MITSUBISHI MOTORS

LANCER EVOLUTION-VIII

ENGINE MAINTENANCE MANUAL

MITSUBISHI MOTORS CORPORATION

Maintenance Manual

4G6 DOHC ENGINE

FOREWORD

This manual describes the 4G6DOHC engine, but explains only points which differ from those in the following maintenance manual:

● 4G6 DOHC Engine Maintenance Manual (No. 1039G46)

The content of this manual is based on the engine as it was in January 2003. Some points may have changed due to subsequent engine specification changes. International SI standard units are used in this manual. (However, old units are used for some figures we have taken from existing documents).

Any opinions, requests, or questions concerning this manual, should be written on the 'Servicing Comment Form' at the end, and sent to us by fax.

January 2003

MITSUBISHI MOTOR CORPORATION

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How to Follow this Manual

Extent of maintenance operation covered in this manual

This manual explains maintenance procedures carried out after the engine has been removed from the vehicle. Please consult the relevant vehicle maintenance manual if you need to remove the engine from the vehicle or carry out checks / maintenance without removing it.

How to follow the explanations

Maintenance Procedures

(1) At the beginning of each section there are component drawings to enable you to understand how they are fitted.

(2) Numbers on these drawings denote the order for maintenance procedures, The drawings also show parts that cannot be re-used, and tightening torques.

Removal order: The numbers before the part names given in the removal order correspond to the numbers in the component drawings, and denote the order in which they are removed.

Fitting order: If the order in which they are fitted is simply the reverse of the order in which they were removed, the fitting order is omitted.

Dismantling order: The numbers before the part names given in the dismantling order correspond to the numbers in the component drawings, and denote the order in which they are dismantled.

Assembly order: If the order in which they are assembled is simply the reverse of the dismantling order, the assembly order is omitted.

Categorisation of Key Maintenance Points

Key points for maintenance/maintenance standards / use of special tools are explained in detail as key maintenance

◀A▶ = key point concerning removing/dismantling

▶A◀ = key point concerning fitting/assembling

◀*▶ = key points concerning removing / dismantling are in '01-14G6DOHC Engine Maintenance Manual'.

▶*◀ = key points concerning fitting / removing are in '01-14G6DOHC Engine Maintenance Manual'

Symbols for Lubricants and Sealants

Lubricant/sealant application/topping-up locations are shown on the component drawing or the following page, by these symbols.

 ..... Grease

 ..... Sealant, liquid gasket (FIPG)

 ..... Brake fluid

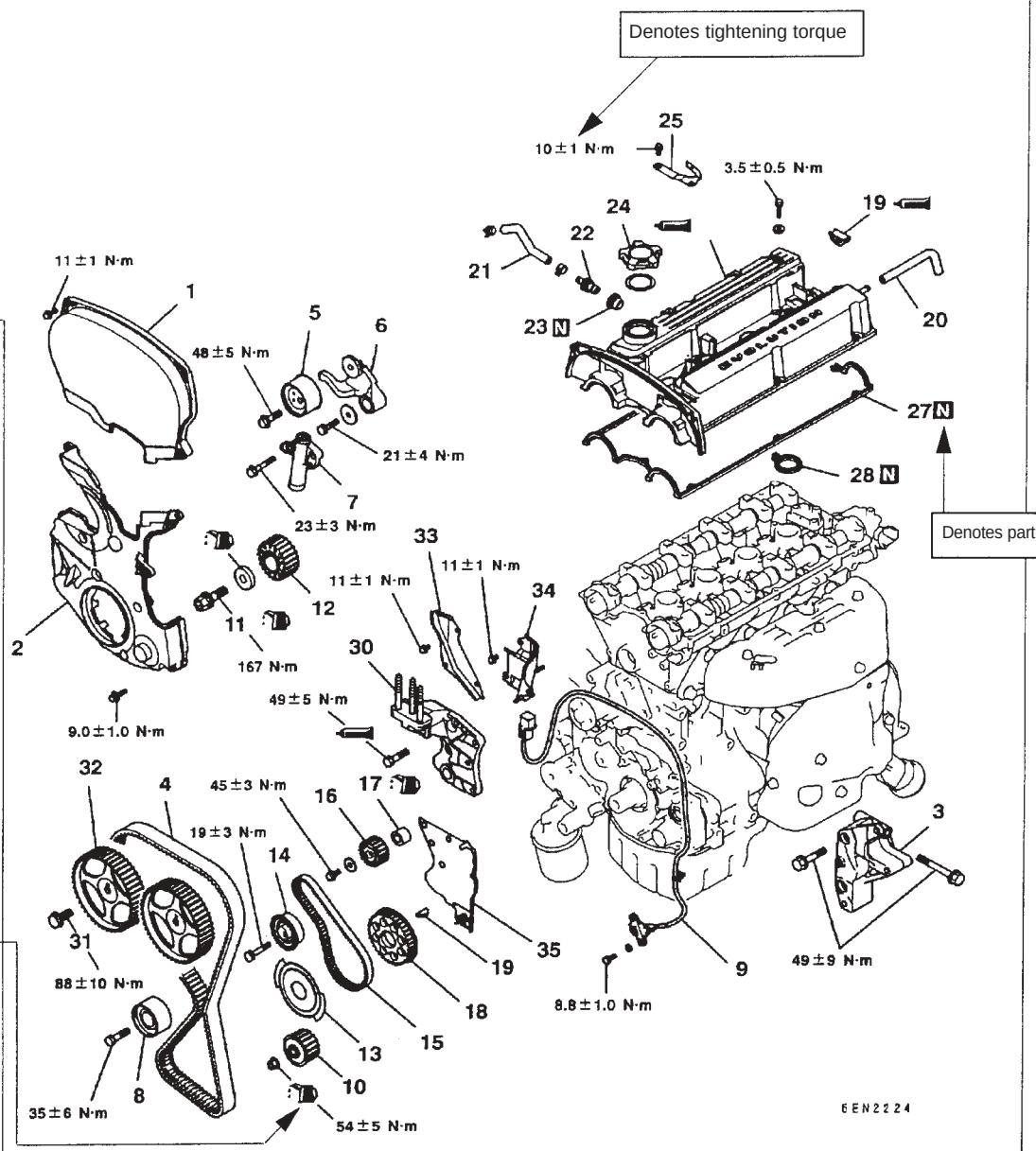
 ..... Engine oil

Checks

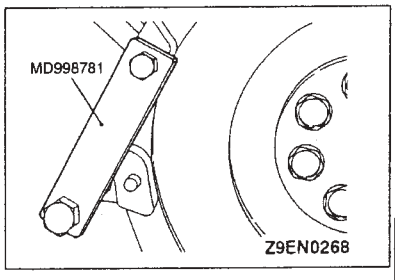
The only checks explained in this manual are those for which special tools or measuring instruments are used. General visual checks and cleaning of components are not explained, but this constitutes essential maintenance and must be carried out.

