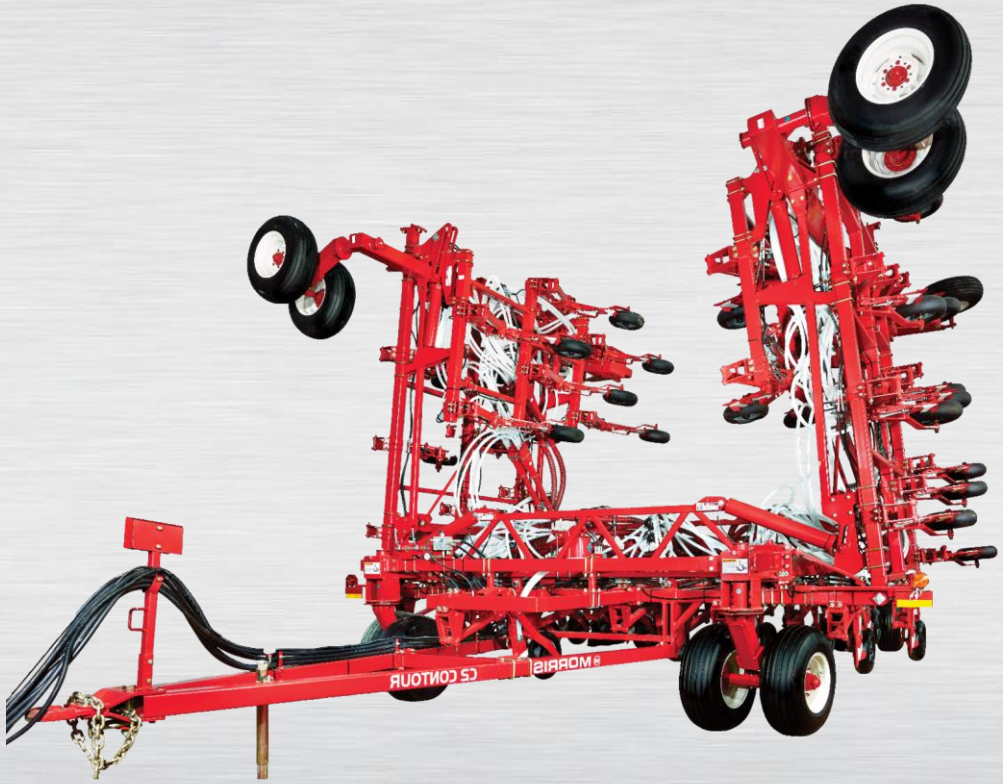
MORRIS

C2 CONTOUR



C2 Drill Training

Module 1 : Hydraulic System Training

Preface

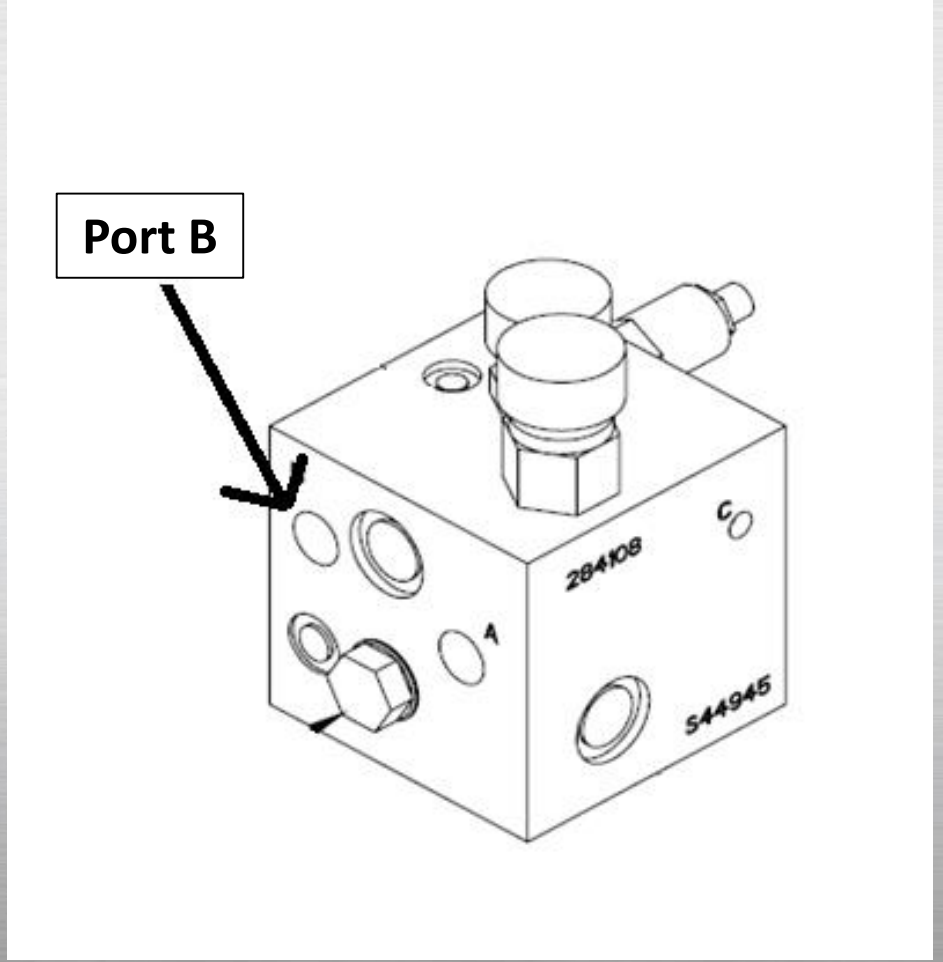
In this module we will review the hydraulic system components and their function. The system components are generally the same for all sizes of Contour II. Where there is a difference, it will be noted when that component is discussed

Hose Couplers

- At the front of the drill hitch, one would find the 3 hydraulic hoses/couplers for the system.
- They are typically marked “raise, lower and case drain”
- The raise and lower hoses are ½” and the case drain hose is ¼”
- Raise and lower refers to the position of the shanks.

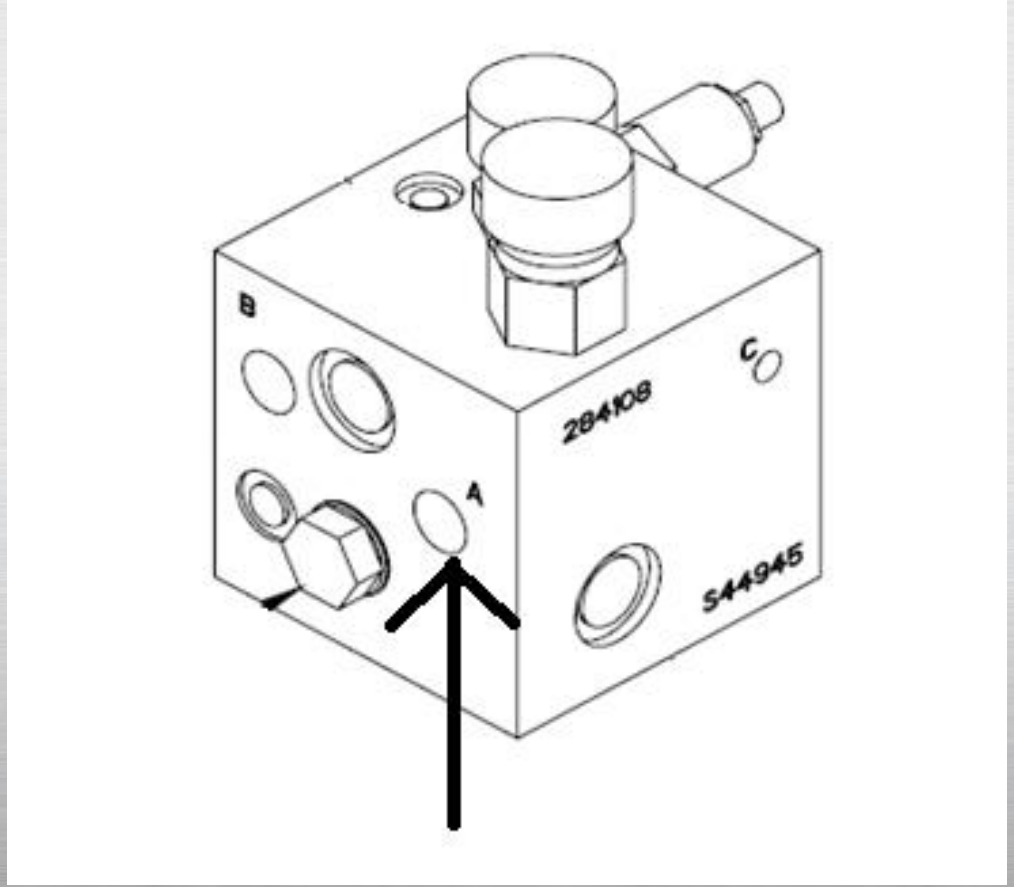
Port Connections

The “**Raise**” hose is connected to the manifold block at the port connecton marked “**B**”



