Fault Finding basics

When a hydraulic system fails to work correctly there are a number of ‘Things’ to do;

1. Stand back and assess the situation, don’t rush in and start taking things to pieces have a cup of coffee, think about the situation!
2. Is there enough oil in the transmission?
3. Is the pump operating?
4. Is the implement too heavy?
5. Are the adjustments correct?
6. Did the fault suddenly happen or was it progressive?
7. Is there an unusual noise?
8. Are the filters OK, have they been changed / cleaned regularly?
9. Are the operating levers OK, do they actually move the linkage?
10. Is the lift latch engaged?
11. Is the diverter valve OK?
12. Is the 3 point linkage positioned / adjusted correctly?
13. If you require ‘Position’ control is the lever in position control?
14. If you are using a plough is the lever in ‘Draught’ control?

Fault finding is largely a state of mind, if a pump is pumping oil then that oil has to go somewhere! Think of a garden hose, if you turn the tap on water should come out of the other end, but if there is a kink in the hose it won’t, if there’s a split in the hose the water will escape! If the tap is only half turned on only a small amount will come out of the other end.

The pump draws oil from the transmission, via the elbow under the differential housing (this elbow incorporates a shut-off valve) and the suction strainer. The shut-off valve allows the suction filter to be serviced, or the suction pipe to be disconnected, without draining the transmission, by unscrewing and pulling down the bolt under the elbow.

The pump operates continuously while the engine is running and is in two sections. The front pump supplies oil to the diverter valve, via the high pressure filter. The rear pump supplies oil direct to the external valve pack.

The diverter valve controls the oil flow from the front section of the pump. With the handle in one position oil is supplied, via a hose connected to the adaptor on the rear face of the hydraulic case and an internal pipe, to the main control valve block. With the handle in the second position, oil is supplied to the external valve pack to supplement the oil supplied direct from the rear section of the pump and allow implements which require a greater oil flow to be operated. The handle should be in the first position whenever the greater oil flow to the the external valve pack is not required.

Oil enters the external valve pack through the rear port of the inlet cover and passes through internal passages to each valve. Exhausting oil passes out of the front port of the inlet cover, via a pipe connected to the right-hand side of the hydraulic case, back to the transmission. A relief valve in the inlet cover allows oil to pass directly from the inlet port to the exhaust port when the maximum oil pressure is exceeded.

Use the charts on the following pages to help fault finding.
Hydraulic fault finding - Main lift - All models with Position & Draught Control - Engine mounted pump

Chart 1
Position / Draught Control Fault

Unit cycles faster than once every 5 sec. in transport or 'Position' control
See chart 2

Failure to lift
Check that auxiliary lever is not fixed in 'Lift'
Check oil level and that the diverter valve is correctly valve is correctly positioned
Check control adjustments
Does relief valve operate (audible) when main control lever is at its 'Mid' lift position?

No

Yes

Check and adjust Hydraulic pressure
Correct pressure can't be obtained
High pressure relief valve failed

Pressure correct but relief valve still operates when 'LIFT' selected
Load to heavy

Does the main lift operate correctly when one of the external valve control valve levers is held in the LIFT position?

No

Test pump
Examine un-loader valve, and relief valve
Remove control valve and lift cylinder and examine all pipes, seals and adaptors for possible leaks
Overhaul control valve and lift cylinder if no leaks are found

Yes

Overhaul or replace the diverter valve

Intermittent loss of 'Position' control
Check oil level and control adjustments
Main lever fault

No

Yes

Check control adjustments
Does relief valve operate (audible) when lifting?

Slow lift
Low lift capacity
Check oil level and that the diverter valve is in its correct position
Check control adjustments
Does relief valve operate (audible) when lifting?

No

Yes

Implement slow to lower
Check control adjustments
Check if lift cylinder or assistor ram is seized
Check if main plunger is seized and inspect the limiting valve in the end of the plunger, replace parts as required

'Draught' control fault
Check correct service is selected
Check oil level and control adjustments

Erratic operation or no response
Remove cross-shaft assembly and:
1. Overhaul main lever and shaft
2. Check main valve plunger is not sticking. Overhaul control valve if required
3. Check draught control cam is not sticking. Overhaul if required

Implement fails to work shallow
Ensure linkage is not preventing implement reaching correct depth
Check that plough shares or implement points are not worn or broken
Try top link in alternative positions and note that light implements with light draught forces or hard ground conditions may require the implement to be weighted

Overhaul Belleville washer pack and anchor bracket

Unit never cycles in 'Position' control
Lift won't go down with control lever in lower 'Lift lock' engaged
Main plunger or un-loader valve sticking

No

Yes

Test pump
Examine un-loader valve, and relief valve
Remove control valve and lift cylinder and examine all pipes, seals and adaptors for possible leaks
Overhaul control valve and lift cylinder if no leaks are found

Overhaul Belleville washer pack and anchor bracket

Note;
Carefully examine all pipes for splits & 'O' rings for failure, renew as necessary. Ensure all unions are tight and that all filters are clean and in good condition.
Hydraulic fault finding - Main lift - All models with Position & Draught Control - Engine mounted pump

Chart 2

From Chart 1
Excessive Cycling
Check oil level
Carefully run through and correct all adjustments

Is pump noisy?

No
Check type, age and condition of transmission oil
‘Faulty / wrong oil’
Change oil
Lift heavy implement and stop engine
Implement holds
Remove un-loader valve

Un-loader valve orifice blocked
Blow out with air

Un-loader valve piston ring broken or worn
Renew piston ring or renew control valve assembly if bore is damaged

Un-loader valve ring stuck in groove
Remove and check
Renew control valve if fault persists

Oil ‘OK’

Yes
Test pump

From Chart 1
Slow lift
Low lift capacity
Lift a heavy implement with assistance from suitable lifting equipment, if required, then stop engine
Implement drops
Check amount of oil on top of lift cylinder piston

Excessive oil on top of piston
Renew lift cylinder piston rings

Minimal oil on top of piston

Overhaul lift cylinder and non-return valve
Check pipes for fractures and ‘O’ rings for leakage / failure
Renew control valve assembly if fault persists

Renew control valve if fault persists

Renew un-loader valve

Remove un-loader valve

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