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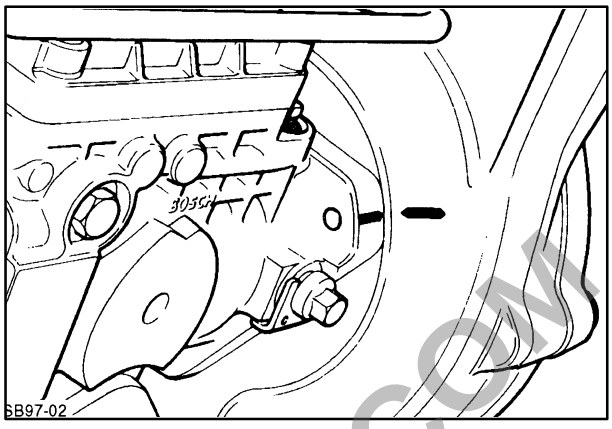
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12. Thoroughly clean the mating surfaces between the cover and plate using a suitable solvent cleaner and carefully apply a thin bead, approximately 2mm, of the recommended flexible gasket sealant, see specifications, to the access plate. Assemble the plate to the cover and tighten the retaining bolts to a torque of 24Nm (18lbf.ft).
13. The remainder of installation is the reverse of removal.



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BATTERY MAINTENANCE AND TESTS

Specific Gravity

The specific gravity of the battery electrolyte indicates the state of charge. Fully charged the specific gravity of the electrolyte is 1.280 minimum at 25°C.

Alternatively the approximate state of charge can be measured by using an accurate digital volt meter (+/– 0.01V) as follows:–

Less than	10.5V Battery un–serviceable*
Less than	11.8V Battery discharged
Less than	12.3V Battery 1/2 charged
Better than	12.6V Battery fully charged

* See note under tests for possible recovery of a mildly sulphated battery.

Battery voltage to be taken with the battery unloaded and:–

A. After the battery has rested unloaded for at least 4 hours.

B. If the vehicle has recently run or battery has recently been charged, switch on headlamps for 2 minutes.

When a battery discharges, sulphuric acid in the electrolyte combines chemically with the plates and this action lowers the specific gravity of the solution.

A battery hydrometer will determine the specific gravity of the electrolyte in a cell and the amount of unused sulphuric acid in the solution is a measure of the degree of charge of that cell.

The lower the temperature at which a battery is required to operate, the more necessary it is that the battery is maintained in a fully charged condition. For example a battery with a low specific gravity of 1.225 at 27°C (80°F) will operate the starting motor at warm ambient temperatures but may not, due to lower battery efficiency at a low temperature.

Table 1 shows the effect of temperature on the efficiency of a typical battery.

Table 1

Temperature	Efficiency of a Fully Charged Battery
25.0°C (77.0°F)	100%
–4.5°C (23.9°F)	82%
–24.0°C (–11.2°F)	64%
–27.5°C (–17.5°F)	58%
–31.0°C (–23.8°C)	50%
–34.5°C (–30.1°C)	40%
–37.5°C (–35.5°C)	33%

Maximum battery life will be obtained if the correct care and periodic inspection is given. It is important that output capacity should not be exceeded by constant and excessive overloading and that charging requirements are maintained.

Servicing The Battery

WARNING

Batteries contain sulphuric acid and during charging generate a highly explosive mixture of hydrogen and oxygen gases.

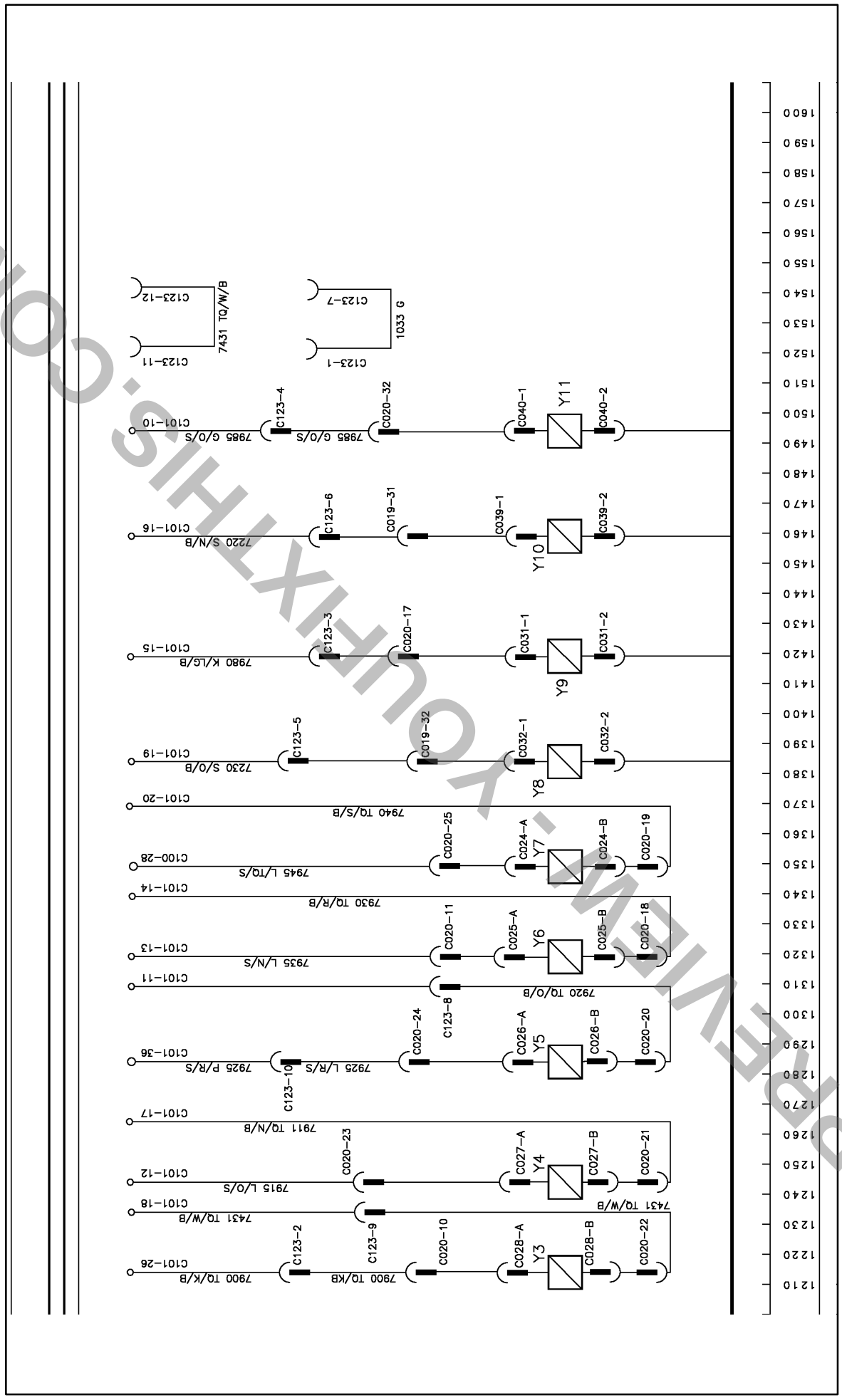
- *Never use equipment that generates flames or sparks in order to control electrolyte level*
- *Do not remove the battery cover plugs without protection for eyes and hands.*

When servicing a battery the following steps should be observed:

1. Maintain the electrolyte to the recommended level of 17 mm (0.67 in.) above the plates. If this is not observed the acid will reach a high concentration that will damage the separators and impair the performance of the plates.
2. Use only distilled or de–mineralised water, do not overfill and never use tap water or water from a rain barrel or other source.
3. Always keep the battery at least 75% charged otherwise the plates will become sulphated and loss of efficiency will result with possible damage from freezing at low temperatures.
4. Avoid overcharging the battery as excessive charging will create high internal heat that will cause plate grid deterioration and produce water loss.
5. When fast charging ensure the battery temperature does not exceed 50°C.
6. Do not add sulphuric acid to a cell unless the electrolyte has been lost through spilling. Before replenishing ensure the solution is at the correct specific gravity. A slow charge is the only method to be employed to fully charge a battery. A high rate charger can be used to quickly boost the battery capacity but this must be followed by a slow charge rate to bring the battery to full capacity.

