

Document Title: Power train, specification	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Power train, specification

Description	MC80	MC90	MC110
Power train type	Hydrostatic with single stage chain drive to wheels	Hydrostatic with single stage chain drive to wheels	Hydrostatic with single stage chain drive to wheels
Transmission	Tandem pump assembly	Tandem pump assembly	Tandem pump assembly
Variable displacement hydrostatic pumps	43,4 cm ³ /rev (2.65 in ³ /rev)	45,9 cm ³ /rev (2.8 in ³ /rev)	45,9 cm ³ /rev (2.8 in ³ /rev)
Relief settings	30 mPa (4351 psi) (300 bar)	30 mPa (4351 psi) (300 bar)	34.5 mPa (5000 psi) (345 bar)
Eaton hydrostatic drive fixed displacement motors	491,7 cm ³ /rev (30 in ³ /rev)	491,7 cm ³ /rev (30 in ³ /rev)	802,9 cm ³ /rev (49 in ³ /rev)

Document Title: Hydraulic system oil contamination	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Hydraulic system oil contamination

Microscopic Contamination

Microscopic contamination occurs when excessive fine particles of foreign material are in the system oil. These particulates are too small to see or feel.

Examples of contamination problems caused by excessive particulates would include the following:

- cylinder rod seals leak,
- control valve spools do not return to neutral, and/or
- hydraulic circuit has a high operating temperature.

Sense Contamination

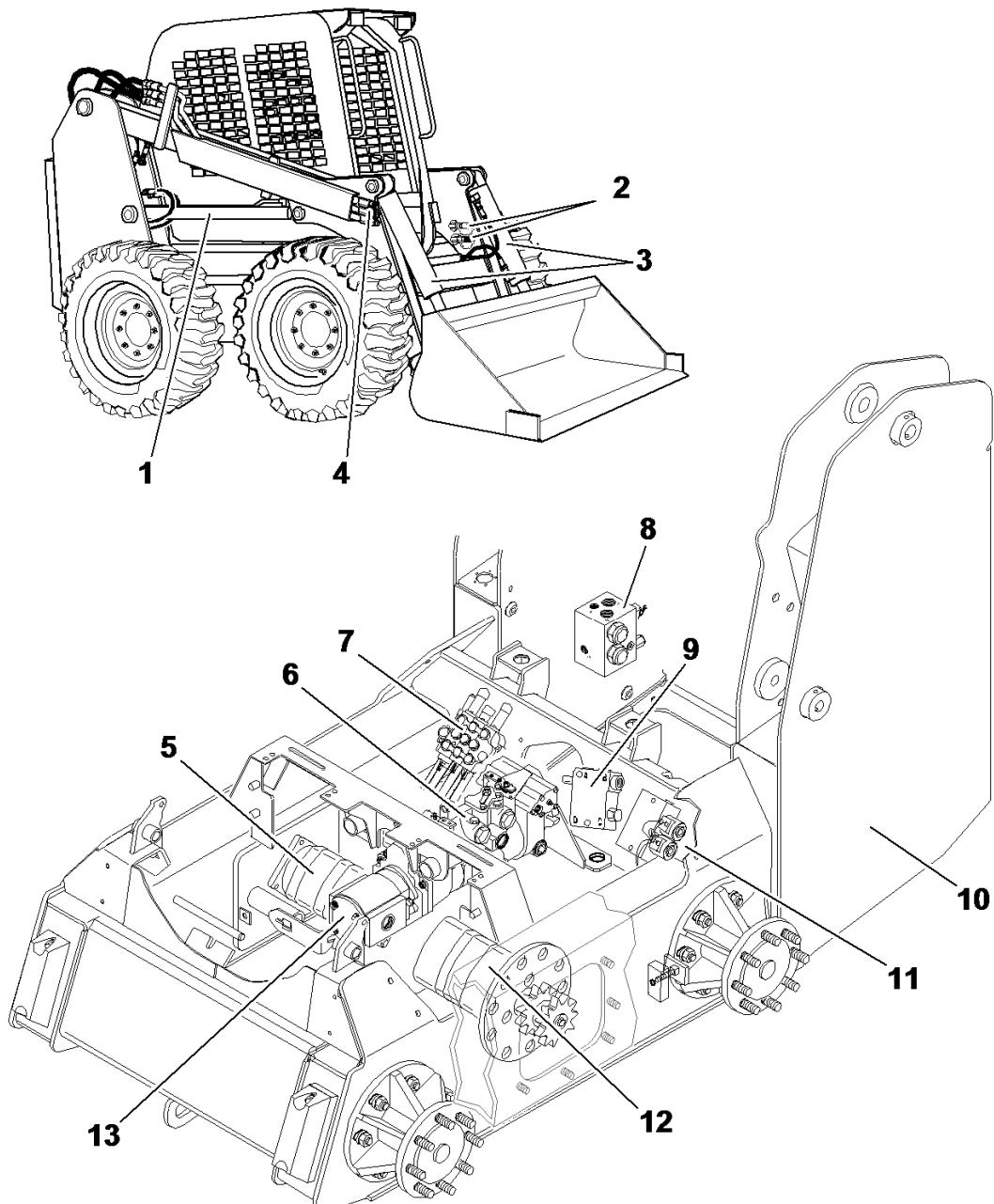
Sense contamination is foreign matter found by sight, touch or smell. This type of contamination can cause a sudden failure of a hydraulic component. Examples of sense contamination are:

- particles of metal or dirt in the system oil,
- air in the system oil,
- system oil dark and thick,
- odor of burned system oil, and/or
- water in the system oil. Water will cause oil to become white in color.

Document Title: Hydraulic terminology	Function Group: component 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Hydraulic component terminology

To understand the safety, operation and maintenance information presented in this section, it is necessary that the operator/mechanic be familiar with the name and location of the machine hydraulic components. The following illustration identifies the components that are referred to throughout this section.



V1009841

Figure 1
Model MC90 optional 'High flow' shown

- | | | | |
|---|---|----|-----------------------------------|
| 1 | Loader arm cylinder | 8 | High flow control valve |
| 2 | Auxiliary hydraulic couplers | 9 | Self level valve |
| 3 | Attachment tilt cylinders | 10 | Hydraulic oil reservoir |
| 4 | High flow couplers | 11 | Loader arm lockout solenoid valve |
| 5 | Right side hydrostatic drive motor | 12 | Left side hydrostatic drive motor |
| 6 | Main hydrostatic control pump
(Transmission) | 13 | Implement pump |
| 7 | Main hydraulic control valve | | |

Document Title: Travel hydraulics, 440 troubleshooting	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Travel hydraulics, troubleshooting

To understand the Travel hydraulics troubleshooting, read the description for respective component

Trouble		
Noise from pump or motor		
Probable cause	Remedy	Ref. section
Oil tank low on oil.	Check for leaks. Fill oil tank.	
Air in system.	Check supply hose to charge or charge/ implement pump for leaks or bad connections.	
Low charge pressure	Check charge or charge/implement pressure.	900 Charge system pressure priority valve relief test (MC80), or 900 Charge system pressure relief valve test
Excessive internal leakage or damage in control pump and/or travel motor.	Test, inspect, and repair defective control pump and/or travel motor. Clean the hydraulic system.	900 Transmission pump, drive relief test 900 Transmission pump, flow — displacement test
Wrong type of hydraulic oil.	Replace oil referring to specification	See Operator's Manual
Hydraulic filter clogged and oil is by-passing filter.	Replace hydraulic oil filter.	

Trouble		
Loss of drive power on one side (both directions)		
Probable cause	Remedy	Ref. section
Parking lock engaged	Check wire. Check adjustment on parking lock	550 Park lock, removal — 550 Park lock pin, adjustment
Disconnected or broken steering control linkage.	Reconnect and adjust steering control linkage.	643 Control lever removal and installation
Drive chain failure.	Inspect and repair drive chains and sprockets. Check drive chain tension.	460 Drive chain, drive- and axle-sprocket, removal — 460 Drive chain tension, adjustment
Wheel axle failure.	Inspect and replace axle.	460 Axle assembly, removing
Travel motor shaft failure.	Remove the access plate and inspect the drive shaft. Inspect and replace defective parts.	441 Travel motor, removing
Excessive internal leakage or damage in control pump and/or travel motor.	Test, inspect, and repair defective control pump and/or travel motor. Check type of oil used. Replace hydraulic oil and oil filter.	900 Hydrostatic drive motor test — 900 Transmission pump, drive relief test 900 Transmission pump, flow — displacement test

Trouble

Loss of drive power on one side (one direction only)

Probable cause	Remedy	Ref. section
Defective drive relief valves.	Test and replace if necessary. Check leafoil valve in travel motor	900 Transmission pump, drive relief test
Binding on travel motor leaking spool.	Check travel motor	

Trouble

Loss of drive power on both sides.

Probable cause	Remedy	Ref. section
Oil tank low on oil.	Check for leaks. Fill oil tank.	
No flow or pressure from charge or charge/implement pump	Check pressure in charge system With full pressure, go to next section. Check loader cycle times at full throttle (MC80 only)	900 Charge system pressure relief valve test or 945 Loader cycle times, MC80 (MC80) — 900 Charge system pressure priority valve relief test (MC80)
Drive shaft universal joint between engine and pump failure.	Inspect and replace damaged parts. Check for misalignment.	442 Transmission drive assembly, replacement
Control pump shaft failure.	Inspect and replace damaged parts.	442 Main travel control pump (MC80 only), removal or 442 Main travel control pump (MC90 and MC110 only), removal
Charge pump cavitation.	Check supply hose to charge and implement pump for leaks or bad connections.	913 Implement pump, removal

Trouble

Loss of drive power on both sides (full flow from charge pump or charge/implement pump).

