COMPONENT LOCATIONS

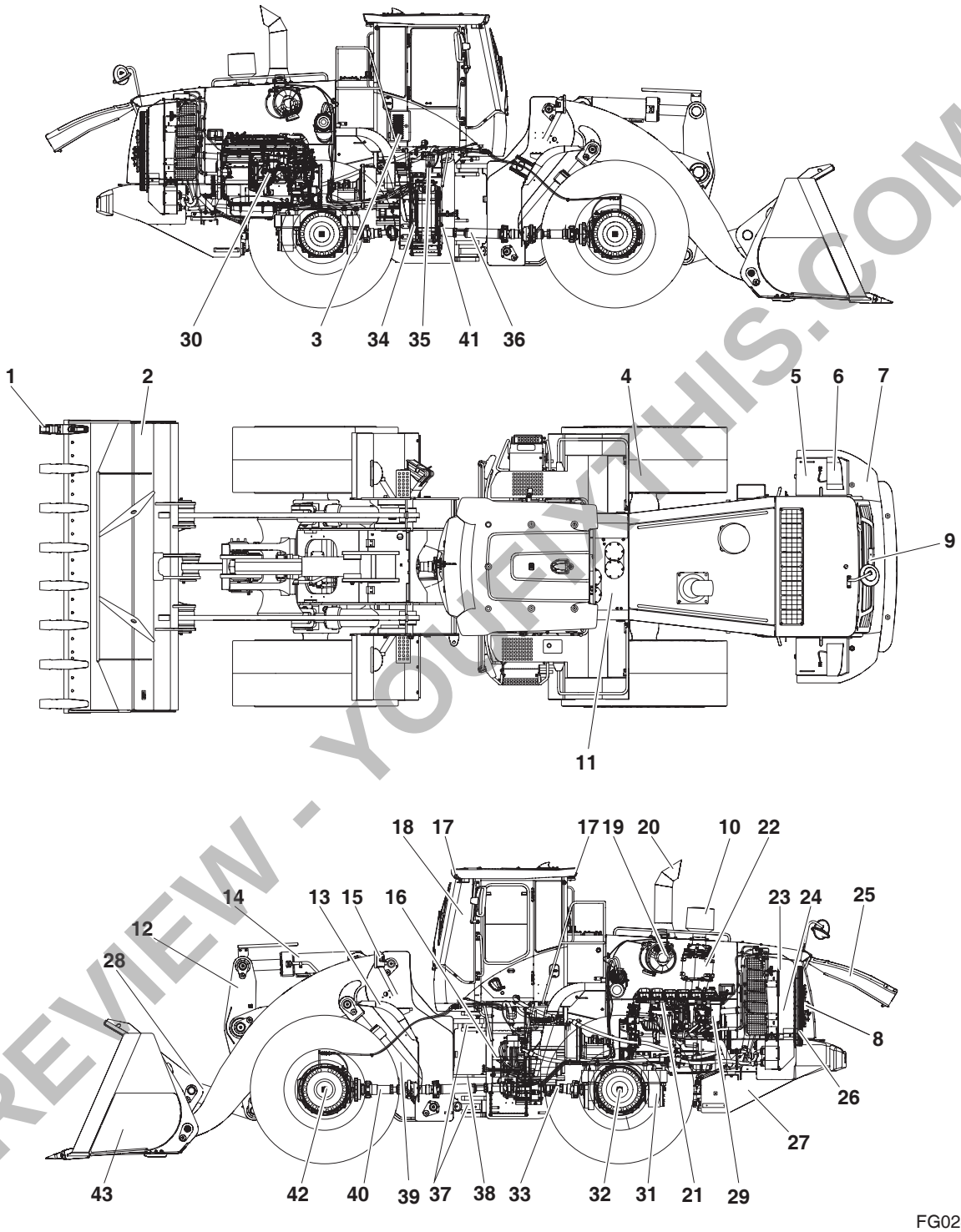


Figure 1

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WELDING PRECAUTIONS AND INSTRUCTIONS

WARNING

AVOID DEATH OR SERIOUS INJURY

To avoid accidents, personal injury and the possibility of causing damage to the machine or to components, welding must only be performed by properly trained and qualified personnel, who possess the correct certification (when required) for the specific welding fabrication or specialized repair being performed.

WARNING

AVOID DEATH OR SERIOUS INJURY

Structural elements of the machine may be built from a variety of steels. These could contain unique alloys or may have been heat-treated to obtain particular strength characteristics. It is extremely important that welding repairs on these types of steel are performed with the proper procedures and equipment. If repairs are performed incorrectly, structural weakening or other damage to the machine (that is not always readily visible) could result. Always consult *DOOSAN* After Sales Service before welding on integral components (loader arm, frames, car body, track frames, upper structure, attachment, etc.) of the machine. It is possible that some types of structurally critical repairs may require Magnetic Particle or Liquid Penetrant testing, to make sure there are no hidden cracks or damage, before the machine can be returned to service.

