Chapter

1.0 Data table

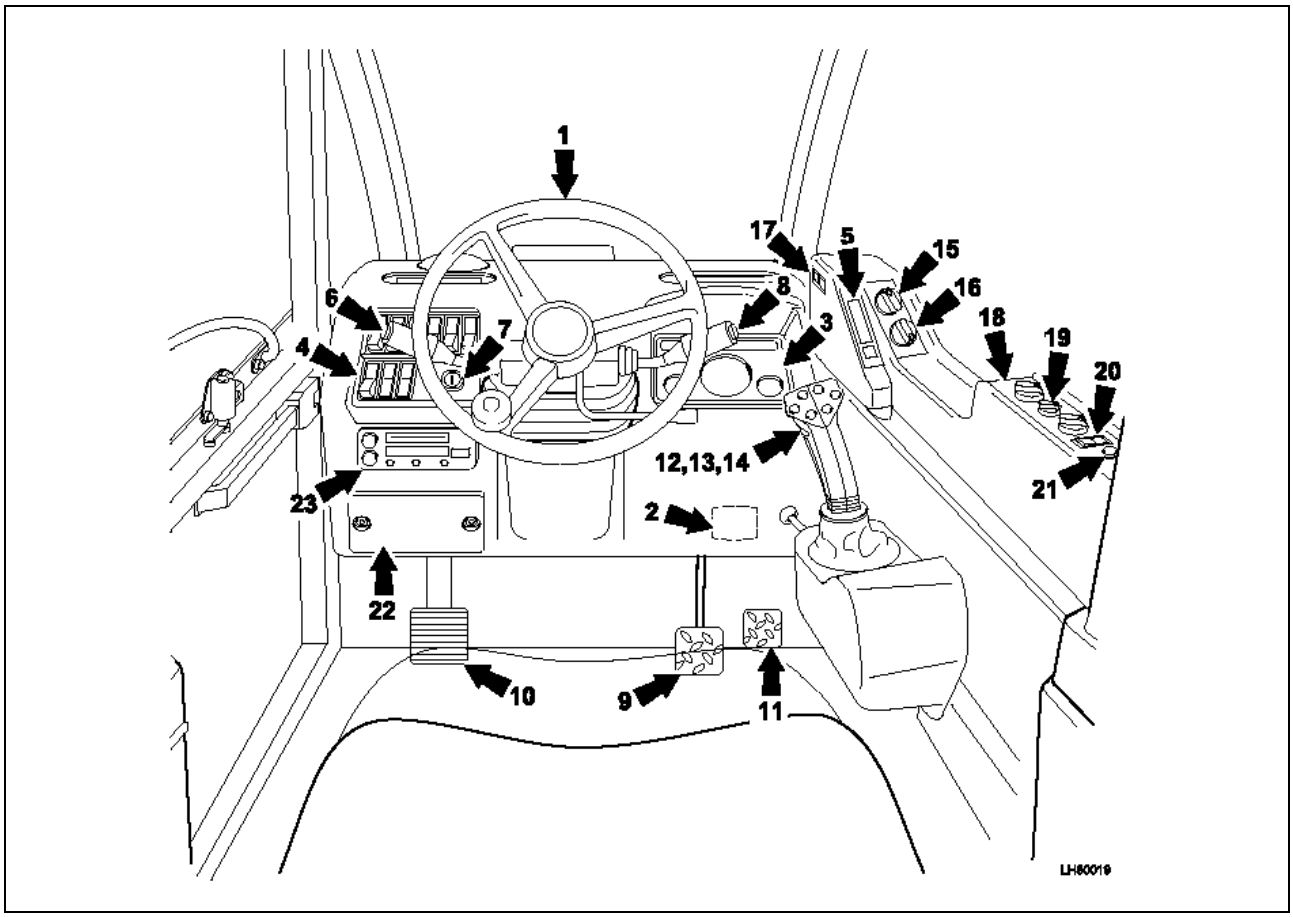
	C 40	C 50
Specification		
Lifting capacity (max)	2200kg	2500kg
Lifting height (max)	5018mm	5540mm
Reach (max)	2820mm	3110mm
Load centre from the back of the forks	500mm	500mm

