EMISSION CONTROL SYSTEM

CONTENTS

1. SPECIFICATIONS

GENERAL SPECIFICATIONS

Positive crankcase ventilation valve	Variable flow rate type
Reed valve	Reed valve type (without air control valve) Reed valve type (with air control valve)
Secondary air control solenoid valve	ON-OFF solenoid valve
EGR valve	Single type
Vacuum regulator valve	Diaphragm type
Thermo valve	Bimetal type or Wax type
Oxygen sensor	Zirconia sensor type
Coolant temperature sensor	Thermistor type

NOTE
The emission control systems differ in their specifications depending on the models and destinations. From the emission control parts listed in the GENERAL SPECIFICATIONS, the optimum ones have been selected and installed.
Refer to the Workshop Manuals of specific models, therefore, for the description of parts that have been mounted.

SERVICE SPECIFICATIONS

Reed valve (with air control valve)		
Valve opening check pressure		36 kPa (270 mmHg, 10.6 inHg)
EGR valve		
Valve closing check pressure		2.7 kPa (20 mmHg, 0.8 inHg)
Valve opening check pressure		43 kPa (320 mmHg, 12.6 inHg)
Thermo valve		
Valve opening check temperature		10°C (50°F) or lower
Valve closing check temperature		80°C (176°F) or higher
Secondary air control solenoid valve		
Resistance [at 20°C (68°F)]		36 – 44 Ω
Coolant temperature sensor		
Except 4G13 (12 valve) engine with electronic control carburetor		
Resistance	At 0°C (32°F)	5.9 kΩ
	At 20°C (68°F)	2.5 kΩ
	At 40°C (104°F)	1.1 kΩ
	At 80°C (176°F)	0.3 kΩ
4G13 (12 valve) engine with electronic control carburetor		
Resistance	At 0°C (32°F)	5.8 kΩ
	At 20°C (68°F)	2.4 kΩ
	At 40°C (104°F)	1.1 kΩ
	At 80°C (176°F)	0.3 kΩ

TORQUE SPECIFICATIONS

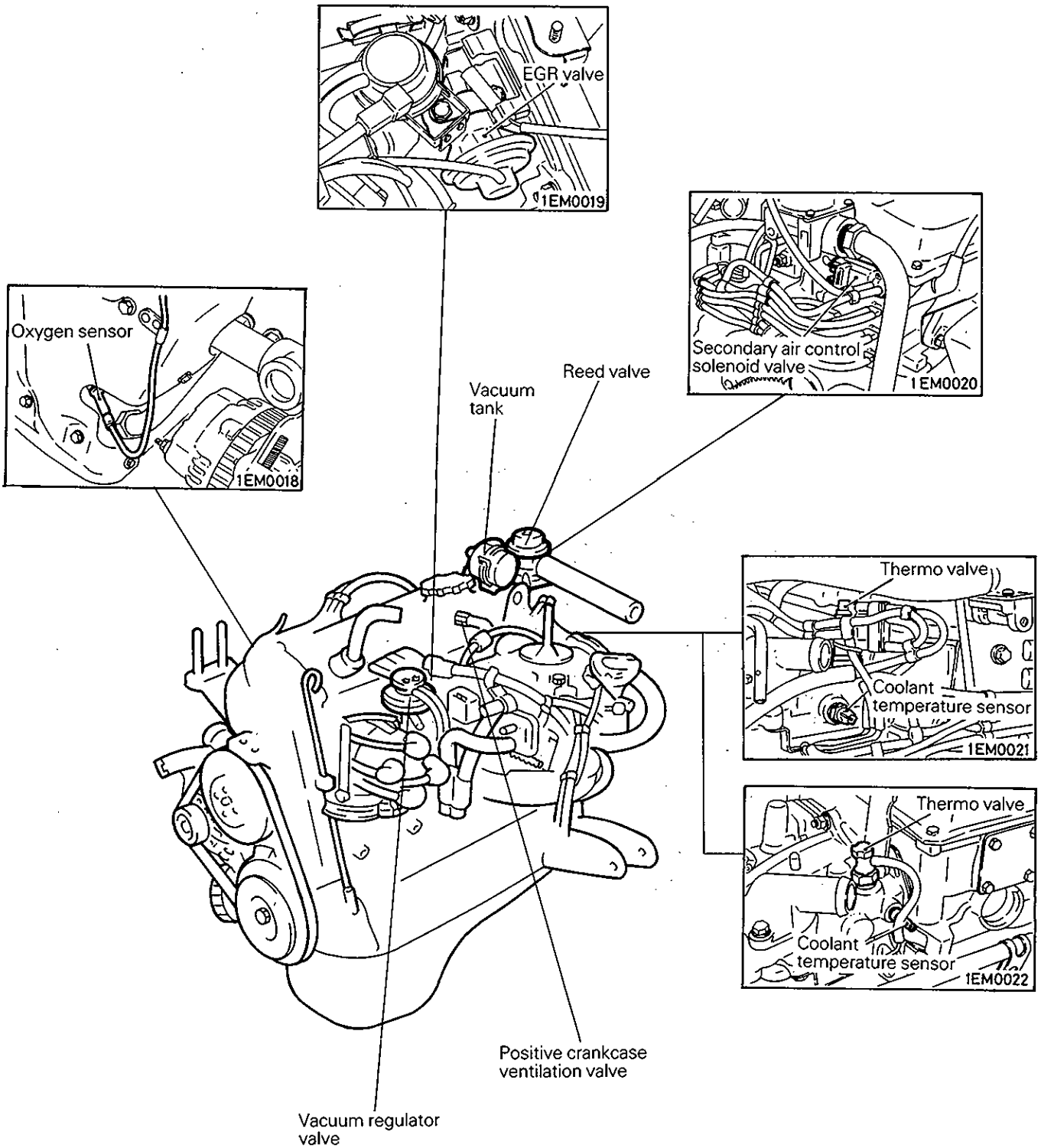
	Torque		
	Nm	kgm	ft.lbs.
Positive crankcase ventilation valve	10	1.0	7.3
Secondary air pipe flare nut (control valve side)	55	5.5	41
EGR valve attaching bolt (M6)	9	0.9	7
(M8)	22	2.2	16
Thermo valve	30	3.0	23
Oxygen sensor	45	4.5	33
Oxygen sensor attaching nut	28	2.8	20
Coolant temperature sensor	30	3.0	23

