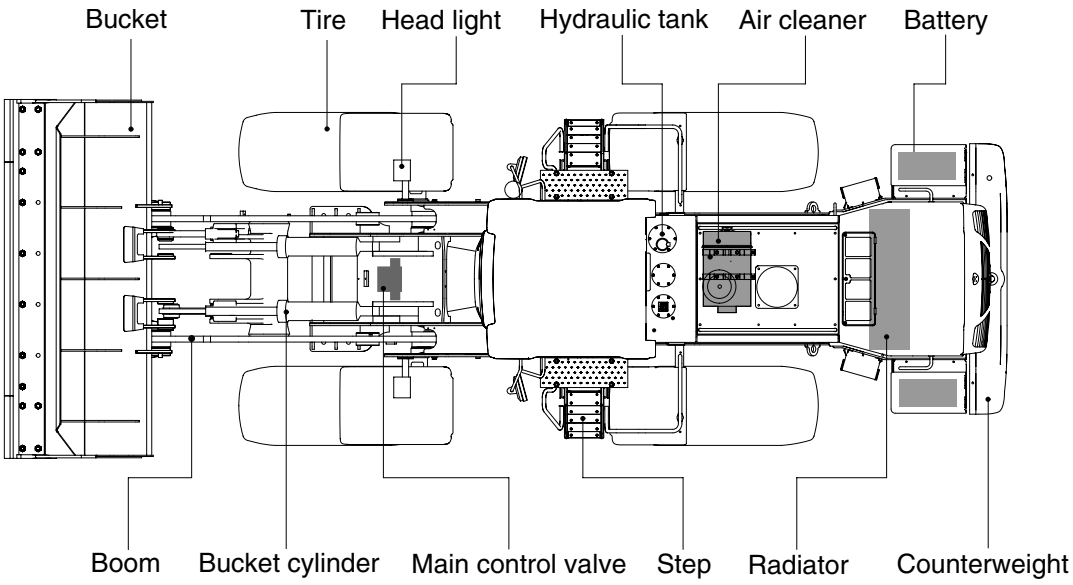
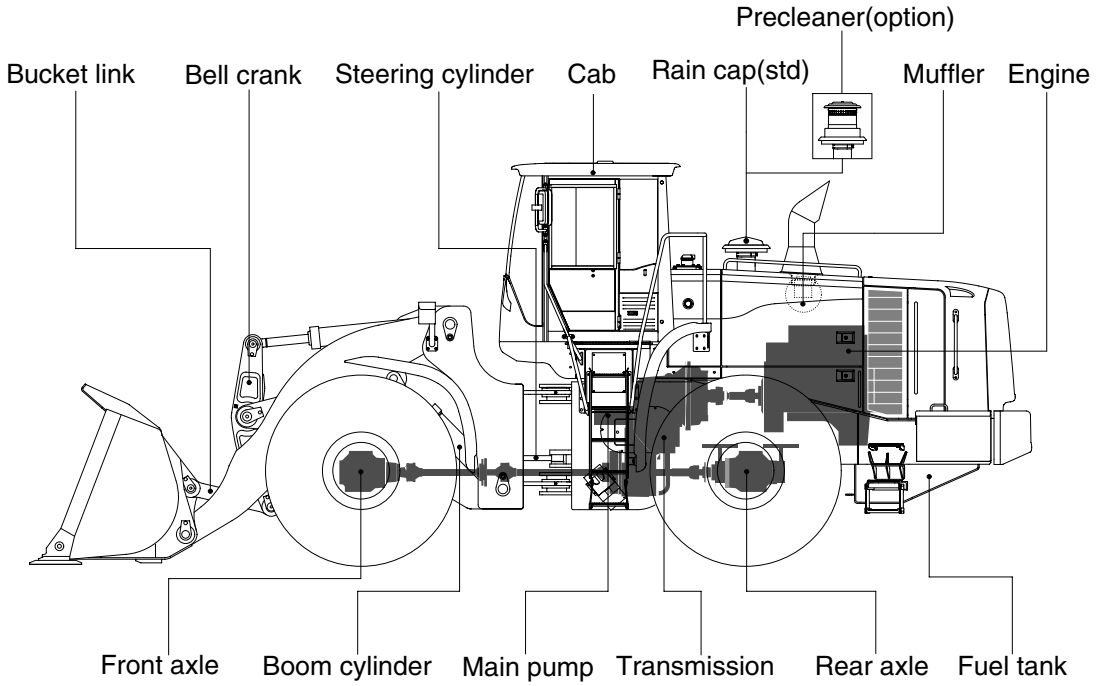
CONTENTS

SECTION 1 GENERAL

GROUP 2 SPECIFICATION

1. MAJOR COMPONENT





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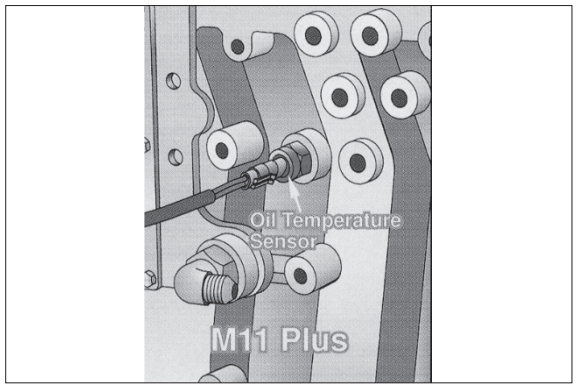
5. TIGHTENING TORQUE OF MAJOR COMPONENT

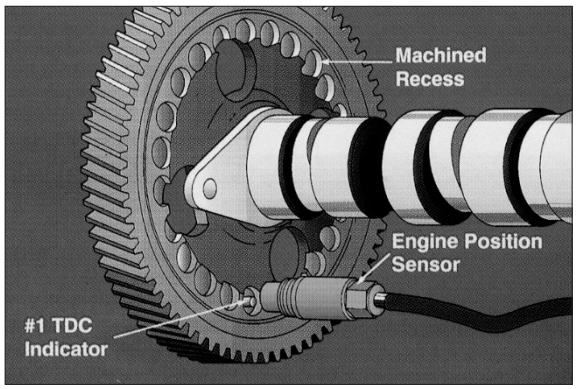
No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut (rubber, 4EA)	M24×3.0	100 ± 15.0	723 ± 108
2		Engine mounling bolt (flywheel housing, 14EA)	M10×1.5	4.6 ± 0.7	33.3 ± 5.1
3		Engine mounling bolt (coupling, 8EA)	1/2-13UNC	8.37 ± 0.41	53.3 ± 3.0
4		Engine mounting bolt (gear housing, 6EA)	M10×1.5	4.6 ± 0.7	33.3 ± 5.1
5		Radiator mounting bolt	M20×2.5	57.9 ± 8.7	419 ± 62.9
6		Fuel tank mounting bolt, nut	M16×2.0	29.7 ± 4.5	215 ± 32.5
7	Hydraulic system	Main pump housing mounting bolt	M16×2.0	29.7 ± 4.5	215 ± 32.5
8		Steering pump housing mounting bolt	M16×2.0	29.7 ± 4.5	215 ± 32.5
9		Main control valve mounting bolt	M12×1.75	12.8 ± 3.0	92.6 ± 21.7
10		Steering unit mounting bolt	M10×1.5	6.9 ± 1.4	49.9 ± 10.1
11		Flow amplifier mounting bolt	M10×1.5	6.9 ± 1.4	49.9 ± 10.1
12		Brake valve mounting bolt	M8×1.25	2.5 ± 0.5	18.1 ± 3.6
13		Cut-off valve mounting bolt	M12×1.75	12.3 ± 2.0	89.0 ± 14
14		Remote control lever mounting bolt	M6×1.0	1.1 ± 0.2	8.0 ± 1.4
15		Safety valve	M8×1.25	2.5 ± 0.5	18.1 ± 3.6
16		Hydraulic oil tank mounting bolt	M20×2.5	57.9 ± 8.7	419 ± 62.9
17	Power train system	Transmission mounting bolt, nut (rubber, 4EA)	M24×3.0	100 ± 15.0	723 ± 108
18		Transmission mounting bolt (bracket, 8EA)	M20×2.5	24.0 ± 2.4	174 ± 18.1
19		Transmission bolt (bracket, converter side)	M16×2.0	18.4 ± 2.0	133 ± 14.5
20		Front axle mounting bolt, nut	M36×3.0	270 ± 30	1950 ± 217
21		Rear axle support mounting bolt, nut	M36×3.0	270 ± 30	1950 ± 217
22		Tire mounting nut	M22×1.5	79 ± 2.5	571 ± 18
23		Drive shaft joint mounting bolt (front, center, rear)	1/2-20UNF	15.5 ± 0.5	112 ± 3.6
24		Drive shaft joint mounting bolt (upper)	1/2-20UNF	10.5 ± 0.5	75.9 ± 3.6
25	Others	Counterweight mounting bolt	M30×2.0	199 ± 30	1439 ± 217
26		Counterweight mounting bolt	M24×3.0	100 ± 15	723 ± 108
27		Operator's seat mounting bolt	M8×1.25	3.4 ± 0.8	24.6 ± 5
28		Cab mounting bolt (4EA)	M20×2.5	58 ± 8.7	419 ± 63

5) The Oil Temperature Sensor is mounted in the main oil rifle. It provides input to the engine protection system.

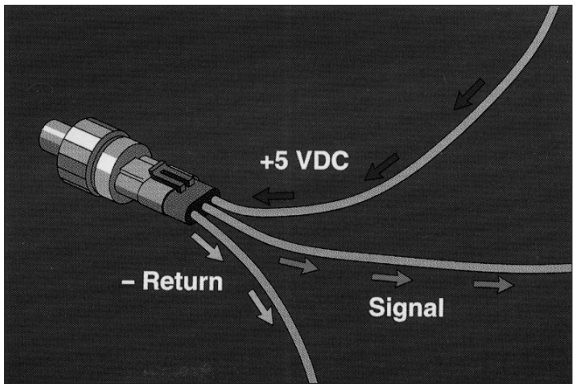


6) The Engine Position Sensor, or EPS, is a magnetic pick-up type device that uses the detection of 24 specially machined surfaces, on the back side of the camshaft gear, to monitor engine speed.

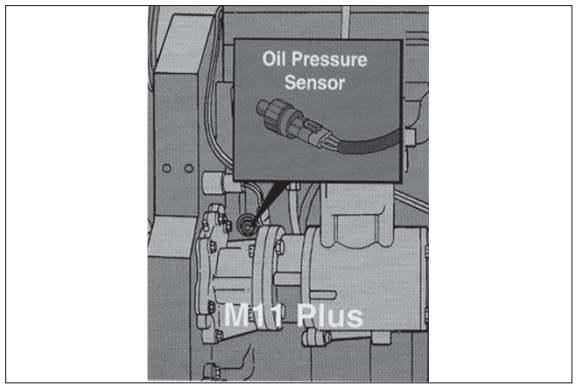
A unique "tooth" indicates number one cylinder at top dead center compression stroke, for injection timing purposes.



7) The pressure sensors are a three-wire type sensor with a 5 volt supply, a signal wire, and a return. Although pressure sensors use an analog signal similar to the temperature sensors, the electronics built into the sensor require that separate signal and return wires be used.

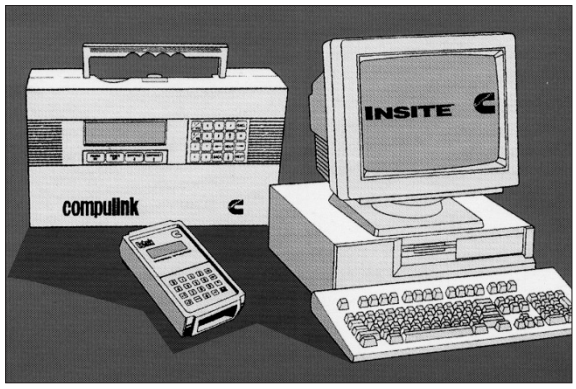


8) The oil Pressure Sensor is mounted in the main oil rifle. Like the oil temperature sensor, it provides input information to the engine protection system.



41) The primary diagnostic tool for use with the QSM system will be the INSITE computer based diagnostic tool.

Echek and Compulink cartridges will be available for use with QSM.



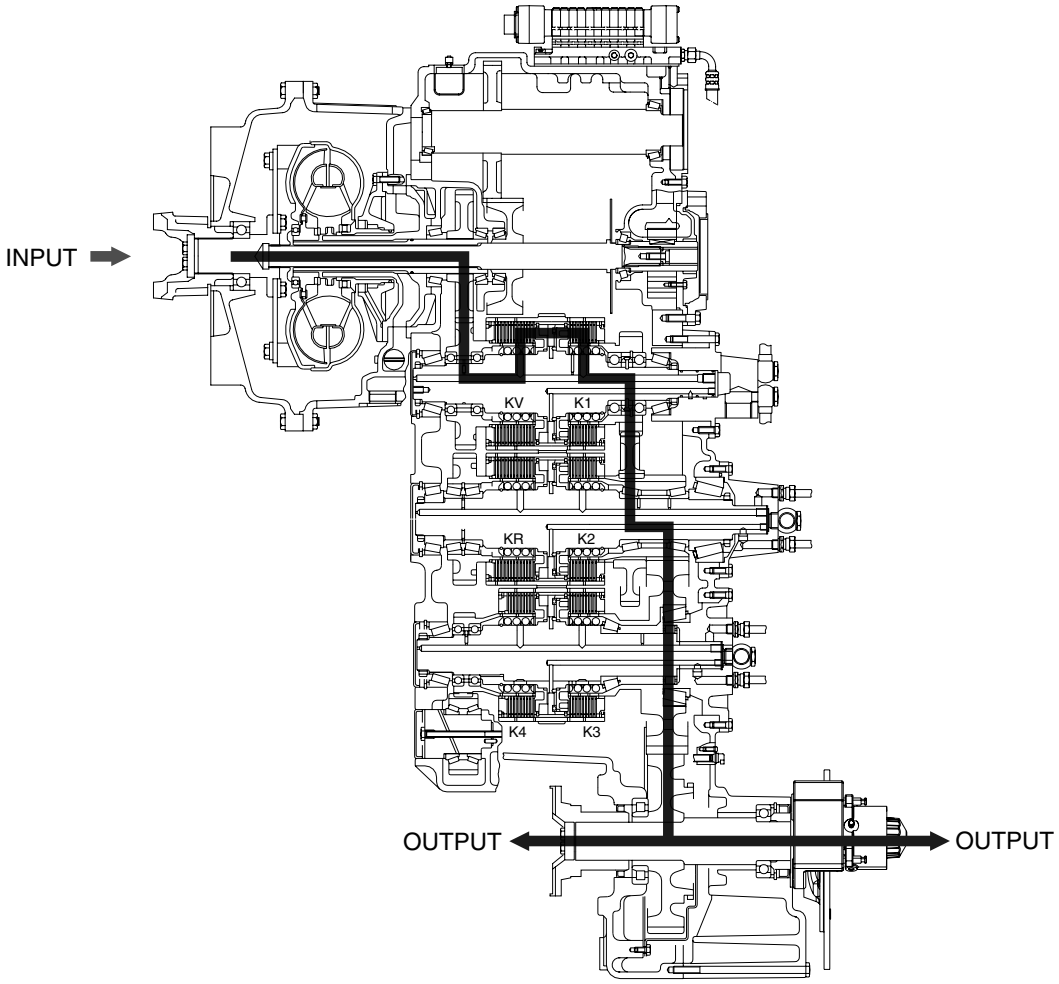
3) OPERATION OF TRANSMISSION

(1) Forward

① Forward 1st

In 1st forward, forward clutch and 1st clutch are engaged.

Forward clutch and 1st clutch are actuated by the hydraulic pressure applied to the clutch piston.



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· Protection from operating errors as far as necessary, is possible via electronic protection (programming).
· Protection from over-speeds (On the basis of engine and turbine speed).
· Automatic reversing (Driving speed-dependent).
· Pressure cut-off possible (Disconnecting of the drive train for maximum power on the power take-off).
· Change-over possibility for Auto-/Manual mode.
· Kick down functions possible.

(3) Driving and shifting

- Neutral position :

Neutral position will be selected via the controller.
After the ignition is switched on, the electronics remains in the waiting state. By the position NEUTRAL of the controller, resp. by pressing the pushbutton NEUTRAL, the EST-37A becomes ready for operation.
Now, a gear can be engaged.

- Starting :

The starting of the engine has always to be carried out in the NEUTRAL POSITION of the controller.
For safety reasons it is to recommend to brake the machine securely in position with the parking brake prior to start the engine.
After the starting of the engine and the preselection of the driving direction and the gear, the machine can be set in motion by acceleration.

At the start off, the converter takes over the function of a master clutch.
On a level road it is possible to start off also in higher gears.

- Upshifting under load

Upshifting under load will be then realized if the machine can still accelerate by it.

- Downshifting under load

Downshifting under load will be realized if more traction force is needed.

- Upshifting in overrunning condition

In the overrunning mode, the upshifting will be suppressed by accelerator pedal idling position, if the speed of the machine on a downgrade should not be further increased.

- Downshifting in overrunning condition

Downshiftings in overrunning mode will be then carried out if the machine should be retarded.

If the machine will be stopped and is standing with running engine and engaged transmission, the engine cannot be stalled. On a level and horizontal roadway it is possible that the machine begins to crawl, because the engine is creating at idling speed a slight drag torque via the converter.
It is convenient to brake the machine at every stop securely in position with the parking brake.
At longer stops, the controller has to be shifted to the NEUTRAL POSITION.

At the start off, the parking brake has to be released. We know from experience that at a converter transmission it might not immediately be noted to have forgotten this quite normal operating step because a converter, due to its high ratio, can easily overcome the braking torque of the parking brake.

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
435 100 2	Engine oil rifle pressure - Data erratic, intermittent, or incorrect. An error in the engine oil pressure switch signal was detected by the ECM.	None on performance. No engine protection for oil pressure.
441 168 18	Battery 1 voltage - Data valid but below normal operational range - Moderately severe level. ECM supply voltage is below the minimum system voltage level.	Engine may stop running or be difficult to start.
442 168 16	Battery 1 Voltage - Data valid but above normal operational range - Moderately severe level. ECM supply voltage is above the maximum system voltage level.	Possible electrical damage to all electrical components.
449 157 0	Injector metering rail 1 pressure - Data valid but above normal operational range - Most severe level.	None or possible engine noise associated with higher injection pressures (especially at idle or light load). Engine power is reduced.
451 157 3	Injector metering rail 1 pressure sensor circuit - Voltage above normal, or shorted to high source. High signal voltage detected at the rail fuel pressure sensor circuit.	Power and or speed derate.
452 157 4	Injector metering rail 1 pressure sensor circuit - Voltage below normal, or shorted to low source. Low signal voltage detected at the rail fuel pressure sensor circuit.	Power and or speed derate.
488 157 16	Intake manifold 1 temperature - Data valid but above normal operational range - Moderately severe level. Intake manifold air temperature signal indicates intake manifold air temperature is above the engine protection warning limit.	Progressive power derate increasing in severity from time of alert.
497 1377 2	Multiple unit synchronization switch - Data erratic, intermittent, or incorrect.	
523 611 2	Auxiliary intermediate (PTO) speed switch validation - Data erratic, intermittent, or incorrect.	None on performance.
527 702 3	Auxiliary input/output 2 circuit - Voltage above normal, or shorted to high source. High signal voltage or open circuit has been detected at the auxiliary input/output 2 circuit.	None on performance.
528 93 2	Auxiliary alternate torque validation switch - Data erratic, intermittent, or incorrect.	None on performance.
529 703 3	Auxiliary input/output 3 circuit - Voltage above normal, or shorted to high source. Low signal voltage has been detected at the auxiliary input/ output 2 circuit.	
553 157 16	Injector metering rail 1 pressure - Data valid but above normal operational range - Moderately severe level. The ECM has detected that fuel pressure is higher than commanded pressure.	The ECM will estimate fuel pressure and power is reduced.
554 157 2	Injector metering rail 1 pressure - Data erratic, Intermittent, or incorrect. The ECM has detected that the fuel pressure signal is not changing.	Possibly hard to start, low power, or engine smoke.

Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair
57	EEC1 timeout Timeout of CAN-message EEC1 from EEC controller · Interference on CAN-Bus · CAN wire/connector is broken · CAN wire/connector is defective and has contact to vehicle ground or battery voltage	OP mode : Substitute clutch control	· Check EEC controller · Check wire of CAN-Bus · Check cable to EEC controller
58	EEC3 timeout Timeout of CAN-message EEC3 from EEC controller · Interference on CAN-Bus · CAN wire/connector is broken · CAN wire/connector is defective an has contact to vehicle ground or battery voltage	OP mode : Substitute clutch control	· Check EEC controller · Check wire of CAN-Bus · Check cable to EEC controller
5C	Auto downshift signal CAN signal for automatic downshift is defective · Cluster controller is defective · Interference on CAN-Bus	No reaction	· Check cluster controller · Check wire of CAN-Bus · Check cable to cluster controller
5D	Manual downshift signal CAN signal for manual downshift is defective · Cluster controller is defective · Interference on CAN-Bus	No reaction	· Check cluster controller · Check wire of CAN-Bus · Check cable to controller
5E	CCO request signal CAN signal for CCO request is defective · Cluster controller is defective · Interference on CAN-Bus	No reaction	· Check cluster controller · Check wire of CAN-Bus · Check cable to controller
61	AEB request signal CAN signal for AEB request is defective · I/O controller is defective · Interference on CAN-Bus	No reaction OP mode : Normal	· Check I/O controller, Omron master · Check wire of CAN-Bus · Check cable to I/O controller, Omron master
64	Sarting gear signal CAN signal for starting gear is defective · I/O controller is defective (illegal starting gear) · Interference on CAN-Bus	No reaction. TCU uses default starting gear OP mode : Normal	· Check I/O controller · Check wire of CAN-Bus · Check cable to I/O controller
65	Engine torque signal CAN signal for engine torque is defective · Engine controller is defective · Interference on CAN-Bus	OP mode : Substitute clutch control	· Check engine controller · Check wire of CAN-Bus · Check cable to engine controller
69	Reference engine torque signal CAN signal for reference of engine torque is defective · Engine controller is defective · Interference on CAN-Bus	OP mode : Substitute clutch control	· Check engine controller · Check wire of CAN-Bus · Check cable to engine controller
6A	Actual engine torque signal CAN signal for actual engine torque is defective · Engine controller is defective · Interference on CAN-Bus	OP mode : Substitute clutch control	· Check engine controller · Check wire of CAN-Bus · Check cable to engine controller

※ Some fault codes are not applied to this machine.

Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair
C6	O.C. at joystick status indicator TCU detected a wrong voltage at the output pin, that looks like a O.C. for this output pin · Cable is defective and has no connection to TCU · Joystick status indicator has an internal defect · Connector pin has no connection to TCU	No reaction OP mode : Normal	· Check the cable from TCU to joystick status indicator · Check the connectors from joystick status indicator to TCU · Check the resistance* of joystick status indicator * See page 3-49
D1	S.C. to battery voltage at power supply for sensors TCU measures more than 6V at the pin AU1 (5V sensor supply)	See fault codes No.21 to 2C	· Check cables and connectors to sensors, which are supplied from AU1 · Check the power supply at the pin AU1(Should be appx. 5V) · Fault codes No.21 to No.2C may be reaction of this fault
D2	S.C. to ground at power supply for sensors TCU measures less than 4V at the pin AU1 (5V sensor supply)	See fault codes No.21 to 2C	· Check cables and connectors to sensors, which are supplied from AU1 · Check the power supply at the pin AU1(Should be appx. 5V) · Fault codes No.21 to No.2C may be reaction of this fault
D3	Low voltage at battery Measured voltage at power supply is lower than 18V(24V device)	Shift to neutral OP mode : TCU shutdown	· Check power supply battery · Check cables from batteries to TCU · Check connectors from batteries to TCU
D4	High voltage at battery Measured voltage at power supply is higher than 32.5V(24V device)	Shift to neutral OP mode : TCU shutdown	· Check power supply battery · Check cables from batteries to TCU · Check connectors from batteries to TCU
D5	Error at valve power supply VPS1 TCU switched on VPS1 and measured VPS1 is off or TCU switched off VPS1 and measured VPS1 is still on · Cable or connectors are defect and are contacted to battery voltage · Cable or connectors are defect and are contacted to vehicle ground · Permanent power supply KL30 missing · TCU has an internal defect	Shift to neutral OP mode : TCU shutdown	· Check fuse · Check cables from gearbox to TCU · Check connectors from gearbox to TCU · Replace TCU
D6	Error at valve power supply VPS2 TCU switched on VPS2 and measured VPS2 is off or TCU switched off VPS2 and measured VPS2 is still on · Cable or connectors are defect and are contacted to battery voltage · Cable or connectors are defect and are contacted to vehicle ground · Permanent power supply KL30 missing · TCU has an internal defect	Shift to neutral OP mode : TCU shutdown	· Check fuse · Check cables from gearbox to TCU · Check connectors from gearbox to TCU · Replace TCU

※ Some fault codes are not applied to this machine.

2. TROUBLESHOOTING

1) TRANSMISSION

※ **Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Remember the following steps when troubleshooting a problem :**

Step 1. Operational check out procedure (See group 3 in section 1.)
Step 2. Operational checks (In this group.)
Step 3. Troubleshooting
Step 4. Tests and/or adjustments (See group 3.)

Problem	Cause	Remedy
Transmission slippage	Low oil level.	Add oil.
	Wrong oil grade.	Change oil.
	Restricted transmission pump suction screen.	Remove and clean screen.
	Leak in transmission control valve or gasket.	Remove valve and inspect gaskets.
	Low transmission pump flow due to worn pump.	Do transmission pump flow test.
	Weak or broken pressure regulating valve spring.	Do transmission system pressure test.
Error code on display	Something wrong in transmission.	Go to transmission error code group at page 3-32~3-48.

(5) Remove the retaining clamp

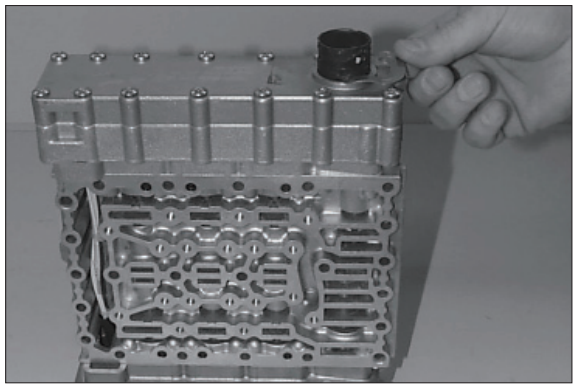


Figure 1005

(6) Loosen the cap screws and take off the cover.
Remove the opposite cover.

※ Special tool
Socket spanner TX-27 5873 042 002

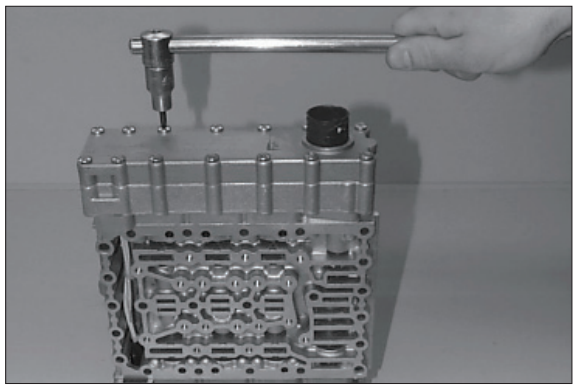


Figure 1006

(7) Remove the wiring harness.

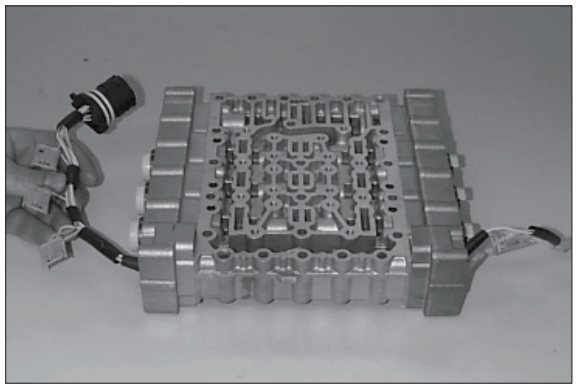


Figure 1007

(8) Loosen the cap screws, remove the fixing plates and the pressure controllers.

※ Special tool
Socket spanner TX-27 5873 042 002

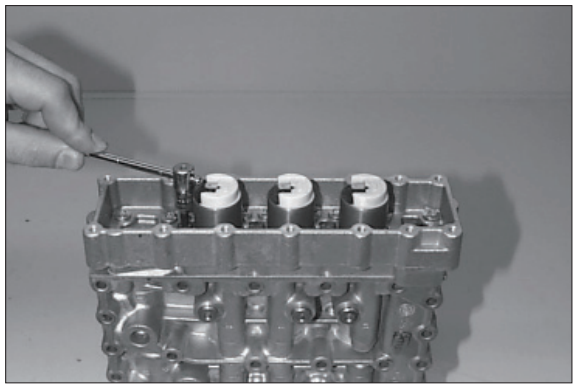


Figure 1008

(2) Loosen the bolt connection and by means of the forcing screws (3EA) separate the cover from the converter bell.

※ Special tool

Forcing screws	5870 204 005

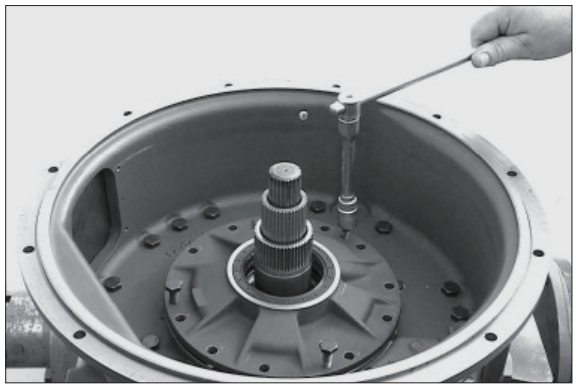


Figure 5

(3) By means of the extractor pull the oil supply flange out of the converter bell.

※ Special tool

Extractor	5870 000 089

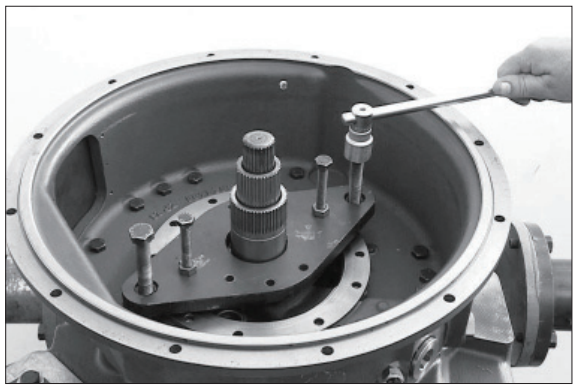


Figure 6

(4) Remove the converter safety valve (arrow 1), if required.

※ Converter safety valve is fixed by means of slotted pin (arrow 2).

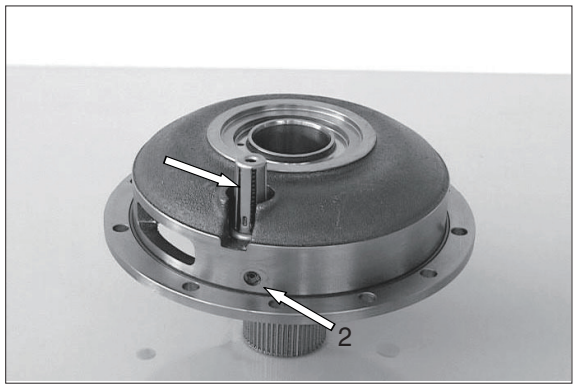


Figure 7

(5) Loosen the bolt connection (M8 and M12) and by means of lifting tackle and pry bar set separate the coverter bell from the transmission housing.

※ Special tool

Eyebolts assortment	5870 204 002
Pry bar set	5870 345 036
Lifting chain	5870 281 047

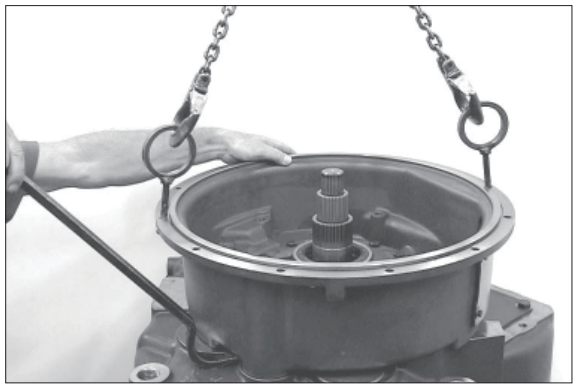


Figure 8

(5) Expel the output shaft from the output gear.

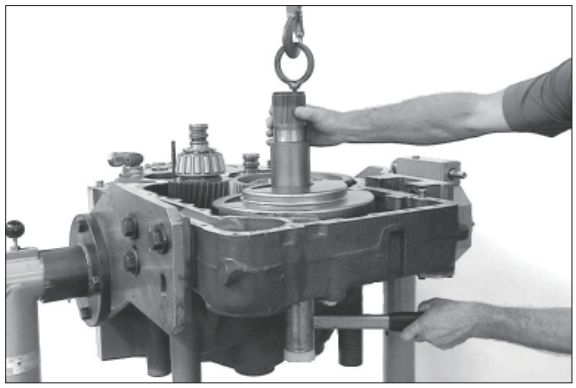


Figure 50

(6) Loosen the hexagon screws and remove the oil baffle.

Lift the output gear out of the transmission housing (figure).

※ Special tool

Stop washer	5870 100 054
Eyebolts assortment	5870 204 002

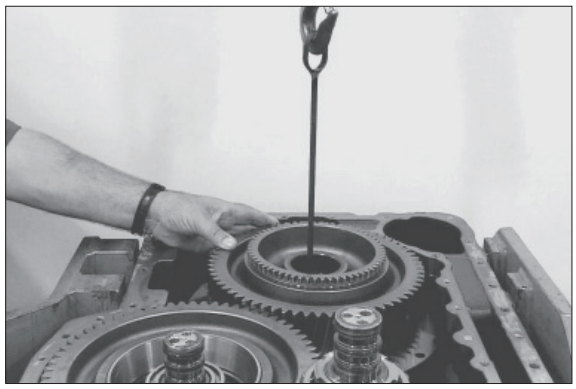


Figure 51

(7) Remove the bearing inner ring from the output gear.

※ Special tool

Three-armed puller	5870 971 003

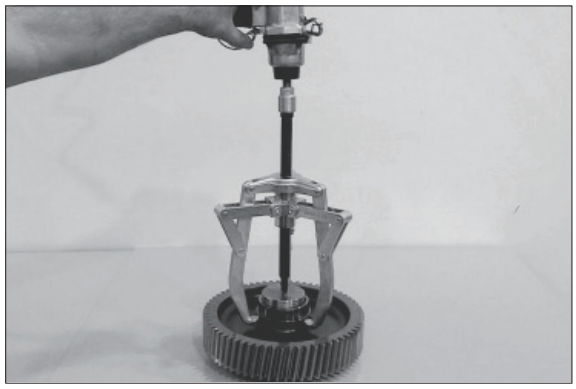


Figure 52

(8) Take the roller bearing out of the housing bore and remove the oil baffle (arrow).

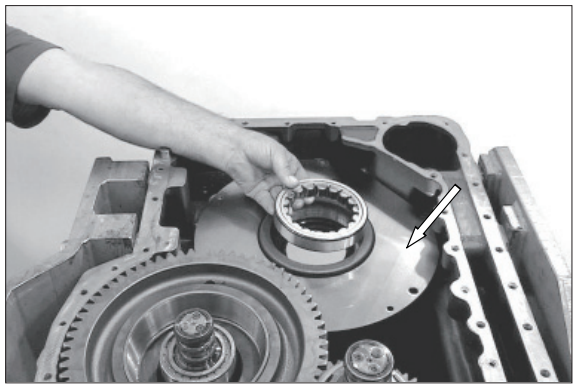


Figure 53

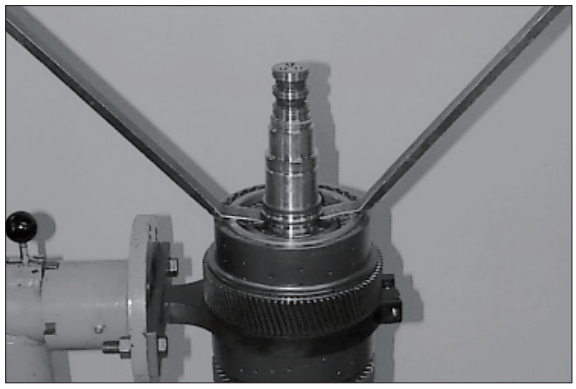


Figure 94

(8) Squeeze out the snap ring.
Remove end shim and disc set K1.

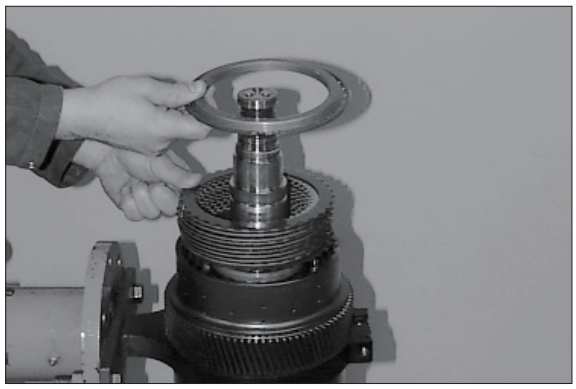


Figure 95

(9) Rotate disc carrier by 90˚.
Loosen the slotted nut.

※ Special tool

Slotted nut wrench	5870 401 118
Slotted nut wrench	5870 401 115

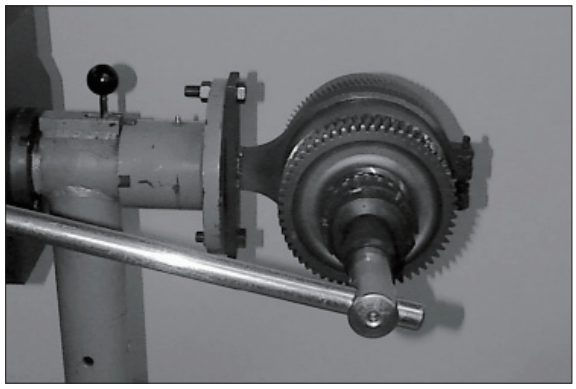


Figure 96

(10) Pull off the taper roller bearing from the disc carrier.

