COMPONENT LOCATIONS

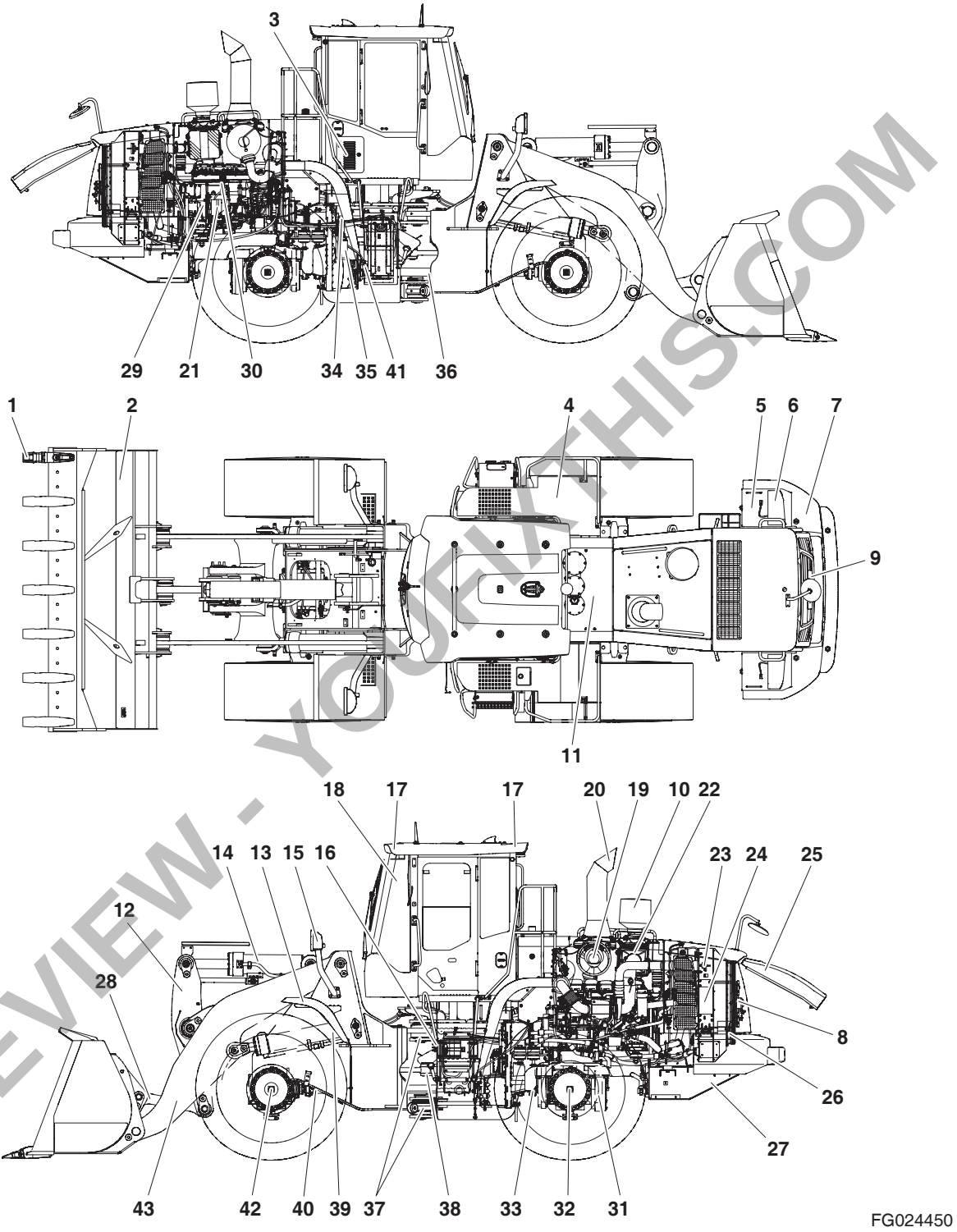


Figure 1

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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

