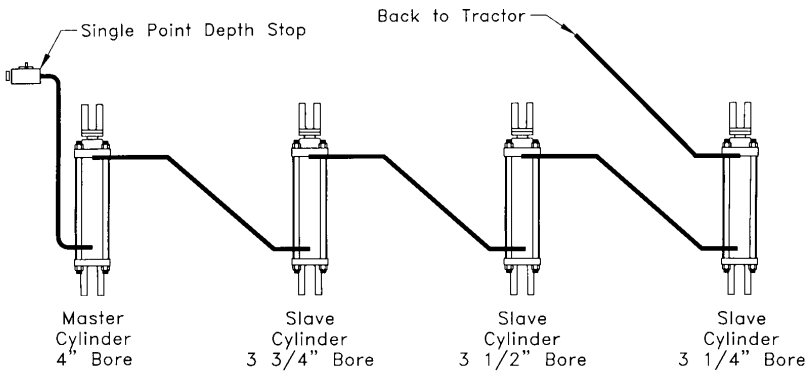
Tillage Hydraulic Systems

Lift System

The lift system used on all Great Plains tillage equipment is a rephasing system. This system consists of a master cylinder or cylinders and two or more slave cylinders. These cylinders operate evenly to raise and lower the machine to the desired working depth. To achieve the same depth each time, a depth stop on the master cylinder or an independent single point depth stop is used, depending on the model. A rebound valve is connected between the rephasing lift system and the tractor. It helps the cylinders to operate evenly and consistently to maintain a positive working depth. The rebound valve is discussed in more detail later in this section. Rephasing cylinder lift systems should be rephased 3 to 4 times an hour to purge any air that may be ingested into the system over time. To rephase the system, raise and hold the lift lever up for 4 to 5 seconds, (2 to 3 seconds if you rephase often). 5 section machines with several cylinders may need to be rephased for 10 to 20 seconds, once or twice a day to keep the system level.



Typical Rephasing Cylinder System

Fold System

The fold system on all Great Plains tillage tools is basically the same. Two fold cylinders on the smaller 3 section units, four on the small 5 section units, and 8 on the large 5 section units. Refer to the operator's manual for exact size of fold cylinders for each unit. Fold cylinders **must** be fully charged with oil before connecting to the wing rockers. When in working position, fold cylinders need to be fully extended to assure proper flexing of the wing sections.

If the unit is stored outdoors over the winter, it is a good idea to fold the implement completely, then lower it to the ground and retract the lift cylinders to protect the cylinder rods from the elements. This will preserve the rods and seals and may prevent trouble with leaky cylinders in the future.

Hydraulic Gang System

On models 5315DV and 6112-6324DV, a single cylinder is used. This is a double acting cylinder and not a rephasing. All other models use a rephasing system similar to the lift system. The gang system does not need to be rephrased nearly as often as the lift because it is not active during operation. It would be a good idea to raise the gang cylinders completely and rephase them at least 3 or 4 times a day.

Rebound Valve

The Rebound Valve addresses problems of air ingestion, uneven cylinder rod extensions and stability when using series cylinders on agriculture implements.

The valve handles these problems through the use of three cartridges: (a) counterbalance (b) pressure reducing and (c) pilot check.

(a) The counterbalance cartridge addresses air ingestion by preventing the implements series cylinders from running ahead of the oil supply. Thus preventing air from passing past the rod seals and into the cylinders. The counterbalance is also a holding and relief valve. This means the operator can raise and lower the machine several times without having to rephase the system. This is great for having to work through wet spots in a field. The new work depth will hold to 3000 P.S.I. before relieving.

(b) The pressure reducing and relieving cartridge addresses the effects of compression in a rephase system. Compression can happen when you lower the implement until the depth stop is activated, and the tractor valve still held in down position. At this time the pressure reducing cancels the high pressure developed, by relieving any pressure over and above 1000 P.S.I. on the rod side of the last cylinder/s in system. Excess pressure is relieved back to tractor.

