950106-00352E
June 2012

EXCAVATOR

Shop Manual

DX140W-3 / DX160W-3

Serial Number 1001 and Up

Serial Number 50001 and Up (Europe Only)

Doosan Infracore
Construction Equipment

MEMO

Do not depend on hydraulic cylinders to support raised equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks, is loosened or disconnected.

If it is necessary to remove guards to perform maintenance, always install guards after maintenance is completed.

HDO1010L

Figure 5

Hot Coolant and Oils - Burn Prevention

Do not touch any part of an operating engine. Immediately after operations are stopped, coolant, engine oil, and hydraulic oil are at their highest temperatures. The radiator and hydraulic tank are still under pressure. Always wait for temperature to cool down. Attempting to remove caps, drain oil or coolant, or replacing filters may lead to serious burns, if done when hot. Relieve all pressure in air system, hydraulic oil system, lubrication system, fuel system, and cooling system, before any lines, fittings or related items are disconnected.

FG019095

Figure 6

To prevent hot oil or coolant from spraying out, stop engine, wait for oil and coolant to cool. Using gloves, slowly loosen cap to relieve pressure.

FG019096

Figure 7

OPERATION

Always make sure that the machine is properly maintained.

Before Engine Starting

Machine Condition

Every day before starting engine for first time, perform the following checks and repair machine before operating, as necessary. If these checks are not properly done death or serious injury could result.

- Check coolant, fuel, and hydraulic tank oil levels, and check for clogged air cleaner and damage to electrical wiring.
- Check operation of gauges, cameras (if equipped) and angle of mirrors, and check that safety lever is in LOCKED position.
- Check that work equipment and travel controls move freely, and work controls return to "NEUTRAL" when released.
- Check that attachment is properly attached and locked.

IMPORTANT

Only use Ultra Low Sulfur Diesel (ULSD) fuel and API-CJ-4/ACEA-E9 grade engine oil with this machine.

Make sure that the machine is equipped with a lighting system that is adequate for job conditions and lights are working properly.

Before moving machine, check position of lower structure. The normal travel position is with dozer blade to front under cabin and outriggers (stabilizers) to rear. When lower structure is rotated in reversed position, directional or travel controls must be operated in opposite directions.

Before performing checks, move machine to an area where there are no obstructions, and operate slowly. Do not allow personnel near machine.

Know maximum operating dimensions of your machine.

Operation on Slopes

If the machine has to be used on a slope, pile soil to make a platform that will keep the machine as horizontal as possible.

Improper traveling on steep slopes could result in machine tipping, rollover or sliding down the slope. Always fasten your seat belt.

When possible, operate machine up slopes and down slopes. Avoid operating machine across slope.

On hills, banks or slopes, carry bucket approximately 20 - 30 cm (8 - 12 in) above ground. In case of an emergency, quickly lower bucket to ground to help stop machine.

Do not travel on grass, fallen leaves, or wet steel plates. Even slight slopes can cause machine to slide down a slope. Travel at low speed and make sure that the machine is always traveling directly up or down slope.

Do not change travel direction on a slope. This could result in tipping or sliding sideways of machine.

Improper operation when working on slopes can cause a tip over. Use caution when swinging or operating work equipment on slopes.

Do not swing work equipment from uphill side to downhill side when bucket is loaded. This could cause machine to tip or rollover.

In addition, lower bucket as far as possible, keep it pulled into front, and keep swing speed as slow as possible.

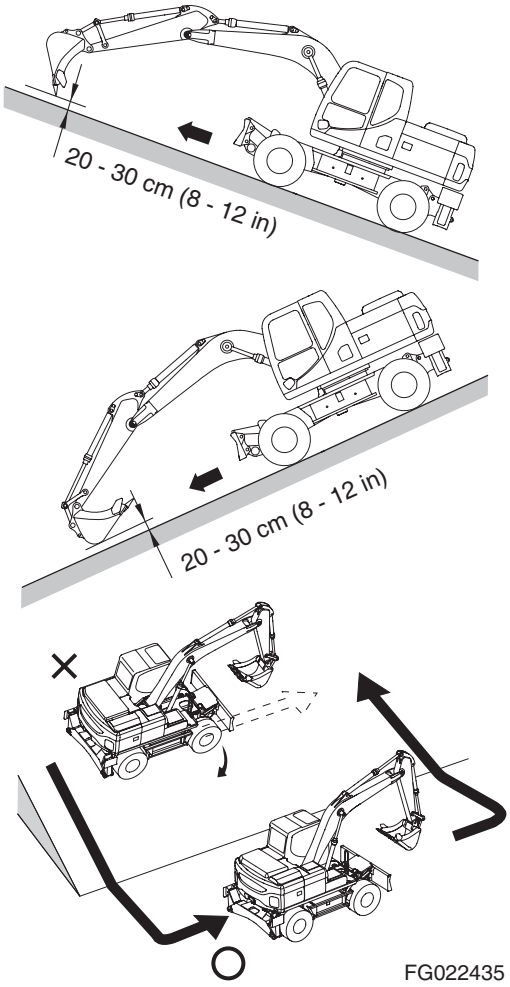

Figure 31

If the machine begins to slide down on a grade, immediately dump load and turn the machine downhill.

Be careful to avoid any ground condition which could cause the machine to tip. Tipping can occur when you work on hills, on banks, or on slopes. Tipping can also occur when you cross ditches, ridges, or travel over unexpected obstructions.

Keep the machine under control. Do not overload the machine beyond capacity.

- When traveling up a steep slope, extend work equipment to front to improve balance, keep work equipment approximately 20 - 30 cm (8 - 12 in) above ground, and travel at low speed.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change position of the machine, then travel backup the slope again.

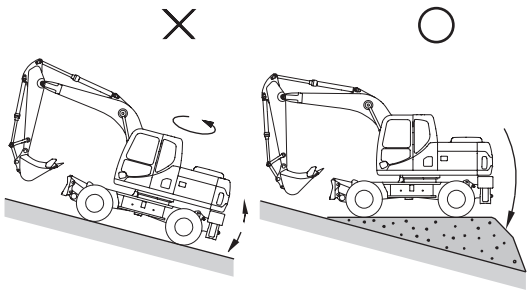

Figure 32

Cleaning

Clean machine before performing inspection and maintenance.

If inspection and maintenance are done when machine is dirty, it will become more difficult to locate problems, and you could slip on steps and work platform areas and injure yourself.

When washing machine, do the following:

- Wear shoes with nonslip soles to prevent slipping and falling.
- Wear safety goggles and protective clothing when washing machine with high-pressure steam or water.
- Do not spray water directly on electrical components (sensors, connectors). If water gets into electrical system, it can cause operation problems.
- Pick up any tools or hammers that are laying in workplace. Wipe up any grease or oil to prevent slippery substances, that can cause tripping or slipping.
- When cleaning cabin top window which is made of polycarbonate material, use tap water. Avoid use of organic solvents for cleaning, such as benzene, toluene or methanol. These solvents can cause a chemical reaction that will dissolve and damage the window.

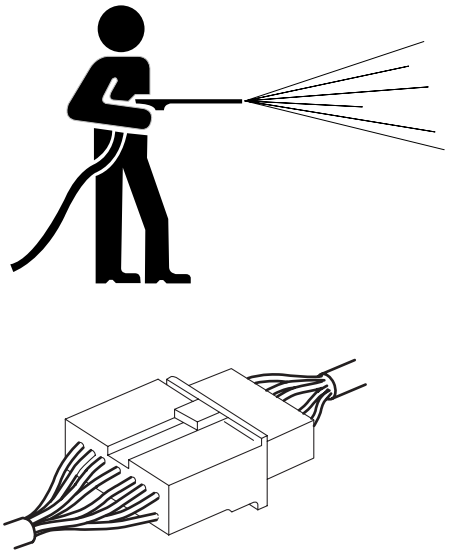

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Figure 39

Proper Tools and Clothing

Only use tools that are intended for the type of service to be done. Metal pieces from low quality or damaged tools, such as chisels or hammers, can break off and hit a service person in the eyes or face causing serious injury.

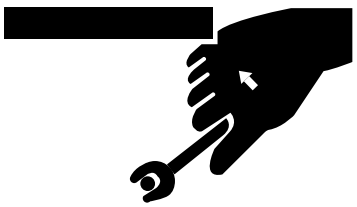

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Figure 40

Disassembling Precautions

When using a hammer to remove pins, pins can fly out or metal particles may break off. Always do the following:

- Hitting hard metal pins, bucket teeth, cutting edges or bearings with a hammer, can cause metal pieces to break or fly off resulting in serious injury. Always wear safety goggles and leather gloves. Keep other personnel away.

Since there is a potential hazard that sparks could be generated, always do the following:

- Do not let tools, rings or other metal objects make any contact between battery terminals. Do not leave tools or other metal objects lying near battery.
- When disconnecting battery terminals, wait for approximately one minute after turning engine starter switch key to "O" (OFF) position, and be sure to disconnect grounding terminal; negative (-) terminal first. Conversely, when connecting them, begin with positive (+) terminal and then grounding (-) terminal, Make sure that all terminals are connected securely.
- Flammable hydrogen gas is generated when battery is charged. Remove battery from machine, take it to a well ventilated place, and remove battery caps, before charging it.
- After charging, tighten battery caps securely.
- After charging, secure battery back in machine.

When repairing or welding electrical system, wait for approximately one minute after turning engine starter switch key "OFF". Then disconnect negative (-) terminal of battery to stop flow of electricity.

Sound

Sound Level Information: Hearing protection may be needed when machine is operated with an open operator station for extended periods or in a noisy environment.

See Operation and Maintenance Manual for sound levels for your machine.

Vibration

Hands and Arms: The weighted root mean square acceleration to which hands and arms are subjected, is less than 2.5 m/s^2.

Whole Body: The weighted root mean square acceleration to which whole body is subjected, is less than 0.5 m/s^2.

Measurements are obtained on a representative machine, using measuring procedures as described in the following standard: ISO 2631/1. ISO 5349, and SAE J1166.

Recommendations for Reducing Vibrations:

1. Select proper machine, equipment and attachments for a particular application.
2. Replace any damaged seat with a genuine DOOSAN seat. Keep seat properly maintained and adjusted.
    - Adjust seat and suspension for weight and size of operator.
    - Inspect and maintain suspension and adjustment mechanisms for seat regularly.
3. Check that the machine is properly maintained.
4. Operate controls smoothly when; steering, accelerating, slowing down, loading, or moving attachments.
5. Adjust machine speed and travel path to reduce vibration level.
    - Slow down when traveling over rough terrain or long distances.
    - Avoid obstacles and rough terrain.

Reference Number	Description
1	Counterweight
2	DPF
3	Engine Cover
4	Engine
5	Hydraulic Oil Tank
6	Fuel Tank
7	Control Valves
8	Radiator and Oil Cooler
9	Swing Motor
10	Air Cleaner
11	Center Joint
12	Swing Bearing
13	Cabin
14	Seat
15	Boom
16	Boom Cylinder
17	Steering Column
18	Arm Cylinder
19	Arm
20	Bucket Cylinder

Reference Number	Description
21	Guide Link
22	Push Link
23	Wheel Chocks
24	Bucket Tooth
25	Side Cutter
26	Bucket
27	Dozer Blade
28	Ram Cylinders
29	Front Axle
30	Swing Lock
31	Step
32	Travel Motor
33	Driveshaft
34	Transmission
35	Rear Axle
36	Return Filter
37	Strainer
38	Outrigger
39	Pumps

APPROXIMATE WEIGHT OF WORKLOAD MATERIALS

IMPORTANT

Weights are approximations of estimated average volume and mass. Exposure to rain, snow or groundwater; settling or compaction because of overhead weight and chemical or industrial processing or changes because of thermal or chemical transformations could all increase value of weights listed in table.

Material	Density 1,200 kg/m³ (2,000 lb/yd³), or less	Density 1,500 kg/m³ (2,500 lb/yd³), or less	Density 1,800 kg/m³ (3,000 lb/yd³), or less	Density 2,100 kg/m³ (3,500 lb/yd³), or less
Charcoal	401 kg/m³ (695 lb/yd³)	-	-	-
Coke, blast furnace size	433 kg/m³ (729 lb/yd³)	-	-	-
Coke, foundry size	449 kg/m³ (756 lb/yd³)	-	-	-
Coal, bituminous slack, piled	801 kg/m³ (1,350 lb/yd³)	-	-	-
Coal, bituminous r. of m., piled	881 kg/m³ (1,485 lb/yd³)	-	-	-
Coal, anthracite	897 kg/m³ (1,512 lb/yd³)	-	-	-
Clay, DRY, in broken lumps	1,009 kg/m³ (1,701 lb/yd³)	-	-	-
Clay, DAMP, natural bed	-	-	1,746 kg/m³ (2,943 lb/yd³)	-
Cement, portland, DRY granular	-	-	1,506 kg/m³ (2,583 lb/yd³)	-
Cement, portland, DRY clinkers	-	1,362 kg/m³ (2,295 lb/yd³)	-	-
Dolomite, crushed	-	-	1,522 kg/m³ (2,565 lb/yd³)	-
Earth, loamy, DRY, loose	-	1,202 kg/m³ (2,025 lb/yd³)	-	-
Earth, DRY, packed	-	-	1,522 kg/m³ (2,565 lb/yd³)	-
Earth, WET, muddy	-	-	1,762 kg/m³ (2,970 lb/yd³)	-
Gypsum, calcined, (heated, powder)	961 kg/m³ (1,620 lb/yd³)	-	-	-

General Maintenance Instructions

Edition 4

CLEANING AND INSPECTION

General Instructions

All parts must be clean to permit an effective inspection. During assembly, it is very important that no dirt or foreign material enters unit being assembled. Even minute particles can cause malfunction of close fitting parts such as thrust bearing, matched parts, etc.

WARNING

AVOID DEATH OR SERIOUS INJURY

Do not inhale vapors or allow solvent type cleaners to contact skin. Keep solvent away from open flame, arcs or sparks or other sources of ignition that could start a fire.

1. Clean all metal parts thoroughly using a suitable cleaning fluid. It is recommended that parts be immersed in cleaning fluid and moved up and down slowly until all oils, lubricants, and/or foreign materials are dissolved and parts are thoroughly clean.
2. For bearings that can be removed, soak them in a suitable cleaning fluid for a minute or two, then remove bearings from cleaning fluid and strike flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. To dry bearings, use moisture-free compressed air. Be careful to direct airstream across bearing to avoid spinning bearings that are not lubricated. DO NOT SPIN BEARINGS WHEN DRYING; bearings may be rotated slowly by hand to facilitate drying process.
3. Carefully inspect all bearing rollers, cages and cups for wear, chipping or nicks to determine condition. Do not replace a bearing cone or cup individually without replacing mating cup or cone at the same time. After inspection, dip bearings in lightweight oil and wrap in clean lintless cloth or paper to protect them until installation.

   For those bearings that are to be inspected in place; inspect bearings for roughness of rotation, scoring, pitting, cracked or chipped races. If any of these defects are found, replace bearings. Also, inspect defective bearing housing and/or shaft for grooved, galled or burred conditions that indicate bearing has been turning in its housing or on its shaft.
4. It is more economical to replace oil seals, O-rings, sealing rings, gaskets and retaining rings when unit is disassembled than waiting for premature failures; refer to latest Micro Fiche and/or Parts Book for replacement items.

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Tightening Torque Specifications (Metric)

(For coated threads, prelubricated assemblies.)

IMPORTANT

Disassembly, overhaul and replacement of components on the machine, installation of new or replacement parts and/ or other service-related maintenance may require the use of thread or flange sealing assembly compound.

Use the information on this page as a general guide in selecting specific formulas that will meet the particular requirements of individual assembly installations. *DOOSAN* does not specifically approve a specific manufacturer or brand name, but the following table of "Loctite" applications is included for which cross-references to other manufacturer's products should also be widely available.

IMPORTANT

Use primer "T" or "N" for all cold weather assembly of fastener adhesives, with Threadlocker sealers 222, 242/243, 262, 271, 272, or 277.

ROPS Certification

This DOOSAN excavator has an operator's cabin that meets ROPS requirements. The seat belt must be worn for rollover protection.

The ROPS certification plate is found on the left side of the cabin on most models. It may vary slightly in its location on some models.

Check the ROPS cabin, mounting, and hardware for damage.

Never modify the ROPS cabin. Replace the cabin and hardware if damaged. See your DOOSAN dealer for parts.

ROPS – Rollover Protective Structure complies with ISO 12117-2:2008.

WARNING

AVOID DEATH OR SERIOUS INJURY

Never modify the operator cabin by welding, grinding, drilling holes or adding attachments unless instructed in writing by DOOSAN. Changes to the cabin can cause loss of operator protection from rollover and falling objects, and can result in death or serious injury.