Measurements	**C 40**	**C 50**
Total length	3650mm	3850mm
Total width	1800mm	1900mm
Total height	1960mm	2130mm
Wheel spacing	2300mm	2300mm
Ground clearance	320mm	320mm
Outer turning circle	3000mm	3100mm

Weight	**C 40**	**C 50**
Total weight	5160kg	5400kg
Weight, engine without oil	273kg	273kg
Weight, front axle (approx)	390kg approx	390kg approx
Weight, rear axle (approx)	370kg approx	370kg approx

Engine	**C 40**	**C 50**
Type	Perkins 1004-42	Perkins 1004-42
Power	64Kw/106 hp	64KW/106 hp
Full load speed	2200 min^{-1}	2200 min^{-1}
Top speed	2250-2400min^{-1}	2250-2400min^{-1}
Idle speed	850 min^{-1}	850 min^{-1}
Coolant capacity	26 litres	26 litres
Coolant thermostat opening	70°C - 80°C approx	70°C - 80°C approx
Engine oil capacity with filter	9 litres	9 litres
Oil pressure at maximum no load speed	3.5 bar	3.5 bar
Oil pressure at minimum no load speed	1.5 bar	1.5 bar
Fuel tank	85 litres	85 litres

1.0 Cab and operating components



The instruments and warning lights can be found to the right hand side of the steering column on the instrument panel.

1. **Instrument: Rev counter**
The rev counter shows the speed of the engine in revs per minute.

2. **Operating hour counter**
The operating hour counter displays the total number of hours the engine has run. The hours are used to calculate the maintenance intervals.

3. **Instrument: Fuel gauge**

4. **Instrument: Engine coolant temperature**
This displays the temperature of the engine coolant. The value can vary slightly.
The machine must NOT be worked, when the display stays for a long period of time in an abnormally high position or if the red light is ILLUMINATED.

5. **Indicator:**
This flashes when the left hand indicator is flashing.

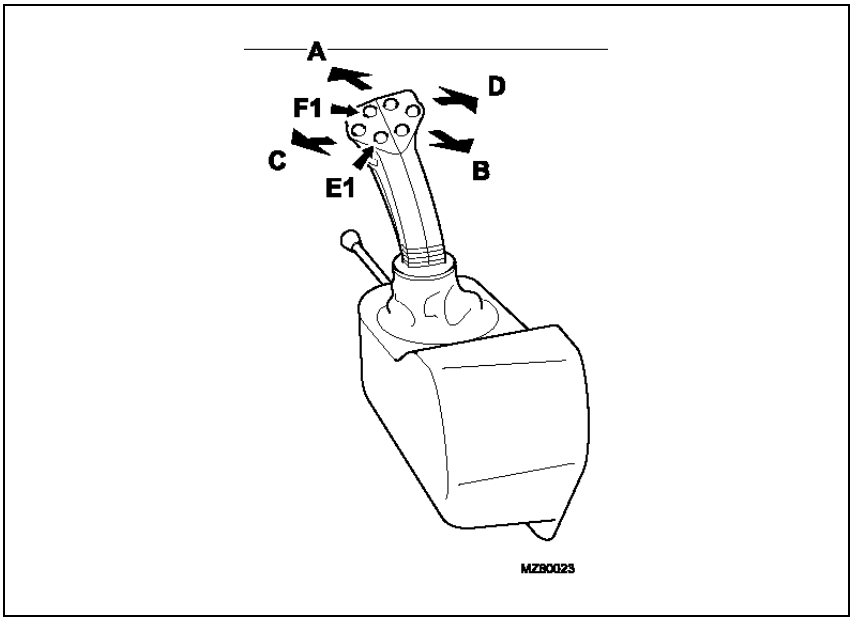
6. **Engine oil pressure:**
This illuminates when the engine oil pressure drops below the normal pressure. The light may come on when the engine is started, but should go out once the engine is running.
The machine must NOT be operated when the light is illuminated.

7. **Not used**

8. **Air filter blocked:**
This is illuminated when the air supply to the engine is restricted.
The machine must NOT be operated if this light is illuminated.

