

ENGINE 4H SERIES

SECTION 6D6 QOS II PREHEATING SYSTEM

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GENERAL DESCRIPTION

QOS II preheating system features a quick-on glow plug with thermometer control of the glowing time and the after-glow time function.

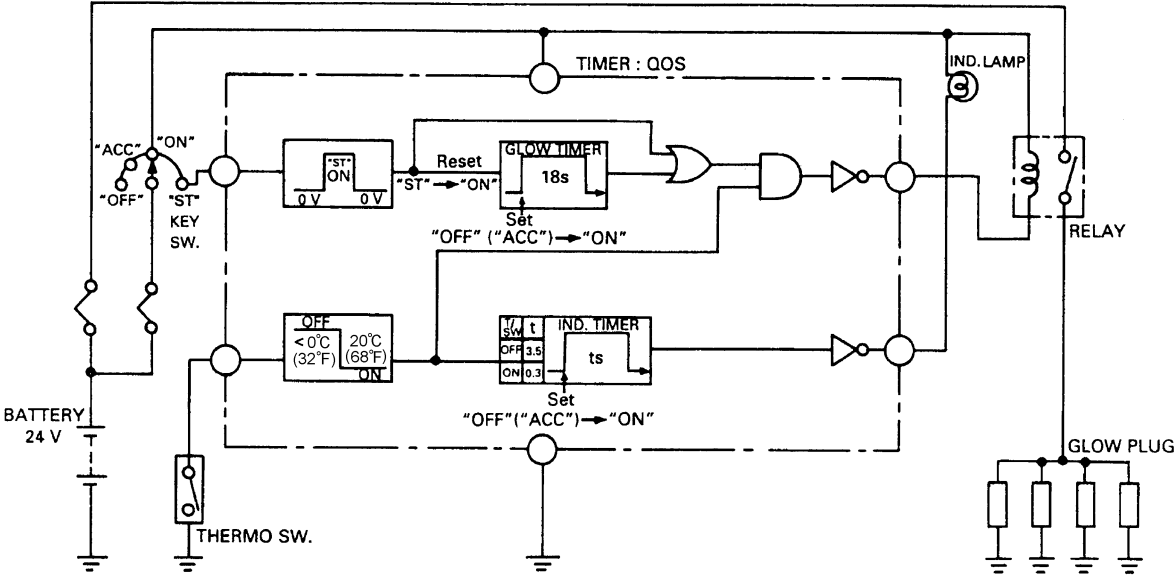
The system consists of a timer, indicator lamp, thermosensor, relay and temperature self-control type glow plug (4 pcs).

With the employment of the thermosensor, the glow time changes according to the engine coolant temperature, thus allowing optimum starting conditions to be obtained.

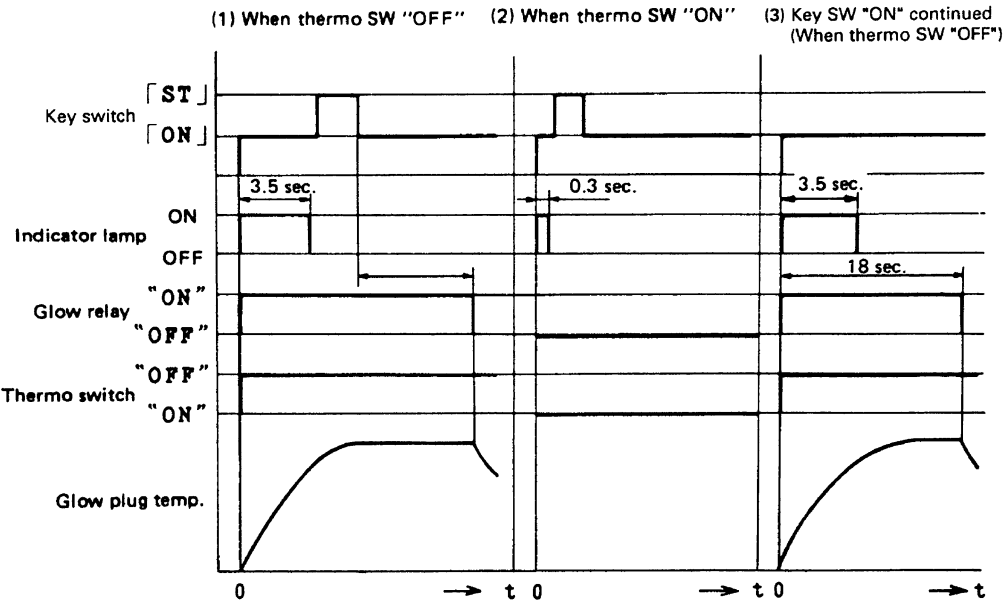
The afterglow time function is controlled by thermosensor.

