# SECTION 10 – ENGINE

**BOOK 1 - 87611239**

## Chapter 2 – 7.5L CNH Engine

**CONTENTS**


| Section | Description | Page |
|---|---|---|
| | Specifications | 6 |
| | Cylinder Block | 6 |
| | Cylinder Head | 6 |
| | Exhaust Valves | 7 |
| | Intake Valves | 7 |
| | Valve Springs | 7 |
| | Camshaft Lobe Lift | 7 |
| | Installed Valve Recession | 7 |
| | Valve Inserts | 7 |
| | Valve Seats | 8 |
| | Valve Timing | 8 |
| | Camshaft Idler Gear | 8 |
| | Camshaft Gear | 8 |
| | Rocker Arm Shaft | 8 |
| | Rocker Arm | 8 |
| | Tappets | 8 |
| | Camshaft | 8 |
| | Connecting Rods | 9 |
| | Piston Pin | 9 |
| | Pistons | 9 |
| | Piston Rings | 9 |
| | Crankshaft | 10 |
| | Crankshaft Drive Gear | 10 |
| | Main Bearing | 10 |
| | Crankpin Bearings | 10 |
| | Crankshaft Re-grinding | 11 |
| | Flywheel | 11 |
| | Oil Pump | 11 |
| | Oil Pressure | 11 |
| | Oil Filter Support | 12 |
| | Engine Oils and Change Periods | 12 |


PREVIEW - YOUFIXTHIS.COM



Download full manual at youfixthis.com

## CLUTCH AND SYNCHRONIZER CALIBRATION

### Calibration Procedure

The Semi-Powershift transmission has 5 clutch packs and 2 synchronizers that require periodic calibration to compensate for wear. Calibration should only be necessary only if a deterioration in gear shift quality is noted.

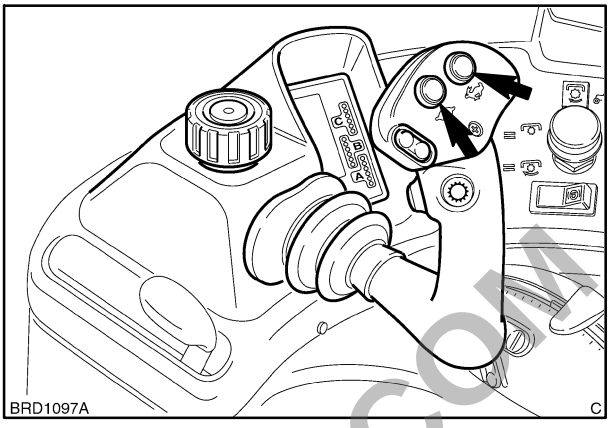
***NOTE:*** *During the calibration procedure the electronic management system detects precisely the point at which the clutches start to engage. The engagement is detected by a reduction in engine speed. During calibration it is essential that no action is taken to cause the engine speed to vary. Be sure that the air conditioner and all electrical equipment is switched off. Do not operate the PTO or any hydraulic lever or move the hand or foot throttle.*

There are two methods to enter the calibration mode

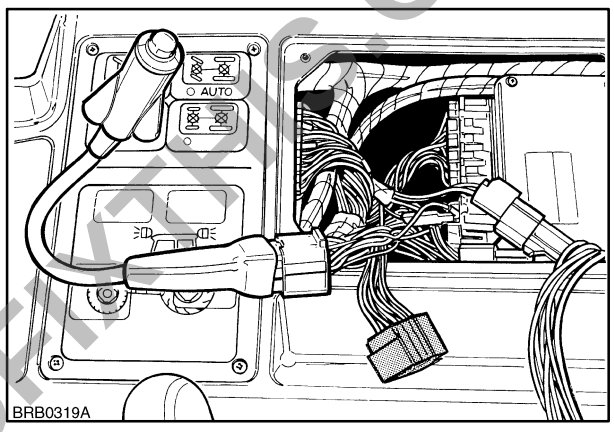
By depressing both up/down shift buttons together during start up.

or alternative method,

Using diagnostic tool **380000488** (**FNH00874**) plugged into the white diagnostic connector and entering mode H1, figure 39, by depressing diagnostic tool button after engine start up.




37



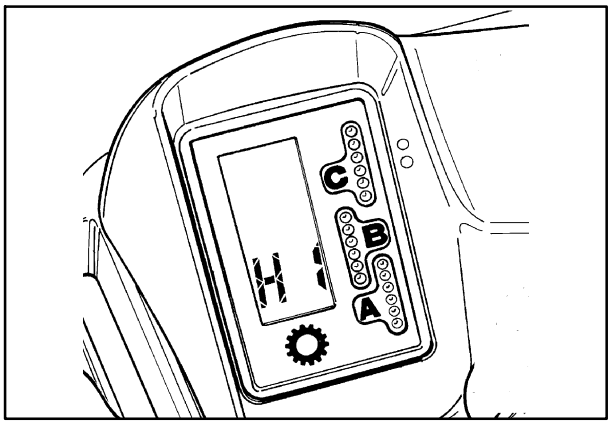

38

### Tractor Preparation

***NOTE:*** *The clutches should be adjusted when the transmission oil temperature is between 20 °C (68 °F) and 50 °C (122 °F).*

Park the tractor on level ground, away from obstacles (in case of unexpected tractor movement).

Apply handbrake, switch off all electrical equipment and air conditioning if fitted. Lower hydraulic equipment to the ground place remote levers in neutral and stop the engine.

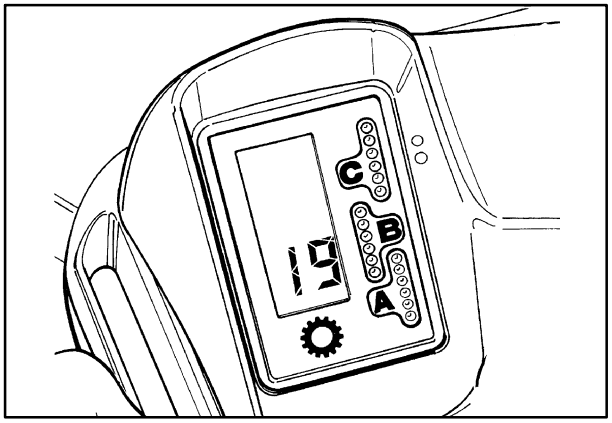



39

Place the shuttle in neutral. Block the wheels, front and rear.

Enter calibration mode using upshift/downshift buttons or diagnostic tool.

Release the buttons. The display will change to show transmission temperature.




40

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

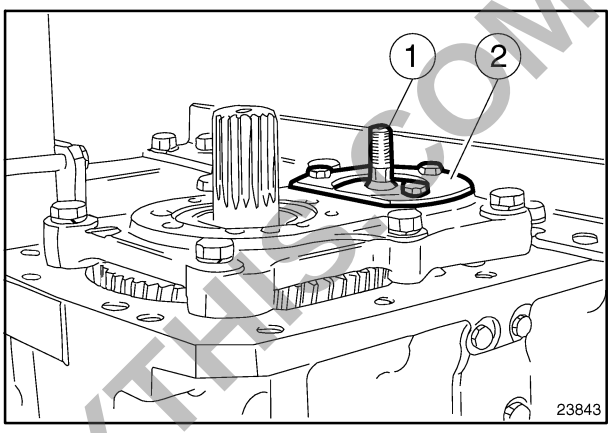
***Range Input and Output Shaft Taper Bearing Adjustment***

**⚠ WARNING ⚠**

Always use suitable tools to align holes. DO NOT USE HANDS OR FINGERS.

Proceed as follows:

1. Install cover (2) without the adjust shim. Install tool no. **50013** (1) (see page 8) on to the input shaft.




74

2. Screw installer tool no. **380000458** (2) on tool no. **50013** (3). Place a dial indicator (1) with the stylus touching the bearing inner race. Turn the shafts to settle the bearing rollers, reset gauge to zero ensuring that the assembly is bottoming.

Through the lever of installer tool no. **380000458** (2), bring the assembly to touch the cover (4) and read the travel (L) on the dial indicator.

