

# 6D34-T

diesel engine

## Shop Manual

(for industrial use)

### FOREWORD

This Shop Manual is published for the information and guidance of personnel responsible for maintenance of Mitsubishi 6D34-T series diesel engine, and includes procedures for adjustment and maintenance services.

We earnestly look forward to seeing that this manual is made full use of in order to perform correct service with no wastage.

For more details, please consult your nearest authorized Mitsubishi dealer or distributor.

Kindly note that the specifications and maintenance service figures are subject to change without prior notice in line with improvement which will be effected from time to time in the future.

Applicable models

(6D34-TLE1)  
(6D34-TLUC)

### GROUP INDEX

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# HOW TO READ THIS MANUAL

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# HOW TO READ THIS MANUAL

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## How This Manual Is Compiled

- This manual is compiled by classifying various systems into certain groups.
- Each group contains specifications; troubleshooting; maintenance service standards; **T** tightening torque; **L** lubricant, fluid and sealant; **C** special tools; and service procedure.
- Page enumeration is independent by every group where first page is always 1.

Group No.	Group denomination	Contents
00	General	General specifications, engine No. and name plate, precautions for maintenance operations, table of standard tightening torques
11	Engine	Engine body
12	Lubrication	Lubrication system
13	Fuel and engine control	Fuel system
14	Cooling	Cooling system
15	Intake and exhaust	Intake and exhaust system, turbocharger, intercooler
54	Electrical system	Starter alternator, preheating system, engine start system, automatic stop system

# General Explanation of This Manual

## ● Specifications

Particulars relative to maintenance service are made.

## ● Structure and operation

- (1) Regarding conventional equipment, descriptions are made in brief.
- (2) Regarding new equipment, descriptions of system and operating condition are made in detail.

## ● Troubleshooting

Symptoms of troubles and possible causes are described comparatively.

## ● Inspection and adjustment mounted in vehicle

Descriptions are made regarding inspection and adjustment of units mounted in vehicle.

## ● Service procedure

In principle, an explanation is given at the spread title page so that the service procedure can be understood. Servicing points are explained as a supplementary explanation.

# Regarding the design of this manual

**CLUTCH BODY**

**Pressure Plate and Lever Assembly**

**Disassembly sequence**

- 1 Bolt
- 2 Washer
- 3 Bolt
- 4 Bolt
- 5 Lip
- 6 Bolt
- 7 Pin
- 8 Pressure spring cap
- 9 Return spring
- 10 Release lever plate
- 11 Clutch cover
- 12 Release lever pin
- 13 Support lever pin
- 14 Bushing
- 15 Support lever
- 16 Release lever
- 17 Bushing

**Assembly sequence**

- 1 Pressure plate & lever assembly
- 2 Clutch disc

\* Flywheel  
 A: Positioning pin (at 2 places)  
 ○: Non-removable part

**Service standards**

Location	Maintenance item	Standard value (Basic standard 2)	Limit	Remarks
1, A	Clearance between strap bolt and strap plate	0.21 to 0.16	0.3	Replace
7	Pressure spring	Included load (standard target 46.1) 4990 N (112.2 kgf)	750 N (16.7 kgf)	Replace
10	Clearance between pin and bushing	0.3 or less	0.5	Replace
10	Release lever	(11) 0.08 to 0.10	0.4	Replace
		03.0 ± 0.7	Adjust difference 0.5 or less	

**Tightening torque**

Location	Parts to be tightened	Tightening torque	Remarks
1	Strap bolt (securing air hose)	30 to 50 (4 to 6)	—
4	Bolt (securing lock plate)	6.5 to 7.5 (0.6 to 0.8)	Wet

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**A Lubricants**

Location	Points of application	Kind	Quantity
1	Threads of strap bolt	LOCTITE 912	As required
10, 10	Sliding surfaces of roller	4	Molybdenum disulfide grease
12, 17	Sliding surfaces of strap	bushing	Molybdenum disulfide grease
13, 14	Sliding surfaces of support	Adjust lever	Molybdenum disulfide grease (NLGI No. 2 (1:1 soap))

**C) Special tools**

Location	Tool name and shape	Part No.	Application
11	Clutch holder	MH081061 91271	Removal and installation of clutch cover
10	Clutch Master Pin	MH082201 91285	Release lever plate height adjustment

**Service procedure**

1) Clearance between strap bolt and strap plate

If the measurement exceeds the limit, replace the defective part.

A: Strap plate

2) Installation of pressure spring

If pressure plate 10 has been reground, insert adjusting washer A corresponding to the amount of reground in the space between the pressure plate and pressure spring 7.

Reground amount	Type and no. of washers
Less than 1 mm	Not required
1 mm or more to less than 2 mm	One 1.2-mm
2 mm or more to less than 3 mm	Two 1.2-mm or one 2.3-mm