Page number Engine type Title

8 4G6 – TIMING BELT



1. Timing belt front upper cover
2. Timing belt front lower cover
3. Power steering pump bracket
4. Timing belt
7. Auto-tensioner
8. Idler pulley
9. Crank angle sensor
10. Oil pump sprocket
11. Crankshaft bolt
12. Crankshaft sprocket



Key Point for Removing

A Removing crankshaft bolt

Using the flywheel stopper (Special tool No.MD998781), secure drive plate, and remove crankshaft bolt.

This letter corresponds to the letter in the Removal / Fitting / Dismantling / Assembly order.

These points explain maintenance procedures / precautions required for removal / fitting / dismantling / assembly.

OVERVIEW

Type Table

Vehicle Name	Vehicle Type	Engine Type	Capacity (cc)	Specifications
Lancer Evolution VIII	CT9A	4G63-7	1,997	DOHC 16 valve T/C

Specifications

Item		Specification
Bore x Stroke (mm)		85 x 88
Total capacity (cc)		1,997
Fuel chamber type		Pent roof type
No. of cylinders		4
Valve mechanism	Type	DOHC
	Intake valves	2
	Exhaust valves	2
	Lash adjuster	Hydraulic type
	Rocker arm	Roller follower type
Compression ratio		8.8
Fuel injection device		Electronic control multipoint fuel injection
Ignition device type		Electronic control, 2 coils
Alternator type		AC (with internal IC regulator)
Starter motor type		Reduction gear motor

Maintenance Standards

Item	Standard	Limit
Cylinder Head, Valves		
Valve spring free height (mm)	50.4	49.4
Valve spring perpendicularity	Less than 2°	4°

Tightening Torques

Item	Tightening Torque (N•m)
Alternator / Ignition System	
Oil level gauge guide bolts	13 ± 1
Water pump pulley bolts	8.8 ± 1.0
Auto-tensioner bolts (washer)	44 ± 10
Auto-tensioner bolts (flange)	24 ± 4
Alternator brace bolts (flange)	23 ± 3
Alternator brace bolts (washer)	22 ± 4
Alternator nuts	44 ± 10
Crankshaft pulley bolts	25 ± 4
Centre cover bolts	3.0 ± 0.5
Ignition coil bolts	10 ± 2

Item	Tightening Torque (N•m)
Spark plugs	25 ± 5
Timing Belt	
Timing belt cover bolts (flange)	11 ± 1
Timing belt cover bolts (washer)	9.0 ± 1.0
Power steering pump bracket bolts	49 ± 9
Tensioner pulley bolts	48 ± 5
Tensioner arm bolts	21 ± 4
Auto-tensioner bolts	23 ± 3
Idler pulley bolts	35 ± 6
Crank angle sensor bolts	8.8 ± 1.0
Oil pump sprocket nuts	54 ± 5
Crankshaft bolts	167
Tensioner B bolts	19 ± 3
Counterbalance shaft sprocket bolts	45 ± 3
Connector bracket bolts	10 ± 1
Rocker cover bolts	3.5 ± 0.5
Engine support bracket bolts	49 ± 5
Camshaft sprocket bolts	88 ± 10
Fuel System	
Throttle body bolts	19 ± 3
Cover bolts	11 ±1
Fuel pressure regulator bolts	8.8 ± 2.0
Delivery pipe and injector bolts	11 ± 1
Vacuum hose and pipe bolts	11 ± 1
Solenoid assembly bolts	9.0 ± 1.0
Vacuum tank bracket bolts	9.0 ± 1.0
Secondary Air System / Intake Manifold	
Exhaust manifold heat protector bolts	14 ± 1
Vacuum hose and pipe bolts	11 ± 1
Air pipe assembly bolts (eye bolts)	49 ± 5
Air pipe assembly bolts (M6 flange)	11 ± 1
Air pipe assembly bolts (M8 flange)	24 ± 3
Air pipe assembly bolts (M8 washer)	14 ± 1
Air control valve assembly bolts	22 ± 4
Air control valve bracket bolts	22 ± 4
Intake manifold stay bolts	31 ± 3
Intake manifold bolts (M8)	20 ± 2
Intake manifold bolts / nuts (M10)	36 ± 6
Exhaust Manifold	
Engine hanger bolts	19 ± 3
Turbocharger heat protector bolts	14 ± 1
O_2 sensor	44 ± 5
Exhaust fitting bracket bolts	35 ± 6
Exhaust fitting bolts / nuts	59 ± 5

Item	Tightening Torque (N•m)
Air outlet fitting bolts	19 ± 1
Oil return pipe bolts (flange)	14 ± 1
Oil return pipe bolts (washer)	9.0 ± 1.0
Turbocharger assembly and pipe assembly bolts / nuts	64 ± 5
Oil pipe bolts (M10 eye bolts)	17 ± 2
Oil pipe bolts (M12 eye bolts)	31 ± 2
Oil pipe bolts (M12 flange)	11 ± 1
Water pipe bolts (flange)	10 ± 1
Water pipe bolts (eye bolts)	42 ± 7
Exhaust manifold nuts (M8)	29 ± 3
Exhaust manifold nuts (M10)	49 ± 5
Water Pump / Water Pipe	
Water temperature sensor	29 ± 10
Water temperature gauge unit	10.8 ± 1.0
Water outlet fitting bolts	10 ± 1
Thermostat case bolts	23 ± 4
Water inlet pipe bolts (M6)	5.0 ± 1.0
Water inlet pipe bolts (M8)	13 ± 2
Water pump bolts	14 ± 1
Knock sensor	23 ± 2

