



Doosan Infracore

DX210W

Serial Number 5766 and Up

Shop Manual

K1017314AE-1

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- When driving machine, avoid obstacles and excessive rough terrain.
6. Keep the machine on terrain where working and traveling conditions are good.
 - Remove any large rocks or obstacles.
 - Fill any ditches and holes.
 - Provide machines for and schedule time to maintain good terrain conditions.
 7. Travel over longer distances (e.g. on public roads) at adjusted (medium) speed.
 - Always adjust the speed to prevent bouncing.

Mounting and Dismounting

Before getting on or off the machine, if there is any oil, grease, or mud on the handrails, or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.

Never jump on or off the machine. In particular, never get on or off a moving machine. These actions may lead to serious injury.

When getting on or off the machine, always face the machine, and maintain three-point contact (both feet and one hand or one foot and both hands) with the handrails, and steps, to ensure that you support yourself securely.

Never hold any control levers when getting on or off the machine.

Apply the door lock securely. If you grip the handrail inside the door when moving on top of the chassis, and the door lock is not applied securely, the door may move and cause you to fall.

Use the points marked by arrows in the diagram when getting on or off the machine.

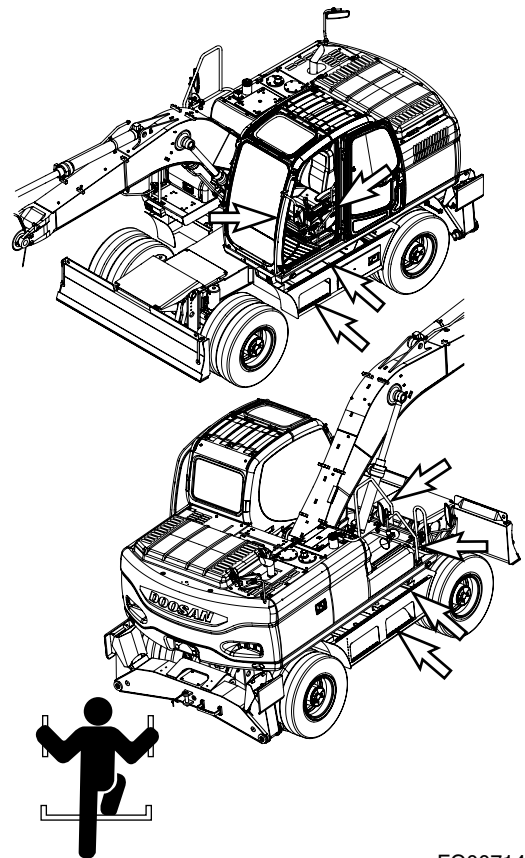


Figure 2

FG007146

Prohibited Operations

Do not dig the work face under an overhang. This may cause the overhang to collapse and fall on top of the machine.

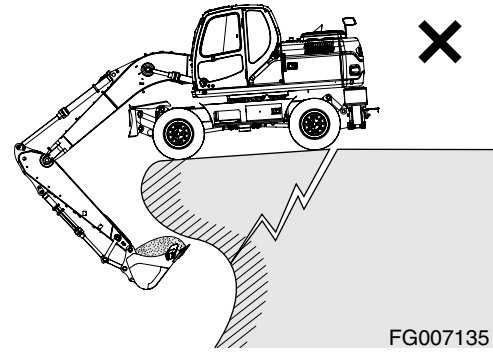


Figure 20

Do not carry out deep digging under the front of the machine. The ground under the machine may collapse and cause the machine to fall.

Working heavy loads over loose, soft ground or uneven, broken terrain can cause dangerous side load conditions and possible tip over and injury. Travel without a load or a balanced load may also be hazardous.

Never rely on lift jacks or other inadequate supports when work is being done. Block tracks fore and aft to prevent any movement.

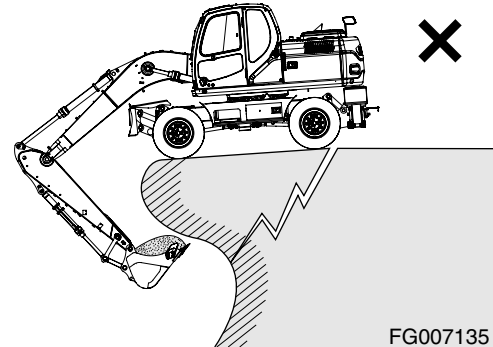


Figure 21

When using the machine, to prevent accidents caused by damage to the work equipment and overturning because of an excessive load, do not use the machine in excess of its ability (in terms of the maximum load and stability determined by the structure of the machine).

When working at the edge of an excavation or on a road shoulder, the machine could tip over, possibly resulting in serious injury or death. Investigate the configuration and ground conditions of the work site beforehand to prevent the machine from falling and to prevent the ground, stockpiles, or banks from collapsing.

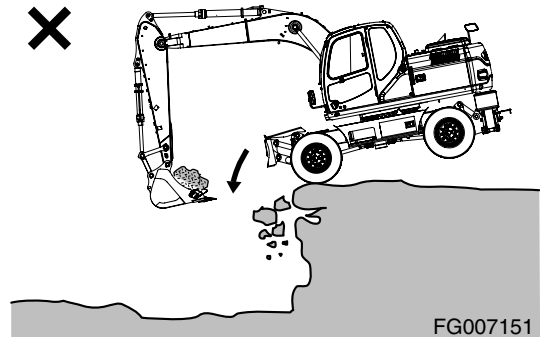


Figure 22

Prevention of Crushing and Cutting

You should always have at least two people working together if the engine must be run during service. One person needs to remain in the operator's seat, ready to work the controls or stop the machine and shut off the engine.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Stay clear of all rotating parts and moving parts.

Keep objects away from moving fan blades. The fan blades will throw objects and the fan blades can cut objects.

Do not use a wire rope cable that is kinked or frayed. Wear gloves when you handle a wire rope cable.

When you strike a retainer pin, the retainer pin might fly out. The loose retainer pin can injure personnel. Make sure that area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Supports and Blocking for Work Equipment

Do not allow weight or equipment loads to remain suspended.

Lower everything to the ground before leaving the operator's seat.

Do not use hollow, cracked or unsteady wobbling supports.

Do not work under any equipment supported only by a lifting jack.

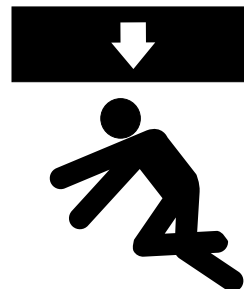


Figure 42

HDO1042L

Action When Abnormality Is Found During Inspection

If any abnormality is found during inspection, always carry out repairs. In particular, if the machine is used when there are still problems with the brake or work equipment systems, it may lead to serious injury.

If necessary depending on the type of failure, please contact your DOOSAN distributor for repairs.

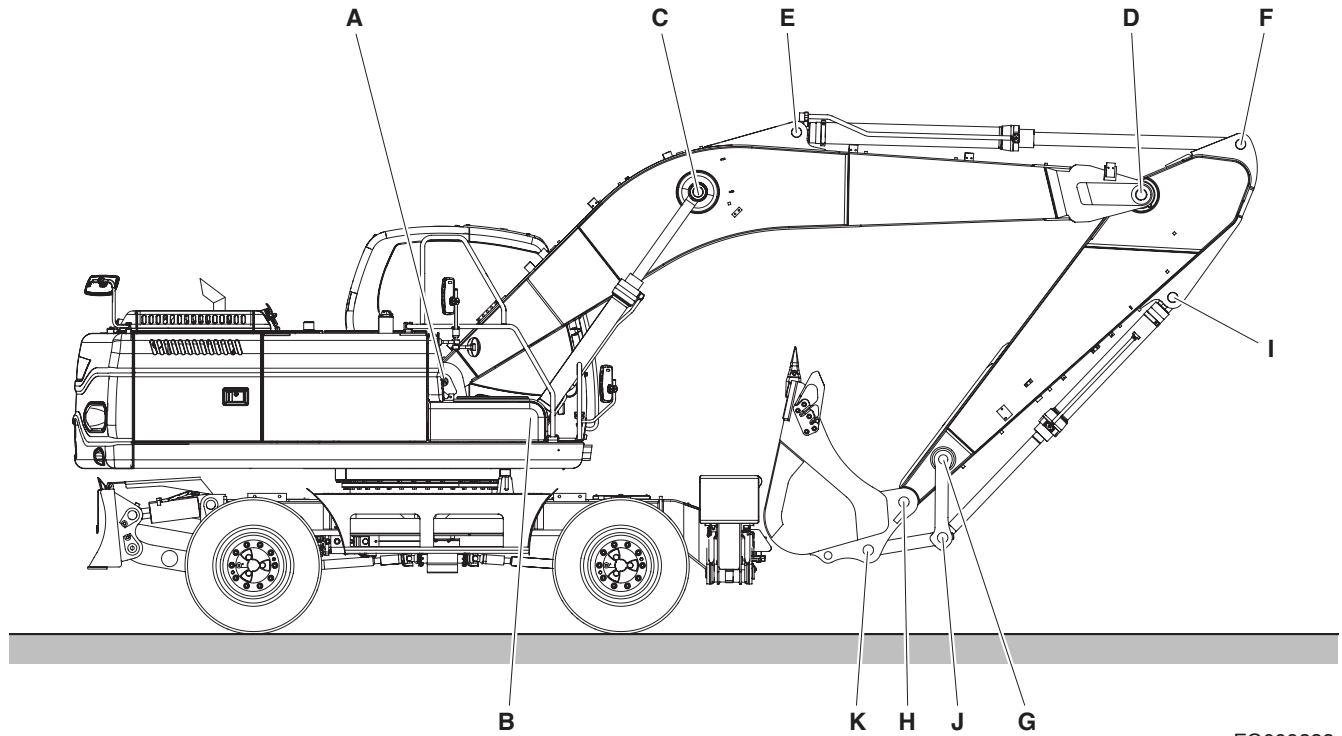
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FRONT PIN SIZE

One-Piece Boom



FG009222

Figure 6

Mounting Pin	Diameter, mm (Inches)	Length, mm (Inches)
A	90 mm (3.54 in)	811 mm (31.93 in)
B	80 mm (3.15 in)	221 mm (8.7 in)
C	80 mm (3.15 in)	792 mm (31.18 in)
D	90 mm (3.54 in)	548 mm (21.57 in)
E	80 mm (3.15 in)	241 mm (9.49 in)
F	80 mm (3.15 in)	274 mm (10.79 in)
G	71 mm (2.80 in)	460 mm (18.11 in)
H	80 mm (3.15 in)	519 mm (20.43 in)
I	80 mm (3.15 in)	227 mm (8.94 in)
J	80 mm (3.15 in)	460 mm (18.11 in)
K	80 mm (3.15 in)	519 mm (20.43 in)

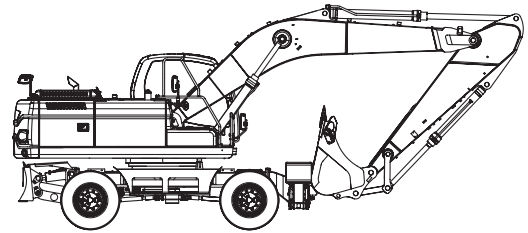
EXCAVATOR PERFORMANCE STANDARDS

Evaluation of equipment performance and operating condition can be made by running the excavator through a series of different tests, and recording results with a stop watch and tape measure.

Compare results of performance tests against the specifications and standards that follow, which are for equipment in new or renewed condition.

Test Conditions

1. All tests should be performed on a flat, level, firm supporting ground surface.
2. All recommended, applicable maintenance and adjustment service should be completed before testing.
3. Hydraulic fluid and engine oil should be of appropriate viscosity for ambient weather conditions. Warm up hydraulic oil to standard operating temperature, between 45° - 55°C (112° - 135°F).
4. Run all tests with the engine speed control set to maximum rpm.
5. Repeat tests with Power Mode engine control settings at both Standard Mode (standard work mode) and Power Mode (high speed mode). Travel speed tests should also be repeated at both high and low speed.



FG007172

Figure 9

Travel Speed Tests

Travel Mode	Speed
High Speed (III)	36.9 km/h (22.9 MPH)
Low Speed (II)	9.2 km/h (5.72 MPH)
Creep Speed (I)	3.7 km/h (2.3 MPH)

1. Block up all wheels securely.
2. Check that rpm at drive shaft is above;
3,090 ± 50 rpm at high speed.
771 ± 50 rpm at low speed.
314 ± 50 rpm at creep speed.

SAFETY PRECAUTIONS



CAUTION

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
ALL MODELS	ALL RANGES

Fatigue Spalling

Flaking of surface metal resulting from fatigue.

Replace bearing - clean all related parts.



Figure 10

HASA530S

Brinelling

Surface indentations in raceway caused by rollers either under impact loading or vibration while the bearing is not rotating.

Replace bearing if rough or noisy.



Figure 11

HASA540S

Cage Wear

Wear around outside diameter of cage and roller pockets caused by abrasive material and inefficient lubrication.

Replace bearings - check seals.



Figure 12

HASA550S

TYPE 8 PHOSPHATE COATED HARDWARE

This chart provides tightening torque for general purpose applications using original equipment standard hardware as listed in the Parts Manual for the machine involved. **DO NOT SUBSTITUTE.** In most cases, original equipment standard hardware is defined as Type 8, coarse thread bolts and nuts and thru hardened flat washers (Rockwell "C" 38 - 45), all phosphate coated and assembled without supplemental lubrication (as received) condition.

The torques shown below also apply to the following:

1. Phosphate coated bolts used in tapped holes in steel or gray iron.
2. Phosphate coated bolts used with phosphate coated prevailing torque nuts (nuts with distorted threads or plastic inserts).
3. Phosphate coated bolts used with copper plated weld nuts.

Markings on bolt heads or nuts indicate material grade ONLY and are NOT to be used to determine required torque.

Nominal Thread Diameter	Standard Torque $\pm 10\%$	
	Kilogram Meter (kg·m)	Foot Pounds (ft lb)
1/4"	1.1	8
5/16"	2.2	16
3/8"	3.9	28
7/16"	6.2	45
1/2"	9.7	70
9/16"	13.8	100
5/8"	19.4	140
3/4"	33.2	240
7/8"	53.9	390
1"	80.2	580
1 - 1/8"	113.4	820
1 - 1/4"	160.4	1160
1 - 3/8"	210.2	1520
1 - 1/2"	279.4	2020
1 - 3/4"	347.1	2510
2	522.8	3780

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Edition 1

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START-UP PROCEDURES

If engine does not start, the fuel system may need priming. Prime the fuel system using the following procedure:

1. Stop Engine.
2. Open left side door and then there is fuel filter.

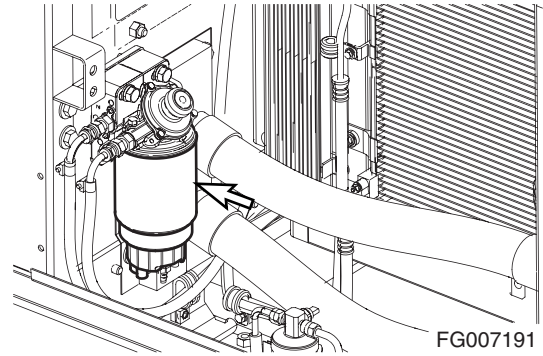


Figure 22

3. Loosen plug (1, Figure 23) on top of fuel filter head.
4. Pump hand operated primer pump (2, Figure 23) by the fuel injection pump. Pump primer until fuel is present at plug hole in fuel filter head.
5. Tighten plug in fuel filter head.
6. Continue to pump primer pump until a strong resistance is felt.
7. Start engine and look for signs of leaks.