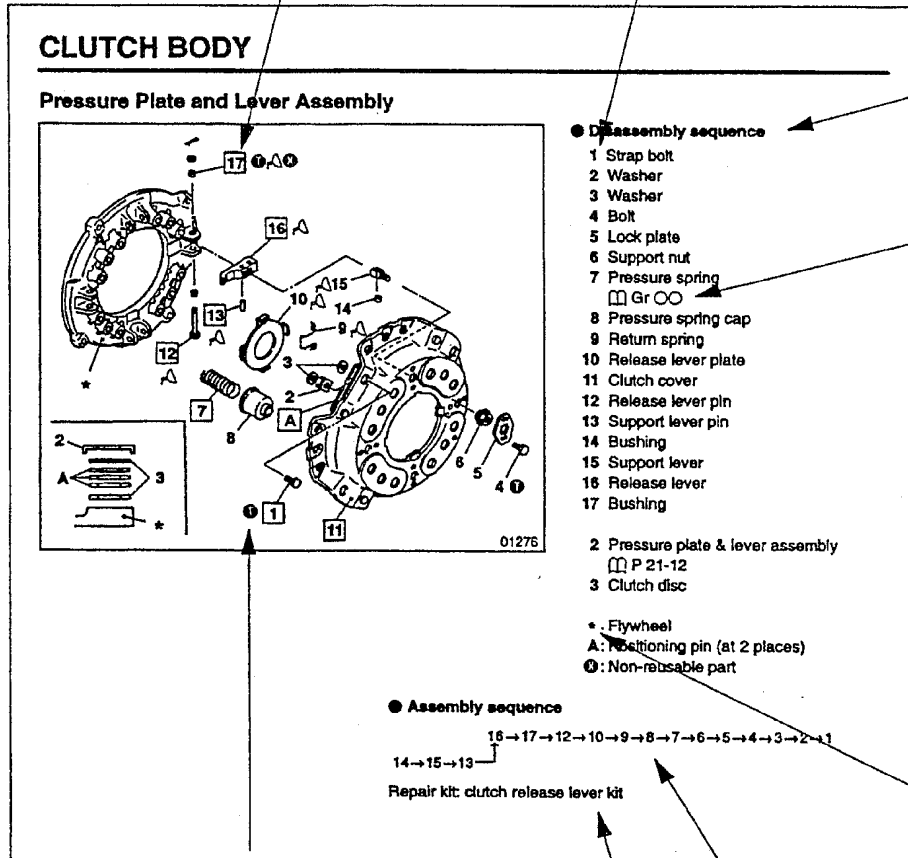
1. .... Illustration for disassembly and assembly or removal and installation: 3-D exploded view of component parts is displayed.
  - 1a. .... Names of parts show an example of the disassembly (removal) sequence.
  - 1b. .... When the assembly (installation) sequence differs from the disassembly (removal) sequence, an example of the assembly (installation) sequence is shown.
2. .... Service standards are shown collectively, classified by location.
3. .... Tightening torques are shown collectively, classified by location.
4. .... Points of lubricant, fluid and sealant application are shown collectively, classified by location.
5. .... Special tools to be used are shown collectively, classified by location.
6. .... When it is considered hard to understand the service procedure, just by the foregoing description, a supplementary description of the service procedure is given.

# HOW TO READ THIS MANUAL

## 1. Illustration for disassembly and assembly or removal and installation

This shows that the appropriate service procedure is described in the text.

This shows the key No. of the part. In the text, this No. is referred to uniformly throughout.



This shows an example of the disassembly (removal) sequence.

This shows that the service procedure is described in another section.

□ P ○○-○○  
 : shows reference page within the same group.  
 □ Gr ○○  
 : shows reference group within the same book.

No service procedure is referred to in this section, but the item can be an objective of various procedures.

### Meaning of symbols

- ⊗ : shows that the tightening torque is specified.
- △ : shows that application of lubricant, fluid or sealant is required.
- ⊗ : shows that the part should not be reused.

This is shown when the assembly (installation) sequence is not the reverse of the disassembly (removal) sequence.

This shows that a repair kit is available.

## 2. Service standards table

Only the relevant service standards are shown.

↓

**Service standards** Unit: mm

Location	Maintenance item	Standard value	Limit	Remedy
1, 11	Clearance between strap bolt and strap plate	0.01 to 0.16	0.3	Replace
7	Pressure spring (Installed length 49.1)	Installed load	835 N {85 kgf}	710 N {72.3 kgf}
		Tilt	2.9 or less	5.0

↑

This shows the key No. of the relevant part.

## 3. Tightening torque table

This shows specified tightening torque.

↓

**Tightening torque** Unit: N·m (kgf·m)

Location	Parts to be tightened	Tightening torque	Remarks
1	Strap bolts (Strap bolt mounting)	39 to 59 (4 to 6)	-
4	Bolt (Lock plate mounting)	5.9 to 7.8 (0.6 to 0.8)	Wet

↑

This shows the key No. of the relevant part.

↑

This shows that the item is to be tightened wet.

## 4. Lubricant, fluid and sealant table

Only the relevant lubricant, fluid and sealant are shown.

↓

This shows the application point.

**Lubricant, fluid and sealant**

Location	Points of application	Type	Quantity
1	Thread area of bolt	LOCTITE 272	As required
10, 16	Friction surfaces of release lever plate and release lever	Molybdenum disulfide grease [NLGI No. 2 (Li soap)]	As required

↑

This shows the key No. of the relevant part.

↑

This shows the specified brand.

# HOW TO READ THIS MANUAL

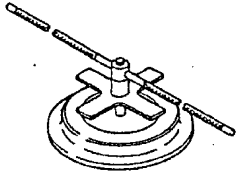
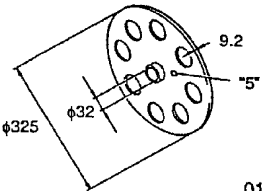
## 5. Special tools table

Only the relevant special tools are shown.

Purpose of special tools is shown.

 Special tools

Unit: mm

Location	Tool name and shape	Part No.	Application
11	Clutch installer 	MH061051 01277	Removal and installation of clutch cover
16	Master plate 	MH062291 01278	Adjust release lever heights

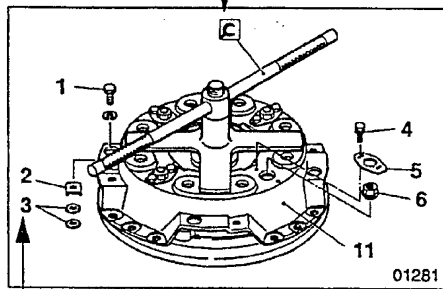
This shows the key No. of the relevant part.

Quote this number when placing an order for the part.

## 6. Service procedure


This indicates a special service tool.

This shows the key No. of the relevant part.