SEALANTS

	Specified sealant	Quantity
Thermo valve threaded part	3M NUT Locking Part No. 4171 or equivalent	As required
Coolant temperature sensor threaded part	3M NUT Locking Part No. 4171 or equivalent	As required

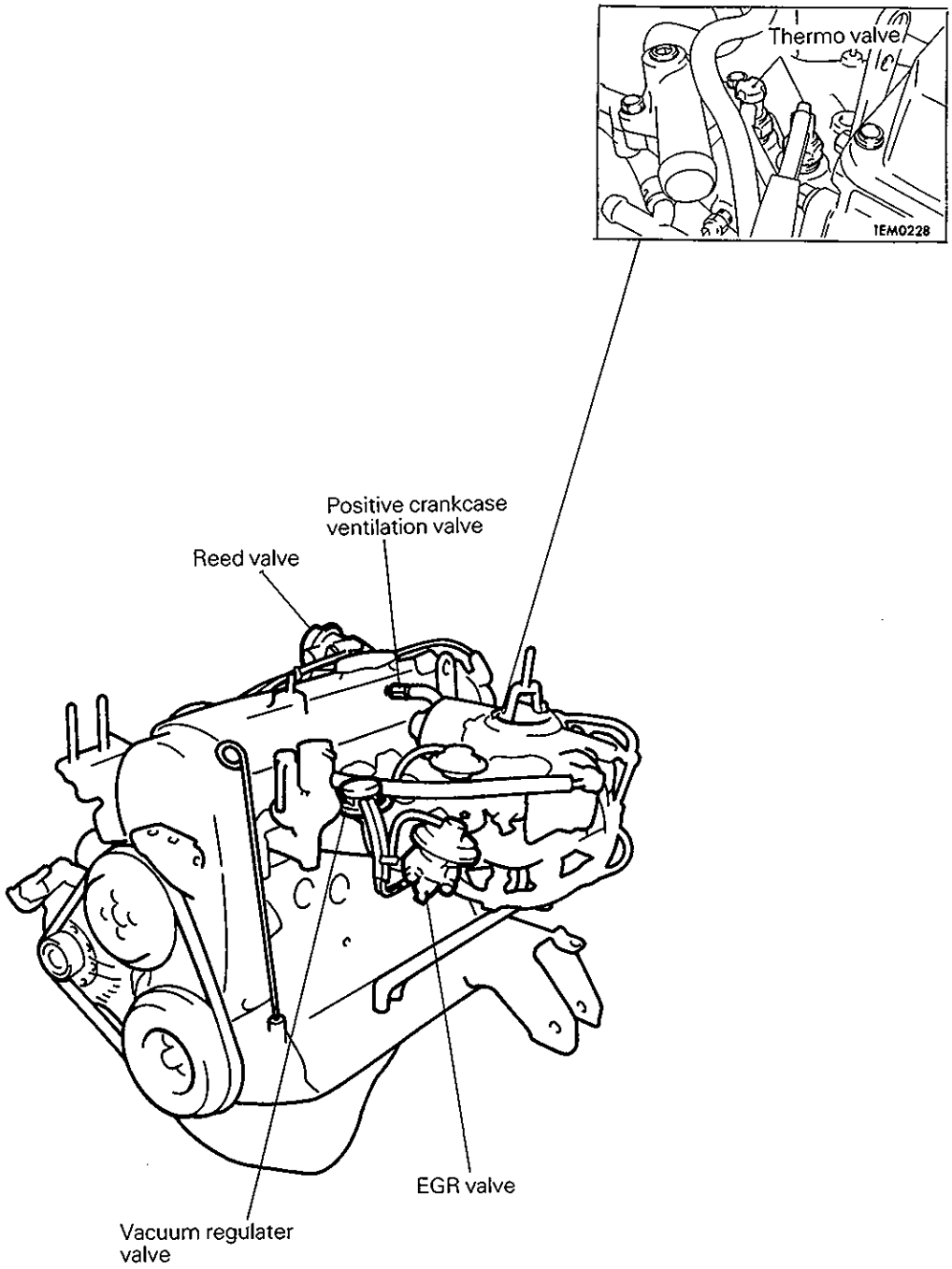
2. PARTS LOCATION

