HINO

WORKSHOP MANUAL

Hino Motors, Ltd.

INDEX: ENGINE GROUP 1/1

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TURBOCHARGER

AIR COMPRESSOR

FLYWHEEL P.T.O.

INTRODUCTION TO DESCRIPTIONS

1. PARTS LAYOUT DRAWING

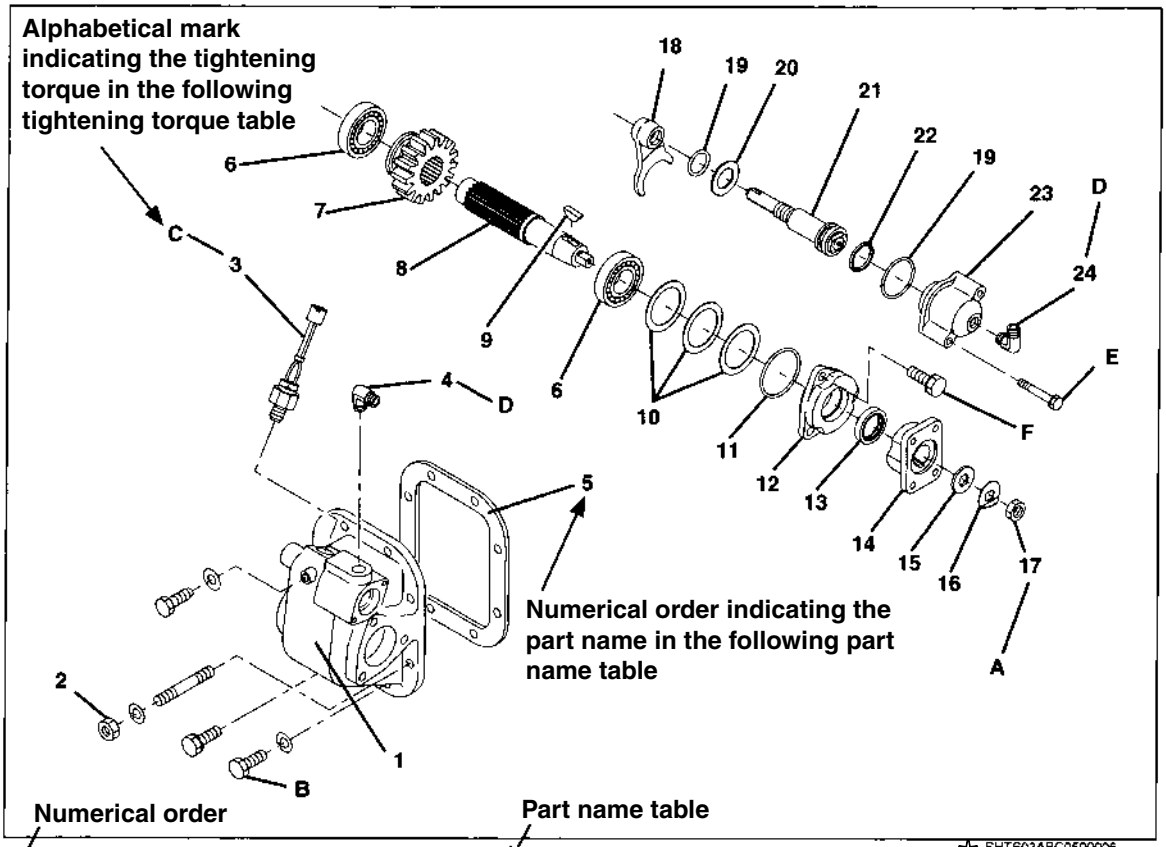
TR05–4 P.T.O. (POWER TAKE-OFF) (TRANSMISSION SERIES: HX07)

EXAMPLE

POWER TAKE-OFF UNIT

COMPONENT LOCATOR

☆ EN03ABC05D100001



☆ SHTS03ABC0500006

1	Power take-off case	13	Oil seal
2	Nut	14	Output shaft flange
3	Position switch	15	Plain washer
4	Connector	16	Lock washer
5	Power take-off case gasket	17	Lock nut
6	Taper roller bearing	18	Shift fork
7	Output gear	19	O-ring
8	Output shaft	20	Collar
9	Woodruff key	21	Shift shaft
10	Shim	22	Shift shaft piston cup
11	O-ring	23	Case cover
12	Seal cover	24	Elbow

Tightening torque table

Tightening torque — Unit: N·m {kgf·cm, lbf·ft}

A	39.2-47 {400-480, 29-34}	D	39.5-58.5 {400-600, 29-43}
B	44.5-53.5 {450-545, 33-39}	E	19-25 {200-250, 15-18}
C	48.5-67.5 {500-690, 36-49}	F	49-62 {500-630, 36-45}

Alphabetical mark — Tightening torque

SHTS01ZZZ0000007

☆ : The ID number is given to preparation items for the purpose of preparing electronic data and is not needed in repair work.

CYLINDER HEAD ASSEMBLY

EN01F02120010701006005

STANDARD VALUE, LIMIT AND ACTION

Unit: mm {in.}

Inspection item	Standard value	Repair limit	Service limit	Action
Under-head length of head bolt	146.5 {5.768}	—	147.5 {5.807}	Replacement
Strain of the bottom surface of the cylinder head	0.05 {0.0020}	0.15 {0.0059}	0.20 {0.0079}	Adjustment by grinding

TIGHTENING TORQUE

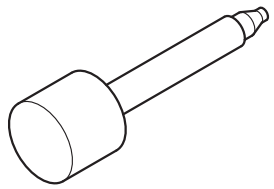
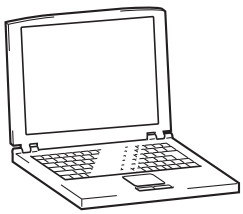
Unit: N·m {kgf·cm, lbf·ft}