The key No. referred to in the text is always the same as the key No. shown in the illustration.

### **11** Removal and installation of clutch cover

- Depress pressure spring 7 using  clutch installer, then remove the following parts:  
Strap bolt 1, washer 2, washer 3, bolt 4, lock plate 5, support nut 6
- Loosen the clutch installer gradually, then remove clutch cover 11 when the pressure spring is fully released.
- For installation, follow the removal sequence in reverse.


Servicing procedures of disassembly (removal), assembly (installation), inspection, adjustment, etc. are shown collectively.

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## Terms and Units

The terms and units in this manual are defined as follows.


- This service manual contains important cautionary instructions and supplementary information under the following four headings which identify the nature of the instructions and information:

**DANGER**  ————— Precautions that should be taken in handling potentially dangerous substances such as battery fluid and coolant additives.

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**WARNING**  ————— Precautionary instructions, which, if not observed, could result in serious injury or death.

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**CAUTION**  ————— Precautionary instructions, which, if not observed, could result in damage to or destruction of equipment or parts.

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**NOTE** ————— Suggestions or supplementary information for more efficient use of equipment or a better understanding.

- **Front and rear**

The terms "front" is the fan side and "rear" the flywheels side of the engine.

- **Left and right**

The terms "right" and "left" shall be used to indicate the side as viewed from the flywheel side of the engine.

- **Terms of service standards**

- (1) Standard value

- Standard value dimensions in designs indicating: the design dimensions of individual parts, the standard clearance between two parts when assembled, and the standard value for an assembly part, as the case may be.

- The figure in [ ] is the basic diameter.

- (2) Limit

- When the value of a part exceeds this, it is no longer serviceable in respect of performance and strength and must be replaced or repaired.

- **Tightening torque**

Excessive or insufficient tightening torque has particular importance in respect of performance. Accordingly, tightening torque is specified in locations that are to be tightened.

Where there is no specified figure for tightening torque, follow the table covering standard tightening torques.

When the item is to be tightened in a wet state, wet is indicated. Where there is no indication, read it as dry, and tighten at specified torque.

- **Unit**

Length, weight, surface area and capacity are in SI units. Imperial and metric units are given in brackets. Temperatures are given in degrees Celsius with degrees Fahrenheit given brackets.

For the conversion into the foot-pound system, refer to the following conversion table.



# HOW TO READ THIS MANUAL

Unit	Sign of SI unit	Sign of foot-pound unit	Conversion rate
Mass quantity of matter	kg g	lb oz	1 kg = 2.2046 lb 1 g = 0.035274 oz
Dimension	m mm	ft. in.	1 m = 3.2808 ft. 1 mm = 0.03937 in.
Capacity	L  cm <sup>3</sup>  cm <sup>3</sup>	gal.  oz  cu.in.	1 L = 0.2642 gal. (U.S.) 1 L = 0.220 gal. (Imp.) 1 cm <sup>3</sup> = 0.033814 oz (U.S.) 1 cm <sup>3</sup> = 0.035195 oz (Imp.) 1 cm <sup>3</sup> = 0.061023 cu.in.
Force	N (Newton)	lbf	1 N = 0.2248 lbf
Pressure	kPa (kilopascal)	lbf/in. <sup>2</sup>	1 kPa = 0.145 lbf/in. <sup>2</sup> 1 kPa = 0.2953 in. Hg
Stress	N/cm <sup>2</sup>	lbf/in. <sup>2</sup>	1 N/cm <sup>2</sup> = 1.45 lbf/in. <sup>2</sup>
Moment of force	N · m	lbf.ft	1 N · m = 0.7375 lbf.ft
Output	kW (kilowatt)	HP	1 kW = 1.34 HP
Temperature	°C	°F	t°C = (1.8t°C + 32)°F

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# GROUP 00 GENERAL

GENERAL SPECIFICATIONS ..... 2

ENGINE NUMBER, NAME PLATE AND CAUTION PLATE ..... 3

PRECAUTIONS FOR MAINTENANCE OPERATION ..... 4

TABLE OF STANDARD TIGHTENING TORQUES ..... 7

# GENERAL SPECIFICATIONS

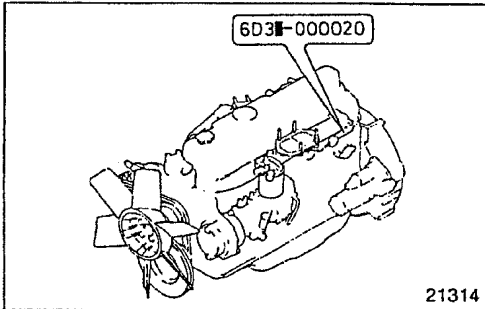
Item	Specifications
Engine model	6D34-T
Type	6-cylinder in-line, water-cooled 4-cycle diesel
Combustion chamber type	Direct injection type
Valve mechanism	Overhead valve (OHV) type
Maximum output kW/rpm {PS/rpm} (ISO, SAE)	125/2100 {170/2100}
Maximum torque N·m/rpm {kgf·m/rpm} (ISO, SAE)	590/1600 {60/1600}
Bore x Stroke mm	104 x 115
Total displacement cc	5861
Compression ratio	18.2
Empty mass kg*	480

\* Empty mass as measured according to Mitsubishi Motors Corporation standard.

