VOLVO

Construction Equipment

Service Information

Document Title: **Power transmission, description**	Function Group: **400**	Information Type: **Service Information**	Date: **2014/3/11**
Profile: **CWL, L45B [GB]**			

Power transmission, description

The machine drive power, forward/reverse, is achieved with hydrostatic drive. The hydraulic pump is flanged to the diesel engine and driven directly. The oil flow from the hydraulic pump passes to a hydraulic motor flanged to the dropbox. The power from the hydraulic motor is transferred via the dropbox to the rear axle. Via the propeller shaft joint the front axle is driven at the same time, giving permanent all-wheel drive.
The 100% differential lock integrated in the front and rear axles can be switched hydraulically. Using the inch brake function, stepless adjustment of the drive speed is guaranteed.

Hydrostatic drive L40B, SN 192 / L45B, SN 195

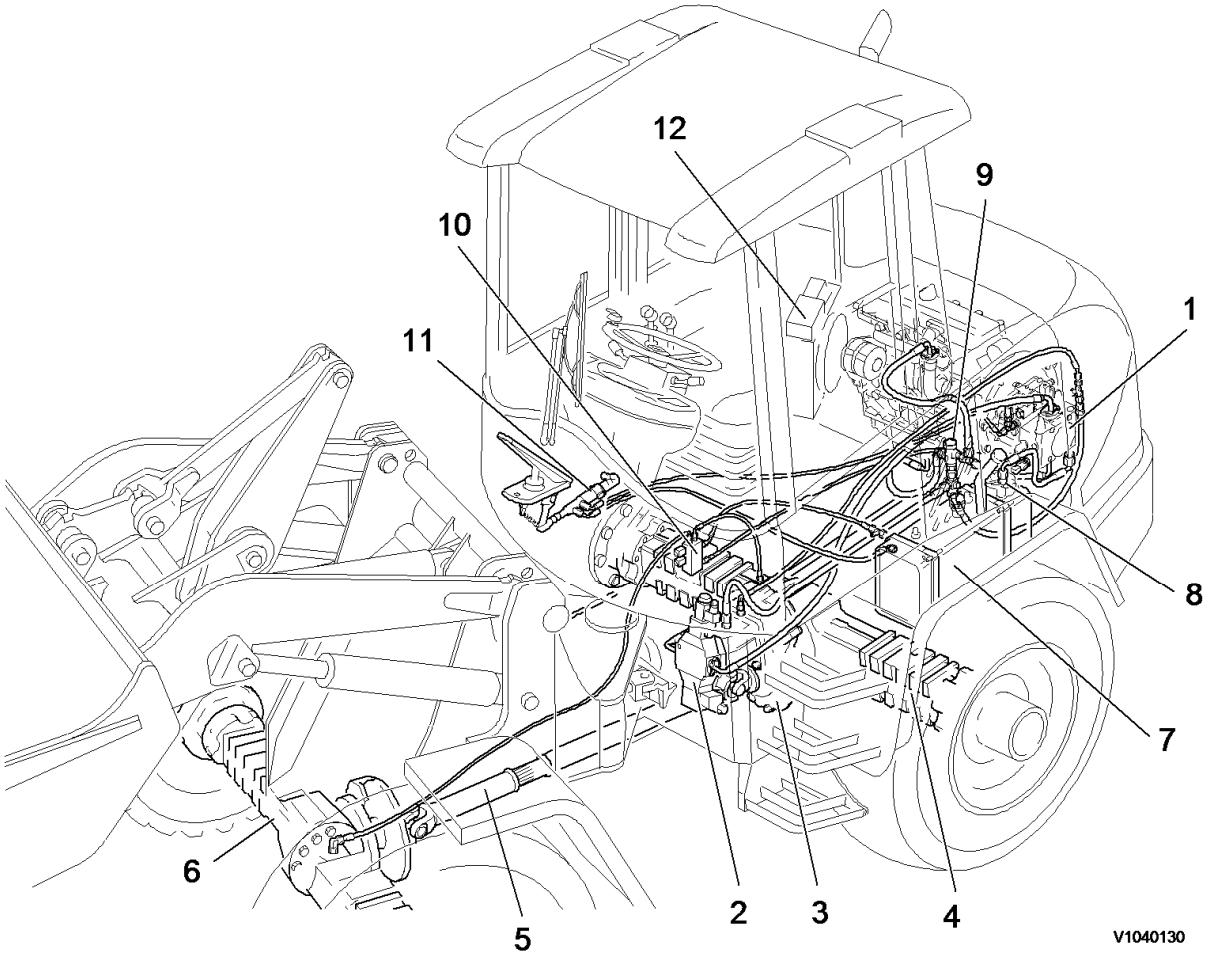

Figure 1
Hydrostatic drive, SN 192, SN 195

1. Hydraulic pump
2. Hydraulic motor
3. Dropbox
4. Rear axle
5. Propeller shaft
6. Front axle
7. Hydraulic oil tank
8. Suction-return filter
9. Thermostat
10. Differential lock valve
11. Inch brake valve
12. Heat exchanger

