
Hino H07C H07CT Engine Workshop Manual



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CHAPTER GI

GENERAL INTRODUCTION

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GENERAL PRECAUTIONS

Some recommended and standard maintenance services for your engine are mentioned in this section.

When performing maintenance on your engine be careful not to get injured by improper work.

Improper or incomplete work can cause a malfunction of the engine which may result in personal injury and/or property damage.

WARNING

When working on your engine, observe the following general precautions to prevent personal injury and/or property damage in addition to the particular NOTES or WARNINGS in the each chapter.

Most threaded fasteners are metric.

Be careful not to mix with threaded fasteners using the inch system.

- **Always wear safety glasses or goggles to protect your eyes.**
- **Remove rings, watches, ties, loose hanging jewelry and loose clothing before starting work on the engine.**
- **Bind long hair securely behind the head.**
- **To avoid serious burns, keep yourself away from hot metal parts such as the engine, exhaust manifold, radiator, muffler, exhaust pipe and tail pipe.**
- **Do not smoke while working on the engine since fuel and gases from the battery are flammable.**
- **Take utmost care when working on the battery. It contains corrosive sulfuric acid.**
- **Large electric current flows through the battery cable and starter cable. Be careful not to cause a short which can result in personal injury and/or property damage.**
- **Always stop the engine and turn off the starter switch, unless the operation requires the engine running. Removing the key from the switch is recommended.**
- **Run the engine only in a well-ventilated area to avoid inhaling of carbon monoxide.**
- **Keep yourself, your clothing and your tools away from moving parts such as the cooling fan and V-belts when the engine is running.**
- **Be careful not to leave any tool in the engine compartment. The tool may be hit by moving parts and can cause personal injury.**

HOW TO USE THIS WORKSHOP MANUAL.

This workshop manual is designed as a guide for servicing vehicle.

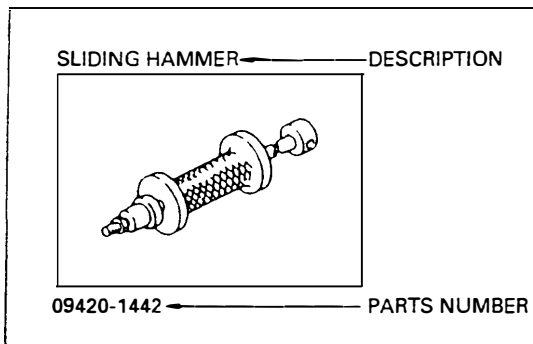
An INDEX is provided on the first page of each chapter.

TROUBLESHOOTING is dealt with each chapter.

When beginning operations, refer to the sections on for a guide to appropriate diagnoses.

SPECIAL TOOLS are dealt with in each chapter.

When ordering a special tool, confirm the parts number with the applicable parts catalog.

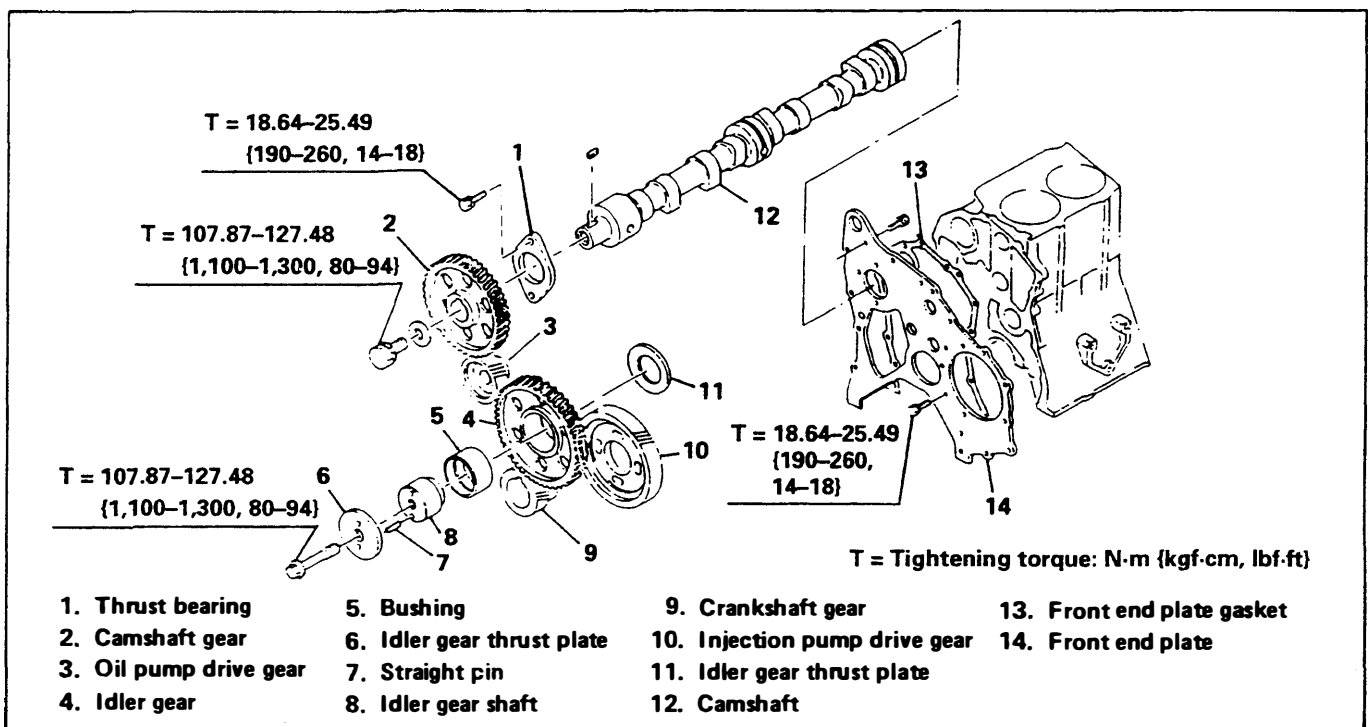


REPAIR PROCEDURES.

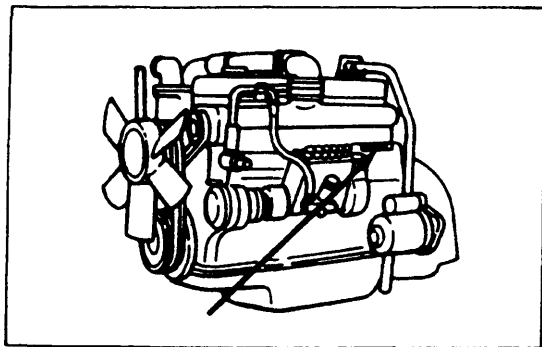
Repair procedures when the self-explanatory such as simple installation and removal of parts have been omitted. Illustrations such as the one below have been provided to make such simple procedures clear. Only essential procedures requiring directions have been dealt with explicitly.

EXAMPLE:

TIMING GEAR AND CAMSHAFT



In some cases, illustrations may be of parts which differ in some nonessential way from the parts found on your particular vehicle. In such cases, however, the principle or procedure being illustrated applies regardless of such nonessential differences.



IDENTIFICATION INFORMATION

ENGINE SERIAL NUMBERS

Please quote these numbers when ordering spare parts or reporting technical matter as they will give you prompt service attention.

The engine serial number is engraved on the engine cylinder block.

SPECIFICATIONS

DIESEL ENGINE FOR INDUSTRIAL USE

HINO**H07D**

7.412 liters, 4-cycle,
6-cyl., water-cooled

● PERFORMANCE (STD. specs.)

GENERAL USE (SAE J1349 Gross)				GENERATOR USE (SAE J1349 Gross)			
Output, intermittent rating kW {HP} at r/min	Output, continuous rating kW {HP} at r/min	Max. torque N·m {lb·ft} at r/min	Min. fuel consumption g/kWh {lb/HP·h} at r/min	Stand-by Power		Prime Power	
				Output at 1,500 r/min kW {HP}	Output at 1,800 r/min kW {HP}	Output at 1,500 r/min kW {HP}	Output at 1,800 r/min kW {HP}
115 {154} at 2,700	100 {134} at 2,700	465 {343} at 1,600	220 {0.362} at 1,600	77 {103}	91 {122}	70 {94}	83 {111}

Ambient conditions:	SAE
Intake air temperature	25°C
Barometric pressure	100 kPa
Water vapour pressure	1.0 kPa

● ENGINE DESCRIPTION

1. Type	Diesel, 4-cycle, 6-cyl., in-line, overhead valve, water-cooled
2. Combustion system	Direct injection type
3. Cylinder	
Bore x Stroke	110 x 130 mm {4.33 x 5.12 in}
4. Piston displacement	7.412 liters {452.3 cu.in}
5. Compression ratio	19.7
6. Direction of rotation	Counter-clockwise viewed from flywheel
7. Dimensions (L x W x H)	Approx. 1,165 x 740 x 868 mm {45.9 x 29.1 x 34.2 in}
8. Dryweight	Approx. 510 kg {1,124 lb}

● FEATURES

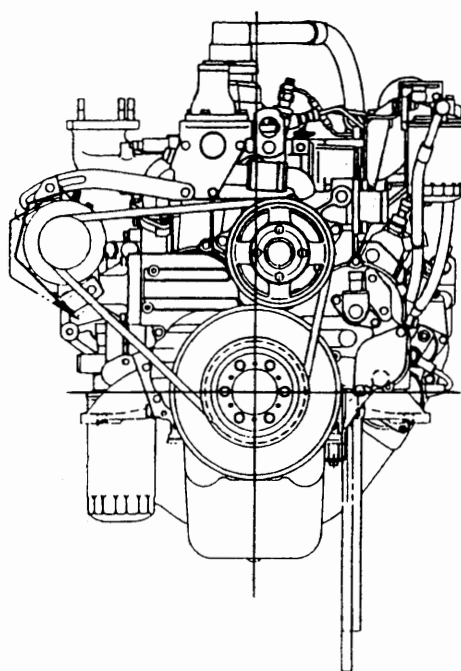
1. Cylinder block	Mono block cast iron with replaceable dry liner
2. Cylinder head	Single piece cast iron
3. Crankshaft	Induction-hardened, die forged special steel with counter weights
4. Piston and rings	Heat-resistance aluminium alloy Two compression rings, chrome plated One oil ring, chrome plated with coil expander
5. Camshaft	Induction hardened carbon steel
6. Valves	Heat resistance steel

● STANDARD EQUIPMENT

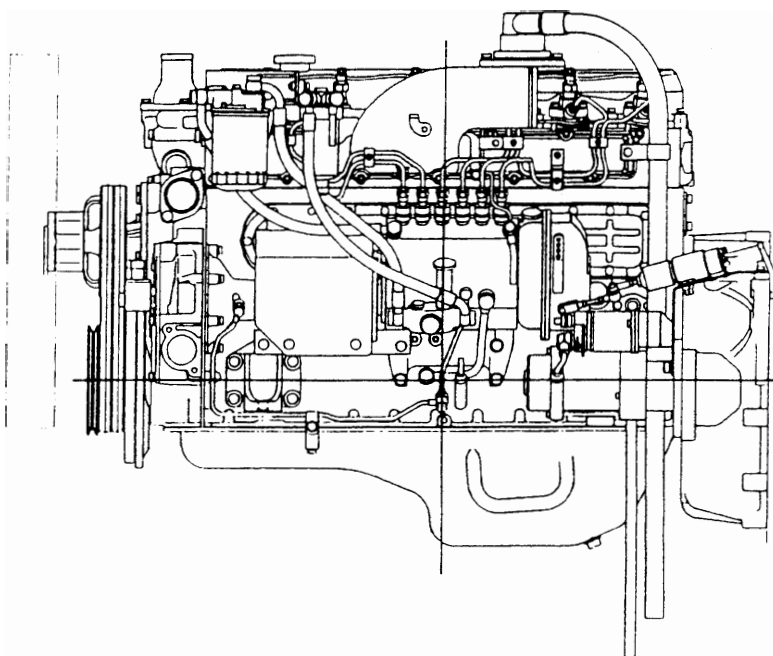
- | | |
|---|--|
| 1. Flywheel housing | HINO own (SAE No. 2 type) |
| 2. Flywheel | HINO own (SAE 11 1/2 in. type) |
| 3. Fuel injection pump type | BOSCH "A" type |
| 4. Governor | Centrifugal, all speed control type |
| 5. Fuel injection nozzle type | BOSCH hole type |
| 6. Fuel filter | Paper element type |
| 7. Water separator | |
| 8. Cooling system | Forced-circulation by volute pump |
| 9. Lubricating system | Full forced pressure feed by gear pump |
| 10. Oil filter | Paper element type (Full flow & By-pass flow) |
| 11. Intake manifold | Inlet position at rear |
| 12. Exhaust manifold with flange plate | Upward exhaust |
| 13. Generator | Alternator with integral regulator
24V, 20A |
| 14. Starter | 24V, 4.5 kW |
| 15. Safety relay | |
| 16. Connectors of electrical equipments | |

● OPTIONAL EQUIPMENT

1. Cooling fan (suction or blowout)
2. Main switch
3. Battery switch
4. Battery relay
5. Starter switch with key
6. Ammeter
7. Fuse box
8. Engine shut off solenoid
9. Emergency relay
10. Coolant temperature switch
11. Coolant temperature gauge sender
12. Coolant temperature gauge
13. Oil pressure switch
14. Oil pressure gauge sender
15. Oil pressure gauge
16. Glow plug
17. Glow plug indicator
18. Tachometer with hourmeter
19. Tachometer cable
20. Muffler
21. Air cleaner
22. Air cleaner cap
23. Radiator with cooling fan shroud



FRONT SIDE VIEW



LEFT SIDE VIEW

SM1-083

- NOTE:** 1) These specifications are subject to change without notice.
2) These specifications are for export models.
3) All specifications of the products are with normal manufacturing allowances and tolerances.
4) The performance and drawings are for standard specifications.

Hino **HINO MOTORS, LTD.**

TOKYO, JAPAN

SPECIFICATIONS

DIESEL ENGINE FOR INDUSTRIAL USE

HINO H07C H07CT H07C-T

SPECIFICATIONS

6.728 liters, 4-cycle,
6-cyl., water-cooled,
turbocharged

● PERFORMANCE (STD. specs.)

GENERAL USE (SAE J1349 Gross)				GENERATOR USE (SAE J1349 Gross)			
Output, intermittent rating kW {HP} at r/min	Output, continuous rating kW {HP} at r/min	Max. torque N·m {lb·ft} at r/min	Min. fuel consumption g/kWh {lb/HP·h} at r/min	Stand-by Power		Prime Power	
				Output at 1,500 r/min kW {HP}	Output at 1,800 r/min kW {HP}	Output at 1,500 r/min kW {HP}	Output at 1,800 r/min kW {HP}
147 {197} at 2,800	128 {171} at 2,800	601 {443} at 1,600	218 {0.358} at 1,600	92 {123}	116 {155}	83 {111}	105 {141}

Ambient conditions:	SAE
Intake air temperature	25°C
Barometric pressure	100 kPa
Water vapour pressure	1.0 kPa

● ENGINE DESCRIPTION

1. Type Diesel, 4-cycle, 6-cyl., in-line, overhead valve, water-cooled, turbocharged
2. Combustion system Direct injection type
3. Cylinder
 - Bore x Stroke 110 x 118 mm {4.33 x 4.65 in}
4. Piston displacement 6.728 liters {410.6 cu.in}
5. Compression ratio 18.5
Except H07CTA-SUFA, HKGA, HKFA, 17.5
6. Direction of rotation Counter-clockwise viewed from flywheel
7. Dimensions (L x W x H) Approx. 1,165 x 740 x 868 mm
{45.9 x 29.1 x 34.2 in}
8. Dryweight Approx. 545 kg {1,200 lb}

● FEATURES

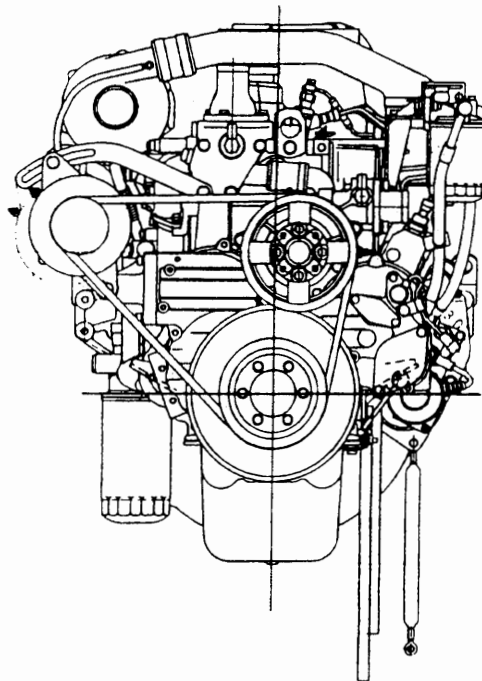
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6. Valves Heat resistance steel

● STANDARD EQUIPMENT

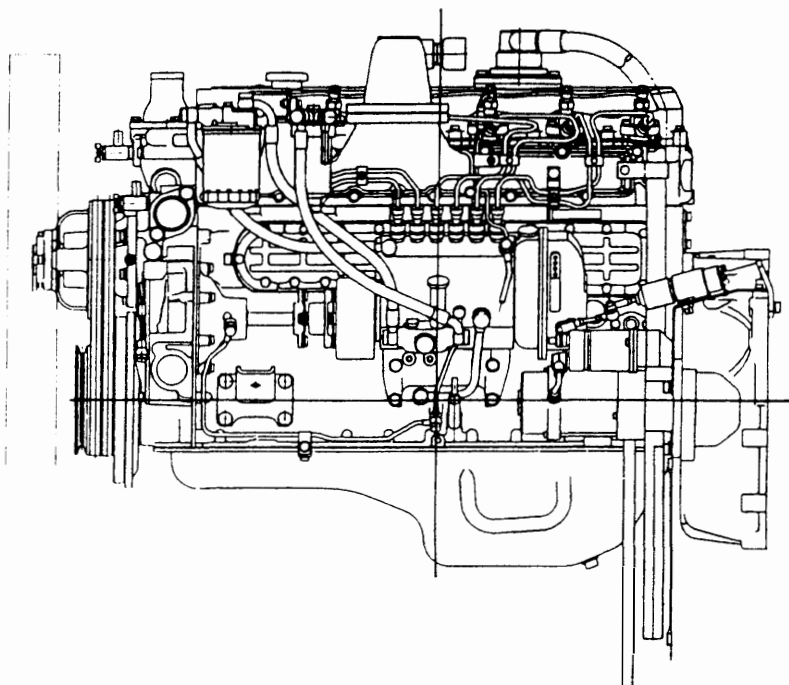
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17. Glow plug indicator
18. Tachometer with hourmeter
19. Tachometer cable
20. Muffler
21. Air cleaner
22. Air cleaner cap
23. Radiator with cooling fan shroud



FRONT SIDE VIEW



LEFT SIDE VIEW

SM1-084

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Hino **HINO MOTORS, LTD.**

TOKYO, JAPAN

TIGHTENING TORQUE OF STANDARD BOLT

Unit: N·m
(kgf·cm)
(lbf·ft)

Bolt identification	Tightening conditions	4	6	8	10	12	14	16	18	20	22	24
4	Even tightening area. Bolt nut, coating, naked bolt, lubricant, etc. Optimum conditions.	0.99 - 1.47 { 10 - 15 0.8 - 1.0 }	3.54 - 5.19 { 36 - 53 2.7 - 3.8 }	8.63 - 12.55 { 88 - 128 7 - 9 }	17.07 - 25.00 { 174 - 255 13 - 18 }	29.82 - 43.63 { 304 - 445 22 - 32 }	47.67 - 69.82 { 486 - 712 36 - 51 }	74.34 - 108.85 { 758 - 1,110 55 - 80 }	101.99 - 150.04 { 1,040 - 1,530 76 - 110 }	145.14 - 212.81 { 1,480 - 2,170 108 - 156 }	199.08 - 292.23 { 2,030 - 2,980 147 - 215 }	251.06 - 367.74 { 2,560 - 3,750 86 - 271 }
	Cast iron or aluminum tightening surface. Washers. Medium conditions.	1.38 - 1.96 { 14 - 20 1.1 - 1.4 }	4.71 - 6.96 { 48 - 71 3.5 - 5.1 }	11.48 - 16.86 { 117 - 172 9 - 12 }	22.76 - 33.34 { 232 - 340 17 - 24 }	39.72 - 58.05 { 405 - 592 30 - 42 }	63.45 - 93.16 { 647 - 950 47 - 68 }	99.05 - 145.13 { 1,010 - 1,480 74 - 107 }	136.32 - 200.05 { 1,390 - 2,040 101 - 147 }	193.20 - 284.39 { 1,970 - 2,900 143 - 209 }	264.78 - 389.32 { 2,700 - 3,970 196 - 287 }	334.41 - 490.33 { 3,410 - 5,000 247 - 361 }
	Tightening area having black coarse surface. Rusty. Naked bolt or lubricant unavailable. Poor tightening conditions.	1.67 - 2.45 { 17 - 25 1.3 - 1.8 }	5.89 - 8.62 { 60 - 88 4.4 - 6.3 }	14.32 - 20.98 { 146 - 214 11 - 15 }	28.44 - 41.67 { 290 - 425 21 - 30 }	49.63 - 72.76 { 506 - 742 37 - 53 }	79.34 - 115.71 { 809 - 1,180 59 - 85 }	123.57 - 181.42 { 1,260 - 1,850 92 - 133 }	170.64 - 249.08 { 1,740 - 2,540 126 - 183 }	241.25 - 355.00 { 2,460 - 3,620 178 - 261 }	331.47 - 485.42 { 3,380 - 4,950 245 - 358 }	417.77 - 612.91 { 4,260 - 6,250 309 - 452 }
6	Even tightening area. Bolt nut, coating, naked bolt, lubricant, etc. Optimum conditions.	1.57 - 2.35 { 16 - 24 1.2 - 1.7 }	5.69 - 8.13 { 58 - 83 4.2 - 6.0 }	13.54 - 19.71 { 138 - 201 10 - 14 }	26.78 - 39.22 { 273 - 400 20 - 28 }	46.78 - 68.64 { 477 - 700 35 - 50 }	74.93 - 109.83 { 764 - 1,120 56 - 81 }	116.70 - 171.61 { 1,190 - 1,750 87 - 126 }	160.83 - 235.35 { 1,640 - 2,400 119 - 173 }	227.52 - 334.40 { 2,320 - 3,410 168 - 246 }	311.86 - 458.95 { 3,180 - 4,680 231 - 338 }	394.23 - 525.63 { 4,020 - 5,360 291 - 387 }
	Cast iron or aluminum tightening surface. Washers. Medium conditions.	2.16 - 3.13 { 22 - 32 1.6 - 2.3 }	7.36 - 10.78 { 75 - 110 5.5 - 7.9 }	17.95 - 26.47 { 183 - 270 14 - 19 }	35.70 - 52.26 { 364 - 533 27 - 38 }	62.38 - 91.39 { 636 - 932 47 - 67 }	100.03 - 147.09 { 1,020 - 1,500 74 - 108 }	155.93 - 228.49 { 1,590 - 2,330 116 - 168 }	213.79 - 313.81 { 2,180 - 3,200 158 - 231 }	304.01 - 446.20 { 3,100 - 4,550 225 - 329 }	416.79 - 608.99 { 4,250 - 6,210 308 - 449 }	525.64 - 769.82 { 5,360 - 7,850 388 - 567 }
	Tightening area having black coarse surface. Rusty. Naked bolt or lubricant unavailable. Poor tightening conditions.	2.65 - 3.92 { 27 - 40 2.0 - 2.8 }	9.22 - 13.53 { 94 - 138 6.8 - 9.9 }	22.46 - 32.95 { 229 - 336 17 - 24 }	44.63 - 65.41 { 455 - 667 33 - 48 }	77.97 - 114.24 { 795 - 1,165 58 - 84 }	124.55 - 183.38 { 1,270 - 1,870 92 - 135 }	195.16 - 286.35 { 1,990 - 2,920 144 - 211 }	267.73 - 392.26 { 2,730 - 4,000 198 - 289 }	379.52 - 557.01 { 3,870 - 5,680 280 - 410 }	520.74 - 764.91 { 5,310 - 7,800 385 - 564 }	657.05 - 965.95 { 6,700 - 9,850 485 - 712 }
8	Even tightening area. Bolt nut, coating, naked bolt, lubricant, etc. Optimum conditions.	2.36 - 3.13 { 24 - 32 1.8 - 2.3 }	8.05 - 10.78 { 82 - 110 6.0 - 7.9 }	19.62 - 26.18 { 200 - 267 15 - 19 }	38.94 - 56.29 { 397 - 574 29 - 41 }	68.06 - 90.71 { 694 - 925 51 - 66 }	99.05 - 145.13 { 1,010 - 1,980 74 - 107 }	169.66 - 226.53 { 1,730 - 2,310 126 - 167 }	233.40 - 310.87 { 2,380 - 3,170 173 - 229 }	331.47 - 442.27 { 3,380 - 4,510 244 - 326 }	454.05 - 605.07 { 4,630 - 6,170 335 - 446 }	573.69 - 763.93 { 5,850 - 7,790 424 - 563 }
	Cast iron or aluminum tightening surface. Washers. Medium conditions.	3.14 - 4.11 { 32 - 42 2.4 - 3.0 }	10.79 - 14.31 { 110 - 146 8.0 - 10.5 }	26.19 - 34.91 { 267 - 356 19 - 25 }	51.88 - 69.23 { 529 - 706 39 - 51 }	90.72 - 120.62 { 925 - 1,230 67 - 88 }	145.14 - 193.19 { 1,480 - 1,970 108 - 142 }	226.54 - 302.04 { 2,310 - 3,080 168 - 222 }	310.88 - 414.82 { 3,170 - 4,230 230 - 305 }	442.28 - 539.37 { 4,510 - 6,010 327 - 434 }	605.08 - 807.08 { 6,170 - 8,230 447 - 595 }	763.94 - 1,018.91 { 7,790 - 10,390 564 - 751 }
	Tightening area having black coarse surface. Rusty. Naked bolt or lubricant unavailable. Poor tightening conditions.	3.93 - 5.19 { 40 - 53 2.9 - 3.8 }	13.44 - 17.94 { 137 - 183 10.0 - 13.2 }	32.76 - 43.63 { 334 - 445 25 - 32 }	64.93 - 86.49 { 662 - 882 48 - 63 }	113.76 - 151.02 { 1,160 - 1,540 84 - 111 }	181.43 - 242.22 { 1,850 - 2,470 134 - 178 }	283.42 - 377.55 { 2,890 - 3,850 210 - 278 }	389.33 - 518.77 { 3,970 - 5,290 288 - 382 }	553.10 - 736.47 { 5,640 - 7,510 408 - 543 }	757.08 - 1,009.10 { 7,720 - 10,290 559 - 744 }	955.17 - 1,273.88 { 9,740 - 12,990 705 - 939 }

NOTE: The torque values given in this table should be applied where bolt torque is not specified.



RECOMMENDED LUBRICANTS FOR ALL HINO ENGINE

HINO MOTORS, LTD.
OVERSEAS OPERATIONS
SERVICE DIV.
TOKYO, JAPAN

LUBRICANTS	POSITIONS	ATMOS- PHERIC TEMP	S. A. E NO.	BP	CALTEX	CASTROL	ESSO	GULF	MOBIL	SHELL	TOTAL
ENGINE OIL (A P I CCI) Previous Classification (A P I DS) (MIL-L 2104C) (MIL-L 45199B)	Cylinder Block Injection Pump Air Cleaner	Above 32° C (90° F)	40	Vanellus C-3 40	RPM DELO 400 Oil SAE 40 or 15W 40 RPM DELO 300 Oil SAE 40	Castrol or Deusol CRD 40 Turbomax Castrol or Deusol RX Super 40 15W 40	Essolube D-3 40 XD 3 40	Gulf Super Duty Motor Oil 40, 15W-40	Mobil Delvac 1340 Mobil Delvac Super 15W-40	Myrina Oil 40, 20W-40 15W-40 Rimula X Oil 40 Rimula CT 40	TOTAL Rubia S 40 TOTAL Rubia TM 15W40
		32° 0° C (90° 32° F)	30	Vanellus C-3 30	RPM DELO 400 Oil SAE 30 or 15W 40 RPM DELO 300 Oil SAE 30	Castrol or Deusol CRD 30 Castrol or Deusol RX Super 30 15W-40	Essolube D-3 30 XD-3 30	Gulf Super Duty Motor Oil 30 15W-40	Mobil Delvac 1330 Mobil Delvac Super 15W-40	Myrina Oil 30, 20W-40 15W-40 Rimula X Oil 30, 10W-30 Rimula CT30	TOTAL Rubia S 30 TOTAL Rubia TM 15W40
		0° 12° C (32° 10° F)	20	Vanellus C-3 20W	RPM DELO 400 Oil SAE 20-20W 15W-40 RPM DELO 300 Oil SAE 20-20W	Castrol or Deusol CRD 20W 20 Castrol or Deusol RX Super 20W/20, 15W-40	Essolube D-3 20W, XD-3 15W-40	Gulf Super Duty Motor Oil 20, 15W-40	Mobil Delvac 1310 Mobil Delvac Super 15W-40	Myrina Oil 20, 20W-40, 15W 40 Rimula X Oil 20 Rimula CT20	TOTAL Rubia S 20 TOTAL Rubia TM 15W40
ENGINE OIL (A P I CC) Previous Classification (A P I DM) (MIL-L 46152) (MIL-L 2104B)		Above 32° C (90° F)	40	Vanellus M 40	RPM DELO 200 Oil SAE 40 RPM DELO 100 Oil SAE 40	Castrol or Deusol CRX 40 Castrol or Deusol RX Super 40 15W 40	Essolube HDX 40 HDX Plus 40	Gulfube Motor Oil XHD 40 15W-40	Mobil Delvac 1240 Mobil Delvac 1140	Rotella TX40, 20W-50 Rotella SX Oil 40, 20W-40	TOTAL Rubia H 40
		32° 0° C (90° 32° F)	30	Vanellus M 30	RPM DELO 200 Oil SAE 30 RPM DELO 100 Oil SAE 30	Castrol or Deusol CRX 30 Castrol or Deusol RX Super 30 15W-40	Essolube HDX 30, HDX Plus 30	Gulfube Motor Oil XHD 30 15W-40	Mobil Delvac 1230 Mobil Delvac 1130	Rotella TX30, 20W-50 Rotella SX Oil 30, 20W-40	TOTAL Rubia H 30
		0° 12° C (32° 10° F)	20	Vanellus M 20W	RPM DELO 200 Oil SAE 20-20W RPM DELO 100 Oil SAE 20-20W	Castrol or Deusol CRX 20W 20 Castrol or Deusol RX Super 20W-20 15W 40	Essolube HDX 20, HOX Plus 20W-20	Gulfube Motor Oil XHD 20 15W-40	Mobil Delvac 1220 Mobil Delvac 1120	Rotella TX20, 20W-50 Rotella SX Oil 20/20W, 20W-40	TOTAL Rubia H 20
COOLANT PUMP BEARING GREASE (MIL-G-10924B)	Coolant Pump Bearing			Energrease LT 2	Marfak Multipurpose 2 or Marfak All Purpose 2	Castrol LM Grease	Esso Multipurpose Grease	Gulflex Poly	Mobilgrease MP 77 MS	Retinax A Alvania Grease R2	TOTAL MULTIS 2
STARTER GREASE	Bushing, Clutch, Drive Shaft, Pinion Shift Lever & Reduction Gear			-----	Molytex Grease EP2	-----	-----	-----	Mobilgrease 29	Aero Shell Grease 17	-----
GENERATOR & STARTER BEARING GREASE	Generator Bearing Starter Bearing			Energrease LT 2	RPM Grease SRI 2	-----	-----	-----	Mobilgrease 28	Aero Shell Grease 7	-----
INJECTION PUMP TIMER GREASE (MIL-G-10924B)	Injection Pump Timer			Energrease LT 2	Marfak Multipurpose 2 or Marfak All Purpose 2	Castrol LM Grease	Esso Multipurpose Grease	Gulflex Poly	Mobilgrease MP 77 MS	Retinax A Alvania Grease R2	TOTAL Multis EP 1
ANTI FREEZE (MIL-A-53009)	Engine, Radiator			Anti Frost	AF Engine Coolant	Castrol Anti-Freeze Castrol Long Life Coolant	Esso Anti-Freeze Coolant	Cruise Master Antifreeze And Summer Coolant	Mobil Permazone	Shellzonell S A J Glycoshell Plus (European Countries) Shellsafe Anti-Freeze P2B1 Coolguard	TOTAL ANTIGEL

Note: Lubricants were amended according to new classification by A P I (American Petroleum Institute)

82-12-200 (T S DR)

CHAPTER EN

HINO ENGINE

Models H07C H07CT H07C-T H07D H07DT for industrial use

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DATA AND SPECIFICATIONS (FOR MODEL H07D H07DT)

Model	HINO H07D HINO H07DT
Type.....	Diesel, 4 cycle, vertical, 6-cylinder, in-line, overhead valve, water-cooled
Aspiration	Natural aspirate
Combustion system	Direct injection
Bore and stroke	110 x 130 mm (4.33 x 5.12 in)
Piston displacement	7.412 L (452.3 cu.in)
Compression ratio	19.7
Compression pressure	3.53–3.82 MPa (36–39 kgf/cm ² , 512–555 lbf/in ²) at 280 r/min
Firing order	1–4–2–6–3–5 (A number of a cylinder is to be counted in order from timing gear side)
Direction of rotation	Counterclockwise viewed from flywheel
Dry weight	Approx. 580 kg (1,279 lb)
Valve seat angle; Intake	30°
Exhaust	45°
Valve face angle; Intake	30°
Exhaust	45°
Hino H07D H07DT Valve timing (flywheel travel); Intake opens	12° before top dead center
Intake closes	44° after bottom dead center
Exhaust opens	51° before bottom dead center
Exhaust closes	13° after top dead center

Adjusting value:

Engine code	Injection pump number	Injection timing	Idling speed (r/min)	Injection pressure MPa (kgf/cm ² , lbf/in ²)	Valve clearance mm (in)
H07D-EUAA	22020-4290	14° B.T.D.C.	725-775	1st : 17.65 (180, 2,560) 2nd : 21.57 (220, 3,128)	IN : 0.30 (0.0118) EX : 0.45 (0.0177)
H07D-NSAA	22020-3763	14° B.T.D.C.	725-825	1st : 17.65 (180, 2,560) 2nd : 21.57 (220, 3,128)	IN : 0.30 (0.0118) EX : 0.45 (0.0177)
H07D-NSAB	22020-3763	14° B.T.D.C.	725-825	1st : 17.65 (180, 2,560) 2nd : 21.57 (220, 3,128)	IN : 0.30 (0.0118) EX : 0.45 (0.0177)
H07D-TOPA	22020-4221	14° B.T.D.C.	725-775	1st : 17.65 (180, 2,560) 2nd : 21.57 (220, 3,128)	IN : 0.30 (0.0118) EX : 0.45 (0.0177)
H07D-TOPB	22020-4221	14° B.T.D.C.	725-775	1st : 17.65 (180, 2,560) 2nd : 21.57 (220, 3,128)	IN : 0.30 (0.0118) EX : 0.45 (0.0177)
H07D-DYAA	22020-3940	14° B.T.D.C.	725-825	1st : 17.65 (180, 2,560) 2nd : 21.57 (220, 3,128)	IN : 0.30 (0.0118) EX : 0.45 (0.0177)

Engine code	Engine oil volume (L)
H07D-EUAA	L : 7 H : 11 TOTAL 13.5
H07D-NSAA	L : 16 H : 24 TOTAL 28.0
H07D-NSAB	L : 16 H : 24 TOTAL 28.0
H07D-TOPA	L : 7 H : 11 TOTAL 13.5
H07D-TOPB	L : 7 H : 11 TOTAL 13.5
H07D-DYAA	L : 16 H : 24 TOTAL 28.0

Hino Diesel Engine Parts

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www.HeavyEquipmentRestorationParts.com

DATA AND SPECIFICATIONS (FOR MODEL H07C H07CT H07C-T)

Model	HINO H07C HINO H07CT HINO H07C-T
Type	Diesel, 4 cycle, vertical, 6-cylinder, in-line, overhead valve, water-cooled
Aspiration	Turbocharged
Combustion system	Direct injection
Bore and stroke	110 x 118 mm (4.33 x 4.65 in)
Piston displacement	6.728 L (410.6 cu.in)
Compression ratio	18.5
Compression pressure	Except H07CT-SUFA, HKGA, HKFA, HKDC, HKDD 17.5 3.44-3.72 MPa (35-38 kgf/cm ² , 498-540 lbf/in ²) at 280 r/min 3.04-3.33 MPa (31-34 kgf/cm ² , 441-483 lbf/in ²) at 280 r/min (HKDC, HKDD)
Firing order	1-4-2-6-3-5 (A number of a cylinder is to be counted in order from timing gear side)
Direction of rotation	Counterclockwise viewed from flywheel
Dry weight	Approx. 545 kg (1,200 lb)
Valve seat angle; Intake	30°
Exhaust	45°
Valve face angle; Intake	30°
Exhaust	45°
Hino H07C H07CT Valve timing (flywheel travel); Intake opens	12° before top dead center
Intake closes	32° after bottom dead center
Exhaust opens	52° before bottom dead center
Exhaust closes	12° after top dead center

Adjusting value:

Engine code	Injection pump number	Injection timing	Idling speed (r/min)	Injection pressure MPa (kgf/cm ² , lbf/in ²)	Valve clearance mm (in)
H07CT-HOCA	22020-4061	14° B.T.D.C.	1,175-1,225	19.61 (200, 2,844)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-IKFA	22020-4191	12° B.T.D.C.	725-775	19.61 (200, 2,844)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-IKFC	22020-4191	12° B.T.D.C.	725-775	19.61 (200, 2,844)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-NSQA	22020-4460	12° B.T.D.C.	725-775	19.61 (200, 2,844)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-HKGA	22020-4342	12° B.T.D.C.	965-1,010	19.61 (200, 2,844)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-HKFA	22020-4400	12° B.T.D.C.	885-935	19.61 (200, 2,844)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-HKDC	22020-4722	11° B.T.D.C.	900-950	17.65 (180, 2,560)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)
H07CT-HKDD	22020-4722	11° B.T.D.C.	900-950	17.65 (180, 2,560)	IN: 0.30 (0.0118) EX: 0.45 (0.0177)

Engine code	Engine oil volume (L)
H07CT-HOCA	L : 16 H: 24 TOTAL 28.0
H07CT-IKFA	L : 16 H: 20 TOTAL 24.0
H07CT-IKFC	L : 16 H: 20 TOTAL 24.0
H07CT-NSQA	L : 16 H: 20 TOTAL 24.0
H07CT-HKGA	L : 16 H: 20 TOTAL 24.0
H07CT-HKFA	L : 16 H: 20 TOTAL 24.0
H07CT-HKDC	L : 14 H: 20 TOTAL 26.0
H07CT-HKDD	L : 14 H: 20 TOTAL 26.0

Hino Diesel Engine Parts

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TROUBLESHOOTING

Symptom	Possible cause	Remedy/Prevention
Engine overheating	Coolant	
	• Insufficient coolant	Add coolant.
	• Defective thermostat	Replace the thermostat.
	• Overflow of coolant due to leakage of exhaust into cooling system	Repair.
	• Coolant leakage from cylinder head gasket	Replace gasket.
	• Defective coolant pump	Repair or replace.
	Radiator	
	• Clogged with rust and scale	Clean radiator.
	• Clogged with iron oxide due to leakage of exhaust into cooling system	Clean coolant passage and Correct exhaust leakage.
	• Clogged radiator core due to mud or other debris	Clean radiator.
	• Defective radiator cap pressure valve	Replace radiator cap
	Abnormal combustion	
	• Incorrect injection timing	Adjust injection timing.
	• Reduced injection pressure	Adjust injection pressure.
	• Poor fuel	Use good quality fuel.
	• Poor nozzle spray	Adjust or replace nozzle.
	• Unsatisfactory automatic timer advance angle ..	Repair or replace timer.
	Other problems	
	• Defective or deteriorated engine oil	Change engine oil.
	• Unsatisfactory operation of oil pump	Replace or repair.
	• Insufficient oil	Add oil.
	• Brake drag	Repair or adjust.
Excessive oil consumption	Pistons, cylinder liners, and piston rings	
	• Wear of piston ring and cylinder liner	Replace piston rings and cylinder liner.
	• Worn, sticking or broken piston rings	Replace piston rings and cylinder liner.
	• Insufficient tension on piston rings	Replace piston rings and cylinder liner.
	• Unsatisfactory break-in of piston rings	Replace piston rings and cylinder liner.
	• Unsuitable oil (viscosity too low)	Change oil as required and replace piston rings and cylinder liners.
	• Incorrectly fitted piston rings (upside down)	Replace piston rings.
	• Gaps of piston rings in line with each other	Reassemble piston rings.

<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
Excessive oil consumption	Valve and valve guides	
	• Worn valve steam	Replace valve and valve guide.
	• Worn valve guide	Replace valve guide.
	• Incorrectly fitted valve stem seal	Replace the stem seal.
	• Excessive lubricant on rocker arm	Check clearance of rocker arm and shaft.
	Excess oil feed	
	• Defective oil level gauge	Replace oil level gauge.
	• Oil level too high	Drain excess oil.
	Other problems	
	• Overcooled engine (low temperature wear)	Warm up engine before moving vehicle. Check cooling system.
	• Oil leakage from miscellaneous parts	Repair.
Piston seizure	Operation	
	• Abrupt stoppage of engine after running At highspeed	Operate engine properly.
	• Hill climbing using unsuitable gear	Select suitable gear.
	Oil	
	• Insufficient oil	Add oil.
	• Dirty oil	Change oil.
	• Poor quality oil	Replace with proper engine oil.
	• High oil temperature	Repair.
	• Low oil pressure	Repair.
	• Defective oil pump	Repair oil pump.
	• Reduced performance due to worn oil pump	Replace oil pump.
	• Suction strainer sucking air	Add oil and/or repair strainer.
	Abnormal combustion	See Symptom: "Engine overheating."
	Coolant	See Symptom: "Engine overheating."
Lack of power	Injection pump	Refer to CHAPTER IP, FUEL INJECTION PUMP.
	Intake	
	• Clogged air cleaner	Clean element or replace element.
	Overheating	See Symptom: "Engine overheating."

<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
Lack of power	Fuel and nozzle	
	• Poor nozzle spray	Adjust or replace injection nozzle.
	• Clogged nozzle with carbon	Clean nozzle.
	• Wear or seizure of nozzle	Replace nozzle.
	• Air in fuel system	Repair and bleed air from fuel system.
	• Clogged fuel filter	Replace element.
	• Use of poor fuel	Use good quality fuel.
	Abnormal combustion	See Symptom: "Engine overheating."
	Piston, cylinder liners, and piston rings	See Symptom: "Engine overheating."
	Other problems	
	• Breakage of turbine or blower	Replace the turbine or blower or turbocharger.
Difficult starting engine	Electrical system	
	• Discharged battery	Charge battery.
	• Defective wiring in starter circuit	Repair wiring of starter.
	• Loose or open-circuit battery cable	Tighten battery terminal connections or replace battery cable.
	• Breakdown of starter	Replace starter
	• Break of glow plug or intake air heater (If so equipped)	Replace
	Injection pump	Refer to CHAPTER IP, FUEL INJECTION PUMP
	Air cleaner	
	• Clogged element	Clean the element or replace the element.
	Fuel system	
	• No fuel in tank	Supply fuel and bleed air from fuel system.
	• Clogged fuel line	Clean fuel line.
	• Air sucked into fuel system through fuel line connections.	Tighten fuel line connections.
	• Clogged fuel filter	Replace element.
	• Loose connection in high-pressure line	Tighten sleeve nut of high pressure line.
	• Water in fuel	Drain and clean fuel system

<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
Difficulty starting engine	Nozzles	
	• Seized bearing	Replace nozzle
	Broken or fatigued nozzle spring	Replace spring.
	Oil system	
	• Oil viscosity too high	Use proper viscosity oil, or install a oil immersion heater and warm up oil.
	Other problems	
	• Seized piston	Replace piston, piston rings, and liner.
	• Seized bearing	Replace bearing and/or crankshaft.
	• Reduced compression pressure	Overhaul engine.
	• Ring gear damaged or worn	Replace the ring gear and/or starter pinion.
Rough idling	• Improperly adjusted or broken accelerator cable	Adjust or replace the accelerator cable.
	Injection pump	Refer to CHAPTER IP, FUEL INJECTION PUMP.
	Nozzles	
	• Uneven injection pressure	Adjust.
	• Poor nozzle spray	Adjust or replace nozzle.
	• Carbon deposit on nozzle tip	Remove carbon.
	• Seized needle valve	Replace nozzle.
	Engine proper	
	• Improper valve clearance	Adjust valve clearance.
	• Improper contact of valve seat	Replace or repair valve and valve seat.
Leakage of exhaust	• Idling speed too low	Adjust idling speed.
	• Coolant temperature too low	Warm up engine.
	• Compression pressure of cylinders markedly different from one another	Overhaul engine.
	Cylinder head gasket	
	• Fatigued gasket (aging)	Replace gasket.
	• Damage	Replace gasket.
	• Improper installation	Replace gasket.

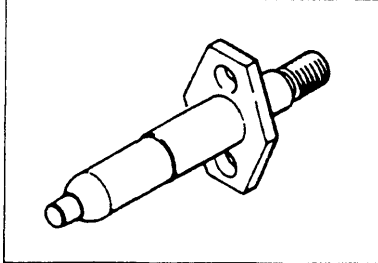
<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
Leakage of exhaust	Cylinder head bolts	
	• Loose bolts	Tighten bolt.
	• Elongated bolts	Replace bolt.
	• Improper tightening torque or tightening sequence	Tighten properly.
	Cylinder block	
	• Cracking	Replace cylinder block.
	• Surface distortion	Repair or replace.
	• Fretting of cylinder liner insertion (insufficient projection of cylinder liner)	Replace cylinder liner or portion cylinder block.
	Cylinder head	
	• Cracking	Replace cylinder head.
	• Surface distortion	Repair or replace.
	Cylinder liners	
	• Cracking	Replace cylinder liner.
	• Corrosion	Replace cylinder liner.
	• Insufficient projection of cylinder liner	Replace cylinder liner.
	Other problems	
	• Incorrect injection timing	Adjust injection timing.

ENGINE OVERHAUL CRITERIA

SPECIAL TOOL

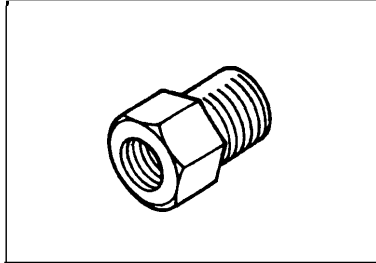
Prior to starting an engine overhaul, it is necessary to have these special tools.

COMPRESSION GAUGE ADAPTER



09408-1010

COMPRESSION GAUGE ADAPTER



09552-1030

FACTORS WHICH DETERMINE WHEN AT ENGINE OVERHAUL IS NEEDED.

1. Lowered compression pressure.
 - a. Before the measurement
 - a) Correct the valve clearance.
 - b) Warm up engine [Bring the coolant temperature to about 80°C {176°F}]
 - c) Charge the battery fully.
 - d) Remove the air cleaner.
 - b. Measurement
 - a) Remove the six nozzle holders
 - b) Install the gauge adapter in the nozzle holder hole.

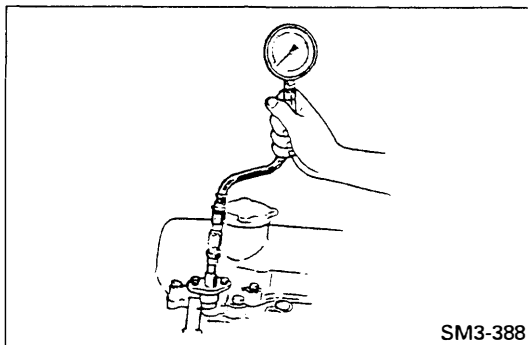
**Special Tool: Compression Gauge Adapter (09408-1010)
(09552-1030)**

- c) Connect a compression gauge to the gauge adapter.
- d) Drive the engine with the starter and read the compression pressure.

NOTE: Do not continuously operate the starter for more than 15 seconds at a time.

- e) Measure the compression pressure for each cylinder. If the compression pressure is low, be sure to repeat the measuring.

NOTE: Be sure not to leak through sealing face.



SM3-388

Unit: MPa {kgf/cm², lbf/in²}

Engine model	Compression ratio	Compression pressure		Difference between each cylinder	Engine speed (r/min)
		Standard	Limit		
H07D H07DT	19.7	3.53–3.82 (36–39, 512–554)	2.75 (28, 398)	Less than 0.294 {3, 43}	280
H07C H07CT	17.5	3.05–3.33 (31–34, 441–483)	2.45 (25, 356)		
	18.5	3.44–3.72 (35–38, 498–540)	2.75 (28, 398)		

EXAMPLE



SM3-349

S.A.E. GRADE	ATMOSPHERIC TEMPERATURE									
	-10	0	32	50	70	90	100	°F		
	-23	-18	0	10	21	32	39	°C		
40										
30										
20W/20										
15W/40										

2. Decreased oil pressure
- Check the oil pressure warning lamp when the oil and coolant temperature is hot [about 80°C {176°F}].
- a. If the warning lamp is lighted, check the oil level.

b. Check oil deterioration.
If oil quality is poor, replace with a suitable grade oil.

c. Remove the oil pressure switch and install the oil pressure gauge.

d. Measure the oil pressure at coolant temperature 80°C {176°F} or more.

Standard oil pressure: 49–490 KPa {0.5–5.0 kgf/cm², 7.11–71.10 lbf/in²}

Service limit: Less than 49 KPa {0.5 kgf/cm², 7.11 lbf/in²}

3. Other factors
- a. The blow-by gas increases.

b. The engine does not start easily.

c. Engine output decreases.

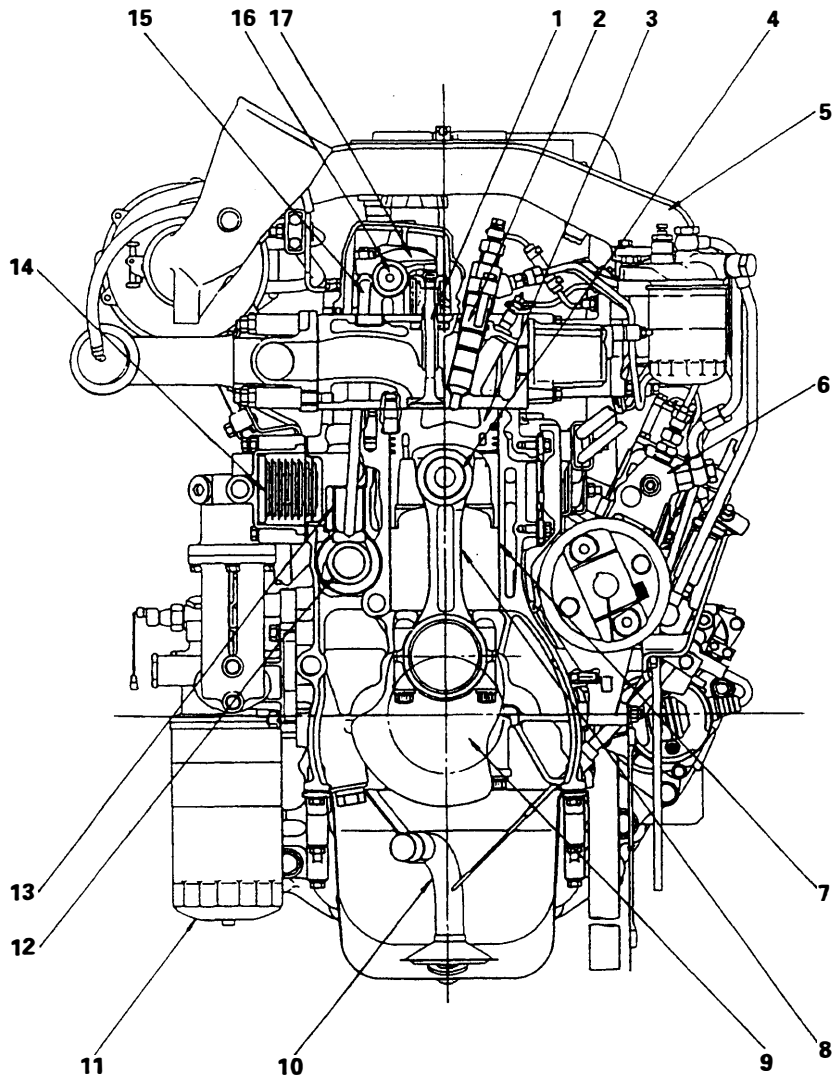
d. Fuel consumption increases.

e. Engine makes greater noise.

f. Excessive oil consumption.