# ENGINE NUMBER, NAME PLATE AND CAUTION PLATE 00

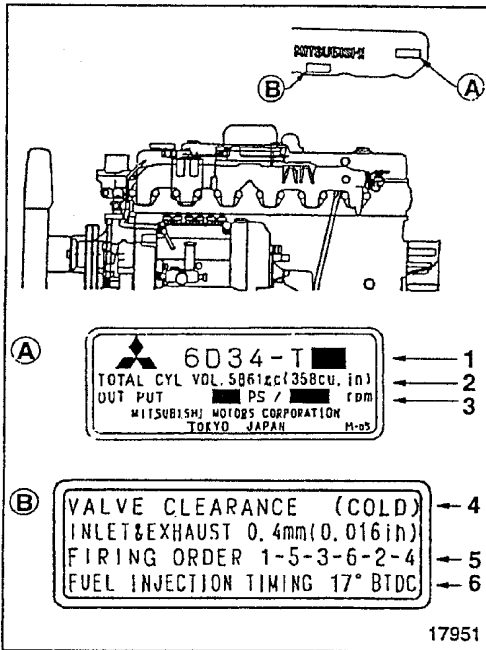
The serial number for engine is assigned to the respective engine in manufacturing sequence: every engine has its own number. This number is required for incidental inspection of the engine. Please do not fail to mention this number to the dealers when ordering spare parts.

## Engine Number



The engine number is punch-marked on the shown location.

## Name Plate and Caution Plate

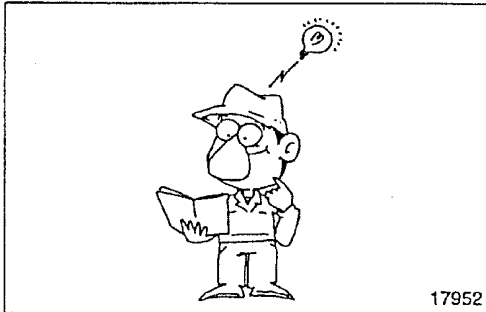


A: Name plate  
B: Caution plate

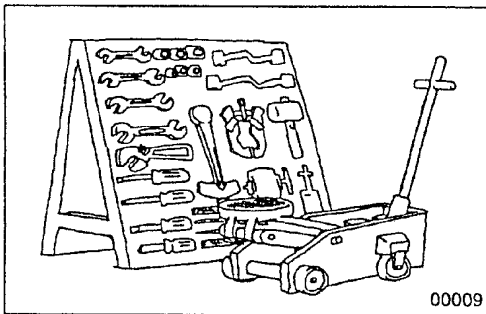
- 1 Engine model
- 2 Total displacement
- 3 Maximum output
- 4 Valve clearance
- 5 Firing order
- 6 Fuel injection timing

# PRECAUTIONS FOR MAINTENANCE OPERATION

In order to determine the condition of the vehicle adequately, attend the vehicle beforehand to find and keep record of the accumulated mileage, operating condition, what the customer's demand is, and other information that may be necessary. Prepare the steps to be taken and perform efficient and wasteless maintenance procedure.



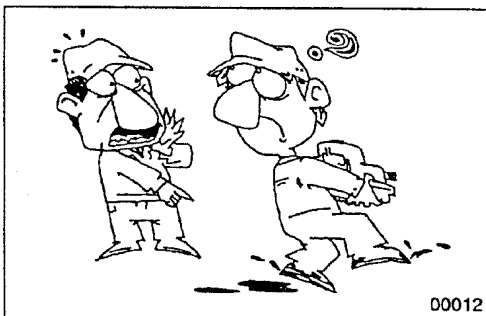
- Determine where the fault exists and check for the cause to see whether removal or disassembly of the part is necessary. Then follow the procedure specified by this manual.
- Perform maintenance work at a level area.



- Prepare general and special tools necessary for the maintenance work.

**WARNING** ⚠

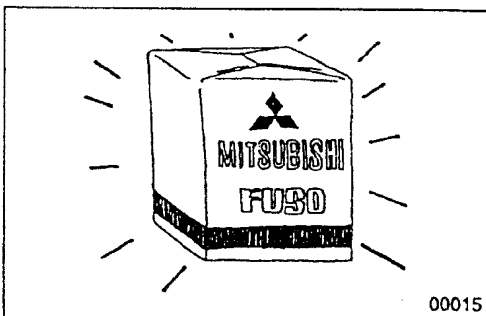
Do not attempt to use tools other than special tools where use of special tools is specified in this manual. This will avoid injury or damage.



- When removing or installing the engine, attach the lifting wire rope hooks to the engine's lifting eyes and hoist the engine slowly such that it does not touch other components.

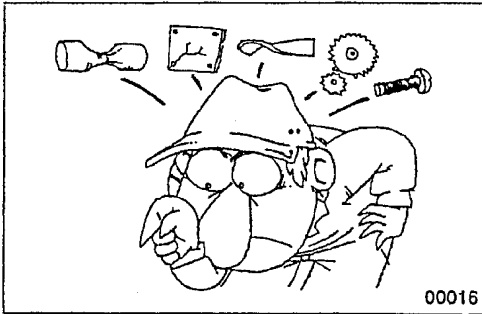
**WARNING** ⚠

Check that the wire rope and crane are sufficiently strong.



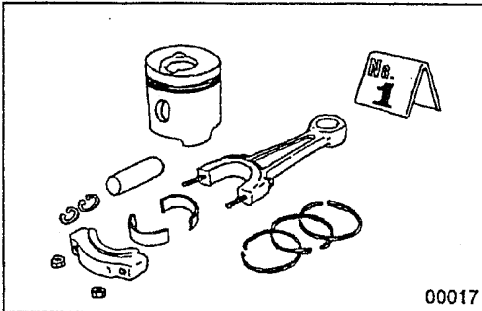
- Be particularly careful not to work in shoes that have oily soles and are slippery. When working as a team of two or more, arrange signals in advance and keep confirming safety. Be careful not to accidentally bump switches or levers.
- Check for oil leakage before cleaning the area having the fault otherwise you might miss detecting the leakage.
- Prepare replacement part(s) beforehand.

- Replace oil seals, packing, O-rings and other rubber parts; gaskets and split pins with new parts whenever any of them has been removed. Use only genuine MITSUBISHI replacement parts.