4G16, 4G13-8 VALVE AND 4G15-8 VALVE



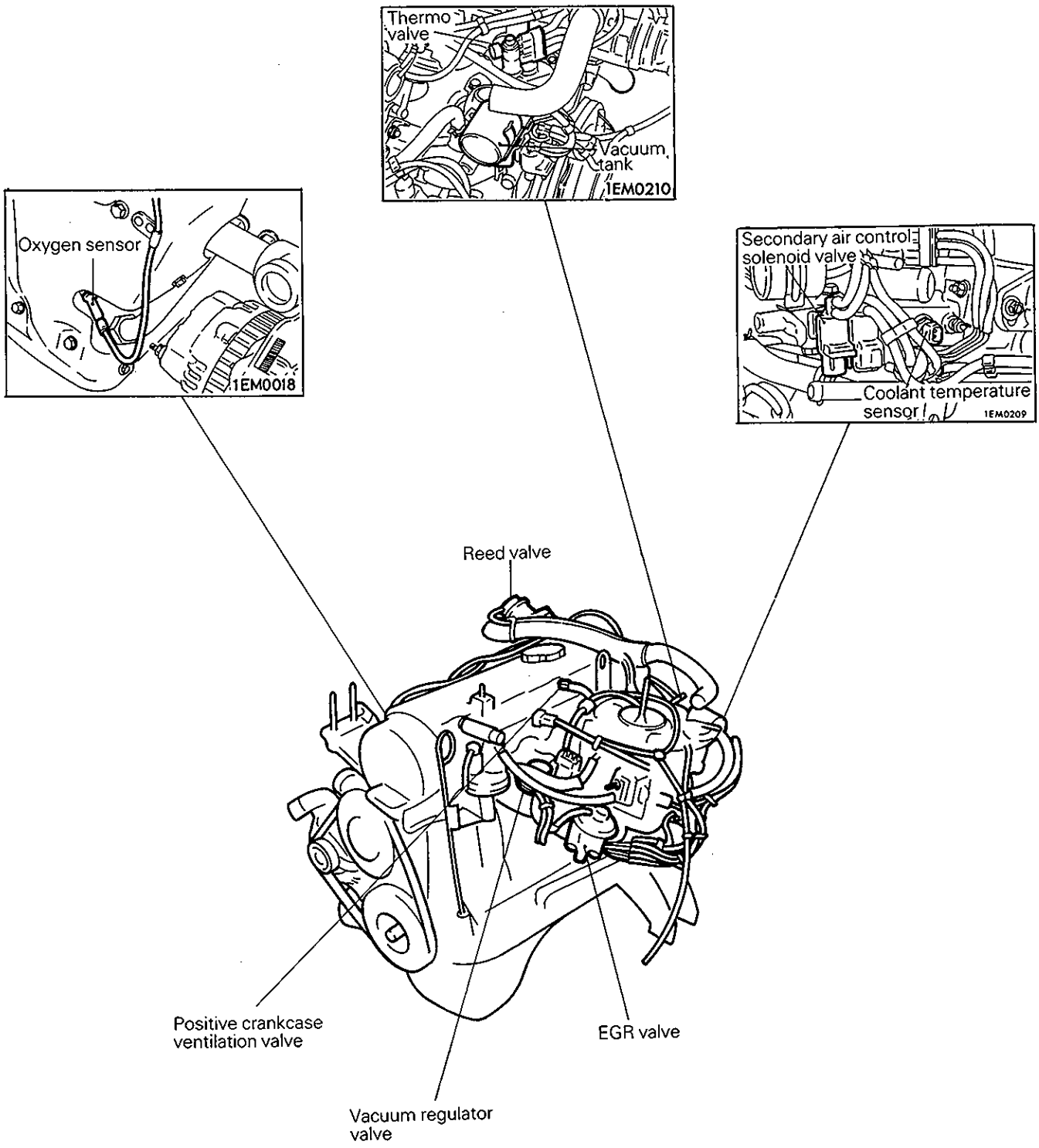
1EM0157

4G13-12 VALVE AND 4G15-12 VALVE WITH VARIABLE VENTURI TYPE CARBURETOR



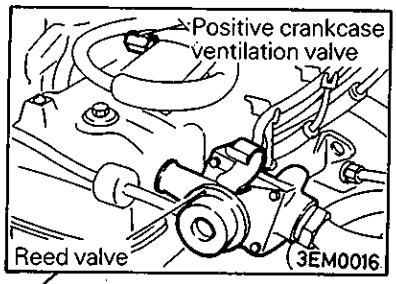
1EM0225

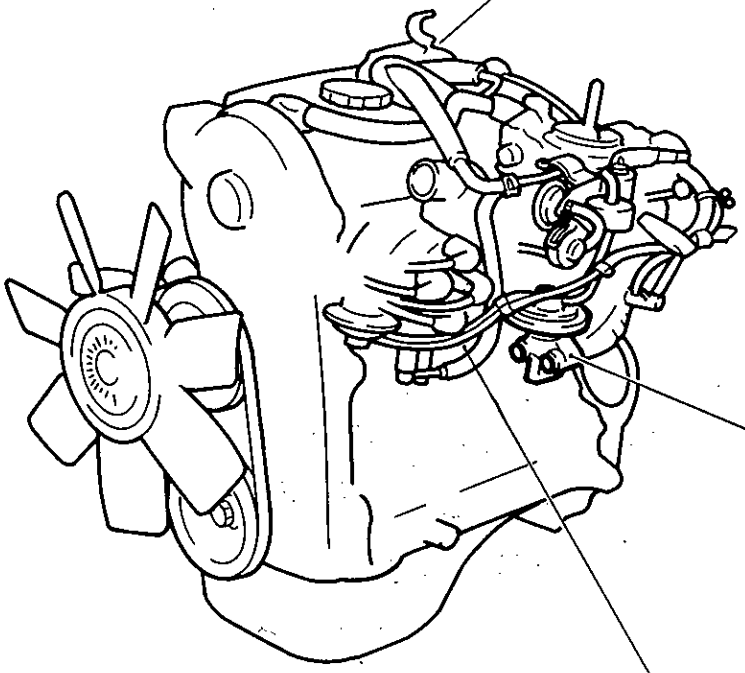
4G13-12 VALVE WITH ELECTRONIC CONTROL CARBURETOR