MEMO

SAFETY INSTRUCTIONS

WARNING

AVOID DEATH OR SERIOUS INJURY

Instructions are necessary before operating or servicing machine. Read and understand the Operation and Maintenance Manual and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments repairs or service. Untrained operators and failure to follow instructions can cause death or serious injury.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX140W-3	1001 and Up, 50001 and Up
DX160W-3	1001 and Up, 50001 and Up
DX170W-3	1001 and Up

START-UP PROCEDURES

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

1. Turn key to "OFF" position.
2. Open right side door to access fuel filter.

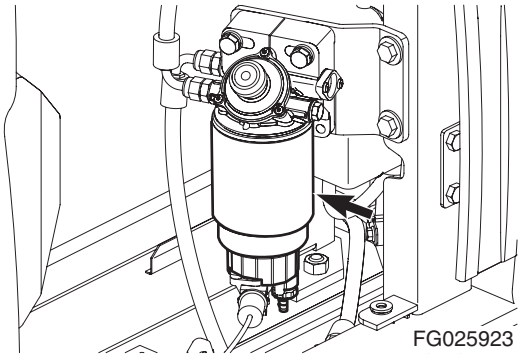

Figure 22

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.

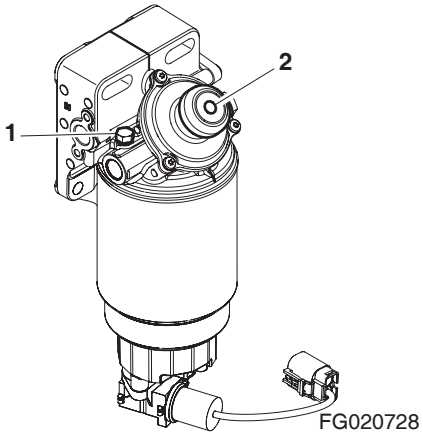

Figure 23

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BRAKE WEAR MEASUREMENT ON AXLES OF MT/MS-E 3050 / 3050 II / 3060 / 3060 II / 3070 / 3070 II RANGE

WARNING

AVOID DEATH OR SERIOUS INJURY

The measurement of wear on the multidisk brake only gives limited information about the braking condition of the system without disassembly of the components.

Take measurement of lining wear at least once per year, in particular, in case of a different braking behavior, like:

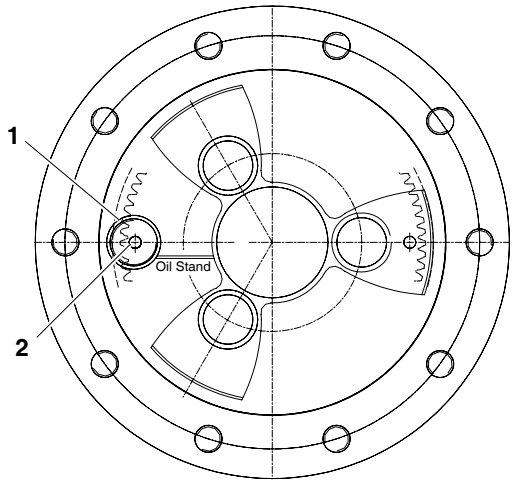
- Brake noises
- Reduced braking power
- Different deceleration
- Different brake oil level
- Different braking pressure

WARNING

AVOID DEATH OR SERIOUS INJURY

To avoid injury from pressurized oil inside the planetary carrier when opening the oil drain and oil fill plug:

1. **Position drain hole to top position (i.e.12 o'clock position). Slowly loosen and unscrew oil drain and oil fill plug to allow any pressure to release.**
2. **Then position oil filler/oil drain hole to the 9 o'clock position to allow oil to drain.**



FG006855

Figure 10

11. Lift-off shaft seal (arrow) with lever and remove both bearing outer rings from hub.

Figure 46

12. Just for axle type MS-E 3060:

    Remove spacer bushing.

Figure 47

13. Pull bearing inner ring from hub.

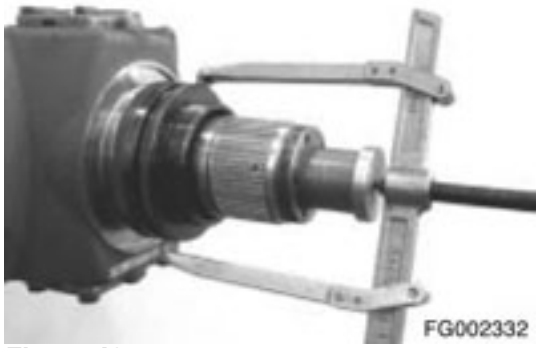


Figure 48

Knuckle Housing

1. Legend to the sketch

Reference Number	Description
1	Bearing Pin
2	Knuckle Housing
3	Axle Housing
4	Shim (Only on Lower Bearing Pin)
5	O-ring
6	Sealing Cap
7	Taper Roller Bearing

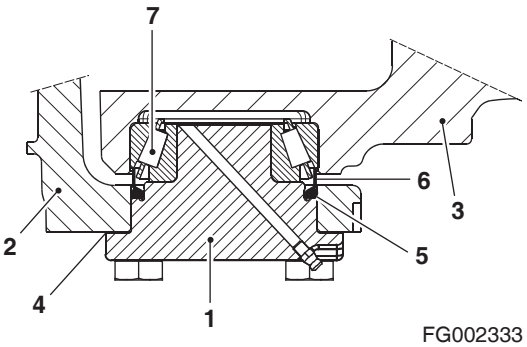


Figure 49

5. Install super-cooled bearing outer ring (see arrow) and bring it into contact position in the inner bearing hole/pinion bearing using the fixture.

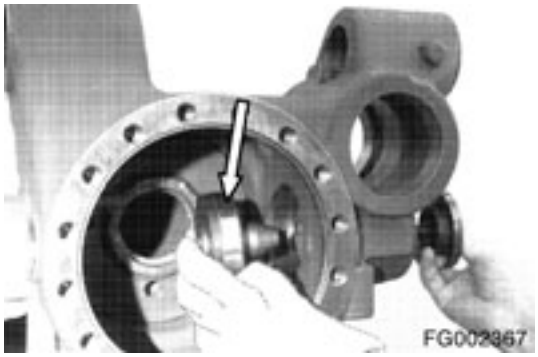


Figure 84

6. Instal outside bearing outer ring/pinion bearing.

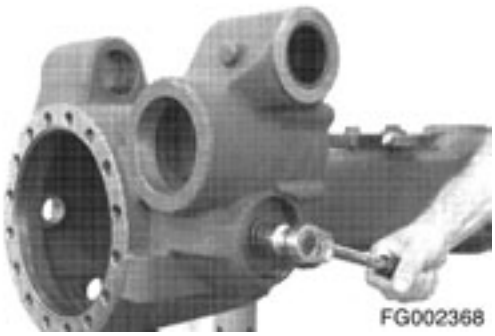


Figure 85

7. Mount heated bearing inner ring until contact is obtained and readjust after cooling-down.

Figure 86

Adjust Rolling Moment of Drive Pinion Bearing 1.0 - 2.0 Nm (Without Seal Ring):

1. Mount spacer ring (s = optional).

IMPORTANT

Reinstalling the spacer ring is approved. However, if the required rolling moment of 1.0 - 2.0 Nm (without seal ring) is not achieved - see bearing rolling moment test - correct the bearing rolling moment using a corresponding spacer ring.

Figure 87

Input Flange

Comment on Figure 118 - Figure 121

Reference Number	Description
1	Drive Pinion
2	Hex Nut
3	Washer
4	Input Flange
5	Screen
6	Seal Ring
7	Bevel Roller Bearing
8	Spacer Nng
9	Input Housing
X	Installation Dimension MS-E 3050 / 3060 →13.0$^{+ 0.2}$ mm MS-E 3070 →13.5 $^{+ 0.2}$ mm

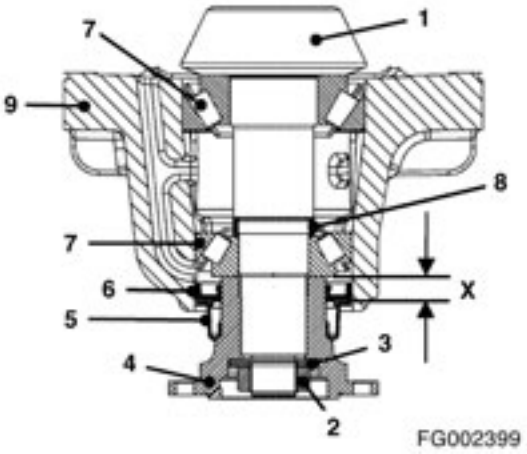


Figure 118

NOTE: *Illustration shows version - MS-E 3060*

1. Place seal ring (6), considering the required installation position (dimension "X") - see Figure 118.

   Contact face (outer diameter) of seal ring:

   - Wet it with spirit (assembly aid) if rubber-coated
   - Apply sealing agent (Loctite #574) if made of metal

   Apply grease on seal and dust lip of the seal ring.

   (Grease e.g. "PETAMO GHY 133 N")

IMPORTANT

Use a suitable driver tool to ensure correct position of seal ring.

Figure 119

2. Press screen / thrust plate (5) on the input flange until contact is obtained - also see Figure 118.

IMPORTANT

Screen/thrust plate must not be deformed when mounted - use suitable driver.

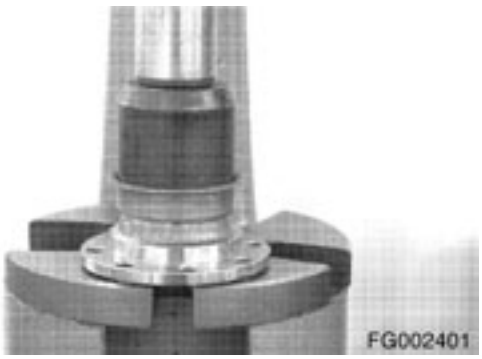


Figure 120

7. Bring hub bearing into contact position (Figure 155 - 157):

   Install ring gear (without sealing elements).

Figure 155

8. Bring hub bearing into contact position - for this purpose tighten slotted nut with a tightening torque of max. 1,400 Nm.

IMPORTANT

Apply lubricant (e.g. MOLYCOTE PASTE 1000) to thread - knuckle housing / slotted nut.

IMPORTANT

While tightening the slotted nut rotate hub in both directions several times - roller setting.

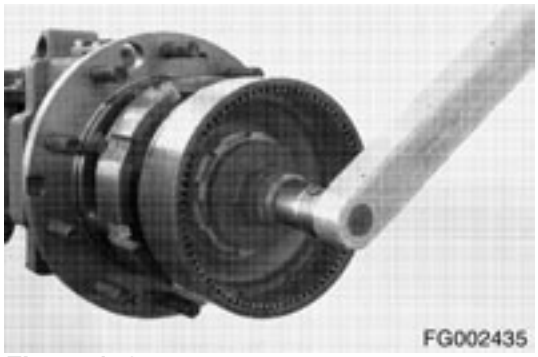


Figure 156

9. Loosen slotted nut again and remove ring gear.

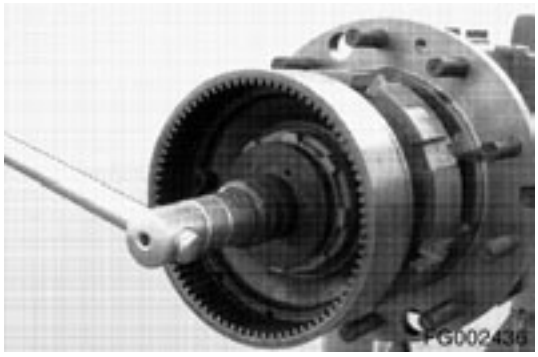


Figure 157

Detailed sketch:

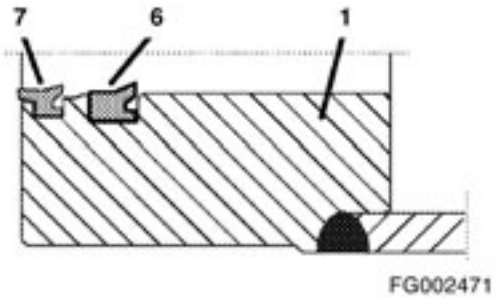


Figure 191

2. Position inner installer (S1) on piston rod (3), install O-ring (4b) and press with inner installer (S2) into annular groove (arrow) of piston (3).

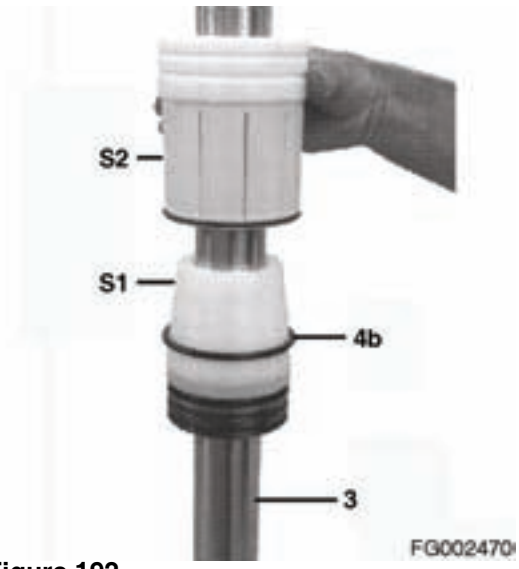
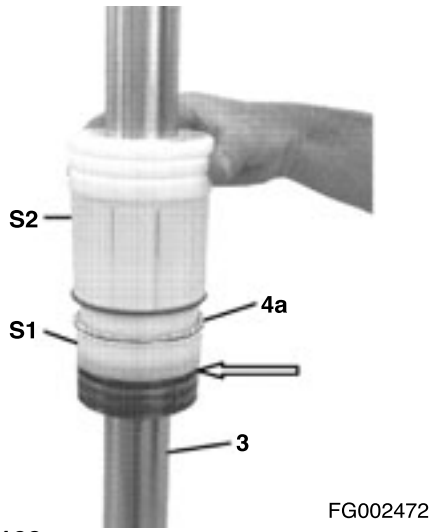


Figure 192

3. Install form seal ring (4a) and press with inner installer (S2) into annular groove (arrow) of piston (3).



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IMPORTANT

When working on the differential / input, you can disassemble the output as a complete unit (See Figure 16) and no complete disassembly is required as illustrated in Figure 17 - Figure 35.

For this purpose secure output assembly using lifting bracket, loosen threaded connections and separate output assembly from axle housing.

Figure 16

3. Secure planetary carrier using lifting strap, loosen both cylinder screws (arrows) and separate planetary carrier from hub.

Figure 17

4. Unsnap retaining ring.

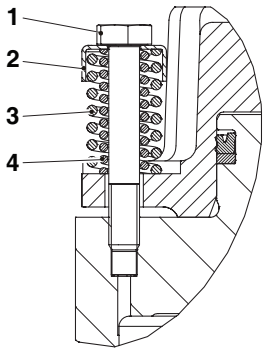
Figure 18

5. Pull off planetary gear using two-armed puller.

Figure 19

Detail "A"

Reference Number	Description
1	Hex. Screw
2	Spring Sleeve
3	Compression Springs (Outer)
4	Compression Springs (Inner)



FG025975

Figure 58

7. Attach piston with spring sleeve (2), compression springs (3 and 4) and. new. hex. screws (1).

IMPORTANT

Use hex. screws just once for assembly

- Tightening torque (M6/8.8): M_A = 8 Nm

FG002560

Figure 59

8. Mount preassembled ring gear, considering installation position (markings O in 12 o'clock position - see arrows, Detail "B")

Figure 60

Detail "B"

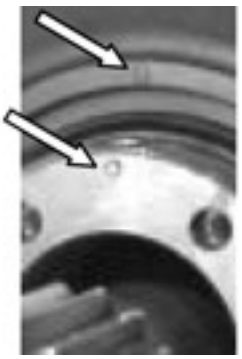

FG002567

Figure 61

3. Separate differential carrier halves and remove releasing single components.

Figure 93

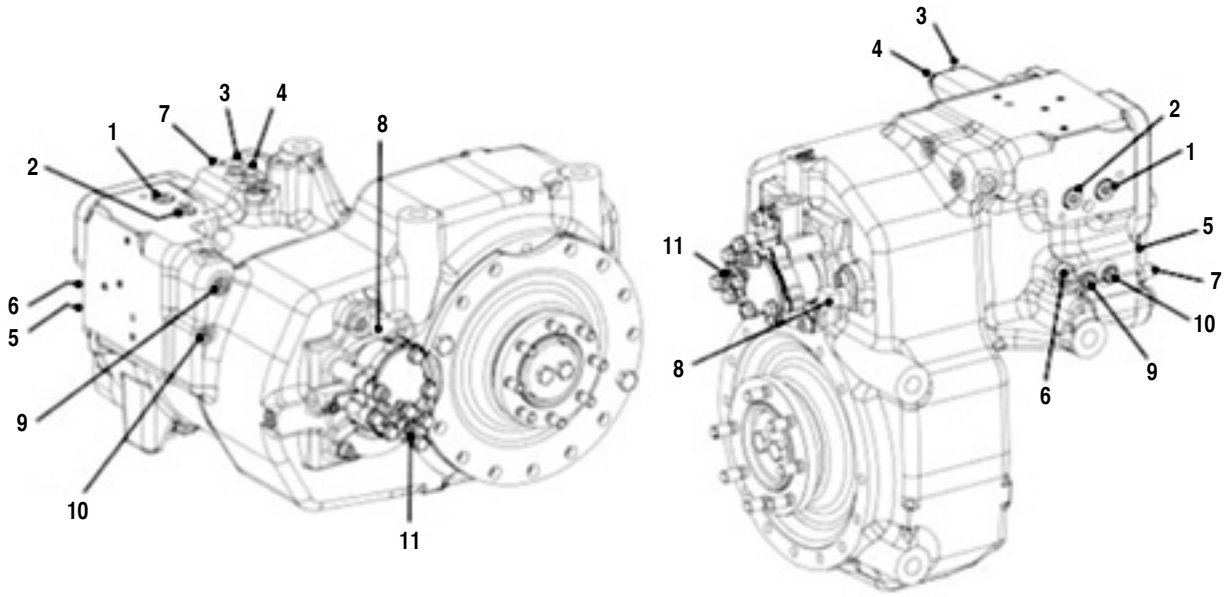
4. Push crown wheel off from differential carrier half.