ENGINE MOVING PARTS

DESCRIPTION



SM3-2422

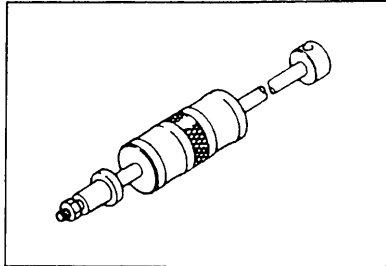
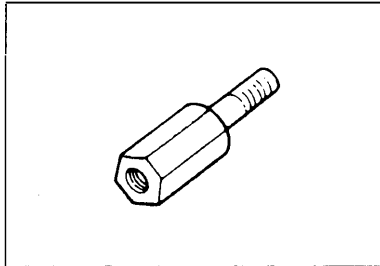
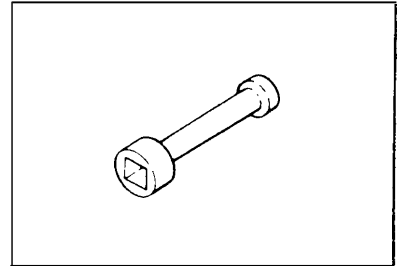
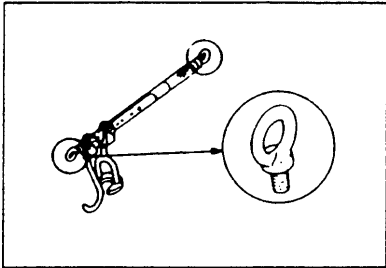
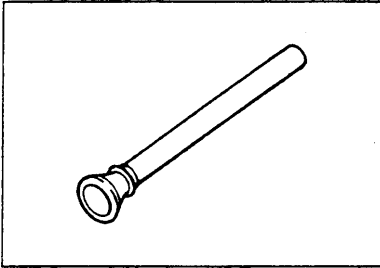
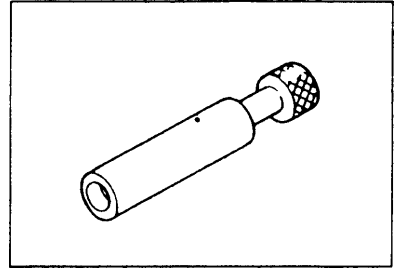
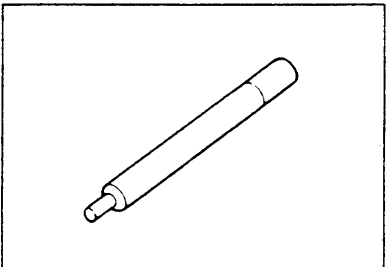
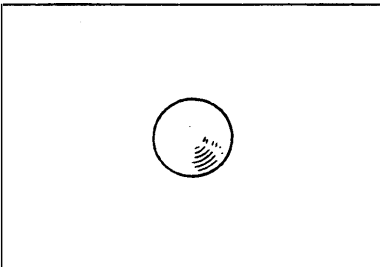
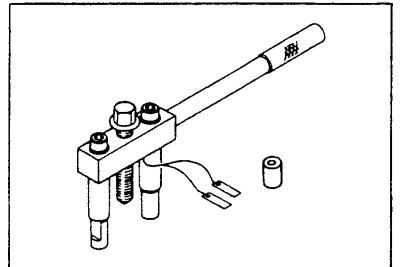
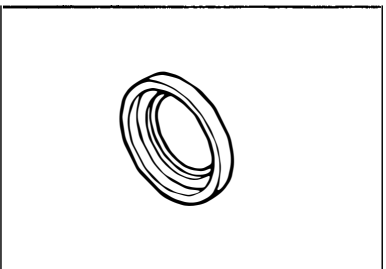
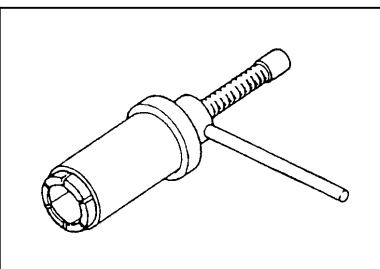
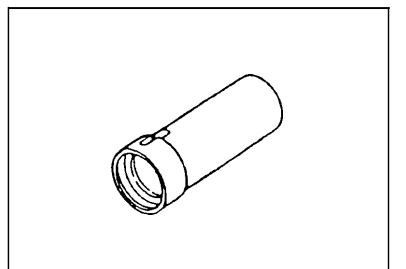
Representative engine model H07C H07CT

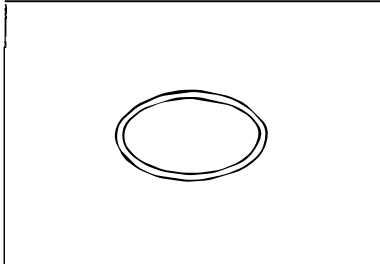
- | | | |
|--------------------|-------------------|------------------------|
| 1. Valve | 7. Cylinder liner | 13. Tappet |
| 2. Nozzle holder | 8. Connecting rod | 14. Oil cooler |
| 3. Piston | 9. Crankshaft | 15. Push rod |
| 4. Piston pin | 10. Oil strainer | 16. Valve rocker shaft |
| 5. Intake manifold | 11. Oil filter | 17. Rocker arm |
| 6. Injection pump | 12. Camshaft | |

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Website: www.HeavyEquipmentRestorationParts.com

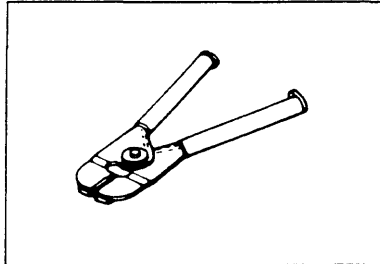
SPECIAL TOOL

Prior to starting an engine overhaul, it is necessary to have these special tools.

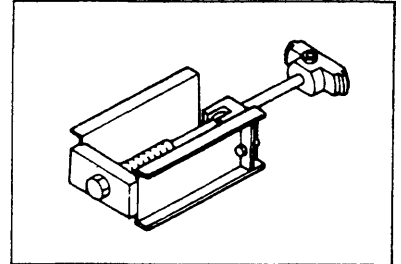
IDLER GEAR SLIDING HAMMER**09420-1442****NOZZLE HOLDER ADAPTER**
(used with 09420-1442)**09462-1130****CYLINDER HEAD BOLT WRENCH****09411-1070****VALVE SPRING PRESS****09470-1022****VALVE LAPPING TOOL****09431-1010****VALVE STEM SEAL PRESS****09472-1770****BAR (For nozzle sleeve)****09472-1210****STEEL BALL (For nozzle sleeve,**
used with 09472-1210)**9800-06100****INJECTION PUMP DRIVE GEAR PULLER****09420-1680****FRONT OIL SEAL PRESS****09482-1090****INJECTION PUMP DRIVE SHAFT SLEEVE PULLER****09420-1670 (Model H07D)****INJECTION PUMP DRIVE SHAFT SLEEVE PRESS****09482-1850 (Model H07D)**

O-RING (Used with 09482-1850)

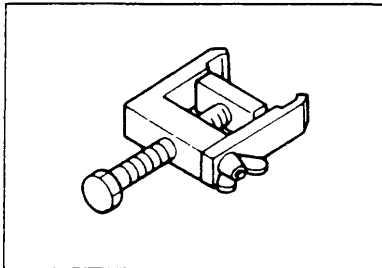
9851-36104 (Model H07D)

PISTON RING EXPANDER

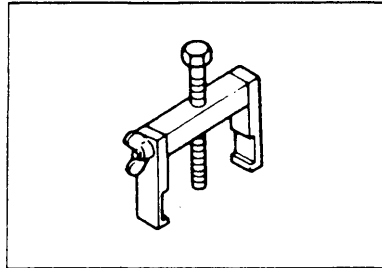
09442-1011

CYLINDER LINER PULLER

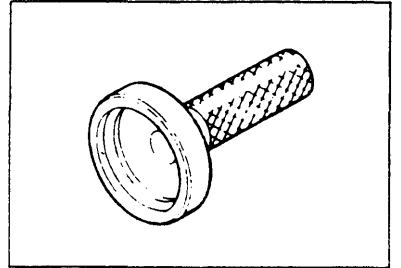
09420-1210

**FRONT OIL SEAL SLEEVE
PULLER**

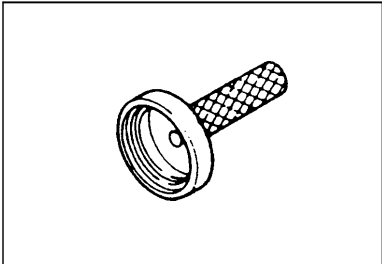
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**REAR OIL SEAL SLEEVE
PULLER**

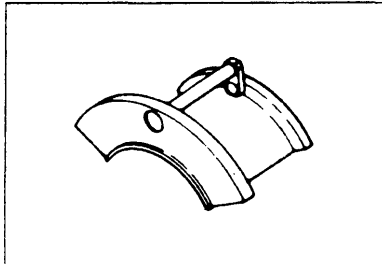
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**FRONT OIL SEAL SLEEVE
PRESS**

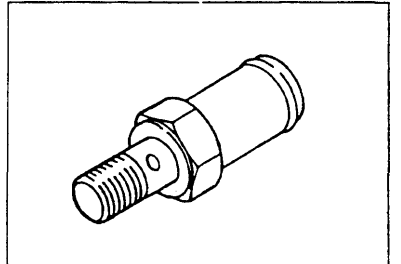
09402-1210

REAR OIL SEAL SLEEVE PRESS

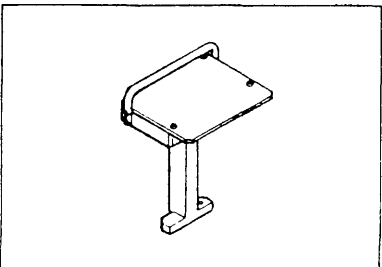
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CYLINDER LINER GUIDE

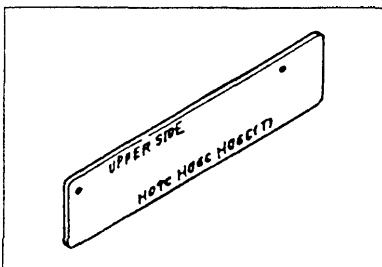
09480-1040

**For Piston cooling jet
CONNECTOR BOLT**

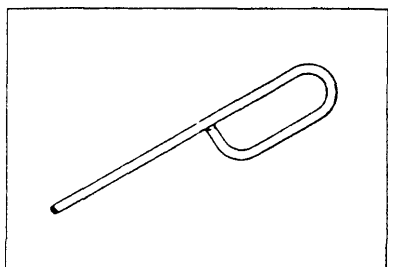
9001-24262

GAUGE

09470-1110 (Mode H07C-T)

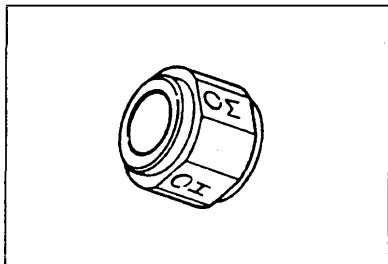
TARGET PLATE

09444-1290 (Model H07D)

ADJUSTING BAR

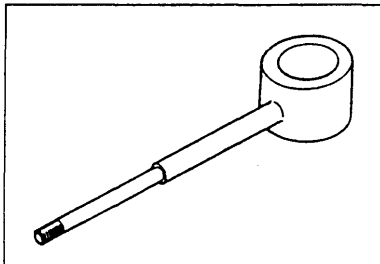
09472-1620

GUIDE
(For piston pin bushing)



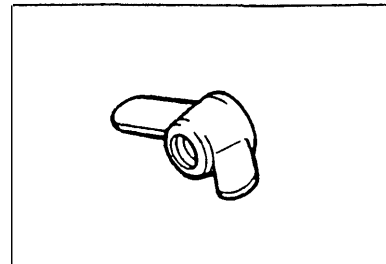
09481-1130 (Model H07C-T)

PRESS SUB-ASSEMBLY
(For piston pin bushing)



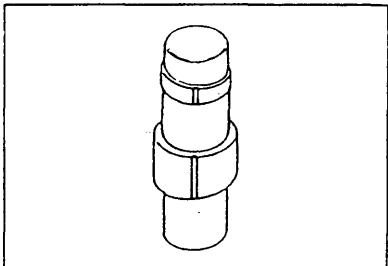
09402-1450 (Model H07C-T)

WING NUT
(For piston pin bushing)



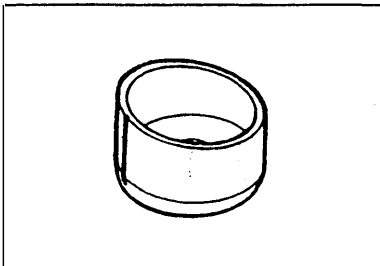
9233-10360 (Model H07C-T)

SPINDLE
(For piston pin bushing)



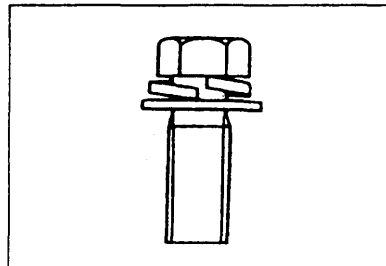
09402-1480 (Model H07D)
09402-1440 (Model H07C-T)

GUIDE
(For piston pin bushing)



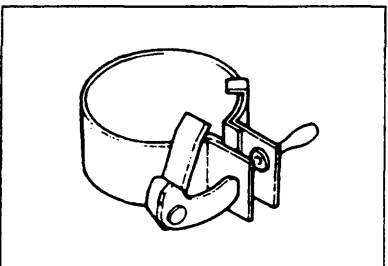
09481-1170 (Model HD07D)
09481-1110 (Model H07C-T)

BOLT
(For piston pin bushing)



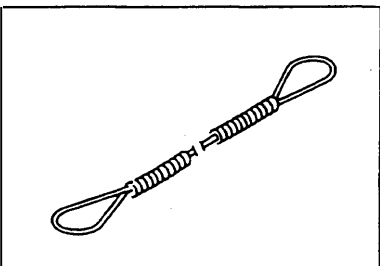
9191-08252

PISTON RING HOLDER



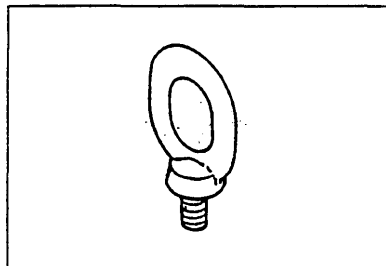
09441-1041

WIRE

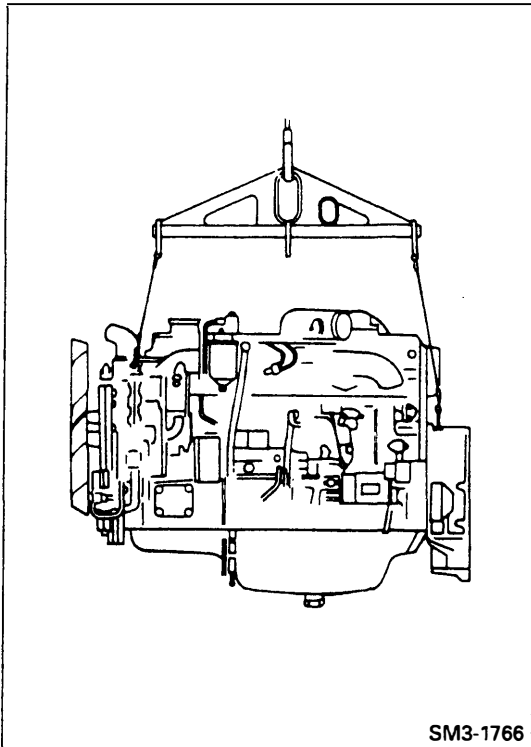


09491-1010

EYE BOLT



09433-1061



IMPORTANT POINTS — DISMOUNTING

DISMOUNT THE ENGINE ASSEMBLY.

WARNING

To avoid the danger of burns, do not drain the engine oil and coolant while the engine and radiator are still hot.

1. Drain the coolant from radiator and cylinder block and engine oil.
2. Disconnect the fuel lines, coolant lines, air lines, electric lines and engine control cables.
3. Disconnect the intake and exhaust systems and equipment.
4. Connect cable from an engine hanger to the hanger bracket (1 point) on the front of the engine, and to the hanger brackets (2 points) on the upper flywheel housing at the rear of the engine. Using a hoist, raise the hanger it so that there is a bit of slack in the cables.
5. Remove the engine mounting nuts (front and rear, both sides).
6. Lift the engine hanger so that the cables are fully tightened, and then, after checking that the cables are securely hooked on the hanger brackets, lift the engine assembly gently and remove it from the vehicle.

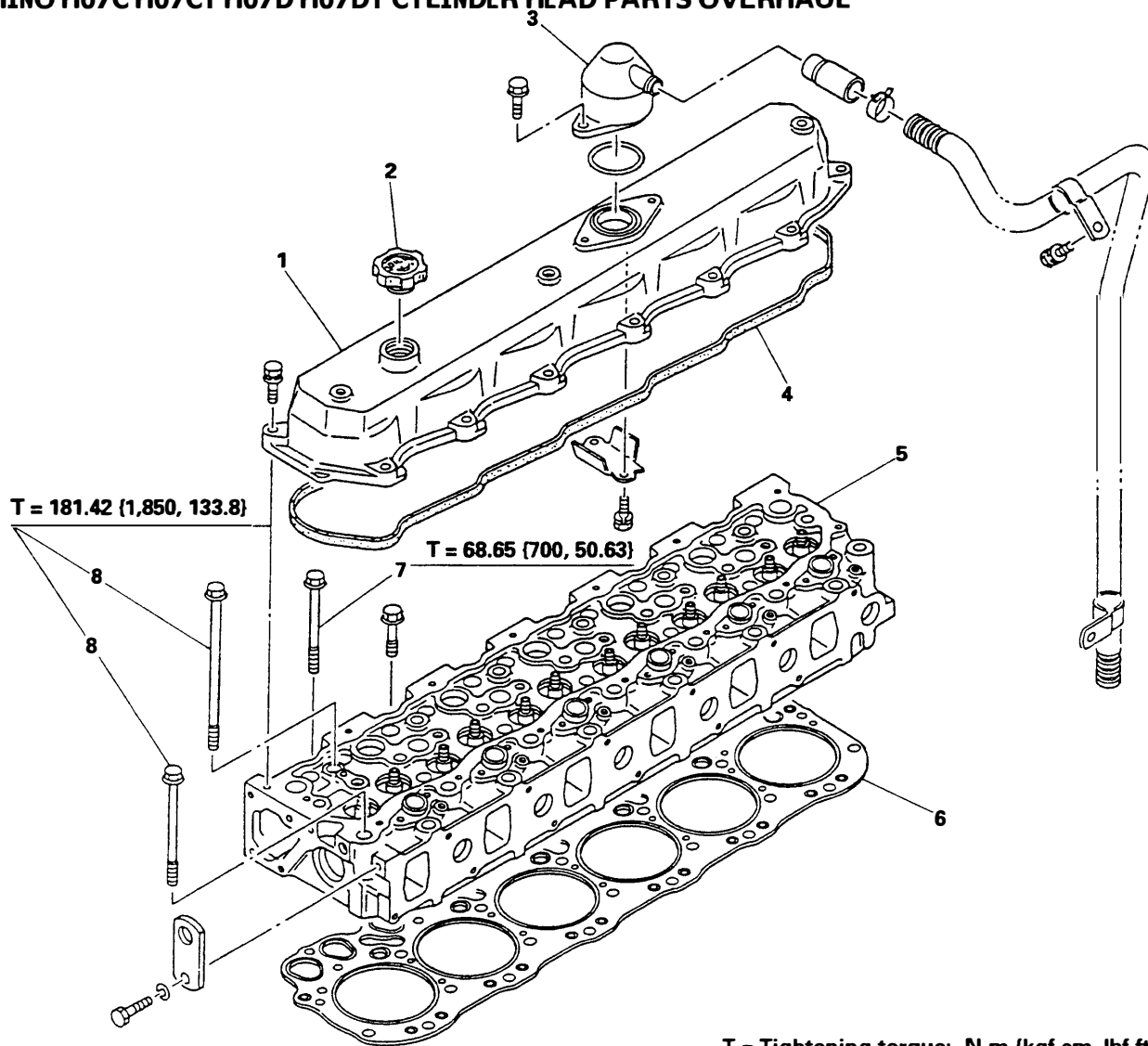
IMPORTANT POINT — MOUNTING

MOUNT THE ENGINE ASSEMBLY.

Mounting of the engine is reverse sequence of dismounting.

CYLINDER HEAD

HINO H07C H07CT H07D H07DT CYLINDER HEAD PARTS OVERHAUL

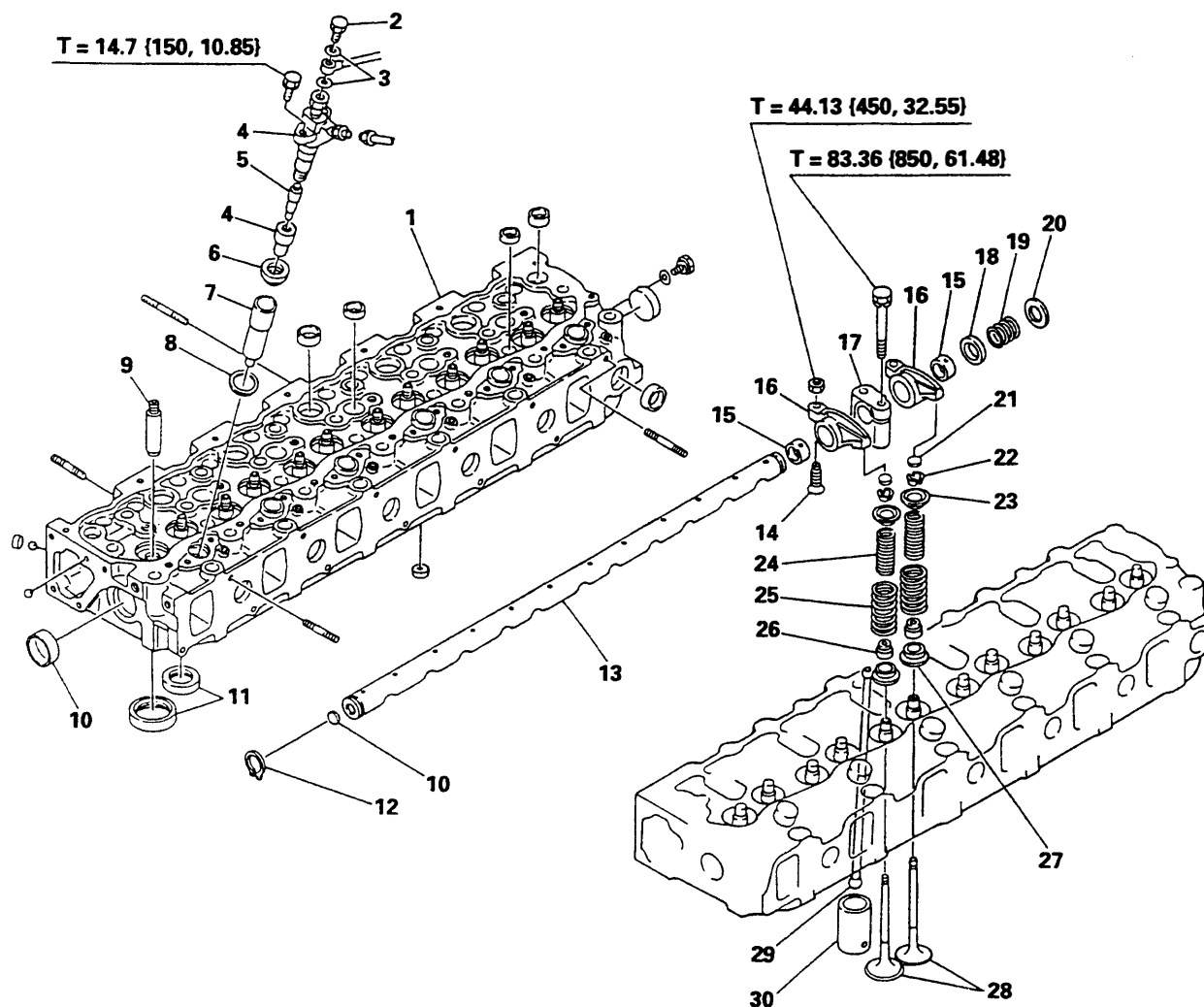


T = Tightening torque: N·m (kgf·cm, lbf·ft)

CYLINDER HEAD AND RELATED PARTS

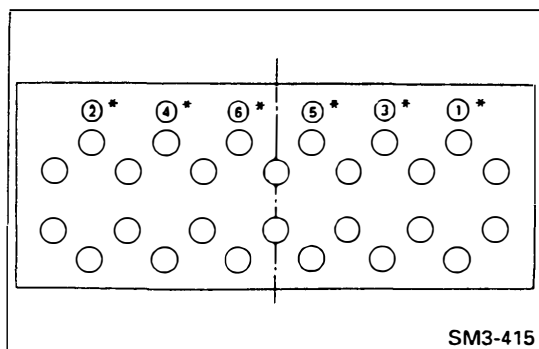
- | | |
|-------------------------------|----------------------------------|
| 1. Cylinder head cover | 5. Cylinder head |
| 2. Oil filler cap | 6. Cylinder head gasket |
| 3. Ventilator | 7. Cylinder head additional bolt |
| 4. Cylinder head cover gasket | 8. Cylinder head bolt |

HINO H07C H07CT H07D H07DT CYLINDER HEAD PARTS OVERHAUL



T = Tightening torque: N·m {kgf·cm, lbf·ft}

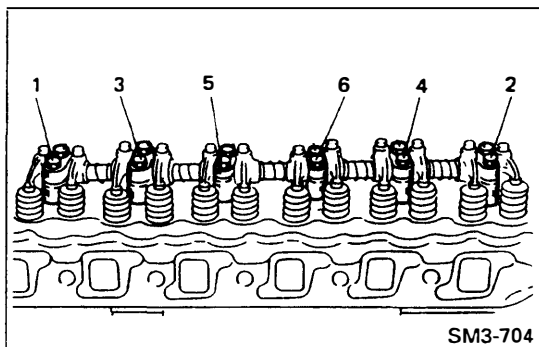
- | | | |
|---------------------------------|-------------------------------------|---------------------------------------|
| 1. Cylinder head | 12. Retainer ring | 23. Valve spring upper seat |
| 2. Connector bolt | 13. Rocker arm shaft | 24. Inner valve spring (If so fitted) |
| 3. Soft washer | 14. Valve clearance adjusting screw | 25. Outer valve spring |
| 4. Fuel injection nozzle holder | 15. Bushing | 26. Valve stem seal |
| 5. Nozzle | 16. Rocker arm | 27. Valve spring lower seat |
| 6. Packing ring | 17. Rocker arm support | 28. Valve |
| 7. Fuel injection nozzle sleeve | 18. Spacer | 29. Push rod |
| 8. O-ring | 19. Spring | 30. Tappet |
| 9. Valve guide | 20. Plain washer | |
| 10. Plug | 21. Valve stem cap | |
| 11. Valve seat | 22. Valve stem key | |

**IMPORTANT POINTS — DISASSEMBLY****REMOVE THE FUEL PIPES AND NOZZLE ASSEMBLY.**

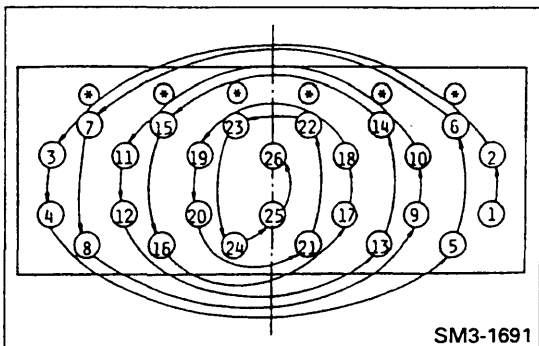
Refer to "INJECTION NOZZLE" in SECTION FUEL SYSTEM.

REMOVE THE CYLINDER HEAD AND ROCKER ARM ASSEMBLY

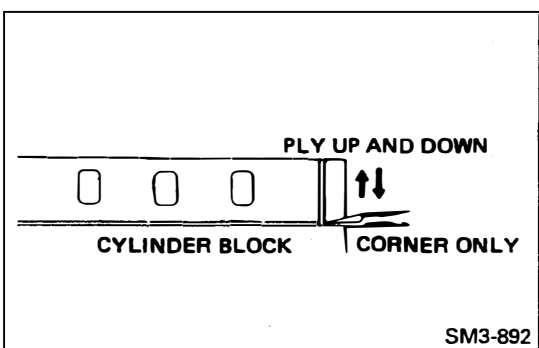
1. Remove the cylinder head additional bolts little by little in three stages and in the numerical order as shown.



2. Remove the rocker arm support bolts.
Loosen the rocker arm support bolts and cylinder head bolt little by little in three stages and in the numerical order as shown.



3. Remove the cylinder head bolts
Loosen the cylinder head bolts little by little in three stages and in the numerical order as shown.

**LIFT THE CYLINDER HEAD FROM THE DOWELS ON THE CYLINDER BLOCK AND PLACE IT ON WOODEN BLOCKS.**

If the cylinder head is difficult to lift off, pry with a chisel between the cylinder head and block.

NOTE: Do not damage the machined surface of the head or block when removing the cylinder head.

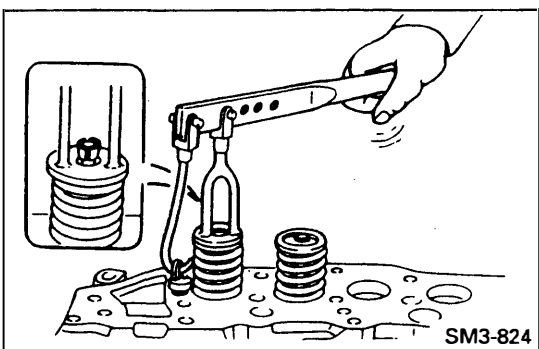
Special Tool: Eye Bolt (09433-1061)
Wire (09491-1010)

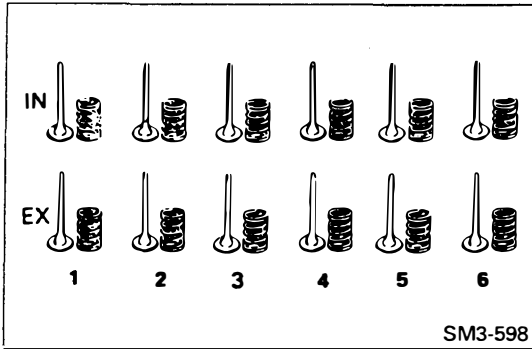
REMOVE THE VALVE SPRINGS.

1. Remove the valve stem keys, upper spring seats, and inner (if so fitted) and outer valve springs from cylinder head.

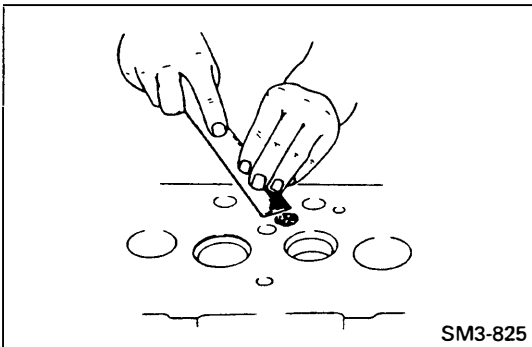
Special Tool: Valve Spring Press (09470-1022)

2. Remove the intake and exhaust valves.





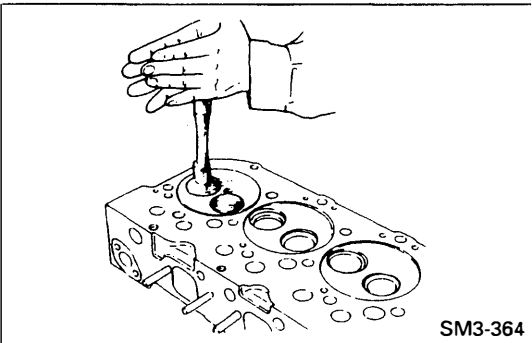
3. Tag valves to identify their cylinder numbers and to leave out the valve lapping.



IMPORTANT POINTS — ASSEMBLY

CLEAN THE CYLINDER HEAD THOROUGHLY WITH A SUITABLE SOLVENT.

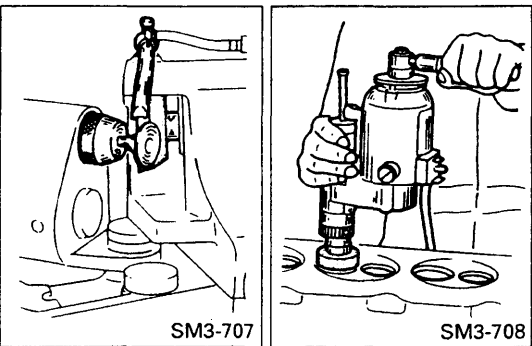
NOTE: Be careful not to damage the cylinder head surface.



IF NECESSARY, HAND-LAP THE VALVE AND VALVE SEAT.

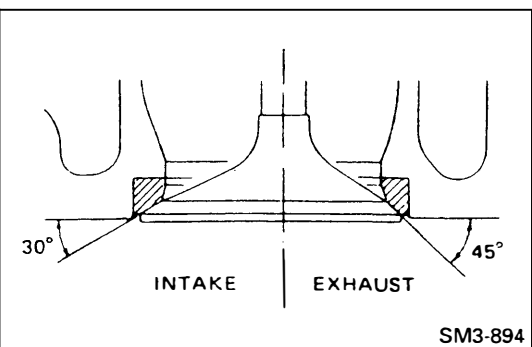
Lightly apply lapping compound to the valve face. Install the valve with a special tool, tap and rotate the valve against the seat.

Special Tool: Valve Lapping Tool (09431-1010)



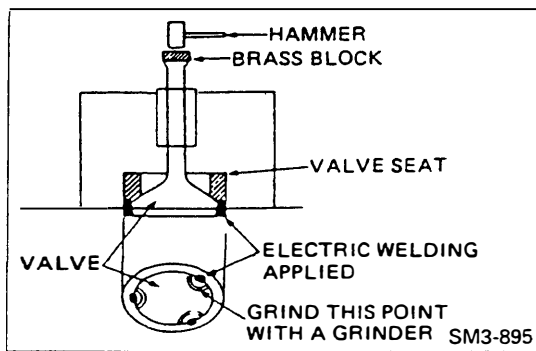
IF NECESSARY, GRIND THE VALVES AND VALVE SEATS.

- NOTE:**
- Grinding of valves and valve seats should only be performed when hand-lapping does not result in proper seating.
 - After grinding, always recheck the valve sink.



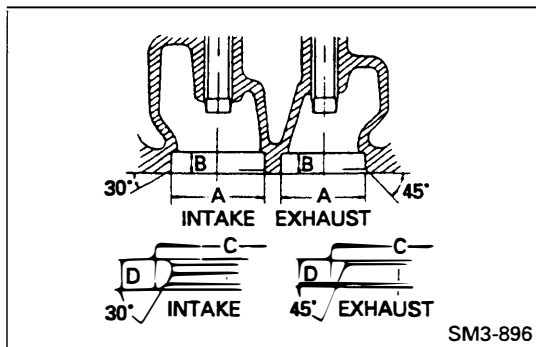
Valve face angle and valve seat angle:

Refer to SECTION DATA AND SPECIFICATIONS.



IF NECESSARY, REPLACE THE VALVE SEAT.

1. Cut the circumference of a valve head at three places with a grinder and install it into the seat as shown and weld the valve to the seat. Then drive the valve and the seat out with a hammer and a brass block.

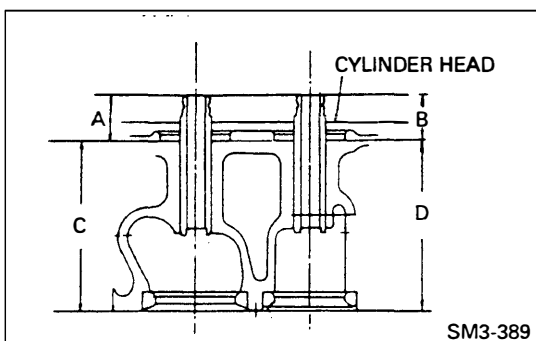
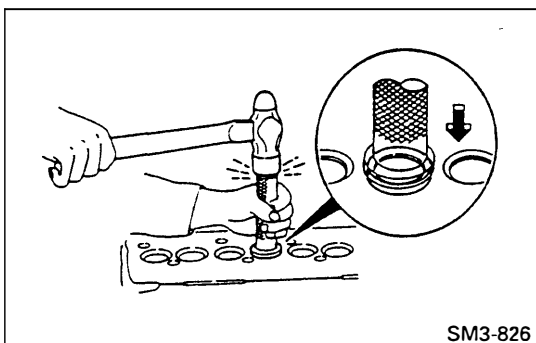


Unit: mm (in)

		Intake	Exhaust
Cylinder head dimension	A	52.000–52.019 {2.0472–2.0479}	45.500–45.516 {1.7913–1.7919}
	B	9.5–9.7 {0.374–0.381}	9.5–9.7 {0.374–0.381}
Valve seat dimension	C	52.085–52.100 {2.0506–2.0511}	45.63–45.645 {1.7965–1.7970}
	D	7.5–7.7 {0.295–0.3031}	8.0–8.2 {0.315–0.322}

3. Valve seat installation.

Heat the cylinder head to about 80° — 100°C {176–212°F} with hot water. On the other hand, cool the valve seat with dry ice or liquid freon for about 30 minutes. Hold the seat with pincers and place it into the heated cylinder head.



IF NECESSARY, REPLACE THE HINO H07C H07CT H07D H07DT VALVE GUIDE.

1. Remove the valve stem seal.
2. Using a brass rod and hammer, drive out the valve guide.
3. Install the valve guide.

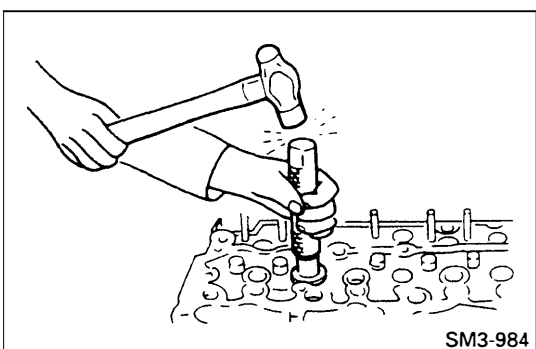
NOTE: Apply engine oil lightly to the valve guide outer circumference before installing.

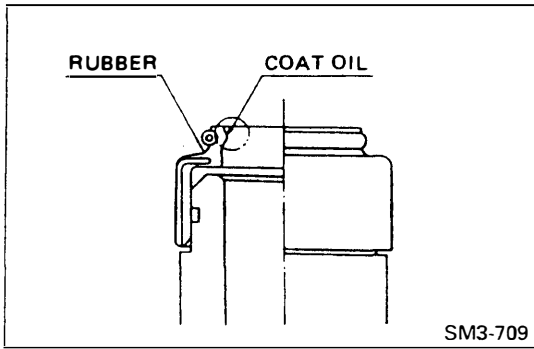
Dimension	A: 23.75 mm {0.935 in}	C: 84.75 mm {3.337 in}
	B: 22.25 mm {0.876 in}	D: 86.25 mm {3.396 in}

IF NECESSARY, REPLACE THE VALVE STEM SEAL.

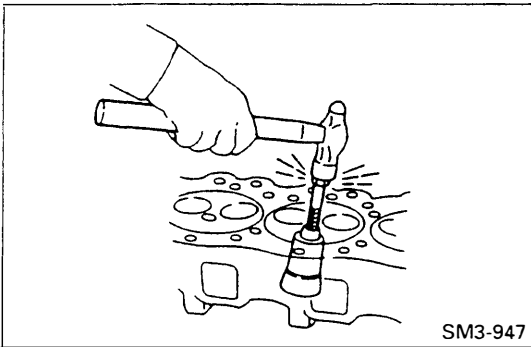
1. Remove the valve stem seal.
 2. Install the valve stem seal.
- First, install the lower spring seat and valve. Then apply engine oil to the lip of the stem seal and drive the stem seal with a special tool.

Special Tool: Valve Stem Seal Press (09472-1770)



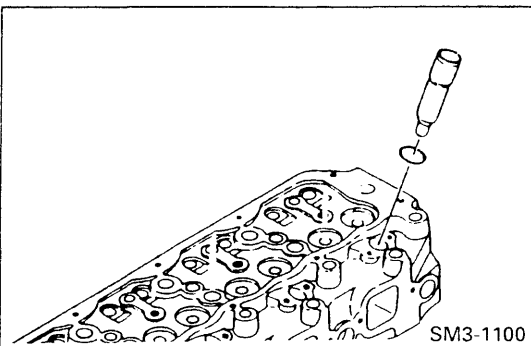


- NOTE:**
- After installing stem seal, make sure that check the rubber position for cracks or any other damage.
 - Do not use the special tool if its tip (surface contacting lower spring seat) is worn or deformed.



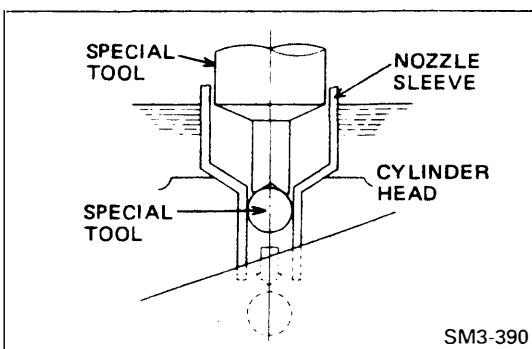
IF NECESSARY, REPLACE THE NOZZLE SLEEVE.

1. Remove the nozzle sleeve.
Place a brass rod with a diameter of 12 mm (0.47 in) at the nozzle hole at the bottom of the cylinder head and remove the cylinder head by hitting the nozzle sleeve.



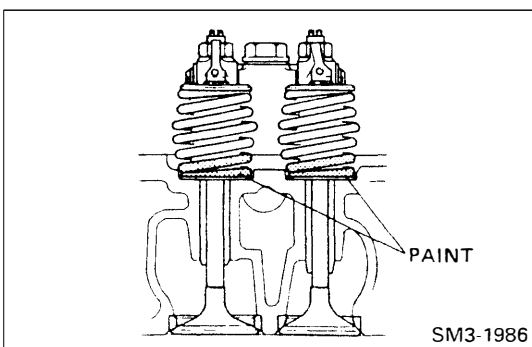
2. Install the nozzle sleeve.
Set the O-ring into the cylinder head
Apply adhesive (Super Three Bond No. 1210 or equivalent) to the lower part of the new copper nozzle sleeve and carefully insert the nozzle sleeve into the cylinder head.

NOTE: A damaged O-ring may cause leaks and lead to overheating or cracked heads.



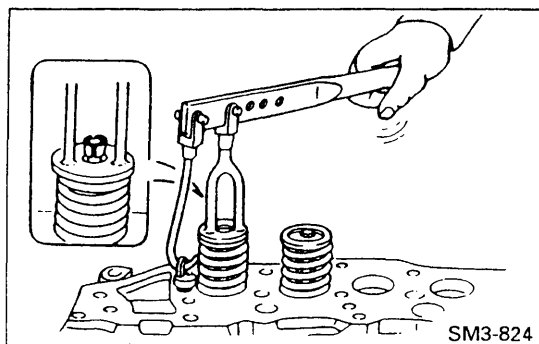
3. Stick the nozzle sleeve fast to the cylinder head by pressing with the special tool.
Insert the seat press (Special tool) into the nozzle sleeve. Push the ball little by little through the hole with the special tool. So that the end of the nozzle sleeve with stick fast to the cylinder head.

Special Tool: Sleeve Bar (09472-1210)
Steel Ball (9800-06100)



ASSEMBLE THE CYLINDER HEAD.

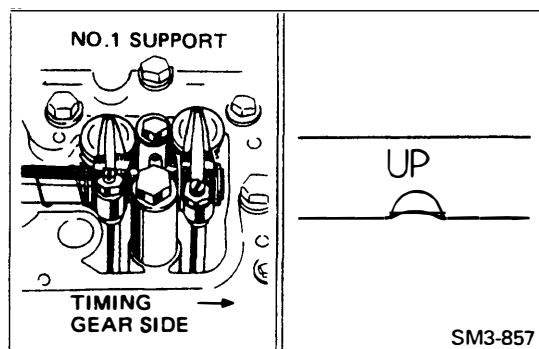
- NOTE:**
- Apply engine oil to contact surfaces of all parts.
 - Make sure that the valves are installed in the correct cylinders.
 - Install the valve springs with their painted side down, since they have variable pitches.



Press upper spring seats and install the valve stem keys securely in the upper spring seats.

Special Tool: Valve Spring Press (09470-1022)

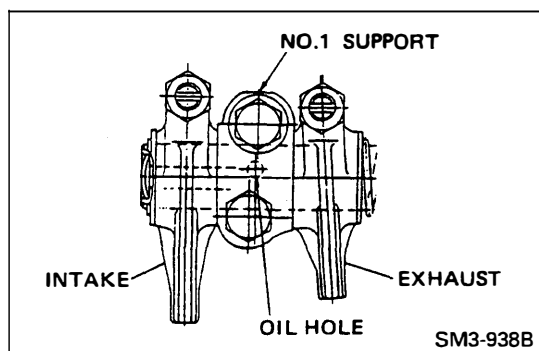
- NOTE:**
- When pressing with the valve spring press, be careful not to damage the stem seals by contacting the upper seats.
 - Drive the valve stem lightly with a hammer to assure proper fit the valve stem key.



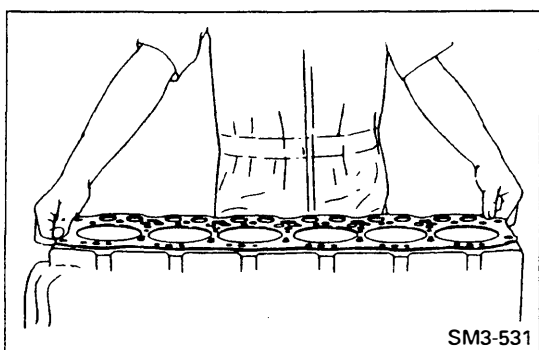
ASSEMBLE THE ROCKER ARM.

Lubricate the rocker arm shaft and bushing.

- NOTE:** Make sure that the rocker arm shaft is installed with the "UP" mark on the shaft upward. Incorrect assembly can result in seizure of the valve stem.



- NOTE:** Confirm that oil hole of rocker arm assembly No. 1 support aligns with shaft oil hole. Improper installation will result in burning of the entire valve assembly.

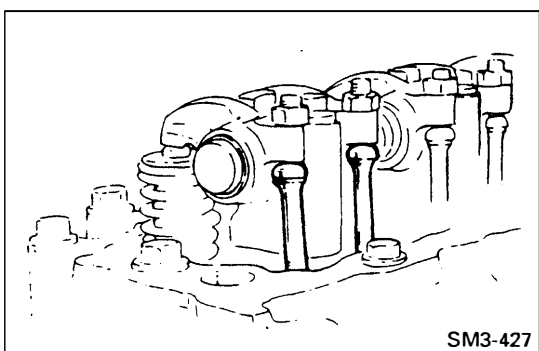


INSTALL THE CYLINDER HEAD AND ROCKER ARM ASSEMBLY.

1. Apply engine oil to the valve lifter face and valve lifter guide then install the valve lifter.
2. Install the cylinder head gasket.

NOTE: Always use new cylinder head gasket after cleaning the surface of the cylinder head, cylinder block and head gasket free of all dirt, water and grease.

3. Install the cylinder head over the dowels on the cylinder block.



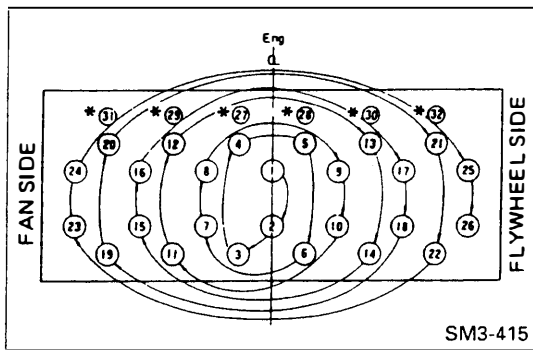
4. Insert the push rods in correct order, after applying engine oil to both ends.
5. Mount the rocker arm assembly on the cylinder head, make sure that the push rods interlock with the adjusting screws.

NOTE: Always loosen the lock nut and raise the adjusting screws fully to the top.

HINO DIESEL ENGINE PARTS

CONTACT EMAIL:

EngineParts@HeavyEquipmentRestorationParts.com
Phone: 269 673 1638



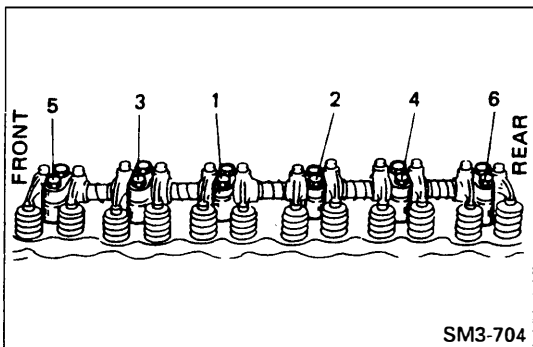
6. Tighten the cylinder head bolts and cylinder head additional bolts (* Mark bolts) in three stages following the tightening order as shown.

NOTE: Apply engine oil to the bolt threads and under the bolt head.

No. 1 – No. 26 Bolts (Cylinder head bolt)

No. 27 – No. 32 Bolts (Cylinder head additional bolt)

Special Tool: Wrench (09411-1070)



7. Tighten the rocker arm support bolts in three stages following the tightening order.
Tighten the bolts to the specified torque at each stage.

INSTALL THE NOZZLE HOLDER

Refer to "INSPECTION NOZZLE" in SECTION FUEL SYSTEM.

HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

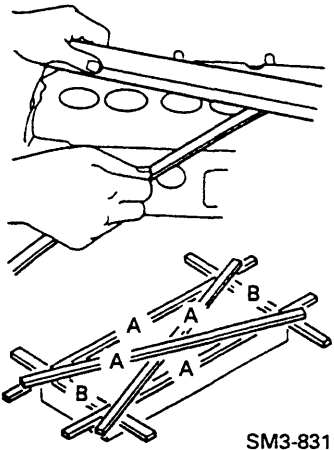
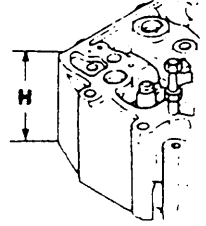
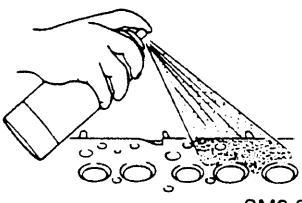
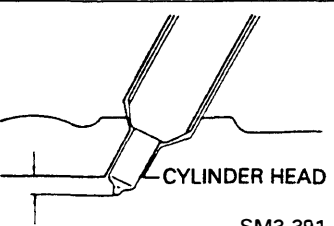
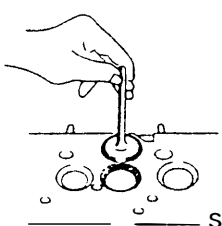
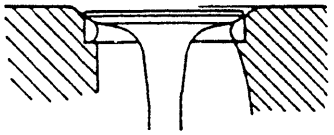
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

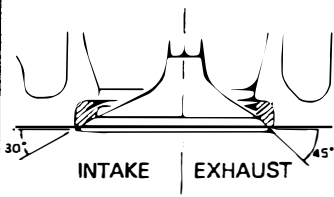
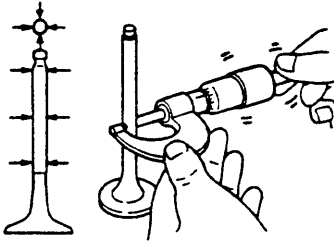
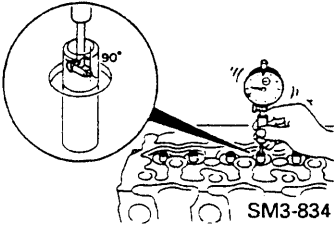
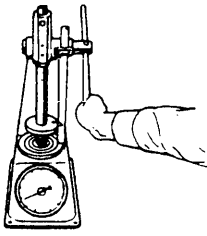
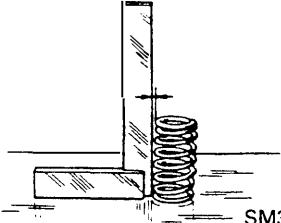
Website: www.HeavyEquipmentRestorationParts.com

INSPECTION AND REPAIR

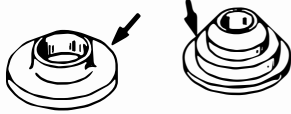
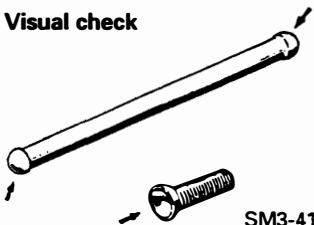
Unit: mm {in}

Inspection Item		Standard	Limit	Remedy	Inspection Procedure
Cylinder Head Flatness		Less than 0.05 {0.0019} at direction A	0.1 {0.0039}	Regrind or replace	 SM3-831
		Less than 0.03 {0.0012} at direction B			
Cylinder Head Height (H)		94.9–95.1 {3.7362–3.7440}	94.7 {3.7283}	Replace	 SM3-887
Cylinder Head Cracks and Damage * Using a Dye Penetrant		—	—	Replace if necessary	 SM3-832
Nozzle Protrusion from Cylinder Head Surface		2.1–2.7 {0.083–0.106}	— sleeve	Replace nozzle sleeve	 SM3-391
Valve Seating Condition * Using Red Lead Marking Compound		There should be good contact around entire circumference of valve head.	—	Hand-lap with lapping com- pound	 SM3-833
Valve Sink	Intake	0.65–0.95 {0.0256–0.0374}	1.2 {0.0472}	Replace valve and/or valve seat	 SM3-420
	Exhaust	1.15–1.45 {0.0453–0.0570}	1.7 {0.0669}		

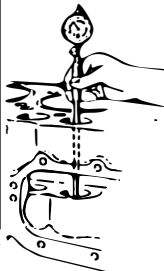
Unit: mm {in}

Inspection Item			Standard	Limit	Remedy	Inspection Procedure
Valve Seat Angle	Intake		30°-30°30'	—	Regrind or replace valve and/or valve seat	 INTAKE EXHAUST SM3-899
	Exhaust		45°-45°30'			
Valve Face Angle	Intake		29°30'-30°			
	Exhaust		44°45'-45°			
Hino H07C H07CT H07D H07DT Intake Valve Stem Diameter			8.947-8.965 {0.3522-0.3529}	8.90 {0.3504}	Replace valve guide and/or valve	 SM3-835
Hino H07C H07CT H07D H07DT Exhaust Valve Stem Diameter			8.932-8.950 {0.3717-0.3724}	8.80 {0.3465}		
Hino H07C H07CT H07D H07DT Intake and Exhaust Valve Guide Diameter			9.020-9.035 {0.3551-0.3557}	9.1 {0.3582}		
Clearance between Valve Stem and Valve Guide	Intake		0.055-0.085 {0.0022-0.0033}	0.18 {0.070}	Replace valve guide and/or valve stem	 SM3-834
	Exhaust		0.070-0.103 {0.0028-0.0040}	0.23 {0.0091}		
Valve Spring Setting Load	Inner (If so fitted)	IN	141.2N {14.4kgf, 31.74lbf} at 47.2 {1.85}	—	Replace if necessary	 23-024
		Ex	130.3N {14.2kgf, 31.30lbf} at 47.4 {1.86}			
	Outer	IN	405.0N {41.3kgf, 91.04lbf} at 50.2 {1.97}	—	Replace	
		Ex	398.1N {40.6kgf, 89.50lbf} at 50.4 {1.98}			
Valve Spring Seat for Wear			—	2.00 {0.078}	Replace if necessary	 SM3-303

Unit: mm {in}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Hino H07C H07CT H07D H07DT Valve Spring Seat for Wear	—	—	Replace	Visual check  SM3-529
Rocker Arm Shaft Diameter	24.159–24.180 {0.9511–0.9520}	24.12 {0.9496}	Replace rocker arm bushing and/or shaft	 SM3-291
Clearance between Rocker Arm Shaft and Bushing	0.030–0.101 {0.0012–0.0039}	0.15 {0.0059}		
Hino H07C H07CT H07D H07DT Rocker Arm and Valve stem Cap Wear or Damage	—	—	Resurface or replace	Visual check  SM3-930
Push Rod Bend	—	0.25 {0.0098}	Replace	 SM3-292
Adjusting Screws and Push Rods Damage	—	—	Replace	Visual check  SM3-419

HINO DIESEL ENGINE PARTS CONTACT**EMAIL:****EngineParts@HeavyEquipmentRestorationParts.com****Phone: 269 673 1638****Website: www.HeavyEquipmentRestorationParts.com**

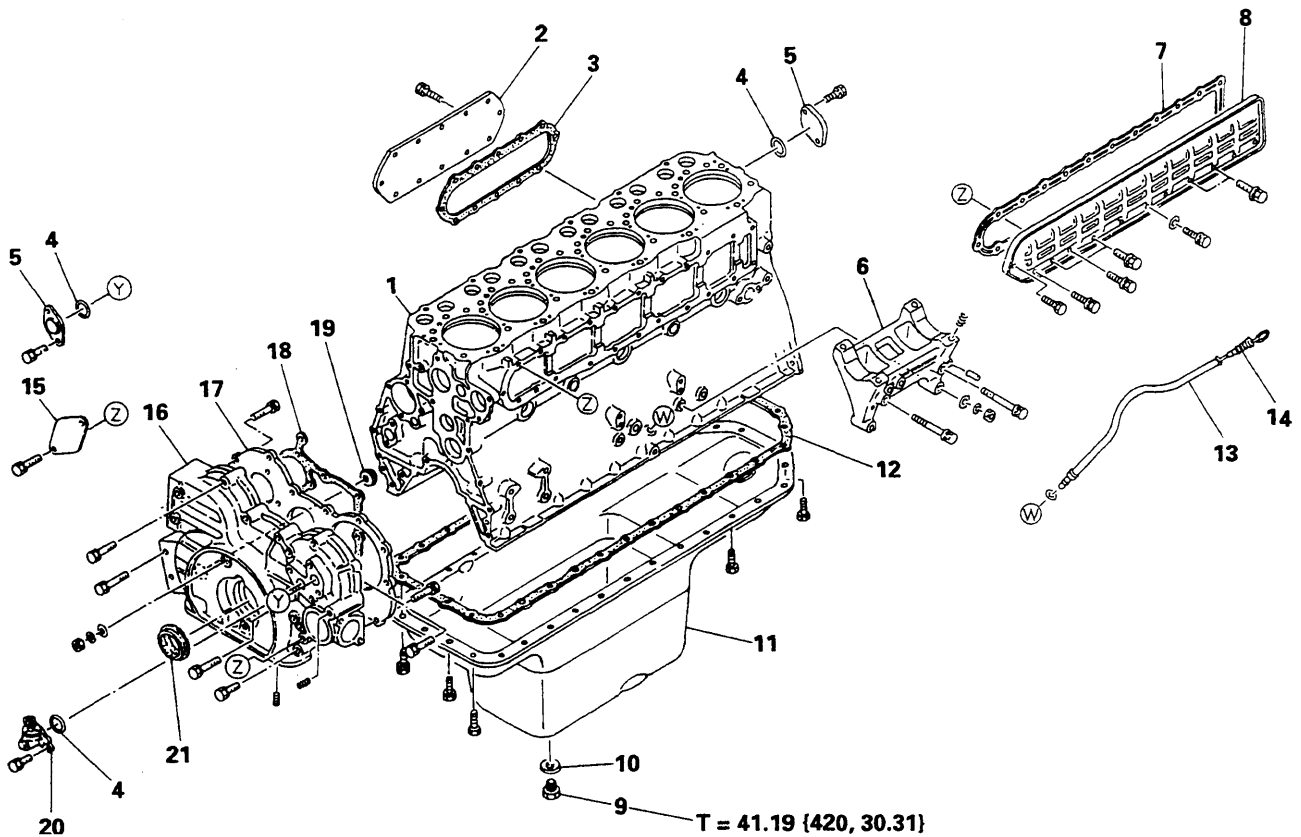
Inspection Item	Standard	Limit	Remedy	Inspection Procedure	
Tappet Diameter	31.950~31.975 {1.2579~1.2589}	31.92 {1.2567}	Replace tappet		
Tappet Guide Inside Diameter	32.000~32.025 {1.2598~1.2608}	32.05 {1.2618}			
Clearance between Tappet and Tappet Guide	0.025~0.075 {0.0010~0.0029}	0.10 {0.0039}			
Tappet for Wear	Should not be worn unevenly.	—	Replace, if necessary	Visual check	

SM3-949

SM3-420

HINO H07C H07CT H07D H07DT TIMING GEAR, CAMSHAFT AND OIL PAN

OVERHAUL

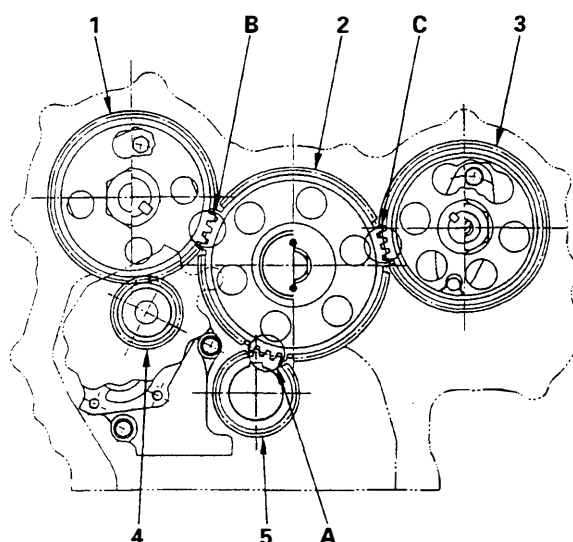


SM3-2441

T = Tightening torque: N·m (kgf·cm, lbf·ft)

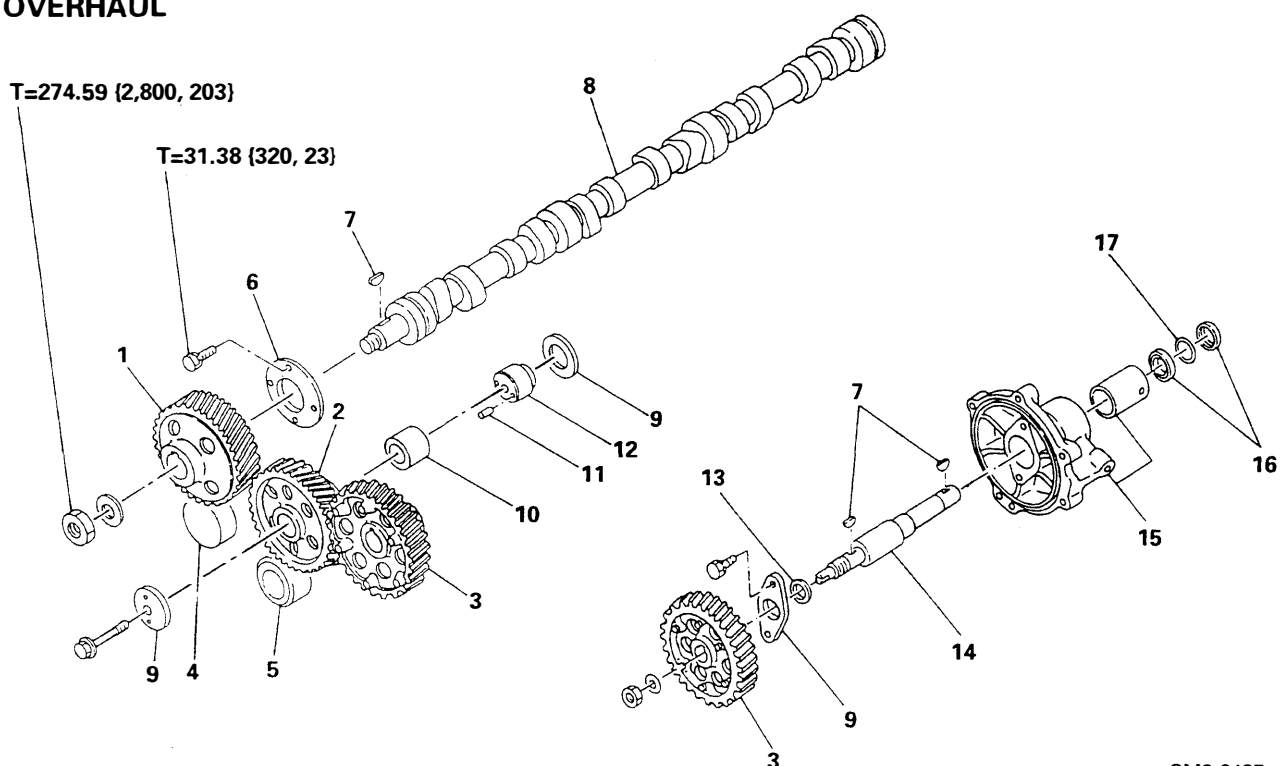
- | | | |
|--------------------------------|-------------------------------|----------------------------|
| 1. Cylinder block | 8. Water gallery cover gasket | 15. Plate seal |
| 2. Valve push rod cover | 9. Plug | 16. Timing gear case cover |
| 3. Valve push rod cover gasket | 10. Soft washer | 17. Front end plate |
| 4. O-ring | 11. Oil pan | 18. Front end plate gasket |
| 5. Flange | 12. Oil pan gasket | 19. Silent block |
| 6. Injection pump bracket | 13. Oil level gage guide | 20. Tachometer drive |
| 7. Water gallery cover gasket | 14. Oil level gage | 21. Oil seal |

HINO H07C H07CT H07D H07DT TIMING GEARS VALVE TRAIN CAMSHAFT



SM3-2436

OVERHAUL



SM3-2437

T = Tightening torque: N·m (kgf·cm lbf·ft)

1. Camshaft gear
2. Idler gear
3. Fuel injection pump drive gear
4. Oil pump drive gear
5. Crankshaft gear
6. Camshaft thrust plate
7. Key

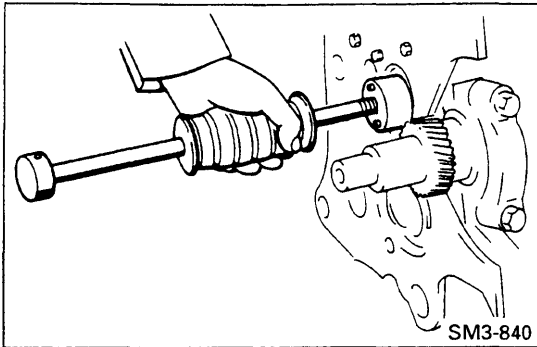
8. Camshaft
9. Thrust plate
10. Bushing
11. Pin
12. Idler gear shaft
13. Collar
14. Injection pump drive shaft

15. Bearing holder case
16. Oil seal
17. O-ring
- A. Match marks "1"
- B. Match marks "2"
- C. Match marks "3"

IMPORTANT POINT — DISASSEMBLY

REMOVE THE CRANKSHAFT PULLEY

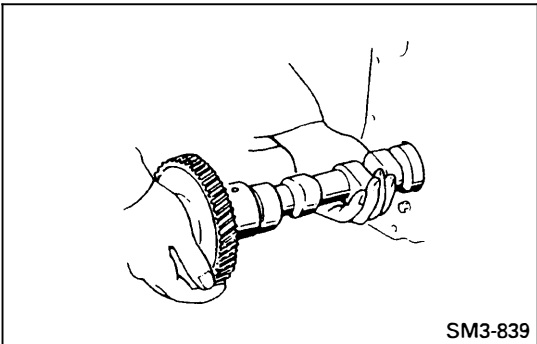
- NOTE:
- Use a puller if necessary
 - Do not remove the crankshaft gear unless it is considered absolutely necessary.



REMOVE THE IDLER GEAR SHAFT.

Using a special tool, remove the idler gear shaft.

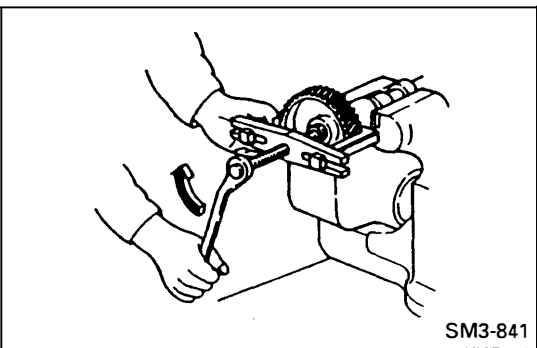
Special Tool: Sliding Hammer (09420-1442)



REMOVE THE CAMSHAFT.

Remove the thrust bearing fitting bolts and pull out the camshaft with gear from cylinder block.

NOTE: Pull the camshaft, slowly turning it so as not to damage the bearings.



IF NECESSARY, REMOVE THE CAMSHAFT GEAR AND INJECTION PUMP DRIVE GEAR.

Hold the shaft assembly with a vice through wooden plates. Remove the nut, then using a gear puller, remove the gear.

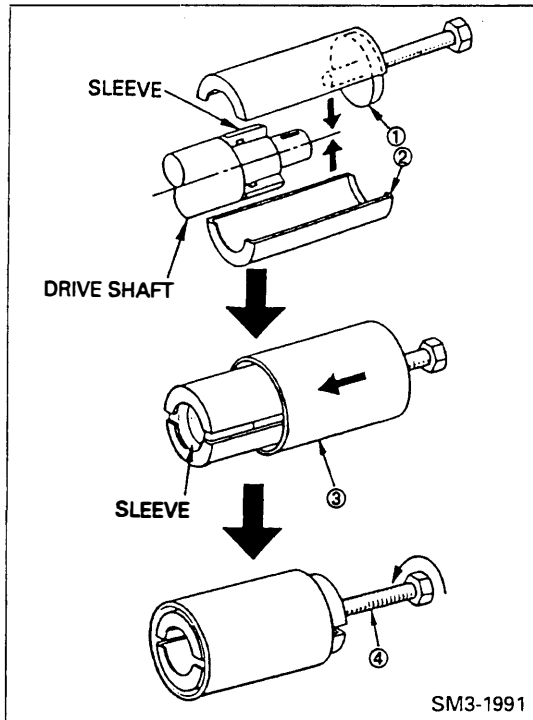
HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

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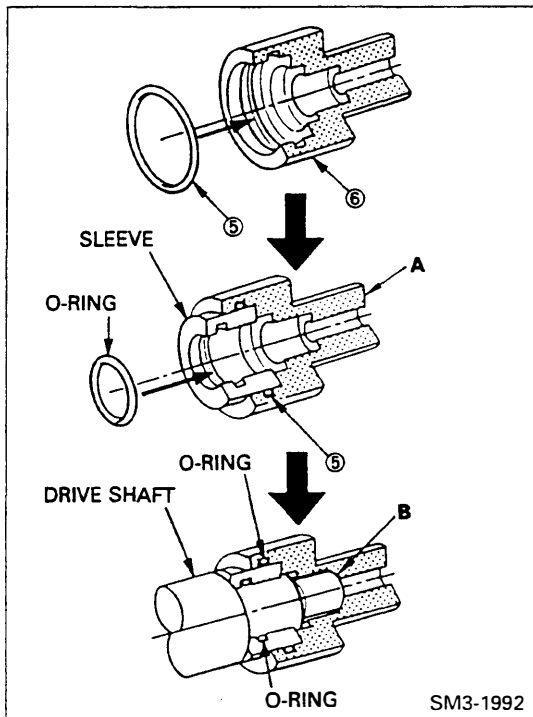


IMPORTANT POINTS — ASSEMBLY

IF NECESSARY, REPLACE THE FUEL INJECTION PUMP DRIVE SHAFT OIL SEAL SLEEVE.

1. Using a special tool, remove the sleeve.
 - a. Put the puller (1), (2) onto the sleeve.
 - b. Insert the hook portion of the puller between shaft and sleeve.
 - c. Insert the puller (3).
 - d. After inserting the puller, screw in the center bolt (4), then remove the sleeve.

Special Tool: Puller Assembly (09420-1670)



2. Using special tools, insert the shaft sleeve with a new O-ring.
 - a. Put the O-ring (5) into the press (6).
 - b. Insert the new oil seal sleeve with new O-ring into the press and then insert them into the drive shaft.
 - c. Hitting the (A) lightly by hammer, contact the press end and the shaft end (B), with this determine the oil seal sleeve position.

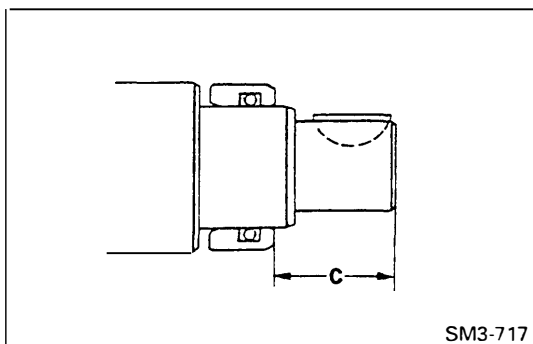
NOTE: ○ Be sure to fit an O-ring on the sleeve and also apply a liberal coating of oil to the shaft.

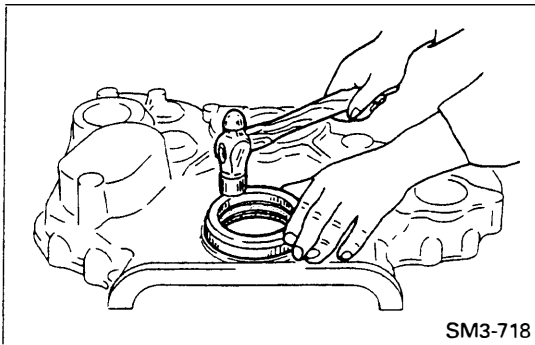
○ When driving on the shaft sleeve, taking care that the O-ring does not get cut or torn.

○ Once a sleeve has been removed, it cannot be reused.

Special Tool: Press (09482-1850)
O-ring (9851-36104)

Distance from the shaft end to the sleeve end (C):
85.2–85.8 mm {3.355–3.77 in}



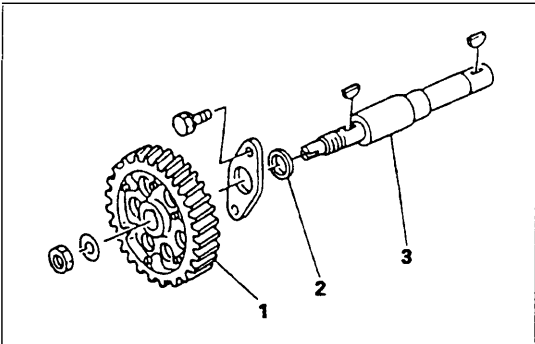


SM3-718

IF NECESSARY, REPLACE THE TIMING GEAR COVER OIL SEAL.

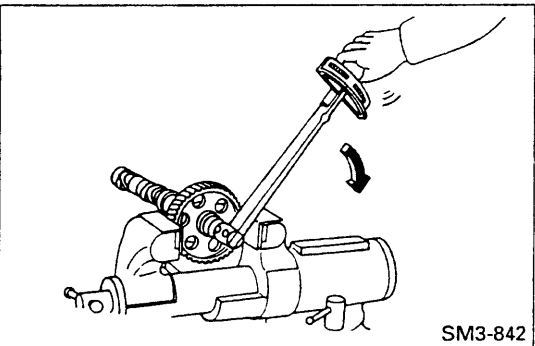
1. Using a screwdriver, remove the oil seal.
2. Install the new oil seal.

Special Tool: Press (09482-1090)

**INSTALL THE INJECTION PUMP DRIVE GEAR TO THE SHAFT.**

1. Fit the collar, thrust bearing and key to the shaft.
2. Install the gear (1) heated to about 100°C {212°F} on the shaft.

NOTE: Make sure that the gear (1) is closely fitted against the collar (2) and shaft (3).



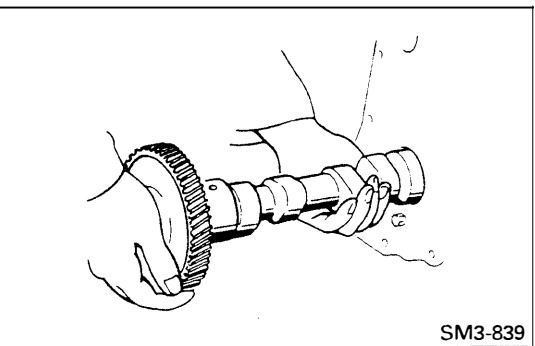
SM3-842

INSTALL THE HINO H07C H07CT H07D H07DT CAMSHAFT GEAR TO THE SHAFT.

Install the camshaft gear with thrust plate.

NOTE: When installing the gear to the camshaft.:

- Heat the gear in hot water [Approx. 100°C {212°F}], then install the gear to the camshaft by using a press.
- When tightening the nut, apply engine oil to the threads and plate surface of the nut.

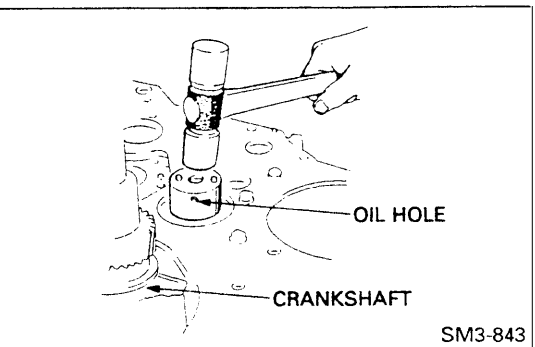


SM3-839

INSTALL THE CAMSHAFT.

Lubricate all journals of the camshaft and insert the camshaft assembly into the cylinder block.

NOTE: Insert the camshaft, slowly turning while inserting so that the bearing will not be damaged.

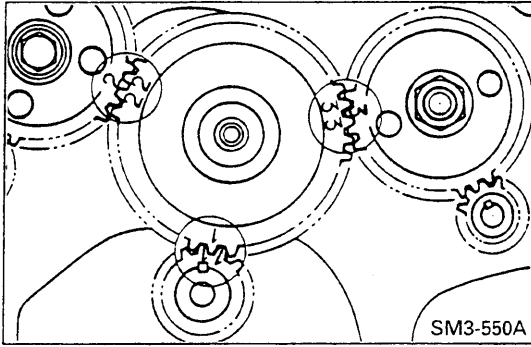


SM3-843

INSTALL THE IDLER GEAR SHAFT.

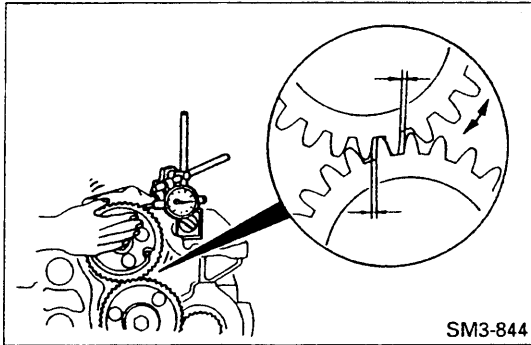
Install the idler gear shaft with thrust plate using a plastic hammer.

NOTE: Be sure that the oil hole is downward, if installed the wrong way, damage to the idler gear shaft and bushing can result.

**INSTALL THE IDLER GEAR.**

When installing the idler gear, be sure that the match marks of the crankshaft gear, camshaft gear, fuel injection pump drive gear, and idler gear are aligned correctly.

- NOTE:**
- Incorrect installation can results in engine damage or lowering of engine performance by causing improper injection timing.
 - When tightening the bolt, apply engine oil to the threads and plate surface of the bolt.

**MEASURE THE GEAR BACKLASH.**

Measure the backlash of each gear using a dial indicator.

Replace the gear if necessary.

Refer to INSPECTION AND REPAIR.

INSTALL THE TIMING GEAR COVER.

Refer to "LIQUID GASKET AND APPLICATION POINTS".

INSTALL THE OIL PUMP AND OIL STRAINER.

Refer to "OIL PUMP AND OIL STRAINER" in SECTION LUBRICATING SYSTEM.

INSTALL THE CRANKSHAFT PULLEY.**HINO DIESEL ENGINE PARTS CONTACT****EMAIL:**

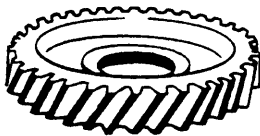
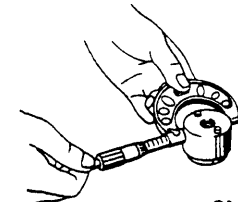
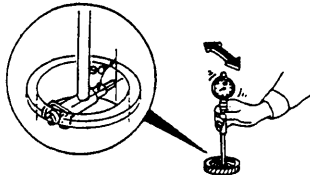
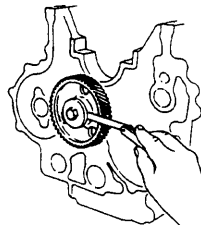
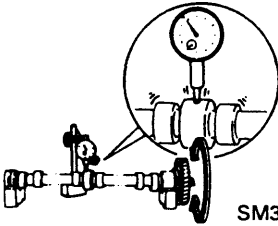
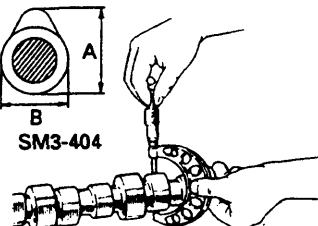
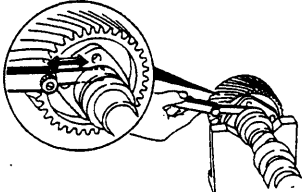
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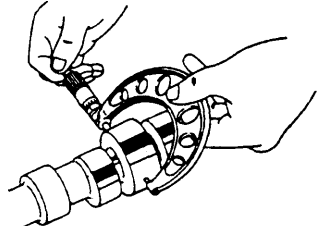
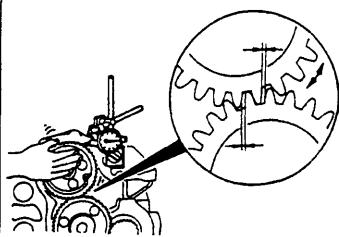
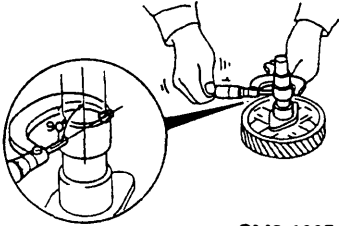
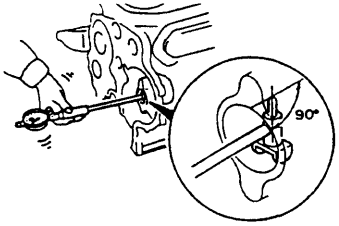
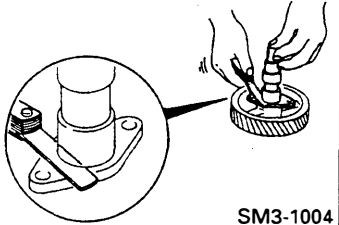
Website: www.HeavyEquipmentRestorationParts.com

INSPECTION AND REPAIR

Unit: mm {in}

Inspection Item			Standard	Limit	Remedy	Inspection Procedure
Gear Teeth for Pitting or Wear			—	—	Replace, if necessary	Visual check  SM3-845
Oil Clearance Between Idler Gear Shaft and Bearing			0.030–0.080 {0.0012–0.003}	0.20 {0.0078}	Replace gear and shaft	 SM3-846  SM3-847
Idler Gear End Play			0.040–0.095 {0.0016–0.0037}	0.30 {0.0118}	Replace thrust bearing	 SM3-421
Camshaft Bend			—	0.05 {0.0020}	Replace	 SM3-858
Camshaft Cam Lift (A – B)	H07D	Intake	7.61 {0.2996}	7.53 {2.9645}	Replace	 SM3-404 SM3-374
		Exhaust	9.01 {0.3547}	8.93 {0.3515}		
	H07C-T	Intake	7.39 {0.2909}	7.59 {0.2595}		
		Exhaust	9.01 {0.3547}	8.93 {0.3515}		
Camshaft End Play			0.100–0.178 {0.0040–0.0070}	0.30 {0.0118}	Replace thrust plate	 SM3-848

Unit: mm {in}

Inspection Item		Standard	Limit	Remedy	Inspection Procedure
Camshaft Journal Diameter Journal No.	No. 1	61.45–61.47 {2.4193–2.4200}	61.35 {2.4154}	Replace camshaft	 SM3-849
	No. 2	61.05–61.07 {2.4035–2.4043}	60.95 {2.3996}		
	No. 3	60.65–60.67 {2.3878–2.3885}	60.55 {2.3839}		
	No. 4	58.25–58.27 {2.2933–2.2940}	58.15 {2.2894}		
Oil Clearance between Camshaft Journal and Bearing		0.03–0.08 {0.0012–0.0031}	0.20 {0.0078}	Replace camshaft and/or bearing	 SM3-850
Timing Gear Backlash	Crankshaft Gear – Idler Gear	0.05–0.11 {0.0020–0.0043}	0.30 {0.0118}	Replace gear, if necessary.	 SM3-844
	Idler Gear – Injection Pump Drive Gear	0.05–0.11 {0.0020–0.0043}	0.30 {0.0118}		
	Idler Gear – Camshaft Gear	0.05–0.11 {0.0020–0.0043}	0.30 {0.0118}		
	Camshaft Gear – Oil Pump Gear	0.05–0.11 {0.0020–0.0043}	0.30 {0.0118}		
Clearance between Injection Pump Drive Shaft and Bearing		0.030–0.072 {0.0012–0.0028}	0.30 {0.0118}	Replace bearing and/or shaft	 SM3-1005  SM3-1008
Injection Pump Drive Gear End Play		0.100–0.200 {0.0039–0.0079}	0.30 {0.0118}	Replace thrust bearing	 SM3-1004

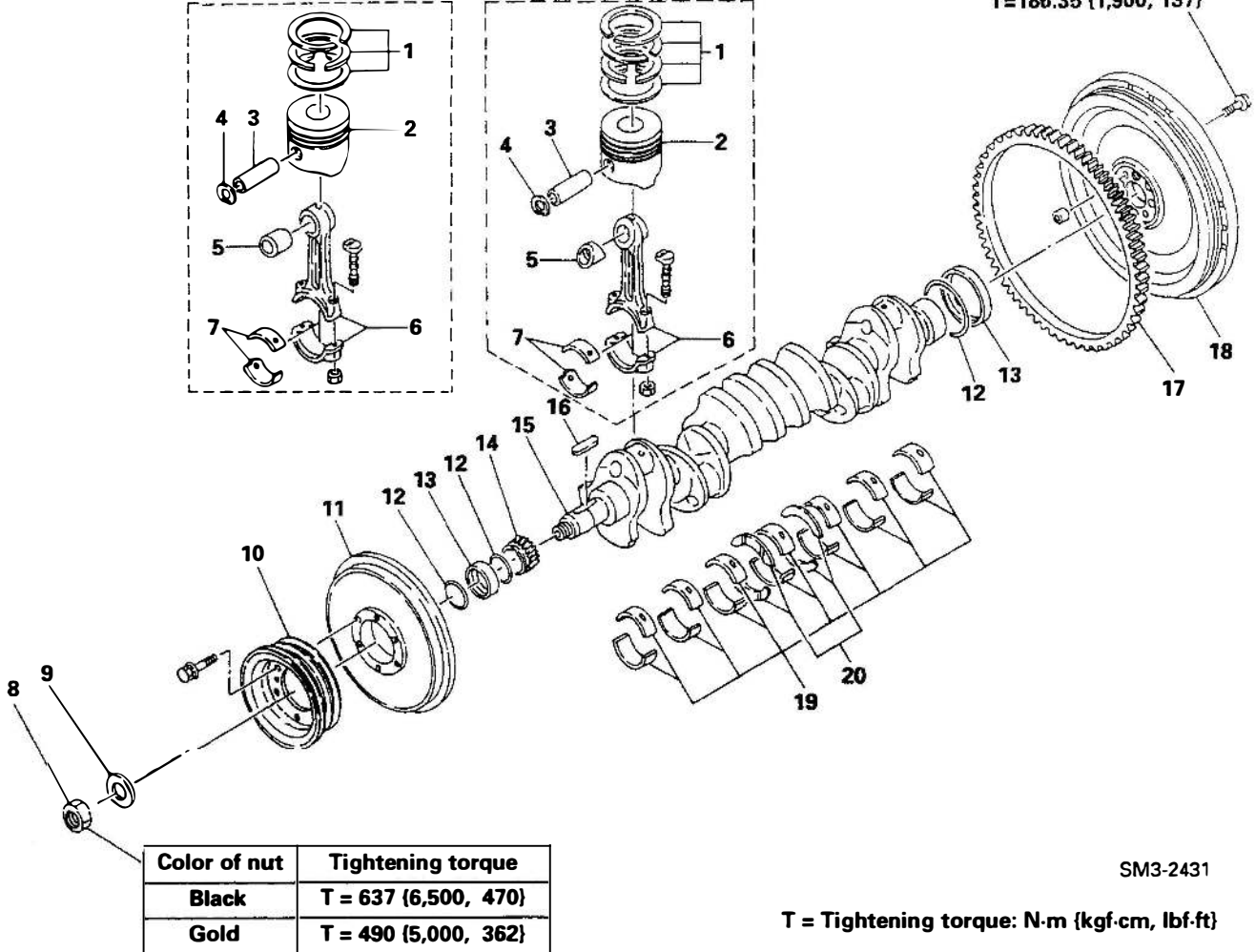
HINO H07C H07CT H07D H07DT PISTON, CRANKSHAFT, CYLINDER BLOCK AND FLYWHEEL HOUSING

OVERHAUL

For model HINO H07D H07DT

For model Hino H07C H07CT

T=186.35 {1,900, 137}



SM3-2431

- | | | |
|-------------------------------|-----------------------|--------------------|
| 1. Piston ring | 8. Nut | 15. Crankshaft |
| 2. Piston | 9. Collar | 16. Key |
| 3. Piston pin | 10. Crankshaft pulley | 17. Ring gear |
| 4. Retainer ring | 11. Torsional dumper | 18. Flywheel |
| 5. Piston pin bushing | 12. O-ring | 19. Main bearing |
| 6. Connecting rod | 13. Sleeve | 20. Thrust bearing |
| 7. Connecting rod cap bearing | 14. Crankshaft gear | |

HINO DIESEL ENGINE PARTS CONTACT

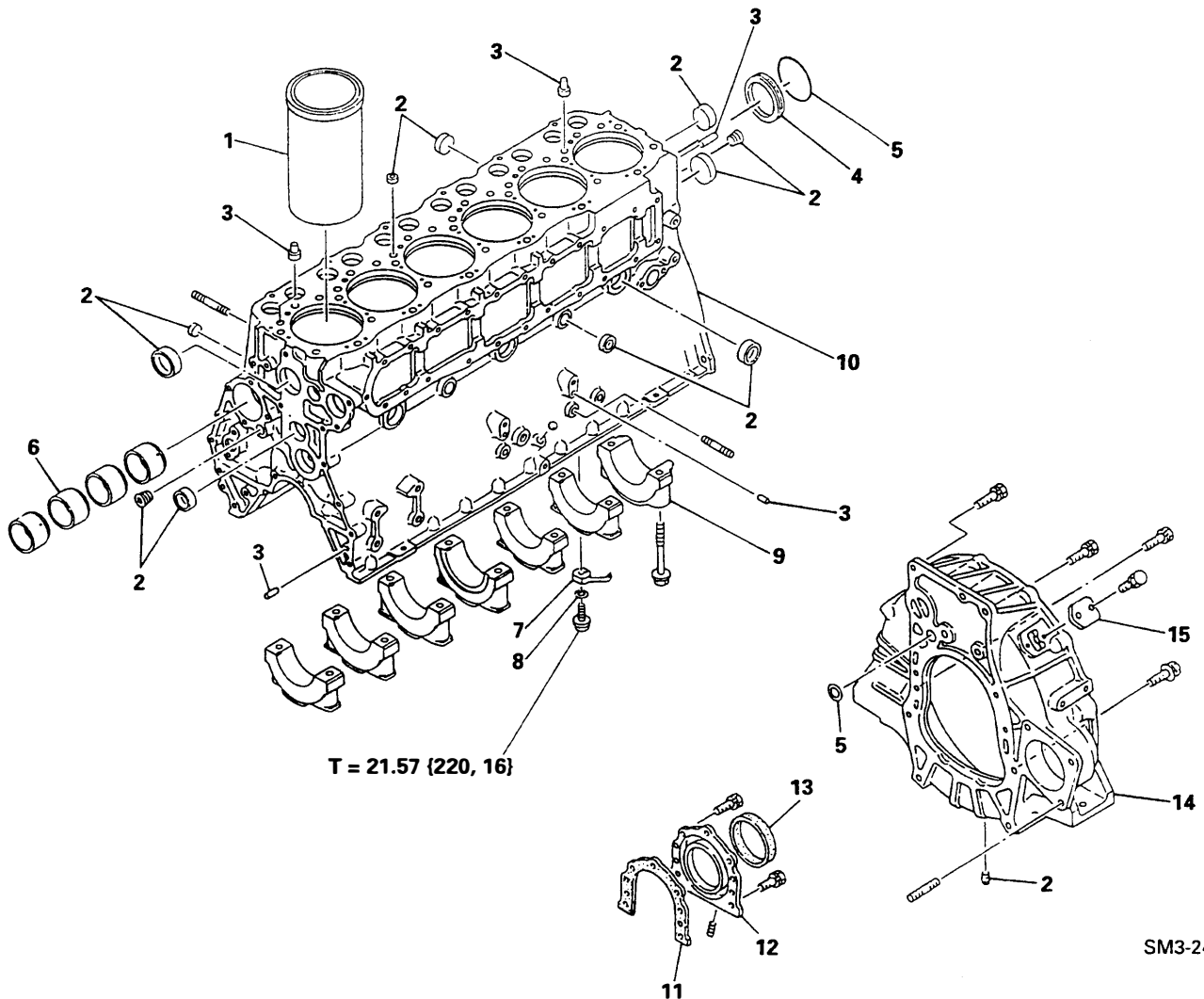
EMAIL:

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HINO H07C H07CT H07D H07DT ENGINE OVERHAUL PARTS



SM3-2438

T = Tightening torque: N·m {kgf·cm, lbf·ft}

- | | | |
|-------------------|---------------------------|------------------------------|
| 1. Cylinder liner | 6. Camshaft bearing | 11. Oil seal retainer gasket |
| 2. Plug | 7. Oil jet pipe | 12. Oil seal retainer |
| 3. Pin | 8. Soft washer | 13. Oil seal |
| 4. Seal plate | 9. Crankshaft bearing cap | 14. Flywheel housing |
| 5. O-ring | 10. Cylinder block | 15. Flywheel dust cover |

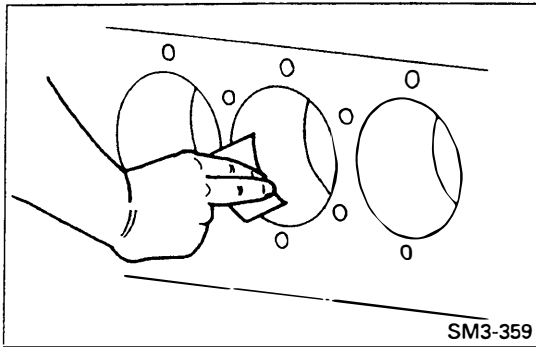
HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

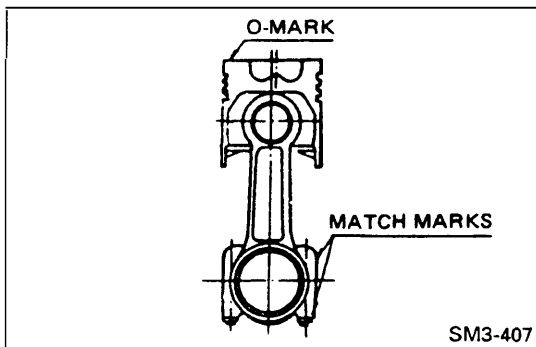
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

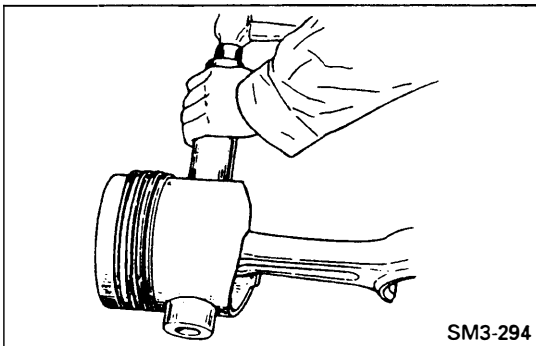
[Website: www.HeavyEquipmentRestorationParts.com](http://www.HeavyEquipmentRestorationParts.com)



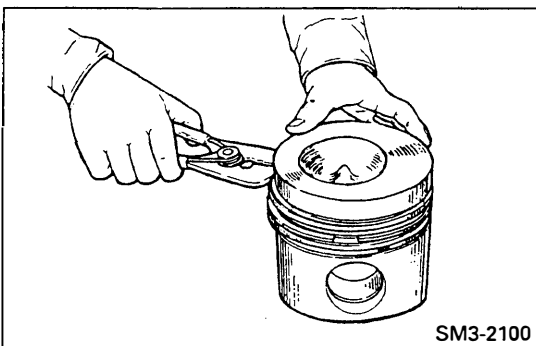
SM3-359



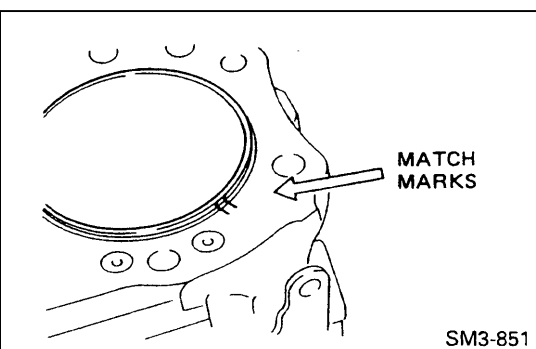
SM3-407



SM3-294



SM3-2100



SM3-851

IMPORTANT POINTS — DISASSEMBLY

REMOVE THE PISTONS WITH CONNECTING RODS.

1. Remove the carbon from the upper end of the cylinder liner with a scraper or emery paper (recommended: No. 150) in a circular direction.

2. Extract the piston and connecting rod assembly out through the top of the cylinder.

NOTE:

- Remove the connecting rod in such a way that the connecting rod does not contact the cooling jet. Adjust the cooling jet if by any chance the rod and the jet make.
- Arrange the piston and connecting rod caps in order.

REMOVE THE HINO H07C H07CT H07D H07DT CONNECTING ROD.

Remove the retainer ring installed on both ends of the piston pin, by means of retainer ring pliers.

NOTE: Warm up the piston first in hot water 80 – 90°C (176 – 194°F) for about 5 minutes before removing the pin.

REMOVE THE PISTON RINGS.

Special Tool: Piston Ring Expander (09442-1011)

NOTE:

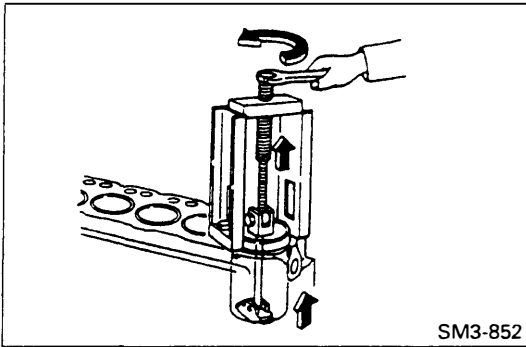
- Handle the piston rings carefully because they are made of a special casting which is easily broken.
- Keep the rings for each cylinder separate.

REMOVE THE CYLINDER LINER.

Before removing the cylinder liners, be sure to put match marks on the cylinder block and liner flange with a pen.

NOTE:

- Do not put match marks with a punch.
- After removing the cylinder liners, put numbers on their periphery or arrange them in sequence.



SM3-852

Special Tool: Cylinder Liner Puller
(09420-1210)

INSPECTION THE HINO H07C H07CT H07D H07DT PISTON COOLING JET POSITIONING.

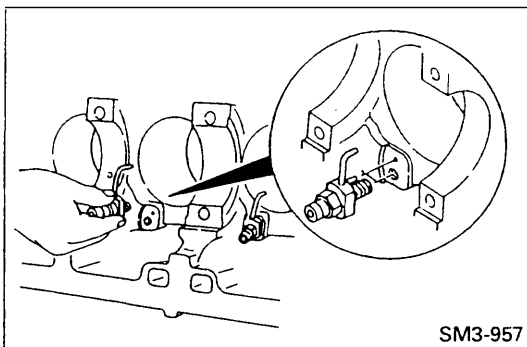
- NOTE:**
- Do not remove the cooling jet except when performing overhauls or when otherwise necessary.
 - In the event that the cooling jet is removed, be sure to replace it on the cylinder.

Inspection of the piston cooling jet positioning procedure are as follows.

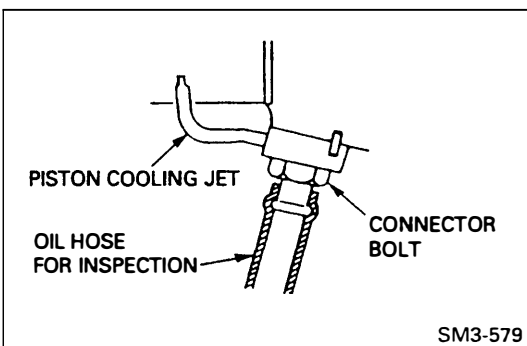
1. Remove the piston cooling jet connector bolt and install a special tool.

Special Tool: Connector Bolt (9001-24262)

2. Use a commercially available oil pump [pressure about 2kgf/cm² {28.44 lbf/sq.in}, flow rate about 2.5L/min {2.64 US. qts/min}].
3. Prepare fresh engine oil.
4. Connect the oil lines.
Connect the oil pump outlet to a special tool (connector bolt).



SM3-957

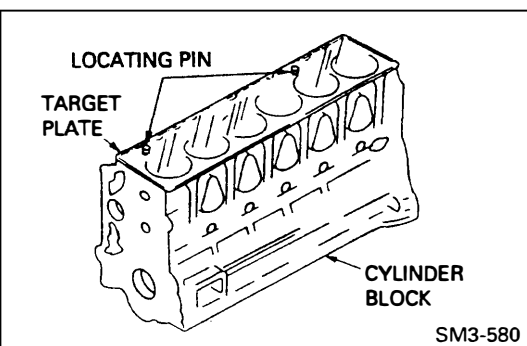


SM3-579

5. Install a special tool on the cylinder block.

For Model H07D

Special Tool: Target plate (09444-1290)

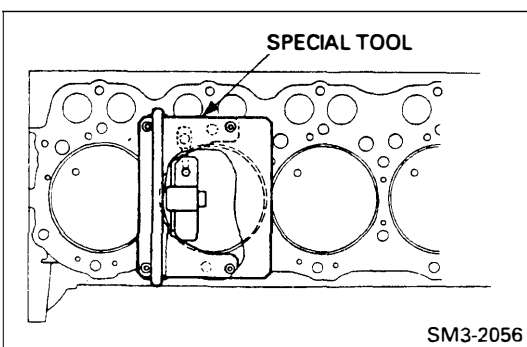


SM3-580

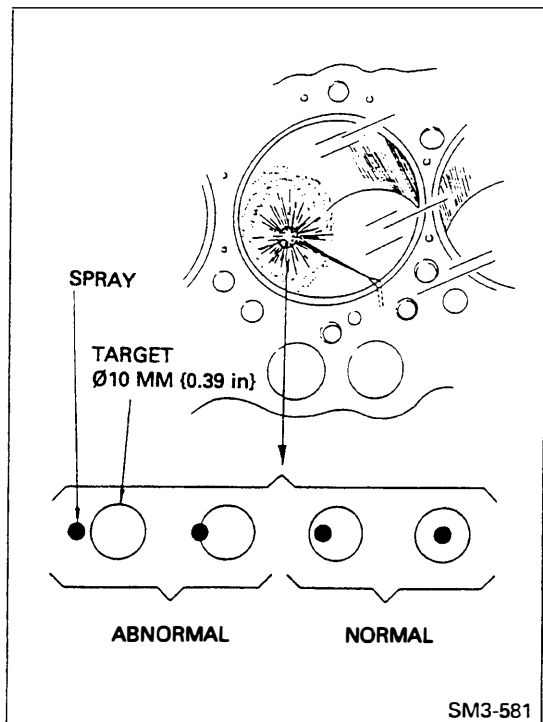
For Model H07C-T

Special Tool: Gauge (09470-1110)

NOTE: Install the special tool after removing the cylinder liner from cylinder block.



SM3-2056

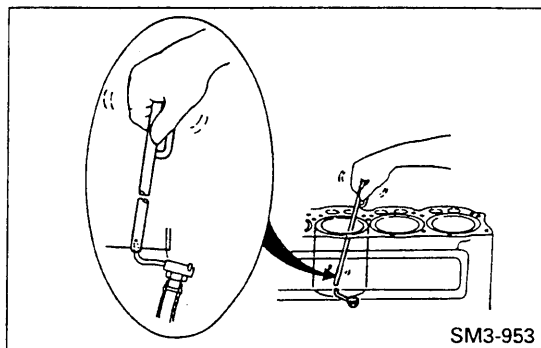


6. Operate the oil pump, and with pressure at about 196 KPa {2kgf/cm², 28.44 lbf/in²}, pump fresh oil from the jet, and perform a spray test. Conditions are normal if the center of stream hits a target plate of Ø10 mm {0.39 in.}.

WARNING

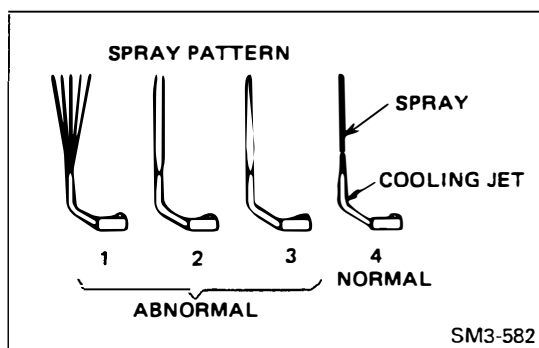
Engine oil is flammable.

This spray test should be done in a well ventilated room and away from any open flames or electric sparks.



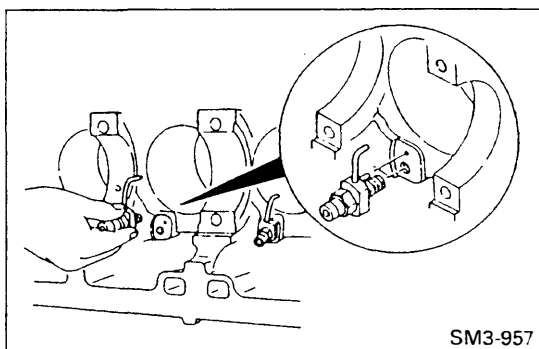
7. If the spray of the cooling jet messes the circle on the target plate, realign then nozzle using a special tool.

Special Tool: Adjuster bar (09472-1620)



8. Spray pattern.
When inspecting the piston cooling jet positioning, check that the spray is dispersed as shown in "4" and not as in "1", "2", or "3" in the illustration at left.

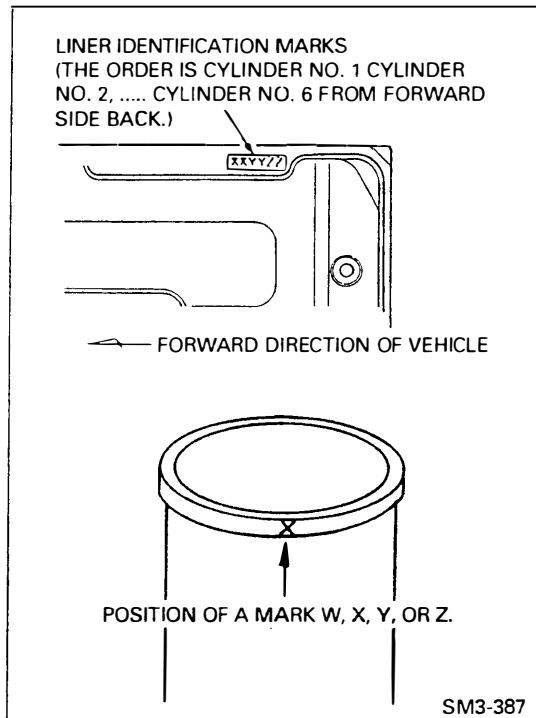
NOTE: If the tip of the jet is damaged so that the spray pattern is bad, replace the jet with a new one. When replacing the cooling jet, always inspect the new piston cooling jet's positioning.



9. After inspecting the piston cooling jet positioning, remove the special tool (connector bolt), then install the cooling jet on the cylinder block using the correct mounting bolt with soft washer.

Tightening Torque: 21.57 N·m {220 kgf·m, 15.91 lbf·ft}

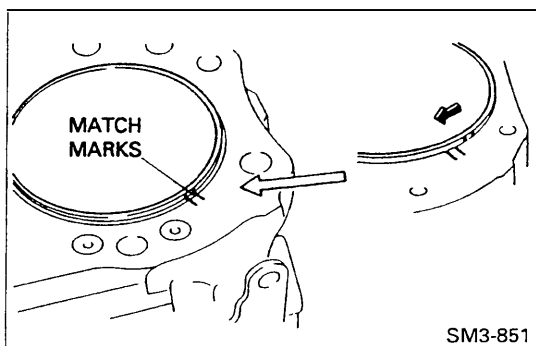
10. After installing the piston, make sure that there is no interference between the cooling jet and the piston when the piston is at bottom dead center.