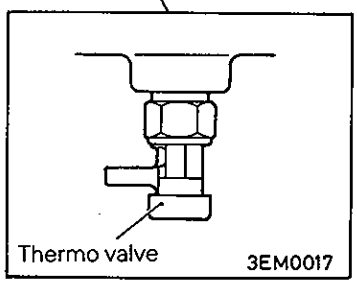


1EM0208

4G33, 4G32 AND 4G37 WITH CONVENTIONAL CARBURETOR

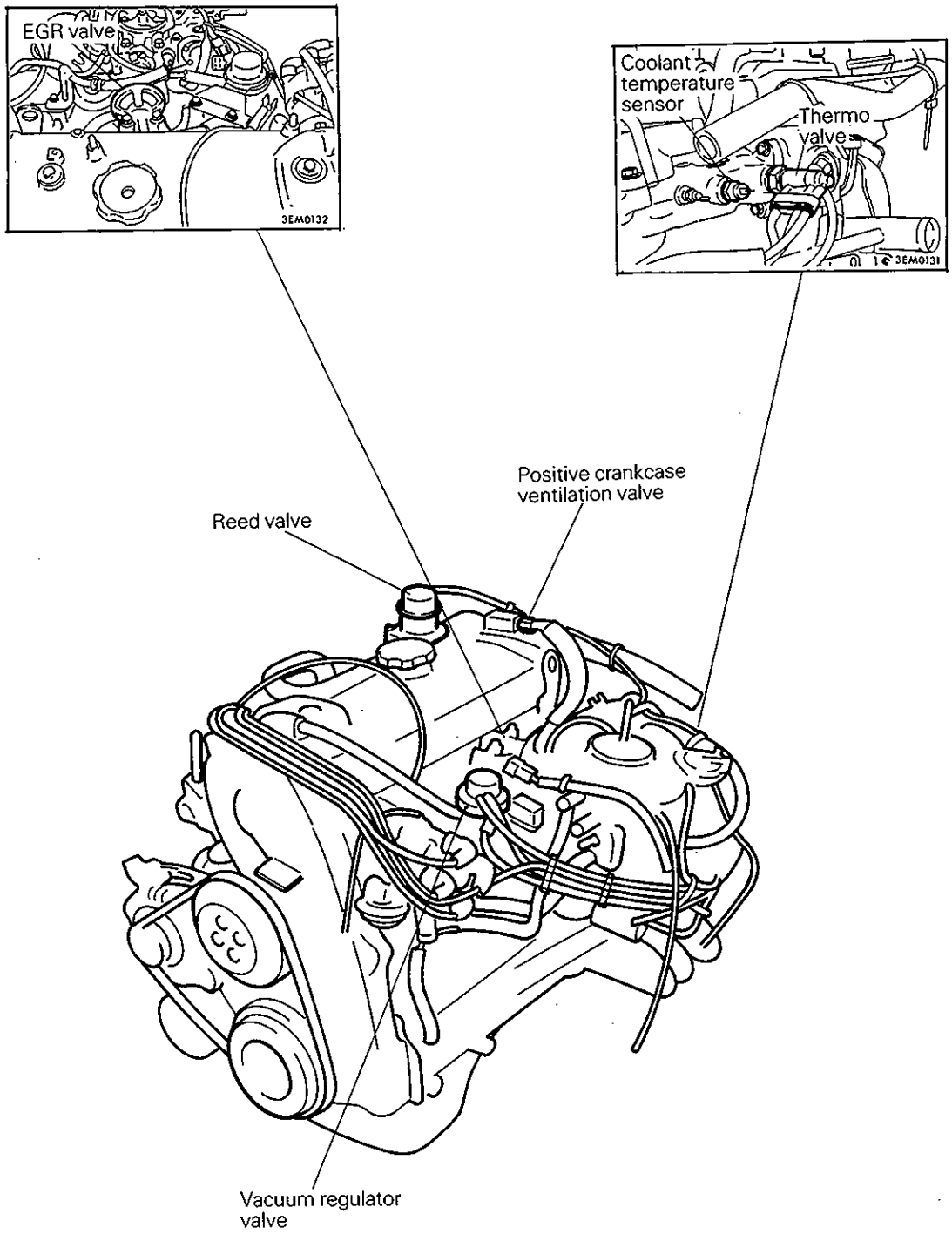






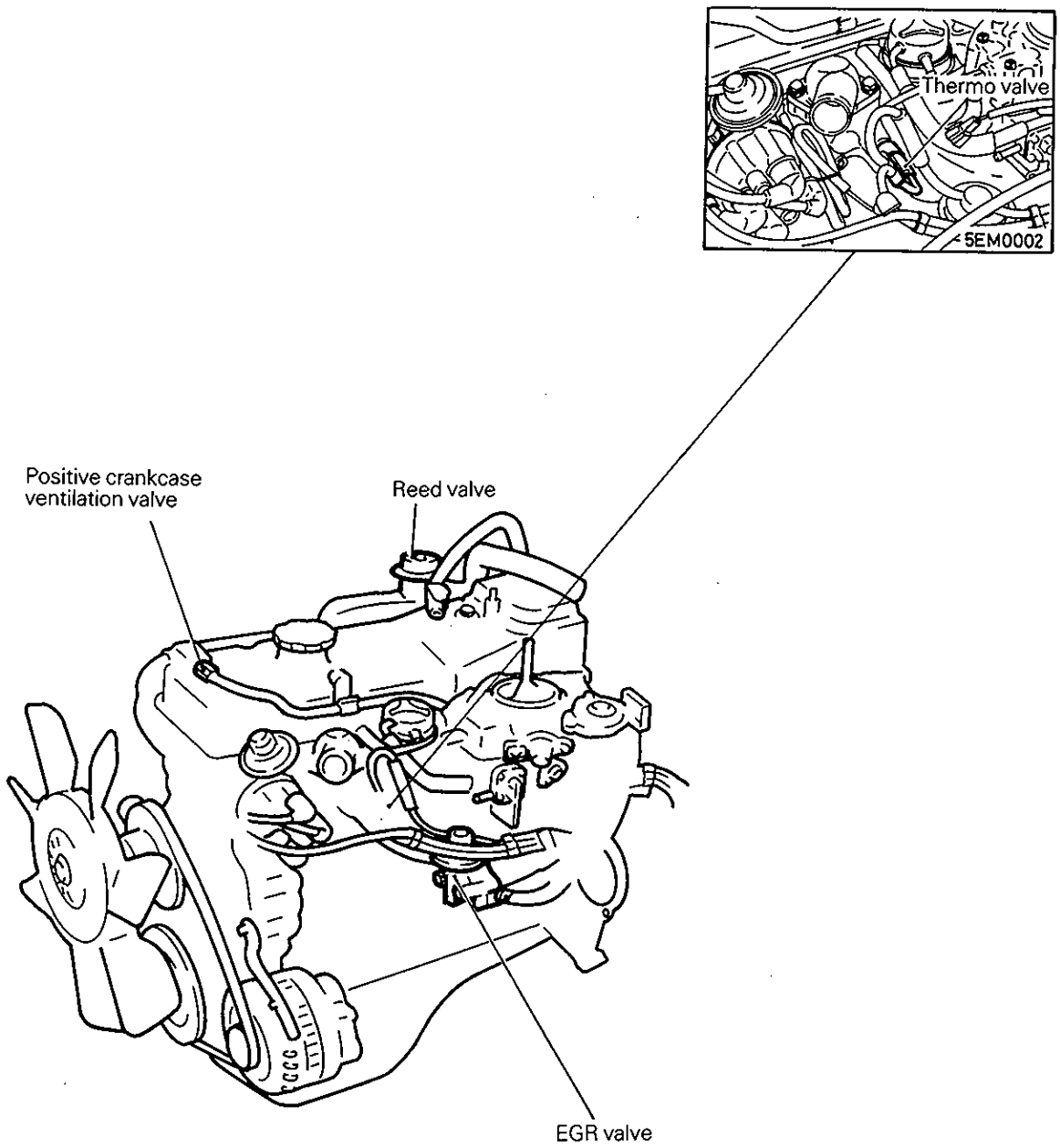
3EM0015