※ Special tool

Gripping insert	5873 001 034
Basic tool	5873 001 000

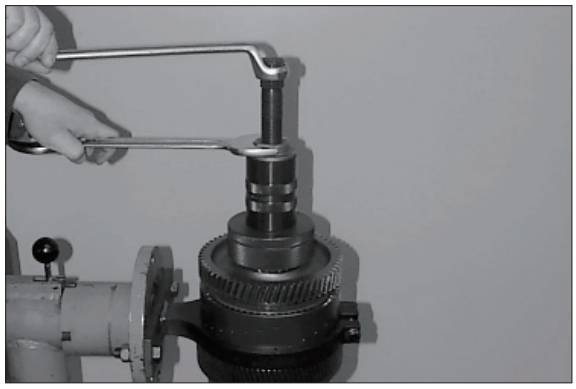


Figure 97

Disc Components K4

※ Below sketch or table shows the standard version as to the installation position of the single components. Obligatory is the respective spare parts list.

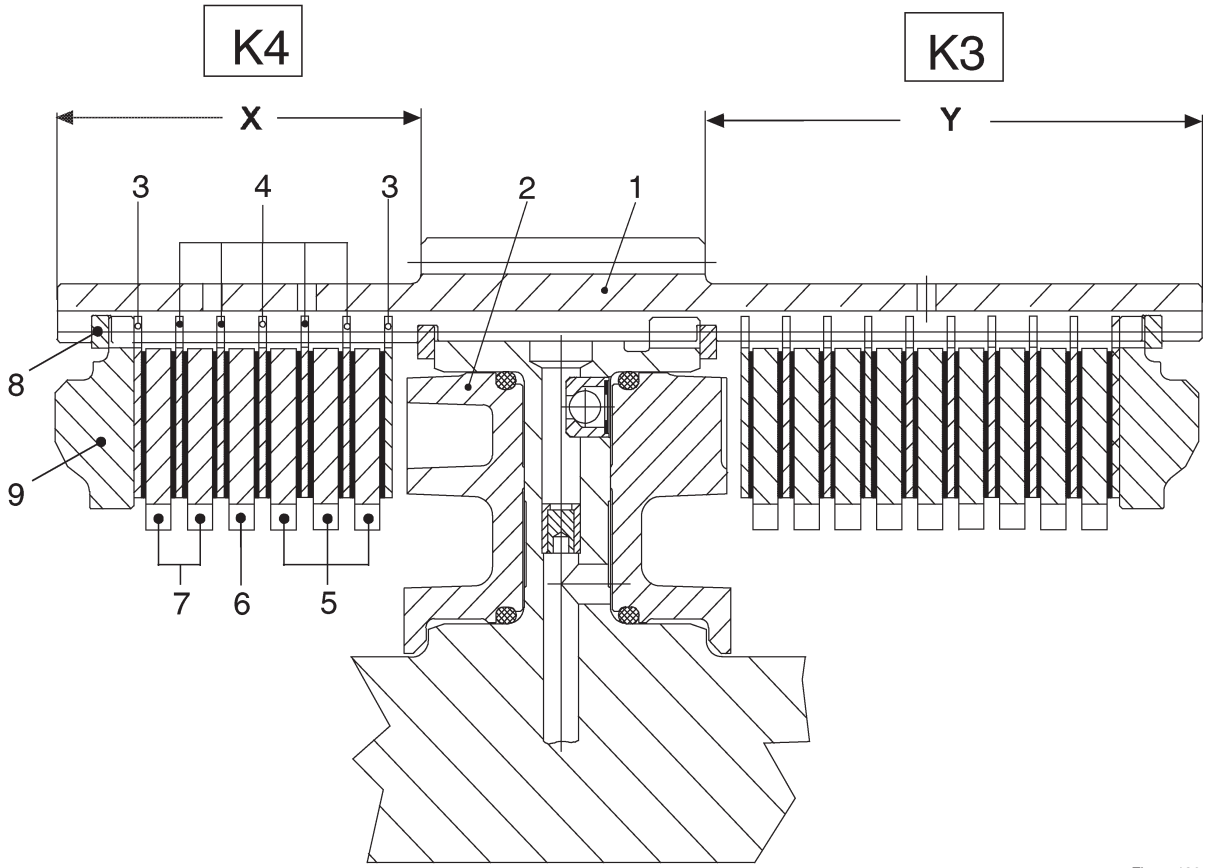


Figure 136

Position	Description	Quantity	s (mm)	Remarks
1	Disc carrier	1		
2	Piston	1		
3	Outer clutch disc	2	1.85	Coated on one side
4	Outer clutch disc	5	2.5	Coated on both sides
5	Inner clutch disc	3	3.5	
6	Inner clutch disc	1	4.0	
7	Inner clutch disc	2	2.5~4.0	Optional
8	Snap ring	1	2.10~3.10	Optional
9	End shim	1		
Number of friction surfaces : 12				
Disc clearance : 2.2 ~ 2.4 mm				

※ Install the outer clutch discs position 3 with uncoated side showing to the piston and end shim respectively. The respective clutch side can be seen on the length of the disc carrier, see sketch.

K4 Dimension X (short disc carrier side)

K3 Dimension Y (long disc carrier side)

(1) Lift the disc carrier with the KR-side showing downwards into the clamping ring and fasten it.
Then rotate disc carrier by 180˚.

⚠ **To install new disc carriers the finished bores have to be sealed with plugs. Installation position, see arrow, figure 160~161.**

※ Special tool

Clamping ring	5870 654 033
Hand mounting tool	5870 320 014
Ratchet	5870 320 018

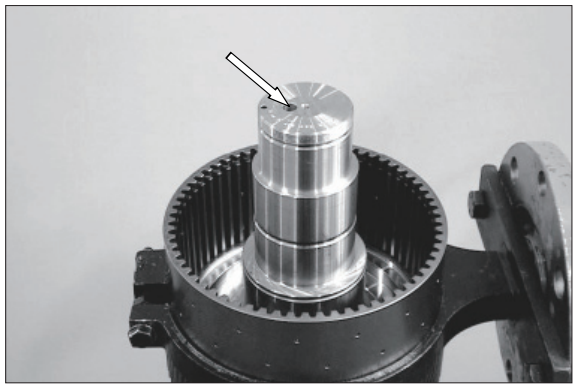


Figure 160

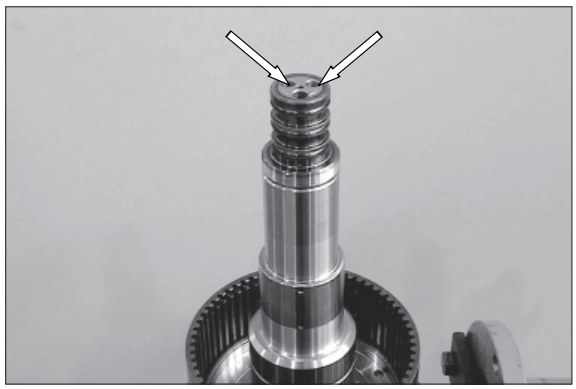


Figure 161

(2) Flush-mount the drain valve (arrow) with the chamfer showing downwards.

※ Special tool

Inserting tool	5870 320 019

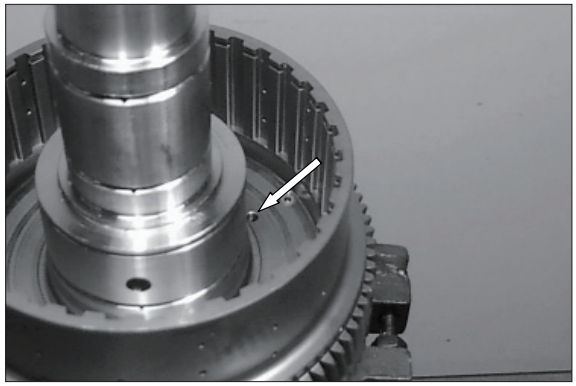


Figure 162

(3) Put both O-rings scroll-free into the annular grooves of the piston, see arrows.

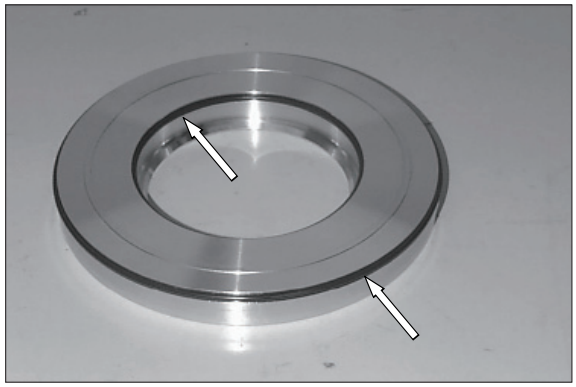


Figure 163

(8) Lift the disc carrier into the clamping ring and fasten it.
Rotate disc carrier by 90˚.
K2-side :
Install the slotted nut.

※ Observe installation position of the slotted nut. Chamfer must show to the bearing inner ring, also see sketch (Figure 159).
Oil the thread.

· Torque limit : 56.1 kgf · m (406 lbf · ft)

※ Special tool

Clamping ring	5870 654 033
Slotted nut wrench	5870 401 099

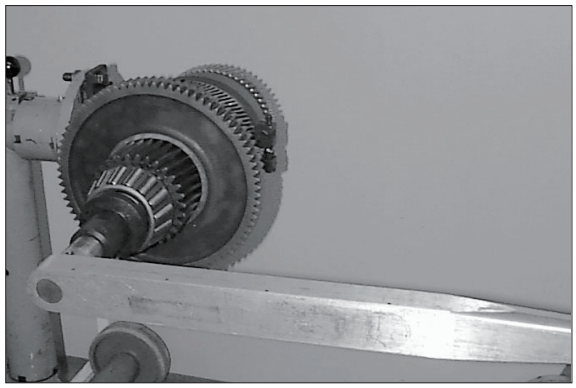


Figure 189

KR-side :
Install the slotted nut.

※ Observe installation position of the slotted nut. Collar (ø 76 mm) must show to the bearing inner ring, also see sketch/page 3-113. Oil the thread.

· Torque limit : 56.1 kgf · m (406 lbf · ft)

※ Special tool

Slotted nut wrench	5870 401 099

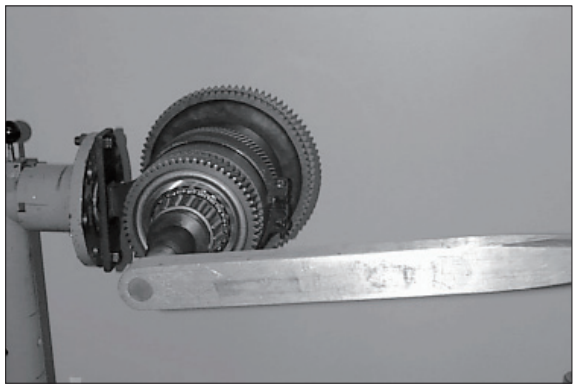


Figure 190

(9) Check function of the clutches K3 and K4 by means of compressed air (figure 191).

※ Closing or opening of the clutches is clearly audible when the single parts have been installed adequately.

Snap-in and lock the rectangular rings (3EA, see arrows).

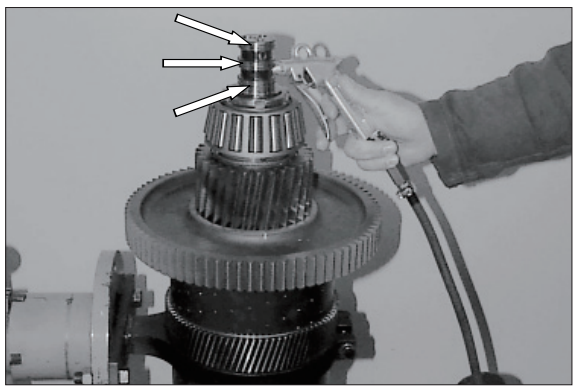


Figure 191

Preassemble and install spur gear K1 (figure 215~222) :

(1) Opposite figure shows the single components of spur gear K1.

1 Ball bearing (assy)
2 Snap ring
3 Spur gear

※ Prior to installation of the single components, align the disc set by means of the spur gear radially and center it, see figure 216.

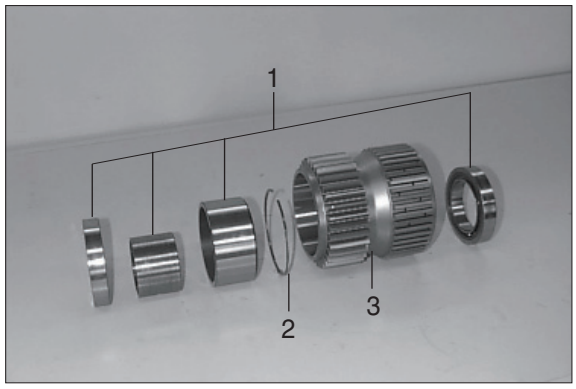


Figure 215

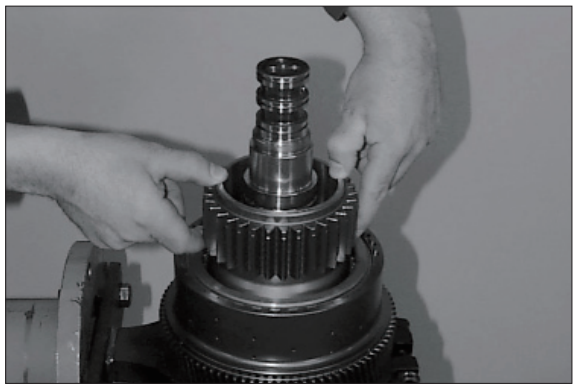


Figure 216

(2) Install the ring.

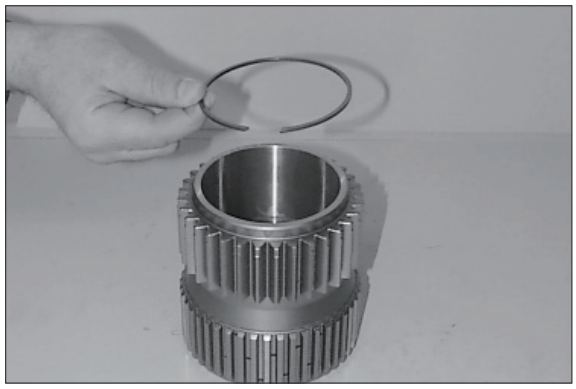


Figure 217

(3) Install the bush with collar (arrow) on face end showing to the snap ring.

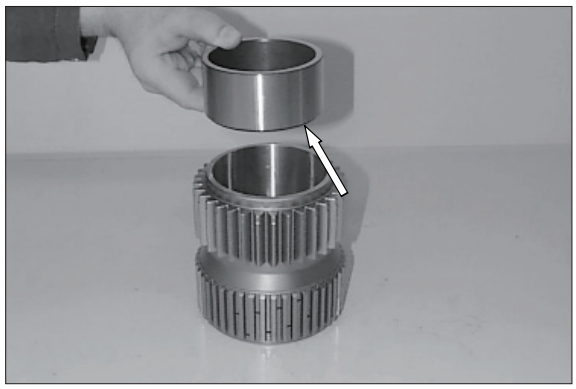


Figure 218

(5) Grease the rectangular rings (3EA, arrows) and centrally align them.

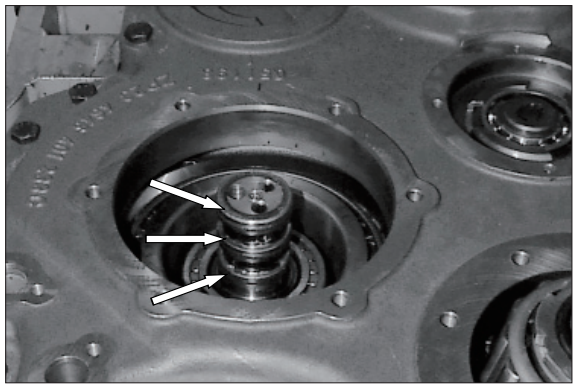


Figure 252

(6) Install the O-ring (arrow) and grease it.
Heat the inner diameter of the bearing cover (bearing seat).

※ Special tool

Hot-air blower 230V	5870 221 500
Hot-air blower 115V	5870 221 501

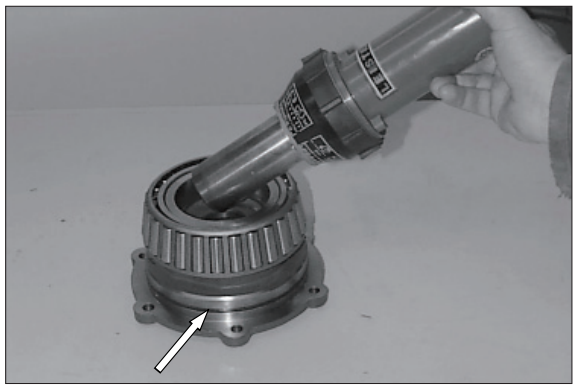


Figure 253

(7) Install two adjusting screws.
Assemble the bearing cover and tighten it equally until contact by means of hexagon screws.

· Torque limit (M10/8.8) :

※ Observe the radial installation position.

※ Special tool

Adjusting screws	5870 204 007

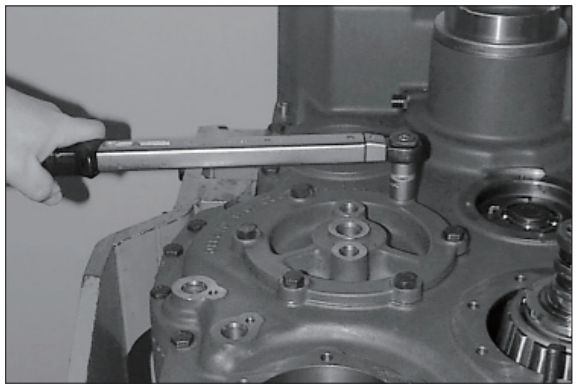


Figure 254

(8) Check the function of both clutches by means of compressed air.

※ In case of a decisive pressure loss, the possible cause might be the breakage of one or several rectangular rings (see arrow , figure 252).
Replace the rectangular rings, if required.

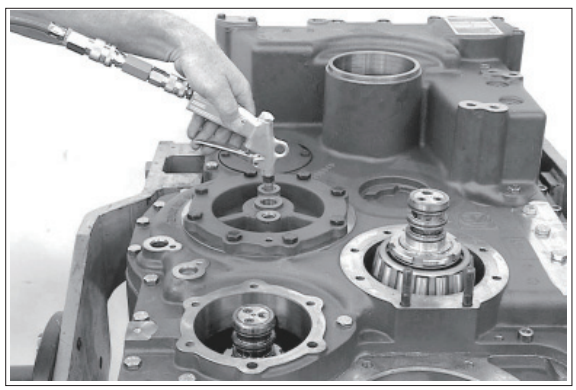


Figure 255

Adjust gap size X = 0.3~0.8 mm (figure 289~292) :

X Gap size
1 Shim
2 O-ring.

