



BLAIN "KV" SERIES VALVE TROUBLESHOOTING

GENERAL

Before you dive right in and start adjusting and repairing a Blain valve, or any valve for that matter, you will find it beneficial to become familiar with the valve by reading as much about it as you can. Read this article from beginning to end. If at all possible, completely dismantle and re-assemble a valve on the bench. Many complete valves are unnecessarily replaced when a simple repair or adjustment would have been sufficient. When troubleshooting a valve it is of great advantage to have a complete set of bypass and down spools (inserts) on hand so that a suspected spool can be changed. It is rare that any other part has to be replaced

The most common enemy of a hydraulic system is DIRT. Modern valves are designed to precise tolerances, and do not tolerate any foreign material. Dirt in the oil line is the single most common cause of valve contamination. It is extremely important that the oil line be cleaned out prior to assembly. Each section should be flushed with solvent and run through with a lint-free clean rag prior to assembly. Follow the instructions which follow and most valve problems can be site rectified without replacing the valve.

The adjustment procedure is not difficult; however, the mechanic **MUST** be familiar with the valve and all its functions. The Blain valve is adjustable over a wide range and a knowledgeable mechanic can set up the adjustments so that the lift operates quietly and smoothly.

Sealing joints : A good quality thread sealer must be used and it must be applied sparingly and only in the quantity required to seal the joint. Too many times too much sealer is used and when the threads are tightened the sealer is squeezed into the inside area of the pipe. This excess sealer can find its way into the valve . Tapered hose fittings do not require any sealer.

USE PROPER SAFETY PRECAUTIONS WHILE PERFORMING VALVE ADJUSTMENTS!

PRE-ADJUSTMENTS

Ensure that there is pressure in the system. If no pressure shows on the gauge, check that the gauge isolating valve is open This is the tee handle on the front of the valve. Also check at all main line shutoffs are open.

1. **MAKE SURE THE COILS ARE THE CORRECT VOLTAGE!**
2. Turn adjustment screw #1 until it is flush with the face of the hex nut.
3. Turn adjustment screw #6 counterclockwise fully
4. Turn adjustment screw "KS" (if equipped) counter clockwise fully'.
5. Turn adjustment screw on "negative pressure switch" (if equipped) clockwise 1 or 2 turns
6. Loosen set screw and turn adjustment screw "S" clockwise 1 or 2 turns.

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ADJUSTMENTS - UP BYPASS - UP ACCELERATION - DOWN ACCELERATION

DOWN ACCELERATION: The down acceleration (#6) adjustment is very sensitive. A small amount of movement causes a significant difference. This adjustment is best started with the screw backed off full. Turn the screw in (clockwise) 1/2 a turn at a time until the lift will not move down Then back off 1/8 of a turn at a time until a smooth down start is accomplished. Don't try and set the start too soft as there could be a problem if the temperature of the oil changes during use.

UP BYPASS: The up bypass adjustment (#1) is the opposite to #6 - It is not very sensitive. The adjuster should be turned "in" (clockwise) to shorten the delay and "out" (counterclockwise) to lengthen the delay This is also called the "up delay adjustment". It reduces the shock of starting and also allows the drive motor to come to full speed before the lift starts to move. Adjustment #1 determines the delay between the motor starting and the initial upward movement of the car This delay with no load on the car should be set to about one second.

UP ACCELERATION: The up acceleration, which begins after this delay of one second, is determined by the size of the bypass insert and the fixed orifice in the insert. This acceleration cannot be changed by adjustment #1. It can be softened if necessary by using the next bypass insert smaller or it can be quickened by using the next insert larger.

If the bypass insert is too small or #1 turned too far in, the up start will not have the one second delay. An undersized insert will also interfere with the relief valve preventing it from being adjusted to a lower setting

ADJUSTMENTS - PRESSURE RELIEF

IMPORTANT NOTE: Do not adjust the up bypass setting after the relief valve has been set at its final setting, or else you will have to readjust the pressure relief.