4G37 WITH ELECTRONIC CONTROL CARBURETOR



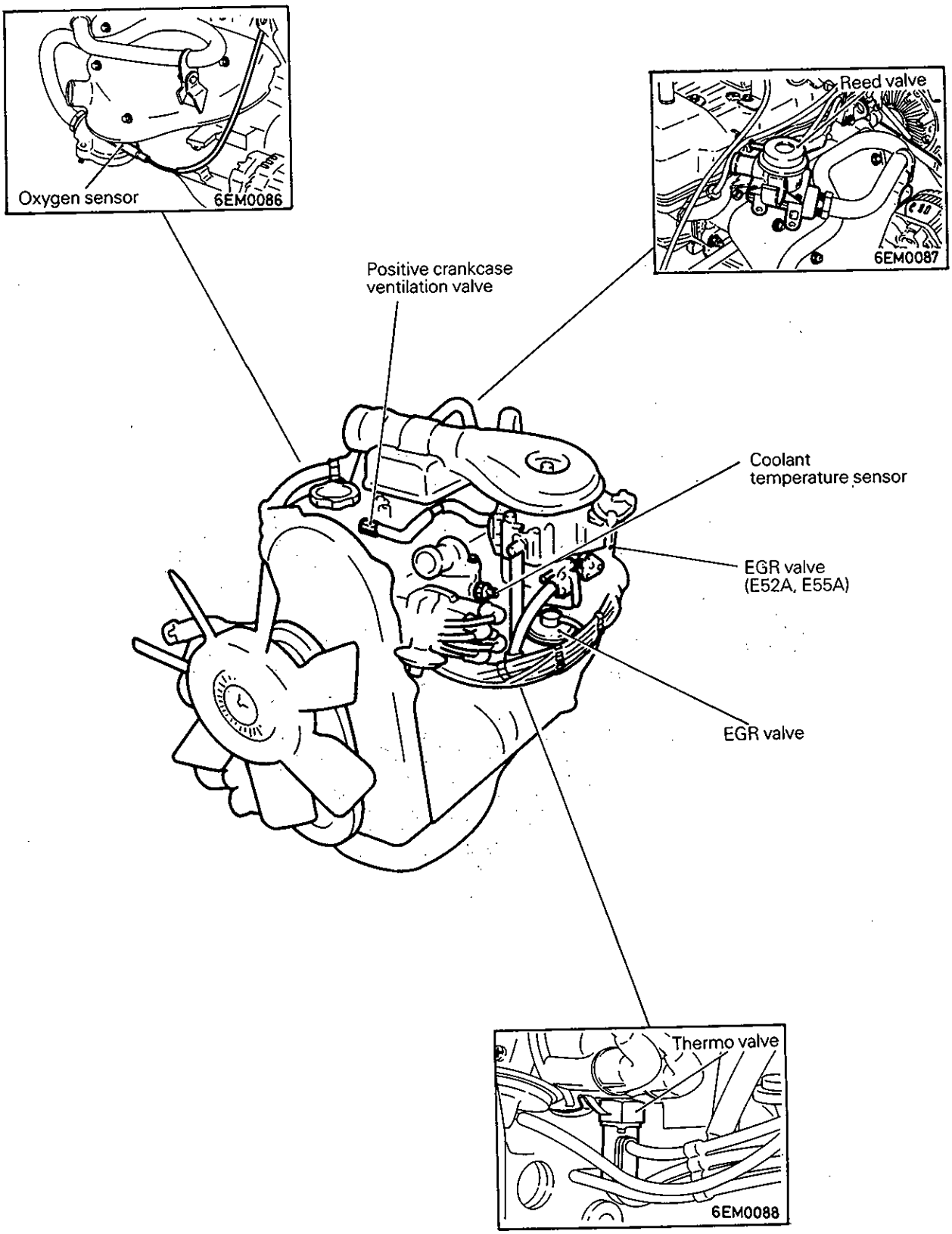
3EM0130

4G54 AND G54B



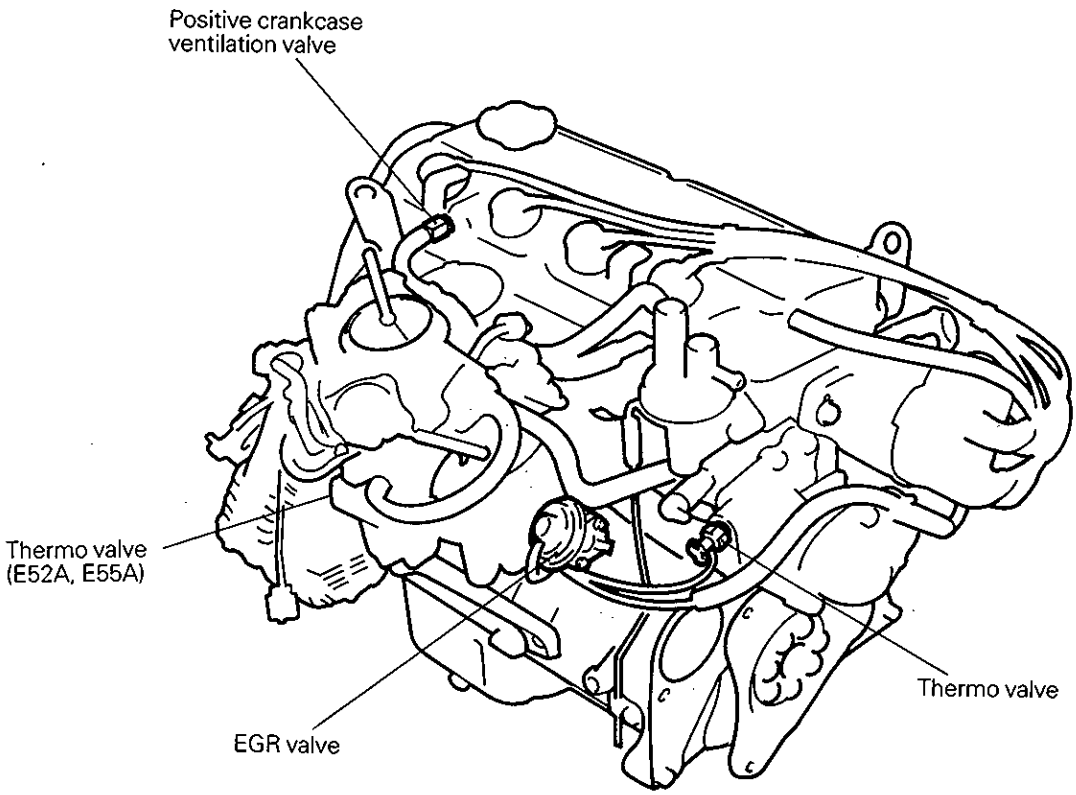
5EM0001

4G63 EXCEPT GALANT (E52A, E55A)