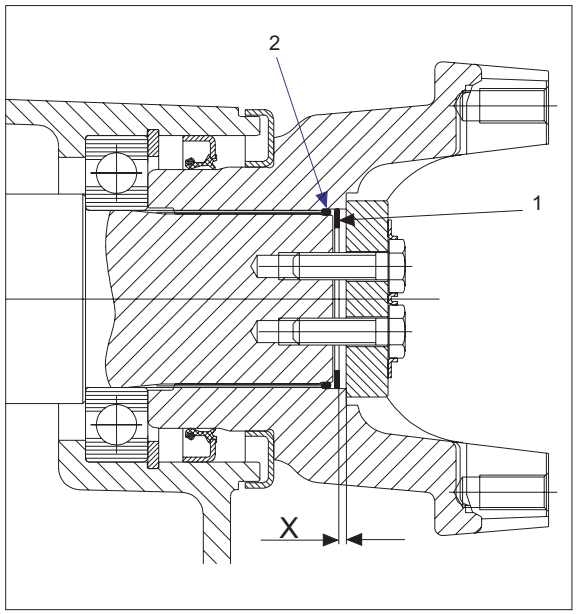


Figure 289

(1) Install the output flange until contact.

Measure Dimension I, from the plane face of the output flange to the end face of the output shaft.

Dimension I e.g ·····37.00 mm

※ Special tool
Digital depth gauge 5870 200 072

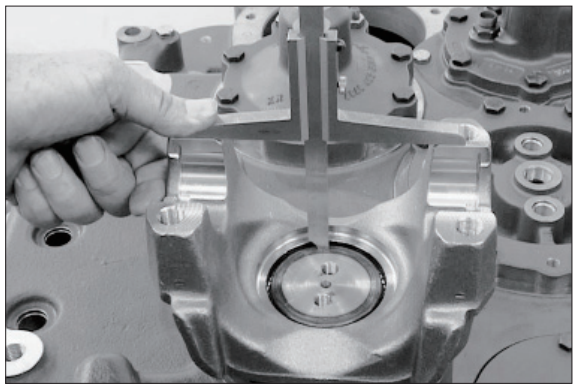


Figure 290

(2) Measure Dimension II, from the plane face to the collar of the output flange.

Dimension II e.g. ····· 36.00 mm

Example :
Dimension I ····· 37.00 mm
Dimension II ····· - 36.00 mm
Difference ····· = 1.00 mm
Gap size X ····· e.g. - 0.50 mm
(0.3~0.8 mm)
Resulting shim ····· s = 0.50 mm

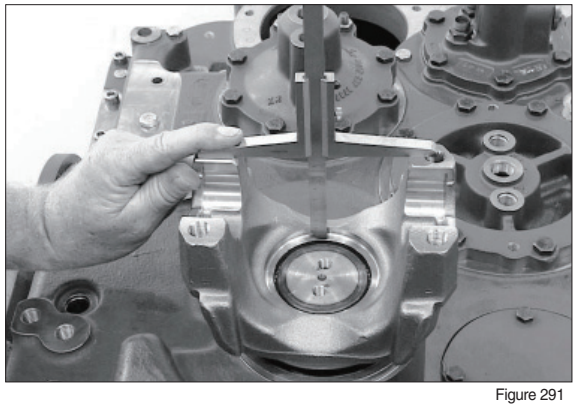


Figure 291

(15) Install the preassembled input shaft until contact.

※ Pay attention to align the key to the keyway.

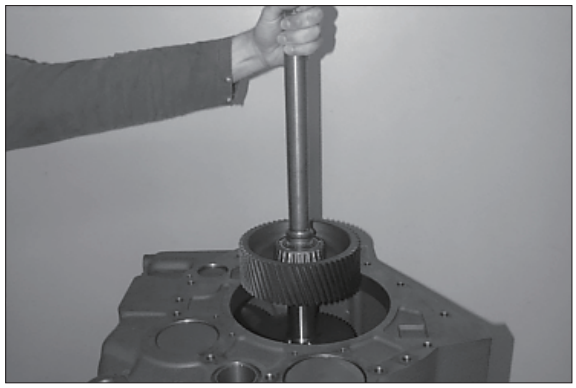


Figure 325

Adjust the axial play of the input shaft bearing = 0.0~0.05 mm (figure 326~328) :

(16) Put on the gasket.
Put on the bearing outer ring, press it on equally and determine Dim. I, from the mounting face (gasket) to the bearing outer ring.

Dim I e.g. ..... 128.50 mm

※ Take several measuring points and determine the mean value.

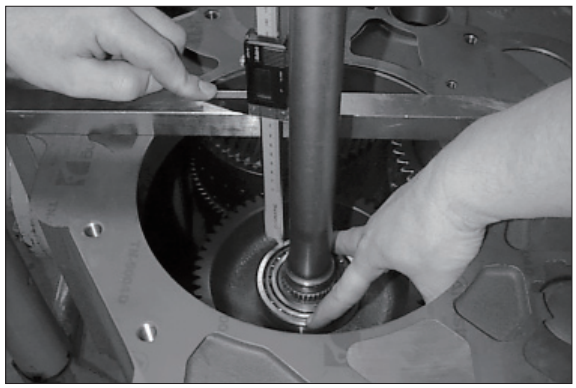


Figure 326

(17) Measure Dim II, from the mounting face/ converter bell to the mounting face/ bearing outer ring.

Dim II e.g. ..... 127.46 mm

Straightedge	5870 200 022
Gauge blocks	5870 200 080
Digital depth gauge	5870 200 072

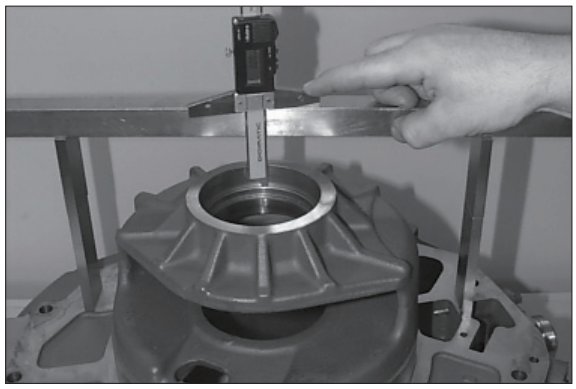


Figure 327

Example :

Dim I		128.50 mm
Dim II	-	127.46 mm
Difference	=	1.04 mm
Axial play	-	0.04 mm
resulting shim(s) s	**=**	**1.00 mm**

Put in the shim and locate the bearing inner ring until contact.

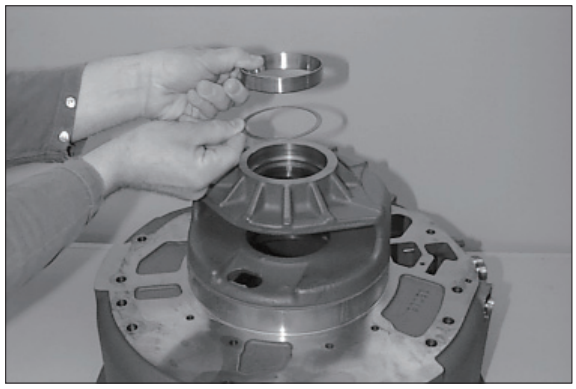


Figure 328

(5) Install the converter bell by means of lifting tackle until contact.

※ Slight rotary motions of the input shaft facilitate the installation (protect teeth from damage). Observe the radial installation position.

※ Special tool

Lifting tackle	5870 281 047
Eyebolts assortment	5870 204 002

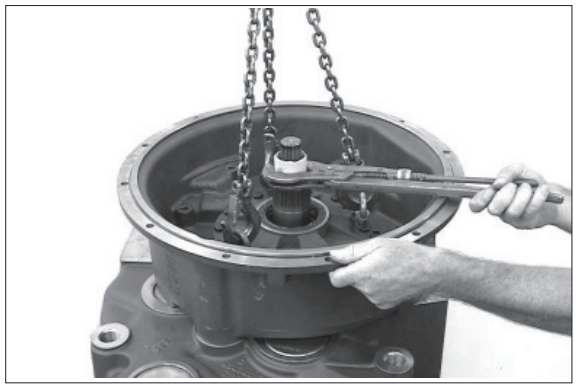


Figure 364

(6) Fasten the converter bell by means of hexagon screws.

· Torque limit (M8/10.9) :
3.47 kgf · m (25.1 lbf · ft)

· Torque limit (M12/10.9) :
11.7 kgf · m (84.8 lbf · ft)

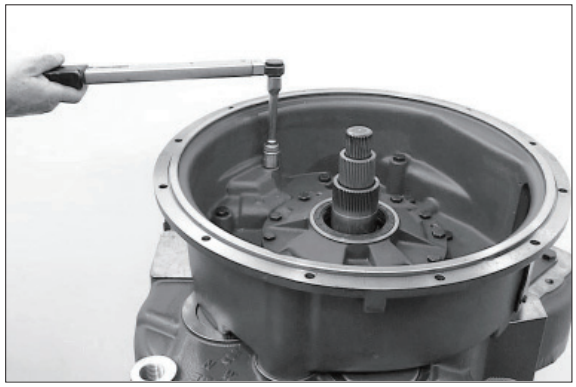


Figure 365

(7) Fasten flexible plate (3EA) by means of hexagon screws (install the washers).

※ Wet thread of the hexagon screws with Loctite (type No. 243).

· Torque limit (M10/8.8) :
4.69 kgf · m (33.9 lbf · ft)

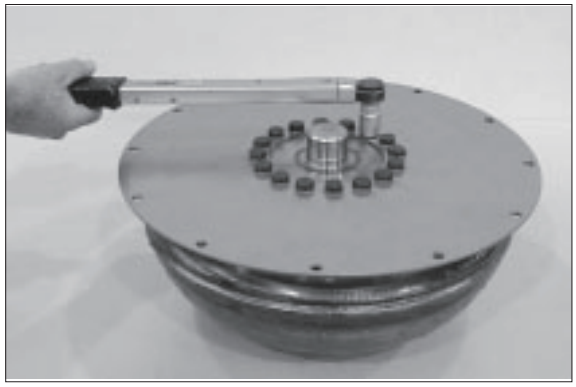


Figure 366

(8) Install the rectangular ring (arrow) into the annular groove and lock it.
Then grease the rectangular ring and centrally align it.

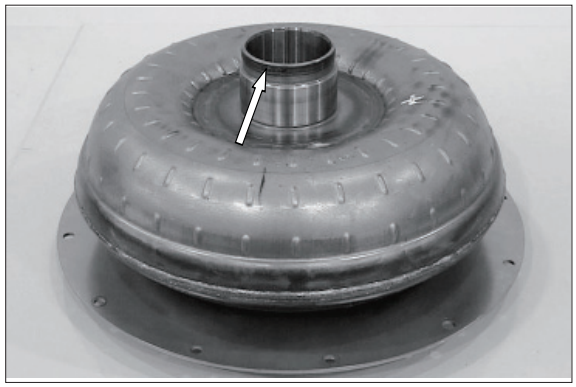
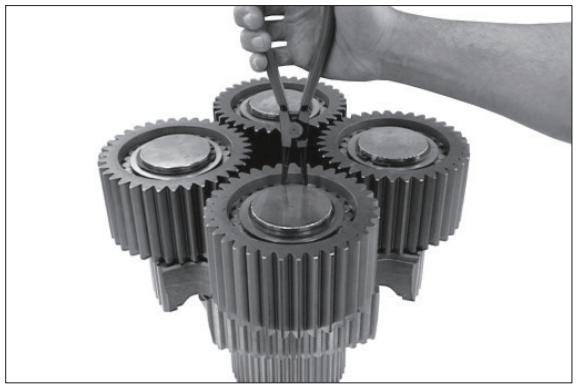


Figure 367

⑪ Disengage retaining ring.



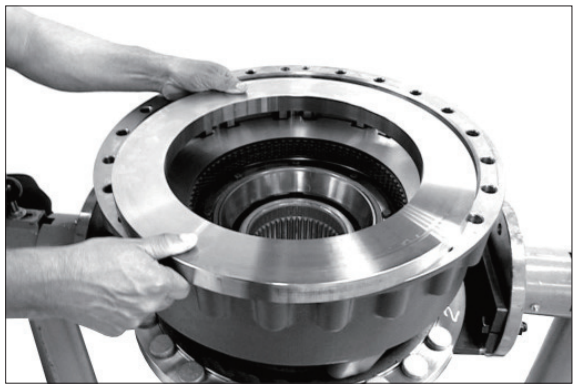
7809AX71

⑫ Pull off planetary gear.

Extractor	AA00 696 012
Clamping cylinder	5873 003 016
Pump	5870 287 010

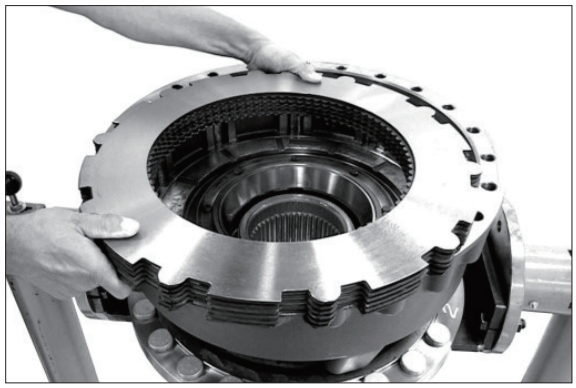
7809AX72

⑬ Lift the end plate out of the brake housing.



7809AX73

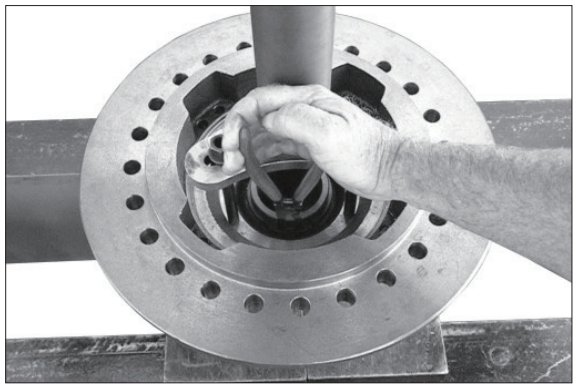
⑭ Lift the disk package out of the brake housing.



7809AX12

⑤ Preload the compression spring by means of the press and disengage the retaining ring.

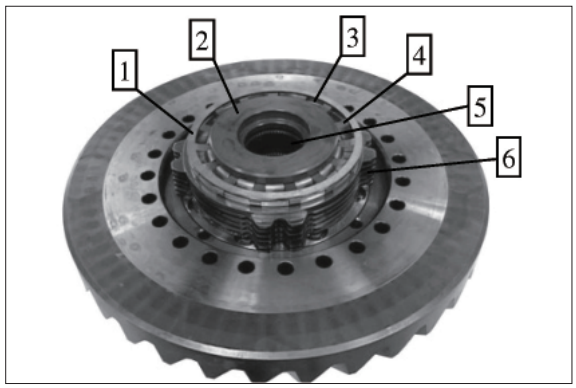
Then pull the sliding sleeve out of the differential cover and remove the releasing compression springs.



7809AX94

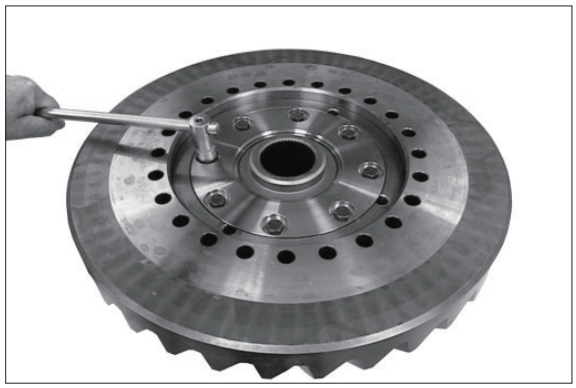
⑥ Remove single parts.

1 = Disk
2 = Pressure piece
3 = Cage
4 = Lever (15EA)
5 = Disk carrier
6 = Disk package



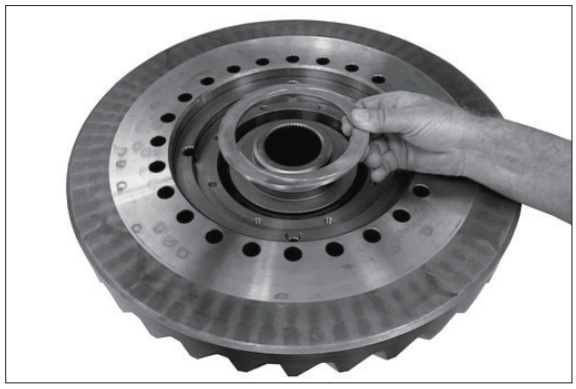
7809AX95

⑦ Loosen hexagon screws and remove the releasing disk.



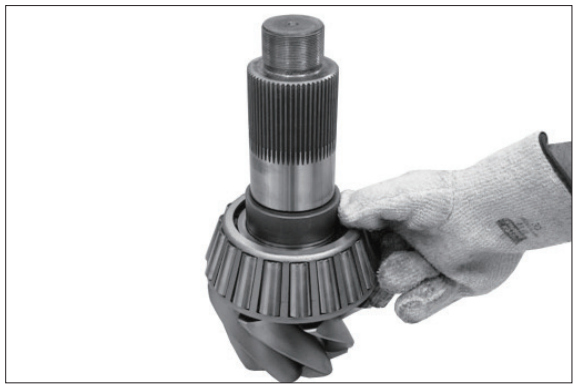
7809AX96

⑧ Remove thrust washer and axle bevel gear from the differential housing.



7809AX97

④ Heat the tapered roller bearing and insert it into the input pinion until contact is obtained.

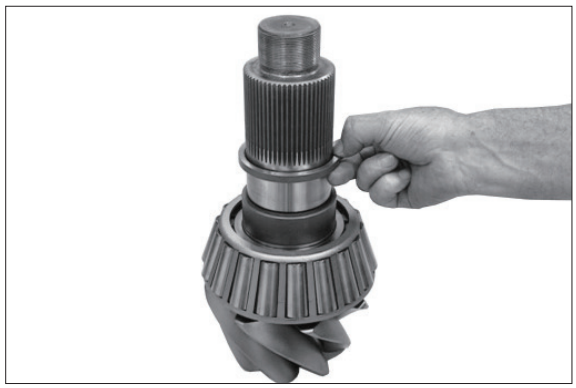


7809AX131

Setting of rolling torque of input pinion bearing 0.1~0.5 kgf·m (without shaft seal ring)

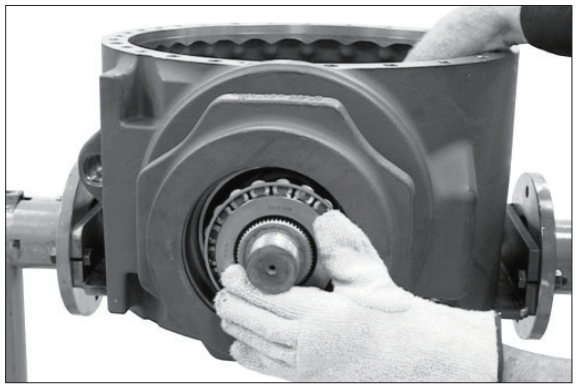
⑤ Insert spacer (e.g. s = 7.13 ㎜).