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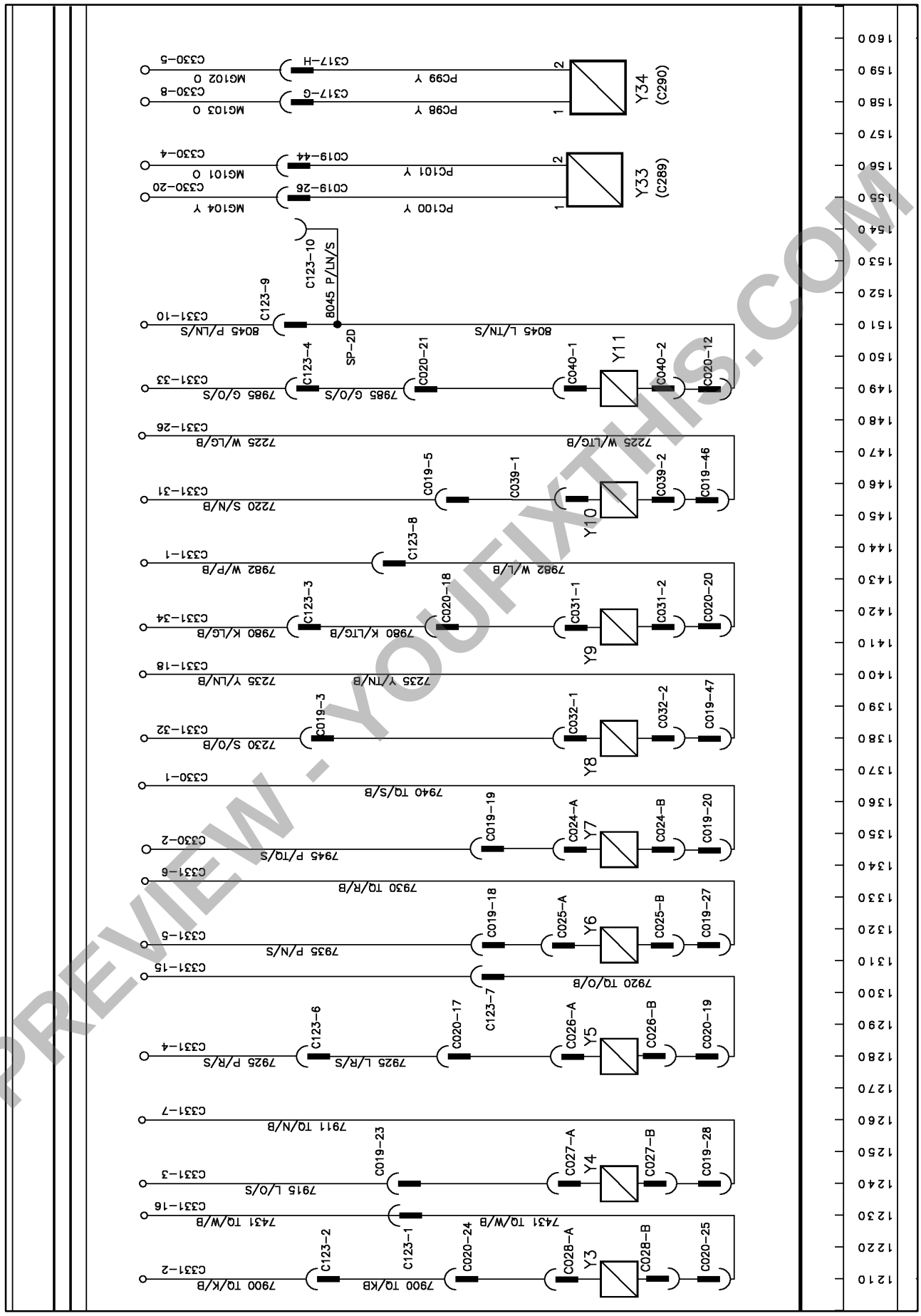
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FAULT CODE	FAULT DESCRIPTION	TRANS. STATUS
CH	Oil temperature above 105 degrees centigrade – Press upshift to proceed	
CL	Oil temperature between 10 and 60 degrees centigrade – press upshift to proceed	