WARNING

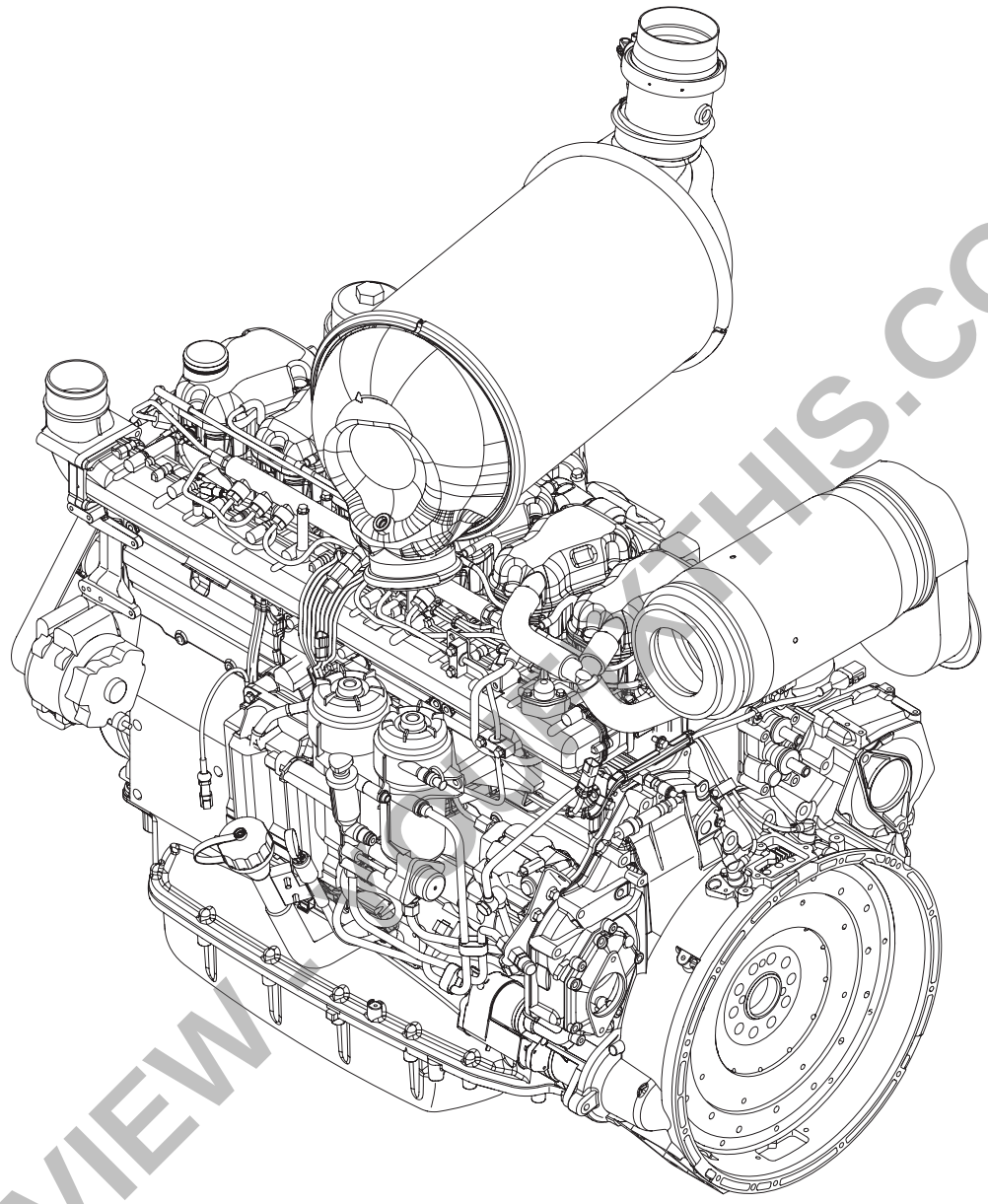
AVOID DEATH OR SERIOUS INJURY

Always perform welding procedures with proper safety equipment and adequate ventilation in a dry work area. Keep a fire extinguisher near and wear personal protective equipment.

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DC13 ENGINE



FG025854

Figure 1

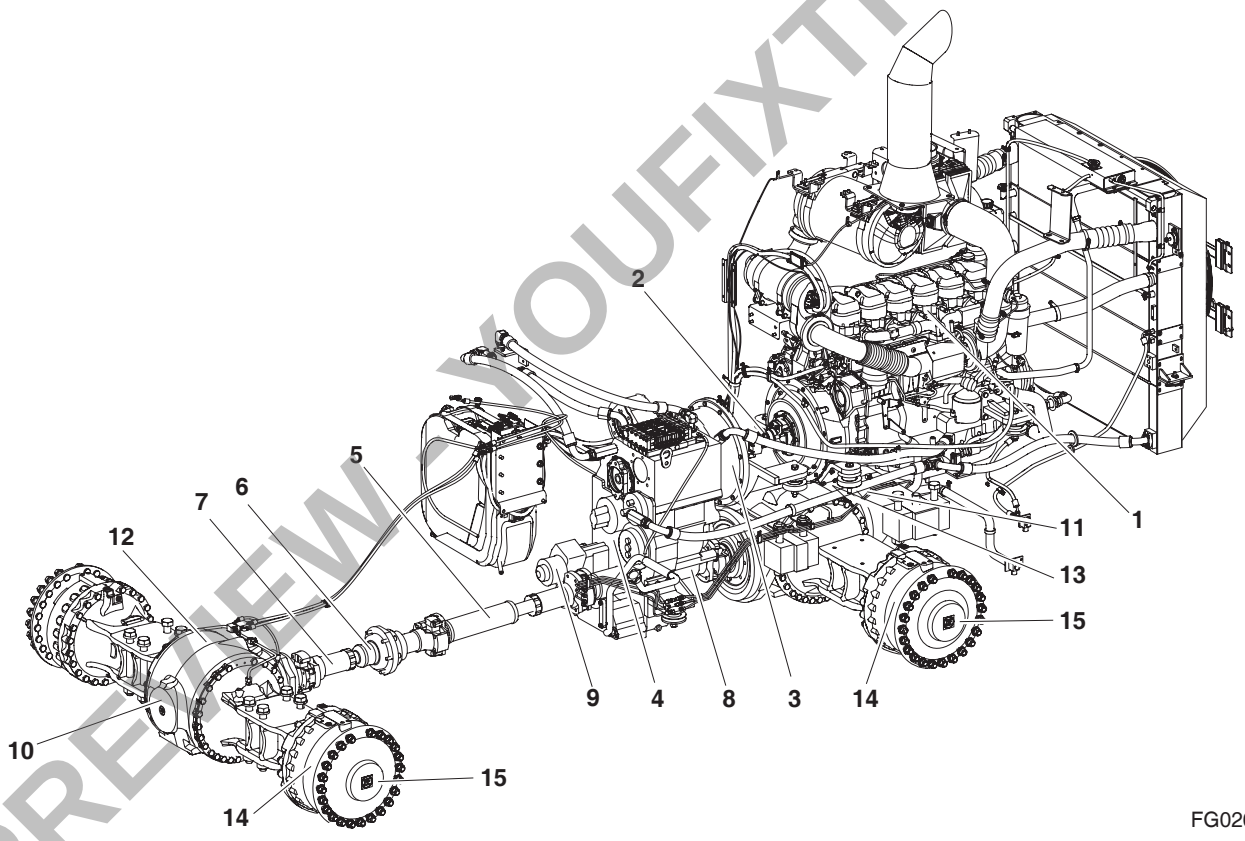
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GENERAL

Figure 1, shows layout of drive train assemblies. The engine (1, Figure 1) drives center drive shaft (engine - transmission) (2) and torque converter (3), which drives a power shift transmission (4). Two output shafts extend out of the transmission. Each output shaft has a drive shaft attached to it. Center and Front drive shaft (5)(6) drives a final drive shaft (7) that drives the front differential (12).

A parking brake (9, Figure 1) is mounted on the transmission output shaft. The front differential is enclosed in the front axle housing (10). Each end of the front axle housing contains reduction gearing (15). Each end of the front axle housing also contains a service brake (14). Rear drive shaft (8) drives the rear differential (13). The rear differential is enclosed in the rear axle housing (11). Each end of the rear axle housing contains reduction gearing (15). Each end of the rear axle housing also contains a service brake (14).



FG026753

Figure 1

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DEFINITION OF OPERATING MODES

Normal

There is no failure detected in transmission system or failure has no or slight effects on transmission control. TCU will work without or in special cases with little limitations. (See “Table of Fault Codes” on page -8.)

Substitute Clutch Control

TCU can't change the gears or the direction under the control of the normal clutch modulation. TCU uses the substitute strategy for clutch control. All modulations are only time controlled (Comparable with EST 25).

Limp-home

The detected failure in the system has strong limitations to transmission control. TCU can engage only one gear in each direction. In some cases only one direction will be possible.

TCU will shift the transmission into neutral at the first occurrence of the failure. First, the operator must shift the gear selector into neutral position.

If output speed is less than a threshold for neutral to gear and the operator shifts the gear selector into forward or reverse, the TCU will select the limp-home gear.

