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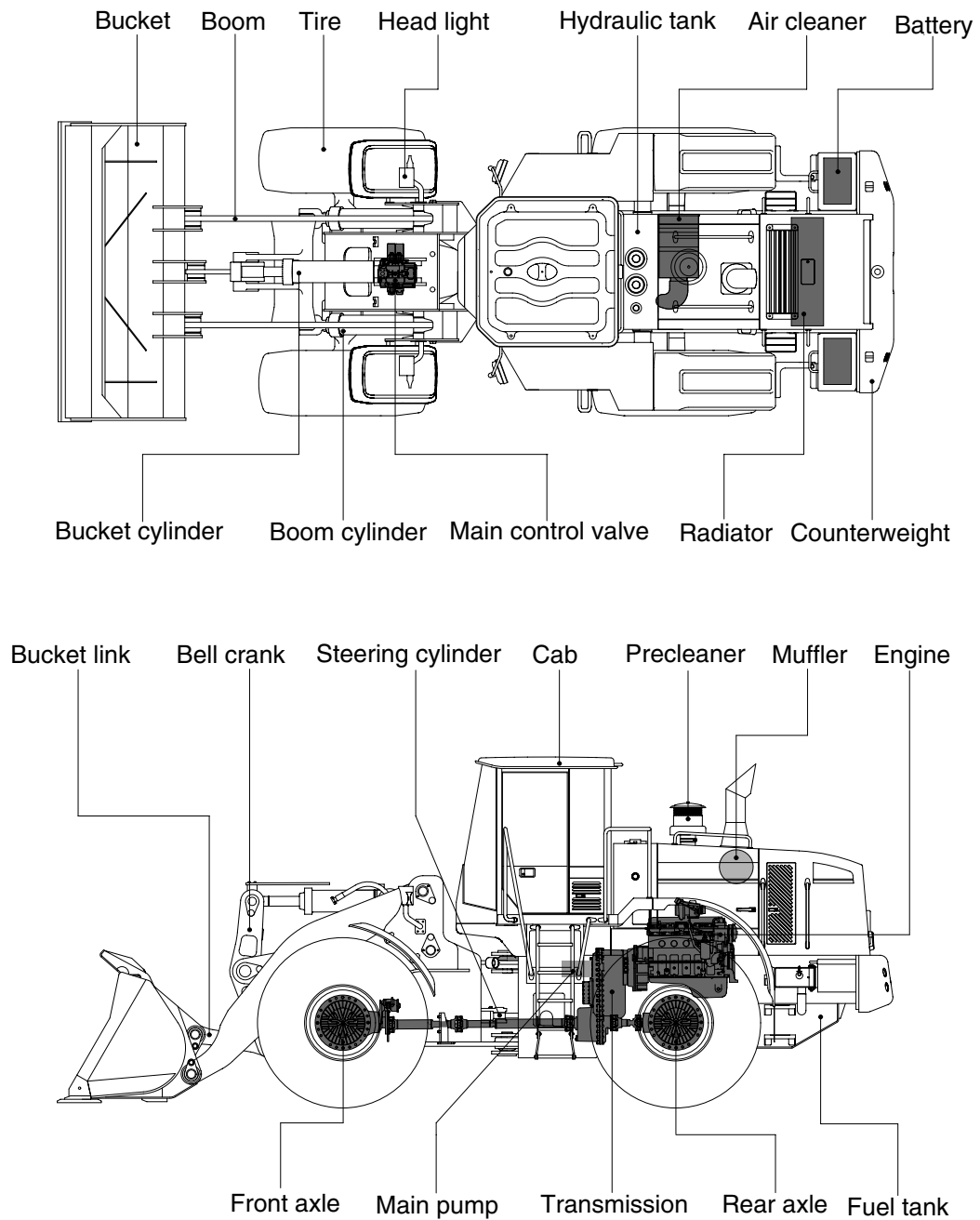
SECTION 1 GENERAL



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GROUP 2 SPECIFICATION

1. MAJOR COMPONENT



7607A2SE01

6. TORQUE CHART

Use following table for unspecified torque.

1) BOLT AND NUT

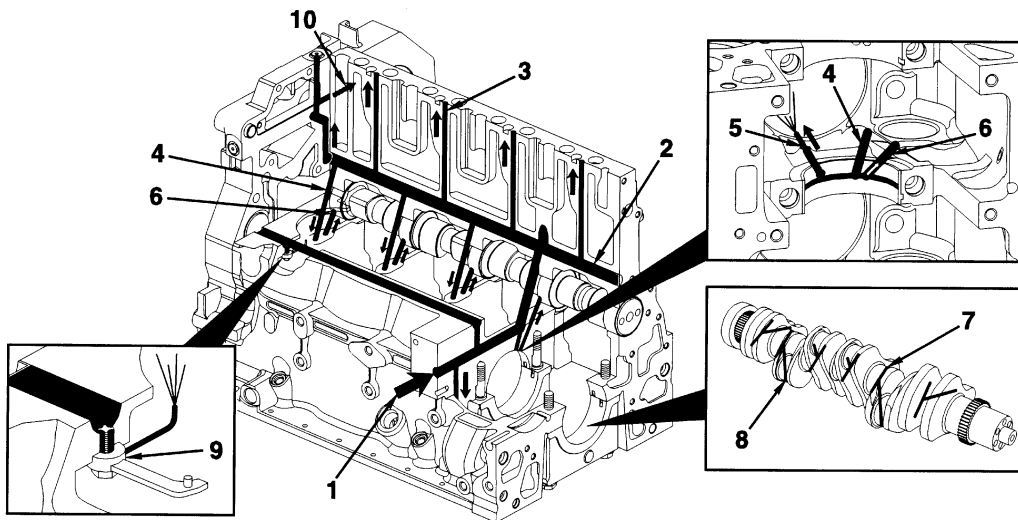
(1) Coarse thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.73 ~ 4.12	19.7 ~ 29.8
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 79.5	9.8 ~ 15.8	71 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 167
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 343
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	350 ~ 457	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.5	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1655
M36 × 4.0	174 ~ 236	1261 ~ 1703	250 ~ 310	1808 ~ 2242

(2) Fine thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · ft
M 8 × 1.0	2.17 ~ 3.37	15.7 ~ 24.3	3.04 ~ 4.44	22.0 ~ 32.0
M10 × 1.25	4.46 ~ 6.66	32.3 ~ 48.2	5.93 ~ 8.93	42.9 ~ 64.6
M12 × 1.25	7.78 ~ 11.58	76.3 ~ 83.7	10.6 ~ 16.0	76.6 ~ 115
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 130	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 194	26.6 ~ 36.0	193 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 390	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 515	70.7 ~ 95.7	512 ~ 692
M24 × 2.0	67.9 ~ 91.9	491 ~ 664	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1338	182 ~ 248	1314 ~ 1795
M36 × 3.0	192 ~ 260	1389 ~ 1879	262 ~ 354	1893 ~ 2561

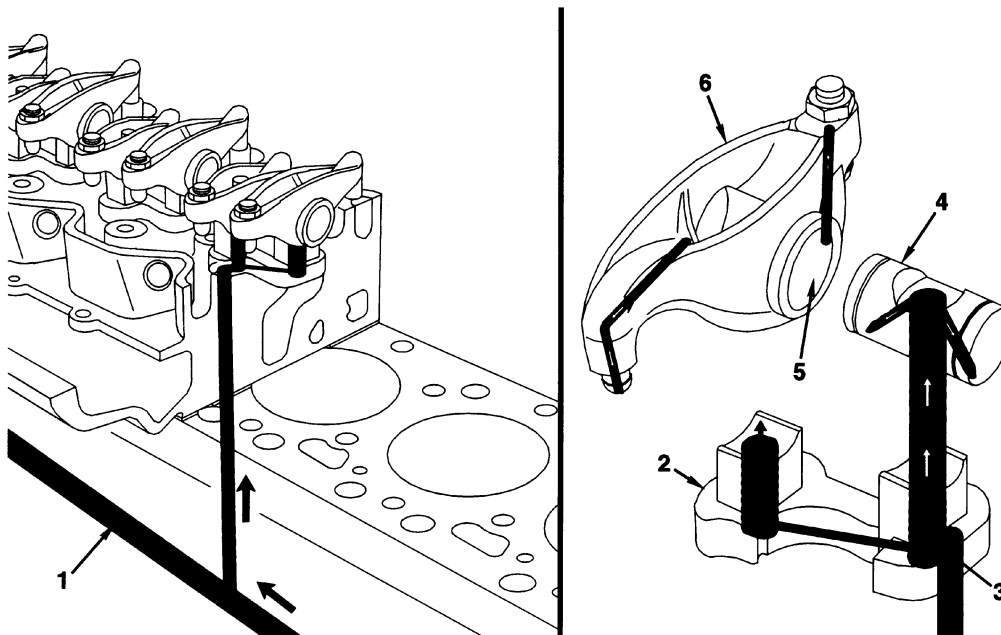
(2) Lubrication for the power components



7607AEG05

- | | | | |
|---|---------------------------------|----|---|
| 1 | From lubricating oil cooler | 6 | To camshaft |
| 2 | Main lubricating oil rifle | 7 | Crankshaft main journal |
| 3 | To valve train | 8 | Oil supply to rod bearings |
| 4 | From main lubricating oil rifle | 9 | Directed piston-cooling nozzle |
| 5 | To piston-cooling nozzle | 10 | To internal lubrication of air compressor |

(3) Lubrication for the overhead

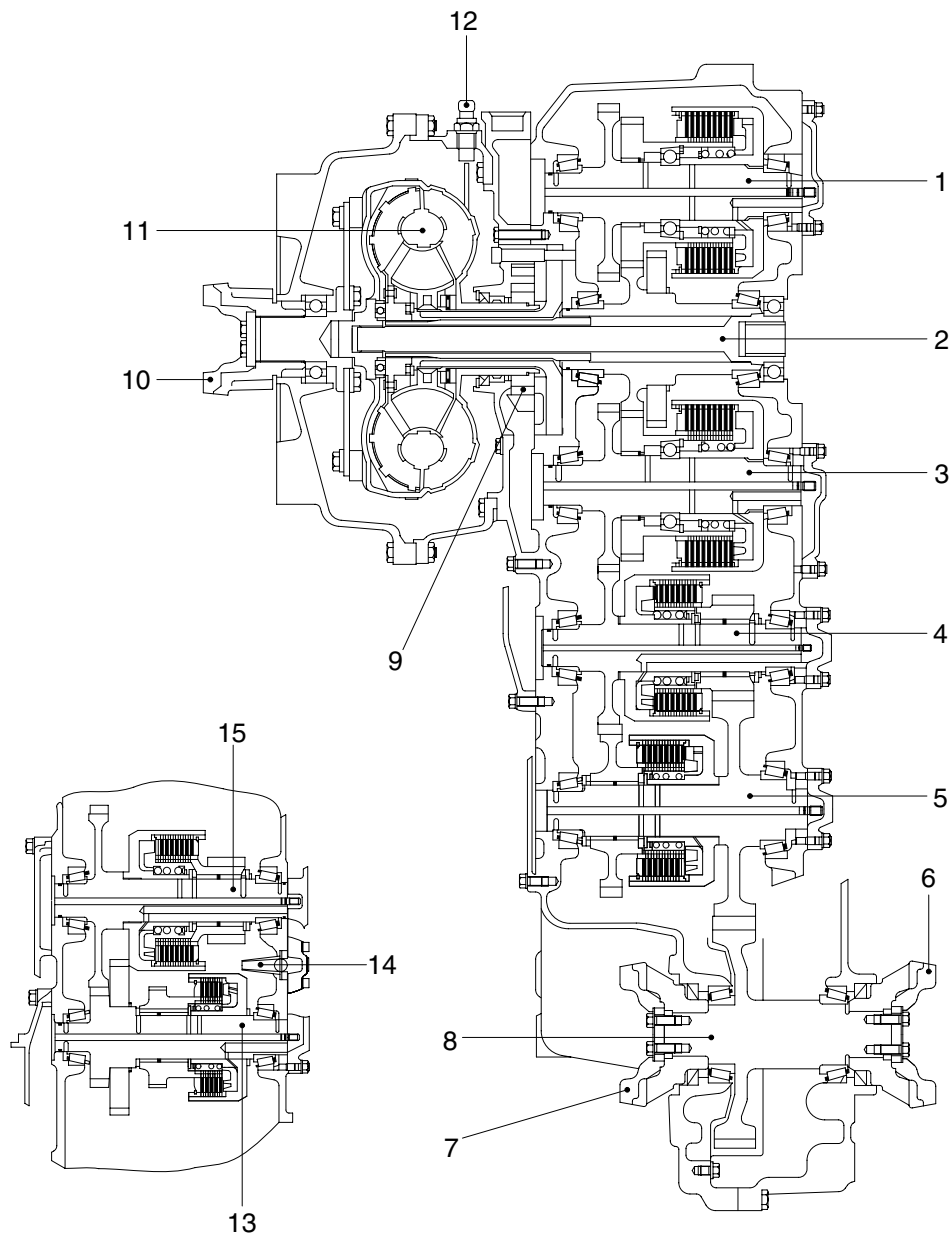


7607AEG06

- | | | | |
|---|----------------------------|---|--------------------|
| 1 | Main lubricating oil rifle | 4 | Rocker lever shaft |
| 2 | Rocker lever support | 5 | Rocker lever bore |
| 3 | Transfer slot | 6 | Rocker lever |

3. TRANSMISSION

1) LAYOUT



7607PT03

- | | | |
|-----------------------------------|--------------------------------|---|
| 1 Reverse clutch(KR) | 6 Rear output flange | 11 Converter |
| 2 Engine-dependent power take-off | 7 Converter side output flange | 12 Inductive transmitter for engine speed |
| 3 Forward clutch(KV) | 8 Output shaft | 13 4th clutch(K4) |
| 4 2nd clutch(K2) | 9 Transmission pump | 14 Converter relief valve |
| 5 3rd clutch(K3) | 10 Input flange | 15 1st clutch(K1) |

By the direct proportional selection with separate pressure modulation for each clutch, the pressures to the clutches, taking part in the gear change, are controlled. In this way, a hydraulic overlap of the clutches to be engaged and disengaged is achieved.

This is leading to fast shiftings without traction force interruption.

At the shifting, the following criteria are considered:

- Speed of engine, turbine, central gear train and output.
- Transmission temperature.
- Shifting mode(Up-, down-, reverse shifting and gear engaging from neutral).
- Load level(Full- and partial load, traction, coasting inclusive consideration of load cycles during the shifting).

The system pressure valve is limiting the maximum control pressure to 16+2 bar and releases the main stream to the converter and lubricating circuit.

A converter relief valve is installed in the converter inlet, which protects the converter against high internal pressures(Opening pressure 9bar).

Within the converter, the oil transfers the power transmission according to the well-known hydrodynamic principle(See torque converter, page 3-3).

In order to avoid cavitation, the converter must be always completely filled with oil.

This is achieved by a converter back pressure valve, following the converter, with an opening pressure of about 3.5bar.

The oil, escaping from the converter, is directed to a oil cooler.

The oil is directed from the oil cooler to the transmission and from there to the lubricating-oil circuit so that all lubricating points are supplied with cooled oil.

In the electro-hydraulic control unit there are 6 pressure regulators installed.

5) GEAR SELECTOR(DW-3)

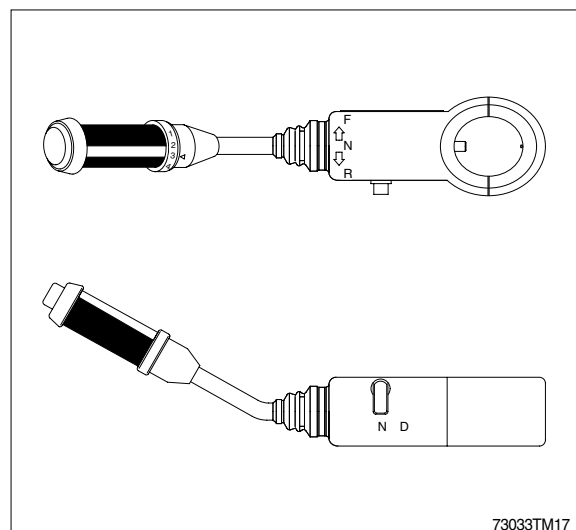
The gear selector is designed for the mounting on the left side of the steering column. The positions(Speeds) 1 to 4 are selected by a rotary motion, the driving direction Forward(F)-Neutral(N)-Reverse(R) by tilting the gear selector lever.

The gear selector is also available with integrated kickdown control knob.

A neutral lock is installed as protection against inadvertent drive off.

Position **N** - Gear selector lever blocked in this position.

Position **D** - Driving.