Hydrostatic drive L40B, SN 191 / L45B, SN 194

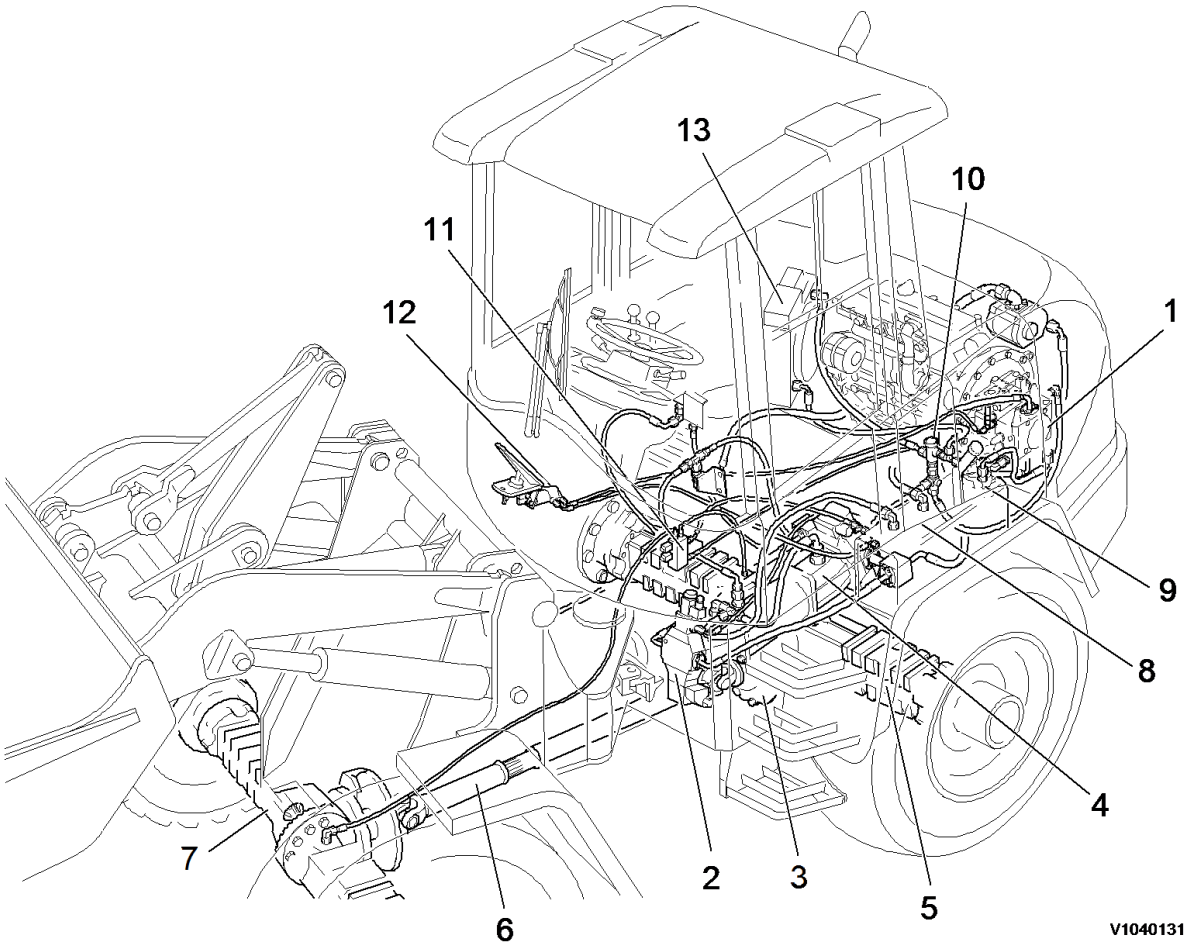

Figure 2
Hydrostatic drive, SN 191, SN 194

1. Hydraulic pump
2. Hydraulic motor **A** 107cm3
3. Dropbox
4. Hydraulic motor **B** 80cm3
5. Rear axle
6. Propeller shaft
7. Front axle
8. Hydraulic oil tank
9. Suction-return filter
10. Thermostat
11. Differential lock valve
12. Inch brake valve

13. Heat exchanger

Document Title: **Transmission, component position**	Function Group: **440**	Information Type: **Service Information**	Date: **2014/3/11**
Profile: **CWL, L45B [GB]**			

