SAFETY RULES

Generalities

- Carefully follow specified repair and maintenance procedures.

- Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get caught on moving parts. Use approved safety clothing such as anti–slipping footwear, gloves, safety goggles, helmets, etc.

- Wear safety glasses with side guards when cleaning parts using compressed air.

- Damaged or frayed wires and chains are unreliable. Do not use them for lifting or towing.

- Wear suitable protection such as approved eye protection, helmets, special clothing, gloves and footwear whenever welding. All persons standing in the vacinity of the welding process should wear approved eye protection. **NEVER LOOK AT THE WELDING ARC IF YOUR EYES ARE NOT SUITABLY PROTECTED.**

- Never carry out any repair on the machine if someone is sitting on the operator's seat, except if they are qualified operators assisting in the operation to be carried out.

- Never operate the machine or use attachments from a place other than sitting at the operator's seat or at the side of the machine when operating the fender switches.

- Never carry out any operation on the machine when the engine is running, except when specifically indicated. Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.

- All repair and maintenance operations should be carried out with the greatest care and attention.
- Disconnect the batteries and label all controls to warn that the tractor is being serviced. Block the machine and all equipment which should be raised.
- Never check or fill fuel tanks or batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
- The fuel filling gun should always remain in contact with the filler neck. Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity build–up.
- To transfer a failed tractor, use a trailer or a low loading platform trolley if available.
- To load and unload the machine from the transportation means, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or trailer platform and block wheels as required by the transporter.
- Always use lifting equipment of appropriate capacity to lift or move heavy components.
- Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stand near the fastening point.
- The working area should be always kept CLEAN and DRY. Immediately clean any spillage of water or oil.
- Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non–flammable non–toxic proprietary solvents.

- Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container.

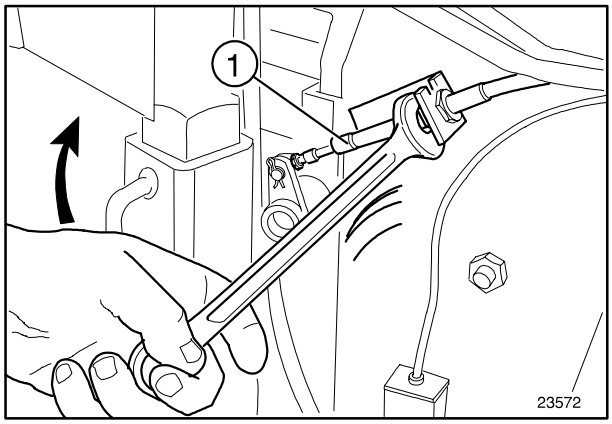
TEST PLAN – TM115 7.5 litre (456 cu in.)

BOSCH VE DISTRIBUTOR TYPE FUEL INJECTION PUMP WITH ELECTRICAL FUEL SHUT–OFF (12mm diameter plunger , 3.2mm lift)

PUMP NH NUMBER: 87801834 TYPE NUMBER: 0 460 426 303 SHEET 1 of 1

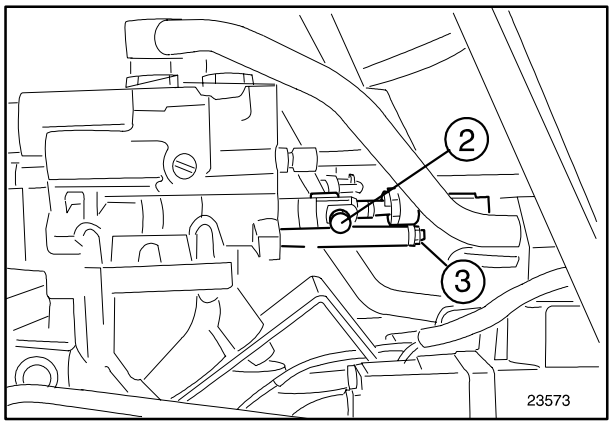
Test No.	Test Description	Pump rpm	Strokes	Overcheck
1	Return fuel	1100	–	58.0 ± 1.0 l/hr
2	Timing piston travel	900	–	2.1 ± 0.7mm
		650	–	0.9 ± 0.6mm
3	Start fuel	100	1000	90.0 cc min.
		350	1000	90.0 cc max.
4	Full load fuel			
	a) Rated speed	1100	1000	65.8 ± 3.0 cc
	b) Peak torque	800	1000	77.0 ± 3.0 cc
	c) Port to port variation	–	1000	6.0 cc max.
5	Hydraulic torque control	600	1000	71.3 ±3.5 cc
6	Governor breakaway	1150	1000	52.0 ± 10.0 cc
7	Low idle fuel	375	1000	20.0 ± 5.0 cc
8	Fuel shutoff solenoid	375	1000	1.5 ± 1.5 cc
9	Static timing lock plunger lift on port “B”	–	–	1.30 ± 0.06mm
10	Test stand equipment			
	a) Bosch nozzle 1 688 901 110 at 250–253 bar nozzle opening pressure			
	b) High pressure pipes – 840mm long with 2.0mm diameter and 6.00mm O.D.			
	c) Fuel gallery inlet pressure 0.3–0.4 bar			
	d) Calibrating fluid – ISO 4113 at 44° – 46°C outlet temperature			

27. Loosen the locknut, slide out the cotter pin and detach the PTO control cable (1).



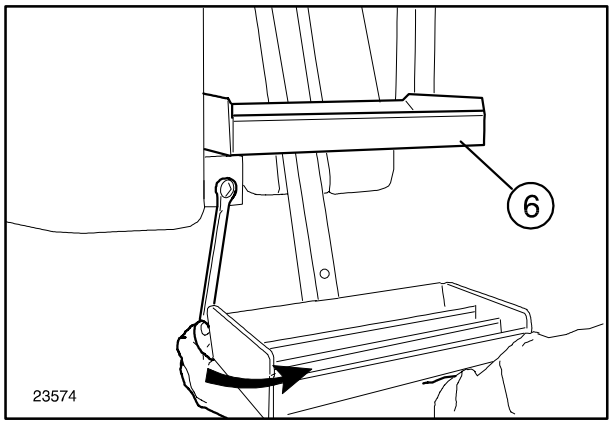
24

28. Remove pins (2), loosen the retaining screws (3) and detach the auxiliary valve control cables, right hand side.
29. If auxiliary valves are fitted also on left hand side, repeat step 28 for left hand side auxiliary valves.



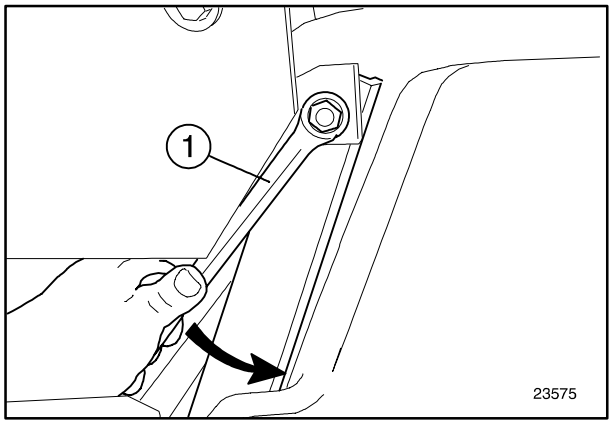
25

30. Loosen the screw attaching steps (6) to the bracket.



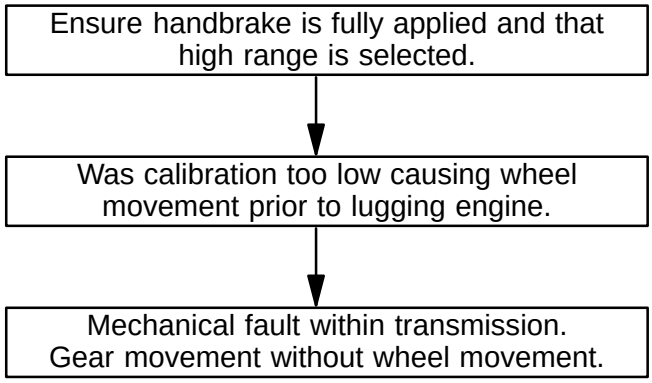
26

31. Loosen the screw attaching steps (1) to the cab platform.
32. Repeat steps 30 and 31 on opposite side and remove steps.