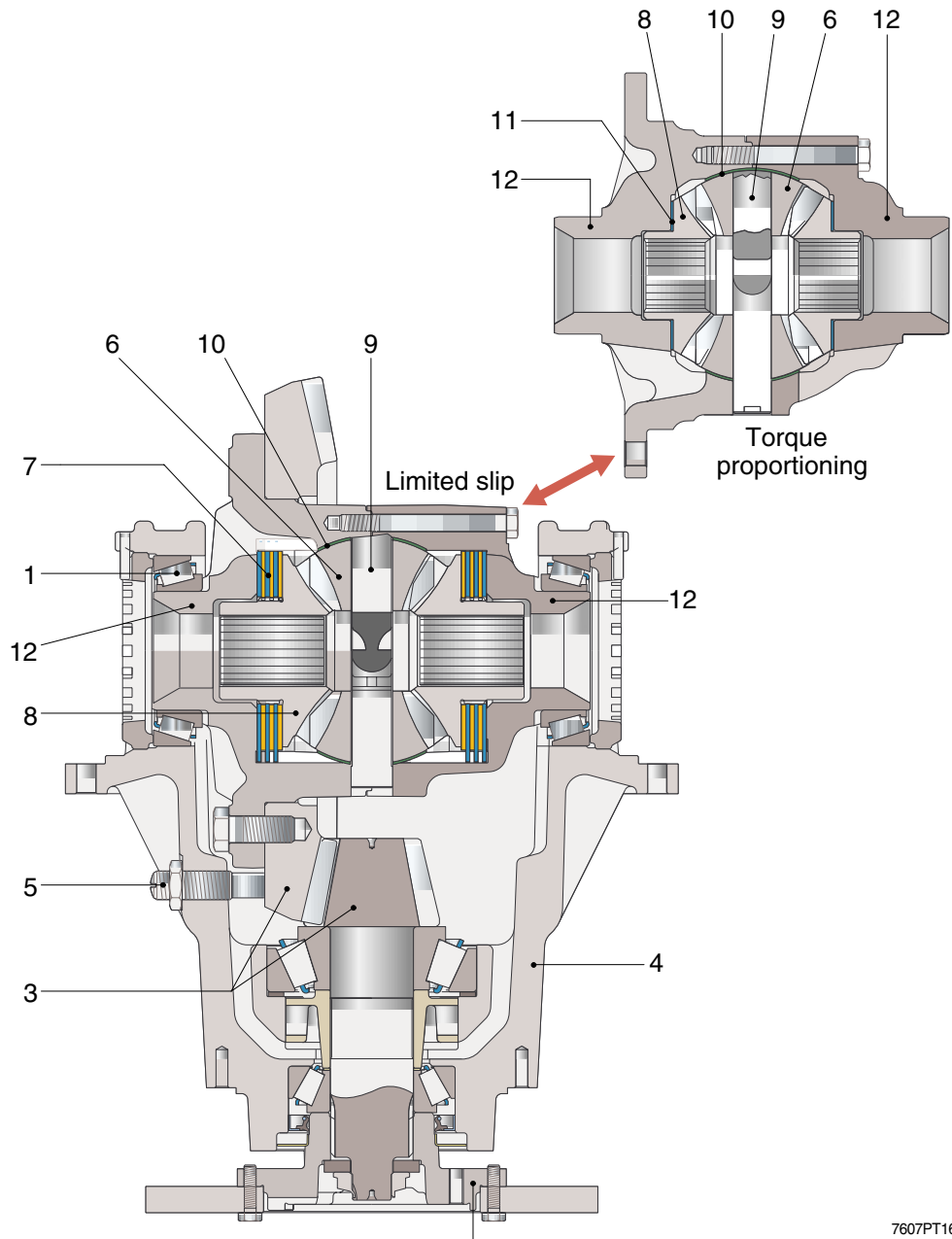
Fault code No.	Reason	Effect (only when fault code is active)
288	SAE J1939 Multiplexing Remote Accelerator Pedal or Lever Position Sensor Circuit - Received Network Data In Error. The OEM vehicle electronic control unit (VECU) detected a fault with the remote accelerator.	The engine will not respond to the remote throttle. Engine may only idle. The primary or cab accelerator may be able to be used.
292	Auxiliary temperature Sensor Input 1 - Special instructions.	Possible engine power derate.
293	Auxiliary temperature sensor input 1 circuit - Voltage above normal, or shorted to high source. High signal voltage or open circuit detected at the OEM auxiliary temperature circuit.	None on performance.
294	Auxiliary temperature sensor input 1 circuit - Voltage below normal, or shorted to low source. Low signal voltage detected at the OEM auxiliary temperature circuit.	None on performance.
296	Auxiliary pressure sensor input 1 - Special instructions.	Possible engine power derate.
297	Auxiliary pressure sensor input 1 circuit - Voltage above normal, or shorted to high source. High signal voltage detected at the OEM pressure circuit.	None on performance.
298	Auxiliary pressure sensor input 1 circuit - Voltage below normal, or shorted to low source. Low signal voltage or open circuit detected at the OEM pressure circuit.	None on performance.
319	Real time clock power interrupt - Data erratic, intermittent, or incorrect. Real time clock lost power.	None on performance. Data in the ECM will not have accurate time and date information.
322	Injector solenoid driver cylinder 1 circuit - Current below normal, or open circuit. High resistance detected on injector number 1 circuit or no current detected at number 1 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
323	Injector solenoid driver cylinder 5 circuit - Current below normal, or open circuit. High resistance detected on injector number 5 circuit or no current detected at number 5 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
324	Injector solenoid driver cylinder 3 circuit - Current below normal, or open circuit. High resistance detected on injector number 3 circuit or no current detected at number 3 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
325	Injector solenoid driver cylinder 6 circuit - Current below normal, or open circuit. High resistance detected on injector number 6 circuit or no current detected at number 6 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.

Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair	Remarks
27	S.C. to battery voltage or O.C. at converter output temperature sensor input The measured voltage is too high: • Cable is defective and is contacted to battery voltage • Cable has no connection to TCU • Temperature sensor has an internal defect • Connector pin is contacted to battery voltage or is broken	No reaction, TCU uses default temperature OP mode : Normal	• Check the cable from TCU to the sensor • Check the connectors • Check the temperature sensor	
28	S.C. to ground at converter output temperature sensor input The measured voltage is too low: • Cable is defective and is contacted to vehicle ground • Temperature sensor has an internal defect • Connector pin is contacted to vehicle ground	No reaction, TCU uses default temperature OP mode : Normal	• Check the cable from TCU to the sensor • Check the connectors • Check the temperature sensor	
31	S.C. to battery voltage or O.C. at engine speed input TCU measures a voltage higher than 7.00V at speed input pin • Cable is defective and is contacted to battery voltage • Cable has no connection to TCU • Speed sensor has an internal defect • Connector pin is contacted to battery voltage or has no contact	OP mode : Substitute clutch control	• Check the cable from TCU to the sensor • Check the connectors • Check the speed sensor	
32	S.C. to ground at engine speed input TCU measures a voltage less than 0.45V at speed input pin • Cable/connector is defective and is contacted to vehicle ground • Speed sensor has an internal defect	OP mode : Substitute clutch control	• Check the cable from TCU to the sensor • Check the connectors • Check the speed sensor	

Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair	Remarks
95	S.C. to battery voltage at relay starter interlock TCU detected a wrong voltage at the output pin, that looks like a S.C. to battery voltage • Cable is defective and has no connection to battery voltage • Starter interlock relay has an internal defect • Connector pin is contacted to battery voltage	No reaction OP mode : Normal	• Check the cable from TCU to the starter interlock relay • Check the connectors from starter interlock relay to TCU • Check the resistance* of starter interlock relay	* See Chapter (9)
96	O.C. at relay starter interlock 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 • Starter interlock relay has an internal defect • Connector has no connection to TCU	No reaction OP mode : Normal	• Check the cable from TCU to the starter interlock relay • Check the connectors from starter interlock relay to TCU • Check the resistance* of starter interlock relay	* See Chapter (9)
97	S.C. to ground at park brake solenoid TCU detected a wrong voltage at the output pin, that looks like a S.C. to vehicle ground • Cable is defective and is connection to vehicle ground • Park brake solenoid has an internal defect • Connector pin is contacted to vehicle ground	No reaction OP mode : Normal	• Check the cable from TCU to the park brake solenoid • Check the connectors from park brake solenoid to TCU • Check the resistance* of park brake solenoid	* See Chapter (9)
98	S.C. to battery voltage at park brake solenoid TCU detected a wrong voltage at the output pin, that looks like a S.C. to battery voltage • Cable is defective and is connection to battery voltage • Park brake solenoid has an internal defect • Connector pin is contacted to battery voltage	No reaction Optional : (Some customers) TCU shifts to neutral caused by park brake feed back OP mode : Normal	• Check the cable from TCU to the park brake solenoid • Check the connectors from park brake solenoid to TCU • Check the resistance* of park brake solenoid	* See Chapter (9)

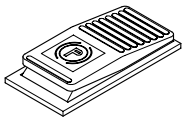
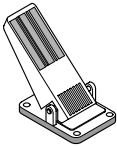
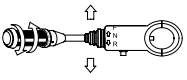
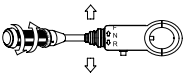
Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair	Remarks
D1	S.C. to battery voltage at power supply for sensors TCU measures more than 6V at the pin AU1 (5V sensor supply)	See fault codes No.21 to 2C	• Check cables and connectors 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	

2) FRONT AXLE DIFFERENTIAL SECTION



7607PT16

- | | | | |
|---|----------------------|----|----------------------------------|
| 1 | Roller bearing | 7 | Clutch |
| 2 | Input flange | 8 | Planetary gear |
| 3 | Bevel gear set | 9 | Spider |
| 4 | Differential housing | 10 | Bevel thrust washer of side gear |
| 5 | Adjusting screw | 11 | Thrust washer of planetary gear |
| 6 | Side gear | 12 | Half case |

Item	Description	Service action
	LOOK/FEEL : Transmission must shift to former(2nd or 3rd or 4th) gear. NOTE : If gear selector lever kick down switch or RCV lever switch is pressed twice, transmission will shift down the immediately back to former gear.	
Forward, reverse and 4th speed clutch pack drag check ※ Transmission must be warmed up for this check. Engine running.	 Park unit on level surface. Apply service brakes. Move gear selector lever to neutral.  Move gear selector lever to 1st. Release parking brake and service brakes.  Run engine at low idle. LOOK : Unit must not move in either direction. NOTE : If unit moves forward, either the forward pack or the 4th speed pack is dragging.	OK Check completed. NOT OK If unit moves, repair transmission.
Transmission shift modulation check Engine running.	 Run engine at approximately 1300rpm. Put transmission in 1st forward, shift several times from forward to reverse and reverse to forward. Repeat check in 2nd gear. LOOK : Unit must slow down and change direction smoothly.	OK Check completed. NOT OK Go to unit shifts too fast, chapter 2 in this group.
Torque converter check	 Start engine. Apply service brakes and release parking brake. Move gear selector lever to 3rd speed. Move gear selector control lever to forward "F" position. Increase engine speed to high idle. LOOK : Torque converter stall rpm must be within the following range. Stall rpm : 2110 ± 70rpm Move gear selector control lever to neutral "N" position and run for 15 seconds.	OK Check completed. NOT OK If stall rpm are too low or too high, problem may be engine power or torque converter. IF OK Replace transmission torque converter.

2) DELIVERY RATES

Port	Description	Size
15	Connection to the oil cooler	1 5/6" -12UNF-2B
16	Connection from the oil cooler	1 5/6" -12UNF-2B

3) INDUCTIVE TRANSMITTER AND SPEED SENSOR

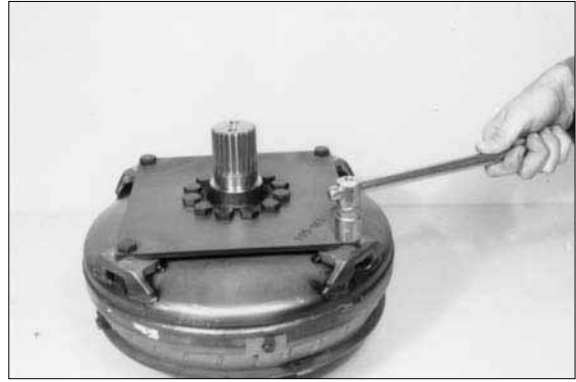
Port	Description	Size
21	Inductive transmitter n turbine	M18 × 1.5
34	Speed sensor n output and speedometer	-
47	Inductive transmitter n central gear train	M18 × 1.5
48	Inductive transmitter n engine	M18 × 1.5

4) CONNECTIONS

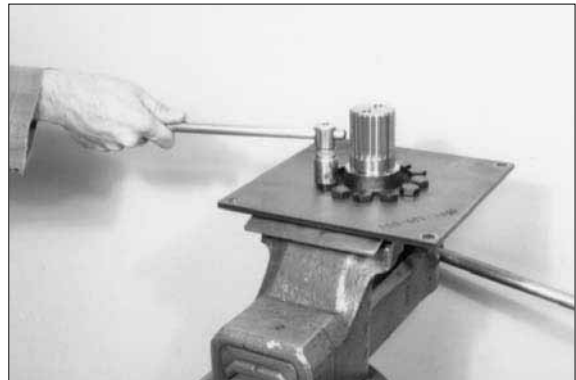
Port	Description	Size
49	Plug connection on the hydraulic control unit	-
68	Pilot pressure(Optional) J	M16 × 1.5
69	System pressure(Optional) G	M16 × 1.5

(2) Converter

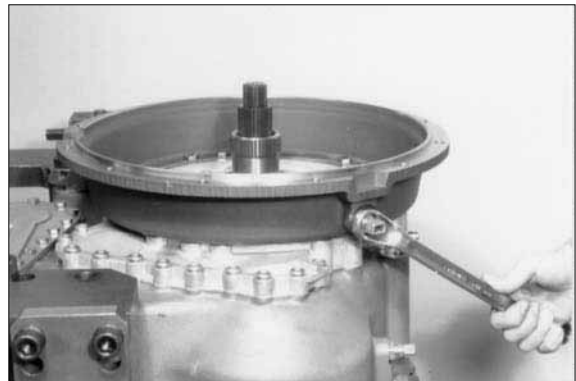
- ① Loosen hexagon head screws and separate diaphragm from the converter.



- ② Loosen hexagon head screws and separate drive shaft from the diaphragm.



- ③ Remove inductive transmitter(Engine).



- ④ Loosen hexagon head screws and remove converter bell.



(7) Disassemble clutch K1, K2 and K3

※ The following figures show the disassembly of clutch K3.

The disassembly of the clutches K1 and K2 is similar.

① Squeeze rectangular ring out.

Pull tapered roller bearing from the shaft.
Remove the opposite tapered roller bearing accordingly.

Grab sleeve(Bearing 33800) 5873 001 059

Grab sleeve(Bearing 39500) 5873 002 038

Basic set 5873 001 000

Basic set 5873 002 001



75773TM110

② Remove running disk, axial needle cage and axial washer.



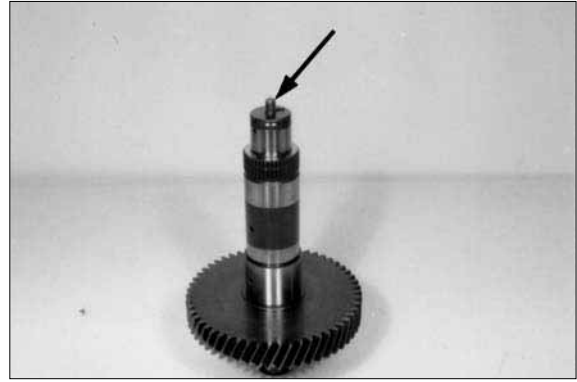
75773TM111

③ Remove idler gear.



75773TM112

- ⑪ Mount stud(Arrow).
Wet screw-in thread with loctite(Type No.241).
· Torque limit(M10) : 1.7kgf · m(12.5lbf · ft)



75773TM160

- ⑫ Insert ball bearing until contact is obtained and fix by means of circlip.



75773TM161

- ⑬ Assemble needle bearing.



75773TM162

- ⑭ Press idler gear against shoulder.
※ Support it on the bearing inner race.



75773TM163

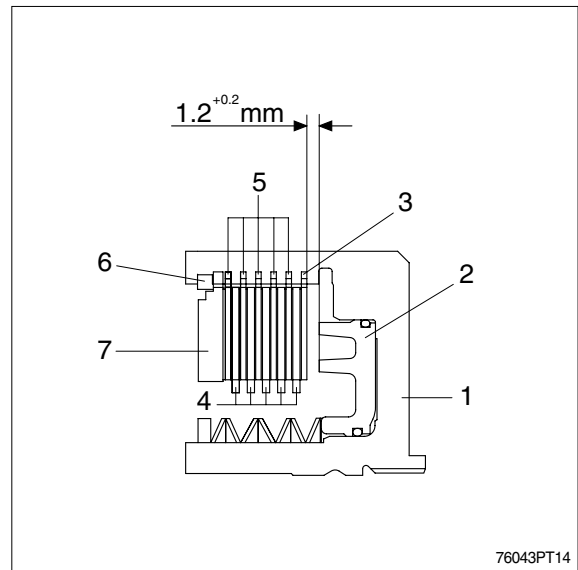
Plate pack K4

※ The following draft shows the installation position of the components.

- 1 Plate carrier
- 2 Piston
- 3 Outer plate-one side coated(1 piece)
- 4 Inner plates(5 pieces)
- 5 Outer plates-coated on both sides (5 pieces)
- 6 Snap ring(Optional s= 2.1~4.2mm)
- 7 End shim

Effective number of friction surfaces = 10

※ Install outer plate 3 with the uncoated side facing the piston.