Adjust shim to be added is given by:

**S = L- (0 to 0.06 mm)**

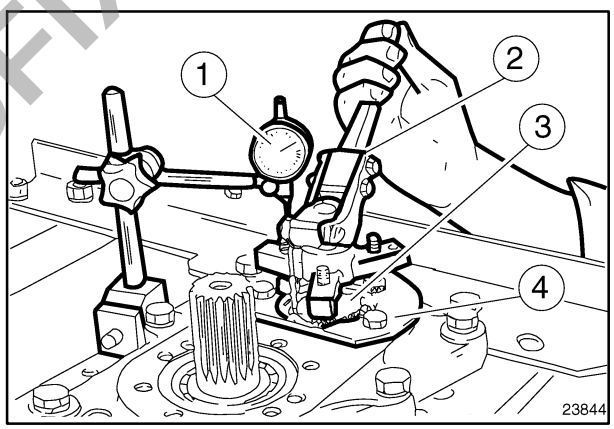
where:

**S** = Adjust shim.

**L** = Travel reading.

**0 to 0.06 mm** = input shaft bearing end play.

***NOTE:*** *Available adjust shims for the range input shaft bearings are listed on page 3.*



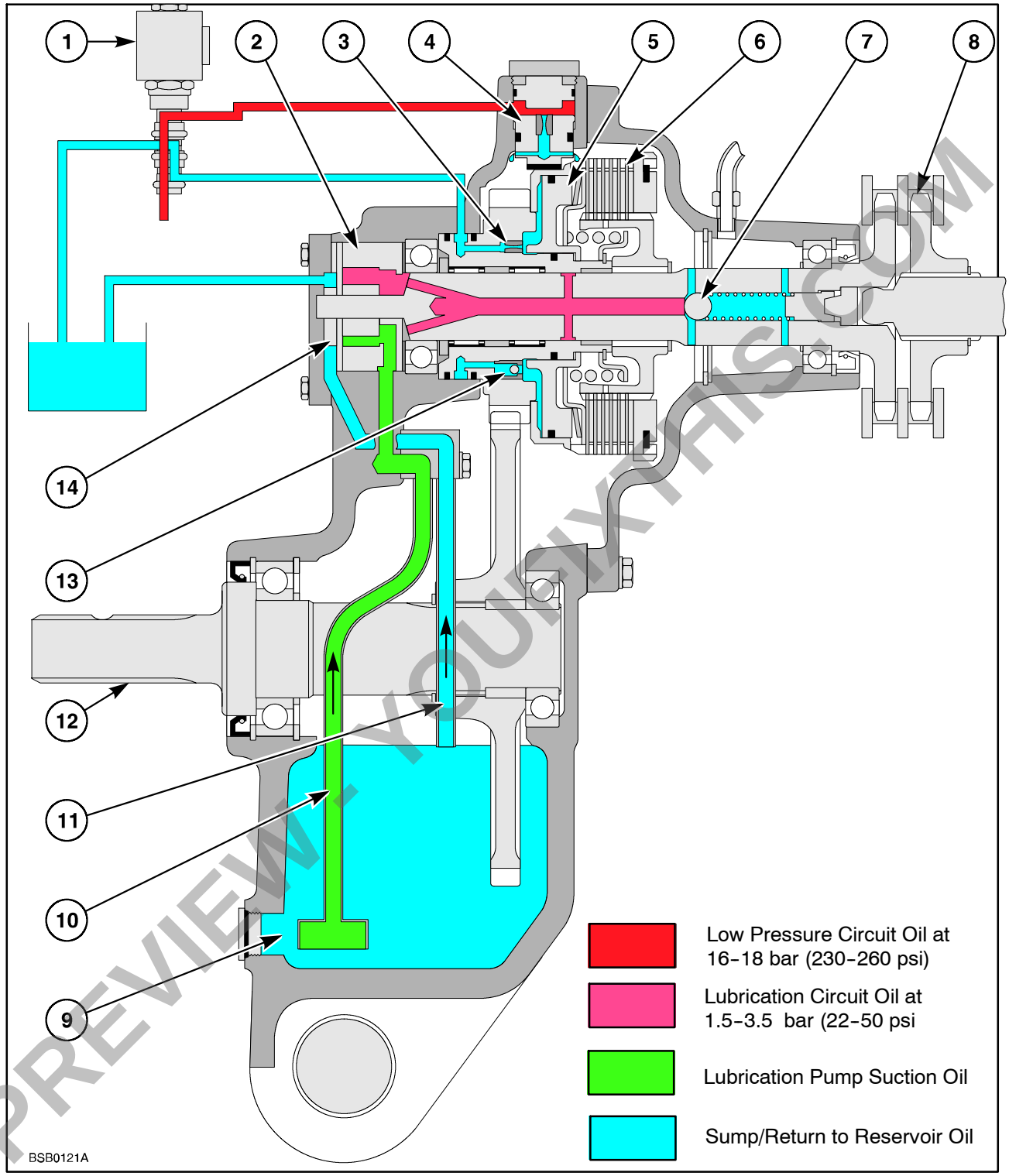

75

3. Dismantle tools (2 and 3), remove cover (4), assemble the shim as previously found, reinstall cover (4) and tools (2 and 3). Repeat step 2 to check end play is to specification, 0 to 0.06 mm.

Remove tools (2 and 3).

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



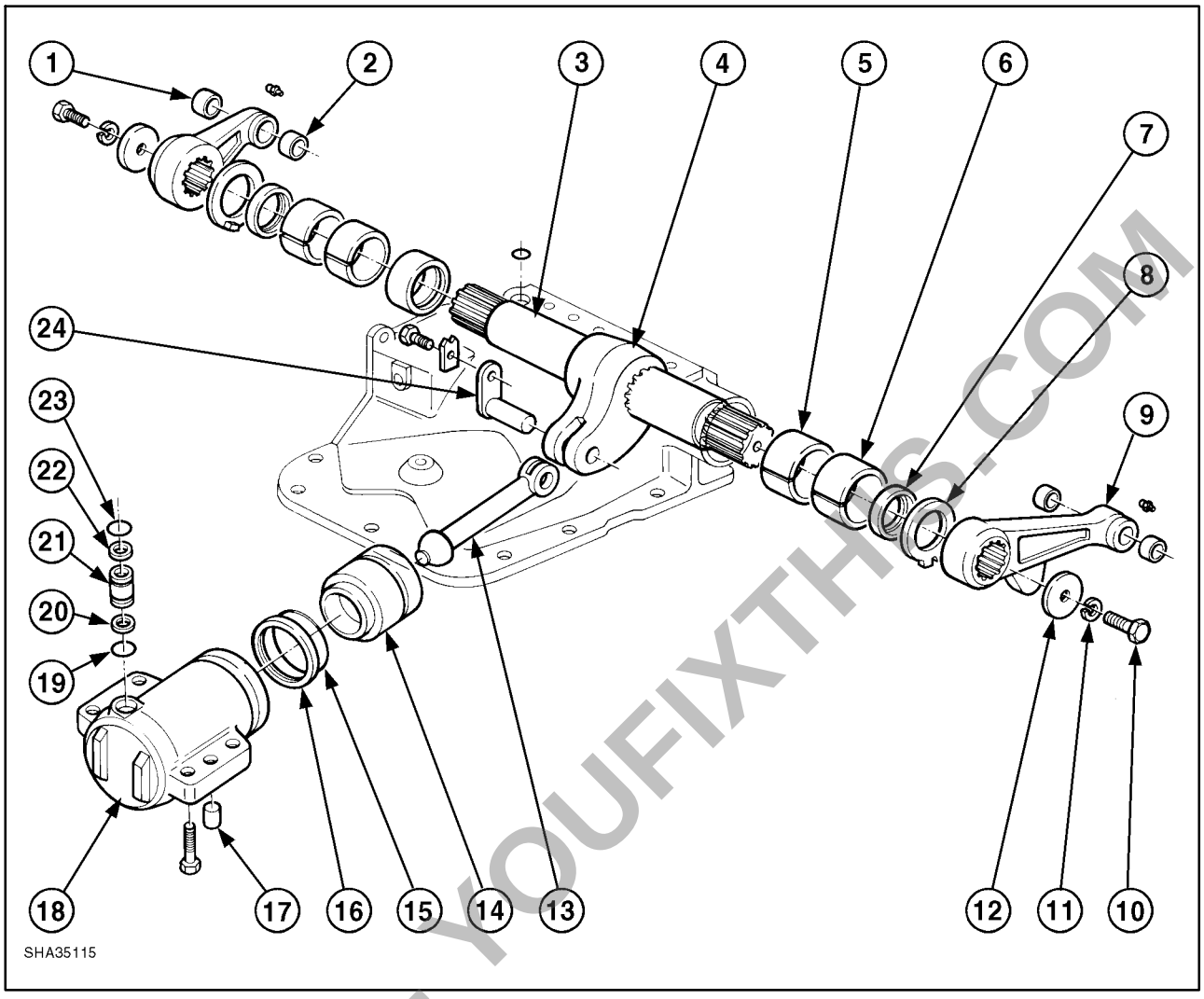

13

**Front PTO Disengaged**

1. Solenoid Valve
2. Lubrication Circuit Pump
3. Orifice
4. PTO Brake
5. Clutch Piston
6. Clutch Plates
7. Lubrication Circuit Relief Valve
8. Input Shaft
9. Lubrication Circuit Reservoir
10. Lubrication Pump Suction Tube
11. Scavenger Pump Suction Tube
12. Output Shaft
13. One Way Check Valve Orifice
14. Scavenger Pump

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com




98

**Hydraulic Lift Cover**

1. Bush
2. Bush
3. Cross Shaft
4. Arm
5. Bush
6. Bush
7. Seal
8. Spacer
9. Arm
10. Bolt
11. Washer
12. Spacer
13. Rod
14. Piston
15. Back up Ring
16. Seal
17. Dowel (2 off)
18. Cylinder
19. 'O' Ring
20. Seal
21. Connecting Tube
22. Seal
23. 'O' Ring
24. Pin

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

***Expansion Valve - Operation***

All of the needed temperature sensing and pressure sensing functions are consolidated into this basic unit and no external tubes are required for these purposes.

The refrigerant from the condenser and receiver dryer enters the thermostatic expansion valve as a high pressure warm liquid. Upon passing through the ball and spring controlled metering orifice, the pressure and temperature of the refrigerant is reduced and the refrigerant leaves the thermostatic expansion valve as a low pressure, lower temperature atomized liquid.

The atomized liquid now passes through the evaporator where it absorbs heat before returning via the expansion valve to the compressor as a warm Low pressure vapor.