If output speed is less than a threshold for reversal speed and TCU has changed into the limp-home gear and the operator selects a shuttle shift, TCU will shift immediately into the limp-home gear of the selected direction.

If output speed is greater than the threshold, TCU will shift the transmission into neutral. The operator has to slow down the vehicle and must shift the gear selector into neutral position.

Transmission Shut Down

TCU has detected a severe failure that disables control of the transmission.

TCU will shut off the solenoid valves for the clutches and the common power supply (VPS1).

Transmission shifts to Neutral. The park brake will operate normally, also the other functions which use ADM 1 to ADM 8.

The operator has to slow down the machine. The transmission will stay in neutral.

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LUBRICATION AND MAINTENANCE INSTRUCTIONS

Oil Grade

ZF List of Lubricants TE-ML 05 are authorized for ZF axles MT-L 3115 II / 3125 II.

The list of lubricants is being continuously updated and can be obtained or viewed as follows:

- at all ZF plants.
- at all ZF service organizations.

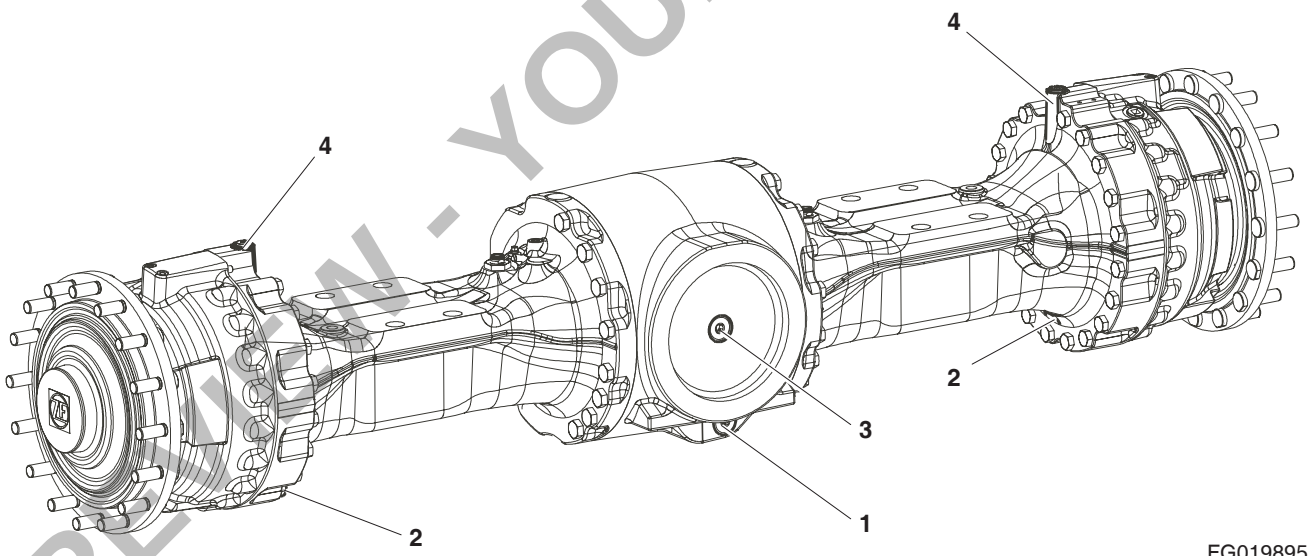
Oil Change

Precondition for a correct oil change is the horizontal installation position of the axle in every direction.

Place the machine in a horizontal position.

Clean all drain plugs, fill plugs and level check plugs carefully before opening them.

Drain oil only immediately after a longer driving time.



FG019895

Figure 1 DRIVE AXLE ASSEMBLY

Reference Number	Description
1	Oil drain hole M36x1.5 axle drive housing
2	Oil drain hole M24x1.5 axle housing

Reference Number	Description
3	Oil filler hole M36x1.5
4	Brake breather

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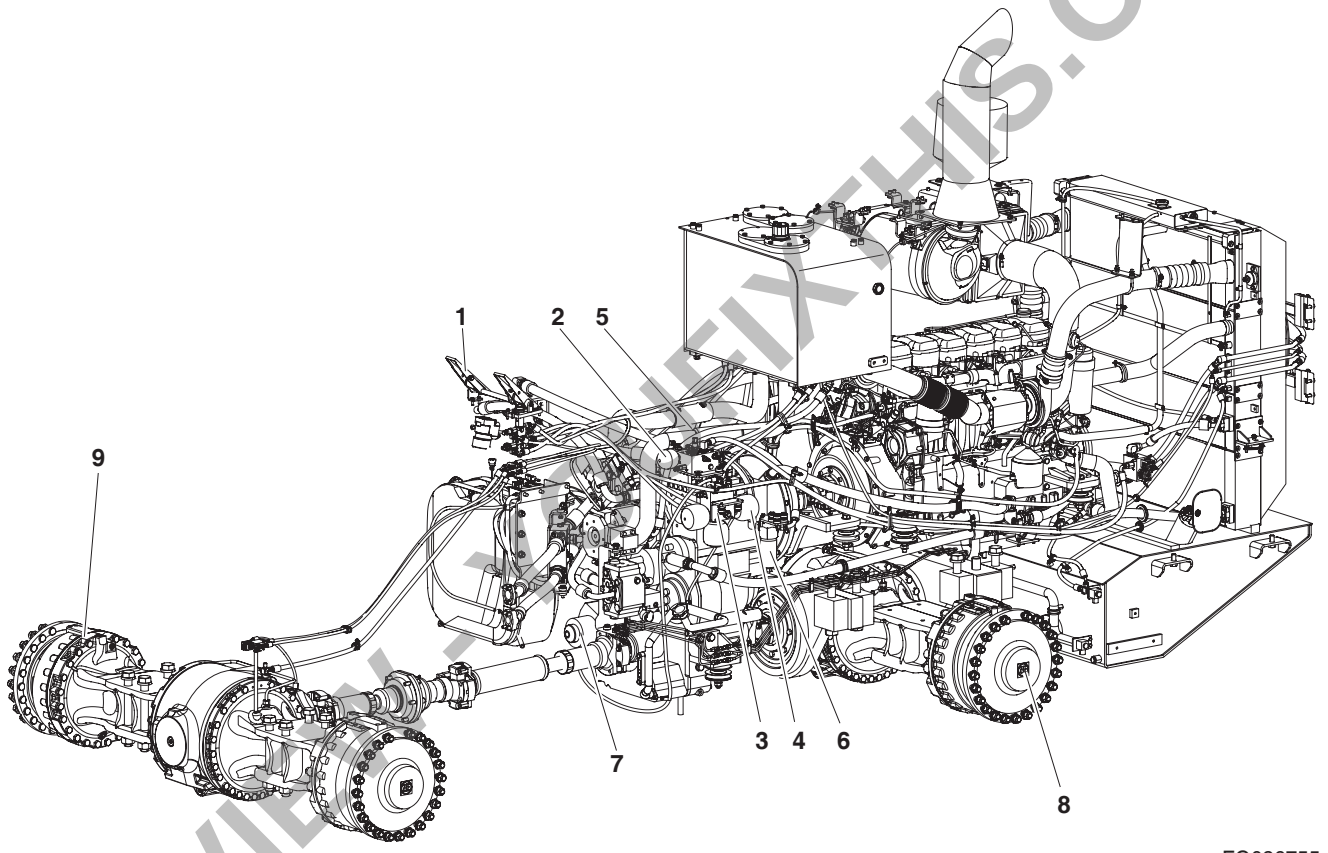
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GENERAL DESCRIPTION

This machine is equipped with a fully hydraulic operated brake system and an independent circuit for the front axle and rear axle.