Repeat procedure if necessary.

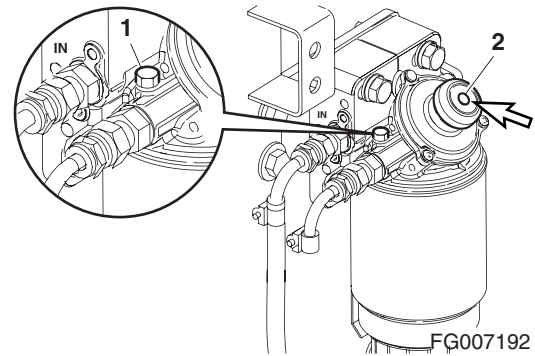


Figure 23

Swing Bearing

Edition 1

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Figure 13

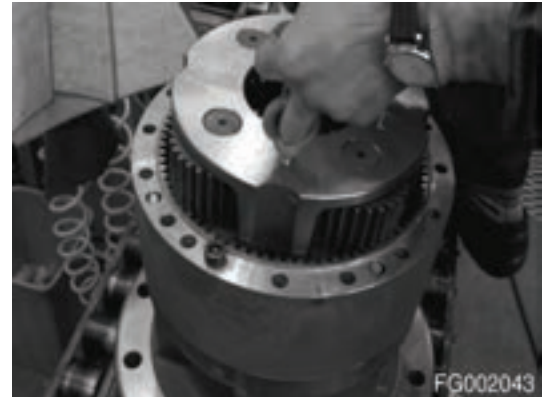


Figure 14

7. Install eye bolts in ring gear and remove it.



CAUTION

Care should be taken not to damage mounting surfaces of ring gear and case. Carefully remove all gasket material from mounting surfaces.



Figure 15

Assembly of Main Case

Cleaning Casing and Other Parts

Steam clean case and other parts, to remove any foreign substances.

- Cleaning fluid: PK6540 (alkali)
- Liquid density: 3 - 5%
- Liquid temperature: 60° - 70°C (140° - 158°F)

Assembly of Shaft and Pinion

1. Insertion of shaft subassembly:
 - A. Set gear case as shown in Figure 51.
 - B. Using a suitable lifting device, lower shaft subassembly into case.
 - C. Using special jig, keep bearing level and press it into case.



Figure 51



Figure 52



Figure 53

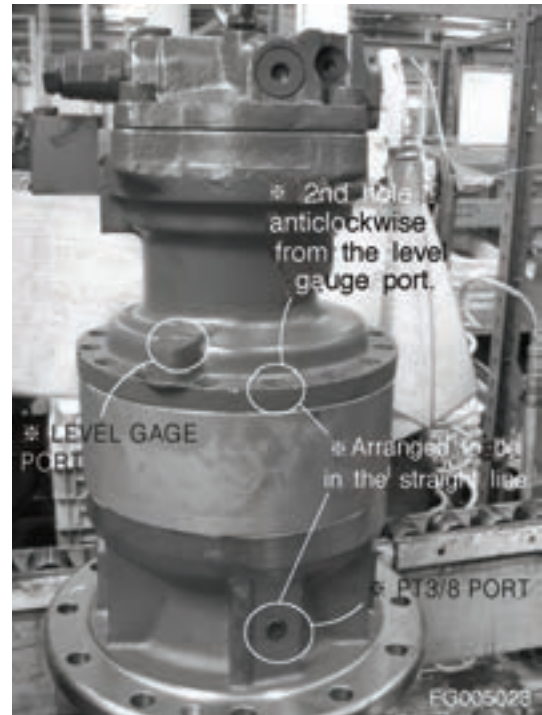


Figure 94

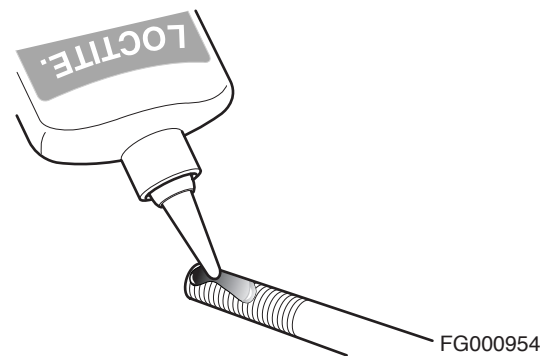


Figure 95

4. Apply Loctite (#2652) to 16 socket bolts (M12x150L, torque: 1,440 kgf.cm), insert into holes, and tighten with an impact wrench.



Figure 96

SAFETY PRECAUTIONS



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APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
DX140W	5001 and Up
DX160W	5001 and Up
DX190W	5001 and Up
DX210W	5001 and Up

OPERATIONAL PRINCIPLE

Neutral Position : A → B

Hydraulic oil, flowing into the A port, passes through the spool to flow out to the B port.

Selective Position : A → C

When pilot pressure is applied to the P port, the spool moves to the right. This operation blocks the oil passage to the B port and opens the oil passage to the C port, which makes the hydraulic oil from the A port discharged to the C port.

NOTE: *The leaked oil, generated in process of this operation, drains out to the T port.*

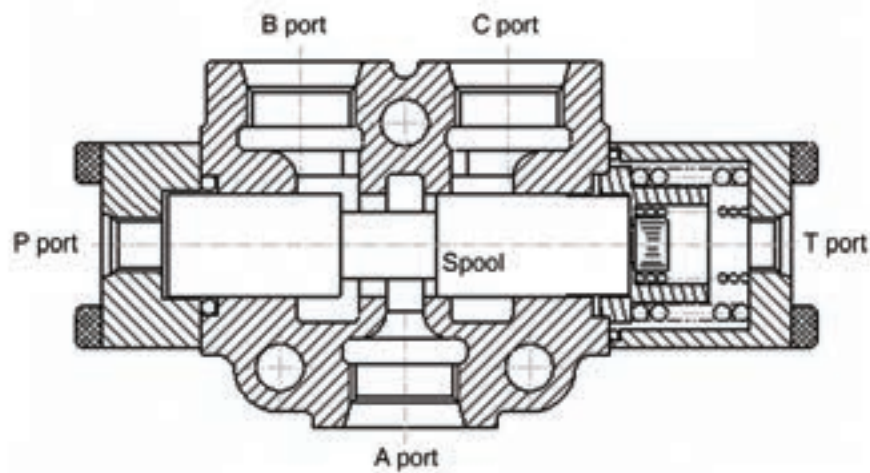


Figure 3

FG007638

HYDRAULIC DIAGRAM

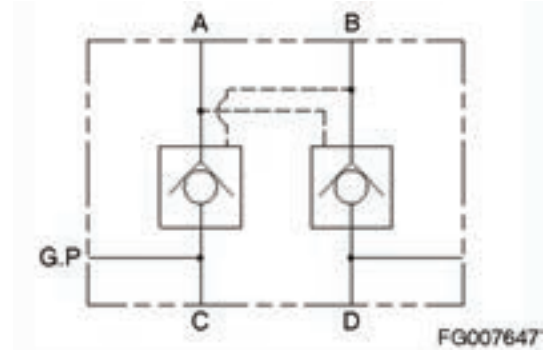


Figure 2

SAFETY PRECAUTIONS



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DX190W	5001 and Up
DX210W	5001 and Up

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10. Unsnap retaining ring.



Figure 24

11. Drive the guide into the cylinder tube (direction of arrow) until the circlip can be removed (see Figure 26).



Figure 25

12. Unsnap circlip.



Figure 26

13. Drive out piston rod together with guide from cylinder tube.



Figure 27

Input

- Legend to Figure 69

Reference Number	Description
1	Input Pinion
2	Hex. Nut
3	Washer
4	Input Flange
5	Screen Sheet
6	Seal Ring
7	Taper Roller Bearing
8	Spacer Ring (Bearing Rolling Moment)
9	Shim (Contact Pattern)
10	Input Housing

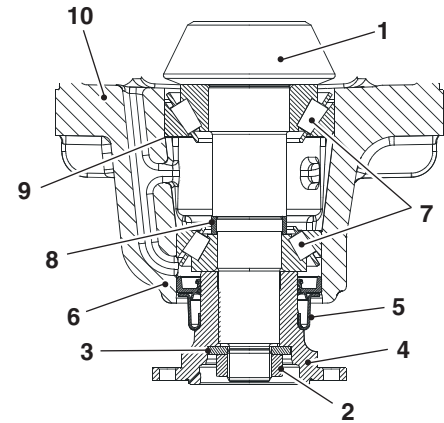


Figure 69

FG002353

- Loosen hex. nut and remove the washer behind.



WARNING

Pay attention to support of axle housing (arrow).



Figure 70

FG002354

- Remove flange.
If required, remove screen sheet from output flange.



Figure 71

FG002355

6. Insert determined shim(s) e.g. "S" = 1.05 mm into bearing hole of axle housing/part II and instal bearing outer ring so that contact is obtained.

! CAUTION

Instal (stick) bearing outer ring into hole with grease - assembly aid.



Figure 108

7. Locate preassembled axle housing /part II (without O-ring) (observe radial installation position) and temporarily fix with hex. screws.



Figure 109

Backlash and Contact Pattern Check

1. Place dial indicator at right angles to a tooth flank of the crown wheel (within the outer diameter area) through oil drain hole and check backlash.

Backlash

MS-E 3050/3060 = 0.12 - 0.24 mm

MS-E3070 = 0.15 - 0.27 mm

! CAUTION

In case of a deviation from the specified backlash, correct it with a suitable shim (See Figure 103).

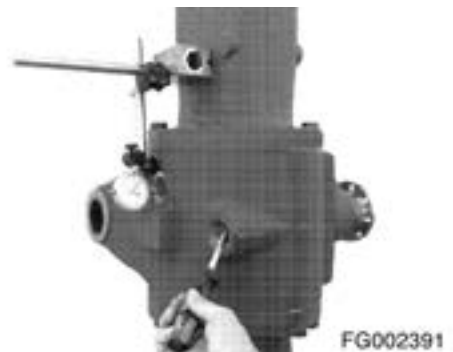


Figure 110

2. Just for axle type MS-E 3060:
Install spacer bush.



Figure 148

3. Mount wheel bolts (l).
Install both bearing outer rings (2) of hub bearing until contact is obtained.
Oil O-ring (3) and locate in annular groove of hub.

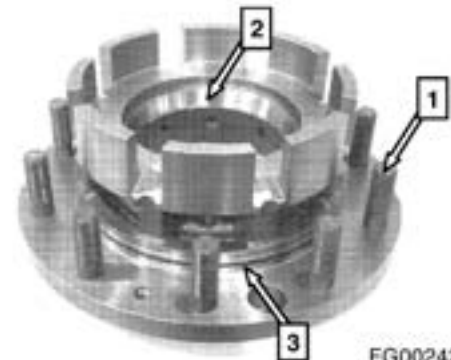


Figure 149

4. Mount shaft seal, considering installation position (marking OUT - SIDE looking upward / outward) and installation dimension "X" - see detailed sketch.

Legend to Figure 85 and detailed sketches:

Reference Number	Description
1	Hub
2	Shaft Seal
X	Installation Dimension

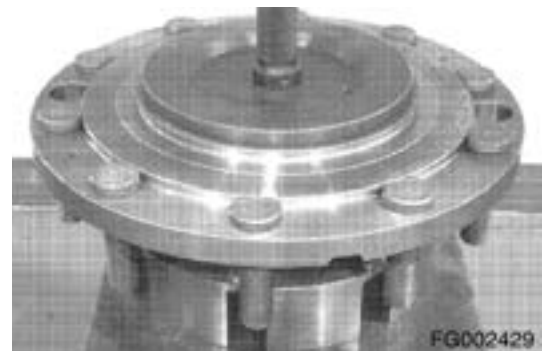


Figure 150

- A. Version MT-E 3050/3060
X = 0.0 ~ 0.3mm

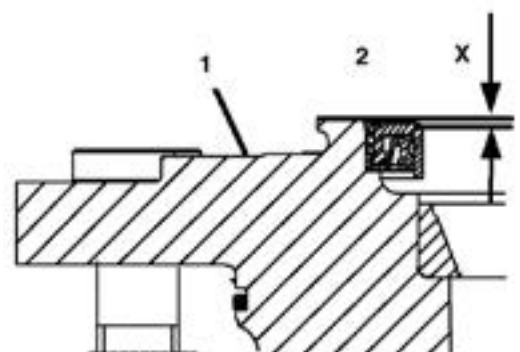
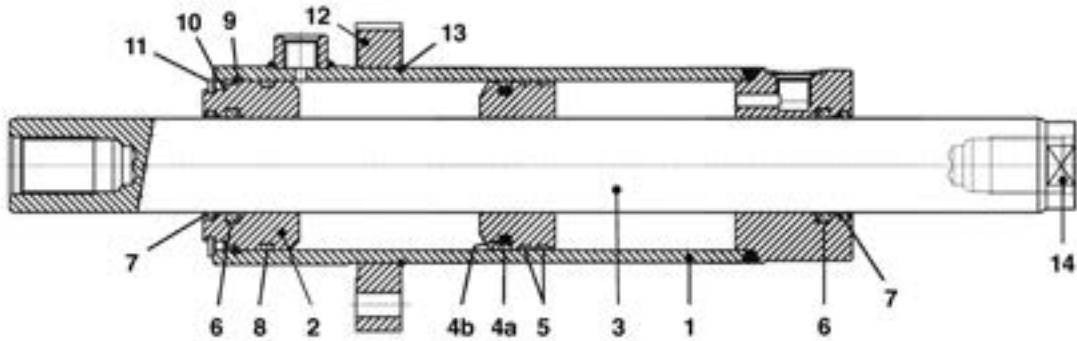


Figure 151

FG002430

Steering



FG002468

Figure 189

Legend to Figure 189 ... Figure 203

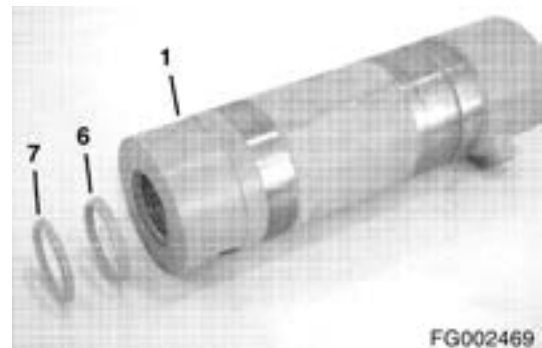
Reference Number	Description	
1	Steering Cylinder (Cylinder Tube with Brake Head)	
2	Brake Head (Loose Part)	
3	Piston Rod	
4a	O-ring	Piston Sealing
4b	Form Seal Ring	
5	Guide Ring	
6	U-ring	

Reference Number	Description
7	Rod Wiper
8	Dual Ring
9	Circlip
10	O-ring
11	Retaining Ring
12	Flange
13	Circlip
14	Wrench Socket (Piston Rod)

1. Mount U-ring (6) and wiper (7) in the steering cylinder (1).

CAUTION

Observe installation position - in this connection see detailed sketch.



FG002469

Figure 190

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8. Remove sun gear shaft and stub shaft.



Figure 24

9. Press off ring gear with piston.

 **CAUTION**

Pay attention to the releasing O-ring (arrow)



Figure 25

10. Loosen hex screws, remove spring sleeves and compression springs.



Figure 26

11. Press piston from ring gear.



Figure 27

2. Dismantle HP-pump abbauen and mount screw neck with O-ring. (Just for transport protection - mount protection cap with O-ring on screw neck).