Probable cause	Remedy	Ref. section
Park lock pins engaged.	Inspect safety bar and wires. Adjust or replace.	550 Park lock, removal — 550 Park lock pin, adjustment
Excessive internal leakage or damage in control pump and/or travel motor.	Test, inspect, and repair defective control pumps and/or travel motors. Change oil and hydraulic filters	900 Transmission pump, drive relief test 900 Transmission pump, flow displacement test

Trouble

Machine will not travel in a straight line.

Probable cause	Remedy	Ref, section
Control lever binding.	Check interference of dirt and debris. Check adjustment and for loose or damaged parts.	643 Control lever removal and installation 643 Neutral centring and control lever adjustment —
Control pump and/or travel motor failure on one side.	Test, inspect, and repair defective control pumps and/or travel motors.	900 Transmission pump, drive relief test — 900 Transmission pump, flow displacement test
Failure in one or more drive bypass/check valves.	Test and replace as necessary.	900 Transmission pump, drive relief test

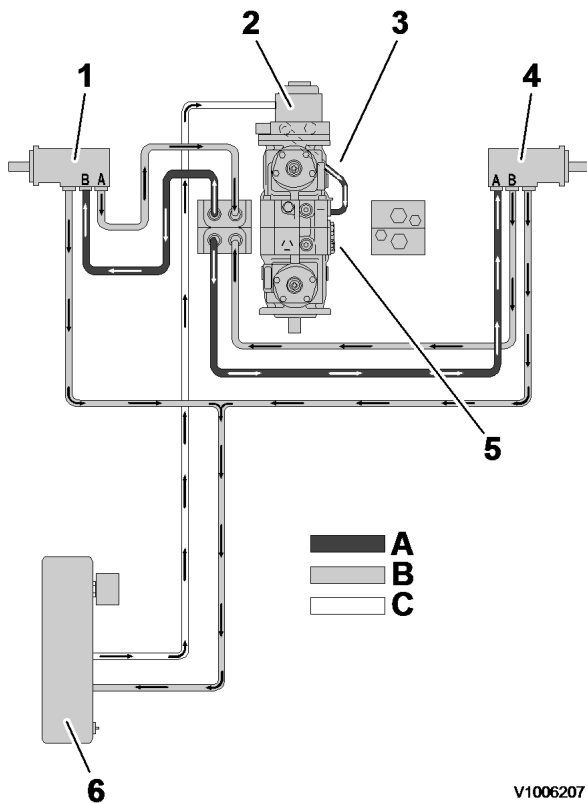
Document Title: Hydraulic circuit	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Hydraulic circuit

The travel hydraulic circuits below each contain an implement pump that draws system oil from the reservoir.

The implement pumps are driven at engine speed by a shaft that passes through from the hydrostatic pump to the implement pump and control pump assembly.

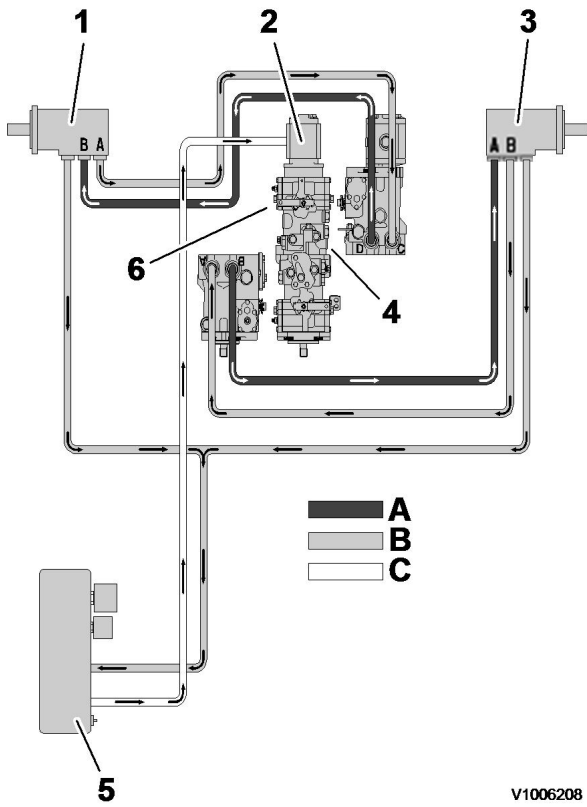
The hydrostatic travel control pumps direct oil to the left and right travel motors. Return oil from the travel motors is directed back to the control pump assembly.