Component
Quick-On-Start II (QOS II)

SYSTEM DIAGRAM

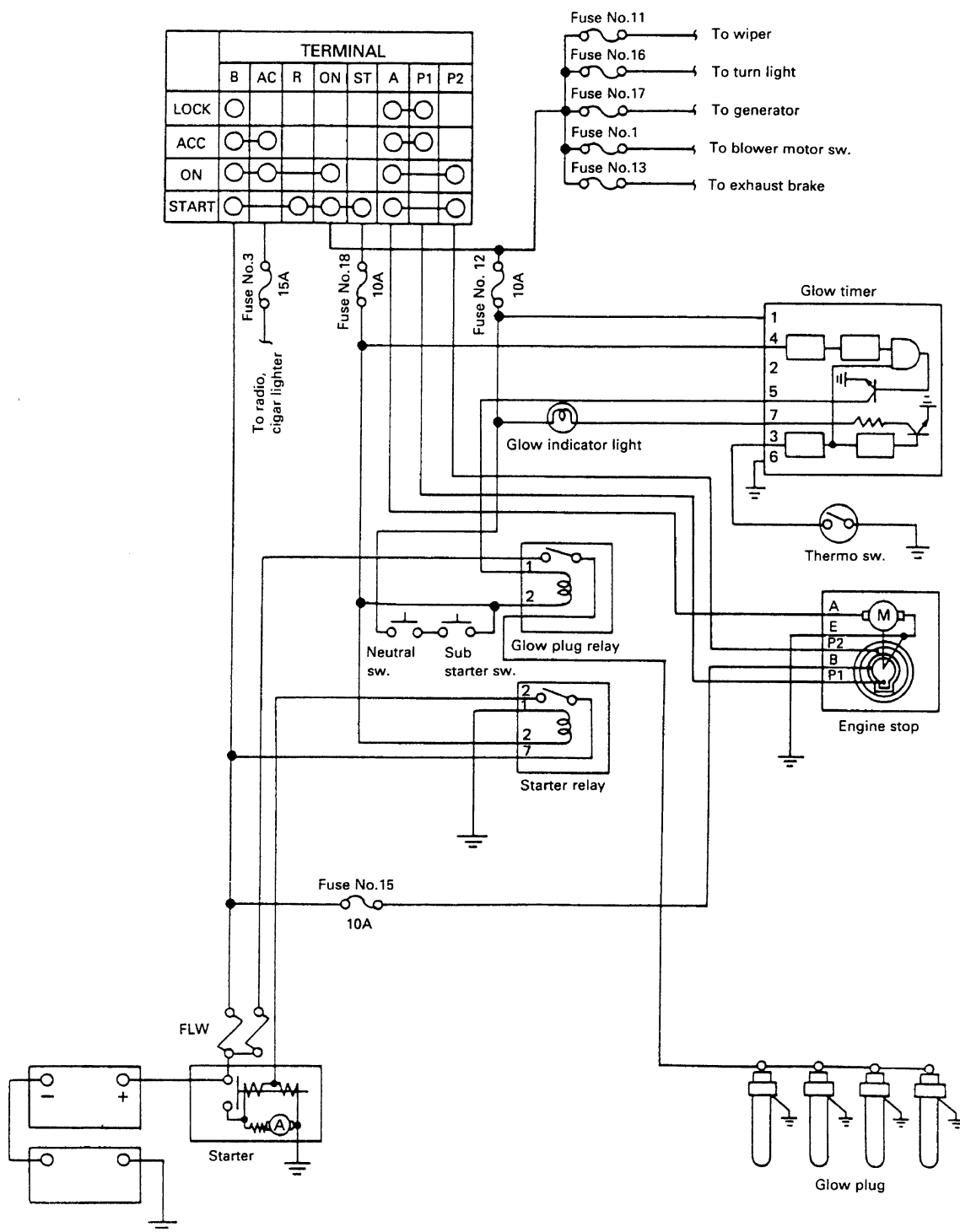


TIMING CHART



STARTING CIRCUIT DIAGRAM (REFERENCE)