Tightening torque (M 14x1.5) $M_A = 23 \text{ N}\cdot\text{m}$



Figure 68

3. Secure slotted nut with cylinder screw - in this connection refer to note on Figure 63!

Tightening torque (M 10/8.8) $M_A = 32 \text{ N}\cdot\text{m}$



Figure 69

Planetary Carrier

adjust axial play of sun gear shaft : 0.3 ~ 1.0 mm (Figure 70~ 80)

1. Determine dimension I, from mounting face of planetary carrier to contact face of thrust washer.

Dimension I, e.g. 260.65 mm



Figure 70

2. Determine dimension II, from front face (arrow) of sun gear to mounting face of hub.

Dimension II, e.g. 255.70 mm

Calculation Example:

Dimension I e.g. 260.65 mm

Dimension II e.g. - 255.70 mm

Difference = 4.95 mm

Required axial play (average) e.g. - 0.75 mm

Result = requ. thrust washer(s) e.g. $s = 4.20 \text{ mm}$



Figure 71

Only for "New Part" Assembly or If Disassembled :

Install O-ring (6) and mount axle drive housing(1) - Pay attention to installation position axle drive housing(1) versus axle housing half(5).

Tightening torque (M18/10.9) $M_A = 390 \text{ N}\cdot\text{m}$

1. Insert shim (backlash) into hole of axle housing half and install bearing outer ring until contact.

We would recommend to install the shim (e.g. $s = 1.20 \text{ mm}$), found during disassembly - also refer to disassembly instructions page -32, Figure 87.



WARNING

However, the required backlash is decisive for the shim(s) to be used.

2. Instal shim ring (arrow, $\varnothing = 160 \text{ mm}$) and determine dimension "A" - See Figure 107, then remove shim ring.

Dimension "A" e.g. 39.92 mm

Calculation Example:

Dimension "A" z.B. 39.92 mm

Dimension "B" 80.00 mm

Result = Dimension "X" $= 119.92 \text{ mm}$

3. Install pre-assembled differential.



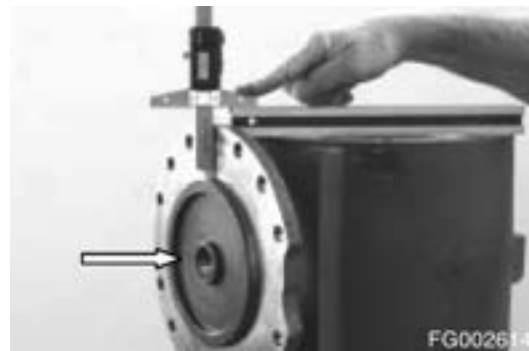
CAUTION

Ensure that inserted differential is perfectly positioned (for this purpose rotate in both directions several times - roller setting).



FG002613

Figure 108



FG002614

Figure 109



FG002615

Figure 110

SAFETY PRECAUTIONS



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MODEL	SERIAL NUMBER RANGE
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DX160W	5001 and Up
DX190W	5001 and Up
DX210W	5001 and Up

2. Remove the cup springs from the clutch.



Figure 21

3. Remove the piston.



Figure 22

4. Pull off both cyl. pins (arrows).



Figure 23



WARNING

Attach 2 (two) eyebolts and pull the piston cautiously out of the housing - risk of damage.



Figure 24

12. Remove the screen sheet.



Figure 64

13. Expel the bearing outer ring from the housing bore (arrow).



Figure 65

14. Remove the stud bolts, if necessary.



Figure 66

Determine the Adjusting Ring for Rolling Moment/Pinion Bearing

1. Rotate the transmission by 180°. Mount the adjusting ring (s = optional).

! CAUTION

It is recommended to reinstall the adjusting ring (e.g. s = 1.35 mm) from the disassembly, if however the required rolling moment of 1.5 ~ 3.0 N·m (without shaft seal) is not obtained - see bearing rolling moment check Figure 104 - the bearing rolling moment is to be corrected with an adequate adjusting ring.

2. Mount the heated bearing inner ring and install it subsequently until contact.



Figure 99



Figure 100

3. Mount the flange.



Figure 101

4. Put on the washer and fasten the flange with hexagon screws.

! CAUTION

Rotate the pinion - when tightening - in both directions (aligning of rollers) several times.

Tightening torque (M 10/8.8) $M_A = 46 \text{ N}\cdot\text{m}$



Figure 102

REASSEMBLY - BRAKE / CLUTCH / PLANET CARRIER

Planet Carrier

1. Illustration shows the HL-Version "Axle Attachment".
Install the bearing outer ring until contact.

! CAUTION

Observe the bearing location - bearing inner ring to bearing outer ring - also see instructions for disassembly page -23, Figure 46.

2. Rotate transmission by 180°.
Install the second bearing outer ring until contact.

! CAUTION

Observe the bearing location - bearing inner ring to bearing outer ring - also see instructions for disassembly page -23, Figure 46.

3. Only for the Version "Transmission Installation Position Horizontal" (Figure 135 and 144)

! CAUTION

Insert the screen sheet and fasten it with countersunk screws.

Secure the countersunk screws with locking compound (Loctite No. 243).



Figure 133



Figure 134



Figure 135

5. Insert both cup springs / clutch.
Fix the cup springs by means of grease and position them centrally. assembly aid.

! CAUTION

Observe the installation position - also see Figure 175.



Figure 173

6. Insert both cup springs / brake.
Fix the cup springs by means of grease and position them centrally. assembly aid.

! CAUTION

Observe the installation position - also see Figure 175.



Figure 174

Legend to Figure 175 ~ Figure 180:

Reference Number	Description
1	Measuring Fixture
2	Piston / Clutch
3	Cup Springs / Clutch
4	Piston / Brake
5	Cup Springs / Brake
6	Transmission Housing
I	Measuring Bore (Disc Clearance / Clutch)
II	Measuring Bore (Disc Clearance / Brake)
A	Mounting Face / Housing - Face / Piston
B	Mounting Face / Housing - Piston Contact / Housing
C	Mounting Face / Housing - Face / Piston
D	Mounting Face / Housing - Piston Contact / Housing
Y	Disc Clearance / Clutch → 2.4 ^{+0.3} mm (Piston Stroke)
X	Disc Clearance / Brake → 1.8 ^{+ 0.3} mm (Piston Stroke)

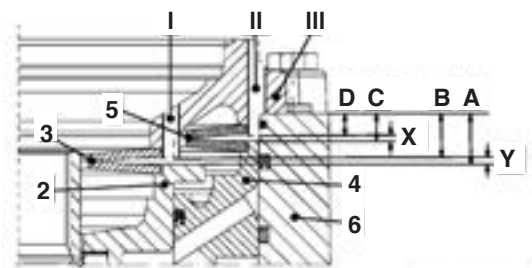


Figure 175

FG002838

2. Install the bleeder valve (1), screw plugs (2) with O-ring screw plug (3) with O-ring and compressed air connection piece (4).

Tightening torque

Bleeder valve (M 10x1)	$M_A = 22 \text{ N}\cdot\text{m}$
Screw plug (M 10x1 with O-ring)	$M_A = 25 \text{ N}\cdot\text{m}$
Screw plug (M 18x1.5 with O-ring)	$M_A = 35 \text{ N}\cdot\text{m}$
Compr.air connect. piece (M 10x1) w. seal. ring) ..	$M_A = 15 \text{ N}\cdot\text{m}$

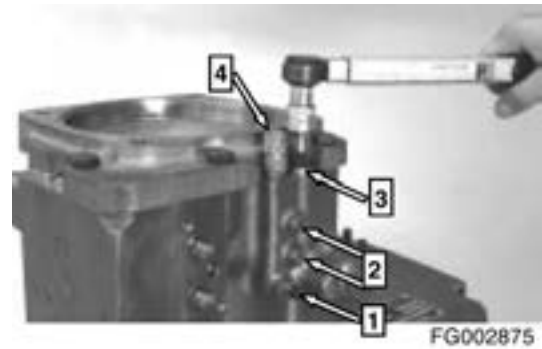


Figure 212

3. Pressurize the emergency release with compressed air $p = 5 + 1\text{bar}$ and close the shut-off valve.

During a test duration of 3 minutes no pressure drop is allowed.



Figure 213

4. Remove the screw plug and the compressed air connection piece (See Figure 212).

Install the bleeder (3) with O-ring and lubrication nipple (4).

Tightening torque

Lubrication nipple (M 10x1)	$M_A = 22 \text{ N}\cdot\text{m}$
Bleeder (M 18x1.5)	$M_A = 22 \text{ N}\cdot\text{m}$



Figure 214

4. Mount the control housing.
Control housing/internal and outer rotor = rotor set



FG002945

Figure 251

5. Position the ball - see arrow -(drive for internal rotor) with grease (assembly aid) into the recess of the pump shaft.



FG002946

Figure 252

6. Mount the internal rotor

 **CAUTION**

Place the groove of the internal rotor over the driving ball (see arrows).



FG002947

Figure 253

7. Assemble the outer rotor.



FG002948

Figure 254

22. Install both oil tubes.

Tightening torque:

Union screw (M 14 x1.5) $M_A = 25 \text{ N}\cdot\text{m}$

Union screw (M 16 x1.5) $M_A = 45 \text{ N}\cdot\text{m}$



Figure 293

FG002958

Version "with" electr. Downshift Interlock - mounted to the Transmission

1. Position both O-rings (arrows).



Figure 294

FG002959

2. Fasten the cpl. downshift interlock with cap screws and washers.

Tightening torque (M8/10.9) $M_A = 23 \text{ N}\cdot\text{m}$

 **WARNING**

Prior to put the unit into operation the specifications and regulations respectively as well as the instructions of the transmission operating and maintenance instructions as well as the specifications and instructions of the vehicle manufacturer have to be observed.



Figure 295

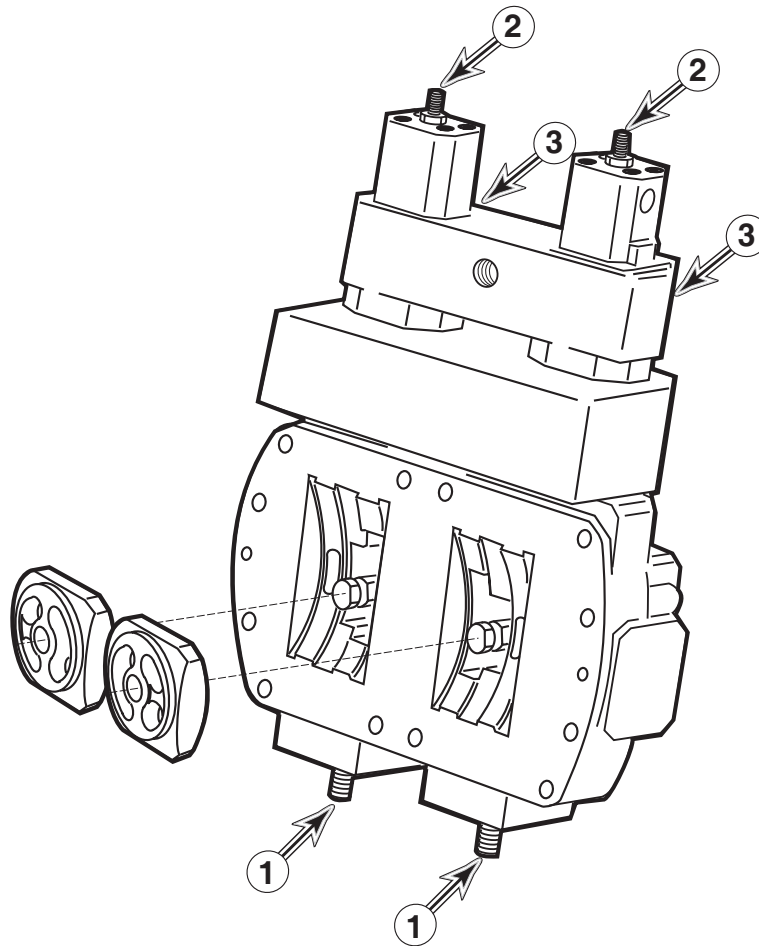
FG002960

Reference Number	Description	Qty.	Torque (See Table 2)
1	Spring Pin	4	
2	Insert	4	
3	Bolt	4	Ta
4	Flywheel	1	
5	Spring Pin	8	
6	Insert	4	
7	Hub	1	
8	Bolt	4	Ta
9	Pump shaft	1	
10	Clamping screw	2	Tb
11	Element	1	

Specification for "Measurement H," from front hub face to pump shaft end, and TIGHTENING TORQUE of bolts and screws written in the "Table 2" must be observed.

Model	Coupling Part Number	"Measurement H"	Torque Value for "Ta"	Torque Value for "Tb"
DX140W	K1013823	8.0 - 9.0 mm (0.315 - 0.354 in)	21 - 23 kg•m (152 - 166 ft lb)	10 - 12 kg•m (72 - 87 ft lb)
DX160W				
DX190W	K1013827	10.0 - 11.0 mm (0.394 - 0.433 in)	21 - 23 kg•m (152 - 166 ft lb)	10 - 12 kg•m (72 - 87 ft lb)
DX210W				
S300LC-V	414-00040	5.5 - 6.5 mm (0.216 - 0.256 in)	44 - 49 kg•m (318 - 354 ft lb)	20 - 22 kg•m (145 - 159 ft lb)
S300LL				
S340LC-V	414-00041	6.5 - 7.5 mm (0.256 - 0.295 in)	44 - 49 kg•m (318 - 354 ft lb)	20 - 22 kg•m (145 - 159 ft lb)
S420LC-V				
S470LC-V				

To check pump imbalance without a flow meter, travel the excavator forward on flat, level terrain. If the machine veers off despite neutral control input and even, balanced track adjustment, the pump which supplies output to the track frame toward which the excavator is veering is weak.



ASS0320L

Figure 10

Refer to the illustration of the pump regulator control valve (Figure 10) for the location of adjustment screws (1, 2 and 3). There are two different adjustments, along with the Negacon, negative control, adjustment screw (3, directly below 1 and 2). Each one of the adjustment procedures could affect the setting of the others.

Check and record the arm dump speed performance test before and after input power adjustment, whether or not a flow meter is used.