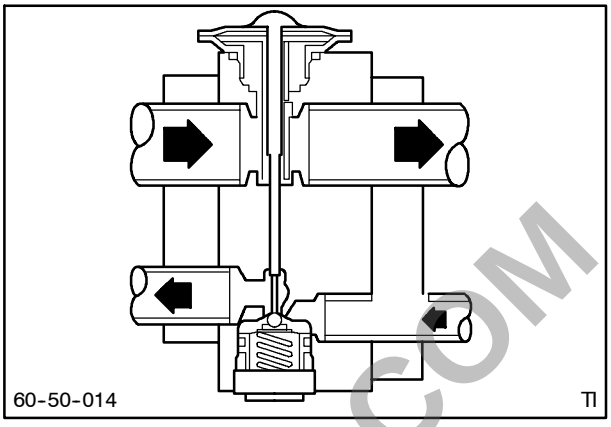
There are two refrigerant passages in the valve. One passage is in the refrigerant line from the condenser to the evaporator and contains the ball and spring type orifice valve. The other passage is in the refrigerant line from the evaporator to the compressor and contains the valve's temperature sensing element.

Liquid refrigerant flow from the condenser and receiver dryer is controlled by a push-rod forcing the orifice valve ball off its seat and the spring exerting pressure on the ball to keep it on its seat.

During stabilized (vehicle shutdown) conditions, the pressure on the bottom of the expansion valve diaphragm rises above the pressure on the top of the diaphragm allowing the valve spring to close the orifice.

When the system is started, the pressure on the bottom of the diaphragm drops rapidly, allowing the orifice to open and meter atomized liquid refrigerant to the evaporator where it begins to vaporize.

Suction from the compressor draws the vaporized refrigerant out of the evaporator and back through a gallery in the top of the valve which passes the temperature sensor.




16

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

## PROCESSOR FEEDS AND GROUNDS 1
## Line 10410-10800

**F20** Fuse 20 - 5A

**F14** Fuse 14 - 5A

**GCM2** C127

**A012** Electronic Management Unit (C105)

| WIRE COLOR CODES | | | | | | | |
|---|---|---|---|---|---|---|---|
| B | Black | R | Red | LTG | Light Green | K | Pink |
| N | Brown | O | Orange | U | Blue | W | White |
| LN | Light Brown | Y | Yellow | TQ | Turquoise | | |
| S | Slate | G | Green | P | Purple | | |

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

## DIAGNOSTIC PLUGS
### Line 9610-10000

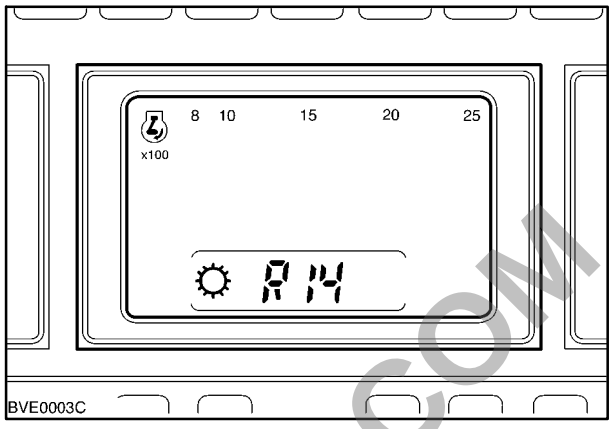
**A015** GCM Diagnostic Connector-Black
**A016** TCM Diagnostic Connector-White
**A030** Ground Speed Link

| WIRE COLOR CODES | | | | | | | |
|---|---|---|---|---|---|---|---|
| B | Black | R | Red | LTG | Light Green | K | Pink |
| N | Brown | O | Orange | U | Blue | W | White |
| TN | Light Brown | Y | Yellow | TQ | Turquoise | | |
| S | Slate | G | Green | L | Purple | | |

PREVIEW - YOUFIXTHIS.COM

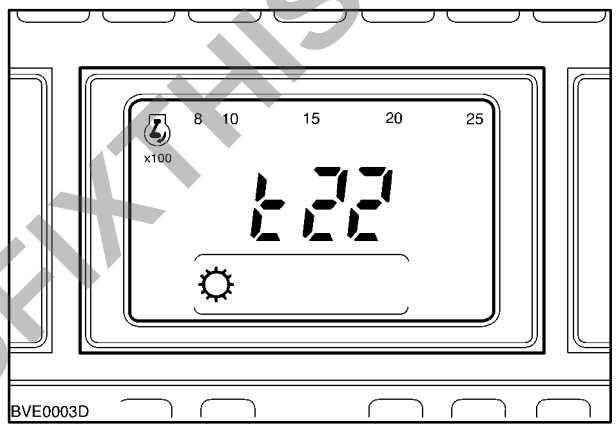
Download full manual at youfixthis.com

8. Electro-Hydraulic Remotes – ‘R’ codes
With Digital Instrument Cluster




59

9. Engine Fault codes – ‘t’ codes
With Digital Instrument Cluster




60

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

## ERROR CODE 23 – CONTROL PANEL DISCONNECTED

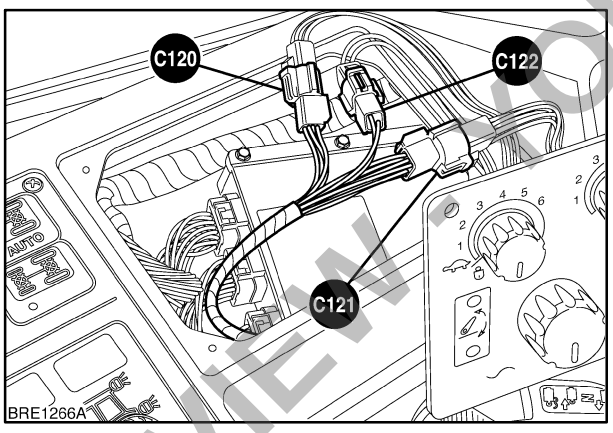
**Possible failure modes:**

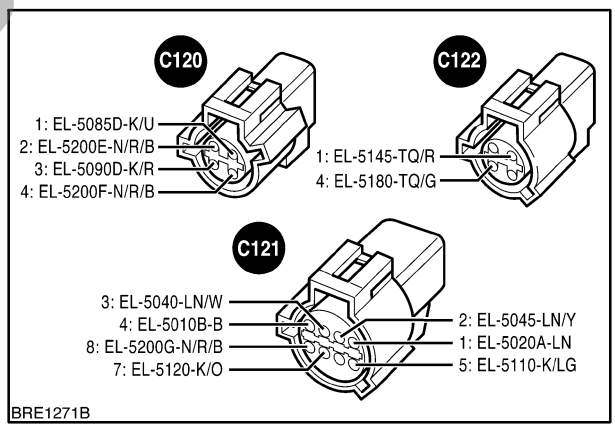
1. Faulty connector
2. Faulty EDC control panel
3. Faulty harness

**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 EDC control panel connecters **C120** and **C121**.
   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. Visually check the harness to the control panel for any damage.
   A. If the harness is damaged, repair or replace as required.
   B. If the harness is not damaged, continue to step 3.
3. Check all harness connectors are connected.
   A. If any connectors are disconnected, connect the connectors as required.
   B. If the harness is okay, remove and replace the EDC control panel.




PREVIEW ONLY
YOUFIXTHIS.COM

Download full manual at youfixthis.com

5. Check for an open circuit.

   A. Disconnect the EHR terminating resistor connector **C292**. Measure the resistance between connector:

   **C277** pin **1 (Y)** and **C292** pin **1 (Y)**

   **C277** pin **2 (G)** and **C292** pin **2 (G)**

   Wiggle the harness and the connectors to check for an intermittent circuit. If the resistance indicated is greater than approximately 5 ohms, repair or replace the harness as required.

   If the harness is okay, replace the terminating resistor.

6. Check for an open circuit.

   A. Measure the resistance between connector:

   **C277** pin **1 (Y)** and **C329** pin **13 (Y)**

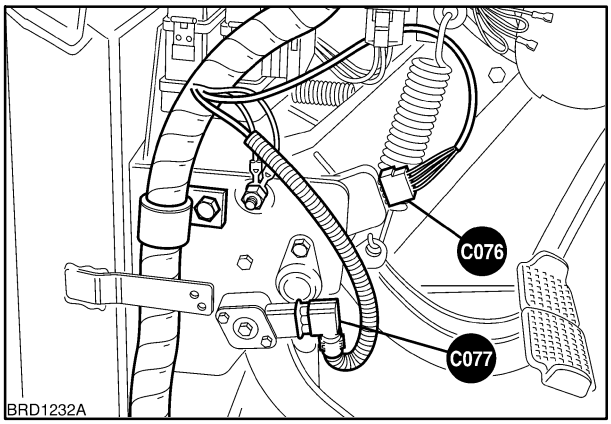
   **C277** pin **2 (G)** and **C329** pin **19 (G)**

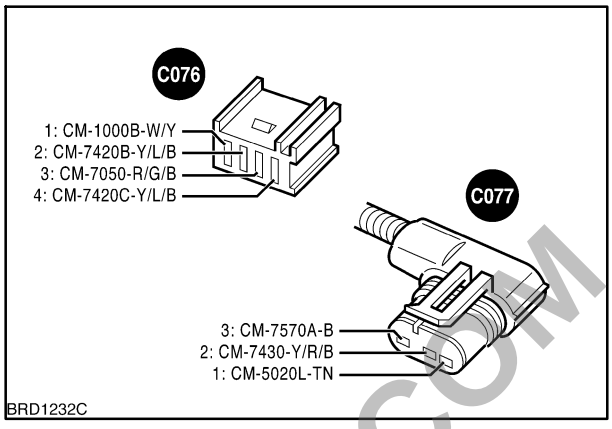
   Wiggle the harness and the connectors to check for an intermittent circuit. If the resistance indicated is greater than approximately 5 ohms, repair or replace the harness as required.