※ According to our experience the necessary rolling torque is obtained when reusing the spacer which has been removed during disassembly (e.g. s = 7.13 ㎜).
A later check of the rolling torque, however, is absolutely necessary.



7809AX132

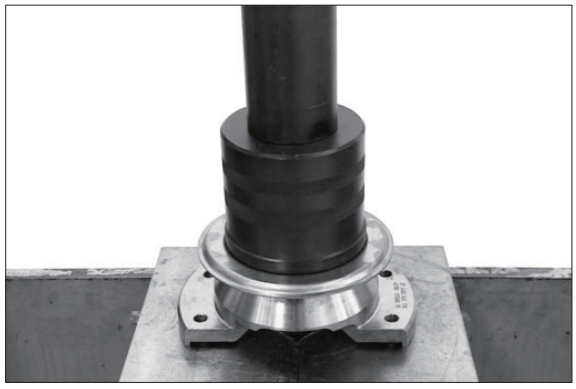
⑥ Insert the preassembled input pinion into the axle drive housing and insert the heated tapered roller bearing until contact is obtained.



7809AX133

⑦ Press the protection plate onto the input flange (see arrow) until contact is obtained.

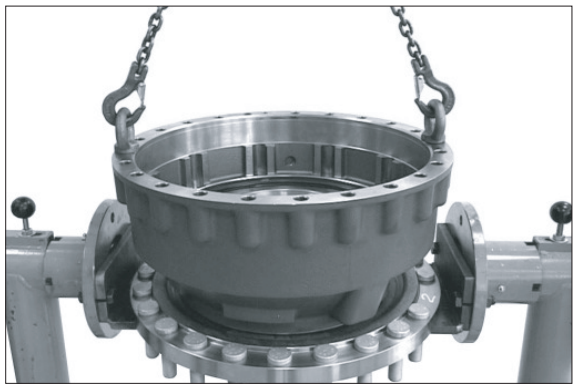
※ Do not fit the shaft seal ring until the contact pattern has been checked.



7809AX134

③ Insert the premounted brake housing by means of the lifting device over the output shaft until contact is obtained.

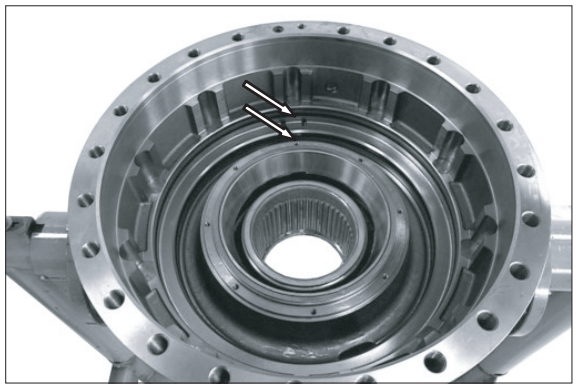
※ Before clamping the seal rings to installation dimension, clean the sliding surfaces and apply an oil film. We recommend to use a leather cloth soaked with oil.



7809AX31

④ Insert back-up rings and grooved rings into the annular grooves of the brake housing (see arrows).

※ Pay attention to the installation position; please also refer to sketch AX34, page 3-223.

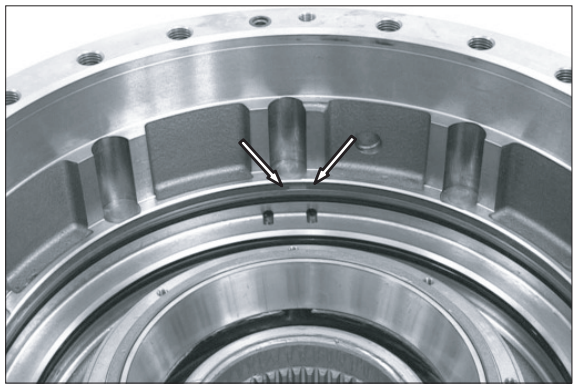


7809AX32

⑤ Clean the annular groove of the brake housing with spirit.
Then insert the guide ring into the annular groove (see also the following sketch) and fix it with loctite #415 at its extremities (see arrows).

※ The full circumference of the guide ring must be in an exact contact position.

※ Upon installation the orifice of the guide ring must show upwards (12 o'clock).



7809AX33

SECTION 4 BRAKE SYSTEM

GROUP 1 STRUCTURE AND FUNCTION

1. OUTLINE

※ The brakes are operated by a pressure compensated, closed center hydraulic system. Flow is supplied by a fixed displacement, gear type brake pump.

BRAKE SYSTEM

The fixed displacement brake pump supplies flow to the cut-off valve for service brake circuit and park brake circuits. It flows to three accumulator. The accumulator has a gas precharge and an inlet check valve to maintain a pressurized volume of oil for reserve brake applications.

Oil through the accumulator flows to the brake valves. The brake valve is a closed center design, dual circuit operated by a pedal.

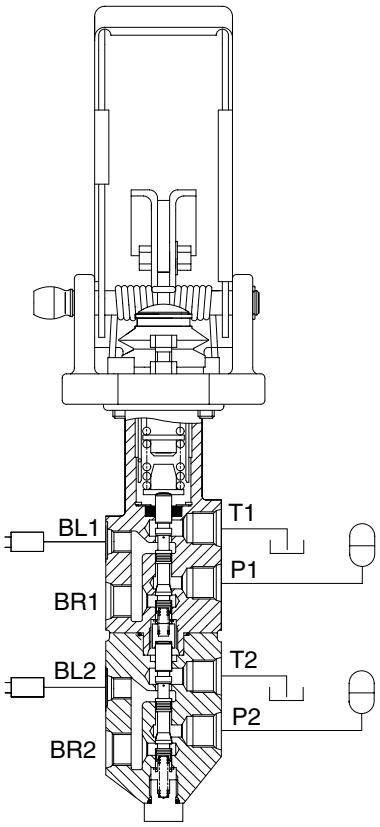
The front and rear brakes will operate simultaneously with only one brake pedal depressed.

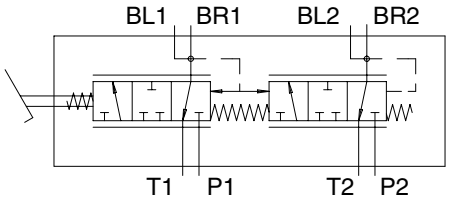
The differential contains annular brake piston and double sided disk.

Brake pump flow also goes to the parking brake solenoid valve in cut-off valve.
The brake system contains the following components:

- Brake pump
- Parking brake solenoid valve in cut-off valve
- Cut-off valve
- Brake valve
- Accumulators
- Pressure switches

2) OPERATION





Hydraulic circuit

Port	Port name	Port size
P1, P2	Pressure port	PF 3/8
T1, T2	Return port	PF 3/8
BR1, BR2	Brake cylinder port	PF 3/8
BL1, BL2	Pressure switch port	PF 1/4

7607B4BS08

· Brake pressure specification : 80 ± 5 bar (1160 ± 70 psi)

(2) Basic setting regulation

① Turn the adjusting screw manually clockwise until both brake pads make contact with the brake disk. Then it is not longer possible to turn the adjusting screw without exerting a major amount of force.

② Turn the adjusting screw anticlockwise in order to set the following rated clearances.

Adjusting screw	Clearance (mm)		Turns
M20 (SW 10)	Min.	1.0	1/4
	Clearance	2.0	1/2
	Max.	3.0	3/4

③ Hold the adjusting screw in position with a hexagonal socket wrench and lock with lock nut.

④ Mount the screw cap and tighten as far as possible manually.

⑤ Mount the pressure connection in accordance with the instructions of the axle.

※ For bleeding the piston chamber use the socket spanner size 13 for the bleeding valve.

(3) Adjusting regulations

During this adjusting process, the parking brake must be released, i.e. the bank of cup springs must be completely pre-tensioned.

① Stand the vehicle on an even surface and secure against rolling away.

② Release the parking brake by using the required release pressure.

③ Release the screw cap and unscrew.

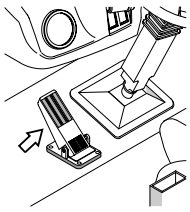
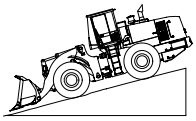
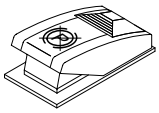
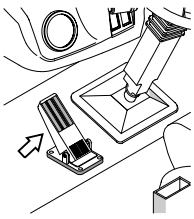
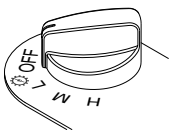
④ Release the lock nut (size 24 or 30) and turn the adjusting screw with socket wrench size 8 or 10 manually clockwise until the two brake pads make contact with the brake disk.

⑤ Turn the adjusting screw anti-clockwise and set the clearance specified in the above table.

⑥ Hold the adjusting screw in position with the hexagonal socket wrench and lock with the lock nut.

⑦ Mount the screw cap and tighten as far as possible manually.

※ Actuate the brake valve several times and check the braking efficiency of the parking brake on a slope.

Item	Description	Service action
Service brake pedal check	 Slowly depress brake pedal. Listen for a hissing noise that indicates oil is flowing to brake pistons. **LISTEN/FEEL** : A hissing noise must be heard when pedal is depressed.	**OK** Check completed. **NOT OK** Inspect for debris under brake pedal.
Service and parking brake system drag checks Engine running	 Position machine on gradual slope. Lower bucket approximately 50 mm (2 in) from ground. Release parking and service brakes.  **LOOK** : Machine must move or coast. **NOTE** : If machine does not move, check brake pedals to be sure they fully release when feet are removed from pedals. Drive machine at high speed for about 5 minutes. Brake drag is indicated if brake areas in differential case are hot. **NOTE** : Observe parking brake. If disk is hot, parking brake drag is indicated.	**OK** Check completed. **NOT OK** Adjust park brake. **NOT OK** Check floor mat interference to pedal or debris build-up. **IF OK** Check for brake pressure when brake is released. Go to brake pressure test.
Clutch cut-off check	 Place clutch cut-off mode switch in L position. Release parking brake. Run engine at half speed in 1st forward. Firmly depress brake pedal.  **FEEL** : Transmission must disengage when brake pedal is depressed at 30% of pedal stroke. **NOTE** : Clutch cut-off mode switch can be selected to operator preference to match your loading needs.	**OK** Check completed. **NOT OK** Adjust clutch cut-off switch.

SECTION 5 STEERING SYSTEM

GROUP 1 STRUCTURE AND FUNCTION

1. OUTLINE

The steering system of this machine consists of a variable displacement piston pump supplying a load sensing steering system and a closed center loader system.
This system offers faster response from the priority valve of flow amplifier and the pump. Also if offers advantages in connection with cold start up and improvements in system stability.

The components of the steering system are :

- Steering pump
- Flow amplifier
- Steering unit
- Steering cylinders

The flow amplifier contain a directional valve, an amplification stage, a priority valve, a pilot pressure relief valve and shock and suction valve.
The steering pump draws hydraulic oil from the hydraulic tank.
Outlet flow from the pump flows to the priority valve of flow amplifier. The priority valve of flow amplifier preferentially supplies flow, on demand, to the steering unit. When the machine is steered, the steering unit routes flow to the steering cylinders to articulate the machine.

When the machine is not being steered, or if pump flow is greater than steering flow, the priority valve supplies flow to the loader system.

That is, output flow from the steering pump enters into the main control valve for the operation of the attachment.

In neutral position, the oil passes from the pump across the integrated priority valve (9B) in the flow amplifier for discharge through the EF port. With the steering unit in neutral, flow through it is blocked and all flow through the priority valve (9B) in flow amplifier is directed out the EF port to the loader control valve.

With the engine off, the priority valve spool (9B) is pushed to the left by the spring (30). The passage to the EF port is blocked while the passage to the P port is open.

When the machine is first started, all pump flow is routed to the steering unit which blocks the flow. With the flow blocked, the pressure increases.
Steering inlet pressure is supplied through the dynamic orifice (42) in the spool. This causes the priority valve spool (9B) to shift to the right against the spring (30) and open the EF port.
As long as the steering unit is in neutral, just enough pressure is maintained at the steering unit to keep the priority valve spool (9B) shifted to the right.

The operating pressure in the loader system has no effect on the operation of the priority valve (9B) of flow amplifier. With the loader actuated in relief, the priority valve (9B) will not shift until the machine is steered.

Flow through the priority valve spool (9B) passes from the P port through the orifice (42) and into the LS port. It flows through the steering unit LS passage which is routed to return when the steering unit is in neutral. This provides a warm-up circuit for the steering unit to prevent binding of the steering unit due to oil temperature extremes.

In neutral position, also the directional valve (9C) is in its center position.
This means that knock and impacts from the cylinder are not transmitted to the steering unit. The flow amplifier is thus of the non-reaction type.

Problem	Cause	Remedy
Slow or hard steering	Too much friction in the mechanical parts of the machine.	Lubricate bearings and joints of steering column or repair if necessary. Check steering column installation.
	Cold oil.	Warm the hydraulic oil.
	Low priority valve pressure setting.	Do priority valve pressure test. Clean or replace cartridge in flow amplifier.
	Worn hydraulic pump.	Do hydraulic pump performance check .
	Sticking priority valve spool.	Remove and inspect.
	Broken priority valve spring.	Remove and inspect.
Constant steering to maintain straight travel	Air in system.	Check for foamy oil.
	Leakage in steering system.	Do steering system leakage check.
	Worn steering unit.	Do steering system leakage check. Do steering unit neutral leakage test in group 3.
	Leaf spring without spring force or broken.	Replace leaf springs.
	Spring in double shock valve broken.	Replace shock valve.
	Gear wheel set worn.	Replace gear wheel set.
	Cylinder seized or piston seals worn.	Replace defects parts.
Slow steering wheel movement will not cause any frame movement	Leakage in steering unit gerotor.	Do steering system leakage check.
	Worn steering unit gerotor.	Do steering leakage check.
Steering wheel can be turned with frames against steering stop	Leakage in steering system.	Do steering system leakage check.
Steering wheel turns with no resistance and causes no frame movement	Broken steering column or splined coupling.	Remove and inspect.
	Lack of oil in steering unit.	Start engine and check steering operation.
	Leakage in steering system.	Do steering system leakage test in group 3.

5. FLOW AMPLIFIER PRESSURE TEST

· **SPECIFICATION**

Oil temperature 45±5˚C (113±9˚F)
Engine speed High idle
Oil pressure 20.1~21.1 MPa
(205~215 bar, 2900~3100 psi)

· **GAUGE AND TOOL**

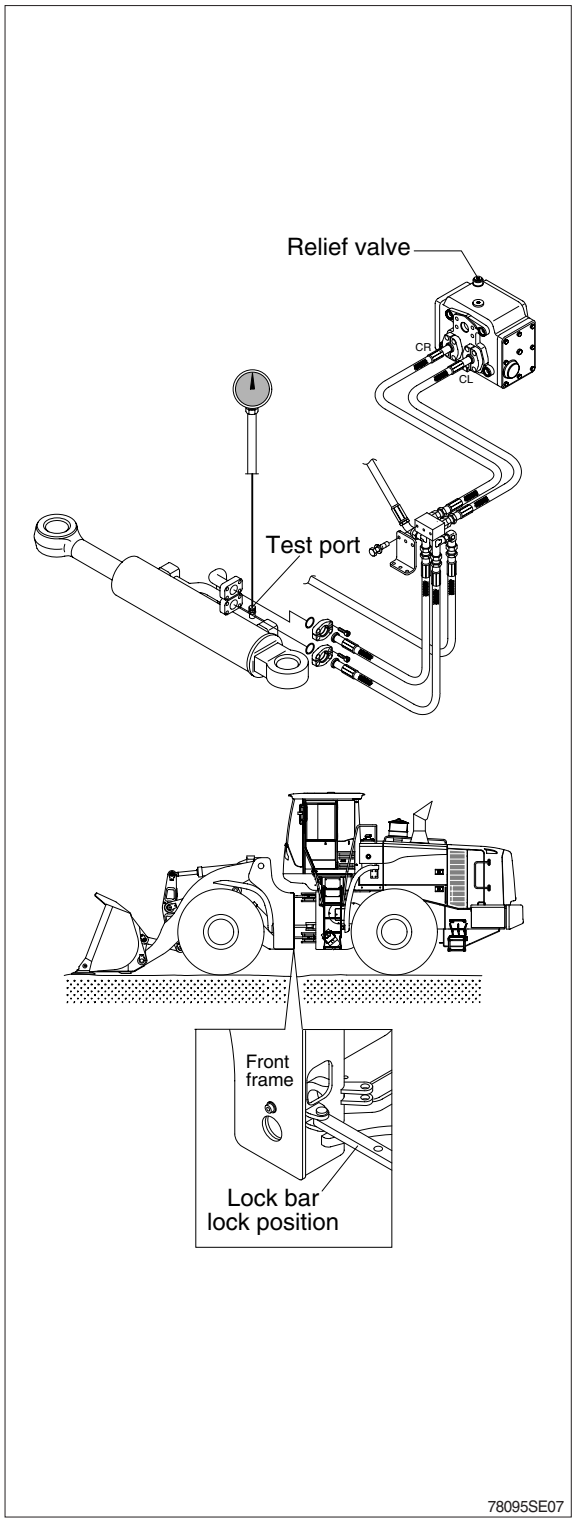
Gauge 0~35 MPa (0~350 bar, 0~5000 psi)
Temperature reader

1) Connect gauge to test port.
2) Install temperature reader (see installation procedure in this group).
3) Install frame locking bar.
4) Heat hydraulic oil to specifications (see hydraulic oil warm up procedure at page 6-45).
5) Run engine at specifications and turn steering wheel rapidly hold approximately 22N (5lb force) pressure on wheel with frames locked.

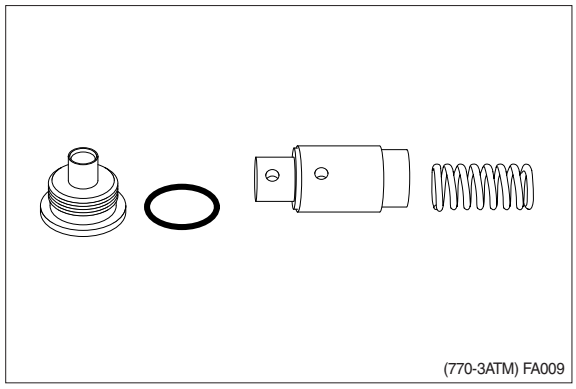
※ If steering wheel is turned slowly, it will continue to with the frames locked.
This will give an incorrect pressure reading.
If steering wheel continues to turn rapidly with the frames locked, steering system leakage is indicated.

6) Read pressure gauge. This is the flow amplifier relief pressure.
7) If pressure in not to specification, turn adjusting screw in relief cartridge using a hex head wrench to adjust pressure.

If pressure cannot be adjusted to specification, disassemble and inspect flow amplifier.

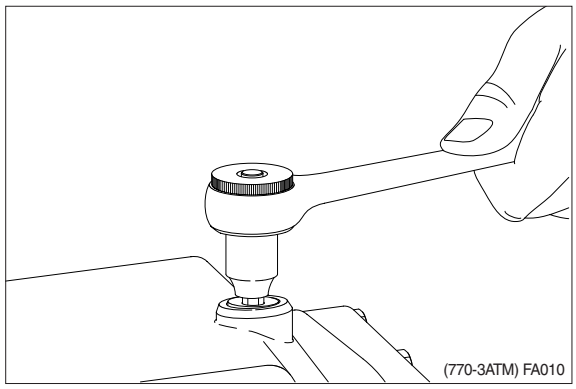


⑦ Counter pressure valve with orifice shown disassembled.

