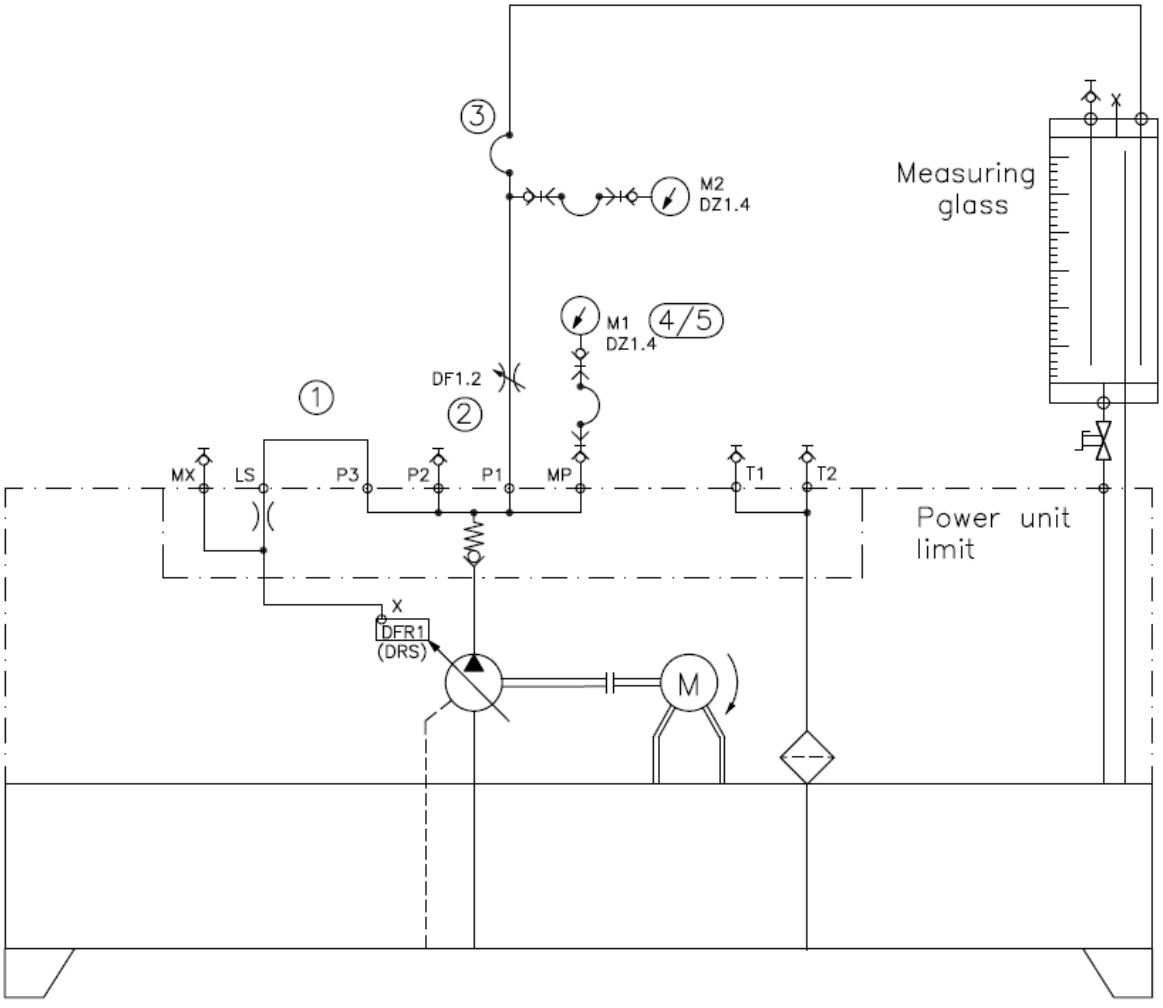
Pressure

Fundamentals:
Contrary to popular belief pumps create flow in the hydraulic system and not pressure. Pressure is caused by the resistance to this flow and this resistance could be from loads on actuators or artificial loads caused within the system itself. These artificial loads could be pressures caused by flow across valving or even the piping network.

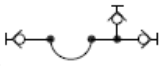
Objective:
Determine the cause of pressure buildup in hydraulic systems.

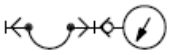
Connections:
Utilizing the schematic below as a guide follow these steps to connect a circuit on the hydraulic trainer.