Tightening point	Tightening torque	Remarks
Cylinder head mounting head bolt	100 {1,020, 74}+135°+90°	Refer to this document.
Cylinder head mounting additional bolt	68.5 {700, 51}	
Exhaust manifold bracket	68.5 {700, 51}	
Mounting union bolt for fuel pipe (return pipe No.2) connecting to common rail	12.5 {127, 9}	
Supply pump to common rail pressure-feed pipe	32 {326, 24}	
Fuel feed pipe No.5 mounting union bolt (supply pump side)	27 {275, 20}	

SUPPLY PUMP

EN01F02120020702003003

SPECIAL TOOL

Configuration	Part Number	Name	Remarks
	S0951-22530	INJECTION PUMP TOOL	For checking supply pump timing
	—	Computer (DOS/V standard)	• Operating system (OS): Windows95, Windows98 (IE5.0 or later), Windows2000 (SP3, IE5.0 or later), WindowsXP (SP1a, IE6.0 or later) • CPU and memory: To guarantee proper operations of the operating systems listed above. • Display: 800 x 600, 256 colors or more
—	09993-E9070*1 The main body and cables (for RS-232C and USB) Cable between vehicle and Hino-Bowie S0904-21220	Hino-Bowie (Interface box)	Computer interface
	Without Bluetooth® 95171-01020 With Bluetooth® 95171-01040	DENSO DST-i Set (without LCD)	
	Without Bluetooth® 95171-01030 With Bluetooth® 95171-01050	DENSO DST-i Set (with LCD)	

(*1): To use Hino-Bowie (the interface box) "S0912-11040 (09121-1040)", it is necessary to update the hardware. For details, see the Manual in the Hino-DX CD.
Also keep the firmware (Hino-Bowie internal software) updated by using the software in the Hino-DX CD. For details, see the Manual in the Hino-DX CD.

COMMON TOOL

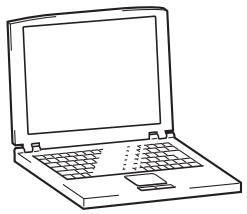
Name	Remarks
Puller (commercially available puller)	For removing the supply pump drive gear

INTAKE

DIESEL THROTTLE

EN01F02120020702005001

SPECIAL TOOL

Configuration	Part Number	Name	Remarks
	—	Computer (DOS/V standard)	• Operating system (OS): Windows95, Windows98 (IE5.0 or later), Windows2000 (SP3, IE5.0 or later), WindowsXP (SP1a, IE6.0 or later) • CPU and memory: To guarantee proper operations of the operating systems listed above. • Display: 800 x 600, 256 colors or more
—	09993-E9070[*1] The main body and cables (for RS-232C and USB) Cable between vehicle and Hino-Bowie S0904-21220	Hino-Bowie (Interface box)	Computer interface
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DOC DOWNSTREAM TEMPERATURE SENSOR

REPLACEMENT

EN01F02120050706034001

1. REMOVING THE DOC DOWNSTREAM TEMPERATURE SENSOR
(1) Remove the DOC downstream temperature sensor.
Reference: EXHAUST (A09C)

2. SINGLE UNIT INSPECTION
(1) Measure resistance using the circuit tester.
Reference: EXHAUST (A09C)

3. ATTACHING THE DOC DOWNSTREAM TEMPERATURE SENSOR
(1) Attach the DOC downstream temperature sensor.
Reference: EXHAUST (A09C)