Transmission, component position

Component arrangement L40B, SN192 / L45B, SN 195

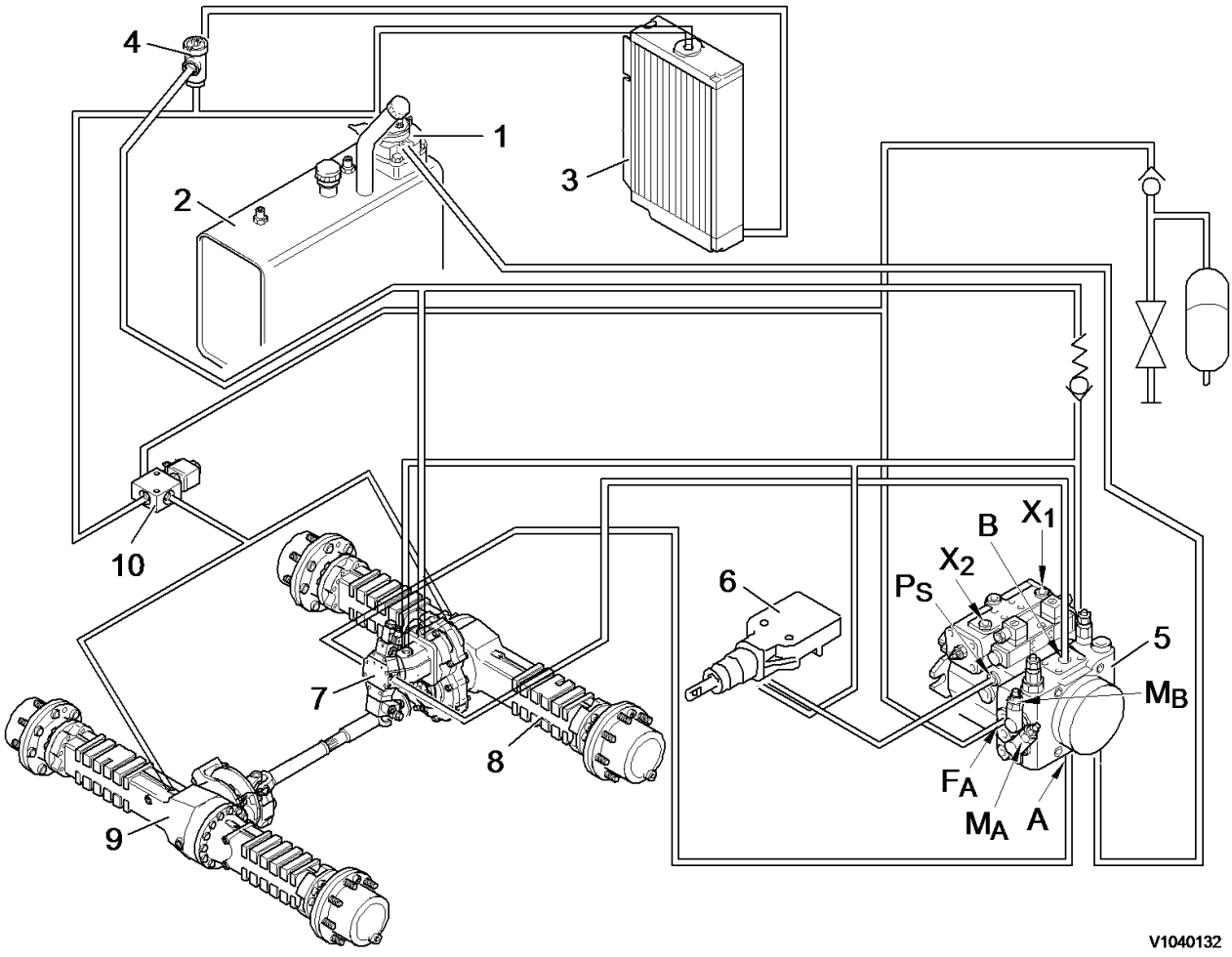

Figure 1
Drive component arrangement SN 192, SN 195

1. Suction-return filter
2. Hydraulic oil tank
3. Heat exchanger
4. Thermostat
5. Hydraulic pump
6. Inch brake valve
7. Hydraulic motor
8. Rear axle
9. Front axle
10. Differential lock valve

A High pressure, reverse

B	High pressure, forward
F_A	Feed pressure, differential lock
M_A	Check high pressure, reverse
M_B	Check high pressure, forward
P_S	Control pressure
X1	Check control pressure, forward
X2	Check control pressure, reverse