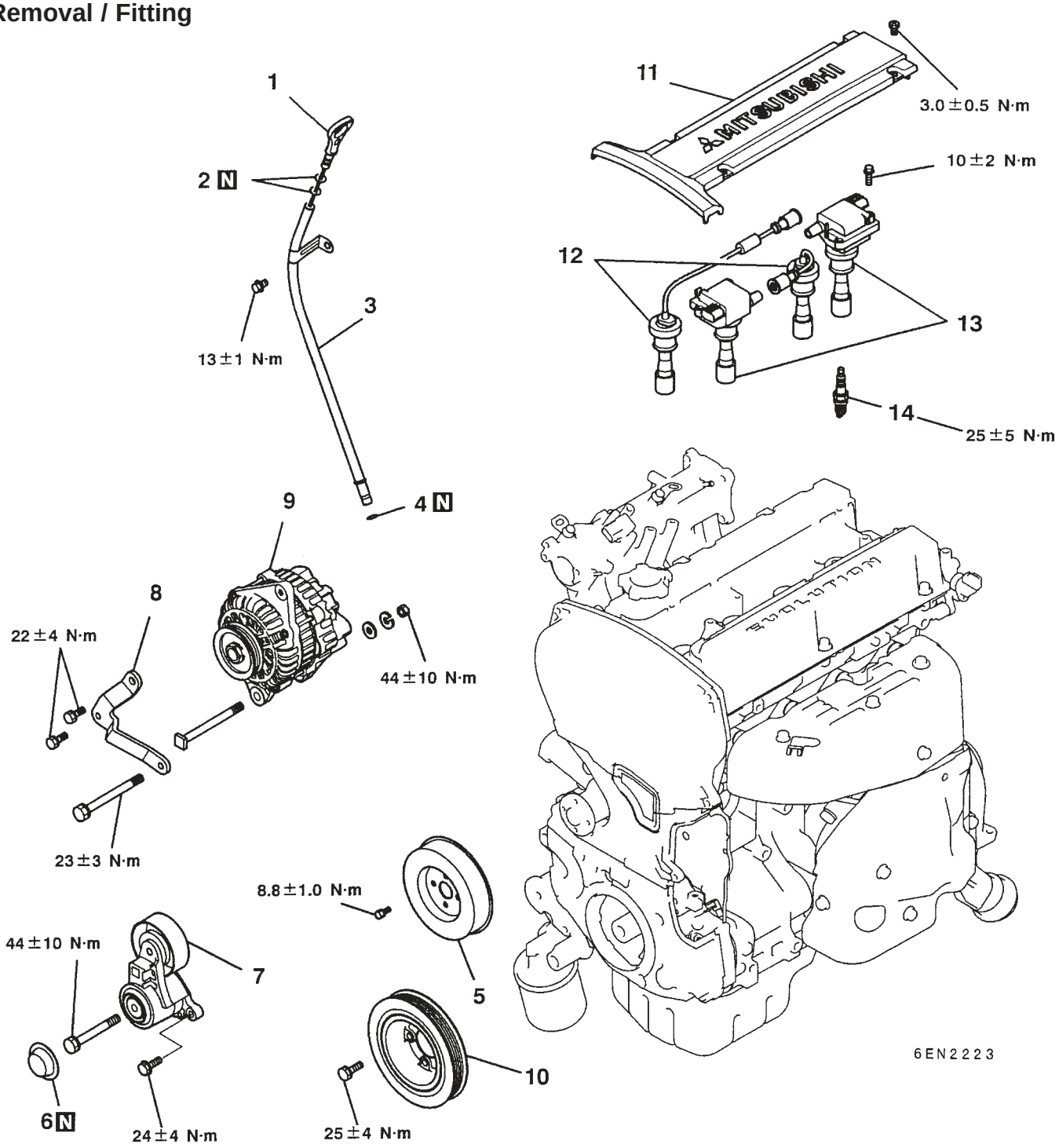
Sealants

Where used	Brand used
Water outlet fitting*	MZ100191 or equivalent
Thermostat housing*	MZ100191 or equivalent

* = Where liquid gasket (FIPG) is used.

Alternator, Ignition System

Removal / Fitting

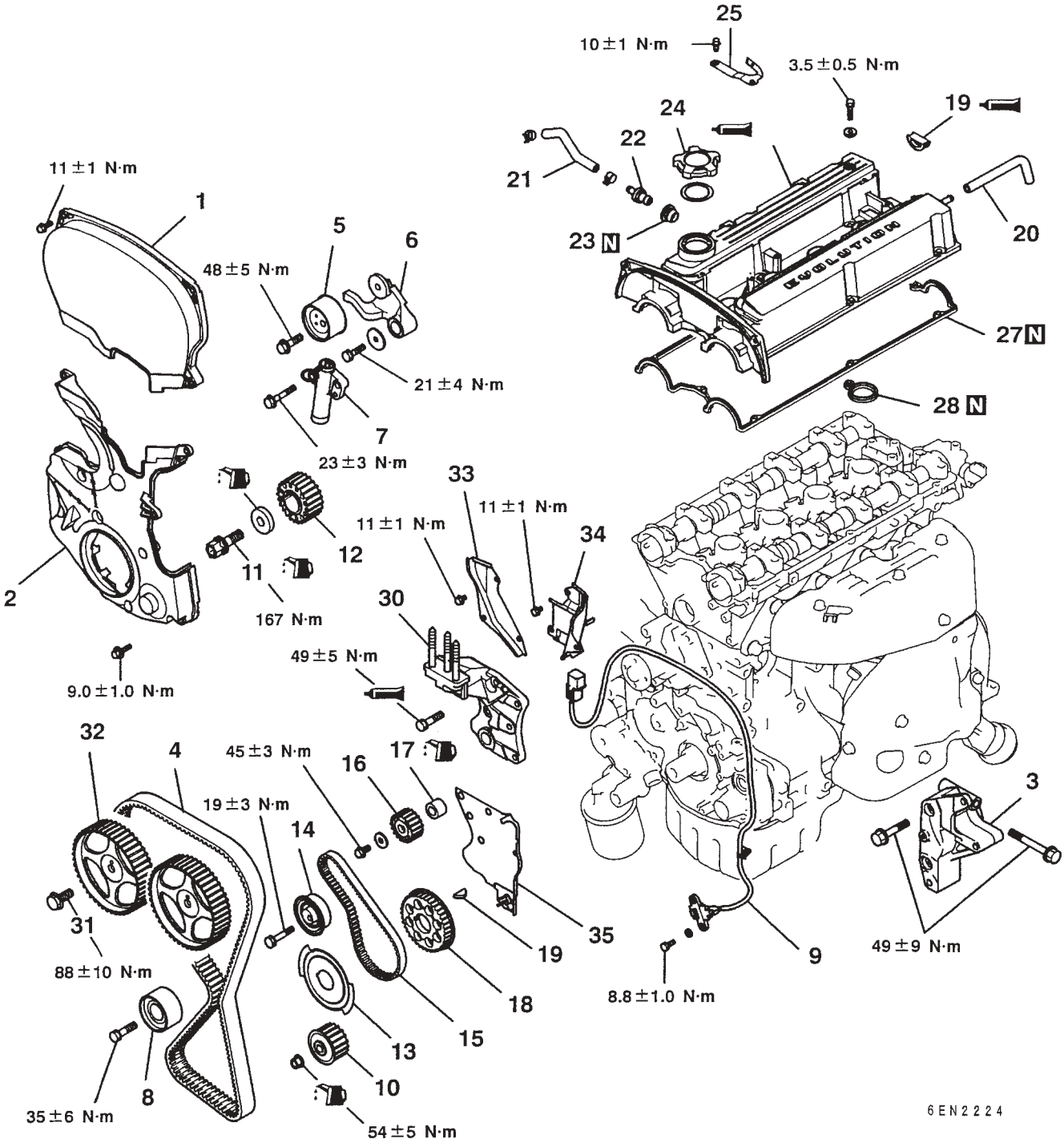


Removal Order

1. Oil level gauge
2. O ring
3. Oil level gauge guide
4. O ring
5. Water pump pulley
6. Cap
7. Auto-tensioner assembly
8. Alternator brace
9. Alternator
10. Crankshaft pulley
11. Centre cover
12. Spark plug cable
13. Ignition coil
14. Spark plug