COOLANT TEMPERATURE SENSOR

REPLACEMENT

EN01F02120050706018001

1. REMOVING THE COOLANT TEMPERATURE SENSOR
(1) Remove the coolant temperature sensor.
Reference: COOLING (A09C)

2. SINGLE UNIT INSPECTION
(1) Measure resistance using the circuit tester.
Reference: COOLING (A09C)

3. MOUNTING THE COOLANT TEMPERATURE SENSOR
(1) Mount the coolant temperature sensor.
Reference: COOLING (A09C)

OIL PRESSURE SWITCH

REPLACEMENT

EN01F02120050706036001

1. REMOVING THE OIL PRESSURE SWITCH
(1) Remove the oil pressure switch.
Reference: LUBRICATION (A09C)

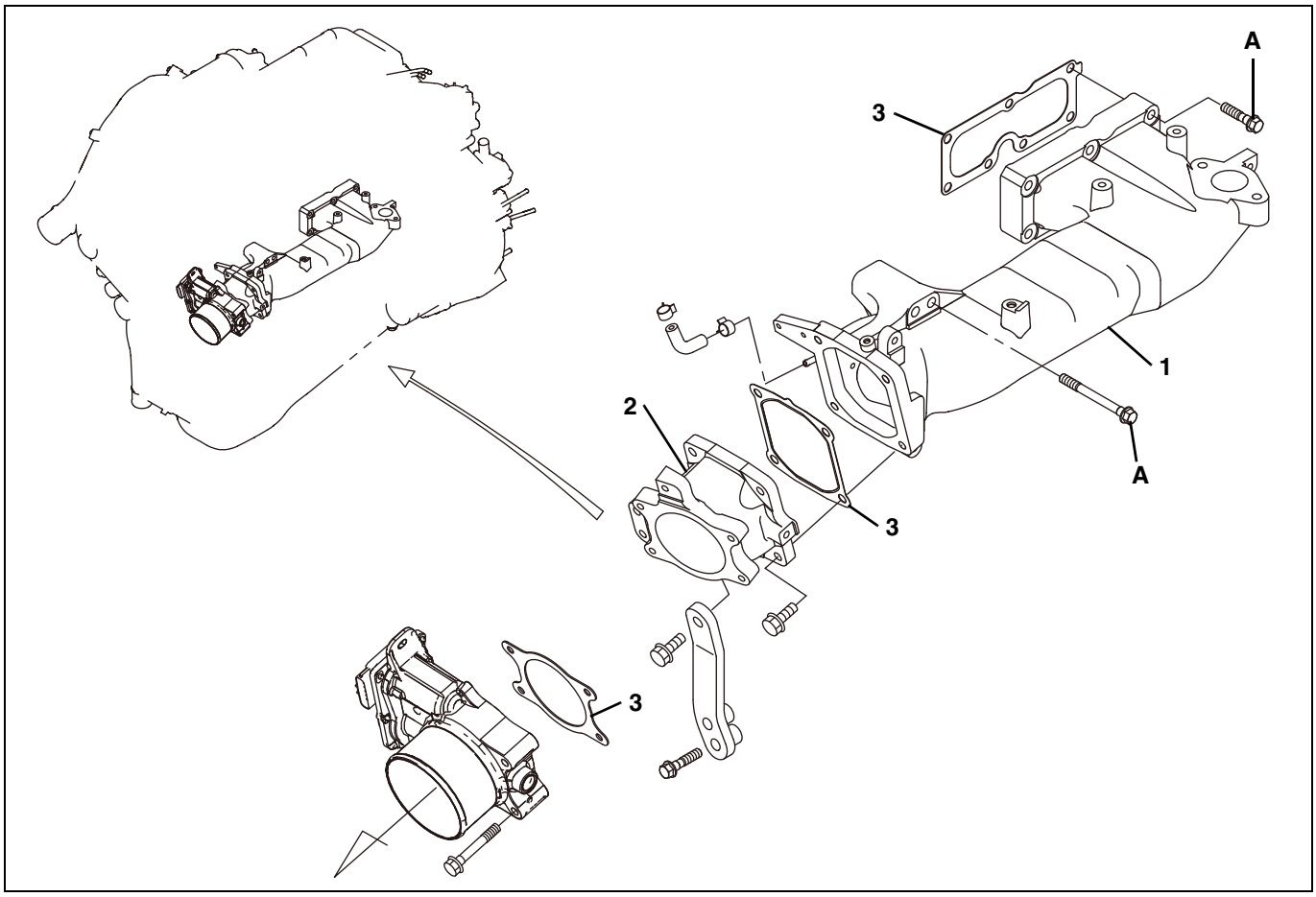
2. SINGLE UNIT INSPECTION
(1) Measure continuity using the circuit tester.
Reference: LUBRICATION (A09C)

3. MOUNTING THE OIL PRESSURE SWITCH
(1) Mount the oil pressure switch.
Reference: LUBRICATION (A09C)

INTAKE PIPE (INTAKE SIDE)

COMPONENT LOCATOR

EN01F02120080401001001

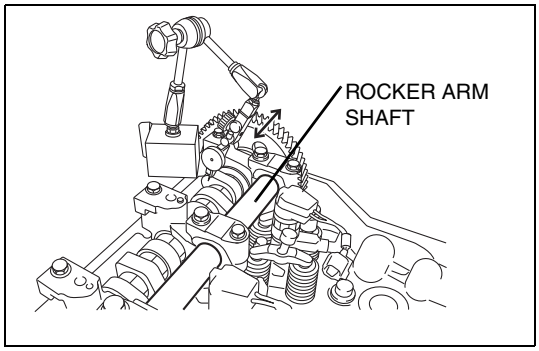


SHTS021200800001

1	Intake pipe (intake side)	3	Gasket
2	Intake pipe		

Tightening torque **Unit: N·m {kgf·cm, lbf·ft}**

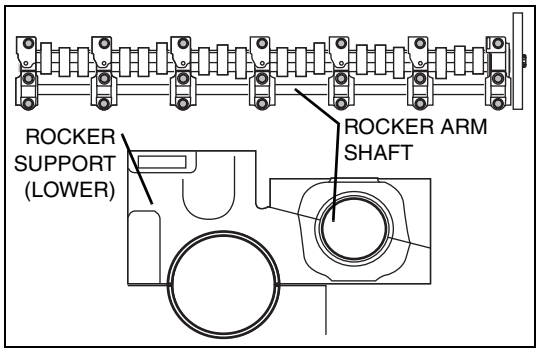
A	55 {561, 41}		



SHTS021200900077

(3) Use the dial gauge to measure the end play of the camshaft. If the value exceeds the standard value, replace the camshaft.

Standard value (mm {in.})	0.10-0.38 {0.0040-0.0150}



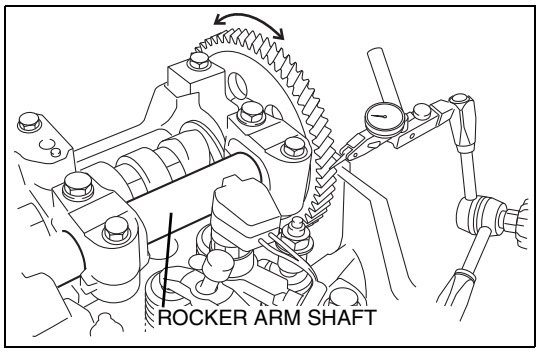
SHTS021200900078

5. INSPECTING FOR BACKLASH BETWEEN THE CAMSHAFT DRIVE GEAR AND CAM IDLE GEAR

(1) Disassemble the rocker arm assembly to make the rocker arm shaft separate from other parts.

(2) Set the camshaft assembly to the cylinder head and tighten the rocker support together with the rocker arm shaft with the specified torque.