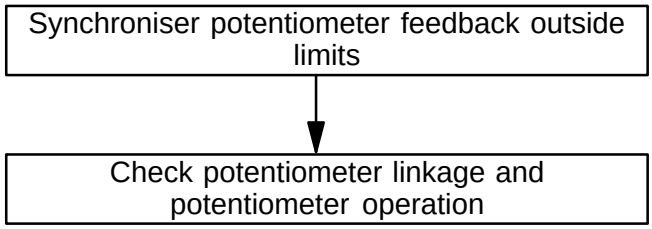


27

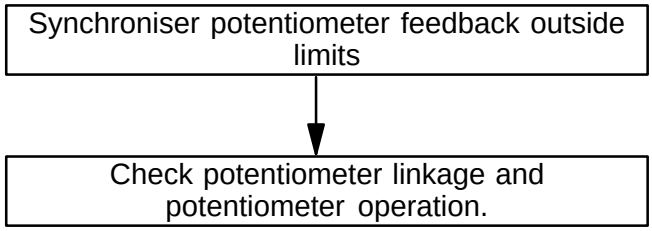
U31 – WHEEL MOTION DETECTED DURING CALIBRATION



U37 – SYNCHRONISER SHUTTLE (REVERSE) MODE CALIBRATION



U38 – SYNCHRONISER HI–LO (FORWARD) MODE CALIBRATION



"N" and "CP can result from improper action by the driver, or they can result from faults in the system which require action from the driver to re-start operation.

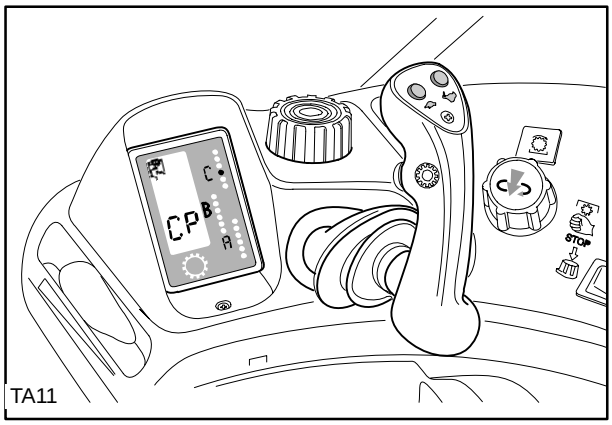
8. Normal error display mode:

   If there are any disabling errors, only disabling errors will be displayed.

   If there are no disabling errors and at least one "N" error is active, "N" will flash.

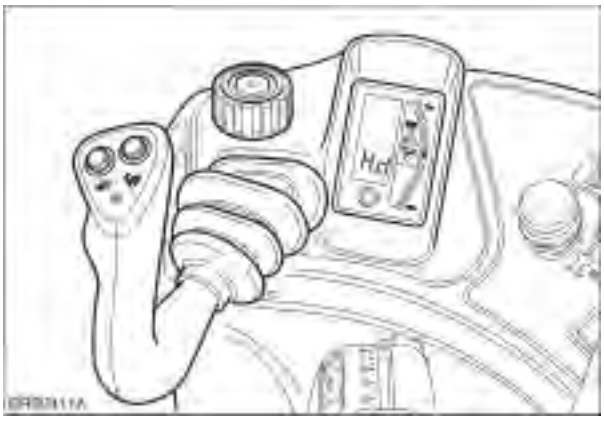
   If there are no disabling errors and no "N" errors, and at least one "CP" error is active, "CP" will flash.

   Hidden errors will not be displayed.



141

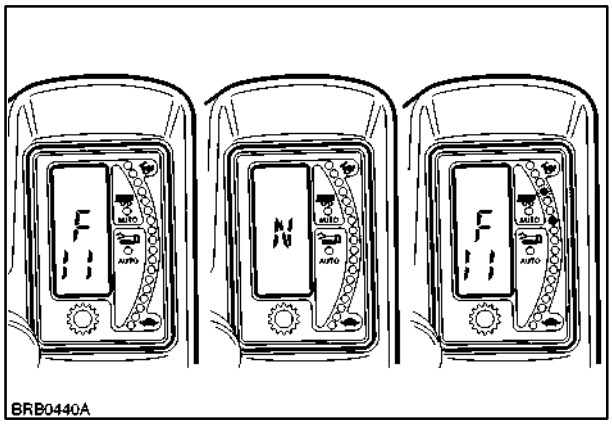
9. Hd in the diagnostic menu will enable "display all errors" mode. Also, a new module (or an old module after the memory has been reset using H8) will automatically be in "display all errors" mode until there are no errors to display for 6 minutes. The six minutes must be during one power-on cycle, i.e. turning off the key switch zeros the timer.



142

   If there are any disabling errors. ALL errors will be displayed sequentially. "N" and "CP" will not be displayed; instead, the error codes associated with the "N" or "CP" fault will be displayed.

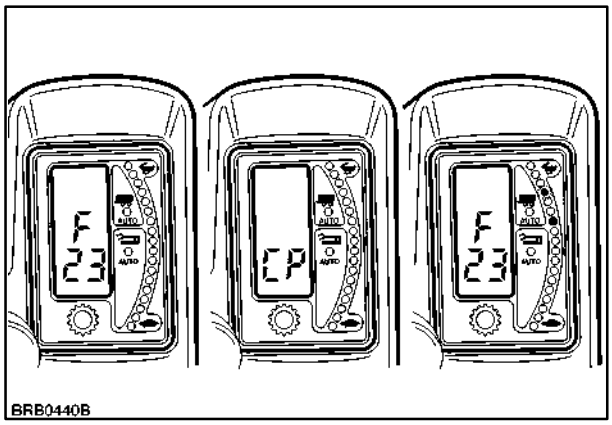
   If there are no disabling errors and there is at least one "N" error, the first "N" error will be displayed. The display will alternate at one second each between "N" (to tell the driver what to do) and the associated error code (to assist with trouble shooting).