Figure 94

Engine and Drivetrain

MEASURING POINTS AND CONNECTIONS ON THE 2 HL 250/270/290 TRANSMISSION - VERSION "SEPARATE INSTALLATION"

(With electric downshift interlock integrated in the vehicle)



INSTALLATION "HORIZONTAL"

INSTALLATION "VERTICAL"

FG007283

Figure 5

Reference Number	Description
1	Pressure Oil Connection - Multidisk Clutch
2	Pressure Oil Connection - Multidisk Brake
3	Bleeder Valve - Clutch
4	Bleeder Valve - Brake
5	Lubrication Nipple (Emergency Release Parking Brake)
6	Bleeder Valve (Emergency Release Parking Brake)

Reference Number	Description
7	Bleeder Pressure Relief Valve (Emergency Release Parking Brake)
8	Speed Transmitter
9	Measuring Point - Road Speed (Brake)
10	Measuring Point - Off-road Speed (Clutch)
11	Measuring Point - Lubrication Pressure

15. Press the input shaft out of the ball bearing/internal gear.

Figure 37 FG002699

16. Unsnap the retaining ring.

FG002700

Figure 38

17. Press the centering disk from the input shaft.

IMPORTANT

In case of an extremely attached seat - heat the centering disk - disassembly aid.

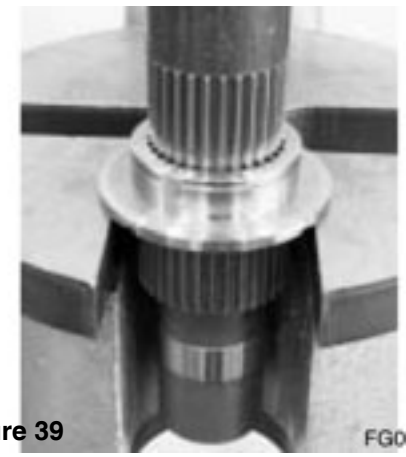


Figure 39 FG002701

18. Unsnap the retaining ring and remove ball bearing.

Figure 40 FG002702

6. Press the output gear out of the ball bearing/cover. Remove released oil baffle plate.

Figure 72

7. Unsnap the retaining ring and expel the ball bearing from the cover.

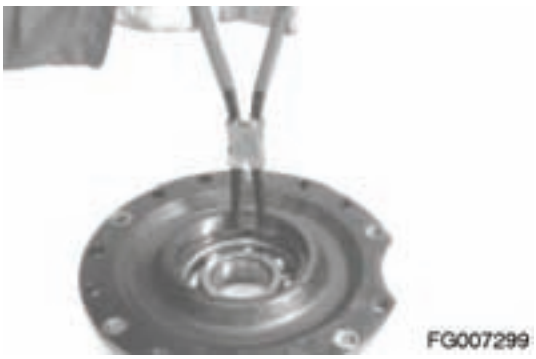


Figure 73

8. Remove both O-rings (arrows) from the cover.

Figure 74

9. Remove screen sheet from the transmission housing.

Figure 75

Legend to the sketch:

Reference Number	Description
1	Shaft Seal
2	Screen Sheet
3	Flange
4	Roller Bearing
5	Bearing Cover
M	Installation Dimension →17.6 $^{}_{-0.5}$ mm
N	Installation Dimension →27.5 $^{+0.3}$ mm

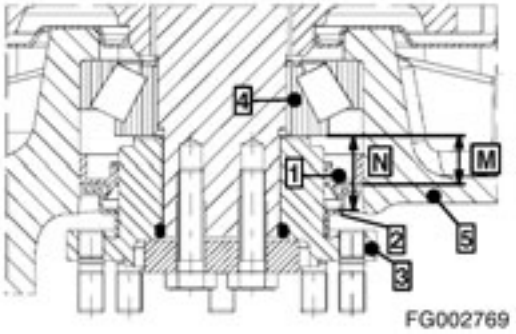


Figure 107

2. Only for installation of a new flange or if stud bolts were removed (Figure 108) Install the stud bolts

   Installation position - Stud bolts with short thread length into flange.

   - Tightening torque (M10 x 1): M_A = 20 Nm

Figure 108

3. Only for installation of a new flange/screen sheet or if removed (Figure 109) Install the screen sheet (2), considering the required installation position (Dim. "N" - See Figure 107).

   Exact installation position of the screen sheet is guaranteed by use of the specified mounting tool.

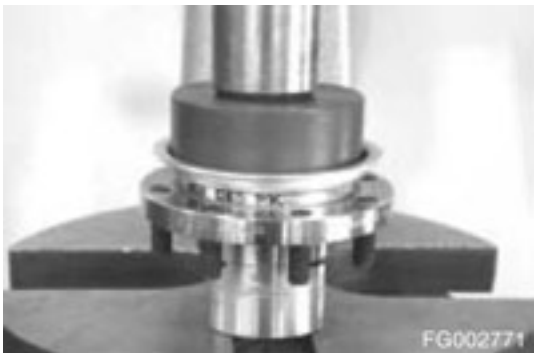


Figure 109

4. Mount the preassembled flange and put the O-ring into the recess.

Figure 110

Legend to the sketch:

Reference Number	Description
1	Planet Carrier
2	Slotted Pins (6x)
3	Center (Planet Carrier)

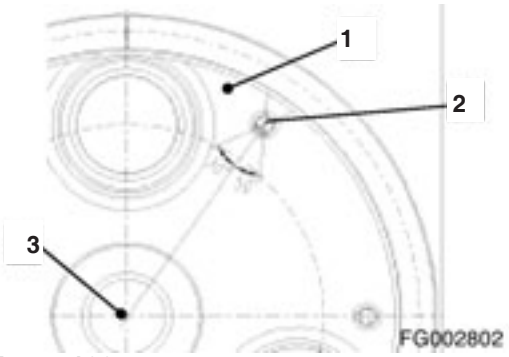


Figure 139

Legend to Figure 140 - Figure 146:

Reference Number	Description
1	Bearing inner ring with cylinder rollers
1a	Packing Sleeve and Assembly Aid
2	Planetary Gear
3	cylinder Rollers
3a	Packing Sleeve and Assembly Aid
4	Shim

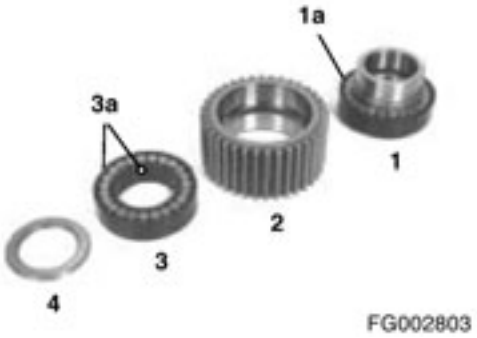


Figure 140

6. Position the planetary gear (2) - with the marking showing downwards.

   Put the bearing inner ring (1) onto the planetary gear (2) and press it until contact is obtained.

   Then remove loose packing sleeve (1a).

WARNING

AVOID DEATH OR SERIOUS INJURY

Keep the bearing inner ring to contact and rotate the planetary gear by 180°.

Figure 141

7. Position the cylinder rollers (3) onto the planetary gear (2).

Figure 142

7. Determine Dim. "A" (Measuring bore "I") from mounting face/housing to the face/piston (clutch).

   Dim. "A" e.g. ..... = 22.45 mm

Figure 177

8. Determine Dim. "C" (Measuring bore "II") from mounting face/housing to the face/piston (brake).

   Dim. "C" e.g. ..... = 11.85 mm

Figure 178

9. Determine Dim. "B" from mounting face/housing to clutch piston contact/housing.

   Dim. "B" e.g. ..... = 19.95 mm

   Example:

   Dim. "A" e.g. ..... 22.45 mm

   Dim. "B" e.g. ..... - 19.95 mm

   Result ..... = 2.50 mm

   Clutch disk clearance (piston stroke) = $2.4^{+0.3}$ mm

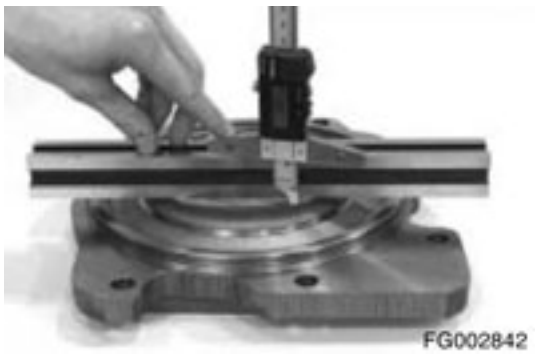


Figure 179

IMPORTANT

If the required disk clearance (piston stroke) is not obtained, this is to be corrected with a suitable outer disk See Figure 168.

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 (M10 x 1): M_A = 15 Nm
   - Screw plug (M10 x 1 with O-ring): M_A = 20 Nm
   - Screw plug (M18 x 1.5 with O-ring): M_A = 35 Nm
   - Compr. air connect. piece (M10 x 1 w. seal. ring): M_A = 20 Nm

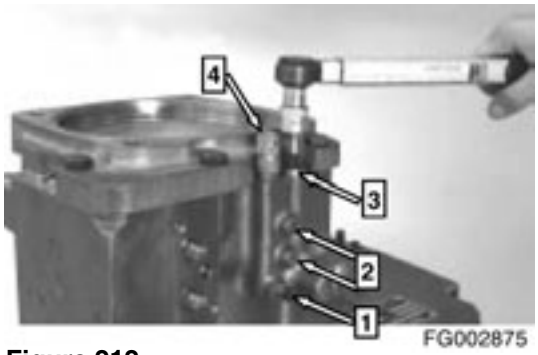


Figure 212

3. Pressurize the emergency release with compressed air p = 5 + 1 bar and close the shutoff valve.

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

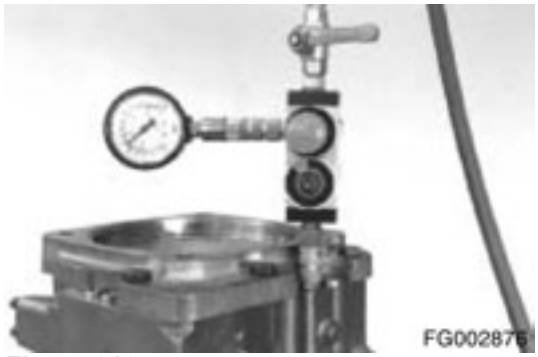


Figure 213

4. Remove 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 (M10 x 1): M_A = 15 Nm
   - Bleeder (M18 x 1.5): M_A = 22 Nm

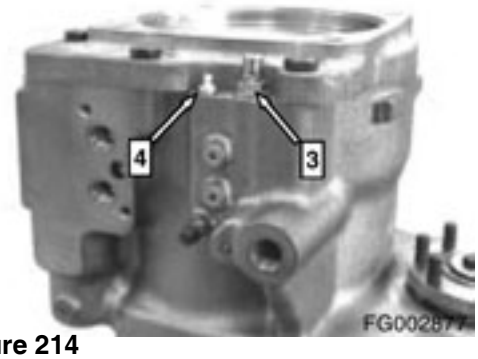


Figure 214

REASSEMBLY - LUBE OIL PUMP/DOWNSHIFT INTERLOCK

Version "with" Lube Oil Pump

1. Mount the ball bearing onto the shaft and fasten it using the retaining ring.

Figure 248

2. Press the preassembled pump shaft into the pump cover and fasten it using the retaining ring.

Figure 249

3. Insert the compression springs (1) and ball (2) into the bores (see arrows - 3x).

IMPORTANT

Before installation oil single parts of the pump/rotor set (control housing, internal and outer rotor) - use oil according to "table of recommended lubricants" pages of operation manual.

IMPORTANT

Keep the pump shaft/cover in "vertical" position - pay attention to the position of the inserted balls/ compression springs See Figure 250 - Figure 256).

Figure 250

IMPORTANT

Keep the assembled pump to contact and rotate the housing by 180°.

Fasten the pump with hexagon screws.

- Tightening torque (M6/8.8): M_A = 9.5 Nm

Figure 285

16. Insert the screen filter - Observe the installation position.

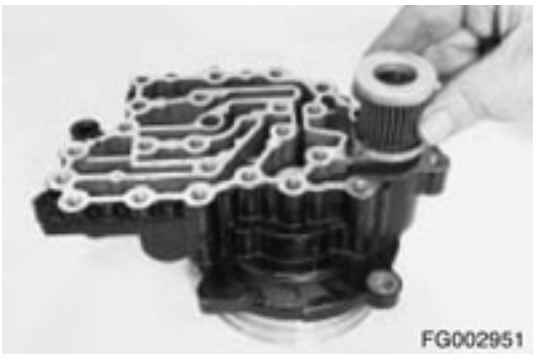


Figure 286

17. Place the gasket.

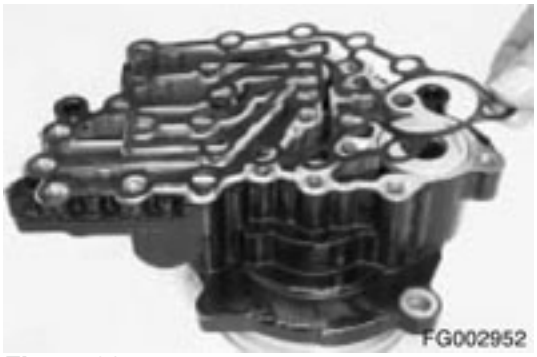


Figure 287

18. Position the cover, fasten it with hexagon screws and washers.

IMPORTANT

Pay attention to different screw lengths.

- Tightening torque (M8/8.8): M_A = 23 Nm

Figure 288

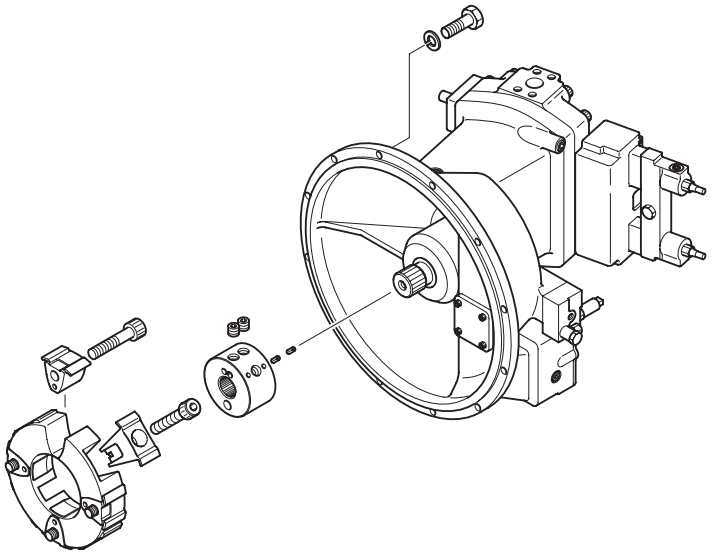


Figure 3 S175LC-V, S180W-V, DX140W, DX160W, DX190W, DX210W

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NOTE: *System specification performance tests of individual activator function are determined by flow rate through the component or circuit, not the control pressure or system pressure available to the actuator. Poor flow through the individual circuit may indicate that component is worn beyond tolerance limits, while all other hydraulic functions are adequate.*

IMPORTANT

It is suggested that troubleshooter maintain the testing sequence of the preceding list. Checks and adjustments near the middle or the end of the list may depend on adequate functioning of systems tested near the top of the list.