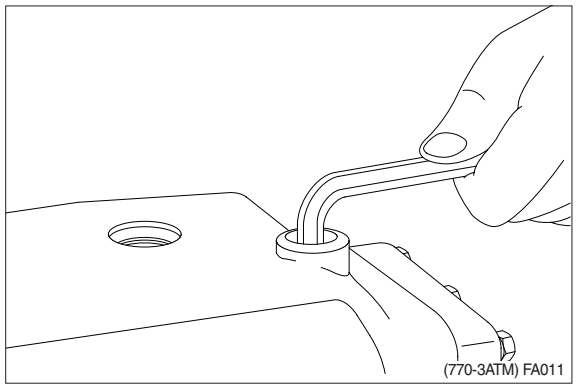


(2) Removing pressure relief valve

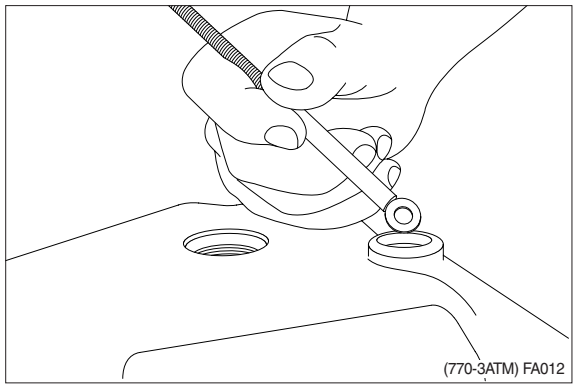
① Unscrew plug with washer (hexagon socket for 8 mm internal hexagon).



② Screw pressure relief valve out (10 mm hexagon key).

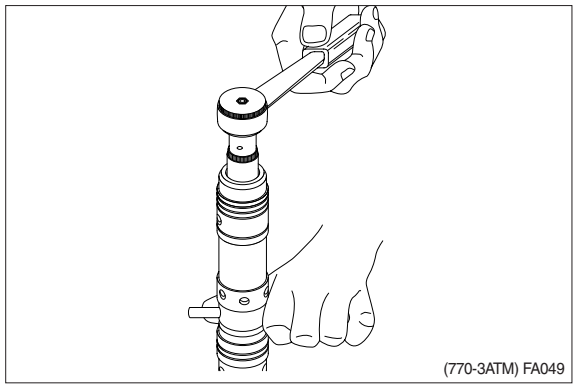


③ Take out washer (magnetic rod).

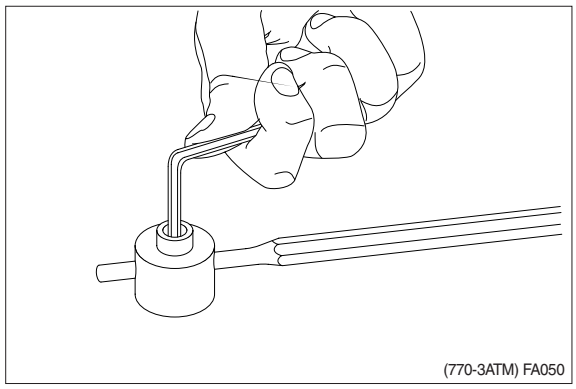


⑨ Unscrew check valve with hexagon socket for 17 mm external hexagon and mandrel in the pin hole.

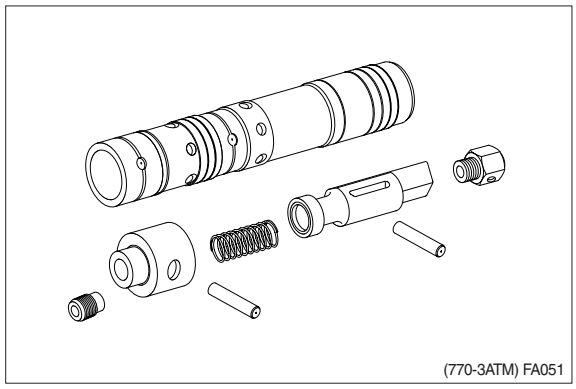
※ Avoid damaging the spool surface.


(770-3ATM) FA049

⑩ Unscrew orifice out of plug with 4 mm hexagon key. Use a mandrel.

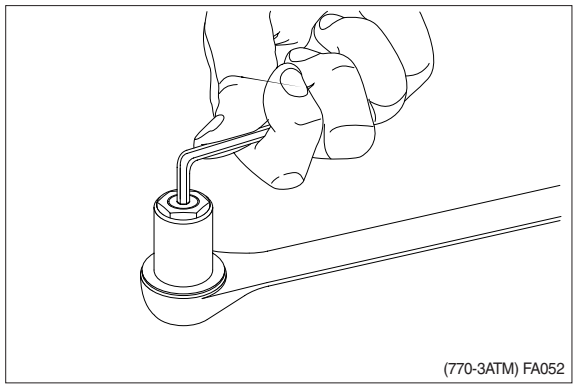

(770-3ATM) FA050

⑪ Amplifier spool shown disassembled.

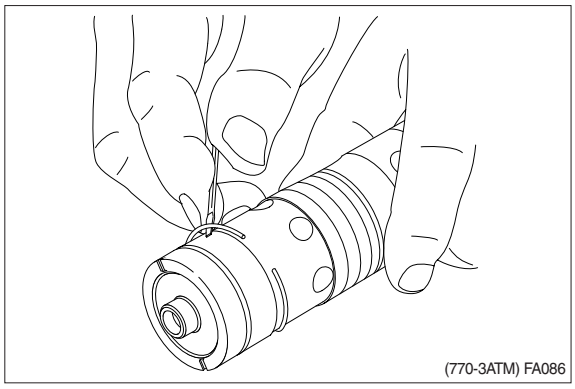

(770-3ATM) FA051

(13) Disassembly of check valve

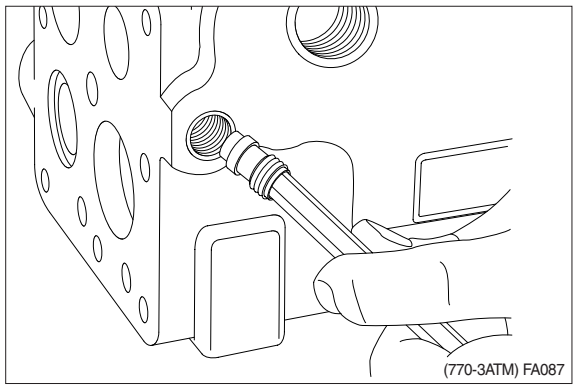
① Unscrew plug with 4 mm hexagon key and hexagon socket for 17 mm external hexagon.


(770-3ATM) FA052

② Fit orifice in LS - connection.
· Tightening torque : 1±0.3 kgf · m
(7.2±2.2 lbf · ft)



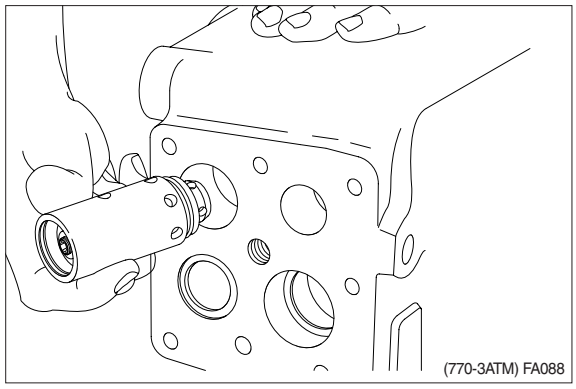
③ Fit throttle check valve in PP - connection.
· Tightening torque : 1±0.3 kgf · m
(7.2±2.2 lbf · ft)



※ Comments on flow amplifiers with internal PP :
1. 1/4 BSP. F in PP - connection.
Fit washer and plug.
· Tightening torque : 4.1±0.3 kgf · m
(29.7±2.2 lbf · ft)
2. 7/16 - 20 UNF in PP - connection.
Fit O-ring and plug.
· Tightening torque : 1.5±0.5 kgf · m
(10.8±3.6 lbf · ft)

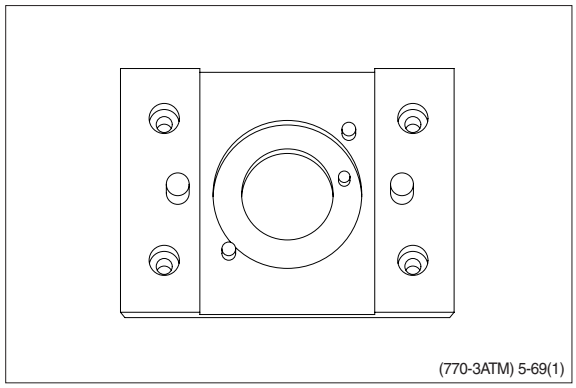
(7) Installation of shock valves

① Guide shock valve in and secure it by hand.
Remember O-ring.



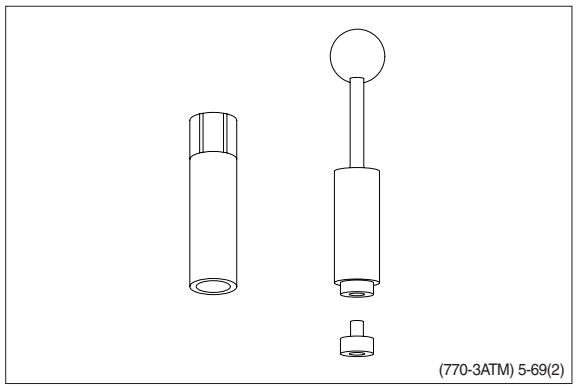
2) TOOLS

(1) Holding tool.



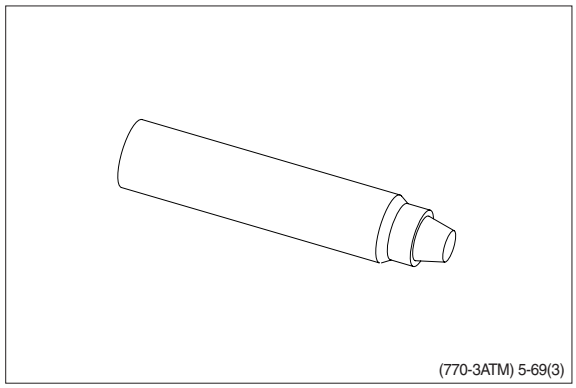
(770-3ATM) 5-69(1)

(2) Assembly tool for O-ring and kin-ring.



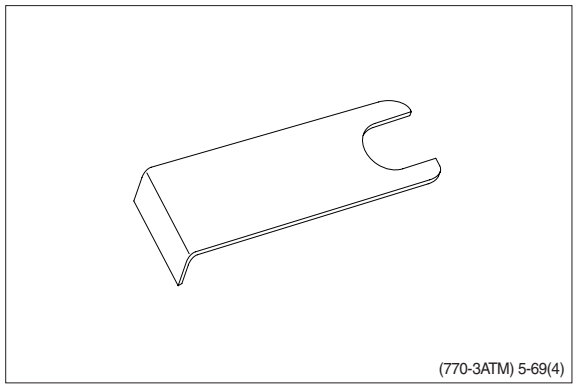
(770-3ATM) 5-69(2)

(3) Assembly tool for lip seal.



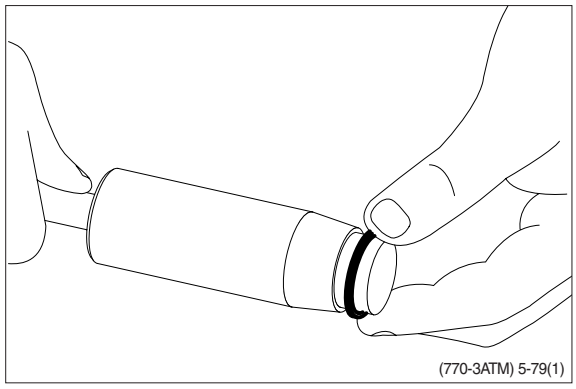
(770-3ATM) 5-69(3)

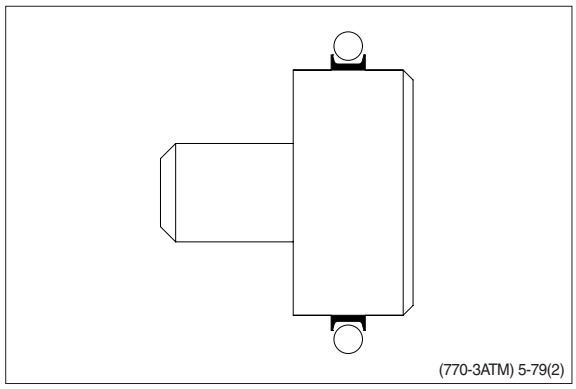
(4) Assembly tool for cardan shaft.



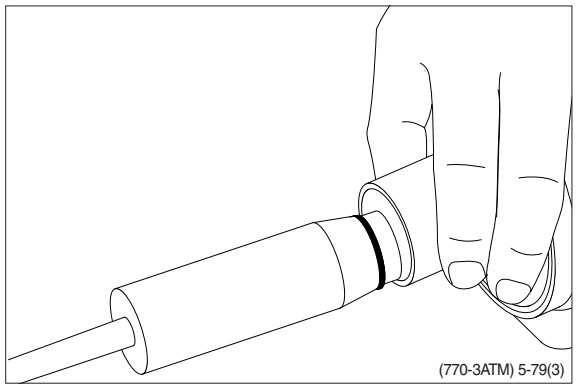
(770-3ATM) 5-69(4)

(11) Grease O-ring with hydraulic oil and place them on the tool.

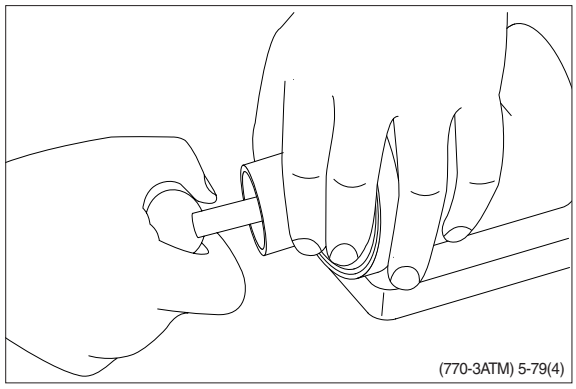

(770-3ATM) 5-79(1)


(770-3ATM) 5-79(2)

(12) Hold the outer part of the assembly tool in the bottom of the steering unit housing and guide the inner part of the tool right to the bottom.

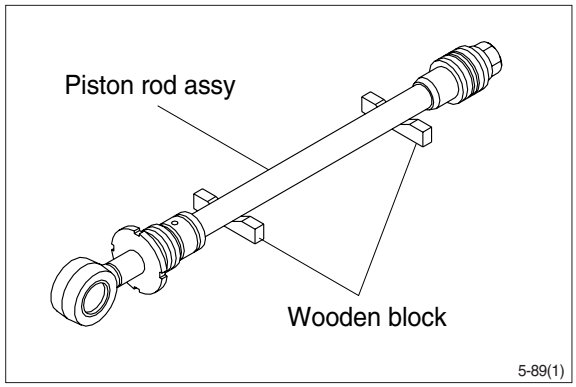

(770-3ATM) 5-79(3)

(13) Press and turn the O-ring into position in the housing.


(770-3ATM) 5-79(4)

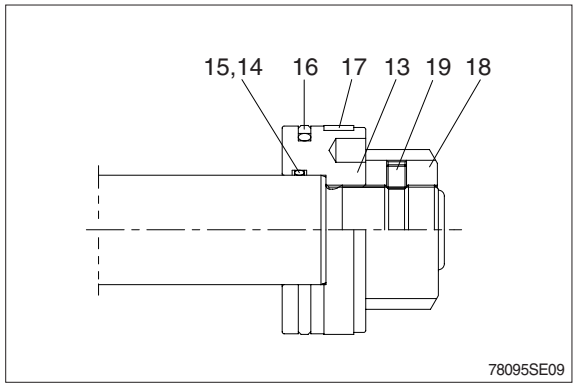
※ Note that the plated surface of piston rod (2) is to be lifted. For this reason, do not use a wire sling and others that may damage it, but use a strong cloth belt or a rope.

⑤ Place the removed piston rod assembly on a wooden V-block that is set level.
※ Cover a V-block with soft rag.

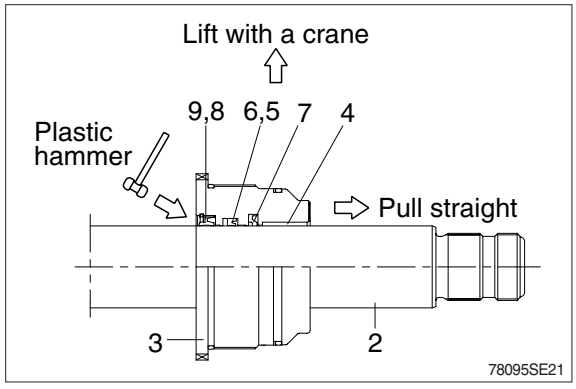


(2) Remove piston and gland assembly

① Remove the set screw (19).
② Remove the piston nut (18).
③ Remove piston assembly (13), back up ring (15) and O-ring (14).