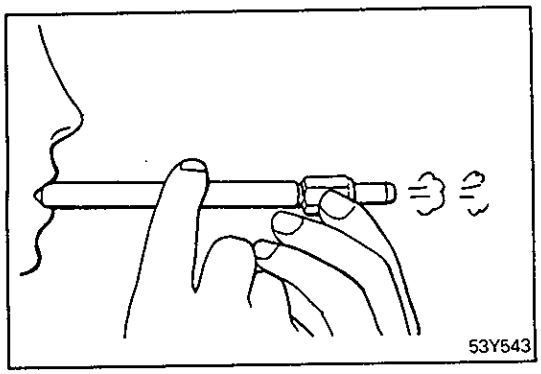


6EM0085

4G93 EXCEPT GALANT (E52A, E55A)



9EM0038



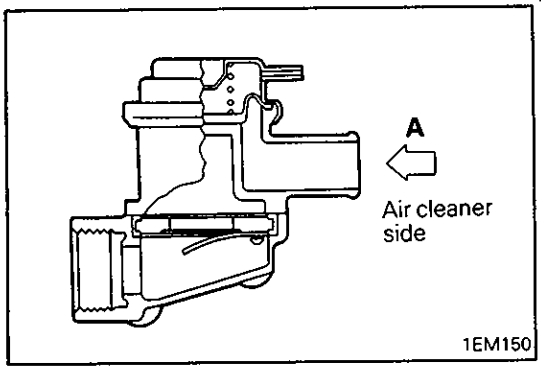
3. INSPECTION

POSITIVE CRANKCASE VENTILATION VALVE

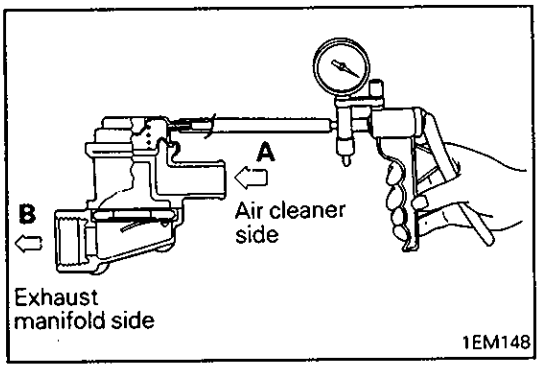
(1) Remove the positive crankcase ventilation valve.
(2) Blow from the threaded end of positive crankcase ventilation valve. If you cannot blow through it, positive crankcase ventilation valve is clogged.
(3) If positive crankcase ventilation valve is clogged, clean positive crankcase ventilation valve with cleaning solvent.
(4) Tighten the positive crankcase ventilation valve to specified torque.

REED VALVE (WITH AIR CONTROL VALVE)

(1) Remove the reed valve.
(2) Blow in air from A side to check that air does not blow through.



(3) Connect a hand vacuum pump to the reed valve nipple.
(4) Apply a vacuum of 67 kPa (500 mmHg, 19.7 inHg) and check air tightness.



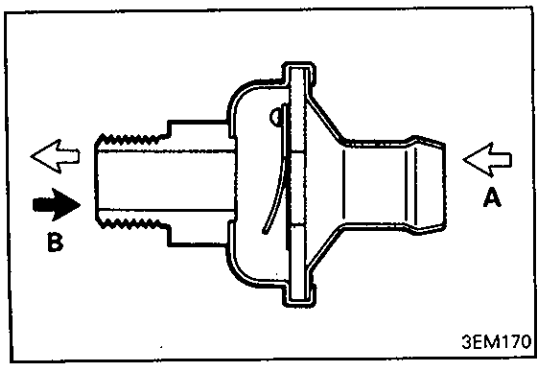
(5) Apply a vacuum of 36 kPa (270 mmHg, 10.6 inHg) and blow in air to check condition as follows.

Air blow direction	Normal condition
A to B	Air blows through
B to A	Air does not blow through

(6) If any fault is found in above checks, replace the reed valve.
(7) Tighten the reed valve to specified torque.

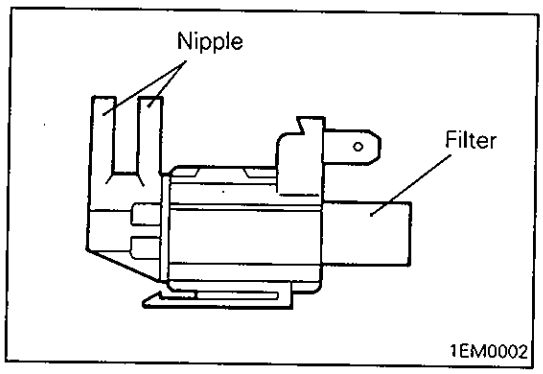
REED VALVE (WITHOUT AIR CONTROL VALVE)

(1) Remove the reed valve.
(2) Blow in air and check condition as follows.



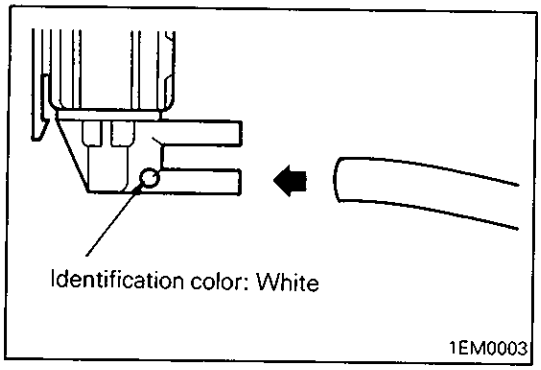
Air blow direction	Normal condition
A to B	Air blows through
B to A	Air does not blow through

(3) If any fault is found in above checks, replace the reed valve.
(4) Tighten the reed valve to specified torque.

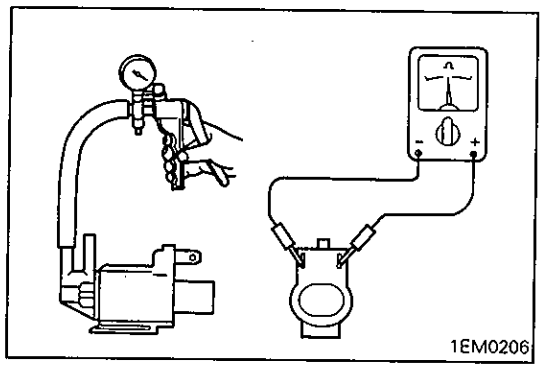


SECONDARY AIR CONTROL SOLENOID VALVE

(1) Remove the secondary air control solenoid valve.