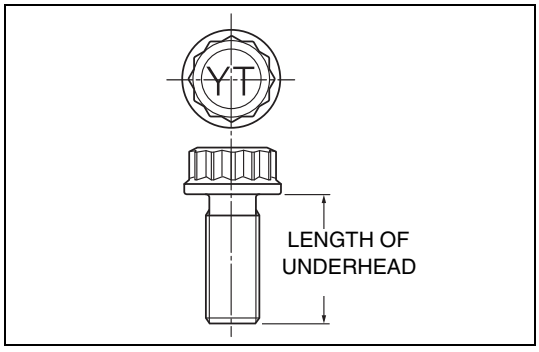
⚠ CAUTION
Make sure that the rocker arm shaft is assembled before tightening the rocker support. If the rocker support is tightened without the rocker arm shaft assembled, the support may break.



SHTS021200900079

(3) Use a dial gauge to measure backlash between the camshaft drive gear and the cam idle gear. If a measurement reading exceeds the service limit, replace a set of the gears.

Standard value (mm {in.})	Service limit (mm {in.})
0.040-0.151 {0.0016-0.0059}	0.30 {0.0118}



SHTS021200900080

6. INSPECTING CAMSHAFT DRIVE GEAR MOUNTING BOLT

(1) Use vernier calipers to measure an underhead length of a camshaft drive gear mounting bolt. If a measurement reading exceeds the service limit, replace the bolt.

Standard value (mm {in.})	Service limit (mm {in.})
30 {1.181}	31 {1.220}

REPLACEMENT

EN01F02120090706008001

REMOVING THE CRANKSHAFT FRONT OIL SEAL

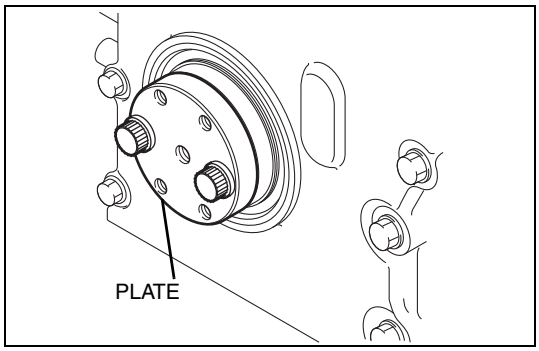
1. REMOVING THE CRANKSHAFT DAMPER

(1) Remove the crankshaft damper.

2. REMOVING THE CRANKSHAFT FRONT OIL SEAL

(1) Mount the special tool oil seal puller plate to the crankshaft with the crankshaft damper mounting bolts (2 pcs.).

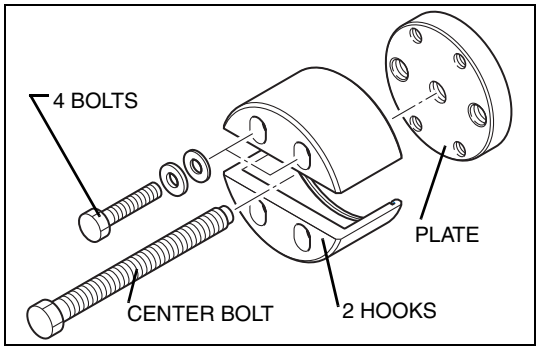
SST: 09220-E1090
Oil seal puller



SHTS021200900181

HINT

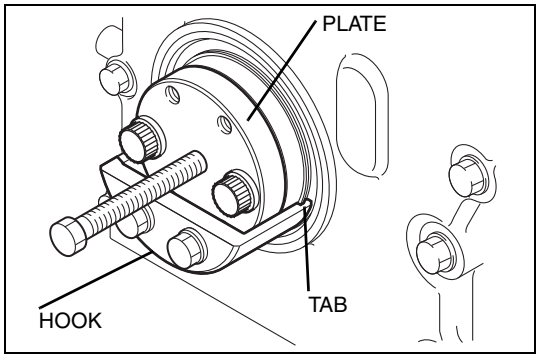
Contents of special tool oil seal puller.



SHTS021200900182

(2) Engaging the hooks (2 pcs.) of the special tool oil seal puller with the claws of the crankshaft front oil seal, mount the hooks to the special tool oil seal puller plate with the supplied bolts.

(3) Unfasten the bolts (2 pcs.) used to mount the special tool oil seal puller plate to the crankshaft.

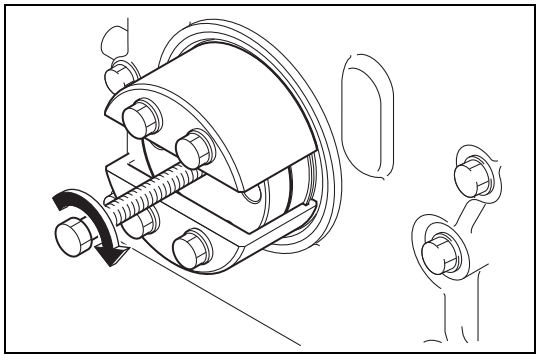


SHTS021200900183

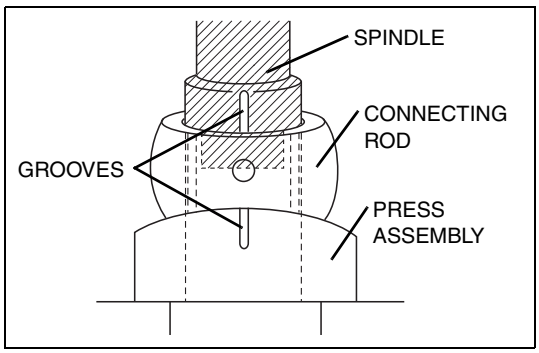
(4) Mount the supplied center bolt to the special tool oil seal puller. Gradually tighten the bolt and pull out the crankshaft front oil seal.

NOTICE

Inspect the engagement of the special tool and oil seal half way through the work and pull off the seal without removing the special tool.