The brake system is composed of brake pedal valve, brake supply valve and accumulators and provided with oil through brake supply valve from pump.

A system pressure drop below 80 kg/cm² (78 bar (1,137 psi)) will be indicated on the display panel in the cabin, warning light will flash and alarm will sound.



FG026755

Figure 1

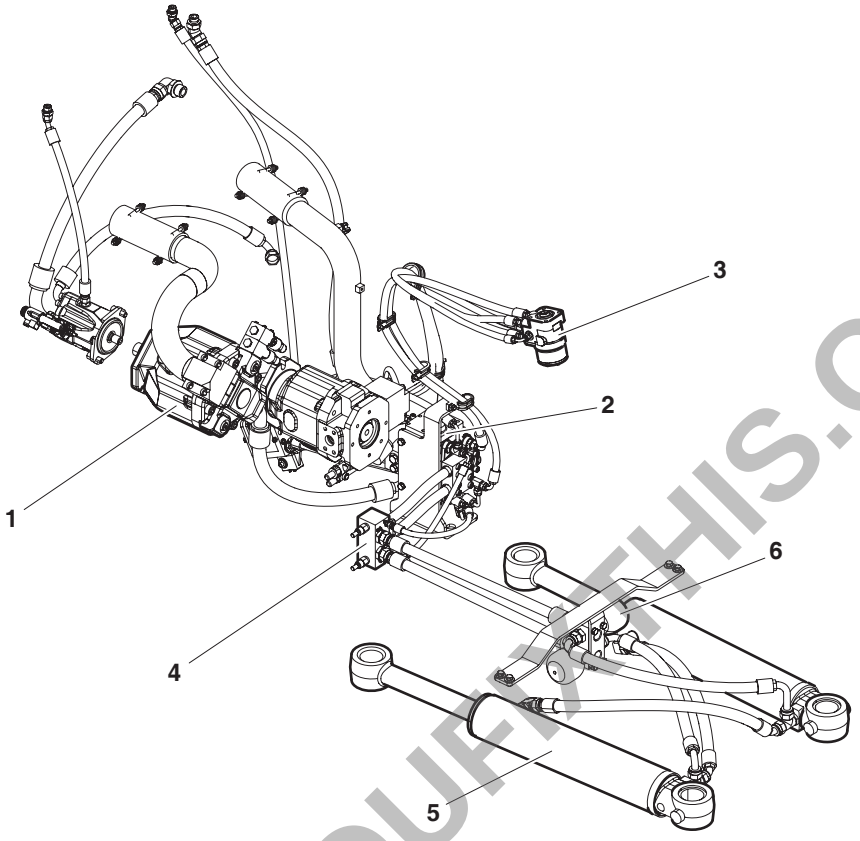
Reference Number	Description
1	Brake Pedal Valve
2	Brake Supply Valve
3	Accumulator Block
4	Brake Accumulator
5	Fan and Brake Pump

Reference Number	Description
6	Hydraulic Filter
7	Parking Brake
8	Rear Axle
9	Front Axle

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GENERAL DESCRIPTION



FG025867

Figure 1

Reference Number	Description
1	Steering Pump
2	Flow Amplifier
3	Steering Unit

Reference Number	Description
4	Jerk Softener
5	Steering Cylinder
6	Accumulator

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GENERAL DESCRIPTION

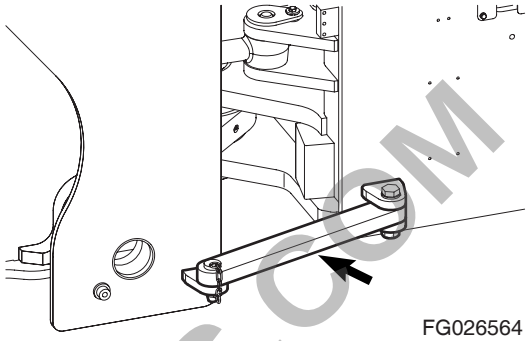
The loader frame is an articulated type: the front frame is joined to the rear frame with two hinge pins around which the loader pivots for steering.

WARNING

AVOID DEATH OR SERIOUS INJURY

Keep out of the articulation area unless the articulated frame lock is installed.

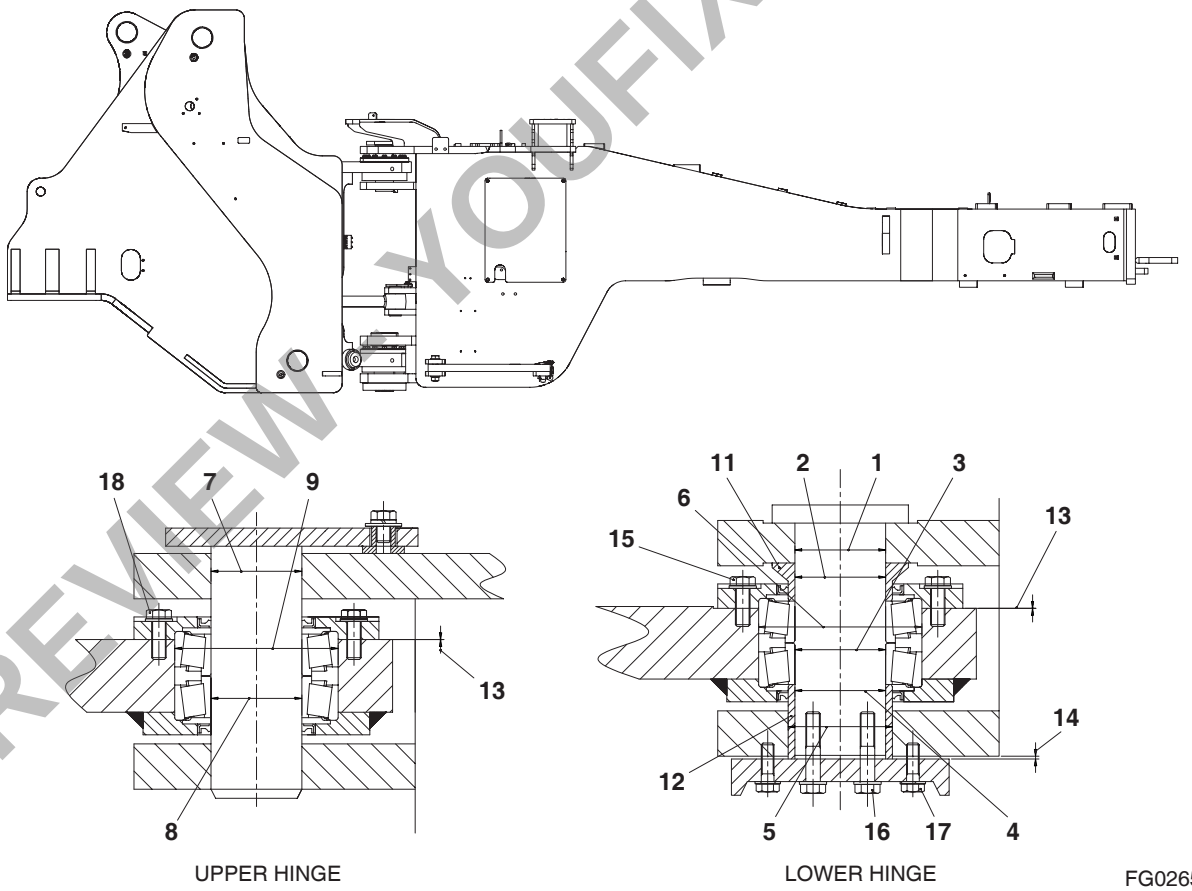
Always install the articulated frame lock before servicing or transporting.