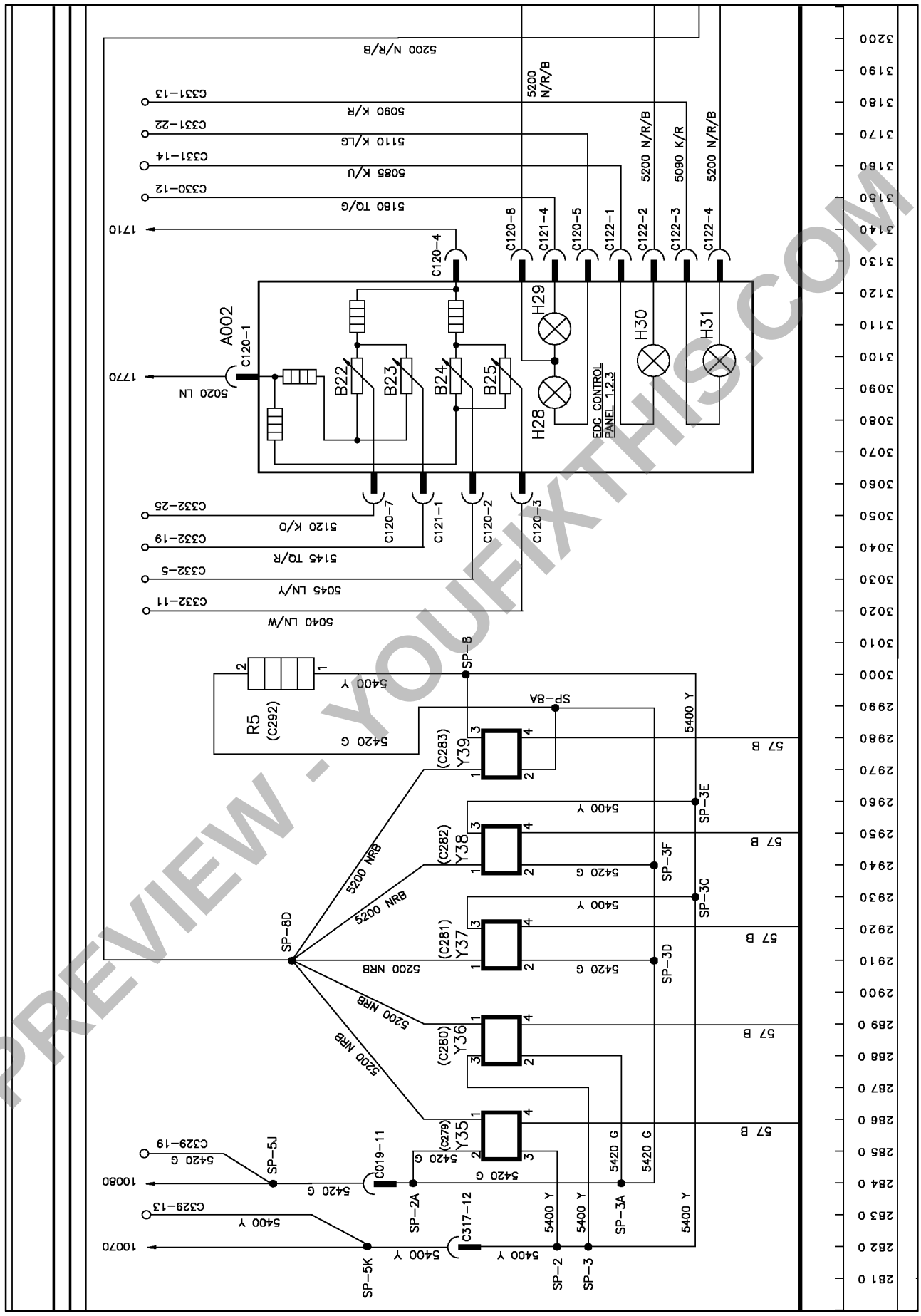
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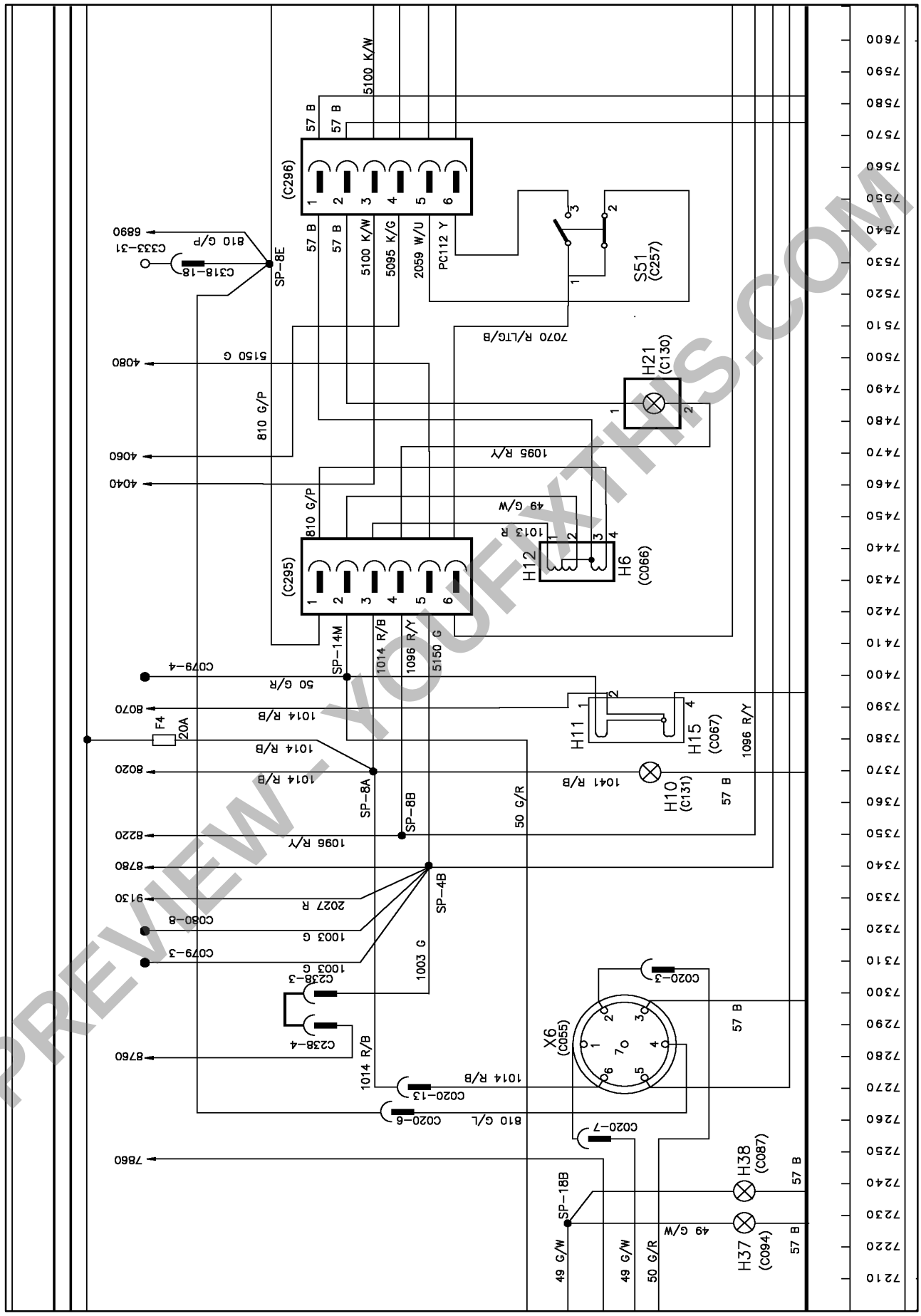
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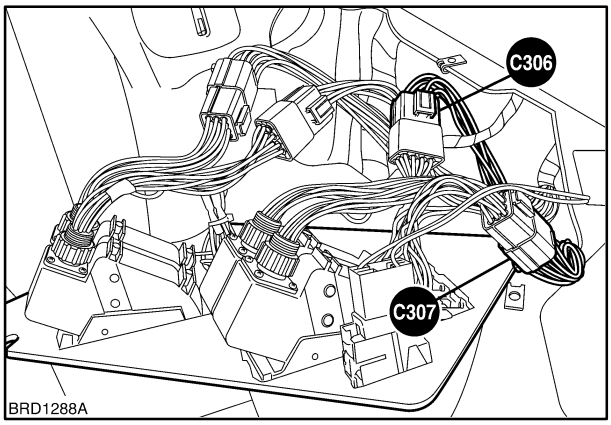
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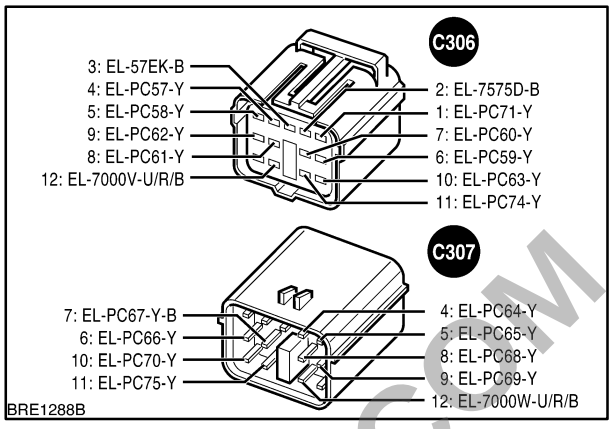
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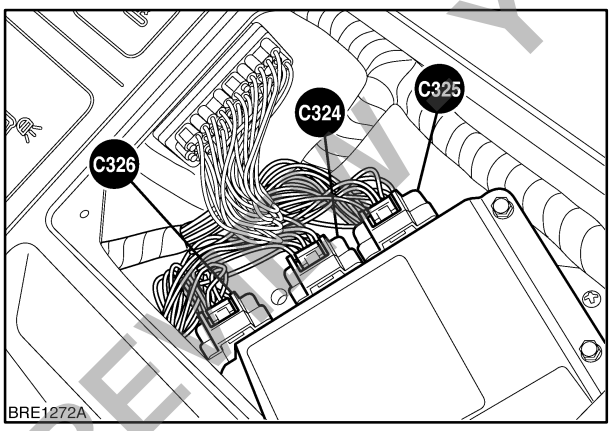


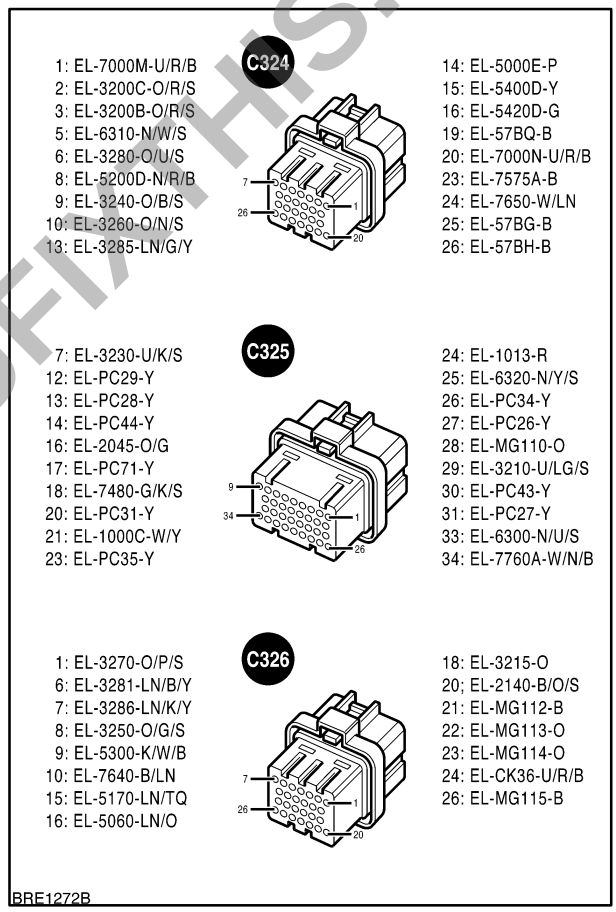
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ERROR CODE T3C – SOLENOID VALVE, DATA VALID BUT BELOW NORMAL RANGE
ERROR CODE T3D – SOLENOID VALVE, DATA INCORRECT
ERROR CODE T3E – SOLENOID VALVE, DATA VALID BUT ABOVE NORMAL RANGE

SERVICE TOOL ERROR CODE – 3610

Cause:

The solenoid valve in the pump control unit (PCU) is permanently energised.

Effects:

Engine shut–down.

Possible failure modes:

1. Faulty connector
2. Faulty engine shut–down relay K5
3. Faulty harness
4. Faulty pump control unit (PCU)

Solution:

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

1. Check the pump control unit (PCU) connector **C273**, front main harness connector **C269**, and the engine control module connector **C315** and **C316**.

   A. Ensure the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight. Repair or replace as required.

   B. If the connectors are okay, continue to step 2.
2. Check the engine shut–down relay K5.

   A. Remove the engine shut–down relay K5 from connector **C312**. Measure the resistance between terminal **30** and terminal **87**. If a closed circuit is indicated, replace the relay.

   B. If the relay is okay, refit and continue to step 3.
3. Check for an open circuit.

   A. Disconnect connector **C273** and **C316**. Check between connector:

   C273 pin **5 (PC3–Y)** and **C316** pin **20 (PC3–Y)**

   C273 pin **6 (B)** and **ground**

   Wiggle the harness and the connectors to check for an intermittent circuit. If an open circuit is indicated, repair or replace the harness as required.