Set the pressure relief (adjustment "S") as follows;

1. Set a full load in the car and run in the Up direction.
2. Observe the pressure gauge.
3. Multiply the pressure by 1.25 to obtain the relief pressure. (For example if the indicated pressure was 400 psi then the relief pressure would be 500)
4. Using a 3mm Allen key- release the set screw on the pressure relief adjuster. Place Allen key in "S" adjuster screw, and turn counter clockwise until the screw is loose.
5. Close the ball valve at the pump unit
6. Start the motor and observe the pressure. If you didn't back out the "S" adjuster and the relief is set too high, the motor may not be able to handle the load and it may stall. It could also blow a fuse with the high current draw on the motor, or damage the gauge. It is important to back out the adjuster screw before starting the motor!
7. Turn the "S" adjuster clockwise until the gauge indicates the relief pressure desired
8. Stop the motor and immediately tighten set screw on the pressure relief adjuster
9. Restart the motor and verify that the pressure has not changed
10. Stop the motor and open the ball valve. Replace the threaded cap over the adjuster screw. Note that the cap has been pre-drilled to accept a seal if required

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ADJUSTMENTS - UP SOFT STOP

TO set the "up soft stop" (if installed): ensure that the pump runs at least 1/2 second after solenoid "A" is de-energized. To pre-set adjustment #5 (up soft start) disconnect solenoid "A" of the valve. Assuming #1 adjustment to be correctly set, turn adjustment #5 clockwise, 1/4 of a turn at a time, until the car begins to move up. Do this by starting and stopping the motor between each 1/4 turn Then back out the adjustment screw 1/8 of a turn at a time, until the car will not move, starting and stopping the motor each time. Reconnect solenoid "A". Final correction of 1/8 turns of #5 in one direction or the other may be necessary to achieve a smooth stop

The up direction control is done through a solenoid valve and therefore it is not possible to run the lift simply energizing the main contractor, like you can on the standard valve. It is necessary to energize solenoid "A" to cause the bypass valve to close and the oil flow to be diverted to the cylinder.

Too much adjustment on the up bypass adjustment (#1) can affect the operation of the up soft-stop.

ADJUSTMENTS - KS (ROPED-HYDRAULIC)

On the roped-hydraulic version of the KV series valve, there is a built in additional valve named the "KS" valve. The function of this adjustment is to prevent operation of the manual lowering valve in the event that the safeties have actuated. If this adjuster is not set correctly it can also affect the normal operation of the down direction. If the car will not descend even with the down full speed adjuster fully out. then this is most likely the "KS" adjuster. It must be turned out (counterclockwise) to permit the oil to flow. Turn the adjuster only enough to permit the lift to descend at its normal speed.

After the adjuster has been set, check that the manual lowering valve will not permit the ram to descend when the car is blocked or supported on the safeties. Manually trip the safeties to perform this adjustment, or prop the car to simulate the required condition.

LOW PRESSURE SWITCH

On some valves. the unit is supplied with a negative pressure switch. The function of this switch is to detect negative (or loss of) pressure past the valve.

To adjust this switch. the easiest method is to remove the wires from the switch connections and use an ohmmeter on continuity setting. The small adjusting screw visible when the cap is removed is turned until a reading on the meter shows the switch closed This should be done while there is less pressure in the systems than exerted by the empty car. You can set the car on the buffer to do this. The switch must not be set too high or it will affect normal operation With all pressure off the gauge the switch is open. It can close at any higher pressure: 60 psi is satisfactory

INSERTS - SPOOLS

The Blain KV series valves all use the same valve body but the internal "spools" or "inserts" are changed to provide the different flow characteristics.

For example the KVIP-20 is a unit set to operate within a flow rate of 0-20 liters per minute at 20 bar the KVIP-40 operates from 21-40 liters per minute of flow and the KV1 P-80 from 41-80 liters per minute The "up soft-stop" valves are designated KVIS-xx (@ = the flow rate of the individual valve as indicated above) the "S" indicates it is the "up soft-stop" series. It is important to note that the flow rates are based on the empty car traveling in the down direction at rated speed.

Once the cap screw containing the 3mm adjuster screw has been removed the end of the insert will be visible within the cavity but will not be reachable except with special tools. There is a fitting on the end of the spool which will accept a 3mm Allen key. Insert the key into the cavity and into the end of the spool. It should be possible to rotate the spool and at the same time pull on it so that it may be extracted. If unable to extract the spool using this method, then continue to the next step

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Use a clean rag and hold it hold over the exposed cavity. This is to catch the small amount of oil which will escape during this procedure. Quickly "jog" the motor to create pressure. This should be as brief a period of motor operation as is possible to obtain. Otherwise there will be a large amount of oil escaping through the cavity. The brief motor operation will create pressure behind the spool and drive it and its spring out of the cavity and into the rag being held over the opening. There are two parts to the insert assembly - the spool and the spring. Be observant to their relative positions to each other.

When inserting the new spool be especially careful not to install it reversed!

Removing the up bypass insert is simply a matter of removing the hexagon bolt head into which the 3mm adjuster screw is installed The end of the insert is readily visible and attainable once the head is removed.

Replace the insert with the new one and tighten the hex bolt head securely.