(c) The pilot check cartridge traps the (1000 P.S.I.) pressure established by the pressure reducing and relieving cartridge. Thus locking the oil at the desired depth of the implement.

Note: To raise and lower implement.

The combination of the counterbalance and pilot check locks the oil in the system therefore the implement may only be raised or lowered with the tractor running.

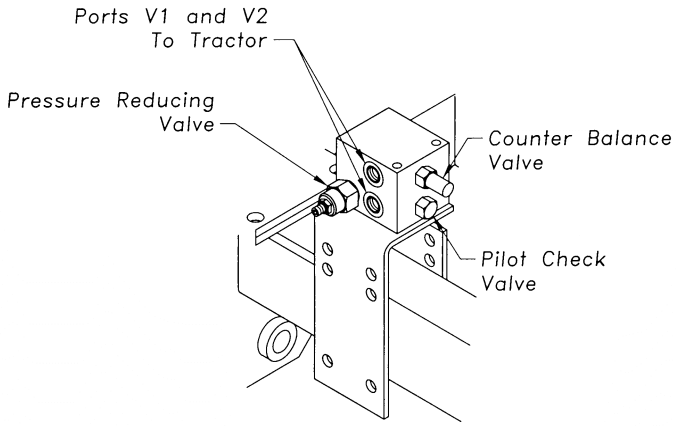
The rebound valve when added to the hydraulic system may restrict the flow on some higher volume output tractor systems. This will cause the detent of the tractor valve to prematurely kick out. This can usually be remedied by slowing the hydraulic flow of the tractor slightly. If problem persists, the pressure-reducing cartridge may be adjusted by loosening the jam nut and turning the screw in ¼ to ½ turn. Once the valve is set and works properly, retighten the jam nut.

All rebound valves come with a decal fixed to the side that states; **Notice: This valve is set at the factory. Do not try to adjust it.**

If the valve has been adjusted and needs to be recalibrated, use the following procedure:

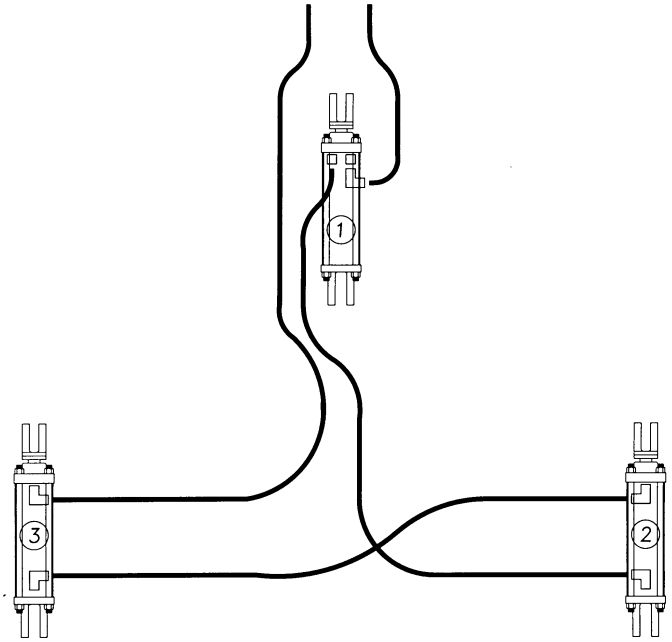
(a) Pressure reducing valve: loosen nut, turn screw all the way in, then back screw out exactly 4 ¼ turns.

(b) Counterbalance valve: loosen nut, turn screw all the way in, then back screw out 2 ¼ turns.