Component



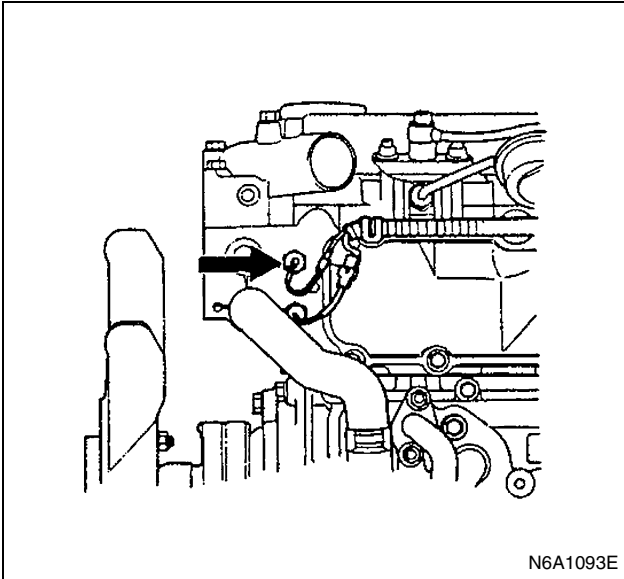
Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

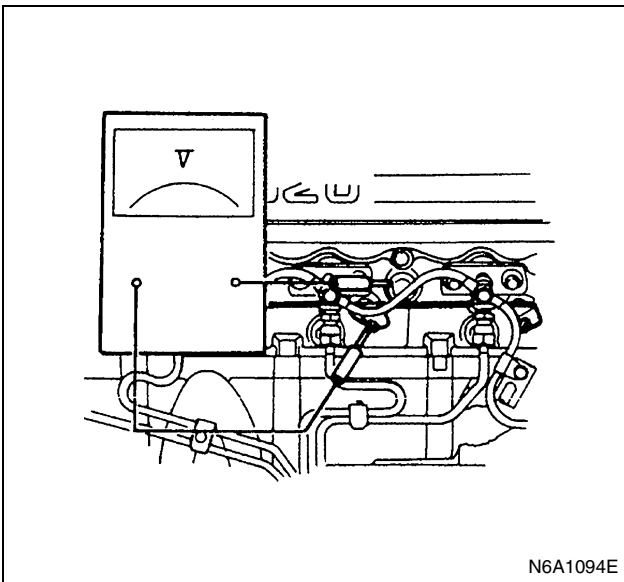
Quick-On-Start II (QOS II)

System

1. Disconnect the connector of the thermo switch.



2. Set the voltage meter in connection as shown in the illustration.



3. Turn the key switch to "ON" position without engine turned and check the following items.

Glow Indicator Lighting Time	Seconds
Standard	3.5

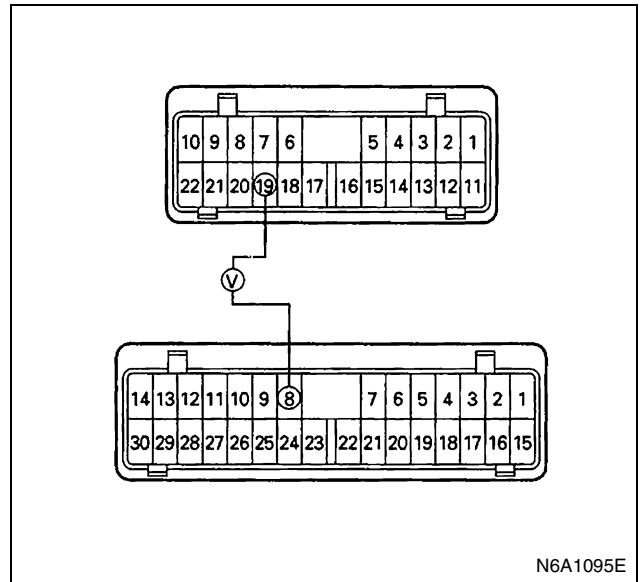
Power Source Voltage Indicating Time	Seconds
Standard	18

When abnormal, check the QOS timer, the glow relay and the thermo switch.