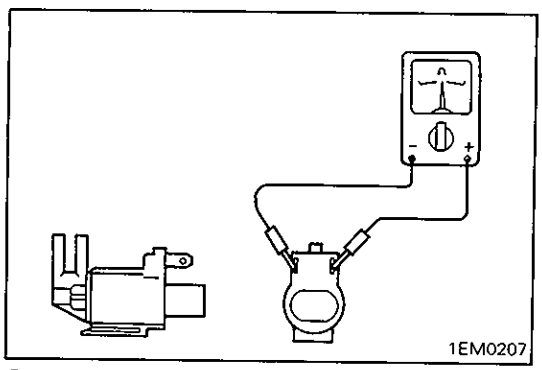


(2) Connect a hand vacuum pump to the nipple (with white identification mark).

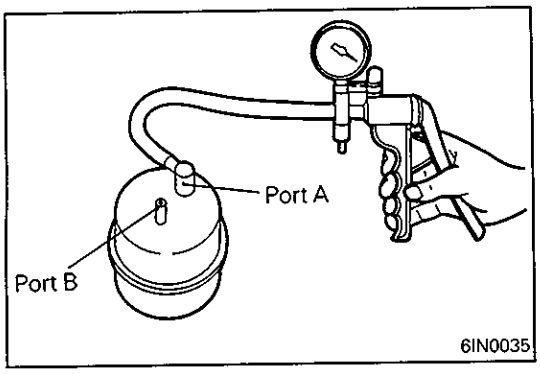


(3) Apply vacuum and check air tightness both when the battery voltage is applied directly to the solenoid valve terminal and when not applied.

Battery voltage	Normal condition
When applied	Vacuum leaks
When not applied	Vacuum holds



(4) Measure solenoid coil resistance.
Standard value: 36 – 44 Ω [at 20°C (68°F)]

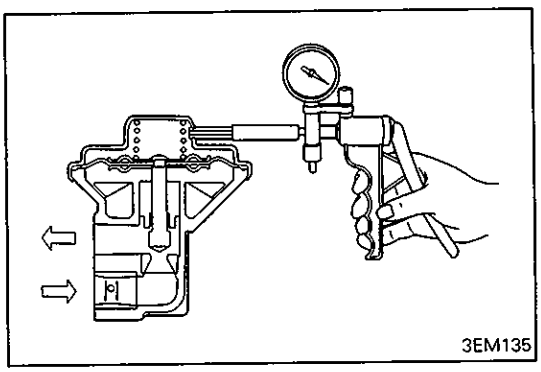


VACUUM TANK

(1) Install a hand vacuum pump to the port A of the vacuum tank and apply 67 kPa (500 mmHg, 19.7 inHg) of vacuum to make sure that the tank is airtight.
(2) Connect the hand vacuum pump to the port B of the tank and make sure that when vacuum is applied, vacuum leaks.

EGR VALVE

(1) Remove the EGR valve and check it for sticking, deposit of carbon, etc.
If such condition exists, clean with adequate solvent to ensure correct valve seat contact.



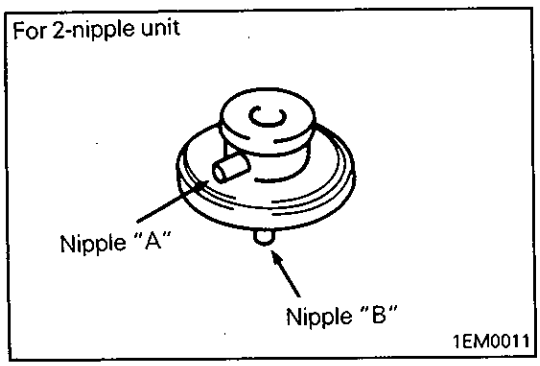
(2) Connect a hand vacuum pump to the EGR valve.

Caution
- **Plug one nipple of the EGR valve.**

(3) Apply a vacuum of 67 kPa (500 mmHg, 19.7 inHg) and check air tightness.
(4) Blow in air from one passage of the EGR to check condition as follows.

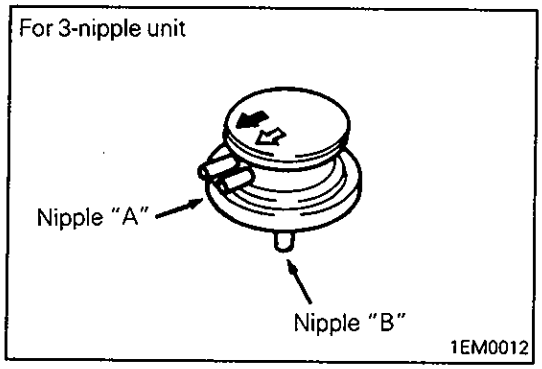
Vacuum	Normal condition
2.7 kPa (20 mmHg, 0.8 inHg) or lower	Air does not blow through
43 kPa (320 mmHg, 12.6 inHg) or higher	Air blows through

(5) Replace the gasket with a new one and tighten the EGR valve to specified torque.



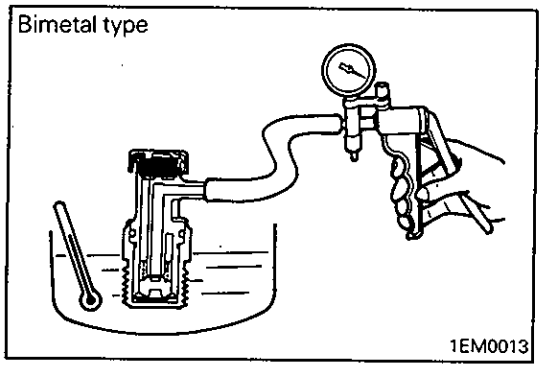
VACUUM REGULATOR VALVE

(1) Remove the vacuum regulator valve.
(2) Connect a hand vacuum pump to nipple "A" and apply vacuum. Vacuum regulator valve is normal if it is not held.
(3) Connect air compressor to nipple "B" and apply a pressure of 4.0 kPa (30 mmHg, 1.2 inHg). Vacuum regulator valve is normal if vacuum build up when the hand vacuum pump is operated.



NOTE
If an air compressor pump is not available, check while blowing air through the nipple "B".

(4) Install the vacuum regulator valve.