Timing Belt

Removal / Fitting

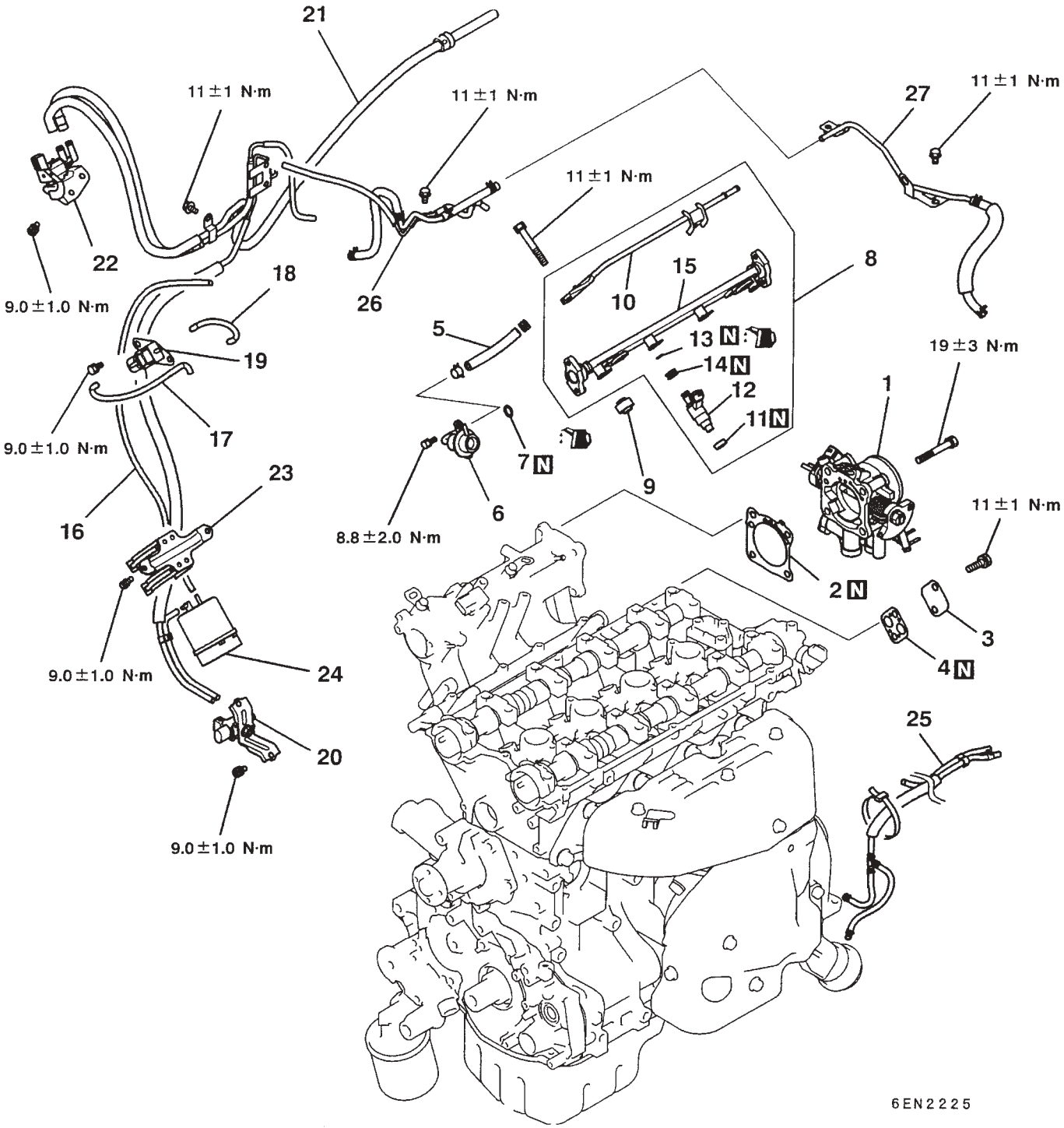


1. Timing belt front upper cover
2. Timing belt front lower cover
3. Power steering pump bracket
◀★▶ ▶★◀ 4. Timing belt
▶★◀ 5. Tensioner pulley
6. Tensioner arm
▶★◀ 7. Auto-tensioner
8. Idler pulley
9. Crank angle sensor
◀★▶ ▶★◀ 10. Oil pump sprocket
◀★▶ ▶★◀ 11. Crankshaft bolt
◀★▶ ▶★◀ 12. Crankshaft sprocket
▶★◀ 13. Crankshaft sensing blade
14. Tensioner B

◀*▶ ▶*◀ 15. Timing belt B
◀*▶ ▶*◀ 16. Counterbalance shaft sprocket
▶*◀ 17. Spacer
◀*▶ ▶*◀ 18. Crankshaft sprocket B
19. Crankshaft key
20. Breather hose
21. PVC hose
22. PVC valve
23. PVC valve gasket
24. Oil filler cap
25. Connector bracket
▶*◀ 26. Rocker cover
▶*◀ 27. Rocker cover gasket A
28. Rocker cover gasket B
▶*◀ 29. Semicircular washer
▶*◀ 30. Engine support bracket
◀*▶ ▶*◀ 31. Camshaft sprocket bolt
32. Camshaft sprocket
33. Timing belt rear right cover
34. Timing belt rear left upper cover
35. Timing belt rear left lower cover