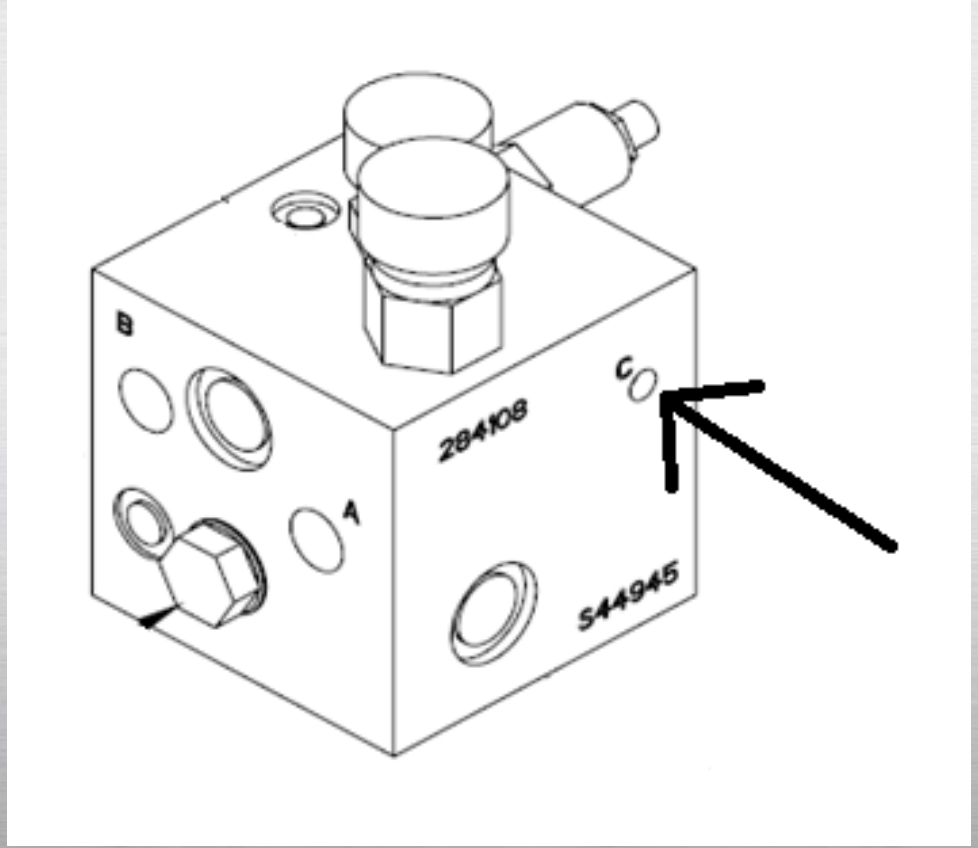
Port Connections

The “**Lower**” hose is connected to the manifold block at the port connecton marked “**A**”



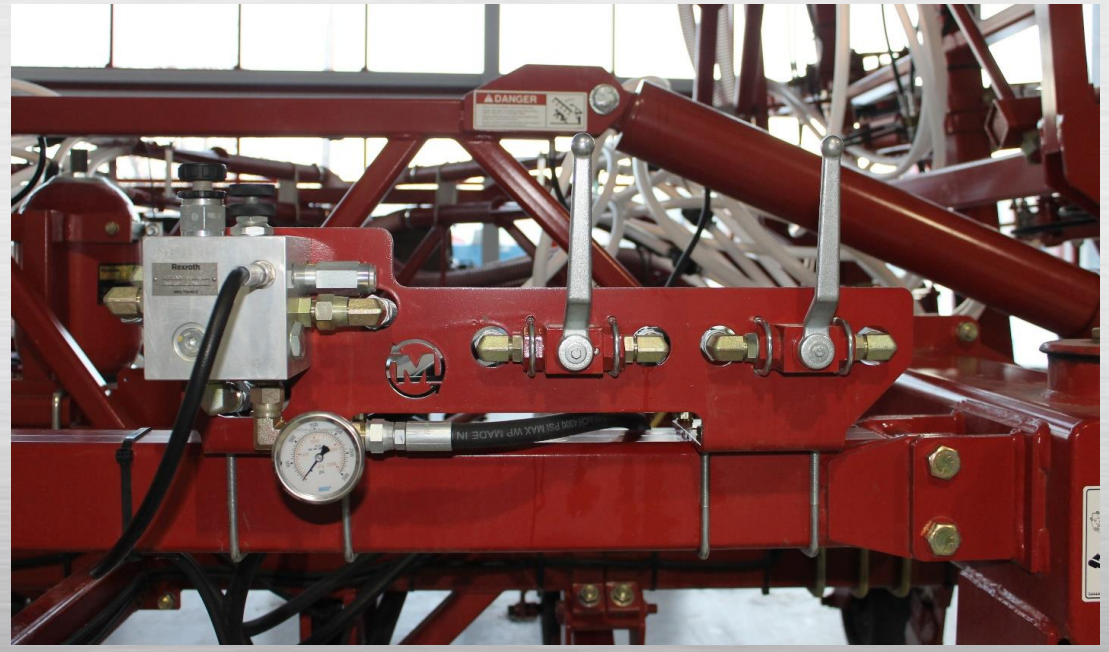
Port Connections

- The "**Case Drain**" hose is connected to the manifold block at the port connecton marked "**C**"
- The case drain line is used to bleed off the pressure reducing/relief valve



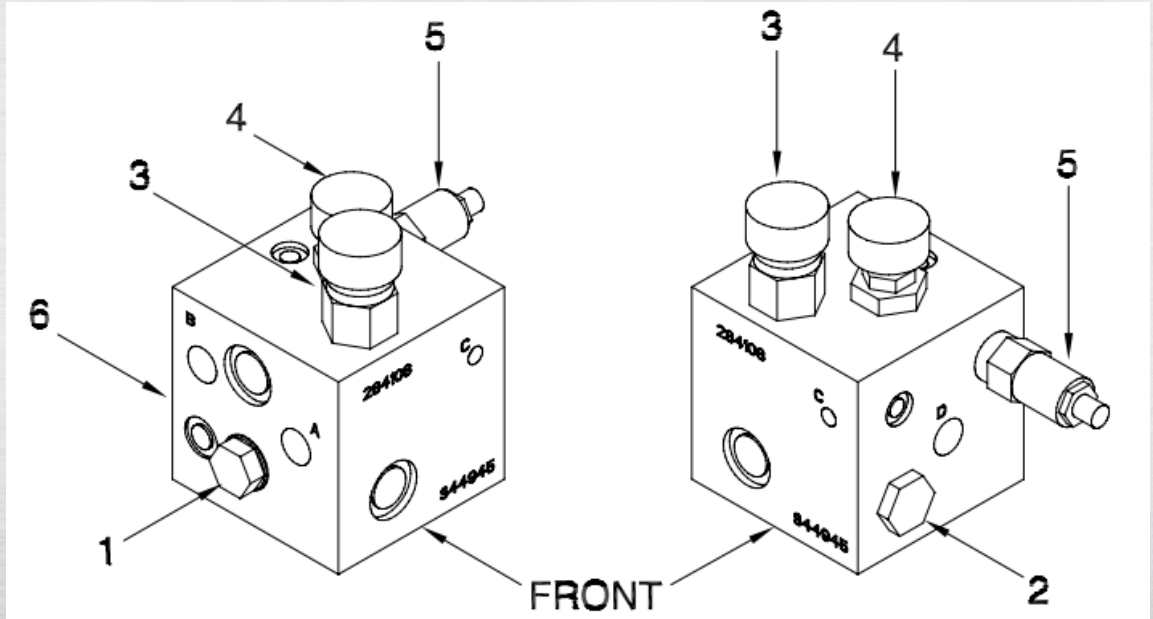
Manifold Block

- The hydraulic manifold block is mounted on a frame cross member at the front of the drill frame.
- It contains the connections for the raise, lower and case drain lines
- It also contains connections for ports leading to the accumulator and pressure display
- Some earlier units were **not** equipped with the pressure display gauge.
- There are also connections for oil lines to the gland/butt ends of the opener cylinders.