   B. If an open circuit is not indicated, continue to step 3.
4. Check for a short to ground.

   A. Check between connector:

   C273 pin **5 (PC3–Y)** and **ground**

   C273 pin **7 (2009–G)** and **ground**

   Wiggle the harness and the connectors to check for an intermittent circuit. If a short to ground is indicated, repair or replace the harness as required.

   B. If a short to ground is not indicated, continue to step 4.
5. Check for a short to +Ve voltage.

   A. Disconnect connector **C315**. Turn the keystart ON. Measure the voltage between connector:

   C273 pin **5 (PC3–Y)** and **ground**.

   C273 pin **7 (2009–G)** and **ground**

   C315 pin **18 (MG128–O)** and **ground**

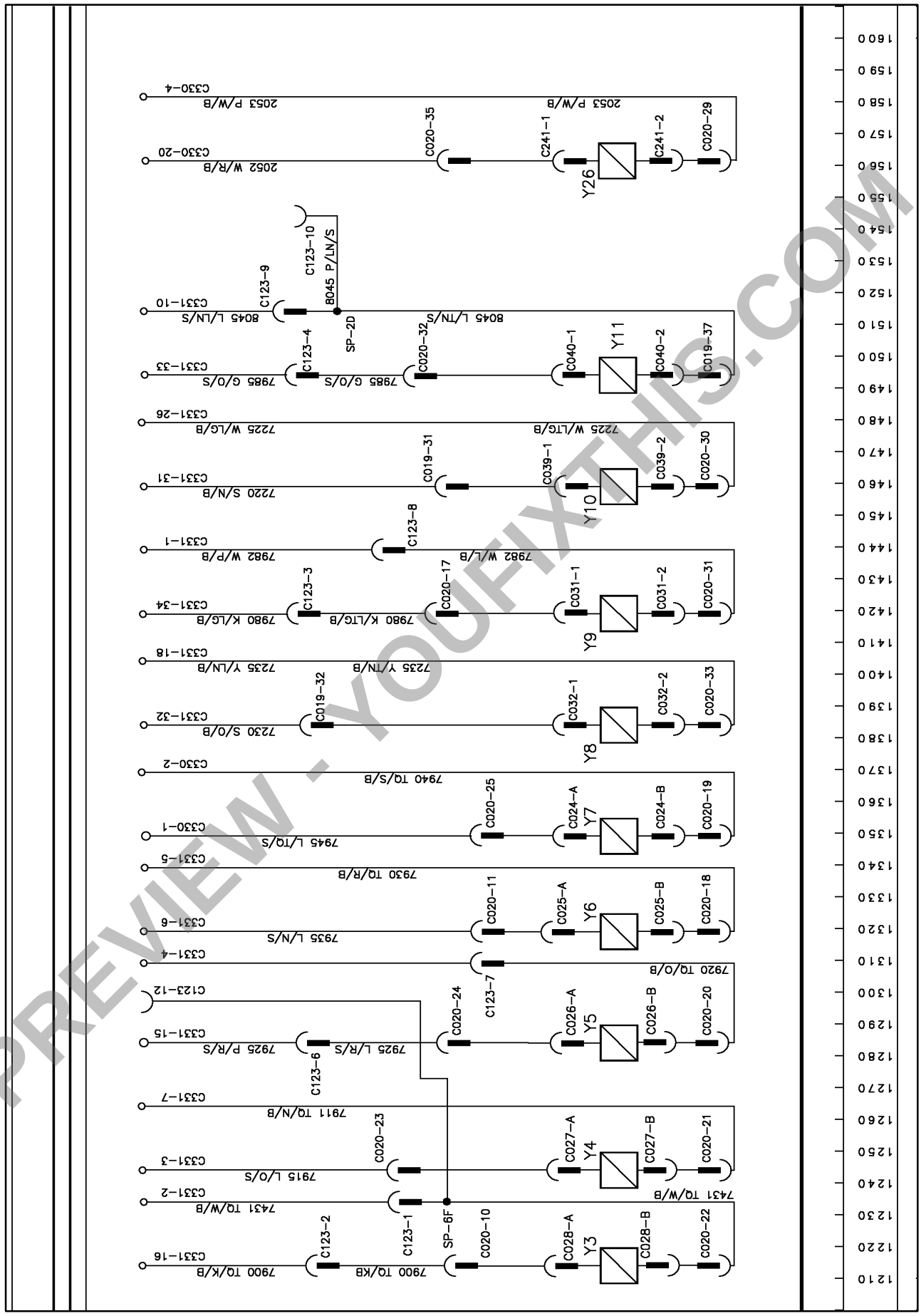
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NOTES PAGE

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ERROR CODE L07 – FRONT AXLE WEIGHT HAS BEEN REDUCED BUT THE SUSPENSION IS UNABLE TO RESET NOMINAL HEIGHT

ERROR CODE L08 – FRONT AXLE WEIGHT HAS BEEN INCREASED BUT THE SUSPENSION IS UNABLE TO RESET NOMINAL HEIGHT

Possible failure modes:

1. Incorrect calibration
2. Incorrect potentiometer linkage length
3. Faulty potentiometer linkage

Solution:

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

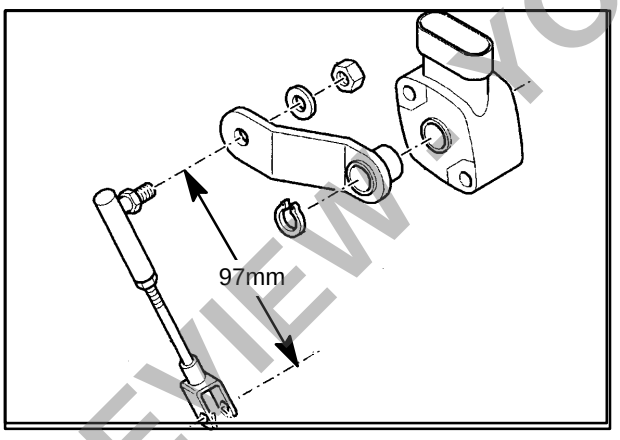
1. Check for other error codes.

   A. Perform the auto calibration procedure (ACP). If any 'U' error codes are displayed during the ACP, continue to the test for the 'U' error code that is displayed.

   B. If no other error code is being displayed, continue to step 2

2. Check the potentiometer linkage length.

   A. Check the potentiometer linkage length is 97mm and that no damage to the linkage is indicated. Adjust, repair or replace as required and perform the ACP.



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ERROR CODE F03 – MEDIUM/REVERSE SYNCHRONISER NOT CALIBRATED OR A BAD CALIBRATION

Effects:

Cannot obtain medium or reverse range and low range (if obtainable).

Possible failure modes:

1. Synchroniser not calibrated
2. Faulty transmission control module (TCM)

Solution:

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

1. Perform the transmission calibration procedure.
   A. If the error code is still displayed, continue to step 2.
2. Check for other error codes being displayed.
   A. If any other error code is being displayed, continue to these tests.
   B. If no other error code is displayed, download the correct level of software. If the fault re–occurs, remove and replace the transmission control module (TCM).

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ERROR CODE F2D – CLUTCH D SOLENOID OVER VOLTAGE

Possible failure modes:

1. External power supply connected
2. Tractor overcharging
3. Faulty solenoid
4. Faulty harness
5. Faulty transmission control module (TCM)

Solution:

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

1. Check for other error codes being displayed.

   A. If any other error code is being displayed, continue to these tests.

   B. If no other error code is displayed, continue to step 2.

2. Check that the tractor battery power supply has not been connected to an external power supply.

   A. If an external power supply is connected to the tractor, disconnect and test the system for normal operation.

   B. If an external power supply is not connected to the tractor, continue to step 3.

3. Check the alternator output.

   WARNING: *Beware of moving parts.*

   A. Start the engine and run at 2000 rev/min. Measure the voltage between the alternator terminal **B+ (N)** and **ground**. If the voltage indicated is greater than approximately 15 Volts, continue to test for a fault in the charging system.

   B. If the voltage indicated is okay, continue to step 4.

4. Check clutch D solenoid.

   A. Disconnect clutch D solenoid connector **C025**. Measure the resistance between the solenoid terminal **A** and terminal **B**. If the resistance indicated is not between 6 Ohms – 8 Ohms, remove and replace clutch D solenoid.

   B. If clutch D solenoid is okay, continue to step 5.

5. Check for +Ve Voltage.

   A. Disconnect the transmission control module (TCM) connector **C101**. Turn the keystart ON. Measure the voltage between connector:

   C101 pin **13 (L/N/S)** and **ground**

   C101 pin **14 (TQ/R/B)** and **ground**

   If a voltage is indicated, repair or replace the harness as required.