9. **Parking brake:**
This warning light is illuminated, when the parking brake has been applied.
Do not try and move the machine with the parking brake applied.

1.4 Telescopic arm and carriage control



Telescopic arm raise and lower

A Forwards = Telescopic arm lower
B Backwards = Telescopic arm raise

Carriage tipping

C To the left, tilt back
D To the right, tilt forwards
By operating the unit diagonally, then both the telescopic arm and the carriage can be operated.

Telescopic arm retraction / extension

Used in conjunction with the joysticks with the roller switch.

E1 upwards, the telescopic arm extends
F1 backwards, the telescopic arm retracts.

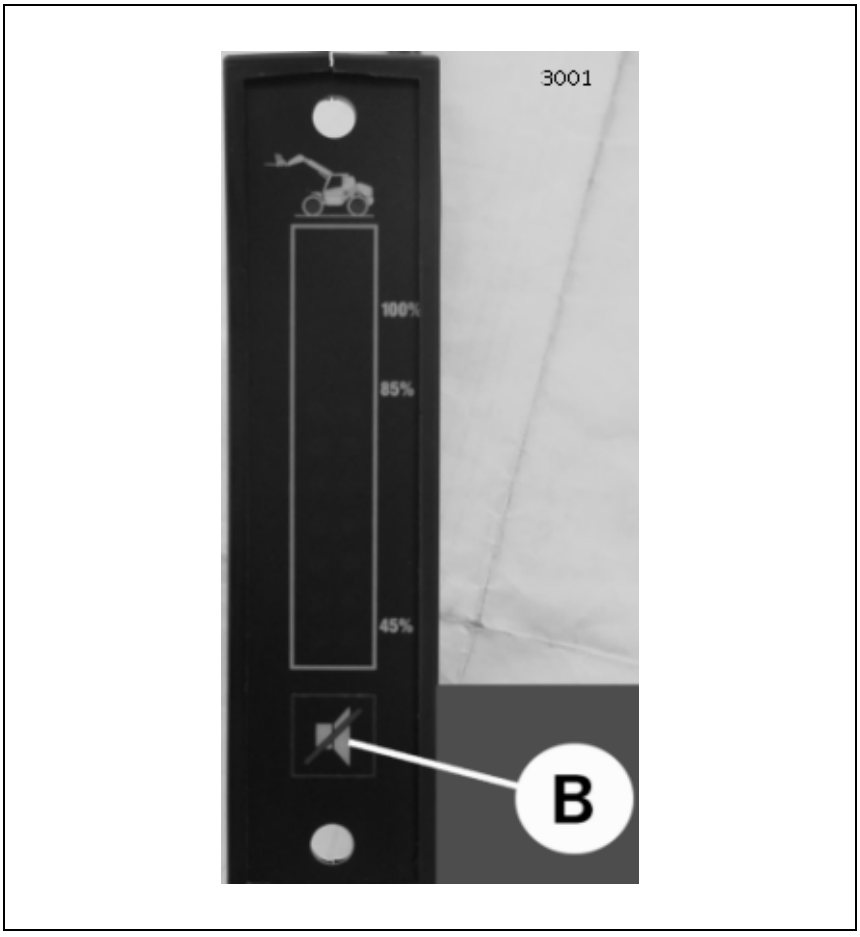
1.0 Operation of load indicator

The load indicator can be found in the cab of the machine. Using an LED display, the load on the forks can be monitored.

A green LED shows that the system is switched on.
The 2nd LED (red) shows that the machine is 50% loaded. Each LED after that approx equates to 6.5%
From 50% loading to 100%, there are a total of 9 LEDs (red).
When 100% loading is achieved, then the LEDs flash and an additional buzzer is sounded.
Should the top LED (red) illuminate, then the machine is loaded to 110%.
For the indicator to work, there is a load cell that supplies the signal and is mounted on the rear axle.
The resistance of the load cell changes when pressure or tension is applied to the rear axle.

Using the ”B” button, the load indicator needs to be checked on a daily basis. The load indicator is OK if, when pressing the button, all the LEDs flash and the warning buzzer can be heard.

Load indicator



B This button is to test the load indicator and to mute the warning buzzer.