Component arrangement L40B, SN191 / L45B, SN 194

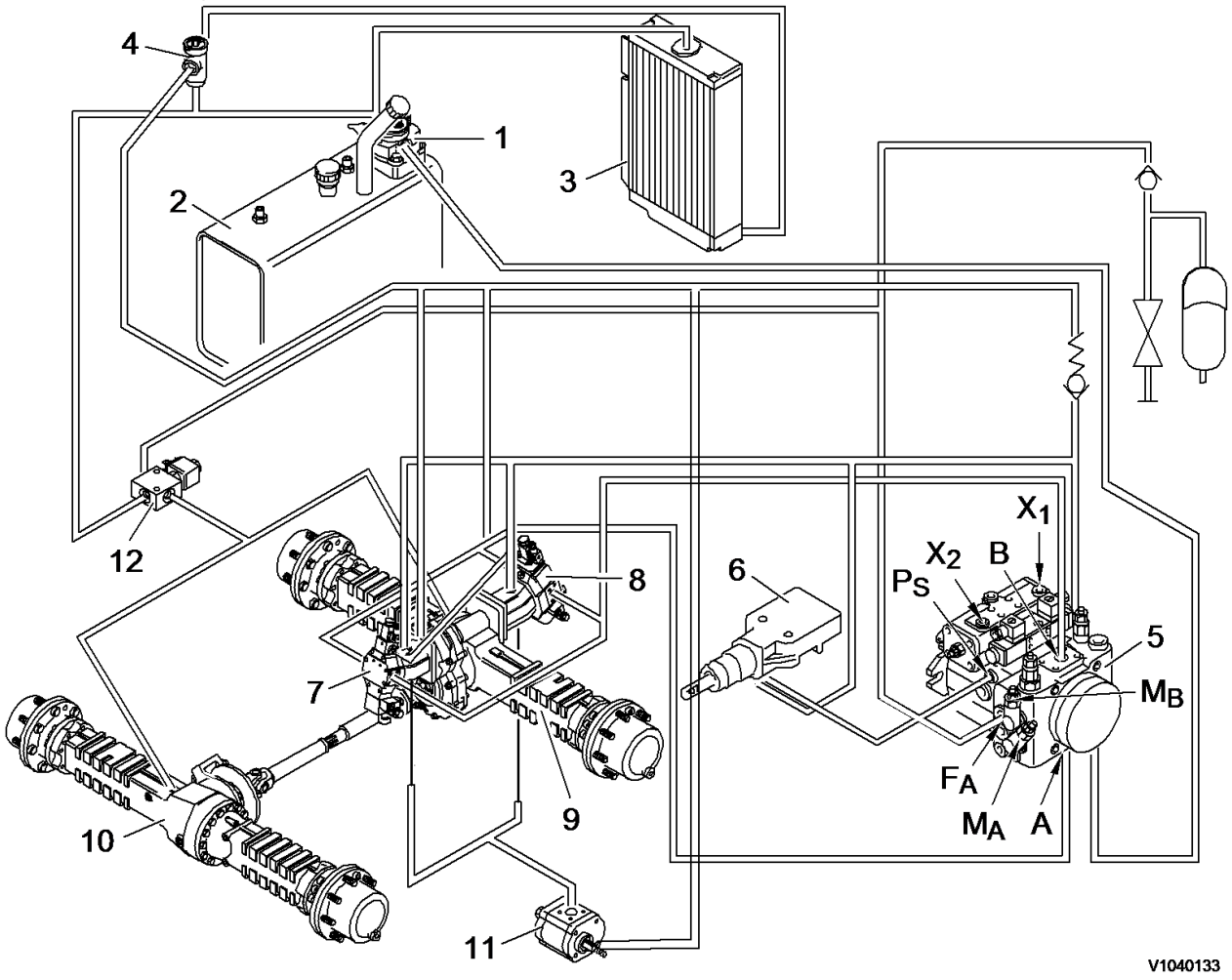

Figure 2
Drive component arrangement SN 191, SN 194

1. Suction-return filter
2. Hydraulic oil tank
3. Heat exchanger
4. Thermostat
5. Hydraulic pump
6. Inch brake valve
7. Hydraulic motor A
8. Hydraulic motor B
9. Rear axle
10. Front axle
11. Suction pump
12. Differential lock valve

A	High pressure, reverse

B	High pressure, forward
F_A	Feed pressure, differential lock
M_A	Check high pressure, reverse
M_B	Check high pressure, forward
P_S	Control pressure
X1	Check control pressure, forward
X2	Check control pressure, reverse

VOLVO

Construction Equipment

Service Information

Document Title: **Check and adjust hydrostatic drive**	Function Group: **440**	Information Type: **Service Information**	Date: **2014/3/11**
Profile: **CWL, L45B [GB]**			

Check and adjust hydrostatic drive

Check and adjust speed activation.

Op nbr

1. Turn off engine.

2. Press travel pedal down until the engine speed adjustment lever lies at full load stop (arrow).

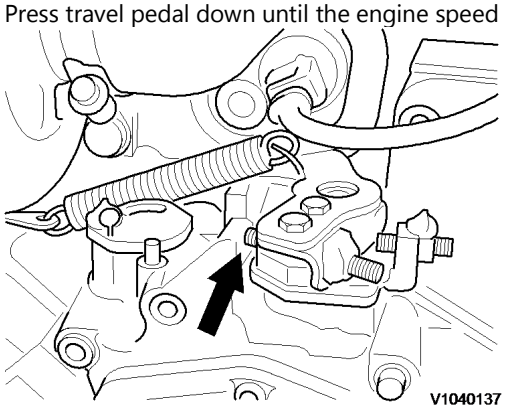

Figure 1
Speed adjustment lever

3. Set the stop bolt on the drive pedal so that there is a play of **2 mm (0,08 in)** between the pedal and the stop bolt.

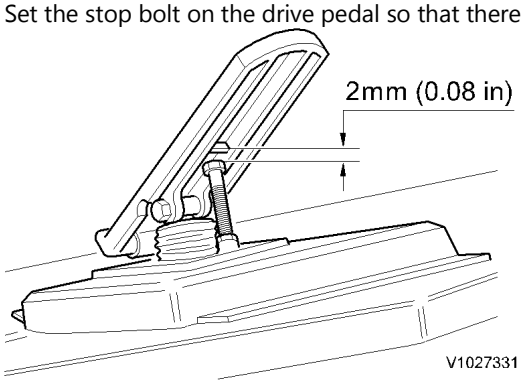

Figure 2
Stop bolt, drive pedal

4. Tighten lock nut and release drive pedal.

5. Open temperature regulator mechanically by turning in the adjustment screw (arrow) until it is flush with the groove on the lock nut.

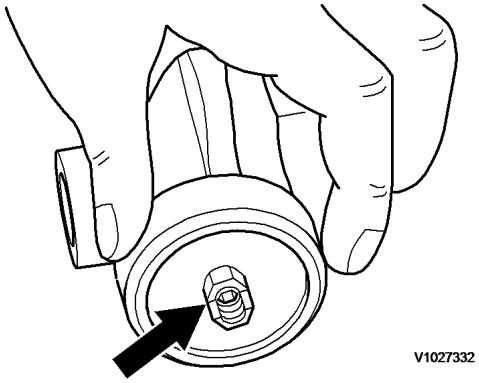

Figure 3
Temperature regulator adjusting screw

6. Check inch valve.

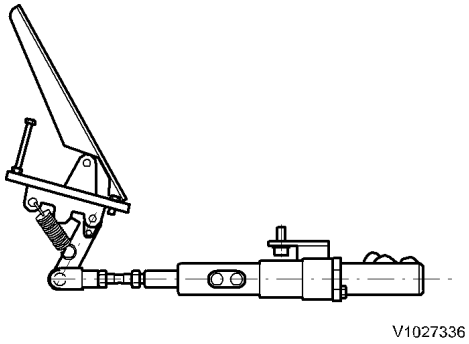

Figure 4
Inch valve

7. Run the machine until a hydraulic oil temperature of **60 + 5 °C (140 + 41 °F)** is reached.
8. Secure the machine so that it is stable during the adjustment work (see diagram).

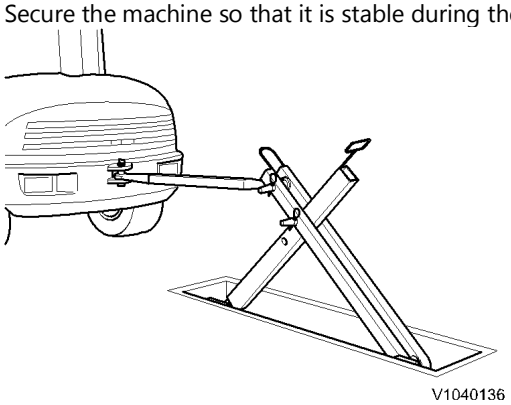

Figure 5
Securing the machine

9. Block the working hydraulics from accidental operation.
10. Turn off engine.
11. Apply parking brakes.
12. Block steering joint using “Joint lock”.