When normal, check the glow plug.

Timer

1. Disconnect the connector of the thermo switch.
2. Set the voltage meter in connection as shown the illustration with connector connected.

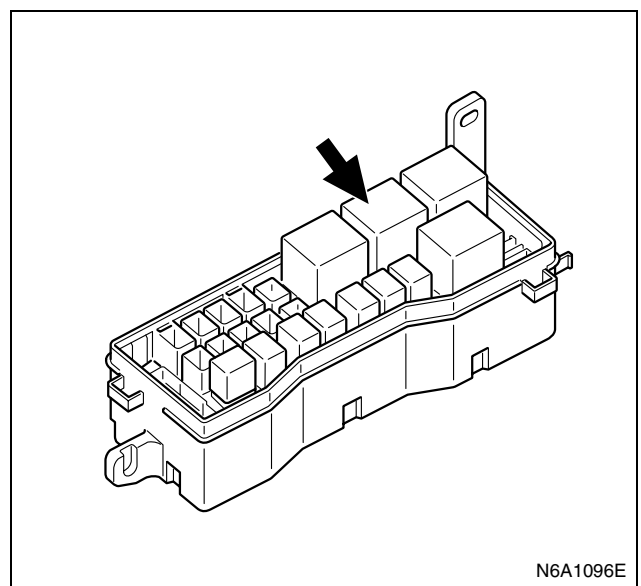


3. Turn the key switch to "ON" position without engine turned, and check the following.

0 Volts Indicating Time	Seconds
Standard	18

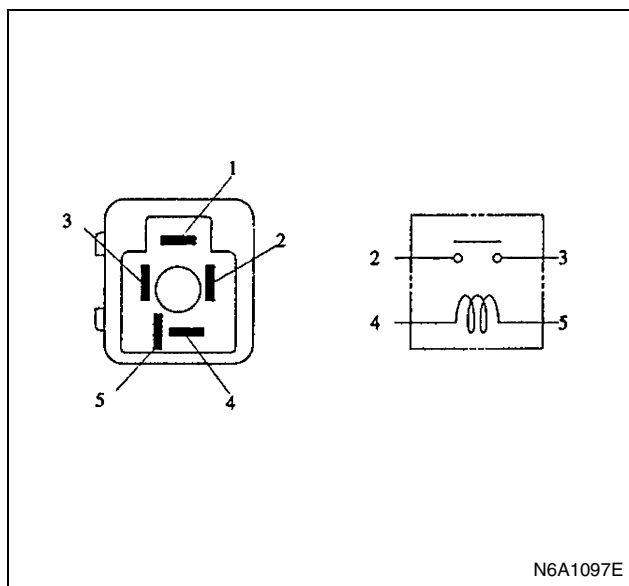
Glow Plug Relay

Location



Specification

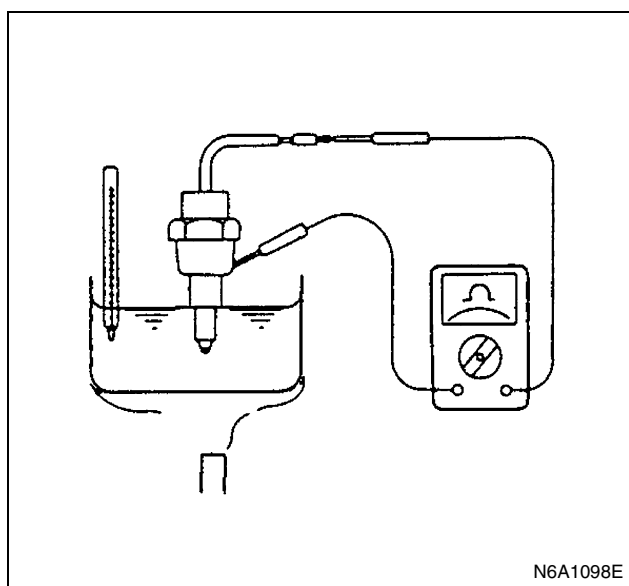
Measure the glow relay resistance between the terminal (4) and the (5) with a circuit tester.