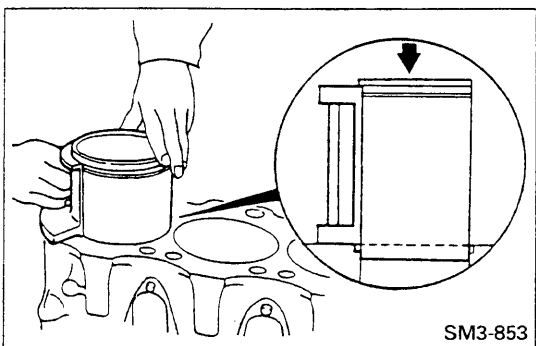
INSERT THE CYLINDER LINER INTO THE CYLINDER BLOCK.

1. When a new cylinder liner is used, make sure that the liner has the same mark as the mark on the cylinder block.

NOTE: Cylinder liners and cylinder block are subject to selective fitting, and so, in case new cylinder liners are to be used, confirm the marks, W, X, Y, and/or Z stamped at the flange areas of cylinder liners and any combination of the marks W, X, Y, and/or Z stamped collectively at the upper or side surface of the cylinder block (Engine No. stamping ground) and insert the ones with identical marks.



2. When reusing a liner, insert the liner in its original position, aligning the marking marked before disassembly.



3. Apply a small amount of clean engine oil on the outer periphery of the liner, and apply pressure on the entire flange section of the liner. If insertion by hand is difficult, use a cylinder liner guide, and the cylinder liner will easily be pushed in.

Special Tool: Cylinder Liner Guide (09480-1040)

NOTE:

- Do not use a liner that has been dropped.
- Take extra care when handling the liner since the liner is easily deformed.

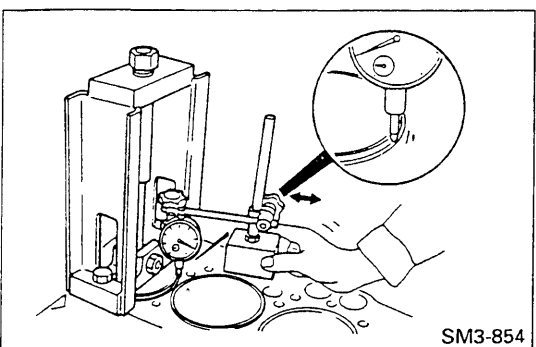
MEASURE THE PROTRUSION OF THE CYLINDER LINER FLANGE.

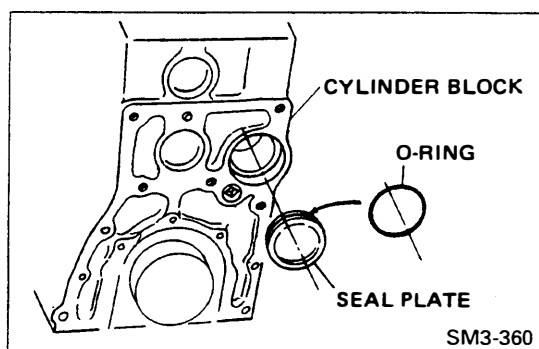
Install a special tool and measure the protrusion of the top end of the cylinder liner from the cylinder block.

Special Tool: Cylinder Liner Puller (09420-1210)

Tightening Torque: 9.80N·m (100 kgf·cm, 7.23 lbf·ft)

Standard: 0.01–0.08 mm (0.0004–0.0031 in)

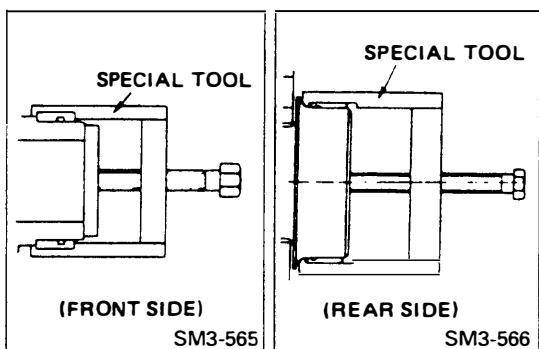


**IF NECESSARY, REPLACE THE CAMSHAFT SEAL PLATE.**

1. Remove the seal plate.
2. Install the seal plate
Install the O-ring to the seal plate, then fit it to the cylinder block.

NOTE:

- As a general rule, fit the seal plate on the cylinder block by hand, taking care to avoid damaging (cutting, tearing or twisting) it. Also, coat the periphery of the O-ring with seal compound (Three Bond 1211).
- Do not re-use the seal plate after removing it.

**IMPORTANT POINT — ASSEMBLY****IF NECESSARY, REPLACE THE OIL SEAL SLEEVE (FRONT AND REAR).**

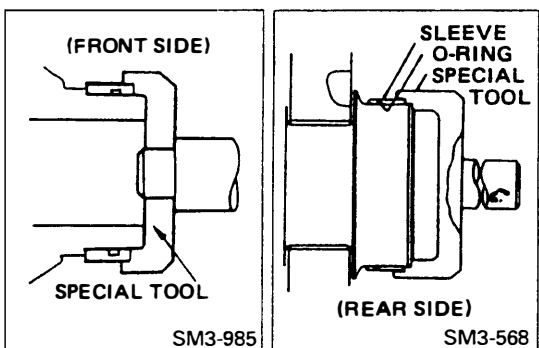
1. Remove the oil seal sleeve using a special tool.

Special Tool: Puller (09420-1071) for front sleeve
Puller (09420-1420) for rear sleeve

NOTE: Do not remove the crankshaft gear unless it is considered absolutely necessary.

2. Install a new sleeve.
Be sure to fit a new O-ring on the sleeve and also apply a liberal coating of oil to the pulley center side at the front, and the crankshaft side at the rear.
When driving on the oil seal sleeve, use an oil seal sleeve press, taking care that the O-ring does not get cut or torn.

Special Tool: Press (09402-1210) for front sleeve
Press (09482-1400) for rear sleeve



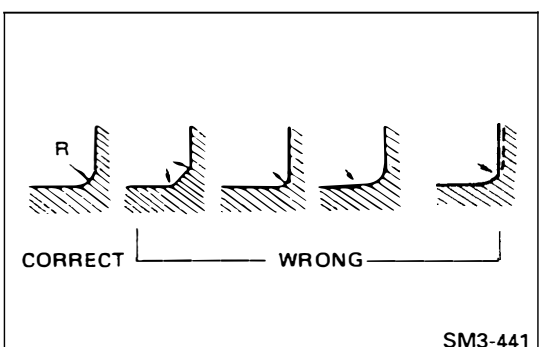
Unit: mm {in}

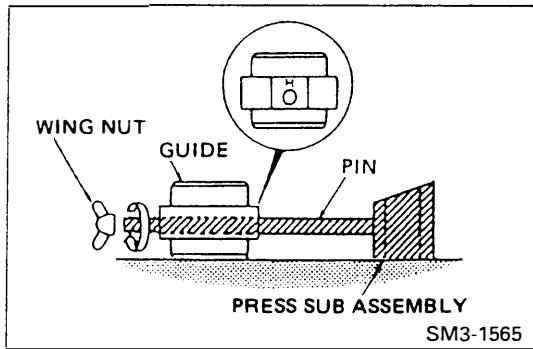
Under size	Outside diameter	
	Crank pin	Journal
0.25	64.71–64.69 {2.5477–2.5468}	79.71–79.69 {3.1382–3.1374}
0.50	64.46–64.44 {2.5378–2.5370}	79.46–79.44 {3.1284–3.1275}
0.75	64.21–64.19 {2.5280–2.5271}	79.21–79.19 {3.1185–3.1177}
1.00	63.96–63.94 {2.5182–2.5173}	78.96–78.94 {3.1087–3.1078}

UNDER SIZE BEARING FOR CRANKSHAFT.**Dimension of Fillet (R):**

Crank Pin: 3.8–4.2 mm {0.150–0.165 in}

Journal: 3.0–3.5 mm {0.118–0.137 in}



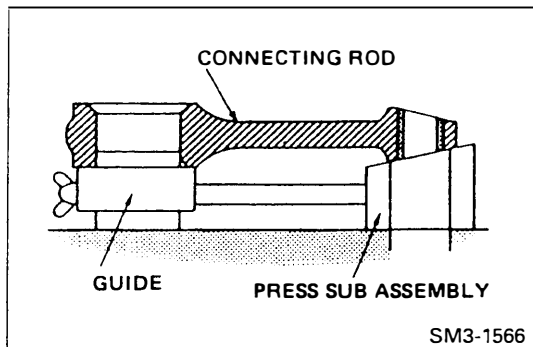
**[For model H07C-T]**

1. Prepare the special tools.

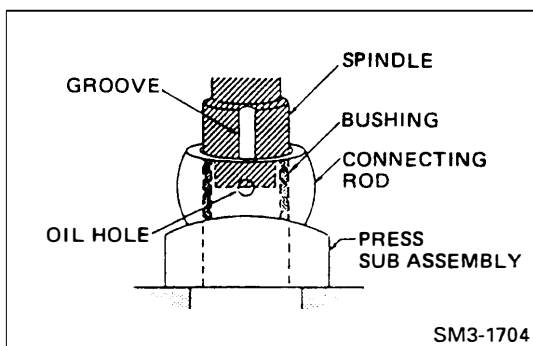
Assemble the guide and press subassembly inserting its pin into the guide then secure them with the wing nut.

Special tools: Guide (09481-1130)
Press sub assembly (09402-1450)
Wing nut (9233-10360)

NOTE: ○ Bring lever "H" punched on the guide above the pin.
○ Making sure to align both supporting surfaces of the guide and press sub assembly flush on a flat plane.



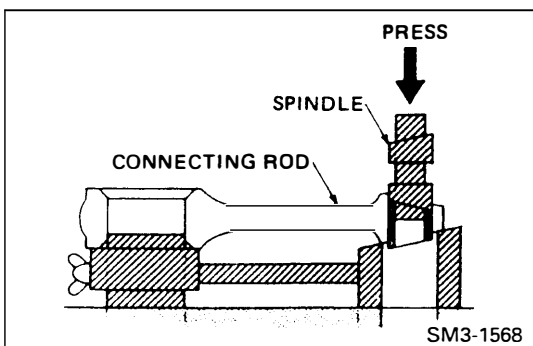
2. Using a special tool, remove the piston pin bushing.
- a. Set the connecting rod assembled without crank pin bore bearing on the guide and press subassembly.



- b. Install the spindle into the bushing.

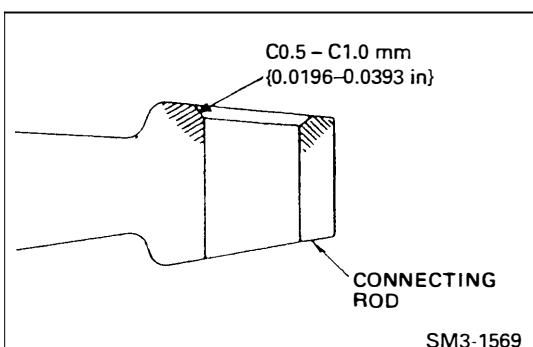
Special tool: Spindle (09402-1440)

NOTE: Align the grooving of the spindle with the oil hole of the bushing.



- c. Using a hydraulic press, remove the bushing.

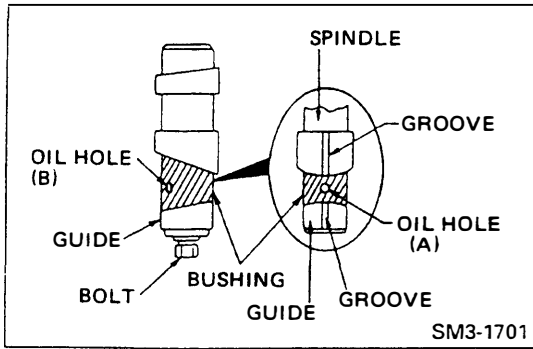
NOTE: Always operate the press slowly and smoothly.



3. Assemble the piston pin bushing.

Chamfer one edge of the bushing hole at the small end of the connecting rod uniformly by C 0.5-1.0 mm {0.0196-0.0393} in.

NOTE: ○ Irregular chamfering can cause out-of-roundness of the pressed bushing, which may result in jamming during insertion.
○ Remove dust from the inner surface of the small-end hole.



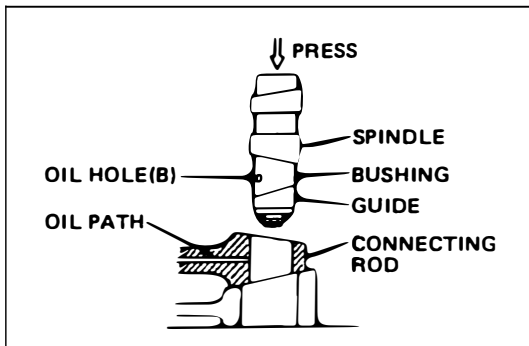
4. Mount the bushing on the spindle.
 - a. Set the bushing and guide on the spindle, then secure them with the bolt.

Special tools: Spindle (09402-1440)
 Guide (09481-1110)
 Bolt (9191-08252)

NOTE: ○ Align oil hole (A) in the bushing with both groove on the spindle and guide, making sure oil hole (B) will meet with oil path in the connecting rod led from crank pinbore in the rod.

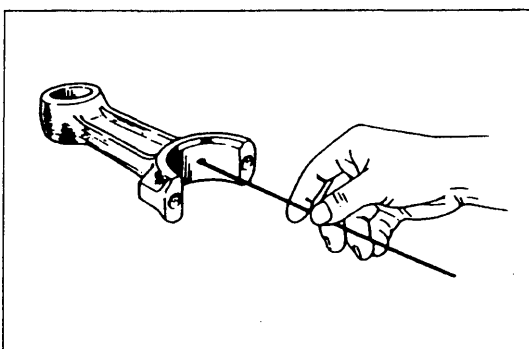
- Tightening torque of bolt:
 5.0–6.8 N·m {50–70 kgf·cm, 3.61–5.06 lbf·ft}

- b. Apply the fresh engine oil around the bushing and guide.



5. Install the bushing in the connecting rod.
 Position the bushing — tool assembly so that oil hole (B) align with the oil path through the connecting rod.

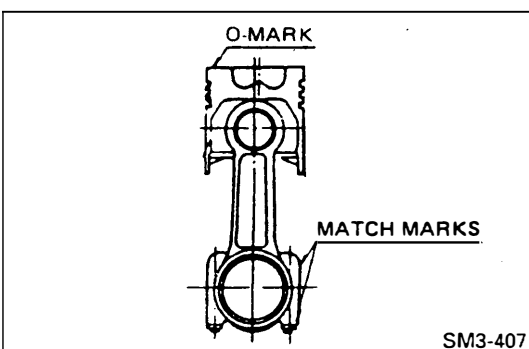
NOTE: Before installing, fully coat the bore in the connecting rod with fresh engine oil.



6. Inspect the bushing position after installation.
 - a. Make sure that the oil hole of the bushing and the oil path of the connecting rod are suitably aligned allowing a 6 mm {0.23 in} diameter rod to penetrate.

NOTE: Misalignment can lead to insufficient lubrication, which may result in seizure.

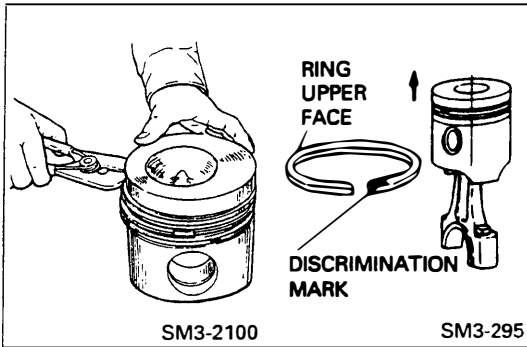
- b. Make sure that a new piston pin inserted in the piston pin bushing can be rotated by hand without rattling.



ASSEMBLE THE PISTON AND CONNECTING ROD.

Make sure that the O-mark at the top of the piston and the connecting rod match marks in opposite directions.

- NOTE:** ○ Use the new retainer rings.
 ○ Heat the piston to about 80–90°C {176–194°F} in hot water about 5 minutes.

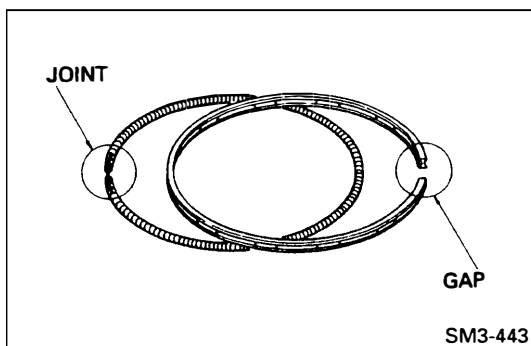
**INSTALL THE PISTON RING.**

1. Install the piston rings in the sequence oil ring, third ring second ring and top ring with the identification mark at the top of the ring facing up.

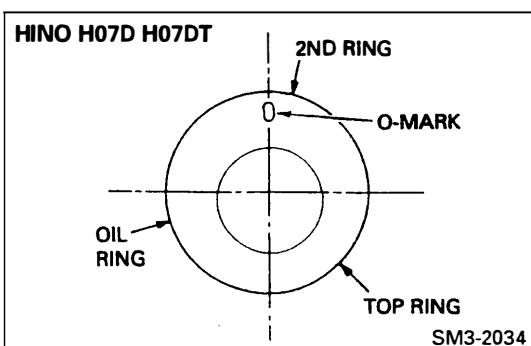
NOTE: Apply oil to the piston rings.

Special Tool: Piston Ring Expander (09442-1011)

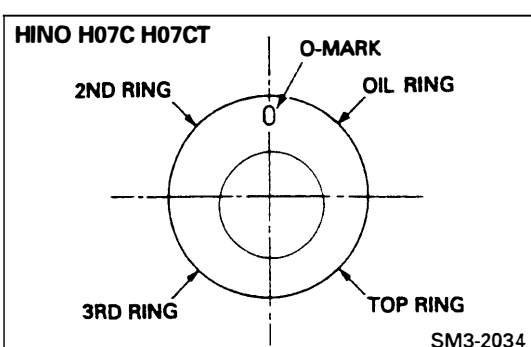
RING No.	Description	
	H07D H07DT	H07C H07CT
Top		
2nd		
3rd	—	
Oil		



2. Connect the ends of the coil expander and then fit the coil inside the piston ring after ensuring that the gap of the piston ring is 180° away from the joint of the coil.



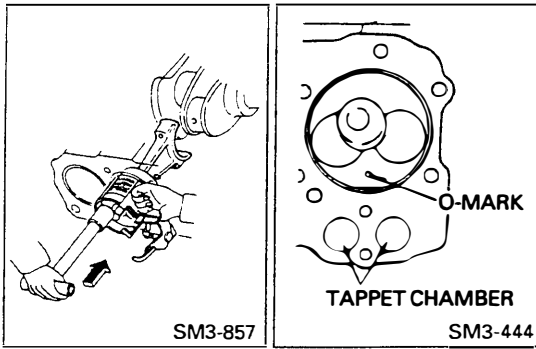
3. Arrange the piston rings so that their gaps are equally spaced.

**HINO DIESEL ENGINE PARTS CONTACT****EMAIL:**

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Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com



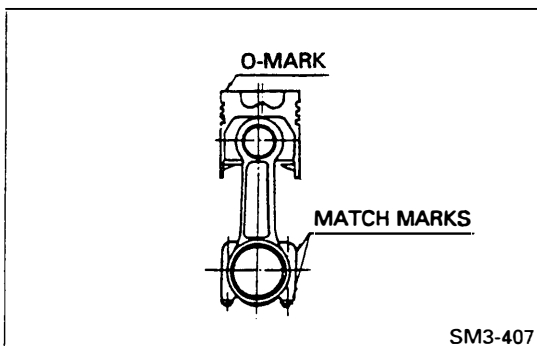
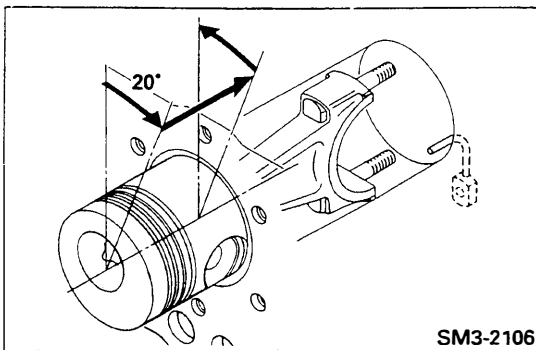
INSTALL THE PISTON WITH CONNECTING ROD INTO THE CYLINDER LINER.

1. Apply engine oil to the piston, cylinder liner and connecting rod bearing surface.
2. Using a special tool, hold the piston rings and push the piston with connecting rod assembly with a wooden rod.

NOTE:

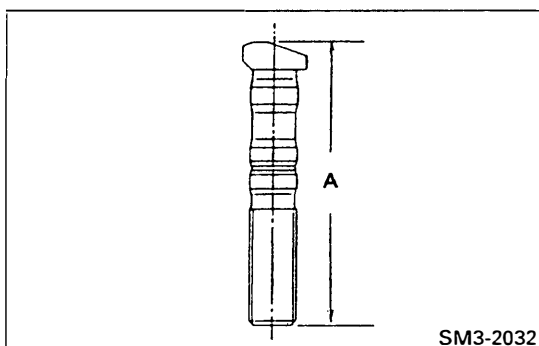
- Check the piston that the O-mark on the top is on the tappet chamber side.
- When installing the bearings on the connecting rod and cap, align the oil holes.
- When installing the piston with connecting rod assembly, be sure that the piston cooling jet is not struck by the connecting rod. If the piston cooling jet is struck, adjust or replace it.

Special Tool: Piston Ring Holder (09441-1041)



INSTALL THE CONNECTING ROD CAP.

1. Apply engine oil to the bearing surface.
2. Align the match marks on the connecting rod and cap.



TIGHTEN THE CAP BOLT For HINO H07D H07DT

1. Measure the overall length of the bolt, if the overall length is (A) mm or more, replace with new bolt.

Dimension (A): 83.5 mm {3.287 in}

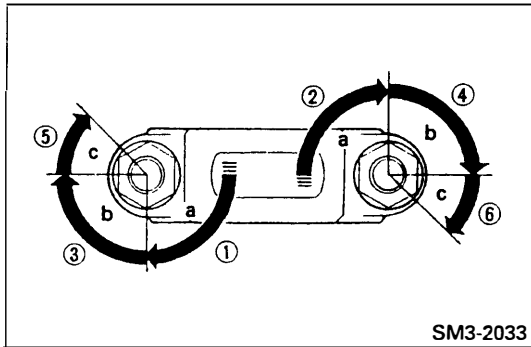
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Website: www.HeavyEquipmentRestorationParts.com



2. Tighten the bolts alternately in the following order.
 - a. Tighten the nut to 68.65 N·m (700 kgf·cm, 50.63 lbf·ft)
 - b. Retighten the nut 1/4 turn (90°)
 - c. Retighten the nut 1/8 turn (45°)

NOTE:

- Apply engine oil to the bolt threads and under surface of the nut.
- When adding torque, never un tighten the nuts, even if they have been overtightened.

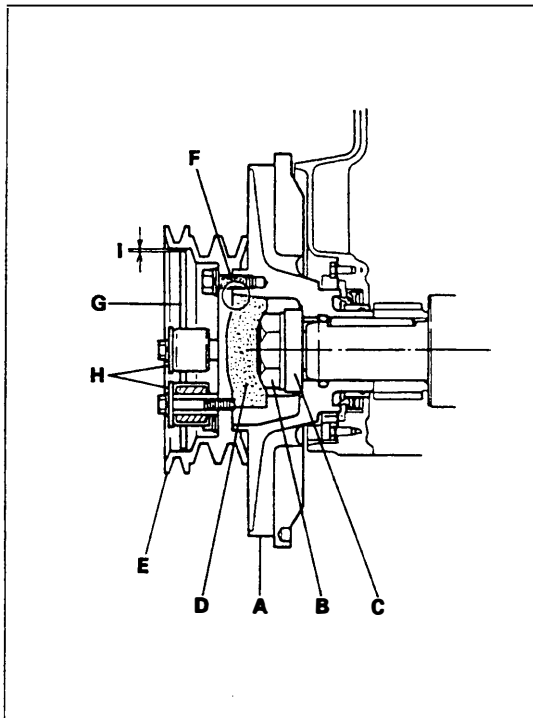
For model HINO H07C H07CT

Tighten the bolts alternately in three stages.

Torque the bolts on final stage.

Tightening torque: 171.623 N·m (1,750 kgf·cm, 126.58 lbf·ft)

NOTE: Apply engine oil to the bolt threads and under surface of nut.



INSTALL THE CRANKSHAFT PULLEY.

1. Install the torsional dumper (A) on the crankshaft.
2. Tighten the nut (B) with the collar (C) in place.

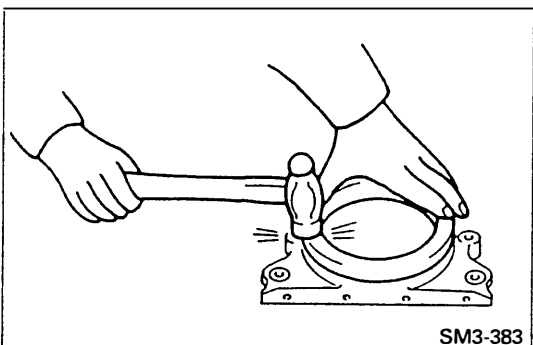
NOTE:

- The nut for mounting the crankshaft pulley is designed for this purpose only. Never use an ordinary nut as a suitable.
- Apply engine oil to the rad of the crankshaft.

3. Install the sound insulator (D-If so fitted) into the torsional dumper, then install the crankshaft pulley (E).

NOTE: When install the pulley, make sure there is no putting of the insulator between the dumper and pulley (F).

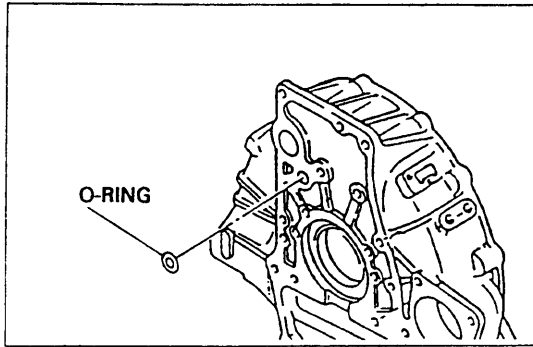
4. Attach the shield assembly (G-If so fitted) and tighten the mounting bolt with Plane washer (H-If so fitted).
5. After installing the shield (If so fitted), make sure that there is clearance 0.5mm {0.019 in} or more between crankshaft pulley and shield all around the perimeter (I).



IF NECESSARY, REPLACE THE OIL SEAL

1. Remove the oil seal.
2. Apply a small amount of clean engine oil on the outer periphery of the oil seal and then install the oil seal to the flywheel housing, ensuring that it is flush with the end of the oil seal retainer.

NOTE: Ensure that the lip of the oil seal is coated with oil seal lubricating grease (lithium-based.)



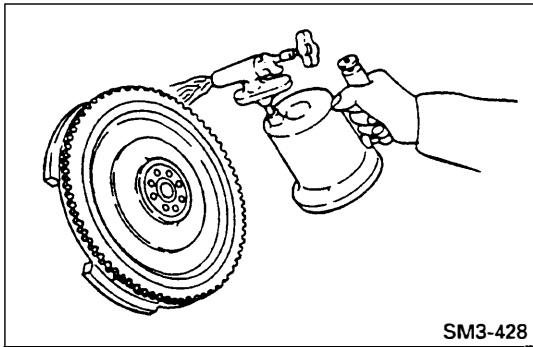
IF NECESSARY, REPLACE THE O-RING

Install the O-ring

NOTE: Apply adhesive (Three Bond 1141) or the flywheel housing to prevent drop off of O-ring.

INSTALL THE FLYWHEEL HOUSING

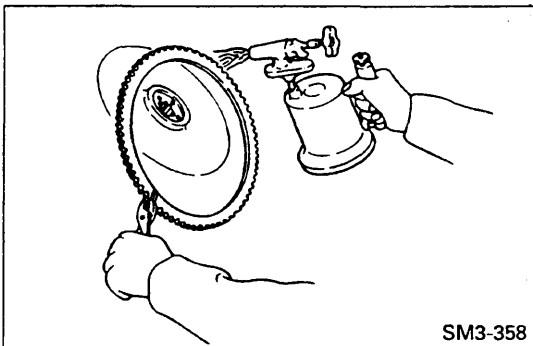
Refer to "LIQUID GASKET AND APPLICATION POINTS".



IF NECESSARY, REPLACE THE HINO H07C H07CT H07D H07DT FLYWHEEL RING GEAR.

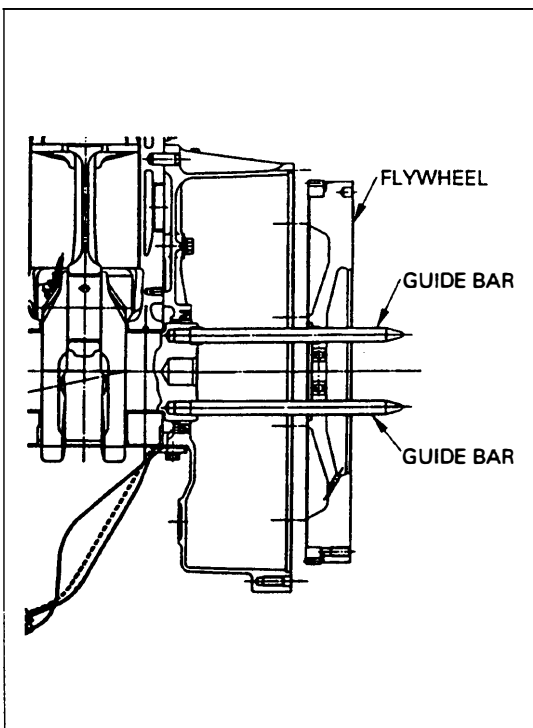
1. Remove the ring gear.
 - a. Heat the ring gear with a blow torch in a uniform manner [Approx. 100°C {212°F}]
 - b. Using a metal rod as a pad and strike all around the ring gear in a uniform manner and remove the ring gear.

NOTE: Be careful not to overheat the ring gear.



2. Install the ring gear.
 - a. Heat the ring gear uniformly using a blow torch [Approx. 100°C {212°F}].
 - b. Drive the ring gear with its chamfered gear teeth facing the block onto the flywheel using a metal rod.

NOTE: Be careful not to overheat the ring gear.



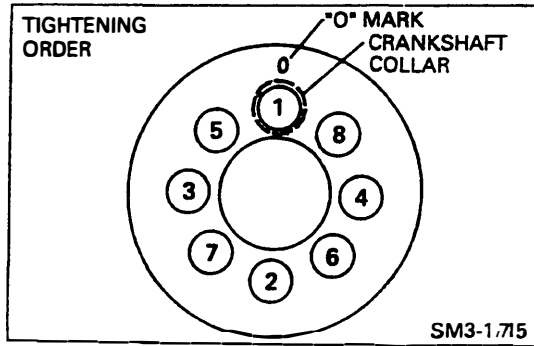
INSTALL THE FLYWHEEL.

1. Make sure that there are no bur and dust on each contact surfaces and tapped holes of the crankshaft and flywheel, and insert the guide bar into the crankshaft.

Special tool: Guide bar (09481-1340)

NOTE: Insert one of the guide bar into the collar knock and the other one into the opposite side of the collar knock.

2. Insert the flywheel into the guide bars softly without shocking until the flywheel contact the collar knock, and then push perfectly.
3. Apply the engine oil to the flywheel bolt threads and bolt bearing surfaces of the flywheel, and tighten the flywheel bolts temporarily by hands.
4. Pull out the guide bars and tighten the rest two flywheel bolts temporarily in the same way as step 3.

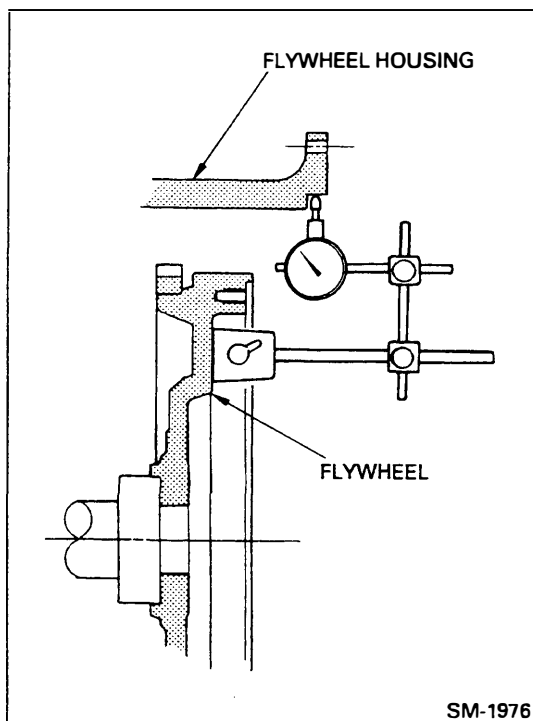


5. Tighten the bolts through several repetition the tightening order so as to reach specified torque evenly and gradually, then slacken and tighten them one by one to the specified torque.

WARNING

The flywheel is heavy, when installing, be careful not to drop it on your feet.

- NOTE:**
- Align the "O" mark on the flywheel and crankshaft collar knock pin.
 - When tightening the bolt, apply engine oil to the threads and flywheel surface of the bolts.



IMPORTANT POINTS — ADJUSTMENT GENERATOR USE ONLY

ANGULAR AND PARALLEL ALIGNMENT.

1. Checking angular (face) alignment.
 - a. Attach the dial indicator stand to the flywheel.
 - b. Apply the dial indicator at right angle to plane surface of flywheel housing.
 - c. Pretension the gauge and step to "0".
 - d. Turn the flywheel slowly and measure the angular alignment.

Repair limit: 0.20 mm (0.0078 in)

- e. If the angular alignment exceeds the limit, install the shim between the cylinder block and flywheel housing.

NOTE: The following shims are available.

Thickness;

0.05 mm (0.0020 in)

0.10 mm (0.0039 in)

0.20 mm (0.0079 in)

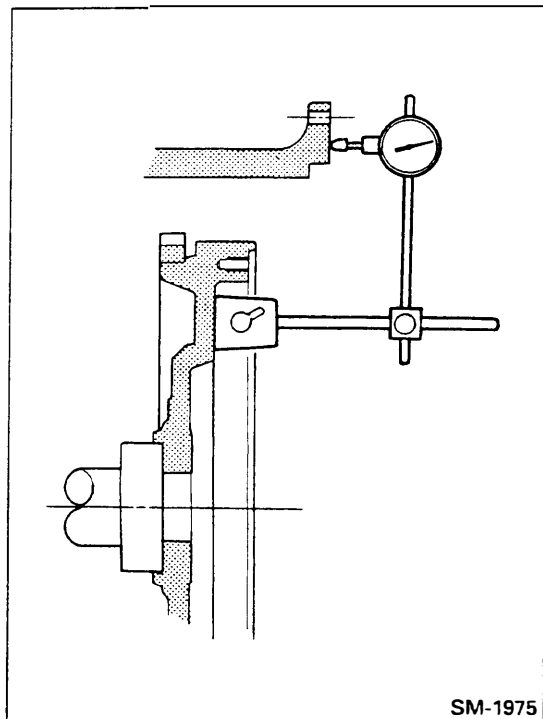
HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

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Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com



2. Checking parallel (bore) alignment.
 - a. Attach the dial indicator stand to the flywheel.
 - b. Apply the dial indicator at right angle to entering surface of flywheel housing.
 - c. Pretension the gauge and set to "0".
 - d. Turn the flywheel slowly and measure the parallel alignment.

Repair limit: 0.20 mm {0.0078 in}

- e. If the parallel alignment exceeds the limit, change the straight pins.

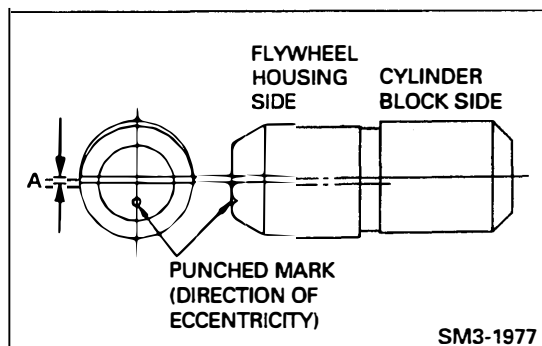
NOTE: The following straight pins are available.

Eccentricity (A);

0.05 mm {0.0020 in}

0.10 mm {0.0039 in}

0.20 mm {0.0079 in}



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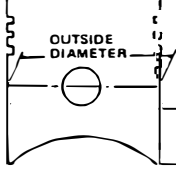
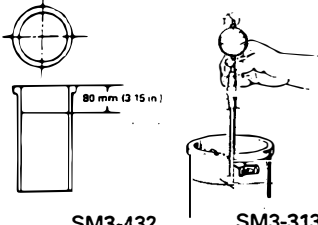
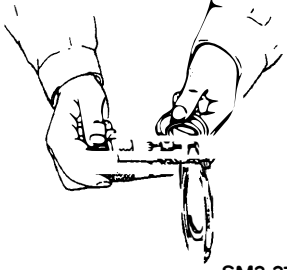
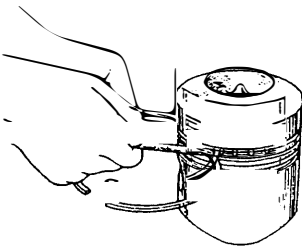
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INSPECTION AND REPAIR

Unit: mm (in)

Inspection Item			Standard	Limit	Remedy	Inspection Procedure
Piston Diameter			110 {4.331} at A: H07D-21{0.8267} H07C-T-64.2{2.528}	—	Replace piston and/or liner	 SM3-910
Cylinder Liner Inside Diameter			110 {4.33}	110.15 {4.3366}		
Clearance between Piston and Cylinder Liner	HINO H07D HINO H07DT		0.053-0.085 {0.0021-0.0033}	—		 SM3-432 SM3-313
	HINO H07C HINO H07CT		0.192-0.224 {0.0076-0.0088}	—		
Projection of Cylinder Liner			0.01-0.08 {0.0003-0.0031}	—		
HINO Piston Ring Breadth	Top	H07D H07DT	3.00 {0.1181}	2.90 {0.1141}	Replace	 SM3-379
		H07C H07CT	—	—		
	2nd		2.00 {0.787}	1.90 {0.0748}		
	3rd	H07D H07DT	—	—		
		H07C H07CT	2.50 {0.0984}	2.40 {0.0944}		
	Oil		4.00 {0.1574}	3.90 {0.1535}		
HINO Piston Ring Groove Breadth	Top	H07D H07DT	3.00 {0.1181}	3.20 {0.1259}	Replace piston	 SM3-2101
		H07C H07CT	—	—		
	2nd		2.00 {0.787}	2.20 {0.0866}		
	3rd	H07D H07DT	—	—		
		H07C H07CT	2.50 {0.0984}	2.70 {0.1062}		
	Oil		4.00 {0.1574}	4.10 {0.1614}		

HINO DIESEL ENGINE PARTS CONTACT

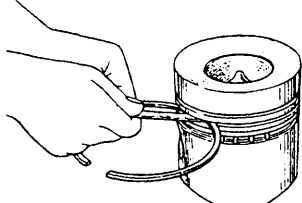
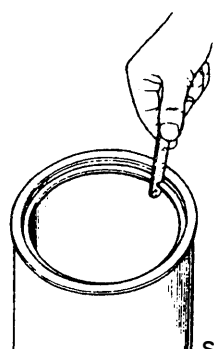
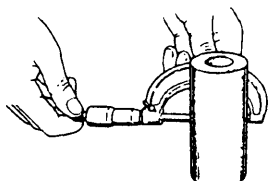
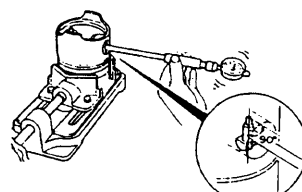
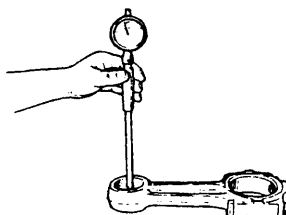
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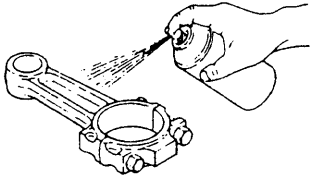
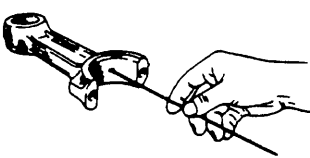
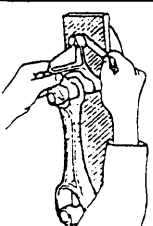
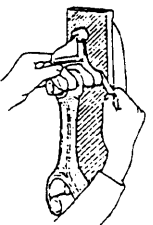
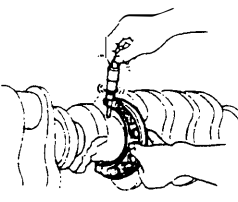
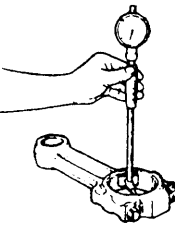
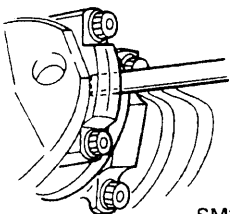
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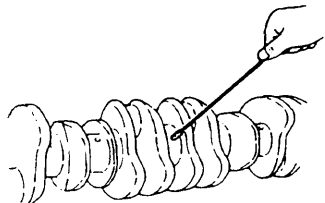
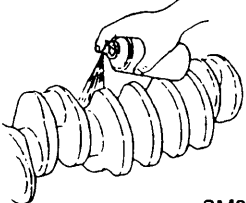
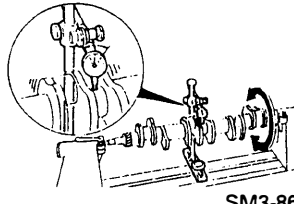
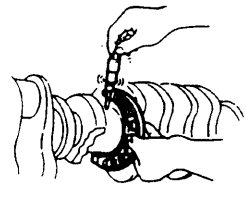
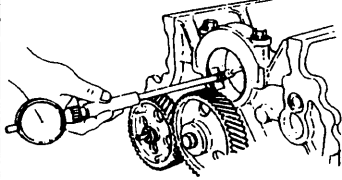
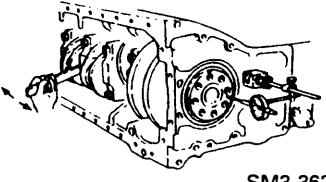
Unit: mm {in}

Inspection Item			Standard	Limit	Remedy	Inspection Procedure
Clearance between Piston Ring and Piston Ring Breadth	Top	H07D	0.06–0.10 {0.0024–0.0039}	—	Replace piston ring and/or piston	 SM3-2101
		H07C-T	—	—		
	2nd	H07D	0.06–0.08 {0.0016–0.0031}	—		
		H07C-T	0.06–0.10 {0.0024–0.0039}	—		
	3rd	H07D	—	—		
		H07C-T	0.05–0.09 {0.0020–0.0035}	—		
	Oil		0.02–0.06 {0.0008–0.0024}	—		
Piston Ring Gap *Insert the piston rings where the wear of the liner is small HINO H07C HINO H07CT HINO H07D HINO H07DT	Top	H07D	0.30–0.40 {0.0118–0.01575}	1.5 {0.0590}	Replace	 SM3-302
		H07C-T	0.30–0.45 {0.0118–0.0177}	1.5 {0.0590}		
	2nd		0.30–0.45 {0.0118–0.0177}	1.20 {0.0472}		
	3rd	H07D	—	—		
		H07C-T	0.30–0.45 {0.0118–0.0177}	1.20 {0.0472}		
	Oil		0.30–0.50 {0.0118–0.0196}	1.20 {0.0472}		
Piston Pin Diameter	HINO H07D H07DT		36.989–37.00 {1.4563–1.4569}	36.96 {1.4551}	Replace piston and/or piston pin	 SM3-297
	HINO H07C H07CT		38.989–39.000 {1.5350–1.5354}	38.96 {1.5339}		
Piston Pin Hole Inside Diameter	HINO H07D H07DT		36.987–37.003 {1.4562–1.4568}	36.05 {1.4192}		 SM3-1585
	HINO H07C H07CT		38.987–39.003 {1.5349–1.5356}	39.05 {1.5374}		
Clearance between Piston Pin and Piston Pin Hole T: Tight L: Clearance			–0.013T–0.014L {–0.00051T–0.00055L}	0.05 {0.0019}		
Connecting Rod Small End Bushing Inside Diameter	HINO H07D H07DT		37.015–37.025 {1.4573–1.4576}	37.10 {1.4606}	Replace bushing and/or piston pin	 SM3-296
	HINO H07C H07CT		39.015–39.025 {1.536–1.5364}	39.10 {1.5393}		
Clearance between Piston Pin and Connecting Rod Small End Bushing			0.015–0.036 {0.0006–0.0014}	0.08 {0.0031}		

Unit: mm {in}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Connecting Rod Cracks or Damage	—	—	Replace	 SM3-363
Connecting Rod Oil Hole Clogged	—	—	Clean	 SM3-424
Connecting Rod Straightness	—	0.1 {0.0039} Per 200 {7.874}	Replace	 SM3-541
Connecting Rod Twist	—	0.1 {0.0039} Per 200 {7.874}	Replace	 SM3-542
Crankshaft Pin Diameter	64.94–64.96 {2.5567–2.5575}	–0.20 {–0.0078}	Regrind crank- shaft and use undersize bearings	 SM3-860
		63.80 {2.5118}	Replace crankshaft	
Clearance between Connecting Rod and Crank Pin	0.031–0.082 {0.0013–0.032}	0.20 {0.0078}	Replace bearing	 SM3-300
Connecting Rod End Play	0.20–0.52 {0.0079–0.0205}	1.00 {0.0393}	Replace connecting rod	 SM3-862

Unit: mm {in}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Crankshaft Oil Hole Clogged	—	—	Clean	 SM3-434
Crankshaft Cracks and Damage	—	—	Replace	 SM3-435
Crankshaft Bend	—	0.09 {0.0035}	Replace	 SM3-861
Crankshaft Journal Diameter	79.940–79.960 {3.1472–3.1480}	–0.20 {–0.0078}	Regrind undersize	 SM3-860
		78.8 {3.1023}	Replace crankshaft	
Clearance between Crankshaft Journal and Main Bearing	0.051–0.102 {0.0020–0.0040}	0.30 {0.0118}	Replace bearing	 SM3-436
Crankshaft Rod End Play	0.05–0.219 {0.0020–0.0086}	0.50 {0.0393}	Replace thrust bearing	 SM3-362

HINO DIESEL ENGINE PARTS CONTACT

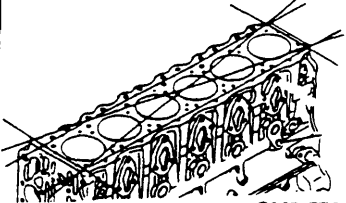
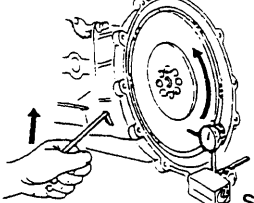
EMAIL:

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Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

Unit: mm (in)

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Cylinder Block Flatness	Less than 0.05 {0.0019}	0.10 {0.0039}	Regrind and/or replace	 SM3-578
Flywheel Face Alignment	—	0.04 {0.0015}	Regrind and/or replace	 SM3-908

HINO DIESEL ENGINE PARTS CONTACT**EMAIL:****EngineParts@HeavyEquipmentRestorationParts.com****Phone: 269 673 1638****Website: www.HeavyEquipmentRestorationParts.com**

LUBRICATING SYSTEM

HINO H07C H07CT H07D H07DT DATA AND SPECIFICATIONS

Oil pump

Type Full forced pressure feed by gear pump

Drive By gear

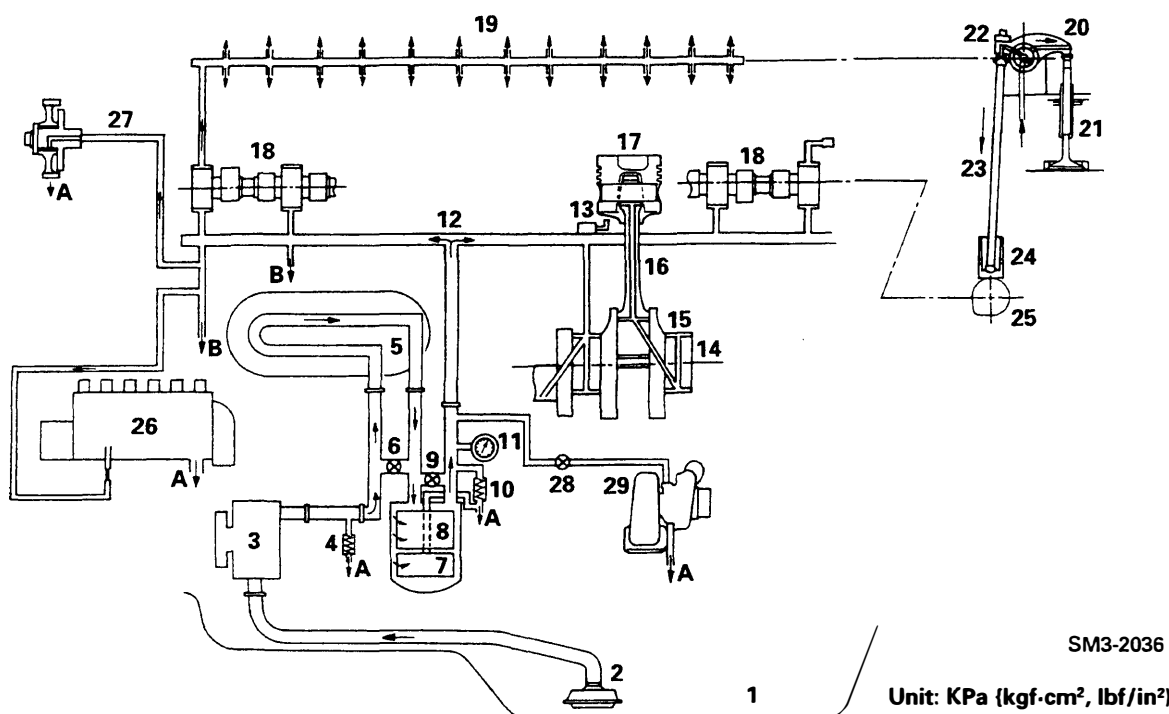
Oil cooler

Type Multiplate type, water-cooled

Oil filter

Type Paper element type

HINO H07C H07CT H07D H07DT LUBRICATING SYSTEM DIAGRAM



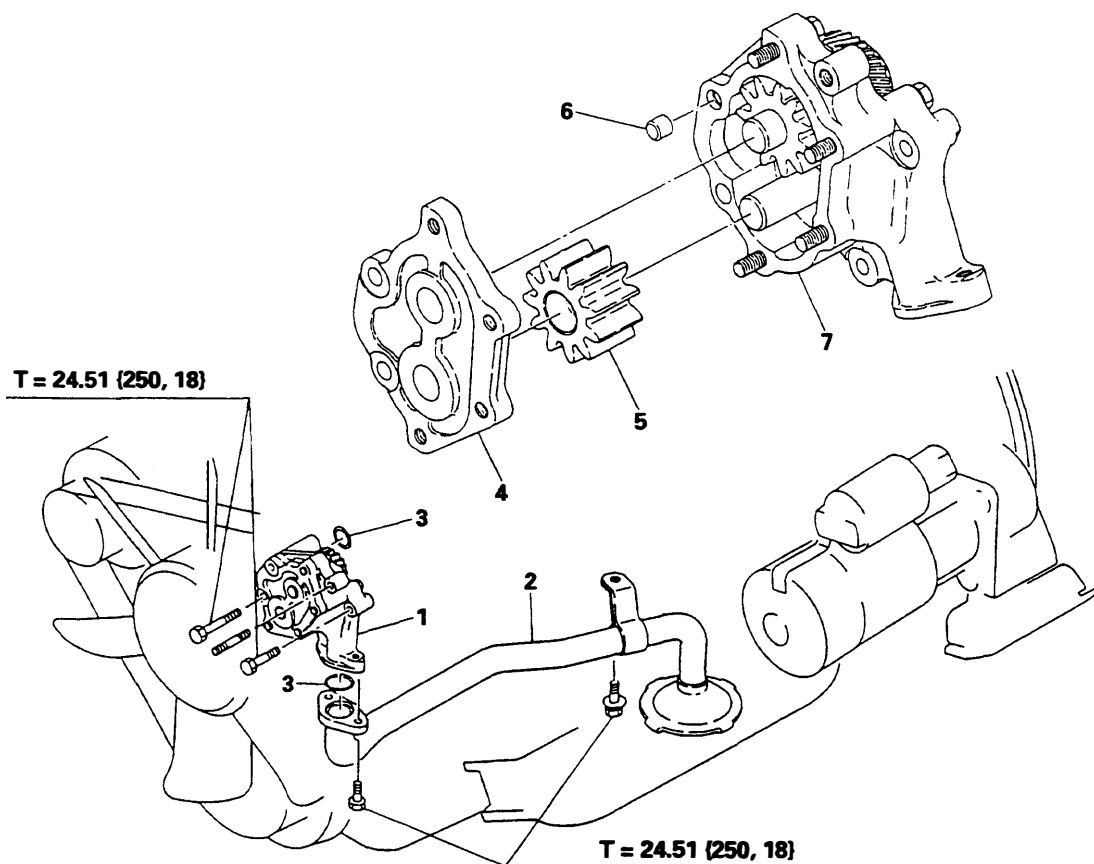
1. Oil pan
2. Oil strainer
3. Oil pump
4. Oil pump safety valve
940 {9.5, 135.09}
5. Oil cooler
6. Oil cooler safety valve
177-215 {1.8-2.2, 25.61-31.29}
7. Oil filter (full flow)
8. Oil filter (by-pass)
9. Oil filter safety valve
128-166 {1.3-1.7, 18.50-24.17}

10. Regulator valve
363-421 {3.7-4.3, 52.63-61.16}
11. Oil pressure gauge
12. Main oil hole
13. Piston cooling jet
14. Crankshaft journal
15. Crankshaft pin
16. Connecting rod
17. Piston
18. Camshaft
19. Rocker arm shaft
20. Rocker arm

21. Valve
22. Valve clearance adjusting screw
23. Valve push rod
24. Tappet
25. Cam
26. Fuel injection pump
27. Idler gear
28. Check valve for turbo charger
(Model H07C-T)
29. Turbo charger (Model H07C-T)
- A. To oil pan
- B. To crankshaft

HINO H07C H07CT H07D H07DT OIL PUMP AND OIL STRAINER

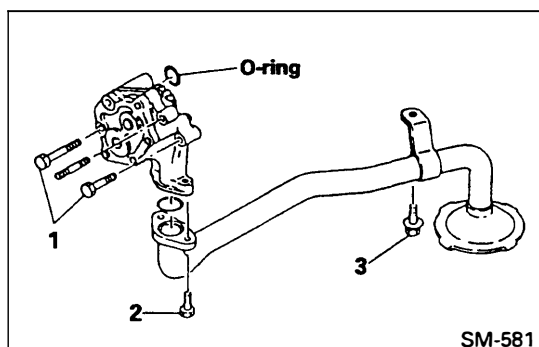
OVERHAUL



SM3-1959

T = Tightening torque: N·m (kgf·cm lbf·ft)

- | | |
|---------------------------|---------------------------|
| 1. Oil pump | 5. Driven gear |
| 2. Oil pipe with strainer | 6. Collar |
| 3. O-ring | 7. Oil pump body assembly |
| 4. Oil pump cover | |



SM-581

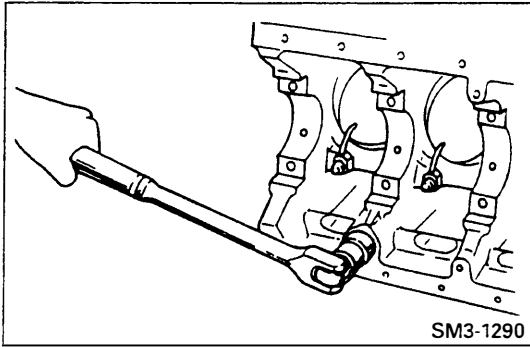
IMPORTANT POINT — MOUNTING

INSTALL THE OIL STRAINER.