FG026564

Figure 1

Maintenance Standard



FG026585

Figure 2

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GENERAL DESCRIPTION

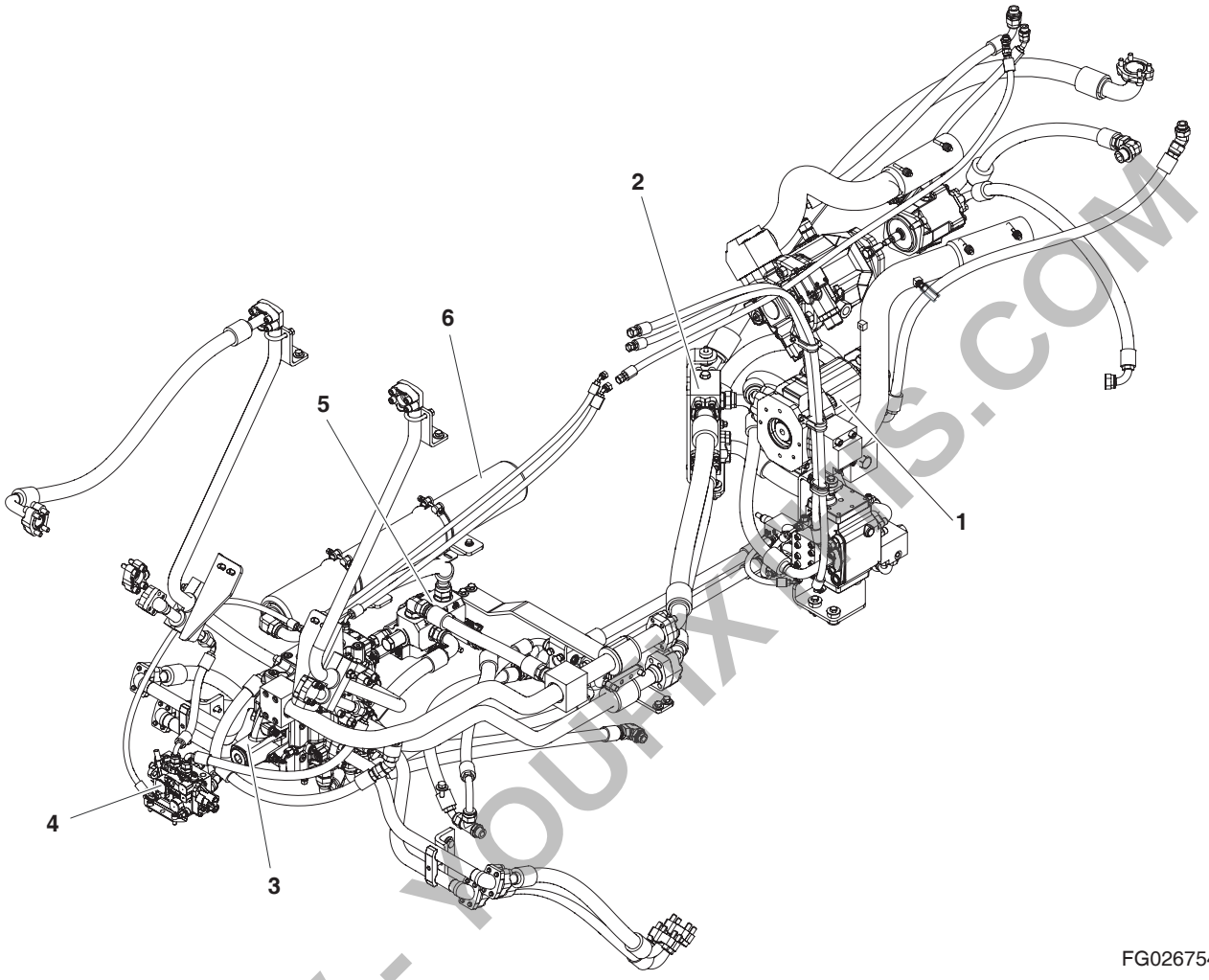


Figure 1

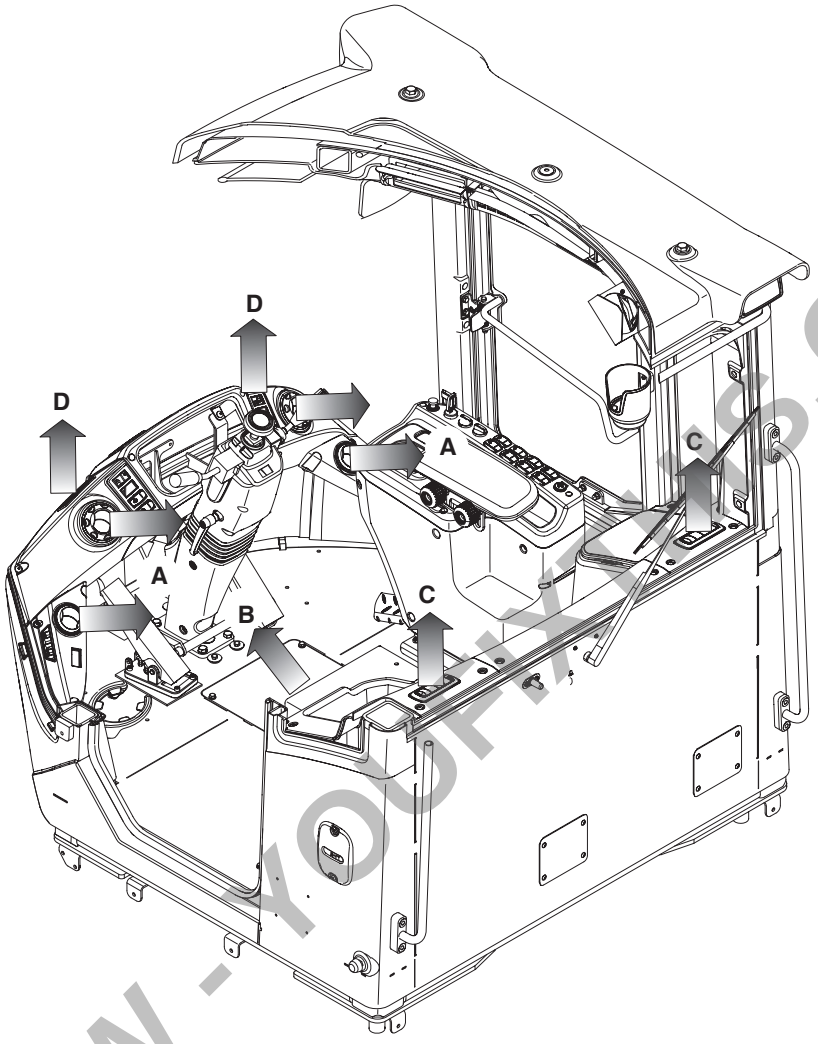
Reference Number	Description
1	Main Pump
2	Main Relief Valve
3	MCV