Check low and high idle speeds.

Op nbr

1. Connect tachometer to engine.

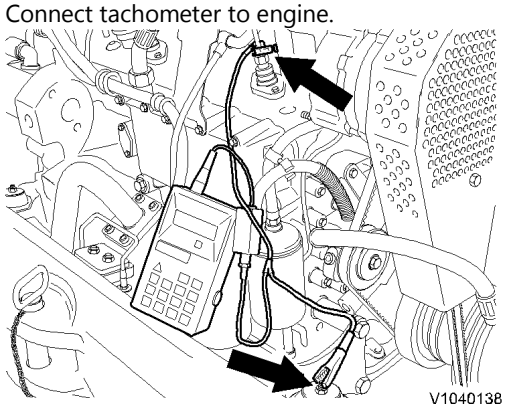

Figure 6

2. Start the engine.
3. Set drive or roll switch (multifunction lever) to position “Neutral”.
4. Check low idle speed. Nominal value: see specifications.
5. Press drive pedal to stop,
6. Read high idle speed on tachometer. Nominal value: see specifications.

Test and adjust feed pressure.

Op nbr

NOTE!
The test temperature of 60 °C (140 °F) must be maintained throughout the entire test.

Test

1. Connect pressure gauge to hydraulic pump, connections (1) and (2).

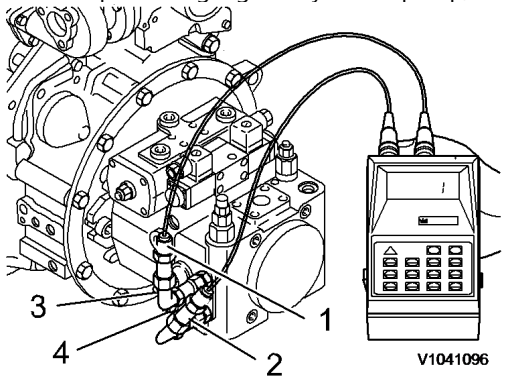

Figure 7

1. Connection “High pressure forward”
2. Connection “High pressure reverse”
3. Controller cartridge
4. Feed pressure valve

2. Start the engine.
3. Set drive or roll switch (multifunction lever) to position “Neutral”.

4. Increase engine speed to high idle.

5. Read display on pressure gauge. Nominal value: Feed pressure, see specifications.

Adjustment

6. Remove seal cap on feed pressure valve (4) and release lock nut.

7. Run engine at low idle speed (see specifications).

8. Turn feed pressure valve adjusting screw to left or right until the pressure gauge shows the nominal value.
   Turn to right: increase pressure
   Turn to left: reduce pressure

9. Tighten lock nut with a tightening torque of **22 Nm (16,2 lbf ft)**.

10. Fit seal cap on feed pressure valve.

Check start up speed and adjust

Op nbr

NOTE!
The test temperature of 60 °C (140 °F) must be maintained throughout the entire test.

Test

1. Connect pressure gauge to hydraulic pump, connection (1).

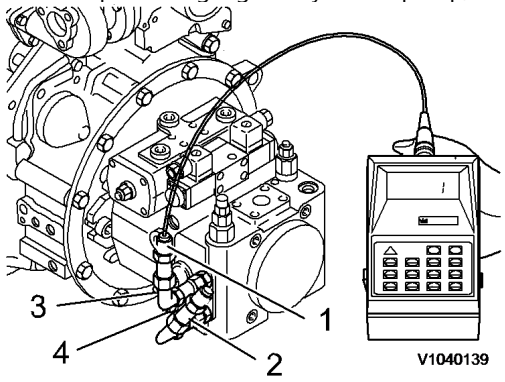

Figure 8

1. Connection “High pressure forward”
2. Connection “High pressure reverse”
3. Controller cartridge
4. Feed pressure valve

2. Start the engine.

3. Slowly increase engine speed until the pressure gauge shows a pressure of **50 bar (0,5MPa) (725 psi)**.

4. Read speed on tachometer. Nominal value: Starting speed, see specifications.

Adjustment

5. Remove seal cap from regulator cartridge (3) and release lock nut.

6. Run engine with a speed of **1150 + 150 /min (19,2 + 2,5 r/s)**.

7. Turn the controller cartridge adjustment screw to left or right until the pressure gauge shows a pressure of **50 bar (0,5 MPa) (725 psi)**.
   Turn to left: increase pressure
   Turn to right: reduce pressure

8. Tighten lock nut with a tightening torque of **22 Nm (16,2 lbf ft)**.

9. Place sealed cap on controller cartridge.

Test and adjust disconnection valve

Op nbr

NOTE!
The test temperature of 60 °C (140 °F) must be maintained throughout the entire test.

Test

1. Connect pressure gauge to hydraulic pump, connections (1) and (2).

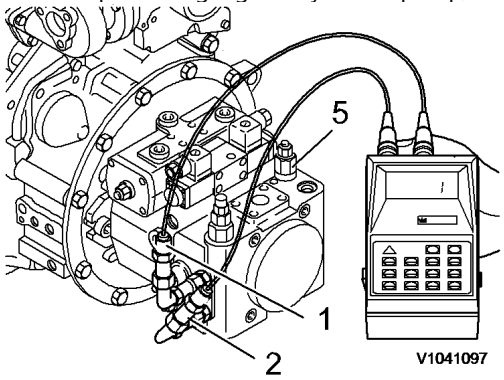

Figure 9

1. Connection “High pressure forward”
2. Connection “High pressure reverse”
5. Disconnection valve

2. Start the engine.

3. Connect drive switch to “Forward.

4. Press drive pedal to stop.

5. Read display on pressure gauge.
   Nominal value: High pressure forward, see specifications.
   Nominal value: pressure reverse = feed pressure, see specifications.