If the measured resistance is outside the specified range, the glow relay must be replaced.

Glow Relay Resistance (Reference)		ohms
Standard		100

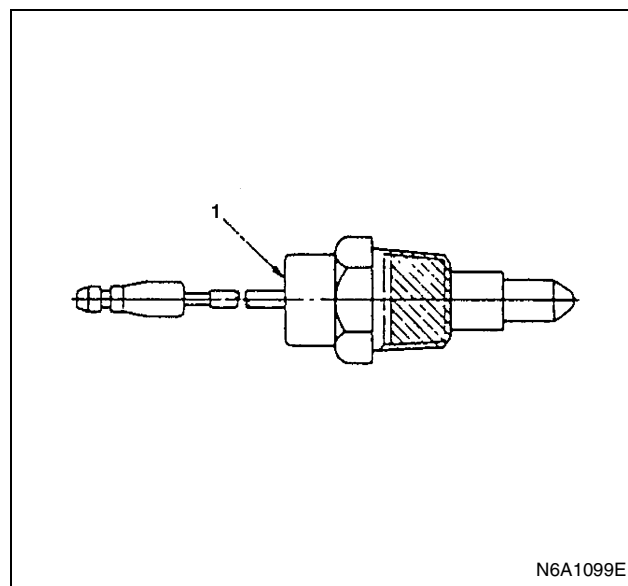
Thermo-Switch



Specification

Operating Temperature		°C (°F)
OFF → ON		7 — 13 (44.6 — 55.4)
ON → OFF		Over 3 (37.4)

- Before installing the thermo-switch, apply LOC-TITE 262 or its equivalent to the portion shown in the illustration.

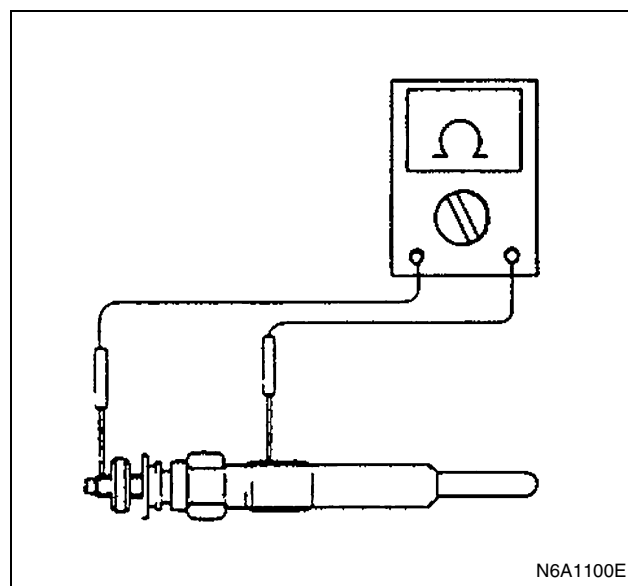


Legend

1. Pink (resin)

Glow plug check

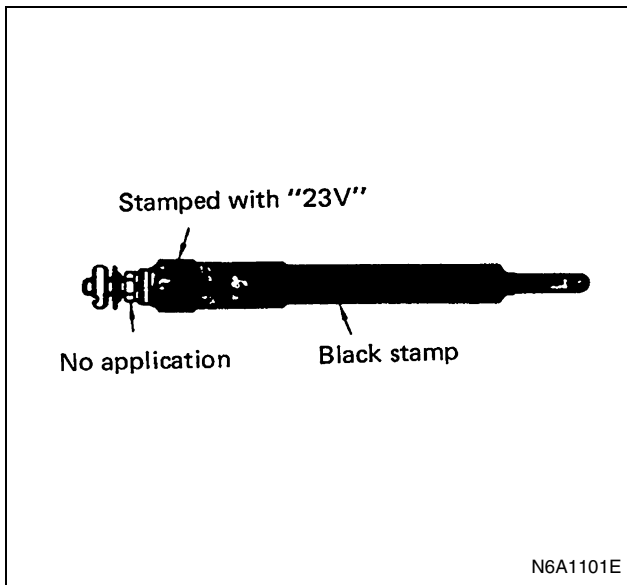
- Use the circuit tester to measure the continuity of the glow plug.