V1006207

Figure 1
Model MC80 (manual control)

1	Left hydrostatic drive motor	A	Pressure
2	Charge/implement pump	B	Return
3	Charge line from implement pump	C	Suction
4	Right hydrostatic drive motor		
5	Main hydrostatic control pump		
6	Hydraulic oil reservoir		



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Figure 2
Model MC90/MC110 (servo control)

1	Left hydrostatic drive motor	A	Pressure
2	Implement pump	B	Return
3	Right hydrostatic drive motor	C	Suction
4	Integral charge pump		
5	Hydraulic oil reservoir		
6	Main hydrostatic control pump		

Document Title: Main hydrostatic travel control pump, description	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Main hydrostatic travel control pump, description

Travel control pump description

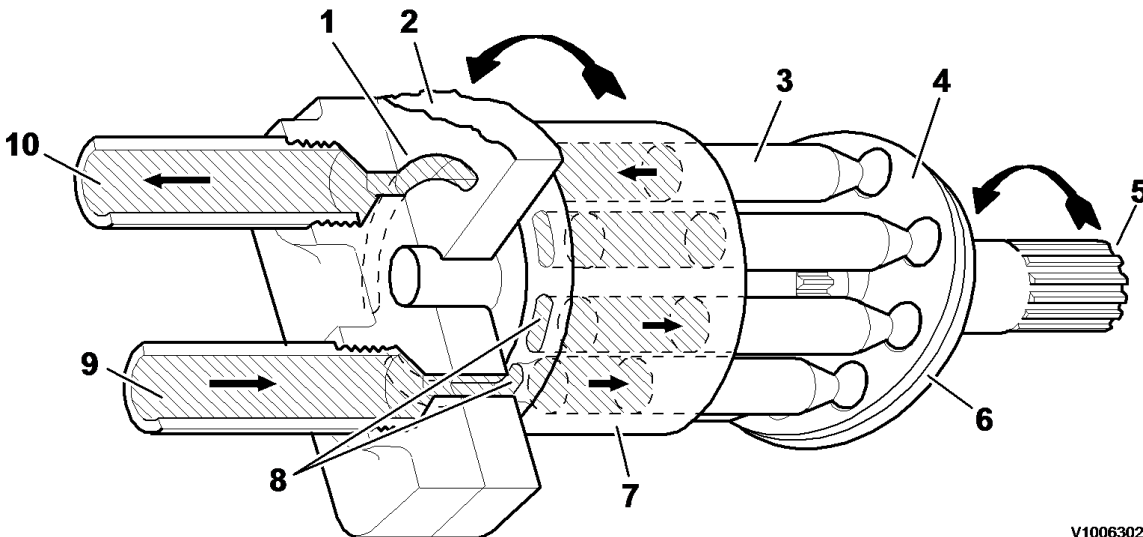
The travel control pump assembly is a typical hydrostatic variable displacement double transmission pump package. The valve block contains four drive circuit relief valves and one charge circuit relief valve. The control pump delivers oil through the valve block to the left and right travel motors. Engine speed and movement of the travel-steering levers determine left and right control pump output.

Travel control pump operation

Rotation of the control pump input drive shaft causes the cylinder block, shoe plate and piston to move against the yoke face, creating a reciprocating motion to each piston within the cylinder block. Inlet and outlet ports connect to a kidney shape slotted wafer plate. As the pistons move out of the cylinder block a low pressure is created and oil is forced into the piston by charge pressure. The oil moves with the cylinder block past the intake kidney slot to the outlet (pressure) kidney slot. The motion of the piston reverses and oil is pushed out of the cylinder block into the outlet port. The angle of the yoke face/shoe plate determines the pump displacement from full displacement in one direction to full displacement in the opposite direction.

The travel control pumps for MC60, MC70 and MC80 utilize a direct mechanical lever for pump displacement/direction control.

The travel control pumps for MC90 and MC110 have a Manual Displacement Control that convert the mechanical input signal to a hydraulic signal with a spring centered 4-way servo valve, and ports hydraulic pressure to either side of a double acting servo piston. The MDC provides output flow to the servo piston in proportion to the angular position of the control handle. The servo piston tilts the cradle washplate, thus varying the pump's displacement from full displacement in one direction to full displacement in the opposite direction.



V1006302

Figure 1
Typical inline control pump operation

1. Outlet valve block, kidney slot
2. Pressure plate
3. Piston
4. Shoe plate
5. Drive shaft

6. Yoke, face
7. Cylinder block bore
8. Intake kidney slot area
9. Inlet port
10. Outlet port

Document Title: Charge/implement pump, description	Function Group: pump, 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Charge/implement pump, description

The charge/implement pump on the model MC80 mounts at the end of two travel control pumps forming a transmission unit. The transmission pump shaft drives the charge and implement pump shaft in all models at engine crankshaft speed. Engine speed determines the pump output; maximum output being at full rated engine speed.