143

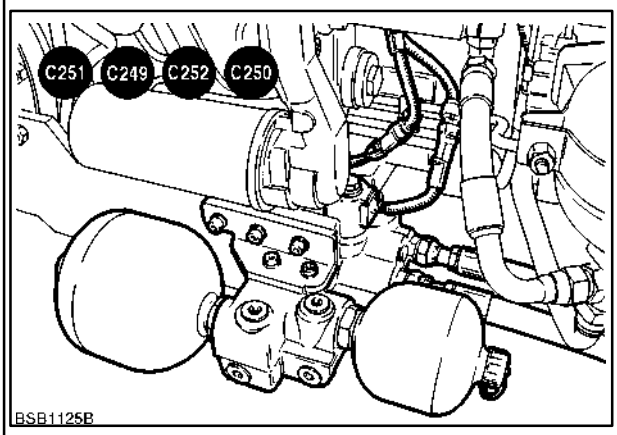
   If there are no disabling errors or "N" errors, and there is at least one "CP" error, the first "CP" error will be displayed. The display will alternate at one second each between "CP" (to tell the driver what to do) and the associated error code (to assist with trouble shooting).

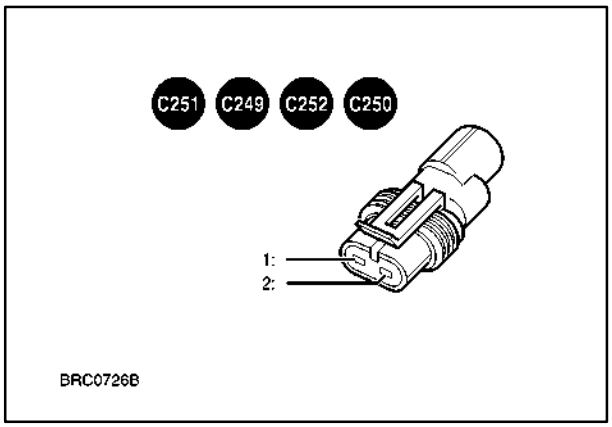
   If there are no disabling errors, "N" errors, or "CP" errors, any hidden errors will be displayed sequentially.

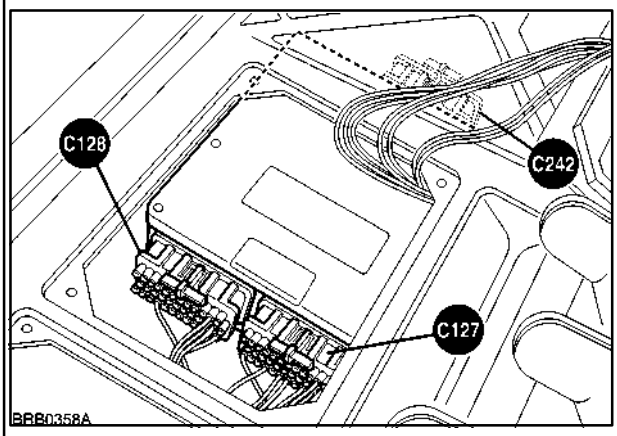


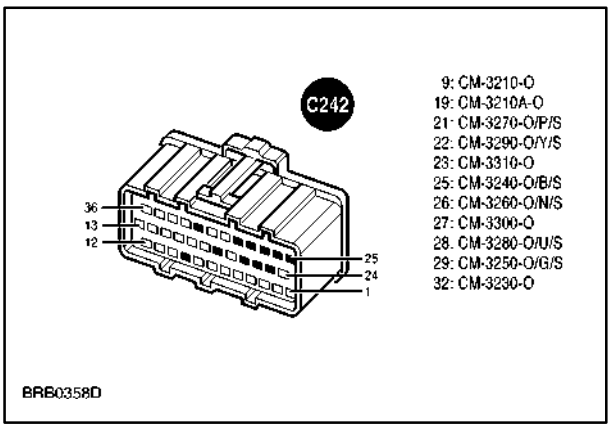
144

Error Codes U09, U10

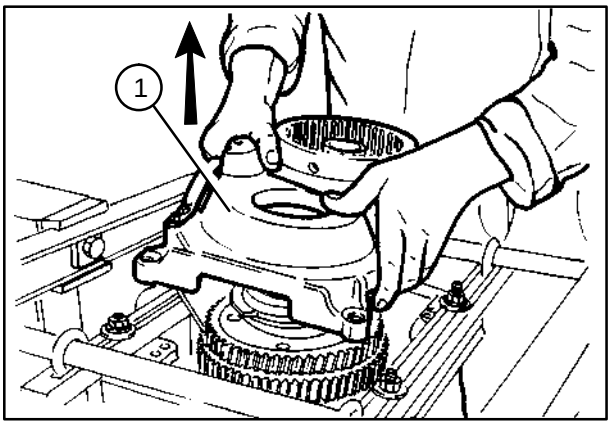






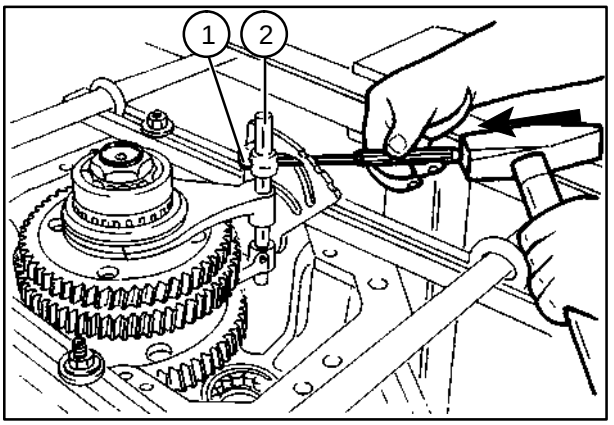


13. Remove the support plate (1) together with the drive shaft.



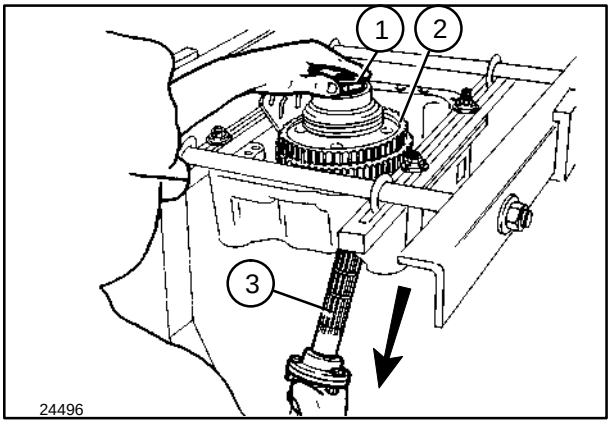
13

14. Remove the pawl retaining pin (1) and recover the pawl (2).



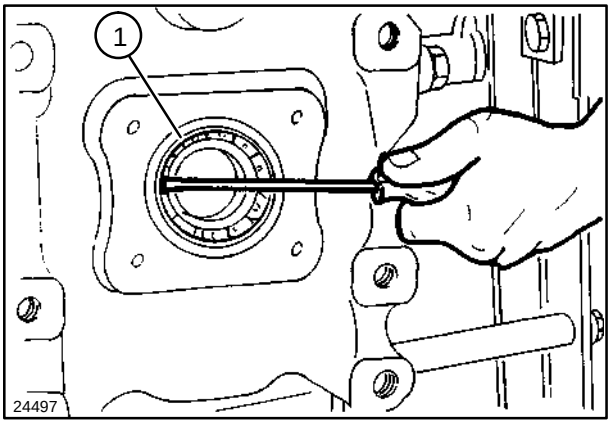
14

15. Loosen the nut (1), slide out the shaft (3) and remove the entire assembly of the driven gears (2) complete with forks and rod.