Manifold Block

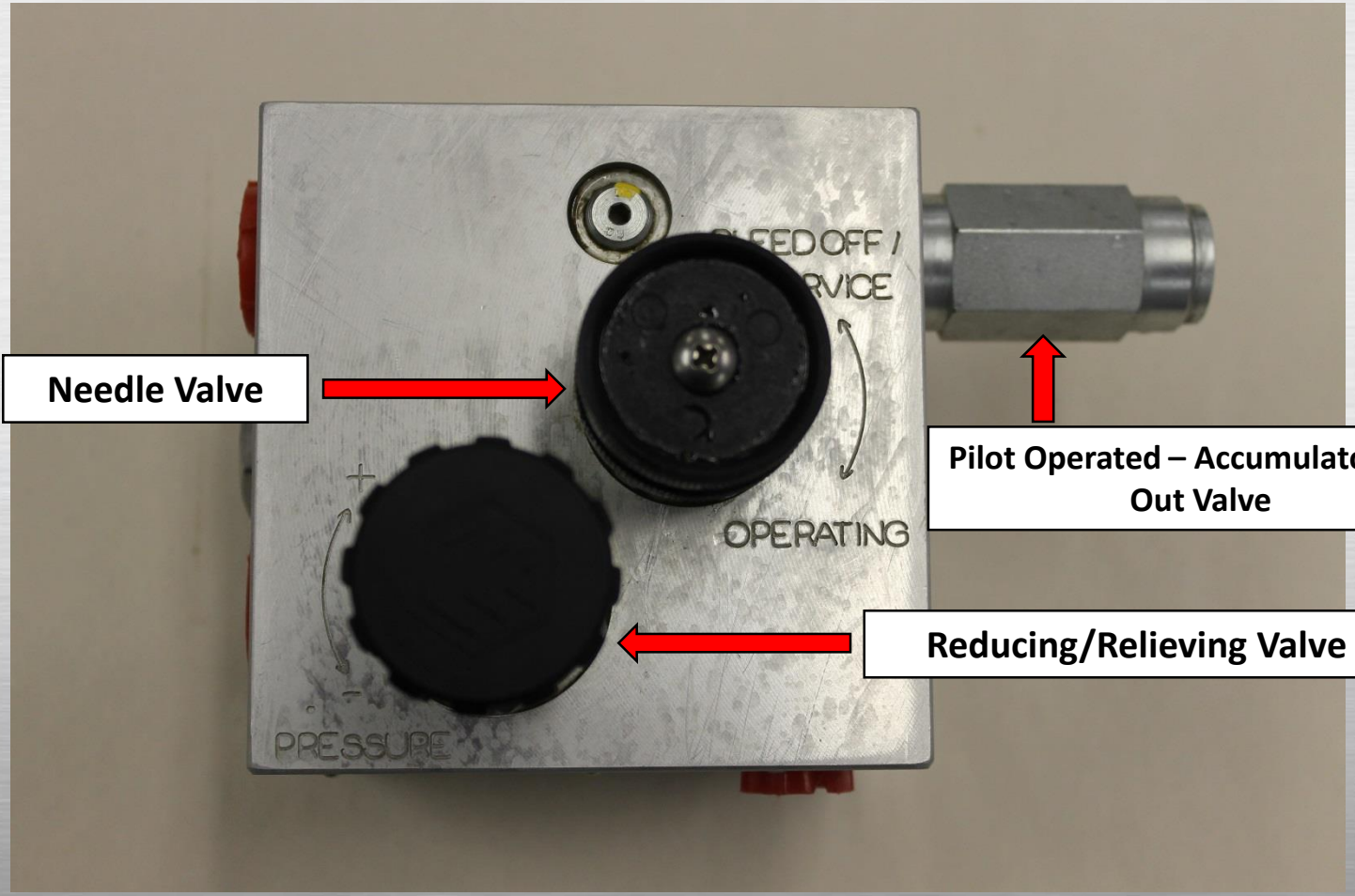
The manifold block also has several valves/cartridges incorporated into it



Item	Part No.	Description	Qty
1	S47139	Check Valve Cartridge - Pilot Operated	1
2	S47140	Check Valve Cartridge - Poppet	1
3	S47141	Check Valve Cartridge - Reducing/Relieving Valve	1
4	S47142	Cartridge Valve - Needle Valve	1
5	S47143	Cartridge - Pilot Operated - Accumulator Lock Out Valve	1
6	S44945	Hydraulic Down Pressure Manifold (Includes All Above Items)	

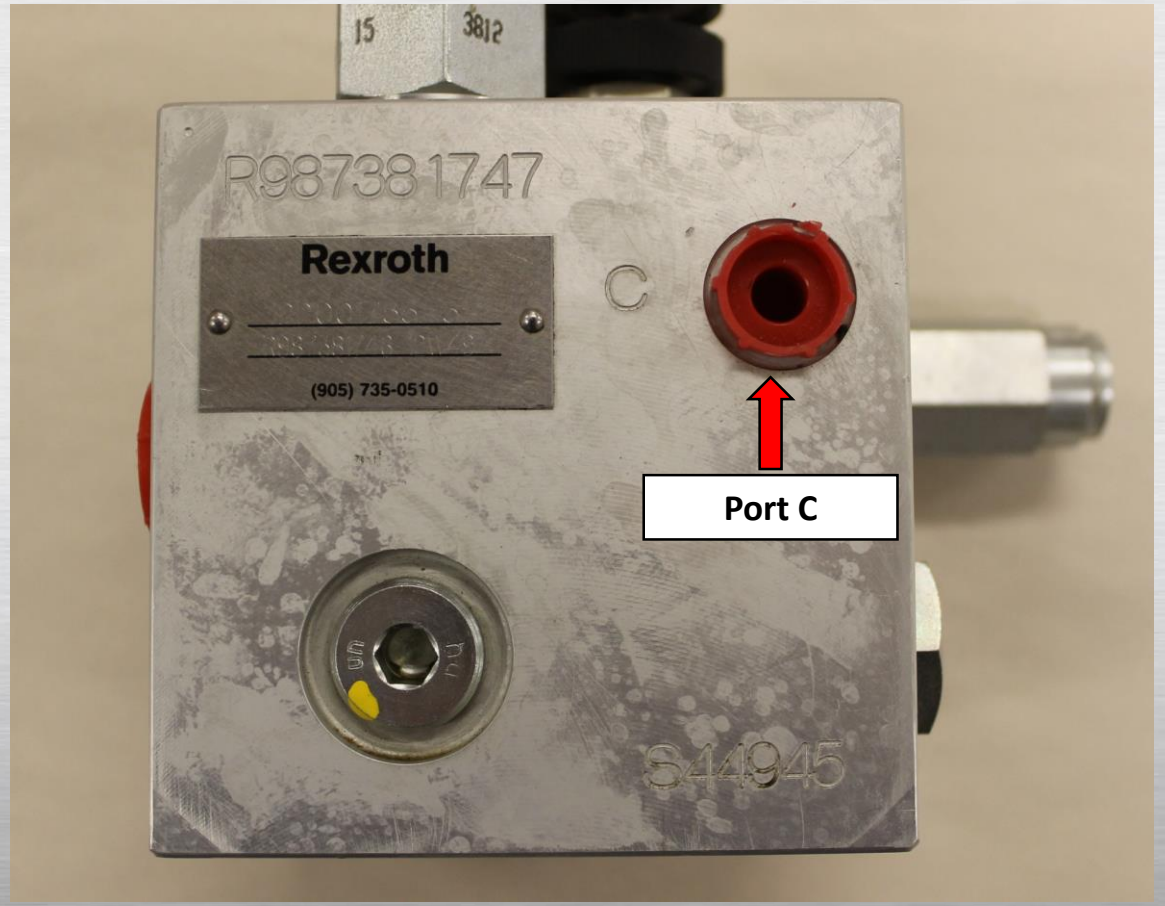
Manifold Block

Locations of these valves/cartridges are illustrated in this picture



Manifold Block

Locations of these valves or cartridges are illustrated in this picture



Manifold Block

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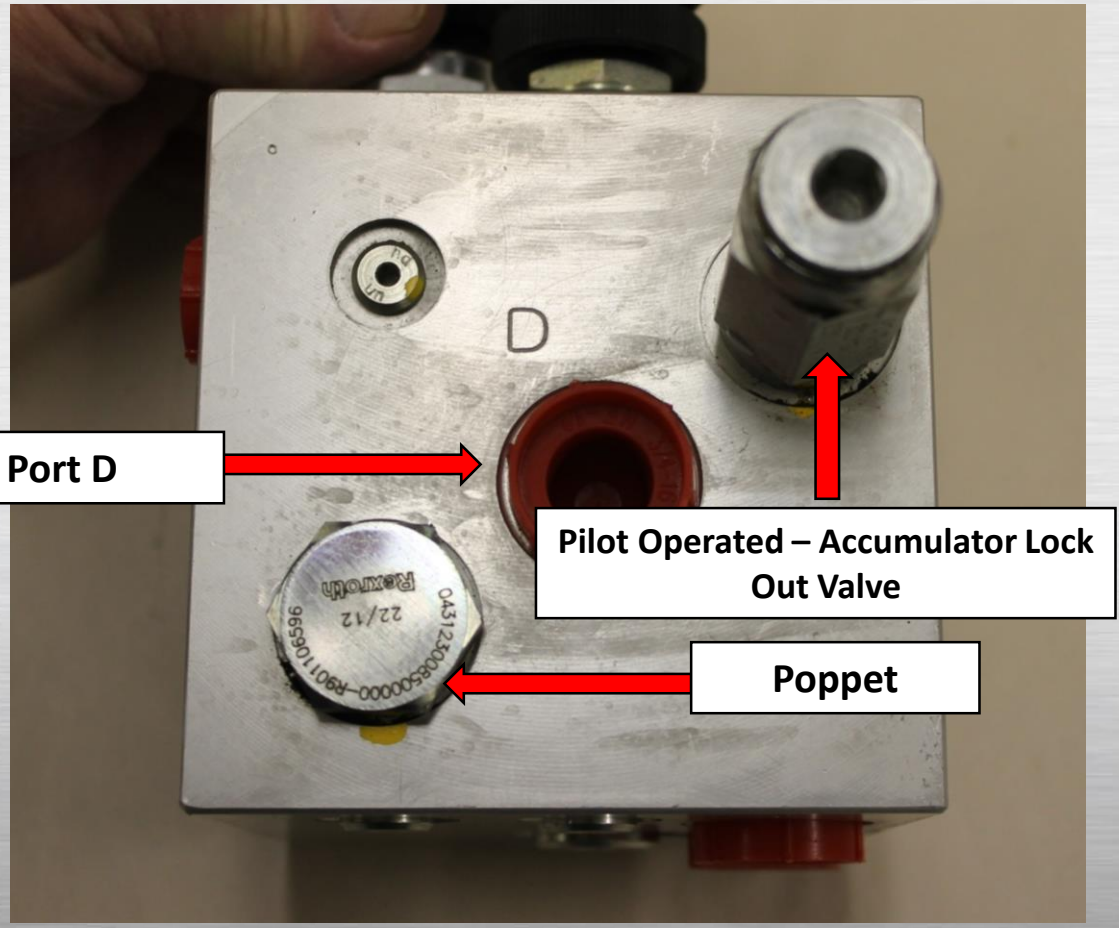