For additional information on the implement function of this pump see [913 Implement pump, description](#).

The model MC90 and MC110 transmission has individual charge and implement pumps. The charge pump is incorporated into the control pump (transmission) assembly, and is located between the transmission halves. The implement pump is mounted on the end of the control pumps, in the same location as on the MC80 model.

Pump operation

The charge pumps develop flow by carrying oil between the of two meshed gears. The pumps draw oil from the hydraulic system oil reservoir and pump the oil to the control pump (transmission) assembly as replenishment oil.

The model MC80 charge/implement pump, using a pressure priority valve, cleaned and filtered oil to the main control valve.

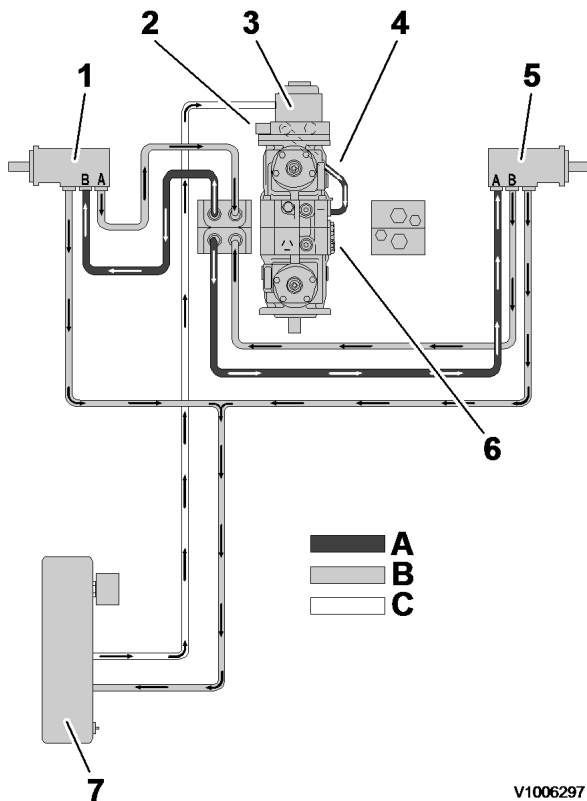
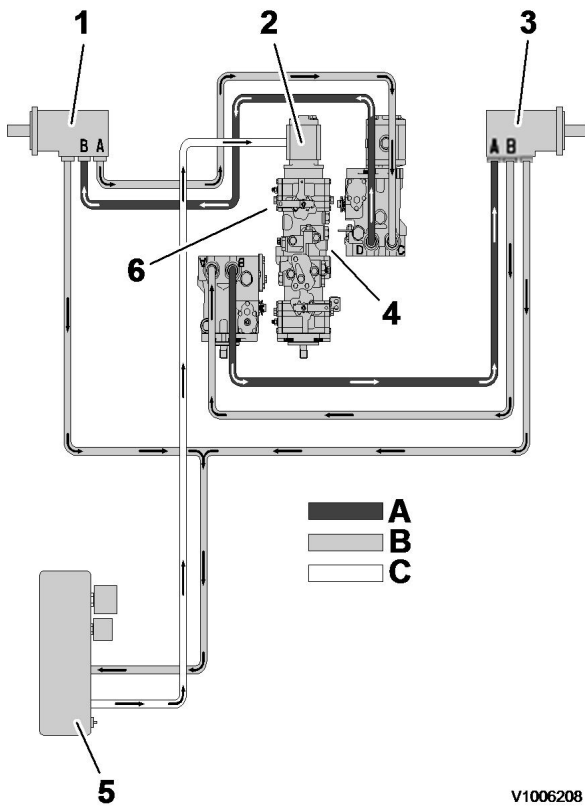


Figure 1
MC80 (manual control)

1	Left hydrostatic drive motor	A	Pressure
2	Pressure priority valve	B	Return
3	Charge/implement pump	C	Suction
4	External charge line from implement pump		

5	Right hydrostatic drive motor		
6	Main hydrostatic control pump		
7	Hydraulic oil reservoir		



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Figure 2
MC90/MC110, (servo control)

1	Left hydrostatic drive motor	A	Pressure
2	Implement pump	B	Return
3	Right hydrostatic drive motor	C	Suction
4	Integral charge pump		
5	Hydraulic oil reservoir		
6	Main hydrostatic control pump		

Document Title: Pressure priority valve (MC80 only), description	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
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Pressure priority valve (MC80 only), description

Valve description

The priority valve assembly (1) is a flow divider that separates the oil flow into two individual circuits, and is incorporated in the charge/implement pump housing (2). The circuit given priority is the charge flow to the main travel control pumps, and is connected to port (3). The remaining flow, connected to port (4) is directed to the main hydraulic control valve.