00016

On disassembly, visually inspect all parts for wear and tear, cracks, damage, deformation, degradation, rust, corrosion, smoothness in rotation, fatigue, clogging and any other possible defect.



00017

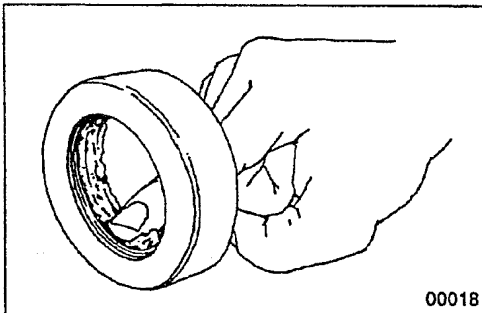
Put alignment marks on part combinations before disassembly and arrange the disassembled parts neatly. This will help avoid mismatching of the parts later.

Put the alignment marks, punch marks, etc. where performance and appearance will not be affected.

Cover the area left open after removal of parts to keep it free from dust.

**CAUTION** ⚠

- Take care to avoid mixing up numerous parts, similar parts, left and right, etc.
- Keep new parts for replacement and original (removed) parts separate.

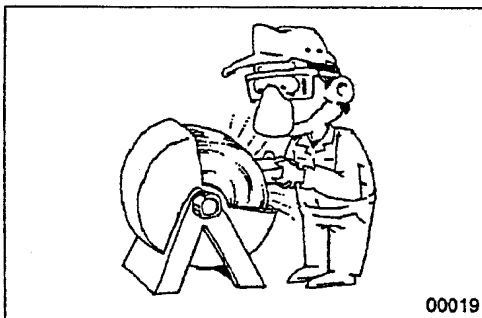


00018

Apply the specified oil or grease to U-packings, oil seals, dust seals and bearings during assembly.

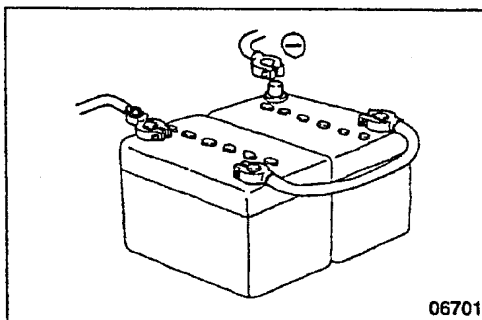
**CAUTION** ⚠

Use only the specified oil, grease, etc. for lubricant. Remove the excess immediately after application with a piece of rag.



00019

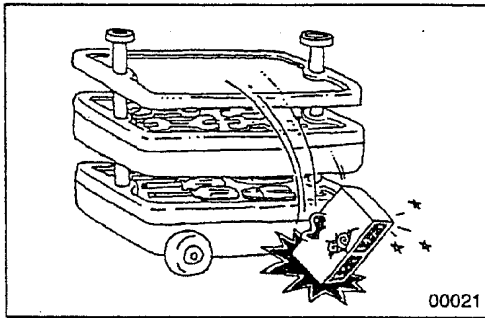
Wear goggles when using a grinder or welder. Pay full attention to safety by wearing gloves when necessary. Watch out for sharp edges, etc. that might injure your hands or fingers.



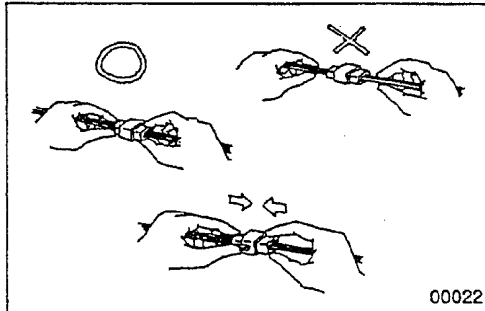
06701

Before carrying out maintenance work on the electric system, disconnect the negative terminals of the batteries.

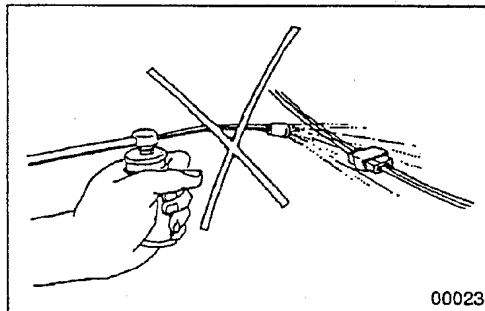
# PRECAUTIONS FOR MAINTENANCE OPERATION



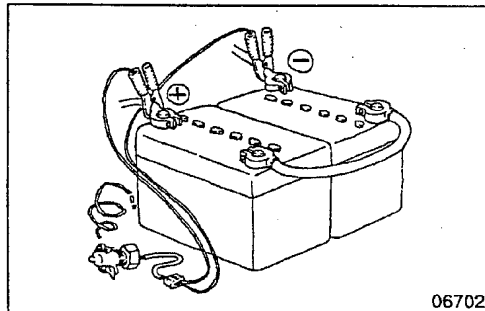
- Take care when handling sensors, relays, etc. which are vulnerable to shock and heat.



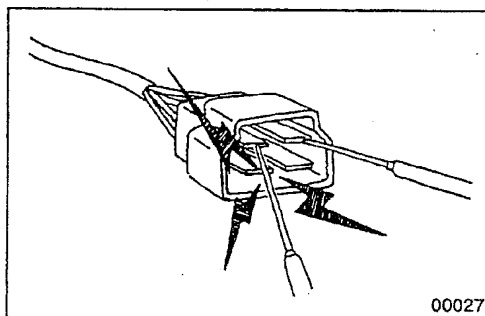
- Pull the connector, and not the harness lead, to separate connectors. To separate a lock-type connector, first push toward arrow mark. To reconnect a lock-type connector, press the separated parts until they click together.