76043PT14

Adjust plate clearance = $1.2^{+0.2} \text{ mm}$

※ For the adjustment of the plate clearance are snap rings of different thickness available.

To ensure a faultless measuring result, install plates for the moment without oil.

⑧ Introduce plate pack according to the draft.



75773TM210

⑨ Lay on end shim and squeeze snap ring in(e.g. s= 3.4mm).



75773TM211

- ⑫ Install both cylindrical pins centrally to the housing face.

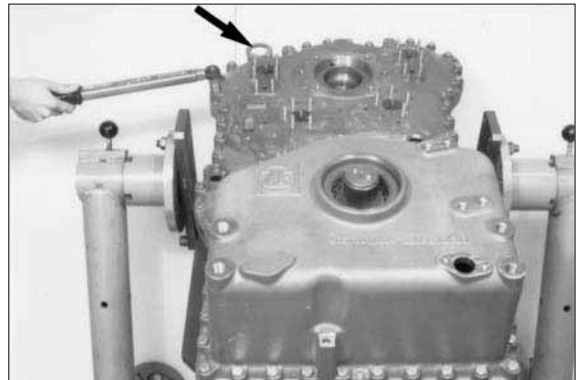


75773TM246

- ⑬ Fasten housing cover by means of hexagon head screws.

· Torque limit(M10/8.8) : 4.7kgf · m
(33.9lbf · ft)

※ Pay attention to position of the fixing plate, see Arrow.

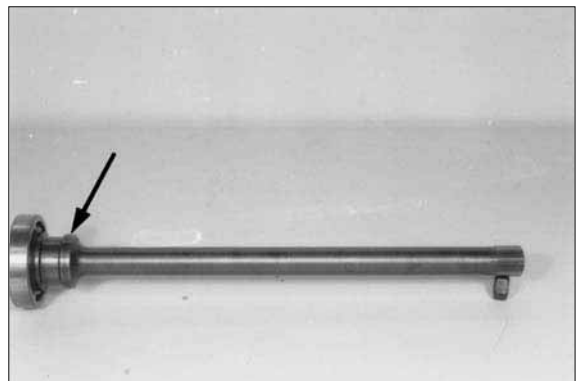


75773TM247

(8) Install pump shaft(Power take off)

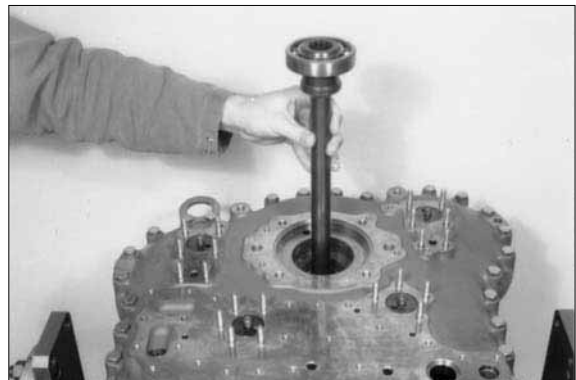
- ① Install ball bearing.

Squeeze rectangular ring in(Arrow) and let it snap in.



75773TM248

- ② Grease rectangular ring, align it centrally and introduce pump shaft until contact is obtained.

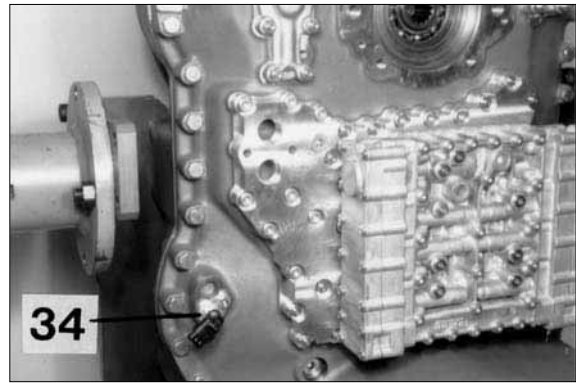


75773TM249

(16) Speed sensor and inductive transmitters

- ① The figures show the installation position of the single inductive transmitters and the speed sensor.

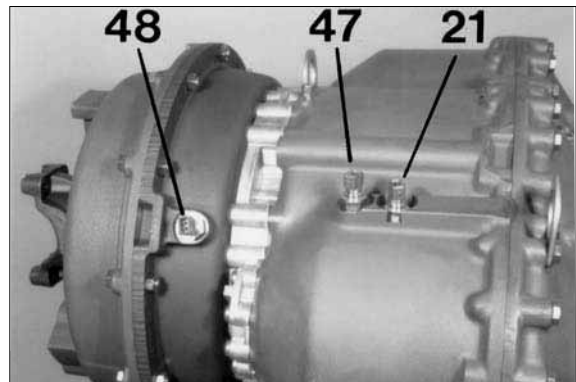
- 34 Speed sensor
n-Output and speedometer
- 21 Inductive transmitter
n-Turbine
- 47 Inductive transmitter
n-Central gear train
- 48 Inductive transmitter
n-Engine



75773TM290

- ② Grease O-rings and install speed sensor as well as inductive transmitters.

- Torque limit : $2.3 \text{ kgf} \cdot \text{m}$ ($17.0 \text{ lbf} \cdot \text{ft}$)
(Socket head screw/Speed sensor)
- Torque limit : $3.1 \text{ kgf} \cdot \text{m}$ ($22.1 \text{ lbf} \cdot \text{ft}$)
(Inductive transmitter)



75773TM291

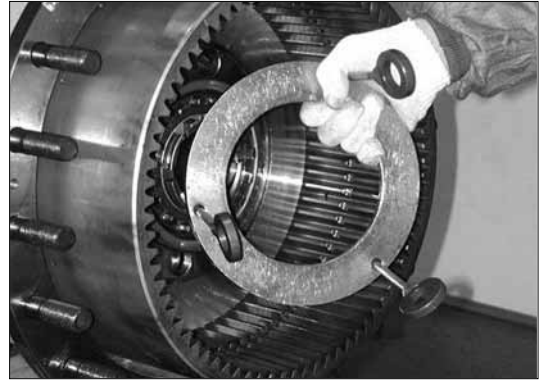
- ③ Install breather (Arrow).

- Torque limit : $1.2 \text{ kgf} \cdot \text{m}$ ($8.9 \text{ lbf} \cdot \text{ft}$)

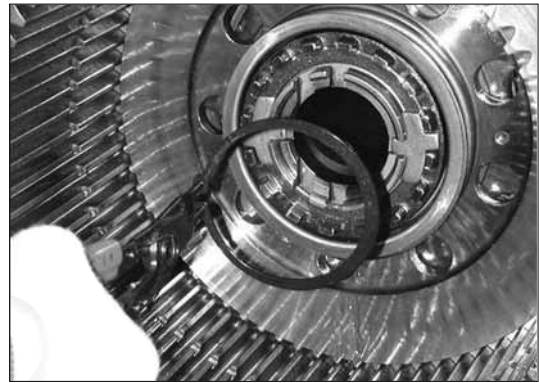


75773TM292

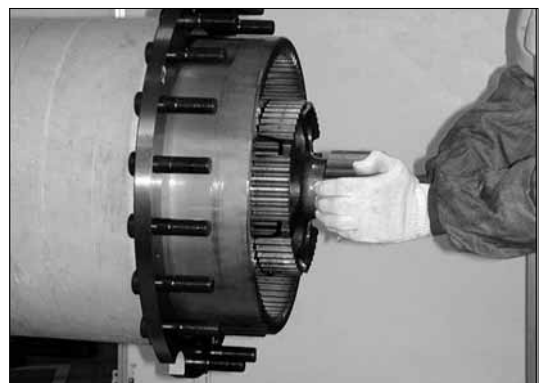
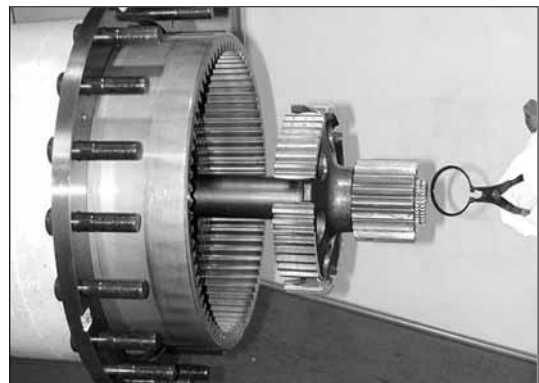
- ⑫ Remove spring compression tool.



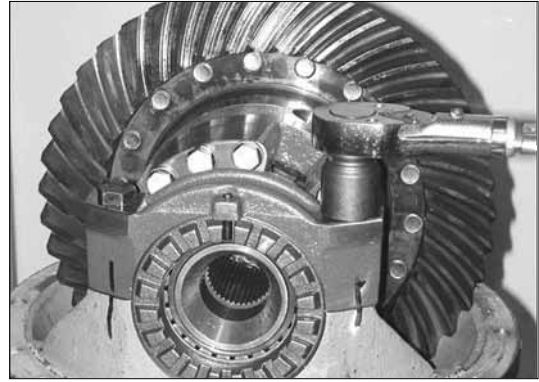
- ⑬ Fit plate and assemble retain ring.



- ⑭ Insert wheel shaft on which sequentially mount ; the thrust washer, discs carrier hub, sun gear and lock ring ; then push all components fully down against hub spindle.



- ② Unlock and remove caps fixing screws.



- ③ Remove lock pin of ring nut, remove caps.



- ④ Unlock nut and remove screw.
(Rear differential only)



- ⑤ Remove fixing screws(4EA) of cross beam
assembly. (Rear differential only)



- ⑳ Tighten the fixing bolt of cross beam assembly.

(Rear differential only)

- Tightening torque : 31.3~34.6kgf · m
(226~250lbf · ft)



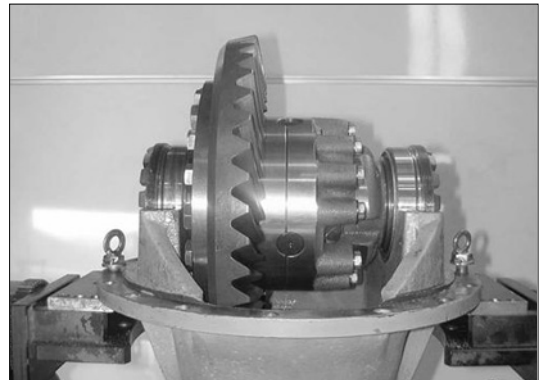
AX152

- ㉑ Fit in the differential assembly on the carrier, and assemble adjusting nut temporarily.

(Front differential only)

Assemble adjusting nut temporary.

(Rear differential only)

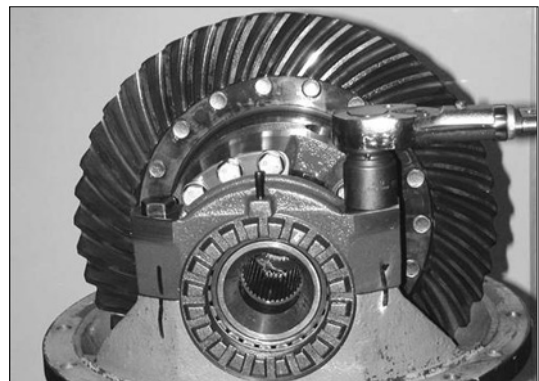


AX061

- ㉒ Install caps, care not to reverse position and lock screws fixing to differential support with belows.

※ Cap tightening torque

- Front axle : 63~69kgf · m(456~499lbf · ft)
- Rear axle : 31.3~34.6kgf · m(226~250lbf · ft)



AX062

- ㉓ Position a dial gauge perpendicular than ring gear tooth and check, with pinion steady, backlash that has to be of 0.25~ 0.33mm (front) and 0.20~0.28mm(rear).

Otherwise rotate both ring nuts by displacing them of the same number of notches and nearing ring gear to pinion if backlash is excessive, by moving away on the contrary.

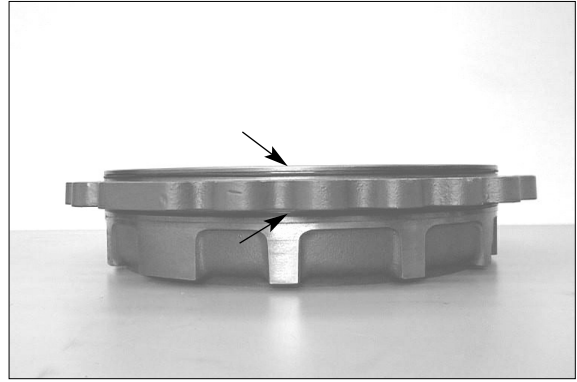
※ Bevel set back lash

- Front axle : 0.25~0.33mm
- Rear axle : 0.20~0.28mm



AX063

- (16) Remove O-rings (see arrows) from the annular grooves of the ring gear.



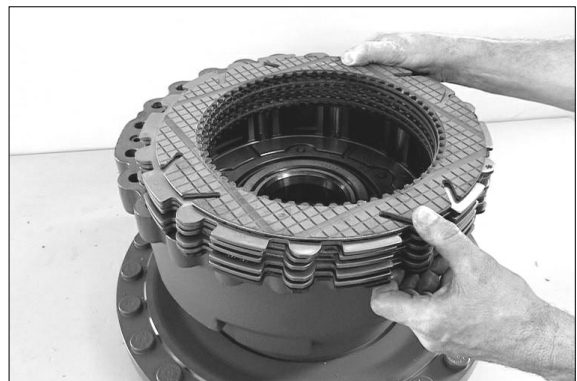
7577AAXF017

- (17) Remove O-ring (see arrow) from the recess of the brake housing.



7577AAXF018

- (18) Take the disc pack out of the brake housing.



7577AAXF019

- (19) Install slotted pins (6EA) in the support shim until they are flush-mounted.



7577AAXF020

(14) Install cup springs (7 pieces each/pin).

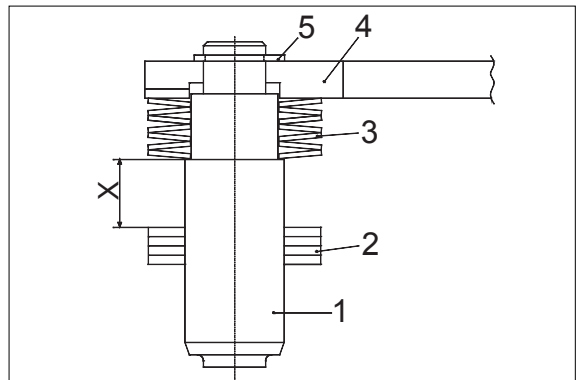
- ※ Pay attention to the installation position of the cup springs, see below sketch.



7577AAXF052

To the sketch :

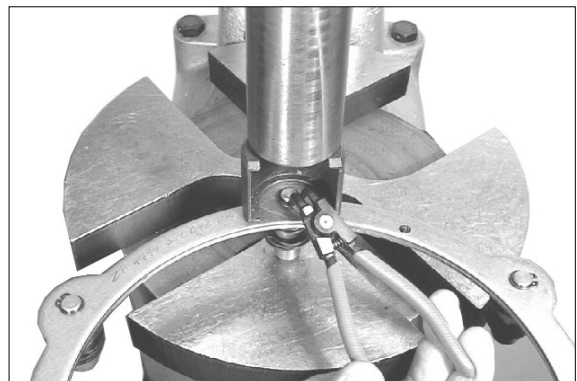
- 1 Pin
- 2 Gripping rings
- 3 Cup springs
- 4 Support shim
- 5 Circlip
- X Installation dimension gripping rings
10.5 $^{+0.3}_{-0}$ mm



7577AAXF053

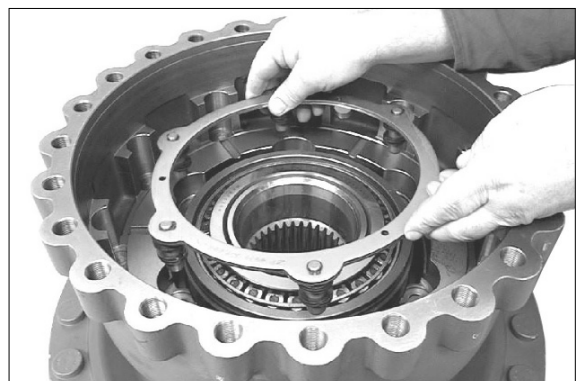
(15) Insert preassembled pins into the support shim and fix it by means of the circlip.

- ※ Special tool
Assembly pliers 5870 900 051
- ※ Pay attention to clearance of the cup springs.



7577AAXF054

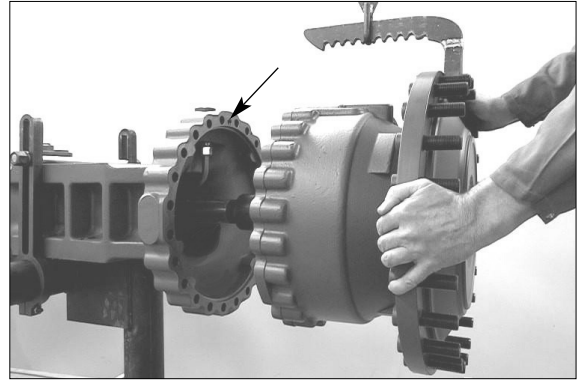
(16) Insert preassembled support shim into the piston.



