature sensor of the expansion valve is defective, and the valve cannot regulate the correct flow of the refrigerant	Replace the expansion valve
	Discharge temperature is low and air flow from vents is restricted	Frozen evaporator core fins	Check electronic thermostat and replace as necessary
	Low-pressure gauge reading is low, or a vacuum reading may be shown	Clogged or blocked refrigerant line	Replace refrigerant line
Suction (Low) and Discharge (High) pressure abnormally high	No bubbles in sight glass after condenser is cooled by water (Insufficient cooling)	Excessive refrigerant in system	- Check sight glass. (See "Reading Sight Glass") - Discharge and recover refrigerant. Recharge to specified amount
	Reduce air flow through condenser	- Condenser clogged - Radiator (condenser) fan does not rotate properly	- Clean - Check cooling fan operation
	Suction (Low) pressure hose is not cold	Air in system	Evacuate and charge refrigerant
Suction (Low) and Discharge (High) pressure abnormally low	Insufficient cooling and excessive bubbles in the sight glass	Insufficient refrigerant in system	- Check sight glass. (See "Reading Sight Glass") - Check for leaks - Discharge and recover refrigerant. Recharge to specified amount

Magnetic Clutch Troubleshooting

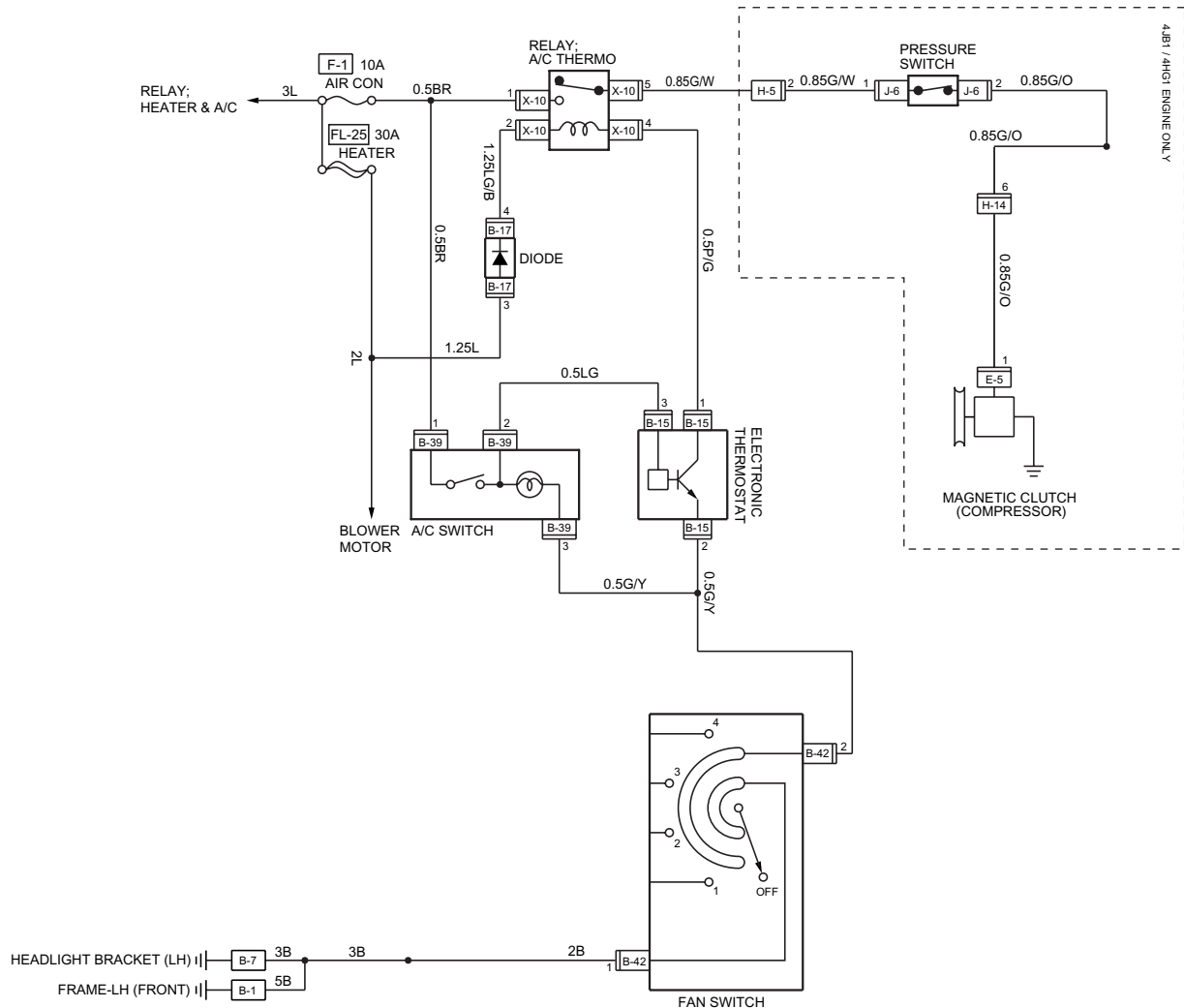
The air conditioning is made up of the evaporator, condenser, electronic thermostat, A/C switch, fan switch and relays.

The air conditioning starts its operation when both the A/C switch and the fan switch are turned on and the magnetic clutch gets engaged through the A/C thermo relay

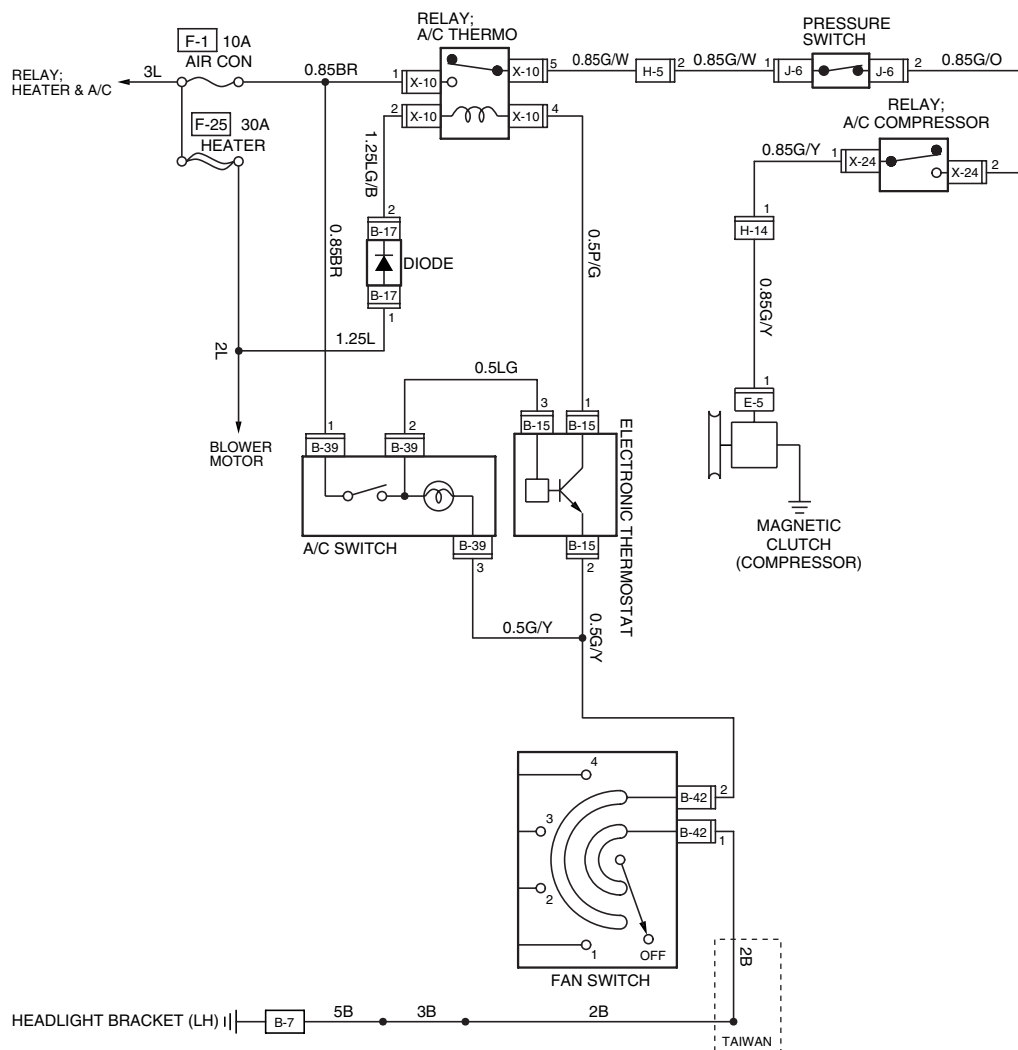
while the engine is running. And it stops when either A/C switch or fan switch is turned off.