Manifold Block

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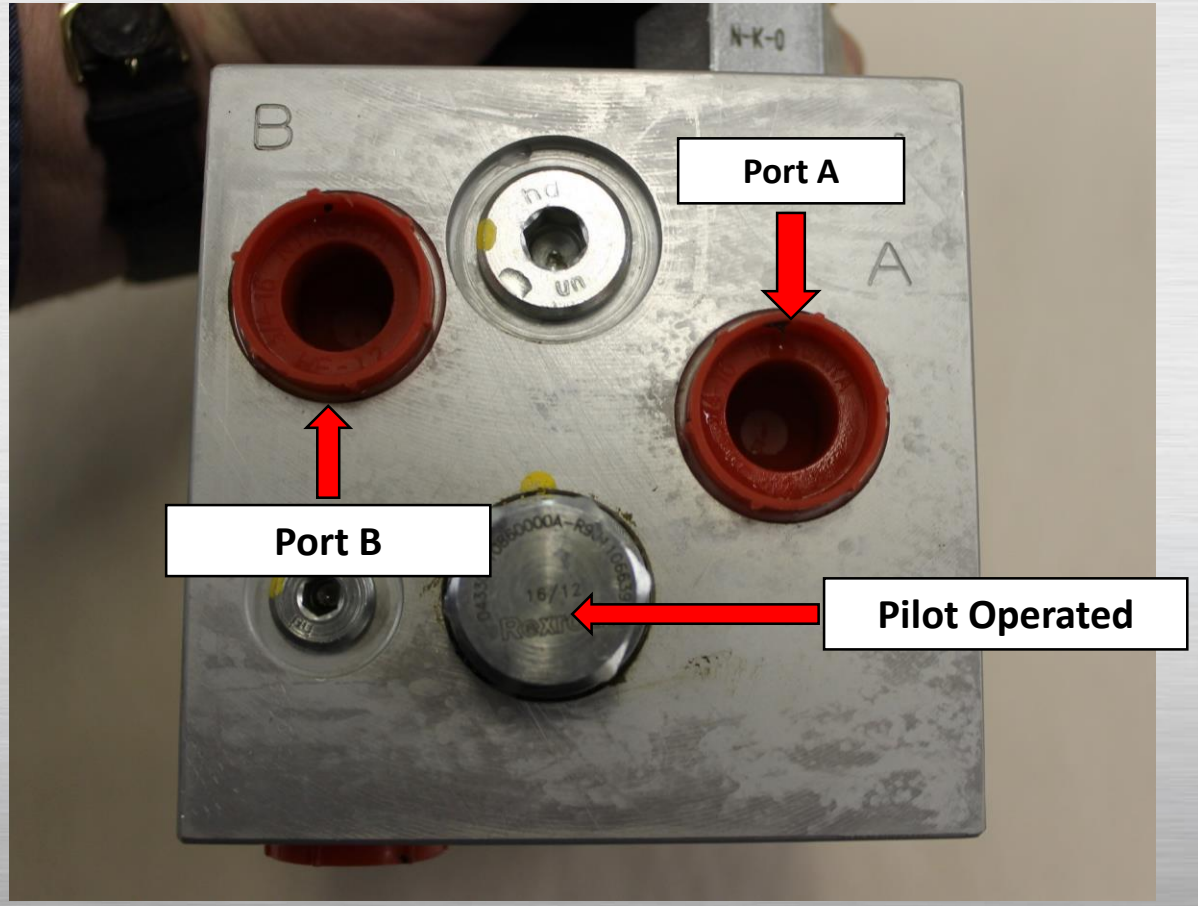


Operation

The hydraulic system for the C2 can be operated in 2 different manners:

- Normal operation
- Pressure adjustment on-the-go

Normal Operation

The opener ball valve is in the unlocked position. This ball valve is open. The operation valve is screwed out fully to the service/bleed-off position. This needle valve is open.

To lower the openers, oil flows through the hose to port "A" of valve block. The oil is allowed to flow simultaneously through ports "D" and "F". Port "F" charges up the accumulator to operating pressure set by the pressure valve. Port "D" charges the butt end of the opener cylinders causing the openers to lower.

Once the operating pressure is reached the oil will stop flowing.

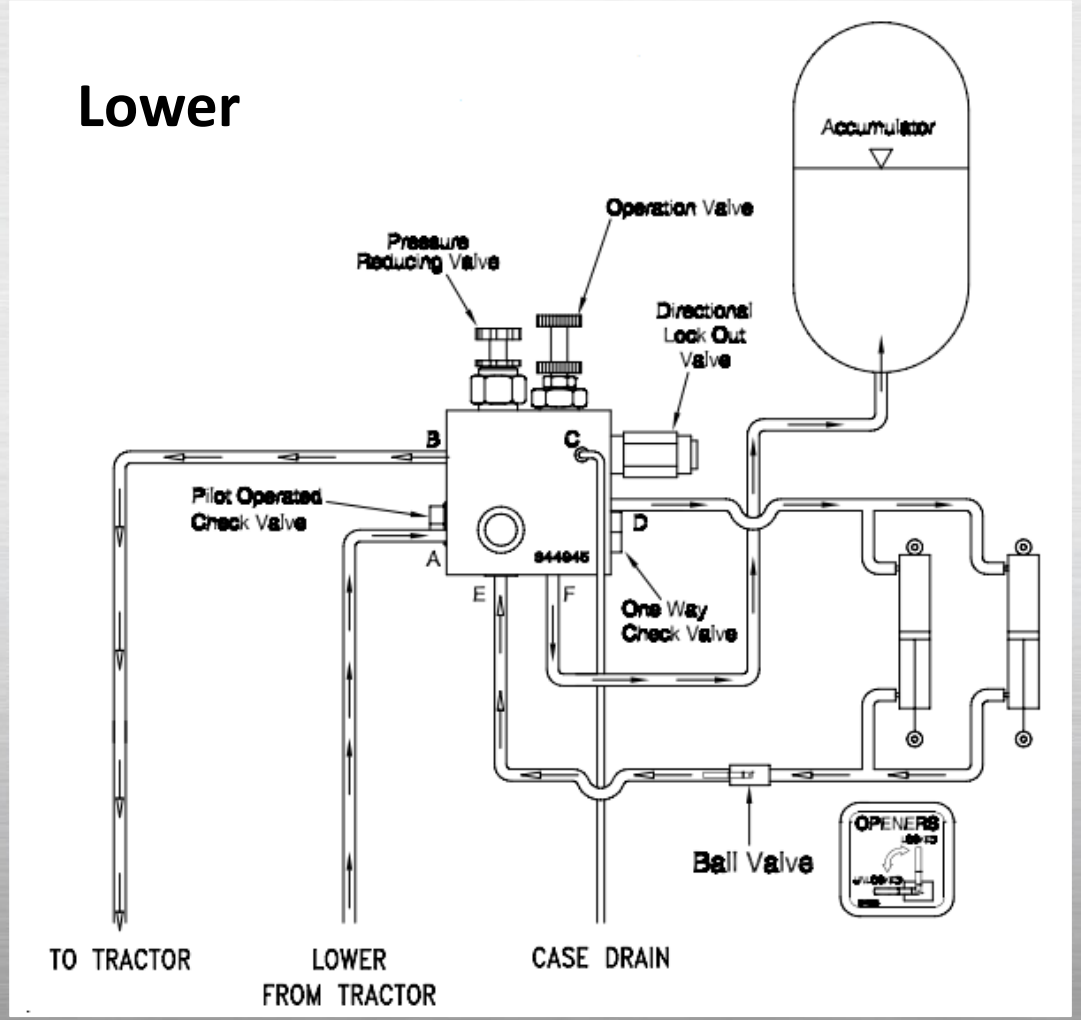
From port "A" of valve block, oil flows through the pressure reducing valve, to the pilot operated check valve unseating the check valve and out of Port "D" to the butt end of the opener cylinders causing the openers to lower. Simultaneously, oil flows from the check valve through the directional lock out valve and out of Port "F" to the accumulator.

When all of the opener cylinders are extended to working position, the hydraulic pressure continues to build in the accumulator, hydraulic lines, cylinders and at the reducing valve. When the pressure has risen to what the reducing valve has been set to the reducing valve closes, preventing a further increase in pressure.

When the hydraulic flow to the pilot operated check valve is stopped, the check valve seats, holding the pressure in the opener circuit.

The oil returning from the gland side of the cylinders flows to the opener ball valve into port "E" of the valve block and out of port "B" back to the tractor.

Note: If the tractor valve has leakage the system pressure will continue to drop during operation.