The button ”B” has two uses.

5.2 Fitting

Applies for all types

1. Drive the machine for approx. 15 min (So axle reaches operational temperature)

2. Stop the machine
   a) On straight level ground
   b) With the wheels straight
   c) With the parking brake released
   d) With the boom in the road travel position
   e) With the boom fully retracted
   f) Without forks or a front attachment.

3. Clean the surface to which the sensor fixes to (metal blank)

4. Fit the sensor
   General tip: Apply loctite 638 to the surface to which the sensor fits too.

CAUTION! ***Do not allow the loctite on the threads or enter the holes.***

5. Tighten the bolts.
   Use 3 off M8 x 20 bolts tightened to 25 Nm

6. Leave the machine at least 2 hrs without moving it in order to allow the glue to dry.

7. Carry out the calibration of the load indicator.

Designations

1 – Oil tank
124 – Oil cooler
144 – Connection, steering hydraulic return line
201 – Charge pump
202 – Filter cartridge
205 – Charge pressure relief valve
206 – Pilot pressure valve
211 – Multi function valve, reverse
212 – Multi function valve, forwards
213 – Servo valve
216 – Servo ram
217 – Axial rod adjusting pump
220 – Axial rod constant motor
221 – Change over valve
222 – Purge valve

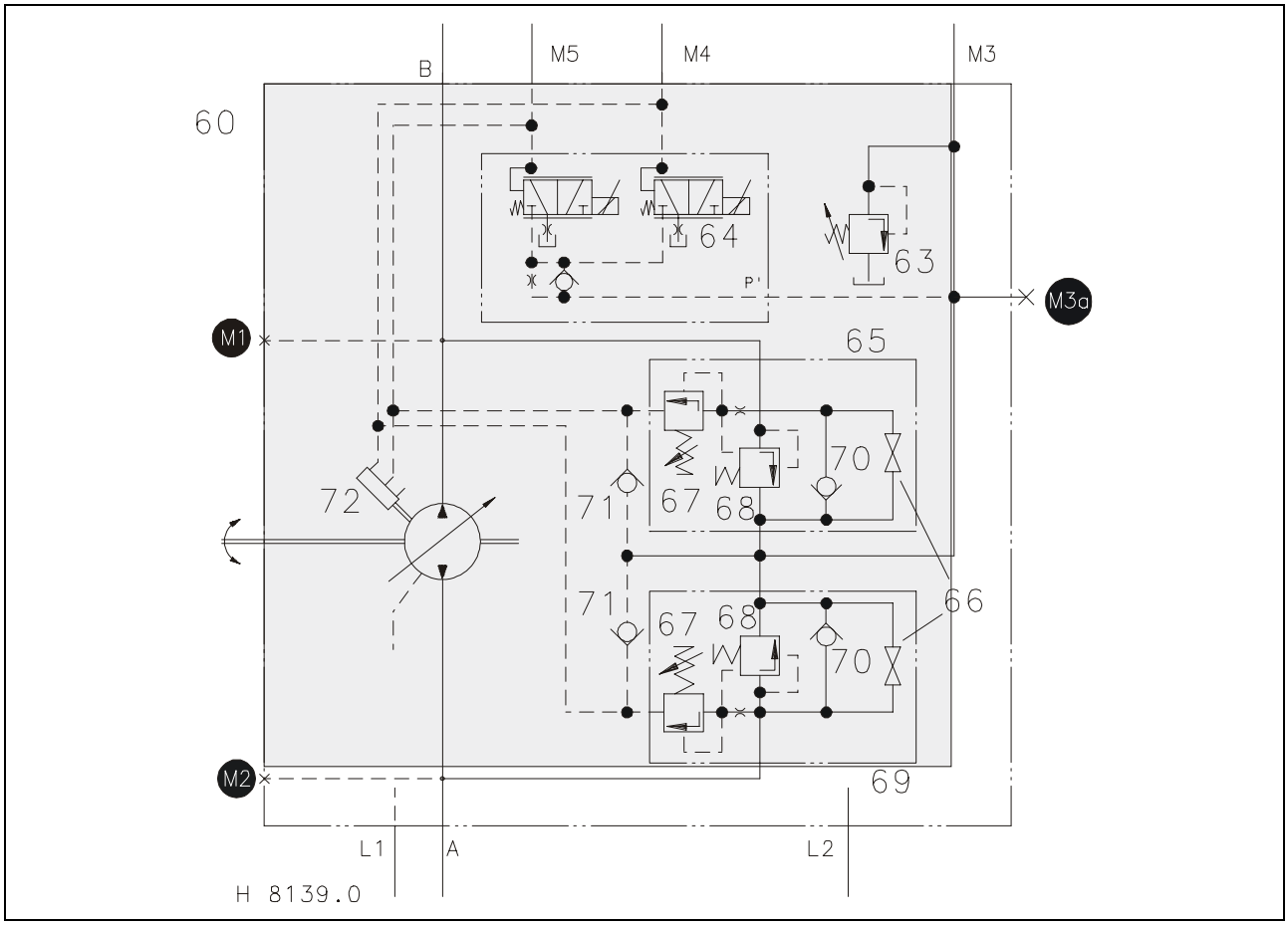
S – Charge pressure circuit
H – High pressure circuit
R – Purging return line
Z – Position pressure channel