NOTE: *Regulator adjustments affect total cumulative horsepower, since each regulator compensates for the output of the other. It is not necessary to adjust both regulators at the same time, but after checking or adjusting one of them, the remaining unit should also be checked.*

TROUBLESHOOTING – JOYSTICK CONTROL VALVE

Problem	Possible Cause	Remedy
Secondary pressure does not increase.	Low primary pressure.	Check primary pressure.
	Broken spring.	Replace spring.
	Spool sticking.	Clean, repair or replace.
	Excess spool to casing clearance.	Replace spool casing.
	Worn or loose handle subassembly.	Repair or replace handle subassembly.
Secondary pressure too high.	Dirt, other interference between valve parts.	Clean, repair or replace.
	Return line pressure too high.	Redirect return line.
Secondary pressure does not hold steady.	Dirt, other interference between valve parts, or worn spool sticking intermittently.	Clean, repair or replace.
	Interference or binding on spool return spring.	Clean, repair or replace.
	Unsteady pressure in tank return line.	Redirect return line.
	Air bubbles in piping (temporary) or air leak.	Vent air, or repair leak.
NOTE: <i>Look for evidence of leaking oil to help locate damaged seals or gaskets that could be the cause of air leaks.</i>		

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Cylinders

Edition 1

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MODEL	CYLINDER	$\varnothing A_{+0.1}^{+0.2}$	MODEL (CYLINDER)
DX300LC	BOOM	140.0 mm (5.51 in)	
	ARM	150.0 mm (5.91 in)	S/ARM
	BUCKET	140.0 mm (5.51 in)	S/BUCKET
DX340LC	BOOM	150.0 mm (5.91 in)	OPT BOOM
	ARM	170.0 mm (6.69 in)	OPT ARM
	BUCKET	150.0 mm (5.91 in)	OPT BUCKET
DX420LC	BOOM	165.0 mm (6.50 in)	OPT BOOM
	ARM	180.0 mm (7.09 in)	OPT ARM
	BUCKET	160.0 mm (6.30 in)	OPT BUCKET
DX140W DX160W	BOOM	110.0 mm (4.33 in)	
	ARM	115.0 mm (4.53 in)	
	BUCKET	95.0 mm (3.74 in)	
	DOZER	130.0 mm (5.12 in)	
	OUTRIGGER	130.0 mm (5.12 in)	
	TWO-PIECE BOOM	150.0 mm (5.91 in)	
DX190W	BOOM	115.0 mm (4.35 in)	
	ARM	125.0 mm (4.92 in)	
	BUCKET	110.0 mm (4.33 in)	
	TWO-PIECE BOOM	180.0 mm (7.09 in)	
DX210W	BOOM	135.0 mm (5.31 in)	
	ARM	135.0 mm (5.31 in)	
	BUCKET	115.0 mm (4.53 in)	
	TWO-PIECE BOOM	180.0 mm (7.09 in)	

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Boom Load Holding Valve

1. When plunger is neutral (Pi pilot signal: "OFF").

Spool (A, Figure 15) is in the position as shown closing off the path between chamber (1) and drain (Dr1). Chamber (1) and chamber (2) are connected through squeeze (4) and the pressure is Pc. $d_1 > d_2$, poppet (B) is seated closing off chamber (2) and chamber (3).

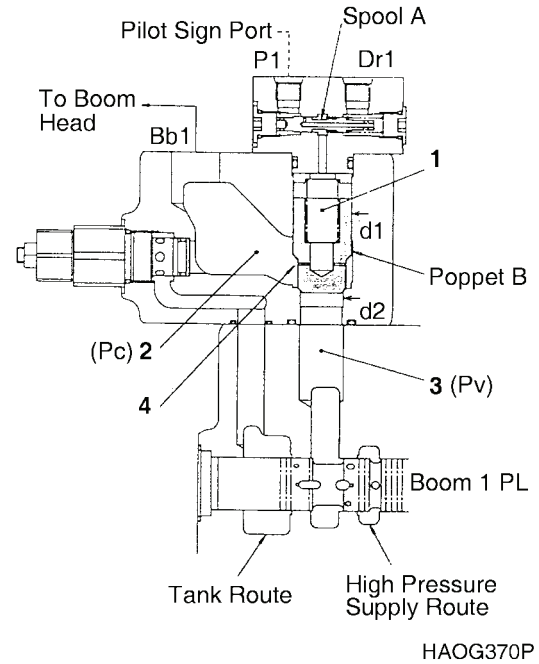


Figure 15

2. When plunger is operated.

A. Boom-up ($P_v > P_c$) (Pi pilot signal: "OFF")

As the plunger is operated, high pressure oil flows in through chamber (3, Figure 16). Chamber (1) and chamber (2) pressures are Pc and equalized through squeeze (4). Pv overcomes set spring pressure and high pressure oil is supplied to the cylinder head.

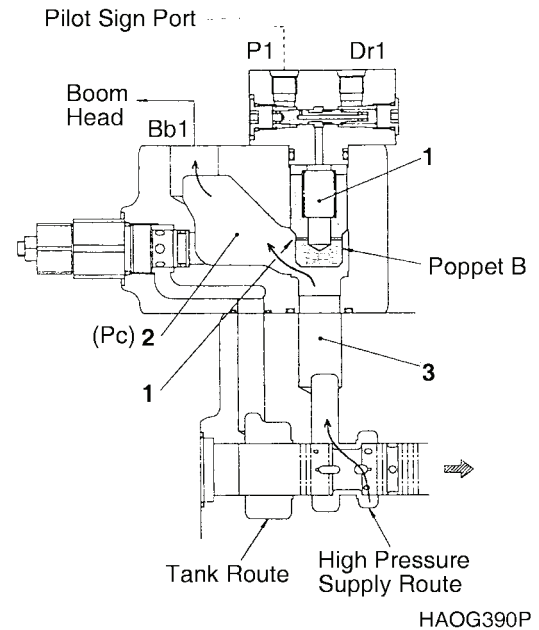
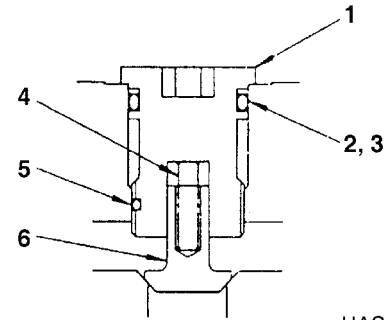


Figure 16

Check Valve

Reference Number	Description
1	Cap
2	Backup Ring
3	O-ring
4	Spring
5	Nylon Chip
6	Check

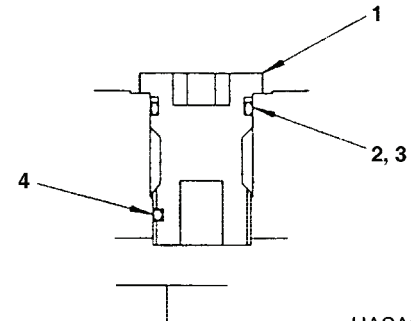


HASA250S

Figure 35

Cap

Reference Number	Description
1	Cap
2	Backup Ring
3	O-ring
4	Nylon Chip

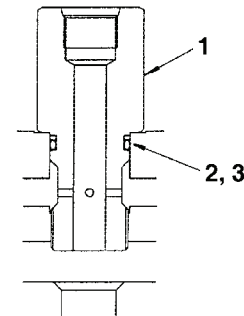


HASA260S

Figure 36

Cap

Reference Number	Description
1	Cap
2	O-ring
3	Backup Ring

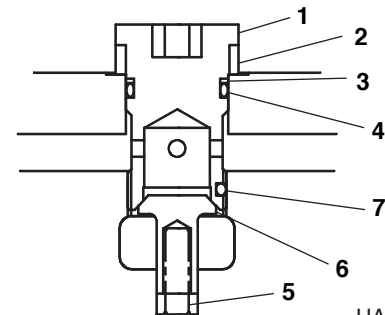


HAAA2640

Figure 37

Check Valve [Sw]

Reference Number	Description
1	Cap
2	Spacer
3	Backup Ring
4	O-ring
5	Spring
6	Check
7	Nylon Chip



HAAA7930

Figure 38

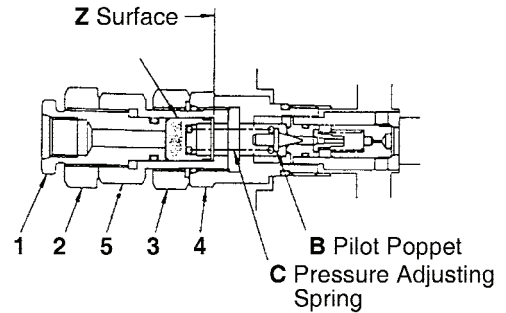
Main Relief Valve Adjustment

IMPORTANT

Improper relief valve pressure settings may cause severe damage to the hydraulic system. Extreme caution should be taken when making pressure adjustments.

IMPORTANT

Inspect all O-ring gaskets for damage and replace as necessary. Never reuse damaged or questionable O-rings.



HAOG590P

Figure 59

High Pressure Adjustment

1. Install an accurate pressure gauge at the discharge outlet of the hydraulic pump.
2. Start the engine and drive hydraulic pump at normal rpm.
3. Completely stroke one of BM-up, AM or BKT plungers and read pressure gauge.
4. Adjust pressure by turning sleeve (7) while monitoring pressure gauge. Each 1/4 turn changes pressure by approximately 45 kg/cm² (640 psi)

IMPORTANT

The relief valve is extremely sensitive and sudden extreme changes should be avoided.

5. Tighten hexagonal nut (3) while sleeve (7) is secured. Recheck high side pressure.

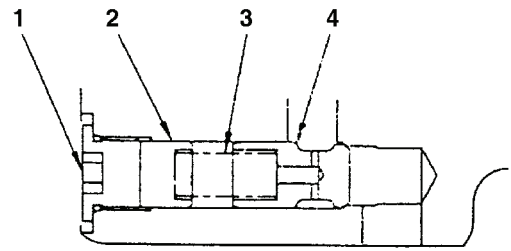
Tightening Torque	6 kg·m (43 ft lb)
--------------------------	----------------------

Low Pressure Adjustment

1. After the High Pressure adjustment has been completed, Low Pressure adjustment can be made by turning the Adjust screw (1).
2. After the desired pressure has been adjusted, tighten hexagonal nut (2) while adjust screw (1) is secured. Recheck low side pressure.

Tightening Torque	6 kg·m (43 ft lb)
--------------------------	----------------------

Reference Number	Description
1	Cap
2	Stopper
3	Spring
4	Check

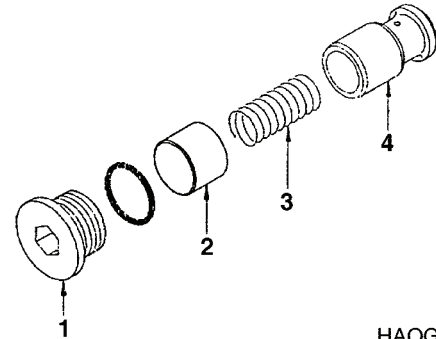


HAOG930P

Figure 87

- Loosen cap (1), remove stopper (2), spring (3) and check (4).

Cap Wrench Size	8.0 mm
Tightening Torque	10 kg·m (72 ft lb)

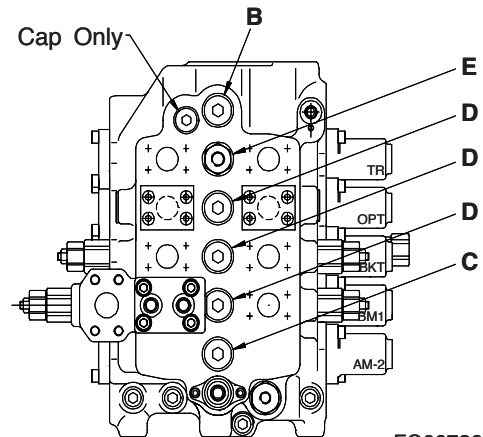


HAOG940P

Figure 88

Check Valve - Locations

Valve Location Reference	Description
A	Main Relief Valve
B	P2
C	AM-2
D	OPT, BKT, BM-1, BM-2, AM-1
E	TL
F	SW



FG007269

Figure 89

Specifications

Model		TSM64	TSM72	TSM86	TSM128	TSM140
Displacement		64	72	86	127.9	140.5
Pressure (kgf/cm ²)	Rated	330	330	330	330	330
	Max	400	400	400	400	400
Maximum speed (min ⁻¹)		2500	2200	1900	2000	1800
*1 Theoretical output torque (kgf•m)		33.6	37.8	45.1	67.1	73.7
*2 Theoretical output power (KW)		75.8	85.2	86.0	134.2	134.5
Brake torque (kgf•m)		36.8	36.8	36.8	70	70
Brake release pressure (kgf/cm ²)		24	24	24	26	26
Weight (kgf)		42.3	42.3	42.3	62	62

NOTE: *1. The theoretical value at the rated pressure, not including mechanical efficiency.

*2. The theoretical value at the rated pressure and the max. speed.

NOTE: TSM86 series can be applied from 64cc/rev to 86cc/rev by the change of displacement.

TSM140 series can be applied from 127.9cc/rev to 140.5cc/rev by the change of displacement.

Oil Filling & Air Bleeder

1. Fill in the casing with oil using the drain port before the operating.

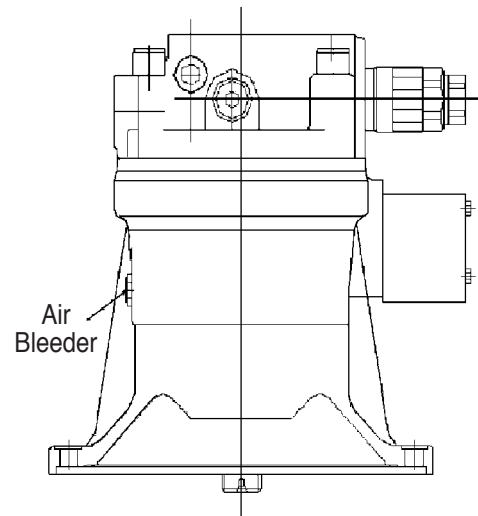
In the motor, there are many kinds of high-speed sliding surface like bearing, piston, shoe, spherical bush, and etc. So If there isn't enough oil, can make some problem like sticking or breaking in those parts.

Use the PF 1/4 port for venting air.

2. All the air in the motor and circuit must be removed, otherwise, it will be likely to be causes of imperfect working or a damage of the motor.

Precaution in Starting Operations

1. If the direction of revolution is correct or not.
2. Whether or not there is any leakage of oil from the motor.
3. If the equipment vibrates abnormally or not during operation or when the revolution direction is changed.
4. If the oil temperature rises rapidly in spite of running for a short period of time.
5. Whether the pressure varies to a great extent as compared with the established one.
6. If the piping is fully connected or not.



FG007427

Figure 10

4. Insert the drive shaft (101) complete with ball bearing into casing (301).

Impact the outside surface of outer loop uniformly till stop at casing section.

Coat the lip of the oil seal with grease and tape the shaft spline for the protection of spline.

Tap evenly.



Figure 30

5. (It is necessary when parallel pin was disassembled from the casing.)

Assemble parallel pin (304) to casing (301).

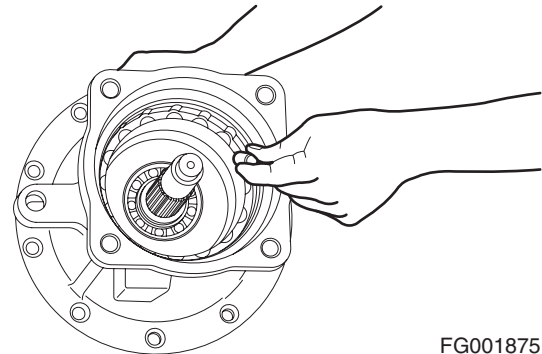


Figure 31

6. Assemble swash plate (202) to casing (301).

If casing is horizontal position from the bottom, It is easy to work.

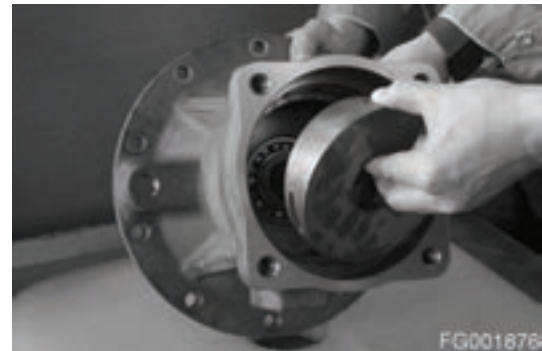


Figure 32

7. Insert roller (209) to cylinder block (205).

Make sure that cylinder block is assembled with all component.

(washer (210), spring (211), ring snap (212))

(Be careful not to damage the sliding surface of the cylinder block. Insert roller to each hole one by one.)



Figure 33

GENERAL REPAIR GUIDELINES



CAUTION

Observe the following notices when carrying out repair work at hydraulic aggregates.