   B. If a voltage is not indicated, continue to step 6.

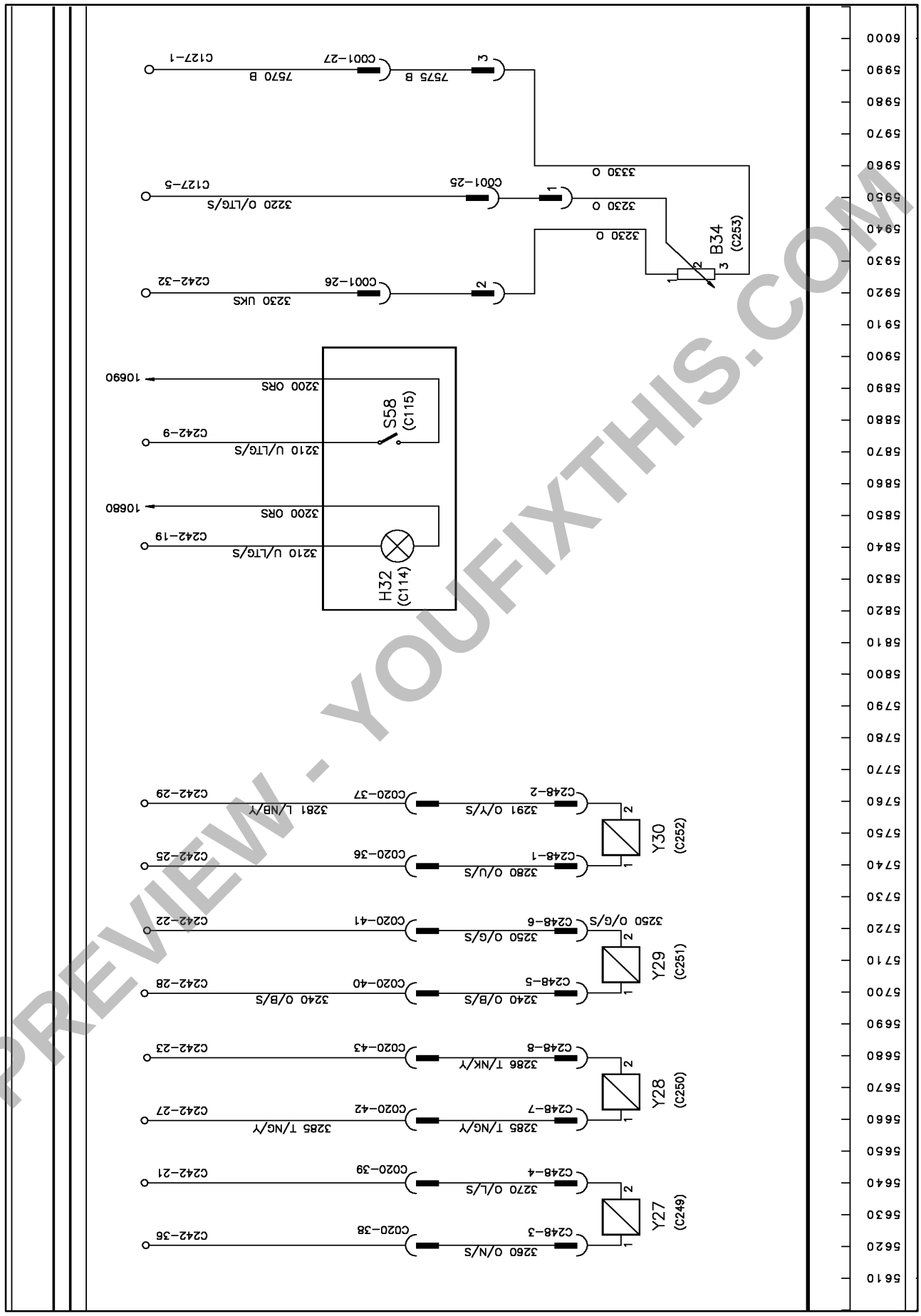
6. Check for a short circuit.

   A. Turn the keystart OFF. Check between connector **C101** pin **13 (L/N/S)** and **C101** pin **14 (TQ/R/B)**. If a short circuit is indicated, repair or replace the harness as required.

   B. If the harness is okay, download the correct level of software. If the fault re–occurs, remove and replace the transmission control module (TCM).

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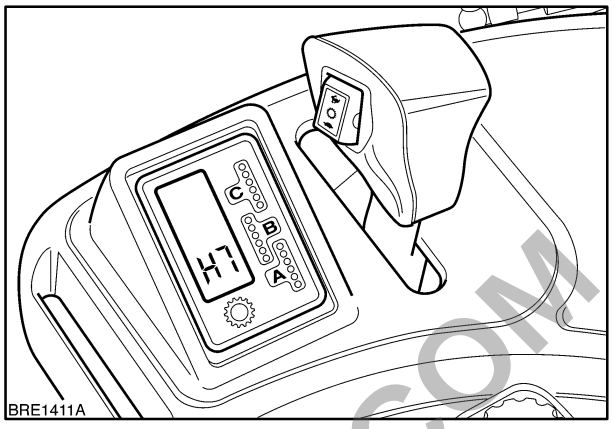


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H7 NOT USED

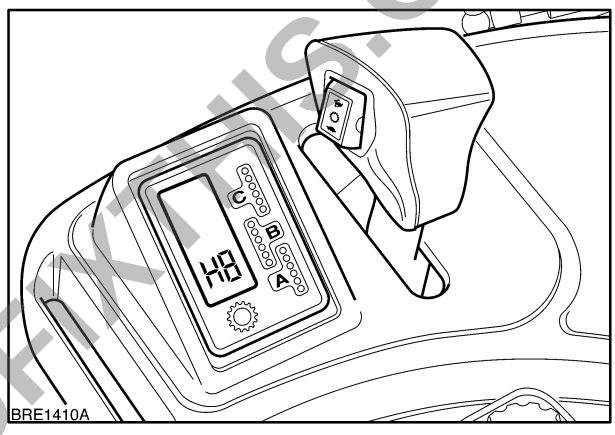
H7 will be displayed when cycling through the H menu but does not have a function.



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H8 NON VOLATILE MEMORY RESET

Used to reset (clear) all calibration figures in the processor.

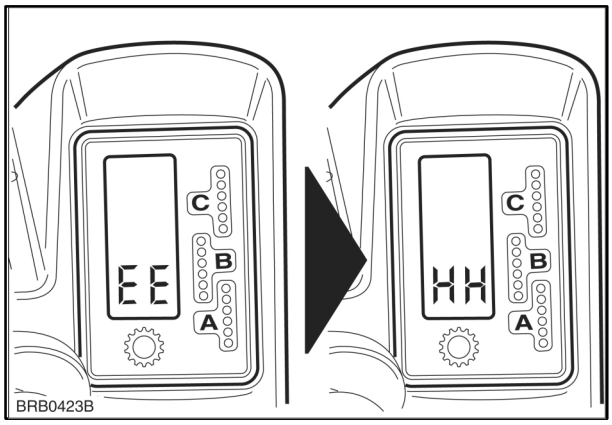


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With H8 selected the procedure is automatic.

The display changes from “H8” to “EE” to “HH”, indicating the processor is now reset.