The closed circuit

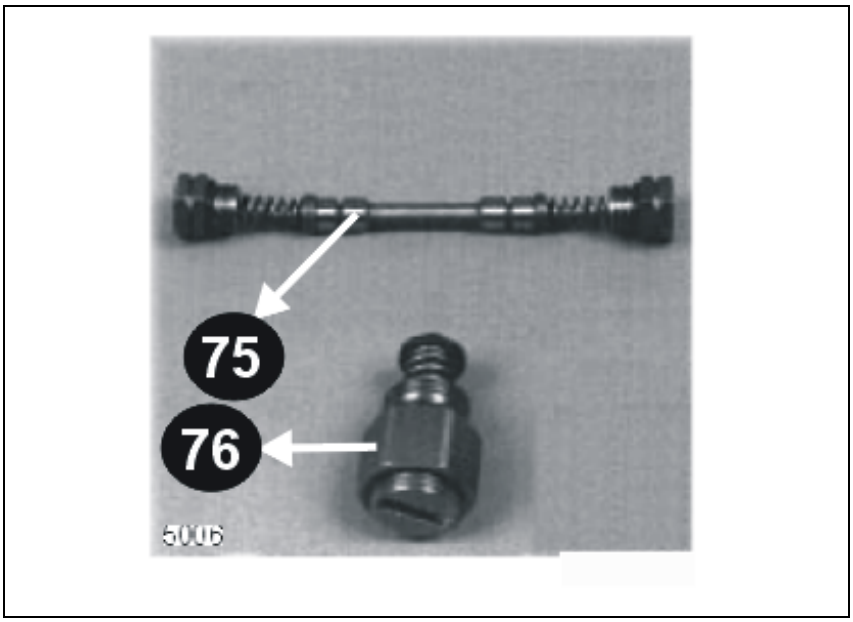
The main connections of the pump are connected to the main engine connections by hydraulic lines. In the closed circuit the hydraulic fluid flowing back from the engine does not flow into the storage tank but instead it always flows back to the pump. Each of the two sides can be subjected to high pressure. The flow direction and speed of the fluid (and hence the speed and turning direction of the motor output shaft) depends on the position of the pump's swash plate. The high pressure is determined by the machine load.

4.0 Test ports, pump 90

Circuit diagram, pump



5.1 Purge valve



75 Purge valve
76 Purge pressure relief valve

Series 51 motors include as standard an integrated purge valve. Circuit purging is carried out in the closed circuit in order to cool the high pressure circuit or to remove contamination from the circuit. Series 51 motors with an integrated purge valve are also equipped with a purge pressure relief valve. The pressure setting of the purge pressure relief valve also influences the function of the circuit purging. A higher setting of the purge pressure relief valve reduces the purging flow and during operation of the closed circuit allows the flow to increase via the charge pressure relief valve of the pump. A lower setting of the purge pressure relief valve allows the purging flow to increase and can lead to an increase of the motor housing pressure.
The correct combination of charge pressure and purge pressure settings ensures the correct function of the circuit purging system. This combination is specially set by the manufacturer for the respective vehicle. The correct charge pressure must remain intact under all operating conditions so as to ensure the adjusting properties of the pump in the closed circuit.