7577AAXF055

- ④ Separate complete output from the axle casing.

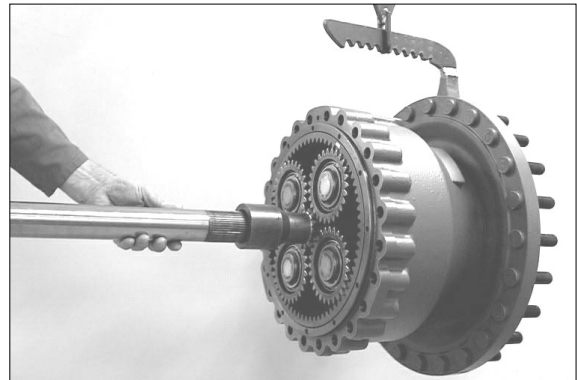
※ Pay attention to released O-ring(see arrow).



7577AAXF008

- ⑤ Pull stub shaft out of the sun gear shaft.

※ Pay attention to released shim(s).



7577AAXF009

- ⑥ Loosen hexagon screws.

※ Mark location of differential carrier to the axle casing (see arrows).

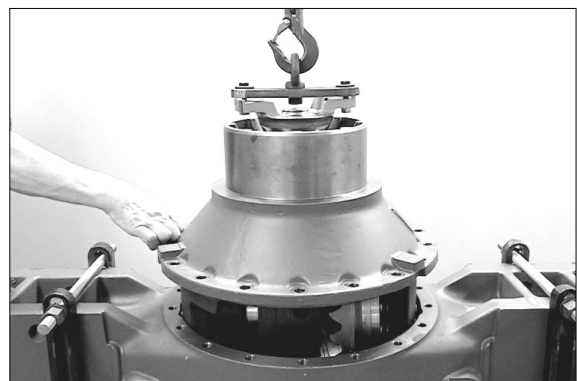


7577AAXF081

- ⑦ Lift differential carrier by means of lifting tackle out of the axle casing.

※ Special tool
Lifting tackle

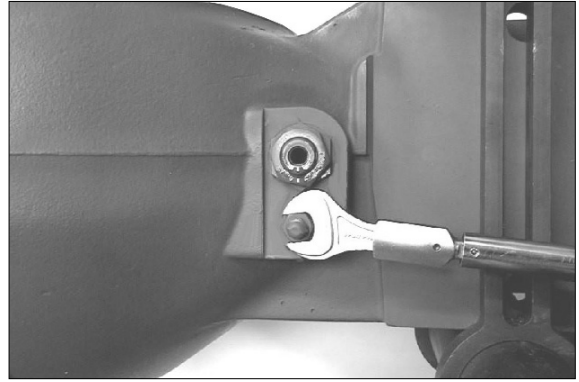
5870 281 044



7577AAXF082

⑧ Install screw plug.

- Tightening torque : 7.1kgf · m
(51.6lbf · ft)



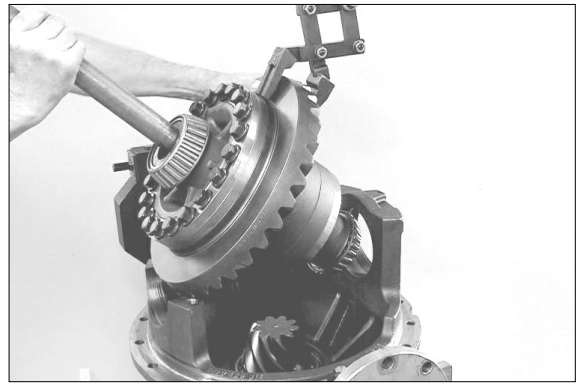
7577AAXF116

- ③③ Insert differential into the axle drive housing by means of lifting tackle.

※ Special tool

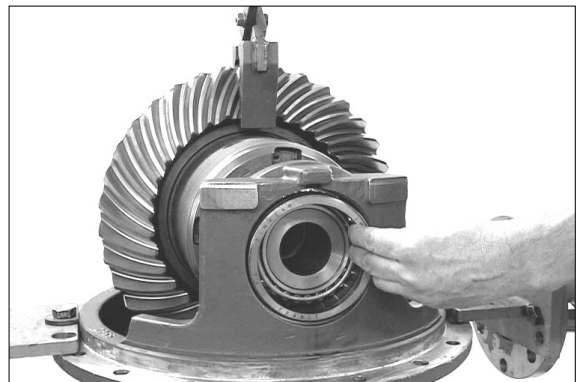
Lifting tackle

5870 281 013



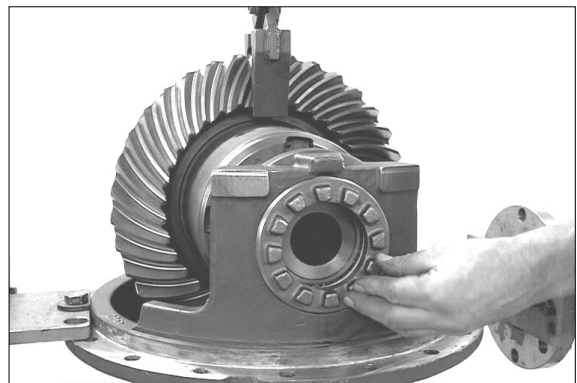
7577AAXF148

- ③④ Place bearing outer ring into the axle drive housing.



7577AAXF149

- ③⑤ Preliminarily fix the bearing outer ring by means of adjusting nut.



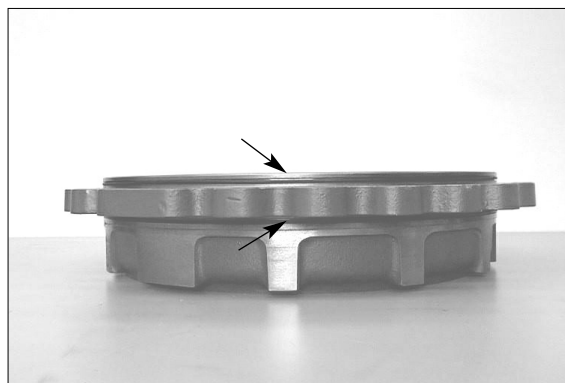
7577AAXF150

- ③⑥ Install crown wheel-sided bearing outer ring.



7577AAXF151

- (16) Remove O-rings (see arrows) from the annular grooves of the ring gear.



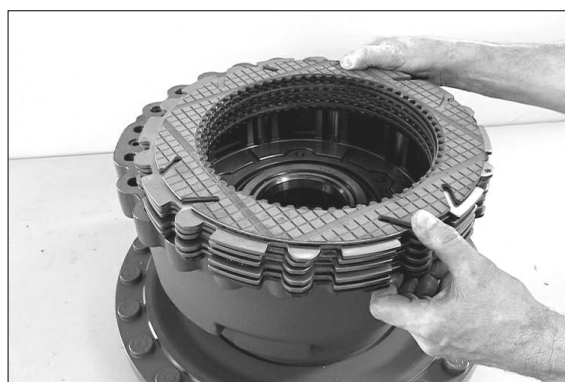
7577AAXF017

- (17) Remove O-ring (see arrow) from the recess of the brake housing.



7577AAXF018

- (18) Take the disc pack out of the brake housing.



7577AAXF019

- (19) Install slotted pins (6EA) in the support shim until they are flush-mounted.



7577AAXF020

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(14) Install cup springs (7 pieces each/pin).

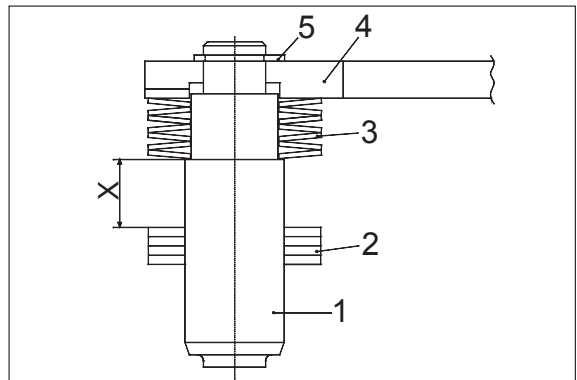
- ※ Pay attention to the installation position of the cup springs, see below sketch.



7577AAXF052

To the sketch :

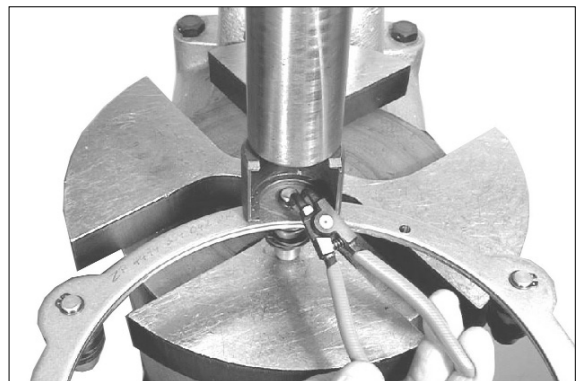
- 1 Pin
- 2 Gripping rings
- 3 Cup springs
- 4 Support shim
- 5 Circlip
- X Installation dimension gripping rings
10.5 $^{+0.3}_{-0}$ mm



7577AAXF053

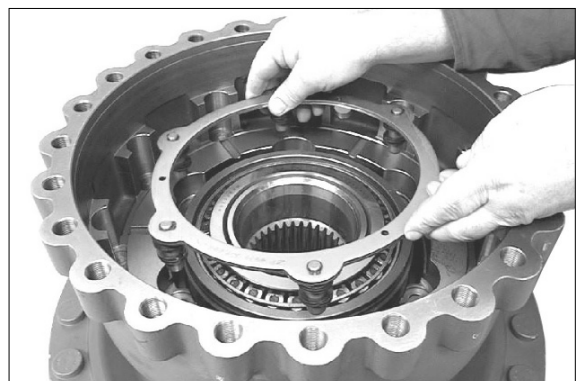
(15) Insert preassembled pins into the support shim and fix it by means of the circlip.

- ※ Special tool
Assembly pliers 5870 900 051
- ※ Pay attention to clearance of the cup springs.



7577AAXF054

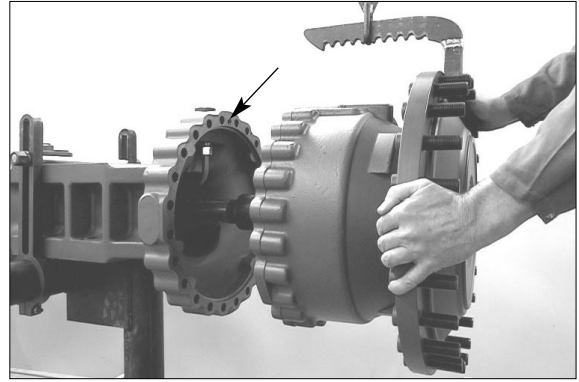
(16) Insert preassembled support shim into the piston.



7577AAXF055

- ④ Separate complete output from the axle casing.

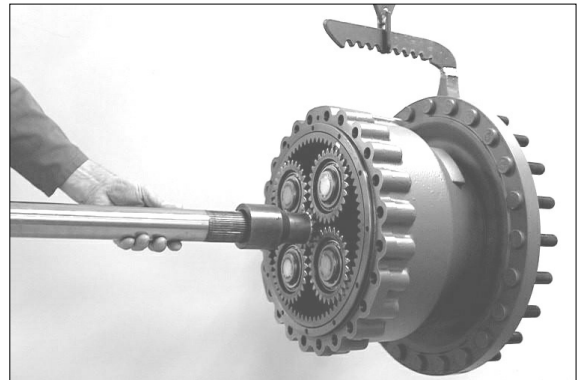
※ Pay attention to released O-ring(see arrow).



7577AAXF008

- ⑤ Pull stub shaft out of the sun gear shaft.

※ Pay attention to released shim(s).



7577AAXF009

- ⑥ Loosen hexagon screws.

※ Mark location of differential carrier to the axle casing (see arrows).

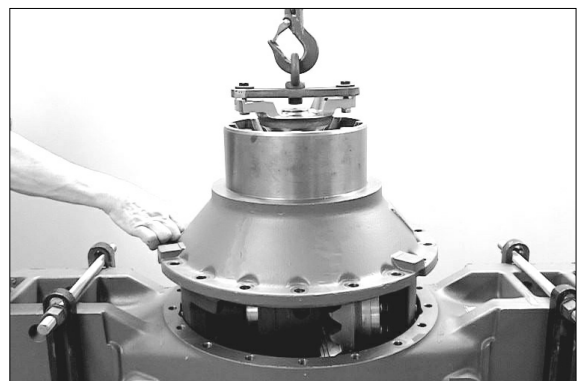


7577AAXF081

- ⑦ Lift differential carrier by means of lifting tackle out of the axle casing.

※ Special tool
Lifting tackle

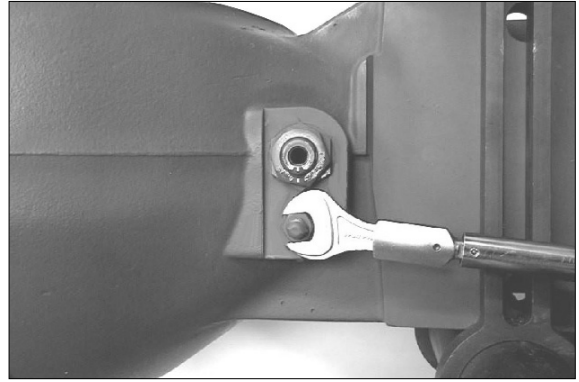
5870 281 044



7577AAXF082

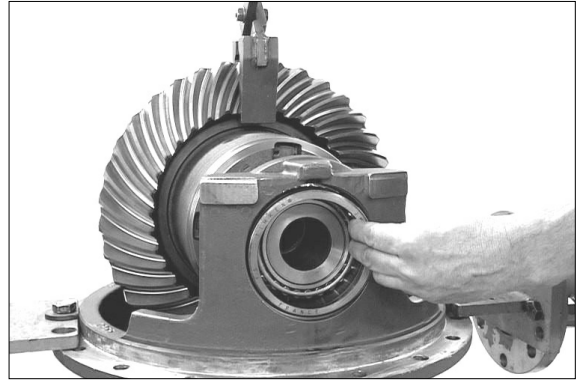
⑧ Install screw plug.

- Tightening torque : 7.1kgf · m
(51.6lbf · ft)

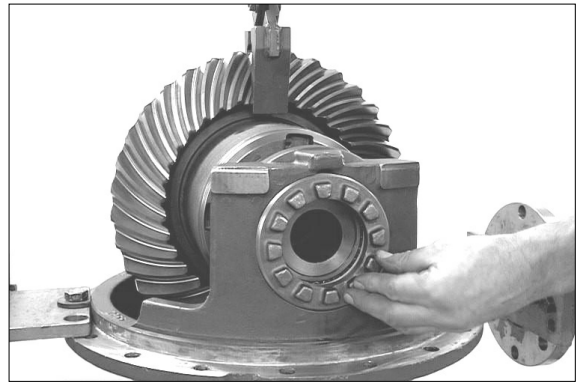


7577AAXF116

- ③③ Place bearing outer ring into the axle drive housing.



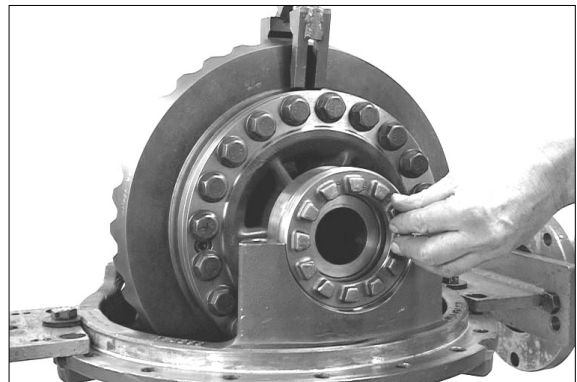
- ③④ Preliminarily fix the bearing outer ring by means of adjusting nut.