Normal Operation

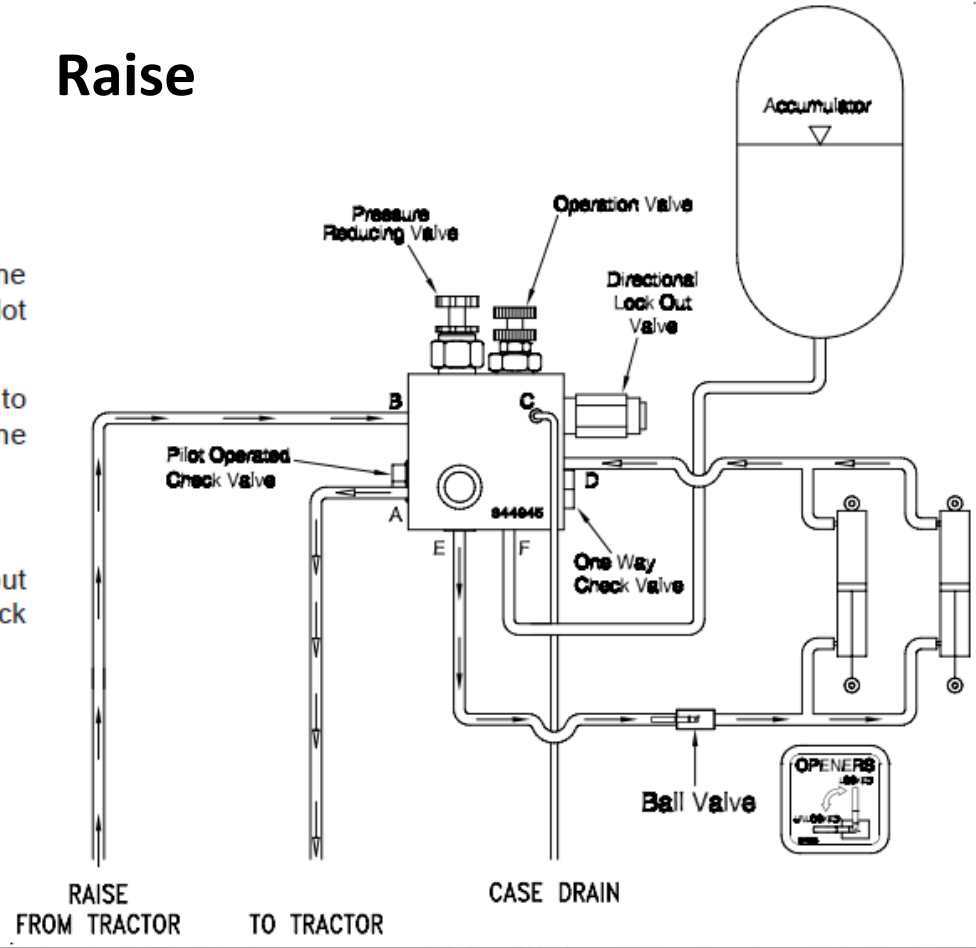
To raise the openers, oil flows from the tractor hose to port "B" of the valve block and out of port "E" to the opener valve and on to the gland side of the cylinders. Oil is also felt on the line that operates the pilot operated check valve. This causes the check valve to open and allow return oil back to the tractor.

Oil from the butt side of the cylinders travels to port "D" and through the opened pilot operated check valve to the pressure relief valve. Oil can not go through the relief valve in this direction and is directed to the one way check valve. The oil then travels through the one way check valve to port "A" of the valve block.

The oil flows through the port "A" of the valve block and back to the tractor.

Oil is also felt on the line that operates the directional lock out valve. This causes the directional lock out valve to close preventing the oil in the accumulator from returning back to the tractor. The directional lock out valve maintains the pressure in the accumulator in this position.

Raise



On-The-Go Operation

The opener ball valve is in the unlocked position. This ball valve is open. The operation valve is screwed out fully to the service/bleed-off position. This needle valve is open.

To lower the openers, oil flows through the hose to port "A" of valve block. The oil is allowed to flow simultaneously through ports "D" and "F". Port "F" charges up the accumulator to operating pressure set by the pressure valve. Port "D" charges the butt end of the opener cylinders causing the openers to lower.

Once the operating pressure is reached the oil will stop flowing.

From port "A" of valve block, oil flows through the pressure reducing valve, to the pilot operated check valve unseating the check valve and out of Port "D" to the butt end of the opener cylinders causing the openers to lower. Simultaneously, oil flows from the check valve through the directional lock out valve and out of Port "F" to the accumulator.

When all of the opener cylinders are extended to working position, the hydraulic pressure continues to build in the accumulator, hydraulic lines, cylinders and at the reducing valve. When the pressure has risen to what the reducing valve has been set to the reducing valve closes, preventing a further increase in pressure.

When the hydraulic flow to the pilot operated check valve is stopped, the check valve seats, holding the pressure in the opener circuit.

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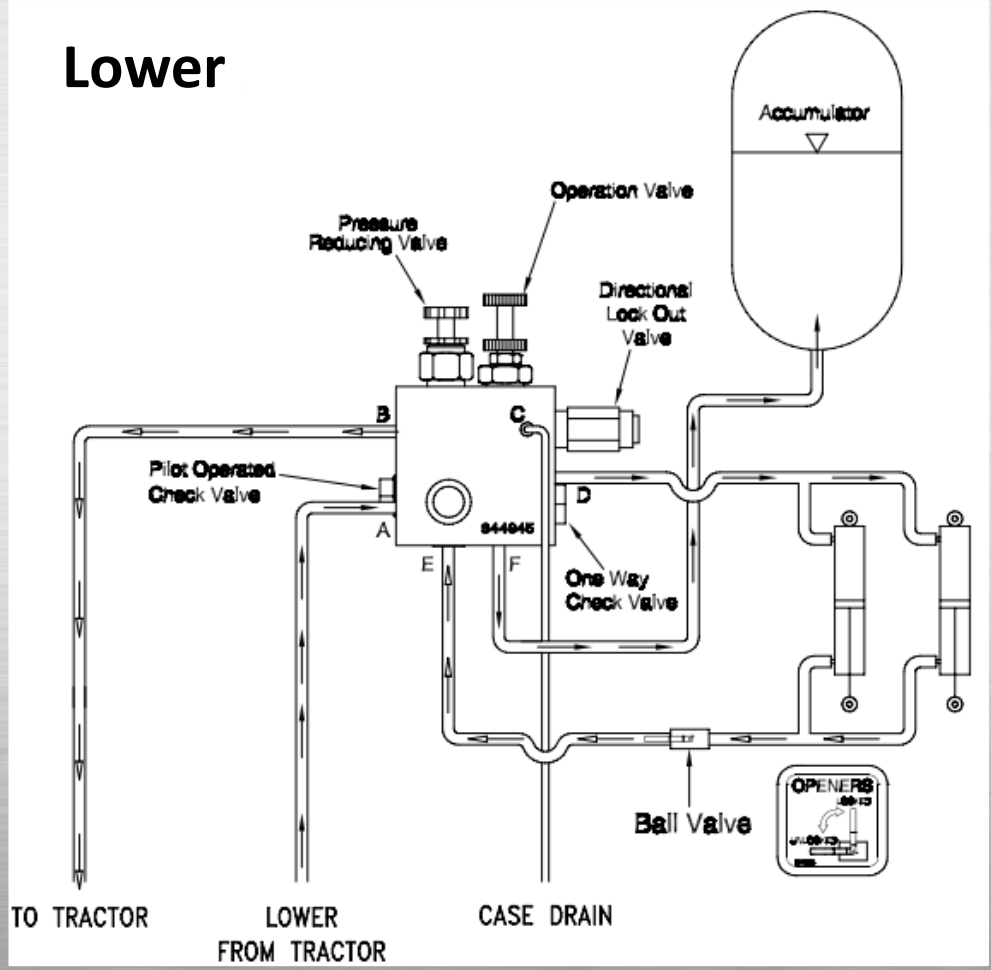

On-The-Go Operation

To raise the openers, oil flows from the tractor hose to port "B" of the valve block and out of port "E" to the opener valve and on to the gland side of the cylinders. Oil is also felt on the line that operates the pilot operated check valve. This causes the check valve to open and allow return oil back to the tractor.

Oil from the butt side of the cylinders travels to port "D" and through the opened pilot operated check valve to the pressure reducing valve. Oil can not go through the reducing valve in this direction and is directed to the one way check valve. The oil then travels through the one way check valve to port "A" of the valve block.

The oil flows through the port "A" of the valve block and back to the tractor.