1. Close all ports of the hydraulic aggregates.



Figure 2

HB7M3002

2. Replace all seals.
Use only original Hydromatik spare parts.

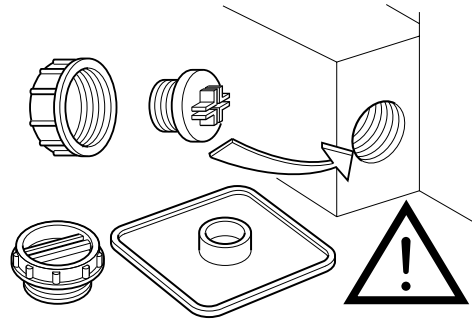


Figure 3

HB7M3003

3. Check all seal and sliding surfaces for wear.



CAUTION

Rework of sealing area f. ex. with abrasive paper can damage surface.

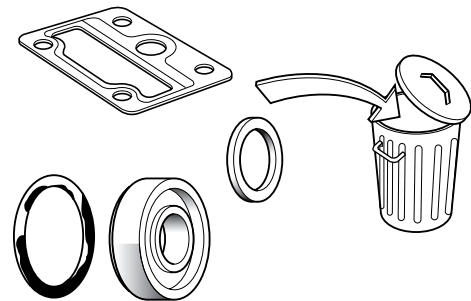


Figure 4

HB7M3004

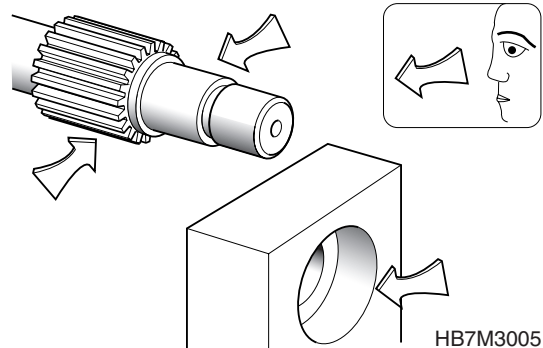


Figure 5

HB7M3005

2. Port plate
Mark position. Loosen screws.
Removal

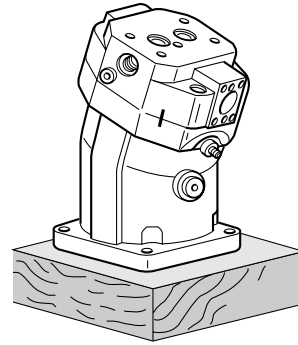


Figure 35

HB7M3035

3. Check O-ring.

 **CAUTION**

Stick new O-ring with some grease.

Do not swivel rotary group.

Piston rings to hang out from the cylinder boring.

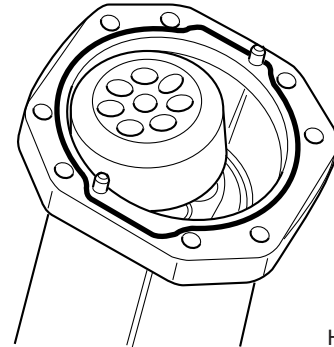


Figure 36

HB7M3036

Remove of the Positioning Piston

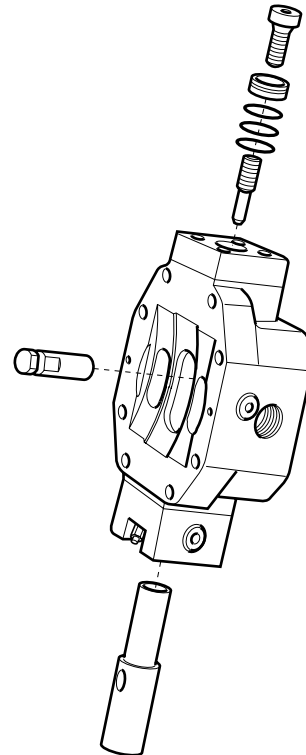


Figure 37

HB7M3037

7. Assemble shaft seal, disc and safety ring.
Press-in with assembly sleeve.

CAUTION

Take care of press-in depth.

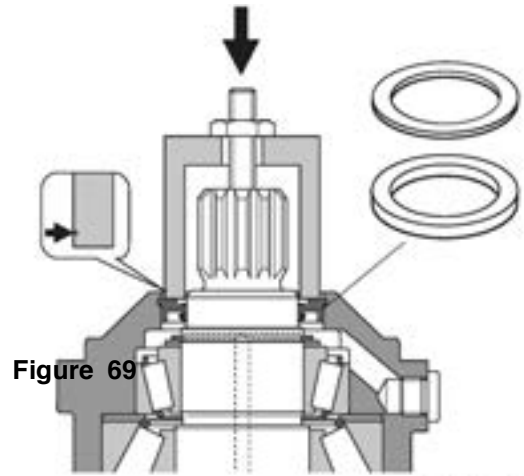


Figure 69

FG003052

8. Assemble counter-balance valve

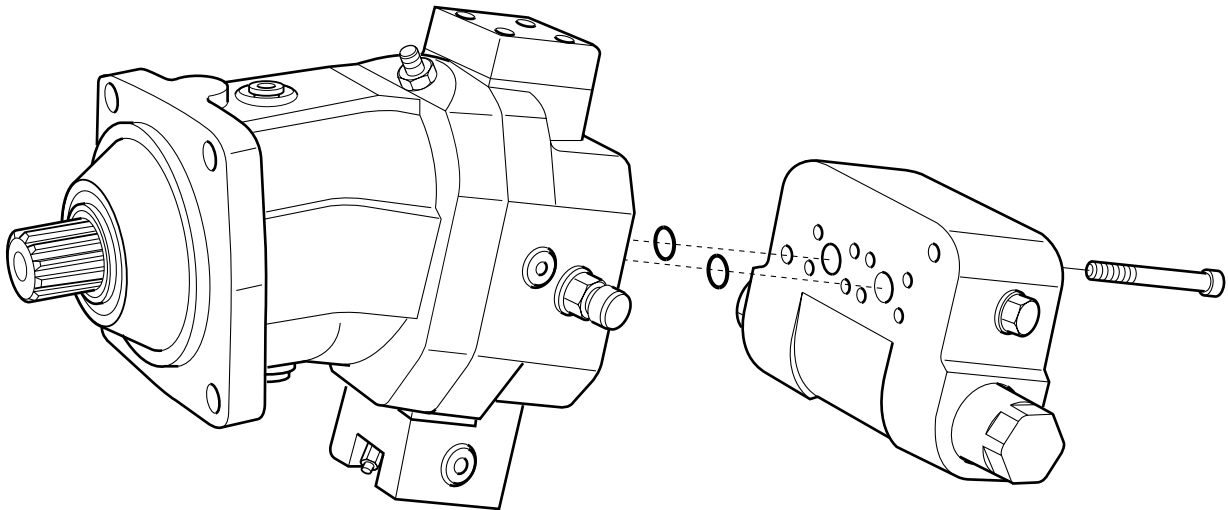


Figure 70

HB7M3030

While Operating to Back

Backward operation also has counterbalancing function like forward operation. The spool moves to left when motor works either for accelerated climbing or for uniform running on a flat road, while oil flows through individual ports (B → B' to Motor to A' to A). While in deceleration and in decent, counter pressure is produced at B' port, contrary to the case of forwarding, causing vehicle body to be under control. While in operation to stop, spool moves toward neutral position and counter pressure produced from neutral orifice (at B' port) produces braking pressure of the relief valve, which forces the vehicle body to stop.

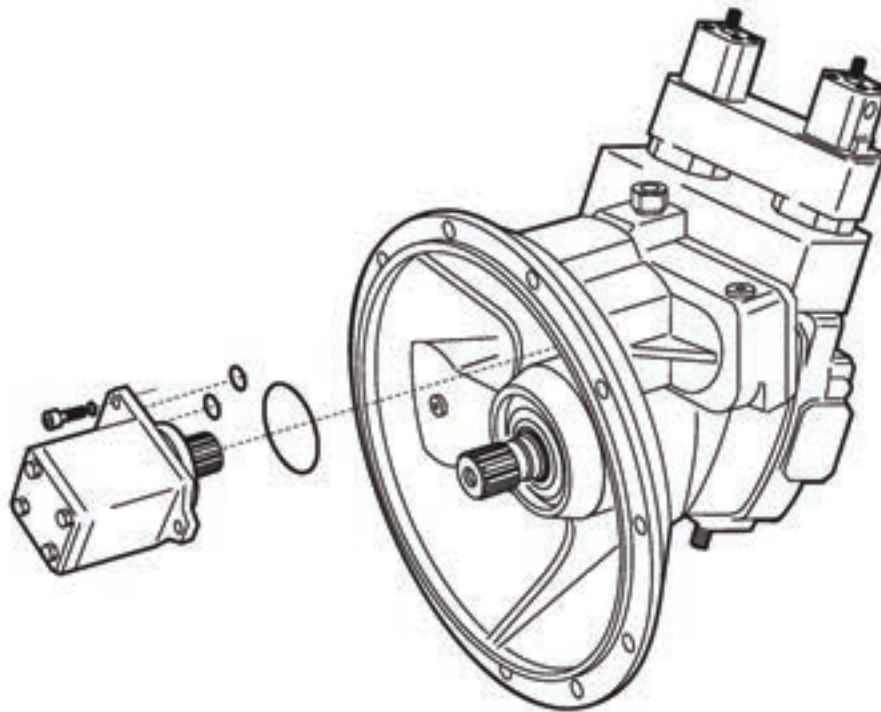
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Gear Pump Sealing

1. Remove gear pump.

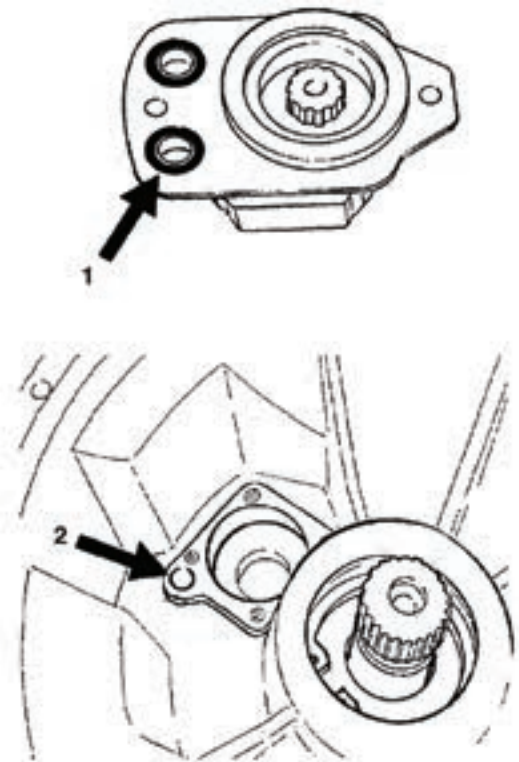


FG003079

Figure 23

Visual Check :

Reference Number	Description
1	O-ring
2	Sealing Surface of the Housing



FG003080

Figure 24

7. Loosen of the screws is only possible if the drive shaft is warmed up at a temperature of approx. 120°C 1/2 hour in an oil bath or heat air furnace.

Screw out the screw quickly.

Intermediate Wheel

1. * Press in bolt into the gear wheel. (Fixed pressing fit).

Can only be disassembled with a hydraulic press.

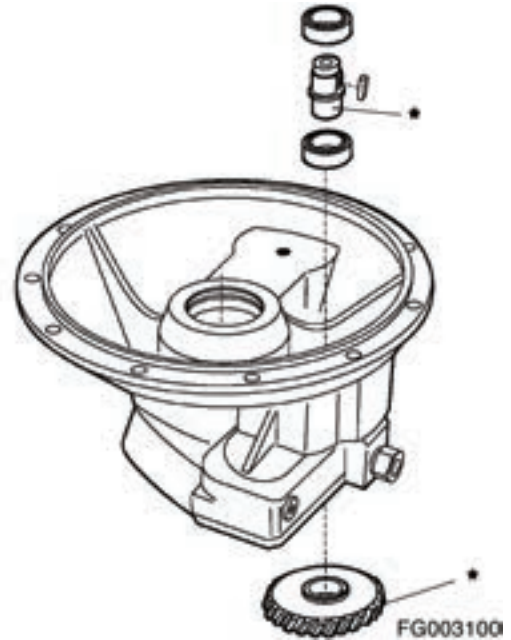


Figure 45

**CAUTION**

Install sleeve.

Press out bolt with a hydraulic manual press.

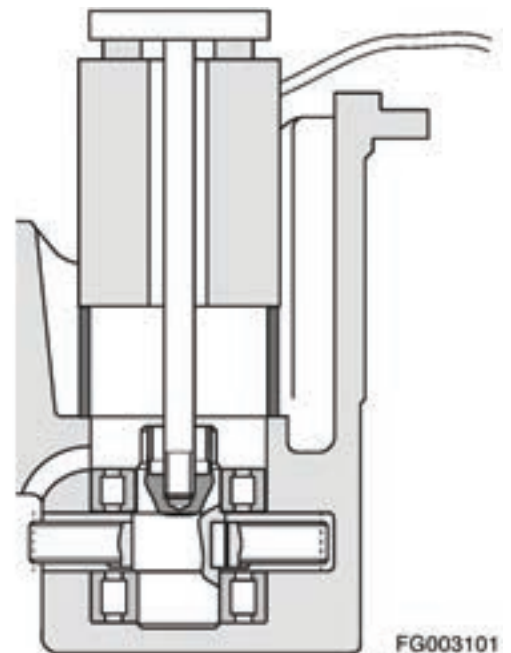


Figure 46

3. Insert rotary group 1. Align the marked gear teeth.

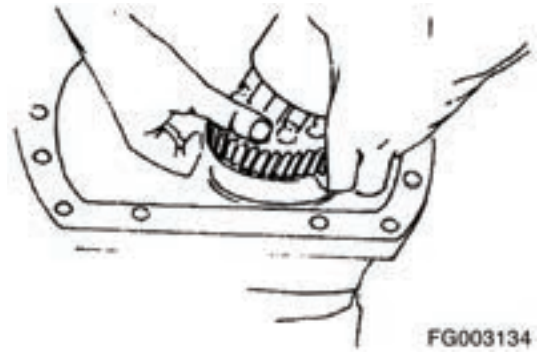


Figure 78

4. The gear tooth markers must coincide.

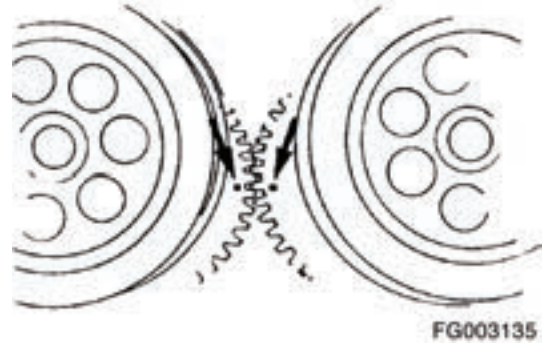


Figure 79

 **CAUTION**

Adjustment of measurement D.

Control hydraulic part!