- Unloaded maximum engine speed baseline test (all controls in neutral).
- Front pump test – operate "travel right" lever. Record values at all specified pressures.
- Rear pump test – operate "travel left" lever. Record values at all specified pressures.

Record the values for each of the three tests (neutral, travel right and travel left) at the following pump pressure levels, with travel speed control set at "high-speed."

Engine rpm	Pressure	Flow
	100 kg/cm^2 (1,422 psi)	
	180 kg/cm^2 (2,560 psi)	
	215 kg/cm^2 (3,508 psi)	
	215 kg/cm^2 (3,508 psi)	
	260 kg/cm^2 (3,698 psi)	
	280 kg/cm^2 (3,982 psi)	
	320 kg/cm^2 (4,551 psi)	
	350 kg/cm^2 (4,978 psi)*	

Compare recorded values with output shown in the P-Q curve in the specifications section of this book.

If test results do not meet specified values, pump output tests can be repeated using different control levers. Recheck front pump operation while stroking the bucket cylinder out lever, and the rear pump by actuating the swing control lever.

NOTE: *When testing bucket and swing functions, read maximum flow tests at 330 kg/cm^2 (4,785 psi), not 350 kg/cm^2 (5075 psi).*

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GENERAL DESCRIPTION

The center joint (swivel) is designed to allow hydraulic oil from the upper structure to flow to components in the lower structure.

It is capable of allowing continuous 360° rotation of the upper structure in relationship to the lower structure.

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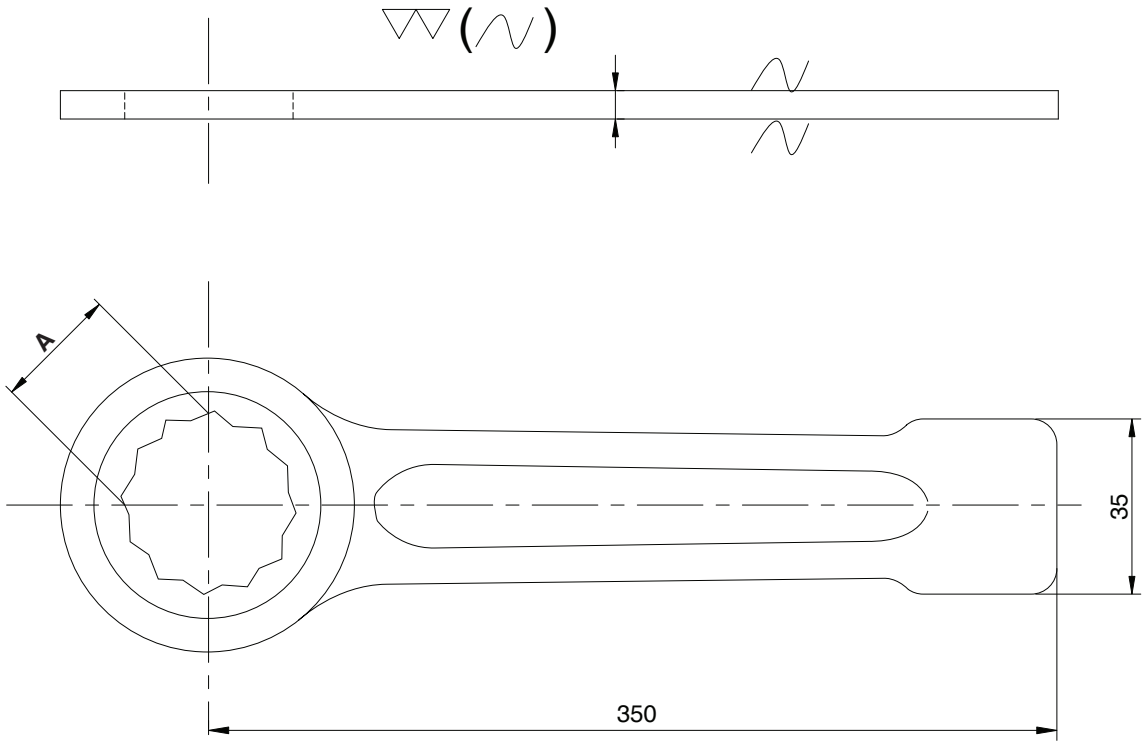
SPECIAL TOOLS AND MATERIALS

Piston Nut



FG018703

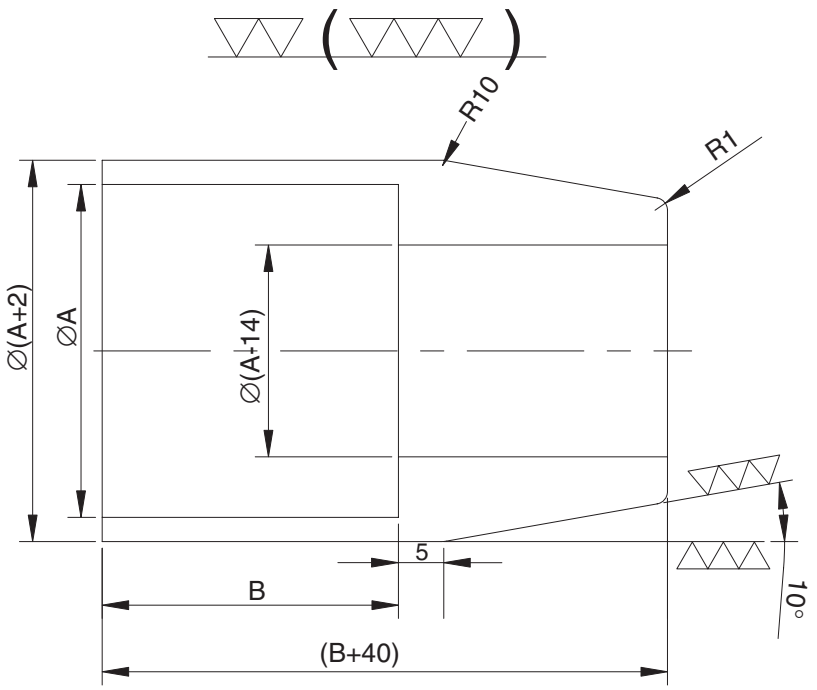
Figure 7

Material SM45C (AISI 1045)

Rockwell Hardened from 22 - 27

Oil Quench

Slipper Seal Jig



ARS4770L

Figure 11

REASSEMBLY

IMPORTANT

Before reassembly:

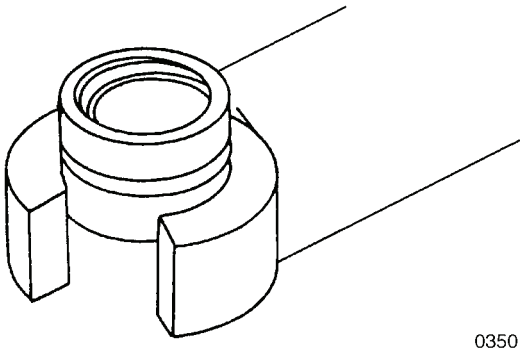
- **Inspect and replace damaged or excessively worn parts.**
- **Clean parts and lubricate with clean hydraulic oil.**
- **Make sure work area is clean.**

Replace any part that shows evidence of damage or excessive wear. Replacement of all O-rings and flexible seals is strongly recommended. Before starting the cylinder reassembly procedure, all parts must be thoroughly cleaned and dried, and/or prelubricated with clean hydraulic fluid. Prepare the work area beforehand to maintain cleanliness during the reassembly procedure.

NOTE: *Reassemble the subassemblies of the cylinder in the following order:*

1. *Body of the cylinder.*
2. *Piston rod.*
3. *Piston assembly.*
4. *Cylinder head assembly.*

1. Reassemble pin bushing (2), (4) to piston rod and body of cylinder.



0350

Figure 30

SPECIFICATIONS

Model				DSM72CHB-10A-02/270-IRV-RG700D01
Motor	Displacement		(cc/rev)	72
	Set Pressure of Relief Valve	Normal	(kg/cm^2)	275
		Maximum	(kg/cm^2)	350
	rpm	Normal	(min^{-1})	1,770
		Maximum	(min^{-1})	2,200
	*1 Theoretical Output Torque		(kg•cm)	31.5
	*2 Theoretical Output Torque		(kg•cm)	71.2
	Brake Torque		(kg•m)	70
	Brake Release Pressure		(kg/cm^2)	20 - 26
	Weight		(kgf)	43
Swing Reduction Gearbox	No.1 Sun Gear			Module: 3, No. of teeth: 22
	No.1 Planetary Gear			Module: 3, No. of teeth: 25
	No.2 Sun Gear			Module: 3, No. of teeth: 22
	No.2 Planetary Gear			Module: 3, No. of teeth: 25
	Ring Gear			Module: 3, No. of teeth: 74
	Reduction Ratio			19.041 : 1
	Weight		(kgf)	82
Swing Device	*1 Theoretical Output Torque		(kg•m)	600
	rpm	Normal	(min^{-1})	93
		Maximum	(min^{-1})	116
	Weight		(kgf)	126

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.

OPERATION INSTRUCTIONS

Inspection

Before installation of a new motor, inspect the following items.

1. Inspect whether or not there is any damage during transit, or if any parts are lost missing.
2. Inspect each tightened part to see if it is loosened or not.
3. Check whether or not covers for flange surface and drain port are perfect, and if the inside of the motor is dirty with intruded dust.

Direction of Rotation

The relation between the oil flow and the revolutionary direction of the shaft is self-explanatory as shown in Figure 9 and Table.

The direction of rotation differs by the direction of the slope of casing.

Be careful for the direction of swing which is differentiated by the shape of casing and direction of flange.

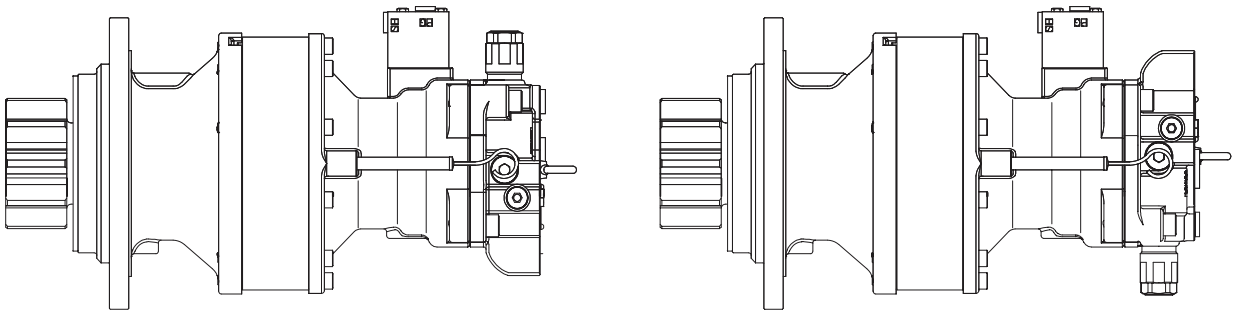


Figure 9

Direction	Inlet	Outlet	Revolutionary Direction of Shaft Facing the Shaft Side
Clockwise	A	B	Right (handed)
Counterclockwise	B	A	Left (handed)

Remove Swing Motor

1. Wind the wire rope around motor, Lift up the motor with a crane and clean the motor with cleaning oil. After cleaning, dry with compressed air.
2. Draw the oil out of the casing (D1).
3. Point the end of the driveshaft downward and attach it on a disassembly table for easy disassembling. Before disassembling make a match mark on motor casing (D1) and valve casing (D2).

   Remove brake valve (D38).

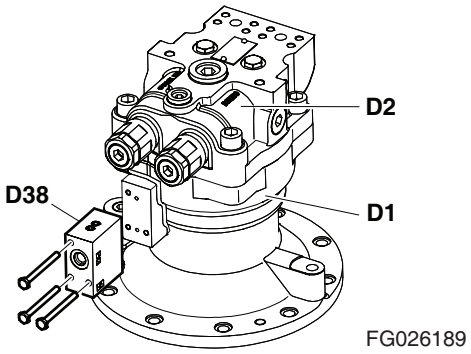


Figure 16

4. Remove relief valve (D37) from valve casing (D2).

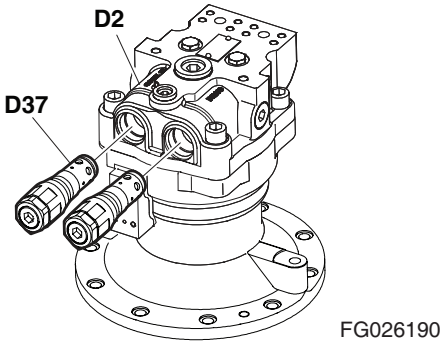


Figure 17

5. Remove RO plug (D25) and remove spring (D24) and plunger (D23) from valve casing (D2).

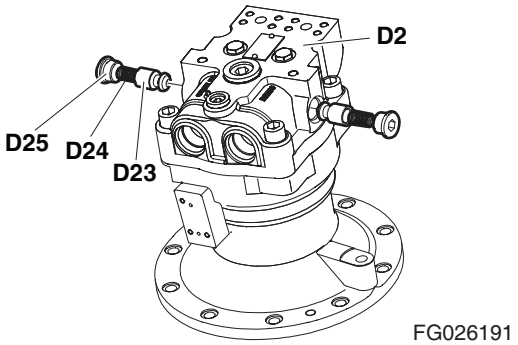
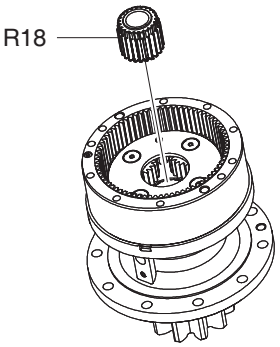


Figure 18

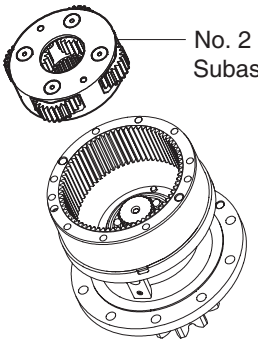
5. Remove No. 2 sun gear (R18) from No. 2 carrier subassembly.