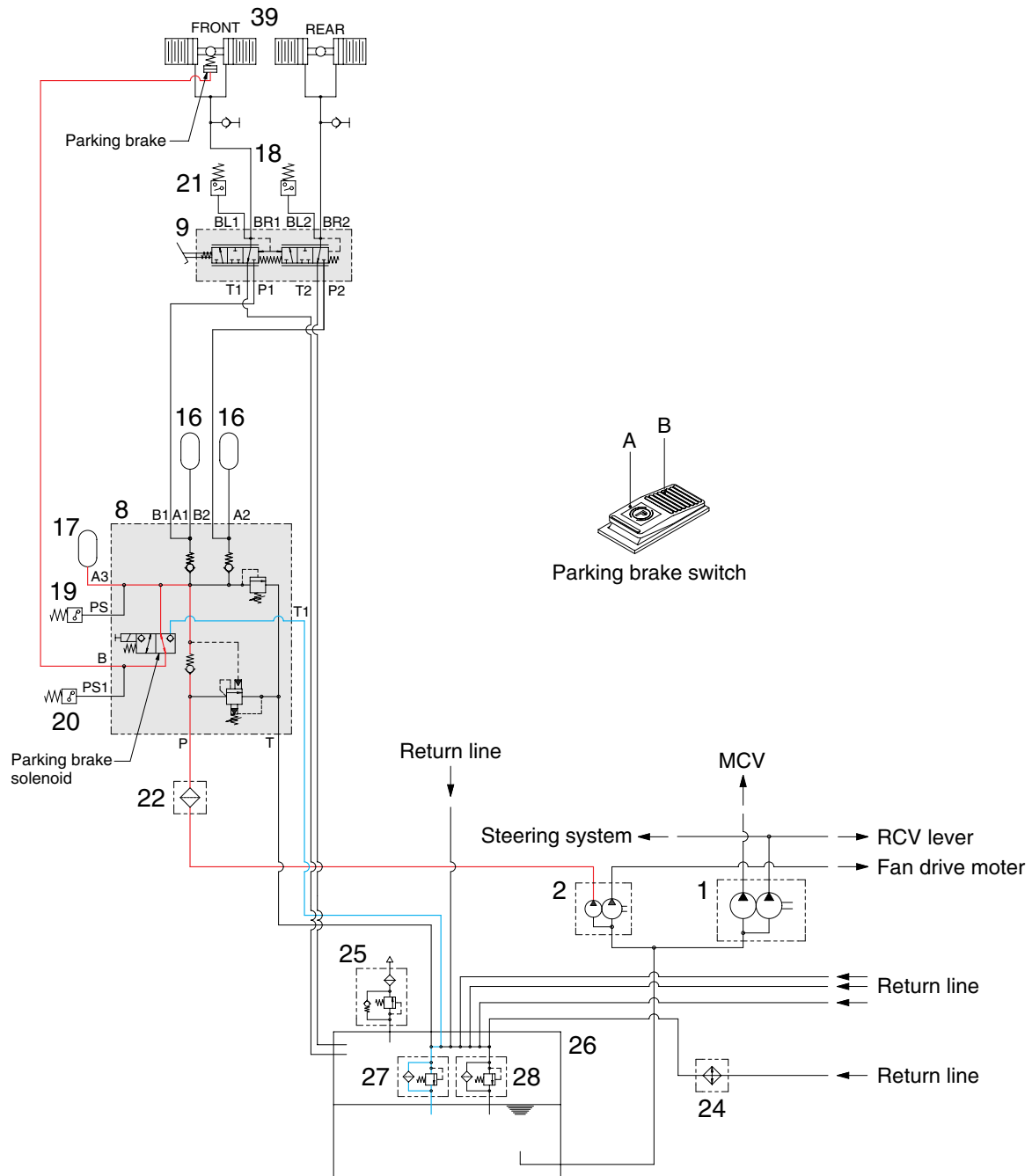
- ③⑤ Install crown wheel-sided bearing outer ring.



- ③⑥ Preliminarily fix the crown wheel-sided bearing outer ring by means of the second adjusting nut.



3) PARKING BRAKE RELEASED

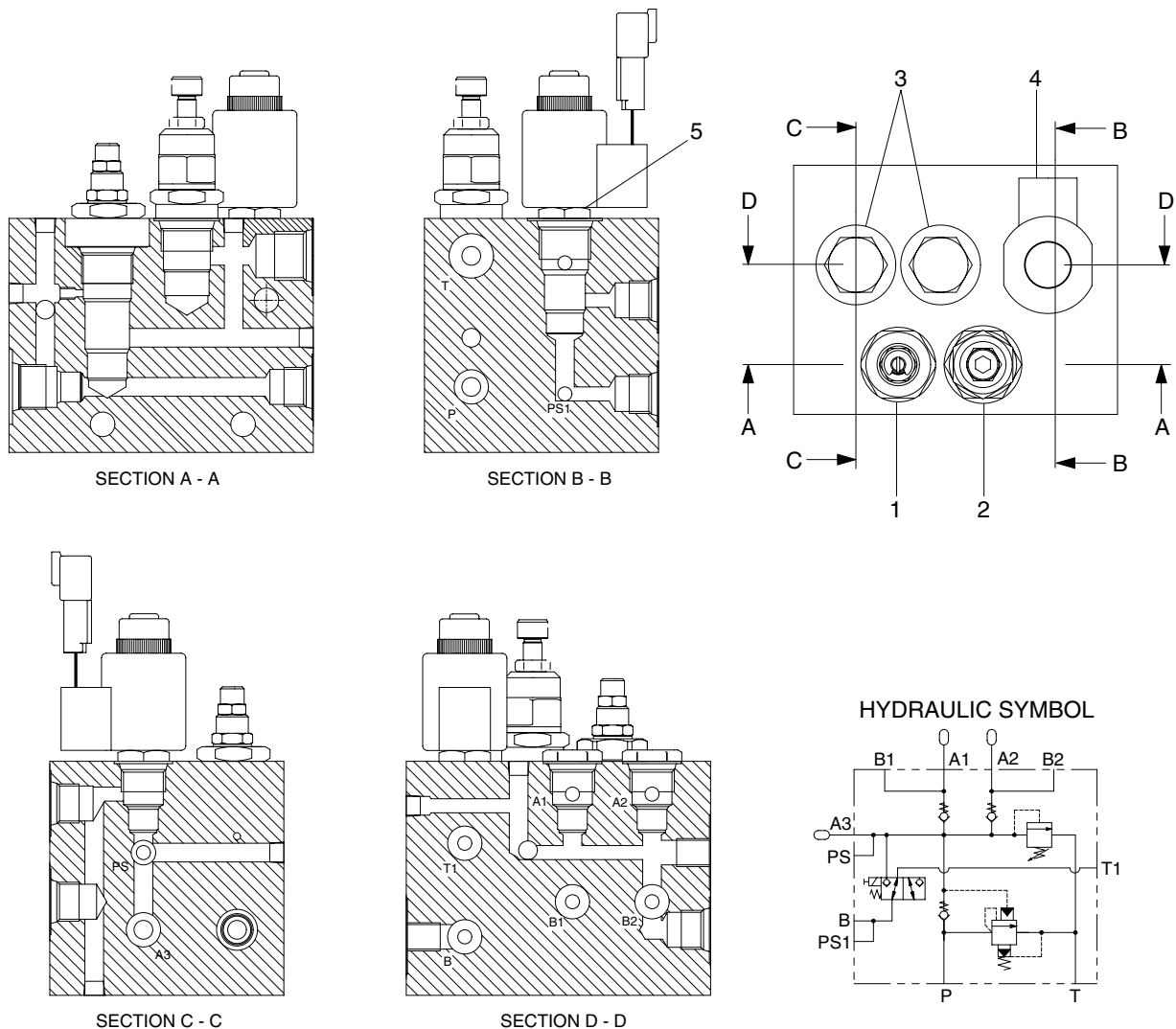


7607ABS04

When the parking brake switch is pressed B position, the solenoid valve is energized and the hydraulic oil controlled the pressure level by the cut-off valve enters the parking brake. It overcomes the force of the spring and pushes the piston rod. This releases the brake. Therefore, the hydraulic oil pressure is applied to the parking brake piston through the solenoid valve and the parking brake is kept released.

5. CUT-OFF VALVE

1) STRUCTURE



- 1 Cut-off valve
- 2 Relief valve
- 3 Check valve

- 4 Coil
- 5 Solenoid valve

2) OPERATION

When the pump works, the oil under the pressure flows into P port.

The oil in P port is stored in the accumulator on A3 port.

As the pressure on P line rises to 150bar, the cut off valve(1) starts cut-offting and the oil in the P port is unloaded. The pressure on P line goes down 120bar by the minute leakage from valve and other factors.

At this pressure, the cut-off valve starts cut-ining.

This process is repeated in the regular period of 30~40 seconds.

7707ABS06

(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
M16(SW 8)	Min.	0.5	1/4
	Clearance	1.0	1/2
	Max.	1.5	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.

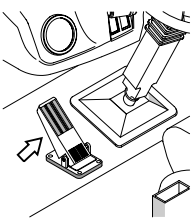
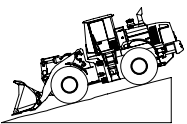
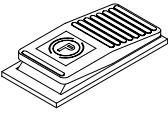
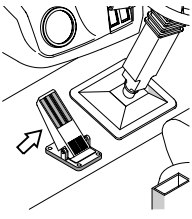
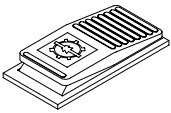
※ For bleeding the piston chamber use the socket spanner size 13 for the bleeding valve.

(3) ADJUSTING REGULATIONS

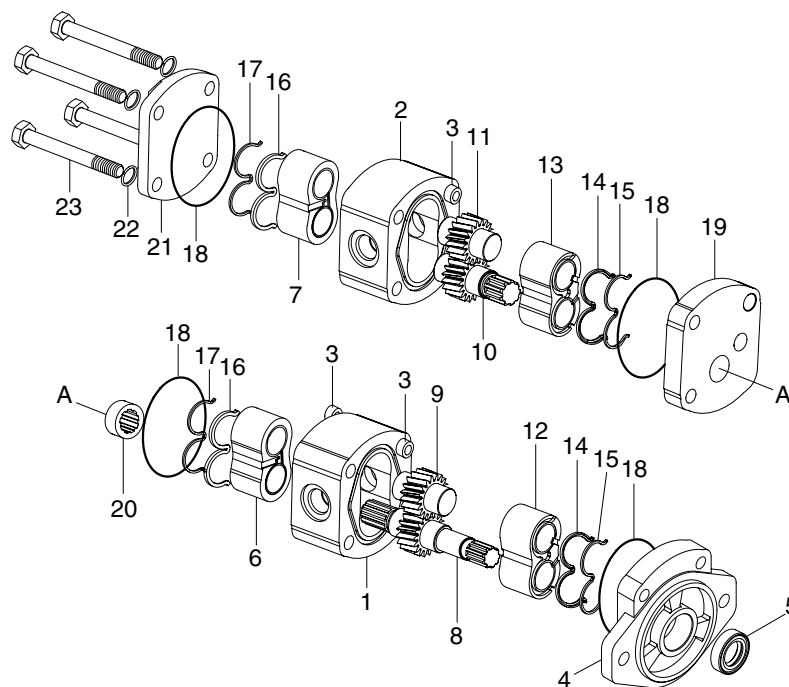
During this adjusting process, the parking brake must be released, i.e. the bank of cup springs must be completely pre-tensioned.

- 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. Inspect clutch cut-off linkage.
Service and parking brake system drag checks Engine running	 Position machine on gradual slope. Lower bucket approximately 50mm(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, go to group 3. 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 on group 3.
Clutch cut-off check	 Place clutch cut-off switch in ON 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 pressure switch can be adjusted to operator preference to match your loading needs.	OK Check completed. NOT OK Adjust clutch cut-off switch, see group 3.

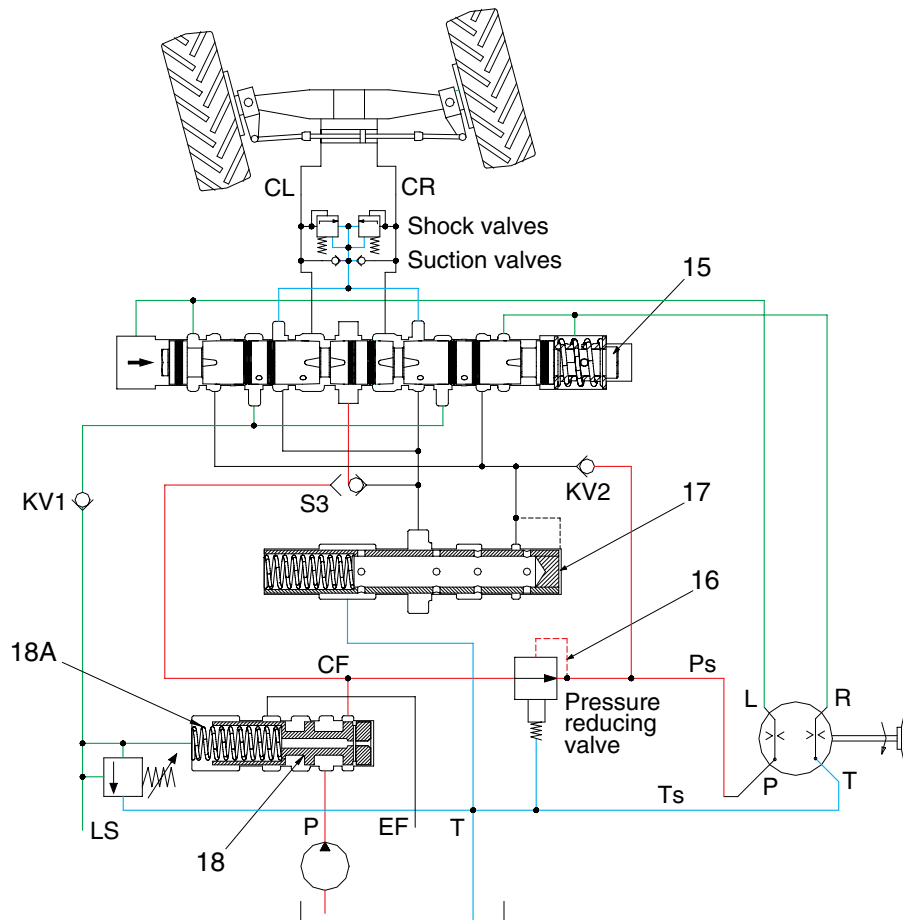
ASSEMBLY



7707BS25

- (8) Fit coupling(20) to the plate(19).
 - (9) Holding the whole unit together carefully turn it over, making sure it is supported on the spacer plate(19) not the shaft.
 - (10) Slide off the rear over and fit seals as in(5) and (6) above.
 - (11) Fit the rear cover(21), taking care not to dislodge the backup seal(16) and bolt(23) the unit together.
 - Tightening torque : 4.8kgf · m(35lbf · ft)
- ※ Pour a small amount of oil into a port and check that the shaft can be rotated without undue force using a smooth jawed hand wrench hooked around the shaft or a suitable half coupling locked against the key.

(2) Turning left



7607SE13

- When the steering wheel is turned to the left, the pressure oil from the steering unit fill on the left side chamber of main steering spool(15), and main steering spool(15) moves to the right in the direction.
- At the same time of moving of main steering spool(15), LS signal will be blocked.
- If LS signal of main steering spool(15) is blocked, it cause to increase pressure of left chamber of priority valve(18A) and then priority valve(18) to be pushed to right side. Consequently, oil will flow via CF of priority valve to main spool. That oil will push steering cylinder rod out and it will cause wheel loader to be steered to left side.
- The rate of movement of main steering spool(15) is concluded as flow rate, which is kept in left chamber from steering unit. Furthermore the rate controls speed of movement for cylinder.
- When the cylinder reaches to end position, pressure of oil flowing through main steering spool(15) will get to be increased. If the oil pressure increase up to relief pressure to be set, relief valve will be activated. It result in decreasing pressure of left chamber of priority valve(18A), and will push priority valve(18) to right side. Then, oil flow to cylinder will be blocked.

Problem	Cause	Remedy
Slow or hard steering	Too much friction in the mechanical parts of the machine Cold oil Low priority valve pressure setting Worn hydraulic pump Sticking priority valve spool Broken priority valve spring	Lubricate bearings and joints of steering column or repair if necessary. Check steering column installation. Warm the hydraulic oil. Do priority valve pressure test in group 3. Clean or replace cartridge in steering valve. Do hydraulic pump performance check . Remove and inspect. Remove and inspect.
Constant steering to maintain straight travel	Air in system Leakage in steering system Worn steering unit Leaf spring without spring force or broken Spring in double shock valve broken Gear wheel set worn Cylinder seized or piston seals worn	Check for foamy oil. Do steering system leakage check. Do steering system leakage check. Do steering unit neutral leakage test in group 3. Replace leaf springs. Replace shock valve. Replace gear wheel set. Replace defects parts.
Slow steering wheel movement will not cause any frame movement	Leakage in steering unit gerotor Worn steering unit gerotor	Do steering system leakage check. 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 Lack of oil in steering unit Leakage in steering system	Remove and inspect. Start engine and check steering operation. Do steering system leakage test in group 3.