5. The Aggressive / Progressive mode switch (alternatively called Rambo / Bambi switch) changes the characteristics of the Hydrostatic pump and therefore transmission behaviour.

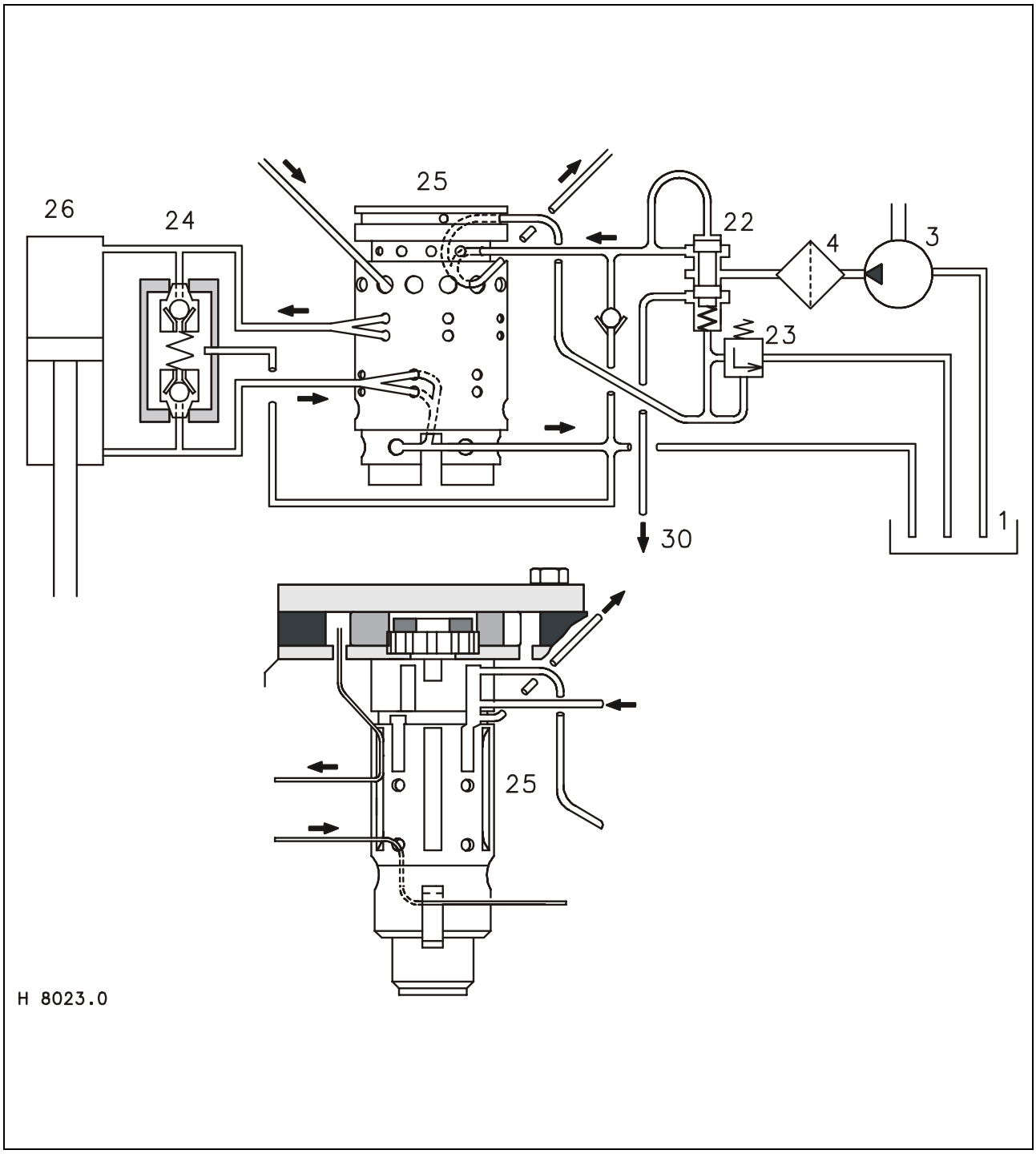
Characteristics of the Progressive mode:
- Good resolution at low-medium engine speeds, i.e. for a large movement of the accelerator pedal there is a small increase in vehicle speed, allowing accurate control over the machine (e.g. placement work).