Fuel System

Removal / Fitting

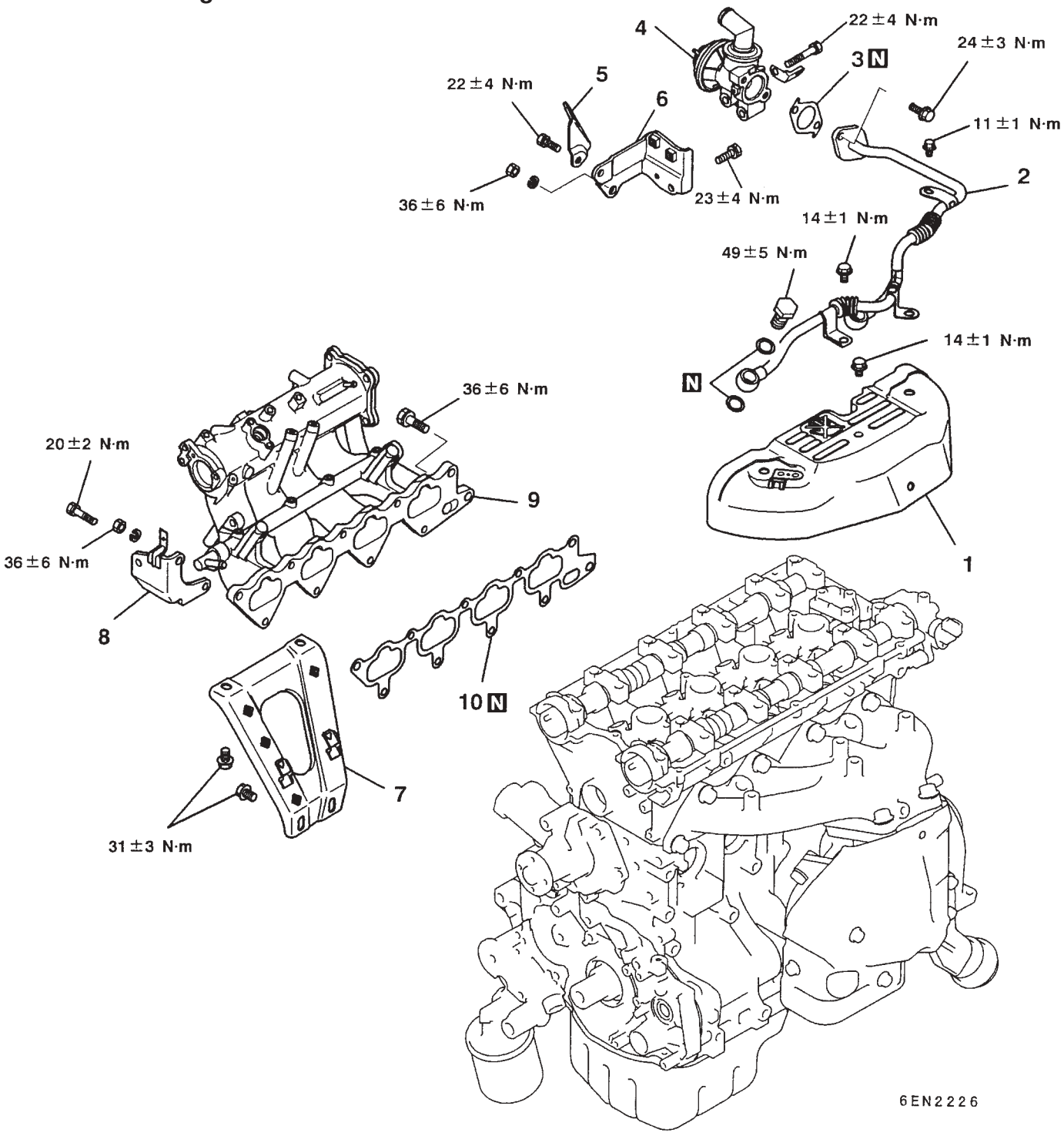


Removal Order

1. Throttle body assembly
2. Throttle body gasket
3. Cover
4. Gasket
5. Fuel hose
6. Fuel pressure regulator
7. O ring
8. Delivery pipe and injector
9. Insulator
10. Fuel return pipe
11. Insulator
12. Injector
13. O ring
14. Grommet
15. Delivery pipe
16. Vacuum hose
17. Vacuum hose
18. Vacuum hose
19. Solenoid valve assembly
20. Solenoid valve assembly
21. Vacuum hose and pipe
22. Solenoid valve assembly
23. Vacuum tank bracket
24. Vacuum tank
25. Vacuum hose assembly
26. Vacuum hose and pipe
27. Vacuum hose and pipe

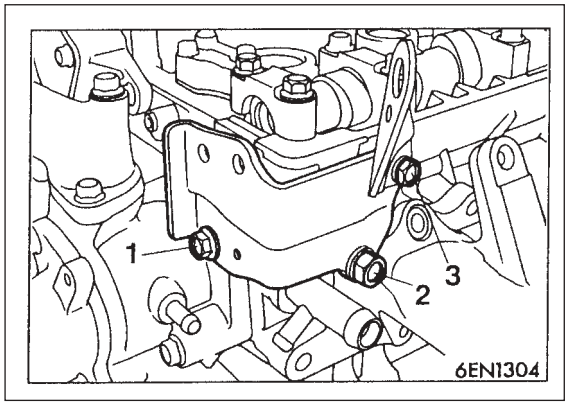
Secondary Air System, Intake Manifold

Removal / Fitting



Removal Order

1. Exhaust manifold heat protector
2. ▶*◀ Air pipe assembly
3. Air control valve gasket
4. Air control valve assembly
5. Engine hanger
6. ▶A◀ Air control valve bracket
7. ▶*◀ Intake manifold stay
8. Alternator brace stay
9. Intake manifold
10. Intake manifold gasket