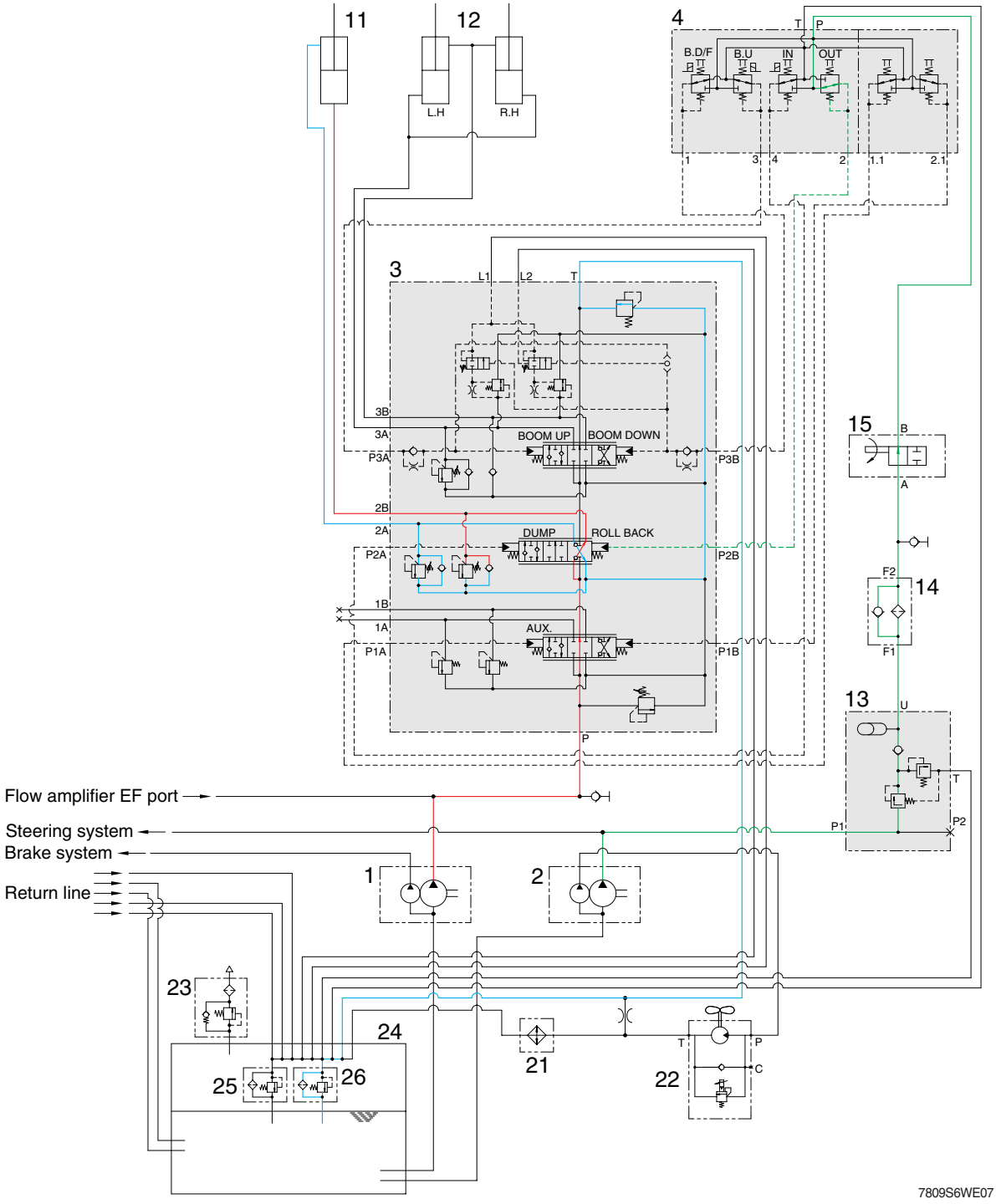


③ Remove the gland (3) assembly from piston rod (2).
※ If it is too heavy to move, move it by striking the flanged part of gland (3) with a plastic hammer.
※ Pull it straight with gland assembly lifted with a crane.
Exercise care so as not to damage the lip of rod bushing (4) and packing (5,6,7,8,9) by the threads of piston rod (2).



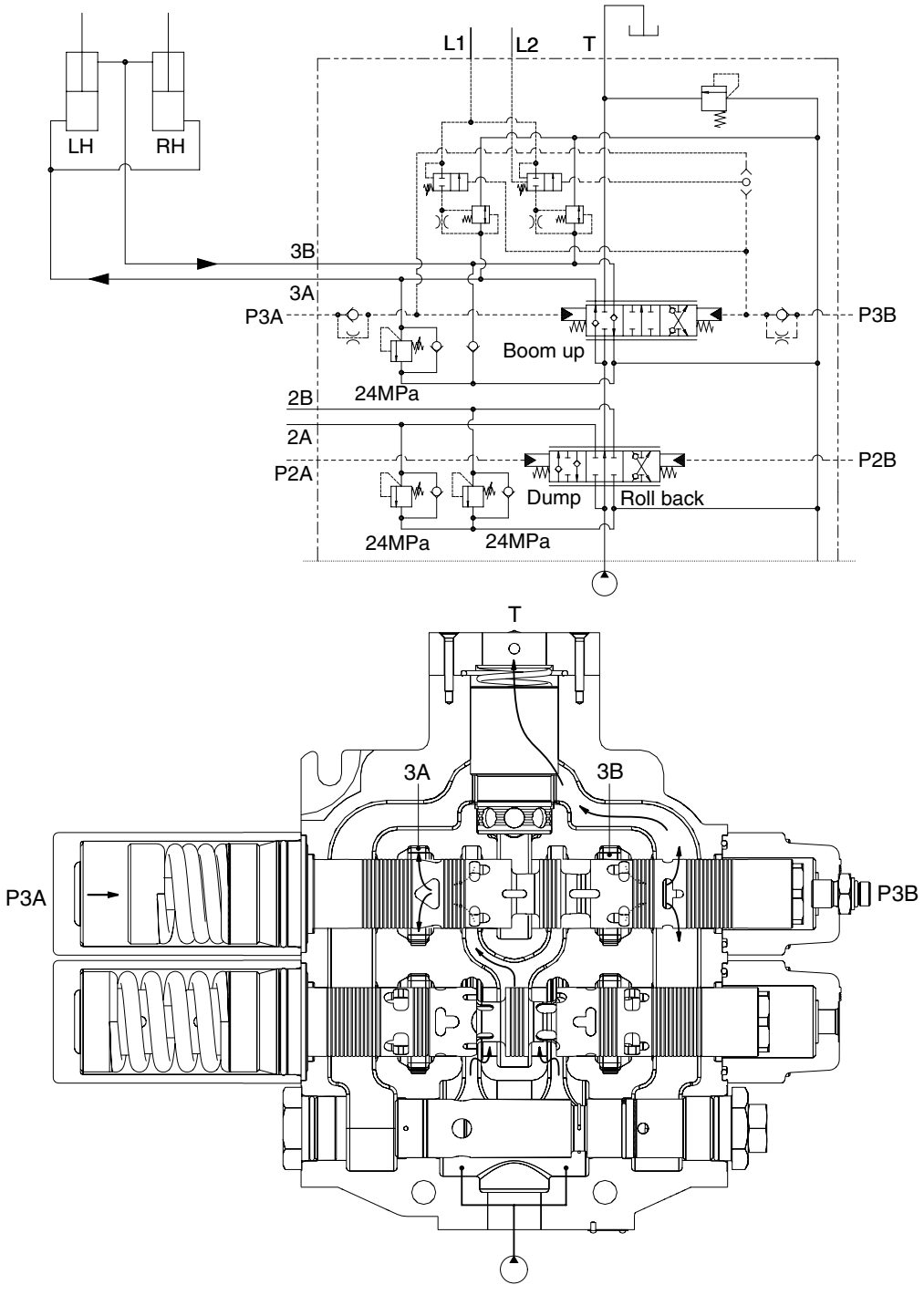
SECTION 6 WORK EQUIPMENT

5) WHEN THE RCV LEVER IS IN THE ROLL BACK (retract) POSITION



- If the RCV lever (4) is pulled left, the bucket spool is moved to roll back position by pilot oil pressure from port 4 of RCV.
- The oil from main pump (1) flows into main control valve (3) and then goes to the large chamber of bucket cylinder by pushing the load check valve of the bucket spool.
- The oil at the chamber of bucket cylinder (11) returns to hydraulic tank (24) through the bucket spool.
- When this happens, the bucket roll back.
- When the rolling speed of bucket is faster, the return oil from the small chamber of bucket cylinder combines with the oil from the pump, and flows into the large chamber of the cylinder.
  This prevents cylinder cavitation by the negative pressure when the pump flow cannot match the bucket rolling speed.

(2) Boom raise position



When the pilot pressure from remote control valve is supplied to the pilot port (P3A), the spool moves to the right and the neutral passage is closed.

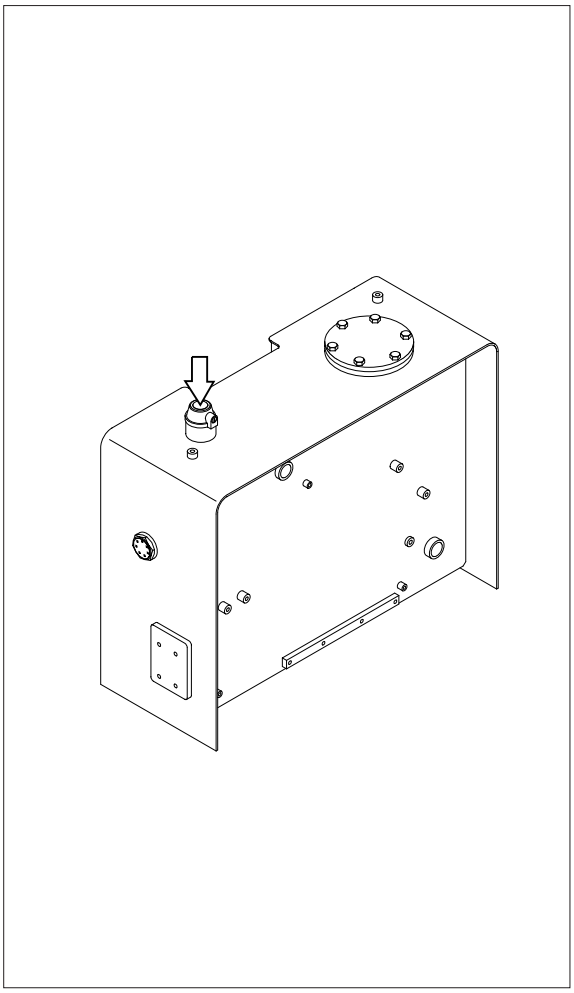
The oil supplied from the pump flow into boom cylinder port (3A).

The pump pressure reaches proportionally the load of cylinder and fine control finished by shut off of the neutral passage.

The return oil from cylinder port (3B) flows into the tank via the low pressure passage.

3) AIR BREATHER

The air breather is equipped with the capacity to perform three functions simultaneously-as an air filter, breathing valve, and as a lubrication opening.



(1) Preventing negative pressure inside the tank

The tank is a pressurized sealed type, so negative pressure is formed inside the hydraulic tank when the oil level drops during operations. When this happens, the difference in pressure between the tank and the outside atmospheric pressure opens the poppet in the breather, and air from the outside is let into the tank or prevent negative pressure.

(2) Preventing excessive pressure inside the tank

When the hydraulic cylinder is being used, the oil level in the hydraulic system increases and as temperature rises. If the hydraulic pressure rises above the set pressure, breather is actuated to release the hydraulic pressure inside the tank.

Problem	Cause	Remedy
Function drifts down	Leaking cylinders.	Do cylinder leakage checks in group 3.
	Leaking seals in circuit relief valve (port relief valve) or valve stuck open.	Inspect seals. Replace relief valve.
	Leaking loader control valve (MCV).	Repair or replace valve section.
Boom drifts up	Leakage in boom down spool.	Remove and inspect boom down spool.
Boom down does not work (engine off)	Safety valve not operated.	Operate valve.
	Stuck pilot control valve.	Inspect.
	Faulty line filter.	Remove and inspect filter.
	Accumulation not operated.	Inspect.
	MCV spool stuck.	Inspect and repair valve.
Oil overheats	Low oil viscosity in hot weather.	Use recommended oil.
	Excessive load.	Reduce load.
	Holding hydraulic system over relief.	Reduce load.
	Leakage in work circuit.	Do boom and bucket cylinder leakage test in group 3.
	Plugged fins in oil cooler.	Inspect and clean oil cooler.
	Internally plugged oil cooler.	Do hydraulic oil cooler restriction test.
	Incorrect system or circuit relief valve setting.	Do loader system and circuit relief valve pressure test in group 3.
	Restriction in oil lines or loader control valve (MCV).	Inspect for dented or kinked lines.
	Malfunctioning steering valve.	Do hydraulic system restriction test in group 3.
	Leaking system main relief valve.	Do hydraulic system restriction test in group 3. Remove and inspect valve and seals.
	Worn hydraulic pump (internal leakage).	Do hydraulic pump performance check in group 2.
Function drops before raising when valve is activated	Stuck open lift check valve.	Do control valve lift check in group 2.

※ Do not adjust the system relief valve above 250 kg/cm^2 (3560 psi). Damage to the pump will result from excessive pressure settings.

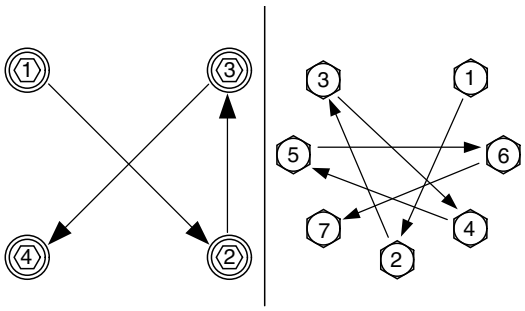
2) GENERAL INSTRUCTION

(1) Preliminary

※ Any servicing work done on main pump is to be done in a clean environment to prevent potential contamination by foreign particles.

※ Appropriate tools and equipment are required in order to insure proper disassembly and reassembly in suitable conditions. In case of repetitive service, a specific working bench is recommended.

※ To prevent oil leakage and body tilting during assembly, housing bolts are to be tightened as per the following pattern.



7803AWE05

(2) Parts

※ Parts must be kept clean at all time. If cleaning is needed, solvent is to be used. It is needed to check and oil the inner parts before assembly.

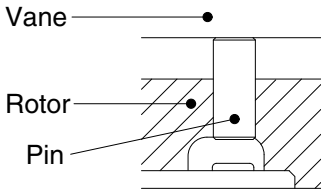
※ In case of replacement of parts with mulitiple numbers, such as vanes and holdout pins, all the parts are to be changed.

① **Vanes**

The faces and edges should be free of scratch from contamination. Vanes should move smoothly in the rotor slots, without excessive clearance. Edges may be stoned with a fine India stone to remove burrs.

② **Vane holdout pins :**

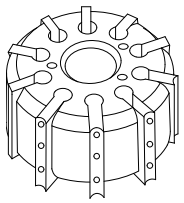
Holdout pins should have no matting marks.



7803AWE50

③ **Rotor :**

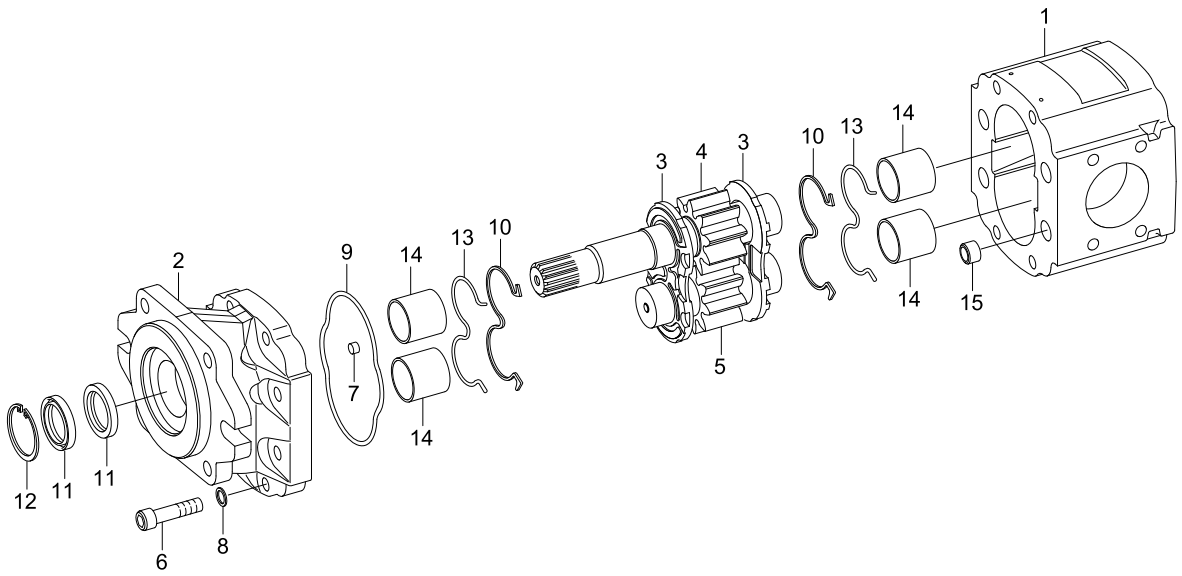
Side surfaces and vane slots should be free of scratches. Side feeds, vane slots and holdout pin orifices should be free of any contamination. Serration(driving splines) should not be deformed by the shaft.



7803AWE51

2. MAIN PUMP (machine serial No.: #0183~)

1) STRUCTURE



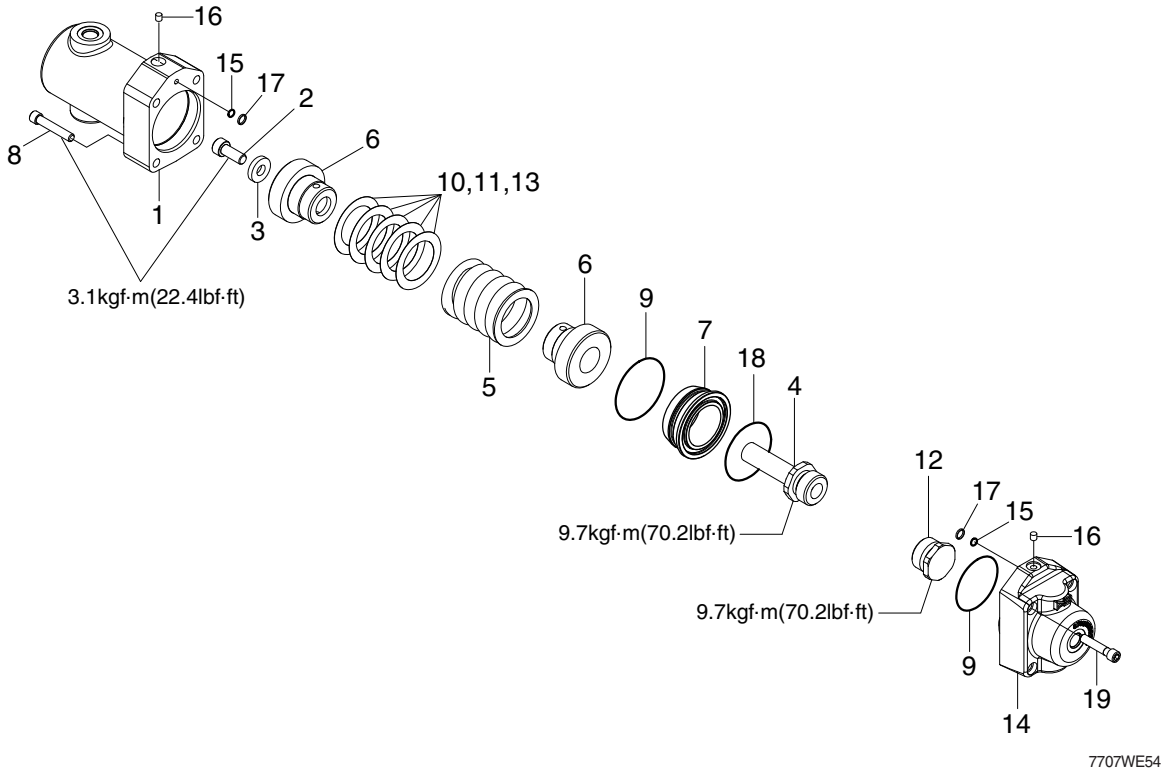
7809SWE50

1	Gear housing	6	Screw	11	Shaft seal
2	Front cover	7	Screw	12	Ring
3	Thrust plate	8	Washer	13	Back up ring
4	Drive shaft	9	O-ring	14	Sleeve bearing
5	Driven gear	10	Seal	15	Steel bushing

(4) BOOM SPOOL CENTERING (Item 6)

Remove 4 retaining screws (8) from the spring centering end. Remove the cover (1) and withdraw the spring pack and spool from the valve.