FG026214

Figure 55

6. Remove No.2 carrier subassembly.



FG026215

Figure 56

7. Remove socket bolt (R28) in ring gear (R7).

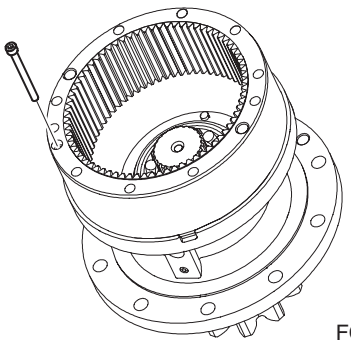


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Figure 57

8. Connect the eyebolts in the two M16 bolt holes on the top to pull the ring gear (R28) out.

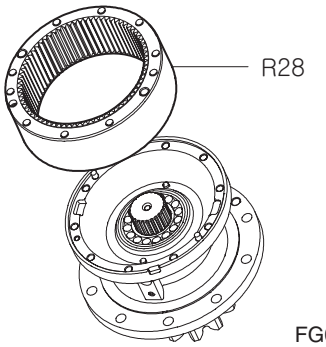

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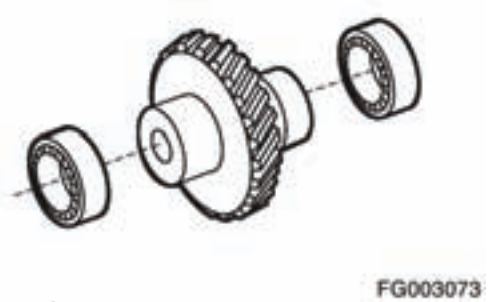
Figure 58

Main Pump and PTO

Edition 1

11. Auxiliary Drive



FG003073

Figure 17

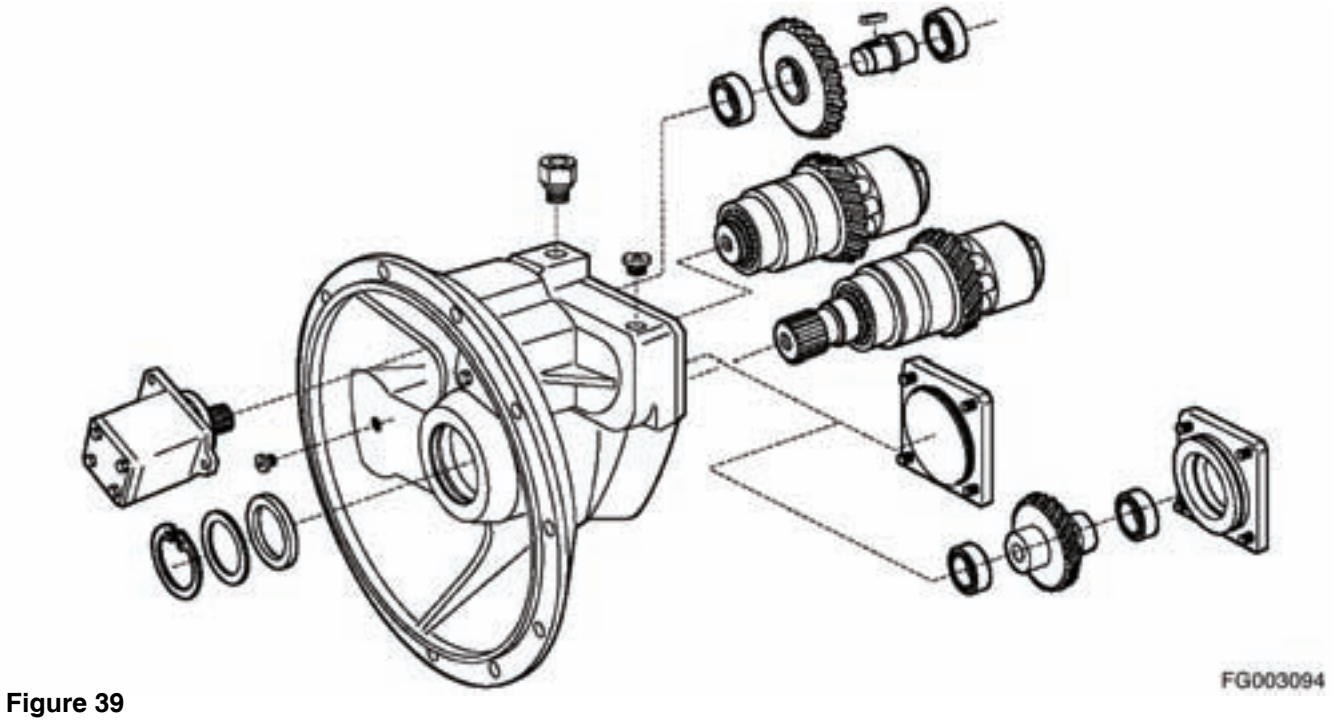


Figure 39

1. Keep the cylinder with a device (Remove it completely with the driveshaft).

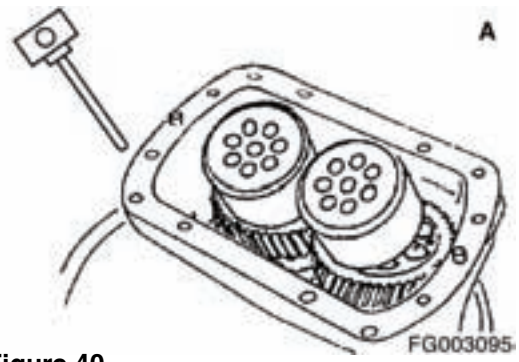


Figure 40

2. Remove cylinder (Remove driveshaft without cylinder).

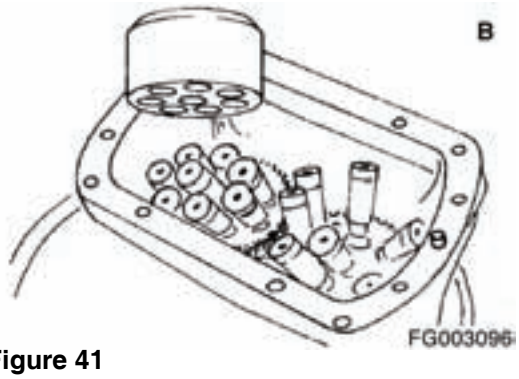


Figure 41

12. Complete Rotary Group

A. Rotary Group

1) Mechanical component: driveshaft is adjusted with the bearing

2) Hydraulic component: Adjustment is necessary *.

IMPORTANT

Adjustment of the hydraulic component is necessary.

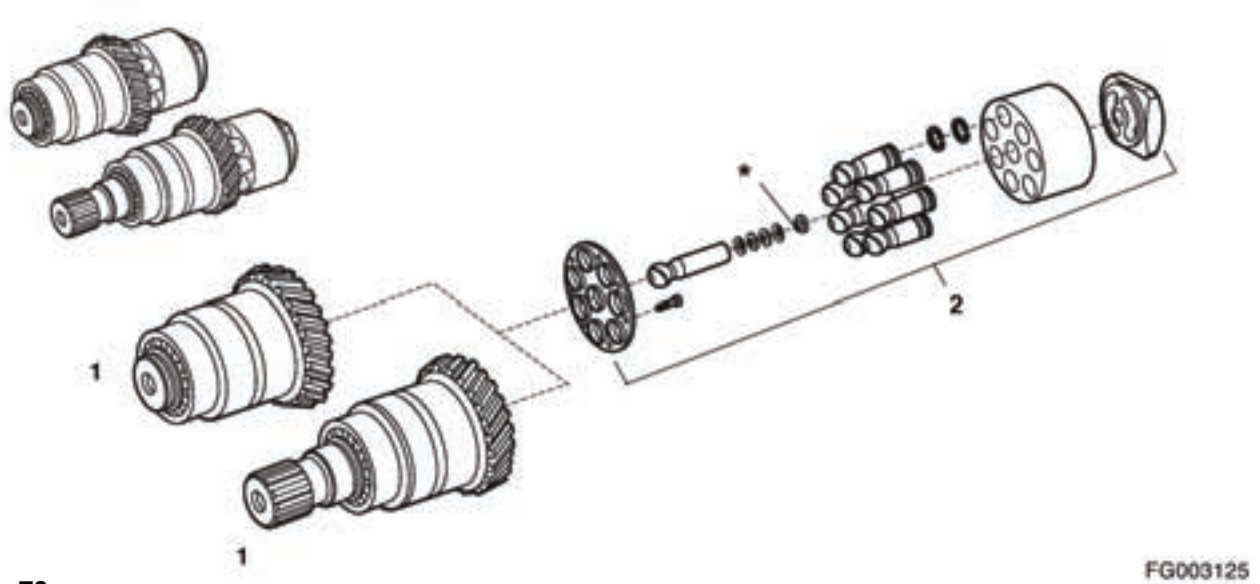


Figure 70

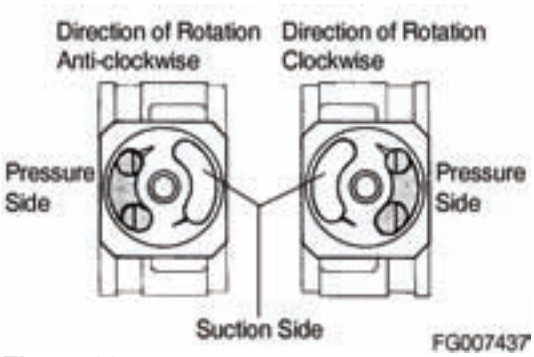


Figure 98

4. Install the control lens in its correct position using grease to hold it in place.

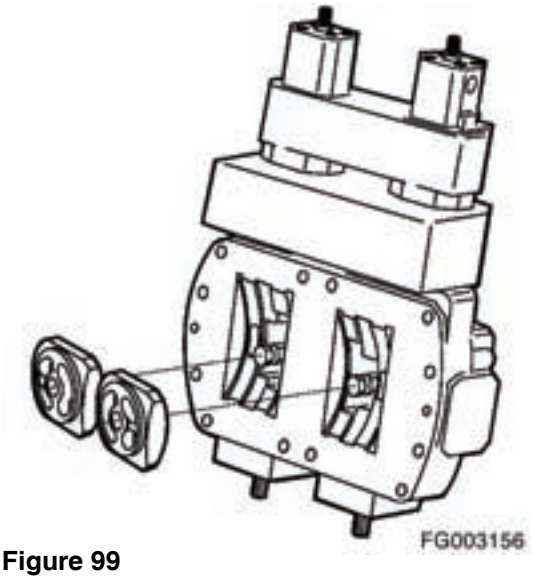


Figure 99

5. Install seal* and controller.

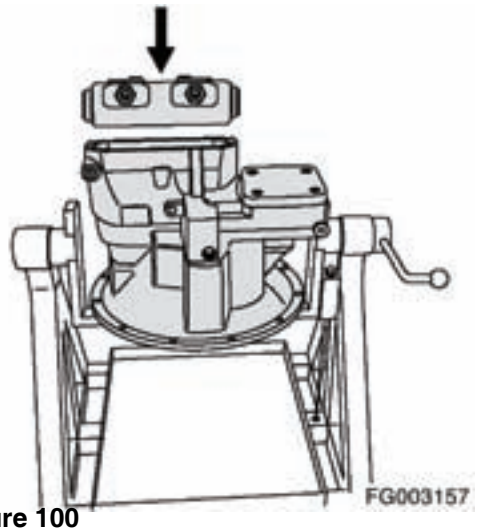


Figure 100

Neutral Cut Spool Movement (First Service convergence)

This valve is equipped with a neutral cut spool at the downstream end (upstream of the low-pressure relief valve) of the neutral path (R1). When port (pcc) is pressurized to move the neutral cut spool (R), the neutral path (R1) will be closed. Accordingly, the flow to the negacon relief valve (Rc1) is shut-off, changing the pressure of the ps2 signal.

In the meantime, the oil supplied through the P2 port joins into the path (S2-2) by (P4, Figure 2) with the external device check as media and by the empty part of the poppet (S2-1) of the first service.

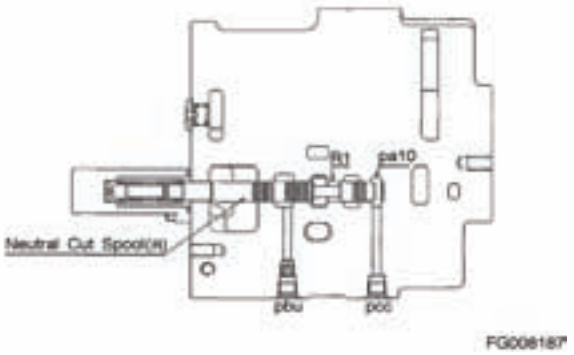


Figure 12

Add-on Spool Movement

As a representative example, the second service is illustrated.

When the spool is moved by pressure in the pilot port prb3 (pra3) of the second service (Section 12), the neutral path (pg) will be closed. The oil supplied through port Pr flows to port BR3 (AR3) by the parallel path (G3), load check valve (S12-1), path (S12-2), and spool head.

Lubricant oil returns to the tank path (Ta) from AR3 (BR3) by the spool head.

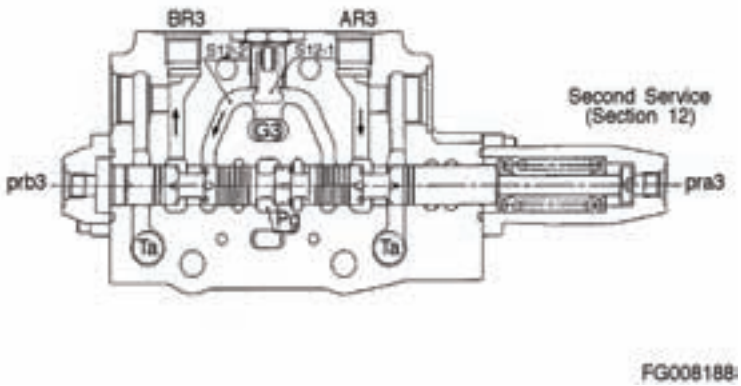


Figure 13

ASSEMBLING

IMPORTANT

Check number of parts, assembling position, and necessary tools before starting assembly. Before assembly, make sure all parts and necessary tools are available. Check the correct position of how all parts are assembled.

Subassembly

Before assembling the parts into valve housing, subassemble the necessary parts.

Main Spool

1. Apply adhesive on the threads of spool.

   Install spring seat, spring, and spool end then fix spool with wooden vise and tighten spool end.

   - Torque: 9.8 - 11.8 Nm

IMPORTANT

Do not apply adhesive excessively. Position the spool as near to the spool end as possible so tightening torque does not bend the spool. Excessive torque can result in spool damage, causing the spool to stick and improper operation of the spool actuator.

IMPORTANT

The spring in boom 2 spool and the straight travel spool are different from other parts. Incorrect assembly of the spools cause a improper operation of the spool actuator.

2. Assemble poppet and spring in the spool.

   Apply adhesive on the spool thread.

   Fix the spool with the wooden vise.

   Apply adhesive to the tread of the plug.

   Insert the plug which is fitted with an O-ring and backup ring.

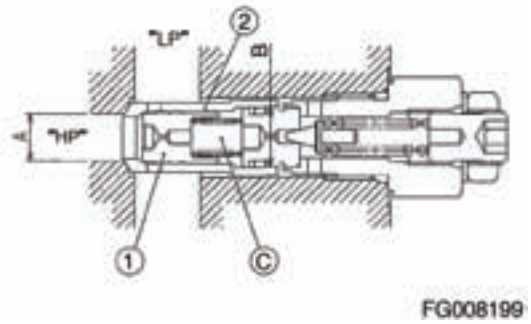
   - Torque: 9.8 - 11.8 Nm

   Assemble spring seat, spring and spool end, and attach spool end.

Add-on Main Relief Valve Operation

1. This relief valve is inserted between the neutral path "HP" and the tank path "LP". Oil is filled into the inner space (C) through the orifice of the main poppet .

   The sleeve (2) and main poppet (1) are securely seated by the areal difference between "A" and "B".

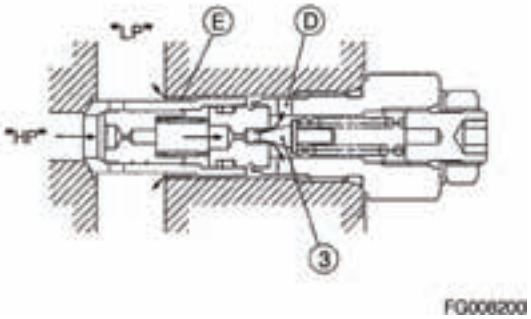


FG008199

Figure 24

2. When the pressure in the neutral path "HP" reaches the preset pilot spring force, the pilot poppet (3) will be opened.

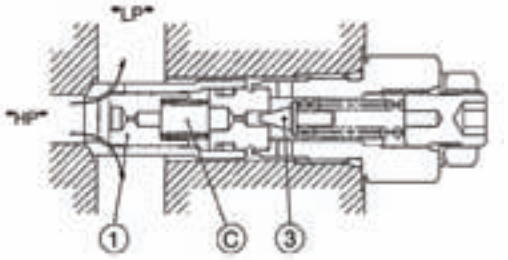
   Oil flows around the pilot poppet (3), through the drill hole (E) and circular gap (D), and is guided to the tank path "LP".



FG008200

Figure 25

3. When the pilot poppet (3) is opened, the pressure in the inner space (C) is decreased to open the main poppet (1). Therefore, the oil in "HP" flows directly through path "LP".



FG008201

Figure 26

Relief valve

Problem	Possible Cause	Remedy
Pressure does not rise at all	Main poppet, sleeve or pilot poppet is stuck open; or there is dust in the valve seat.	Replace relief valve.
Relief pressure is unstable	Pilot poppet seat is scratched.	
	Piston or main poppet is stuck.	
Relief pressure fluctuates	Seat worn by dust.	
	Loose locknut or adjuster	Reset the pressure, and tighten the locknut by specified torque.
Oil leak	Relief valve seat is damaged.	Replace relief valve.
	Parts are stuck with dust.	
	O-ring is worn.	Replace the O-ring in the adjuster or installation part.

Hydraulic System: Overall

Problem	Possible Cause	Remedy
Hydraulic system is not in good condition, or does not function at all.	Pump failure	Check pressure, or replace pump.
	Relief valve failure	Replace relief valve.
	Cylinder failure	Repair or replace.
	Pump load pressure is too heavy.	Check circuit pressure.
	Valve is cracked.	Replace with valve assembly.
	Spool does not stroke in full travel.	Check spool movement.
	Tank oil level is too low.	Refill hydraulic oil.
	Filter in the circuit is clogged.	Wash or replace filter.
	Circuit piping line is throttled.	Check piping.