15

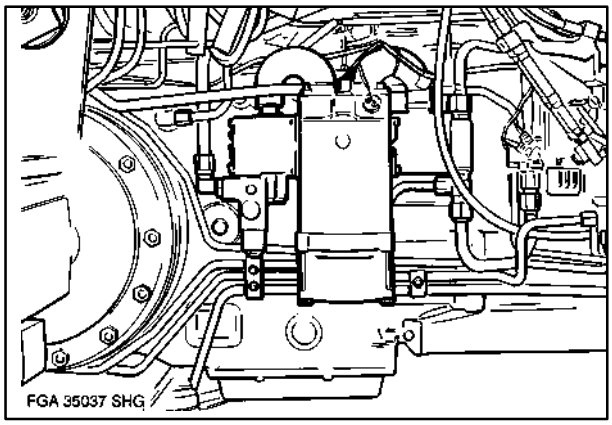
16. Remove the seal (1).



16

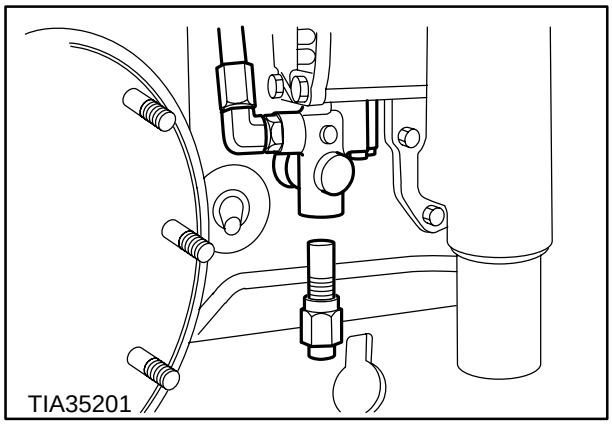
The open centre high pressure hydraulic circuits for tractors installed with mechanically controlled hydraulic lift are shown in Figures 24 and include the components shown on the following pages.

Open centre hydraulic pump assembly comprising of the high pressure gear pump (1) and steering and low pressure gear pump (2).



18

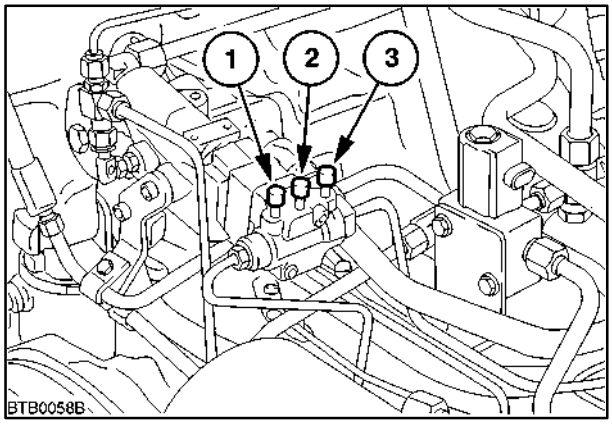
High pressure circuit relief valve located at the base of the pump diverts pump flow to sump if the system pressure reaches 190 bar (2760 lbf/in^2).



19

The trailer brake valve is located beneath the cab on the left hand side of the tractor. The valve diverts oil pressure to the trailer brakes whenever the right hand tractor brake pedals is depressed. This is unlike the valve installed on the closed centre system where both pedals have to be depressed in order for the valve to operate.

The trailer brake has absolute priority over other services in the circuit.



20

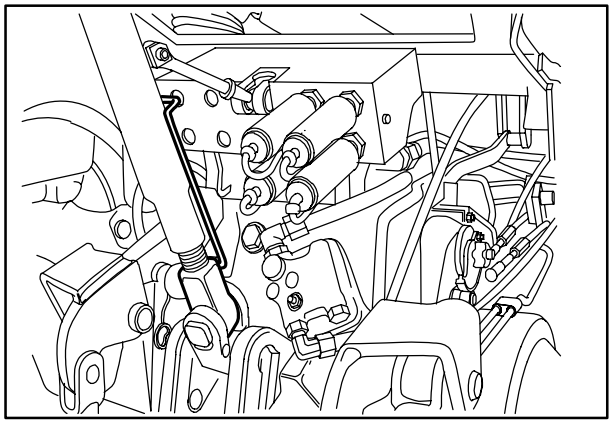
The open centre remote valves are available as two three or four valves per tractor.

The valves can be double–acting with float and kick out.

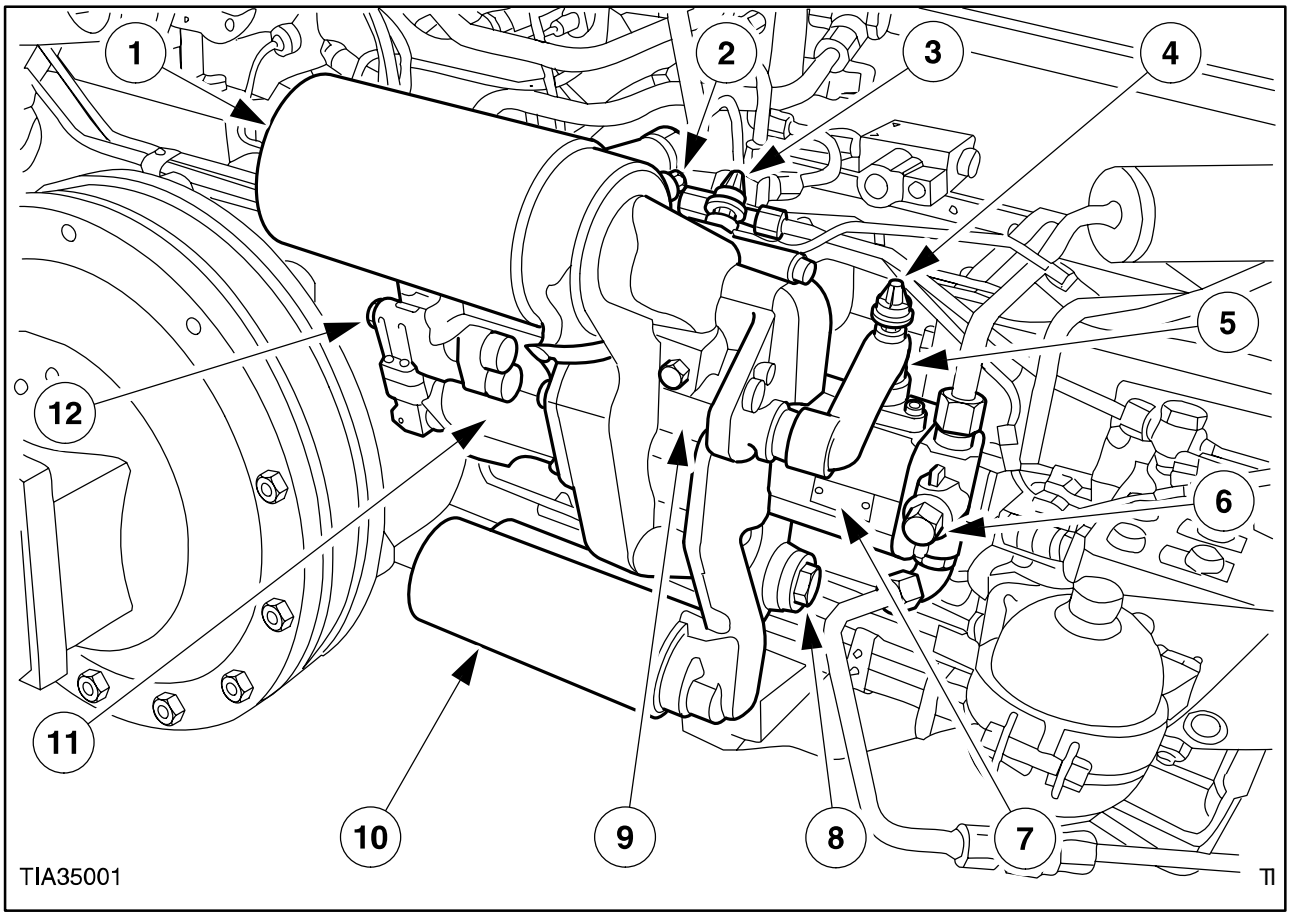
Double acting convertible to single–acting with float.