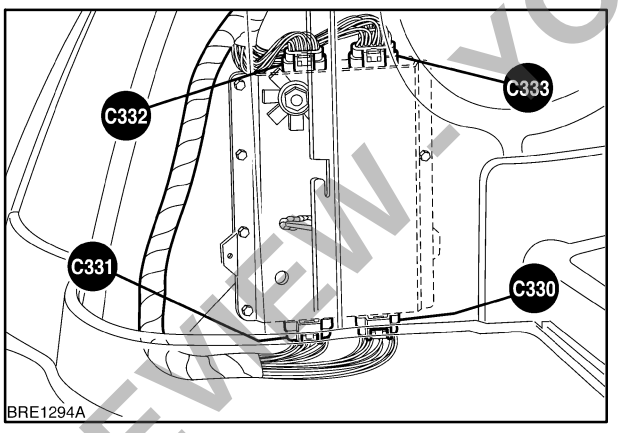
   B. If the harness is okay, remove and replace the central controller (XCM).

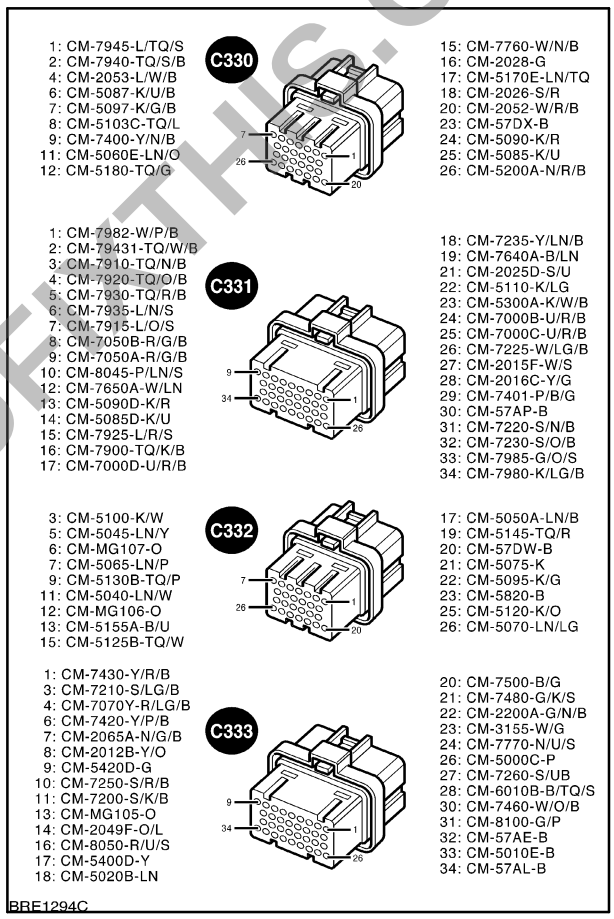
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



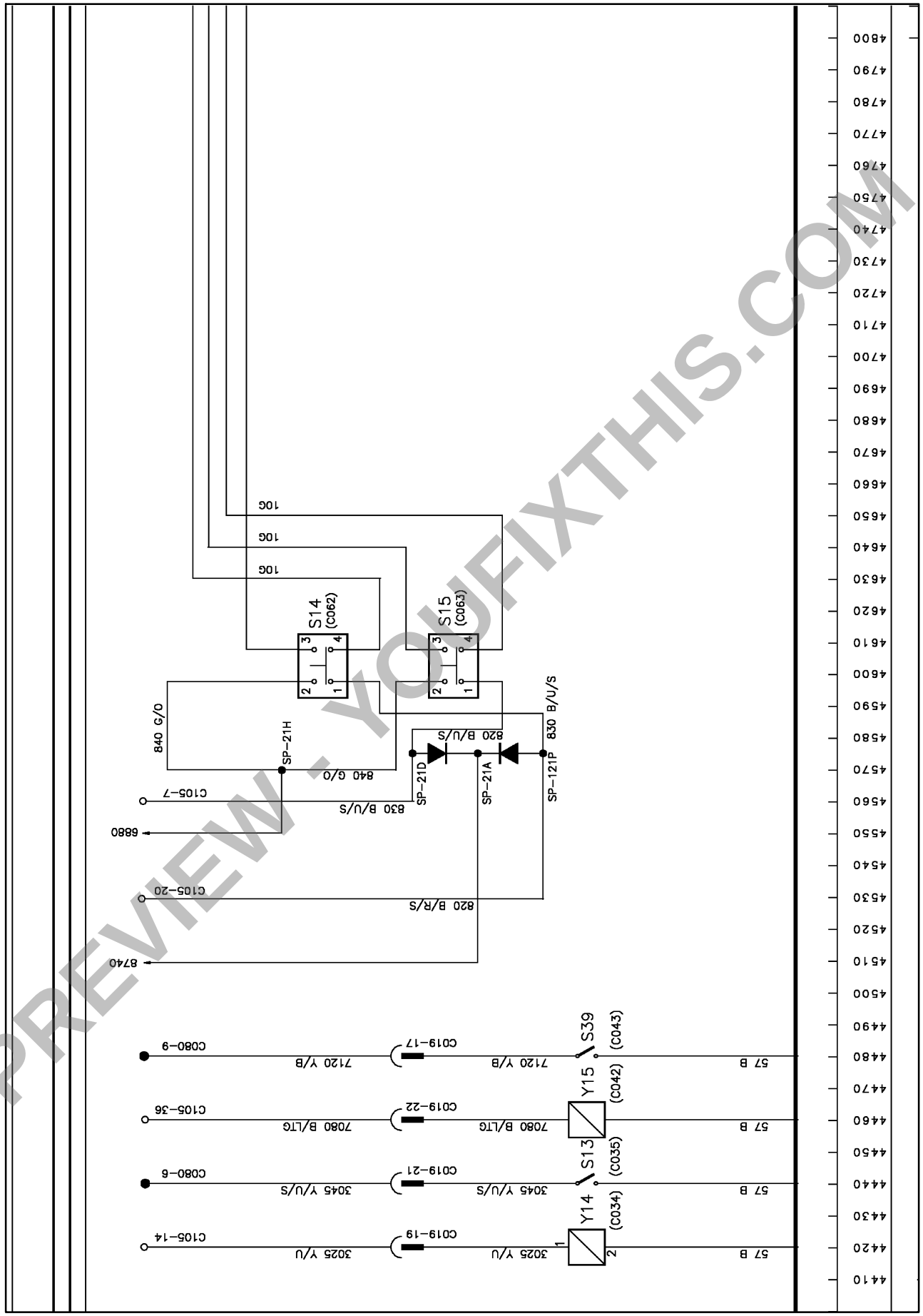




PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com




PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

## ERROR CODE 32 – DRAFT LOAD POTENTIOMETER SHORTED TO +12V

**Possible failure modes:**

1. Faulty harness
2. Faulty general control module (GCM)

**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 +5 volts.

   A. Disconnect the EDC control unit connector **C240**. Turn the Key/Start "On". Measure the voltage between connector **C240** pin **D (B)** and **C240** pin **C (LN)**. If the voltage is approximately +5 volts, download the correct level of software. If the fault reoccurs, remove and replace the general control module (GCM).

   B. If the voltage is greater than +5 volts, continue to step 2.

2. Check for a short to +12 volts.

   A. Turn the Key/Start "Off". Disconnect the general control module (GCM) connector **C127**. Turn the Key/Start "On". Check between connector:

   **C240** pin **D (B)** and **ground**

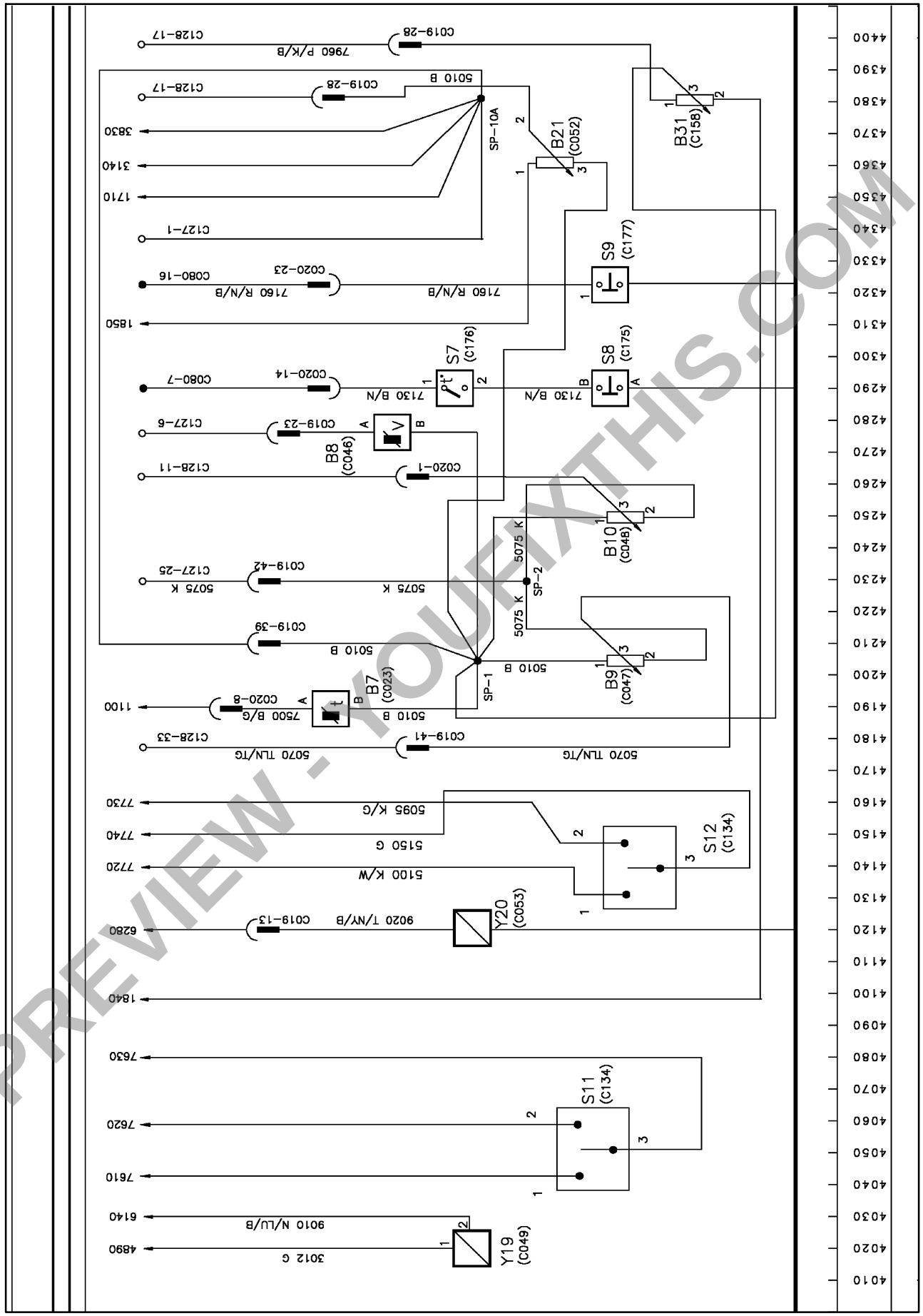
   **C240** pin **C (LN)** and **ground**

   If a short to +12 volts is indicated repair or replace the harness as required.

   B. If the harness is okay, download the correct level of software. If the fault reoccurs, remove and replace the general control module (GCM).