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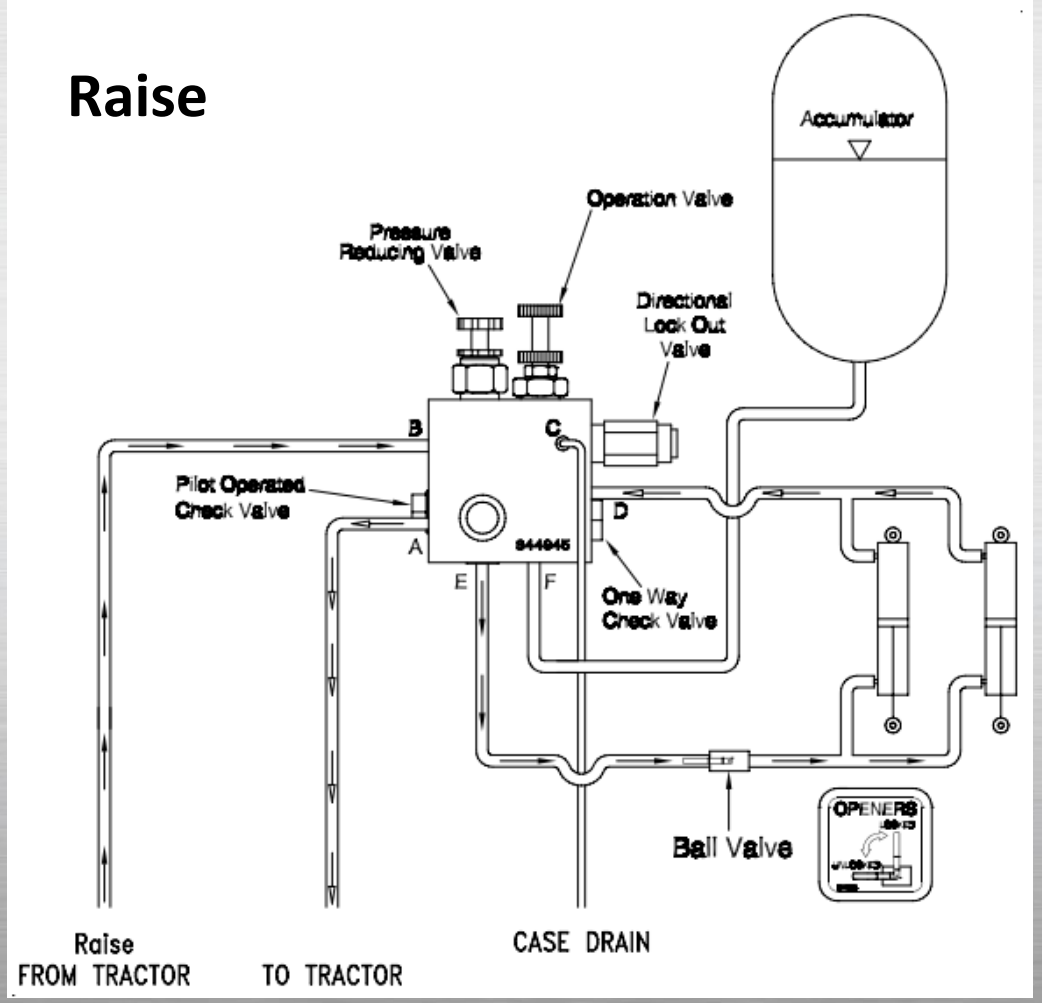


On-The-Go Operation

Pressure adjustment on the go, requires input from the operator to function.

The operator will have selected the operation valve to be in the bleed off/service position.

The adjustable reducing valve (Pressure Valve) will be set to provide correct trip and packing pressure.

With the Contour Air Drill moving forward, lower openers into the ground. Hold tractor hydraulic lever until the maximum preset operating pressure is reached. This ensures that all of the openers are fully charged and engaged. To reduce operating pressure on the go:

- Place tractor hydraulic lever into "Float Position" until pressure drops to desired operating point.
- Release hydraulic lever once desired pressure is reached.

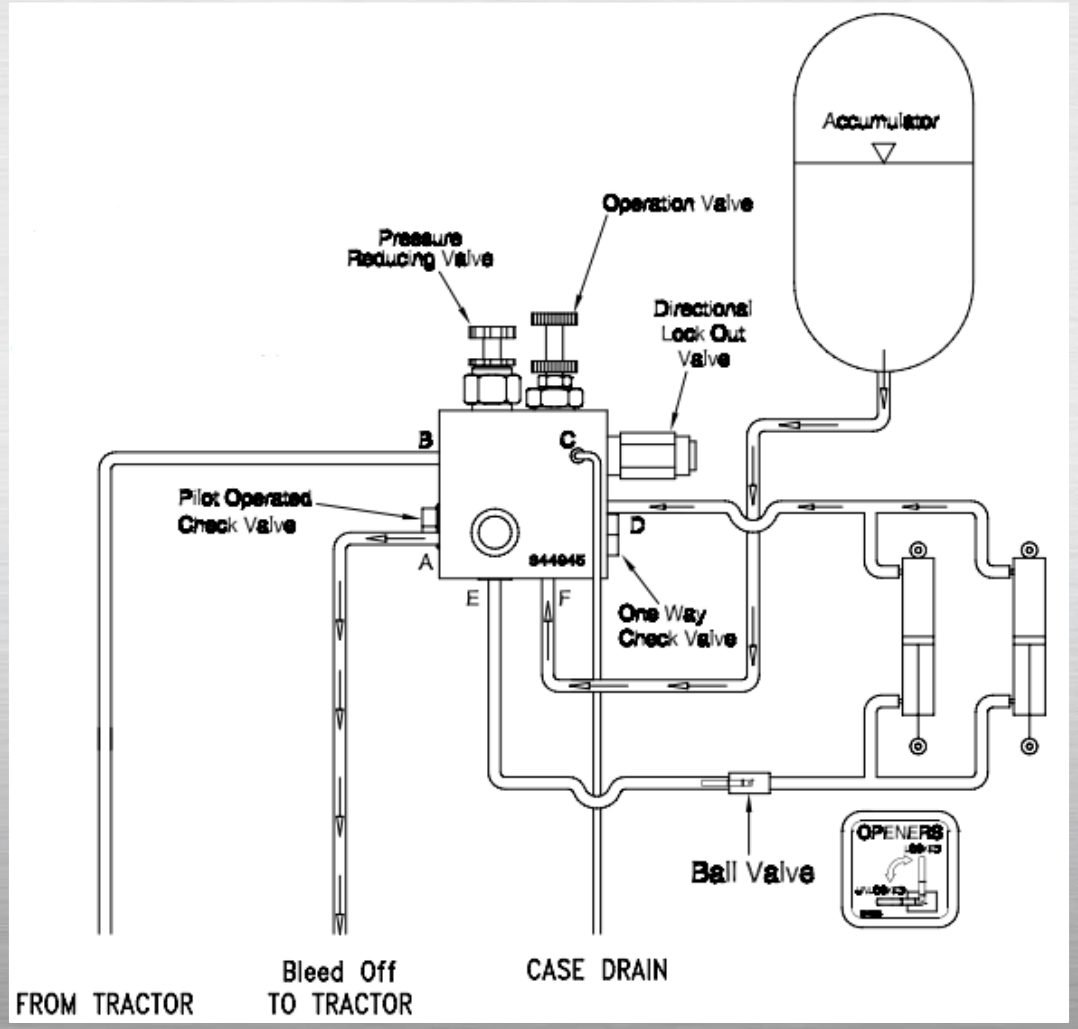
Note: If pressure drops too rapidly when tractor remote is put into float, the "Operating" valve can be turned in a few turns to reduce bleed-off speed.

To increase operating pressure:

- Operate tractor hydraulic lever to increase pressure.

With the tractor lever in the float position the pilot operated check valve does not receive any pilot pressure to open it and the directional lock out valve does not receive any pilot pressure to close it.

The oil flows from the accumulator and the butt end of the opener cylinders through the operation valve and the one way check valve back to the tractor. When the tractor hydraulic lever is released the oil is again trapped and the pressure will be reduced. If the pressure reduction is too great the operator will have to pressure the system up to the desired pressure.



Accumulator

- The accumulator is mounted on the drill frame, behind the hydraulic control manifold. There are two sizes of accumulators used on C2 drills:
  - 2.5 gallon unit on the 25’-51’ drills
  - 5 gallon unit on the 61’-86’ drills
- **Accumulator Precharge pressure on C2 drills are set at 350 PSI. (Contour I drills set at 500PSI)**

2.5 Gallon

5 Gallon

How Does the Accumulator Work?

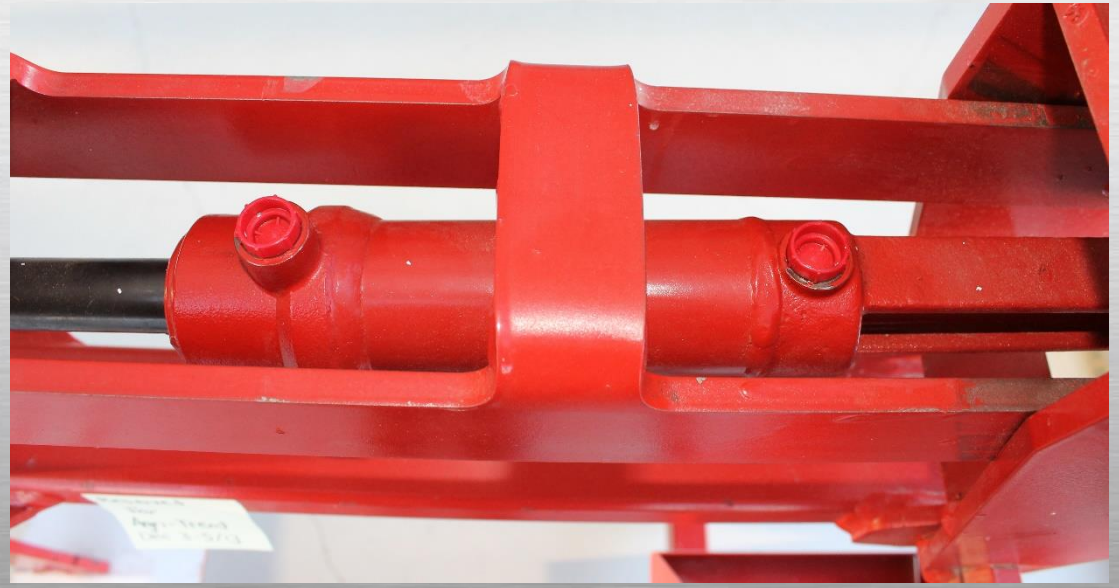
Its function is to provide hydraulic oil under pressure to operate the opener cylinders. It receives oil when the tractor hydraulics are engaged to lower the openers on the drill. The amount of oil placed into the accumulator is determined by the pressure that is set by the pressure adjusting valve. When operating in the field if an opener trips, the cylinder collapses and the oil is displaced into the accumulator. When the opener has cleared the obstacle the accumulator oil under pressure is sent to the cylinder to reengage it to its operating position.