5. STEERING VALVE(EHPS) PRESSURE TEST

• SPECIFICATION

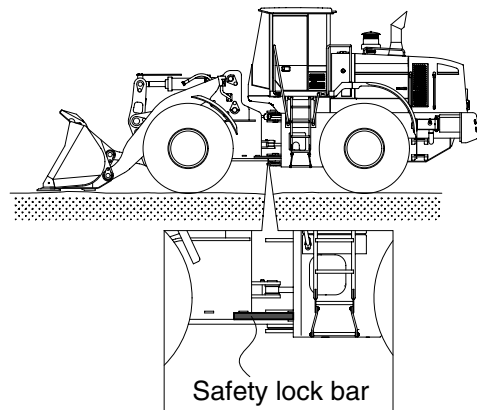
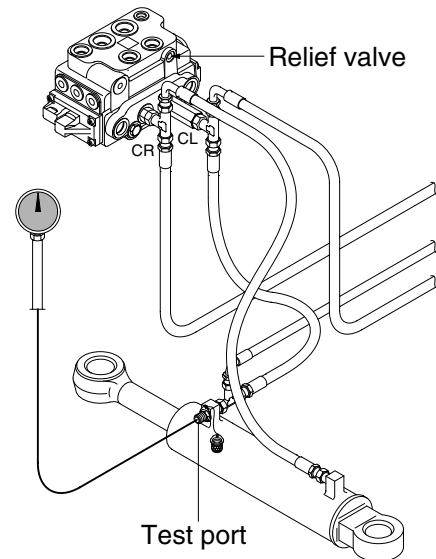
Oil temperature	$45 \pm 5^{\circ}\text{C}$ ($113 \pm 9^{\circ}\text{F}$)
Engine speed	High idle
Oil pressure	20.1~21.1MPa (205~215bar, 2900~3100psi)

• GAUGE AND TOOL

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

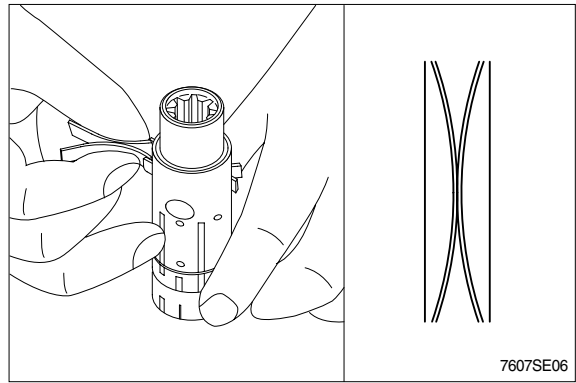
- 1) Connect gauge to test port.
- 2) Install temperature reader(See installation procedure in this group).
- 3) Install frame locking bar.
- 4) Heat hydraulic oil to specifications(See hydraulic oil warm up procedure at page 6-50).
- 5) Run engine at specifications and turn steering wheel rapidly hold 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 steering valve relief pressure.
- 7) If pressure is 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 steering valve.

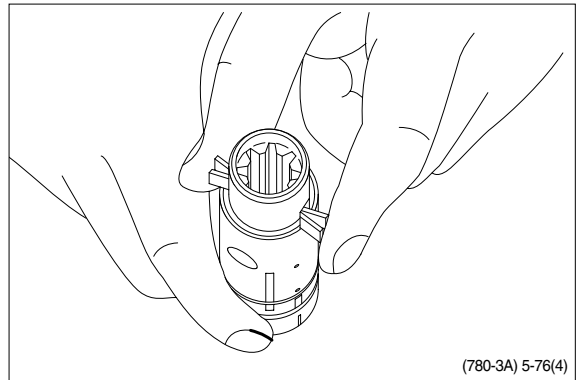


7607ASE20

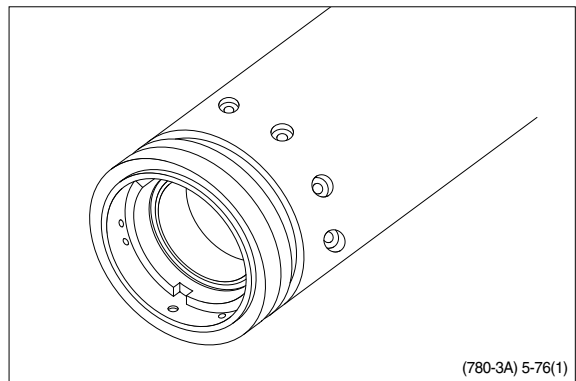
- (1) Place the two flat neutral position springs in the slot.
Place the curved springs between the flat ones and press them into place.



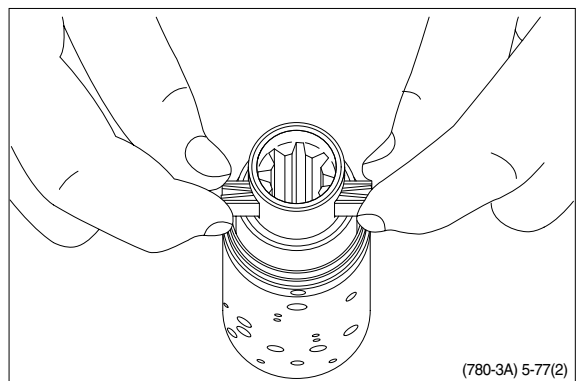
- (2) Line up the spring set.



- (3) Assemble the spool/sleeve and make sure the marks on spool and sleeve are opposite each other(see drawing page 5-36).

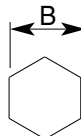


- (4) Press the springs together and push the neutral position springs into place in the sleeve.



2) TOOLS AND TIGHTENING TORQUE

(1) Tools

Tool name	B	Remark
L-wrench	5	
Spanner	36	
Wrench	For gland	
(-) Driver	Small and large sizes	
Torque wrench	Capable of tightening with the specified torques	

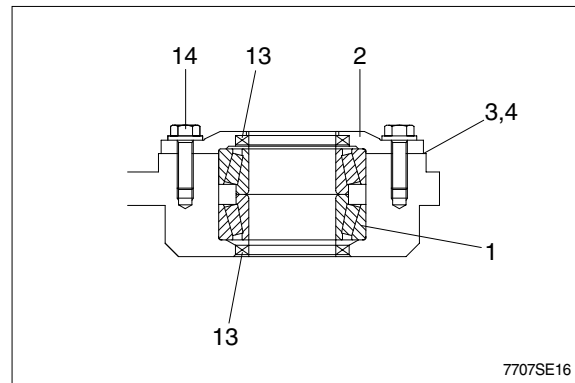
(2) Tightening torque

Part name	Item	Size	Torque	
			kgf · m	lbf · ft
Gland	3	M85×3	75±8	542±58
Piston	13	M36×3	50±5	362±36
Piston nut	17	M36×3	75±8	542±58
Set screw	18	M10×1.5	5.4±0.5	39±3.6

(8) Remove bolt(14) and then take out cover(2) and shims(3,4).

(9) Take out dust seal(13) from the cover(2).

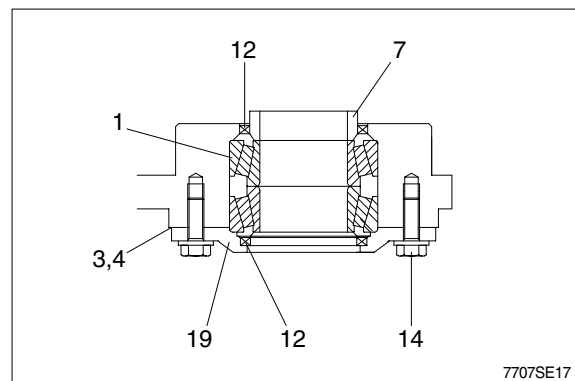
(10) Remove the bearing(1), and dust seal(13).



(11) Remove bolt(14) and then take out cover(19) and shims(3,4).

(12) Take out the dust seal(12) from the cover(19).

(13) Remove the bearing(1), collar(7) and dust seal(12).



3) INSPECTION

(1) Check the bearing sliding surface for excessive wear, scorching or scratches; replace if necessary.

(2) Replace all dust seals(12,13) with new ones.

(3) Grind any pins(6, 10) dented with an oilstone or replace any pins abrasive excessively.

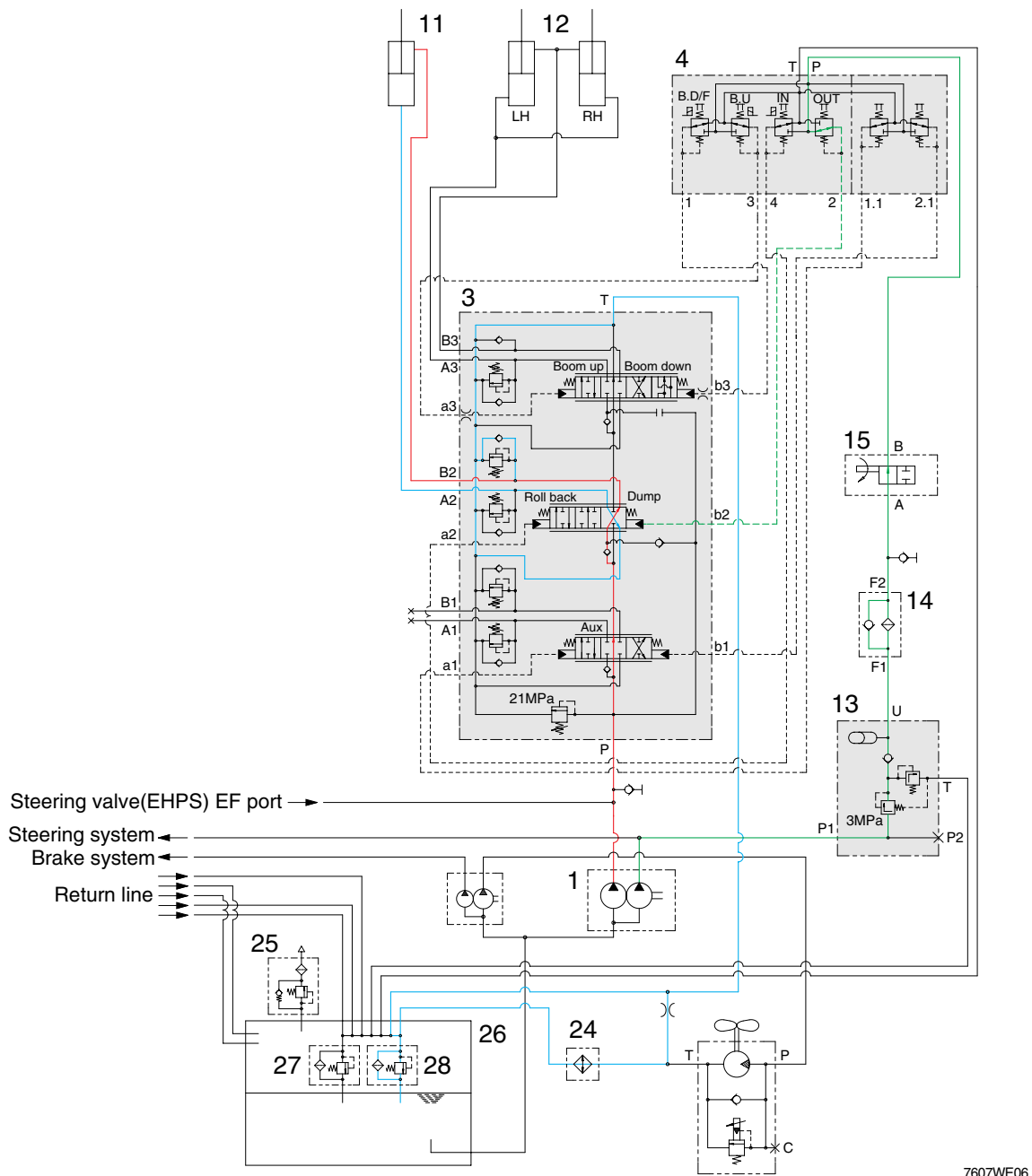
(4) Check inside cover(2, 19) and collar(7, 8) for dents or scratches; if any damage is found, correct with a grinder or replace.

(5) The serviceable limit of pins and bushings is shown in the table below.

Unit : mm

Item No.	Name	Std dimension	Serviceable limit			Remedy
			Outer dia	Inner dia	Clearance	
6, 10	Pin	90	89.5		0.8	Replace
1	Tapered roller bearing			90.5		
7, 8	Collar			90.5		
12, 13	Dust seal	When removed				Replace

4) WHEN THE RCV LEVER IS IN THE DUMP POSITION

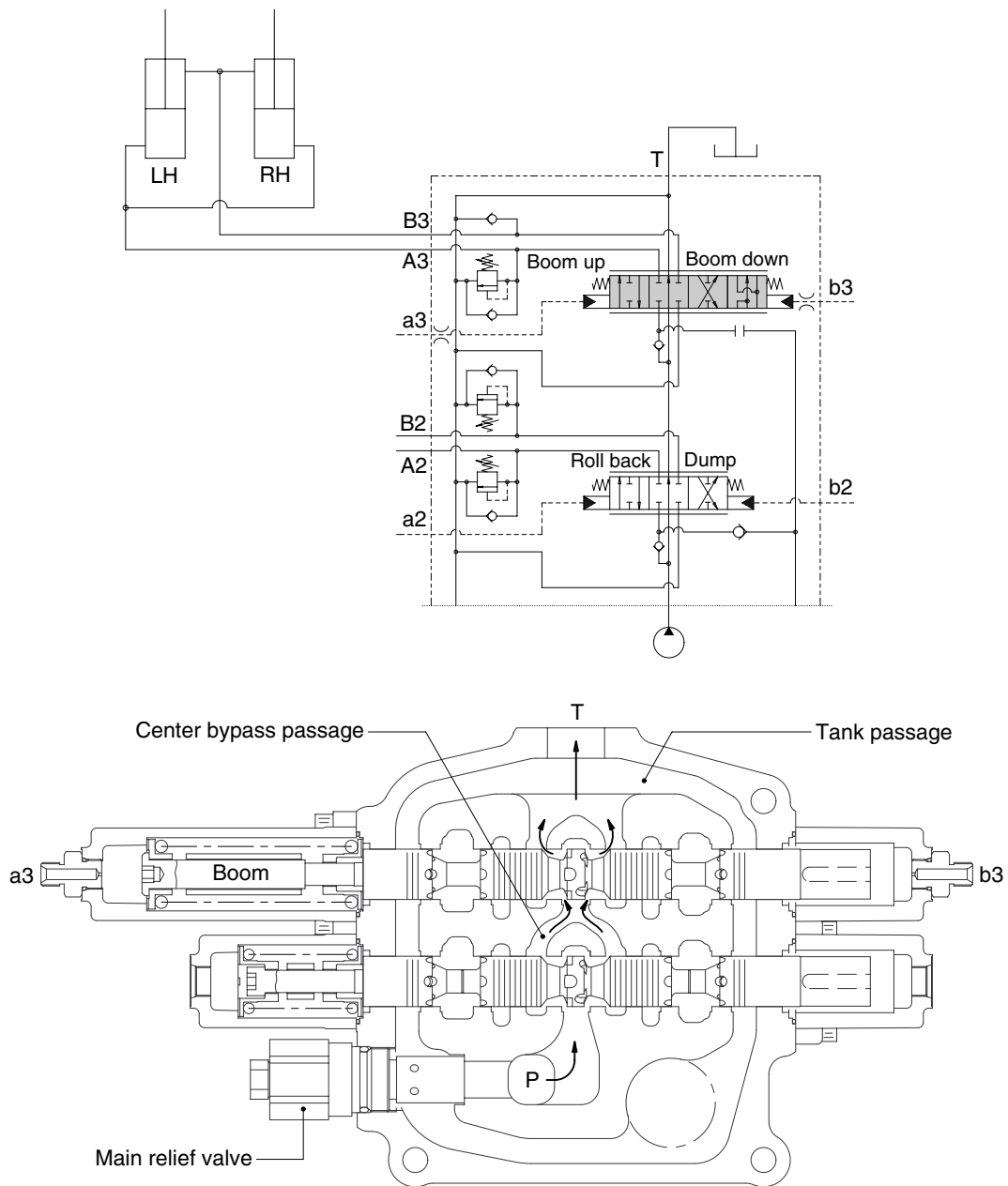


7607WE06

- If the RCV lever(4) is pushed right, the bucket spool is moved to dump position by pilot oil pressure from port 2 of RCV.
- The oil from main pump(1) flows into main control valve(3) and then goes to the small chamber of bucket cylinder(11) by pushing the load check valve of the bucket spool.
- The oil at the large chamber of bucket cylinder(11) returns to hydraulic tank(26) through the bucket spool.
- When this happens, the bucket is dumped.
- When the dumping speed of bucket is faster, the oil returned from the large chamber of bucket cylinder combines with the oil from the pump, and flows into the small chamber of the cylinder. This prevents cylinder cavitation by the negative pressure when the pump flow cannot match the bucket dump speed.

2) BOOM SECTION OPERATION

(1) Spool in neutral

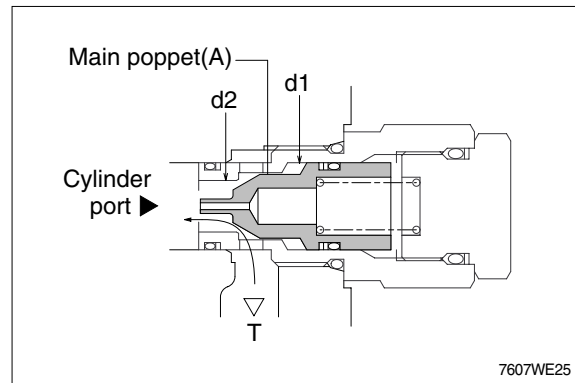


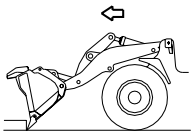
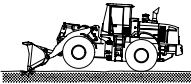
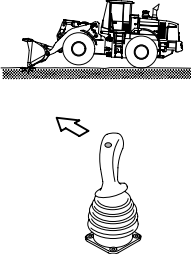
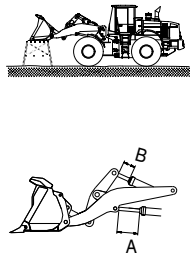
7607WE11

When the boom plunger is in neutral position, oil from the pump flows to the tank through the center bypass line.