Double acting convertible to single–acting.

When four remote valves are installed the optional flow divider valve (1) is available enabling simultaneous operation of remote valve No 1 with another remote valve or hydraulic lift.



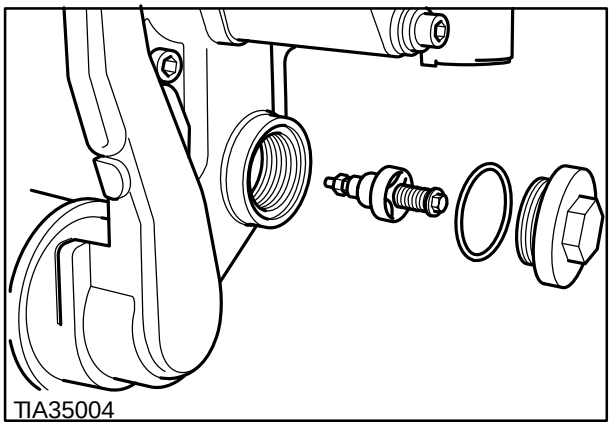
21



16

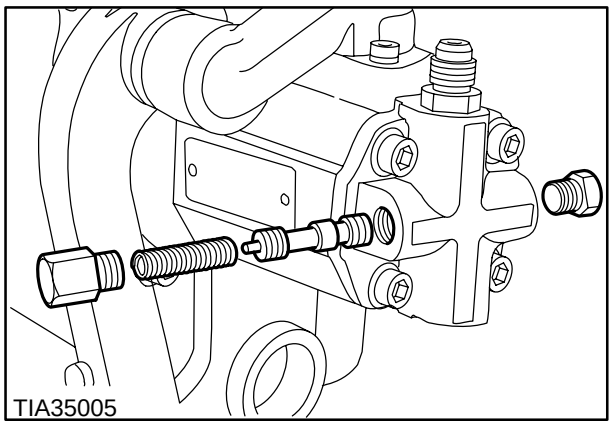
CCLS Hydraulic Pump Installation

1. Intake Filter
2. Oil Low Temperature Switch
3. Intake Filter Restriction Switch
4. Low Charge Pressure Switch
5. Charge Pressure By–Pass Valve
6. Steering Flow Control Valve
7. Steering and Low Pressure Circuit Pump
8. Charge Pressure Filter Dump Valve
9. Charge Pump
10. Charge Pressure Filter
11. Variable Flow Piston Pump
12. Load Sensing Valve (Flow and Pressure Compensating Valves)