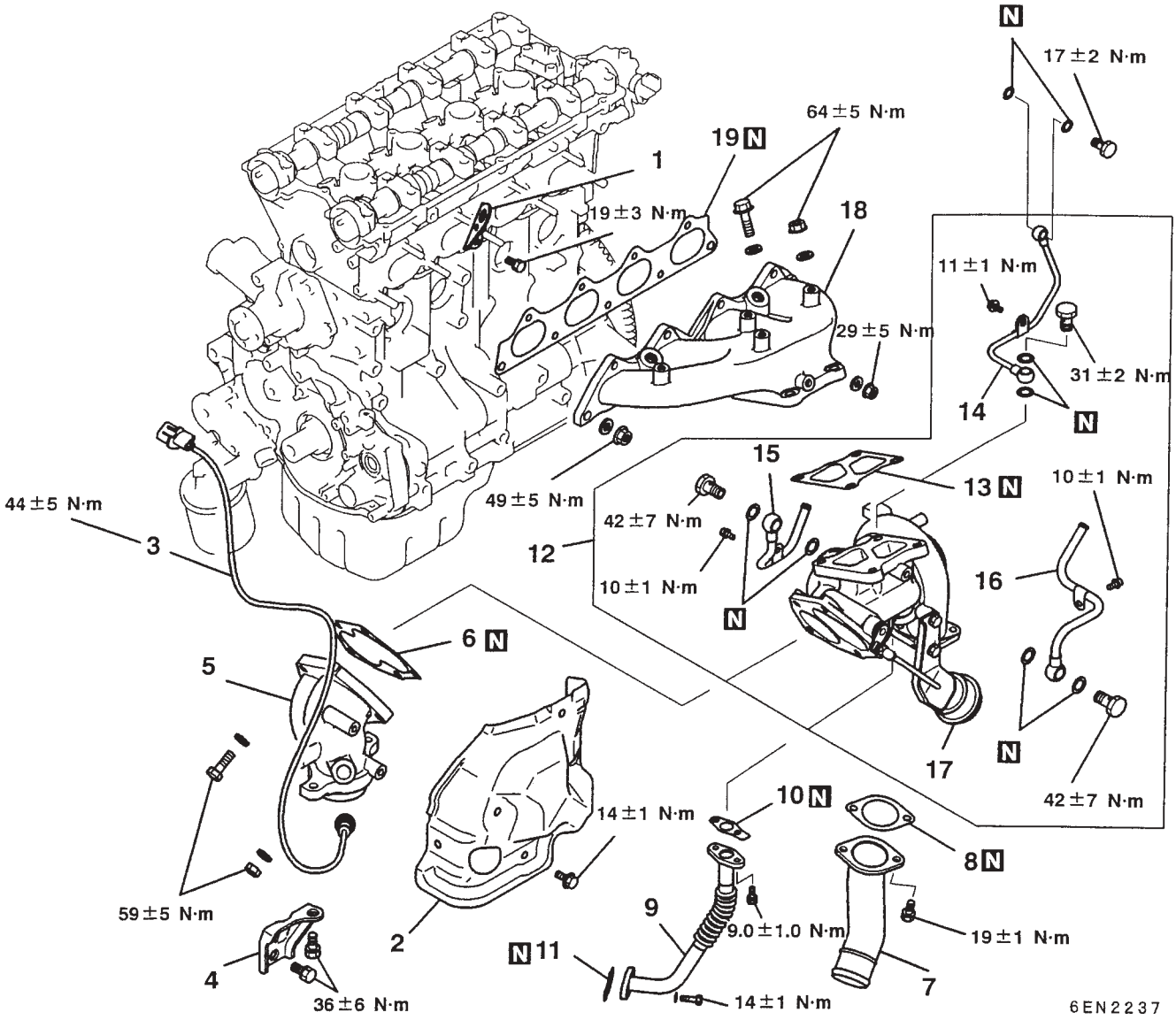
Key Points for Fitting

▶A◀ Fitting air control valve bracket

1. Temporarily tighten bolts which secure air control valve bracket and engine hanger to intake manifold.
2. Tighten Bolt No. 1 in drawing, which also secures thermostat housing, to specified torque, 23 ± 4 N•m.
3. Tighten Nut No. 2 to specified torque, 36 ± 6 N•m.
4. Tighten Bolt No. 3 in drawing, which also secures engine hanger, to specified torque, 22 ± 4 N•m.

Exhaust Manifold

Removal / Fitting

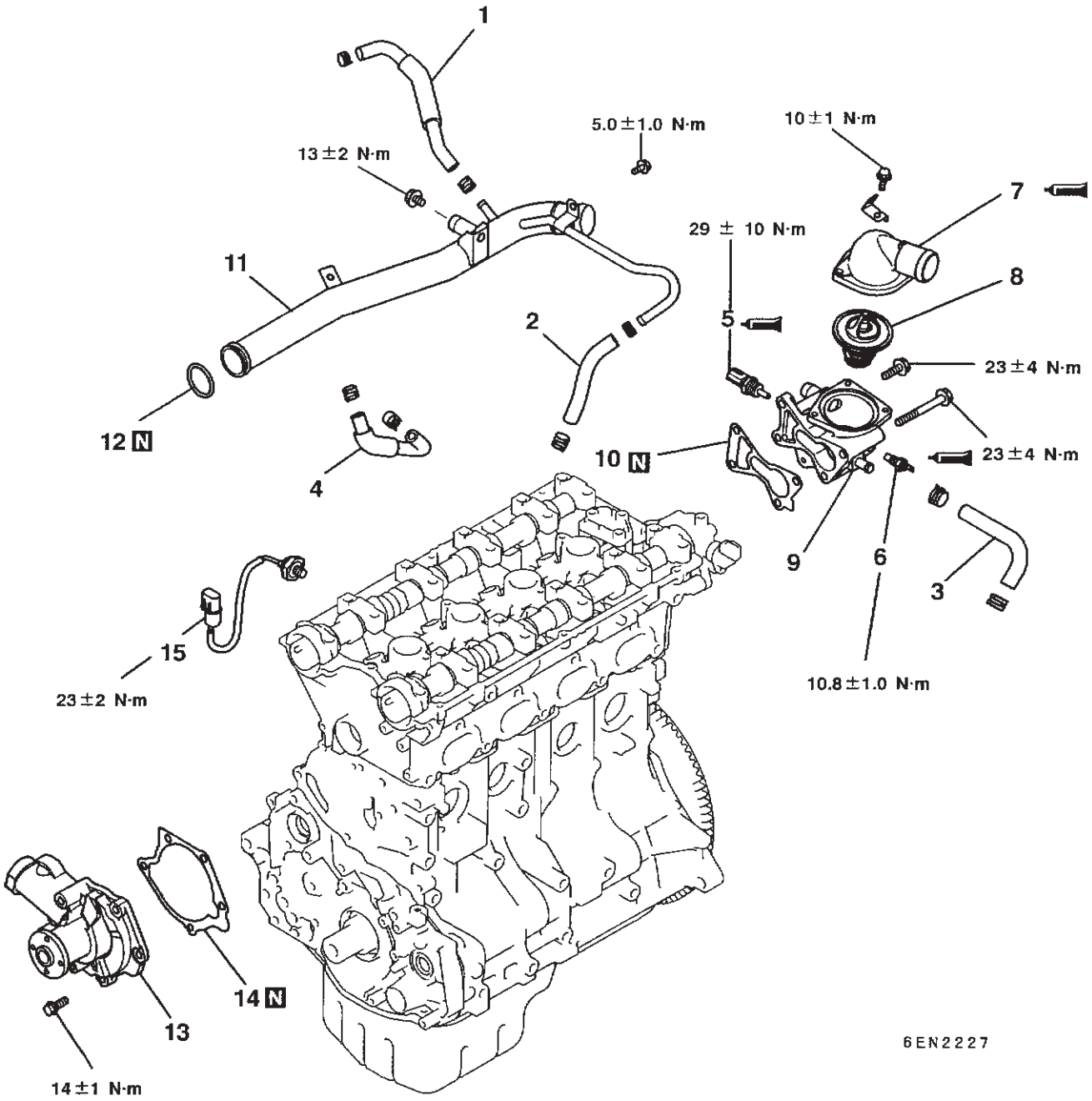


Removal Order

1. Engine hanger
2. Turbocharger heat protector
3. O_2 sensor
4. Exhaust fitting bracket
5. Exhaust fitting
6. Exhaust fitting gasket
7. Air outlet fitting
- ▶*◀ 8. Air outlet fitting gasket
9. Oil return pipe
10. Oil return pipe gasket
- ▶*◀ 11. Oil return pipe gasket
12. Turbocharger assembly and pipe assembly
13. Turbocharger gasket
14. Oil pipe
15. Water pipe B
16. Water pipe A
17. Turbocharger assembly
- ▶*◀ 18. Exhaust manifold
19. Exhaust manifold gasket