Reference Number	Description
4	3rd Spool Valve
5	Load Isolation System Valve
6	Accumulator

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GENERAL DESCRIPTION



FG021249

Figure 1

Soild-type heater and air conditioner are installed in the cover behind the operator's seat.

Temperature of the operator's cabin is adjusted automatically to the temperature set by operator.

(Please refer to the Operation and Maintenance Manual for detailed full automatic control.

Vent mode selects the direction of discharged air.

Outlets by vent modes

Modes				
Outlets	A+C	A+B+C	B+C	B+D

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SAFETY MESSAGES

Safety messages and safety decals included in this manual and on the machine provide instructions how to operate, service and maintain the machine. Safety messages and safety decals indicate potential hazards and describe safety precautions required to avoid hazards. Operator and maintenance personnel should read and understand these safety messages and decals before beginning operation or maintenance.

SAFETY ALERT SYMBOL

Be Prepared - Get to Know All Operating and Safety Instructions.

This is a Safety Alert Symbol. Wherever it appears in this manual or on safety decals on the machine, you must be alert to the potential for personal injury or accidents. Always observe safety precautions and follow recommended procedures.

Signal Words

The signal words "DANGER," "WARNING," "CAUTION" are used throughout safety messages and safety decals in this manual or on the machine. They indicate an existence of, and the relative seriousness of a hazard. All three indicate that a safety risk is involved. Observe the precautions indicated whenever a Safety Alert Symbol is present, no matter which signal word appears next to it.

DANGER

DANGER - This signal word is used on safety messages and safety labels and indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING - This signal word is used on safety messages and safety labels and indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION - This signal word is used on safety messages and safety labels and indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

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Steering

Power Steering System SP002465
Steering Unit SP002425
Steering Pump SP002480
Flow Amplifier SP002434
Jerk Softener and Accumulator SP002658
Emergency Steering SP002436

Frame

Articulation Center SP002542
Counterweight SP002437

Tank

Oil Tank SP002725
Fuel Tank SP002439

Hydraulics

Main Pump SP002486
Main Control Valve SP002441
3rd Control Valve (Option) SP002442
Load Isolation System SP002443
Cooling System SP002444
Pilot System SP002445
Hydraulic Schematic (DL550-3) SP002659

Electrical System

Air Conditioner SP002447
Electrical System SP002448
Electrical Schematic (DL450-3 / DL550-3) SP002449

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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
ALL MODELS	ALL RANGES

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8. Back off the micrometer.
9. Tighten the hexagon socket screw securing the cutter.
10. Check the value again.
11. Install the cutting head on the tool, tighten the hexagon socket screw in the center.

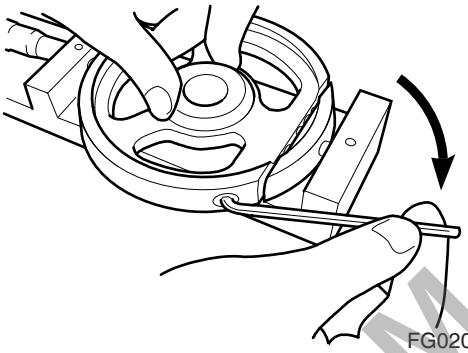

FG020341

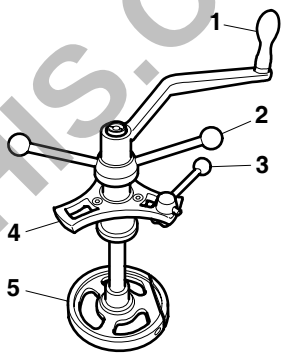
Figure 78

Adjust the Diameter of the Cylinder Liner Seat

Diameter of lower liner seat

- 139.04 +/- 0.04 mm
- 140.04 +/- 0.04 mm

Reference Number	Description
1	Crank Handle
2	Feed Screw
3	Lever
4	Guide Plate
5	Cutting Head



FG020342

Figure 79

1. Check that upper surface of the upper liner seat on the cylinder block is not damaged.
2. Turn the feed screw clockwise until cutting head is at the top of the tool.
3. Lubricate the cutting head sliding surfaces with thin-bodied oil.
4. Lower the tool into the cylinder block until guide plate centers in the upper liner seat.
5. Secure the guide plate with the lever.
6. Install the crank handle and crank the cutter clockwise.

IMPORTANT

The cutter must never be cranked counterclockwise.

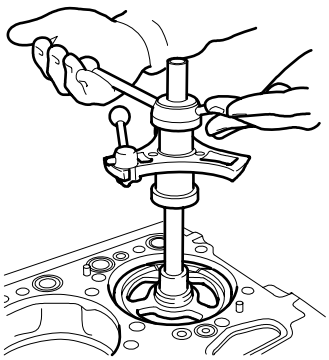
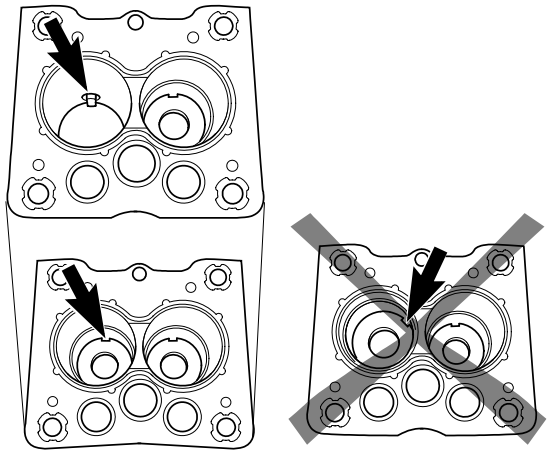

FG020343

Figure 80

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FG020550

Figure 274

12. Install the pipes (3, 4 and 5, Figure 273). Use new washers.
13. Install a new high-pressure pipe 2.
14. Install the high-pressure pipe brackets.
15. Install the cable connection.
16. Start the engine and clear the fault codes.