17

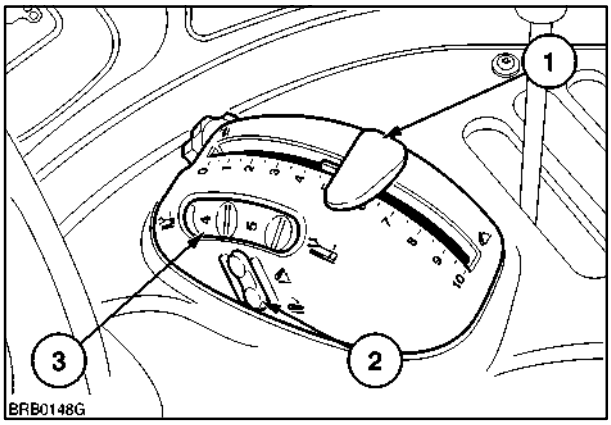
Charge Pressure Filter Dump Valve



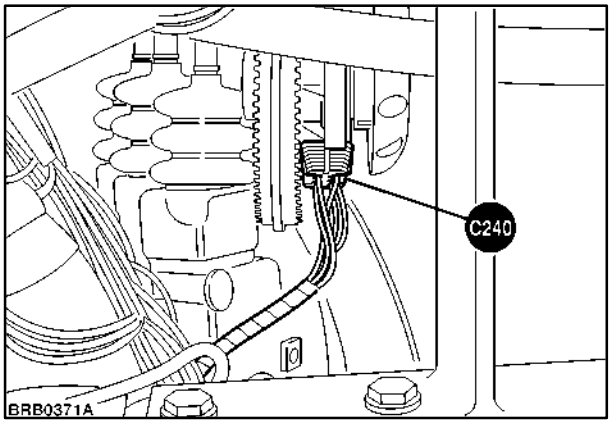
18

Steering Flow Control Valve

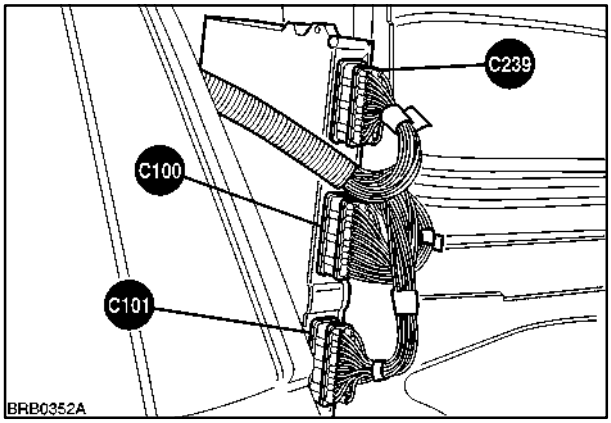
Error Code 8 Raise/Work Switch Failure



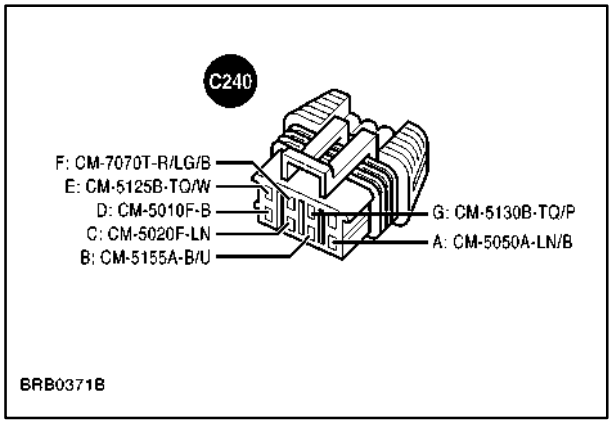
57



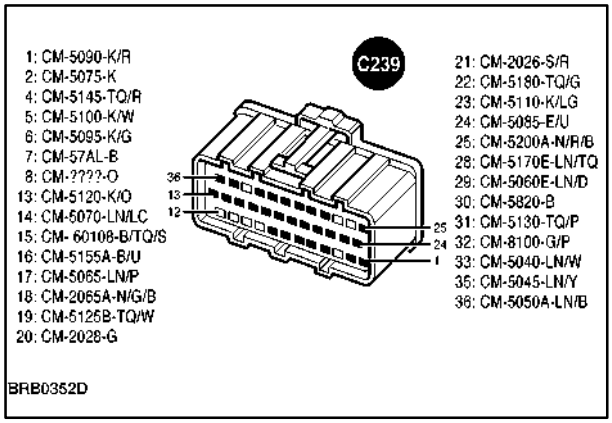
58



59

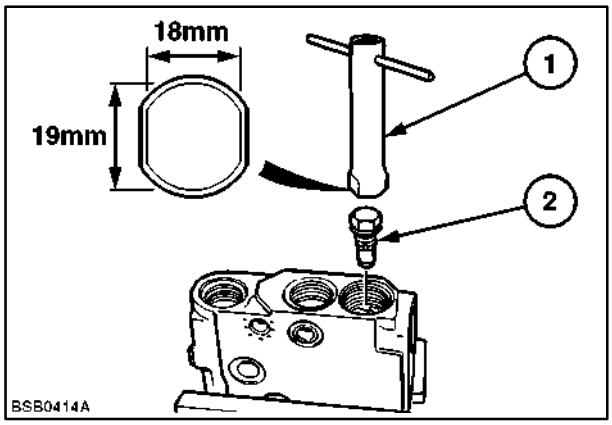


60



61

7. Manufacture box spanner (1) from 18mm internal diameter steel tube and remove lift cylinder safety valve seat (2).

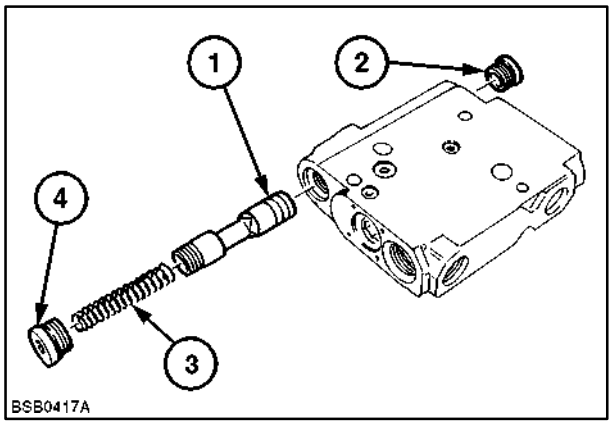


324

8. Remove flow compensating spool (1).

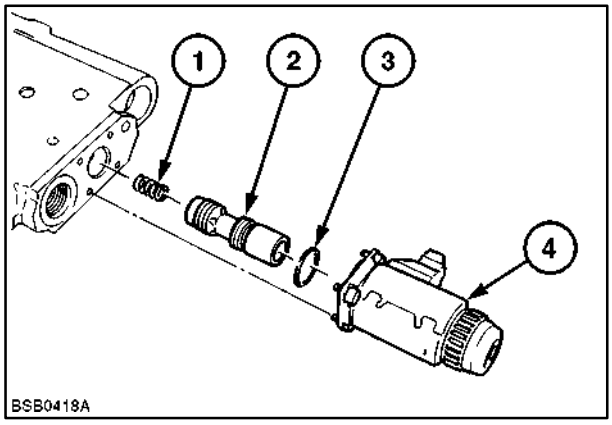
⚠ WARNING ⚠

A large spring (3) is positioned beneath the plug (4), take extreme care when removing plugs.



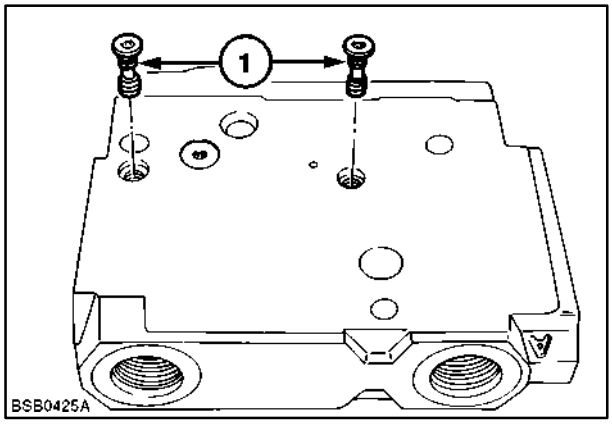
325

9. Remove solenoid assembly (4), 'O' ring (3), raise spool (2) and spring (1).



326

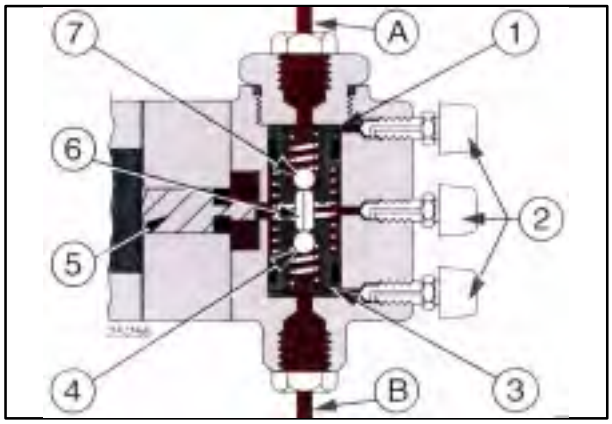
10. To remove the lowering metering valve it is necessary to disassemble the valve in stages as follows:–
11. Remove retaining screws.



327

Closed Centre Circuit Pilot Valve Operation

1. Piston.
2. Bleed screw.
3. Piston.
4. Ball.
5. Pilot piston.
6. Plunger.
7. Ball.



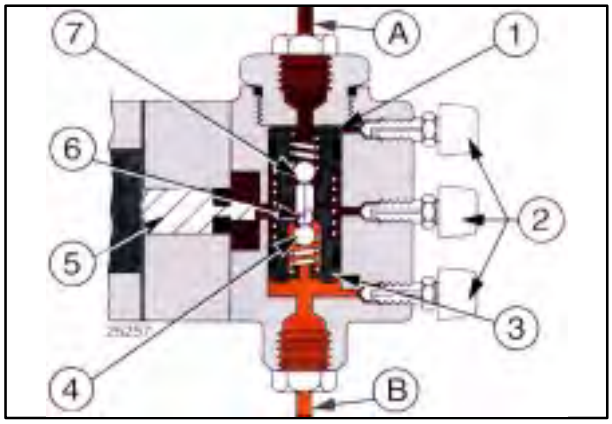
7

Brakes Not Applied.

When tractor brakes are not applied, passages (A and B) are not under pressure.

Single–Pedal Braking.

When only one brake pedal is pressed, pressure flows to the trailer brake valve pilot valve. Brake control oil pressure through the passage (B) moves the ball (4) against the piston (3). As no pressure oil comes from passage (A), the ball (4) moves the plunger (6) and the ball (7). Oil pressure keeps the ball (4) against the piston (3) closing the passage. Therefore oil can't act on pilot piston (5) and consequently the trailer brake valve is not actuated.