- Good anti-stall at medium-high engine speeds, i.e. for a small drop in engine speed there is a large speed reduction and increase in tractive effort, i.e. the engine does not stall when the machine movement is blocked (e.g. heavy duty rehandling).

Characteristics of the Aggressive mode:
- A sharp speed increase with a small amount of accelerator pedal movement gives a quick accelerating machine with a very responsive behaviour (e.g. rehandling and rapid shuttling work).
  It has to be noted that the difference in driving behaviour is different only in the range of approximately 900 to 2000 engine rpm. Outside that range the two characteristics are identical and consequently the machine will reach the same final speed.

6. When applying the parking brake, the Hydrostatic pump is put into neutral and therefore the transmission is in neutral. This to prevent the machine burning the brake discs.

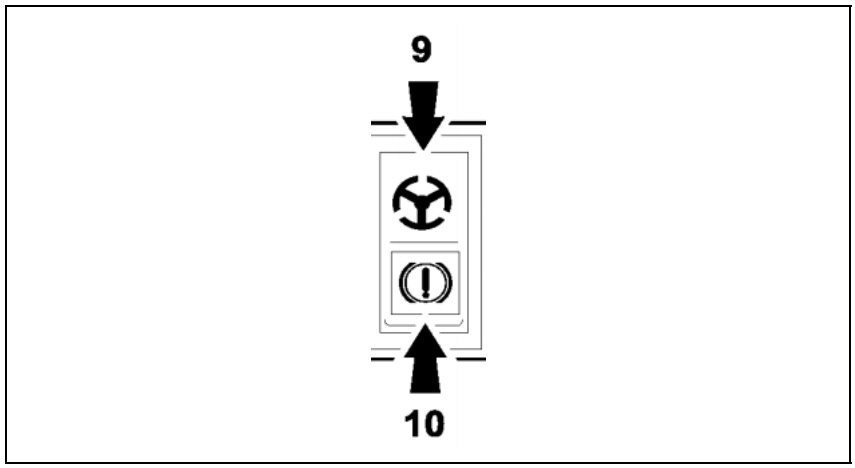
2.2 Steering



Key

01	Hydraulic tank
03	Pump
04	Pressure filter
22	Priority valve
23	Pressure relief valve
24	Shock valve
25	Rotary valve
26	Steering ram

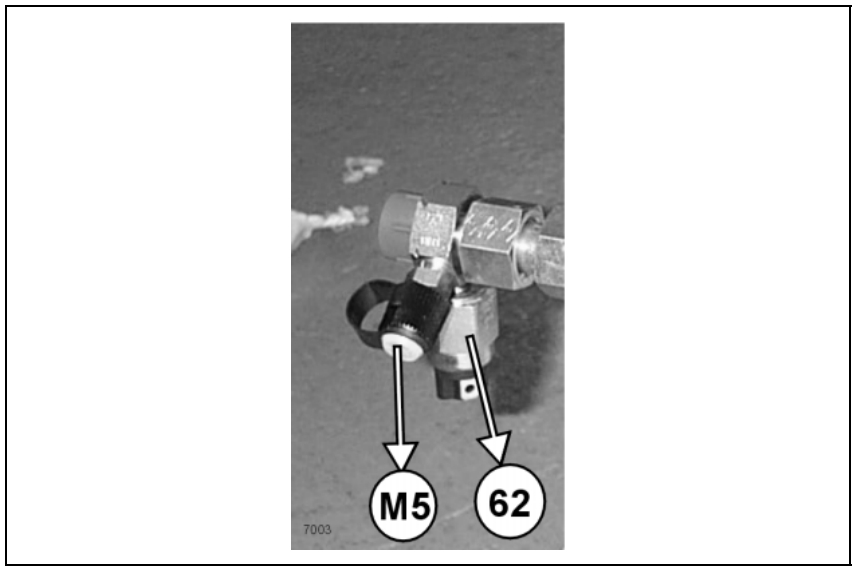
Warning light



9 Warning light steering pressure
10 Warning light brake pressure

Should the system pressure of the steering drop below the required amount, then the steering oil pressure switch (L) sends a signal to the warning light (9) in the cab.