Adjustment

6. Remove seal cap from disconnection valve (5) and release flange nut.

7. Press drive pedal to stop.

8. Turn disconnection valve adjusting screw to left or right until the pressure gauge shows the nominal value.
   Turn to right: increase pressure
   Turn to left: reduce pressure
   NOTE!
   If the specified nominal value is not reached, adjust the high pressure valve.

9. Tighten flange nut with a tightening torque of **22 Nm (16,2 lbf ft)**.

10. Fit seal cap on disconnection valve.

High pressure valve, adjust

Op nbr

1. Remove seal cap on high pressure valve (6).

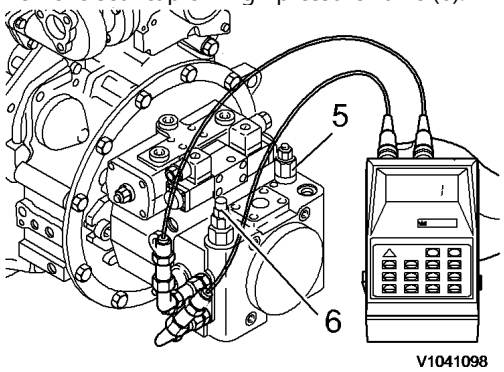

Figure 10

5. Disconnection valve
6. High pressure valve

2. Turn disconnection valve adjusting screw (5) two turns to the right.

3. Turn adjusting screw on high pressure valve (6) to the right until the pressure gauge shows the nominal value (see specifications).

4. Turn adjusting screw on disconnection valve (5) to the left until the pressure gauge shows the nominal value (see specifications).

5. Tighten flange nut with a tightening torque of **22 Nm (16,2 lbf ft)**.

6. Refit seal cap.

Check and adjust mechanical zero position of pump.

Op nbr

NOTE!
The test temperature of 60 °C (140 °F) must be maintained throughout the entire test.

Test

1. Connect pressure gauge to hydraulic pump, connections (1) and (2).

2. Connect adjustment chambers X1 and X2 with a hose (arrow).

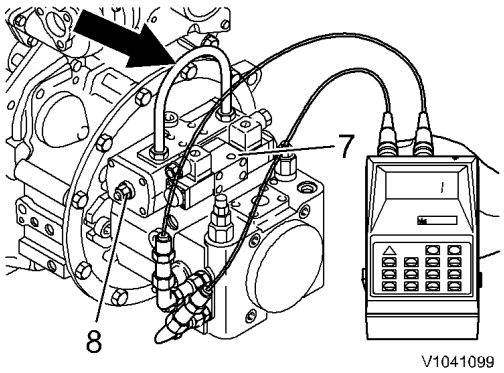

Figure 11

7. 4/3–way valve
8. Adjustment actuator cylinder

3. Start engine and activate drive switch several times in forward and reverse.
4. Turn off engine.
5. Remove both electrical connectors (forward-reverse) on 4/3–way valve (7).
6. Start engine and run at low idle speed.
7. Read pressure gauge, both connections must show the same pressure (Δp=0).

Adjustment

8. Release lock nut on adjustment actuator cylinder (8)
9. Adjust by turning the adjusting screw until the pressure gauge shows the same pressure (Δp = 0).
10. Tighten lock nut with a tightening torque of **40 Nm (29,5 lbf ft)**.
11. Turn Engine Off
12. Remove hose (arrow) and seal connections X1 and X2.
13. Reconnect both electrical connectors to 4/3–way valve (7).
14. Set drive or roll switch (multifunction lever) to position "Neutral".
15. Start engine and slowly increase engine speed to high idle.
16. Read pressure gauge, both connections must show the same pressure (Δp=0).
    NOTE!
    If the pressures are different, repeat the adjustment in the same way.

Test regulation start of hydraulic adjustment motor, and adjust machines L40B, SN 192 and L45B, SN195

Op nbr

NOTE!
The test temperature of 60 °C (140 °F) must be maintained throughout the entire test.

Test

NOTE!
Ensure that the pressure switch B20 (8.5 bar / 123 psi) switches ground to the electronics unit (ECU) at a working pressure of

more than 8.5 bar / 123 psi, and hence the direction valve Y10 is powered.

1. Remove floor plate.
2. Connect pressure gauge to hydraulic pump connection (1) “High pressure forward”.

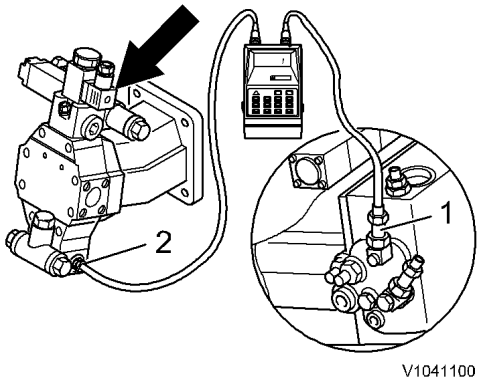

Figure 12

3. Connect pressure gauge to hydraulic motor connection (2) M1.
4. Remove electric connector (arrow) from shift solenoid Q_{max}..
5. Start the engine.
6. Connect drive switch to “Forward.
7. Slowly increase engine speed.
8. At a pressure display of (see specifications) at connection (1) “High pressure forward”, the pressure (start control) at connection (2) M1 hydraulic motor must increase.