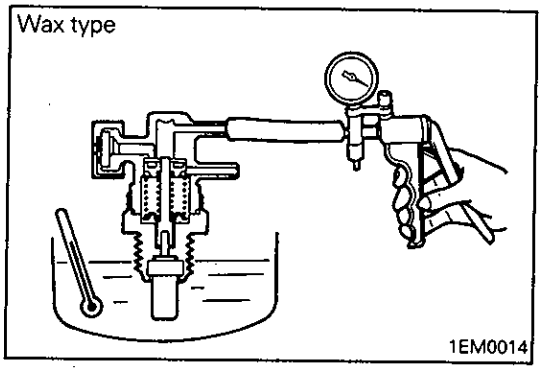


THERMO VALVE

(1) Remove the thermo valve.

Caution
- **When removing the thermo valve, do not use wrenches or other tools on the resin part.**

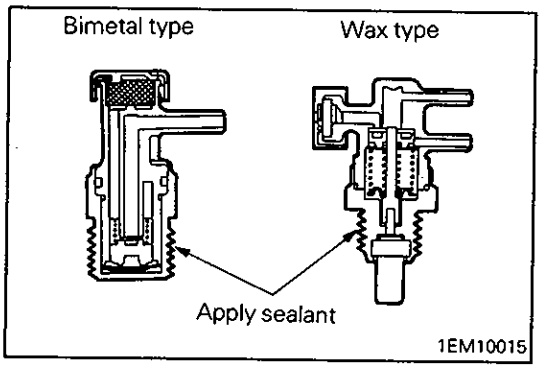
(2) Connect a hand vacuum pump to the thermo valve nipple.
(3) Immerse the temperature sensing section in water and apply a negative pressure by a hand vacuum pump while heating the water.



Water temperature	Normal condition
10°C (50°F) or lower	Vacuum leaks
80°C (176°F) or higher	Vacuum holds

NOTE
Different engines have different number of thermo valve nipples. Be sure to check all nipples.

(4) If any fault is found in above checks, replace the thermo valve.

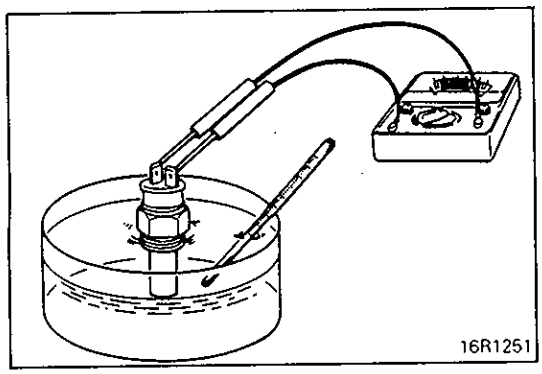


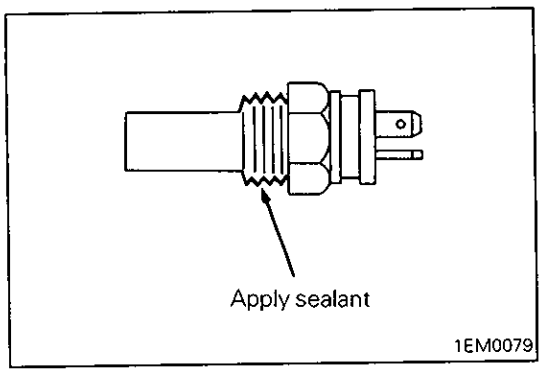
(5) Apply sealant to threaded portion.

Specified sealant:
3M NUT Locking No. 4171 or equivalent

(6) Install the thermo valve and tighten it to specified torque.

Caution
- **When installing the thermo valve, do not use wrenches or other tools on the resin part.**





COOLANT TEMPERATURE SENSOR [Except 4G13 (12 valve) engine with electronic control carburetor]

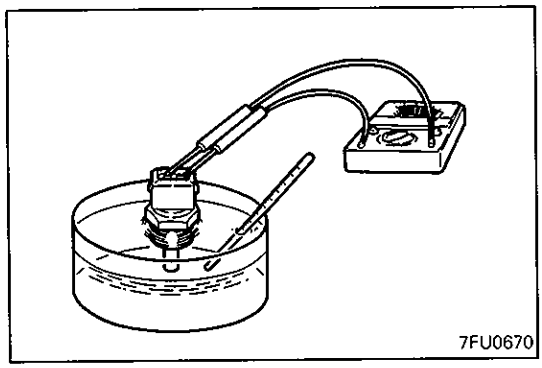
(1) Remove the coolant temperature sensor from the intake manifold.
(2) Immerse the temperature sensing section in water and measure resistance between terminals 1 and 2 while heating the water.

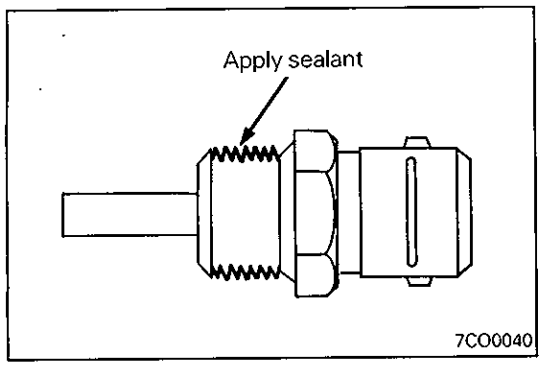
Temperature °C (°F)	Resistance (kΩ)
0 (32)	5.9
20 (68)	2.5
40 (104)	1.1
80 (176)	0.3

(3) If the resistance deviates greatly from the standard value, replace the coolant temperature sensor.
(4) Apply sealant to threaded portion.

Specified sealant:
3M NUT Locking No. 4171 or equivalent

(5) Install the coolant temperature sensor and tighten it to specified torque.





COOLANT TEMPERATURE SENSOR [4G13 (12 valve) engine with electronic control carburetor]

(1) Remove the coolant temperature sensor from the intake manifold.
(2) Immerse the temperature sensing section in water and measure resistance between terminals 1 and 2 while heating the water.

Temperature °C (°F)	Resistance (kΩ)
0 (32)	5.8
20 (68)	2.4
40 (104)	1.1
80 (176)	0.3

(3) If the resistance deviates greatly from the standard value, replace the coolant temperature sensor.
(4) Apply sealant to threaded portion.

Specified sealant:
3M NUT Locking No. 4171 or equivalent

(5) Install the coolant temperature sensor and tighten it to specified torque.

NOTES