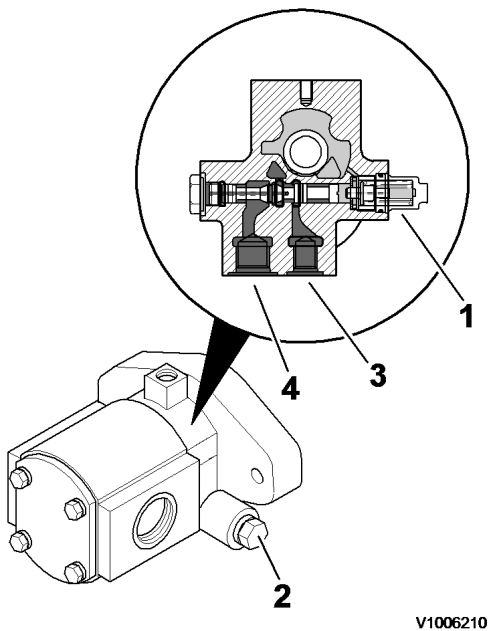


Figure 1
Pressure priority valve assembly

1. Pressure priority valve
2. Charge/implement pump housing
3. Charge flow port
4. Remaining flow port

Valve operation

With the engine stopped, oil in the charge (1) and implement port (2) is trapped, and the priority valve control spool (3) is at rest on the non-spring end (4) of the housing. When the engine is started, oil flow from the pump enters the housing at port (5), is fed to the control spool groove (6) and then to the charge port (1).

The charge circuit is ported to the non-spring end (4) of the valve housing by a small passage (7) in the control spool.

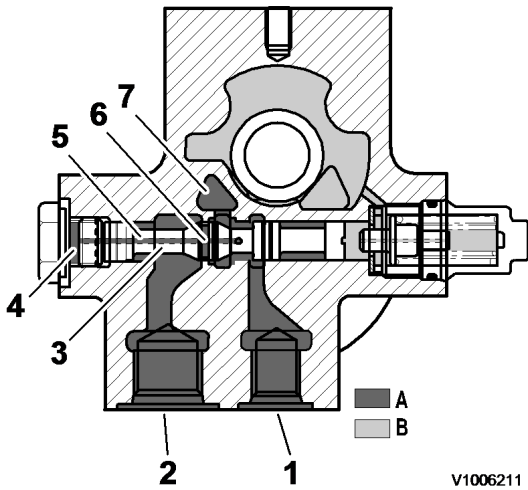


Figure 2
Pressure priority valve, spool at rest

1	Charge port	A	Trapped oil
2	Implement port	B	Pressure free oil
3	Control spool		
4	Non-spring end		
5	Port		
6	Control spool groove		
7	Passage in the control spool		

Pump pressure acting, on the non-spring side (1) on the control spool (2), will move the spool toward the opposite side of the housing, and up against the load spring (3). The spool moves across until it reaches a point where the flow to the charge port is controlled to maintain the required pressure. Excess flow is diverted to the main control valve through port (4). As pressure varies in this line, the spool moves to throttle the flow into the charge port line through port (5) to maintain the required charge pressure.