NOTE: *All calibrations will need to be performed following an H8 operation.*

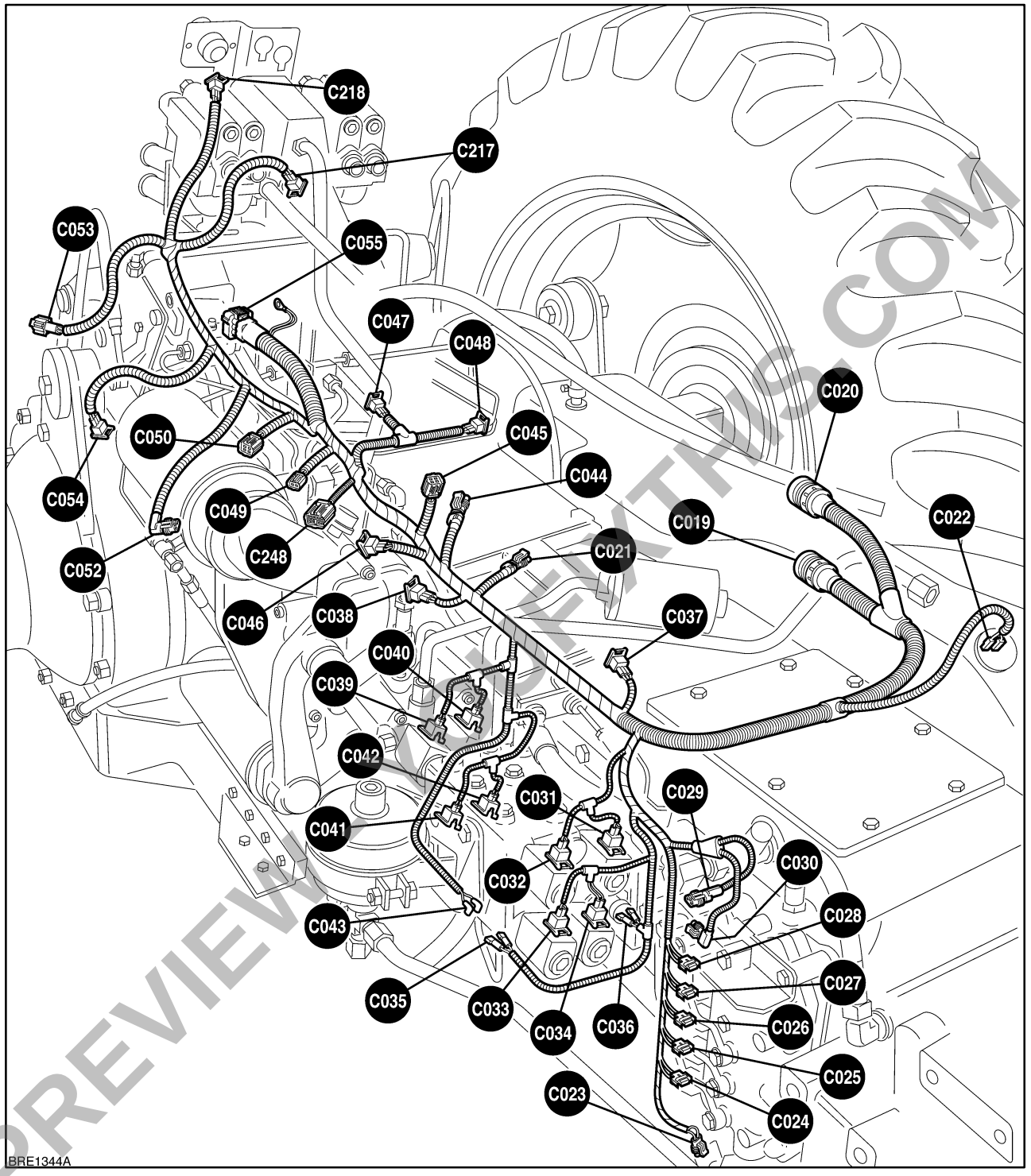


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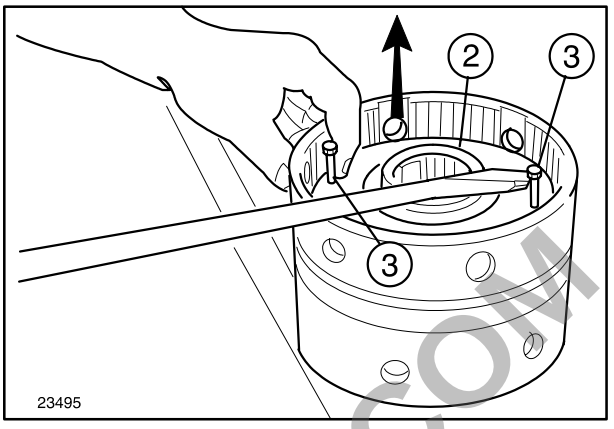
SEMI POWERSHIFT 120–155 MODELS – REAR MAIN (TRANSMISSION) HARNESS



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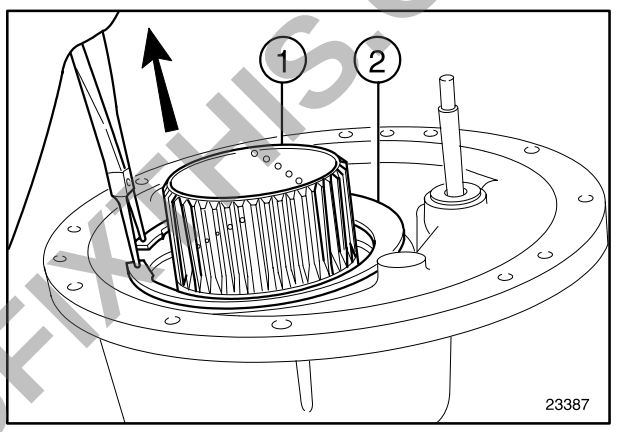
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42. Screw two bolts into the threaded holes in the piston (2), then withdraw piston pulling it out using the bolts.
43. Repeat steps 40 to 42 to disassemble clutches D and E.



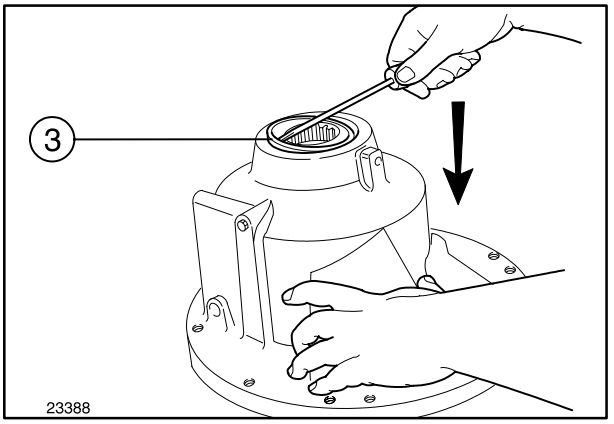
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44. Remove the retaining ring (1), the bearing inner lock ring and retrieve the hubs of the clutches A and B along with the bearing and clutch A discs and centering springs.



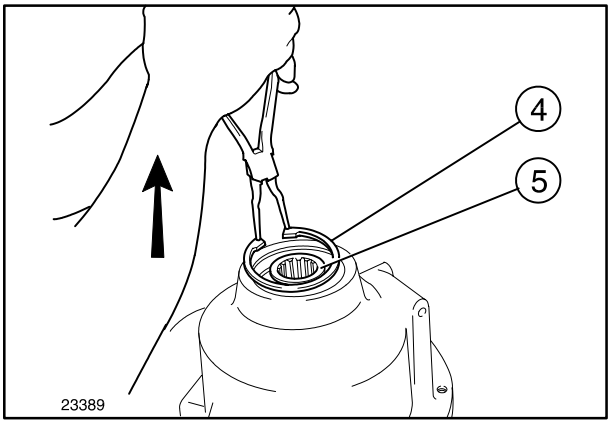
100

45. Remove seal (3).



101

46. Remove the outer (4) and inner circlips from the outside of clutch A (5), withdraw clutch A from the cover. Retrieve the bearing.



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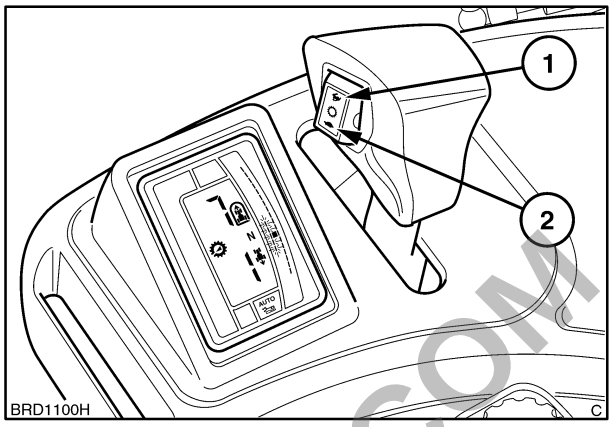
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Changing the Gear Span

The range of plus or minus two gears may be expanded both up and down on the move, using the downshift and upshift controls (1) and (2).

Example 1: Upshift gears: When operating in AUTO mode in 7th. gear, as described above, the segments for 5th. and 9th. gear will flash. On reaching 9th gear press the upshift control (1) once to select 10th gear. When the tractor has upshifted to 10th, press the control again to select 11th gear. AUTO shifting will now be provided between 5th and 11th gears. The segment for 5th will continue to flash identifying the lowest automatic gear selected.

Example 2: Downshift gears: Assuming 5th has been selected as the lowest AUTO ratio, slow the tractor until this gear has been engaged. Then, using the downshift control (2), select 4th gear and further reduce speed until 4th gear engages. 3rd gear may now be selected if required. Applying this technique it is possible to select gears 1 to 11 in the AUTO field range.



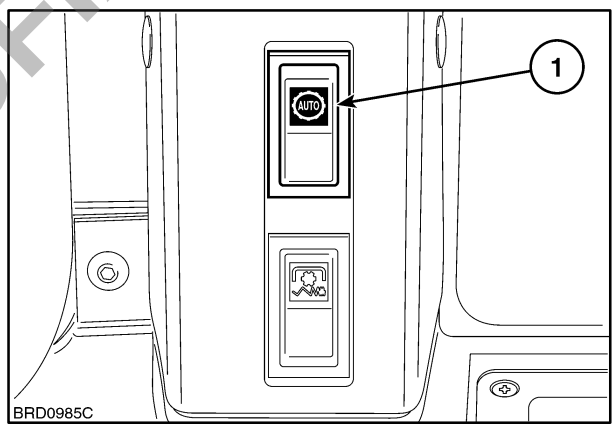
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Reducing the gear span

If necessary, the number of gears available in the Field AUTO range may be reduced by using the upshift and downshift controls in the following way.