The cylinder port(A3, B3) are shut off from the high pressure feed passage and tank passage by the boom plunger.

- (2) When the cylinder port pressure comes to lower than the tank passage pressure (closer to negative pressure), the poppet (A) opens receiving the tank passage pressure for the difference in area between d_2 and d_1 . Oil from the tank passage flows to the cylinder port in order to prevent cavitation.



Item	Description	Service action
Bucket rollback circuit relief valve check	 Position bucket at a 45° angle against an immovable object. Engage transmission in 3rd speed forward. LOOK : Bucket angle must not change.	OK Check complete. NOT OK Replace boom lower check valve.
Bucket dump circuit relief valve low pressure check	 Raise front of machine which bucket at 45° angle. Backdrag with bucket while observing bucket angle. LOOK : Bucket must not rollback	OK Go to next check. NOT OK Do loader system and circuit relief valve test at page 6-52.
Pilot control valve float check Run engine at low idle.	 With the bucket partially dumped, lower boom to raise front of machine. Push control lever to the float detent position and release lever. LOOK : Front of machine lower to the ground and valve must remain in float position when lever is released.	OK Check complete. NOT OK Do pilot control valve pressure test in group 3.
Boom cylinder and bucket cylinder drift check Heat hydraulic oil to operating temperature.	 Set the boom and bucket horizontal, then stop the engine. Stop the engine, wait for 5 minutes, then start measuring. Measure the amount the lift and dump cylinder rods retract during 15 minutes.(Unloaded bucket) A : Retraction of boom cylinder rod B : Retraction of bucket cylinder rod Boom cylinder must drift less than 40mm Bucket cylinder must drift less than 50mm	OK Check complete. NOT OK Go to next check.

- 5) Start the filter caddy. Check to be sure oil is flowing through the filters.

Operate filter caddy approximately 10 minutes so oil in hydraulic oil tank is circulated through filter a minimum of four times.

- ※ **Hydraulic oil tank capacity : 150 l (39.7U.S. gal)**

Leave filter caddy operation for the next steps.

- 6) Start the engine and run it at high idle.

- ※ **For the most effective results, cleaning procedure must start with the smallest capacity circuit then proceed to the next largest capacity circuit.**

- 7) Operate all functions, one at a time, through a complete cycle in the following order: Clam, steering, bucket, and boom. Also include all auxiliary hydraulic functions.

Repeat procedure until the total system capacity has circulated through filter caddy seven times, approximately 30 minutes.

Each function must go through a minimum of three complete cycles for a through cleaning for oil.

- ※ **Filtering time for machines with auxiliary hydraulic functions must be increased because system capacity is larger.**

- 8) Stop the engine. Remove the filter caddy.

- 9) Install a new return filter element.

- 10) Check oil level in reservoir; Add oil if necessary.

10. PILOT CONTROL VALVE PRESSURE TEST

· SPECIFICATION

Oil temperature $45 \pm 5^{\circ}\text{C}$ ($113 \pm 9^{\circ}\text{F}$)

Engine speed Low idle

Begin metering $1/4"$ of lever travel

Pressure in detent :

Boom float detent 1.9MPa (19bar)

Pressure at feel position :

Boom power down 19~22bar

Boom raise 19~22bar

Bucket rollback 19~22bar

Bucket dump 19~22bar

· GAUGE AND TOOL

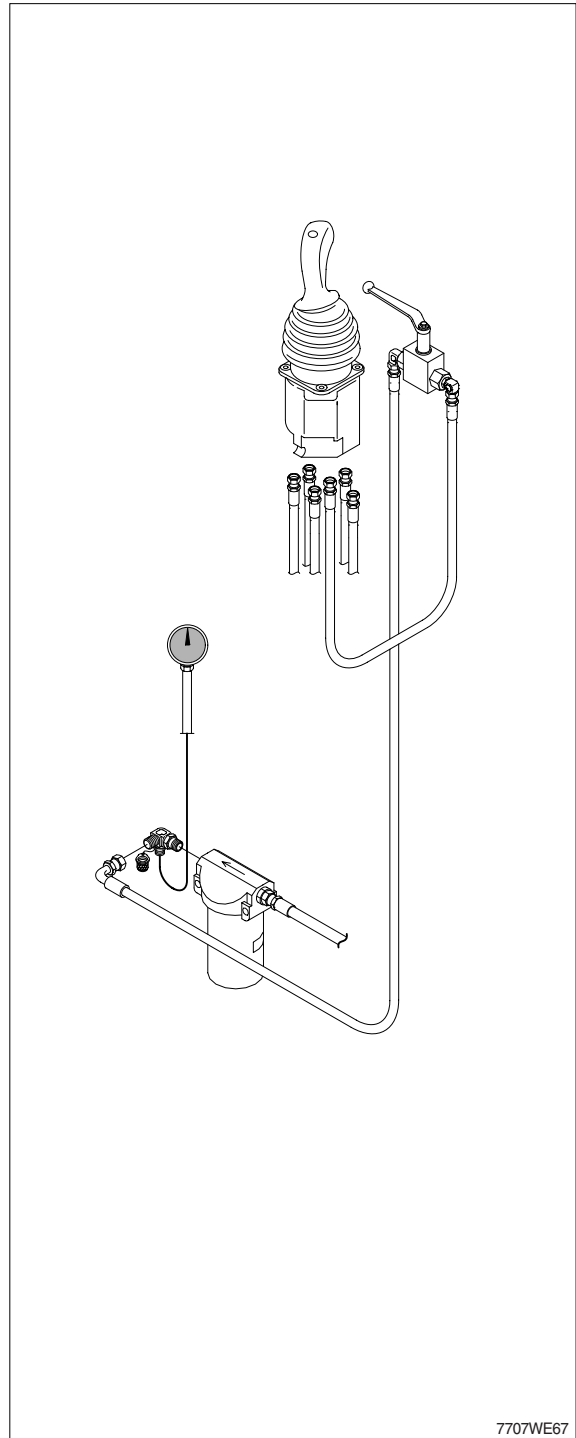
Gauge 0~7MPa (0~70bar, 0~1000psi)

As the control lever is moved from neutral, the pilot pressure will suddenly jump up to approximately 5.8bar at $1/4$ in. travel. The pressure should then increase smoothly to the specification at the FEEL position (Or $3/4$ lever travel), and then jump up about 430psi as the lever is moved into detent.

This test will determine if adequate pilot pressure is available to move the loader control valve spools.

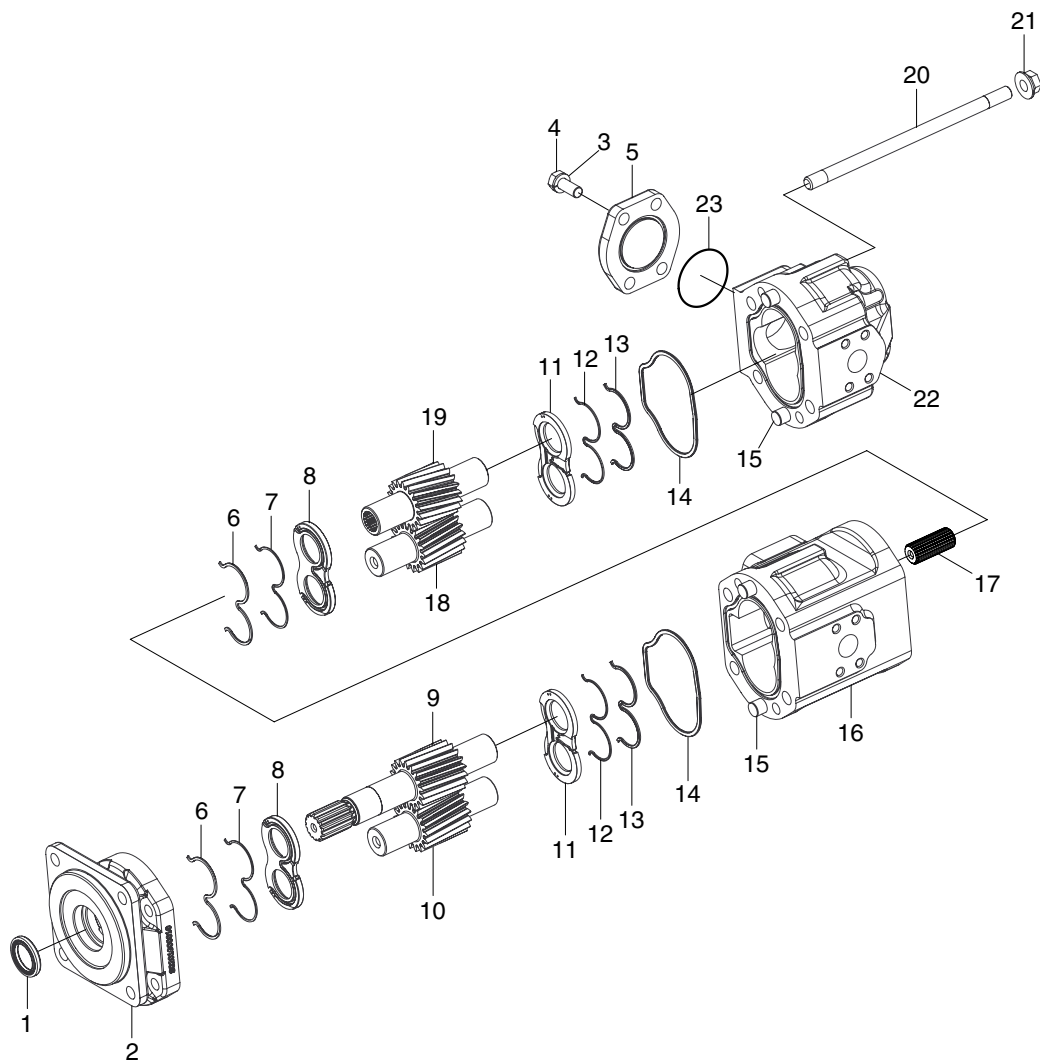
※ **The FEEL position is when lever is moved to feel the ramp of the detent before lever passes into detent position.**

- 1) Lower boom to ground.
- 2) Connect gauge to the pilot pressure port of function to be checked.
- 3) Install temperature reader (See temperature reader installation procedure in this group).
- 4) Heat hydraulic oil to specification (See hydraulic oil warm up procedure in this group).



7707WE67

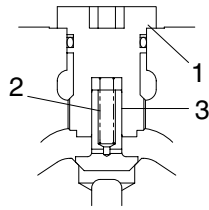
6) ASSEMBLY



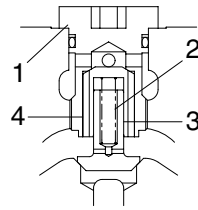
7607WE33

- ※ It is critical that the wearplates are assembled into the pump with regard to the following:
 - The seal side of the wearplate must be adjacent to the adaptor or body.
 - The high pressure side of the wearplate must be adjacent to the outlet port.
 - ※ This must take place in a clean dry area, ensuring that all parts are clean and free from contamination or loose particles. Lightly oil all surfaces.
- (1) Place body vertically with gear pockets upper most.
 - (2) Slide wearplate(11) complete with O-ring seal(12) and back up seal(13) down through the housing to the bottom of the gear pockets.
- ※ Be sure to refit the wearplate the same as that marked from this position during disassembly.
- (3) Fit the gears(18,19) within the housing taking care to replace as marked, with the teeth reassembled to their original related position.
 - (4) Fit the wearplate(8) complete with O-ring seal(7) and back up seal(6).
- ※ Be sure to refit the wearplate the same as that marked from this position during disassembly.

11) LOAD CHECK VALVE



- Bucket for 2-spools valve
- Aux for 3-spools valve
- Boom for 2 & 3-spools valve



- Bucket for 3-spools valve

7607WE57

Example for explanation : Bucket section of 3-spools valve(double check)

- (1) Remove cap(1) pull out spring(2), check (3) and (4)

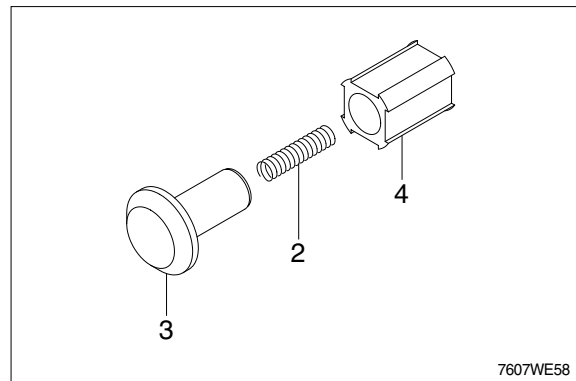
- Cap(2)

Width across flat : 36mm

Tightening torque : 25.5kgf · m(184lbf · ft)

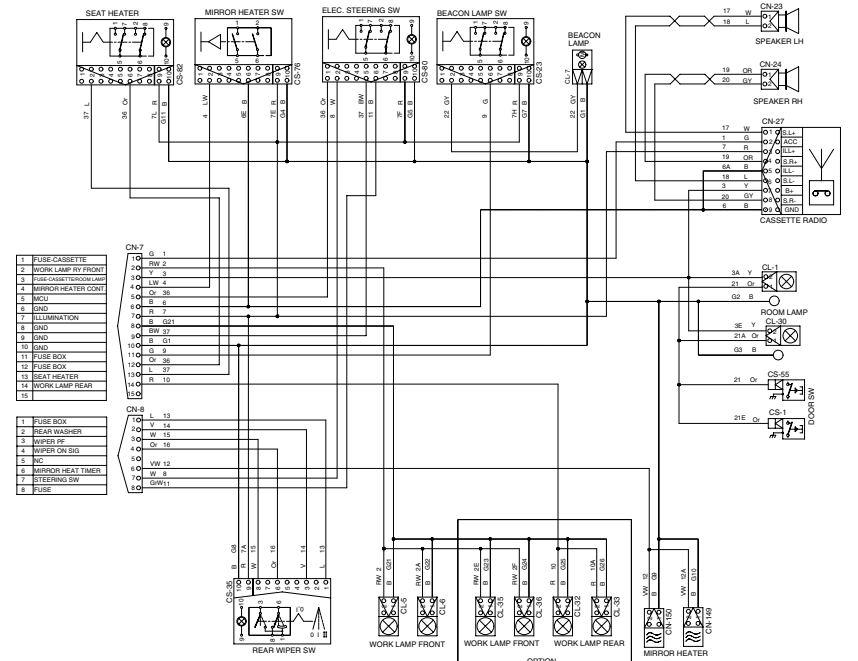
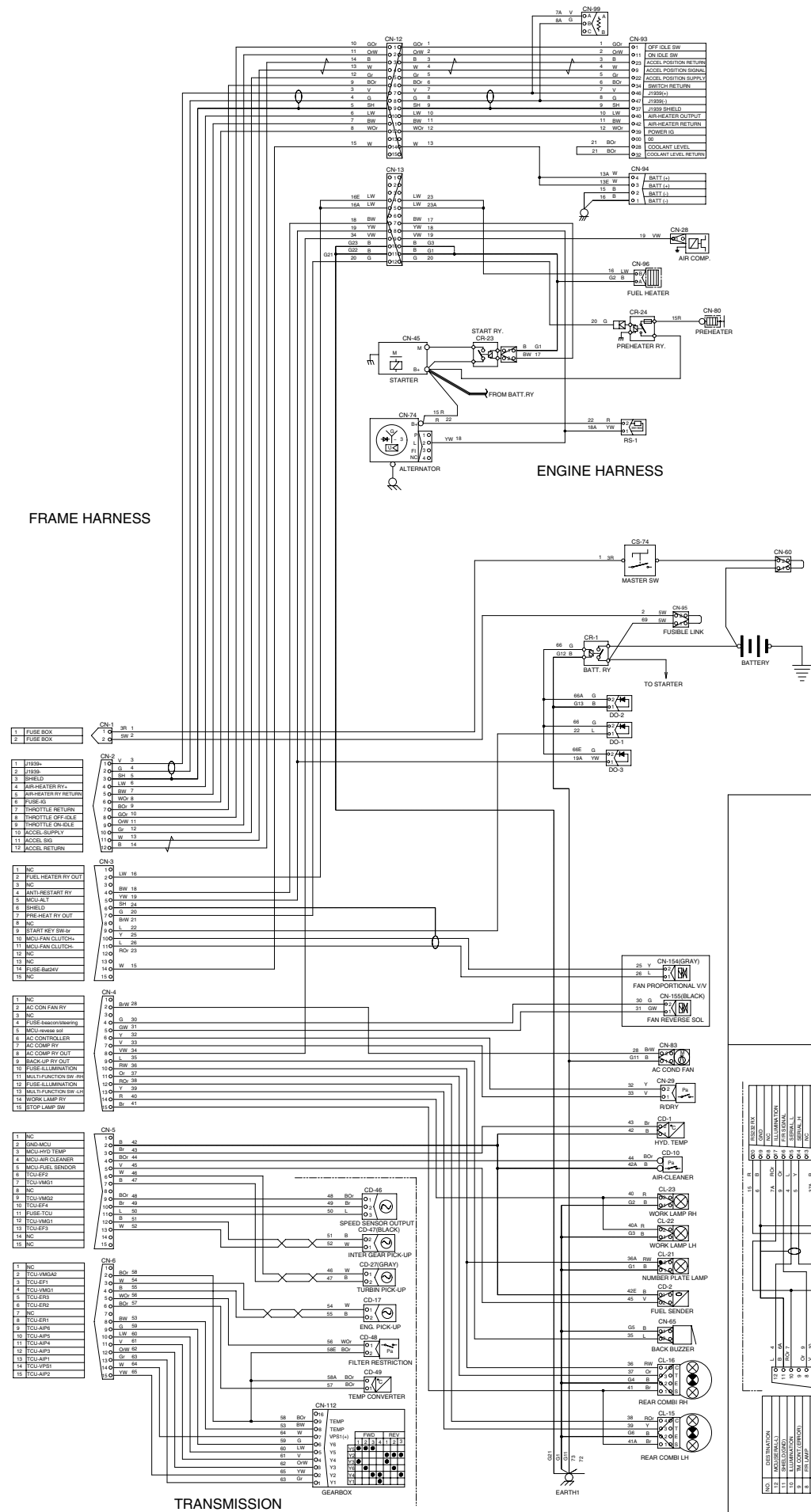
- ※ When reassembly ;
Be careful for the back-up ring not to protrude.