7. Insert pressure plate assembly into body while keeping it straight.

   NOTE: *Seal side should face to rear cover, opposite side of gears.*

   NOTE: *Pay attention to installation direction of seal.*

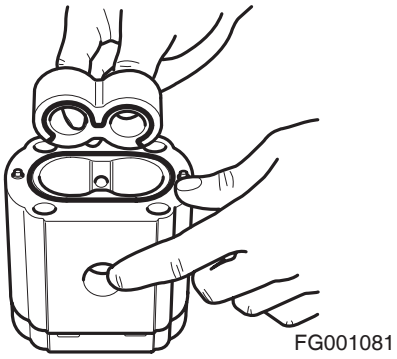


Figure 16

8. Install drive gear and driven gear.

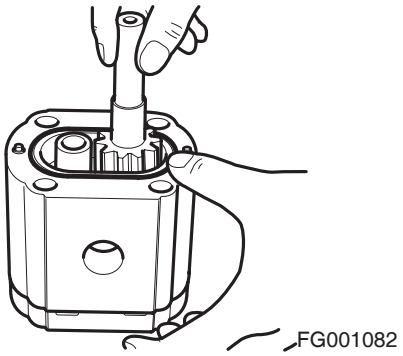


Figure 17

9. Insert pressure plate into body in proper direction.

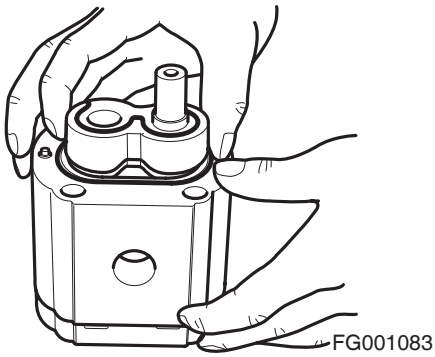


Figure 18

10. Locate mounting flange in right position.

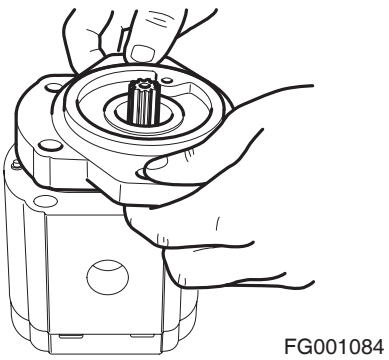
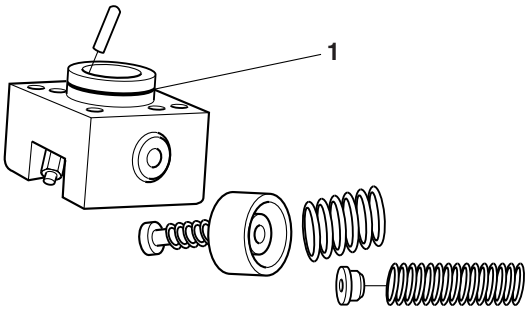


Figure 19

MEMO

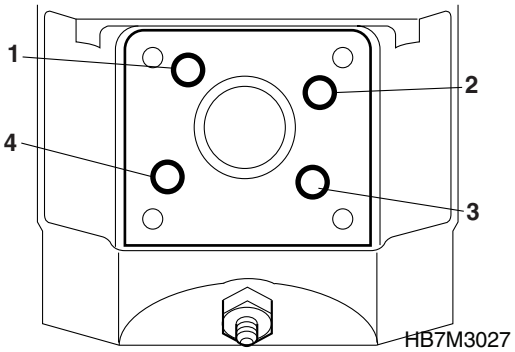
Reference Number	Description
1	Check of O-ring



HB7M3026

Figure 26

Reference Number	Description
1	O-ring / High-pressure - Small Control Piston Side
2	O-ring / Control Pressure
3	O-ring / High-pressure - Check Valve
4	O-ring / High-pressure - Check Valve

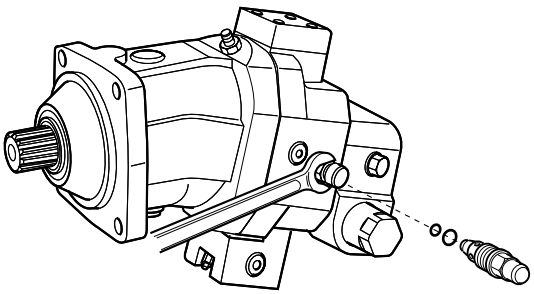


HB7M3027

Figure27

Seal of the Relief Valve / Counterbalance Valve

1. Remove relief valve.

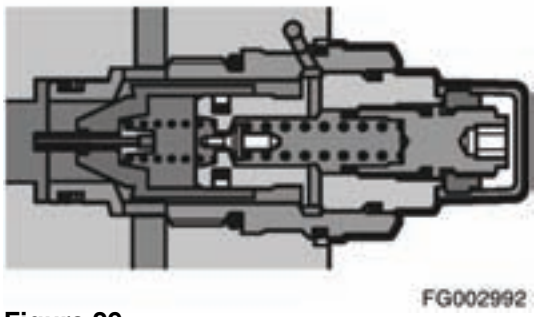


HB7M3028

Figure 28

2. Inspect!

   O-ring

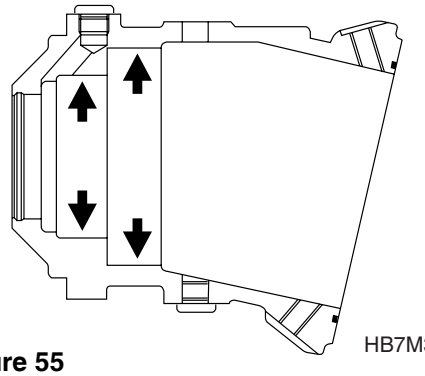


FG002992

Figure 29

7. Visual check:

   Bearing areas free of scoring and no evidence of wear.



HB7M3055

Figure 55

Hydraulics Schematic

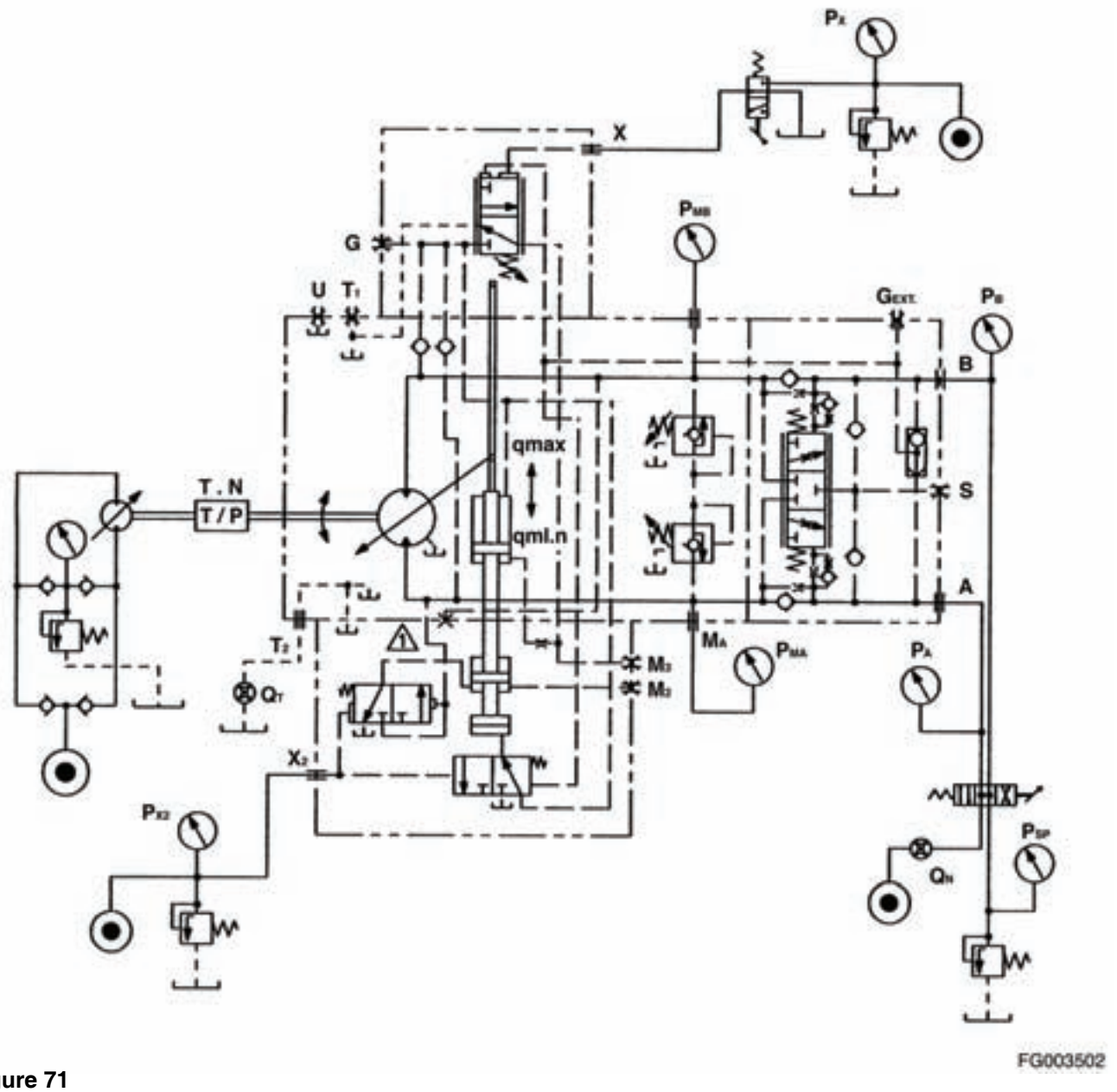


Figure 71

COUNTERBALANCE VALVE

Recommended Tools

Hexagonal Wrench	2.5, 4, 8, 14, 30 mm
Torque Wrench	0 - 15 kg•m (0 - 115 ft lb)
Loctite	242, 572
Seal Tape	150

Disassembly

NOTE: *Disassemble counterbalance valve in reverse order of assembly.*

SAFETY INSTRUCTIONS

WARNING

AVOID DEATH OR SERIOUS INJURY

Instructions are necessary before operating or servicing machine. Read and understand the Operation and Maintenance Manual and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments repairs or service. Untrained operators and failure to follow instructions can cause death or serious injury.

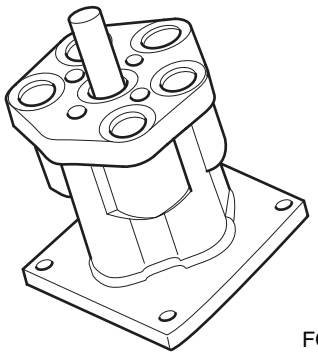
APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX140W-3	1001 and Up, 50001 and Up
DX160W-3	1001 and Up, 50001 and Up
DX170W-3	1001 and Up
DX190W-3	1001 and Up

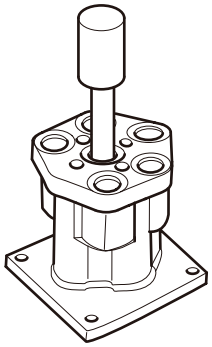
MEMO

2. Install bushing (3) into case (1) using jig.



FG013506

Figure 17

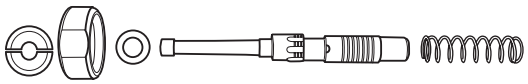


FG013508

Figure 18

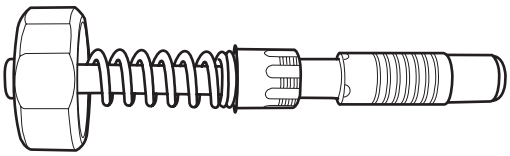
3. Take care when assembling spool kit assemblies (1 and 3, 2 and 4). (They must be assembled in same way).

   The assembly order is; spool (4), shim (5), spring (6), spring seat (7), and stopper (8).



FG013509

Figure 19



FG013503

Figure 20

17. Shake out the balls.

For further information on the disassembly of housing and spool/ sleeve.

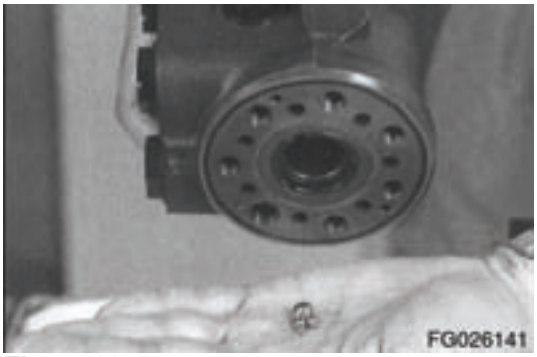


Figure 23

STRUCTURE

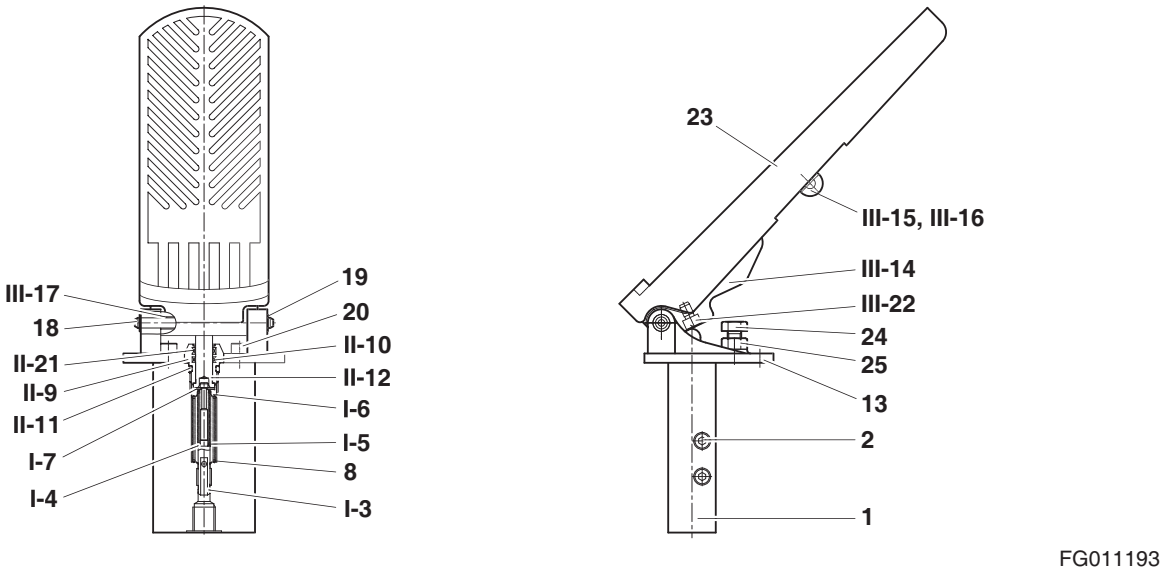


Figure 1

PARTS LIST

No.	Part Name	Standard	Material	Q'ty
1	Body			1
2	Plug			2
I	Spool Kit			
I-3	Spool			1
I-4	Spring Seat			1
I-5	Spring			1
I-6	Spring Seat			1
I-7	Stopper			1 set
8	Spring			1
II	Plug Kit			
II-9	Plug			1
II-10	Seal	DYR10	N.B.R	1
II-11	O-ring	P14	N.B.R	1
II-12	Push Rod			1
13				
III				
III-14				
III-15				
III-16				
III-17				
18				
19				
20				
III-21				

Functions of 4-Solenoid Valve Assembly Package

Functions

This solenoid valve package has functions as below:

1. Drives forward and Backward.
2. Boosts main Pressure.
3. Controls cruise driving.

Application by Function of Each Solenoid Valve

Reference Number	Function	Operations	Remarks
C1 and C2	Driving Forward or Back Ward	Used to drive vehicles forward or backward by operating the travel valve of the main control valve.	
C3	Main Pressure Boost	Used to increase set pressure of the main relief valve to boost excavation power temporarily.	
C4	Cruise Control	Used to reduce driver fatigue in long haul operations.	

Detailed Functions and Application of Each Solenoid Valve

1. Control of Driving Forward or Backward

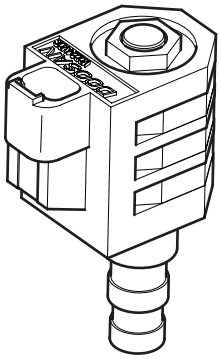
   The incoming pressure and oil flows from the pilot pump is supplied by C4 to the solenoid valve (C1 and C2) that controls driving directions - forward and backward driving. The position of the lever - Forward driving, Backward driving, Gear shift - directs this pressure and oil flows to activate C1 and C2 and then the travel valve of the main control valve.

   This incoming pressure and oil flows from the main pump make the travel motor rotate in the right or reverse direction changing driving directions of the vehicle. When the vehicle runs forward, forward driving solenoid valve (C1) operates, while backward solenoid valve (C2) operates when the car runs backward.

2. Main Pressure Boost

   This is a function that increases the pressure of the main relief valve to boost excavation power temporarily. When the pressure boost switch on the lever is turned on by the signals of the EPOS controller, this solenoid valve for pressure boost is turned "ON" for operation increasing the set pressure of the main relief valve from 350 bar approximately to 370 bar approximately, to boost excavation power. In addition, this solenoid valve can be operated by selecting a mode on the switch (operation/parking/driving). The default pressure in the relief valve is 370 bar in the driving mode.