1) Using an appropriate length hose connect from port ‘P3’ directly to port ‘LS’ on the P/T/LS connection block
2) Connect the line mounted throttle valve ‘DF1.2’ to the ‘P1’ connection of the P/T/LS connection block.
3) Using a hose c/w gauge connector, connect from throttle valve ‘DF1.2’ to one connection of the measuring glass
4) Mount two pressure gauges ‘DZ1.4’ on the mounting grid where they can be easily read
5) Connect the capillary hose of the pressure gauges:
   Gauge ‘M1’ to port ‘MP’ on the P/T/LS connection manifold
   Gauge ‘M2” to the gauging point connector on the downstream side of throttle valve ‘DF1.2’

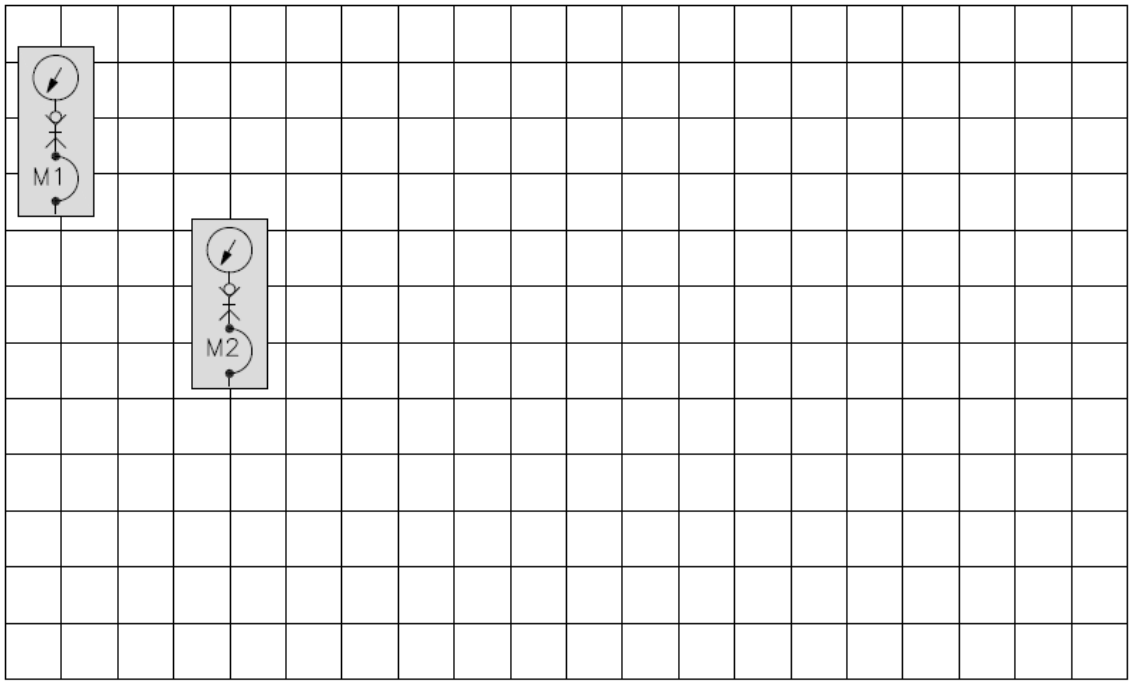


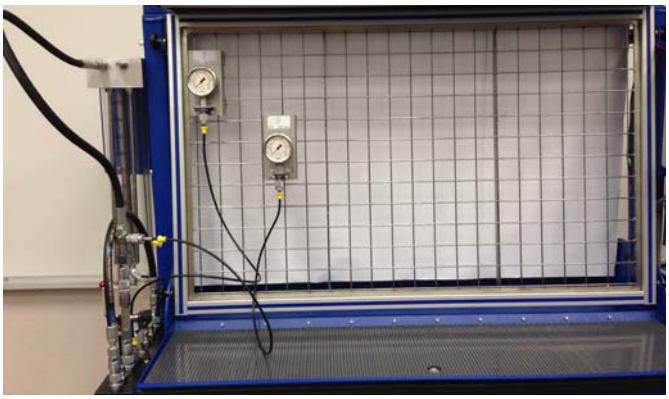
Components:
You will require the following components:

	Hose assembly	
1x	Pressure hose c/w gauge connection	

2x	Pressure gauge DZ1.4	
1X	Throttle valve DF1.2	

Before beginning the experiment read the **Rules for hydraulic trainer operation** sheet.





Instructions
Utilizing the installed pressure gauges determine the effect of the throttle valve setting on the pressure in the hydraulic system.

Procedure
Steps in the experimental procedure:
1. Has your instructor checked the constructed circuit?
2. Check again that all connection hoses are firmly coupled. (pull/turn to test)
3. Ensure the red E-STOP button is not engaged on either of the starters. (rotate the button to reset)
4. Open the shut-off valve on the bottom of the measuring glass to enable the glass to drain.
5. Open the throttle valve DF1.2 completely (fully CCW)
6. Switch on the pump via the green START push button.

a) Measure the pressure at gauges 'M1' and 'M2' with throttle valve DF1.2 fully open and record them in the following table.
b) Slowly close off the throttle valve until you read a pressure of 200 psi at gauge M1
c) Record in the chart the pressure you now read at M2
d) Close the throttle valve DF1.2 by ½ turn increments and measure and record the resultant pressures at M1 and M2 in Table 1 on the following page.