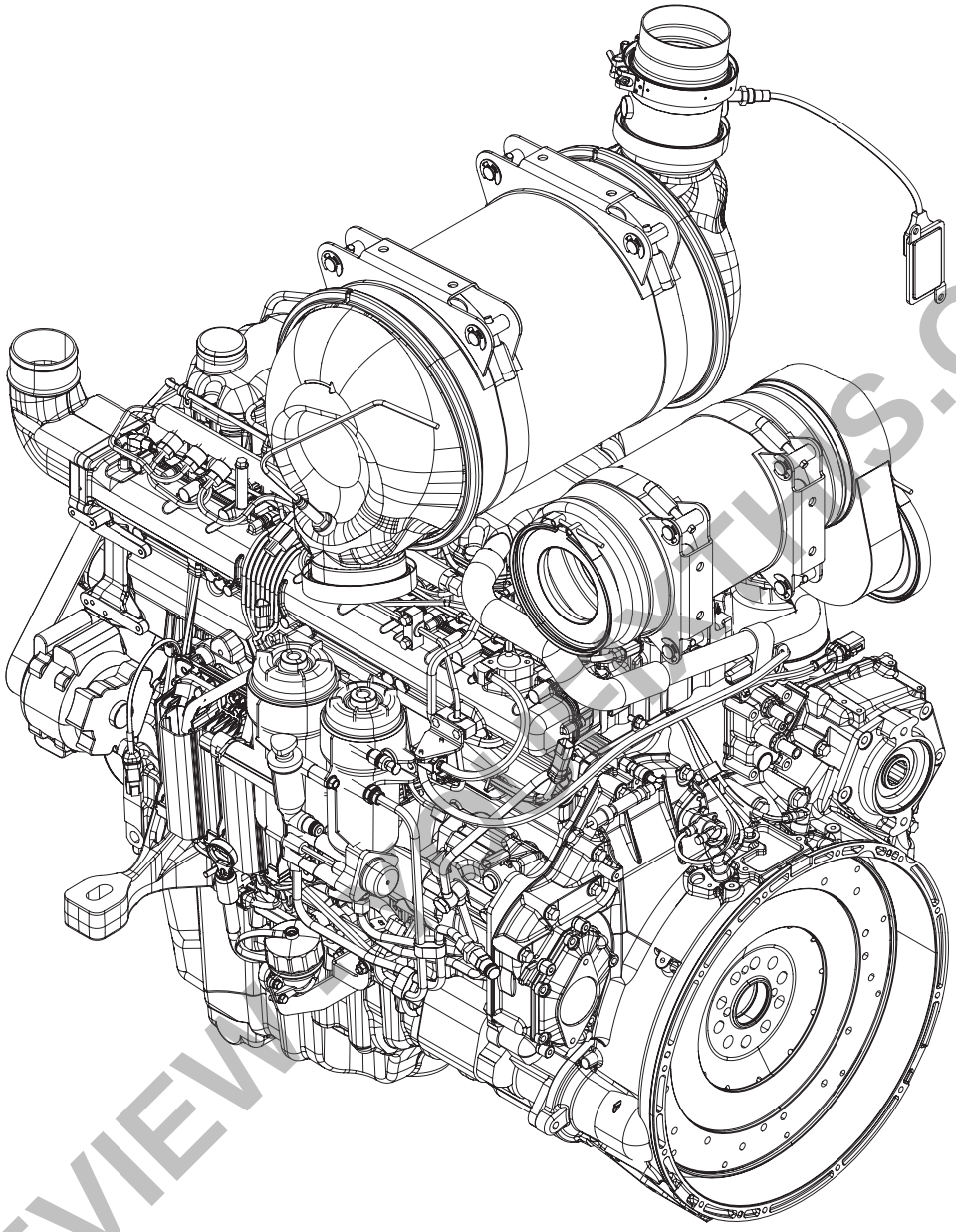
AVOID DEATH OR SERIOUS INJURY

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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DC9 ENGINE



FG024302

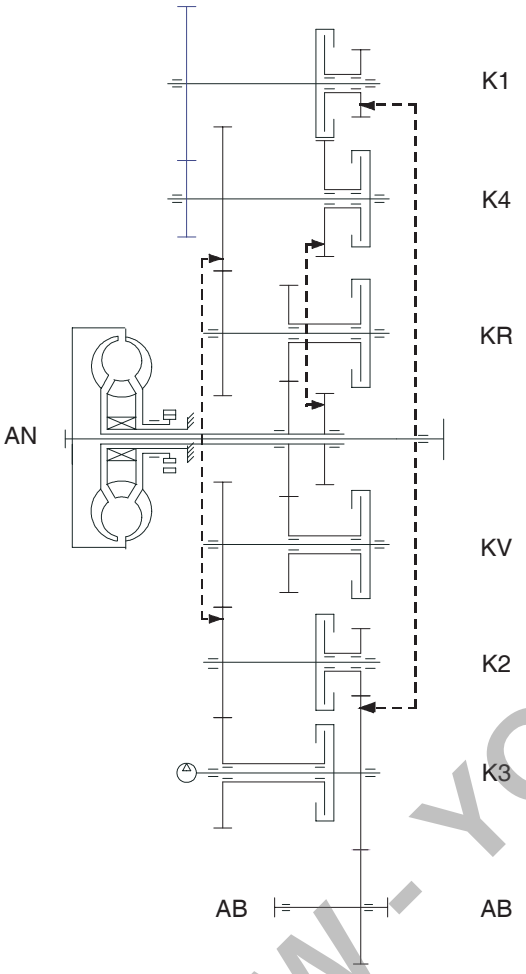
Figure 1

PREVIEW ONLY

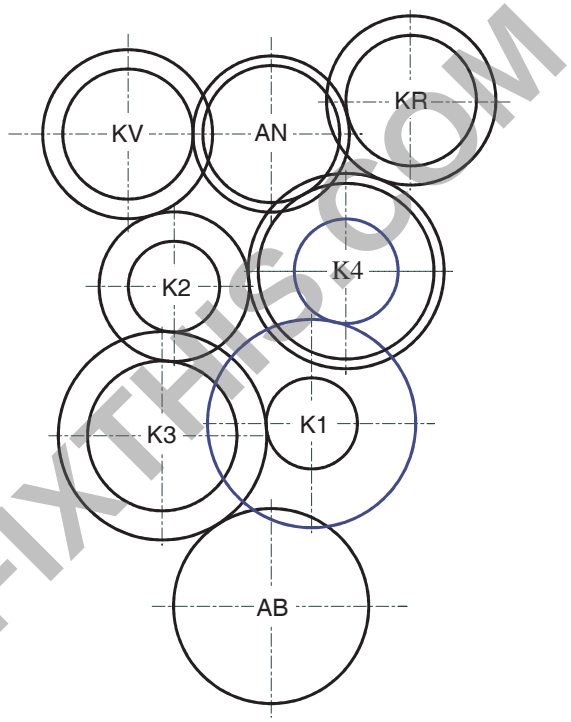
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CONFIGURATION 4WG-210

Transmission schematics



Gear schematics



FG022732

Figure 2

Reference Number	Description
KV	Forward Clutch
KR	Reverse Clutch
K1	1st Gear Clutch
K2	2nd Gear Clutch

Reference Number	Description
K3	3rd Gear Clutch
K4	4th Gear Clutch
AN	Input
AB	Output

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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 3085 II / 3095 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.

Oil drain only immediately after a longer driving time.