In addition to these switches, the air conditioning is also stopped by turning off the magnetic clutch temporarily under the predetermined condition when the abnormal refrigerant pressure is sensed by pressure switch, or when the air temperature is sensed by electronic thermostat that prevents the evaporator core from freezing.

For 12 Volt (LHD Model Except 4JH1)

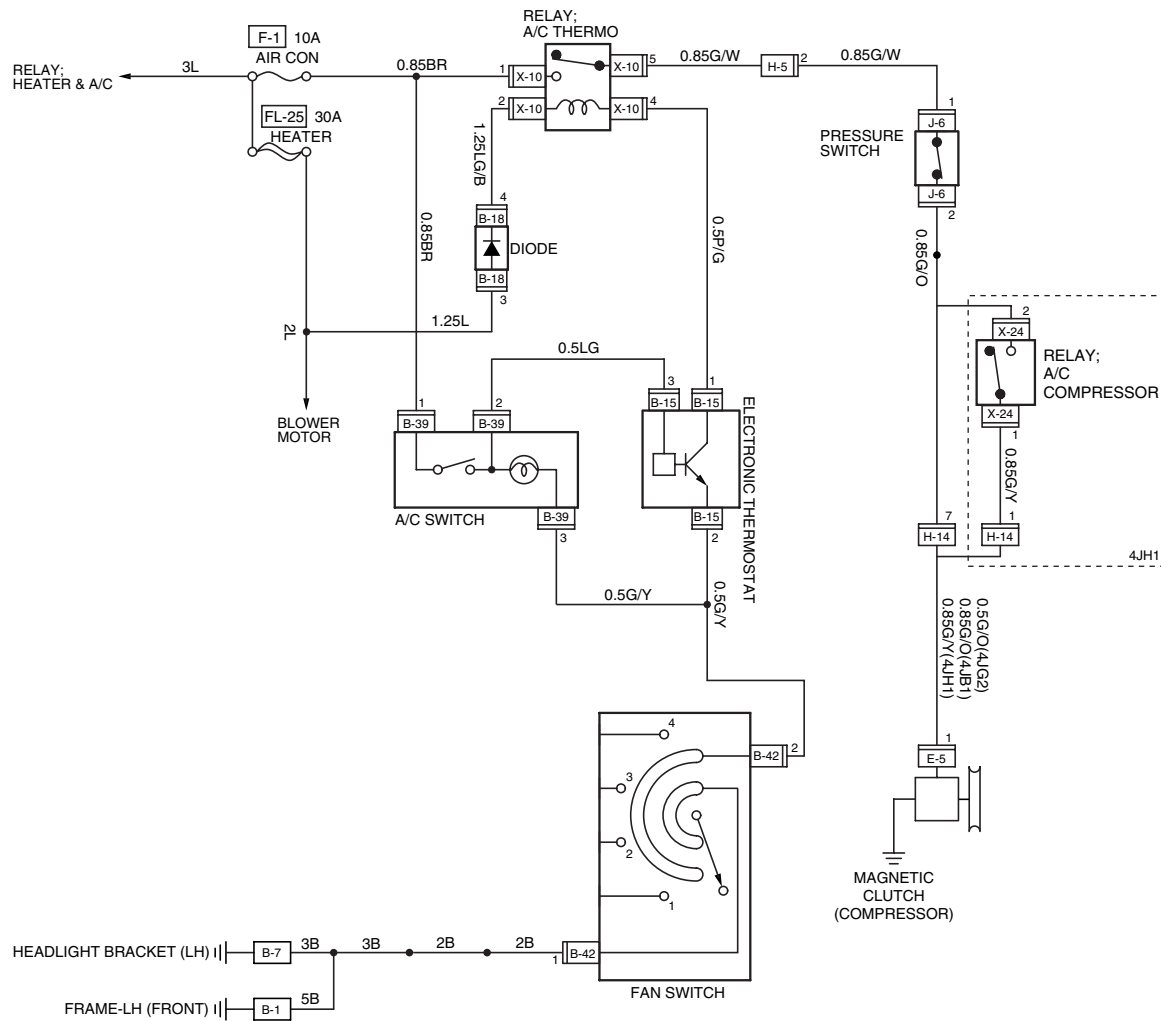


For 12 Volt (LHD Model 4JH1/Taiwan)

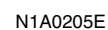


N1A0218E

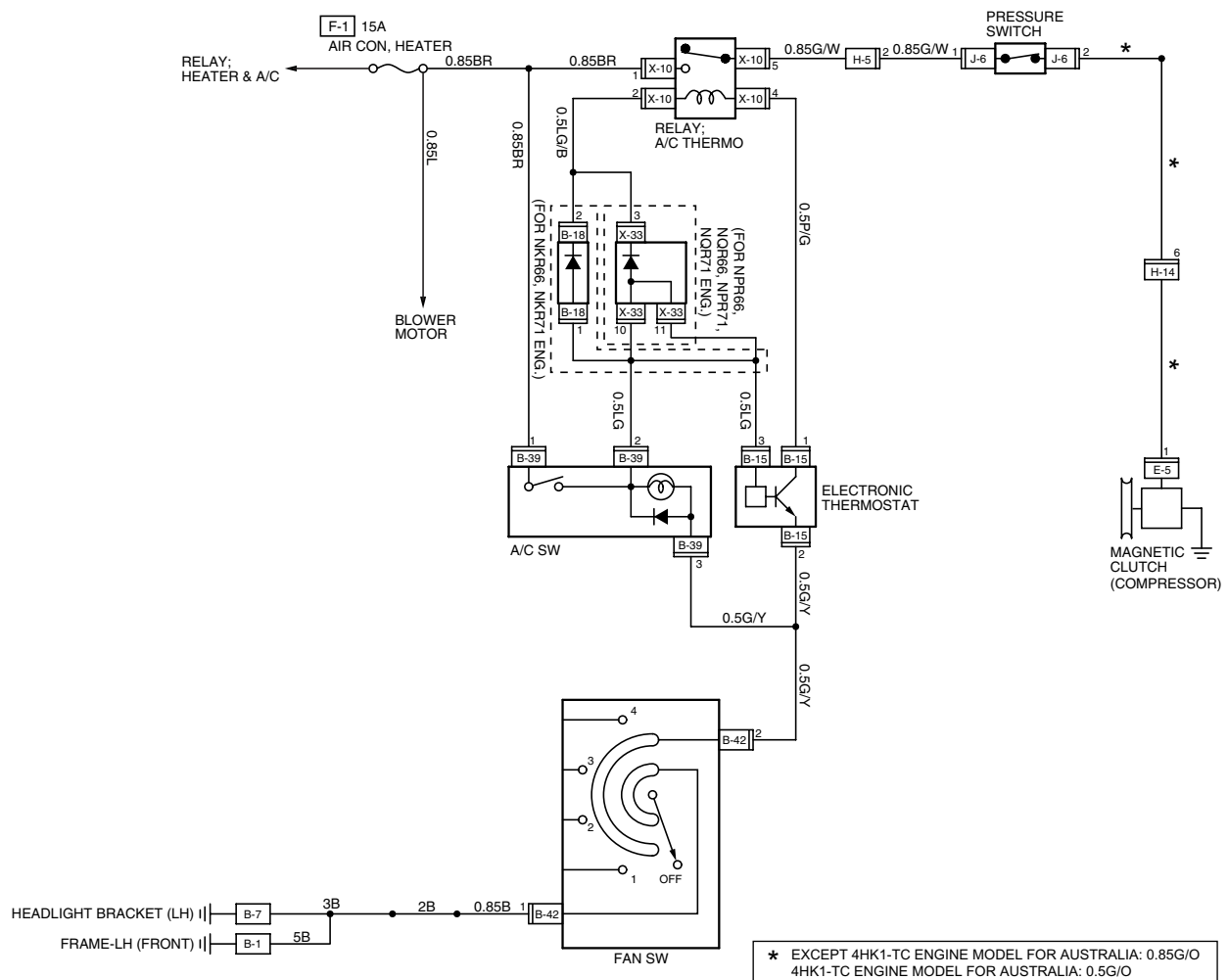
For 12 Volt (RHD Model)