8

Tractor braking circuit oil (brakes not applied)

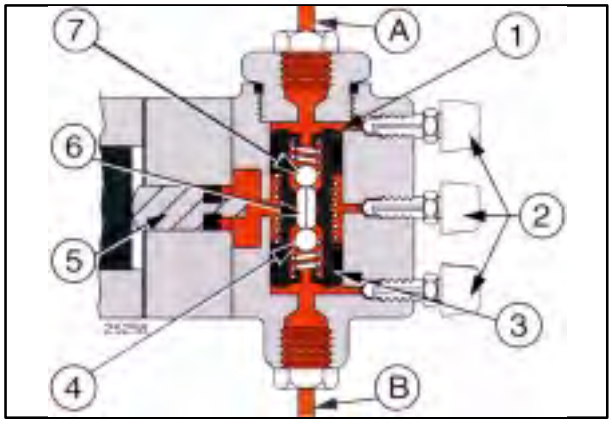
Tractor braking circuit oil (under pressure)

Two–Pedal Braking.

When both pedals are depressed pressure oil enters the pilot valve from both passages (A and B).

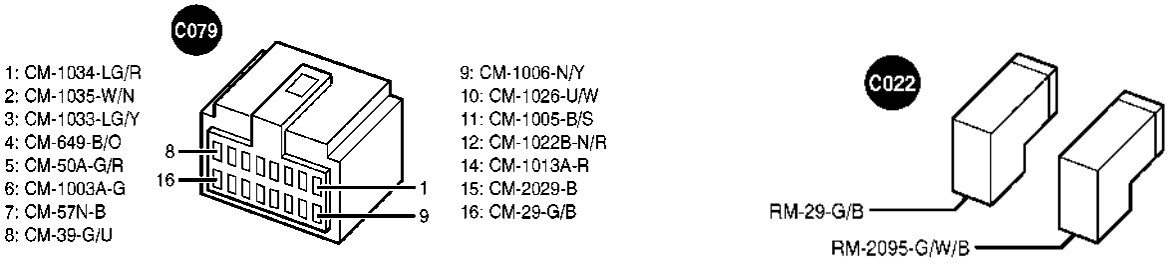
Oil pressure moves the two pistons (1 and 3) one against the other while the plunger (6) keeps the two balls (4 and 7) off the holes located on the two pistons (1 and 3).

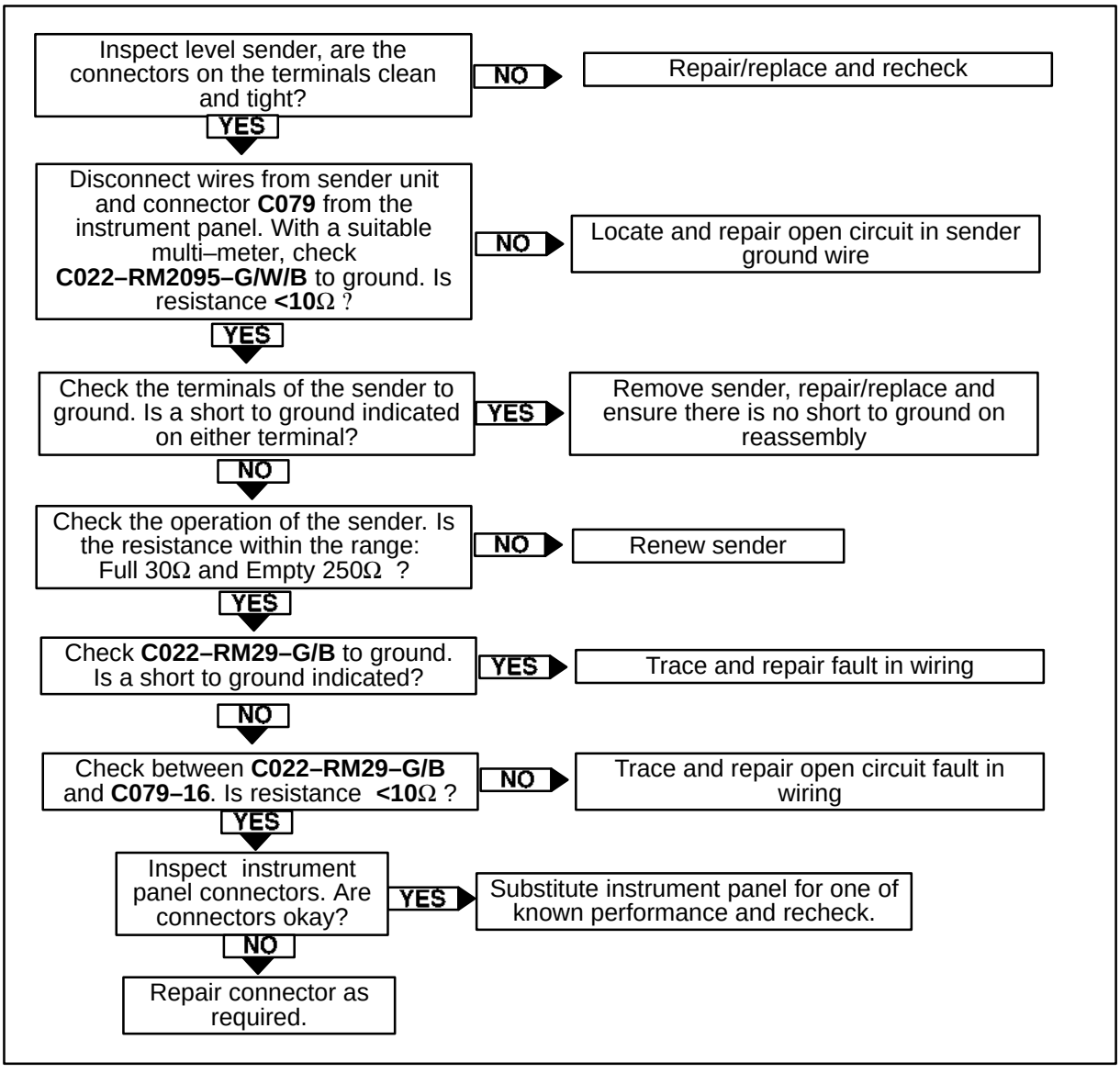
In this situation pressure oil contacts the pilot piston (5) operating the trailer brake valve.