Removing Injectors

WARNING

AVOID DEATH OR SERIOUS INJURY

The fuel system has a very high fuel pressure of up to 3,000 bars (43,500 psi). The fuel system must be depressurized using SDP3 before any work is started.

The system should always be treated as pressurized, even when the engine is switched off.

Wear protective gloves and goggles.

IMPORTANT

The fuel system is very sensitive to dirt. It is therefore very important that everything is as clean as possible when work is done on the fuel system.

When the fuel system has been opened, compressed air must not be used to blow clean components.

When cleaning, rags or paper which shed fibres must not be used. Use lint-free rags. Clean tools before use.

Do not use worn chrome-plated tools as flakes of chrome may come off.
Cover connections of removed components with a lint-free rag and tape.

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Powershift Transmission

The multispeed reversing transmission in countershaft design is power shiftable by hydraulically actuated multidisk clutches.

All gears are constantly meshing and carried on antifriction bearings.

The gear wheels, bearings and clutches are cooled and lubricated with oil.

The 4-speed reversing transmission is equipped with 6 multidisk clutches.

At the shifting, the actual plate pack is compressed by a piston, movable in axial direction, which is pressurized by pressure oil.

A compression spring takes over the pushing back of the piston, thus the release of the plate pack. As to the layout of the transmission and the specifications of the closed clutches in the single speeds, “Schedule of Measuring Points and Connection 4WG-310” on page 1-13 and “Oil Circuit Diagram 4WG-310 Forward 1st Speed” on page 1-15.

Transmission Control

Transmission control, See “Schedule of Measuring Points and Connection 4WG-310” on page -13., Electro-hydraulic unit on page -14 and “Oil Circuit Diagram 4WG-310 Forward 1st Speed” on page 1-15.

The transmission pump, necessary for the oil supply of the converter, and for the transmission control, is sitting in the transmission on the engine-dependent input shaft.

The feed rate of the pump is Q = 135 l/min. at n_{Engine} = 2000 min^{-1}.

This pump is sucking the oil via the coarse filter out of the oil sump and delivers it via the ZF-Fine filter - the filters is fitted externally from the transmission - to the main pressure valve.

ZF-Fine filter

Filtration ratio according to ISO 4572: $\beta_{30} \geq 75$ $\beta_{15} = 25$ $\beta_{10} = 5.0$

Filter surface at least: 2 x 6,700 cm^2 = 13,400 cm^2

Dust capacity according to ISO 4572 at least: 17 g

The six clutches of the transmission are selected via the 6 proportional valves P1 to P6.

The proportional valve (pressure regulator unit) is composed of pressure regulator (e.g. Y6). follow-on slide and vibration damper.

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9. Heat roller bearing and position it against shoulder.

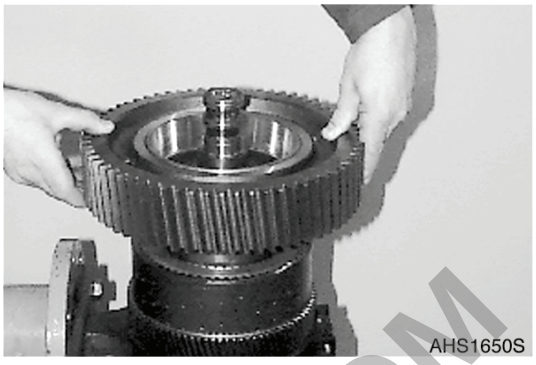


Figure 215

10. Tighten slotted nut.

CAUTION

AVOID INJURY

Use protective gloves.

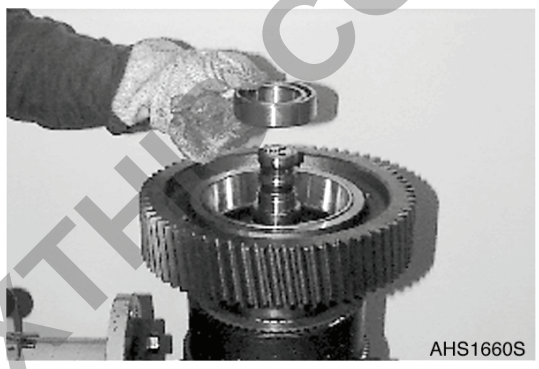


Figure 216

11. Introduce inner bearing race.

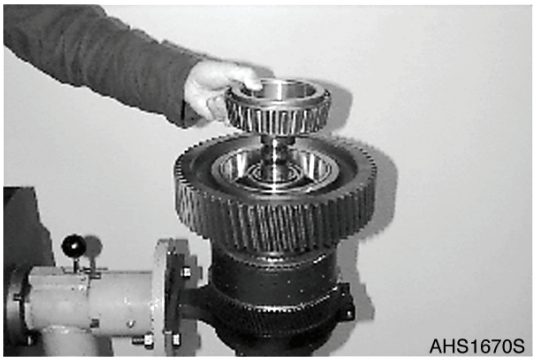


Figure 217

12. Check function of clutch using compressed air.

NOTE: *At correctly installed components, the closing resp. opening of the clutches is clearly audible.*

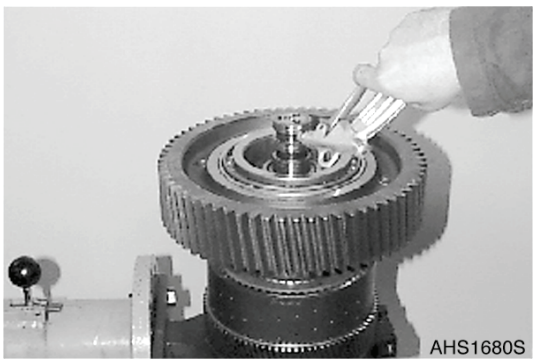


Figure 218

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24. Attach electrohydraulic control unit (1, Figure 45) equally using torx screws (2 and 3, Figure 45).

Tightening torque (M6/10.9x76) M_A = 9.5 Nm

Tightening torque (M6/10.9x100) M_A = 9.5 Nm

(S) Socket wrench TX-27 5873 042 002

(S) Reducing adapter 5870 656 056

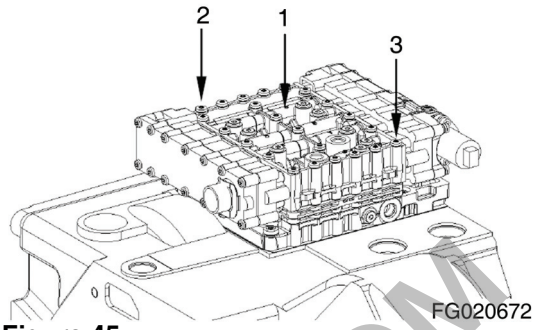


Figure 45

25. Pipe - System pressure to lock-up clutch valve.

Attach pipes (1, Figure 46) with hollow screws (3, Figure 46) and O-rings and screw nut (2, Figure 46).

Install O-ring 13x2 on hollow screw (3, Figure 46), insert into eye of pipes, mount O-ring 18x2.5 and.

Tightening torque M_A = 45 Nm

Fastening of screw nut (2, Figure 46).