- When washing the vehicle, cover the electric system parts and instruments with waterproof material beforehand (Cover with vinyl sheet or the like). Keep water away from harness wire connectors and sensors. If any of them should get wet, wipe them off immediately.



- To apply voltage for testing, check that the positive and negative cables are connected properly, then increase voltage gradually from 0 volt. Do not apply voltage higher than the specified value. In particular, pay close attention to the electronic control unit and sensors, since they are not always supplied with 24V.



- When using testers or the like for continuity tests, be careful not to allow test probes to touch the wrong terminals.










# TABLE OF STANDARD TIGHTENING TORQUES

00

- Use specified bolts and nuts and tighten them at specified torques according to the following table, unless otherwise specified.
- Threads and contact seats shall be dry.
- Where there is a difference in strength classification between the nut and bolt (or stud bolt), the torque specified for the bolt shall apply.







## Hex-head Bolt and Stud Bolt

Unit: N · m {kgf · m}

Strength classification	4T		7T		8T	
Representation Diameter symbol	  (Stud)		  (Stud)		  (Stud)	 02154
M5	2 to 3 {0.2 to 0.3}	-	4 to 6 {0.4 to 0.6}	-	5 to 7 {0.5 to 0.7}	-
M6	4 to 6 {0.4 to 0.6}	-	7 to 11 {0.7 to 1.1}	-	8 to 12 {0.8 to 1.2}	-
M8	9 to 14 {0.9 to 1.4}	-	17 to 26 {1.7 to 2.6}	-	20 to 29 {2.0 to 3.0}	-
M10	19 to 28 {1.9 to 2.8}	18 to 26 {1.8 to 2.7}	36 to 52 {3.5 to 5.5}	33 to 49 {3.3 to 5.0}	45 to 60 {4.5 to 6.0}	41 to 59 {4.3 to 6.9}
M12	35 to 50 {3.4 to 5.0}	31 to 46 {3.1 to 4.7}	70 to 95 {7.0 to 9.5}	65 to 85 {6.5 to 8.5}	85 to 110 {8.5 to 11}	75 to 100 {7.5 to 10}
M14	60 to 85 {6.0 to 8.5}	55 to 75 {5.5 to 7.5}	120 to 160 {12 to 16}	110 to 140 {11 to 14}	130 to 180 {13 to 18}	120 to 160 {12 to 17}
M16	90 to 130 {9.5 to 13}	90 to 120 {9.0 to 12}	180 to 240 {18 to 24}	160 to 220 {16 to 22}	200 to 270 {20 to 27}	190 to 260 {19 to 26}
M18	140 to 190 {14 to 19}	120 to 160 {12 to 16}	260 to 340 {26 to 35}	220 to 290 {22 to 30}	290 to 390 {30 to 40}	260 to 340 {26 to 35}
M20	190 to 260 {19 to 26}	170 to 230 {17 to 23}	350 to 470 {36 to 48}	320 to 420 {32 to 43}	410 to 550 {41 to 56}	370 to 490 {37 to 50}
M22	260 to 340 {26 to 35}	230 to 300 {23 to 31}	470 to 640 {48 to 65}	430 to 570 {43 to 58}	550 to 740 {56 to 75}	490 to 670 {50 to 68}
M24	340 to 450 {34 to 46}	290 to 390 {29 to 40}	630 to 840 {63 to 86}	540 to 730 {55 to 74}	730 to 980 {74 to 100}	630 to 840 {64 to 86}

## Hex-head Flange Bolt

Unit: N · m {kgf · m}






Strength classification	4T		7T		8T	
Representation Diameter symbol						 02154
M6	4 to 6 {0.4 to 0.6}	-	8 to 12 {0.8 to 1.2}	-	9 to 14 {0.9 to 1.4}	-
M8	10 to 15 {1.0 to 1.5}	-	19 to 28 {1.9 to 2.8}	-	22 to 32 {2.2 to 3.3}	-
M10	21 to 30 {2.1 to 3.1}	20 to 28 {1.9 to 2.9}	39 to 58 {3.9 to 6.0}	37 to 53 {3.6 to 5.4}	50 to 65 {5.0 to 6.5}	45 to 65 {4.5 to 6.5}
M12	38 to 54 {3.8 to 5.5}	35 to 51 {3.4 to 5.2}	80 to 110 {8.0 to 11}	70 to 95 {7.0 to 9.5}	90 to 120 {9.0 to 12}	85 to 110 {8.5 to 11}




# TABLE OF STANDARD TIGHTENING TORQUES

## Hex-head Nut

Unit: N·m {kgf·m}

Strength classification	4T		6T			
Representation						
Diameter symbol	02155					
	Standard screw	Coarse screw	Standard screw	Coarse screw		
M5	2 to 3 {0.2 to 0.3}	-	4 to 6 {0.4 to 0.6}	-		
M6	4 to 6 {0.4 to 0.6}	-	7 to 11 {0.7 to 1.1}	-		
M8	9 to 14 {0.9 to 1.4}	-	17 to 26 {1.7 to 2.6}	-		
M10	19 to 28 {1.9 to 2.8}	18 to 26 {1.8 to 2.7}	36 to 52 {3.5 to 5.5}	33 to 49 {3.3 to 5.0}		
M12	35 to 50 {3.4 to 5.0}	31 to 46 {3.1 to 4.7}	70 to 95 {7.0 to 9.5}	65 to 85 {6.5 to 8.5}		
M14	60 to 85 {6.0 to 8.5}	55 to 75 {5.5 to 7.5}	120 to 160 {12 to 16}	110 to 140 {11 to 14}		
M16	90 to 130 {9.5 to 13}	90 to 120 {9.0 to 12}	180 to 240 {18 to 24}	160 to 220 {16 to 22}		
M18	140 to 190 {14 to 19}	120 to 160 {12 to 16}	260 to 340 {26 to 35}	220 to 290 {22 to 30}		
M20	190 to 260 {19 to 26}	170 to 230 {17 to 23}	350 to 470 {36 to 48}	320 to 420 {32 to 43}		
M22	260 to 340 {26 to 35}	230 to 300 {23 to 31}	470 to 640 {48 to 65}	430 to 570 {43 to 58}		
M24	340 to 450 {34 to 46}	290 to 390 {29 to 40}	630 to 840 {63 to 86}	540 to 730 {55 to 74}		