Adjustment

9. Release lock nut on adjusting screw (see fig.).

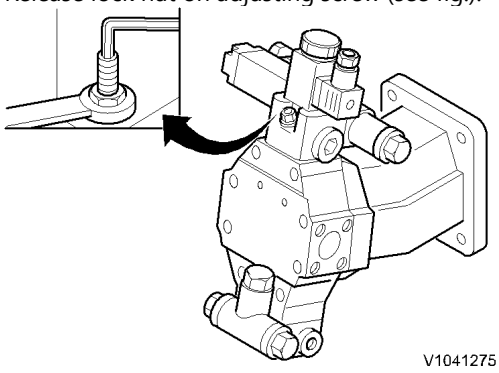

Figure 13
Adjusting screw, control pressure

10. Control pressure is triggered too early. Turn adjusting screw counter-clockwise using Allen key.
11. Control pressure is triggered too late. Turn adjusting screw clockwise using Allen key.
12. Tighten adjusting screw lock nut with a torque of **10 Nm (7.4 lbf ft)**.
13. Remove pressure gauge from hydraulic motor and screw in locking bolt, tighten with a torque of **20 Nm (14.8 lbf ft)**.

14. Connect electric connector to shift solenoid.

Test regulation start of hydraulic adjustment motors, and adjust machines L40B, SN 191 and L45B, SN194

Op nbr

NOTE!
First check and adjust hydraulic motor B (A6VM 80HA).

1. Remove floor plate.
2. Connect pressure gauge to hydraulic pump connection (1) “High pressure forward”.
3. Connect pressure gauge to hydraulic motor B connection (2) M1.

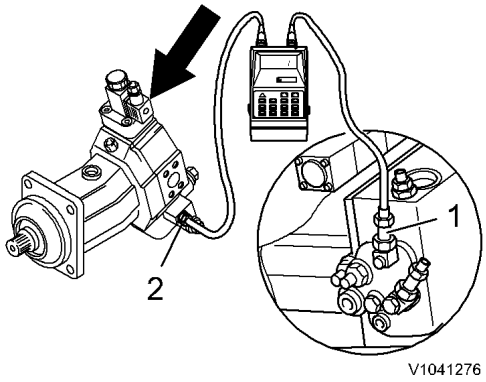

Figure 14

4. Remove electric connector (arrow) from shift solenoid Q_{max}..
5. Start the engine.
6. Set drive switch to gear 3 and engage “Forward.
7. Slowly increase engine speed.
8. High pressure “forward increases.
9. The pressure at the hydraulic motor remains at 0 bar.
10. When reaching the start control of the motor, the high pressure at the motor measurement point increases to the start control pressure (see specifications).
11. If the start control is too early or too late, the following adjustments must be made.
12. **Adjustment**
    Release lock nut on adjusting screw (see fig.).

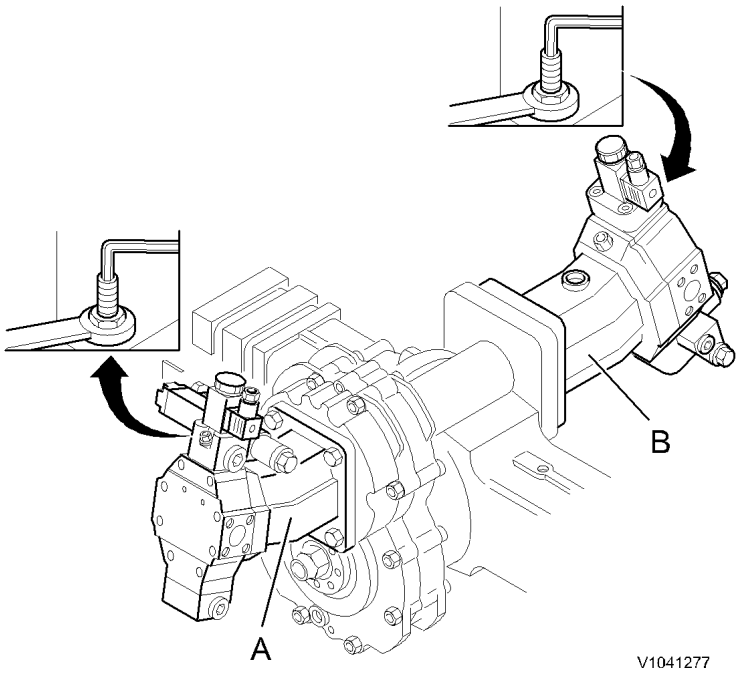

Figure 15

13. Control pressure is triggered too early. Turn adjusting screw counter-clockwise using Allen key.
14. Control pressure is triggered too late. Turn adjusting screw clockwise using Allen key.
15. Check control pressure again.
16. Tighten adjusting screw lock nut with a torque of **10 Nm (7.4 lbf ft)**.
17. Remove pressure gauge from hydraulic motor and screw in locking bolt, tighten with a torque of **20 Nm (14.8 lbf ft)**.
18. Connect electric connector to shift solenoid.
    NOTE!
    Check start control of hydraulic motor A and adjust in the same way as for motor B.

Restore operating condition after all test and adjustment work

19. After performing all test — and adjustment work, seal the adjusting screws.
20. Reset temperature controller to basic setting by unscrewing the adjusting screw until it is flush with the lock nuts on the outside.

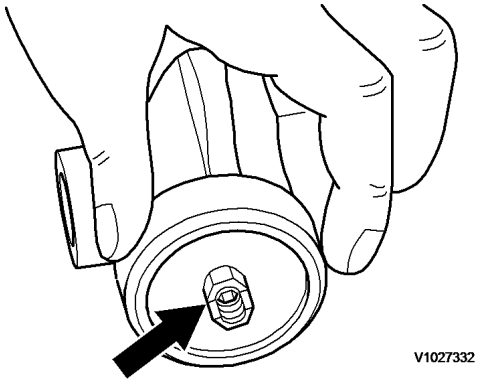

Figure 16

21. Tighten lock nut with a tightening torque of **10 Nm (7.4 lbf ft)**.

22. Remove tachometer and pressure gauge.

23. Carry out test drive.
    NOTE!
    If errors occur in direction “Reverse”, repeat the adjustment process completely in reverse travel.