Solenoid Valve Diagram



FG026151

Figure 6

Troubleshooting Guide

Parts

Symptom	Check Points	Descriptions	Remedy
Solenoid valve will not function properly	1. Foreign materials, contaminants in valve.	1. Disassemble valve and check if any foreign materials or contaminants such as sludge lodged between case and spool.	Remove foreign materials and clean the contaminated area.
	2. Damages in tube and retainer.	2. Disassemble valve and check if the tube and retainer area is deformed (dented, contracted).	Replace valve.
	3. Breaking of wire, short-circuiting, thermal reactions in coil.	3. Disassemble valve and check resistance of coil. Condition: 26.7Ω @ 20°C Breaking of wire: The resistance of coil is ∝(infinite). Short circuiting: The resistance is low or excessive.	Replace coil.
	4. Connection to terminal in connector	4. Check if the terminals of the cap housing (with a lead coil) and the housing (facing housing) are connected properly.	Replace faulty housing and terminal.
No pilot pressure	1. Pilot pressure	1. Remove adapter and hydraulic hoses at the PL port and install a pressure gauge to check discharge pressure value at the pilot pump with C3 operated.	Refer to the above checkpoints and descriptions for "Solenoid valve"
	2. Pilot relief valve	2. Check operation of the relief valve installed on the pilot line. Check if pressure is bypassed by foreign materials.	Remove foreign materials and replace relief valve.
	3. Pilot pump	3. Check pilot pump operation.	Replace pilot pump
	4. Pilot filter	4. Check if the mesh screen of pilot filter is contaminated by foreign materials.	Clean affected parts and replace filter.

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Structure 6
Parts List 6
Functions and Operation 7
Cautions for Operation 7
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Assembly 10

MEMO

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Quick Fit Valve

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General Description 6
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Assembly Diagram and Tools Required 7
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Disassembly and Reassembly Instructions 9

Service Brake Pedal Valve

Edition 1

2. Install plug (4) on lower part (1).
   - Tools : 19 mm wrench
   - Tightening torque: 1,400 - 1,650 kg•m

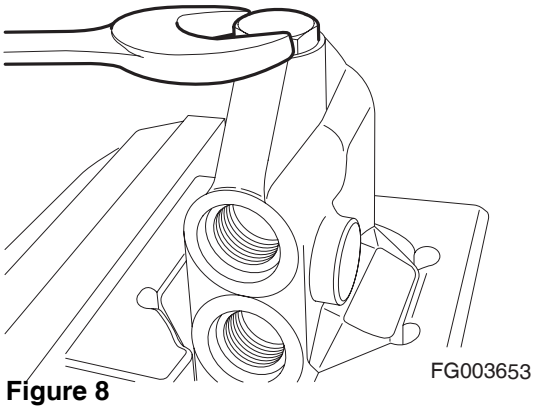


Figure 8

3. Install O-ring (5).

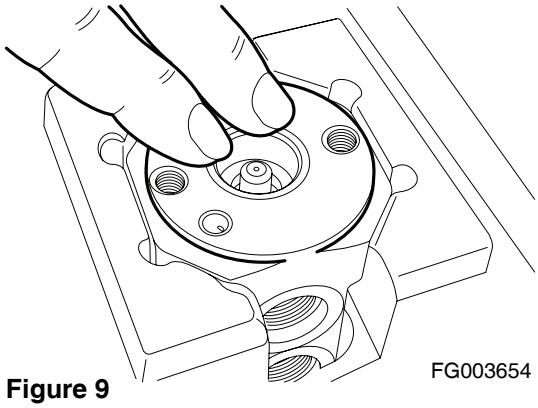


Figure 9

4. Install spring guide (6) and upper spring (7).

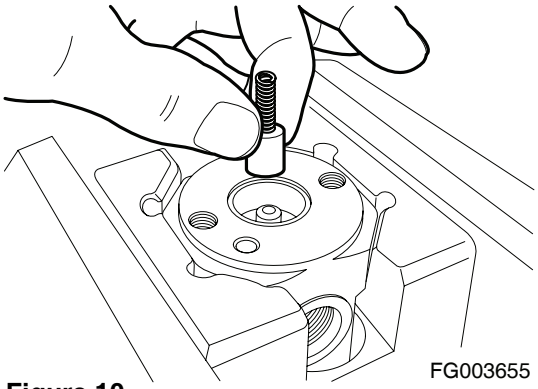


Figure 10

Hydraulic Schematic (DX140W-3/ DX160W-3)

Edition 1

MEMO

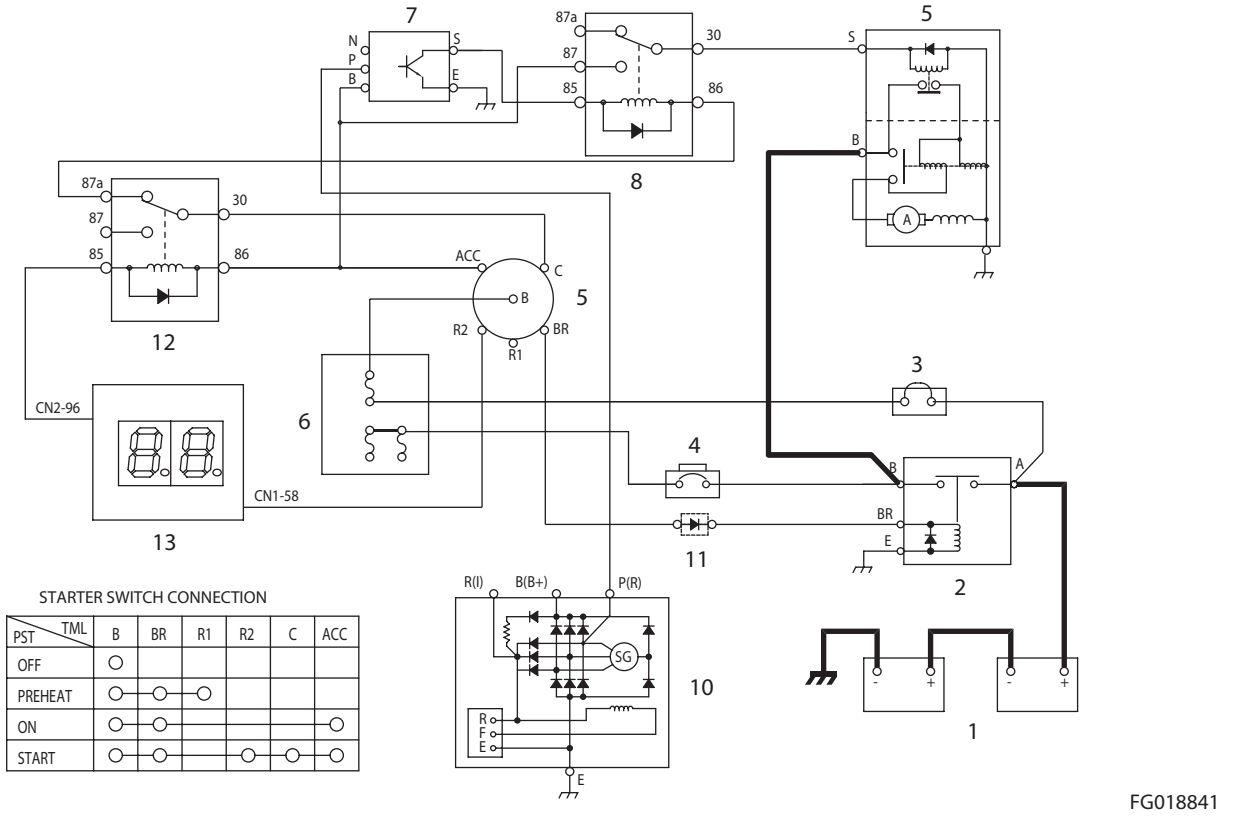
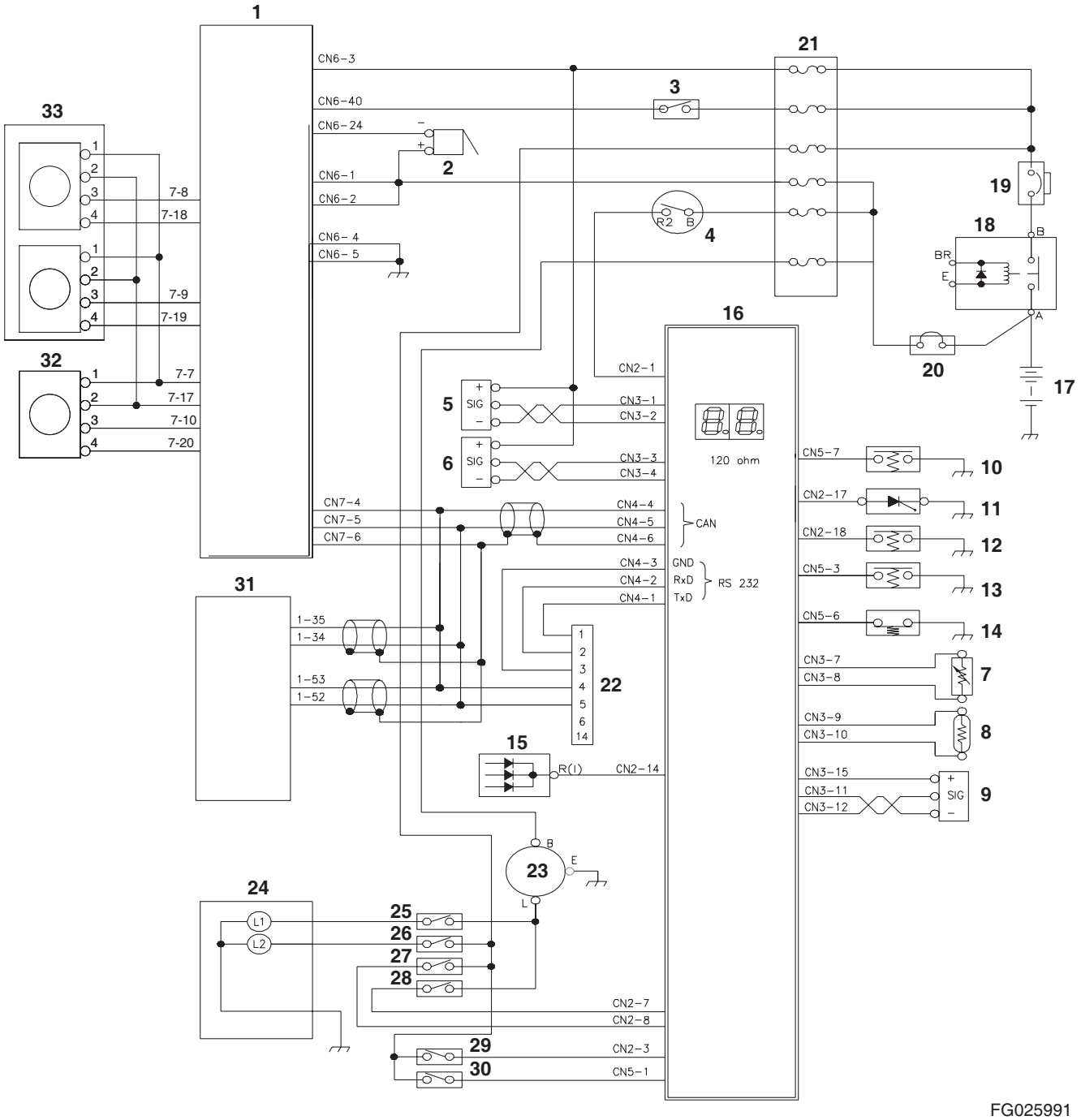


Figure 3 Starter Circuit (1) - While Starting

Reference Number	Description
1	Battery
2	Battery Relay
3	Fusible Link
4	Circuit Breaker
5	Starter Switch
6	Fuse Box
7	Starter Controller

Reference Number	Description
8	Starter Relay
9	Starter
10	Alternator
11	Diode
12	Starter Relay 2
13	EPOS Controller

Monitoring System Schematic



FG025991

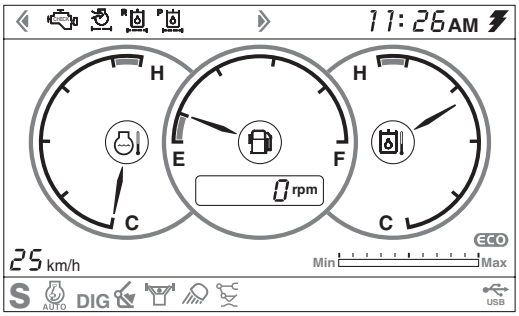
Figure 11

USER MENU

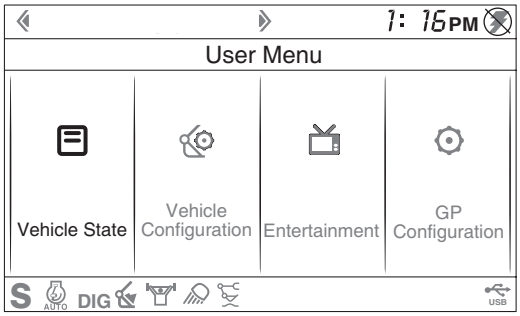
User Menu - Access and Escape Methods

Access Method

On the normal display screen, click on the jog switch to access the user menu screen.



<Normal Indication Monitor>



<Main Menu Monitor>

FG023286

Figure 13

Escape Method

1. Press the ESC button to move to the normal display screen.
2. If 20 seconds have passed without the operation of the button, the normal display screen will be displayed.
3. Turning "OFF" the starter switch to cut off power, you will move to the normal display screen.

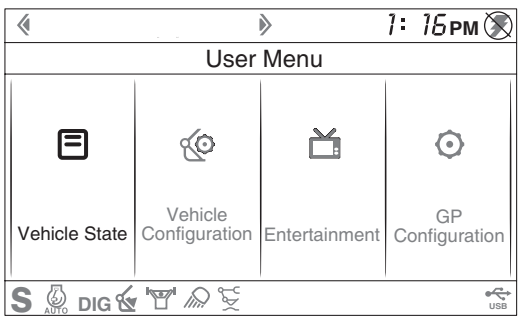
User Menu

Press jog switch to make "USER MENU" appear.

Turn the jog switch and move the cursor to see an reversed display on the desired menu. Then, press on the jog switch to select the menu item.

Vehicle State ↔ Vehicle Configuration ↔ Entertainment ↔ GP Configuration

Press the ESC button to return to the previous screen.



FG023287

Figure 14

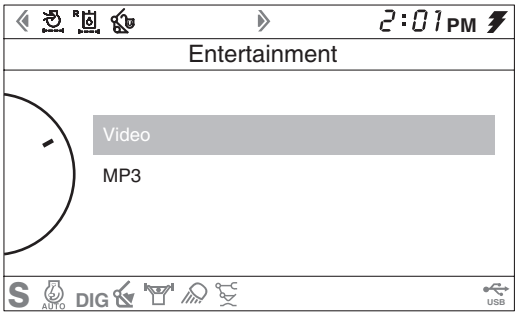
WARNING

AVOID DEATH OR SERIOUS INJURY

Do not use vehicle state menu when traveling or operating.

Video ↔ MP3

Press the ESC button to return to the previous screen.



FG023301

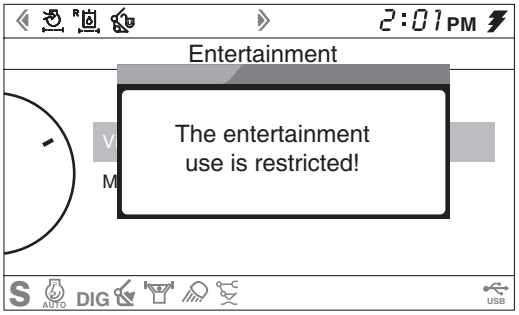
Figure 48

If the use of entertainment is limited, this pop-up window will be created.

To lift the use limits, you should change the limit setup in the GP configuration.

The pop-up window will automatically disappear in 3 seconds. Press the ESC button or the jog switch to remove pop-up window.

For details, See “GP Configuration” on page -54.



FG023302

Figure 49

If the use of entertainment is not limited, this pop-up window will be created. The pop-up window will automatically disappear in 3 seconds.

Press the ESC button or the jog switch to remove pop-up window.

WARNING

AVOID DEATH OR SERIOUS INJURY

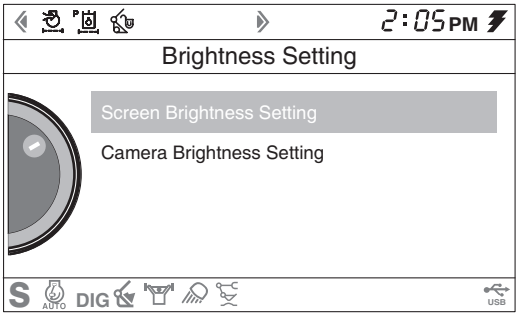
Listening to entertainment clips, such as video, music, etc., can cause an accident, resulting in death or serious injury.