Example 1: Upshift gears: With the upper limit gear showing as 9th (flashing segment) and the tractor working in a lower gear, depress the downshift control (2) Figure 43. The flashing segment will show a one gear reduction each time the control is depressed.

Example 2: Downshift gears: With the tractor stopped and the engine running, depress and hold in the AUTO switch (1), on the cab 'B' pillar. Using the upshift control (1) Figure 43, move the lower limit gear upwards (flashing segment) until the desired gear is obtained. This procedure will permit the lower limit gear to be changed without affecting the upper limit gear setting in the AUTO memory.



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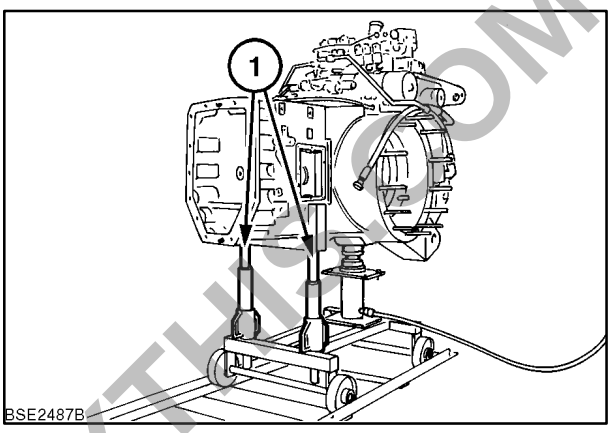
REAR AXLE HOUSING

Overhaul

⚠ WARNING ⚠

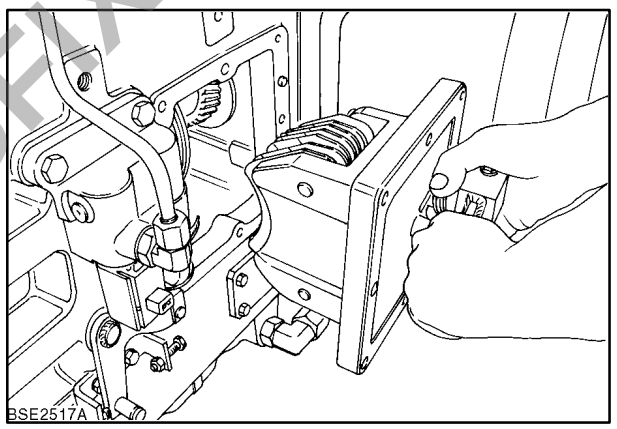
Handle all components with the greatest care.Do not insert hands or fingers between the parts.Wear suitable protection clothing, including goggles, gloves and footwear.

1. Support the rear axle housing using the tractor splitting tool 380000569 and support tool 380000403 (1).



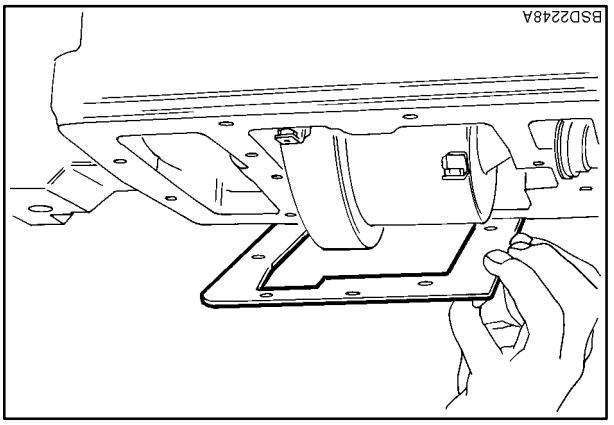
27

2. Loosen the attaching bolts and remove the parking brake control assembly.



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3. Remove the inner transfer box guard.



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⚠ CAUTION ⚠

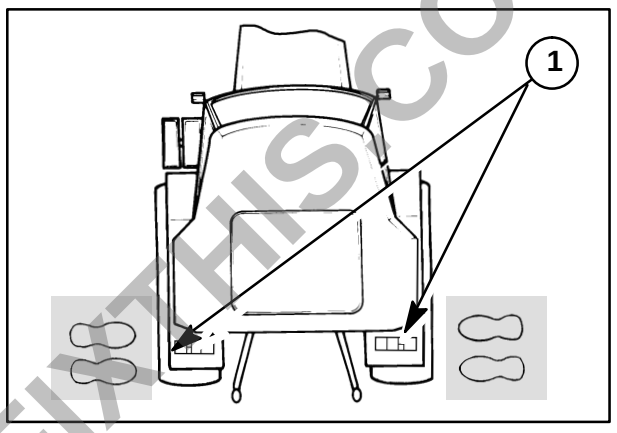
Before leaving the tractor to operate the external Power Take Off switches:

- Move the gearshift levers to neutral.
- Disengage the PTO
- Apply the parking brake.

With the engine running, move the hand throttle lever to the low idle position (fully rearwards).

Figure 11

The operator must only activate the external Power Take Off switches (1) while standing to the side of the tractor (outboard of the rear tyres). To avoid damage to implement or tractor, operation of the in cab and external PTO switches should **not** be carried out simultaneously.



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⚠ WARNING ⚠

Before using the external Power Take Off switches, ensure that no person or object is in the area of the implement, 3-point linkage or PTO shaft.

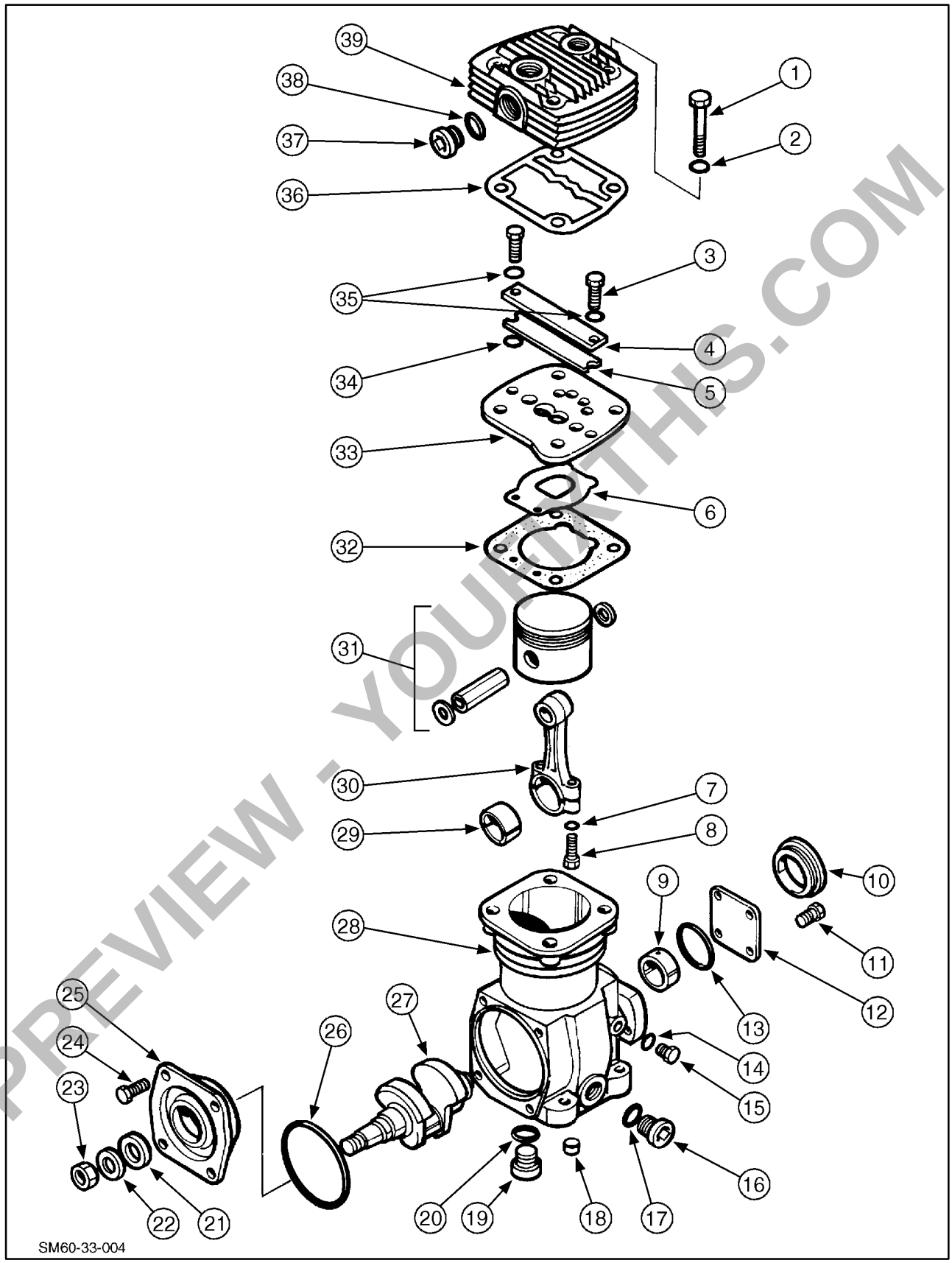
Never operate the external switches while standing:

- Directly behind the tractor or tyres.
- Between the lower links.
- On or near the implement.
- Never extend arms, legs, any part of the body or any object into the area near the 3-point linkage, PTO shaft or implement while operating the external switch.
- Never have an assistant working the opposite set of controls.
- When moving to the opposite set of controls, move around the tractor or implement.
- Do not cross between the implement and tractor.