- ※ Only Bucket section has double check.

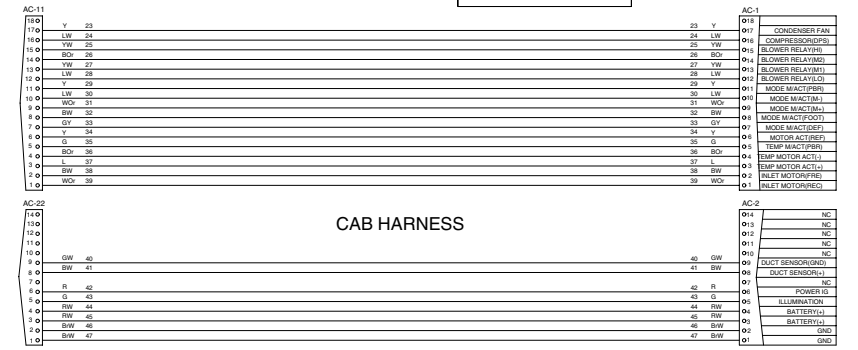


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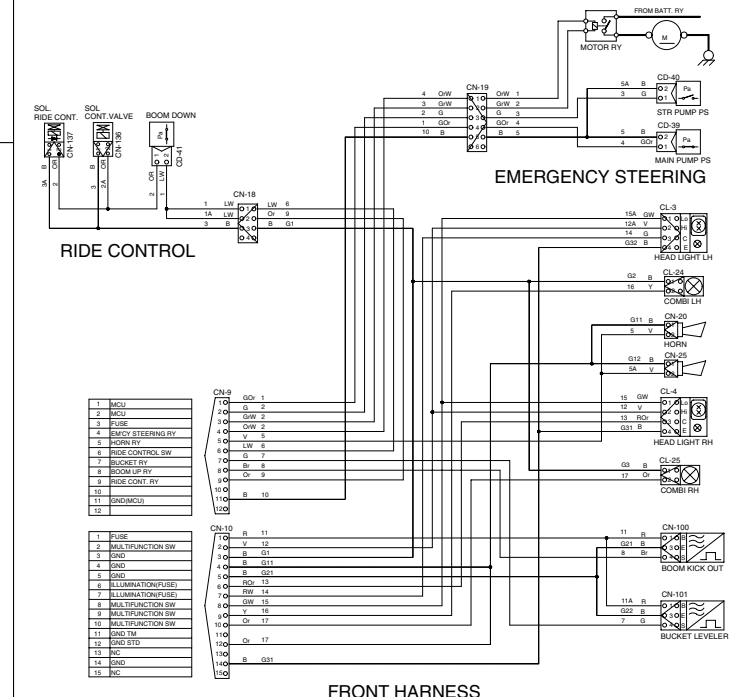
FRAME HARNESS



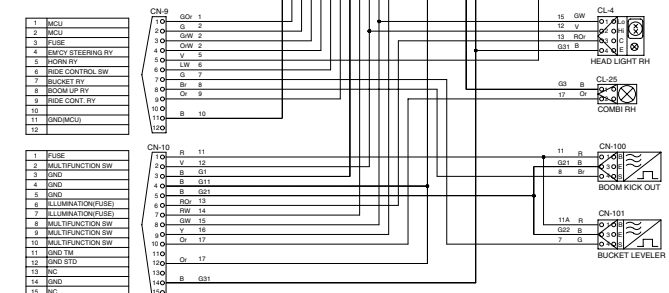
CAB HARNESS



EMERGENCY STEERING



FRONT HARNESS



5. CHARGING CIRCUIT

When the starter is activated and the engine is started, the operator releases the key switch to the ON position.

Charging current generated by operating alternator flows into the battery through the battery relay (CR-1).

The current also flows from alternator to each electrical component and controller through the fuse box.

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74(2)] → I/conn [CN-13(8)] → I/conn [CN-3(5)] → MCU [CN-58(25)]
→ Cluster charge warning lamp ON

(2) Charging flow

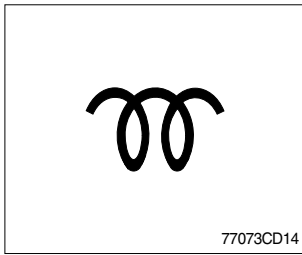
Alternator → Starter [CN-45(B⁺)] → Battery relay [CR-1]
└→ Battery(+) terminal → Charging
└→ Fusible link [CN-95(1)→(2)] → I/conn [CN-1(2)] → Fuse box

2) CHECK POINT

Engine	Key switch	Check point	Voltage
Running	ON	① - GND (Battery) ② - GND (Battery relay) ③ - GND (ALT B ⁺) ④ - GND (ALT 2) ⑤ - GND (MCU) ⑥ - GND (Fuse box)	20~28V

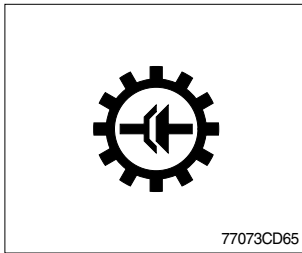
※ GND : Ground

12) PREHEATER PILOT LAMP



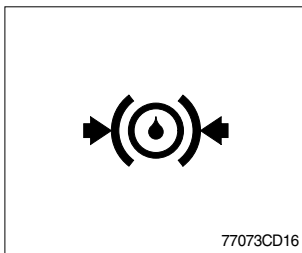
- (1) This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 5~45 seconds, depending on engine temperature, indicating that preheating is completed.
- (2) When the lamp goes out the operator should start cranking the engine.

13) CLUTCH CUT OFF PILOT LAMP



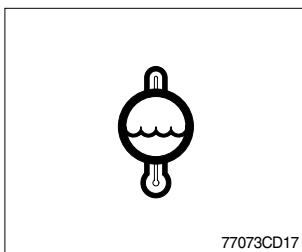
- (1) When the clutch cut off switch is pressed, the lamp lights ON.

14) BRAKE FAIL WARNING LAMP



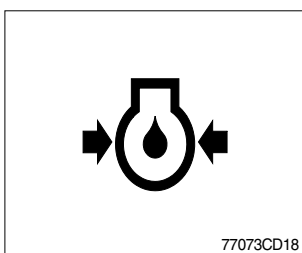
- (1) The lamp lights ON when the oil pressure of service brake drops below the normal range.
- (2) When the lamp is ON, stop the engine and check for its cause.
※ **Do not operate until any problems are corrected.**

15) ENGINE OVERHEAT WARNING LAMP



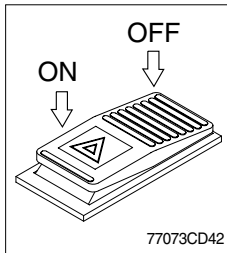
- (1) This lamp is turned ON when the temperature of cooling water is over the normal temperature(104°C, 219°F).
- (2) Check the cooling system when the lamp is ON.

16) ENGINE OIL PRESSURE WARNING LAMP



- (1) This lamp is comes ON after starting the engine because of the low engine oil pressure.
- (2) If the lamp comes ON during engine operation, shut OFF engine immediately. Check engine oil level.

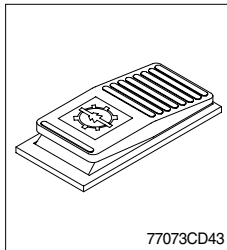
2) HAZARD SWITCH



(1) Use for parking, or loading machine.

※ If the switch is left ON for a long time, the battery may be discharged.

3) CLUTCH CUT OFF SWITCH



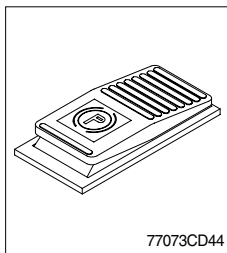
(1) This switch is pressed, it will cut off the clutch when brake operates.

※ Be careful not to use this switch when driving on a slope.

(2) When the switch failure occurs, it will be able to operate a clutch off function from LCD.

※ Refer to page 7-28.

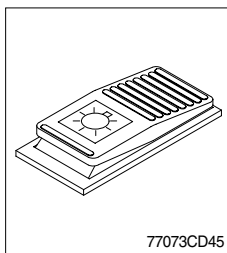
4) PARKING BRAKE SWITCH



(1) This switch is pressed, the parking brake will start to operate and the gauge panel warning lamp will come ON.

※ When operating the gear selector lever, be sure to release the parking brake. If the machine is operated with the parking brake engaged, the brake will overheat and may cause the brake system to go out of order.

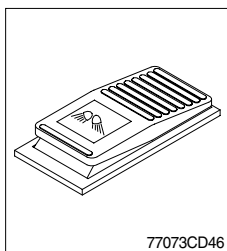
5) MAIN LIGHT SWITCH



(1) This switch is used to operate the clearance lamp and head light by two steps.

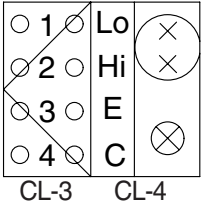
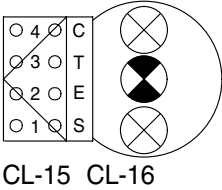
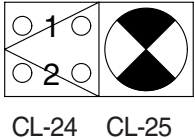
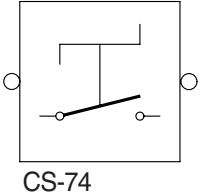
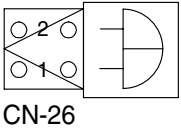
- **First step** : Clearance lamp and cluster illumination lamp come ON. Also, all indicator lamp of switches come ON.
- **Second step** : Head light comes ON.

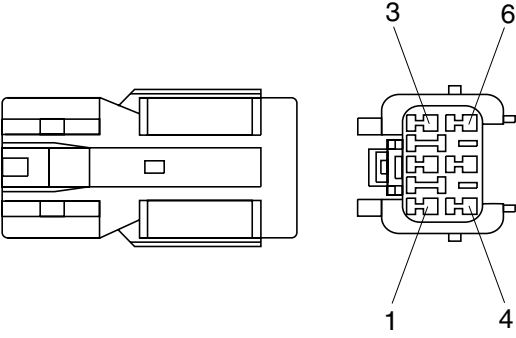
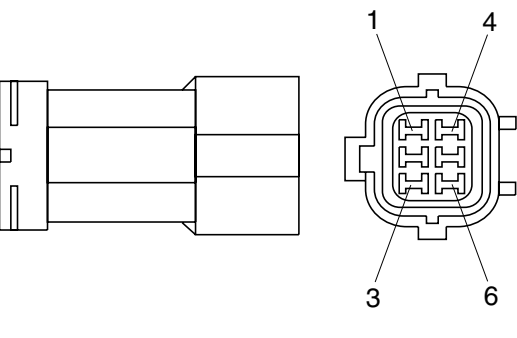
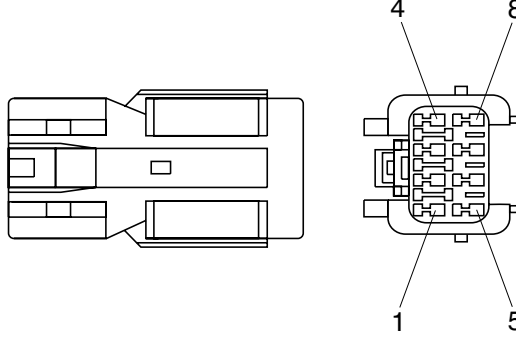
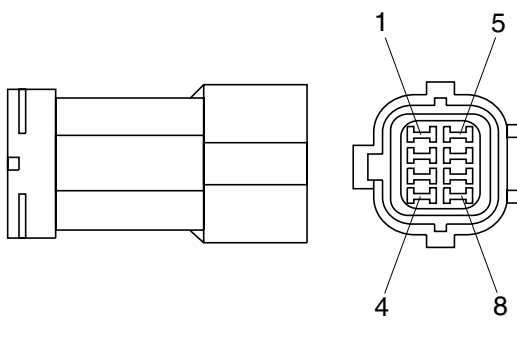
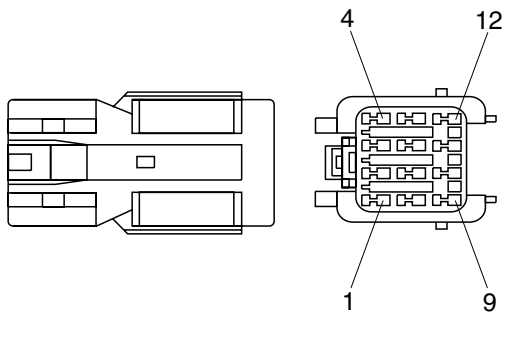
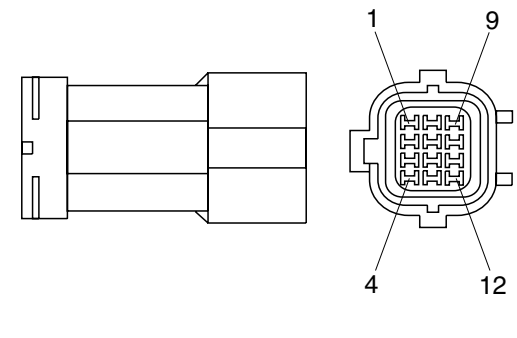
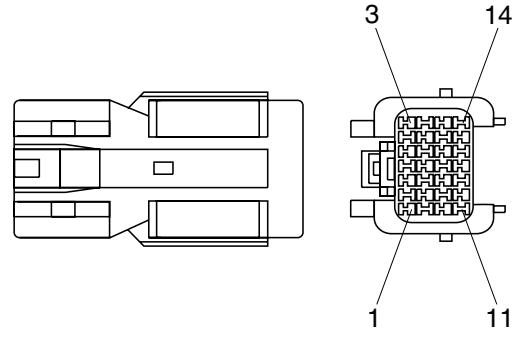
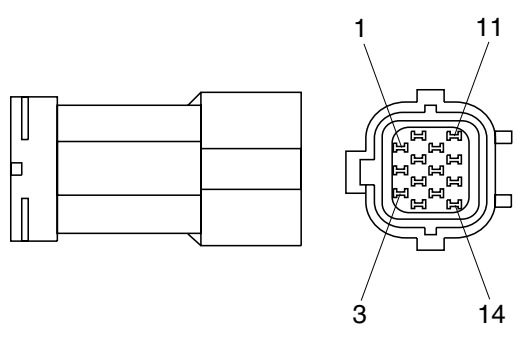
6) WORK LAMP SWITCH

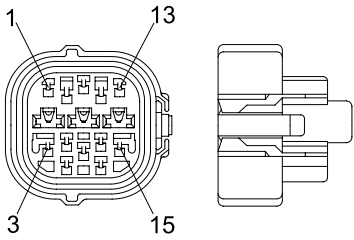
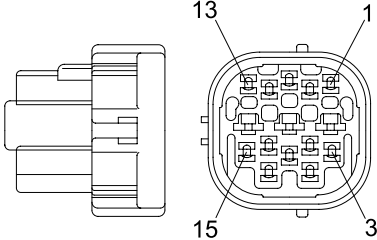


(1) This switch is used to operate the front and rear work lamps by two steps.

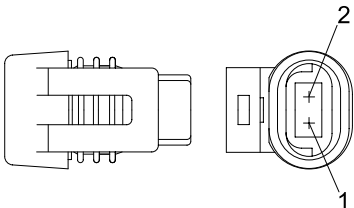
- **First step** : Front work lamp located on the cab comes ON.
- **Second step** : Rear work lamp located on the cowl comes ON.

Part name	Symbol	Specifications	Check
Head lamp	 CL-3 CL-4	24V 75W/70W (H4 TYPE) 24V 4W (T4W)	※ Check disconnection Normal : A few Ω
Combi lamp	 CL-15 CL-16	24V 5W (R5W) 2×24V 21W (P21W)	-
Turn lamp	 CL-24 CL-25	24V 21W (P21W)	-
Master switch	 CS-74	Continuous capacity : 180Amp Push in capacity : 1000Amp	-
Warning buzzer	 CN-26	24V 200mA 90±5dB(1 m)	-

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

No. of pin	Receptacle connector(Female)	Plug connector(Male)
15	 368301-1	 2-85262-1

17)METRI-PACK TYPE CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
2	 12040753	

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