N1A0219E

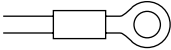
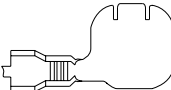
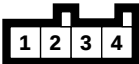
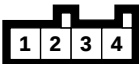
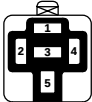


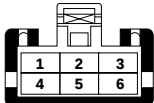
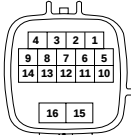
For 24 Volt (RHD Model)



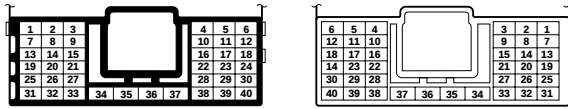
00-24 SERVICE INFORMATION

Connector List

No.	Connector Face
B-1	 000-001
B-7	 000-012
B-17	 004-004
B-18	 004-004
B-15	 003-009
X-10	 005-001
B-39	 003-019

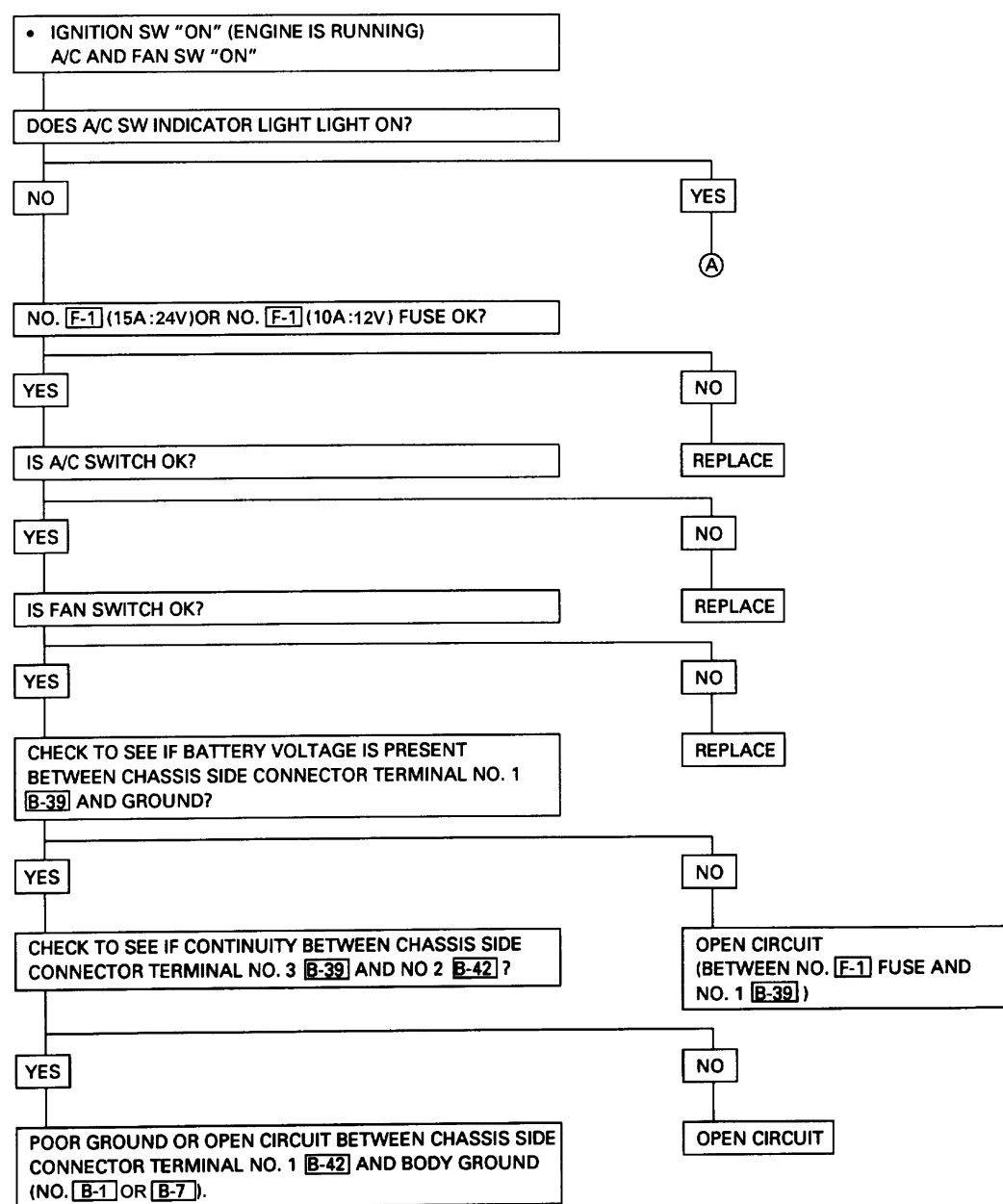
No.	Connector Face
B-42	 006-001
E-5	 001-013
E-5	 001-014
H-14	 016-003
H-14	 016-004
J-6	 002-032
H-14	 016-001
H-14	 016-002