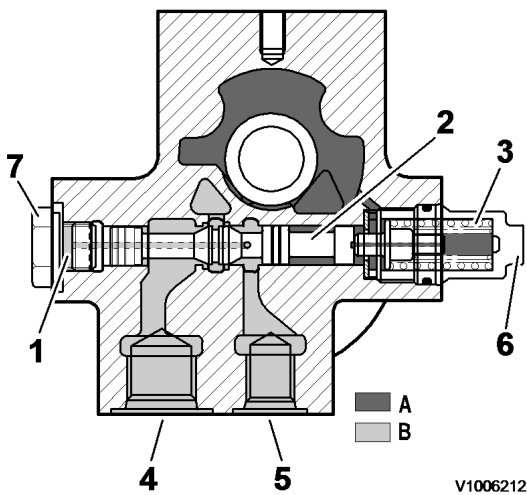


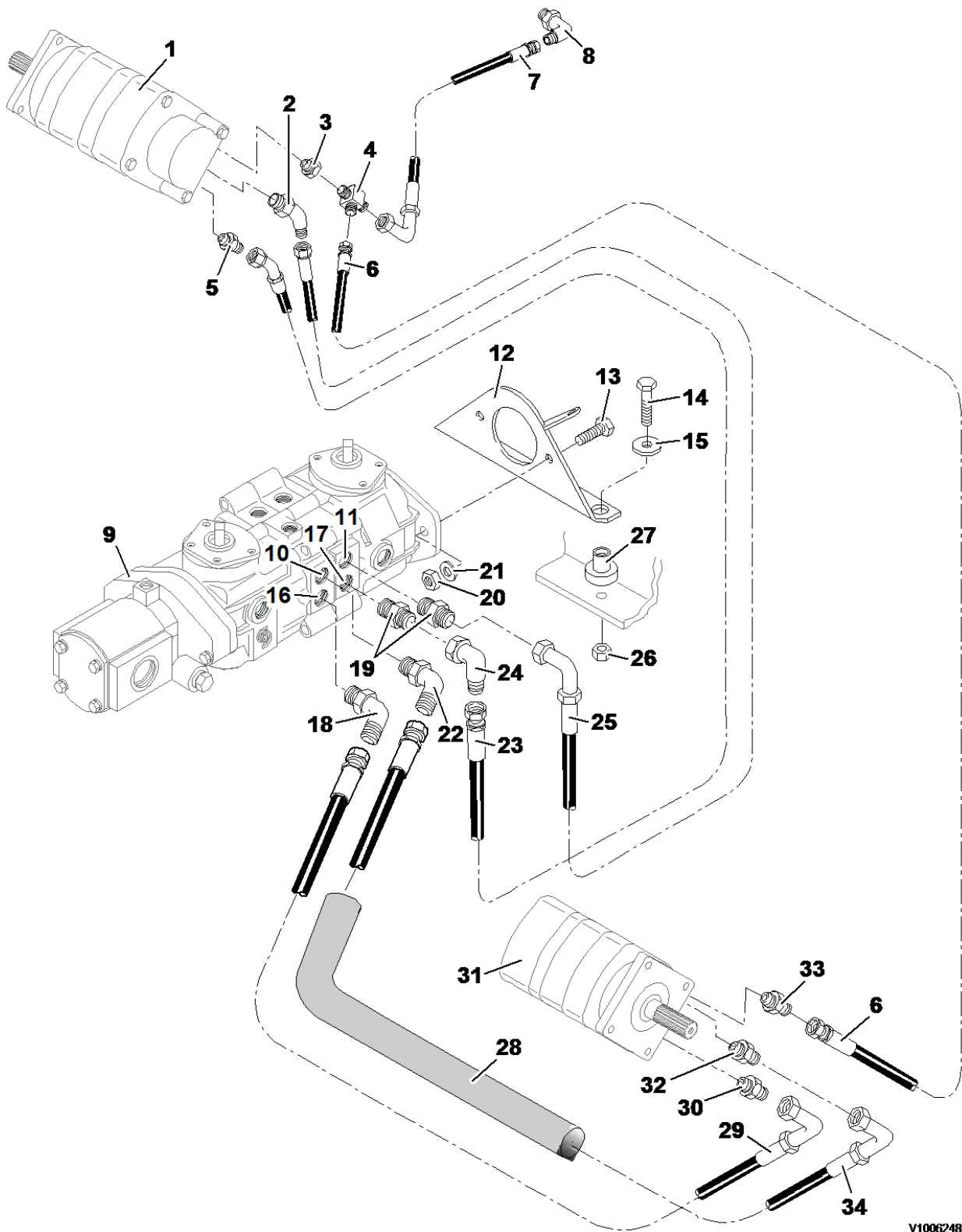
Figure 3
Pressure priority valve, spool in control

1	Non-spring end	A	Trapped oil
2	Control spool	B	Pressure free oil
3	Load spring		
4	Port		

5	Port		
6	Cap		
7	Plug		

Document Title: Travel system, hydraulic components, description	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Travel system, hydraulic components, MC80, description



V1006248

Figure 1
Hydraulic travel components, Model MC80

Position	Designation	Position	Designation	Position	Designation
1	Right travel motor	12	Mount, rear transmission	23	Hose assembly
2	Elbow, 45° SAE 16	13	HHCS, 1/2-13x2" (2)	24	Elbow, 90° SAE 16
3	Reducer, SAE 4-6	14	HHCS, 3/8-16x2-1/4" (2)	25	Hose assembly
4	Tee, male run, SAE 6	15	Washer, rebound (2)	26	Nut, hex lock 3/8-16

5	Connector, straight SAE 4-6	16	Port "B"	27	Isolator, rear mount (2)
6	Hose assembly, left motor to right motor	17	Port "B"	28	Guard, hose 28" lg.
7	Hose assembly, right motor tee to control valve	18	Elbow, 90° SAE 16-12	29	Hose assembly
8	Elbow, 90°, SAE 12-16	19	Connector, straight SAE 16-12	30	Connector, straight SAE 4-6, Port "B"
9	Transmission	20	Nut, hex lock 1/2-13 (2)	31	Right travel motor
10	Port "A"	21	Washer, flat 1/2 (2)	32	Connector, straight SAE 4-6, Port "A"
11	Port "B"	22	Elbow, 90° SAE 16-12	33	Connector, straight SAE 6-4
				34	Hose assembly

Thank you very much for reading.