## Hex-head Flange Nut Unit: N·m {kgf·m}

Strength classification	4T	
Representation		
Diameter symbol	02155	
	Standard screw	Coarse screw
M6	4 to 6 {0.4 to 0.6}	-
M8	10 to 15 {1.0 to 1.5}	-
M10	21 to 30 {2.1 to 3.1}	20 to 28 {1.9 to 2.9}
M12	38 to 54 {3.8 to 5.5}	35 to 51 {3.4 to 5.2}

**Tightening torque for flare nut for general purpose**

Unit: N · m {kgf · m}

Pipe diameter	φ4.76 mm	φ6.35 mm	φ8 mm	φ10 mm	φ12 mm	φ15 mm
Tightening torque	17 {1.7}	25 {2.6}	39 {4.0}	59 {6.0}	88 {9.0}	98 {10.0}

**Tightening torque for air piping nylon tube for general purpose  
{DIN type}**

Unit: N · m {kgf · m}

Standard diameter	6 × 1 mm	10 × 1.25 mm	12 × 1.5 mm	15 × 1.5 mm
Tightening torque	$20^{+5.9}_{-0} \left\{ \begin{array}{l} 2.0^{+0.6} \\ -0 \end{array} \right\}$	$29^{+9.8}_{-0} \left\{ \begin{array}{l} 3.5^{+1.0} \\ -0 \end{array} \right\}$	$49^{+9.8}_{-0} \left\{ \begin{array}{l} 5.0^{+1.0} \\ -0 \end{array} \right\}$	$54^{+4.9}_{-0} \left\{ \begin{array}{l} 5.5^{+1.0} \\ -0 \end{array} \right\}$