Turns	fully open		close by ½ turn	close by ½ turn	close by ½ turn	close by ½ turn	close by ½ turn	close by ½ turn
p M1 (psi)	160 psi	200 psi	290 psi	580 psi	725 psi	725 psi	725 psi	725 psi
p M2 (psi)	0 psi	0 psi	0 psi	0 psi	0 psi	0 psi	0 psi	0 psi

Table 1

e) Close the throttle valve completely and note what you see at the pressure gauges and the flow to the measuring glass. Explain.

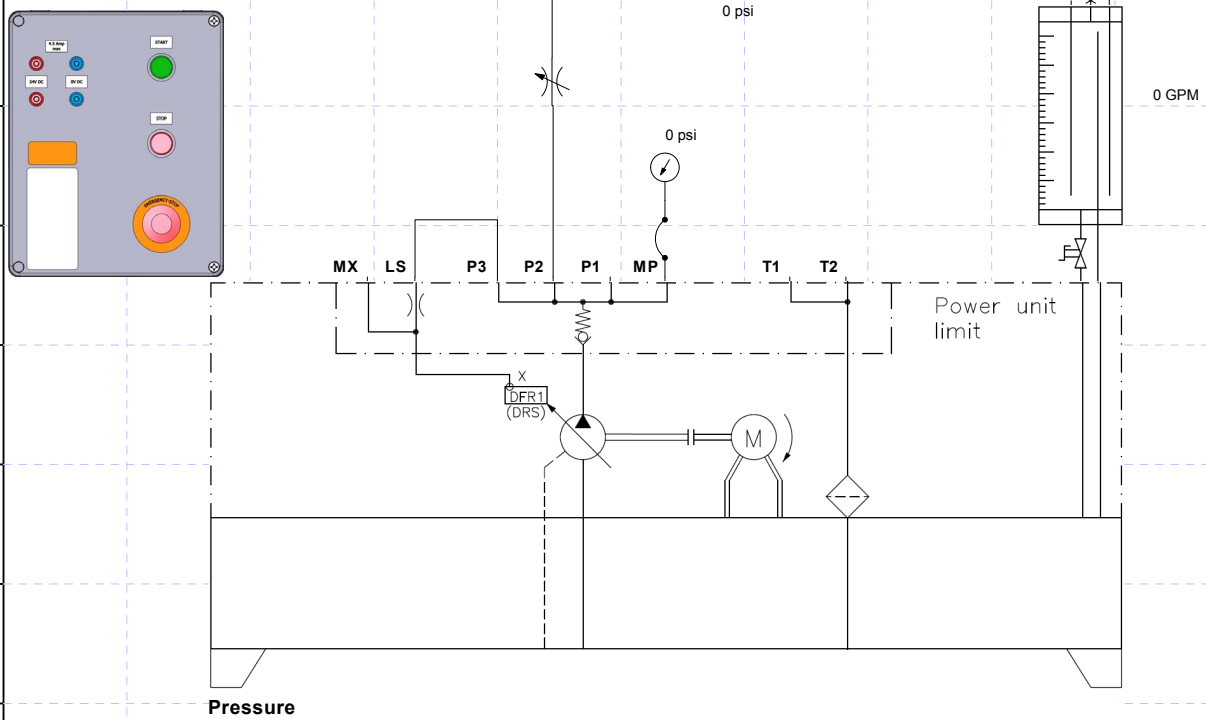
M1 = 725 psi M2 = 0 psi Flow ☐ yes ☒ no

f) When complete switch off the pump via the red STOP push button

Conclusions:

1) Resistance to flow in the hydraulic circuit produces pressure

2) Even with the flow control valve backed out completely there is still some pressure


0 psi
0 psi
0 GPM
MX
LS
P3
P2
P1
MP
T1
T2
Power unit limit
X
DFR1
(DRS)
M

Pressure

b)

Turns	fully open		Close by 1/2 turn	Close by 1/2 turn	Close by 1/2 turn	Close by 1/2 turn	Close by 1/2 turn	Close by 1/2 turn
p M1 (psi)		200 psi						
p M2 (psi)								

c) Close the throttle valve completely.

d) Note what you see at the pressure gauges and the flow to the measuring glass. Explain.

M1 = _____ psi M2 = _____ psi Flow ☐ yes ☐ no

Conclusions

1) Resistance to flow in the hydraulic circuit produces _____

2) Even with the flow control valve backed out completely there is still some _____