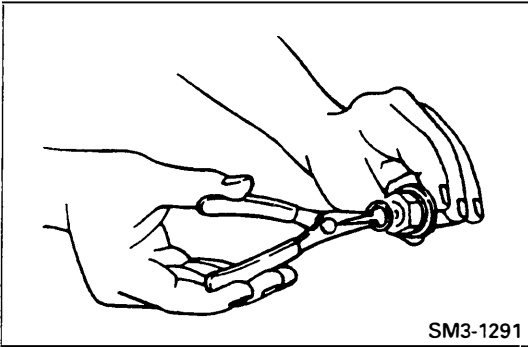
Rear Sump Oil Strainer

1. Tighten bolts 1, 2 and 3 temporarily.
2. Align bolt holes of cylinder block and bracket.
3. Tighten bolts 1, 2 and 3 to specified torque.

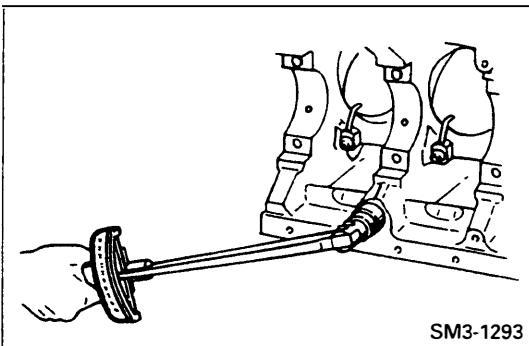
NOTE: Be sure to install O-ring

**OIL PUMP SAFETY VALVE****REMOVE THE SAFETY VALVE.**

1. Remove the safety valve from the bottom of the cylinder block.



2. Remove the retainer ring, and then disassemble the safety valve.

**INSTALL THE SAFETY VALVE.**

1. Install the valve, spring, shim, seat and retainer ring in that sequence.
2. Install the safety valve to the bottom of the cylinder block.

Tightening Torque: 83.36 N-m {850 kgf-cm, 61 lbf-ft}

HINO DIESEL ENGINE PARTS CONTACT**EMAIL:**

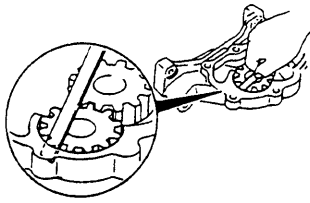
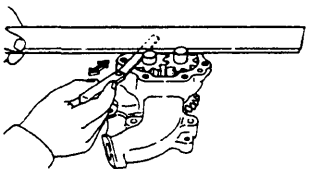
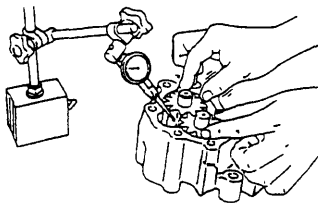
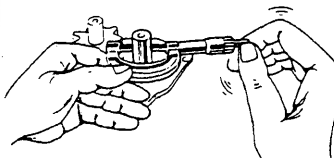
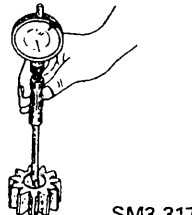
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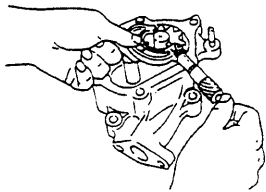
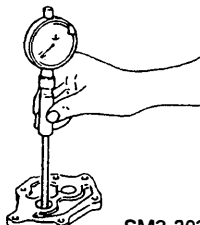
INSPECTION AND REPAIR

Unit: mm {in}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve and Spring. Wear or Damage.	—	—	Replace, if necessary	- Sliding face of valve for possible damage. - Valve moves smoothly.
Clearance between Gear and Case	0.033–0.100 {0.0013–0.0039}	0.15 {0.0059}	—	 SM3-970
Gear End Play	0.050–0.095 {0.0020–0.0037}	0.15 {0.0059}	—	 SM3-927
Gear Backlash	0.072–0.277 {0.0029–0.109}	—	—	 SM3-2037
Clearance between Driven Gear and Shaft	0.040–0.083 {0.0016–0.0032}	—	—	 SM3-868  SM3-317

INSPECTION AND REPAIR

Unit: mm {in}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Clearance between Drive Shaft and Oil Pump Cover	0.040–0.085 {0.0016–0.0033}	—	—	 SM3-2039  SM3-2038

HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

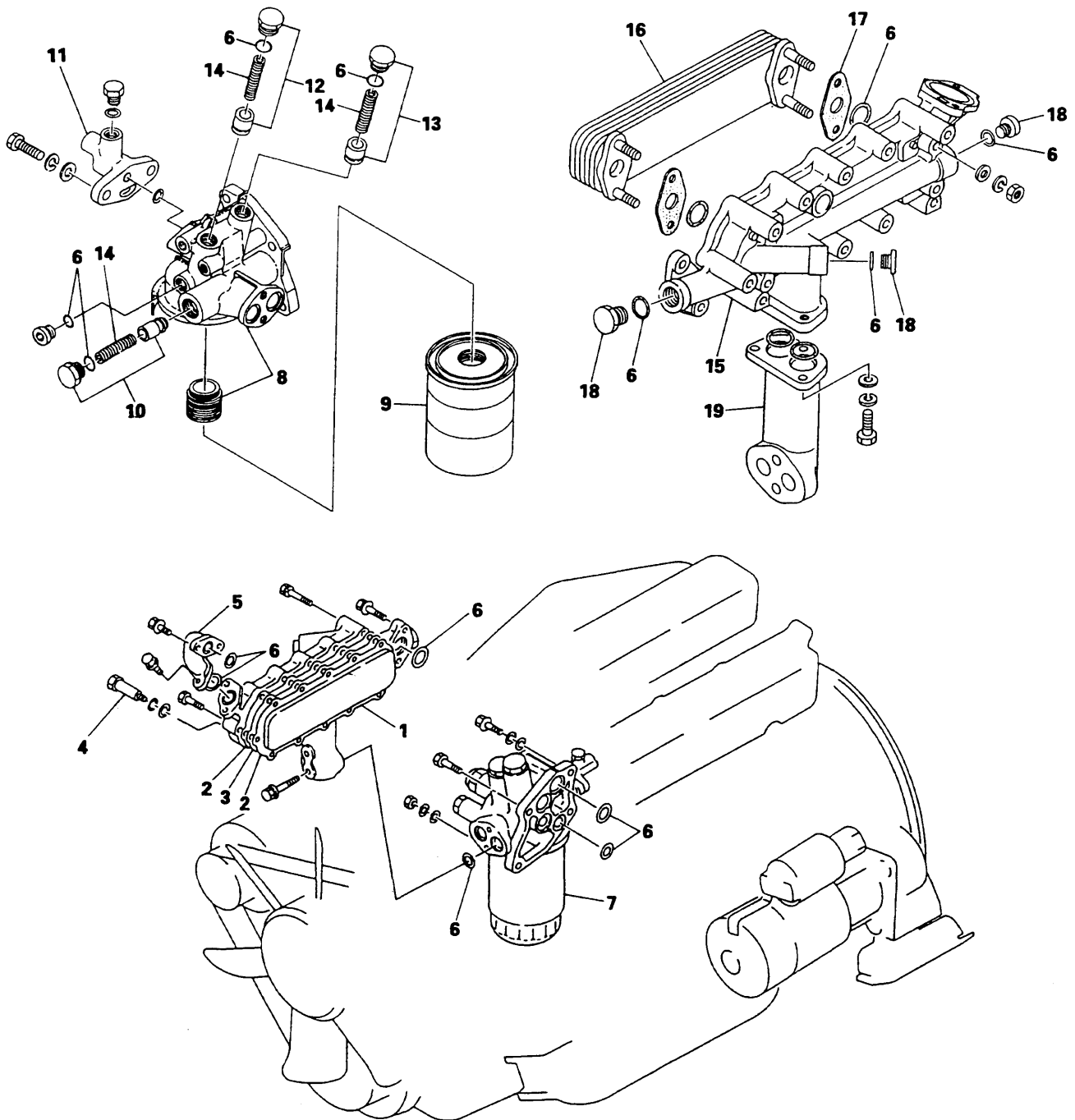
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

HINO H07C H07CT H07D H07DT OIL COOLER

OVERHAUL



1. Oil cooler
2. Oil cooler case gasket
3. Water gallery cover
4. Reamer bolt
5. Coolant pipe
6. O-ring
7. Oil filter
8. Element cover

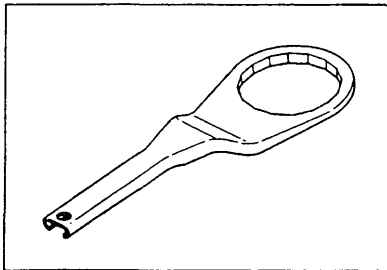
9. Oil filter element
10. Oil cooler safety valve
11. Check valve for turbocharger (Model H07C-T)
12. Oil filter safety valve
13. Pressure regulator valve
14. Spring
15. Oil cooler case

16. Oil cooler element
17. Gasket
18. Plug
19. Oil pipe

SPECIAL TOOL

Prior to starting an engine overhaul, it is necessary to have these special tools.

WRENCH



09553-1021

IMPORTANT POINT — DISMOUNTING

REMOVE THE OIL FILTER ELEMENT.

Using a special tool, unscrew the oil filter.

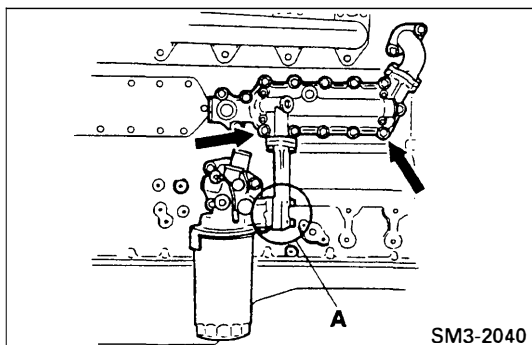
Special Tool: Wrench (09553-1021)

IMPORTANT POINTS — ASSEMBLY

INSTALL THE OIL FILTER ELEMENT.

1. Apply a slight amount of engine oil to the gasket of the new filter.
2. Tighten the new filter by hand until the gasket touches the cover and then tighten another 3/4 to 1 full turn with a special tool.

Special Tool: Wrench (09553-1021)



INSTALL THE OIL COOLER ASSEMBLY

1. Tighten the two reamer bolts.
2. Tighten the other bolts only after continuing that the gap at the joint between the oil pipe and oil filter (A) is 0.5 mm (0.019 in) or less.

NOTE: Be sure to install O-ring on the oil pipe.

INSPECTION AND REPAIR

Unit: mm (in)

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valves and Springs. Wear or Damage.	—	—	Replace, if necessary.	1. Sliding face of valve for possible damage. 2. Valve move smoothly
Oil Cooler Air Tightness Air Pressure: 588 KPa {6 kgf/cm ² , 85.3 lbf/in ² }	—	—	Replace, if necessary	 SM3-516

HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

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Website: www.HeavyEquipmentRestorationParts.com

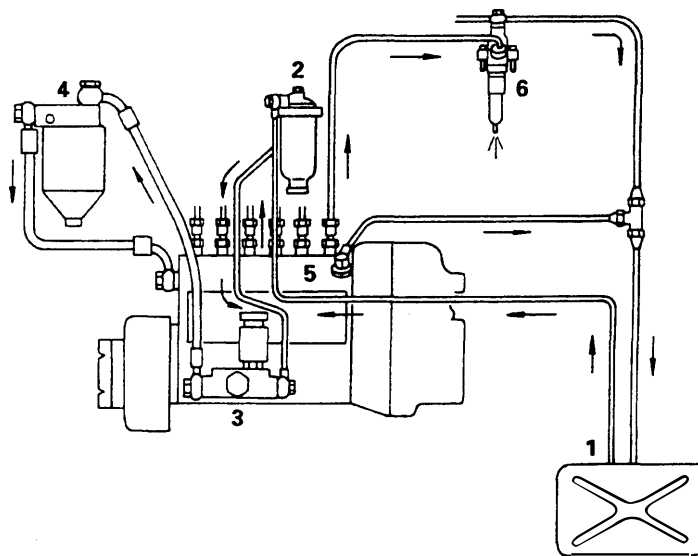
HINO H07C H07CT H07D H07DT FUEL SYSTEM

DATA AND SPECIFICATIONS

Hino H07C H07CT H07D H07DT Injection nozzle

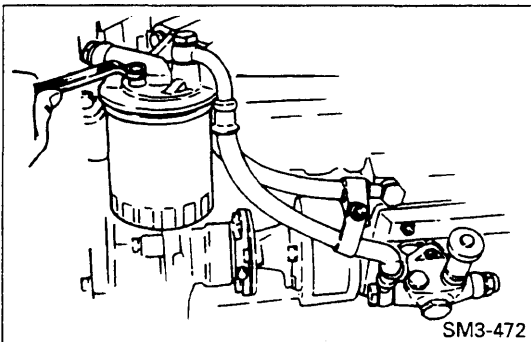
Type Multi-hole nozzle type

FUEL SYSTEM DIAGRAM



1. Fuel tank
2. Water separator
3. Fuel feed pump
4. Fuel filter
5. Injection pump
6. Injection nozzle

SM3-2433



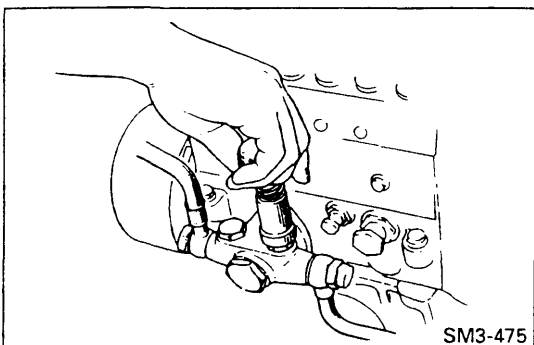
SM3-472

AIR BLEEDING FUEL SYSTEM.

1. Loosen the bleeder plug on the fuel filter.
2. Loosen the priming pump knob.
3. Operate the priming pump knob until the air will not come out from the bleeder plug.
4. Tighten the bleeder plug.

Tightening Torque: 3.93–5.88 N·m (40–60 kgf·cm, 3–4 lbf·ft)

NOTE: The bleeder plug should be tightened while the priming pump knob is operated.



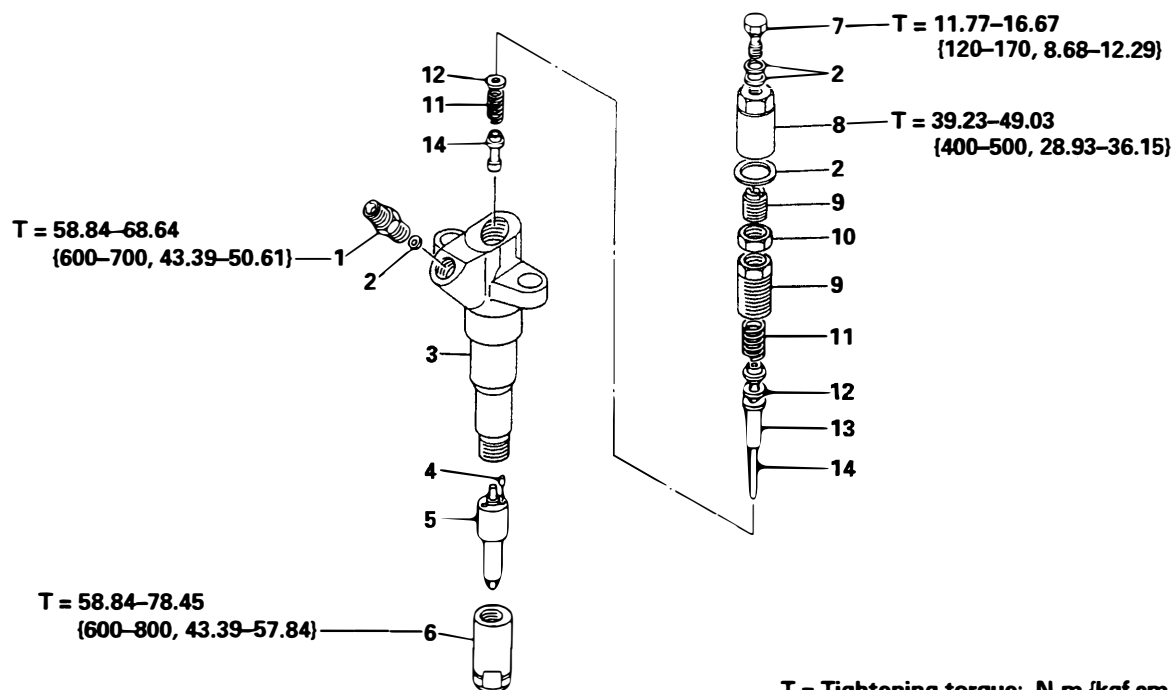
SM3-475

5. Once again, operate the priming pump knob several times.
6. Push back the priming pump knob and tighten it.

NOTE: Wipe off any splashed fuel.

HINO H07C H07CT H07D H07DT INJECTION NOZZLE

[For model HINO H07D HINO H07DT IN]JECTOR



T = Tightening torque: N·m {kgf·cm lbf·ft}

SM3-2430

- | | | |
|---------------------------|---------------------------------------|-----------------------------|
| 1. Inlet connector | 6. Nozzle retaining nut | 11. Nozzle spring |
| 2. Gasket | 7. Joint bolt | 12. Shim |
| 3. Nozzle holder assembly | 8. Nozzle holder cap nut | 13. Distance piece |
| 4. Nozzle dowel pin | 9. Nozzle holder adjusting screw | 14. Nozzle holder press pin |
| 5. Nozzle | 10. Nozzle holder adjusting screw nut | |

HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

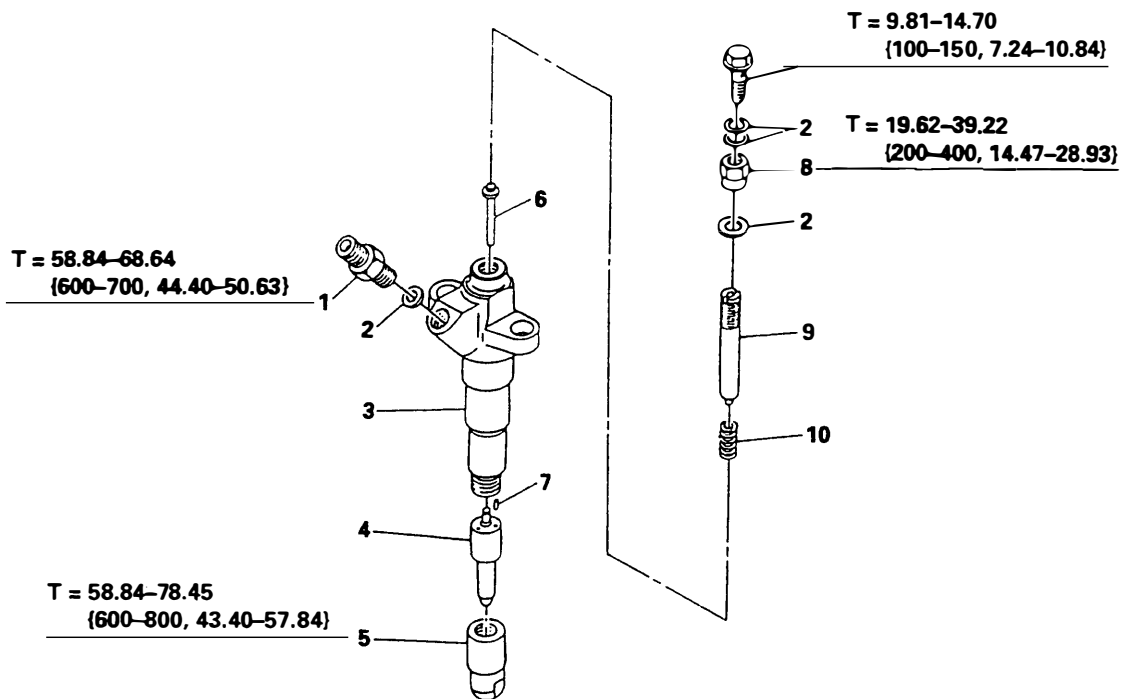
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

OVERHAUL

[For model HINO H07C HINO H07CT]



T = Tightening torque: N·m {kgf·cm lb·ft}

1. Inlet connector
2. Gasket
3. Nozzle holder assembly
4. Nozzle

5. Nozzle retaining nut
6. Nozzle holder pressure pin
7. Nozzle dowel pin
8. Nozzle holder cap nut

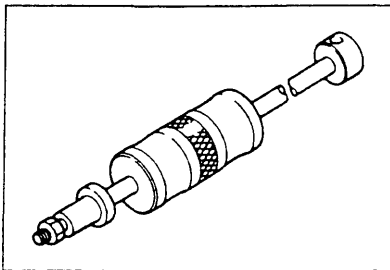
9. Adjusting screw
10. Pressure spring

HINO DIESEL ENGINE PARTS CONTACT**EMAIL:****EngineParts@HeavyEquipmentRestorationParts.com****Phone: 269 673 1638****Website: www.HeavyEquipmentRestorationParts.com**

SPECIAL TOOL

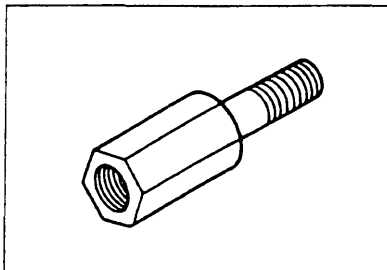
Prior to starting an engine overhaul, it is necessary to have these special tools.

IDLER GEAR SLIDING HAMMER

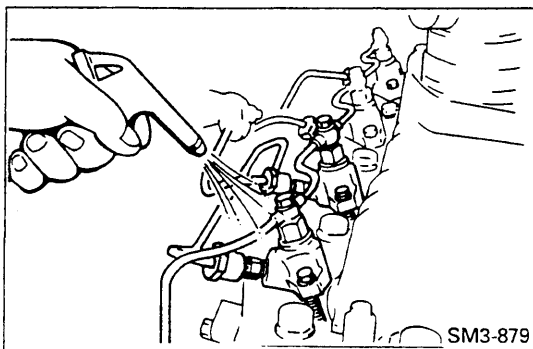


09420-1442

NOZZLE HOLDER ADAPTER (Used with 09420-1442)



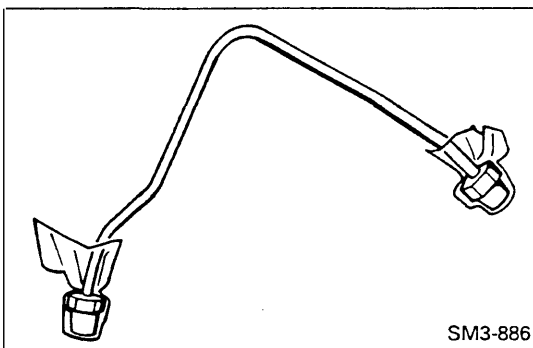
09462-1130



IMPORTANT POINTS — DISMOUNTING

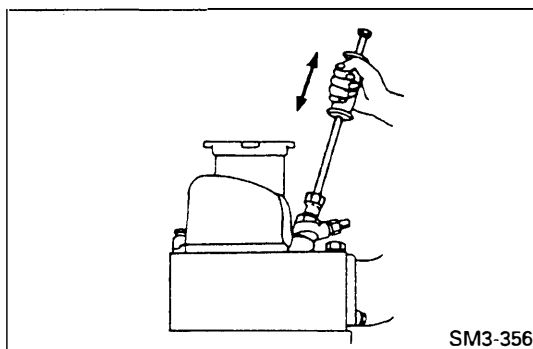
CLEAN OFF SURROUNDING AREA OF THE NOZZLE AND THE FUEL LINE CONNECTORS

NOTE: If foreign matter is allowed to enter the combustion chamber, engine trouble may result.



REMOVE THE FUEL INJECTION PIPE.

NOTE: Cover open ends of the pipes and fuel injection pump to prevent entry of dirt.



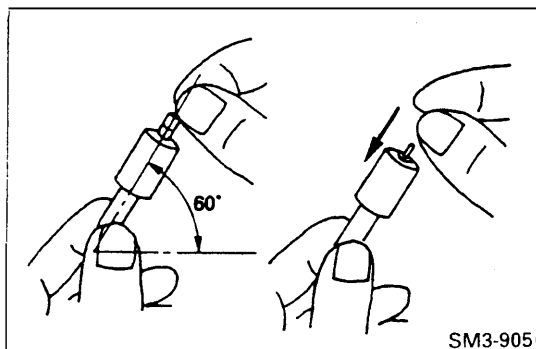
REMOVE THE NOZZLE HOLDER.

Using special tools, if the nozzle is difficult to remove by hand.

Special Tool: Sliding Hammer (09420-1442)
Adapter (09462-1130)

NOTE: ○ After removal of the nozzle holder, cover the nozzle holder with cloth. Also cover the cylinder head with a cloth to prevent dust from getting in.

IMPORTANT POINTS — ASSEMBLY FOR HINO MODEL H07D HINO H07DT

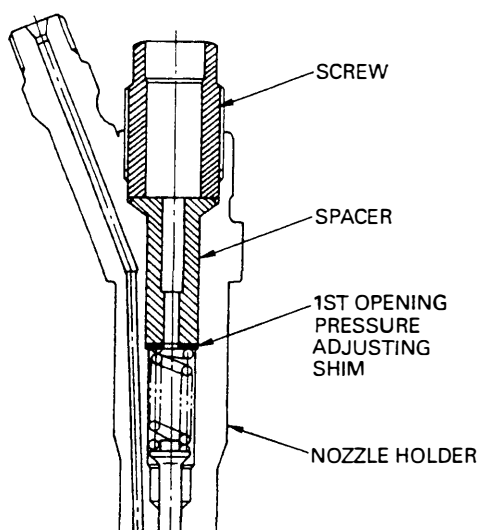


TEST THE NOZZLE SINKING.

Wash the nozzle proper with diesel fuel oil, then immerse it in diesel fuel oil.

Next slide the needle inside the nozzle proper and ensure that it move smoothly. The needle valve should fall under its own weight when withdrawn vertically about 1/3 and released. If its motion is sluggish, replace the nozzle with a new one.

STEP-1



ADJUST THE INJECTION PRESSURE

1. Adjusting 1st opening pressure.
 - a. Install the 1st opening pressure adjusting shim and spacer.
 - b. Install the special tool on the nozzle holder and tighten with specified torque.

Special Tool: Screw (09511-2090)

Tightening Torque: 49.04–58.83 N·m (500–600 kgf·cm, 36.16–43.38 lbf·ft)

- c. Install the nozzle holder to the nozzle tester, check the 1st opening pressure.

1st opening pressure (adjusting pressure):

18.15–18.92 MPa (185–193 kgf/cm², 2,631–2,744 lbf/sq.in)

- d. Perform the adjustment of the 1st opening pressure with the 1st opening pressure adjusting shim. When replace the 1st opening pressure adjusting shim, remove the special tool and spacer.

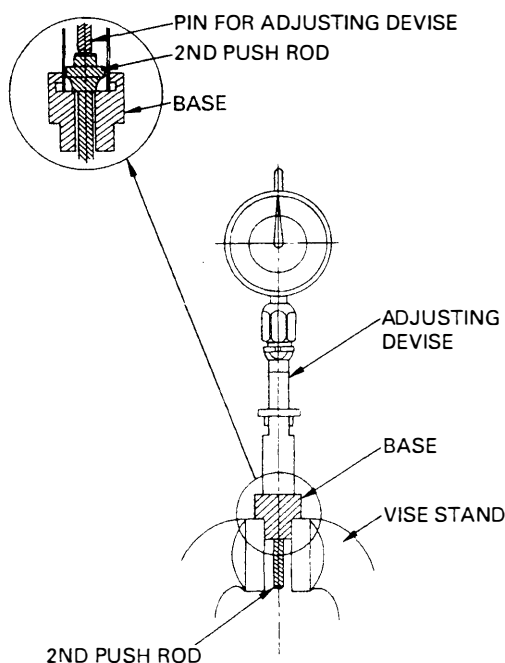
Adjusting shim

Thickness	Parts number
53 kinds in thickness from 0.50 to 1.54 mm (0.020 to 0.061 in) each differing 0.02 mm (0.00079 in)	22881 – 6360 to 22881 – 7140

NOTE: ○ Changing the 1st opening pressure adjusting shim every 0.02 mm (0.00079 in), the first opening pressure changes about every 245 KPa (2.5 kgf/cm², 35.55 lbf/sq.in) (Thickening the adjusting shim, the 1st opening pressure increases.)

- If the 1st opening pressure is adjusted, it is necessary that adjust the pre-lift and the 2nd opening pressure.

STEP-2



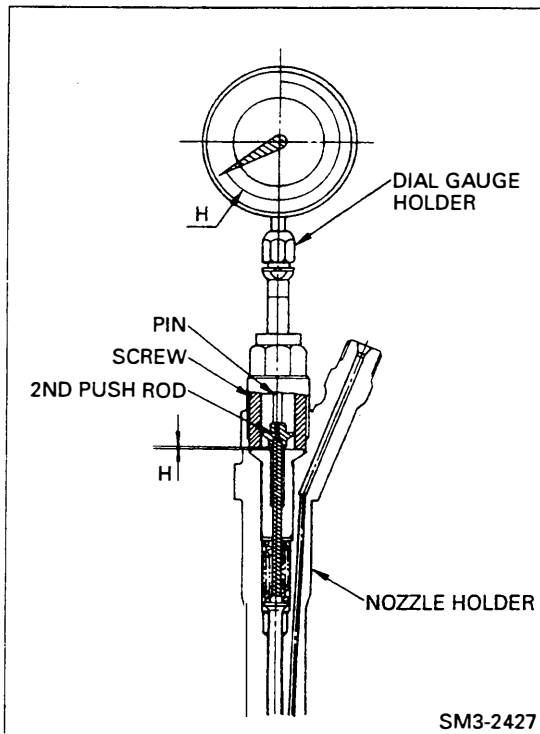
2. Adjusting pre-lift
 - a. Aligning to "0" (ZERO) point of adjusting device. Install the dial gauge and pin to the adjusting device. Install the base on vice stand and insert the 2nd-push rod. After set the adjusting device, align the dial gauge to "0" (ZERO) point.

Special Tool: Adjusting device (09511-2010)

Pin (09511-2020)

Base (09511-2030)

Screw (09511-2090)



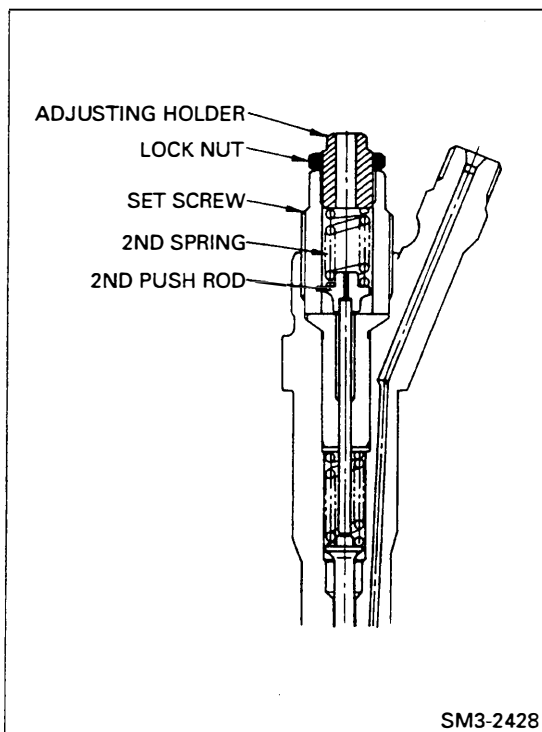
- b. Insert the 2nd push rod in the nozzle holder and install to the screw using the middle screw of adjusting device.

NOTE: Do not install the pre-lift adjusting shim.

- c. When push down the part of dial gauge holder supporting by hand, read the lift measurement "H" of dial gauge.
 d. Measure the thickness of pre-lift adjusting shim and calculate the pre-lift value according to following expression.
 Pre-lift value = thickness of pre-lift adjusting shim – lift measurement "H".
 e. If pre-lift value is deviated from standard value, adjust with pre-lift adjusting shim.

Pre-lift value: 0.08 mm {0.003 in}

NOTE: The pre-lift adjusting shim is identical with the 1st opening pressure adjusting shim.



3. Adjusting 2nd opening pressure

- a. Pull out the pre-lift adjusting shim and insert the 2nd push rod and 2nd spring, then tighten the set screw with specified torque. To set screw should be set the adjusting screw and lock nut.

Tightening torque: 49.04–58.83 N·m {500–600 kgf·cm, 36.16–43.38 lbf·ft}

NOTE: It is impossible to get the correct opening pressure with pre-lift adjusting shim in.

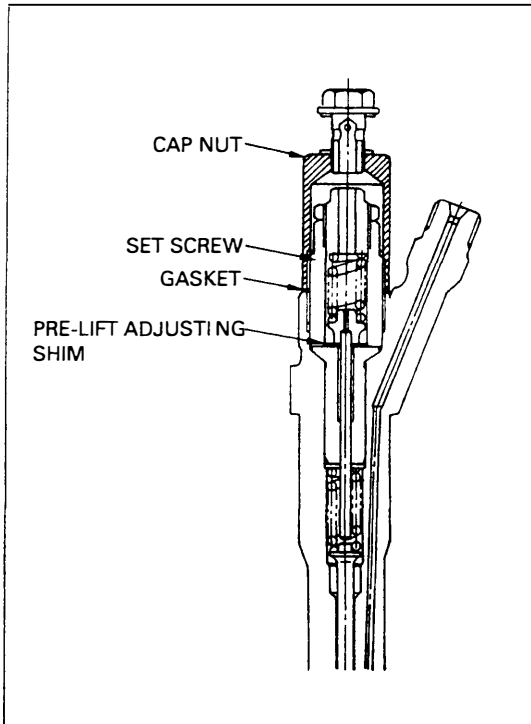
- b. Install the nozzle holder to the nozzle tester, check the 2nd opening pressure.

2nd opening pressure: 26.88–27.45 MPa {274–280 kgf/cm², 3,896–3,981 lbf/sq.in²}

- c. After perform the adjustment of the 2nd opening pressure with the adjusting screw, tighten the lock nut with specified torque.

Tightening torque: 19.62–24.51 N·m {200–250 kgf·cm, 14.47–24.51 lbf·ft}

NOTE: Do not loose the lock nut after adjusting.



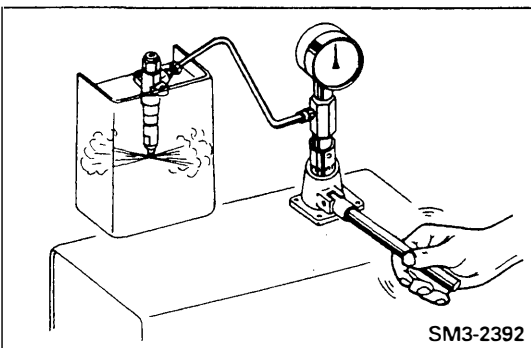
4. Installation and inspection
 - a. Remove the set screw, then insert the pre-lift adjusting shim. Retighten the set screw with specified torque.

Tightening Torque: 49.04–58.83 N·m {500–600 kgf·cm, 36.16–43.38 lbf·ft}

- b. Tighten the cap nut with specified torque.

Tightening Torque: 39.23–49.03 N·m {400–500 kgf·cm, 28.93–36.15 lbf·ft}

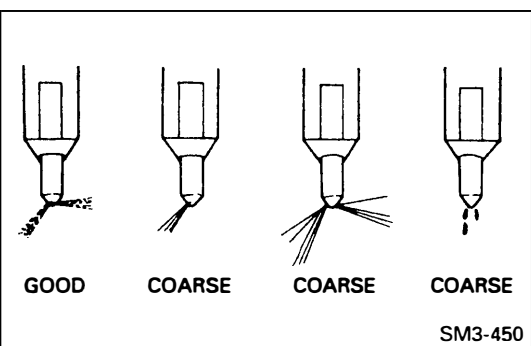
NOTE: Replace the gasket with new one.



- c. After finish to install, set the nozzle holder to the nozzle tester then check the 1st opening pressure and the spray condition.

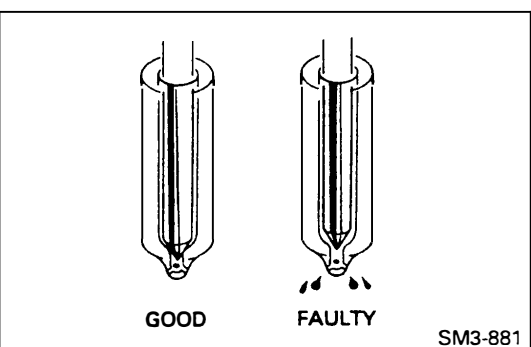
TEST THE SPRAY PROFILE.

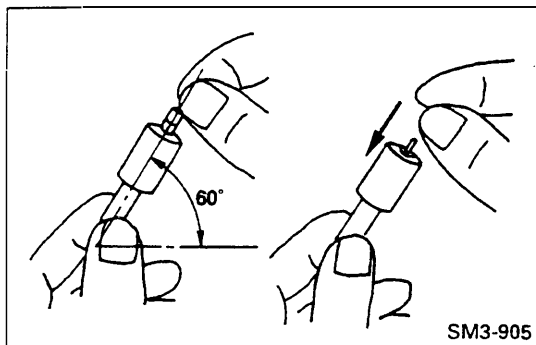
In the case of the new nozzle, operate the lever at the rate of 30 to 60 strokes per minute, and for a used nozzle, operate the lever at the rate of 15 to 60 strokes per minute.



TEST THE FUEL LEAKAGE

When checking for fuel leakage from the nozzle, apply a pressure of about 0.98–1.96 MPa {10–20 kgf/cm², 142–284 lbf/in²} lower than the correct injection pressure to the nozzle by means of the nozzle.



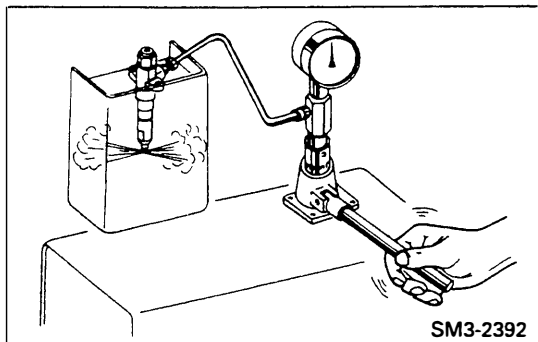


[FOR HINO MODEL H07C H07CT H07C-T]

TEST THE NOZZLE SINKING.

Wash the nozzle proper with diesel fuel oil, then immerse it in diesel fuel oil.

Next slide the needle inside the nozzle proper and ensure that it move smoothly. The needle valve should fall under its own weight when withdrawn vertically about 1/3 and released. If its motion is sluggish, replace the nozzle with a new one.



ADJUST THE INJECTION PRESSURE.

Connect the nozzle holder with a nozzle tester and move the lever at the rate of about 50 to 60 times per minute.

Injection pressure:

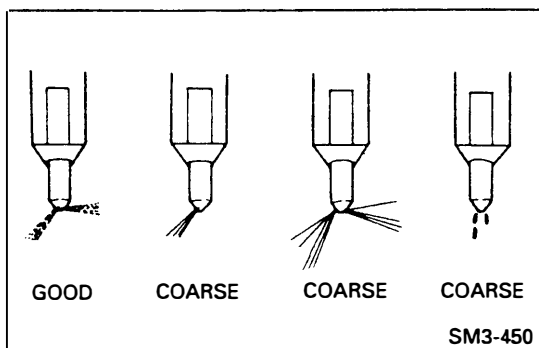
20.1–20.6 MPa (205–210 kgf/cm², 2,916–2,986 lbf/in²)

Except H07CT-HKFA

18.1–18.6 MPa (185–190 kgf/cm², 2,632–2,702 lbf/in²)

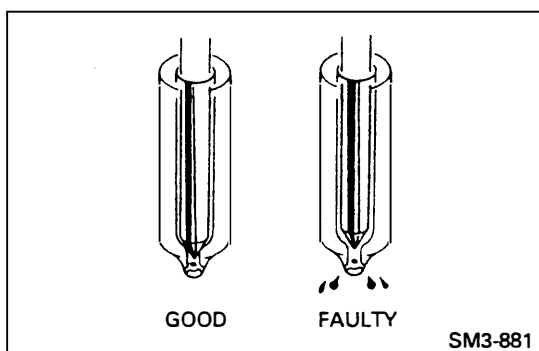
WARNING

- Diesel fuel is flammable
This nozzle adjusting should be done a well ventilated room and away from any open flames or electric spark.
- The spray must always be covered. Keep your face and body away from the spray. This is because of the risk of fuel oil getting in your eyes or passing into your body.



TEST THE SPRAY PROFILE.

In the case of the new nozzle, operate the lever at the rate of 30 to 60 strokes per minute, and for a used nozzle, operate the lever at the rate of 15 to 60 strokes per minute.



TEST THE FUEL LEAKAGE

When checking for fuel leakage from the nozzle, apply a pressure of about 0.98–1.96 MPa (10–20 kg/cm², 142–284 lbf/in²) lower than the correct injection pressure to the nozzle by means of the nozzle.

IMPORTANT POINT — MOUNTING**INSTALL THE NOZZLE HOLDER ASSEMBLY**

NOTE: Tighten the nozzle holder bolts alternately right and left, tightening the bolts gradually until the specified torque is reached evenly.

Tightening torque: 14.7 N·m {150 kgf·cm, 10.85 lbf·ft}

WARNING

If a single bolt is tightened first to the specified torque, when the other bolts are tightened the actual effective torque will be excessive, resulting in possible damage to the nozzle holder and or bolt. On the other hand, if the bolts are not tightened sufficiently, gas way leak, resulting in scorching of the nozzle.

HINO DIESEL ENGINE PARTS CONTACT**EMAIL:**

EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

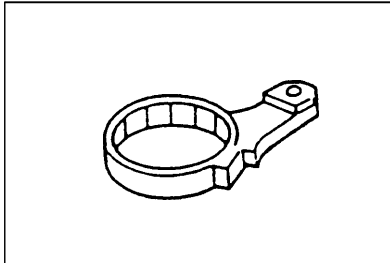
Website: www.HeavyEquipmentRestorationParts.com

FUEL FILTER

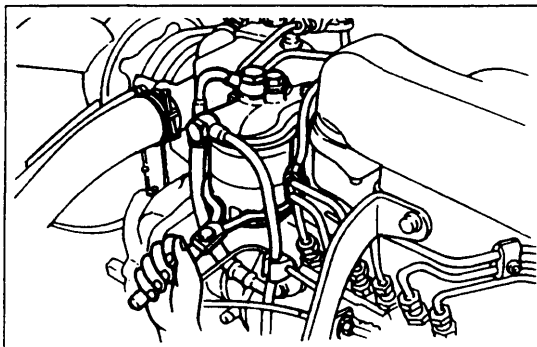
SPECIAL TOOL

Prior to starting an engine overhaul, it is necessary to have these special tools.

WRENCH



09503-1040



IMPORTANT POINT — DISMOUNTING

REMOVE THE FUEL FILTER.

Using a special tool, unscrew the fuel filter.

NOTE: Be careful not to spill diesel fuel.

Special Tool: Wrench (09503-1040)

IMPORTANT POINT — MOUNTING

INSTALL THE FUEL FILTER.

1. Apply a small amount of diesel fuel to the gasket of a new fuel filter.
2. Manually tighten the new fuel filter until its gasket touches the cover and then tighten another 2/3 turn with a special tool.

Special Tool: Wrench (09503-1040)

COOLING SYSTEM

DATA AND SPECIFICATIONS

Coolant pump

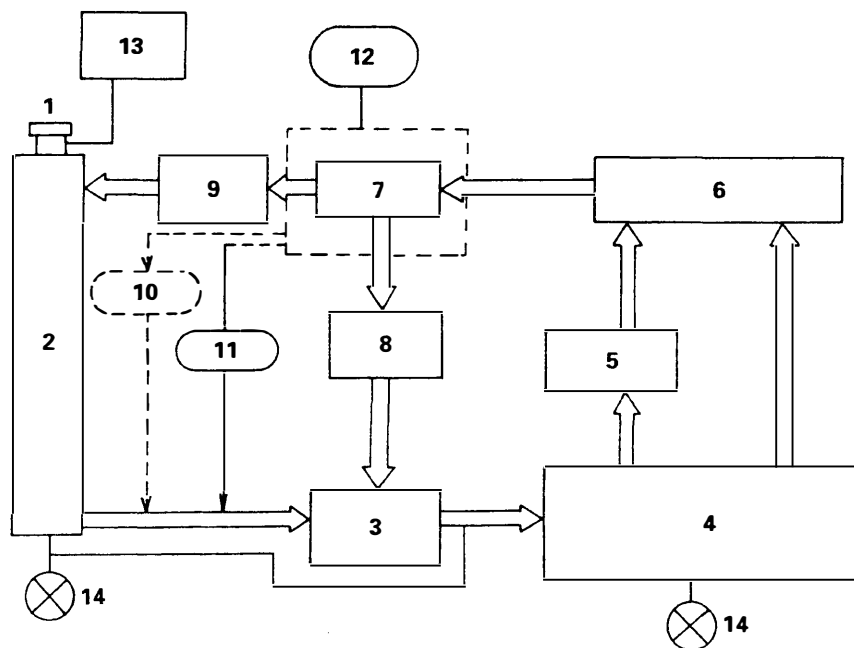
Type Forced circulation by volute pump

Drive By V-belt

Thermostat

Type Wax type, bottom bypass system

COOLING SYSTEM DIAGRAM



SM3-2041

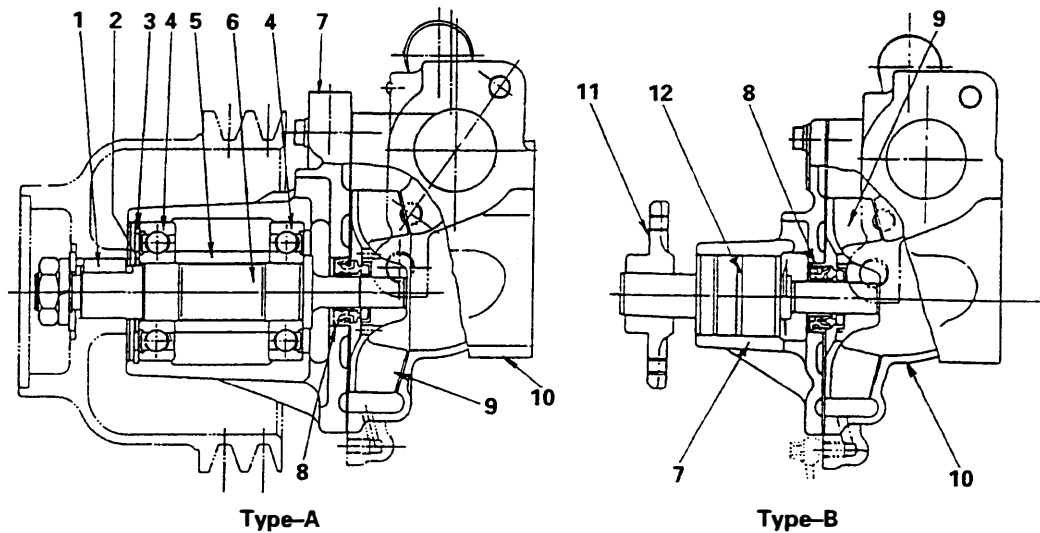
1. Radiator cap
2. Radiator
3. Coolant pump
4. Cylinder block
5. Oil cooler

6. Cylinder head
7. Thermostat
8. Bypass hose
9. Thermostat cover
10. Turbo charger (Model H07C-T)

11. Car heater (If so fitted)
12. Coolant temperature gauge
13. Reservoir tank (If so fitted)
14. Drain plug

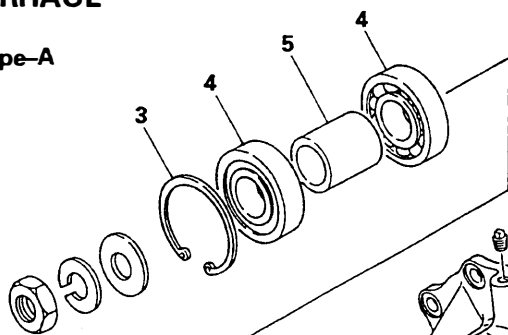
HINO H07C H07CT H07D H07DT WATER PUMP

DESCRIPTION

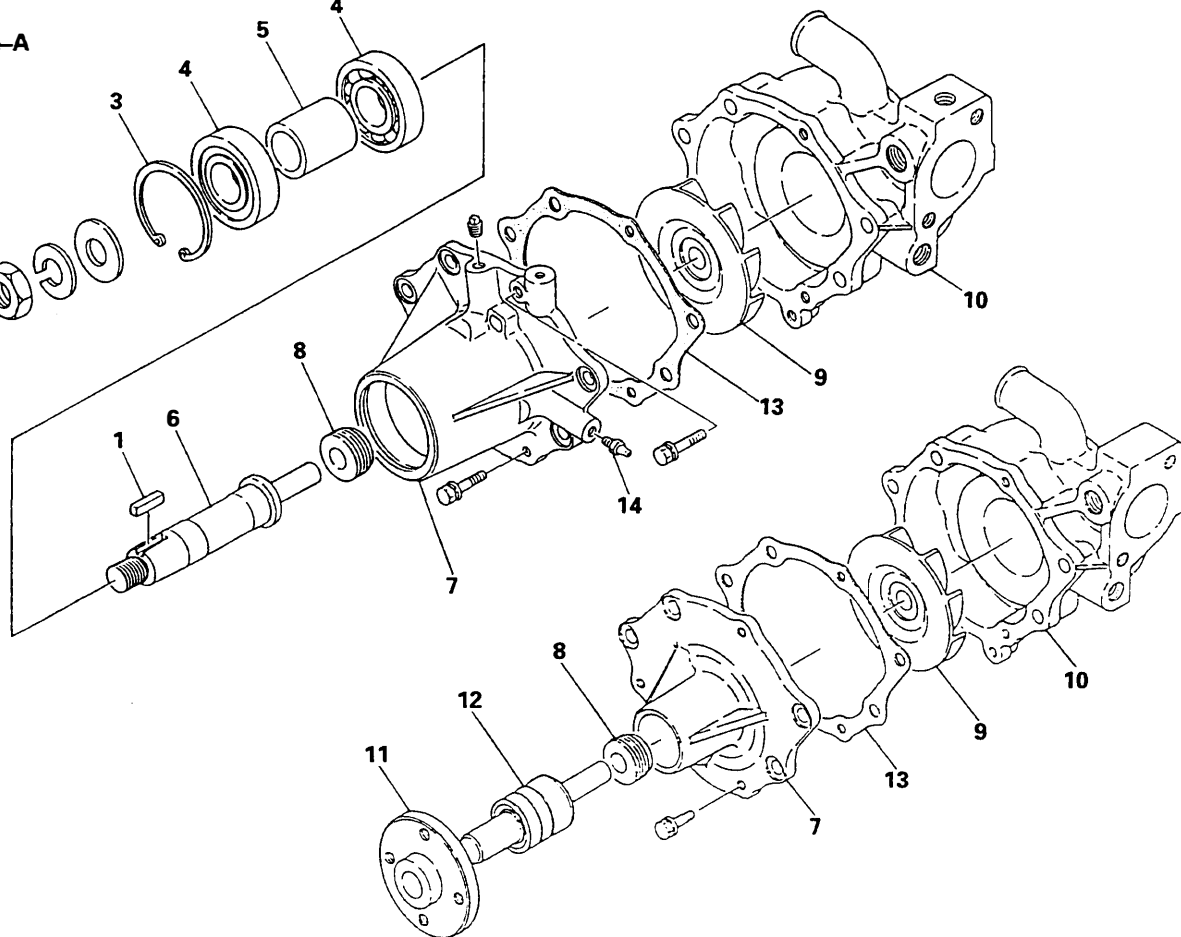


OVERHAUL

Type-A



Type-B



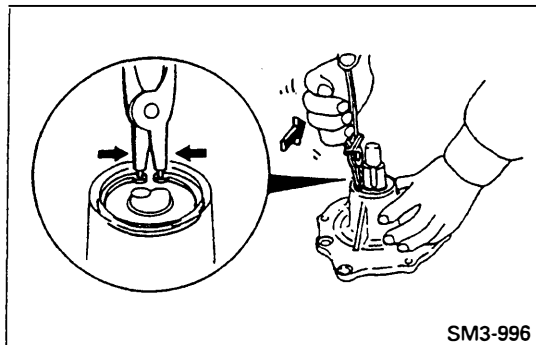
- 1. Key
- 2. Collar
- 3. Retainer ring
- 4. Bearing
- 5. Collar

- 6. Shaft
- 7. Case
- 8. Seal
- 9. Vane
- 10. Cover

- 11. Pulley center
- 12. Shaft assembly
- 13. Gasket
- 14. Lubrication fitting

[FOR TYPE-A]**IMPORTANT POINTS – DISASSEMBLY****REMOVE THE RETAINER RING.**

Remove the retainer ring using retainer ring pliers.