**Tightening torque for air piping nylon tube for general purpose  
{SAE type}**

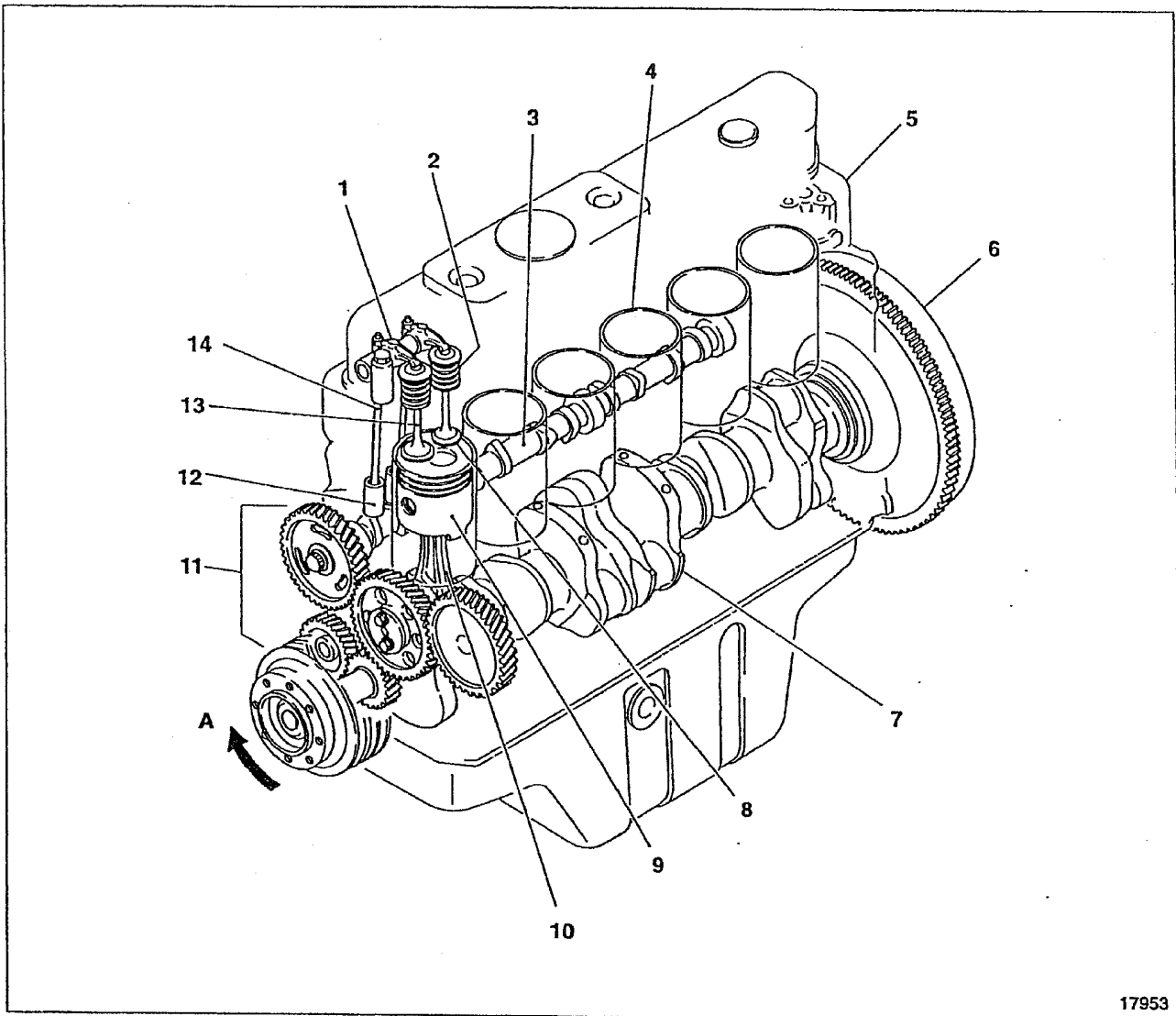
Unit: N · m {kgf · m}

Standard diameter	1/4 in.	3/8 in.	1/2 in.	5/8 in.
Tightening torque	$13^{+3.9}_{-0} \left\{ \begin{array}{l} 1.3^{+0.4} \\ -0 \end{array} \right\}$	$29^{+4.9}_{-0} \left\{ \begin{array}{l} 3.0^{+0.5} \\ -0 \end{array} \right\}$	$49^{+4.9}_{-0} \left\{ \begin{array}{l} 5.0^{+0.5} \\ -0 \end{array} \right\}$	$64^{+4.9}_{-0} \left\{ \begin{array}{l} 6.5^{+0.5} \\ -0 \end{array} \right\}$

# GROUP 11 ENGINE

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# STRUCTURE AND OPERATION



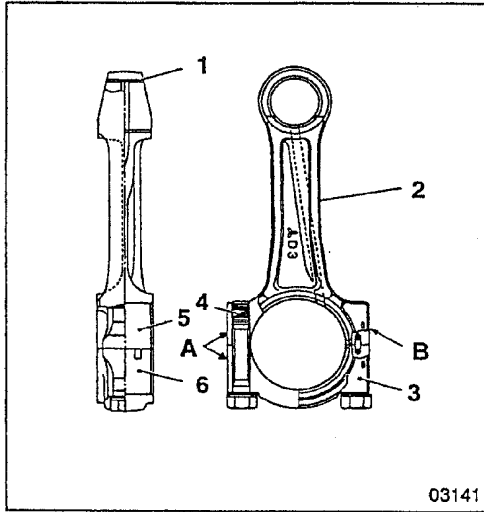
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- 1 Rocker arm
- 2 Valve spring
- 3 Camshaft
- 4 Cylinder sleeve
- 5 Cylinder head
- 6 Flywheel
- 7 Crankshaft
- 8 Exhaust valve

- 9 Piston
- 10 Connecting rod
- 11 Timing gear
- 12 Tappet
- 13 Inlet valve
- 14 Push rod

A: Direction of rotation

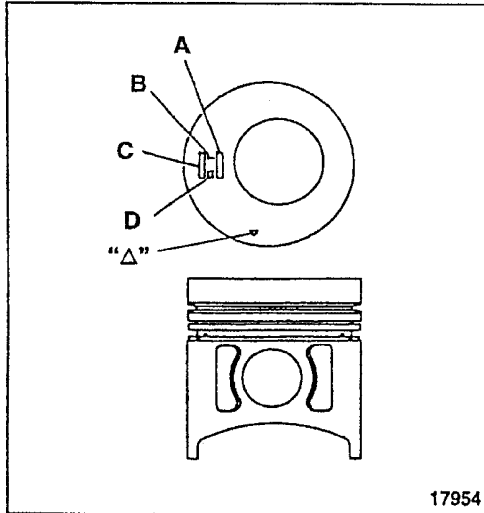
### Connecting Rods



- 1 Connecting rod bushing
- 2 Connecting rod
- 3 Connecting rod cap
- 4 Connecting rod bolt
- 5 Upper connecting rod bearing
- 6 Lower connecting rod bearing

A: Alignment mark  
 B: Weight mark stamp  
 (A, B, C, D, E, F, G)

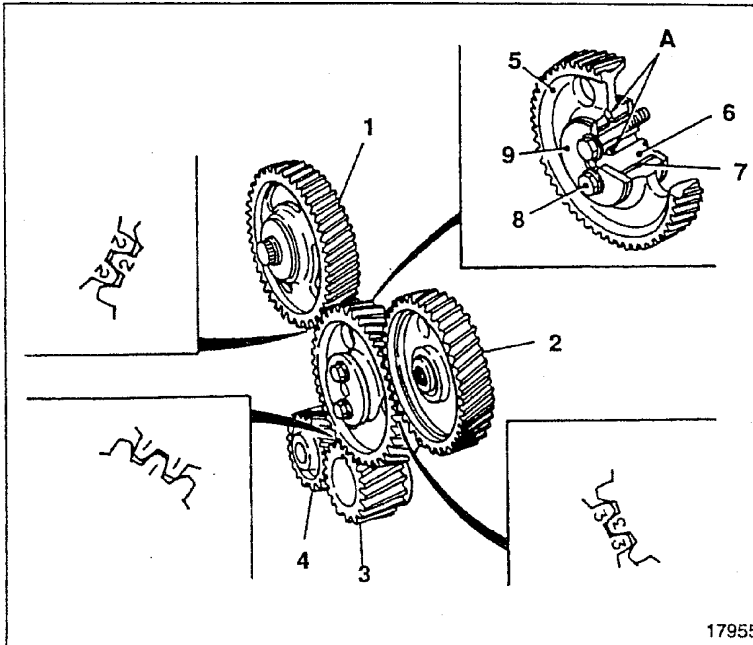
### Pistons



- A: Part number
- B: "T" mark
- C: Weight mark
- D: Oversize mark (0.50, 1.00)
- △: Front mark

# STRUCTURE AND OPERATION

## Timing Gears



- 1 Camshaft gear
- 2 Injection pump gear
- 3 Crankshaft gear
- 4 Oil pump gear
- 5 Idler gear
- 6 Idler gear shaft
- 7 Idler bushing
- 8 Bolt
- 9 Thrust plate

A: Oil hole

Each gear is stamped with a timing gear alignment mark ("1", "2" or "3") for correct gear engagement during reassembly.

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