4.3 Steering measurement table



7005

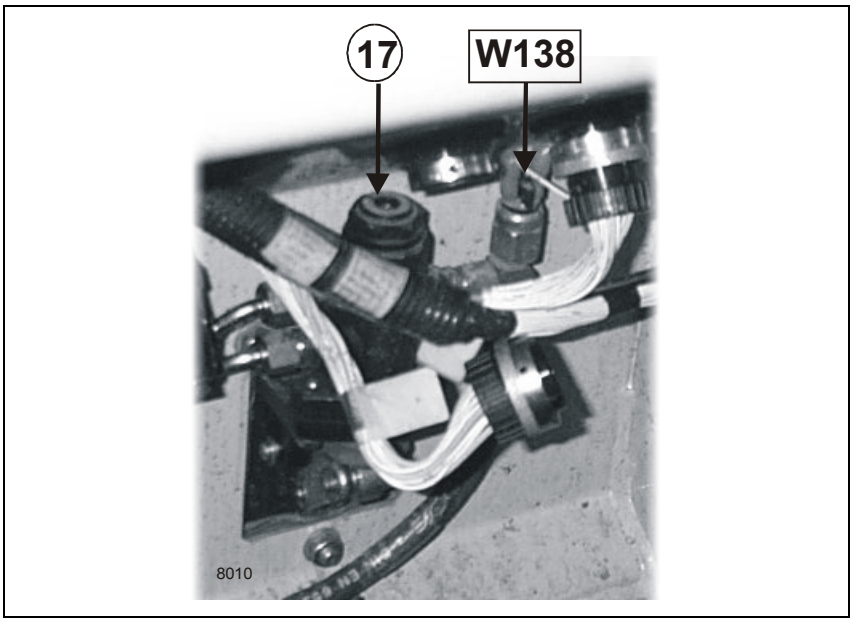
M 5 Steering test port
62 Steering oil pressure switch (10bar) (optional)

Pressure readings

Return = 20^{+7} bar
System pressure = 170^{+15} bar
Shock valve = 230 ±15 bar

NOTE! The readings are taken with the engine at full speed and the oil at working temperature of approx. 60°C.

1.5 Pressure switch for the brake lights



W138 Pressure switch for the brake lights
17 Kicker plate brake valve

The oil pressure switch (W138) activates the brake lights. The switch is fitted in the line to the wheel brake cylinder. The minimum pressure of response of the switch amounts to approx. 5 bar.

1.6 Accumulator

15 Accumulator pre-tensioned to 41 bar

The accumulator is positioned on the front left hand side of the chassis. With the single braking system, only the accumulator with the oil pressure switch is available.

Pos	Description	Comments
24	Steering unit	Danfoss OSPF 250
25	Rotary valve	4/3 way valve
26	Shock valves	225 - 245 bar
27	4/3 way valve	Required for steering modes
28	Steering PRV	Opens at 175 bar
29	One way valve	Fitted to the P line of the steering
30	Steering ram	Rear axle
31	Steering ram	Front axle
32	Control unit (working hydraulics)	
33	Base plate with PRV	Opens at 240 bar
34	4/3 way valve	Boom raise and lower
35	4/3 way valve	Front attachment tilt
36	Shock valve for tilt	Tilt forward 210 bar and back 125 bar
37	4/3 way valve	Boom extension / retraction
38	4/3 way valve	Hydraulic additional function (front and rear quick coupling or hitch)
39	4/3 way valve	Addition
40	End plate	
41	One way valve	
42	Ram	Boom raise and lower
43	Load hold valve	
44	Ram	Tilt
45	Load hold valve	
46	Compensating ram	Hold the carriage level
47	Ram	Boom extension / retraction
48	Load hold valve	
49	Change over valve	Switches between the front or rear quick couplings and the hitch