Tightening torque M_A = 35 Nm

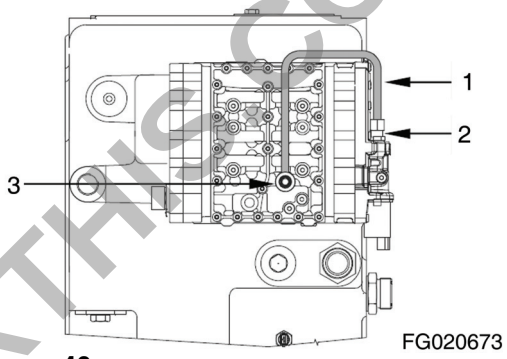


Figure 46

26. Pipes - System pressure from lock-up clutch valve to lock-up clutch (Figure 47 and Figure 48).

Attach pipe union (1, Figure 48).

Tightening torque M_A = 40 Nm

Attach connection socket (2, Figure 48)

Tightening torque M_A = 35 Nm

Attach pipes (3, Figure 48) with screw nut (4, Figure 47 and 5, Figure 48).

Tightening torque M_A = 35 Nm

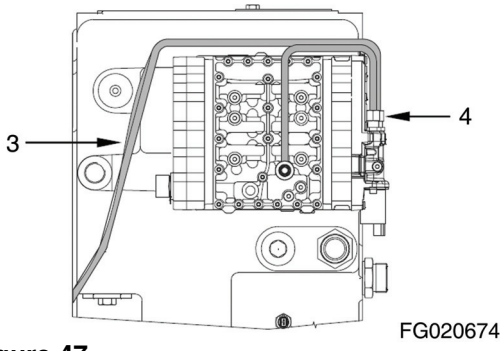


Figure 47

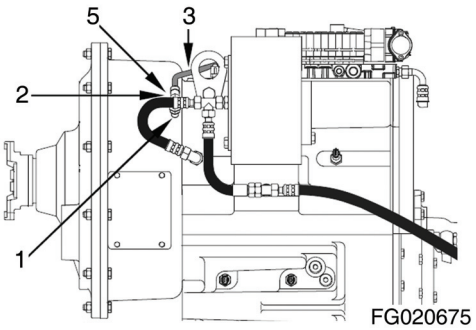


Figure 48

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4. Remove adjusting screw and fasten the axle using hexagon screw.

   NOTE: *Wet the thread of the hexagon screw with Loctite (Type No. 243).*

   Tightening torque (M10/8.8) M_A = 46 Nm

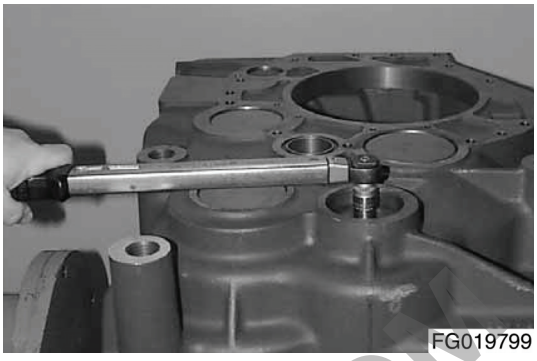


Figure 362

5. Insert the sealing covers (arrow), with the concave side facing downwards, flush to the housing surface.

   NOTE: *Wet contact face with Loctite (Type No. 262).*

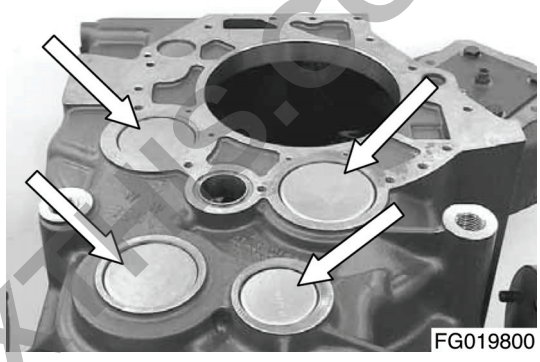


Figure 363

Transmission Pump

Version combined with 2nd/3rd or 4th Power Take-Off

NOTE: *Version combined only with the 1st Power Take-off is described from page -128.*

1. Press the needle sleeve (arrow), with the reinforced coating towards the press-in tool until contact.

   (S) Mounting tool 5870 058 041

   (S) Handle 5870 260 002

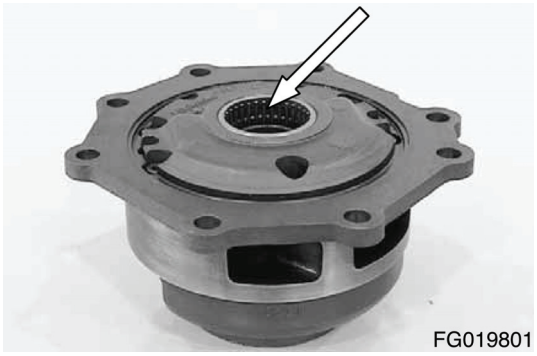


Figure 364

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20. Preload the differential by means of the press and bolt with new locking screws.

    Tightening torque (M16/12.9) M_A = 400 Nm

    (S) Pressure piece AA00 694 360

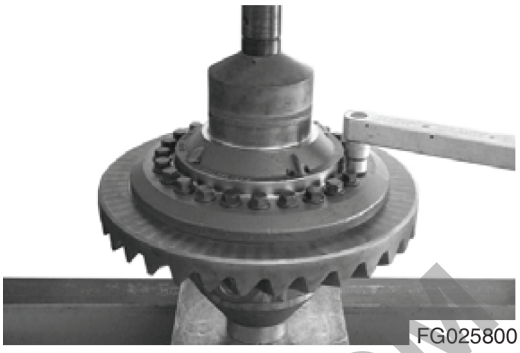


Figure 78

21. Heat both tapered roller bearings and insert until contact is obtained.

IMPORTANT

Adjust tapered roller bearing after cooling down.

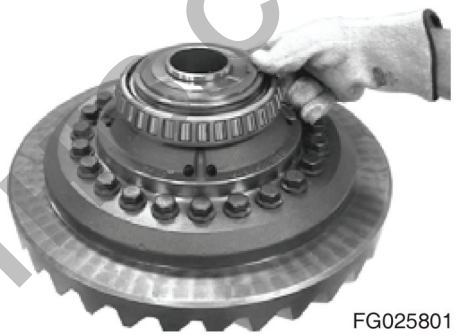


Figure 79

22. Insert axial roller cage (see arrow).

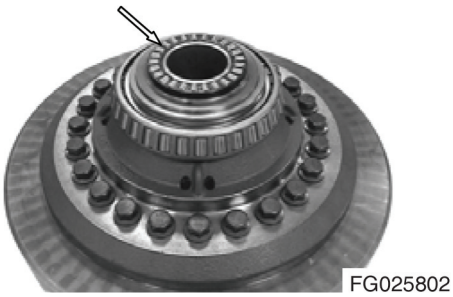


Figure 80

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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
DL550-3	10001 and Up

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