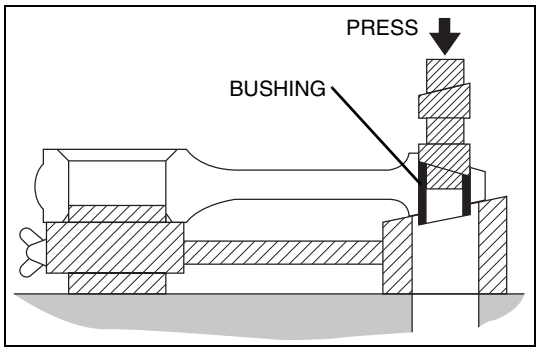
SHTS021200900184



SHTS021200900316

(3) Mount the special tool spindle to the connecting rod bushing.
SST: 09222-E1030
Spindle

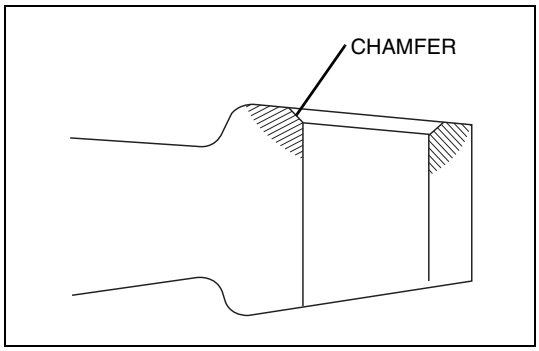
NOTICE
When mounting, align the groove on the press sub assembly with the one on the special tool spindle.



SHTS021200900317

(4) Use a press to pull off the connecting rod bushing.

NOTICE
Carefully operate the press.



SHTS021200900318

(5) Uniformly chamfer one side of the small end of the connecting rod as shown in the figure.

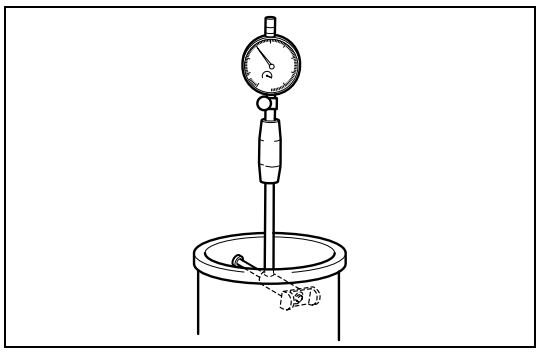
NOTICE
- **Remove all burrs.**
- **After chamfering, remove dirt from the oil hole and the inner surface of the small end.**

INSPECTING THE COMPONET PARTS

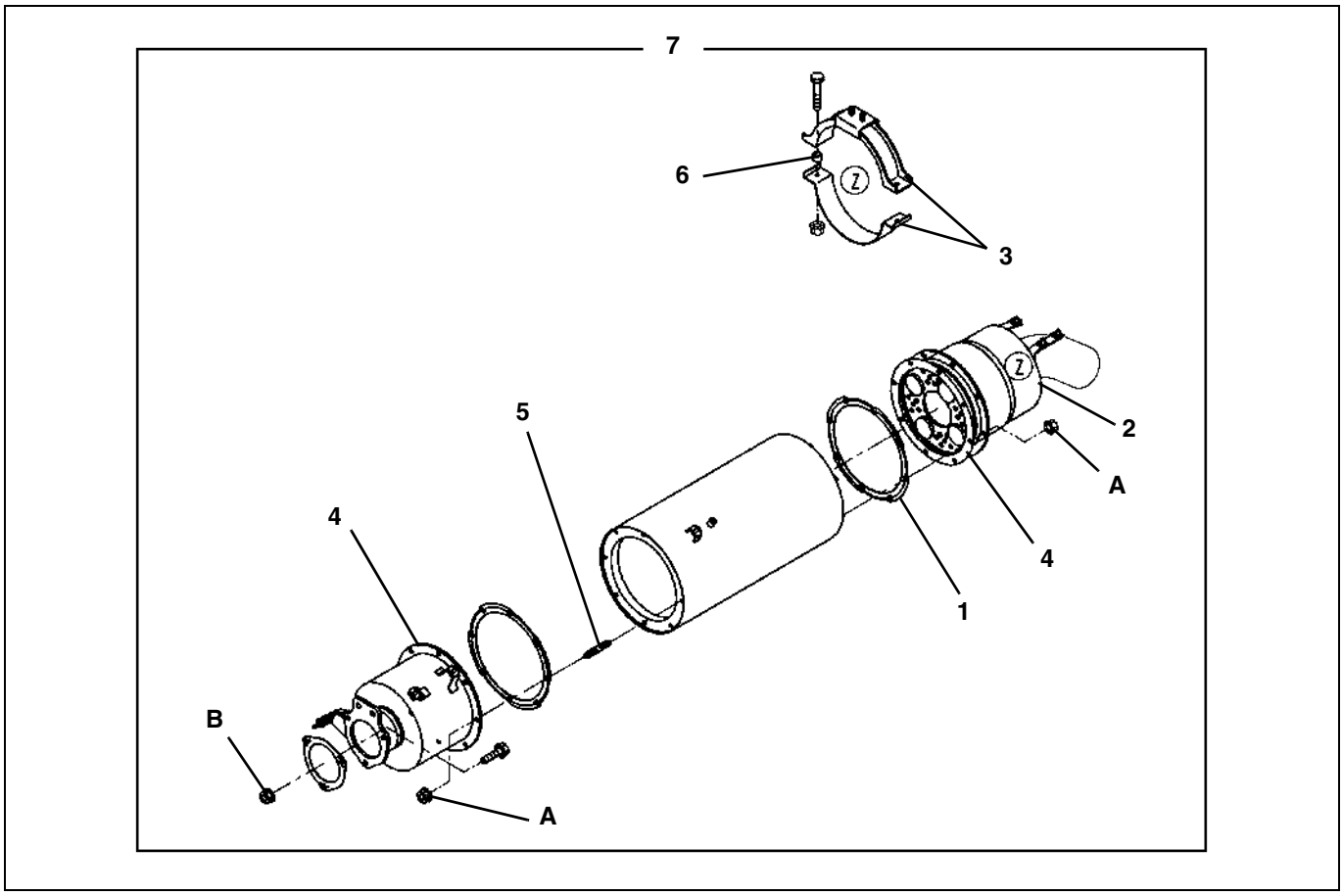
1. INSPECTING THE PISTON CLEARANCE

(1) Use the cylinder gauge to measure the inner diameter of the sliding surface of cylinder liner.