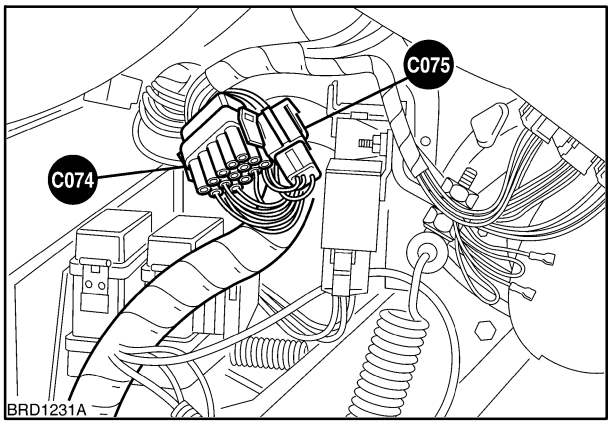
PREVIEW - YOUFIXTHIS.COM

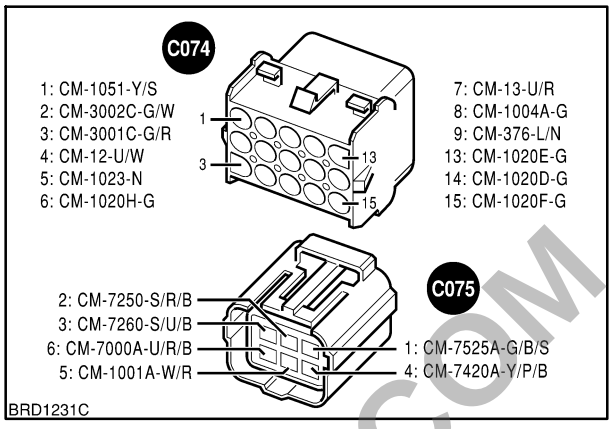
Download full manual at youfixthis.com

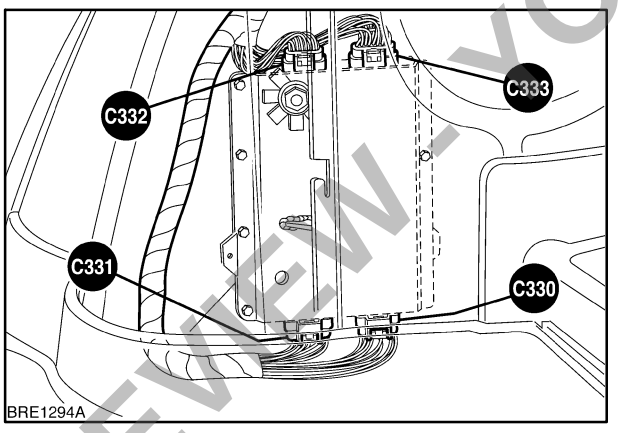


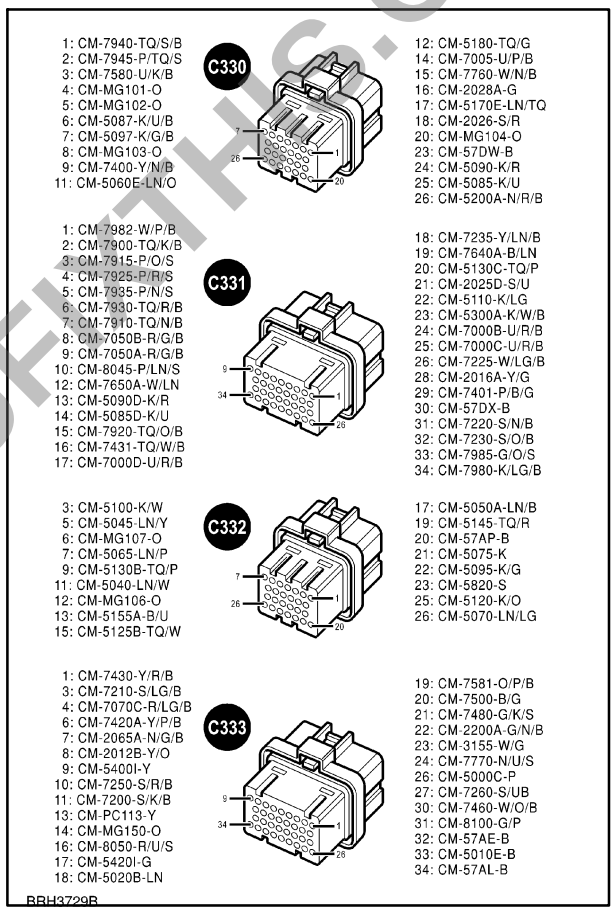

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



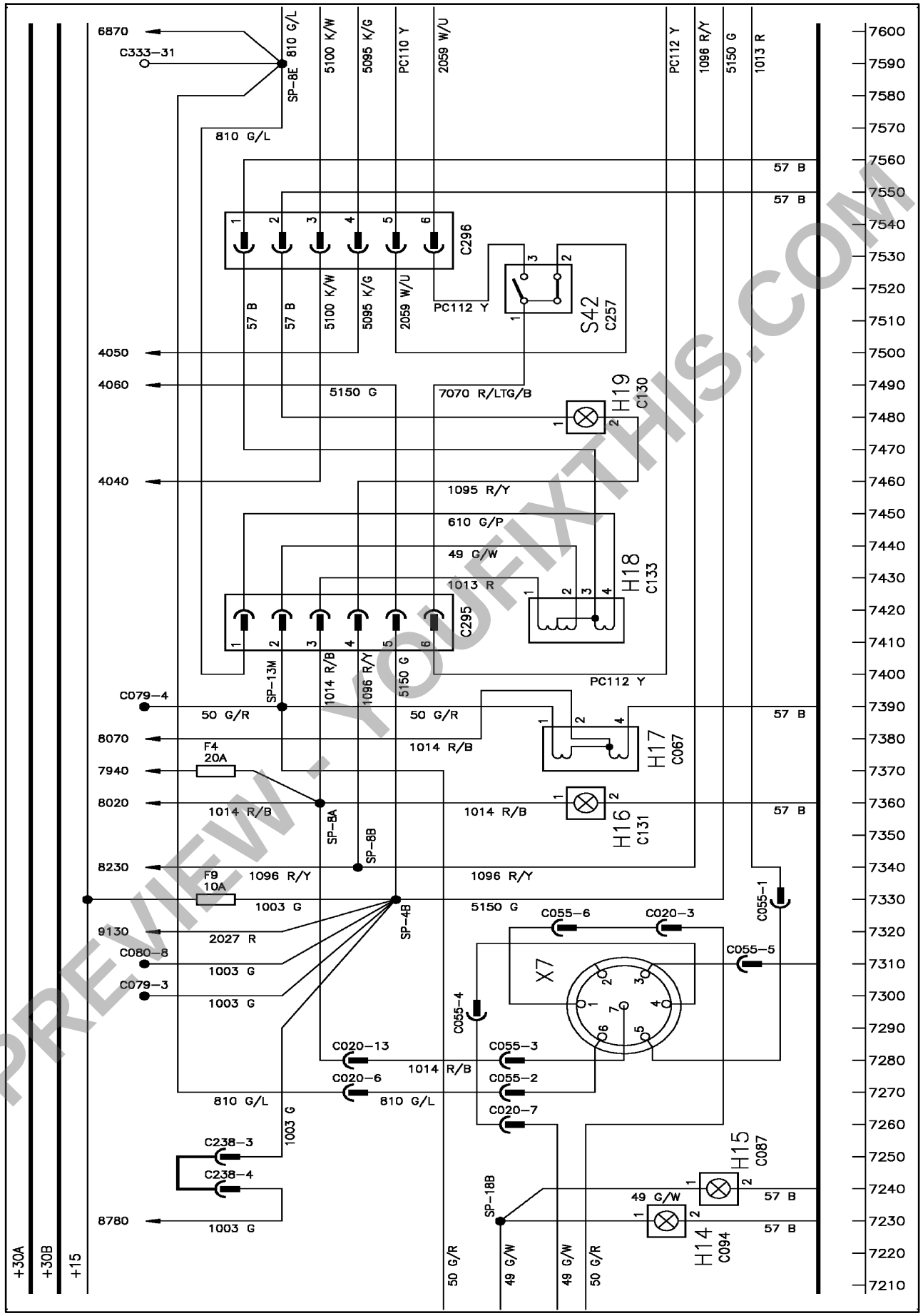



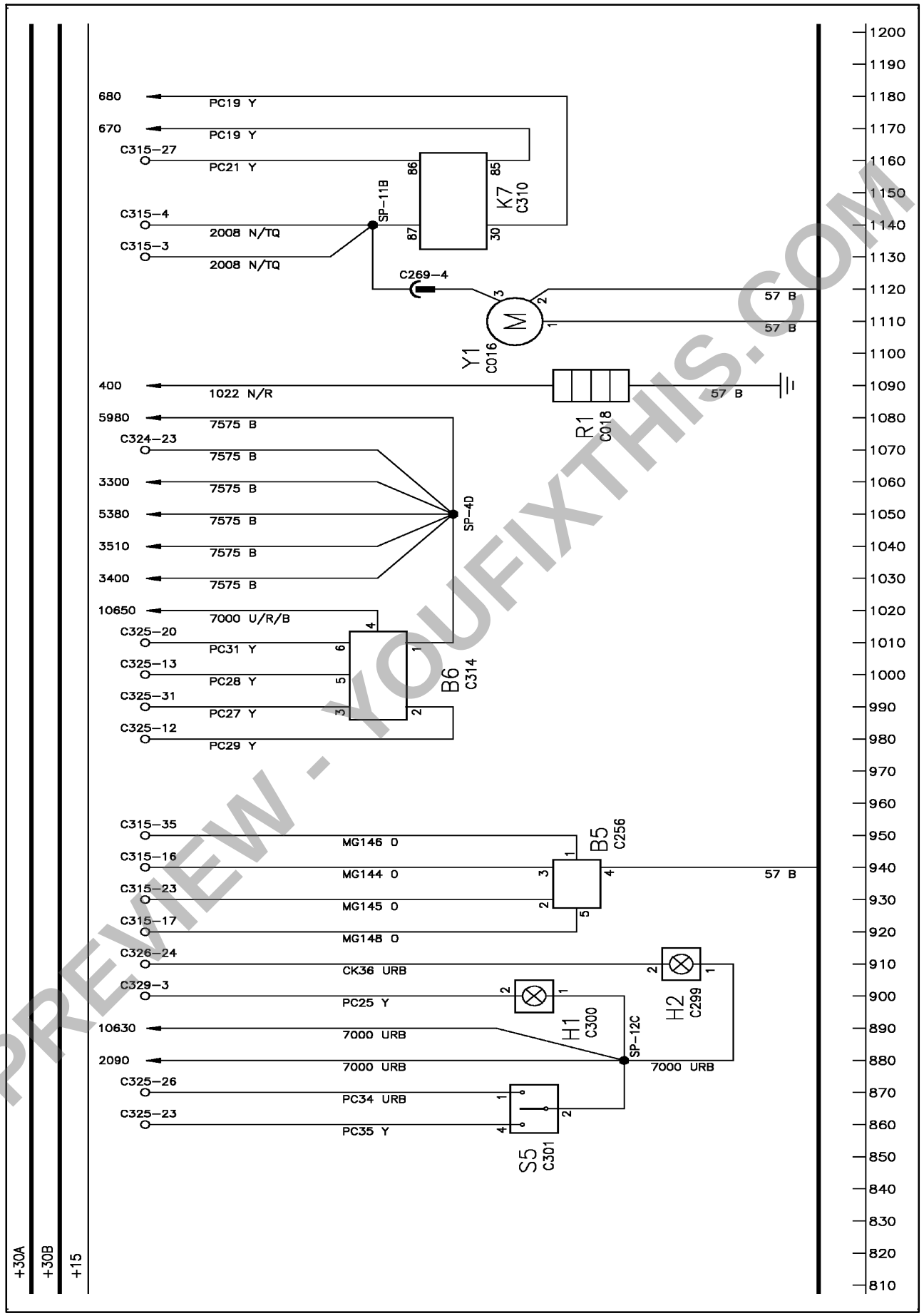

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



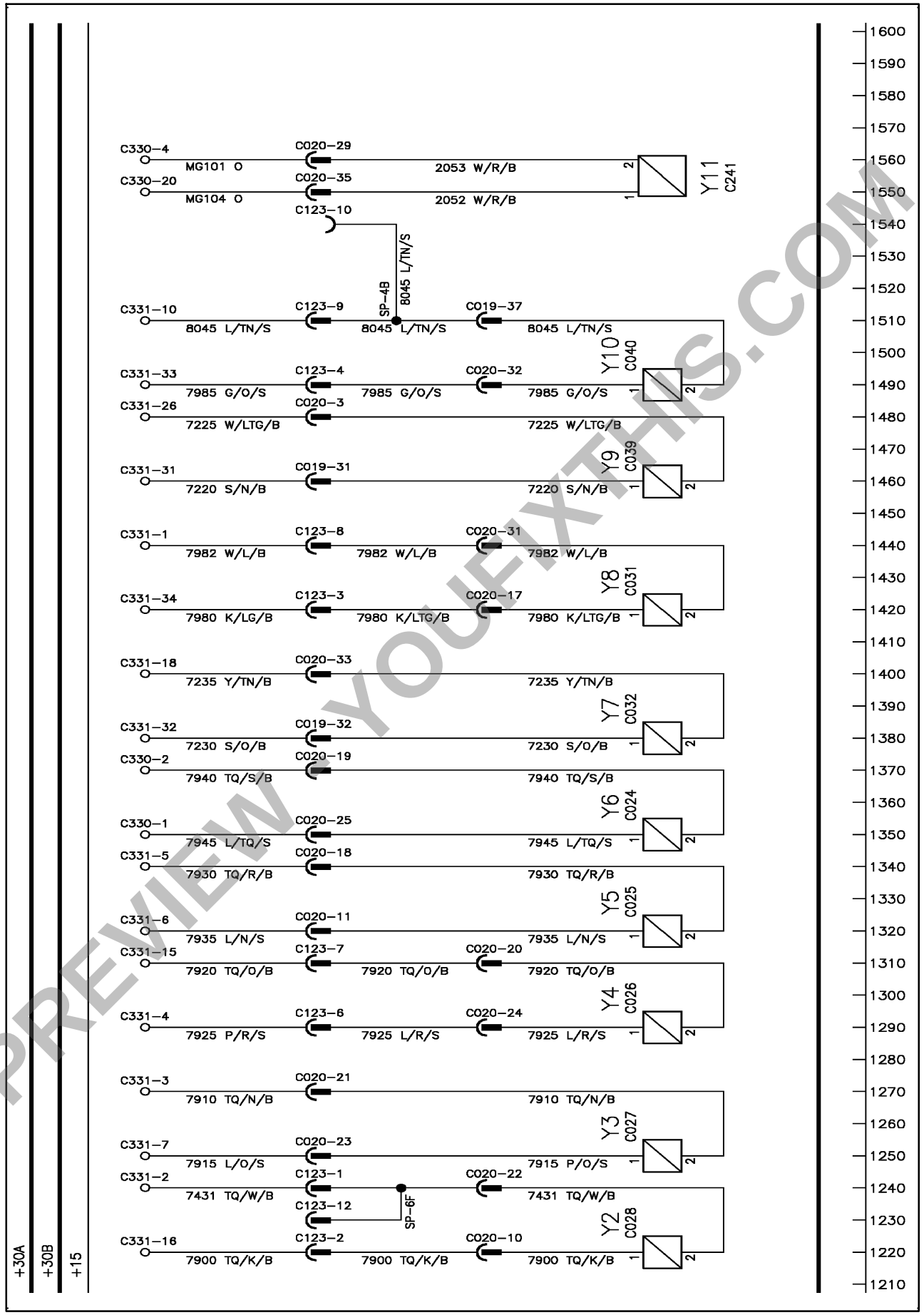

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



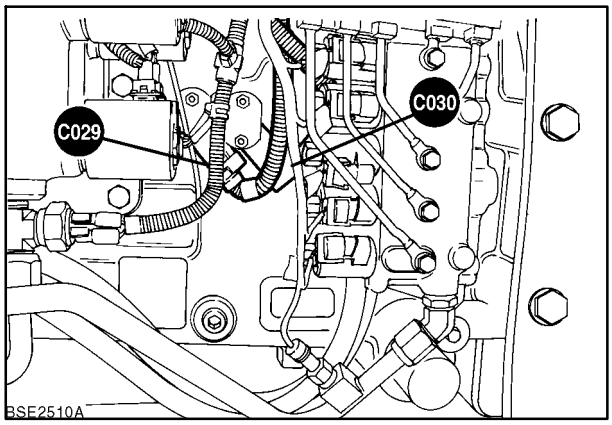

PREVIEW - YOUFIXTHIS.COM

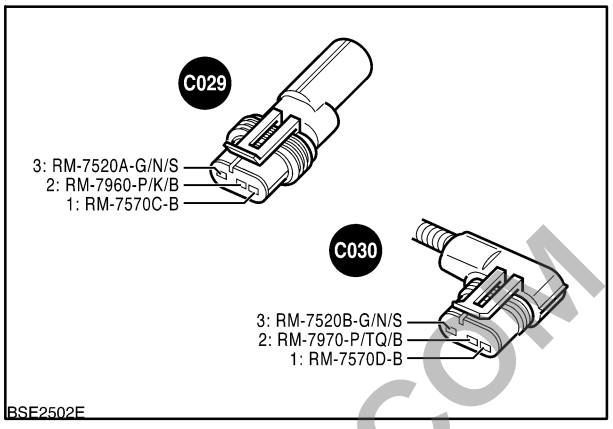
Download full manual at youfixthis.com




PREVIEW - YOUFIXTHIS.COM

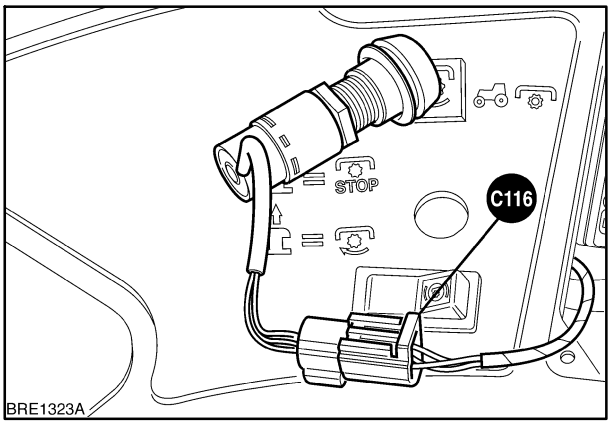
Download full manual at youfixthis.com



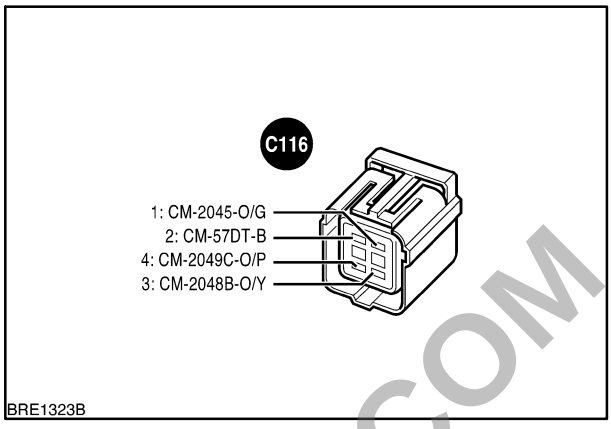




PREVIEW - YOUFIXTHIS.COM

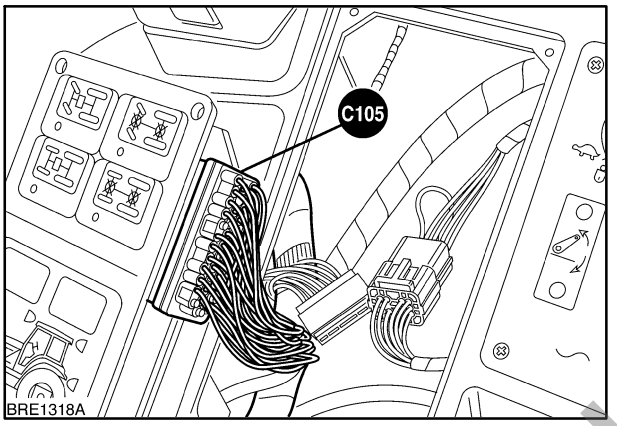
Download full manual at youfixthis.com



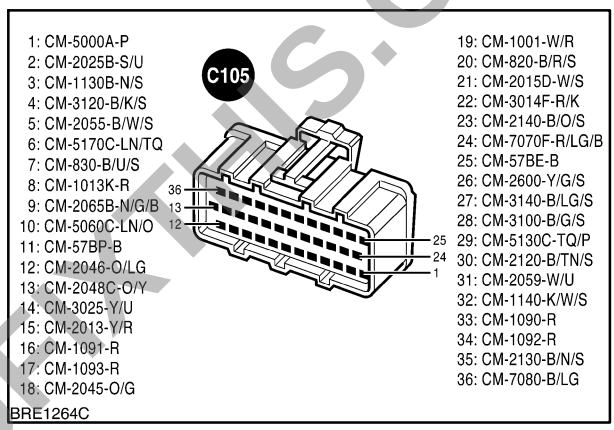
BRE1323A



BRE1323B