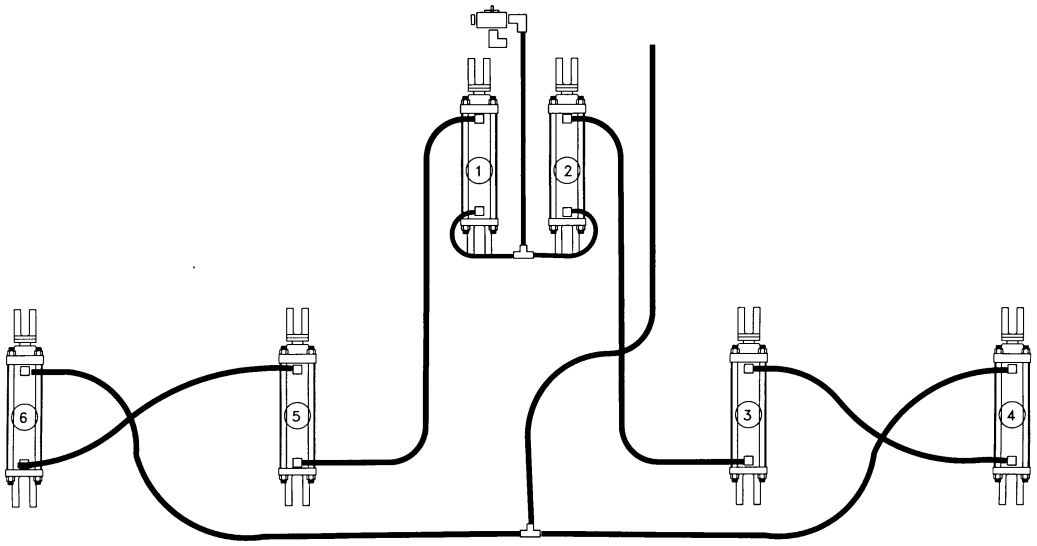
Trouble Shooting Guide for Rephasing Cylinder Systems

Rephase the cylinder lift system prior to troubleshooting by raising the machine completely and holding the tractor valve in the up position for 5-10 seconds. This procedure purges the system of any trapped air and synchronizes the cylinders with the rods completely extended. Release the lever and the entire machine should settle down about ½".



3 Cylinder System with One Master

Symptom	Probable Cause	Remedy
Entire Machine Settles	Leaking Single Point Depth Cartridge	Replace cartridge
Center (1) Settles and Wings (2) and (3) Rise	Defective Piston Seal in Cylinder (1)	Replace Piston Seals in Cylinder (1)
Wing (2) Settles and Wing (3) Rises Slowly	Defective Piston Seals in Cylinder (2) or Oil is Leaking Between Piston and Rod	Replace Piston Seals in Cylinder (2) and/or Tighten Piston on Rod
Wing (3) Settles	Defective Piston Seals in Cylinder (3) or Oil is Leaking Between Piston and Rod	Replace Piston Seals in Cylinder (3) and/or Tighten Piston on Rod



6 Cylinder System with 2 Master Cylinders

Symptom	Probable Cause	Remedy
Entire Machine Settles	Leaking Single Point Depth Cartridge	Replace cartridge
Center of Machine Settles & All Wings Rise Slowly	Defective Piston Seal in Cylinder (1) and (2)	Replace Piston Seals in Cylinder (1) and (2)
Wings (5) and (6) Settles & Wings (3) and (4) Rise Slowly	Defective Piston Seals in Cylinder (2) or Oil is Leaking Between Piston and Rod	Replace Piston Seals in Cylinder (2) and/or Tighten Piston on Rod
Wings (3) and (4) Settles & Wings (5) and (6) Rise Slowly	Defective Piston Seals in Cylinder (1) or Oil is Leaking Between Piston and Rod	Replace Piston Seals in Cylinder (1) and/or Tighten Piston on Rod
Wing (3) Settles and Wing (4) Rises Slowly	Defective Piston Seals in Cylinder (3) or Oil is Leaking Between Piston and Rod	Replace Piston Seals in Cylinder (3) and/or Tighten Piston on Rod
Wing (4) Settles	Defective Piston Seals in Cylinder (4) or Oil is Leaking Between Piston and Rod	Replace Piston Seals in Cylinder (4) and/or Tighten Piston on Rod