Standard value (mm {in.})	112 {4.409}



SHTS021200900319



SHTS021201000022

1	Gasket	5	Filter
2	Stiffener	6	Spacer
3	Support	7	DPR cleaner assembly
4	Noise suppressor		

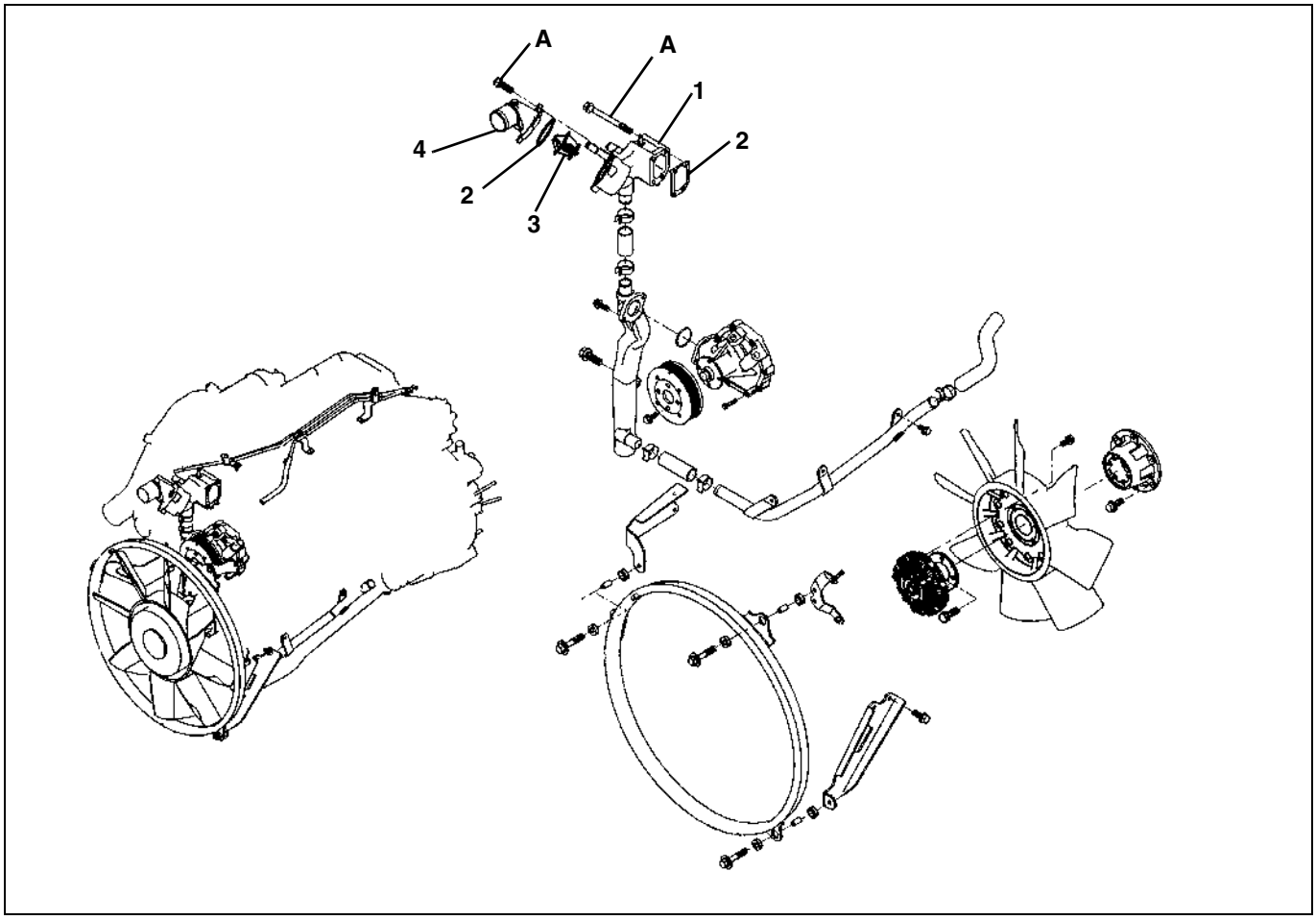
Tightening torque **Unit: N·m {kgf·cm, lbf·ft}**