Pressure Gauge

- Some earlier units were not equipped with a pressure gauge.
- The gauge is located near the manifold block on the hydraulic line to the accumulator and measures system operating pressure.

Opener Cylinders

Opener hydraulic cylinders are mounted in the top assembly of each opener. They have several functions:



Opener Cylinders

- They raise and lower the opener. When they are being used to lower the opener, further extension of the cylinder rod causes the shank to extend to its operating position.

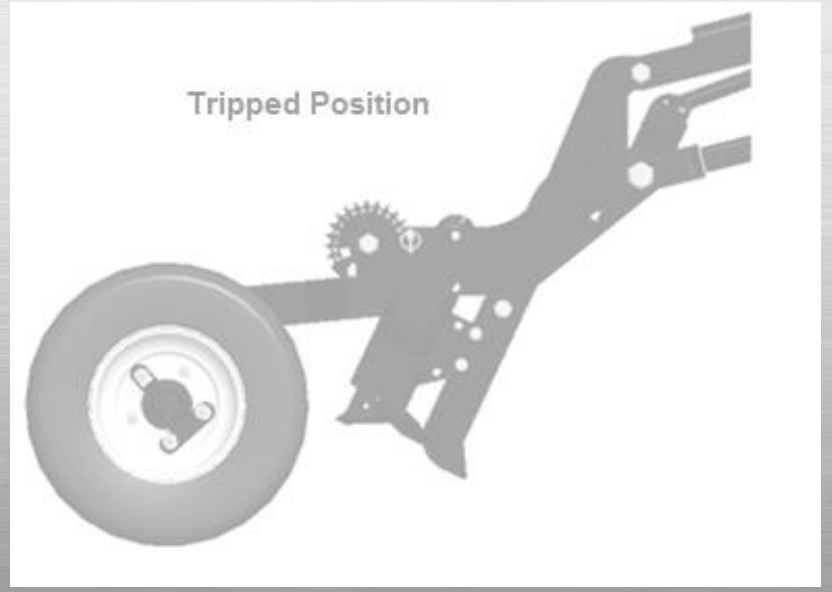
- Further extension of the cylinder rod causes downward pressure to be applied to the opener and packer wheel. This pressure in the circuit is known as operating pressure.

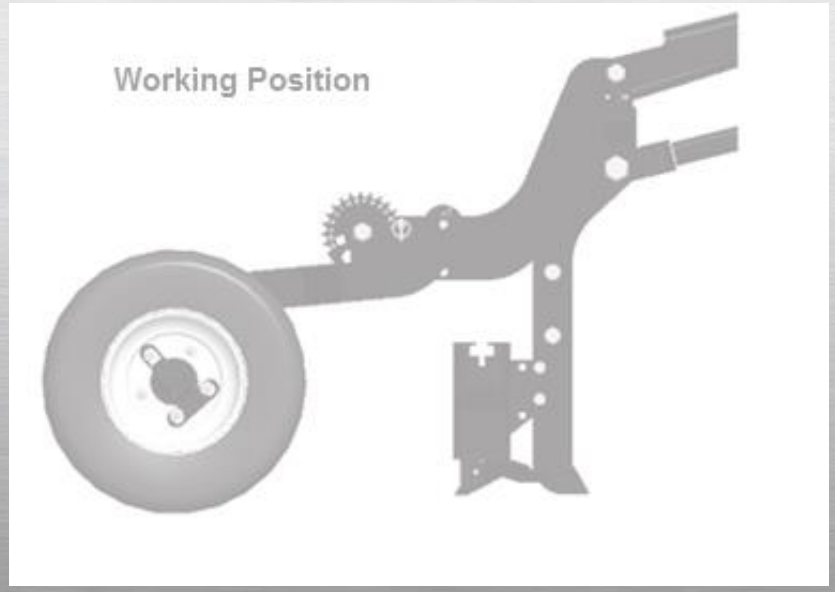
Opener Cylinders

- When the opener is being raised, pressure is relieved from the opener and packer wheel, the shank assembly moves back out of the operating position and then the opener rises to the transport position.

Opener Cylinders

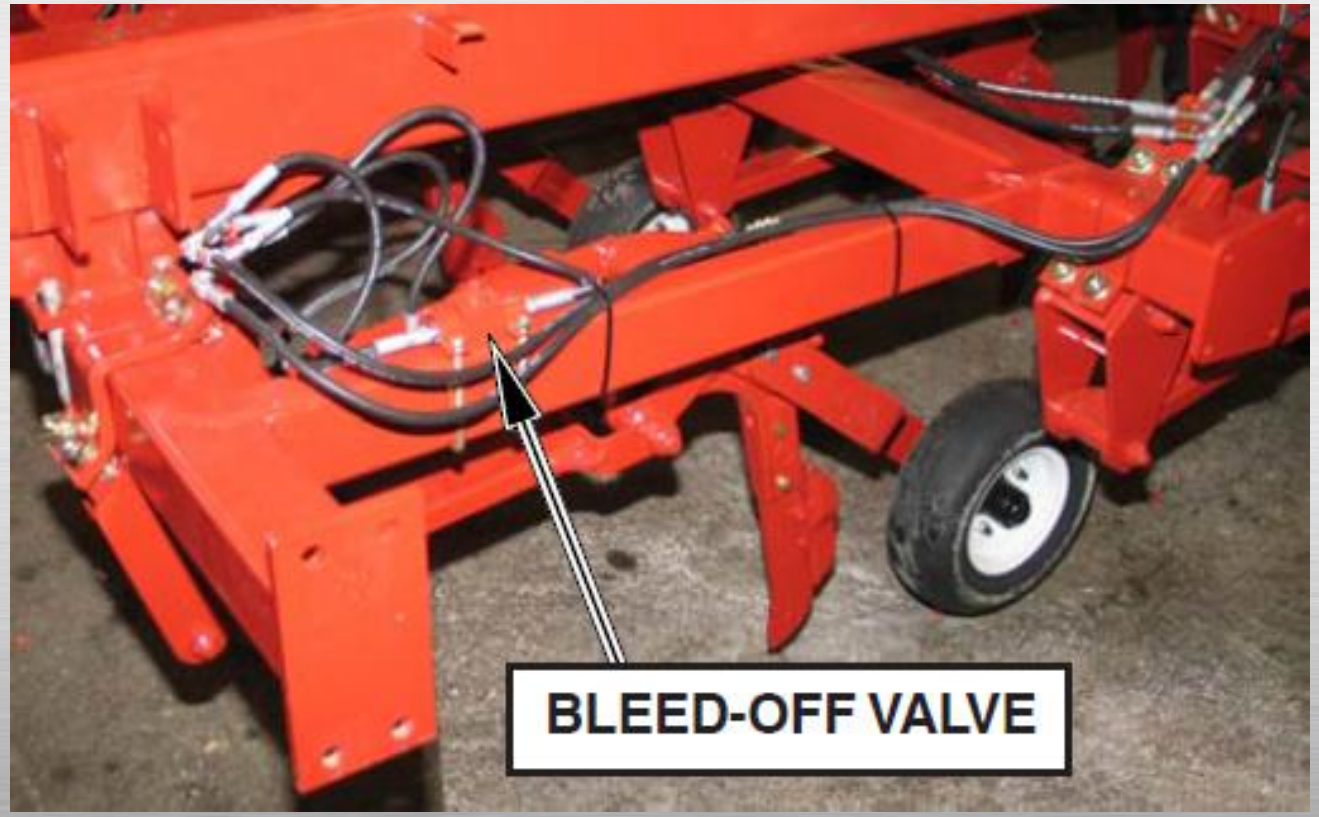
The cylinder also acts as the trip mechanism for the shank/opener assembly. If the opener encounters an object in the field, the shank is forced back, collapsing the cylinder. When the obstacle is cleared pressure oil from the accumulator forces the cylinder to extend putting the shank back in the operating position.





Bleed Off Valve

- At the outer ends of the drill there are valves that are referred to as bleed off valves. These valves are two position ball valves and are used to separate the lift and lower circuits from each other.