Figure 80

HB7M3002

Plugs with Internal Hexagon and Profile Seal Ring (to N 02.009)

Thread	Tightening Torque M_A in N·m
M8 x 1	5
M10 x 1	10
M12 x 1.5	20
M14 x 1.5	30
M16 x 1.5	35
M18 x 1.5	40
M20 x 1.5	50
M22 x 1.5	60
M26 x 1.5	70
M27 x 2	90
M30 x 1.5	100
M33 x 2	140
M42 x 2	240
M48 x 2	300
G 1/8 A	10
G 1/4 A	30
G 3/8 A	35
G 1/2 A	60
G 3/4 A	90
G 1 A	140
G 1 1/4 A	240
G 1 1/2 A	300

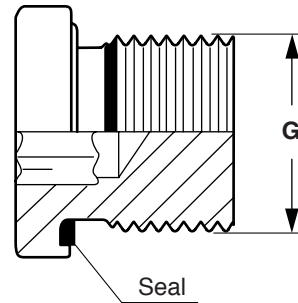


Figure 106

FG007439

Seal-Lock - Sealing Nuts (to N 02.100)

Thread	Tightening Torque M_A in N·m
M6	10
M6 x 0.5	11
M8	22
M8 x 1	24
M10	40
M10 x 1	44
M12	69
M12 x 1.5	72
M14	110
M14 x 2	120
M16	170
M16 x 1.5	180

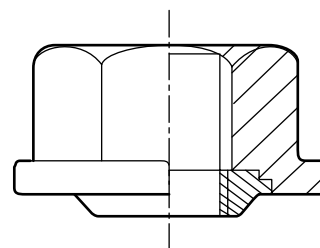
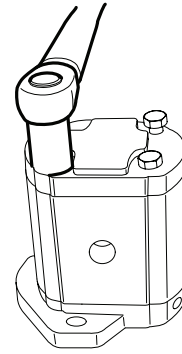


Figure 107

FG003165

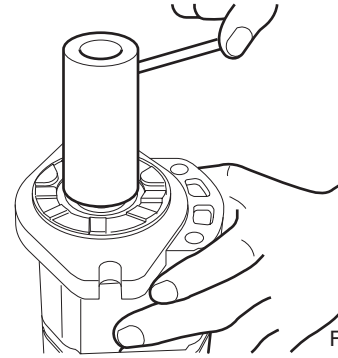
11. Tighten bolts with washer in a crisscross pattern to a torque value of 45 Nm.



FG001085

Figure 20

12. Check that pump rotates freely when drive shaft is turned by hand. If not a pressure plate seal may be pinched.



FG000851

Figure 21

SAFETY PRECAUTIONS



CAUTION

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
DX140W	5001 and Up
DX160W	5001 and Up
DX190W	5001 and Up
DX210W	5001 and Up

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Dozer Control Valve

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- Performance Curve..... 8
- Hydraulics Symbol..... 8
- Disassembly & Assembly Tools 8
- Disassembly 9
- Assembly 12

10. Assemble guide(16) and lever(20) with spring pin(21).

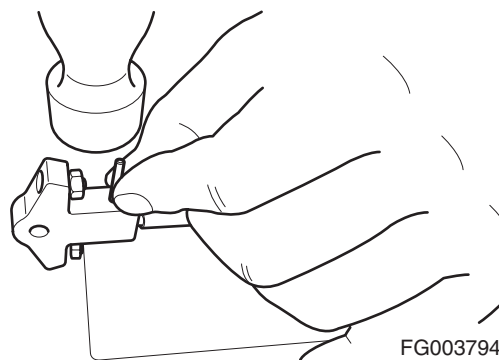


Figure 25

FG003794

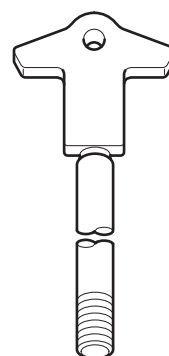


Figure 26

FG003794-1

11. Assemble guide(16) in the cover with pin(17).

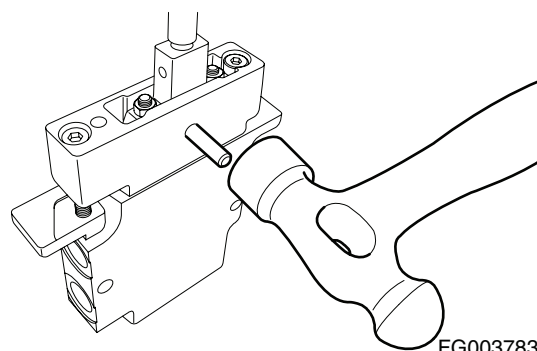


Figure 27

FG003783

12. Adjust the clearance of lever(20) with wrench and spanner.

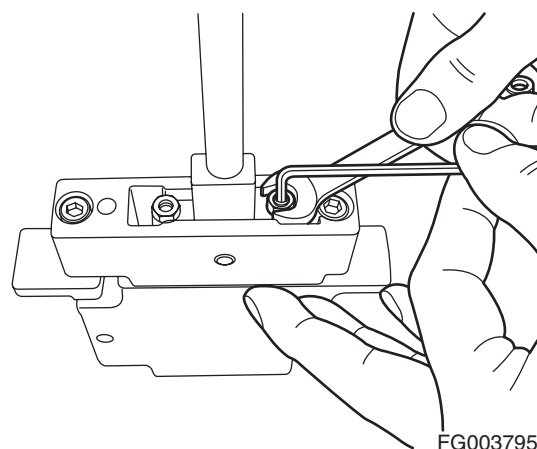


Figure 28

FG003795

5. Assembly tool for dust seal.
Code no. SJ 150-9000-22.



Figure 8

6. Torque wrench 0-7 daNm.
13 mm socket spanner.
6, 8 and 12 mm hexagon sockets.
12 mm screwdriver.
2 mm screwdriver.
13 mm ring spanner.
6, 8 and 12 mm hexagon socket spanners.
Plastic hammer.
Tweezers.



Figure 9

The tools named under point F are not available from Danfoss.

Assembly Pattern for Double Bearing

Reference Number	Description
1	Washer For Axial Bearing
2	Outer Needle bearing
3	Outer Bearing Race
4	Spool
5	Sleeve
6	Inner Needle bearing
7	Inner Bearing Race

* The inside chamfer on the inner bearing race must face the inner spool.

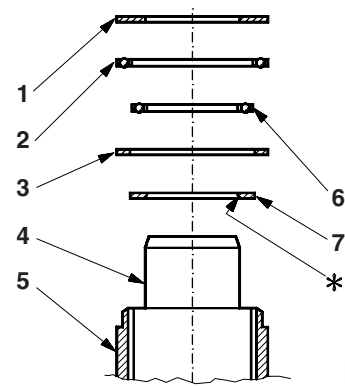


Figure 51

FG003326

Installation Instructions for O-ring/Kin-ring /Roto Glyd

1. Turn the steering unit until the bore is horizontal. Guide the outer part of the assembly tool into the bore for the spool/sleeve.

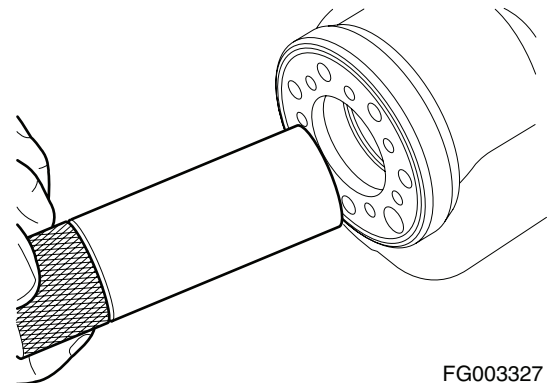


Figure 52

FG003327

2. Grease O-ring and king-ring/roto glyd with hydraulic oil and place them on the tool.

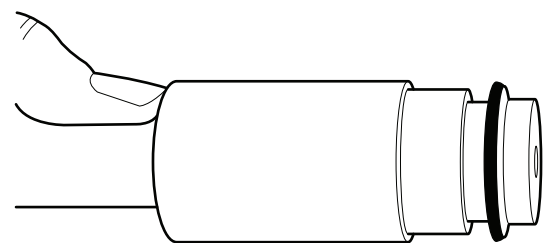


Figure 53

FG003328

Accelerator Pedal Valve (Hydraulic)

Edition 1

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One Spool Valve

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 - Replacement of Main Relief Valve 12
 - Replacement of Overload Relief Valve 13
 - Replacement of Sub-Block Ass'y 14

1. Installation of Surface Plate

Install a surface plate on a workbench for replacement of the sub block assembly.



Figure 18

2. Removing Sub-Block Ass'y

Place the main frame on the surface plate, installed on the workbench.

Remove the assembly by unfastening the four nuts, fixing it, with a spanner or a hexagon wrench (13mm).



Figure 19

3. Replacing Block Ass'y

Replace the faulty assembly with a new one and assemble the new one in order.



Figure 20

4. Assembling Nuts

Arrange the main frame and fasten the four nuts at the specified standard torque with a torque wrench (13mm).

Before completely fastening the nuts, check if each sub-lock is properly arranged based on the surface plate.

Standard Torque: 2.05 kgf•m

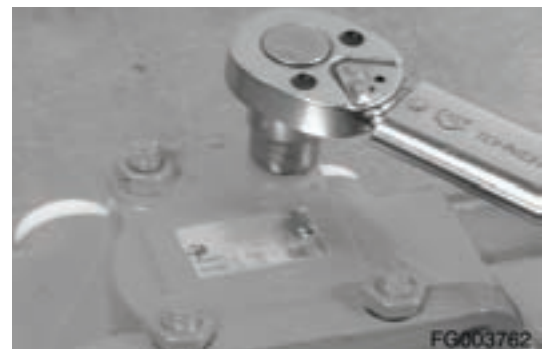
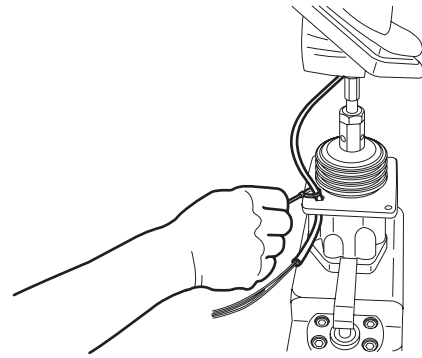


Figure 21

DISASSEMBLY

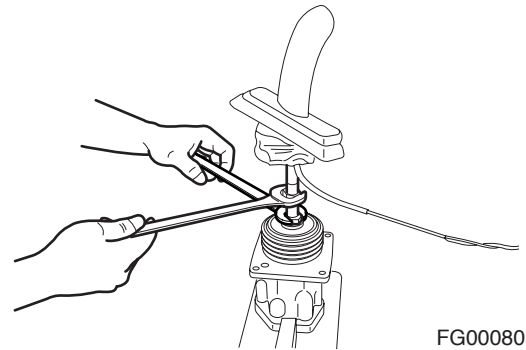
1. Remove lead wire from bushing (29).



FG000804

Figure 3

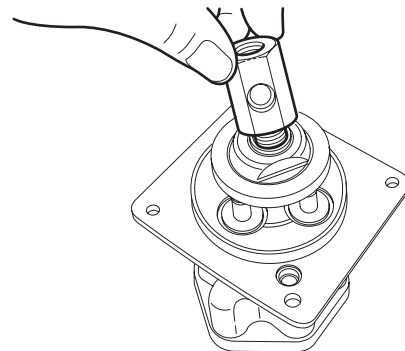
2. Remove lever assembly from case (1).



FG000805

Figure 4

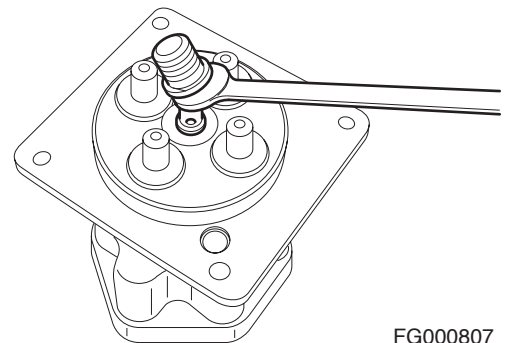
3. Remove hex nut (23) and swash plate (22) from case.



FG000806

Figure 5

4. Remove joint assembly (21) from case.



FG000807

Figure 6

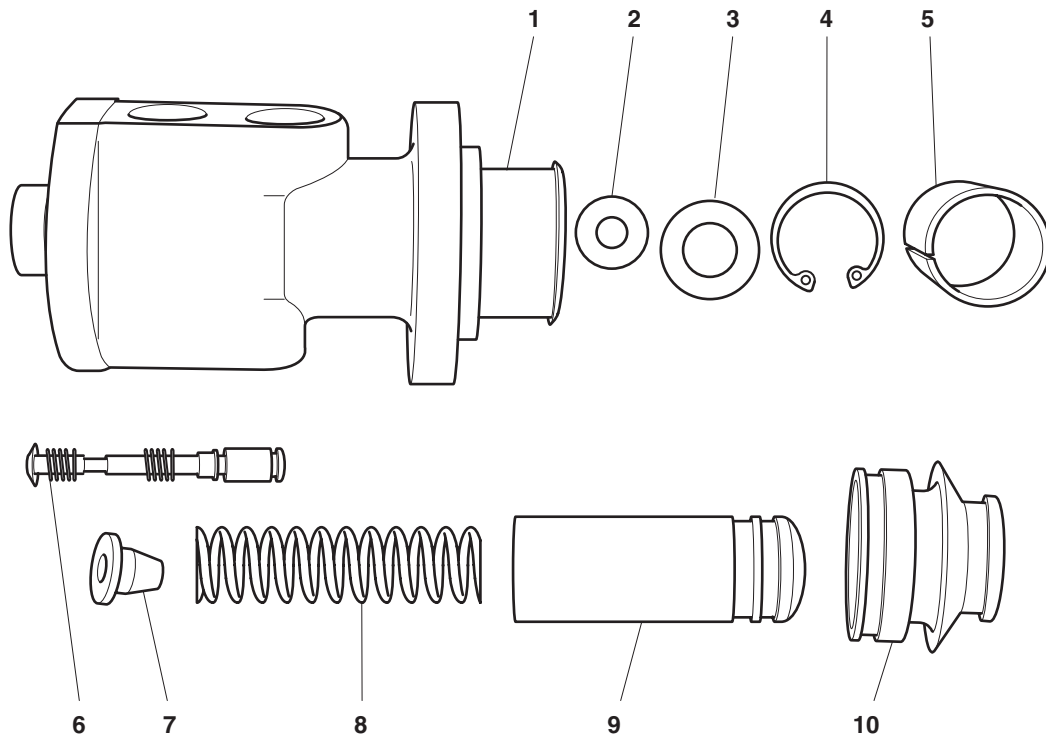
Breaker EPPR Valve (Opt)

Edition 1

Service Brake Pedal Valve

Edition 1

Reassembly of the Upper Part



FG003656

Figure 11

Reference Number	Description
1	Upper Part
2	Oil Seal
3	Plain Washer
4	Retaining Ring
5	Drive Bearing

Reference Number	Description
6	Spool
7	Spring Retainer
8	Main Spring
9	Holder
10	Rubber Cover

1. Install oil seal (2), plain washer (3), retaining ring (4), and drive bearing on lower part (1).

Tools: Drive bearing jig and snap ring plier.

CAUTION

Use a jig to press and push bearing.

Never remove the dry bearing.

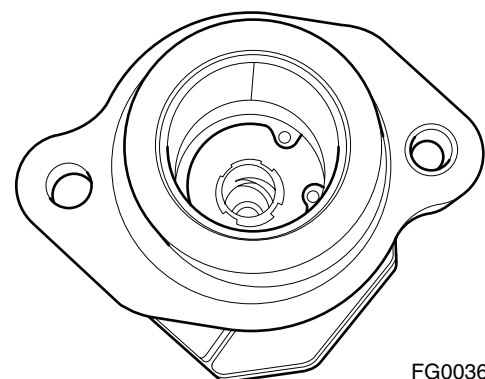


Figure 12

FG003657

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- 6-Solenoid Valve..... 11
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Cautions for Disassembly and Re-assembly

1. Clean up the surrounding area to remove any foreign substances before disassembly and re-assembly.
2. Make sure to observe the assembly torques and tools specified in table of page 16 when disassembling and re-assembling parts.
3. Follow the directions described in the above drawing for disassembly and re-assembly.
4. Disassembly and re-assembly of solenoid valve
 - A. Disassemble the valve by turning 2-1 coil lock nut in the disassembly direction.