- When the obtained value is outside the specified range, replace the glow plug with a new one.
- Glow plug resistance = About 4Ω (at room temperature)

Notice:

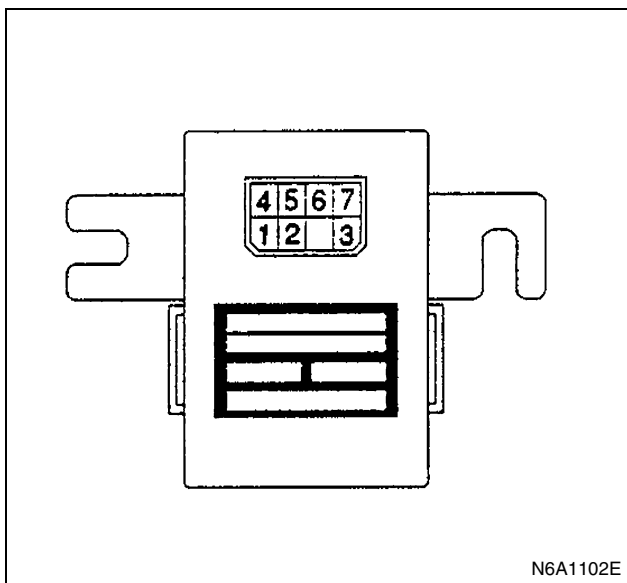
When changing glow plugs, use a set of 4 glow plugs of the same manufacture.



- Note that an identification mark is provided to prevent any possible faulty assembly.

Type	Rated Voltage (V)	Total length mm (in)
Standard	23	141 (5.55)