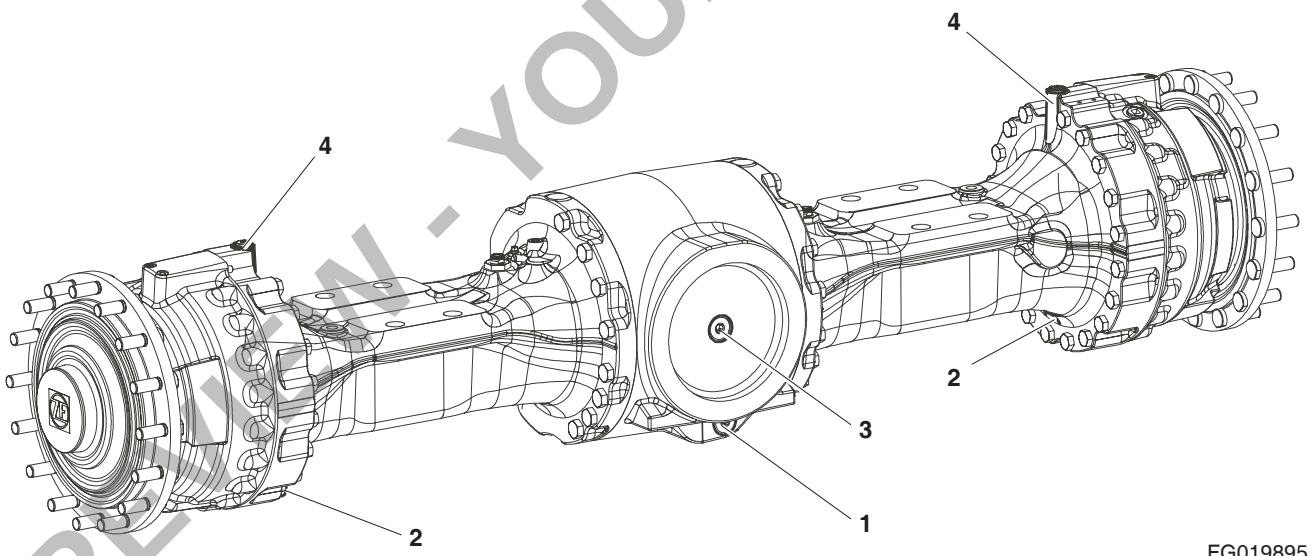


Figure 1 DRIVE AXLE ASSEMBLY

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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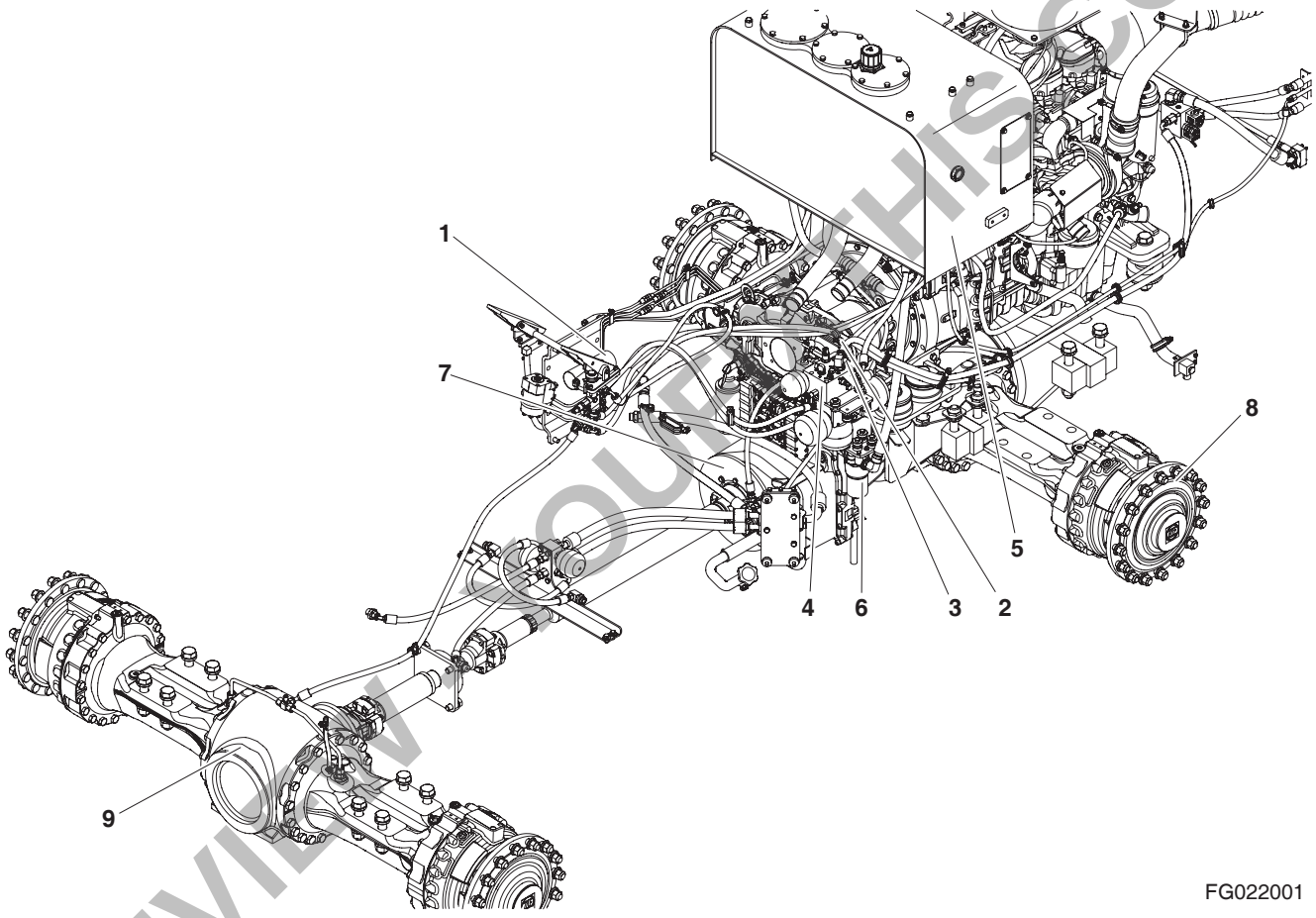
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GENERAL DESCRIPTION

This machine is equipped with a fully hydraulic operated brake system and has a 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 65 bar (943 psi) will be indicated on the display panel in the cabin, warning light will flash and alarm will sound.



FG022001

Figure 1

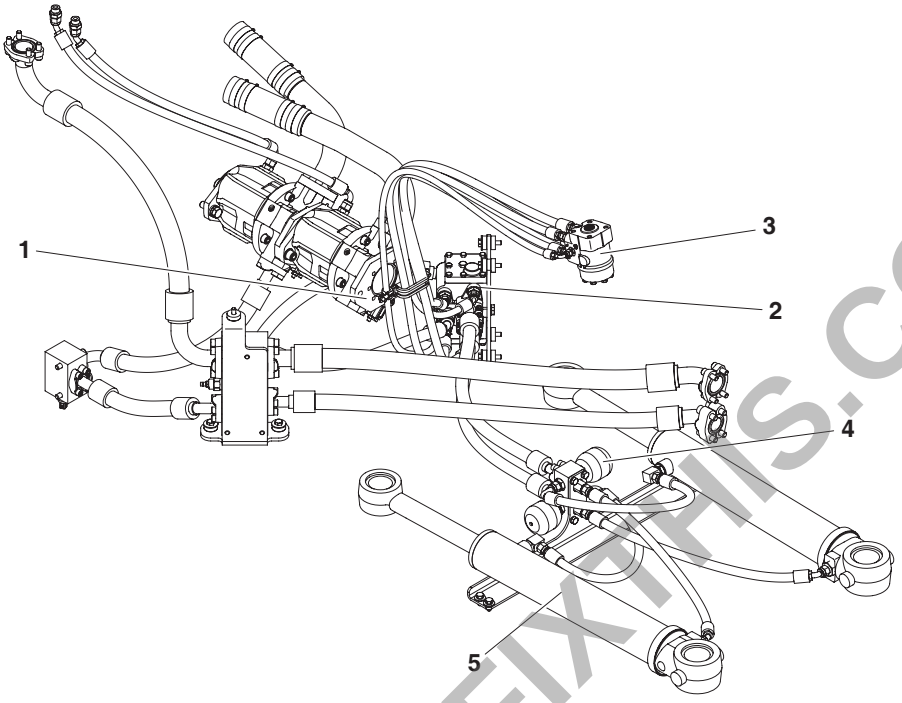
Reference Number	Description
1	Brake Pedal Valve
2	Supply Valve
3	Accumulator Block
4	Brake Accumulator
5	Fan and Brake Pump

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

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GENERAL DESCRIPTION



FG023721

Figure 1

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

Reference Number	Description
4	Accumulator
5	Steering Cylinder

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GENERAL DESCRIPTION

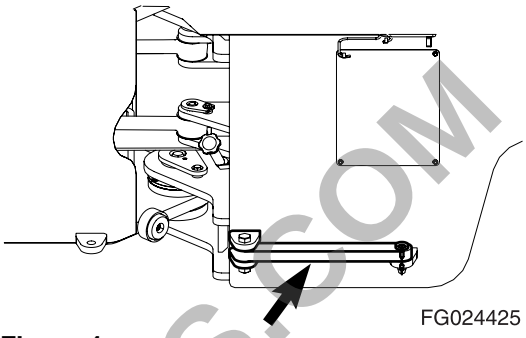
The loader frame is an articulated type: the front frame is joined to the rear frame with two hinge pins around which the loader pivots for steering.