CAUTION

Do not damage the tube and retainer of Solenoid Valve when disassembling the coil lock nut.

In case the tube and retainer gets damaged (dented, deformed), solenoid valve will not work.

- B. After disassembling coil lock nut, take out 3 coil using your hand.
- C. Then, disassemble 3 Solenoid valve by turning it in the disassembly direction.
- D. Identify problems and re-assembling solenoid valve and coil.
- E. Avoid using excessive torque in re-assembling solenoid valve and coil.



CAUTION

Excessive use of torque will result in defects on solenoid valve.

5. Be careful not to let any contaminants go into the package when re-assembling.
6. Make sure to clean parts before re-assembly after disassembly.

Functions of 3 Solenoid Valve Assembly Package

Functions

This solenoid valve package has functions as below:

1. Selects devices for operation (dozer blade/ STD).
2. Performs a ram lock function.
3. Controls driving speed.
4. Cuts off pilot pressure.

Application by Function of Each Solenoid Valve

Valve No.	Valve Function	Application	Remark
C1	Selects devices. - Dozer blade	Dummy plug (C1) shut off the circuit against selection system. Only dozer blade is available for selection.	
C2	Performs a ram lock function.	Used to absorb vibration from the front axle depending on road conditions when the vehicle is moving while it keeps the front axle stable to increase operation convenience when the vehicle is working.	Ram lock
C3	Controls driving speed.	Converts to low-speed driving (below 5km/h).	
C4	Cuts off pilot pressure.	Supplies the pressure and oil flows discharged by the pilot pump to the solenoid valve that supplies pilot pressure and the remote control valve, to drive each device.	

Detailed Function and Application Descriptions by Solenoid Valve

1. Selects devices for operation.

This Dummy plug(C1) selects sub-devices such as a dozer blade and forms a closed circuit for selection system. So, pilot directional valve will not operate and the opening position of spool will remain the same at all times as pilot pressure will not be transmitted to pilot directional valve. However, the pressure and oil that are going into the devices (dozer blade & outrigger) will be transmitted to dozer blade with the directional valve in its normal opening position (no operation).

2. Performs ram lock functions.

Ram lock is a function to absorb vibration from the front axle depending on road conditions when the vehicle is moving while it keeps the front axle stable to increase operation convenience when the vehicle is working.

- A. How the ram lock function "ON" works

SAFETY PRECAUTIONS



CAUTION

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

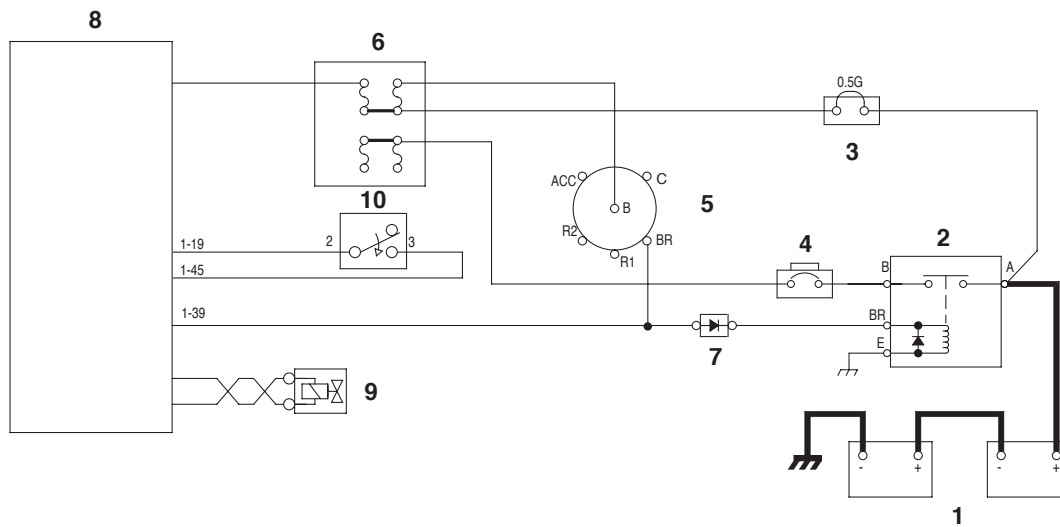
The contents of this section apply to the following models and serial number ranges.

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DX210W	5001 and Up

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STARTER SWITCH CONNECTION

PST	TML	B	BR	R1	R2	C	ACC
OFF		○					
ON		○	○				○
START		○	○		○	○	○



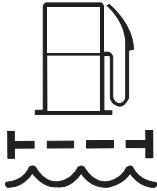


FG001473

Figure 7 ENGINE STOP CIRCUIT

Reference Number	Description
1	Battery
2	Battery Relay
3	Fusible Link
4	Circuit Breaker
5	Starter Switch

Reference Number	Description
6	Fuse Box
7	Diode
8	Engine Controller
9	Injector Solenoid
10	Emergency Stop Switch

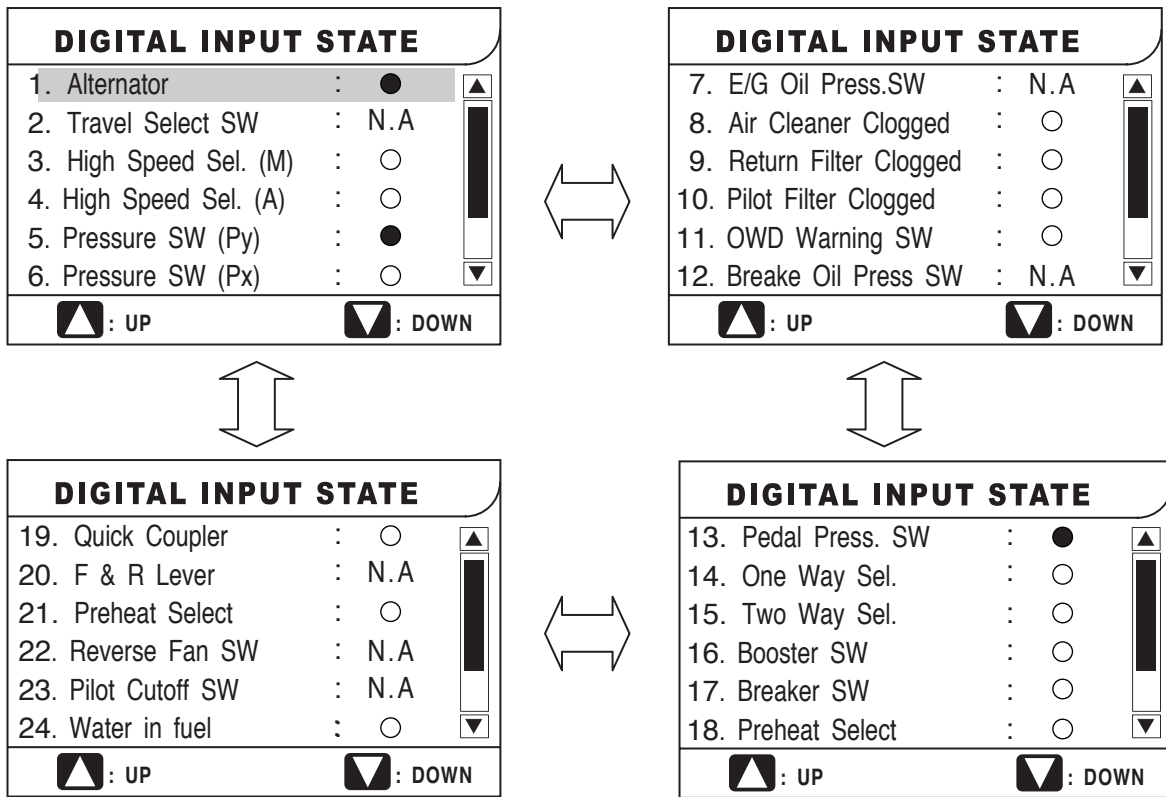
Travel	 FG004605	CN2-3	Lights up when travel was selected.	
Working Light	 HB4O2003	CN2-6	It lights when work light turns "ON".	
Water Separator	 FG010520	CN3-19 CN3-20	This symbol appears when the water separator is full. This symbol appears when water separator sensor output voltage is about 1.5V below.	

INITIAL OPERATION

Item	Input (Terminal)	Output (Operation and initial setting mode)
Initial Operation	When "CN6-1,2" is applied battery voltage (starter switch shifts from "OFF" to "ON")	<ul style="list-style-type: none"> LCD, all of LED and warning lights are turned "ON" and turned "OFF" after about 2 seconds. Warning buzzer is activated and turned "OFF" after about 2 seconds. Power mode: Standard mode. Auto Idle: High Output (Activation). Display: Indicating coolant temperature, Fuel level, Hydraulic oil temperature, Engine speed. Clock: Current time display.

NOTE: Refer to method for setting clock in operation manual for setting time.

Menu Select



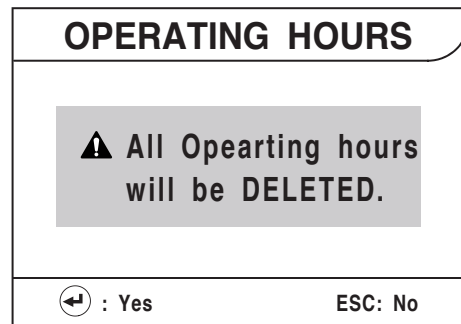
FG013611

Figure 31

- B. Reset screen of operation hour
- C. Exiting Sub-menus: If escape button (ESC, 4 on Figure 25) is pressed for more than 1 second, this information screen will be returned to previous screen.

NOTE: When "YES" (←, 3 on Figure 25) button is pressed, operation hours will reset. At this time, resetting signal will be displayed and the screen will move to previous menu after resetting.

NOTE: When "NO" (ESC, 4) button is pressed, the screen will recover to previous menu without resetting.

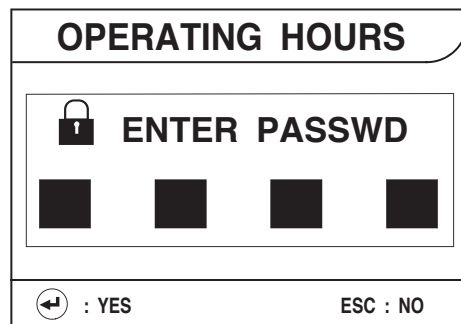


FG013626

Figure 47

Machine Operation Info Screen

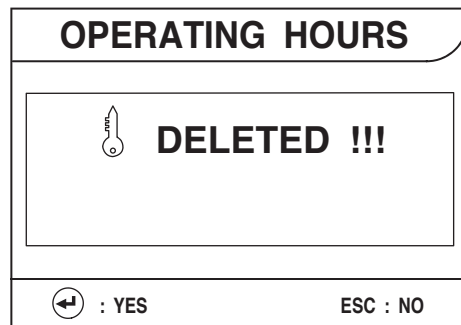
- 1. If you press the "YES" (←, 3 on Figure 25) button, password entrance screen appears.



FG013627

Figure 48

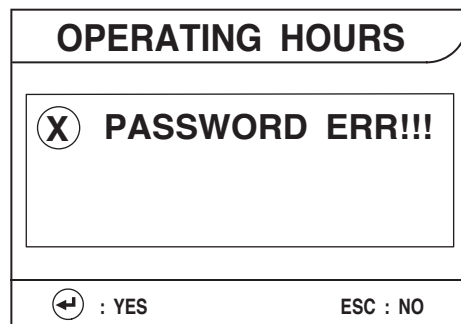
- 2. When right password is input, machine operation periods will be deleted and Reset Completed screen will appear 3 seconds.



FG013628

Figure 49

- 3. If you press the "NO" (ESC, 4) button, the previous screen appears without resetting operation periods.



FG013629

Figure 50

ENGINE CONTROL CIRCUIT DIAGRAM

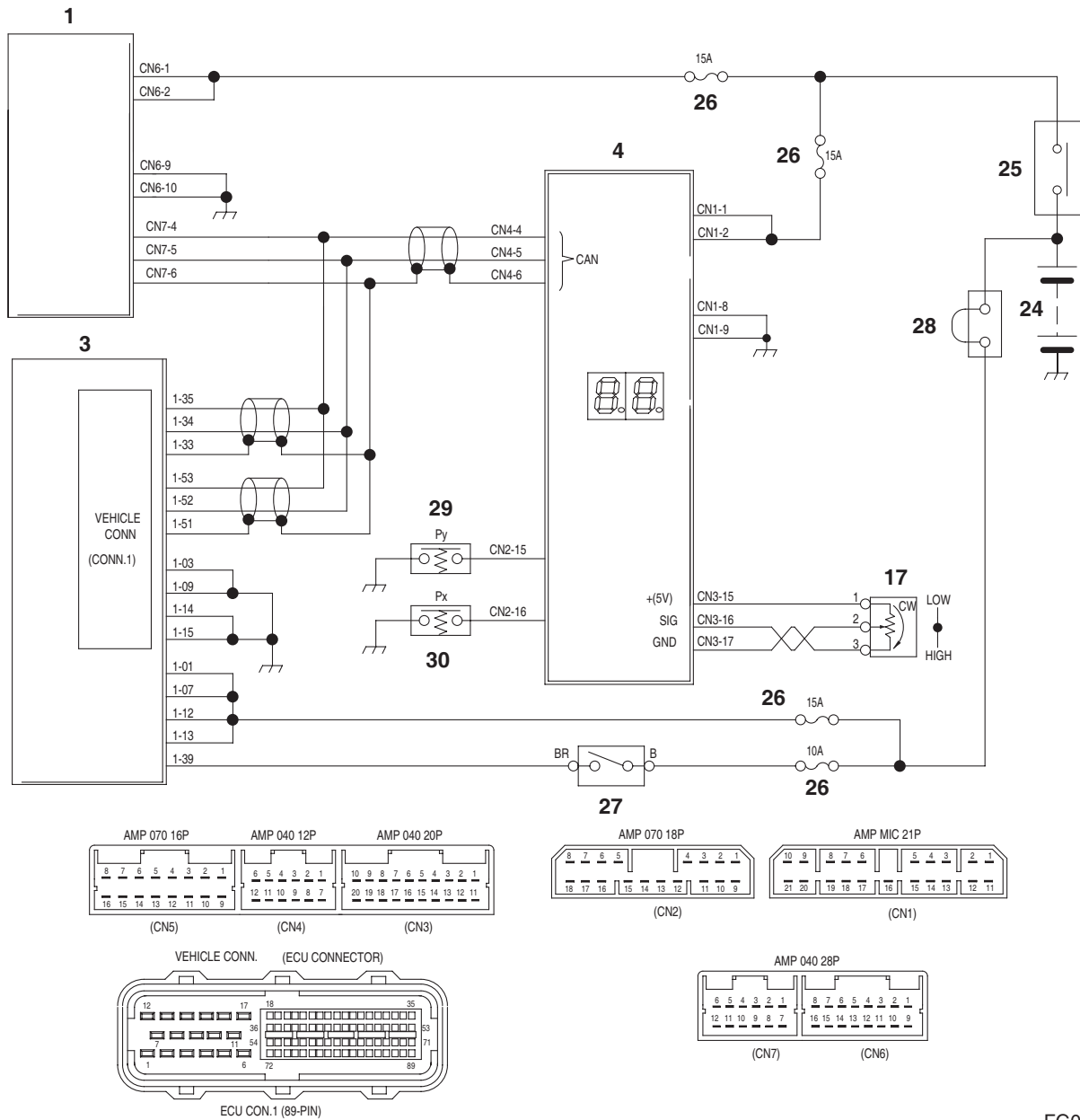


Figure 62

FG009234

Reference Number	Description
1	Instrumental Panel
3	Engine Controller
4	e-EPOS Controller
17	Engine Control Dial
24	Acceleration Pedal
25	Battery

Reference Number	Description
26	Battery Relay
27	Fuse
28	Start S/W
29	Fusible Link
30	Pressure S/W (Py)
31	Pressure S/W (Px)

If the automatic travel speed control switch is set to the "OFF" position, the travel motor will run in the I-speed (low speed) range. If the selector switch is set to the "I" position, the travel motor will run in the II-speed (high speed) range. If the selector switch is set to the "II" position, the e-EPOS controller will monitor the main pump discharge pressure and automatically select the "ON" - "OFF" status of the II - speed travel solenoid valve based on the travel load. The travel speed is changed between the I-speed and the II-speed mode.