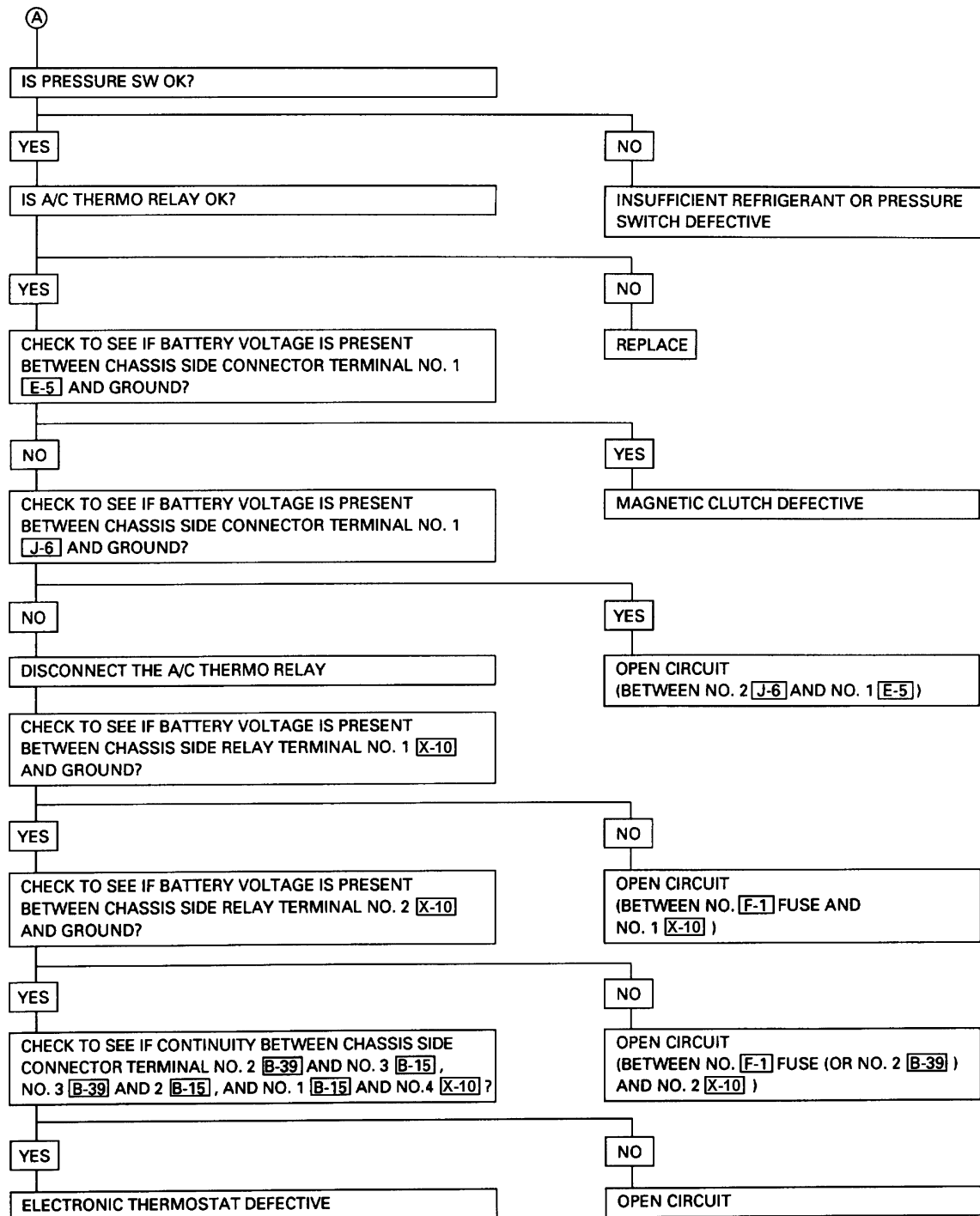
H-5



N8A5488E

Magnetic Clutch Does Not Operate





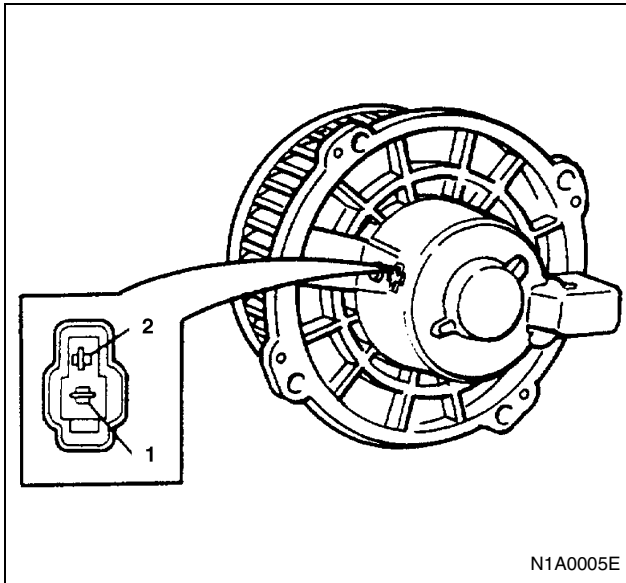
Compressor Troubleshooting

ITEM	TROUBLE	POSSIBLE CAUSE	CORRECTION
1	Noise from compressor	1. Defective Piston 2. Defective bearing 3. Defective shaft	Replace cylinder and shaft assembly Replace cylinder and shaft assembly Replace cylinder and shaft assembly
2	Noise from magnetic clutch face	1. Defective bearing 2. Defective clutch 3. Clearance between drive plate and pulley is not standard	Replace magnetic clutch Replace magnetic clutch Adjust the clearance or replace magnetic clutch
3	Insufficient cooling	1. Defective gasket 2. Defective reed valve 3. Defective suction valve	Replace gasket Replace valve plate Replace suction valve
4	Not rotating	1. Defective piston 2. Defective shaft 3. Rotating parts seized due to insufficient oil	Replace cylinder and shaft assembly Replace cylinder and shaft assembly Replace compressor
5	Oil and/or gas leakage	1. Defective seal 2. Defective O-ring	Replace shaft seal Replace

Individual Inspection

Blower Motor

1. Disconnect the blower motor connector from the blower motor.
2. Connect the battery positive terminal to the No. 1 (No. 2; RHD) terminal of the blower motor and negative to the No. 2 (No. 1, RHD).
3. Be sure to check to see if the blower motor operates correctly.

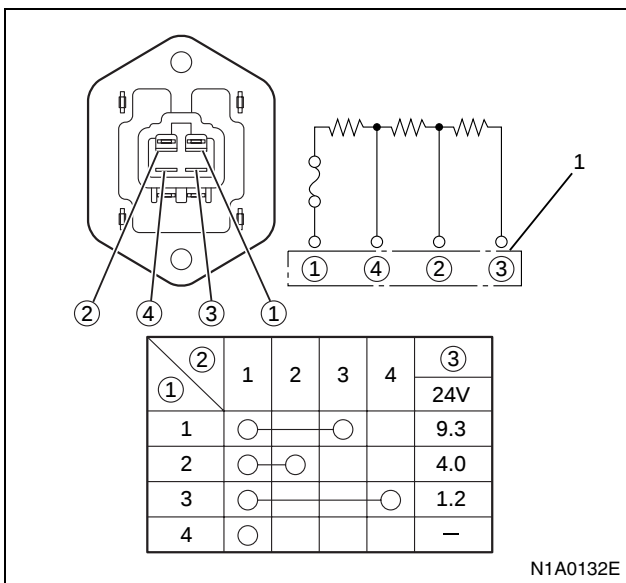


N1A0005E

Resistor

1. Disconnect resistor connector.
2. Check for continuity and resistance between the terminals of the resistor.

Except Taiwan

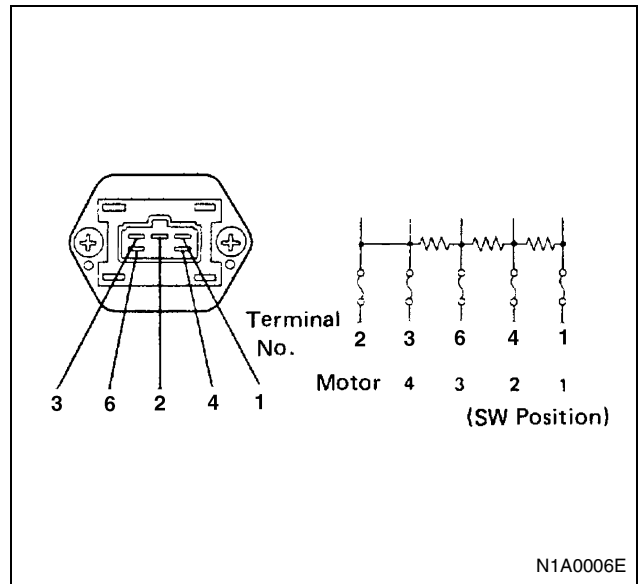


N1A0132E

Legend

1. SW position
2. Terminal No.
3. Resistance value

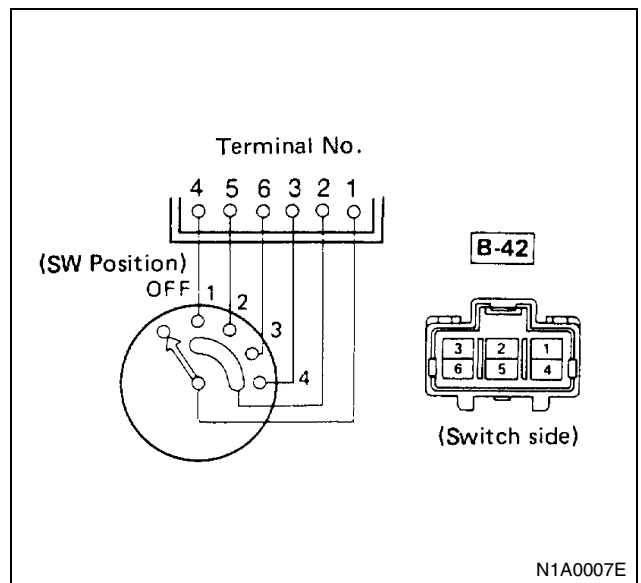
For Taiwan



N1A0006E

Fan Switch

Check for continuity between fan switch and A/C switch side connector terminals.