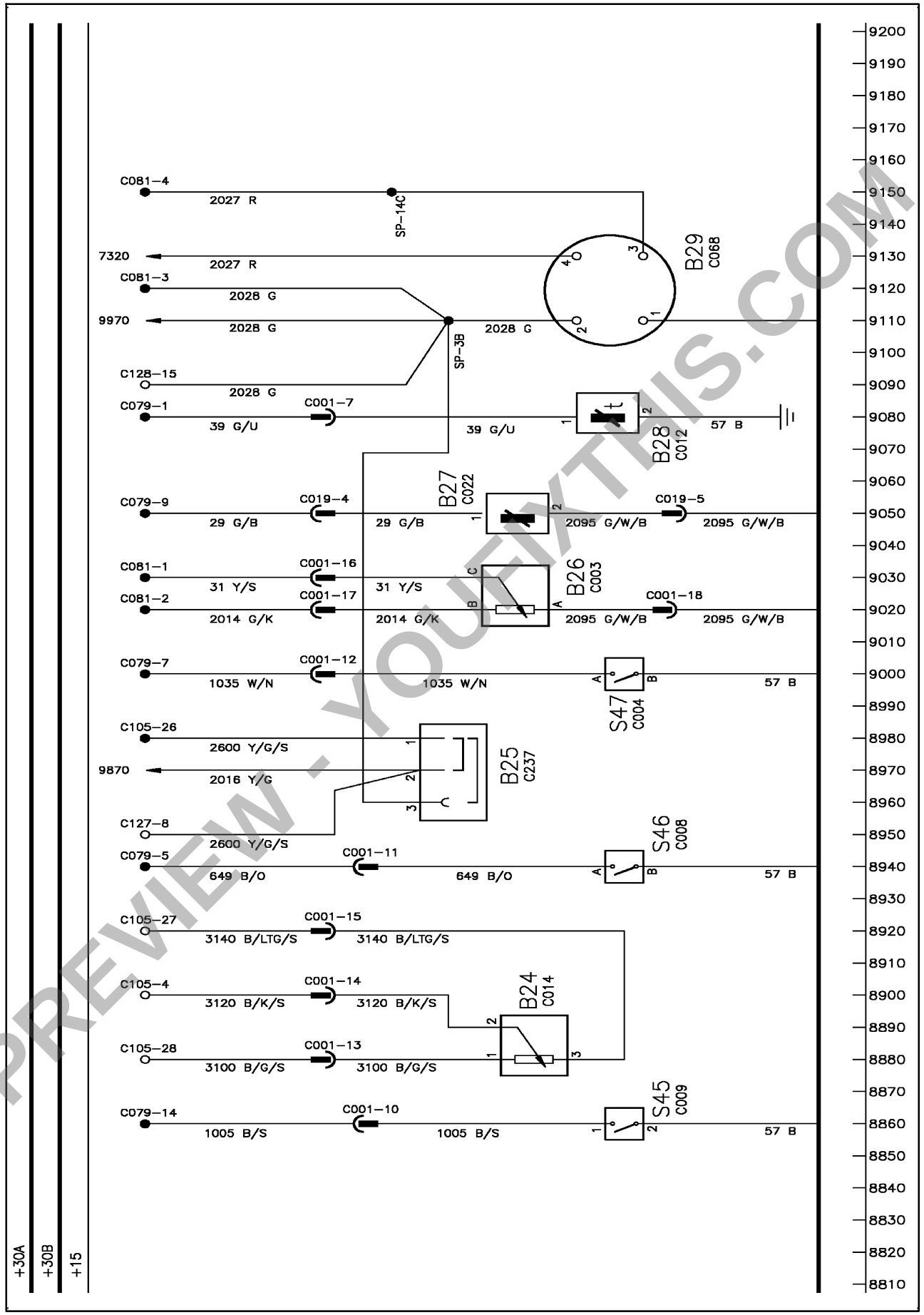
BRE1318A



BRE1264C

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com




PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

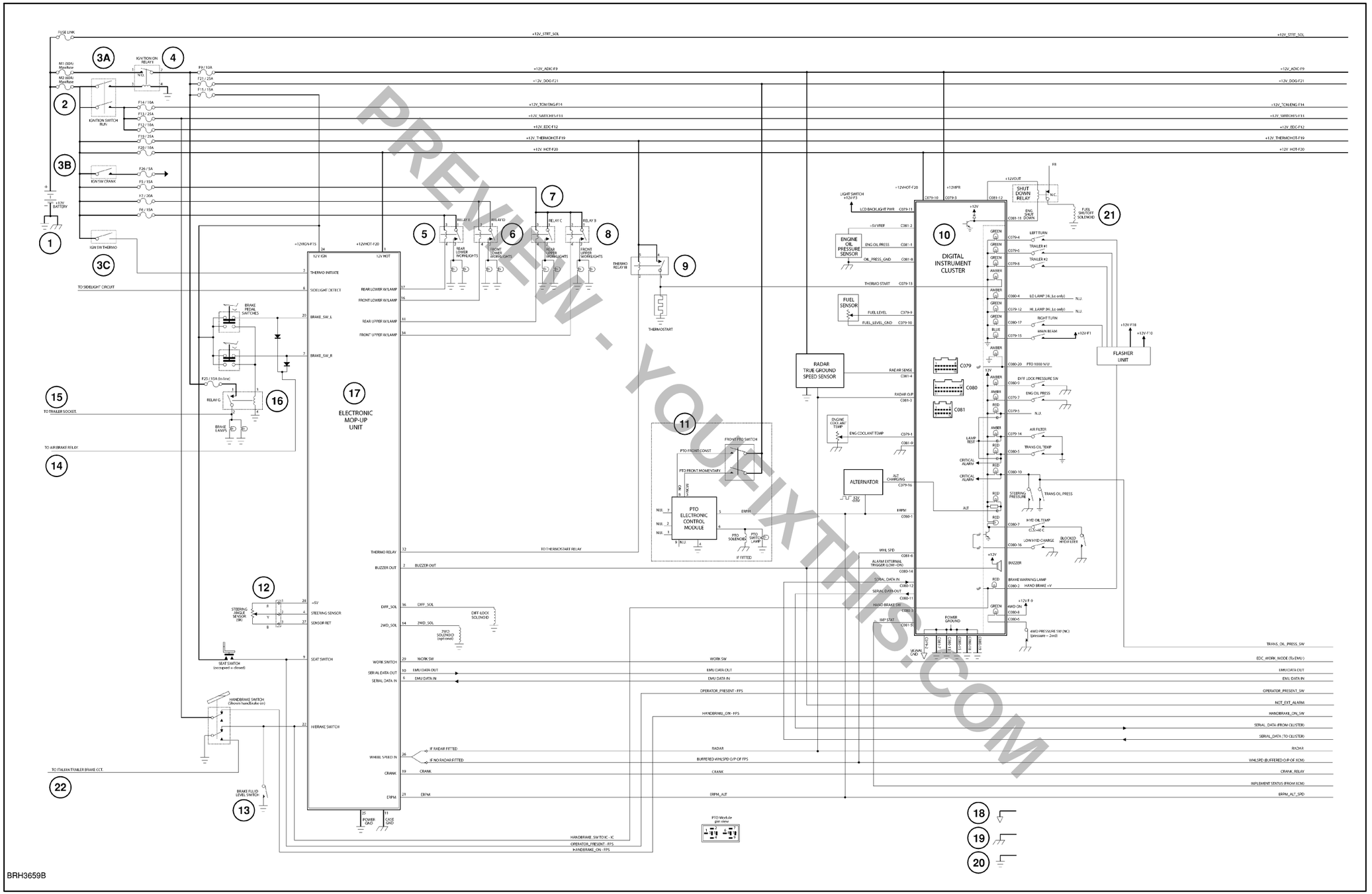
# Electrical Harnesses
# Semipowershift 120 to 155 Models
# (Before Serial No. ACM263458)

**CONTENT**


| Section | Description | Page |
|---|---|---|
| | Harnesses | 98 |
| | Main Extension Connectors | 99 |
| | Wire Color | 100 |
| | Wire Code | 100 |
| | Lighting Harness - Semipowershift - 120 to 155 Models | 102 |
| | Lighting Harness Connectors | 103 |
| | Lighting Harness Connector Location and Identification | 104 |
| | Front Main (Engine) Harness - Semipowershift - 120 to 155 Models | 106 |
| | Front Main (Engine) Connectors | 107 |
| | Front Main (Engine) Garbess Connector Location and Identification | 108 |
| | Rear Main (Transmission) Harness - Semipowershift - 120 to 155 Models | 113 |
| | Rear Main (Transmission) Harness Connectors | 114 |
| | Rear Main (Transmission) Harness Connector Location and Identification | 115 |