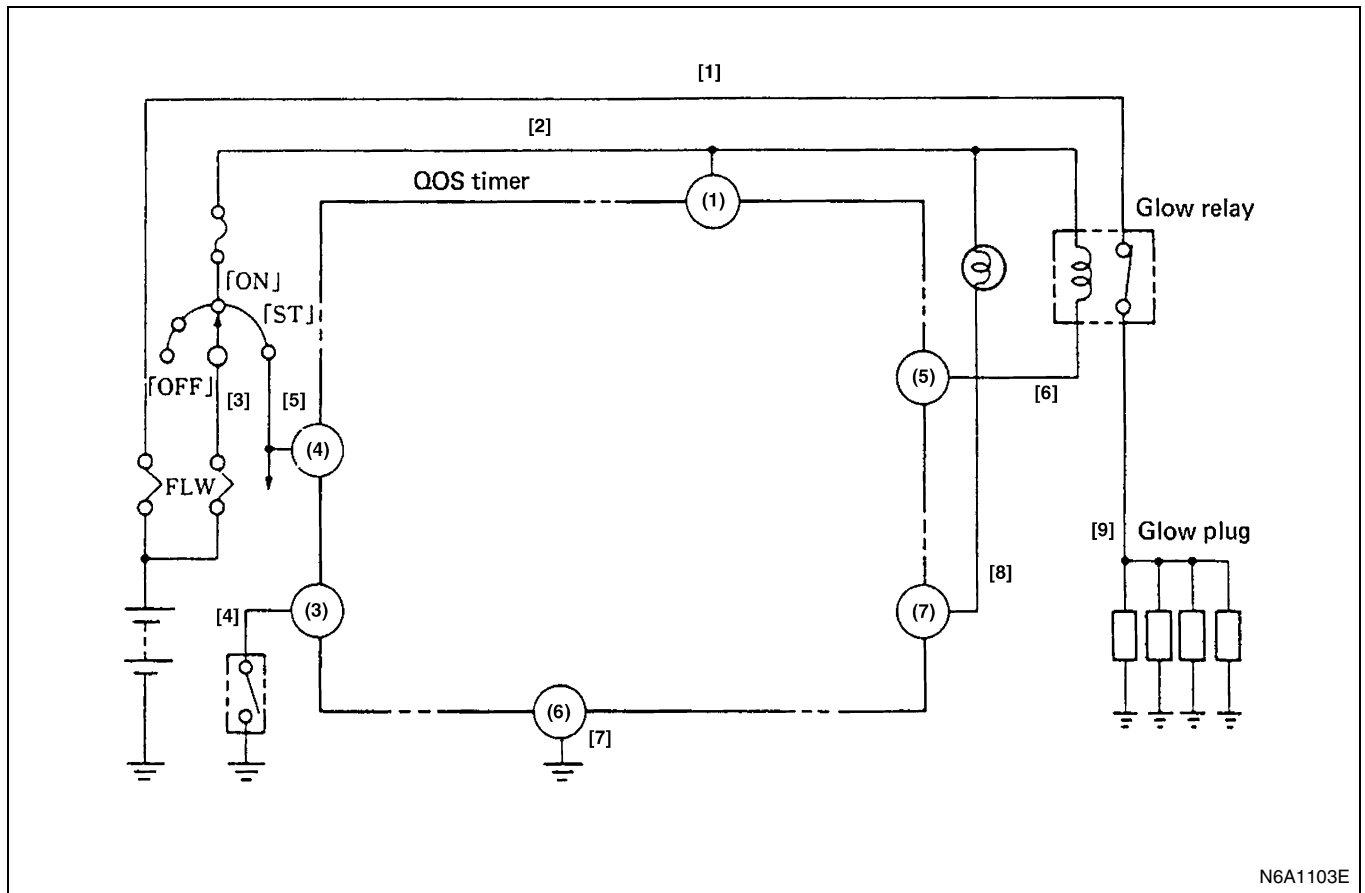
QOS Timer



Timer Specification	
No.	Connection to
1	Starter SW "ON"
2	—
3	Thermo SW
4	Starter SW "ST"
5	Glow relay
6	Earth (ground)
7	Indicator lamp

TROUBLESHOOTING

Circuit diagram

**Notice:**

A figure in a circle "()" shows a terminal No.

A figure in a square "[]" shows a circuit No.

When the Cooling Water Temperature is Below 0°C (32°F).

Condition	Possible cause	Circuit
The glow relay does not turn on.	1. Defective connection in fusible link between battery and starter switch	[3]
	2. Defective connection or broken wire in starter switch circuit	
	3. Defective connection or broken wire in fuse No.3	[2]
	4. Defective starter switch	
	* Items 3 and 4 above coincide with troubles in other circuits.	
	5. Defective connection of glow relay terminal	[1]
	6. Broken wire in glow relay excitation coil	
	7. Broken wire in the circuit between glow relay and timer	[6]
	8. Defective glow relay (There is no continuity in main connection.)	
	9. Defective connection in QOS timer Defective QOS timer	
	10. Defective ground circuit in QOS timer	[7]
	11. Defective thermo-switch (The thermo-switch does not turn off even when water temperature is below zero.)	
	12. Defective ground circuit in thermo-switch	[7]
Glow relay turns on, but does not get pre-heated.	1. Defective connection of fusible link between battery and start switch	[1]
	2. Defective connection of glow relay main link terminal connector, or broken wire in preheating circuit	
	3. Defective connection of plug connector with preheating circuit	[9]
Glow relay remains on, and does not turn off.	1. Defective QOS timer	
	2. Circuit is shorted to ground between QOS timer terminal (5) and glow relay	[6]
	3. Defective glow relay	
Indicator lamp does not light on.	1. Defective QOS timer	
	2. Broken wire in bulb	[8]
	3. Broken wire in indicator lamp harness	

When the Cooling Water Temperature is Over 0°C (32°F).

Condition	Possible cause	Circuit
Indicator lamp does not light on.	1. Defective QOS timer	
	2. Broken wire in bulb	[8]
Indicator lamp lights on for a long time.	1. Defective thermo-switch, or broken wire in thermo-switch circuit (Indicator lights on for about 3.5 sec.)	[4]
	2. Defective QOS timer	
Glow relay is ready to turn on, or remains on.	1. Circuit is shorted to ground between terminal (5) and glow relay.	[6]