N1A0007E

Heater & A/C and A/C Thermo Relay

Check for continuity between relay side connector terminal.

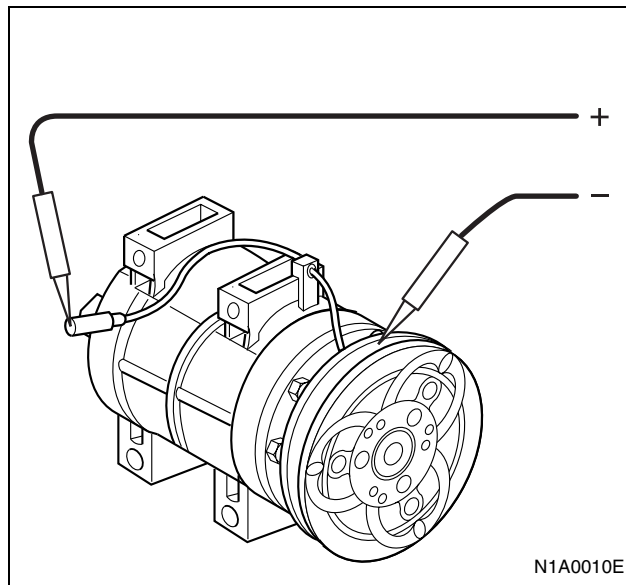
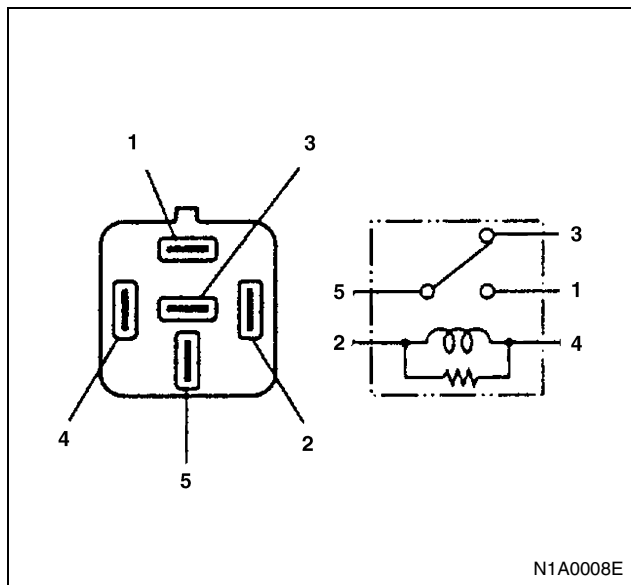
3 — 5 --- Continuity

1 — 5 --- No Continuity

When battery voltage is applied between 2 — 4

3 — 5 --- No Continuity

1 — 5 --- Continuity

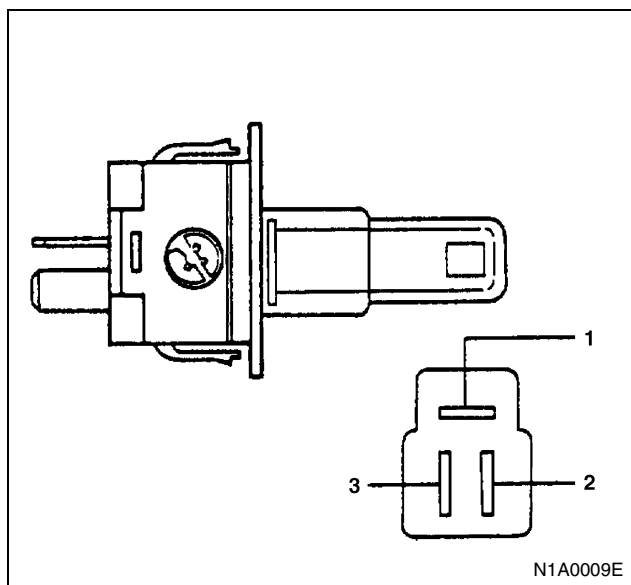
**Pressure Switch**

Disconnect the connector and check for continuity between pressure switch side connector terminal.

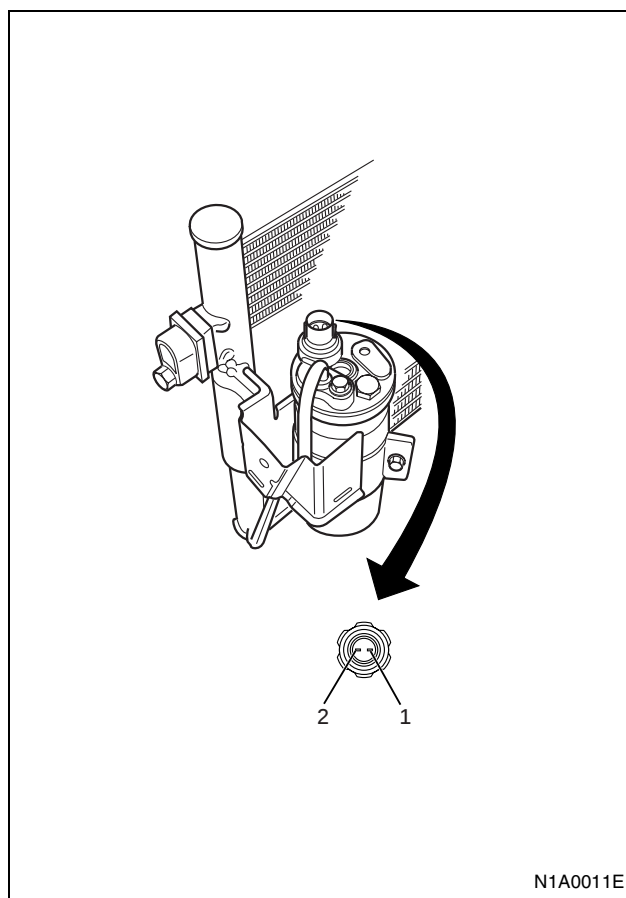
Terminal No.	Control	Continuity
1 — 2	Magnetic Clutch	Continuity