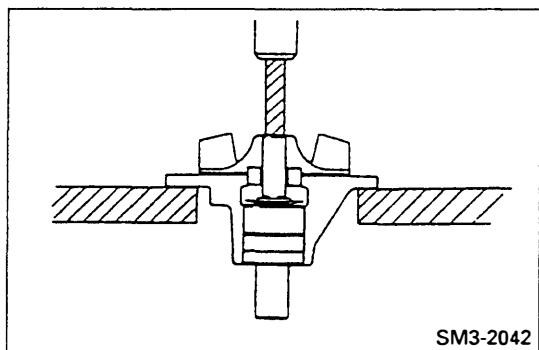


SM3-996

REMOVE THE VANE AND SHAFT.

Using a press, push the end of the shaft on the vane side.

NOTE: If the press is applied without removing the retainer ring, the pump case will be damaged.

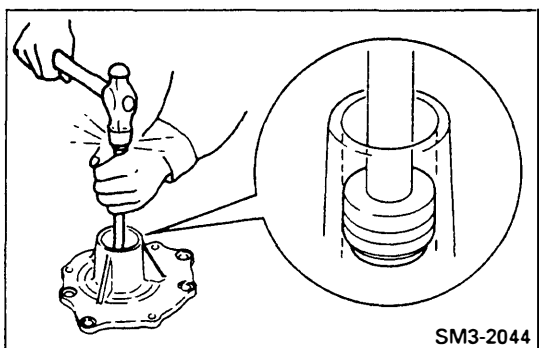


SM3-2042

REMOVE COOLANT SEAL FROM THE CASE.

Using a copper rod, strike the coolant seal.

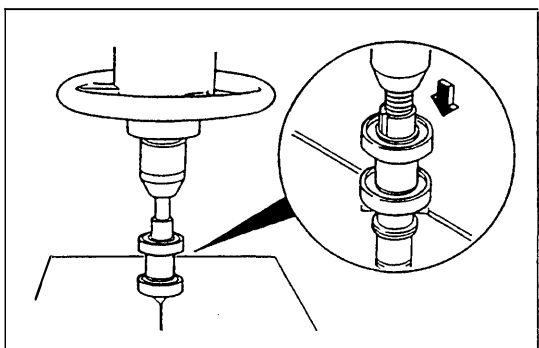
NOTE: It is not possible to reuse the seal after removing it from the case. Accordingly, be sure to replace it with a new one.



SM3-2044

REMOVE THE BEARING AND COLLAR USING A PRESS.

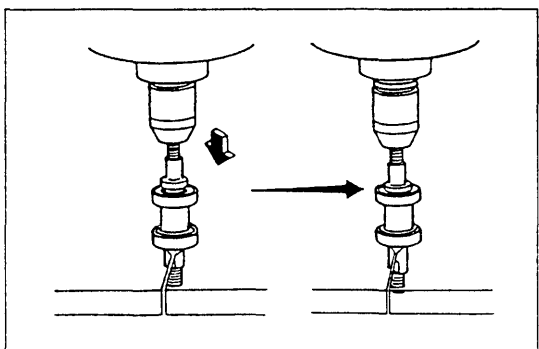
NOTE: It is not possible to reuse the oil seal after removing it from the case. Accordingly, be sure to replace it with a new one.

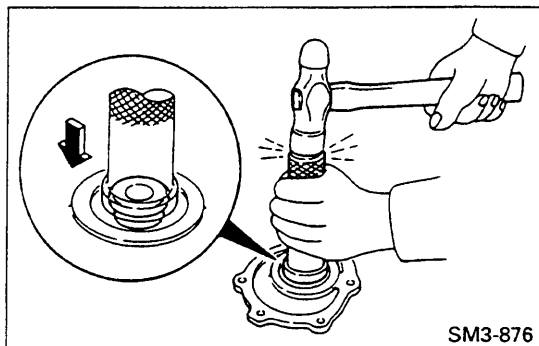
**IMPORTANT POINTS – ASSEMBLY****INSTALL THE BEARING TO THE SHAFT.**

Install the ball bearings with collar on the shaft using a press.

NOTE:

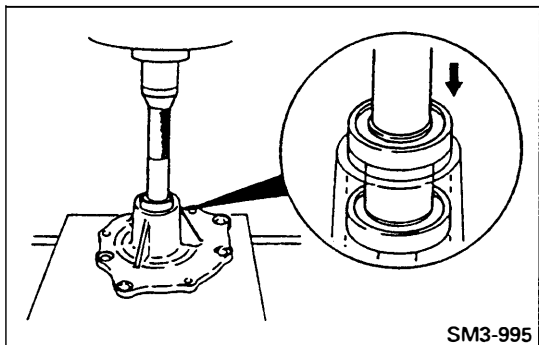
- Install the bearings properly aligning the centers of the 3 bearings and the collar.
- Do not install the bearings by striking the shaft with a hammer.
- When installing individual bearings, use grease-packed bearings.



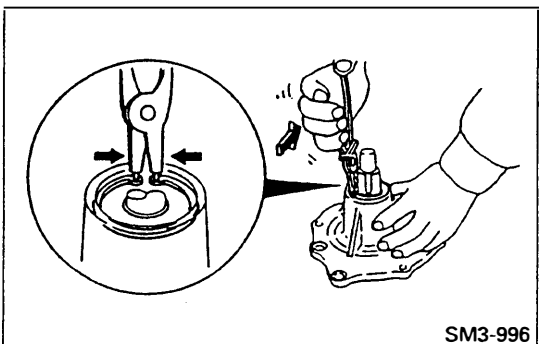
**INSTALL THE COOLANT SEAL**

1. Apply a little liquid sealer to the coolant seal outer circumference and case.
2. Install the coolant seal

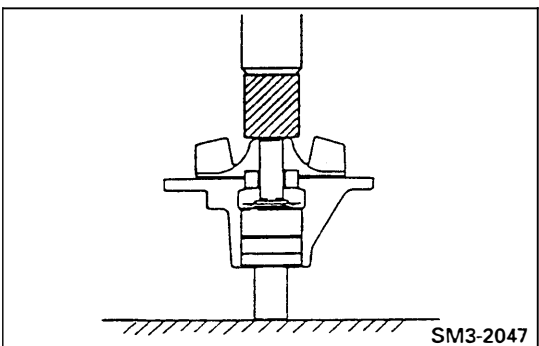
NOTE: Replace the coolant seal with new one.



FIT THE SHAFT INTO THE CASE USING A PRESS.

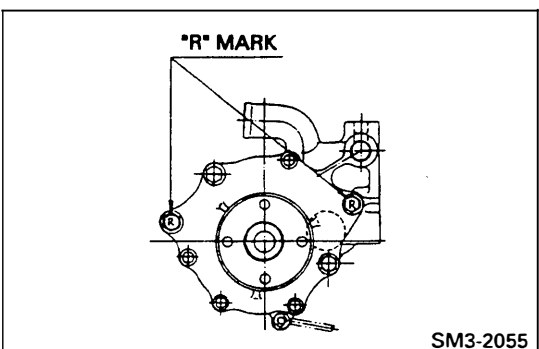
**INSTALL THE RETAINER RING**

After fitting the shaft, install the plain washer, then install the new retainer ring by means of an expander.

**INSTALL THE VANE.**

Press the vane onto the shaft.

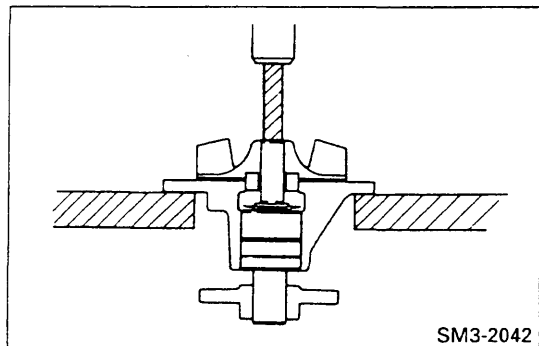
NOTE: The vane face is to flush until end of the shaft.

**IMPORTANT POINT – MOUNTING****INSTALL THE COOLANT PUMP ASSY**

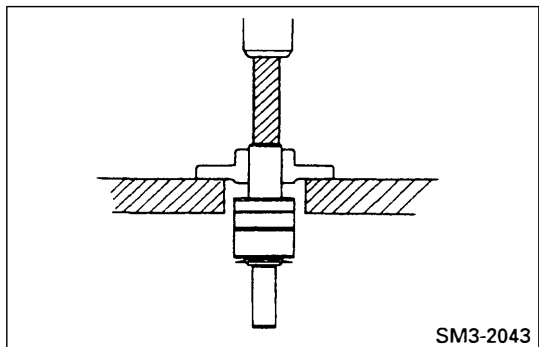
Reamer bolt fitting position.

[FOR TYPE-B]**IMPORTANT POINTS — DISASSEMBLY****REMOVE THE VANE AND SHAFT.**

Using a press, push the end of the shaft on the vane side.

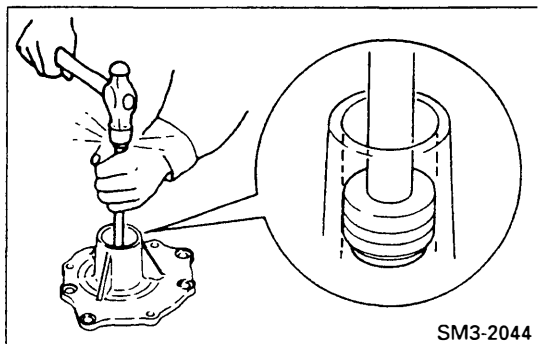
**REMOVE THE PULLEY CENTER**

Using a press, push the end of the shaft on the pulley center side.

**REMOVE COOLANT SEAL FROM THE CASE**

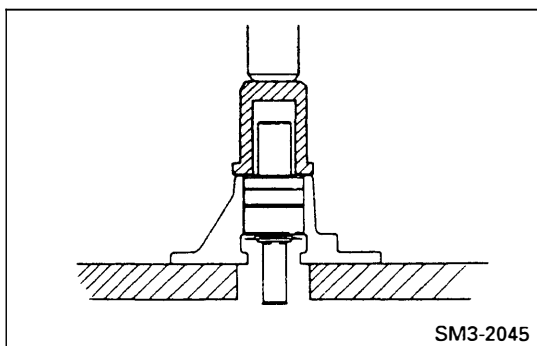
Using a copper rod, strike the coolant seal.

NOTE: It is not possible to reuse the seal after removing it from the case. Accordingly, be sure to replace it with a new one.

**IMPORTANT POINTS — ASSEMBLY****INSTALL THE SHAFT ASSEMBLY**

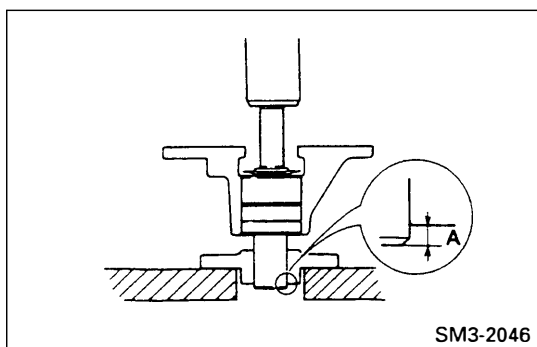
Press the shaft assembly into the case.

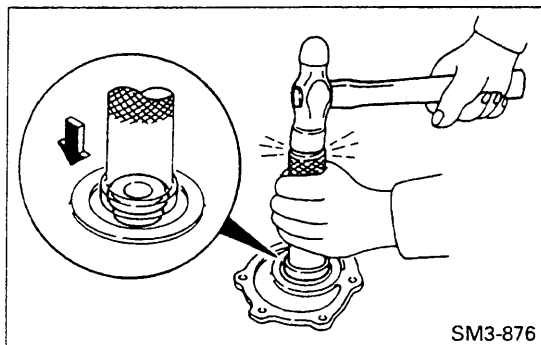
NOTE: The bearing face is to flush until edge of the shaft.

**INSTALL THE PULLEY CENTER**

Press the pulley center onto the shaft.

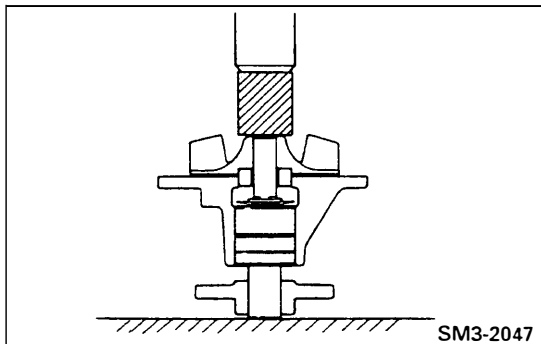
Dimension A: 3.1 mm {0.122 in}



**INSTALL THE COOLANT SEAL**

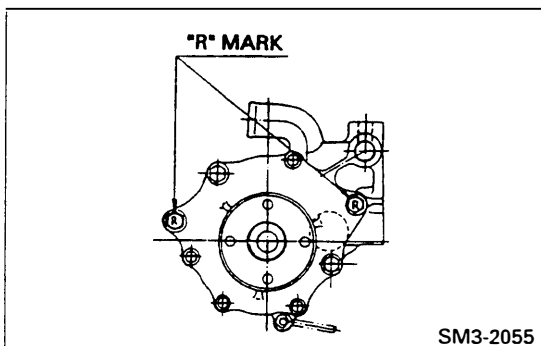
1. Apply a little liquid sealer to the coolant seal outer circumference and case.
2. Install the coolant seal

NOTE: Replace the coolant seal with new one.

**INSTALL THE VANE**

Press the vane onto the shaft.

NOTE: The vane face is to flush until end of the shaft.

**IMPORTANT POINT — MOUNTING****INSTALL THE COOLANT PUMP ASSY**

Reamer bolt fitting position

HINO DIESEL ENGINE PARTS CONTACT**EMAIL:**

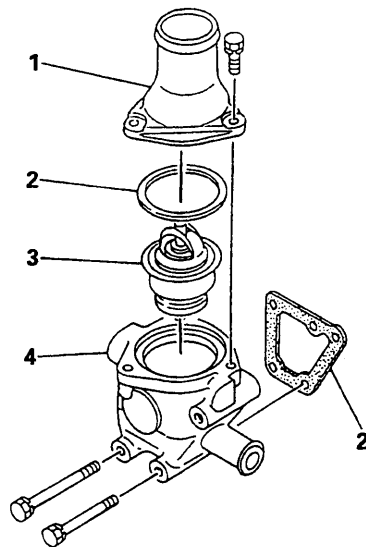
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

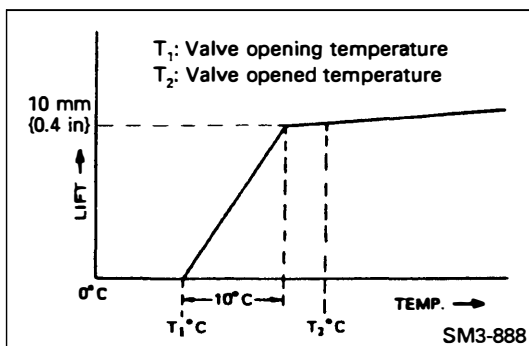
THERMOSTAT

OVERHAUL



1. Thermostat case cover
2. Gasket
3. Thermostat
4. Thermostat case

SM3-2432



IMPORTANT POINTS — ASSEMBLY

INSPECT THE THERMOSTAT FUNCTION.

1. Place the thermostat in hot water and check the valve opening temperature and the valve lift.

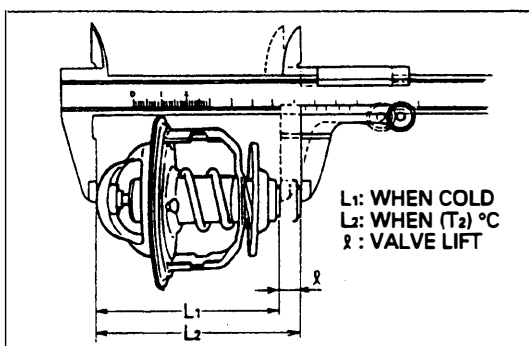
NOTE: The thermostat valve opening temperature (T_1) is engraved on the thermostat seat, and it should be confirmed.

Thermostat valve opening temperature;

Thermostat valve opening temp. (T_1)	Service standard
76.5°C	74.5–78.5°C (167–173°F)
82°C	80–84°C (145–215°F)

Thermostat valve lift;

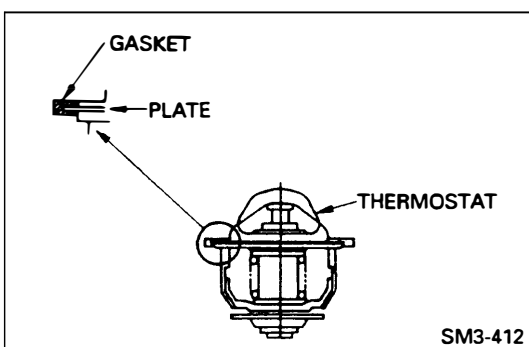
Thermostat valve opening temp. (T_1)	Measuring temp. (T_2)	Valve lift (ℓ)
76.5°C	90°C (194°F)	10 mm (0.394 in) or more
82°C	95°C (203°F)	



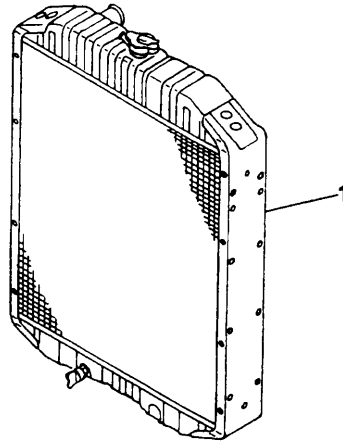
2. Immerse a heated thermostat in water of normal temperature. If it completely closes within 5 minutes it is satisfactory. If it remains even slightly open, it is defective and must be replaced.

MOUNT THE THERMOSTAT.

1. Remove the water and dirt adhering to the thermostat case.
2. Replace the gasket without fail if it is corroded, damaged or flattened.
3. Before installing the hose, apply liquid gasket to the hose installation of the thermostat case cover.
4. In order to prevent clogging of the radiator, do not use a large amount of liquid gasket.



RADIATOR



RADIATOR

1. Radiator

SM3-2264

IMPORTANT POINT — DISMOUNTING

DISMOUNT THE RADIATOR.

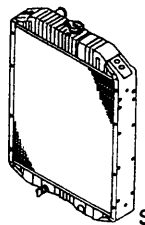
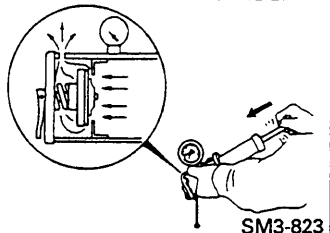
WARNING

To avoid the danger of burns to not drain the coolant while the engine and radiator are still hot.

NOTE: When dismantling and mounting the radiator, do not damage the radiator core.

INSPECTION AND REPAIR

Unit: KPa {kgf/cm², lbf/in²}

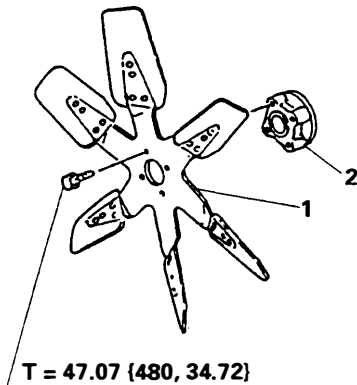
Inspection Item		Standard	Limit	Remedy	Inspection Procedure
Coolant leakage		—	—	Replace radiator	 SM3-2264
Clogging of the Fins		—	—	Clean	
Radiator cap valve opening pressure	0.5	39.3–58.8 {0.4–0.6, 5.7–8.5}	—	Replace	 SM3-823
	0.9	73.6–102.9 {0.75–1.05, 10.7–14.9}			

NOTE: The coolant filler cap valve opening pressure is shown on the cap and it should be confirmed. If the cap pressure is incorrect, there is a risk of abnormally high pressure being generated in the cooling system, which may cause the hose to drop off or burst and, in turn, damage the engine.

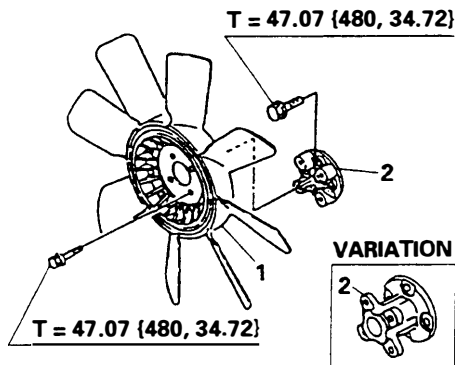
COOLING FAN

OVERHAUL

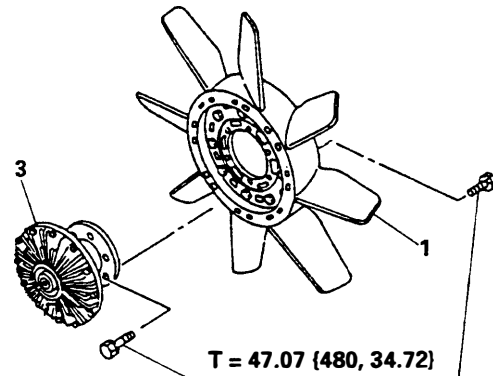
STEEL 6-BLADE, BLOWOFF TYPE



PPG 8-BLADE, BLOWOFF TYPE



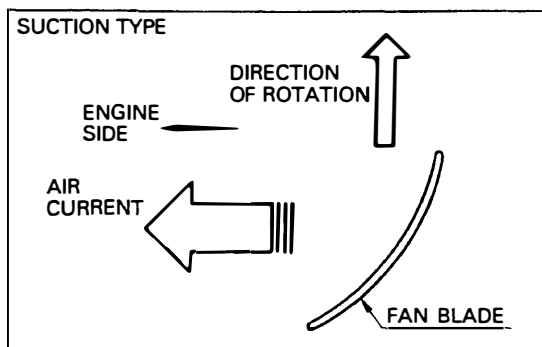
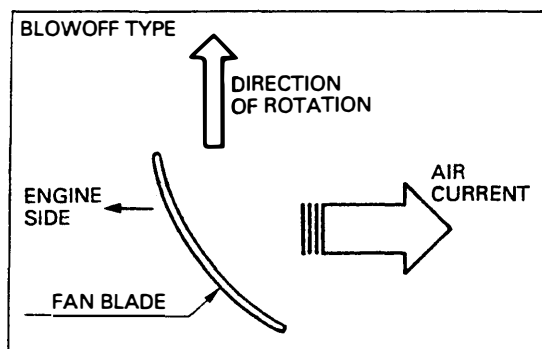
PPG 8-BLADE, SUCTION TYPE, WITH FAN CLUTCH



1. Cooling fan
2. Fan spacer
3. Fan clutch

T = Tightening torque: N·m {kgf·cm, lbf·ft}

1. Shock to the fan clutch and fan.
During maintenance and inspection, be careful not to drop or strike the fan clutch or fan itself. The resulting damage may lower the performance of the fan. Also, note that the fan is made of plastic and may become damaged or deformed if force is applied to it.
2. Replacing the fan.
Do not replace the fan unless it is faulty. When replacing the fan, replace it with the same type as the one which was removed. If the fan is replaced with one of a larger capacity because of overheating or, conversely is replaced with one of a smaller capacity due to overcooling, the cooling performance may in fact be reduced and durability may be jeopardized.
3. Other items
Check the temperature detector (bimetal) to see if there is any mud or dust on it.
If the bimetal is covered with mud or dust, the fan performance will be erratic, and any result in overheating or overcooling. In such case, carefully remove mud and dust adhering to the surface of the bimetal, using a wire brush, or the like.
Take care not to apply excessive force particularly.
Do not paint the fan or fan clutch.
Do not place any paint or other reagents which are likely to dissolve plastic in contact with the fan.

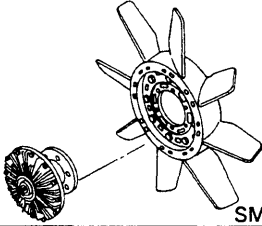


IMPORTANT POINT — MOUNTING

INSTALL THE COOLING FAN.

NOTE: The cooling fan should be installed rightly as shown.

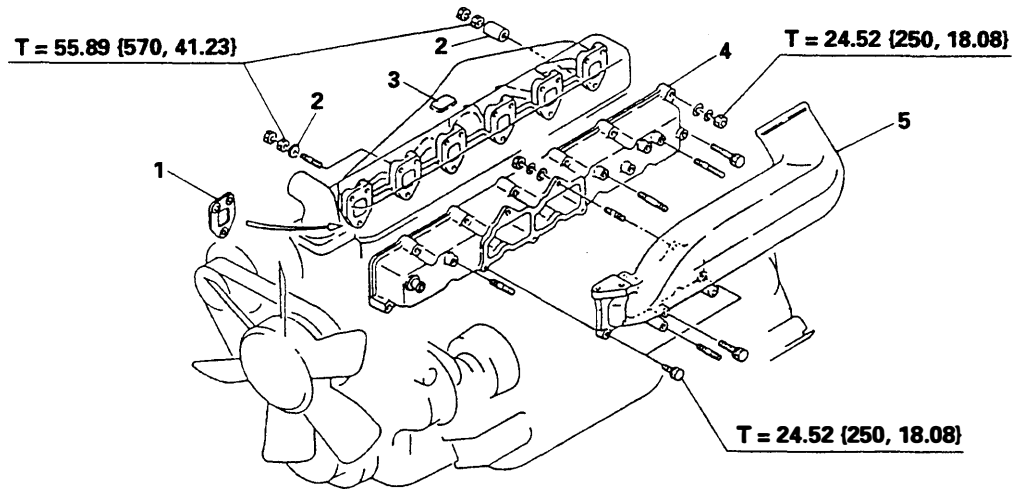
INSPECTION AND REPAIR

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Cooling fan and fan clutch deformation and damage	—	—	Replace if necessary	 SM3-2443

HINO H07C HINO H07CT HINO H07D HINO H07DT AIR INTAKE AND EXHAUST SYSTEM

OVERHAUL

HINO H07D HINO H07DT



T = Tightening torque: N·m {kgf·cm, lbf·ft}

- 1. Hino Exhaust Gasket
- 2. Spacer
- 3. Hino Exhaust manifold

- 4. Hino Intake manifold
- 5. Intake pipe

HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

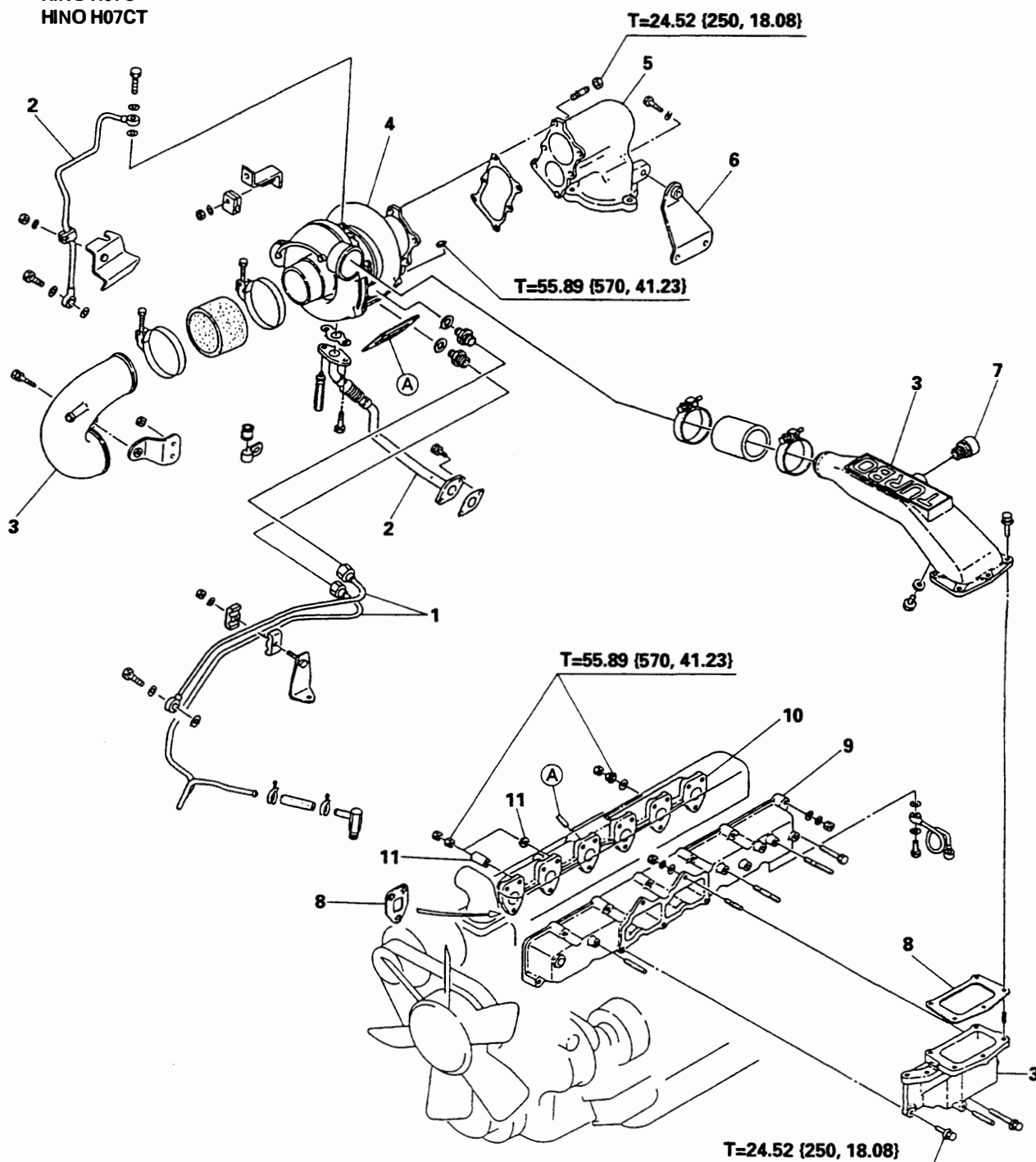
EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

OVERHAUL

HINO H07C
HINO H07CT

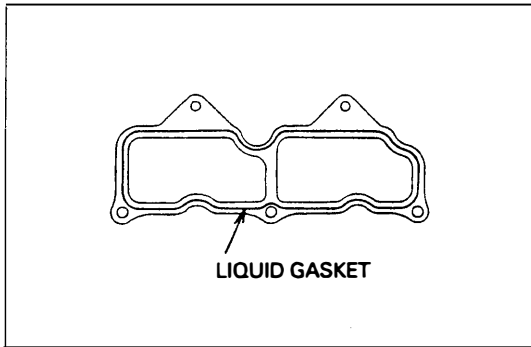


T = Tightening torque: N·m {kgf·cm, lbf·ft}

- 1. Hino Coolant pipe
- 2. Hino Oil pipe
- 3. Hino Intake pipe
- 4. Turbocharger

- 5. Connector
- 6. Bracket
- 7. Safety valve
- 8. Hino Exhaust Gasket

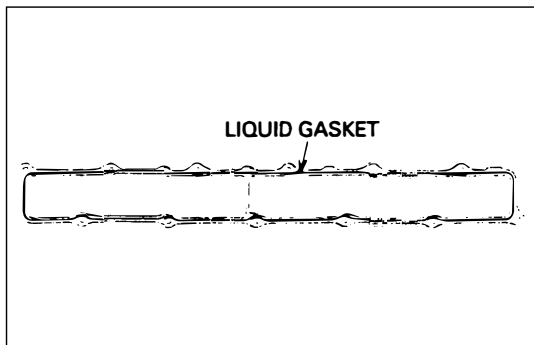
- 9. Hino intake manifold
- 10. Hino Exhaust Manifold
- 11. Spacer



IMPORTANT POINTS — MOUNTING

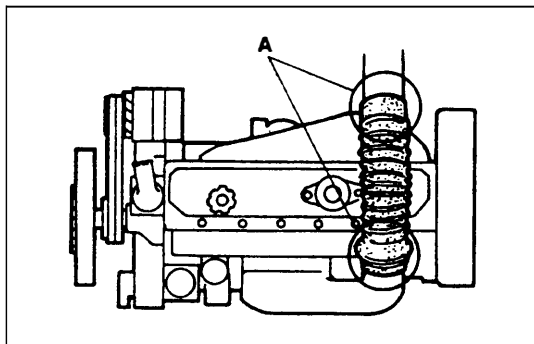
INSTALL THE INTAKE PIPE.

Refer to "LIQUID GASKET APPLICATION POINTS" in SECTION ENGINE MOVING PARTS.



INSTALL THE INTAKE MANIFOLD

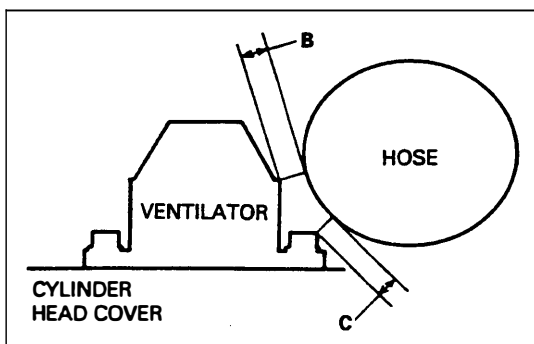
Refer to "LIQUID GASKET APPLICATION POINTS" in SECTION ENGINE MOVING PARTS.



INSTALL THE INTAKE PIPE.

NOTE: Do not twist the hose too much.

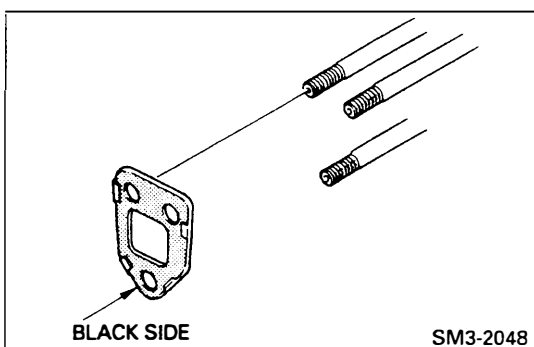
Hose insertion A : 30–40 mm {1.182–1.574 in}



NOTE: Ensure that the clearance between the hose and ventilator as shown.

Clearance B: 15–20 mm {0.591–0.787 in}

Clearance C: 10–15 mm {0.394–0.590 in}



INSTALL THE Hino H07C Hino H07CT Hino H07D Hino H07DT EXHAUST MANIFOLD

1. Through the exhaust manifold with the gasket in place.

NOTE: Make sure that black side of the gasket is opposite to the exhaust manifold.

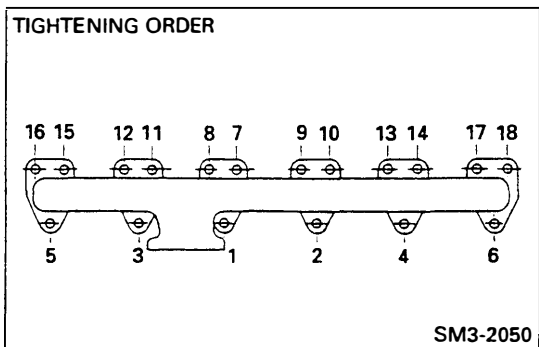
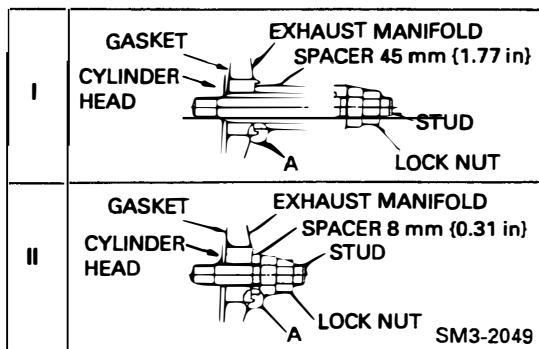
HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

EngineParts@HeavyEquipmentRestorationParts.com

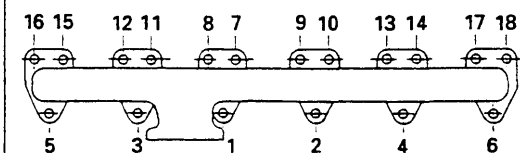
Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com



SM3-2049

TIGHTENING ORDER



SM3-2050

2. Through the spacer in place as shown

Applicable cylinder No.

MODEL \ TYPE	I	II
H07D	1, 5, 6	2, 3, 4
H07C-T	1, 6	2, 3, 4, 5

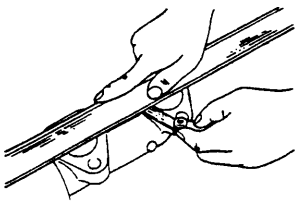
3. Tighten the flange nut by hand.

NOTE: When tightening the flange nut, pay attention so that the spacer does not ride onto the facing-machined section of the flange.

4. Tighten the flange nuts little by little in three stages and in the numerical order as shown torque the nuts on final stage.
5. Tighten the lock nuts.

INSPECTION AND REPAIR

Unit: mm (in)

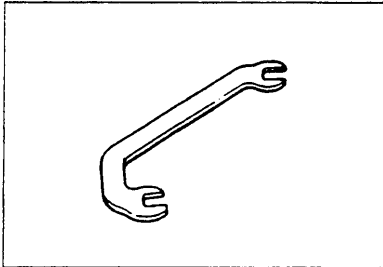
Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Hino H07C Hino H07CT Hino H07D Hino H07DT Exhaust Manifold Flatness	Less than 0.10 {0.0039}	0.50 {0.0196}	Resurface or replace Resurface Limit: 0.1 mm {0.0039 in} par flange.	 SM3-711
Exhaust Manifold Wear or Damage	—	—	Resurface or replace	

HINO H07C HINO H07CT HINO H07D HINO H07DT ENGINE COMPONENT PARTS DISMOUNTING AND MOUNTING

SPECIAL TOOL

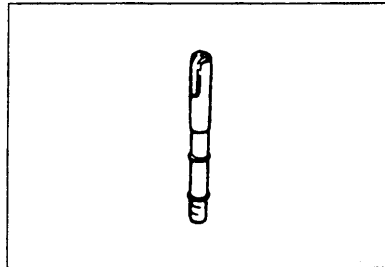
Prior to starting an engine overhaul, it is necessary to have these special tools.

INJECTION PUMP COUPLING WRENCH



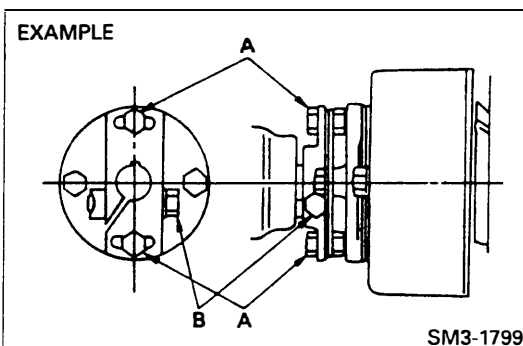
09819-1705
09819-3004

V-BELT TENSION GAUGE



09444-1210

EXAMPLE



SM3-1799

INJECTION PUMP

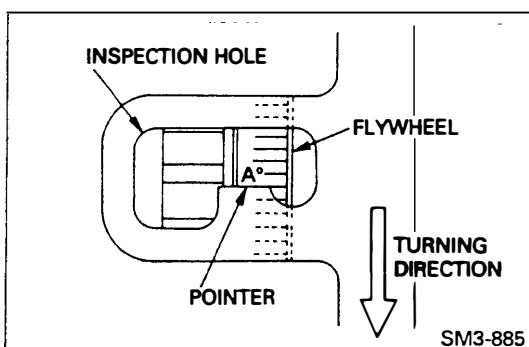
IMPORTANT POINTS — DISMOUNTING

REMOVE THE FUEL INJECTION PUMP.

1. Disconnect the fuel lines, oil lines and engine control lines.
2. Remove the through bolt "B" and the two flange bolts "A" (in slotted holes) at the coupling.
3. Remove the pump mounting bolts and then dismount the pump.

NOTE: Cover open end of the pipes and pump to prevent entry of dirt.

Special Tool: Wrench (09819-1705)
(09819-3004)



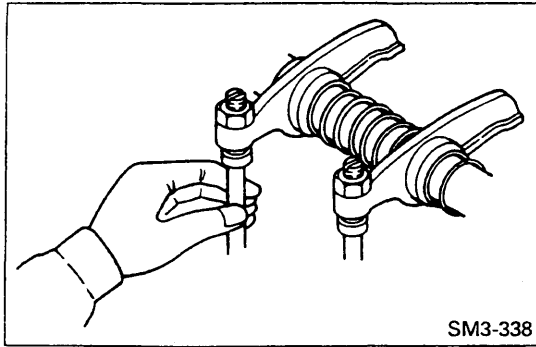
SM3-885

IMPORTANT POINTS — MOUNTING

INSTALL THE FUEL INJECTION PUMP.

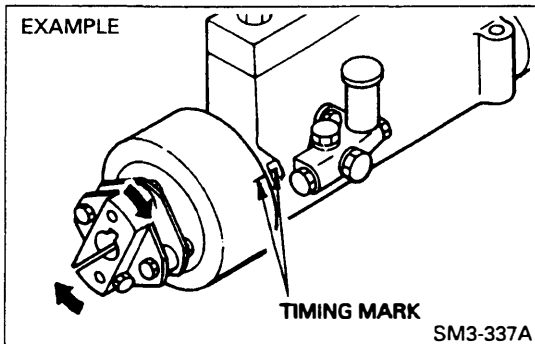
1. Adjust the injection timing.
Turn the crankshaft counter-clockwise viewed from the flywheel side to align the injection timing mark on the flywheel at A° before top dead center for No. 1 cylinder on compression stroke with pointer on the flywheel housing.

Injection timing (A°): Refer to SECTION DATA AND SPECIFICATION.

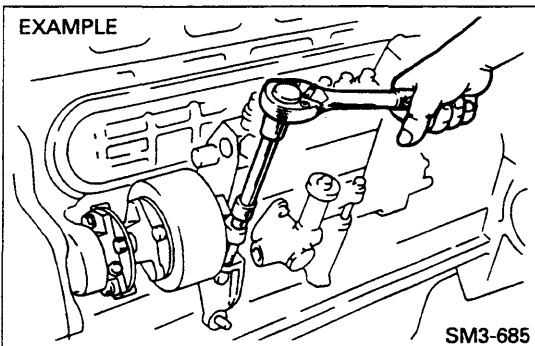


2. Check the push rods on No. 1 cylinder are loose and push rods on No. 6 are tight.

NOTE: If not, turn the crankshaft one complete revolution and align marks as above.



3. Slowly turn the automatic timer flange to clockwise viewed from coupling side to align the injection timing mark on the automatic timer with pump body pointer.

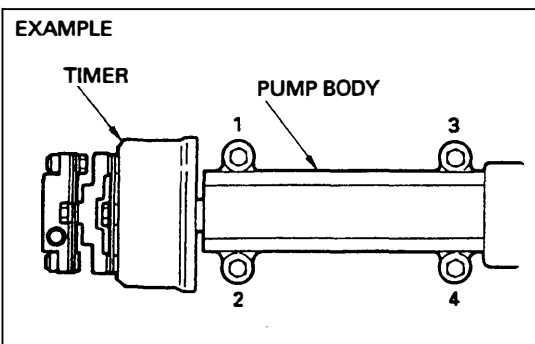


4. Position the pump on the pump bracket and adjust the position of the pump so that its mounting holes align with those of the bracket and then tighten the mounting bolts evenly in following order.

Tightening order: 1-2-3-4

Unit: N·m (kgf·cm, lbf·ft)

	Tightening torque
1st stage	1.97-4.90 (20-50, 1.4-3.6)
2nd stage	9.81-14.70 (100-150, 7.2-10.8)
3rd stage	18.64-25.49 (190-260, 14-18)



HINO DIESEL ENGINE PARTS CONTACT

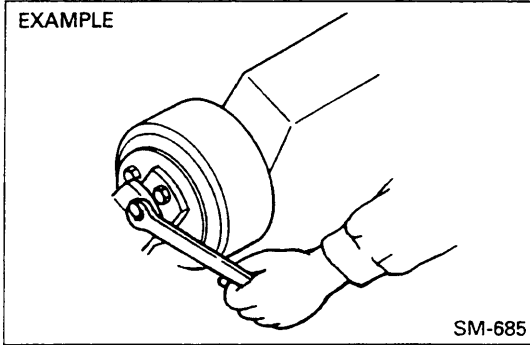
EMAIL:

EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

EXAMPLE



5. Using a special tool, tighten the two flange bolts (in slotted holes) at the coupling.

NOTE: There should not be any gap between the laminated plates or be any deformation of the flange due to pressure the laminated plates.

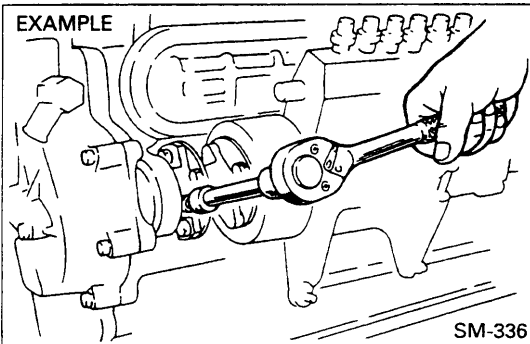
Special Tool: Injection pump coupling wrench (09819-1705)
(09819-3004)

Tightening Torque;

8 mm {0.31 in} dia: 29.42 N·m {300 kgf·cm, 21.70 lbf·ft}

10 mm {0.39 in} dia: 58.84 N·m {600 kgf·cm, 43.40 lbf·ft}

EXAMPLE



6. Tighten the through bolt at the flange.

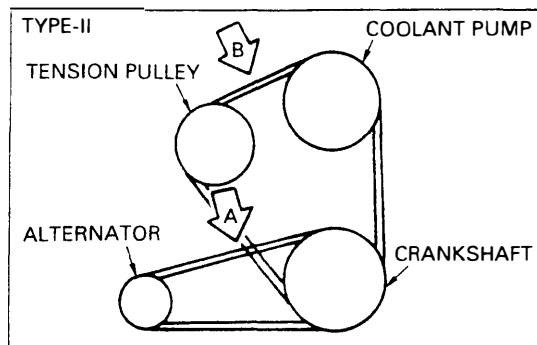
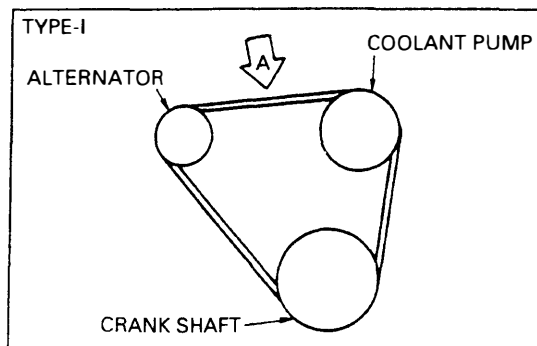
NOTE: Do not tighten the through bolt before tightening the two flange bolts.

Tightening Torque;

10 mm {0.39 in} dia: 58.84 N·m {600 kgf·cm, 43.40 lbf·ft}

12 mm {0.47 in} dia: 88.26 N·m {600 kgf·cm, 65.10 lbf·ft}

7. Connect the fuel lines, oil lines and engine control lines.



GENERATOR

IMPORTANT POINT — MOUNTING

V-BELT ADJUSTMENT.

1. Install the V-belts, and adjust the belt tension.

NOTE:

- Do not under any circumstances apply the lever directly against the generator body owing to the risk of damaging the generator.
- When installing a new V-belt or adjusting the tension, be sure to repeat the adjustment two or three times, after running the engine for several minutes each time.

2. V-belt deflection

Apply a load of about 98N {10 kgf, 22 lbf} by pressing with your finger or special tool.

Assembly standard (A) : 10–15 mm {0.40–0.59 in}

(B) : 6–10 mm {0.24–0.39 in}

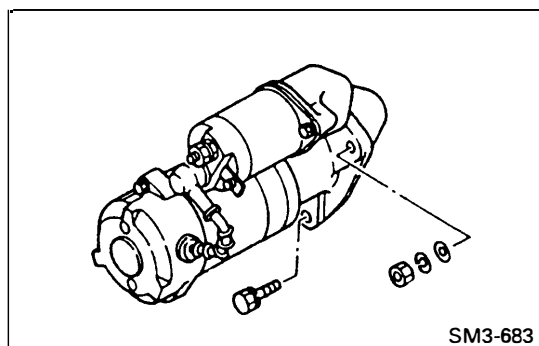
Special Tool: V-belt tension gauge (09444-1210)

NOTE: If the belt is excessively tensioned, there is a risk of damaging the bearings of the generator or coolant pump and also shorting the life of the V-belt.

Conversely, if there is insufficient tension on the V-belt, the belt will slip, unusual noise will be emitted, the battery may run down and the engine may overheat.

Through Bolt Tightening Torque:

83.36 N·m {850 kgf·cm, 61.48 lbf·ft}



STARTER

IMPORTANT POINT — MOUNTING

INSTALL THE STARTER ON THE ENGINE.

1. Install the starter on the engine.

Fitting Bolt and Nuts Tightening Torque:

83.36 N·m {850 kgf·cm, 61.48 lbf·ft}

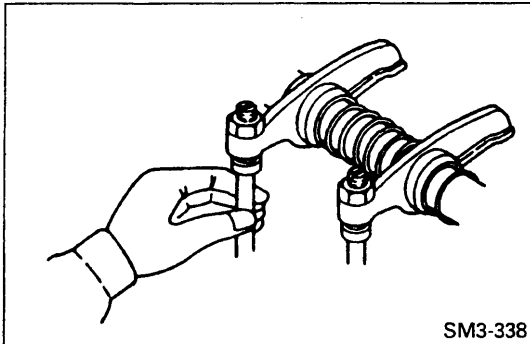
2. Connect the harness to match the marks.
3. Connect the battery cable.

IMPORTANT POINT — DISMOUNTING

REMOVE THE STARTER FROM THE ENGINE.

1. Disconnect the battery cable from the negative (–) terminal of battery.
2. Put the match marks on the harness and starter terminals with a pen and then disconnect the harness.
3. Remove the starter from the engine.

HINO H07C HINO H07CT HINO H07D HINO H07DT ENGINE TUNE-UP



METHOD FOR DETERMINING IF THE NO. 1 OR NO. 6 PISTON IS AT THE TOP DEAD CENTER ON COMPRESSION STROKE.

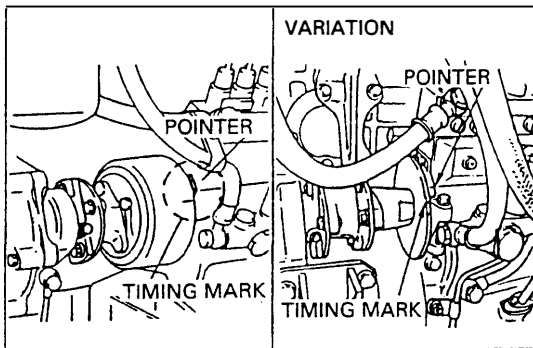
NOTE:

- Turning the crankshaft, align the mark "1-6" on the flywheel with the pointer on the flywheel housing.
- In this position either the No. 1 or No. 6 piston is at the top dead center on compression stroke.

1. If both No. 1 intake and exhaust rocker arms can be moved easily by hand, the No. 1 piston is at top dead center on compression stroke.

2. If the injection timing mark is nearly aligned with the pump body pointer, the No. 1 piston is at top dead center on compression stroke.

NOTE: If not, turn the crankshaft one complete revolution and align marks as above.

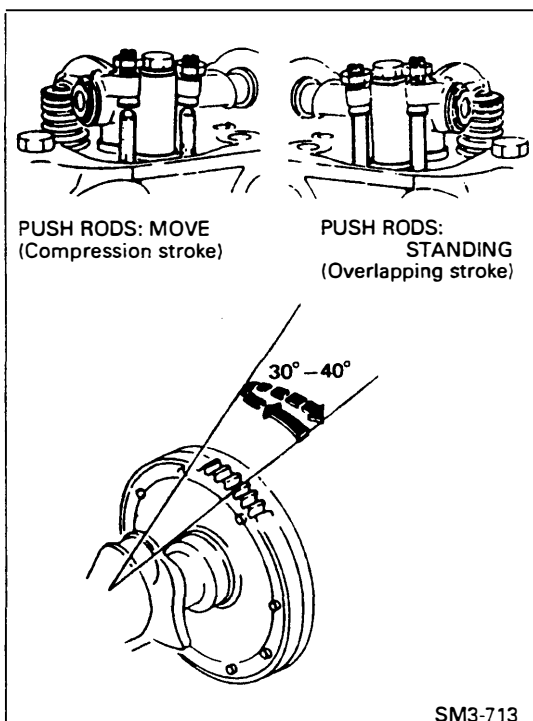


3. While locking at the push rods of No. 1 and No. 6 pistons, turn the crankshaft counter-clockwise and clockwise about 30° to 40° (see left figure).

If the piston whose exhaust and intake push rods do not move during the interval, it is at the top dead center on compression stroke.

If the piston whose push rods have moved, it is at the completion of the exhaust and begun of the intake stroke (overlapping stroke).

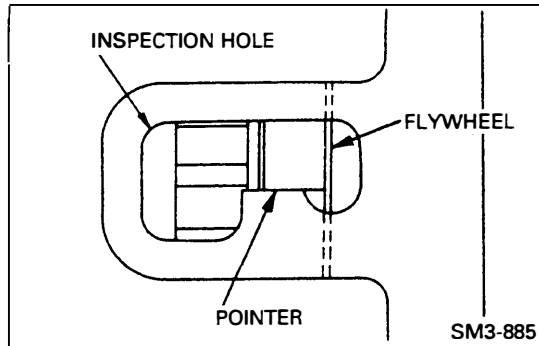
NOTE: Always loosen the lock nut and raise the adjusting screws fully to the top. If the adjusting screws are too low, the piston and valves may strike each other during valve clearance adjustment.