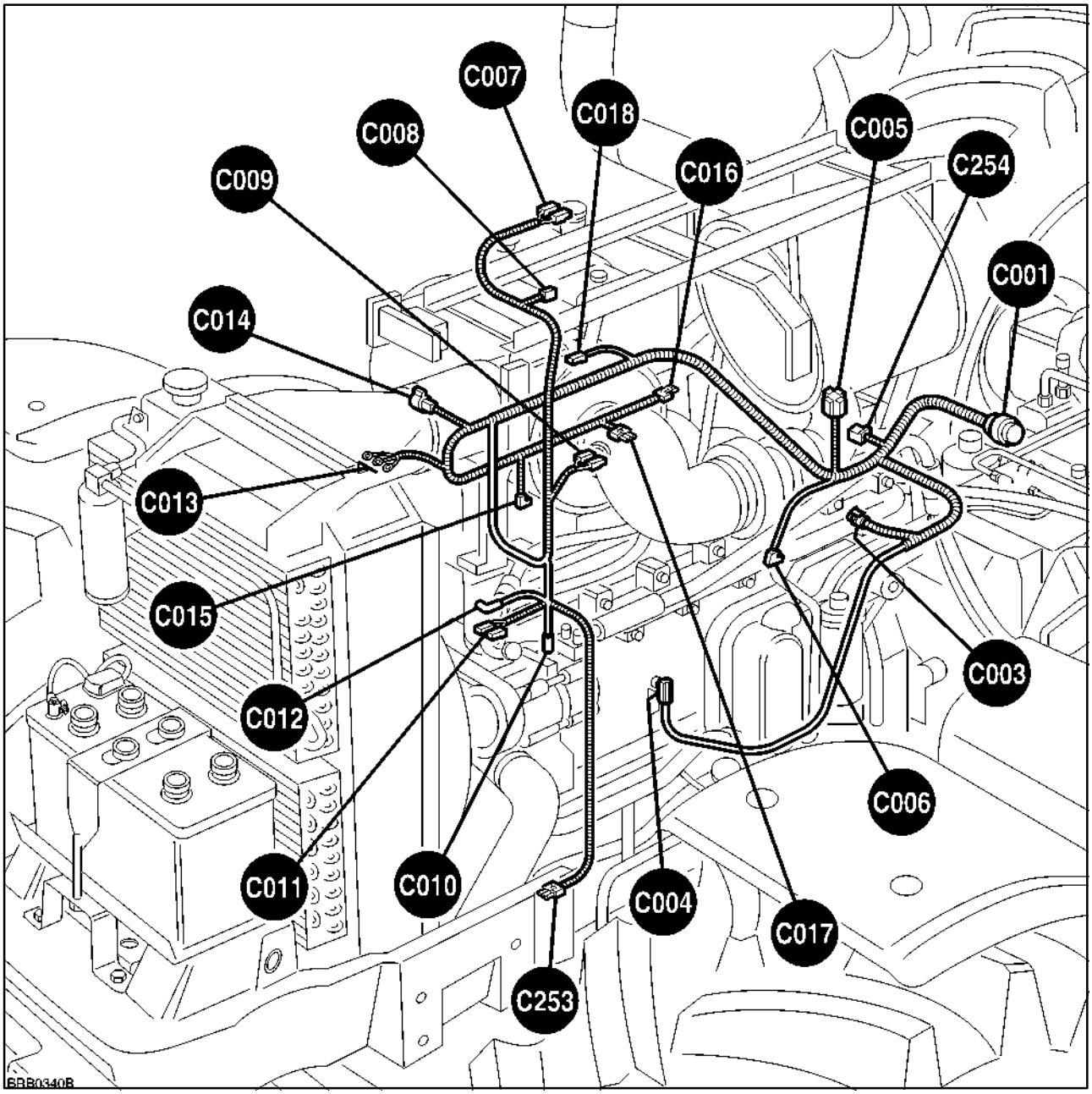
9

ERROR CODE 3 – Fuel Tank Level Sender Short to Earth/Ground
ERROR CODE 4 – Fuel Tank Level Sender Open Circuit or Short to +12V

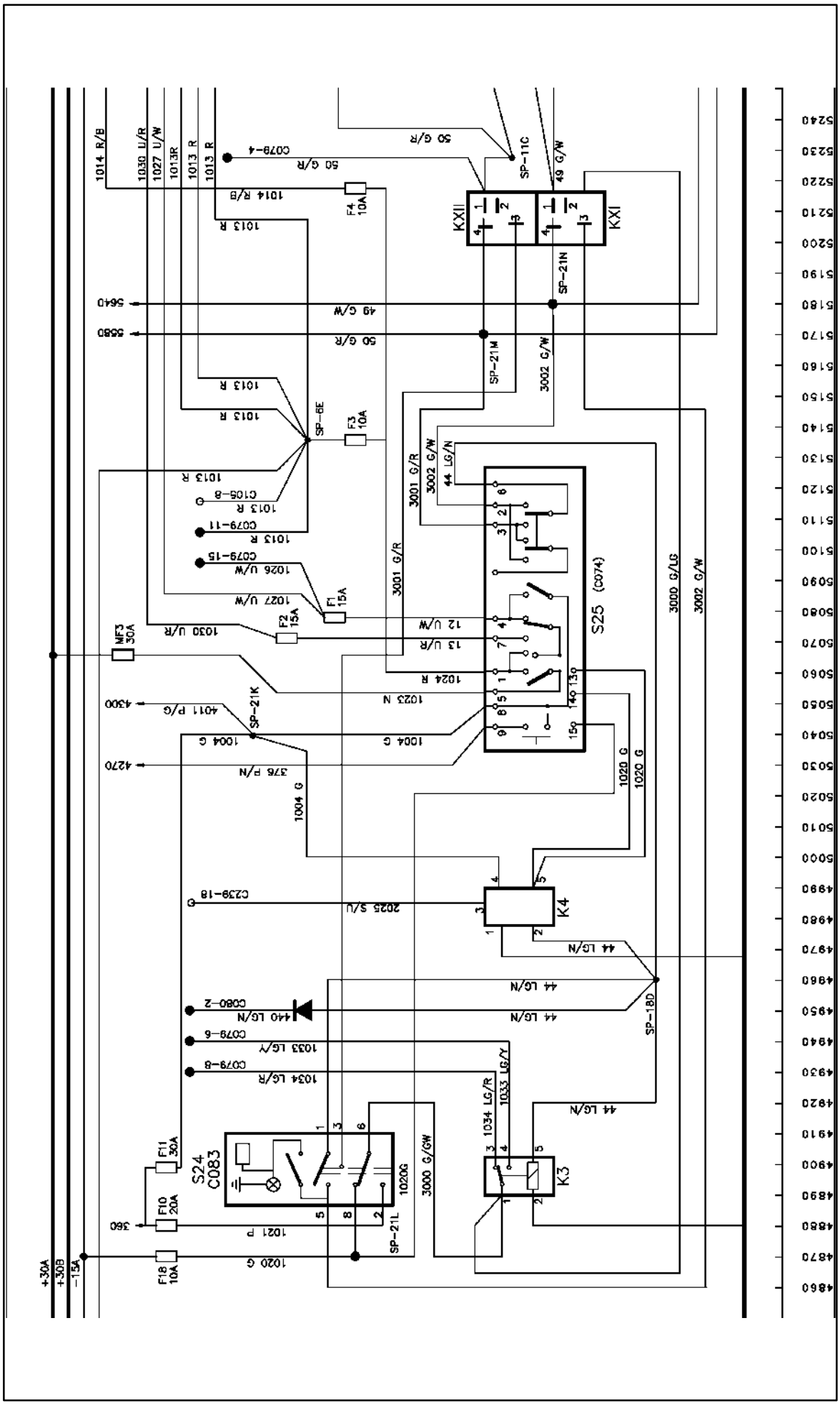




FRONT MAIN (ENGINE) HARNESS



10


KXII
KXI
SP-11C
SP-21N
SP-21M
SP-6E
SP-21K
SP-21L
SP-18D
S25 (C074)
S24 C083
K4
K3
F4 10A
F3 10A
F1 15A
F2 15A
F11 30A
F10 20A
F18 10A
MF3 30A
+30A
+30B
-15A
1014 R/B
1030 L/R
1027 U/W
1013R
1013 R
50 G/R
49 G/W
44 LG/N
3001 G/R
3002 G/W
3000 G/LG
1020 G
1004 G
1024 R
1023 N
1026 U/W
1027 U/W
1030 U/R
12 U/W
13 U/R
4011 P/G
376 P/N
2025 S/U
1440 LG/N
1033 LG/Y
1034 LG/R
1021 P
1020G
C079-4
C079-11
C079-15
C079-6
C079-8
C080-2
C239-18
C106-8
4300
4270
360
5640
5580