| | Chassis Main (Cab) Harness - Semipowershift - 120 to 155 Models | 121 |
| | Chassis Main (Cab) Harness Connectors | 122 |
| | Chassis Main (Cab) Harness Connector Location and Identification | 124 |
| | Electronic (Right-Hand Console) Harness - Semipowershift - 120 to 155 Models | 134 |
| | Electronic (Right-Hand Console) Harness Connectors | 135 |
| | Electronic (Right-Hand Console) Harness Connector Location and Identification | 136 |

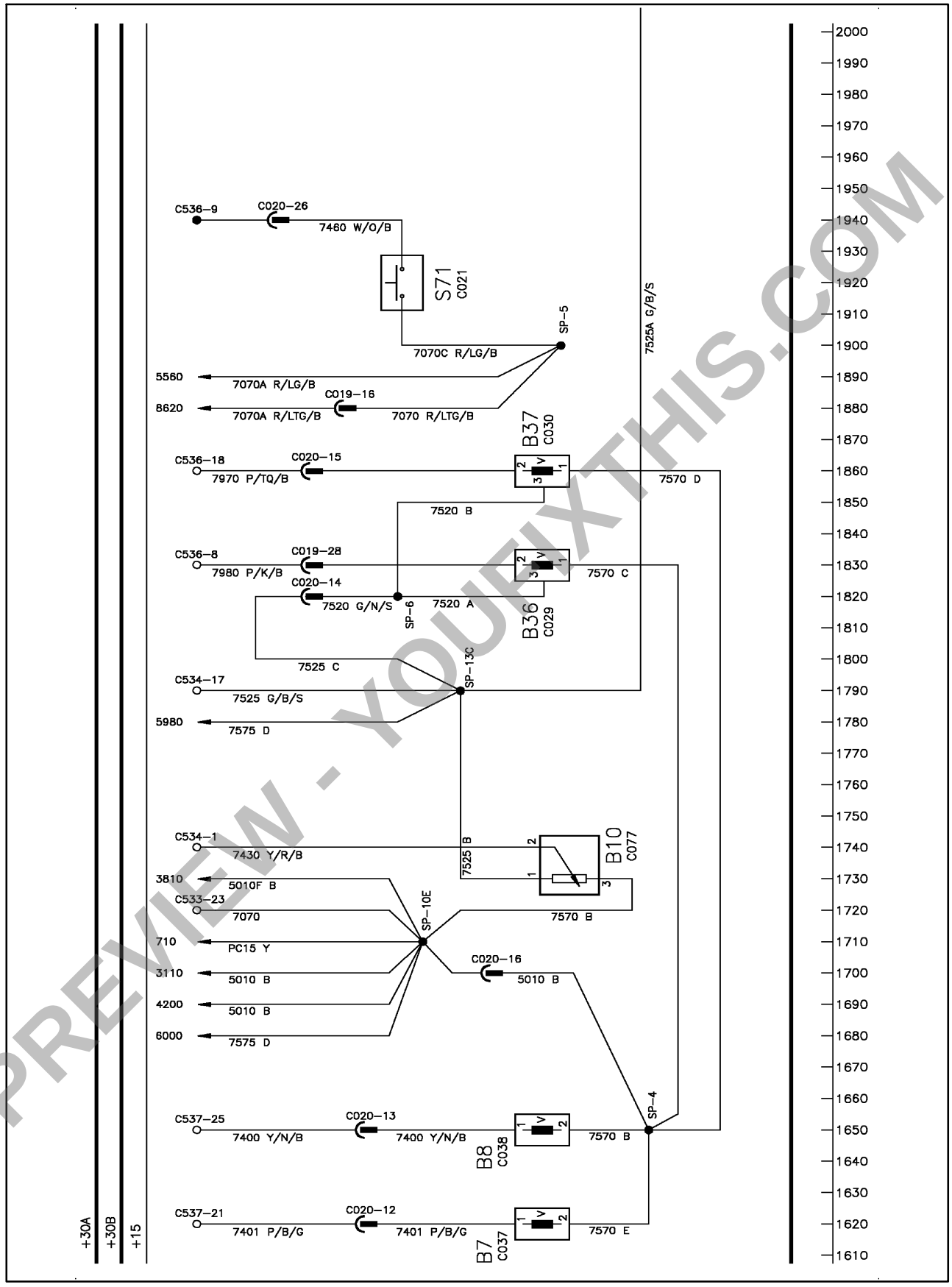

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com




PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com




PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

# PREVIEW ONLY

You're viewing 25 of 7954 pages

## The full manual includes:

- All 7954 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

**GET FULL MANUAL NOW**

**New Holland TM120, TM130, TM140, TM155, TM175, TM190 Repair Manual**

**Scan or click anywhere**
**youfixthis.com**

*Click anywhere on this page to get the full manual*