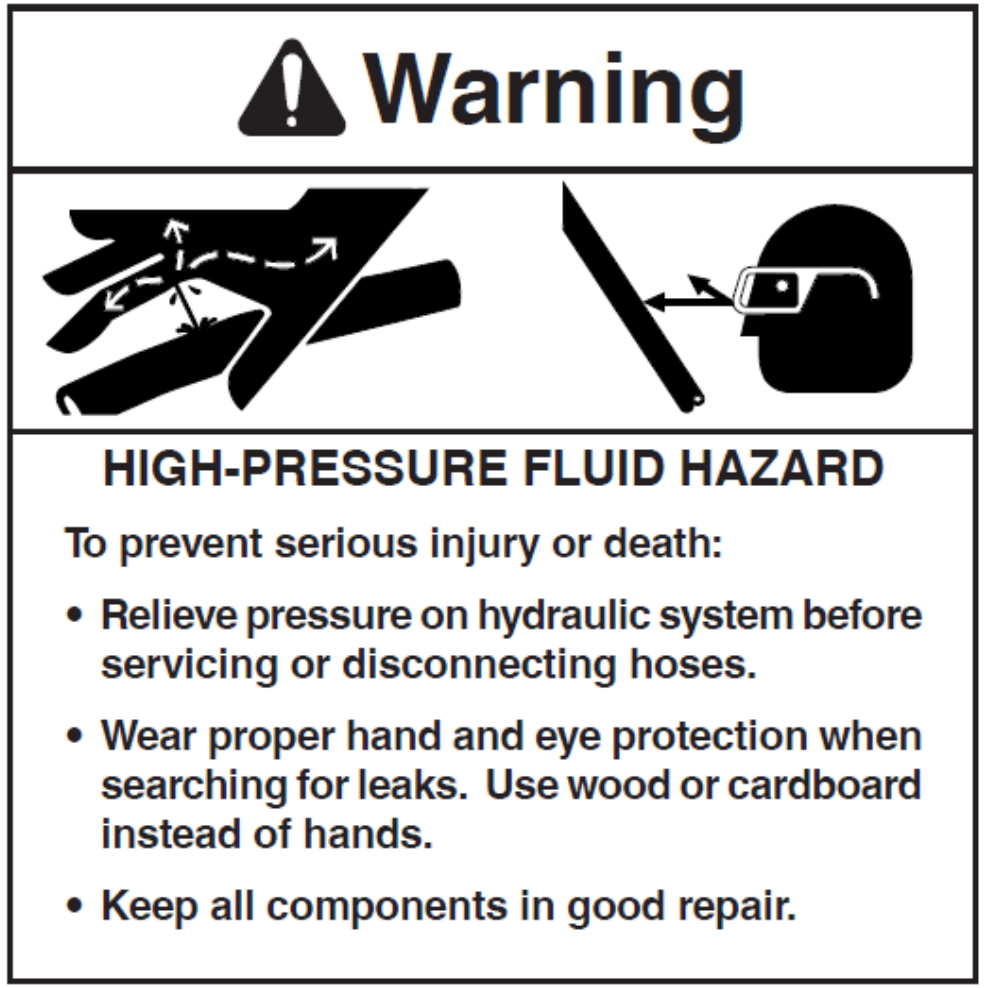


Bleeding The Hydraulic System

If hydraulic system has been serviced air will need to be bleed out of system as follows:

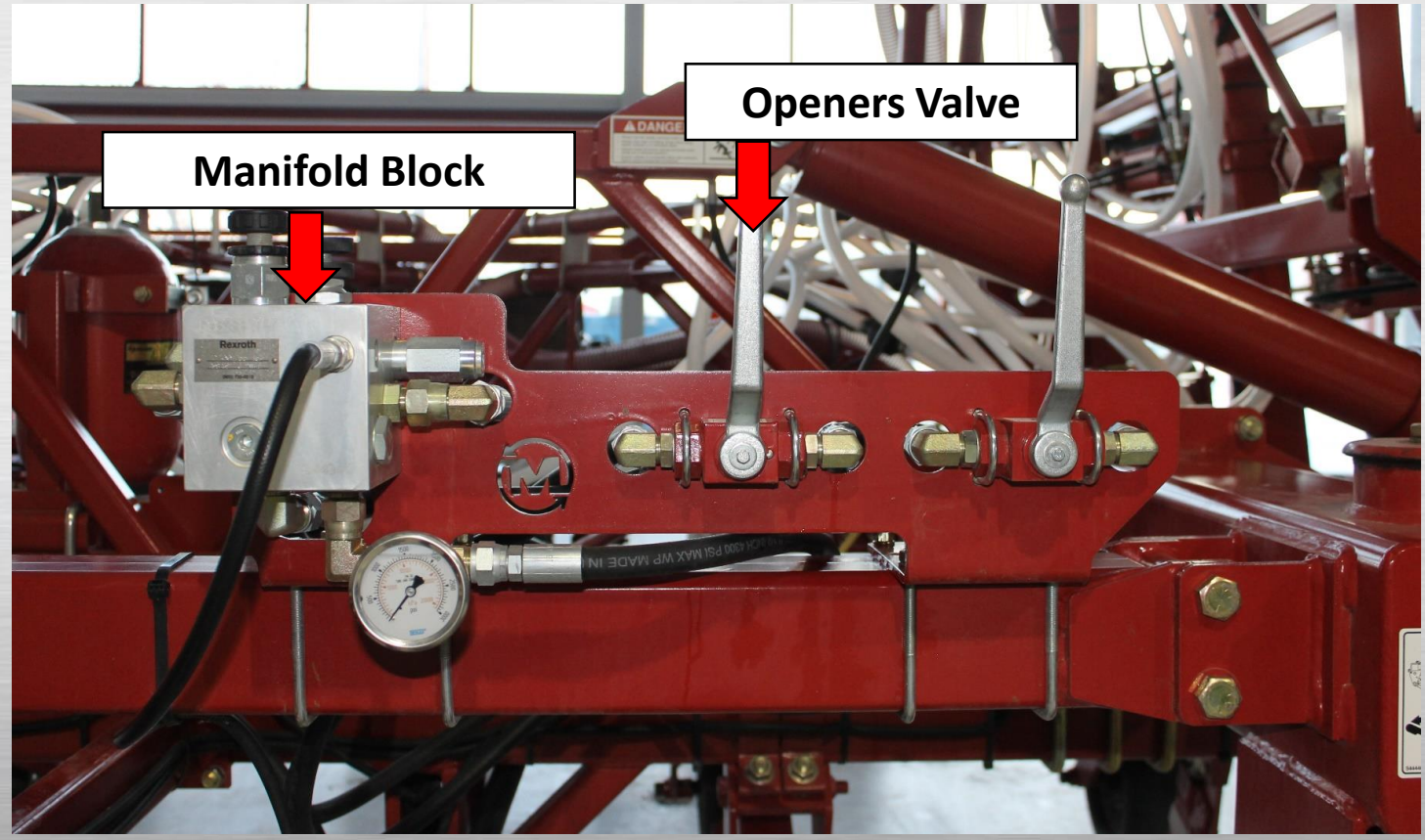
To bleed hydraulic system of air:

- Lift openers up and lock tractor remote in lift position.
- With tractor hydraulics operating, open bleed-off ball valves on end of drill wings.
- Allow oil to cycle for a few minutes then change direction of tractor remote to lower openers and cycle for a few more minutes.
- Close bleed-off ball valves and lift openers up.
- Repeat above procedure for a second time.
- Close bleed-off ball valves and lift openers up.
- Lock “Openers” valve and check to see that openers stay firmly in position.
- If openers are spongy repeat procedure until air is gone.



Opener Cylinders

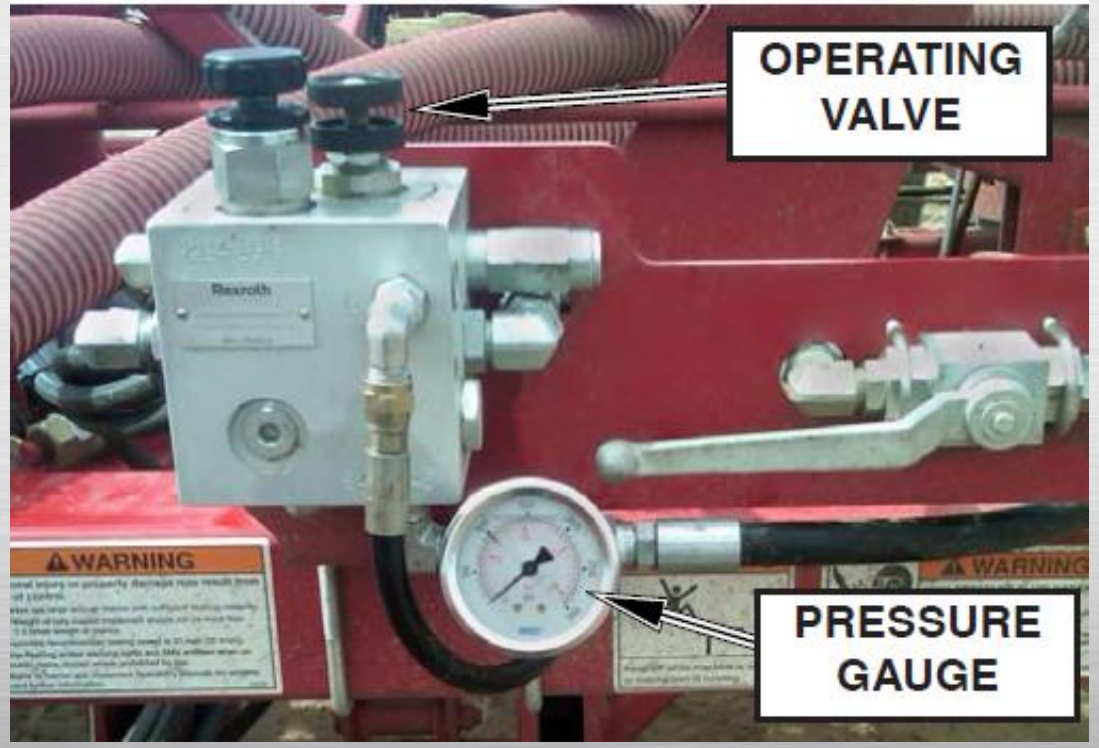
- The openers valve is located to the immediate left of the manifold block when viewed from the rear. This valve is used to lock the openers in the raised/transport position.



Openers Valve Transport Operation

For long distance transport or storage bleed all pressure from Opener hydraulic system:

- Operate the opener hydraulics, to raise the openers fully.
- Screw “Operating” valve out to open position.
- Put tractor remote in “float” position.
- Let openers drop and pressure go to 0 psi (or near 0 psi) on gauge.
- Lift openers to transport position and lock “Openers” valve.



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We hear you.