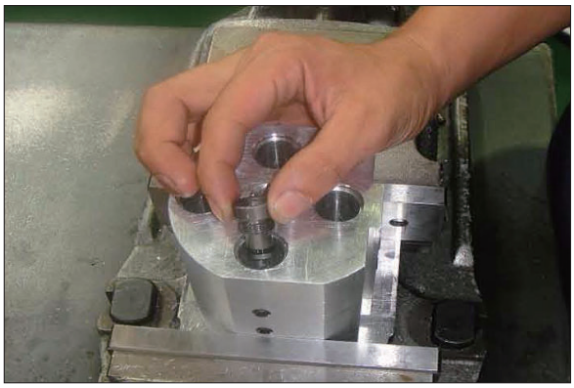
Hold the spool in a suitable soft clamp being careful not to damage the spool surface or bend the spool. Remove the spool caps from the spool. The replacement assembly is supplied with the spring set to the correct load. Refit the spool caps to the specified torque using loctite 542 or similar medium strength oil tolerant thread locking product.



1	Cover	8	Cap screw	14	Cover
2	Cap screw	9	O-ring	15	O-ring
3	Washer	10	Shim (0.020inch, 2EA)	16	Plug
4	Spool cap	11	Shim (0.005inch, 2EA)	17	Back up ring
5	Spring	12	Spool cap	18	O-ring
6	Spring retainer	13	Shim (0.005inch, 1EA)	19	Cap screw
7	Seal retainer				

3) ASSEMBLY

(1) Coat oil on O-ring and mount plug (3) into body assembly (1).



7607BRCV13

(2) Tighten the plug (3).

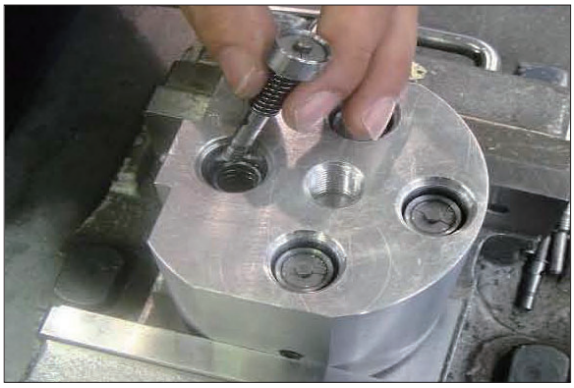
- Tool : Wrench 10 ㎜
- Tightening torque : 30±3 kgf · m (217±21.7 lbf · ft)

7607BRCV14

(3) Assemble spring (4).

7607BRCV15

(4) Assemble spool kit.

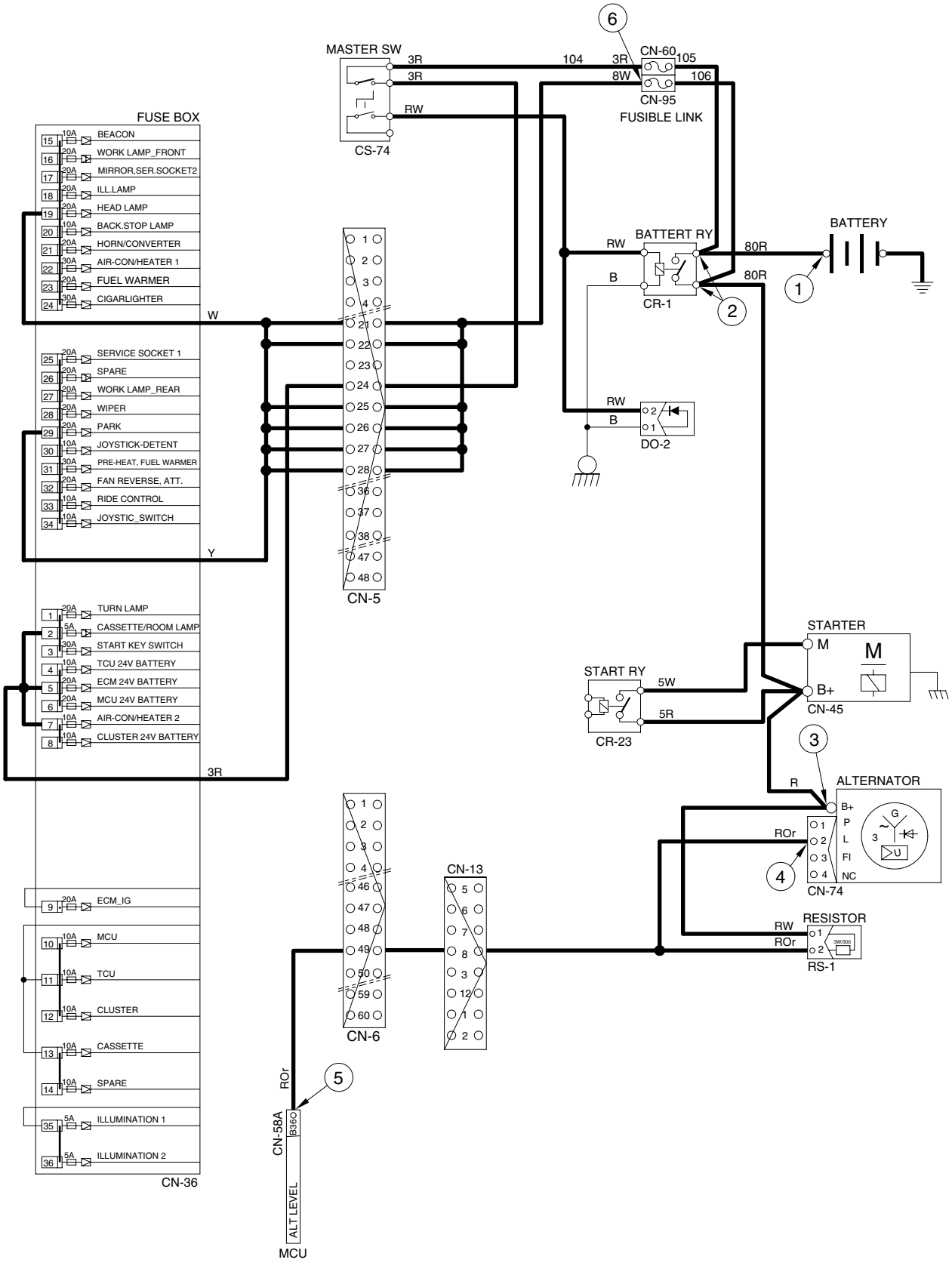


7607BRCV16

MEMORANDUM

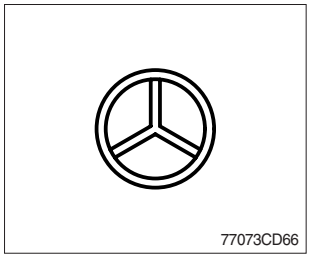

Robex
HYUNDAI HEAVY INDUSTRIES CO., LTD.
CONSTRUCTION EQUIPMENT DIV.

CHARGING CIRCUIT



7809S7EL07

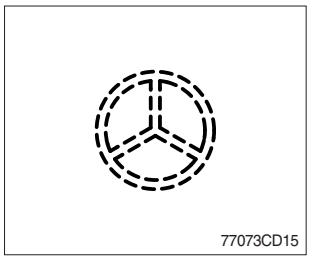
(9) Steering warning lamp



① **Primary**

This lamp indicates that the primary steering has failed. When the indicator comes on and the action alarm sounds, steer the machine immediately to a convenient location and stop the machine. Stop the engine and investigate the cause.

※ **Do not operate the machine until the cause has been corrected.**



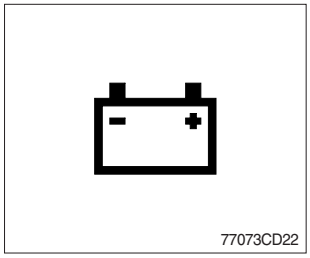
② **Emergency**

This lamp indicates the emergency steering system is active.

※ **Immediately pull the machine to a convenient stop and stop the engine.**

※ **The emergency steering system can be manually tested. Refer to page 7-46.**

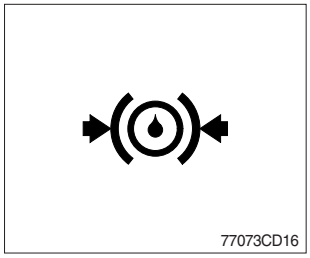
(10) Battery charging warning lamp



① This lamp is ON when key ON, it is turned OFF after starting the engine.

② Check the battery charging circuit when this lamp comes ON, during engine operation.

(11) Brake fail warning lamp

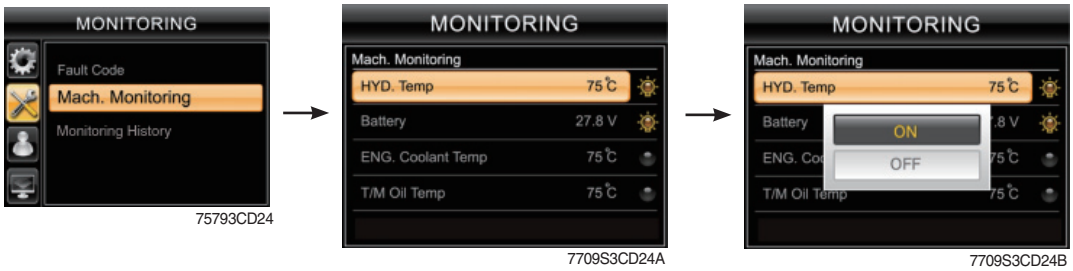


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

② When the lamp is ON, stop the engine and check for its cause.

※ **Do not operate until any problems are corrected.**

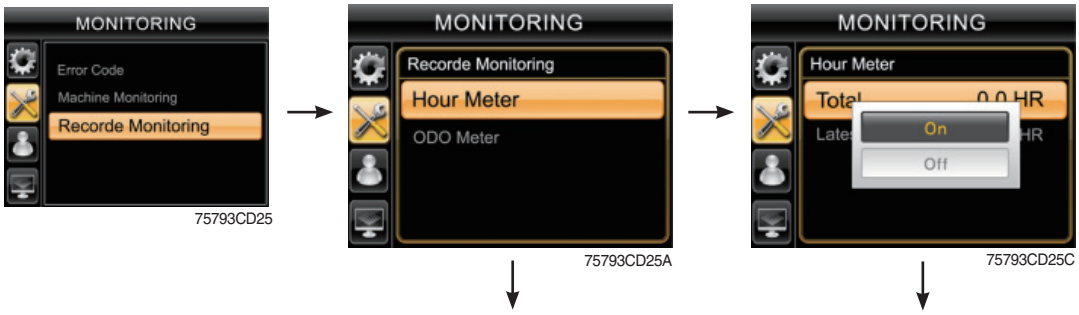
② Machine monitoring



75793CD24 7709S3CD24A 7709S3CD24B

- Monitor the status of the machine.
- To check the item in main display, choose it and press ↵ .
- The right icon shows ON/OFF status.

③ Record monitoring



75793CD25 75793CD25A 75793CD25C

75793CD25D

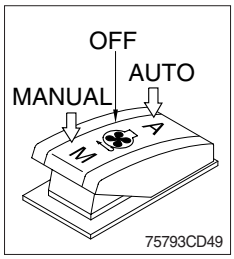
- **Hour meter**
  - **Total** : total hour meter
    To show the item in the main display, select "ON" and press ↵ (this item could not reset).
  - **Latest** : the latest hour meter after reset.
    To show the item in the main display, select "ON" and press ↵.
    To reset the latest hour meter, select "initializing" and press ↵.

75793CD25F 75793CD25H

75793CD25J

- **ODO meter**
  - **Total** : total ODO meter
    To show the item in the main display, select "ON" and press ↵ (this item could not reset).
  - **Latest** : the latest ODO meter after reset.
    To show the item in the main display, select "ON" and press ↵.
    To reset the latest odometer, select "initializing" and press ↵.

7) FAN CONTROL SWITCH



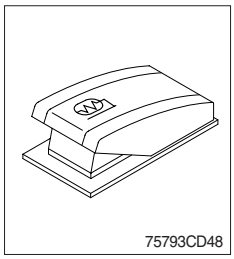
(1) This switch use to control the cooling fan.

(2) This switch has three positions.

- **AUTO** : The fan automatically work in reverse according to set up interval and time.
  ※ **Refer to page 7-32.**
- **OFF** : Only forward rotation is possible.
- **MANUAL** : The fan rotates reverse only while pressing this position. If release the switch, return to the OFF position.

(3) On pressing the switch, the indicator lamp is turned ON.

8) MIRROR DEFROST SWITCH (option)

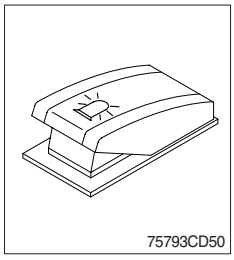


(1) If the mirror defrost switch is pressed in condition of key ON, it operates for 15 minutes. After 15 minutes, the defrost function stops automatically.

(2) One more pressing the switch in operation also stops defrost function.

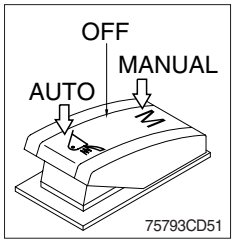
(3) On pressing the switch, the indicator lamp is turned ON.

9) BEACON SWITCH (option)



(1) This switch turns ON the rotary light on the cab.

10) RIDE CONTROL SWITCH (option)



(1) AUTO

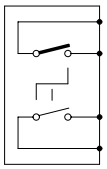
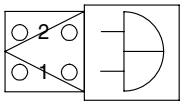
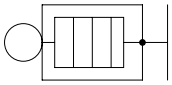
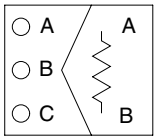
Press in the bottom of the ride control switch in order to turn on the automatic ride control. The automatic ride control automatically turns on when the travel speed exceeds a preset speed of approximately 7 km/h. The automatic ride control automatically shuts off during low speed travel (below 7 km/h).

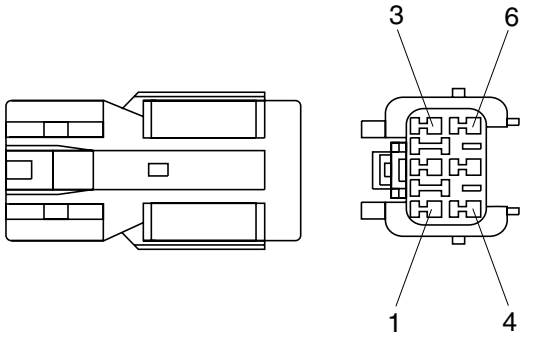
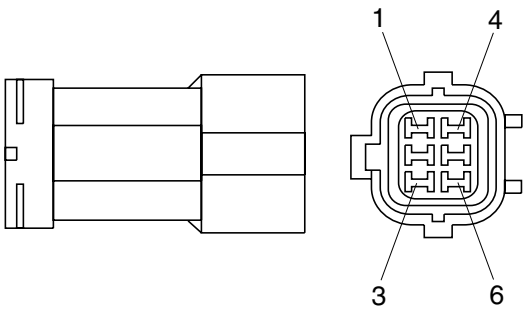
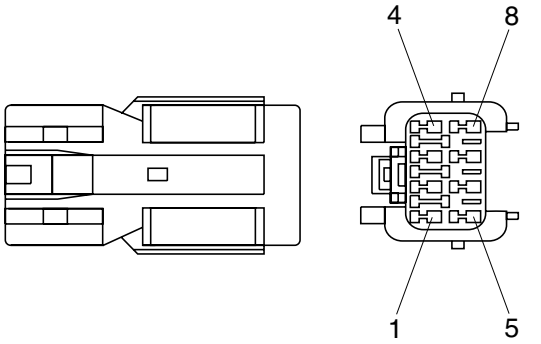
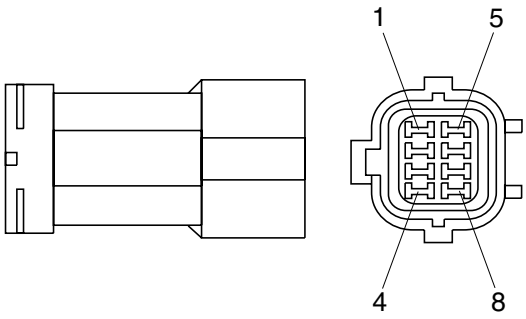
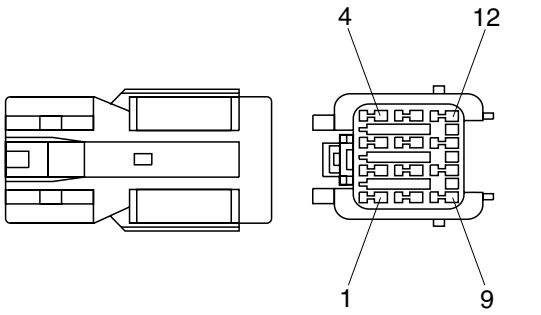
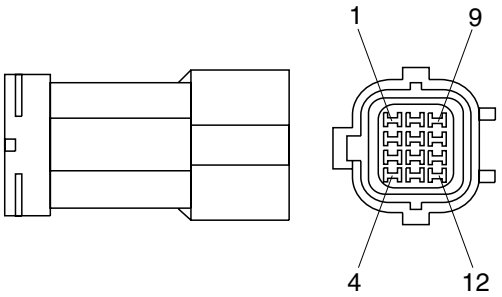
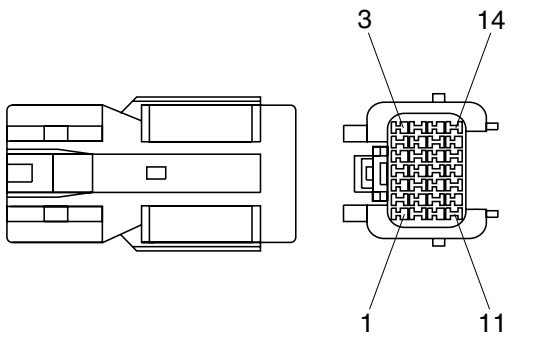
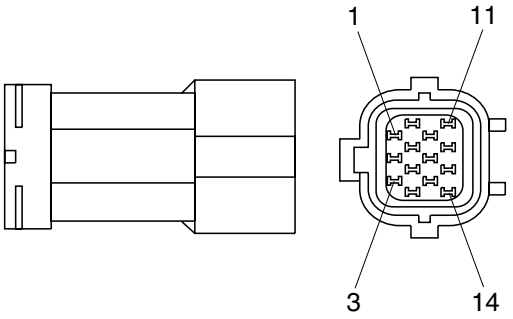
(2) MANUAL

Press in the top of the ride control switch in order to turn on the system for ride control regardless speed. The ride control will smooth the ride of the machine during travel.

(3) OFF

Press the ride control switch to the middle position in order to turn off the system for the ride control.

Part name	Symbol	Specifications	Check item
Master switch	 CS-74	Continuous capacity : 180Amp Push in capacity : 1000Amp	-
Warning buzzer	 CN-26	24V 200mA 90±5dB (ℓ m)	-
Preheater	 CN-80	24V 200A	Resistance 0.25~0.12 Ω
Resistor	 CN-99	4W	Resistance A - B : 120 Ω

No. of pin	Receptacle connector (female)	Plug connector (male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000