WARNING

AVOID DEATH OR SERIOUS INJURY

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

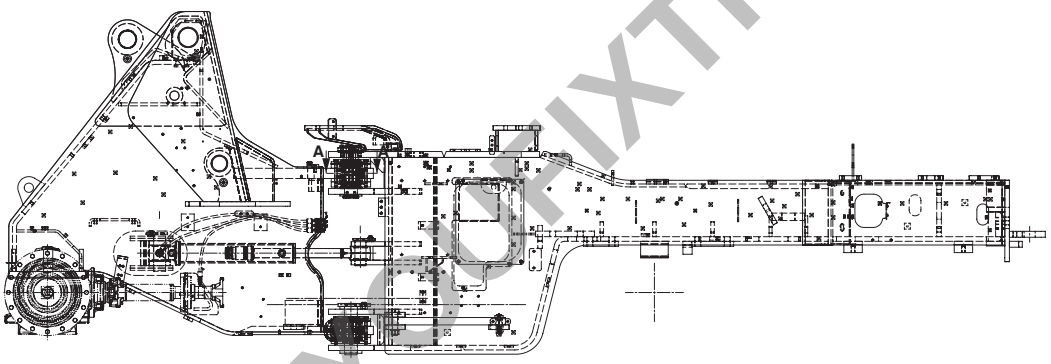
Always install the articulated frame lock before servicing or traveling.

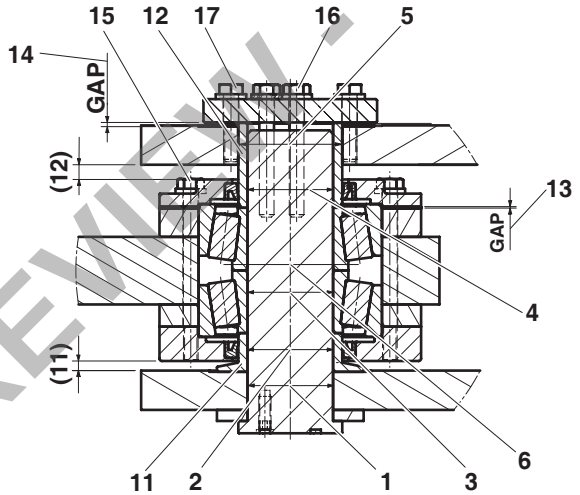


FG024425

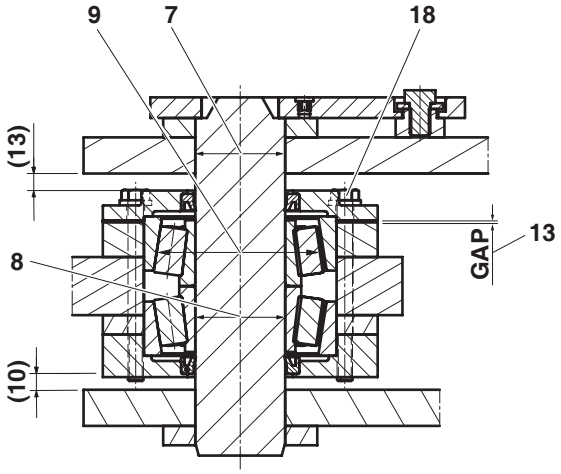
Figure 1

Maintenance Standard





SECTION A-A
(UPPER HINGE BEARING)



SECTION A-A
(LOWER HINGE BEARING)