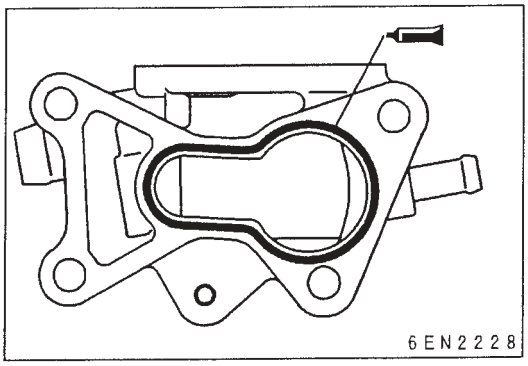
Water Pump, Water Hoses

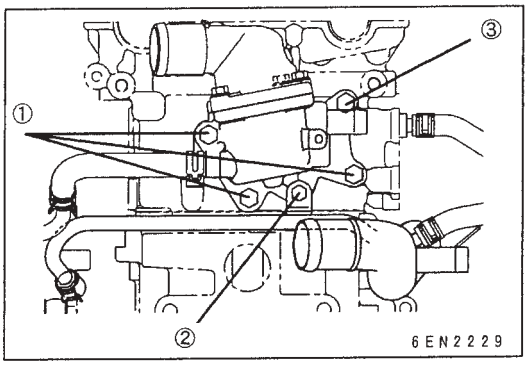
Removal / Fitting

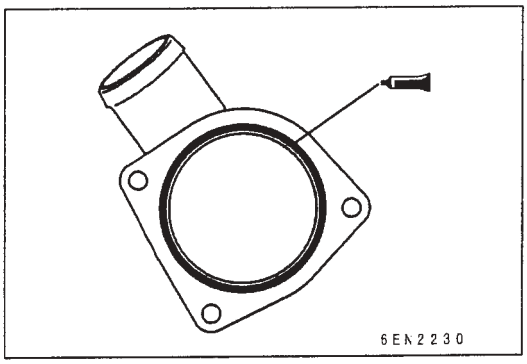


Removal Order

1. Water hose
2. Water hose
3. Water hose
4. Water hose
- ▶★◀ 5. Water temperature sensor
- ▶★◀ 6. Water temperature gauge unit
- ▶B◀ 7. Water outlet fitting
8. Thermostat
- ▶A◀ 9. Thermostat housing
10. Gasket
- ▶★◀ 11. Water inlet pipe
- ▶★◀ 12. O ring
13. Water pump
14. Water pump gasket
15. Knock sensor







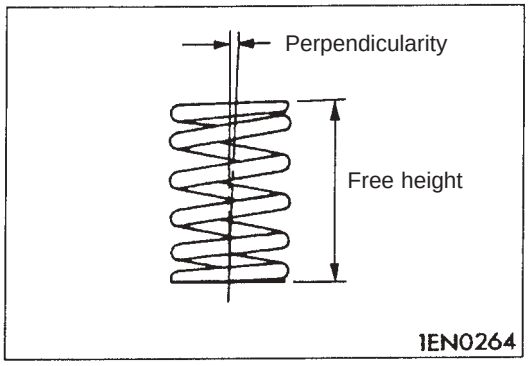
Key Points for Fitting

▶A◀ Fitting thermostat housing

(1) Squeeze liquid gasket (thickness 3mm) into area indicated in drawing.
Liquid gasket brand:
MZ100191 or equivalent
(2) Tighten bolts indicated by j on drawing, to specified torque, 23 ± 4 N•m.
(3) Tighten water inlet pipe bolt (k), using fixing on pipe, to specified torque, 5.0 ± 1.0 N•m.
(4) Bolt l was tightened when fitting air control valve bracket was fitted (See Page 13).

▶B◀ Fitting water outlet fitting

Squeeze liquid gasket (thickness 3 mm) into area shown in drawing.
Liquid gasket brand:
MZ100191 or equivalent



Cylinder Head / Valves

Checks

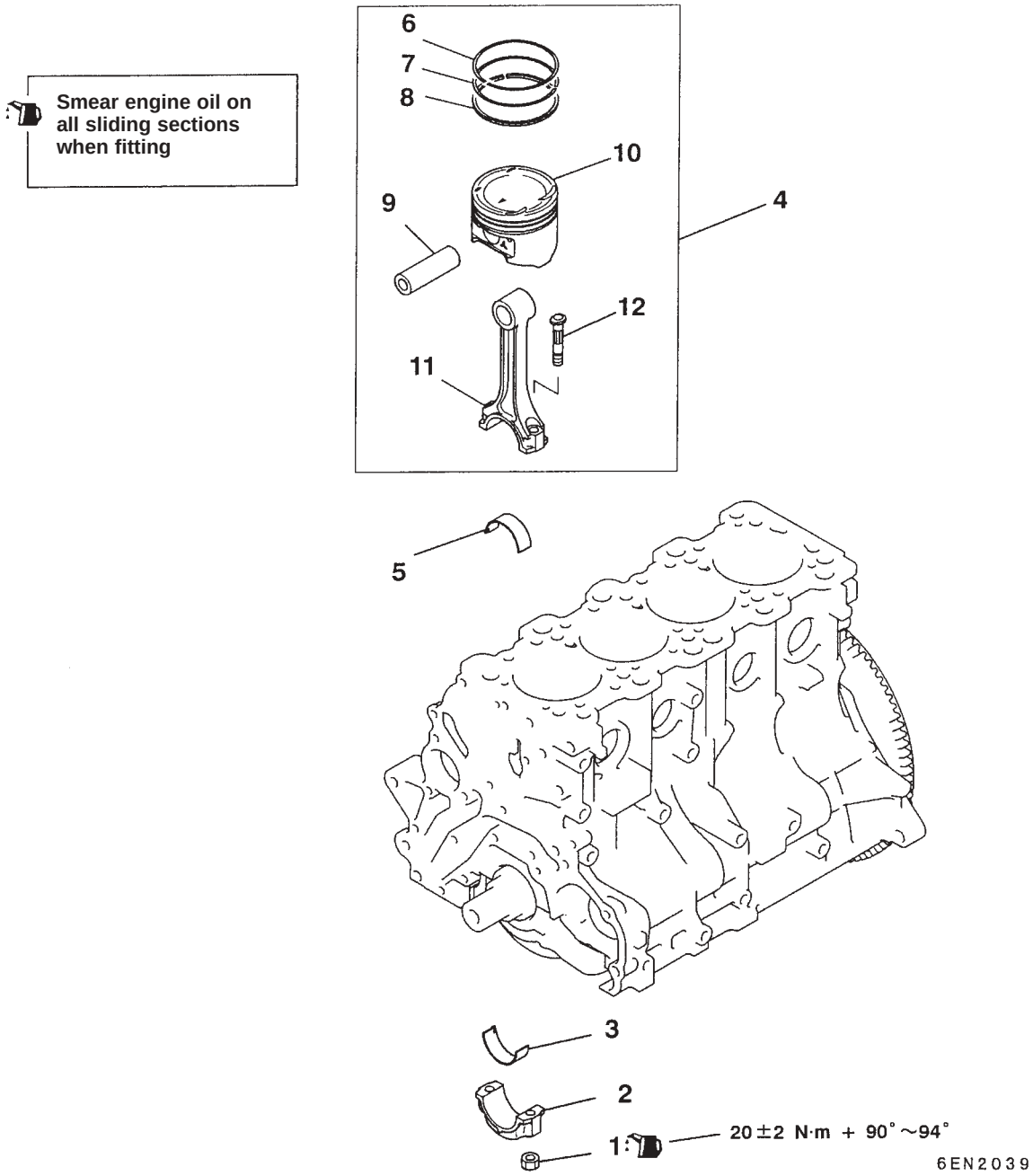
Valve springs

(1) Measure free height of spring. If it is above limit, replace valve spring.
Standard height: 50.4 mm
Limit: 49.4 mm

(2) Measure perpendicularity of spring. If it is 'leaning' by more than the permitted limit, replace the valve spring.
Standard variance from perpendicular:
Within 2.0°
Limit: 4°