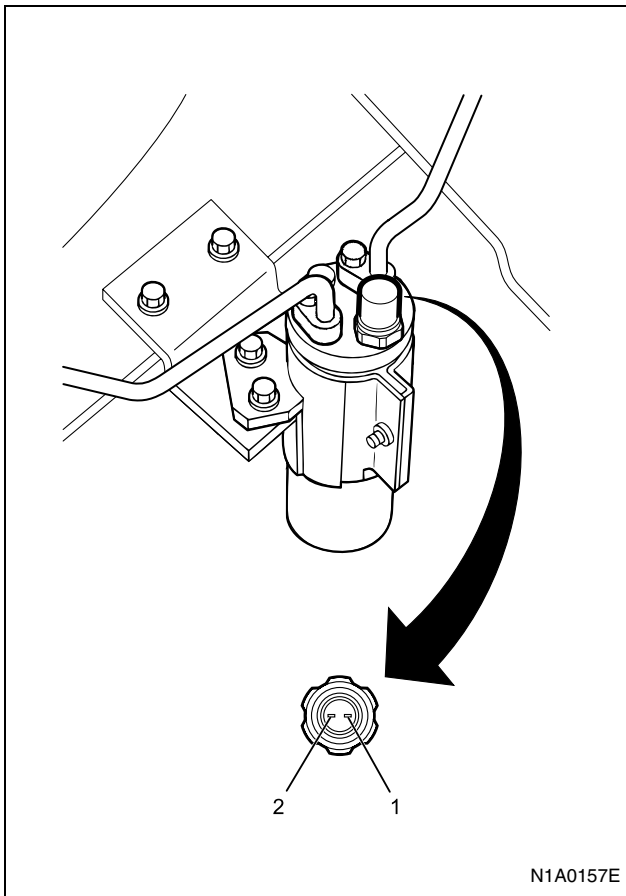
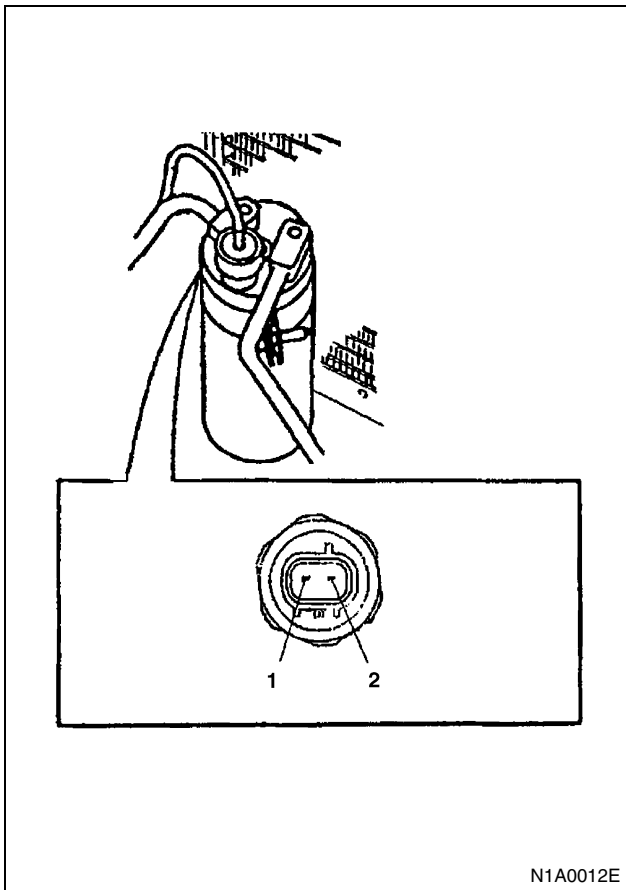
For GCC**A/C Switch**

Check for continuity between A/C switch side connector terminals.

**Magnetic Clutch**

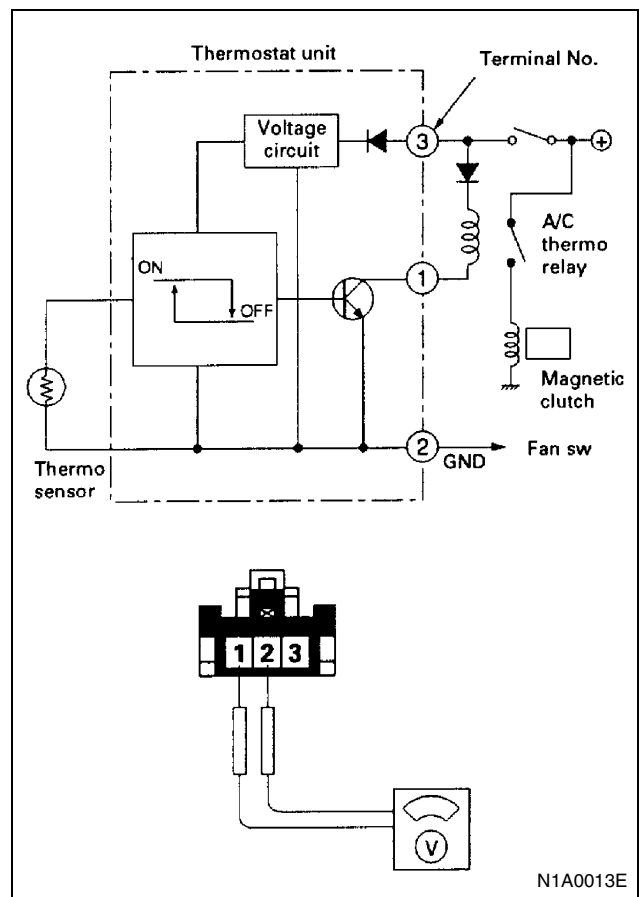
1. Disconnect the magnetic clutch harness connectors.
2. Apply battery voltage to the clutch side connector terminal, check to see if the magnetic clutch is attracted to the pulley.



For Australia**For Taiwan****Electronic Thermostat**

1. With the air select lever set to "VENT" and the air source select lever to "CIRC", start the air conditioning.
2. While shifting the temperature control lever from "FULL COOL" through the "FULL HOT", check to see if the magnetic clutch turns on and off.
(*Note that the time required to reach the "OFF" point depends on the warm or cold air at $3.5 \pm 0.5^{\circ}\text{C}$ at the electronic thermostat thermo sensor).
3. While the magnetic clutch is turning "ON" and "OFF", measure the voltage between chassis side connector terminal No. 1 and No. 2.