Do not play entertainment files when operating the machine.

FG023303

Figure 50

If you want to change the screen brightness, select the screen brightness setting to display the brightness adjustment screen.



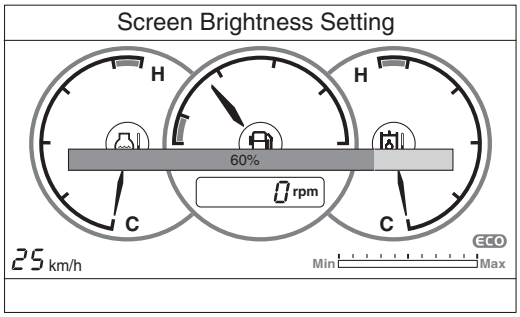
FG023315

Figure 87

Turn the jog switch and adjust the brightness of 0 - 100% at an interval of 10%.

The screen brightness when manufactured is set as 60%.

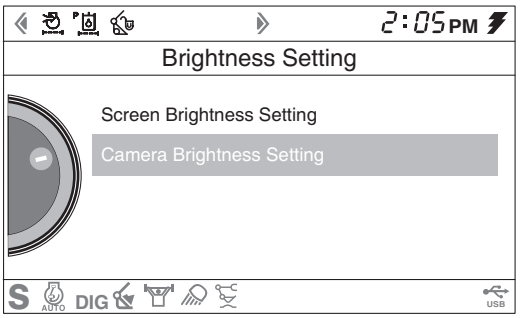
Press the ESC button to return to the previous screen.



FG023316

Figure 88

If you want to change the camera screen brightness, select the camera brightness setting to display the camera screen brightness adjustment screen.



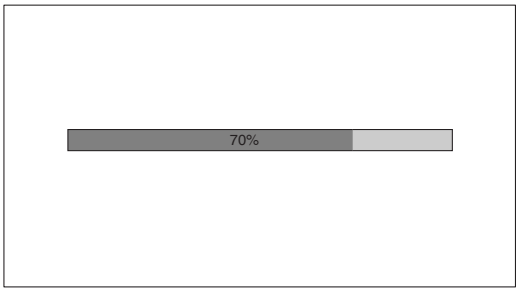
FG023317

Figure 89

Turn the jog switch to adjust the brightness of 0 - 100% at an interval of 10%.

The camera screen brightness at the machine release time is set as 60%.

Press the ESC button to return to the previous screen.



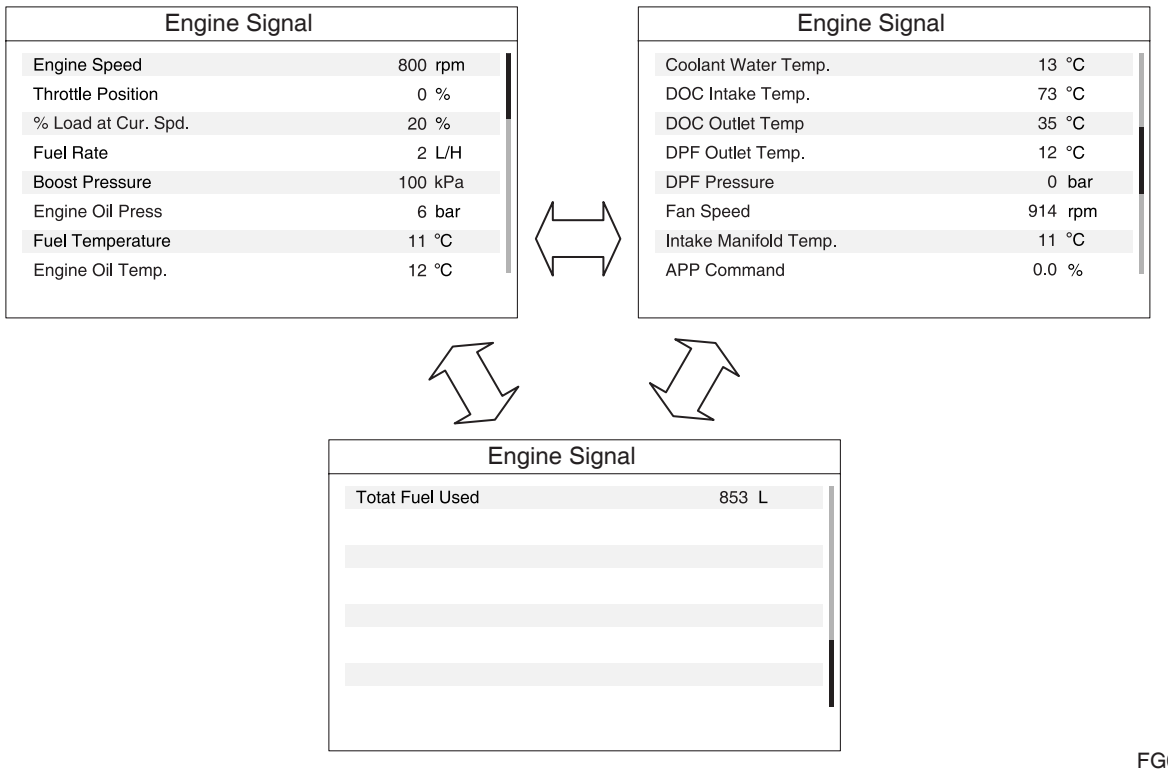
FG018244

Figure 90

Engine Signal Description

Analog Items	Display	Remark
1. Engine Speed	rpm	Engine Speed
2. Throttle Position	%	Throttle Position
3. % Load at Current Speed	%	Current load ratio of equipment
4. Fuel Rate	L/H	Fuel Rate
5. Boost Pressure	kPa	Pump pressure for boost
6. Engine Oil Pressure	bar	Engine Oil Pressure
7. Fuel Temperature	°C	Fuel Temperature
8. Engine Oil Temperature.	°C	Engine Oil Temperature
9. Coolant Water Temperature.	°C	Coolant Temperature Gauge
10. DOC Intake Temperature.	°C	DOC Intake Temperature
11. DOC Outlet Temperature.	°C	DOC Outlet Temperature
12. DPF Outlet Temperature.	°C	DPF Outlet Temperature
13. DPF Pressure	bar	DPF Pressure
14. Fan Speed	rpm	Fan Speed
15. Intake Manifold Temperature.	°C	Intake Manifold Temperature
16. App Command	%	App Command
17. Total Fuel Used	L	Total Fuel Used

Submenu Selections



FG018861

Figure 116

GP Display Code	GP Display Description	Measuring Point	Correct Value		Remarks
			Active	Passive	
E520203	Monitoring of PRV	2.36, 2.60			Torque limit level = 2
E520206	Time Out Error of CAN Module A	CAN signal			No Torque limit
E520336	Engine Temperature Sensor Plausibility				No Torque limit
E520602	Hydraulic Oil Temperature CAN Time Out	CAN signal			No Torque limit
E520603	Time Out Error of CAN Receive Frame DEC1V	CAN signal			Display Code
E520604	ECU Hardware Chip CY146 Error	Internal fault			No torque limit
E520605	DPM system error	Internal fault			Torque limit level = 3
E520606	Time Out Error of CAN Receive Frame EGR Valve	CAN signal			Air control problem, EGR = 0/ Torque level 1
E520607	EGR Valve Actuator Error	Smart Actuator			EGR = 0, Torque level 1
E520608	Error Message from VGT Actuator	CAN signal			Torque limit level 2
E520609	Air Control Governor Deviation Error	Internal fault			EGR = 0, Torque level 1
E520610	Power Stage for Intake Air Heater	1.83			
E520611	Time Out Error of CAN Receive Frame Vehicle Cutoff Switch	CAN signal			No torque limit
E520612	Accelerator Pedal CAN Max Error	CAN signal			Torque level = 2
E520613	Vehicle Cutoff Switch Error	CAN signal			No torque limit
E520614	Time Out Error of CAN Receive Frame VGT	CAN signal			Torque limit = 1
E520615	Performance Limit Activation	Internal fault			Torque limit level = 3
E520616	ECU Power Stage Test	Internal fault			No Torque limit
E520617	Metering Unit Supply Voltage	DPM pin number			Display code
E520618	Monitoring of ADC	Internal fault			No torque limit
E520619	Monitoring of Communication Module	Internal fault			No torque limit
E520620	Completely Damaged Particulate Filter	Internal fault			No torque limit
E520621	Monitor Pressure Differential Characteristics				Torque limit level = 2
E520622	Disconnected DPF Pressure Sensor Hose Line				No torque limit
E520623	MU Differential Pressure MIN	1.90, 1.55			Display Code
E520624	Monitoring of Injection	Internal fault			No torque limit

ELECTRONIC HYDRAULIC CONTROL SYSTEM (EPOS)

Control System Schematic

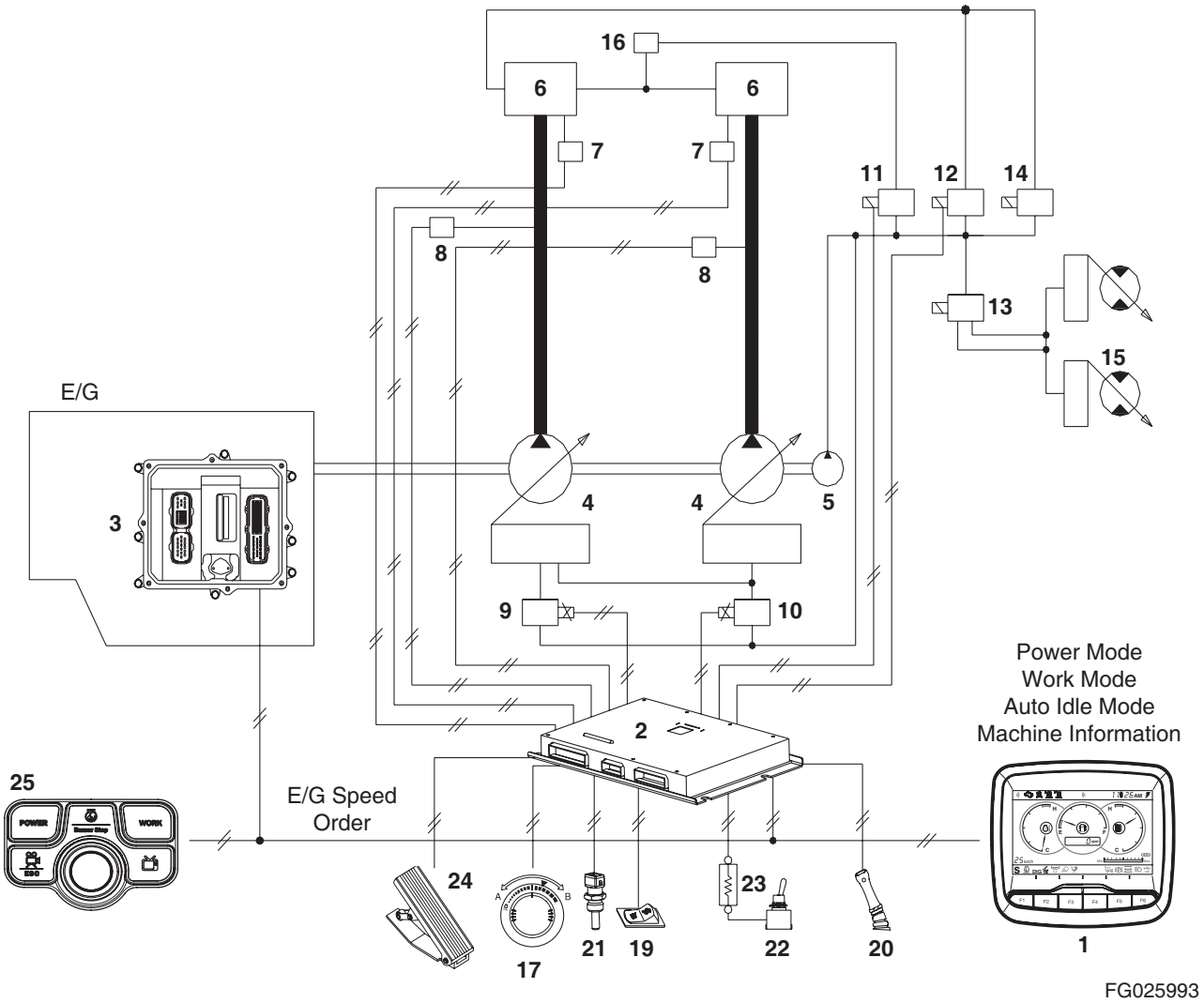


Figure 146

CRUISE CONTROL

Operation

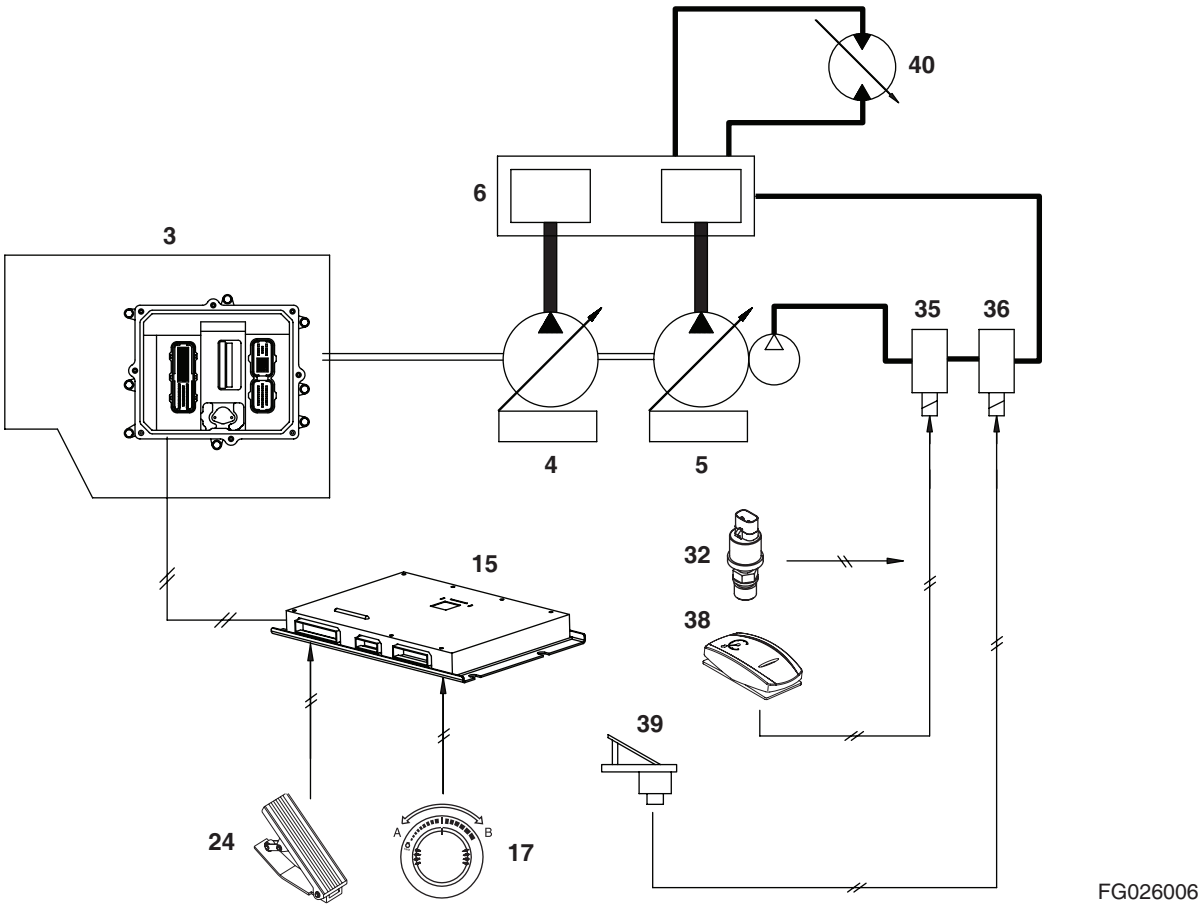


Figure 161

Reference Number	Description
3	Engine Controller (ECU)
4	Main Pump
5	Aux Pump
6	Control Valve
15	EPOS Controller
17	Engine Control Dial
24	Acceleration Pedal

Reference Number	Description
32	Pressure Switch (Py)
35	Cruise Solenoid Valve
36	Forward Solenoid Valve
38	Cruise Switch
39	Brake Pedal
40	Travel Motor

Cruise control is used for reducing operator's fatigue during long travel distances.