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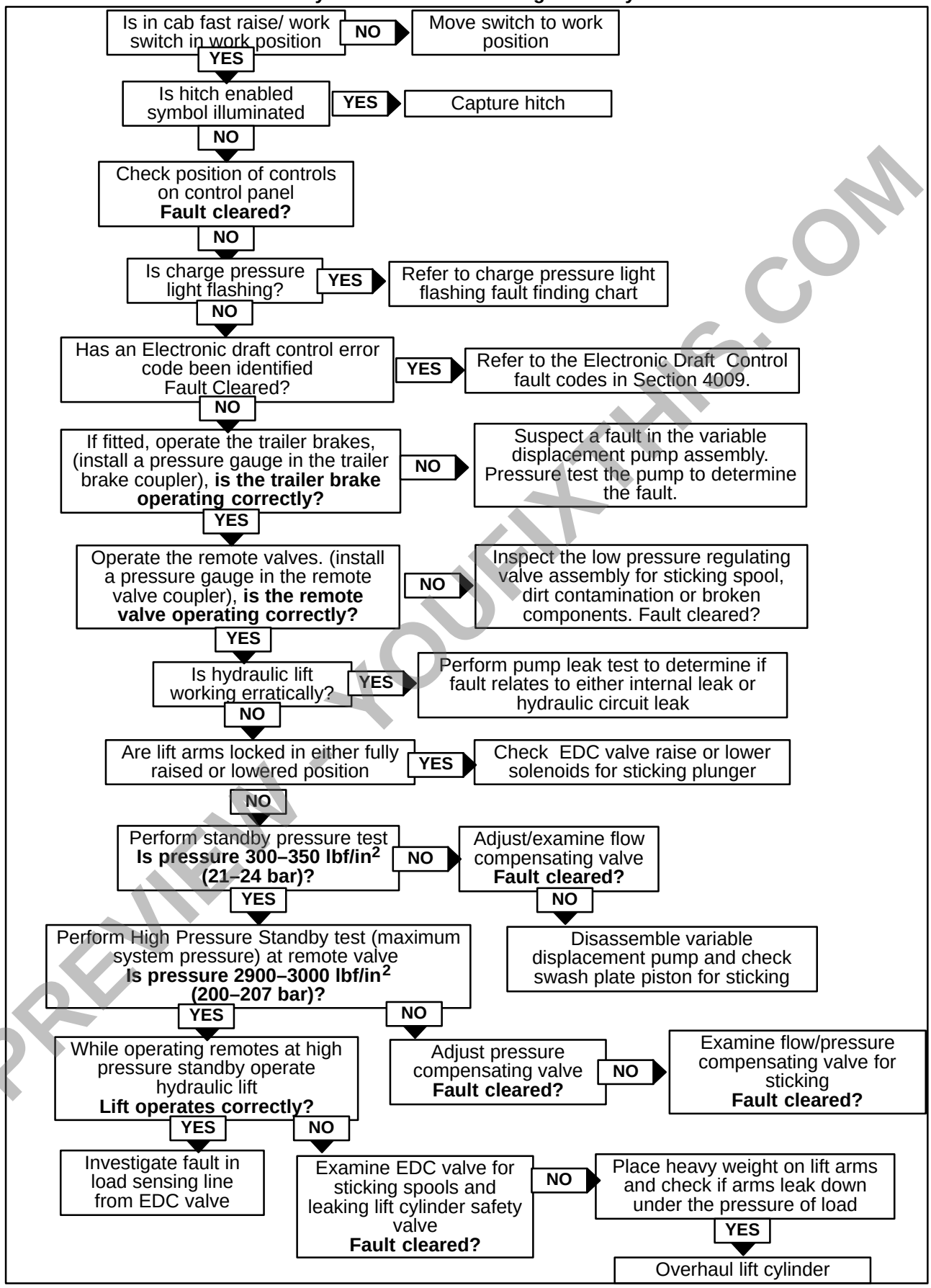
COMPONENT OVERHAUL – COMPRESSOR



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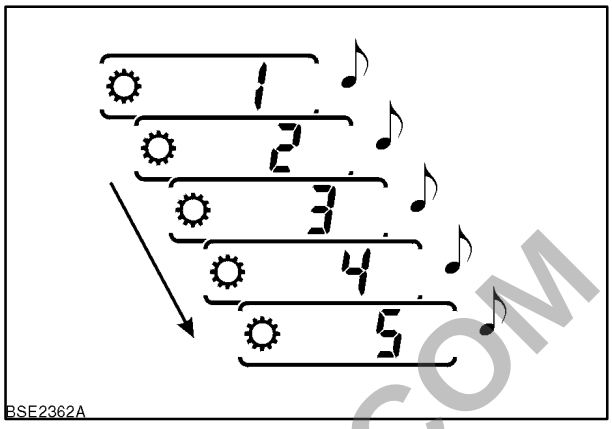
Hydraulic Lift Not Working Correctly



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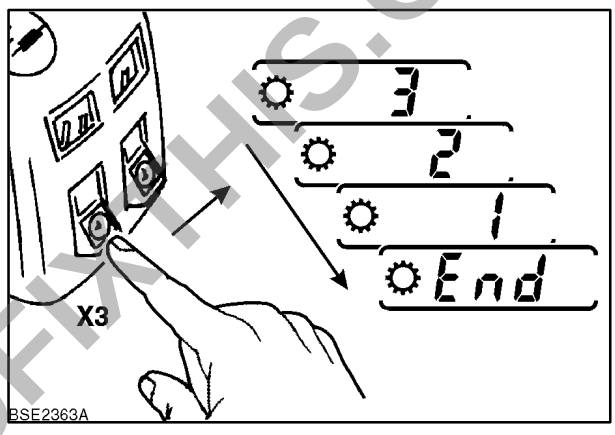
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6. Turn the Key Start switch ON and select H Menu mode HL.
7. ***Reconnect each valve in the correct order, ie, No.1 on the right hand end as viewed from behind the tractor.*** As each valve is connected wait for that valve to be recognised by the control module, this is highlighted by an audible beep as-well as the valve number being displayed on the instrument cluster. It will take approximately 10 seconds for each valve to be recognised.



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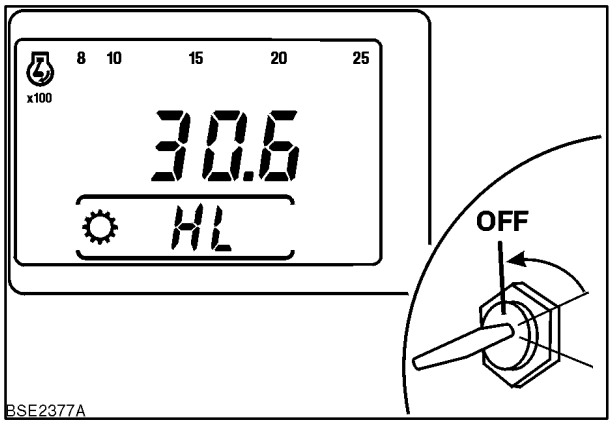
8. When the last valve has been recognised pulse the No.1 EHR Valve timer switch 3 times in quick succession.
9. The number 3 will be displayed followed by 2, 1 and then END. This will signify the end of the procedure.



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10. Turn the key start switch OFF to store the programming.

NOTE: *After the installation of a new or repaired valve it will be necessary to recalibrate the control lever. Refer to 'recalibrating the control levers' detailed earlier in this Chapter.*



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