Terminal No.	Magnetic Clutch	Voltage
1 — 2	ON	0 V
	OFF	Battery voltage



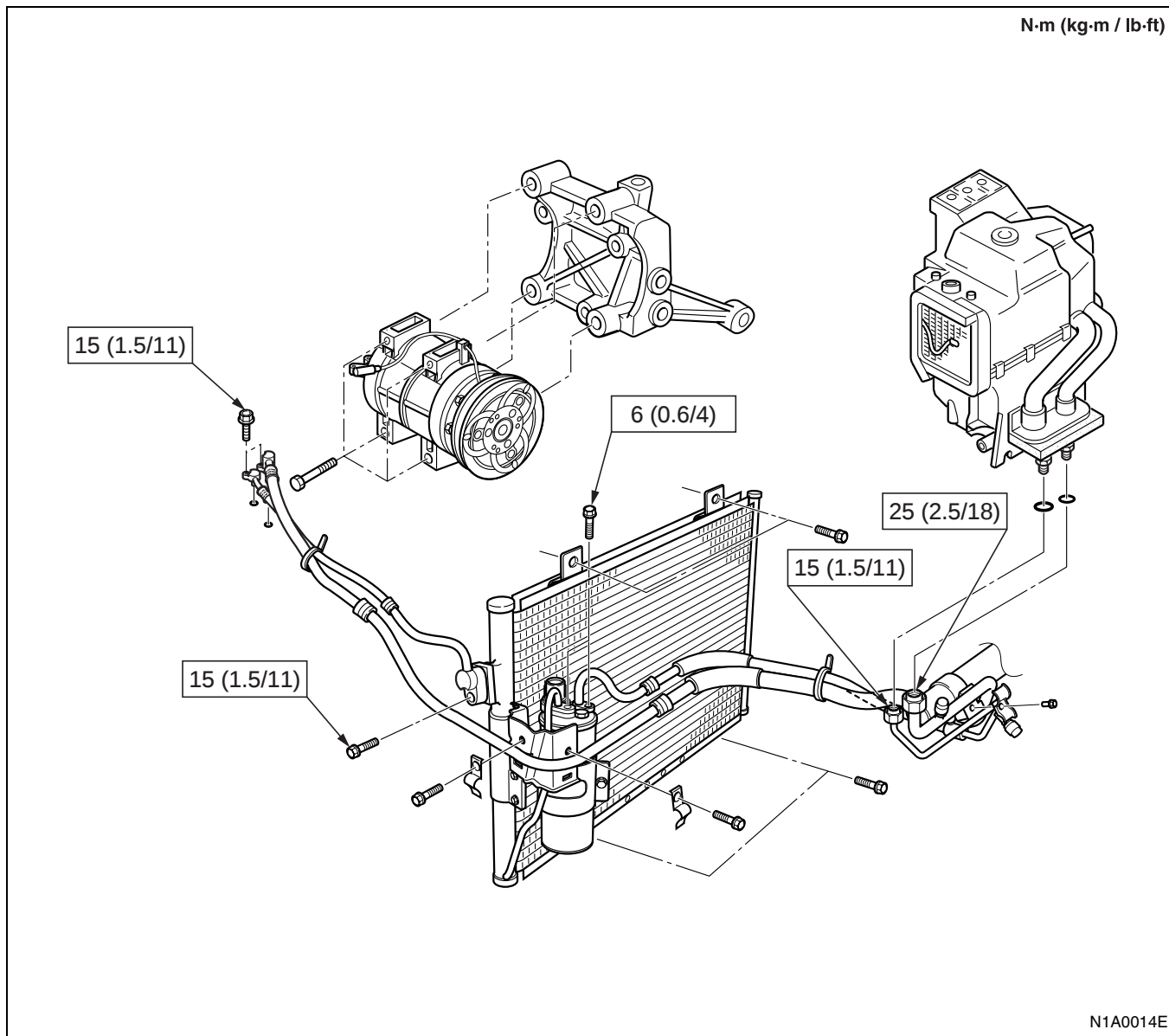
MAIN DATA AND SPECIFICATIONS

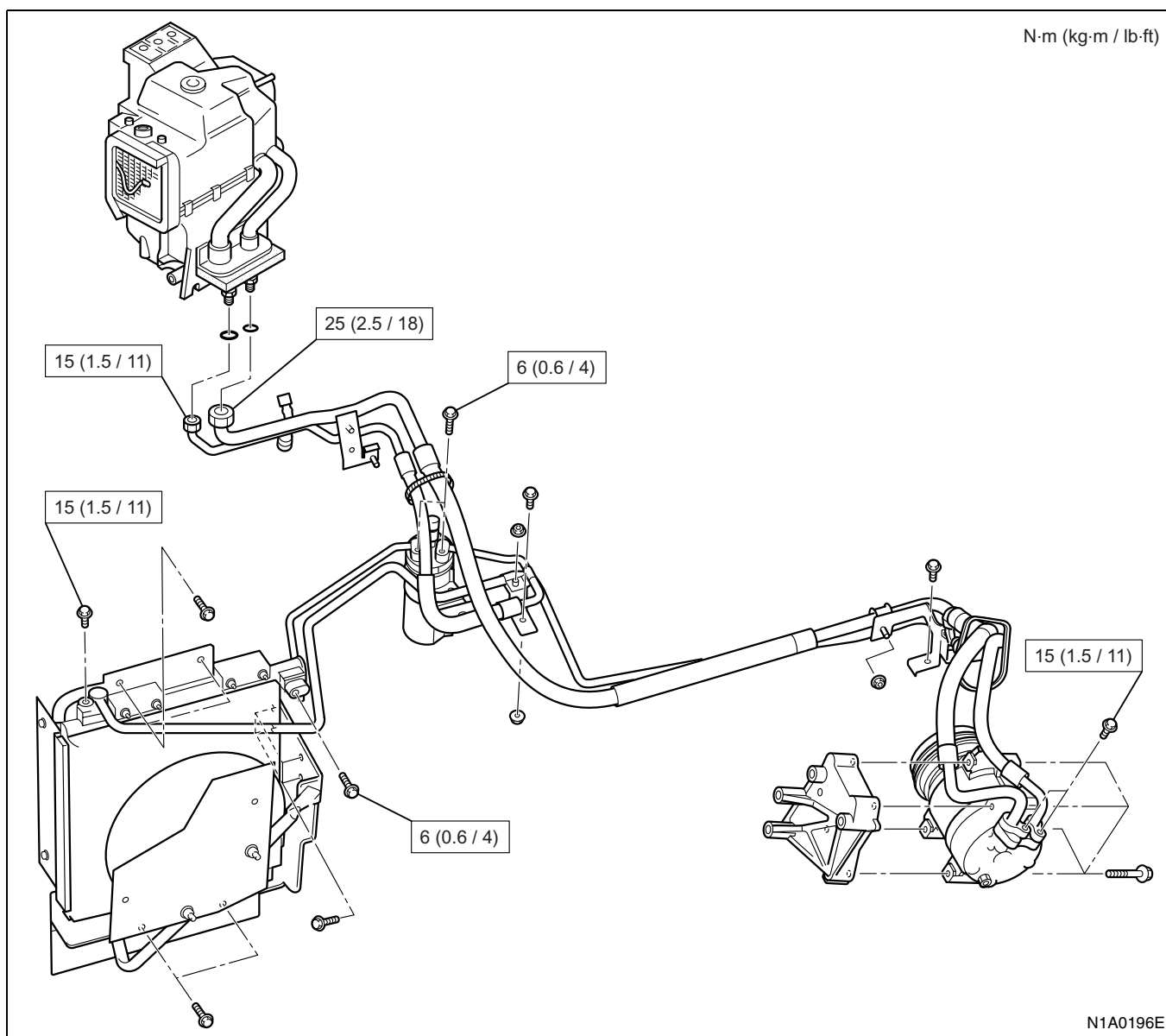
HEATER UNIT			
Temperature control			Reheat mix system
Capacity	kW (kcal)		4.30 (3,700)
Air flow	(m ³ /hr)		280
HEATER CORE			
Type			Fin & tube type
EVAPORATOR ASSEMBLY			
Capacity	kW (kcal)		4.47 (3,850)
Air flow	(m ³ /hr)		420
EVAPORATOR CORE			
Type			Al-laminate louver fin type
EXPANSION VALVE			
Type			External pressure equalizer type
THERMOSTAT SWITCH			
Type			Electronic thermostat
	°C (°F)		OFF: Below 3.5 ± 0.5 (38.3 ± 0.9) ON: Above 5.0 ± 0.5 (41.0 ± 0.9)
CONDENSER			
Type			Parallel flow
Radiator performance	kW (kcal)		11.0 (9,500) - NPR, NKR (for GCC) 5.1 (4,400) - NKR (for Taiwan), NPR (for Australia)
RECEIVER/DRYER			
Internal volume	cc (Imp. fl oz)		300 (8.5) - NKR (for Taiwan), NPR (for Australia) 250 (7.1) - NKR, NPR (for GCC)
PRESSURE SWITCH			
Type			Dual pressure switch (for GCC and Taiwan)
	kPa (kg/cm ² / PSI)		- Low pressure control (for GCC) ON: 206 ± 30 (2.1 ± 0.3 / 30 ± 4) OFF: 177 ± 25 (1.8 ± 0.2 / 26 ± 3) - High pressure control (for GCC) ON: 2350 ± 200 (24.0 ± 2.0 / 341 ± 29) OFF: 2940 ± 200 (30.0 ± 2.0 / 426 ± 29) - Low pressure control (for Taiwan) ON: 221 ± 20 (2.25 ± 0.2 / 32 ± 3) OFF: 196 ± 20 (2.0 ± 0.2 / 28 ± 3) - High pressure control (for Taiwan) ON: 2350 ± 200 (24.0 ± 2.0 / 341 ± 29) OFF: 2940 ± 200 (30.0 ± 2.0 / 426 ± 29)