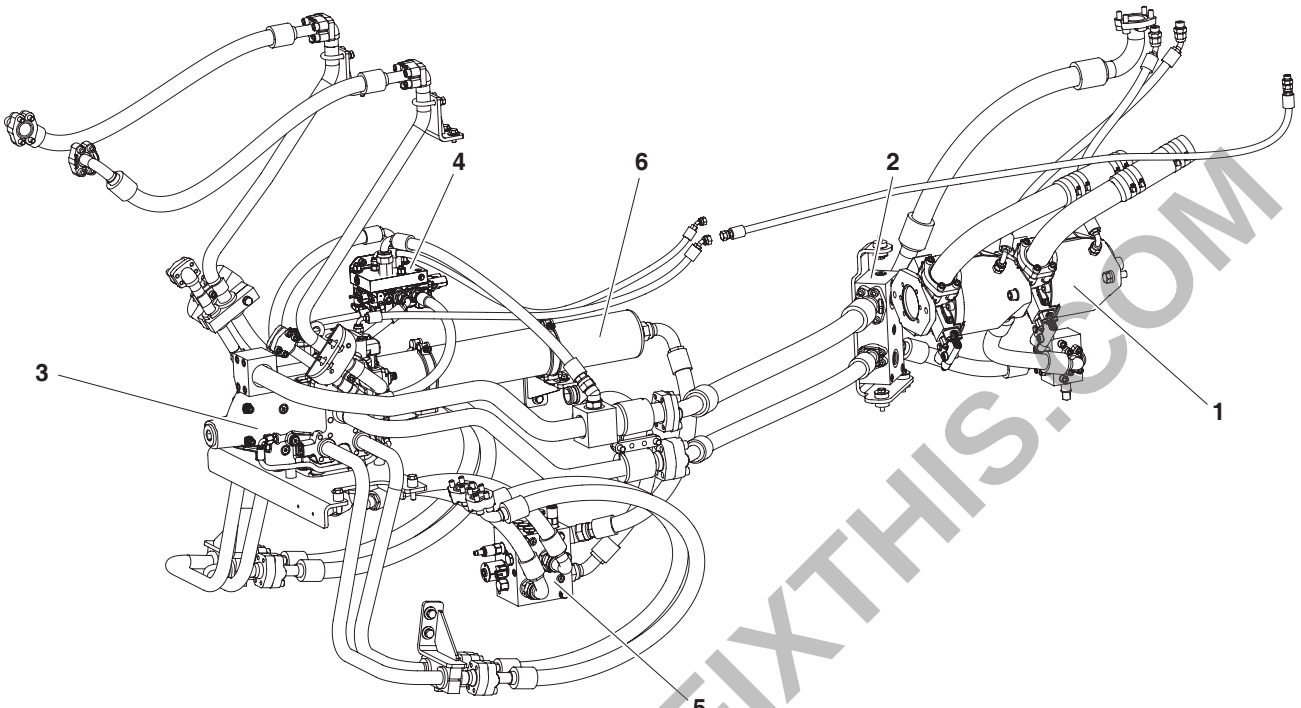
FG022002

Figure 2

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GENERAL DESCRIPTION



FG022693

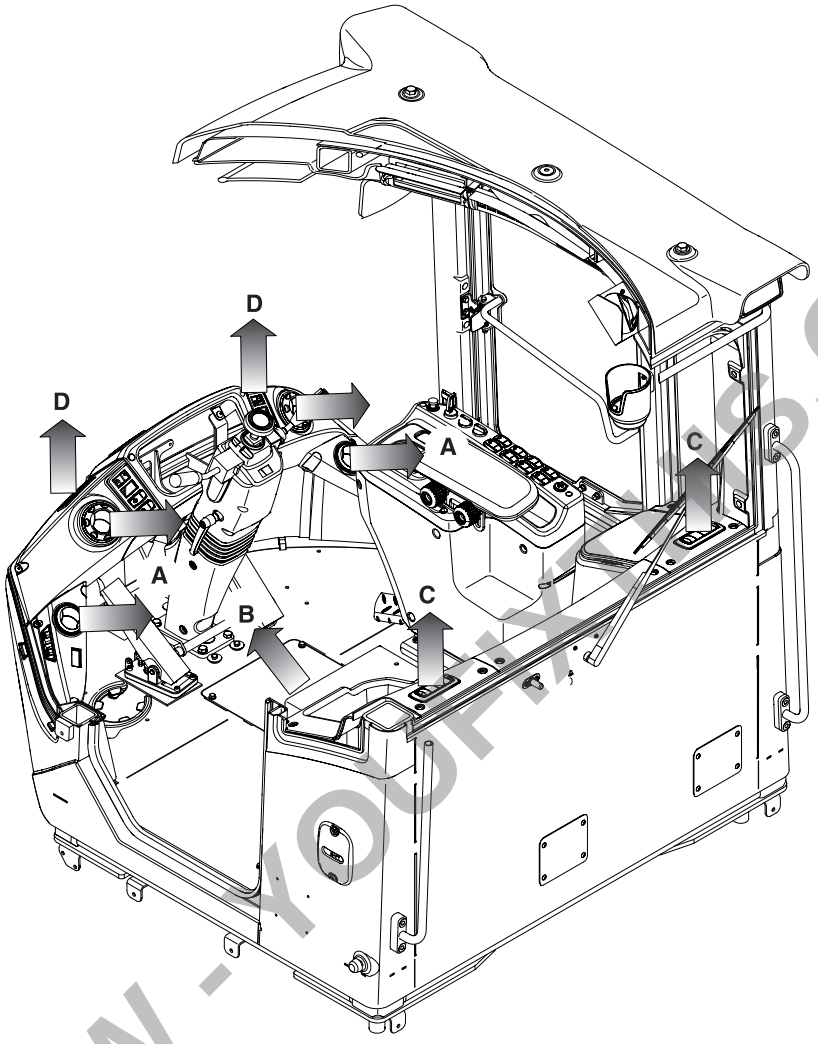
Figure 1

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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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 SP002478
Steering Unit SP002479
Steering Pump SP002480
Flow Amplifier SP002481
Jerk Softener and Accumulator SP002482
Emergency Steering SP002483

Frame

Articulation Center SP002467
Counterweight SP002437

Tank

Oil Tank SP002484
Fuel Tank SP002485

Hydraulics

Main Pump SP002486
Main Control Valve SP002441
3rd Control Valve (Option) SP002442
Load Isolation System SP002487
Cooling System SP002488
Pilot System SP002445
Hydraulic Schematic DL300-3 / DL350-3 ..... SP002489

Electrical System

Air Conditioner SP002447
Electrical System SP002575
Electrical Schematic DL300-3 / DL350-3 / DL420-3 / DL450-3 ..... SP002449

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8. Wind round and at the same time turn the vertical feed screw clockwise until cutter just touches the liner seat.
9. Lift the rapid feed ring and move the cutter back so it is within the liner seat surface.
10. Adjust the vertical feed screw to start machining. The maximum feed per cut is 0.05 mm. If 0.05 mm is not enough, several cuts may be required until required position is reached.

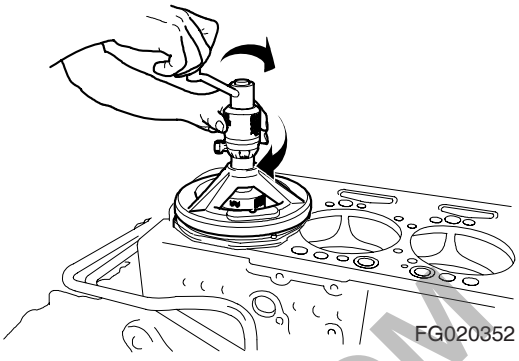


Figure 87

IMPORTANT

Never wind the milling cutter counterclockwise; otherwise the cutter will break.

11. Wind clockwise with an even movement. Hold in the horizontal feed screw with the other hand at the same time. The cutter will be fed horizontally at 0.13 mm per turn.

    Wind carefully when the cutter starts to approach the outer edge of the liner seat.

    Release the horizontal feed screw when the cutter has gone over the edge so feeding stops.

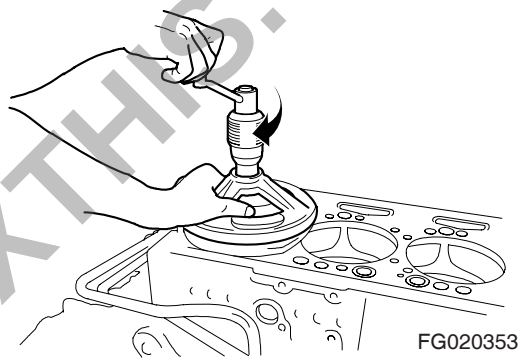


Figure 88

12. Move the cutter back towards the center of the cylinder bore by holding down the rapid feed ring at the same time as the cutter is moved back by hand.
13. Repeat steps 10-12 if insufficient cutting depth has been attained.
14. When the required depth has been attained, hold down the rapid feed ring and move the cutter to the middle of the cylinder bore. Change the switch on the milling cutter to position 2 and lift out the entire tool. Then remove setting ring.
15. Clean any swarf from the liner seat.
16. Position the shim on the liner seat. The shim must be dry.
17. Position the cylinder liner.
18. Measure to ensure that height corresponds to the height specified in the work description for measuring cylinder liner height.

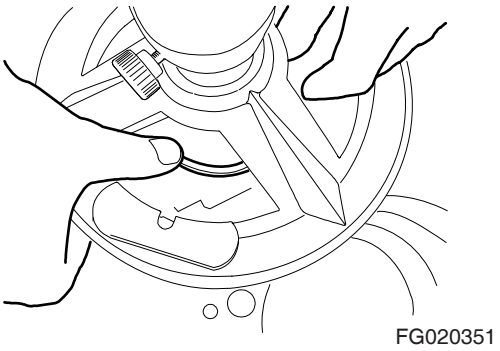


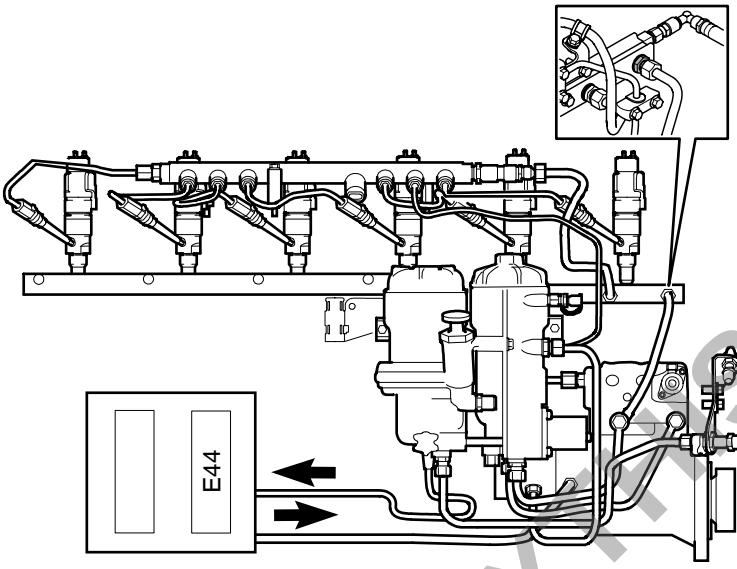
Figure 89

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Overflow Valve

Overflow Valve Location



FG020497

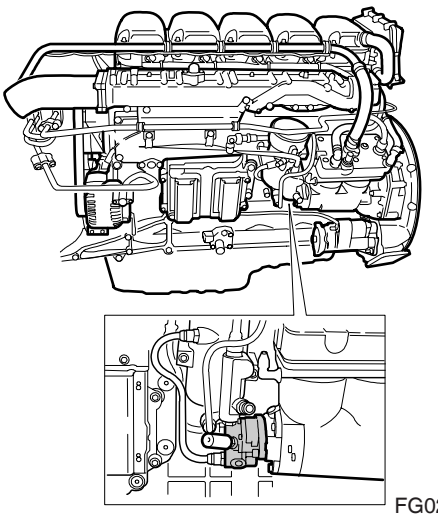
Figure 280

Feed Pump

Location

The position also applies to 11 and 12 liter engines.

The feed pump is located at the back of the compressor.



FG020558

Figure 281

Removing and Installing the Feed Pump

WARNING

AVOID DEATH OR SERIOUS INJURY

The fuel system has a very high fuel pressure of up to 3,000 bars (45,000 psi). The fuel system must be depressurized using SDP3 before any work is started.

Use SDP3 to minimize the high-pressure in the fuel system.

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

Wear protective gloves and goggles.

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5. Pull converter safety valve (1, Figure 12) out of housing hole.

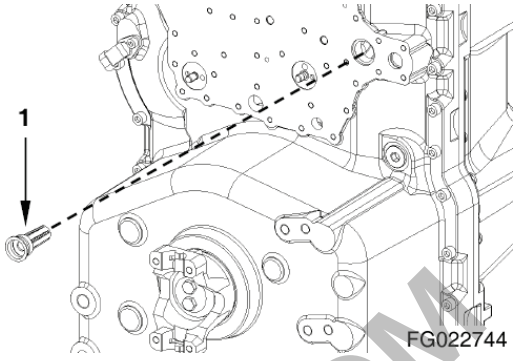


Figure 12

6. Mark installation position of wiring harness (1, Figure 13) towards valve block (2, Figure 13).

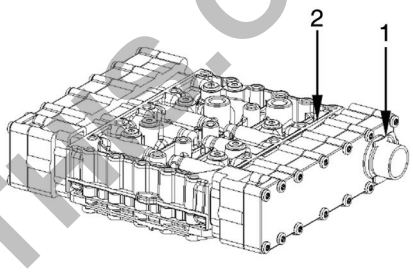


Figure 13

7. Loosen torx screws (1, Figure 14).

   (S) Socket wrench TX-27 5873 042 002

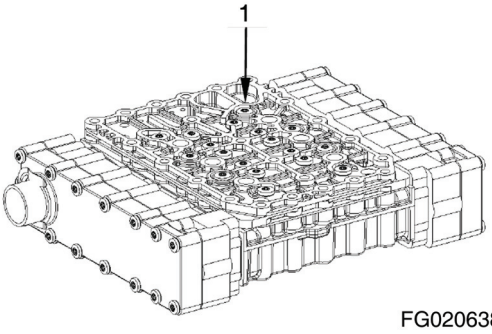


Figure 14

8. Separate duct plate (1, Figure 15) and sealing plate (2, Figure 15) from valve block (3, Figure 15).

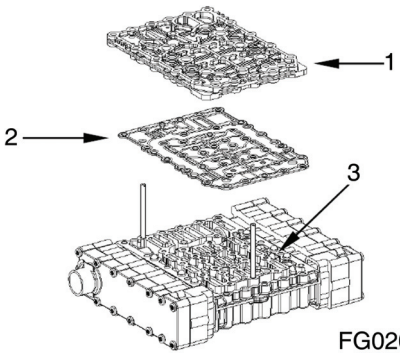


Figure 15

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5. Attach parking brake (1, Figure 365) on transmission housing using the hex. screw guide pin (2, Figure 365).

   Tightening torque (M20x1.5) M_A = 46 Nm

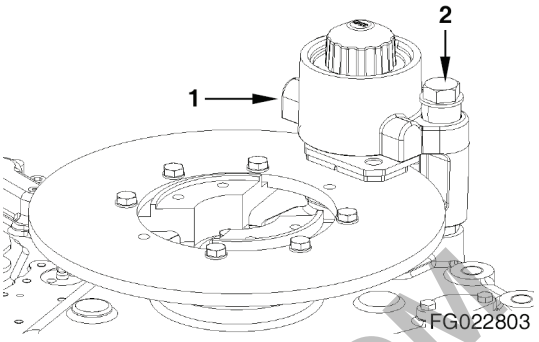


Figure 365

6. Install hex nut on brake caliper using the open-end wrench insert.

   Tightening torque (M20x1.5) M_A = 230 Nm

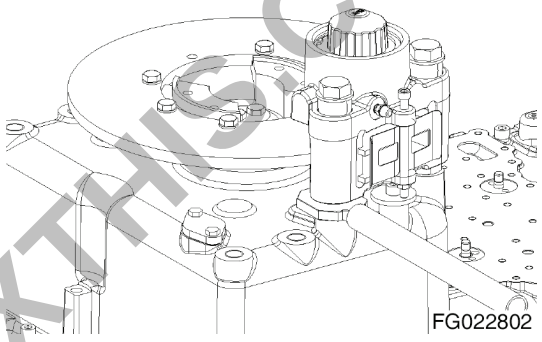


Figure 366

7. Insert setting gauge on both sides between base disk and brake disk and hold in its position.

   NOTE: *All installation, fitting and maintenance instructions, functional characteristics and setting specifications for the parking brake see original KNOTT documentation ("Parking Brake" on page -139).*

   Clearance: 0.5 – 1.5 mm
   Normal. clearance: 1.0 mm

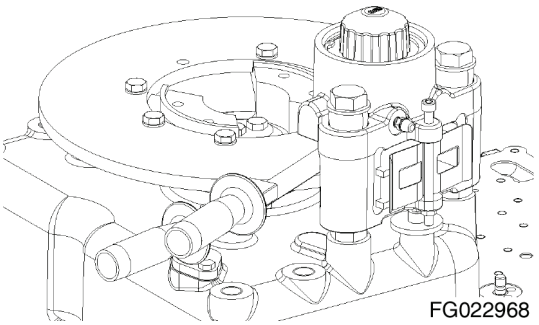


Figure 367

Output Flange on Output Side (Fordable Version):

1. Use driver (S, Figure 368) to mount 1st shaft seal 90x120x10 with the sealing lip showing to the oil sump (see arrow and Figure 370).

   NOTE: *Wet outer diameter (rubber coated) with spirit. (1st shaft seal and 2nd shaft seal)*

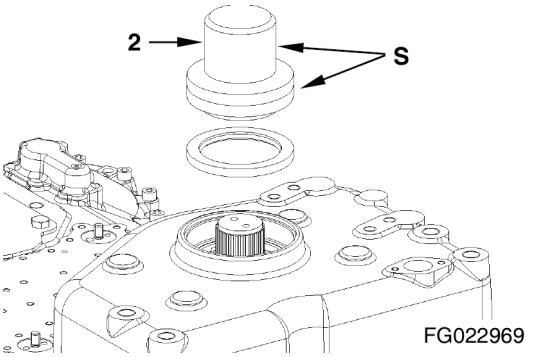


Figure 368

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5. Take off idler gear (1, Figure 149), remove needle cage (2, Figure 149) and axial bearing assy (3, Figure 149).

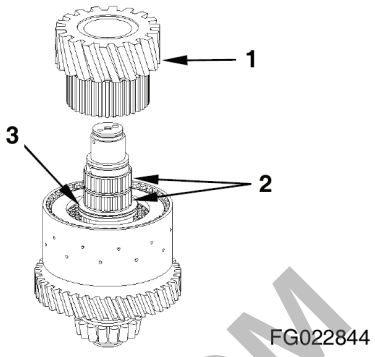


Figure 149

6. Pull clutch (1, Figure 150) off the shaft.

   NOTE: *Disassembly clutch (1,* Figure 150*) see Figure 153-Figure 158.*

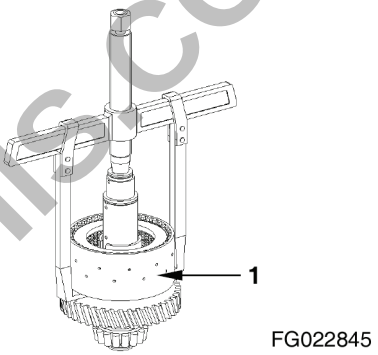


Figure 150

7. Turn shaft (2, Figure 151) by 180° and snap out piston ring (1, Figure 151).

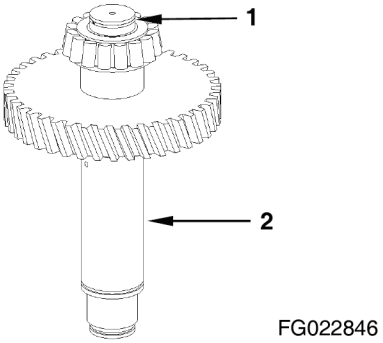


Figure 151

8. Pull tapered roller bearing (inner ring) off the shaft.

   (S) Forcing device 5870 026 100

   (S) Grab sleeve 5873 001 059

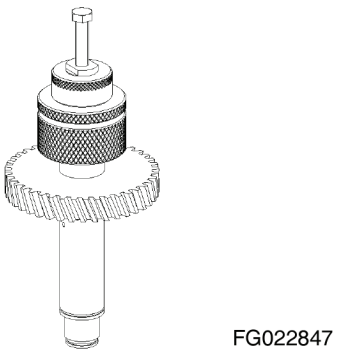


Figure 152

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10. Attach input flange (3, Figure 498) using washer (1, Figure 498) and hexagon screws (2, Figure 498).

    Tightening torque (M8/10.9x50) M_A = 34 Nm

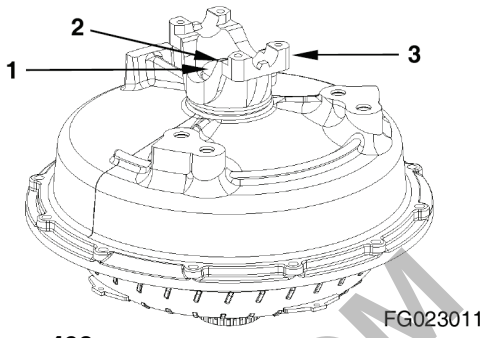


Figure 498

11. Position converter using lifting device until cover (1, Figure 499) is in contact with the converter bell housing (2, Figure 499).