The travel load is monitored by the two pressure sensors in the discharge lines of the front (upper) and rear (lower) pumps. When the travel load is high (pressure over 300 kg/cm² (4,300 psi) the solenoid valve is turned "OFF" and I-speed (low) is selected. In the case when the travel load is low (pressure under 160 kg/cm² (2,280 psi), the solenoid valve will be turned "ON" and the II-speed will be selected. But, if the engine speed control switch dial is set below approximately 1400 rpm, the travel speed will be set to I-speed mode.

Operation

Input					Output		Remark
Parking Brake Switch (4)	Work/ Travel Switch (7)	Ram Lock Switch (13)	Ram Lock Pressure Switch (10)	Combination Switch (F/R) (6)	Ram Lock Solenoid Valve (11)	Console (Ram Lock Light) (12)	
"2-3" Terminals (Parking)			-		Lock (OFF)	ON	
	"2-1" Terminals (Travel)	"2-1" Terminals (Lock)	-	-	Lock (OFF)	ON	
		"2-3" Terminals (Release)	-	-	Release (ON)	OFF	
	"2-3" Terminals (Work)	"2-1" Terminals (Lock)	OFF (below 47Bar)	-	Lock (OFF)	ON	
		"2-3" Terminals (Release)		-	Release (ON)	OFF	
		-	ON (above 47Bar)	OFF	Lock (OFF)	ON	
		"2-1" Terminals (Lock)		ON	Lock (OFF)	ON	
		"2-3" Terminals (Release)		ON	Release (ON)	OFF	

NOTE: "-" is don't-care condition.

Sun Sensor

Built beside the socket of spare power, it senses the quantity of the sun radiation to optimize discharge temperature and air flow as set by driver.

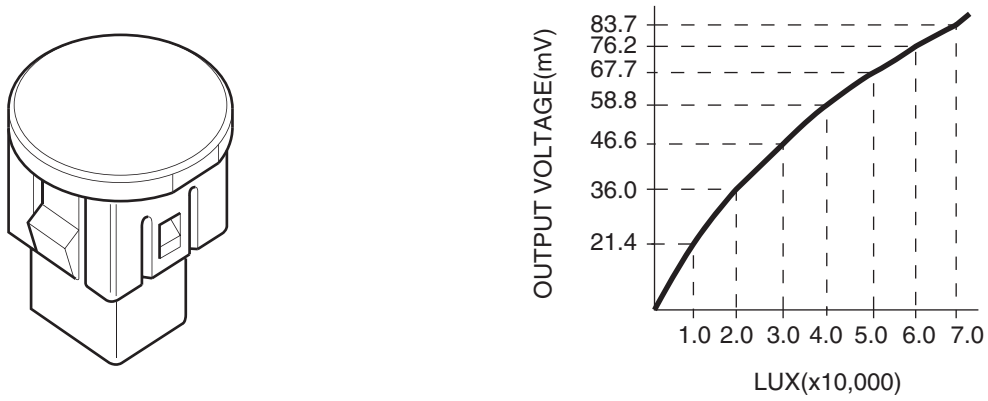


Figure 97

FG001062

Control Panel

Appearance and Terminal Arrangement

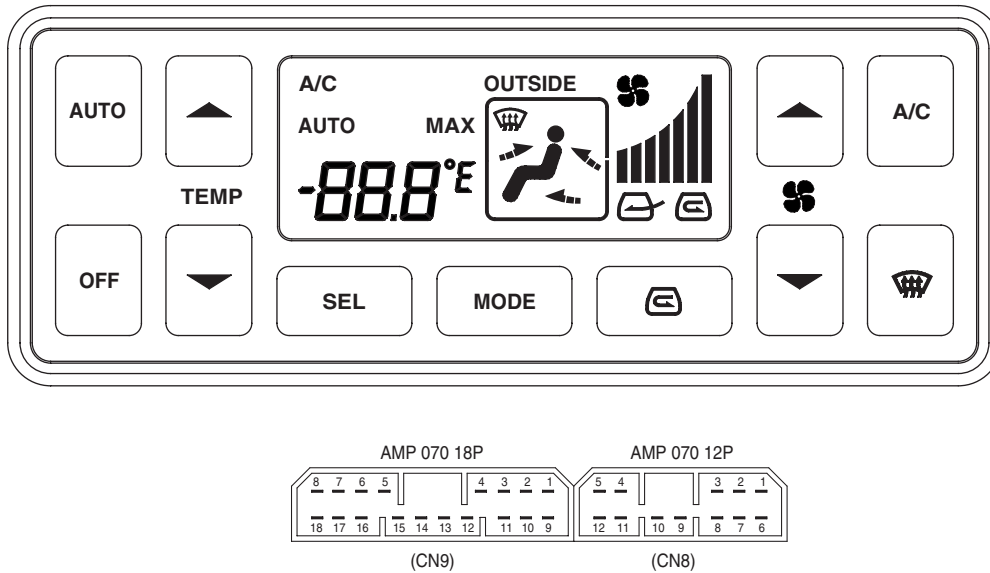


Figure 98

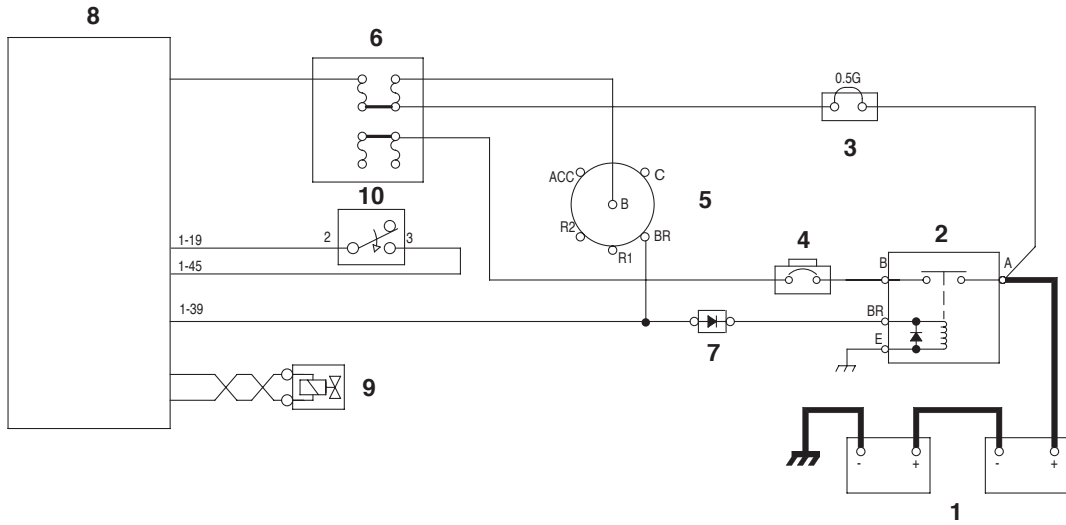
FG001063

Refer to "Air Conditioner and Heater" of operation manual.

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Receiver Dryer.....	108

STARTER SWITCH CONNECTION

PST	TML	B	BR	R1	R2	C	ACC
OFF		○					
ON		○	○				○
START		○	○		○	○	○



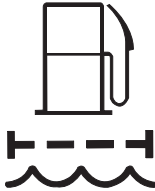


FG001473

Figure 7 ENGINE STOP CIRCUIT

Reference Number	Description
1	Battery
2	Battery Relay
3	Fusible Link
4	Circuit Breaker
5	Starter Switch

Reference Number	Description
6	Fuse Box
7	Diode
8	Engine Controller
9	Injector Solenoid
10	Emergency Stop Switch

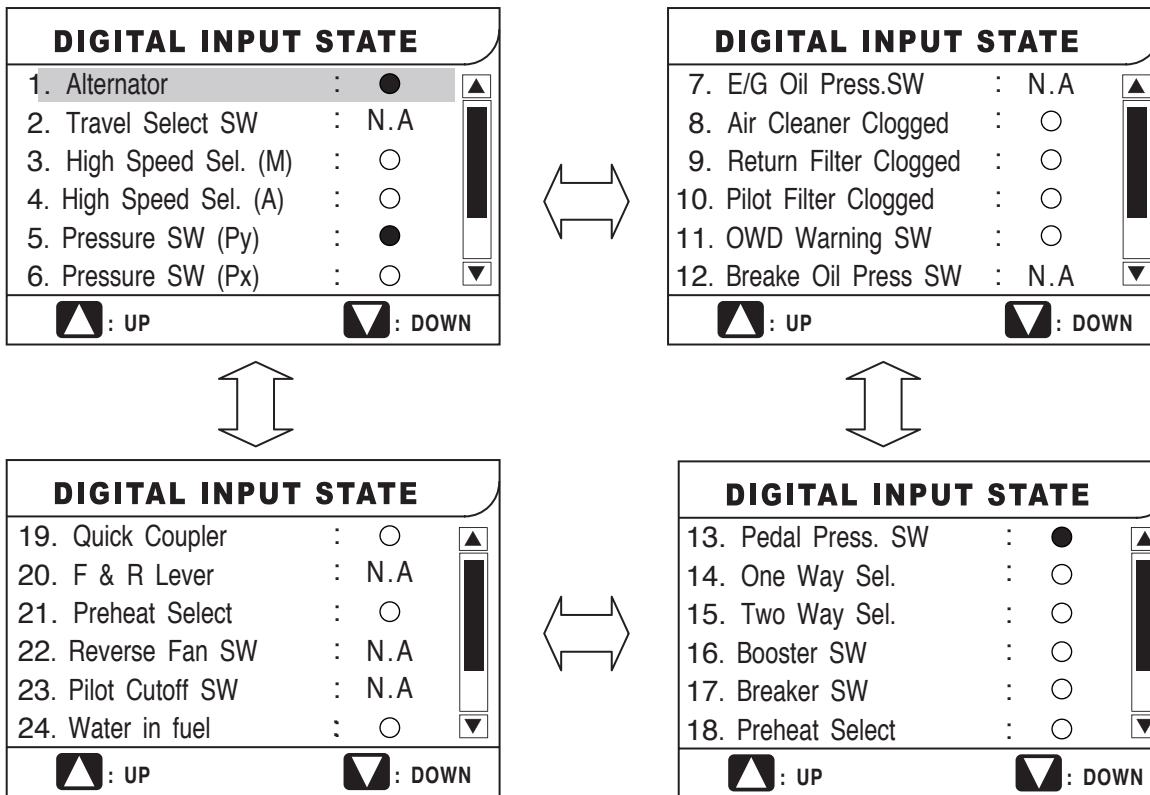
Travel	 FG004605	CN2-3	Symbol up when travel was selected.	
Working Light	 HB4O2003	CN2-6	This symbol when work light turns "ON".	
Water Separator	 FG010520	CN3-19 CN3-20	This symbol appears when the water separator is full. This symbol appears when water separator sensor output voltage is about 1.5V below.	

INITIAL OPERATION

Item	Input (Terminal)	Output (Operation and initial setting mode)
Initial Operation	When "CN6-1,2" is applied battery voltage (starter switch shifts from "OFF" to "ON")	<ul style="list-style-type: none"> LCD, all of LED and warning lights are turned "ON" and turned "OFF" after about 2 seconds. Warning buzzer is activated and turned "OFF" after about 2 seconds. Power mode: Standard mode. Auto Idle: High Output (Activation). Display: Indicating coolant temperature, Fuel level, Hydraulic oil temperature, Engine speed. Clock: Current time display.

NOTE: Refer to method for setting clock in operation manual for setting time.

Menu Select



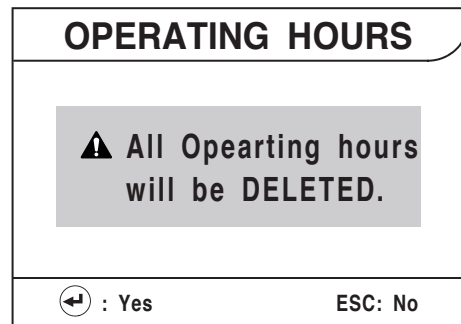
FG013611

Figure 31

- B. Reset screen of operation hour
- C. Exiting Sub-menus: If escape button (ESC, 4 on Figure 25) is pressed for more than 1 second, this information screen will be returned to previous screen.

NOTE: When "YES" (←, 3 on Figure 25) button is pressed, operation hours will reset. At this time, resetting signal will be displayed and the screen will move to previous menu after resetting.

NOTE: When "NO" (ESC, 4) button is pressed, the screen will recover to previous menu without resetting.

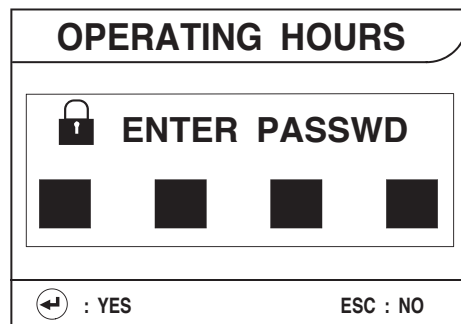


FG013626

Figure 47

Machine Operation Info Screen

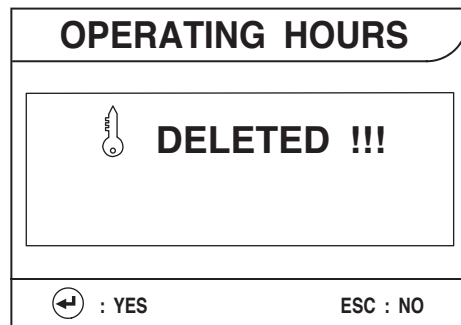
- 1. If you press the YES" (←, 3 on Figure 25) button, password entrance screen appears.



FG013627

Figure 48

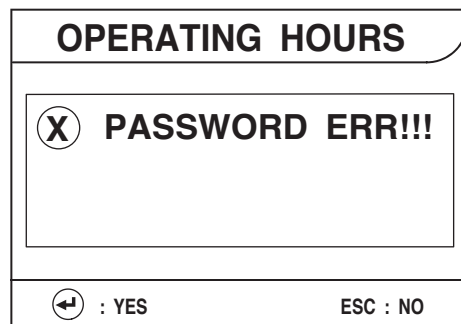
- 2. When right password is input, machine operation periods will be deleted and Reset Completed screen will appear 3 seconds.



FG013628

Figure 49

- 3. If you press the "NO" (ESC, 4) button, the previous screen appears without resetting operation periods.



FG013629

Figure 50

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