REFRIGERANT Type/Specified amount COMPRESSOR	Triple pressure switch (for Australia) - Low pressure control ON: 206 ± 30 ($2.1 \pm 0.3 / 30 \pm 4$) OFF: 177 ± 25 ($1.8 \pm 0.2 / 26 \pm 3$) - Medium pressure control ON: 1470 ± 100 ($15 \pm 1.0 / 213 \pm 14$) OFF: 1079 ± 120 ($11 \pm 1.2 / 156 \pm 17$) - High pressure control ON: 2350 ± 200 ($24.0 \pm 2.0 / 341 \pm 29$) OFF: 2940 ± 200 ($30.0 \pm 2.0 / 426 \pm 29$) R-134a / 450 (0.99) (for GCC) R-134a / 600 (1.32) (for Australia, Taiwan)
Model Swash plate type (except Taiwan) Number of cylinder Bore Stroke Displacement	DKS-15-D (except Taiwan) DKS-13CH (for Taiwan) 10 30.5 (1.2) 21.4 (0.8) 156 (4.4)
Swash plate type (for Taiwan) Number of cylinder Bore Stroke Displacement	6 36 (1.42) 21.4 (0.84) 131 (3.7)
Maximum speed Direction of rotation Lubrication system Lubricant Shaft seal Weight MAGNETIC CLUTCH Type Rated voltage Starting torque Direction of rotation Weight	(rpm) 7,000 (up to 8,400) Clockwise (Front-side view) Pressure differential type cc (Imp fl oz) ZXL-100PG / 180 (5.0) (ISUZU PART NO. 8-97101-338-0) Lip type kg (lbs) 4.4 (9.7) (except Taiwan) 4.1 (9.0) (for Taiwan) Electromagnetic single-plate dry clutch 12 (24) Volts D.C. N·m (kg·m / lb·ft) 49 (5.0 / 36) Clockwise (Front-side view) kg (lbs) 2.1 (4.6)

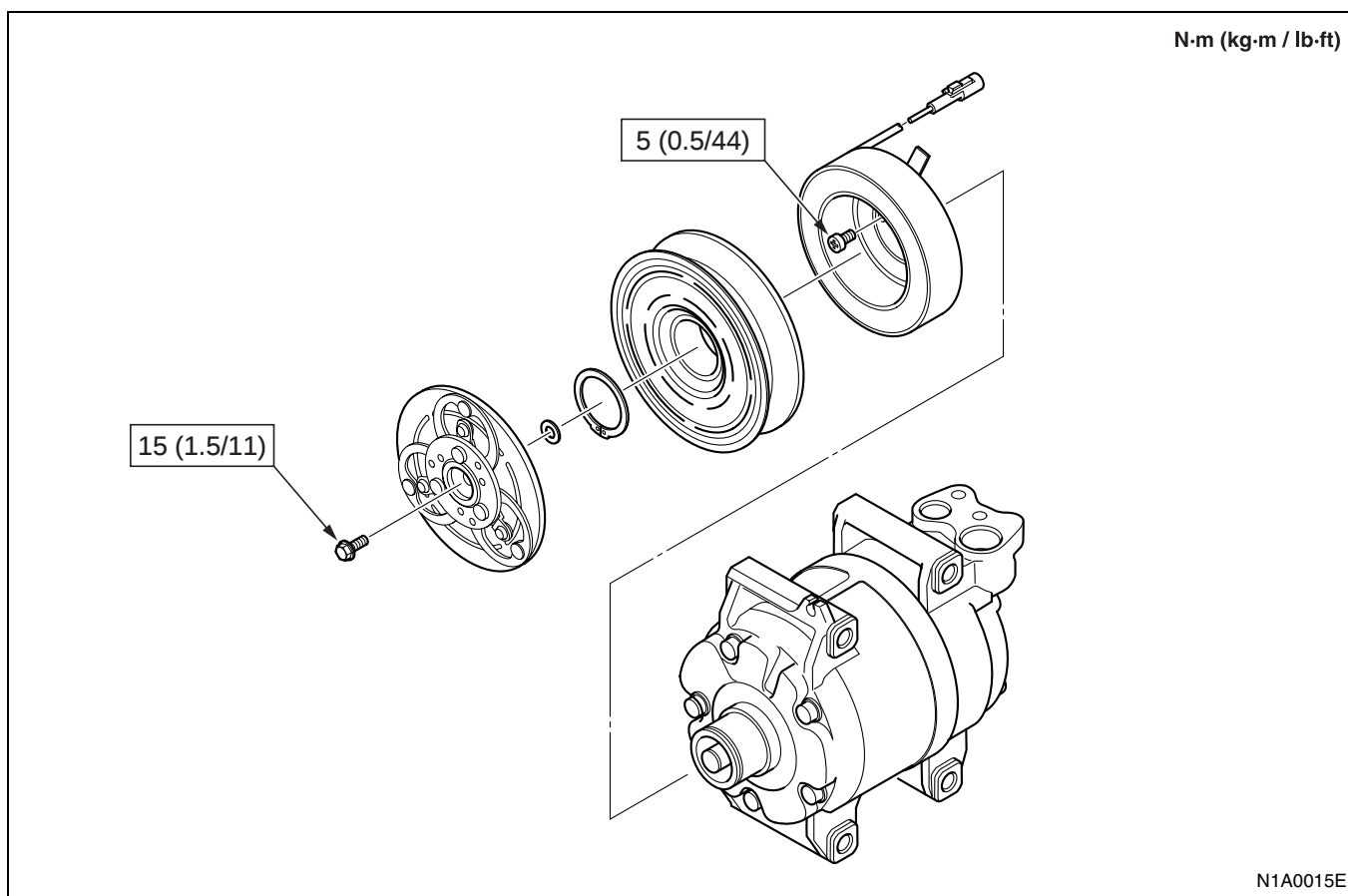
FIXING TORQUE

Refrigerant Line Fixing Torque (Except 4HK1-TC Engine Model For Australia)



Refrigerant Line Fixing Torque (4HK1-TC Engine Model For Australia)

Drive Plate / Field Coil Fixing Torque



SPECIAL TOOLS

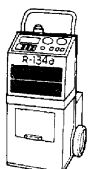
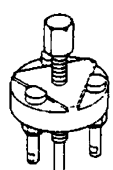
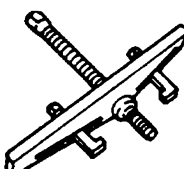
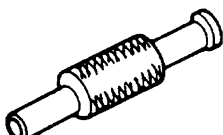
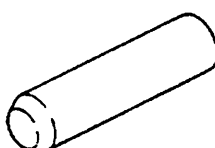
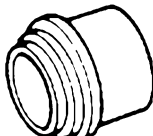
Illustration	Tool Number / Description / Remarks
 5884006290	5-8840-0629-0 (J-39500-A) / ACR ⁴ (115V 60Hz) 5-8840-0630-0 (J-39500-220A) / ACR ⁴ (220-240V 50/60Hz) 5-8840-0631-0 (J-39500-220ANZ) / ACR ⁴ (220-240V 50/60Hz Australian model) ACR ⁴ : R-134a Refrigerant Recovery/ Recycling / Recharging / System
 5884001170	5-8840-0117-0 (J-33939) / Drive plate holder
 5884001220	5-8840-0122-0 (J-33944-A) / Drive plate puller
 5884006210	5-8840-0621-0 (J-33944) / Forcing screw
 5884001210	5-8840-0121-0 (J-33943) / Pulley puller pilot
 5884001110	5-8840-0111-0 (J-8433) / Pulley puller

Illustration	Tool Number / Description / Remarks
 5884001200	5-8840-0120-0 (J-33942) / Shaft seal remover and installer
 5884003680	5-8840-0368-0 (J-34614) / Shaft seal guide
 5884001180	5-8840-0118-0 (J-33940) / Pulley installer
 5884000070	5-8840-0007-0 (J-8092) / Drive handle