VOLVO

Construction Equipment

Service Information

Document Title:	Function Group:	Information Type:	Date:
Hydraulic diagram transmission	**440**	**Service Information**	**2014/3/11**
Profile: **CWL, L45B [GB]**			

Hydraulic diagram transmission

Drive L40B, SN 192 / L45B, SN 195

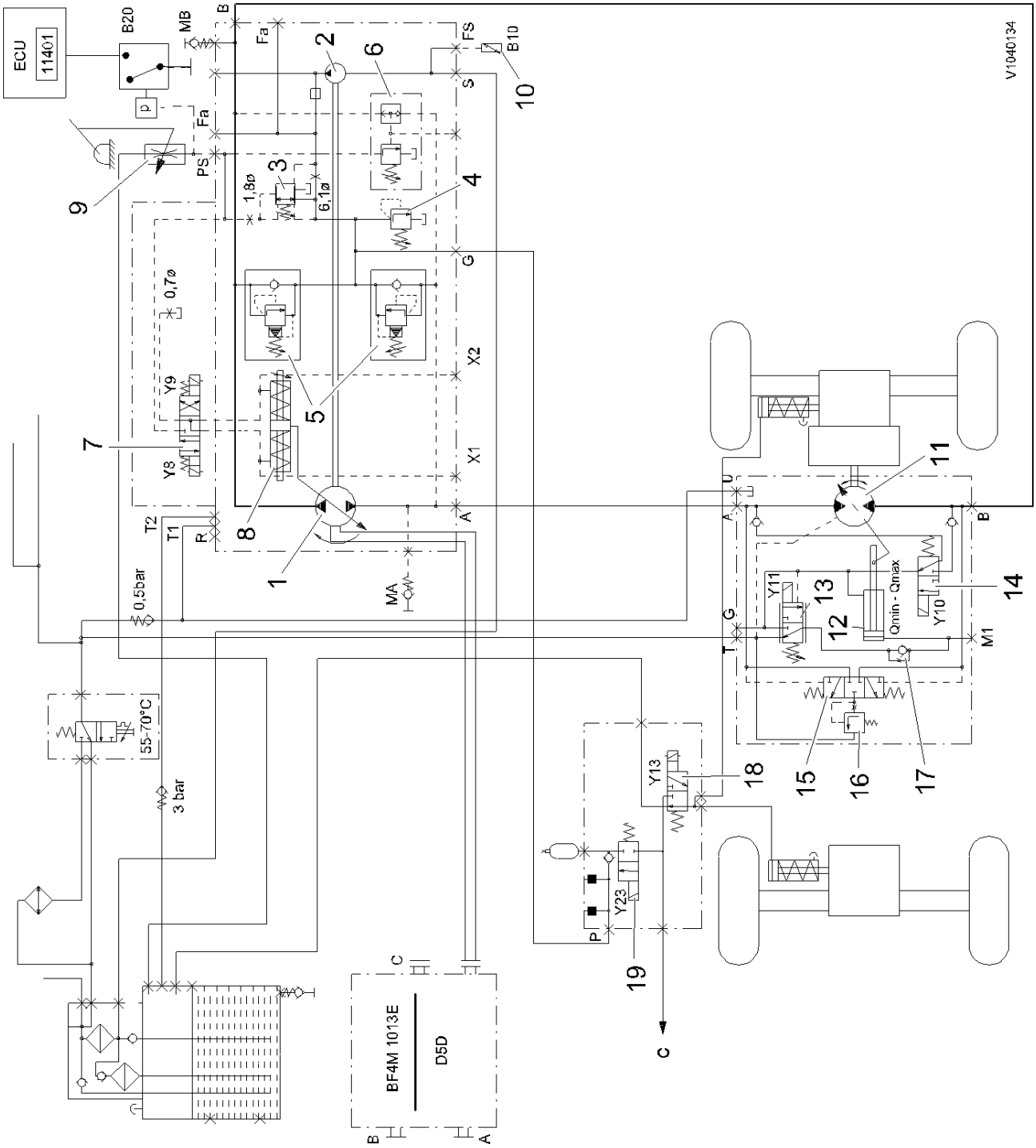

Figure 1

Hydraulic diagram, drive SN 192, SN 195

1. Hydraulic pump
2. Feed pump
3. Controller cartridge
4. Feed pressure valve
5. Secondary limiter valve, forward/reverse
6. Shut-off valve with change-over valve
7. Solenoid valve, forward/reverse
8. Control piston
9. Inch brake valve
10. Combination sensor, hydraulic oil temperature
11. Hydraulic motor
12. Control piston
13. Solenoid valve, hydraulic motor
14. Solenoid valve, direction valve
15. Flushing valve
16. Pressure build-up valve
17. Restriction valve
18. Diff. lock solenoid valve
19. Solenoid valve, hydraulic control

A	High pressure, reverse
B	High pressure, forward
C	Connection, pre-control
G	Connection, differential lock / pre-control
R	Bleeding air
S	Suction port
T	to tank
T1	to connection U hydraulic motor via pressure build-up valve 0.5 bar
T2	to tank via 3.0 bar valve
U	Flush connection of hydraulic pump, connection T2
Fa	Feed pressure
MA	Check high pressure, reverse
MB	Check high pressure, forward
X1	Operating pressure, forward
X2	Operating pressure, reverse

Drive L40B, SN 191 / L45B, SN 194