A	65-75 {663-765, 48-55}	B	108-132 {1,101-1,346, 80-97}

THERMOSTAT CASE AND THERMOSTAT

COMPONENT LOCATOR

EN01F02120110401007001



SHTS021201100030

1	Thermostat case	3	Thermostat
2	Gasket	4	Thermostat case cover

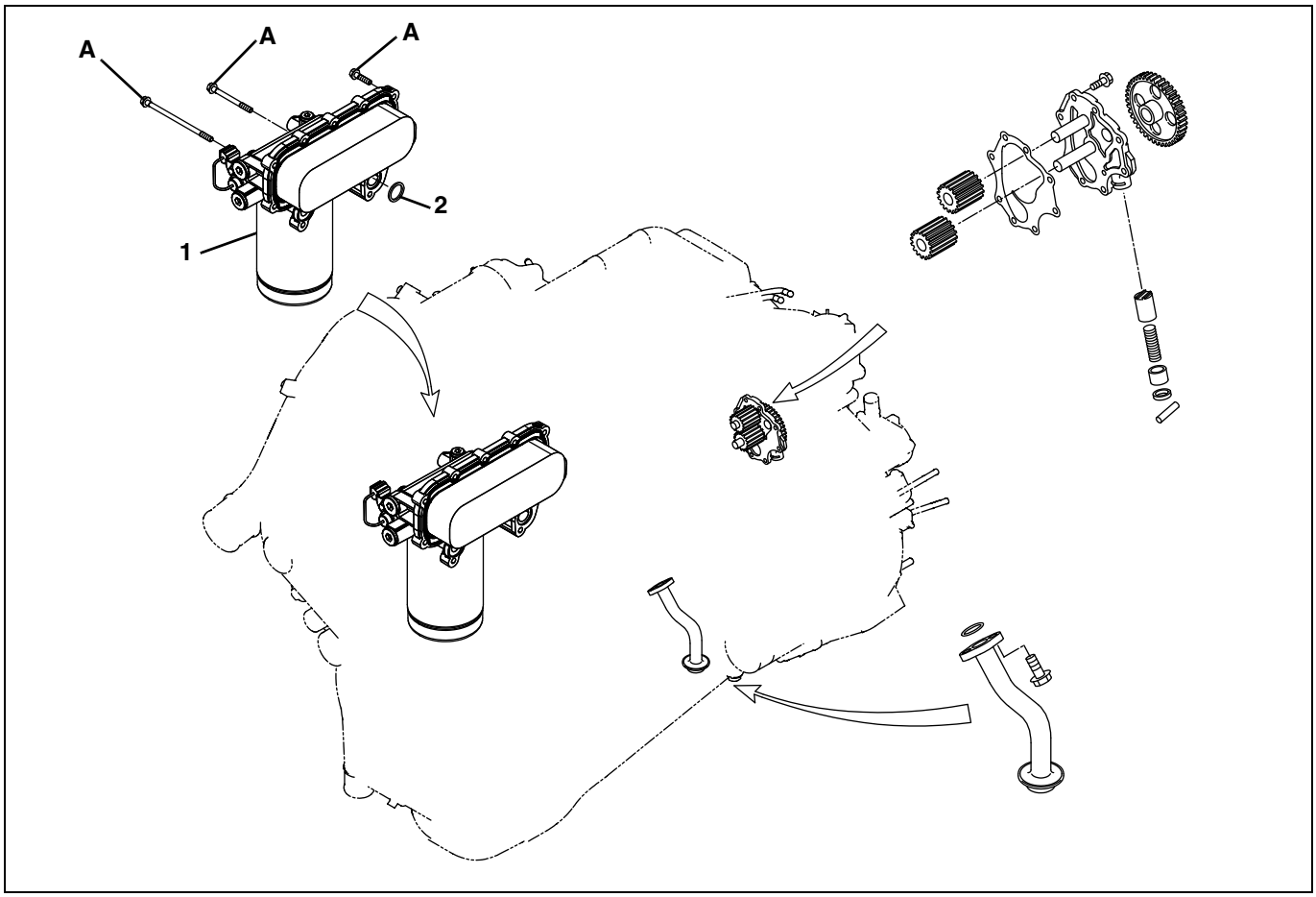
Tightening torque **Unit: N·m {kgf·cm, lbf·ft}**

A	55 {561, 41}		

OIL COOLER

COMPONENT LOCATOR

EN01F02120120401004001



SHTS021201200008

1 Oil cooler assembly	2 O-ring

Tightening torque **Unit: N·m {kgf·cm, lbf·ft}**

A 28.5 {291, 21}	

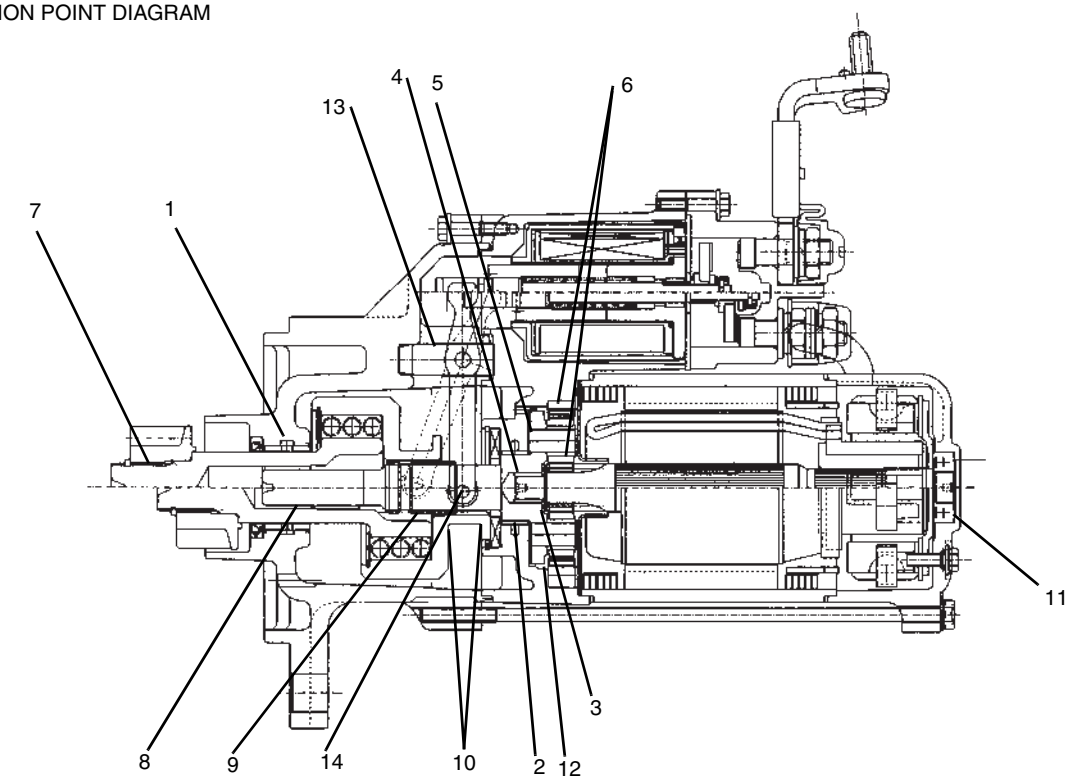
19. LUBRICATION

(1) See the diagram and the table below for applying oil and grease.