This is part of the demo page.

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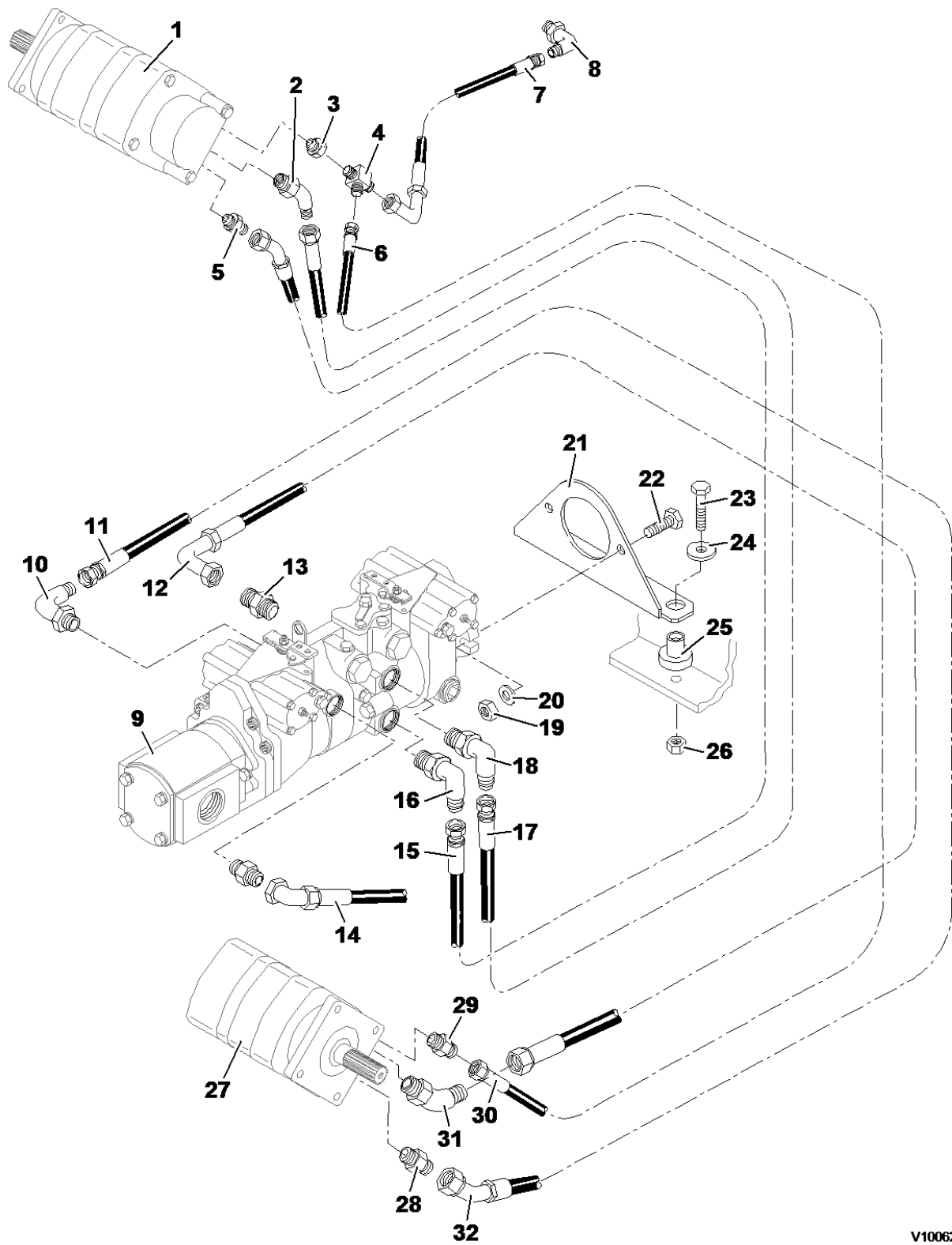
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Document Title: Travel system, hydraulic components, description	Function Group: 440	Information Type: Service Information	Date: 2014/3/18
Profile: SSL, MC80 [GB]			

Travel system, hydraulic components, MC90, description



V1006257

Figure 1
Hydraulic travel components, Model MC90

Position	Designation	Position	Designation	Position	Designation
1	Right travel motor	12	Hose assembly	23	HHCS, 3/8-16x2-1/4" (2)
2	Elbow, 45° SAE 16	13	Connector, straight SAE 16, Port "D"	24	Washer, rebound (2)
3	Reducer, SAE 4-6	14	To drive filter/hydraulic tank	25	Isolator, rear mount (2)