HINO H07C HINO H07CT HINO H07D HINO H07DT VALVE CLEARANCE

INSPECTION AND ADJUSTMENT OF THE VALVE CLEARANCE

1. Set the No. 1 piston to top dead center on compression stroke.



2. With the No. 1 piston positioned at top dead center on compression stroke, adjust the No. 1 valve clearance using a thickness gauge.

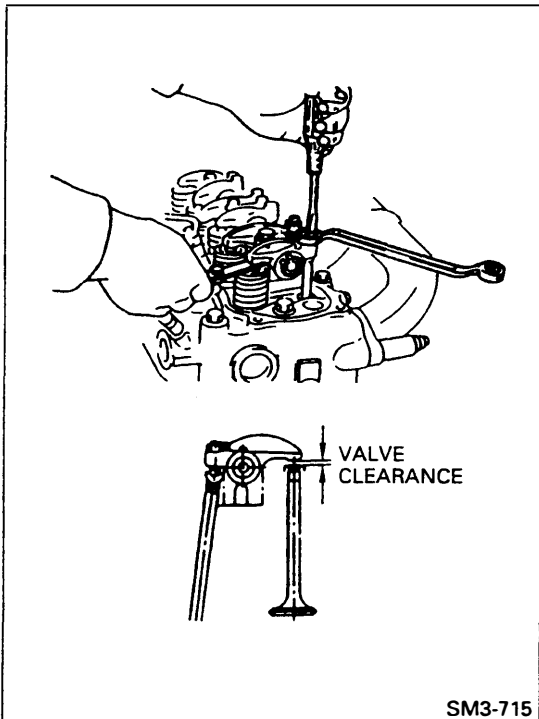
The thickness gauge should move with a very slight pull.

3. Adjust the other valves.

Turn the crankshaft counter-clockwise 180° viewed from flywheel side. Adjust the valve clearance for each cylinder in the firing order.

Firing order: 1-4-2-6-3-5

Hino H07C Intake Valve Lash Clearance 0.30MM or 0.012 Inch
 Hino H07C Exhaust Valve Lash Clearance 0.45MM or 0.018 Inch
 Hino H07CT Intake Valve Lash Clearance 0.30MM or 0.012 Inch
 Hino H07CT Exhaust Valve Lash Clearance 0.45MM or 0.018 Inch
 Hino H07D Intake Valve Lash Clearance 0.31MM or 0.0118 Inch
 Hino H07D Exhaust Valve Lash Clearance 0.46MM or 0.0177 Inch
 Hino H07DT Intake Valve Lash Clearance 0.31MM or 0.0118 Inch
 Hino H07DT Exhaust Valve Lash Clearance 0.46MM or 0.0177 Inch

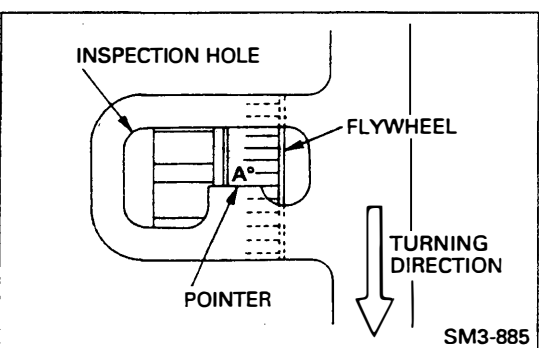


INJECTION TIMING

INSPECT THE INJECTION TIMING.

1. Turn the crankshaft counter-clockwise viewed from the flywheel side to align the injection timing mark on the flywheel or crankshaft pulley damper at A° before top dead center for No. 1 cylinder on compression stroke.

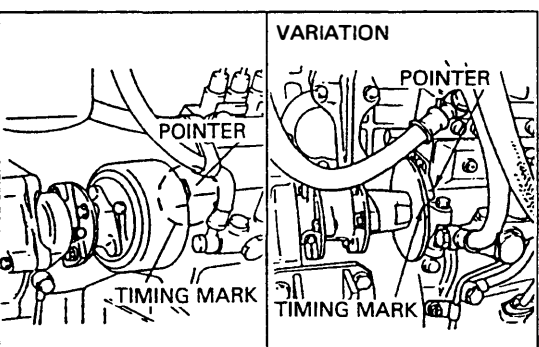
Injection Timing (A°): Refer to SECTION DATA AND SPECIFICATIONS

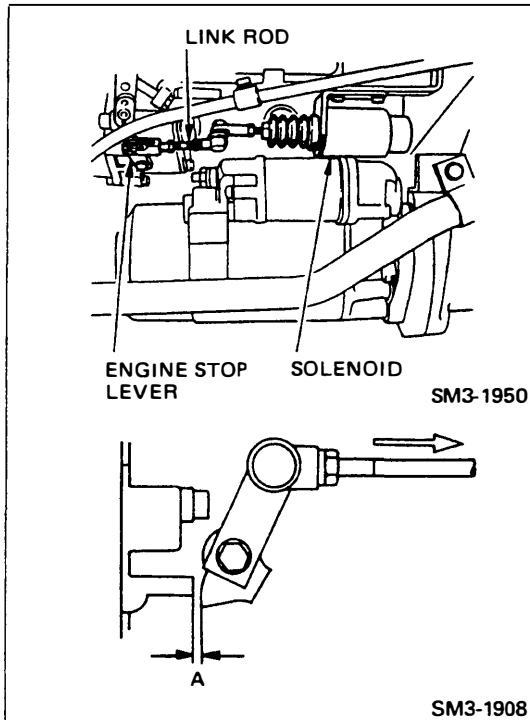


2. Check that the injection timing mark (the scribe line, not the notch) on the timer housing is aligned with the pointer (the scribe line) timing plate on the pump housing.

If not, adjust the injection timing.

NOTE: When adjusting the injection timing, refer to "FUEL INJECTION PUMP" in section ENGINE COMPONENT PARTS for details.





ENGINE CONTROL

ADJUST THE SOLENOID (ENGINE STOP) LINK ROD.

1. Adjust the link rod length so that the clearance between the stopper of the governor case and the engine stop lever becomes "A" when the solenoid plunger is fully pushed in.

Assembly Standard "A": 2-3 mm (0.08-0.11 in)

NOTE: If the clearance adjustment is unsatisfactory or the action of the solenoid is sluggish, solenoid seizure, insufficient output or engine stoppage may result.

2. After the above adjustment is over, move the link rod by hand and make sure that it moves lightly.

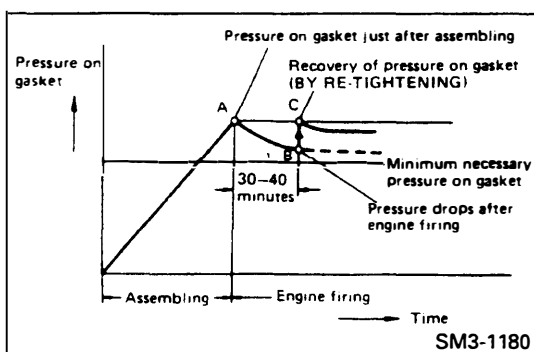
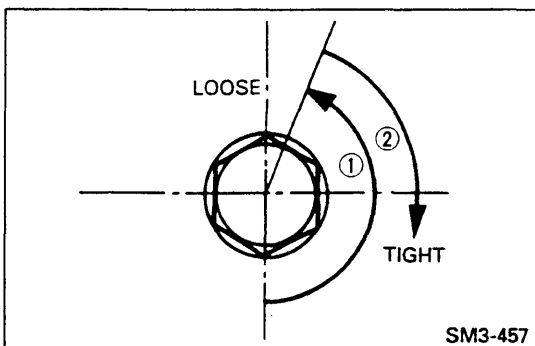
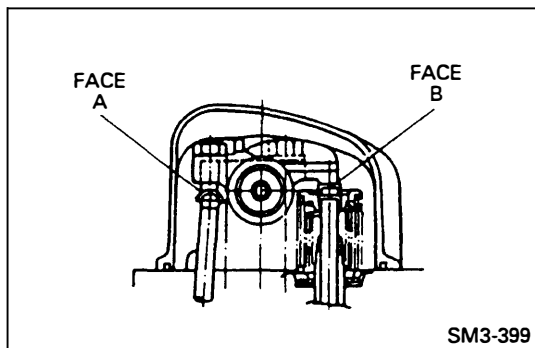
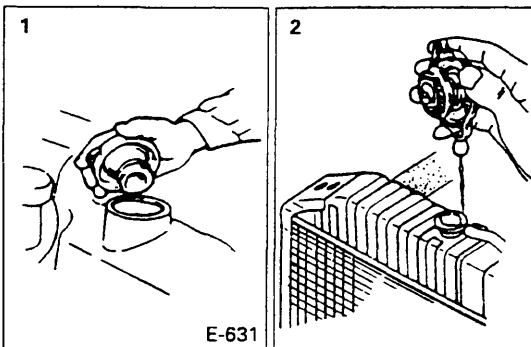
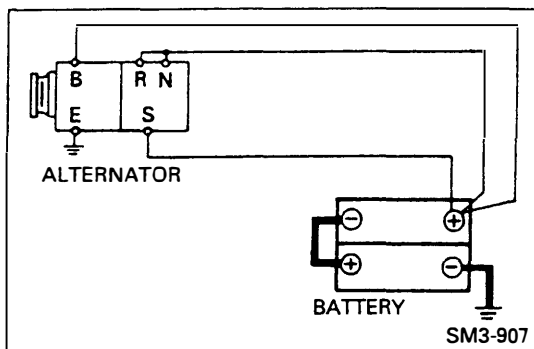
HINO DIESEL ENGINE PARTS CONTACT

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ENGINE TUNE-UP ON TEST BENCH

- NOTE:**
- If the engine is started with the power steering oil pump installed, the oil pump may burn or oil may spurt out, remove the oil pump from the engine and install a cover to prevent oil leakage from the point of removal.
 - Starting the engine when the alternator is not connected to the battery may damage the alternator. Always connect to the battery.

SET THE ENGINE ASSEMBLY ON A TEST BENCH.

1. Add the proper amount of the specified engine oil through the oil filler cap on the cylinder head cover.
2. Add coolant.
Bleed out air from inside the coolant gallery through the cylinder block drain plug.

BLEED AIR FROM FUEL SYSTEM.

Refer to section FUEL SYSTEM.

CHECK THE INJECTION TIMING.

Refer to "FUEL INJECTION PUMP" in section ENGINE COMPONENT PARTS DISMOUNTING AND MOUNTING.

CHECK THE VALVE CLEARANCE.

START THE ENGINE.

NOTE: Before starting the engine, make sure that the fuel cut lever of the fuel injection pump is operating normally.

1. Check the oil feed to rocker arms.
 - a. Set the engine speed to 600-650 r/min.
 - b. When one minute after starting the engine, oil should flow to the head (Face A) of all push rods and the head (Face B) of all valves. If the time required for the oil to flow to the rocker arms is long, various troubles such as seizing, abnormal wear and unusual noise may occur.
2. Retightening the cylinder head bolt.
Retighten the cylinder head bolts according to the following instructions.
 - (1) Retightening schedule
Retighten at the first 30 hours following servicing which involves the loosening or removal of any cylinder head bolt. Such servicing includes replacement of the cylinder head gasket, servicing of the valve gear parts, and the like.
 - (2) Retightening procedure
Step 1: Warm up the engine in the same way as in engine turning.
Step 2: Following the cylinder head bolt tightening order, loosen the first cylinder head bolt by 1/4 to 1/2 turns as shown (SM3-457), then tighten into it to its specified torque. Repeat until all the bolts have been retightened.

Tightening procedure:

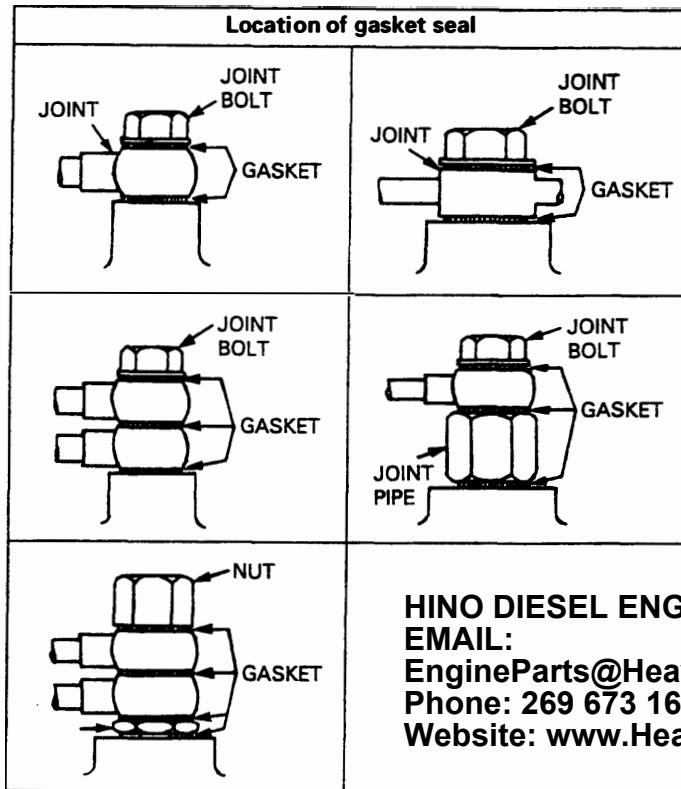
Refer to "CYLINDER HEAD" in SECTION ENGINE MOVING PARTS.

- NOTE:**
- Be sure to loosen one bolt at a time, then retighten it before going on the next bolt.
 - By retighten, face pressure of cylinder head is restored from point B to C as shown.

RECHECK THE VALVE CLEARANCE, WHEN ENGINE IS COLD.

PROCEDURE FOR INSTALLING JOINTS AND GASKETS OF ENGINE PIPES

1. Gasket seal type (aluminum + rubber, asbestos or copper).



Tightening torque chart

Clamping screw size (Diameter) mm (in)	Tightening torque N·m (kgf·cm, lbf·ft)
8 {0.315}	12-16 {120-170, 8.68-12.29}
10 {0.394}	18-22 {180-230, 13.02-16.63}
12 {0.472}	23-27 {230-280, 16.64-20.25}
14 {0.551}	23-27 {230-280, 16.64-20.25}
16 {0.630}	30-34 {300-350, 21.69-25.30}
18 {0.709}	40-44 {400-450, 28.94-32.54}
20 {0.787}	40-44 {400-450, 28.94-32.54}
22 {0.866}	52-58 {530-600, 38.34-43.39}
24 {0.945}	71-78 {720-800, 52.08-57.86}
28 {1.102}	128-147 {1,300-1,500, 94.03-108.49}

HINO DIESEL ENGINE PARTS CONTACT

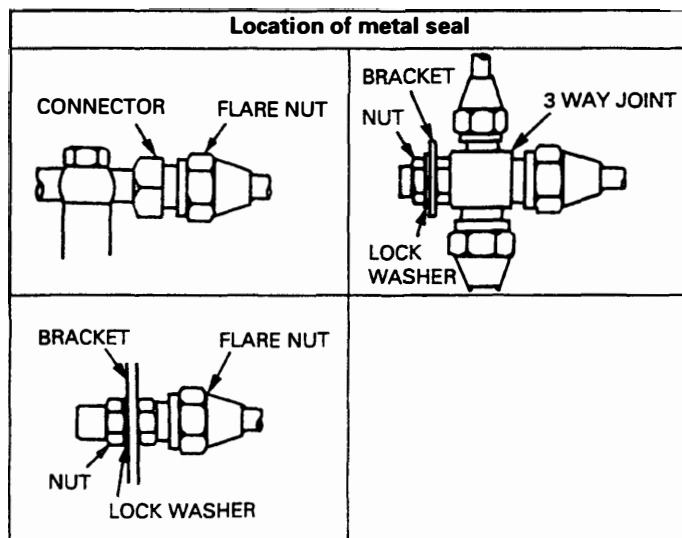
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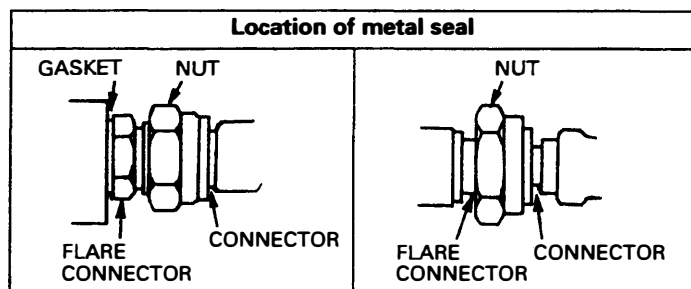
2. Metal seal type (Flares connector type).



Tightening torque chart

Clamping screw size (Diameter) mm (in)	Tightening torque N·m (kgf·cm, lbf·ft)
12 {0.472}	20-22 {200-220, 14.47-16.63}
14 {0.551}	33-35 {330-360, 23.87-26.03}
16 {0.630}	40-49 {400-500, 28.94-36.16}
18 {0.709}	59-68 {600-700, 43.39-50.63}
20 {0.787}	64-68 {650-700, 47.00-50.61}

3. Metal seal type (Nipples connectors type).



Tightening torque chart

Clamping screw size (Diameter) mm (in)	Tightening torque N·m (kgf·cm, lbf·ft)
10 (0.394)	10–14 {100–150, 7.23–10.84}
20 (0.787)	20–24 {200–250, 14.47–18.08}

- NOTE:**
- Before installing the joints, ensure that there is no dirt or burrs adhering to the various seat faces (pipe joints, gaskets, etc.)
 - Because the pipes can move relatively free during installation and the seat faces are liable to tilt, first temporarily tighten the pipes, then tighten them to specification and ensure that there is no leakage from them.
 - When tightening two pipes together, be very careful that they do not rotate together.
 - After installing the pipes, apply the correct pressure to each pipe joint and ensure that there is no leakage.
 - Ensure that the various tightening torques conform to the above table.
 - If a soft washer #4840 FR-N (aluminum + rubber and carbon press fit part) is loosened or removed subsequent to being installed, be sure and replace it with a new one.
There is no need to replace it, however, for normal retightening.

LIQUID GASKET AND APPLICATION POINTS

The engine use liquid gasket instead of conventional sheet gaskets. Apply liquid gasket, therefore, taking the following items into account.

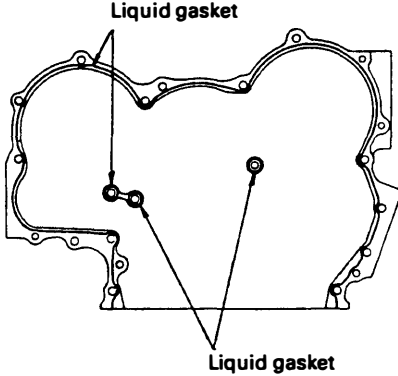
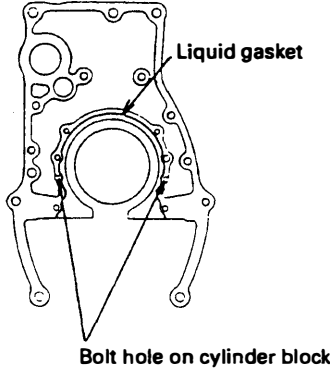
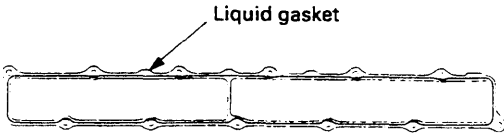
1. LIQUID GASKET APPLICATION POINTS AND COATING WIDTH

Recommended liquid gasket;

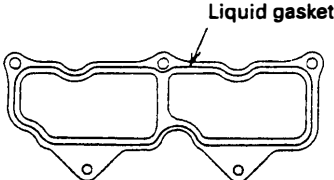
Three Bond TB1207D : 04132-1207 (Silver color) for (a), (b) and (e)

Three Bond TB1207B : 04132-1217 (Black color) for (c) and (d)

Unit: mm (in)

Parts name	Application points	Coating width
(a) Timing gear cover	Faces which mate with cylinder block (flange face, boss face)  Liquid gasket Liquid gasket	1.5 – 2.5 (0.06 – 0.10)
(b) Flywheel housing	Flange face which mates with cylinder block  Liquid gasket Bolt hole on cylinder block	1.5 – 2.5 (0.06 – 0.10)
(c) Intake manifold	Flange face which mates with cylinder head  Liquid gasket	1.5 – 2.5 (0.06 – 0.10)

Unit: mm (in)

Parts name	Application point	Coating width
(d) Intake air pipe	Flange face which mates with intake manifold 	1.5 – 2.5 {0.06 – 0.10}

2. COATING LIQUID GASKET AND PARTS ASSEMBLY PROCEDURE

1. Completely remove old liquid gasket from each part and the respective mating part, and remove oil, water, and dirt using cloth.
2. Be careful not to apply excessive or insufficient liquid gasket. Also, be sure to overlap the start and end of each coating.
3. When assembling coated parts, be careful that there is no misalignment between mating parts. If there is any misalignment, coat the parts again.
4. Assemble the various parts within 20 minutes after applying liquid gasket. If more than 20 minutes have elapsed, remove the liquid gasket and apply it again.
5. After assembling the various parts wait for at least 15 minutes before starting the engine.

3. REMOVING PARTS

When removing each part, do not attempt to pry one portion of the flange alone but use the flange collar or clearance to pry the flange at several points alternately.

NOTE: When removing the oil pan, the flange of the oil pan may sometimes become deformed preventing it from being reused. To prevent this, therefore, first insert plates with a thin edge at several points around the periphery of the oil pan, then remove the oil pan using a screwdriver.

CHAPTER EE

HINO ELECTRICAL EQUIPMENT

Models: H07C H07CT H07D H07DT

DATA AND SPECIFICATIONS	EE- 2
LOCATION OF ELECTRICAL EQUIPMENT	EE- 2
TROUBLESHOOTING	EE- 3
GENERAL INSTRUCTION	EE- 5
BATTERY	EE- 6
ENGINE STARTING CIRCUIT	EE- 7
INTAKE AIR HEATER CIRCUIT	EE- 9
ENGINE STOP CIRCUIT	EE-10
METER AND GAUGE CIRCUIT	EE-11
ELECTRICAL WIRING DIAGRAM	

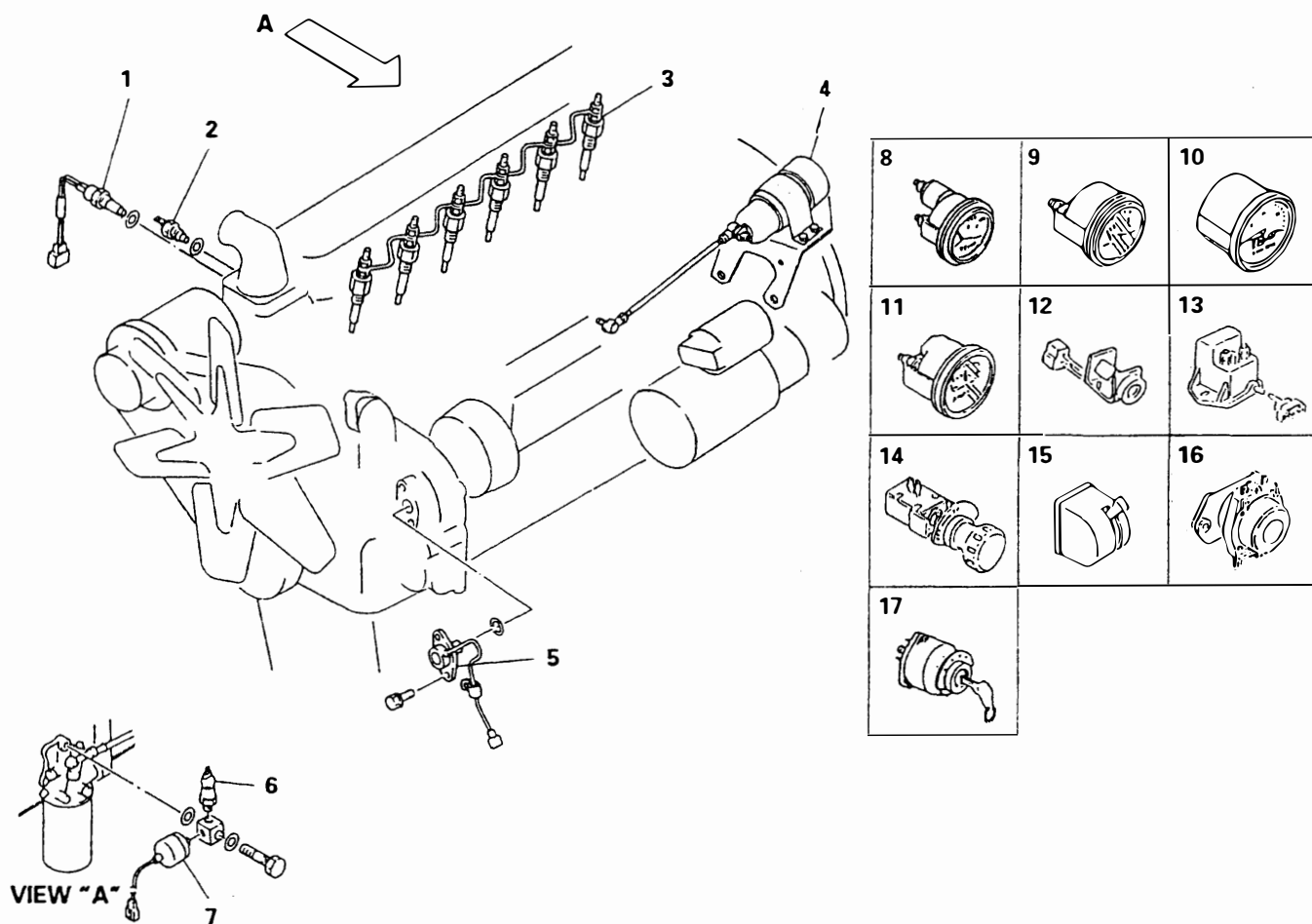
DATA AND SPECIFICATIONS

Electrical system

Voltage Direct current 24 volts

Ground Negative (-) ground

HINO H07C HINO H07CT HINO H07D HINO H07DT LOCATION OF ELECTRICAL EQUIPMENT



1. Coolant temperature switch
2. Coolant temperature gauge sender unit
3. Hino Glow plug
4. Solenoid coil
5. Revolution sensor

6. Oil pressure switch
7. Oil pressure gauge sender unit
8. Coolant temperature gauge
9. Oil pressure gauge
10. Tachometer
11. Ammeter

12. Glow plug controller
13. Starter block relay
14. Battery switch
15. Battery main switch
16. Battery relay
17. Starter switch

TROUBLESHOOTING

Symptom	Possible cause	Remedy/Prevention
A lot of exhaust is emitted but the engine does not start or is difficult to start. (Auxiliary starting device: Standard specifications)	Auxiliary starting device	
	- Loose wiring of heater signal or defective Repair or replace. heater signal. - Defective heater plug Replace. - Defective wiring between heater and plug Repair.	
(Auxiliary starting device: Option specifications)	- Defective power relay Repair or replace. - Defective heater plug Replace. - Defective wiring between heater and plug Repair. - Defective sensing resistor Replace. - Defective heater control timer Replace.	
Solenoid does not operate when engine is running, even if abnormal signal is input. (Engine does not stop.)	Emergency stop relay	
	- Alternator malfunctions Repair or replace. - Insufficient battery voltage Charge or replace. - Faulty connection at N terminal of Repair. emergency relay - Defective solenoid Replace.	
Solenoid operates with starter switch is turned ON	Emergency stop relay	
	- Faulty connection at R1 terminal Repair. - Faulty connection at B and C terminal Repair.	
When the starter switch is turned OFF, the battery relay switch goes OFF and the solenoid fails to operate.	Battery	
	Insufficient voltage Charge or replace.	
	Alternator	
	Malfunctions Repair or replace.	
Starter chattering or improper plunging	Battery	
	Insufficient voltage Charge or replace.	
	Starter block relay	
	- Faulty connection at terminals Repair. - Internal circuit abnormal Replace. - Relay switch abnormality (faulty contacts) Replace. improper sliding between rod and moving core, or open-circuit or burnt out coil	
	Starter switch	
	Faulty connection at terminals	

<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
Improper disengagement of starter or defective hold function when engine is rotating	Alternator	
	Defective (correct voltage not generated) Repair or replace.	
	Starter block relay	
	- Improper terminal connection Repair. - Reverse connections to terminals B and C Repair.	
Re-plunging during inertial rotation	Starter block relay	
	Reverse connections to terminals B and C Repair.	

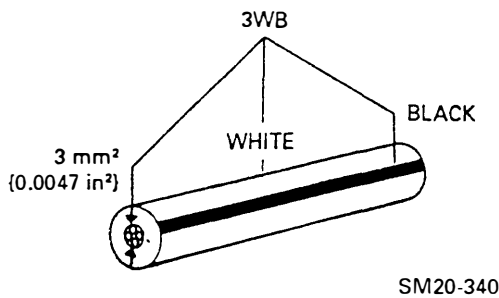
HINO DIESEL ENGINE PARTS CONTACT**EMAIL:****EngineParts@HeavyEquipmentRestorationParts.com****Phone: 269 673 1638****Website: www.HeavyEquipmentRestorationParts.com**

GENERAL INSTRUCTION

WARNING

Be sure to disconnect the ground cable before servicing the electrical circuits except for on-vehicle testing.

EXAMPLE:



WIRING CODE

- Wiring colors are indicated by a code.

B : Black	Lg : Light green
Br : Brown	R : Red
G : Green	W : White
L : Blue	Y : Yellow
- The first letter indicates the ground wire color and second letter indicates the stripe color.
- Arabic numerals indicates the cross sectional area of wire.
Example: 3 indicates 3 mm² (0.0047 in²)

CONNECTOR

The connectors exist as male and female connectors.

Male and female connectors are classified according to the shape of the terminals in the connector (refer to the figure on the left).

Male and female connectors are provided with a lock, so that they can not be separated easily.

For connector separation, hold the connector, unlock the lock and separate the connector.

NOTE: When the connector is pulled by pulling the wires, the connection between the terminals and the wires will be damaged.

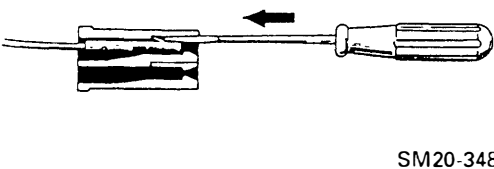
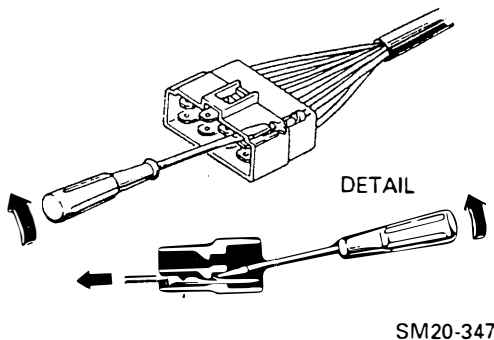
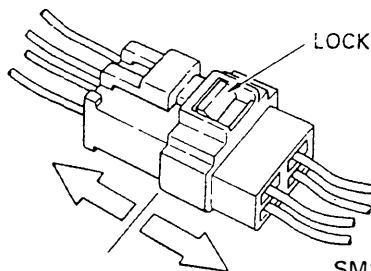
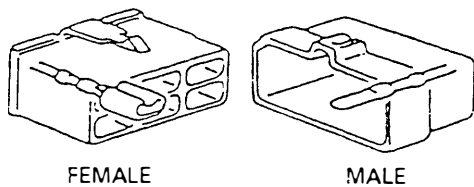
- Remove the terminal from the connector.
 - Insert a miniature screwdriver or a terminal puller between terminal and connector and unlock the lock between terminal and connector.
 - When the lock has been released, pull the wire to remove the terminal.
- Install the terminal in the connector.
 - Insert the terminal into the connector until the clicking sound of lock engagement can be heard.
 - Pull the wire to confirm correct lock engagement.

FUSE

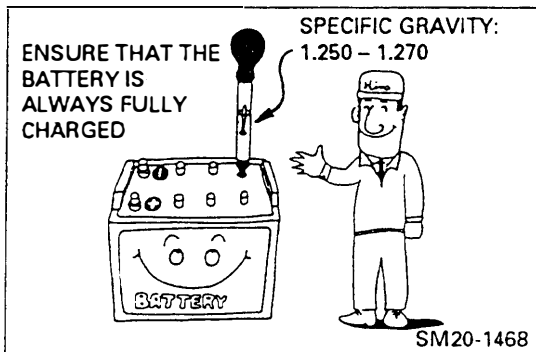
- The power supply must be switched off for fuse replacement.
- Use a fuse with a suitable amperage.

NOTE: Wire burning may be caused when a fuse with an excessively large current capacity is used.

- If the fuse should blow frequently, investigate the cause and remove it.



BATTERY



CONVERSION FORMULA FOR SPECIFIC GRAVITY.

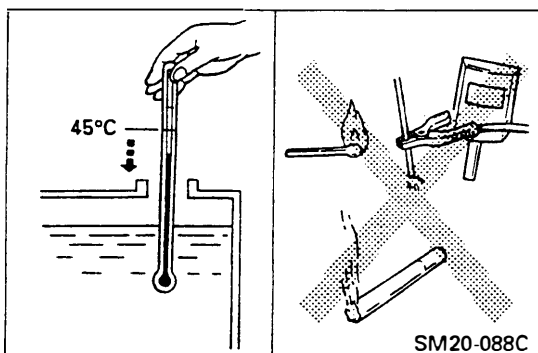
- The specific gravity of electrolyte changes according to the temperature of the electrolyte itself, hence it is based on a temperature of 20°C {68°F}. Consequently, if the temperature is not 20°C when the specific gravity is measured, it is necessary to convert the measured value to the equivalent value at 20°C.

Temperature conversion formula: $S_{20} = S_t + 0.0007 (t - 20)$

Where,

- S_{20} is the specific gravity at 20°C (reference temperature)
- S_t is the specific gravity at the measuring temperature
- t is the temperature during measurement
- 0.0007 is the temperature coefficient of the electrolyte

NOTE: As a rough guide, if the temperature of the electrolyte rises or falls by 15°C {59°F}, the specific gravity of the electrolyte will vary by about 0.01.



BATTERY CHARGING

- Be careful of the following points.
- 1) While the battery is being charged, ensure that the temperature of the electrolyte does not rise above 45°C {113°F}.
- 2) While the battery is being charged, be particularly careful to keep it away from sources of fire.
- 3) The amount of electrolyte must be within the specified level.

Specific gravity when battery is fully charged:

1.250 - 1.270 at 20°C {68°F}

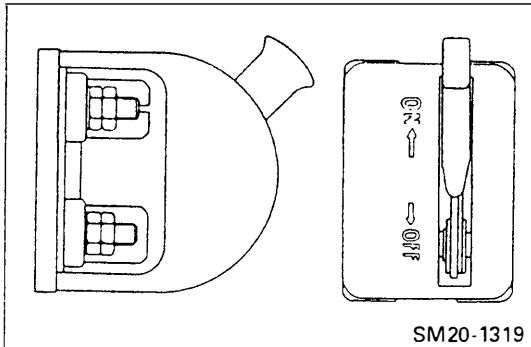
CLEANING THE BATTERY

- If the terminals at the top of the battery are dirty, clean them with cold water or lukewarm water.
- Apply a light coating of grease to the terminals to prevent them from rusting so as to prevent faulty contact.

CONNECTING THE BATTERY CABLES

- Clamp the cables securely to prevent improper contact between the cables and the battery terminals.
- Be very careful not to connect the (+) and (-) leads in reverse. (Because this may cause equipment run off the battery to be damaged.)

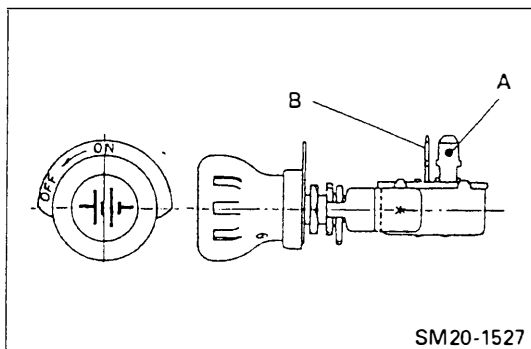
ENGINE STARTING CIRCUIT



BATTERY MAIN SWITCH INSPECTION

Check continuity between terminals.

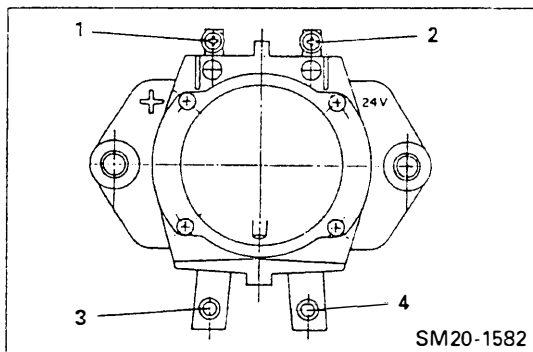
Terminal Switch position	Between terminals
ON	Continuity
OFF	No continuity



BATTERY SWITCH INSPECTION

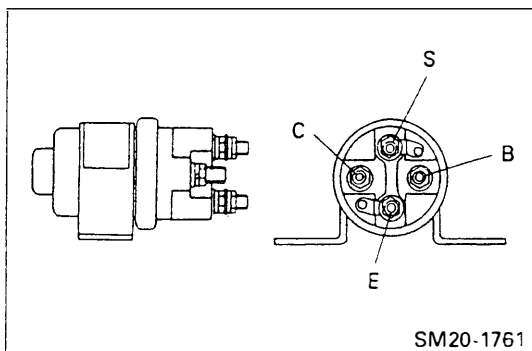
Check continuity between terminals.

Terminal Switch position	Between terminals
ON	Continuity
OFF	No continuity



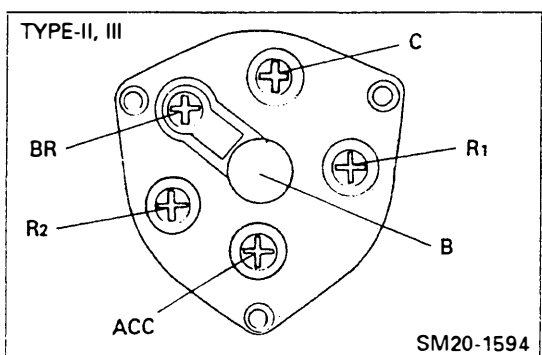
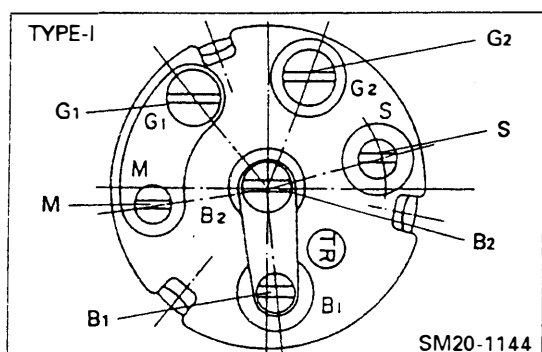
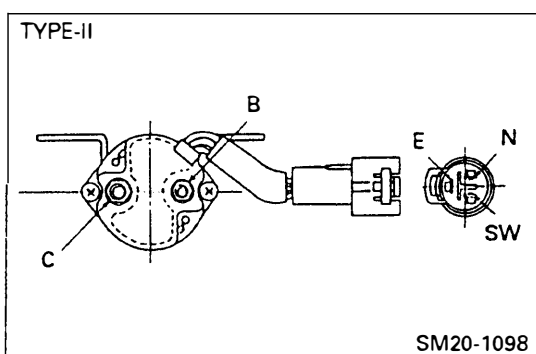
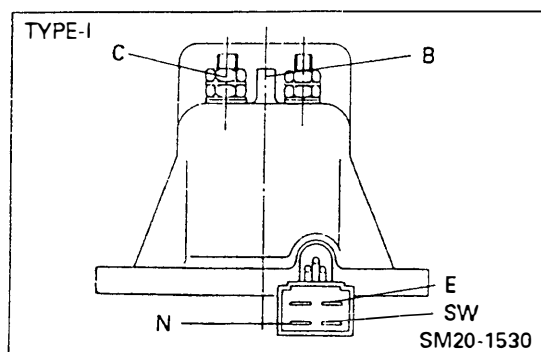
BATTERY RELAY INSPECTION

1. Apply voltage to terminals;
24V to terminal 1,
Ground to terminal 2.
2. If relay is normal, terminals 3 and 4 goes be continuity.



STARTER RELAY INSPECTION

1. Apply voltage to terminals;
24V to terminal S,
Ground to terminal E.
2. If relay is normal, terminal B and C goes be continuity.



STARTER BLOCK RELAY INSPECTION

1. Apply voltage to terminals;
24V to terminal S,
Ground to terminal E.
2. If relay is normal, terminal C and B goes be continuity.
3. Then apply voltage to terminals;
24V to terminal S,
12V to terminal N,
Ground to terminal E.
4. If relay normal, relay does not operate. (Safety system operates.)

STARTER SWITCH INSPECTION

Check continuity between terminals.

Type-I

Terminals	B ₁	B ₂	G ₁	G ₂	M	S
Switch position						
OFF	○	○				
HEAT	○	○	○	○	○	
ON	○	○			○	
START	○	○		○	○	○

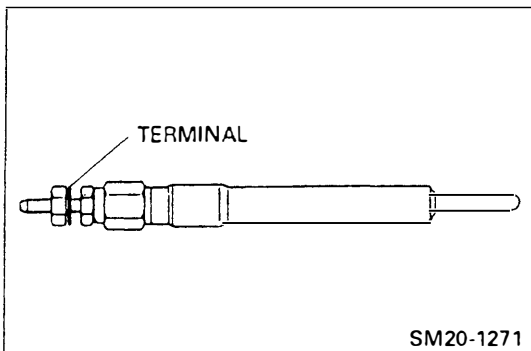
Type-II

Terminals	B	R ₁	ACC	R ₂	C	BR
Switch position						
OFF	○					
I	○	○				○
II	○		○			○
III	○			○	○	○

Type-III

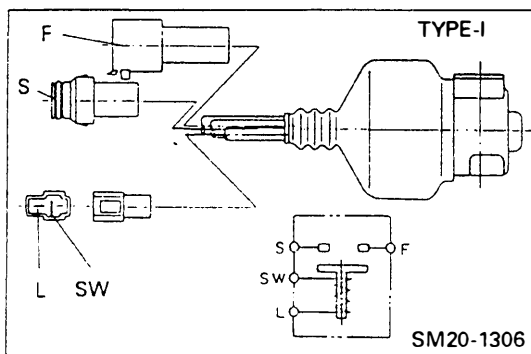
Terminals	B	ACC	C	BR	R ₂
Switch position					
OFF	○				
I	○	○		○	
II	○	○	○	○	○

INTAKE AIR HEATER CIRCUIT



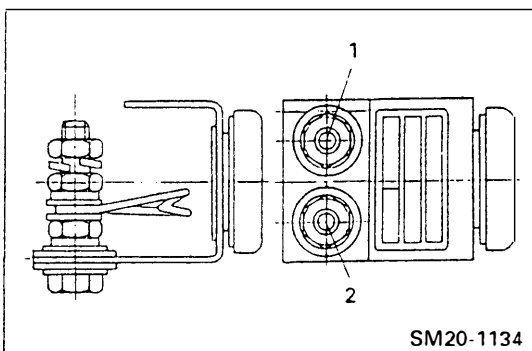
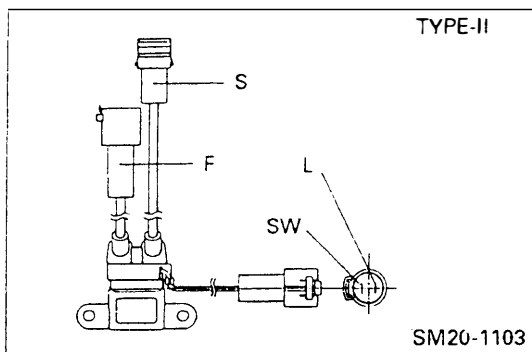
GLOW PLUG INSPECTION

Check continuity between terminal and body ground.



INTAKE AIR HEATER RELAY INSPECTION

1. Apply voltage to terminals;
12V to terminal SW,
Ground to terminal L.
2. If relay is normal, terminals S and F goes be continuity.



GLOW PLUG CONTROLLER INSPECTION

Check continuity between terminals 1 and 2.

HINO DIESEL ENGINE PARTS CONTACT

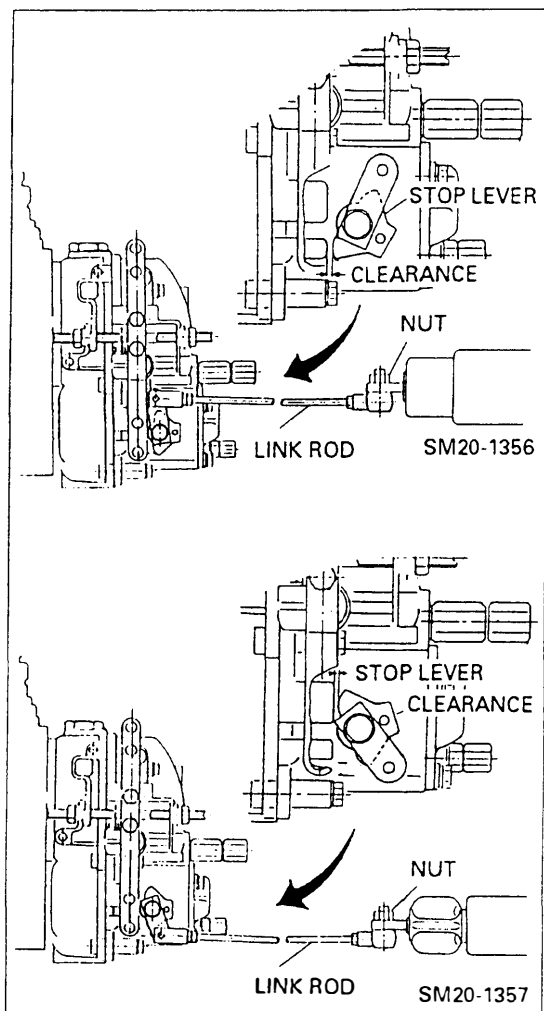
EMAIL:

EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

ENGINE STOP CIRCUIT



SOLENOID AND LINK ROD INSPECTION

1. Connect the battery to the solenoid terminals and confirm that the solenoid is drawn in.
2. Push in the plunger by hand and confirm that there is a clearance between the stopper and the stop lever.

Standard clearance: 2–3 mm {0.01188–0.1181 in}

If there is no clearance, perform adjustment with the link rod.

- NOTE:**
- If the clearance adjustment is unsatisfactory or the action of the solenoid is sluggish, solenoid burnout, insufficient output or insufficient engine stoppage may result.
 - Install the link rod with the nut at the top.

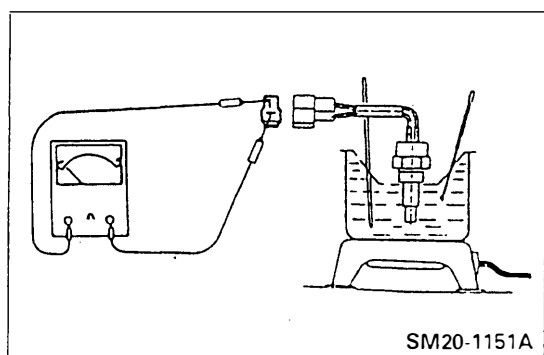
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COOLANT TEMPERATURE SWITCH INSPECTION

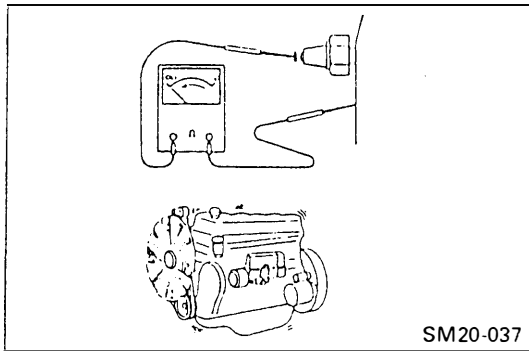
Check continuity between terminals.

Type-I

Terminals	1	2
Temperature: °C {°F}		
More than 96–100 {205–212}	○	○
Less than 91 {196}		

Type-II

Terminals	1	2
Temperature: °C {°F}		
More than 100–104 {212–219}	○	○
Less than 95 {203}		

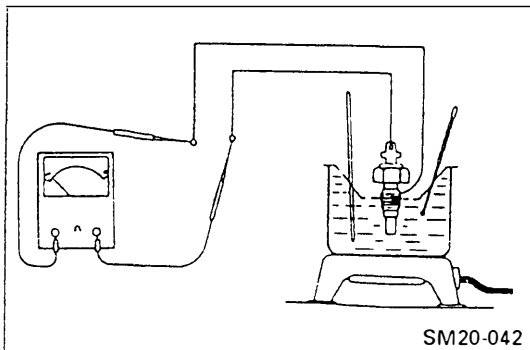


OIL PRESSURE SWITCH INSPECTION

1. Start the engine and disconnect the coupler.
2. Check continuity between terminal and engine ground.

	Terminal	Body
Engine stop		
Engine running		

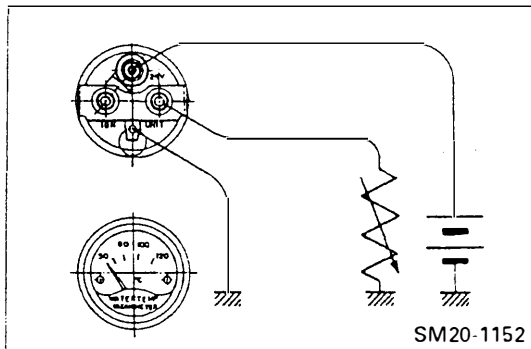
METER AND GAUGE CIRCUIT



COOLANT TEMPERATURE GAUGE SENDER UNIT INSPECTION

Warm up sender gauge and measure resistance between terminal and body ground.

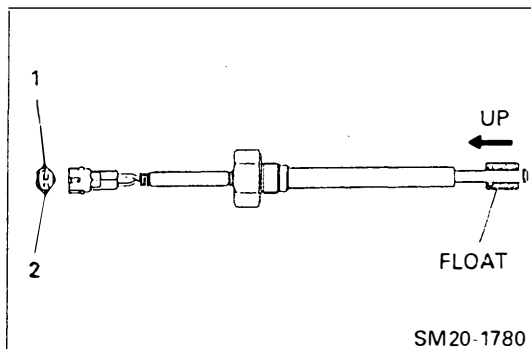
Temperature	80°C {176°F}	100°C {212°F}
Resistance (Ω)	73.7 ^{+11.5} _{-11.2}	37.7 ^{+6.7} _{-5.5}



COOLANT TEMPERATURE GAUGE INSPECTION

1. Wire gauges, resistors and variable resistor as shown in figure.
2. Check indicated value on gauges.

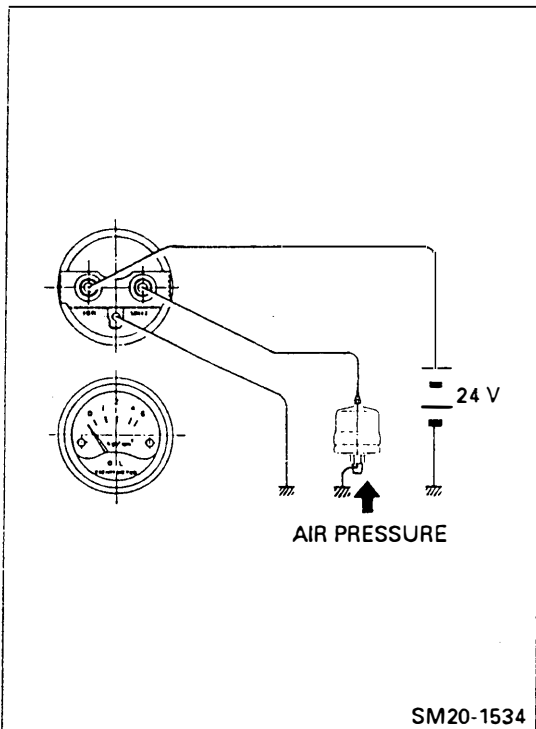
Variable resistor (Ω)	80°C {176°F}	100°C {212°F}
Gauge reading	65 ⁺⁶ ₋₁	36.5 ⁺³ ₋₁



COOLANT LEVEL SWITCH INSPECTION

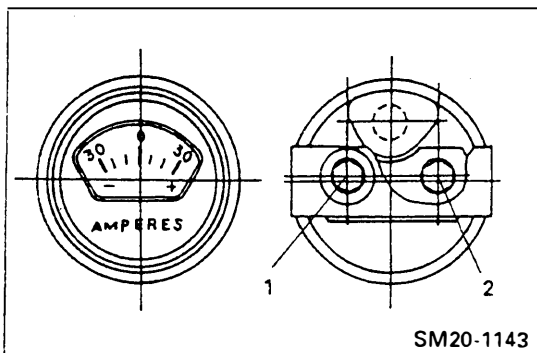
Check continuity between terminals.

Terminals	1	2
Flat position		
UP		
DOWN		



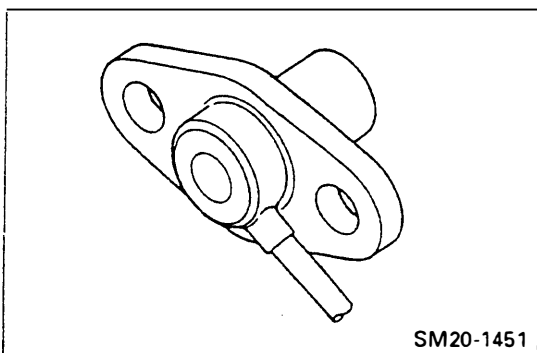
OIL PRESSURE GAUGE INSPECTION

1. Wire the receiver gauge and the sender as shown in figure.
2. Apply air pressure to the sender gauge and check the receiver.
3. If it is not correct, replace the either one (receiver or sender) and check again.