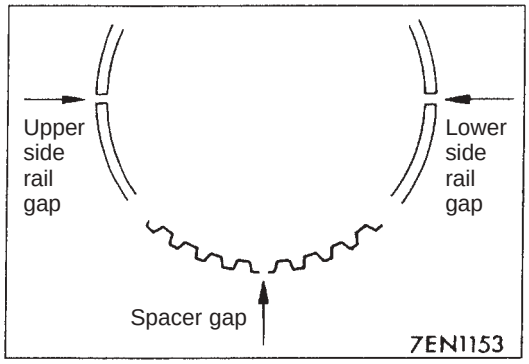
Pistons, Connecting Rods

Removal / Fitting



Removal Order

- ◗✱◖ 1. Connecting rod cap nut
- ◖✱◗ ◗✱◖ 2. Connecting rod cap
- ◗✱◖ 3. Connecting rod bearing
- ◗✱◖ 4. Piston connecting rod
- ◗✱◖ 5. Connecting rod bearing
- ◗✱◖ 6. Piston ring No. 1
- ◗✱◖ 7. Piston ring No. 2
- ◗A◖ 8. Oil ring
- ◖✱◗ ◗✱◖ 9. Piston pin
- 10. Piston
- 11. Connecting rod
- 12. Bolt

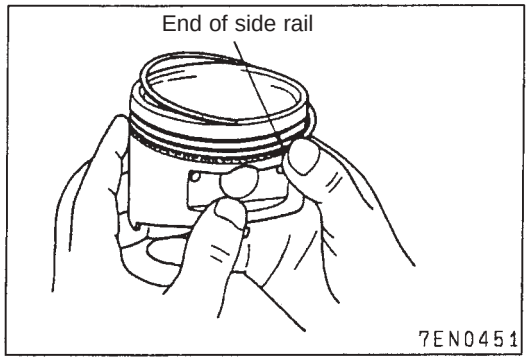


▶A◀ Fitting oil ring

1. Fit oil ring spacer into piston ring groove, then ft upper side rail, and finally fit lower side rail.

   NB:
   (1) Fit them so that the side rail / spacer gaps are in the positions shown in the drawing.
   (2) Mark (new) spacers and side rails with distinguishing colour (shown in chart below) to denote their sizes.

Size	Colour
S.T.D.	None
0.50 mm O.S.	Red
1.00 mm O.S.	Yellow



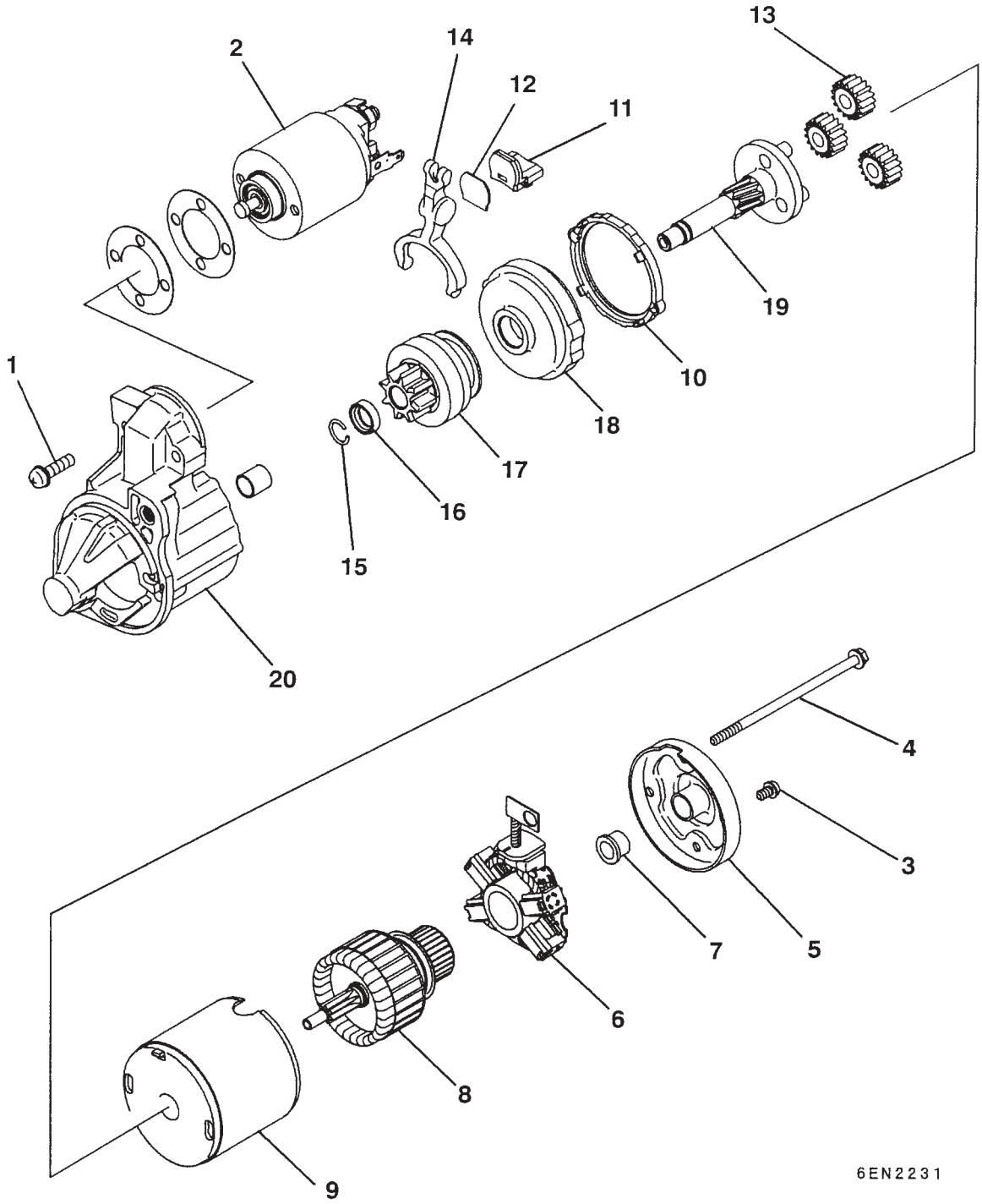
2. Tip for fitting side rails: First insert one end of rail into piston groove. Then, holding this end with your thumb, as shown in the drawing, push the rest of it in.

   Warning
   Like the other piston rings, opening the side rails out with ring expanders may cause them to break.

3. After fitting the side rail on the piston, check that it rotates smoothly in both directions.

Starter Motor

Removal / Fitting



Dismantling Order

1. Screw
◀*▶ 2. Magnetic switch
3. Screw
4. Bolt
5. Cover assembly
6. Brush holder
7. Rear bearing
8. Armature
9. Yoke assembly
10. Packing A
11. Packing B
12. Plate
13. Planetary gear
14. Lever

Dismantling Order

◀*▶ ▶*◀ 15. Snap ring
◀*▶ ▶*◀ 16. Snap ring
17. Over-running clutch
18. Internal gear
19. Planetary gear shaft
20. Front bracket

Memo: