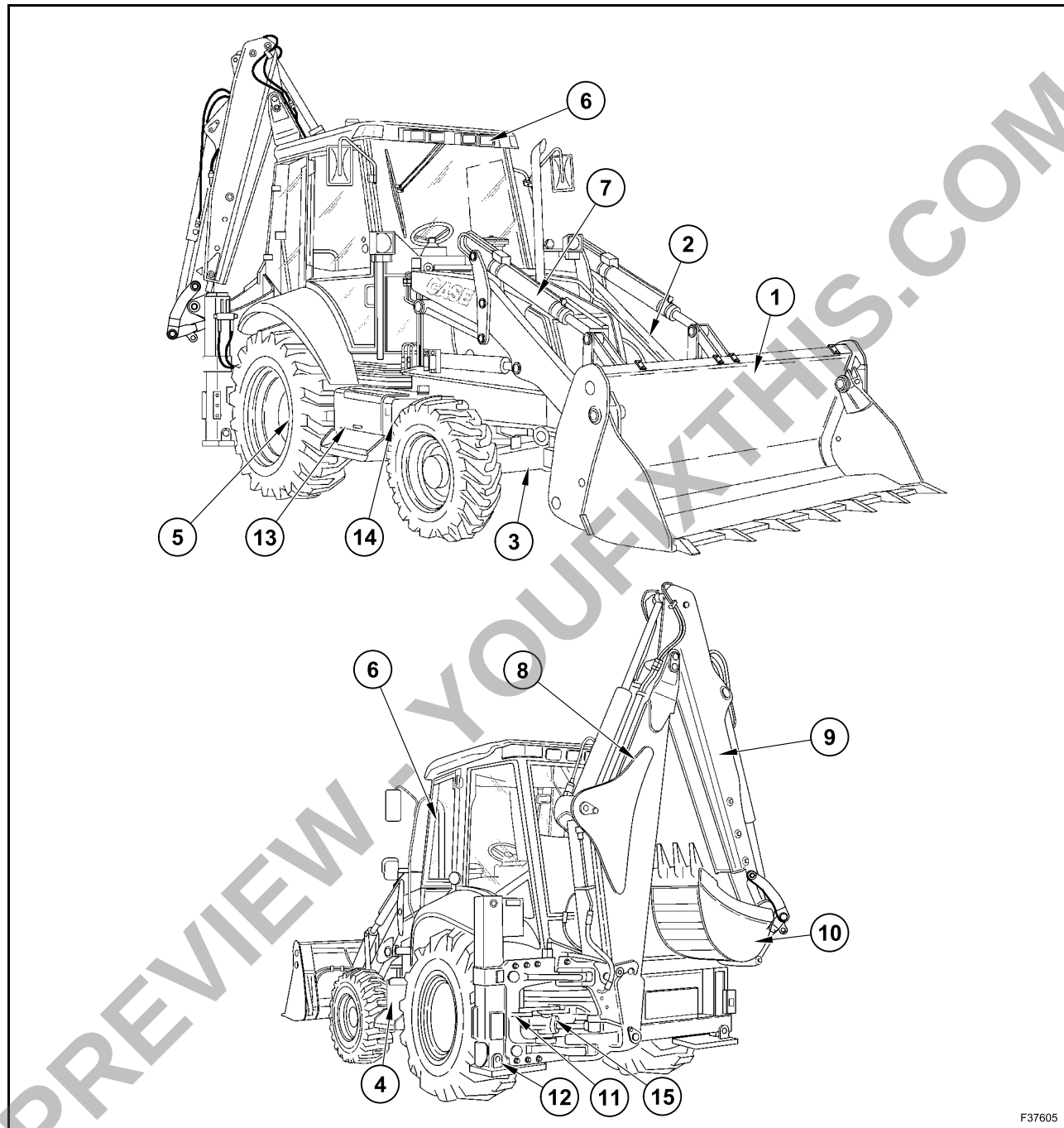


2. IDENTIFICATION OF MAIN COMPONENTS

SIDESHIFT VERSION (590SR for example)



F37605

- | | |
|----------------------------|---|
| 1. Loader bucket | 9. Dipper or telescopic dipper |
| 2. Loader arm | 10. Backhoe bucket |
| 3. Front axle | 11. Backhoe attachment sideshift carriage |
| 4. Fuel tank | 12. Stabilizers |
| 5. Rear axle | 13. Battery box |
| 6. Operator's compartment | 14. Hydraulic oil tank |
| 7. Engine guard | 15. Swing cylinders |
| 8. Backhoe attachment boom | |

1.2 SPECIFICATIONS

Torque converter ratio	2.38:1
Weight	17.4 kg
Torque of retaining screws for transmission	58 Nm
Torque of retaining screw for flywheel	41 Nm
Torque of screw for drive plate to the convertor	53 Nm
Torque of screw for drive plate to the flywheel	41 Nm

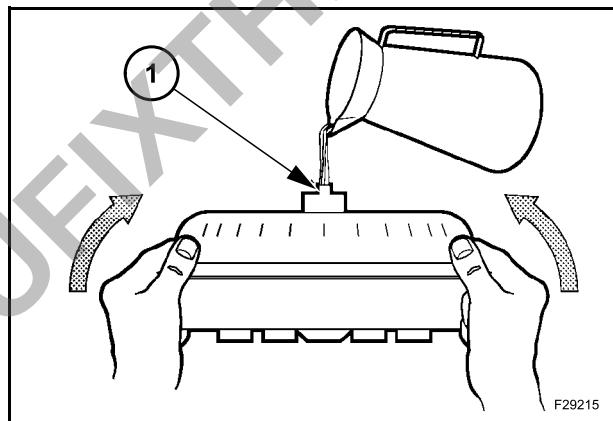
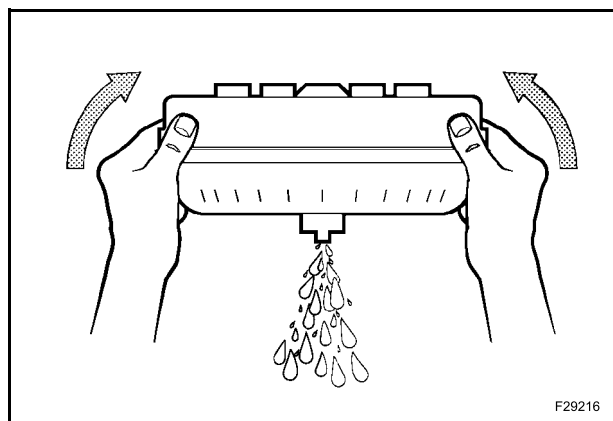
Hydraulic tests

Tachometer setting	2000 rpm
Test temperature, oil	80-85 °C
Cold start valve (for reference only)	26 bar
System pressure test	13.7-15.2 bar
Torque converter	7-11 bar

1.3 OVERHAUL

The torque converter, is a welded unit and cannot be disassembled. The only maintenance performed on the converter, other than the stall test, is cleaning and visual inspection. A commercial torque converter cleaner may be used to clean the converter. However, if a commercial cleaner is not available, the converter should be cleaned as outlined below.

- Drain as much oil as possible from the hub of the converter by tilting the converter in all directions.
- Fill the converter about half full, through the hub (1), with paraffin base solvent or any cleaning solvent specified for cleaning transmissions.
- Plug the opening in the hub, then circulate the solvent inside the converter by rotating and shaking.
- Drain the solvent from the converter.
- Repeat previous steps, as required, until the solvent that is drained from the converter is clean.



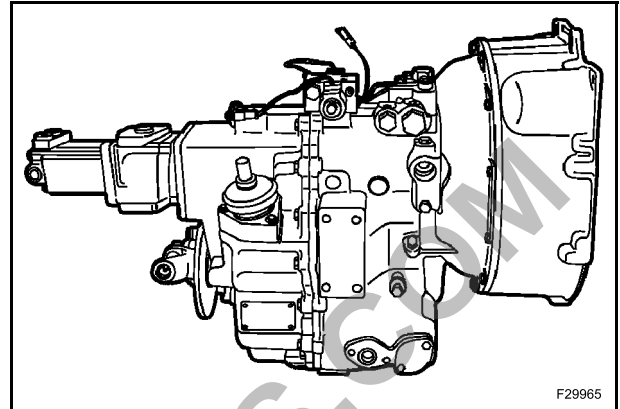
1.4 INSPECTION

Inspect the splines on the converter hub for wear or damage and the weld joints for cracks. If the hub is worn or damaged and/or the weld joints cracked, a new converter must be installed. A new drive plate should also be installed if it is warped.

1. POWERSHUTTLE TRANSMISSION “TURNER MODEL COM-T4-2025”

This transmission is used on powershuttle loader backhoe models 580SR / 580SR+ / 590SR.

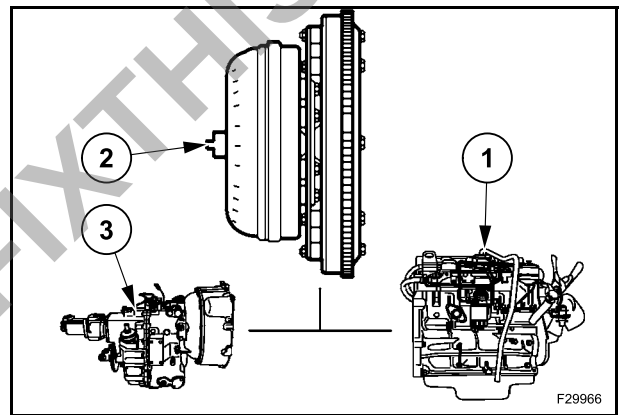
The transmission consists of a torque converter, an internal rotor-type hydraulic pump, an oil distributor, a solenoid control valve assembly, two hydraulically operated clutches, a 4-speed synchromesh geartrain, transmission case and oil cooler tubes.



F29965

NOTE: a conventional clutch is not used with this transmission.

The transmission case serves as an oil tank for the torque converter and hydraulic clutch assemblies. The transmission receives power from the engine (1) by a fluid coupling in the torque converter (2) and hydraulic clutch assemblies in the transmission (3).



F29966

1.1 SPECIFICATIONS

GEAR RATIO

Forward				Reverse			
1	2	3	4	1	2	3	4
4.824	2.998	1.408	0.792	4.020	2.496	1.173	0.660

COLD START BY-PASS VALVE SPRING

Free length..... 53.4 mm ± 0.96 mm

FORWARD CLUTCH SPRING

Free length..... 76.6 mm

CLUTCH PISTON SPRING

Free length..... 75.9 mm

DETENT SPRING

Free length (Approximately)..... 42.06 mm

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ELECTRICAL DIFFERENTIAL LOCKING OPERATION (Powershift)

⚠ WARNING

The differential lock fitted to this machine is operated by oil pressure and controlled by an electrically operated solenoid. The solenoid valve is energized by means of the button (1) mounted in the right control lever.

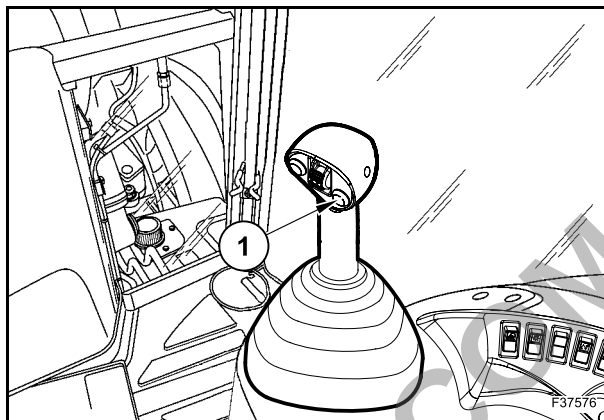
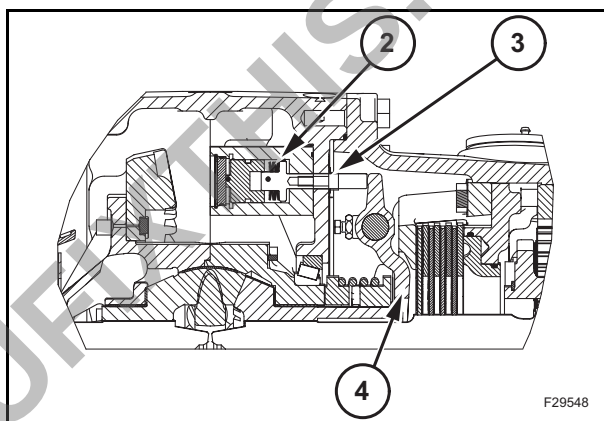
The differential lock effectively places both rear wheels into a direct drive when selected, this action stops one rear wheel spinning.

In conditions inducing wheel slip (differential lock not yet engaged), press down the differential lock switch and the lock will engage giving direct drive to both rear wheels.

The lock will remain engaged until either of the foot brakes are applied and the machine stops or by disengaging the switch. The warning lamp on the instrument panel will turn off when the differential lock has disengaged.

When selecting switch (1) on gauge cluster, the differential is activated with the oil pressure supplied by the transmission, which acts on piston (3) for differential locking.

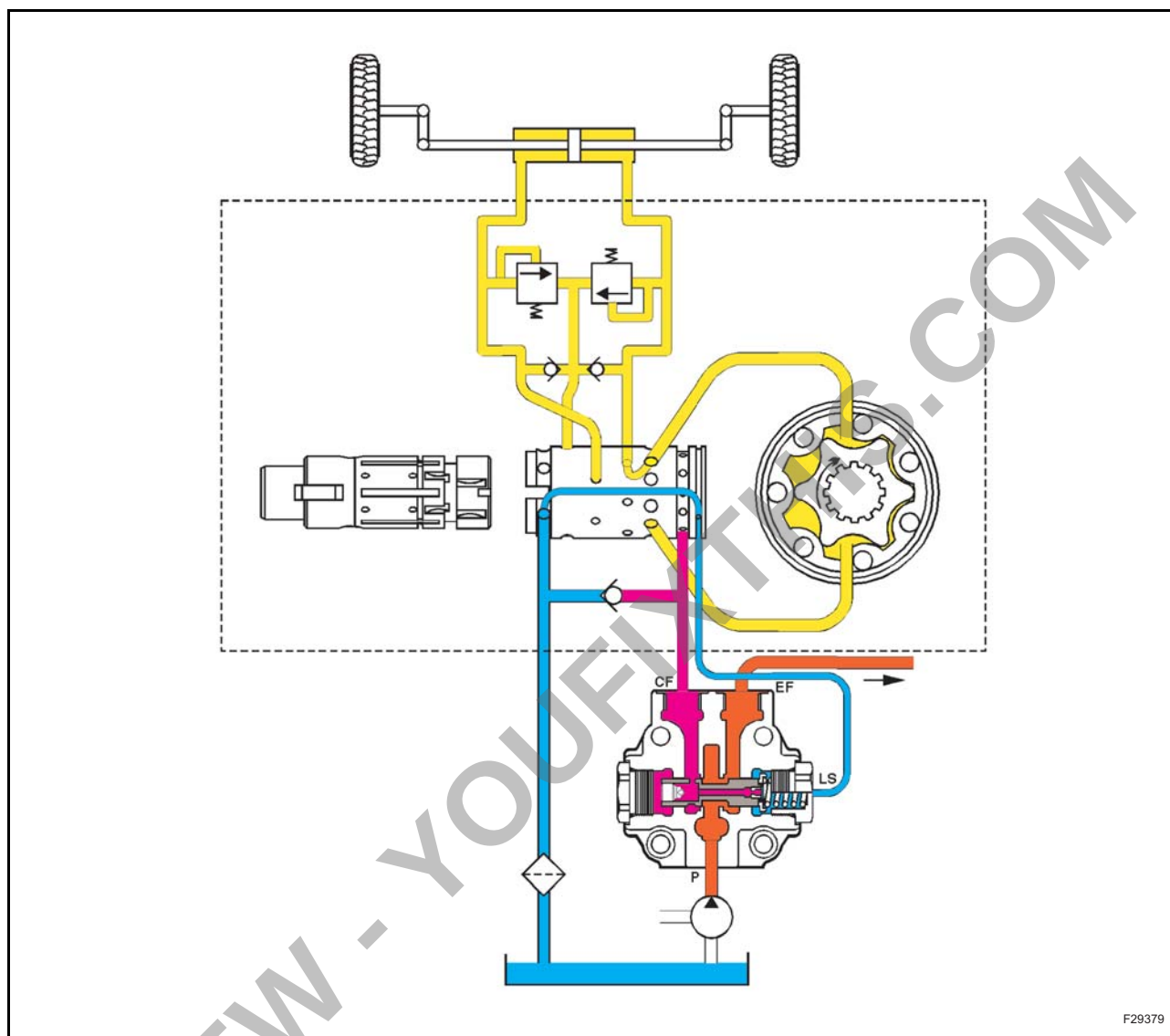
This oil under a pressure of 13-14 bar, always available when the engine is running, is controlled by a solenoid valve. When the switch is released (differential locking not necessary) oil is diverted to the filler of the level dipstick (discharged) and the piston spring (2) of the differential releases the locking (4).



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POWER STEERING - NEUTRAL

— Pump pressure
— Stand-by pressure

— Trapped oil
— Return to oil tank

When the steering wheel is held still, the leaf springs return and hold the power steering spool in the neutral position.

This ensures no more oil is supplied to the steering cylinder. The spool also traps the oil in the steering cylinder and allows oil in the sensing lines to return to tank therefore allowing the priority flow divider to move to the left.

1. SPECIFICATIONS

HEATING	
ENGINE RADIATOR COOLANT	
Antifreeze - Ambra Agriflu	12 litres
Water	12 litres
System type	Pressurized FULL FLOW by-pass with expansion chamber
FAN BELT DEFLECTION	
Naturally aspired	13 - 19 mm
Turbocharged	10 - 16 mm
THERMOSTAT	
Start to open at	82 °C
Fully open at	95 °C
Radiator cap	0.90 bar
TORQUE VALUES	
Coolant/hot water hose connections	5 Nm
Air hose ducting connections	5 Nm
Heater housing to floor mounting bolts	6.2 Nm
REFRIGERANT	
Refrigerant	HFC 134a
Refrigerant charge	1.2 kg
Compressor oil	SP20 (PAG Type, Viscosity index 100)
Oil change amount	135 cc
CHECK CONDITIONS	
Air inlet temperature	37.8 °C
Rated air inlet moisture	40%
Evaporation temperature	0 °C
Overheating	5 °C
Inlet air speed	1.0 - 2.0 - 3.0 m/s
Condensation temperature	58 °C (absolute 16 bar)
Undercooling	2 °C

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1. LOADER ATTACHMENT CONTROLS

WITH STANDARD LOADER BUCKET

Located on the right of the steering wheel, this nine position lever operates all the loader attachment controls. The speed of movement of each control depends on the angle to which the lever is tilted. In the intermediate position, two movements can be obtained simultaneously.

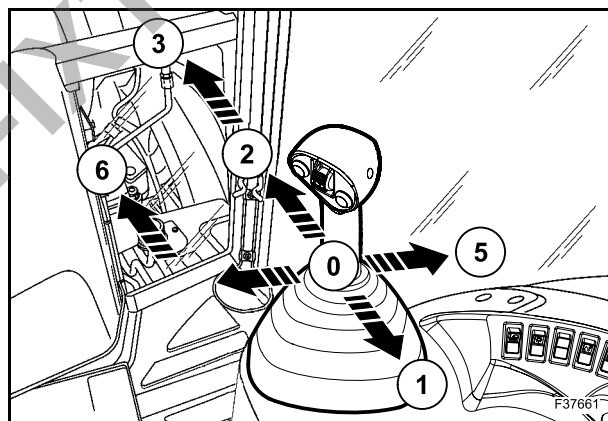
WITH 4x1 LOADER BUCKET

The function of the lever is identical to that of the machine fitted with the standard loader bucket, with the addition of the clam control.

1.1 LOADER ATTACHMENT OPERATION

NEUTRAL AND HOLD

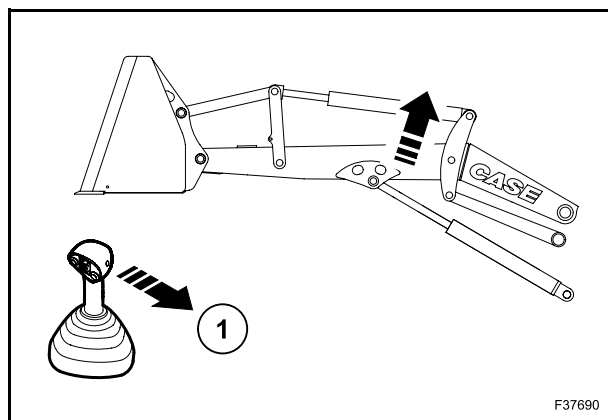
With the lever in the neutral/hold position (0), the attachment movement can be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



1

RAISING THE LOADER ATTACHMENT

With the lever in position (1), the attachment rises.



2

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PREVENT ACCIDENTS

The majority of accidents and injuries which occur in industry, on the farm, at home or on the road, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason **MOST ACCIDENTS CAN BE PREVENTED** by recognizing the real cause and taking the necessary precautions, before the accident occurs.

Regardless of the care used in design and construction of any type of equipment, there may be conditions that cannot be completely safeguarded against, without interfering with reasonable accessibility and efficient operation.

A careful operator and / or technician is the best insurance against accidents. The complete observance of one simple rule would prevent many thousands of serious injuries each year.

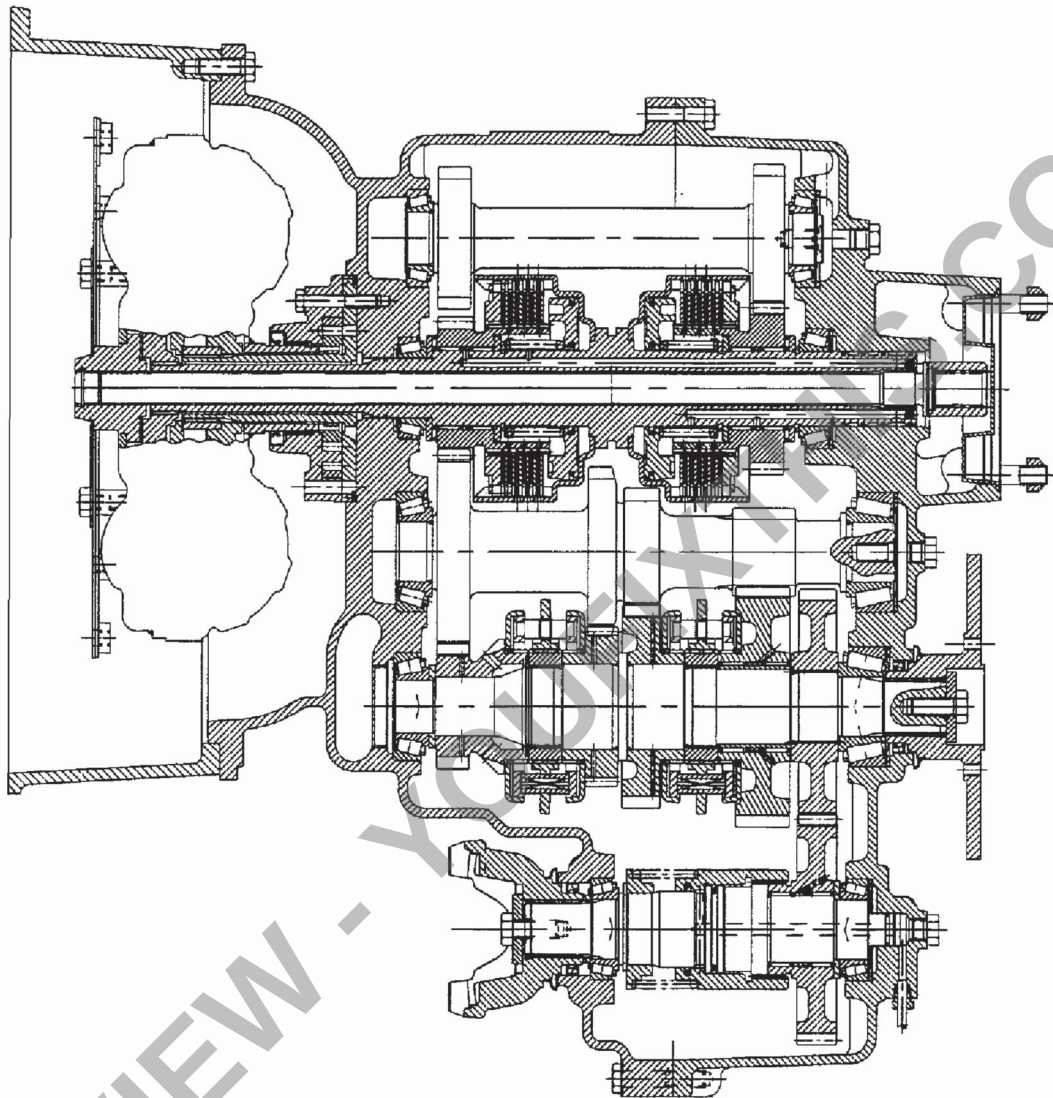
This rule is: never attempt to clean, lubricate or adjust a machine while it is in motion.

WARNING

Before carrying out any maintenance operation, adjustment and or repair on machines equipped with attachments, controlled hydraulically or mechanically, make sure that the attachment is lowered and safely set on the ground. If it is necessary to have the equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the hydraulic lift cylinders, cable and /or mechanical device used for controlling the equipment.

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1.9 TRANSMISSION 4WD COMPONENTS

F27512

THE RANGE CLUTCHES

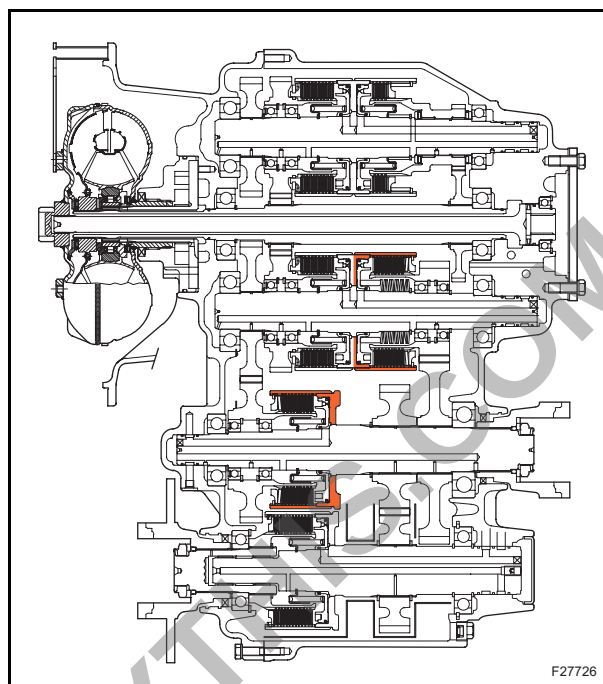
Once a directional clutch is engaged power is transmitted to the range clutches (1st or 2nd).

Operation and actuation of the range clutches is similar as the directional clutches.

The engagement of the range clutches is also modulated to enable a smooth engagement.

The modulation of these clutches is achieved by means of a restrictor valve fitted in the control valve and controlled electronically. It also limits the oil flow to the clutch during shifts.

In the clutch itself the plate before the end plates is dished to build up the clamping force of the clutch gradually.



F27726

■ The range clutches

THE OUTPUT SECTION

With a range clutch engaged power is finally transmitted to the output shafts.

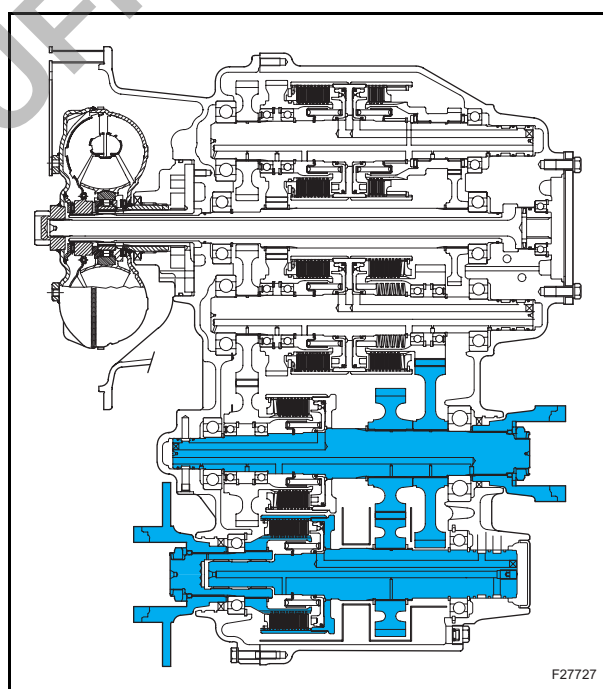
The transmission can have an upper output or lower output at the rear side of the unit, and a lower output at the front side. The rotation of the rear upper output is opposite to the engine rotation when forward travel is selected. The rotation of the rear lower output and of the front output is the same as the engine rotation when forward travel is selected.

Ratio between upper and lower output is 0.951:1.

The lower front output has an axle disconnect clutch to enable 4WD.

The clutch is similar as the other clutches except that it has no modulation.

The disconnect is controlled electronically. Without an electrical signal the clutch is always engaged.



F27727

■ The output section

Remove the spring retainer snap ring.



Remove the clutch piston spring retainer.



Remove the clutch piston spring.



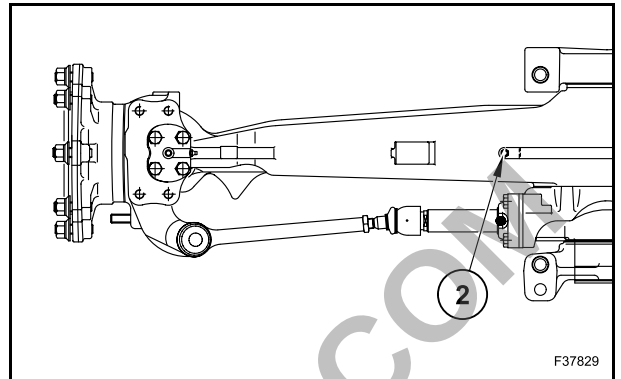
Remove the clutch piston wear plate.



Before draining the oil from axle housing, use the breather (2) to release possible internal pressure.

⚠ WARNING

Risk of violent oil ejection.



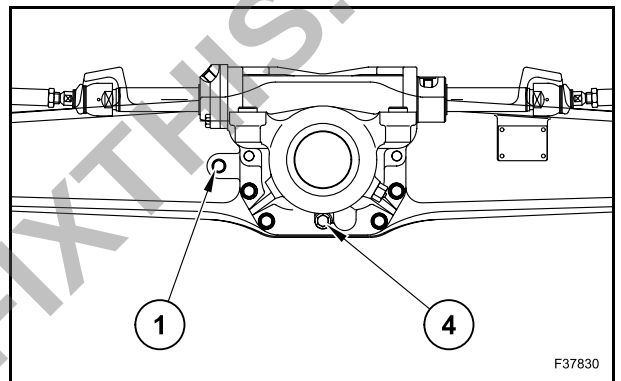
To drain the oil remove the level plug (1) and the drain plug (4).

⚠ WARNING

Risk of violent oil ejection.

Drain all oil.

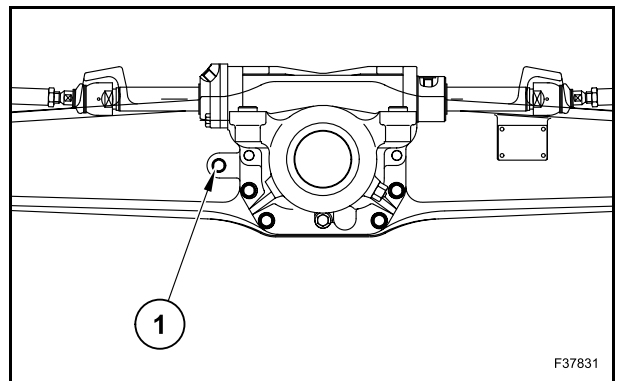
Clean the drain plug (4) and tighten to the requested torque.



Always use the oil breather (2) to release possible internal pressure.

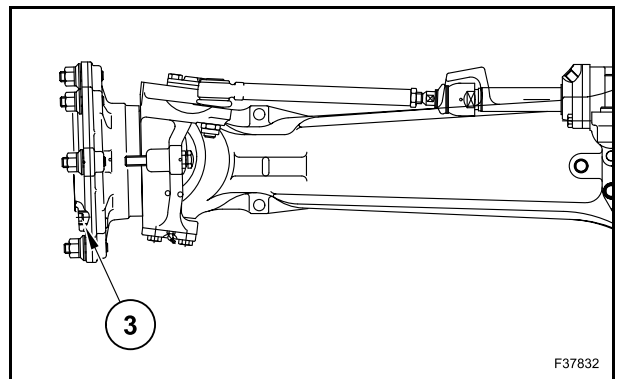
Unscrew the level plug (1) and fill to the bottom of the level plug hole with the specified oil.

Wait to allow the oil to flow through the axle. Check oil level and fill to the specified level if necessary. Screw the level plug (1) to the prescribed torque.

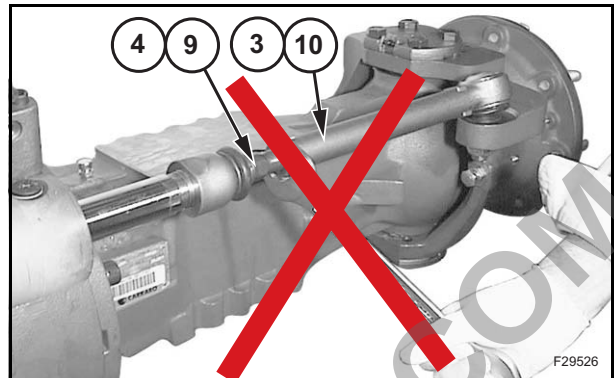


Before draining the oil from the wheel hub, rotate it so that the plug (3) is in the lowest possible position and partially unscrew the plug to release any possible internal pressure.

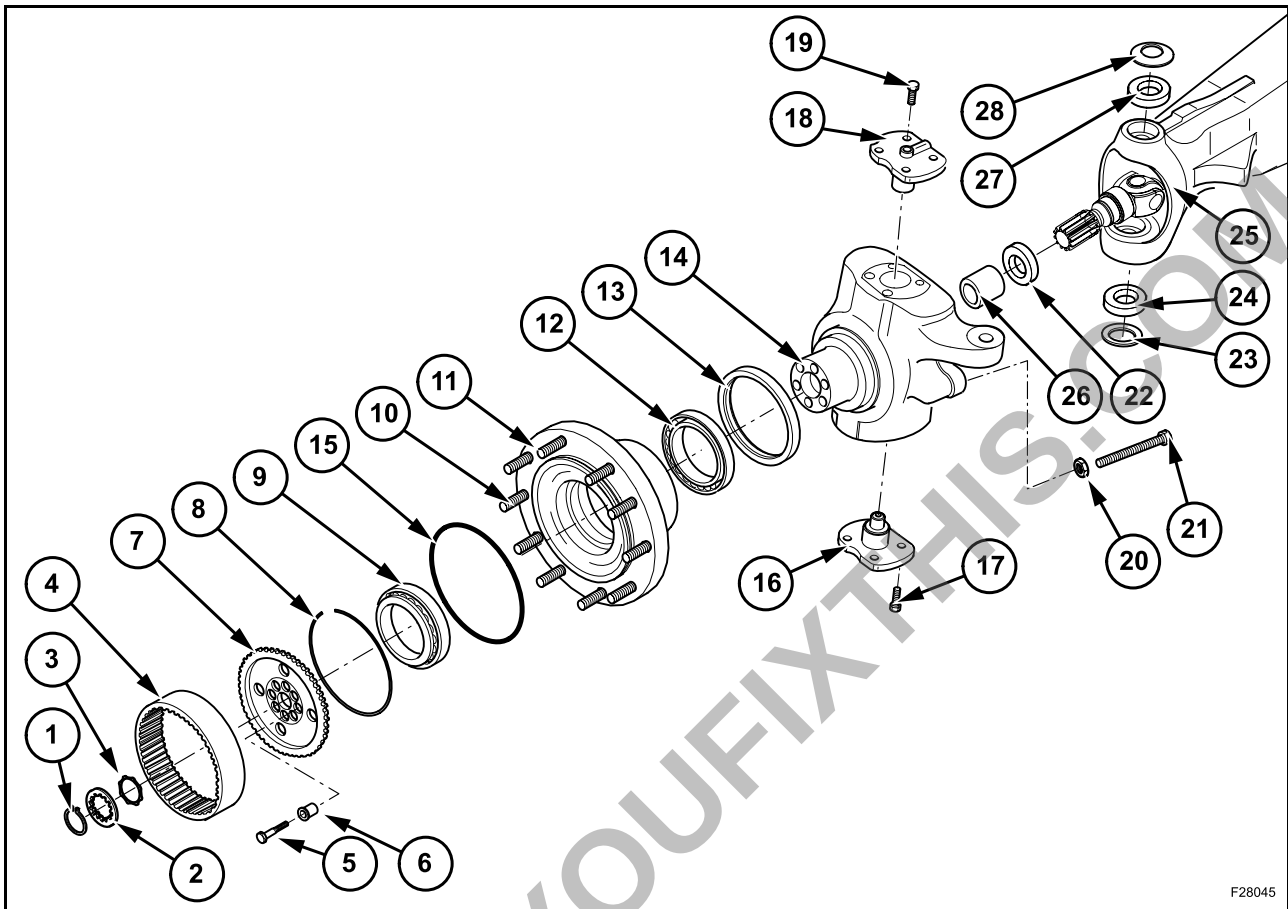
Remove the plug and drain the oil.



Screw the locknuts (4) and (9) of the tie rods (3) and (10) only when the toe-in adjustment has been carried out.



WHEEL HUB



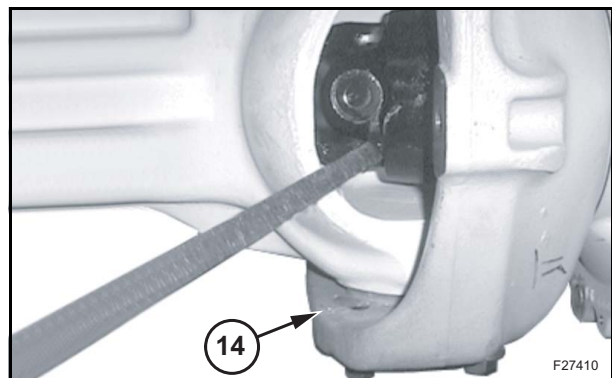
F28045

Disassembly

Insert a lever between the swivel housing (14) and the axle shaft and fit into the cardan shaft. With the lever, push the cardan shaft in the direction of the wheel hub to allow the removal of the snap ring.

⚠ WARNING

Do not damage the cardan shaft.



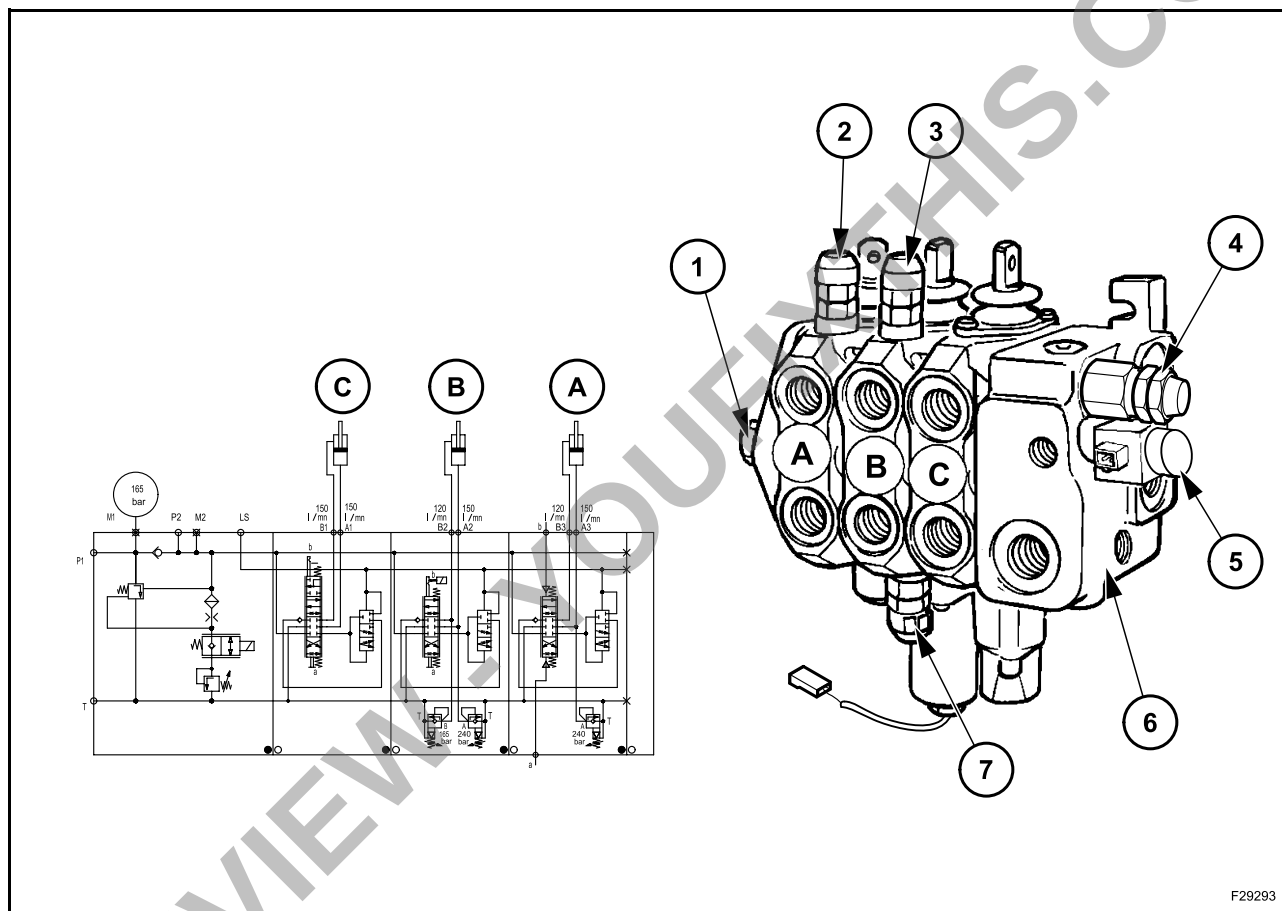
F27410

LOADER CONTROL VALVE

The loader control valve is mounted on the right side of the machine adjacent to the pump. The valve assembly consists of two or three spool operated sections:

- Loader lifting
- Loader bucket
- 4x1 loader bucket

Usually the loader control valve has three valve sections when is installed on the loader backhoe the 4x1 bucket.



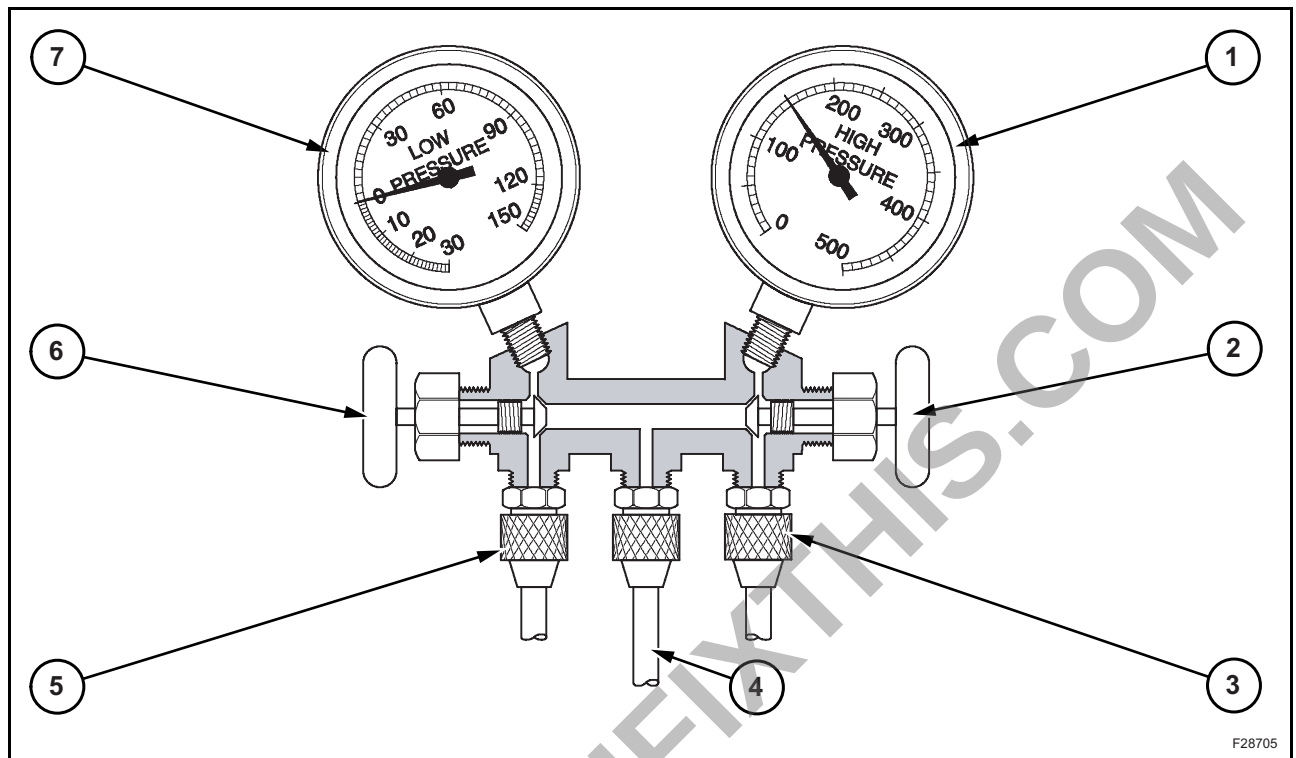
- A. 4x1 loader bucket section
- B. Loader bucket section
- C. Lifting section
- 1. End cover
- 2. 4x1 loader bucket relief valve
- 3. Loader bucket relief valve (rod end) 240 bar
- 4. Hydraulic speed relief valve 165 bar
- 5. Hydraulic speed solenoid
- 6. Inlet section
- 7. Loader bucket relief valve (piston end) 165 bar

BACKHOE

Refer to the following backhoe fault finding chart after first considering the preceding charts. This chart should only be referred to if the supply system is operating normally, thereby confirming that the hydraulic supply systems and the pump are correctly operating. See also "Fault finding hydraulic pump".

PROBLEM	CAUSE	CORRECTION
The lifting system is inoperative, is too slow, loses power or does not hold	Lifting system relief valve stuck open, set too low or seat leaking Valve spool leakage Piston seals leaking or cylinder barrel damaged	Test the pressure of the lifting system relief valve. Examine lift section of backhoe control valve assembly for wear and scoring. Examine/reseal piston and gland.
The digging control fails to operate, is slow or loses power	Digging system relief valve (piston end) stuck open, set too low or seat leaking Valve spool leakage Piston seals leaking or cylinder barrel damaged	Test the pressure of the digging system relief valve. Examine digging section of backhoe control valve assembly for wear and scoring. Examine/reseal piston and gland.
The digging control fails to operate, is slow or loses power	Bucket circuit relief valve (rod end) stuck open, set too low, or seat is leaking Valve spool leakage Piston seals leaking or cylinder barrel damaged	Test the pressure of the bucket relief valve. Examine bucket section of backhoe control valve assembly for wear and scoring. Examine/reseal piston and gland.
The telescopic dipper fails to operate, is slow or loses power	The telescopic dipper system relief valve (piston end) is stuck open, set to a too low value or there is a leak in the seat Valve spool leakage Piston seals leaking or cylinder barrel damaged	Test the pressure of the telescopic dipper relief valve. Examine telescopic dipper section of backhoe control valve assembly for wear and scoring. Examine/reseal piston and gland.
Stabilizer pads leaking	Stabilizer safety valve leaking Piston seals leaking or cylinder barrel damaged	Inspect and overhaul the stabilizer safety valve. Examine/reseal piston and gland.

PERFORMANCE TEST EXAMPLE 8



Performance Test Example 8

1. High side low
2. High side hand valve closed
3. High side hose connected to high side service connector
4. Not used
5. Low side hose connected to low side service connector
6. Low side hand valve closed
7. Low side low

PROBLEM

Insufficient cooling.

CAUSE

Improper operation of thermostatic expansion valve (stuck open).

CONDITIONS*

Low side pressure too low (zero or vacuum). Gauge should read 1-2 bar.

High side pressure low. Gauge should read 13.3-14.8 bar.

Evaporator air cool, but not sufficiently cold.

Evaporator inlet pipe surface shows considerable moisture or frost.

Low pressure switch cutting out.

CORRECTIVE PROCEDURES

1. Place finger on expansion valve to evaporator tube. If too cold to touch, proceed as follows:
Operate the system at maximum cooling.

Check the low side gauge. The pressure should lower slowly.

2. If the procedure outlined in Step 1 shows that the expansion valve is defective, proceed as follows:
Discharge the system.
Replace the expansion valve.
Evacuate the system.
Charge the system.
Performance test the system.

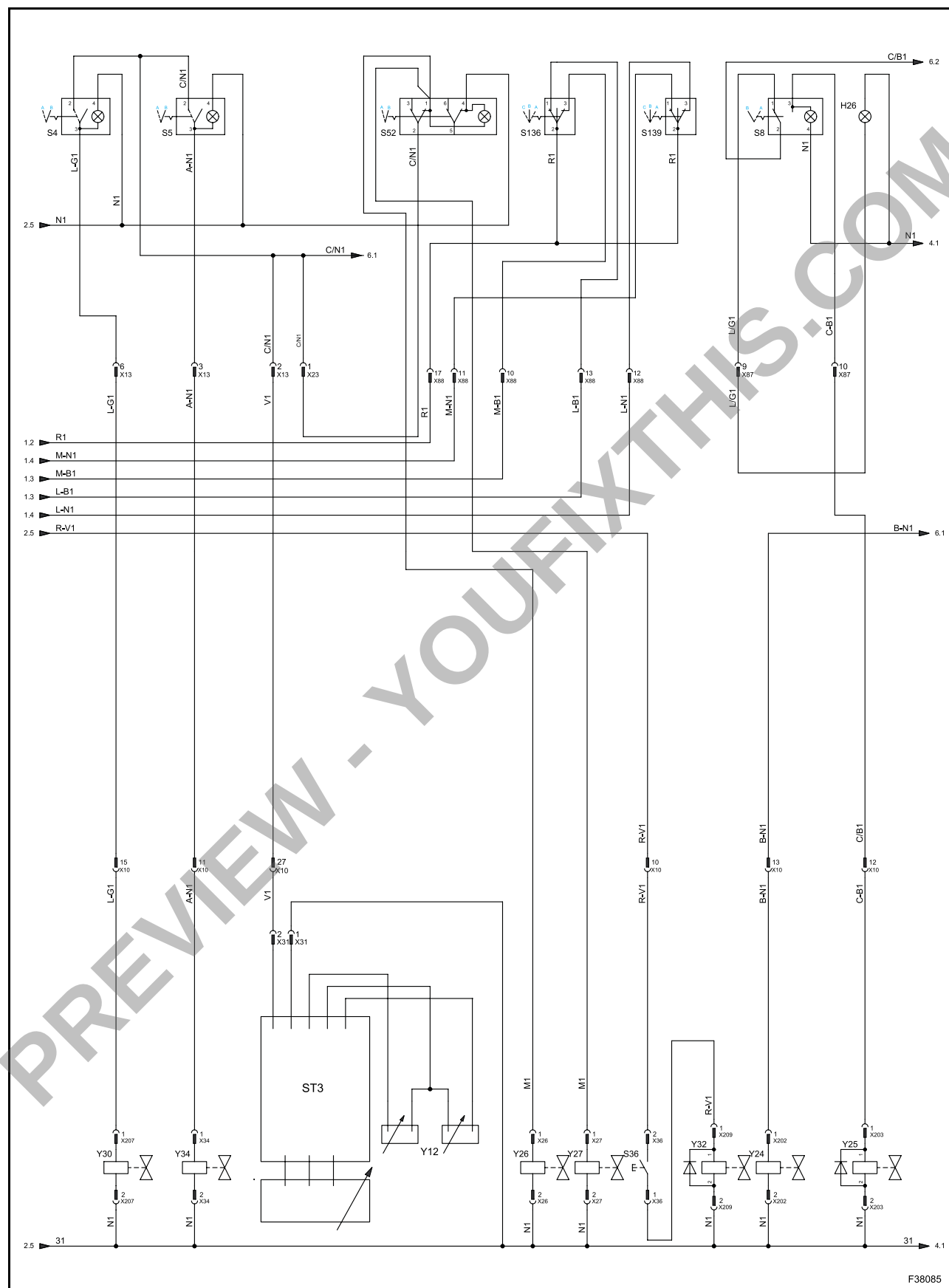
DIAGNOSIS

Expansion valve is not permitting a sufficient flow of refrigerant. May be caused by valve stuck in restricted or closed position.

NOTE: * test procedure based upon ambient temperature of 35 °C.

For proper high side gauge reading for other ambient temperatures, refer to the pressure temperature chart.

SOLENOID VALVE LINE DIAGRAM



6.5 PRELIMINARY CHECK AND TESTS

To prevent damage to components of the alternator charging circuit, the following precautions must be taken during maintenance:

- NEVER connect or disconnect a charging circuit connection, including the battery, when the motor is running.
- NEVER dead short to ground any component of the charging circuit.
- ALWAYS disconnect the ground cable from the battery (negative) to recharge the battery on the vehicle using a battery charger.
- ALWAYS respect the polarity when connecting the battery on the vehicle or when connecting an auxiliary starter battery to the motor.

IMPORTANT: connect the positive cable to the positive terminal and the negative cable to the negative terminal.

PRELIMINARY CHECKS

Before undertaking an electrical inspection, check the charging circuit and the electrical circuit carefully. Check the state of cables and the tightening of connections.

Checking the battery

Check each cell of the battery with a hydrometer. The battery must be charged at least 70% and be in good condition.

Checking the drive belt

Check that the belt and the pulley of the alternator are clean, without any trace of oil and grease and that they are in good condition.

Checking the indicator lamp

Turn the ignition key and check that the charge indicator is well lit.

If it is not fully lighted, check its bulb. If the bulb is OK, check the alternator wire connections as described in the "Preliminary tests" section below.

If the indicator lamp is lighted, start the motor and run it at a speed that is higher than the idling speed. The indicator lamp must turn off.

If the indicator lamp does not turn off, turn off the motor and disconnect the ground cable L. If the indicator lamp goes out, an alternator component is defective. Follow the instructions given in the "Checking the alternator components" section below.

If the indicator lamp stays lighted, look for a dead short to ground between the terminal "L" cable and the indicator lamp.

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