NOTICE

Keep oil and grease away from the commutator surface and brush and contact during work.

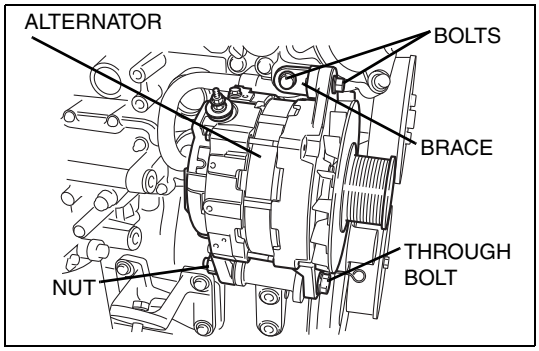
LUBRICATION POINT DIAGRAM



SHTS021201500069

LUBRICATION LIST

Code	Lubrication point	Oil and grease	Amount (g {oz})	Remarks	Manufacturer of oil and grease
1	Pinion case bushing and grease reservoir	Multemp AC-N	0.8-1.5 {0.028-0.052}		KYODO YUSHI
2	Bracket center bushing and grease reservoir	Multemp AC-N	0.8-1.5 {0.028-0.052}		KYODO YUSHI
3	Shim washer	Multemp AC-N	0.2-0.5 {0.007-0.017}	Apply grease to the both sides of washer	KYODO YUSHI
4	Armature front bushing	Multemp AC-N	0.5-1 {0.017-0.035}		KYODO YUSHI
5	Shim washer	Multemp AC-N	0.2-0.5 {0.007-0.017}	Apply grease to the both sides of washer	KYODO YUSHI
6	Internal gear	Multemp AC-N	7-11 {0.245-0.385}		KYODO YUSHI
	Armature gear				
	Planetary gear				
7	Pinion straight spline	Multemp AC-N	0.5-1 {0.017-0.035}		KYODO YUSHI

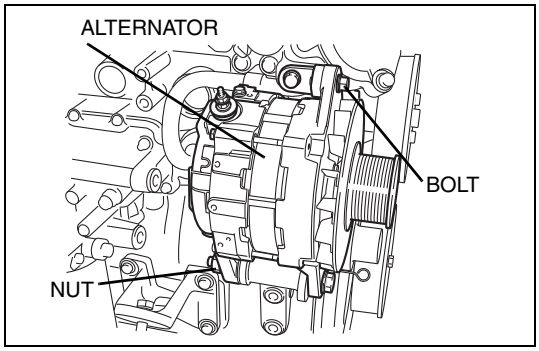


SHTS021201500174

(2) Replace with new washers, temporarily install the alternator and brace with the bolts (2 pcs.), nut, and through bolt.

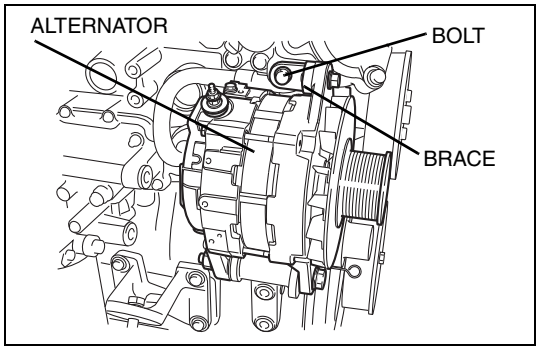
NOTICE

Adjust the positions of the alternator and brace so that no excessive load is applied to the brace.



SHTS021201500175

(3) With specified tightening torques, tighten the bolt and nut that temporarily tighten the alternator.
Tightening Torque:
(Nut)
132 N·m {1,350 kgf·cm, 97 lbf·ft}
(Bolt)
55 N·m {561 kgf·cm, 41 lbf·ft}



SHTS021201500176

(4) Tighten the bolts used to temporarily install the brace with the specified torque.
Tightening Torque:
55 N·m {561 kgf·cm, 41 lbf·ft}

2. MOUNTING THE V-RIBBED BELT

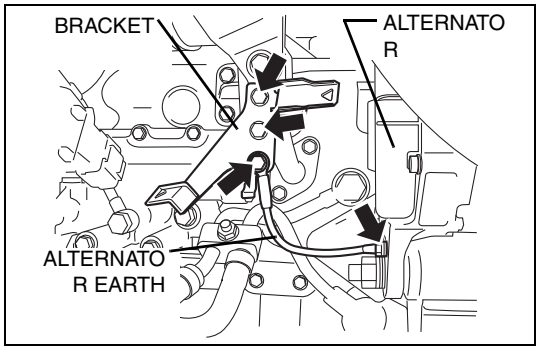
(1) Return the auto tensioner pulley fixing bolt slowly to mount the V-ribbed belt.

3. MOUNTING THE INTAKE PIPE (EXHAUST SIDE)

(1) Mount the U-turn pipe and boost pipe.
INTAKE

4. CONNECTING THE HARNESS

(1) Mount the alternator earth and bracket with the bolts (4 pcs.) as shown in the figure.
Tightening Torque:
(Alternator earth)
4 N·m {41 kgf·cm, 2.9 lbf·ft}
(Bracket)
28.5 N·m {291 kgf·cm, 21 lbf·ft}



SHTS021201500177

NOTICE

Route the alternator earth wire so that it does not interfere with peripheral parts.