AMMETER INSPECTION

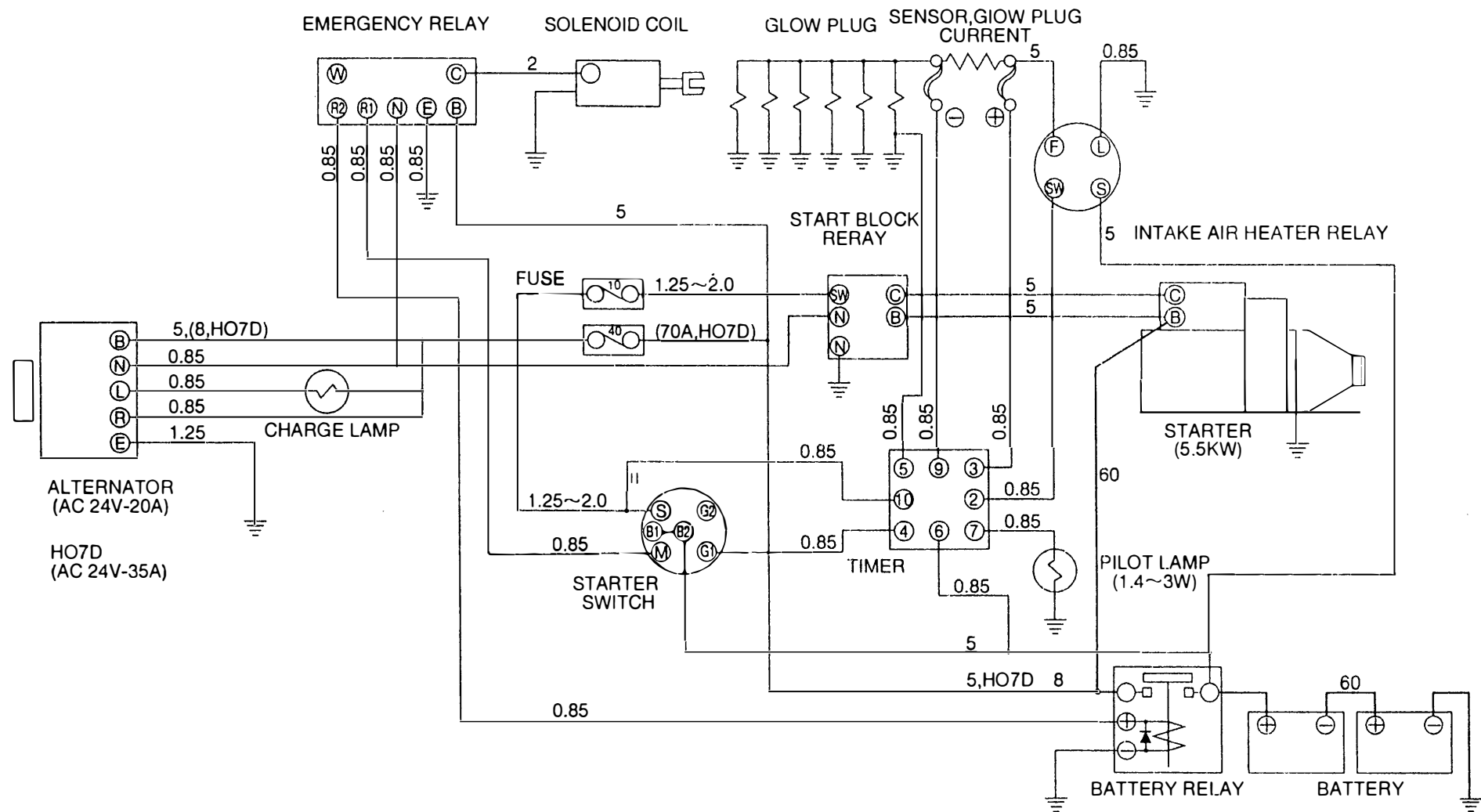
Check continuity between terminals 1 and 2.



REVOLUTION SENSOR INSPECTION

Check continuity between terminals.
If it is normal, between terminals is continuity.

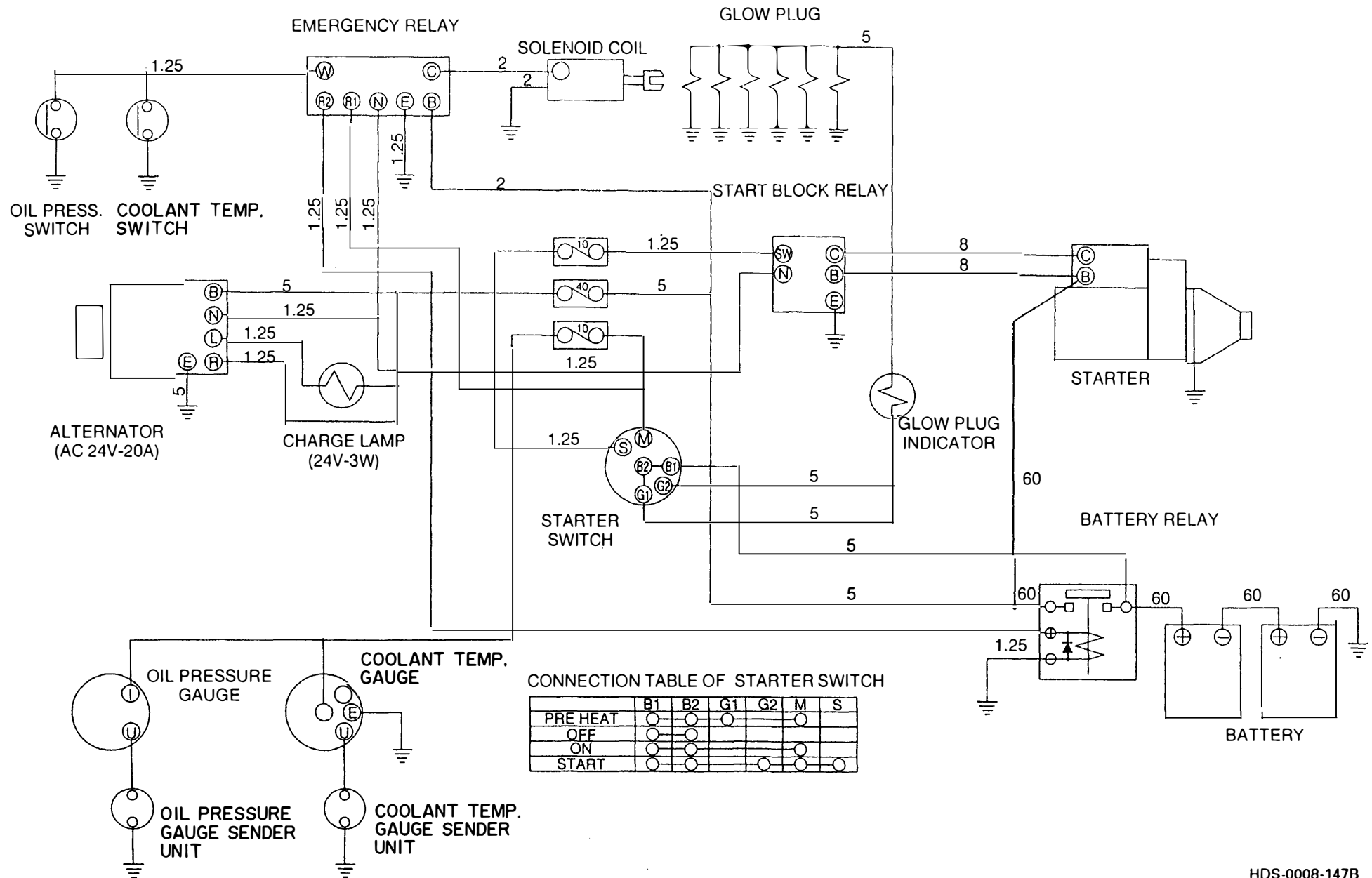
ELECTRICAL WIRING DIAGRAM MODEL H07D, H07C-T



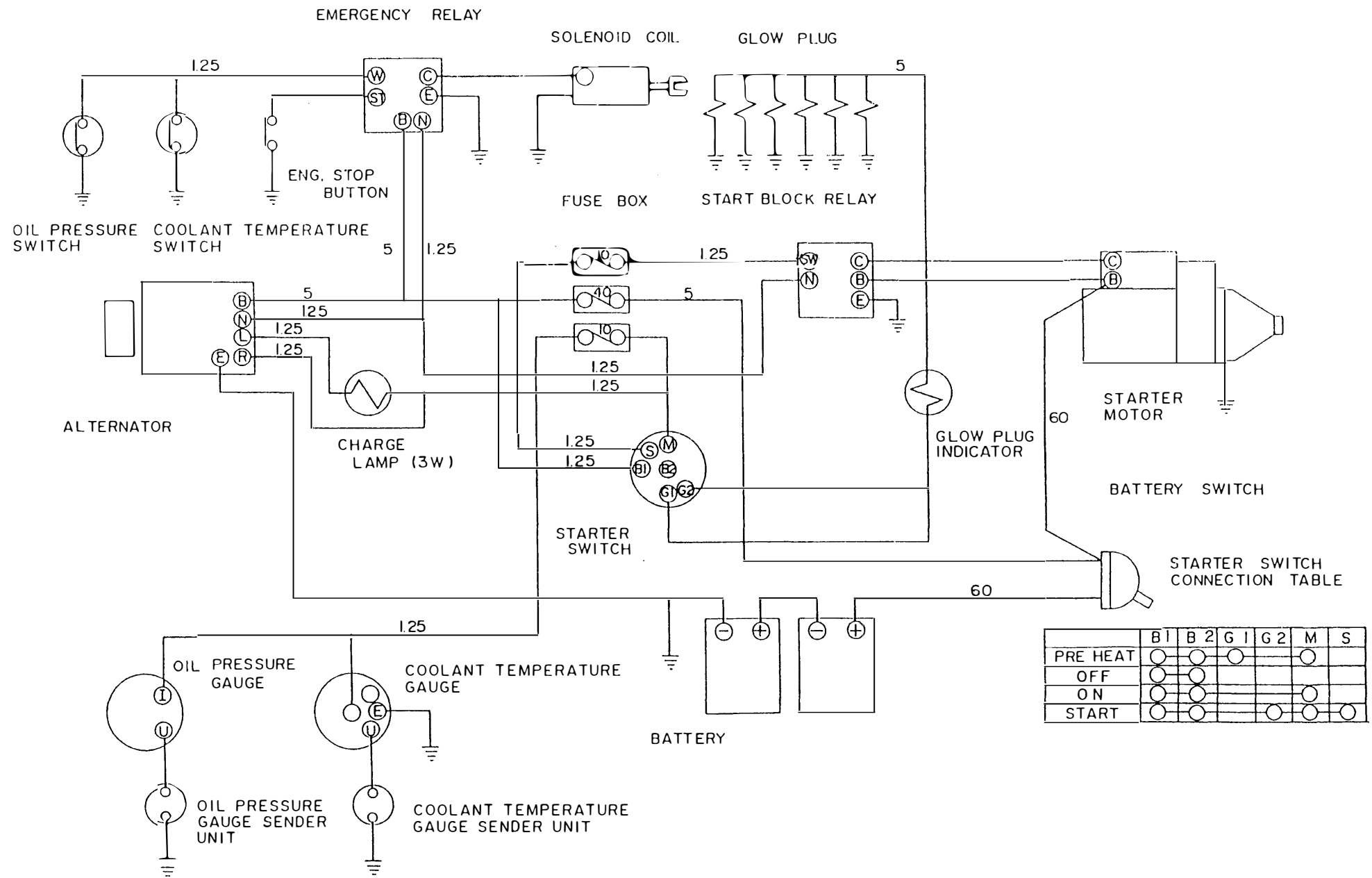
CONNECTION TABLE OF STARTER SWITCH

	B1	B2	G1	G2	M	S
PRE HEAT	☐	☐	☐		☐	
OFF	☐	☐				
ON	☐	☐			☐	
START	☐	☐		☐	☐	☐

ELECTRICAL WIRING DIAGRAM MODEL H07D, H07C-T



ELECTRICAL WIRING DIAGRAM MODEL H07D, H07C-T



CHAPTER TU

TURBOCHARGER

Model IHI RHC6

DATA AND SPECIFICATIONS	TU-2
TROUBLESHOOTING	TU-3
OVERHAUL CRITERIA	TU-5
TURBOCHARGER	TU-7

HINO DIESEL ENGINE PARTS CONTACT

EMAIL:

EngineParts@HeavyEquipmentRestorationParts.com

Phone: 269 673 1638

Website: www.HeavyEquipmentRestorationParts.com

DATA AND SPECIFICATIONS

Parts No.	24100-2202, 2203, 2531	24100-2780, -2990
Type	RHC62W	RHC62
Turbine type	Radial flow type	Radial flow type
Blower type	Centrifugal type	Centrifugal type
Lubricating method	External lubrication type	External lubrication type
Bearing type	Full floating type	Full floating type
Direction of rotation	Counterclockwise as seen from the turbine side	Counterclockwise as seen from the turbine side
Cooling type	Oil and water cooling type	Oil cooling type
Waste gate valve	Equipped	Equipped
Application	Construction equipment	Air compressor

TROUBLESHOOTING

Symptom	Possible cause	Remedy/Prevention
Dense black smoke	Insufficient air intake	
	● Air cleaner is choked with dust, causing greater intake air resistance.	Disassemble and clean or replace the air cleaner element.
	● Air inlet is choked	Repair.
	● Air is leaking from intake manifold	Repair.
	Turbocharger does not rotate smoothly.	
	● Engine oil impurities deposited on rotor, resulting in heavy rotation or sticking.	Overhaul and clean turbocharger and/or change engine oil.
	Bearing sticking	
	● Insufficient lubrication or blockage of lubricating oil lines.	Check lubricating oil system, and/or repair.
	● Abnormal wear or damage of seal ring caused by wear of journal bearing, due to insufficient lubrication.	Repair.
	● Temperature of lubricating oil too high	Check cooling system.
	● Unbalanced rotating parts	Change rotating parts.
	● Incomplete warming-up, failure to idle before stopping engine, or jack rabbit starts.	Operate vehicle properly.
	Loose or damaged turbine rotor or blower impeller.	
	● Over-rotation	Check and adjust the engine.
	● Temperature of exhaust gas too high	Check and adjust the engine.
High volume exhaust like noise.	● Foreign matter present	Remove foreign material. Inspect the air cleaner and air intake manifold. Repair if necessary.
	● Worn thrust bearing	Overhaul and repair.
	● Incomplete assembly	Reassembly.
High volume exhaust like noise.	Exhaust gas leaking before turbocharger, therefore insufficient revolution.	Check and repair connections.
	Deformed or blocked exhaust gas lines therefore insufficient revolution.	Repair.
White smoke	Choking defects, or deformation of oil return lines so that oil leaks around blower or turbine sides.	Repair and replace the lines.
	Seal ring may be broken or worn due to abnormal wear of thrust washer.	Replace the thrust washer.

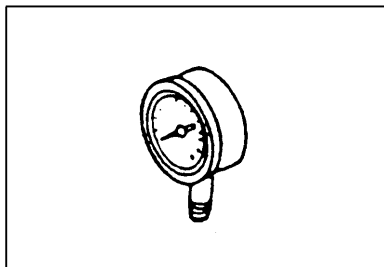
<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
Loss of power	Gas leakage from exhaust system Air leakage from air manifold Clogged air cleaner element Turbocharger dirty or damaged	Repair. Repair. Clean or replace. Repair or replace.
Poor response of turbocharger	Carbon accumulation on the turbine side seal ring and heavy rotation Poor combustion	Change engine oil, clean turbocharger. Check fuel system and improve combustion.
High pitched noise and vibration	Noise ● So called "surging" Surging sometimes occurs when the gas passage at the nozzle of the turbine housing is choked or when compressed air does not flow in proper responses to acceleration. ● Loosen rotating parts Vibration ● Joints loose between turbocharger and intake, exhaust manifold or oil lines. ● Damaged bearing, loose rotating parts, imbalanced rotating parts, etc.	Overhaul and clean turbocharger. Replace. Check the mounting and repair. Repair.

OVERHAUL CRITERIA

SPECIAL TOOLS

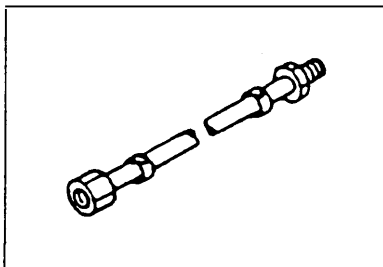
Prior to starting a turbocharger overhaul, it is necessary to have these special tools.

BOOST PRESSURE GAUGE



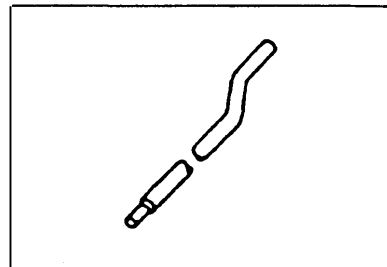
09444-1250

BOOST PRESSURE GAUGE HOSE



17108-1040

**ATTACHMENT FOR MEASURING
TURBINE SHAFT RADIAL PLAY**



09444-1230

CONDITIONS WHICH DETERMINE WHEN TURBOCHARGER OVERHAUL MAY BE NEEDED.

INSPECT THE TURBOCHARGER BOOST PRESSURE.

Inspect the turbocharger boost pressure according to the following procedures.

NOTE: Before measurement.

- Coolant temperature should approximately 80°C (176°F).
- Air cleaner element should be clean.

WARNING

When making a pressure test, be sure that personnel are adequately protected against any stream of pressurized air that might be released by a leak or the rupture of a hose.

1. Remove the blind plug on the intake pipe and install the hose and pressure gauge (special tools).

Special Tools: Pressure Gauge (09444-1250)

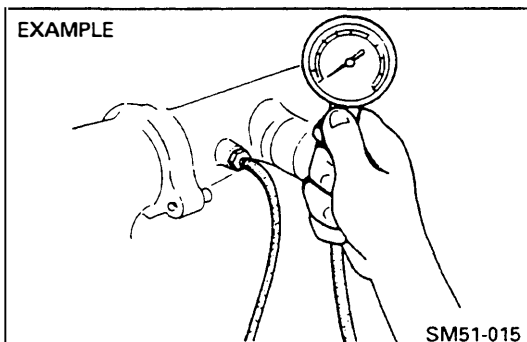
Hose (17108-1040)

2. Disengage the clutch and run the engine at maximum r/min.
 3. Read boost pressure.
- If the boost pressure is below the normal value, turbocharger overhaul is needed.

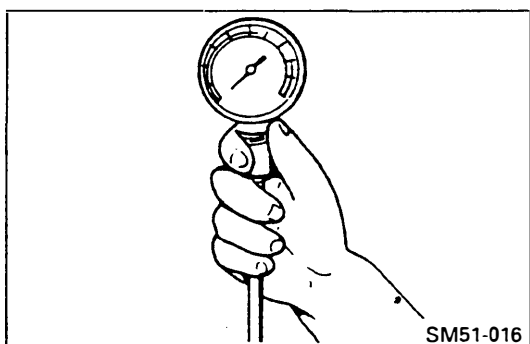
Boost Pressure;

24100-2202 24100-2203 24100-2531 24100-2990	79.43 kPa (0.81 kgf/cm ² , 11.52 lbf/in ²)
24100-2780	29.41 kPa (0.30 kgf/cm ² , 4.26 lbf/in ²)

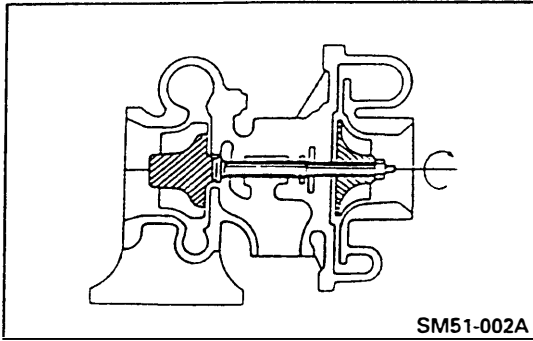
EXAMPLE



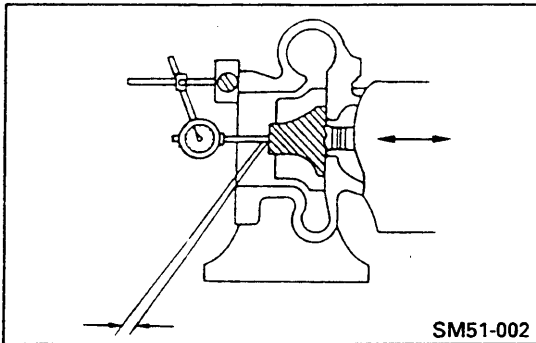
SM51-015



SM51-016

**INSPECT THE TURBINE SHAFT ROTATION.**

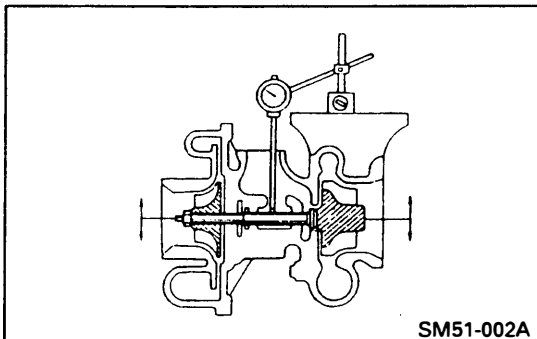
Rotate the blower impeller by hand to see if it turns smoothly. If it does not turn smoothly, clean and inspect the bearing and turbine rotor.

**INSPECT THE TURBINE ROTOR FOR AXIAL PLAY.**

If the axial play is greater than the service limit, replace the thrust bearing and/or thrust spacer.

Axial Play: 0.05–0.08 mm (0.0020–0.0031 in)

Service Limit: 0.10 mm (0.0039 in)

**INSPECT THE TURBINE ROTOR FOR RADIAL PLAY.**

If the radial play is greater than the service limit, replace the bearings and/or turbine rotor.

Special Tool: (09444-1230)

Radial Play: 0.09–0.12 mm (0.0036–0.0047 in)

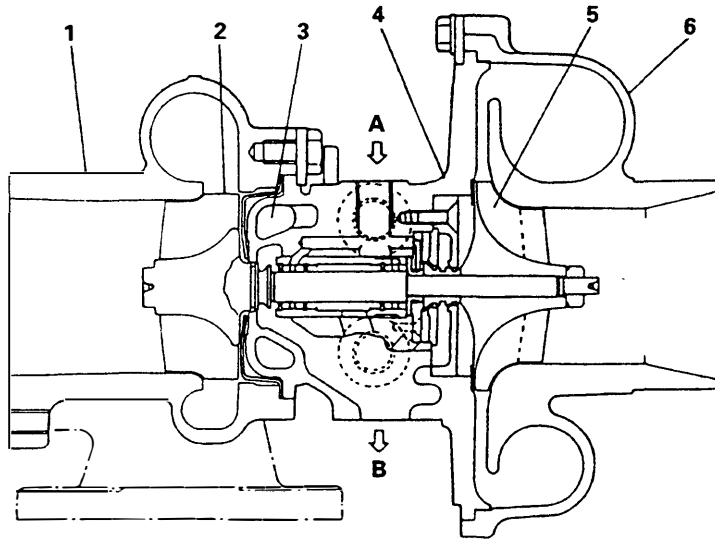
Service Limit: 0.17 mm (0.0067 in)

OTHER FACTORS

1. The engine lacks power or engine exhaust emits black smoke.
2. Noise of excessive vibration of the turbocharger.
3. Excessive engine oil consumption.
4. Gas leakage at the turbine end or blower end.
5. Oil leakage from the turbocharger.

TURBOCHARGER

DESCRIPTION



Representative type RHC62W

- 1. Turbine case
- 2. Turbine rotor
- 3. Cooling channel
- 4. Bearing case
- 5. Blower impeller
- 6. Blower case
- A. Oil inlet
- B. Oil outlet

OVERHAUL

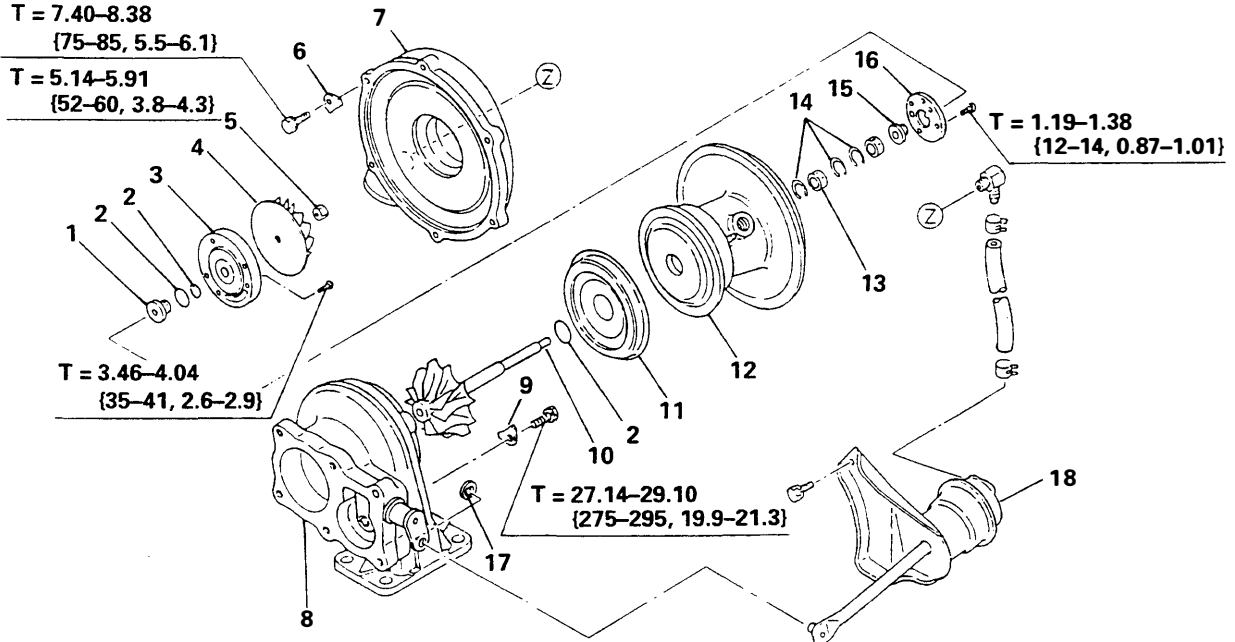
T = 7.40–8.38
{75–85, 5.5–6.1}

T = 5.14–5.91
{52–60, 3.8–4.3}

T = 3.46–4.04
{35–41, 2.6–2.9}

T = 27.14–29.10
{275–295, 19.9–21.3}

T = 1.19–1.38
{12–14, 0.87–1.01}

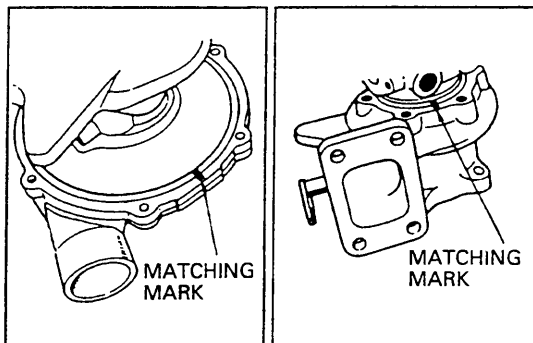


T = Tightening torque: N·m {kgf·cm, lbf·ft}

- 1. Oil thrower
- 2. Seal ring
- 3. Seal plate
- 4. Blower impeller
- 5. Lock nut
- 6. Lock plate

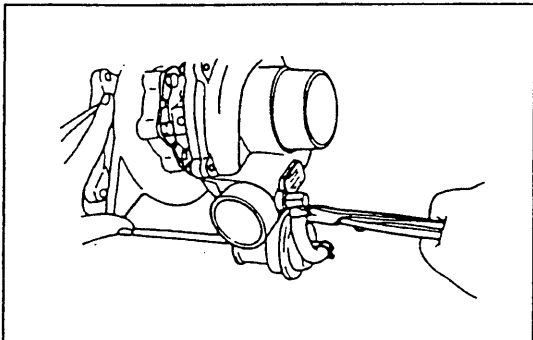
- 7. Blower case
- 8. Turbine case
- 9. Lock plate
- 10. Turbine shaft
- 11. Heat protector
- 12. Bearing case

- 13. Journal bearing
- 14. Retainer ring
- 15. Thrust spacer
- 16. Thrust bearing
- 17. Retaining washer
- 18. Actuator



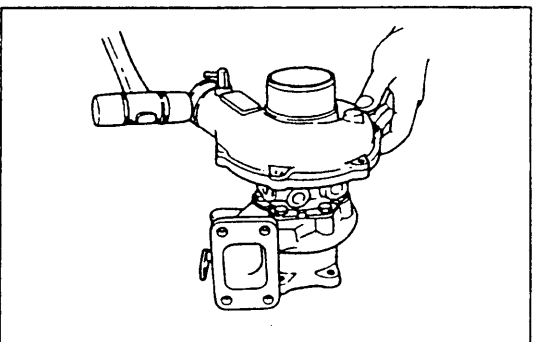
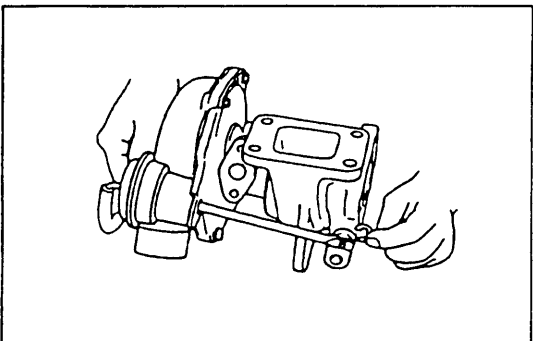
IMPORTANT POINTS – DISASSEMBLY

Make matching marks on the turbine case, bearing case and blower case to aid alignment during reassembly.



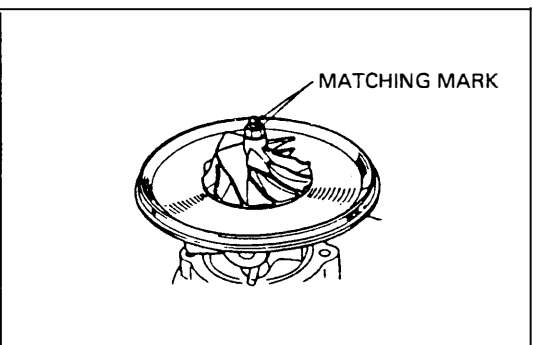
REMOVING THE CONNECTING PART OF WASTE GATE ACTUATOR. (IF SO EQUIPPED)

1. Remove the actuator hose.
2. Remove the actuator contr. rod retaining washer.



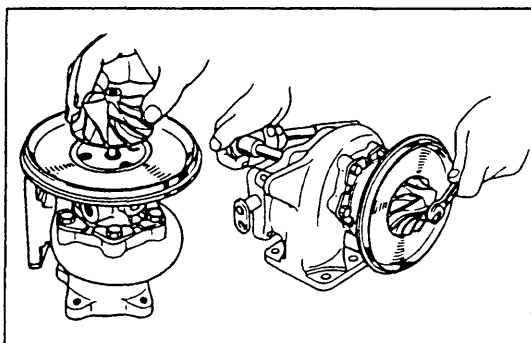
REMOVING THE BLOWER CASE.

- NOTE:**
- If the blower casing cannot easily be removed by hand, tap it carefully all around using a plastic hammer and carefully remove it.
 - Do not damage the blower impeller.



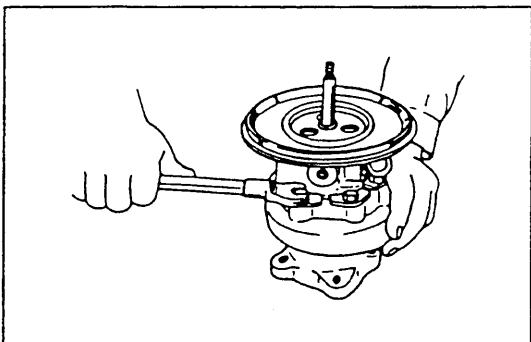
REMOVING THE BLOWER IMPELLER.

- NOTE:** Check the matching mark for reassembly.



1. Remove the blower impeller fitting nut.

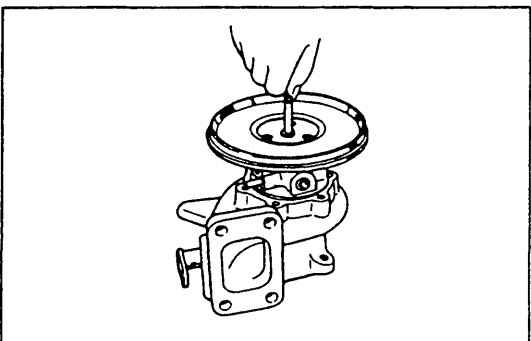
NOTE: Turn the lock nut clockwise to loosen the nut (Let hand threads).



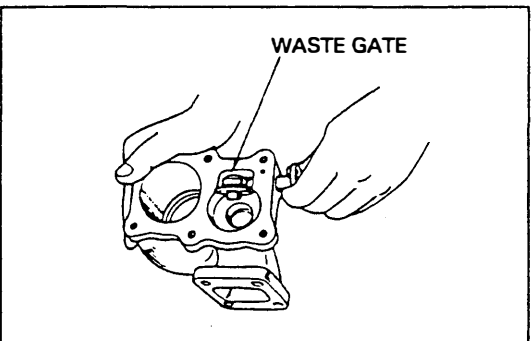
REMOVING THE TURBINE CASE.

NOTE: ○ Because the bolts on the turbine side are exposed to high temperature, if they have seized, do not apply an unreasonable force to remove them because they may break. Spray a lubricant onto them, then wait for about 15 minutes and loosen them.

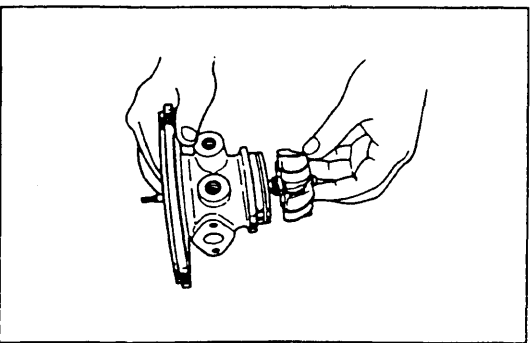
- If the turbine casing cannot easily be removed by hand, tap it carefully all round using a plastic hammer and carefully remove it.



NOTE: Do not drop the turbine shaft when remove the turbine shaft from bearing case.



NOTE: Waste gate system is irresolvable then do not remove, disassemble and adjust it. (If so equipped)

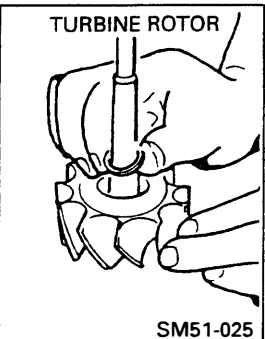
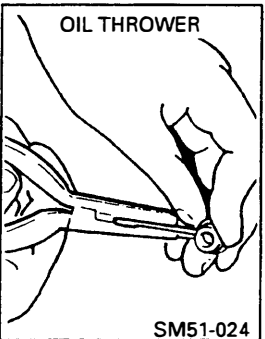
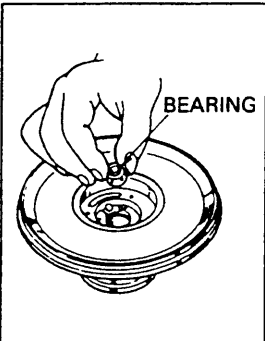
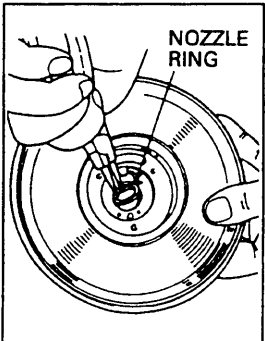
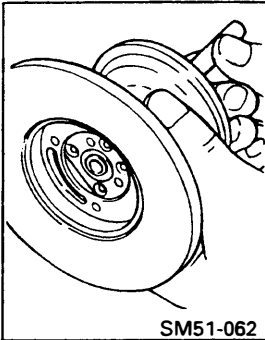
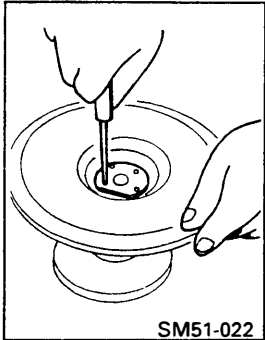
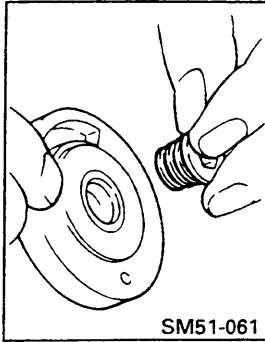
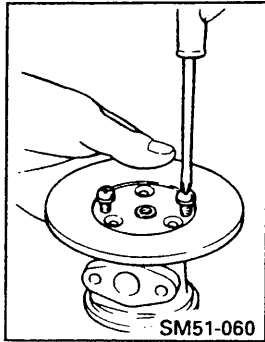


PULLING OUT THE TURBINE SHAFT.

1. Remove the turbine rotor with heat protector.

NOTE: ○ If the turbine shaft cannot easily be removed by hand, tap the shaft end of blower side.

- If the heat protector cannot easily be removed, tap with chisel.



REMOVE THE BEARING.

1. Remove the seal plate.
Pull out the seal plate using the two screws.
2. Remove the oil thrower from the seal plate.

3. Remove the thrust bearing and thrust spacer.
Loosen the bolt, then remove the thrust bushing using a 8 dia. copper rod.

NOTE: When removing the thrust bearing and thrust spacer, be careful not to damage the thrust bearing hole in the bearing case.

4. Remove the two outer retainer rings of each bearing.

NOTE: When removing the retainer ring, be careful not to damage the front face of the hole in the bearing case.

5. Remove the bearings.

REMOVE THE SEAL RINGS.

NOTE: When removing the seal ring, do not the turbine shaft surface groove of the seal ring.

IMPORTANT POINTS – ASSEMBLY

CLEAN ALL PARTS.

1. Before cleaning, the disassembled parts should be visually inspected to check for burning, abrasion, carbon deposits, gas and oil leakage.
2. Thoroughly clean all the parts with diesel fuel, using a soft brush, and dry with compressed air.

NOTE:

- Never use a caustic cleaning solution, as it may attack aluminum.
- Never use a wire brush.

ASSEMBLE THE JOURNAL BEARINGS.

1. Install the first retainer ring in the bearing casing.

NOTE:

- Bevelled edge of the retainer ring should be towards the bearing.
- Make sure that the retainer ring is securely fitted in the groove.
- Install the retainer ring with the gap facing as shown in the drawing.

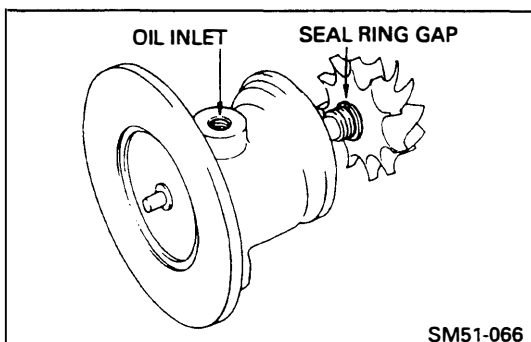
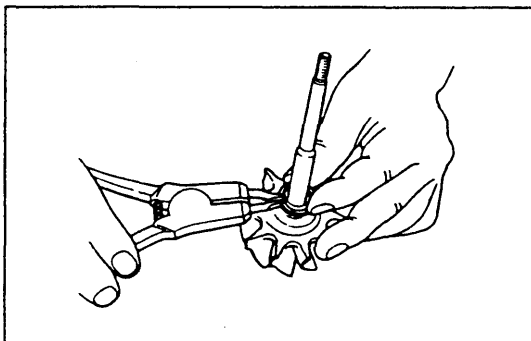
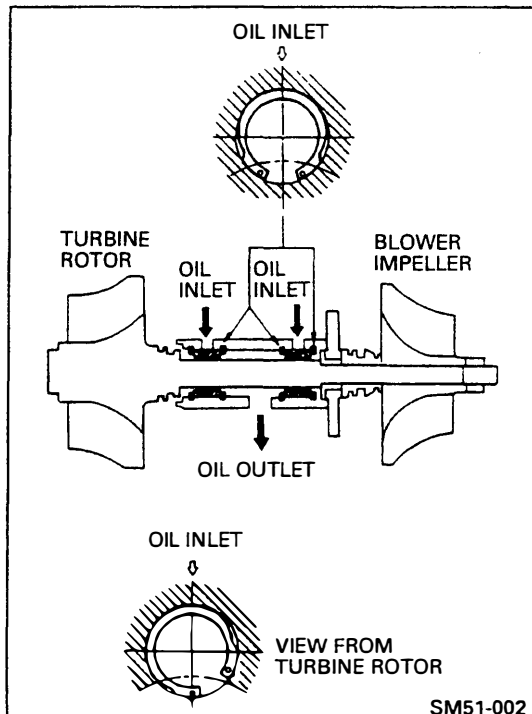
2. Install the bearing in the bearing case.

NOTE: Apply clean engine oil.

3. Install the other retainer ring.

NOTE: The only nearest turbine side of the retainer ring should be installed according to the figure on the left.

4. Repeat step 1) through 4) to install the second bearing.



ASSEMBLE THE TURBINE SHAFT.

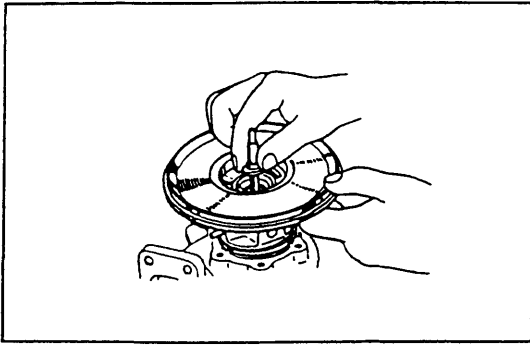
1. Install a new seal ring in the ring groove of the turbine shaft.

NOTE: Insert the seal ring concentric with the turbine shaft. If it is inserted with unreasonable force, it may be damaged.

2. Position the heat protector on the bearing case.
3. Coat the journals of the turbine rotor with clean engine oil; and install the turbine rotor in the bearing case.

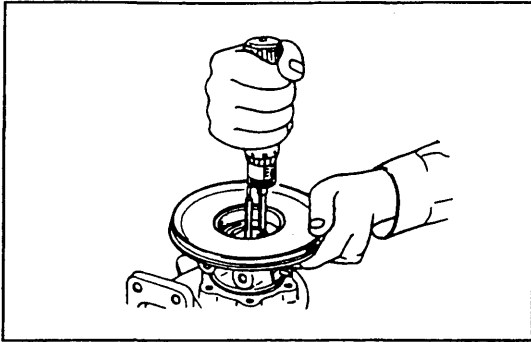
NOTE:

- The gas in the seal ring of the turbine shaft must face towards the journal bearing.
- When inserting the turbine shaft, be very careful not damage the journal bearing.



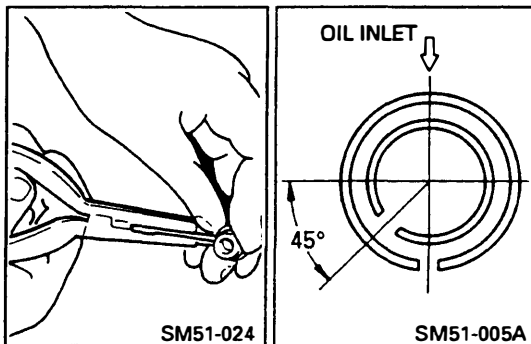
ASSEMBLE THE THRUST SPACER AND THRUST BEARING.

1. After built in the turbine shaft to bearing case, place it to turbine case and install the thrust spacer.



2. Coat the clean engine oil to the thrust bearing.
3. Install the thrust bearing by lock tight applied screw.

NOTE: Confirm the fitness of thrust spacer and thrust bearing when tightening.

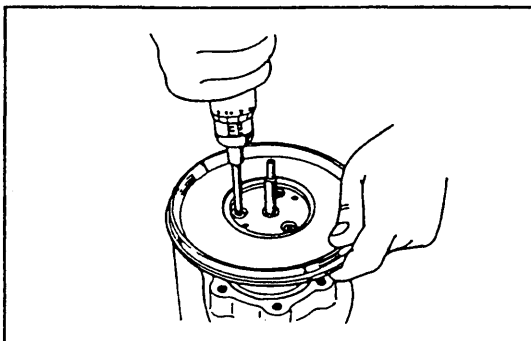


INSTALL THE SEAL PLATE.

1. Insert two new seal rings on the oil thrower.
2. Install the oil thrower in the seal plate.

NOTE:

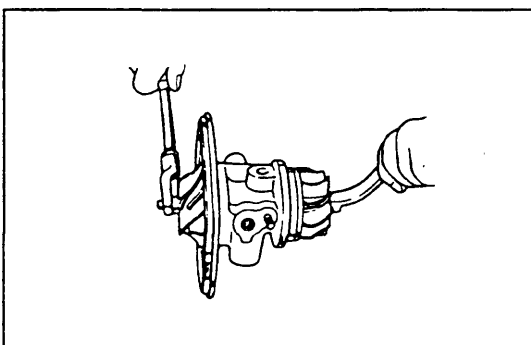
- The openings of seal rings should be positioned as shown.
- If it is inserted with unreasonable force, it may be damage.



3. Install the plate in the bearing case.

NOTE:

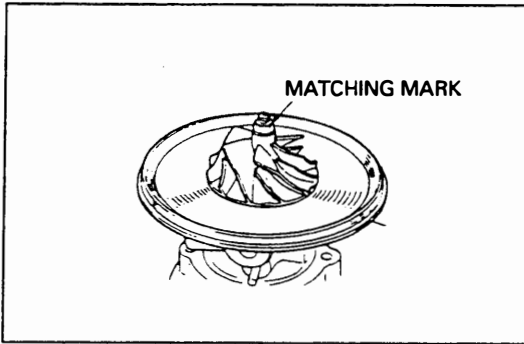
- The oil return hole should face the oil outlet side.
- Apply liquid packing (Three Bond No. 1207C or No. 1215 or equivalent) to turbine side flange face of seal plate.
- Install the seal plate by lock tight applied screw.
- Take care that the liquid packing does not protrude from the flange.



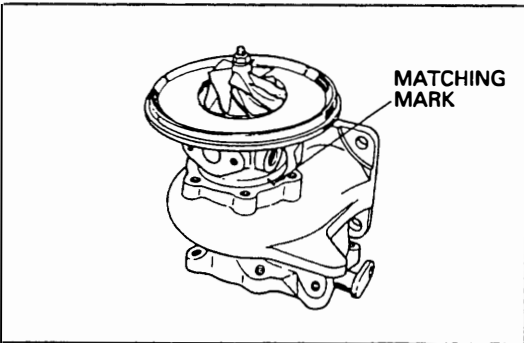
ASSEMBLE THE BLOWER IMPELLER ON THE TURBINE SHAFT.

1. Install the blower impeller to turbine shaft and tighten the nut.

NOTE: Take care that this nut has left hand threads.



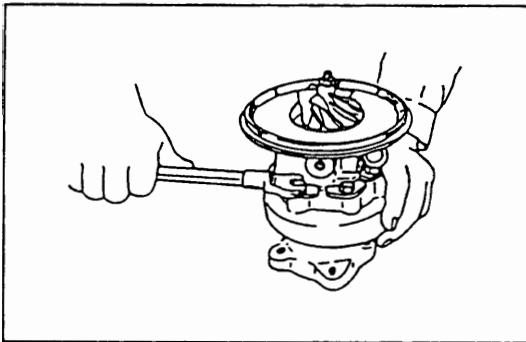
- Align the matching mark of blower impeller, lock nut and turbine shaft.



ASSEMBLE THE TURBINE CASE.

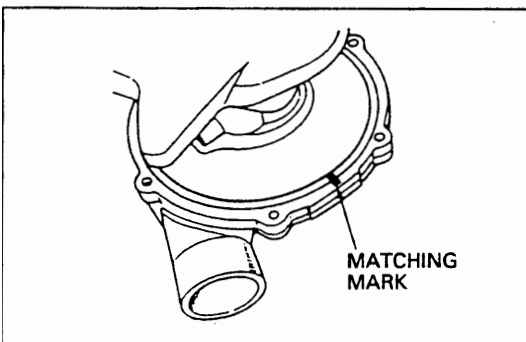
- Align the matching mark which put before disassembly.

NOTE: In case of replacing the parts, confirm the oil port position and exhaust gas inlet port position.



- Install the turbine case to bearing case by lock plate.

NOTE: Coat tightening bolt with antiseize compound before installation.



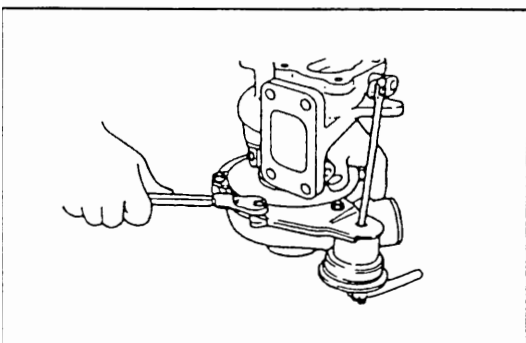
INSTALLATION OF BLOWER CASE.

- Apply liquid packing (Three Bond No. 1207C or No. 1215 or equivalent) to blower side flange face of bearing case.

NOTE: Take care that the liquid packing does not protrude to blower case inside.

- Align the matching mark of blower case and bearing case.

NOTE: In case of replacing the parts, confirm the oil port position and air outlet port position.



INSTALLATION OF WASTE GATE ACTUATOR. (IF SO EQUIPPED)

- Install the waste gate actuator to blower case.

ASSEMBLY TEST

1. Rotate the blower impeller by hand to see if it turns smoothly.
Refer to SECTION OVERHAUL CRITERIA.
2. Check the turbine rotor for axial play.
Refer to SECTION OVERHAUL CRITERIA.
3. Check the turbine rotor for radial play using a special tool.
Refer to SECTION OVERHAUL CRITERIA.
4. Check the waste gate valve operating condition. (If so equipped)
 - a) Apply air pressure to waste gate actuator and confirm the control rod lift.

Parts No.	Control rod lift mm {in}		Air pressure kPa {kgf/cm ² , lbf/in ² }
24100-2202 24100-2203 24100-2990	A	2 {0.0079}	125.6 – 135.3 {1.28 – 1.38, 18.21 – 19.62}
	B	5 {0.197}	143.2 – 154.9 {1.46 – 1.58, 20.77 – 22.47}
24100-2531	A	2 {0.0079}	106.9 – 116.6 {1.09 – 1.19, 15.51 – 16.92}
	B	5 {0.197}	106.0 – 117.6 {1.08 – 1.20, 15.37 – 17.06}
24100-2780	A	2 {0.0079}	109.9 – 119.6 {1.12 – 1.22, 15.94 – 17.35}
	B	4 {0.157}	120.7 – 218.6 {1.23 – 2.23, 17.50 – 31.71}

- b) Raise the air pressure from 0 kPa {0 kgf/cm², 0 lbf/in²} and confirm the air pressure as above value when control rod lift to A and B.

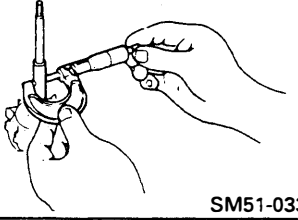
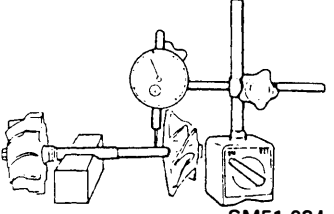
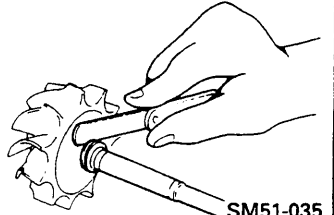
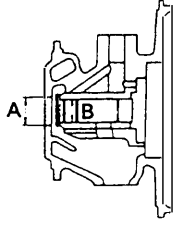
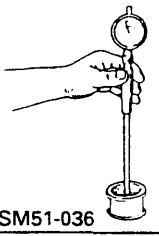
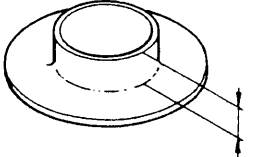
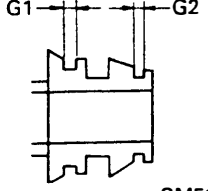
NOTE: ○ When exceed the air pressure to measure the control rod lift, repeat again from first.
 ○ Do not exceed the air pressure of 78.4 kPa {1.8 kgf/cm², 25.296 lbf/in²}.

- c) Reduce the air pressure from control lift B – A, at this time confirm the air pressure does not down move than 5.8 kPa {0.06 kgf/cm², 0.853 lbf/in²}.

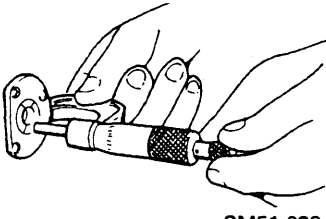
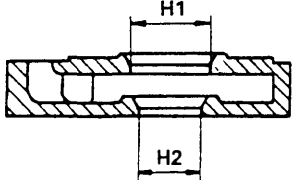
If not with in above value, check or replace the turbine case unit.

INSPECTION AND REPAIR

Unit: mm (in)

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Turbine Shaft Outside Diameter	—	10.39 {0.4090}	Replace	 SM51-033
Turbine Shaft Bend	—	0.011 {0.0004}	Replace	 SM51-034
Seal Ring Groove Width of Turbine Shaft	—	1.33 {0.0524}	Replace shaft assembly.	 SM51-035
Bearing Case Inside Diameter	—	A: 17.03 {0.6705} B: 15.10 {0.5944}	Replace	 SM51-006
Journal Bearing Inside Diameter	—	10.44 {0.4110}	Replace	 SM51-036
Journal Bearing Outside Diameter	—	14.98 {0.5897}	Replace	
Thrust Spacer Height	—	4.08 {0.1606}	Replace	 SM51-007
Seal Ring Groove Width of Oil Thrower	—	G1: 1.46 {0.0576} G2: 1.25 {0.0492}	Reemplace	 SM51-006A

Unit: mm {in}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Thrust Bearing Thickness	—	3.98 {0.1566}	Replace	 SM51-038
Sealing Bore of Seal Plate	—	H1: 14.05 {0.5531} H2: 12.45 {0.4901}	Replace	 SM51-006B

Notes:
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