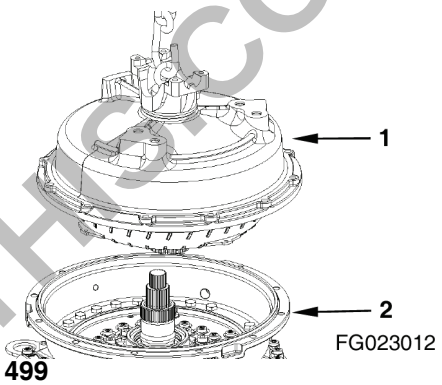


Figure 499

12. Bolt converter bell housing (1, Figure 500) to cover (2, Figure 500) using cylindrical screws and hexagon nuts.

    NOTE: *Pay attention to radial installation position, see markings done during disassembly (arrows).*

    Tightening torque (M10/8.8) M_A = 46 Nm

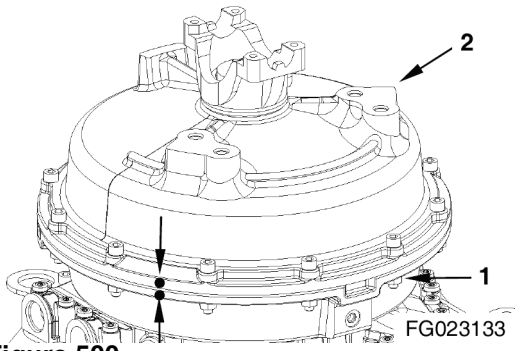


Figure 500

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3. Press piston (see arrow) out of the axle housing (Figure 36) using compressed air.

IMPORTANT

This operation is only necessary for the version with DHL.

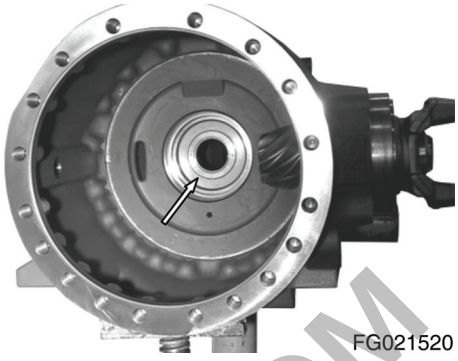


Figure 35

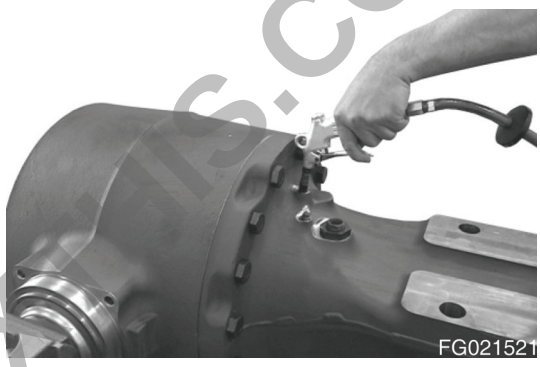


Figure 36

4. Heat slotted nut using hot air blower.

IMPORTANT

Slotted nut is secured with Loctite. (Type no.: 262)

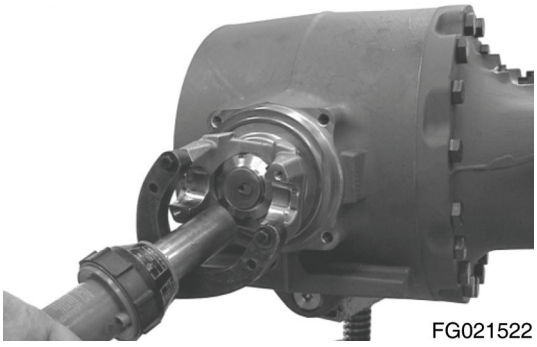


Figure 37

5. Loosen slotted nut and remove shim behind.

   (S) Slotted nut wrench 5870 401 139

   (S) Clamping device 5870 240 002

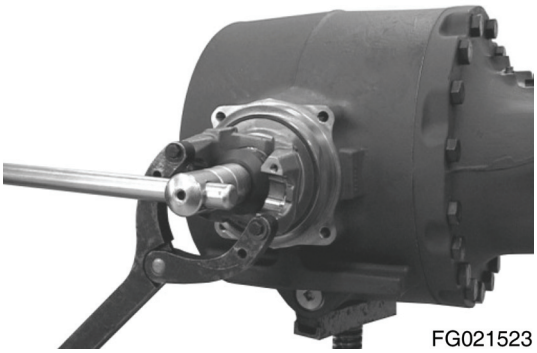


Figure 38

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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.

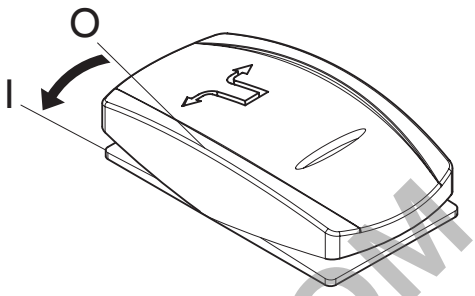
MODEL	SERIAL NUMBER RANGE
DL300-3	10001 and Up
DL350-3	10001 and Up

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Emergency Steering Function Test

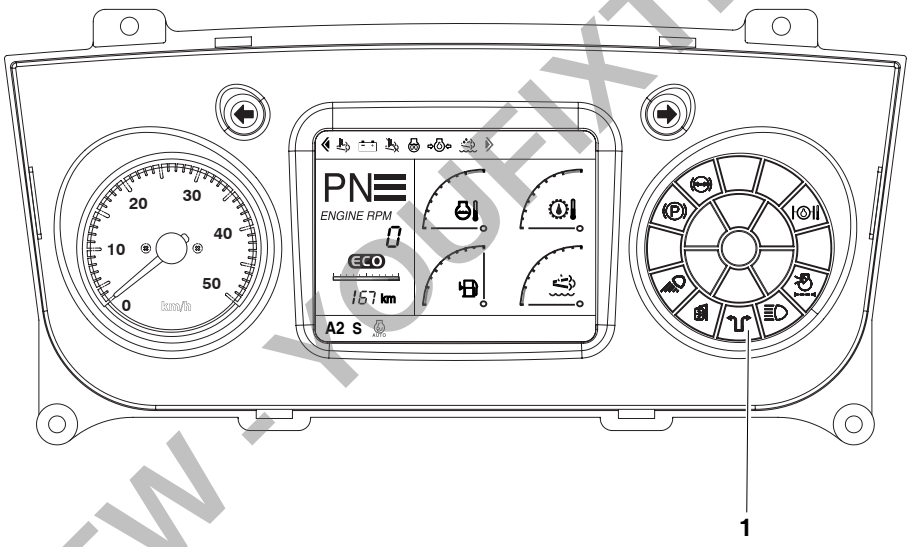
Emergency steering system function test is performed on a stationary machine with engine off. The starter switch must be in position I (ON). When test switch in the cabin is pressed, turn steering wheel at the same time. If system is functioning properly the machine should steer.



FG019225

Figure 3 TEST SWITCH

The secondary steering indicator light should turn "ON." Emergency steering indicator light (option) indicates that emergency steering pump starts (1).



FG020945

Figure 4

Emergency Steering Automatic Test

This is a system that checks pressure on the emergency steering line. If starter switch turn to I (ON) position, a emergency light on the front gauge panel light up about 3 seconds.

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SAFETY INSTRUCTIONS

WARNING

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APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DL300-3	10001 and Up
DL350-3	10001 and Up

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