Do not use any thread sealers when replacing the adjuster heads. They are self-sealing and only require to be securely tightened

PERFORMANCE FACTORS

There are many factors which act on a hydraulic system to provide the operating parameters of the lift. It is impossible to review them all in this service bulletin The installer should be aware of some of the conditions however which can act on a system and affect the lift operations

Oil temperature: The hotter the oil the faster the lift will descend and the slower it will ascend. Maximum valve rating is 70 C (158 F).

Oil viscosity: The lower the viscosity of the oil the faster the lift will descend and the slower the lift will ascend. (Valve rating 15-35@ cst at 120 F..)

Feed line size: An undersized oil feed line can affect operation. The pressure in the up direction, will increase and thereby could even affect the required horsepower of the system. The down speed may be slow if the oil line is too small.

Too many 90 degree bends can create additional pressure in the system and affect both the up and down direction. It is good practice to use 45 degree bends or less whenever installing an oil line. If hose is used a minimum bending radius generally of 8 is acceptable depending on hose diameter.

TRAVEL SPEED

The "up speed" is determined by the gallons per minute of the pump and motor combination. This cannot be changed without changing either the pump or motor. The valve itself cannot be adjusted to provide a higher rated speed in the "up" direction. The up speed could theoretically be lowered by throttling the line, but it is not advisable.

If the lift is traveling too slow in the up direction. then look to the relief valve as being the most probable cause. It will most likely be set too low. Raise the pressure by turning the adjusting screw in clockwise. It is also possible that the up bypass spool is not closing all the way, or has a leak. Remove the spool and check for dirt, bad o-rings, ect.

In rare instances. the motor and pump may **not** be matched up to provide the proper speed, and if after checking the relief valve the problem persists, call the factory. You must have the motor information (rpm and hp) available plus the pump number. This information can be found on the pump and motor themselves, or on the tags fastened to the valve shelf on submersible pump models.

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The "down speed" is adjustable. but there is a relationship between load and speed. A lightly loaded lift will create less pressure in the system, and therefore less flow through the valve A fully loaded lift will provide the best speed.

The setting to contract speed should be done with a fully loaded car as this will cause the maximum flow through the valve. The difference between full and empty should not exceed 5% - 10%. If this does happen then the valve may be undersized. It should be possible to open the "down speed" adjuster and have the lift descend at a rate in excess of the rated speed. It should be necessary to "throttle back" the adjuster for proper operation

Undersizing of the oil lines can also cause insufficient down speed, but with the low flow requirements of most lifts this is not usually the cause. If the down contract speed (or close to it) cannot be attained after checking the above, then call us.

EXCESSIVE DOWN COASTING

If the lift coasts excessively in the down direction, try this before dismantling the valve:

1. Close the ball valve at the power unit and open the pressure gauge shut off handle.
2. Run the lift in the up direction. Observe that the pump is running full speed and the oil is "bypassing" through the relief valve. The pressure gauge will read high, indicating the maximum pressure set by the relief valve position
3. Electrically energize the down solenoid while the motor is still running. This will cause most of the oil which is bypassing through the relief valve to bypass through the down valve needle seat and return to the tank.
4. With the motor still running, de-energize the down solenoid, and open the manual lowering valve.

If this does not cure the problem, further disassembly will be required.

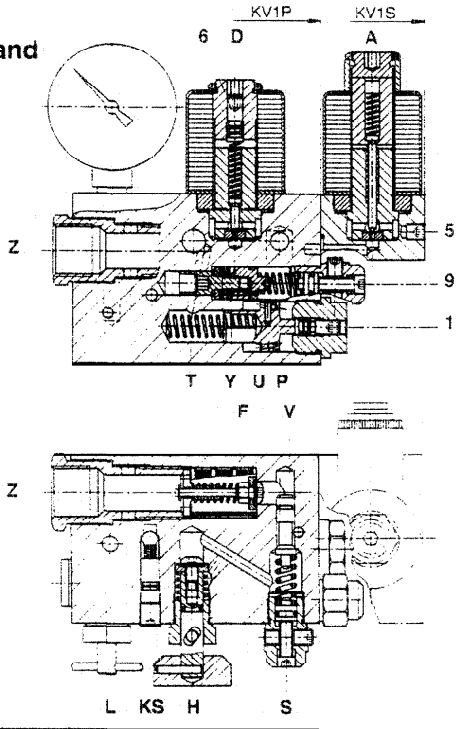
Please feel free to contact us if you are having difficulty that cannot be solved using the procedures outlined here. It will be helpful if you have the following information available when you call:

- ___ Job name and number
- ___ Complete valve number
- ___ Empty and full car pressures
- ___ Empty and full car speeds up and down

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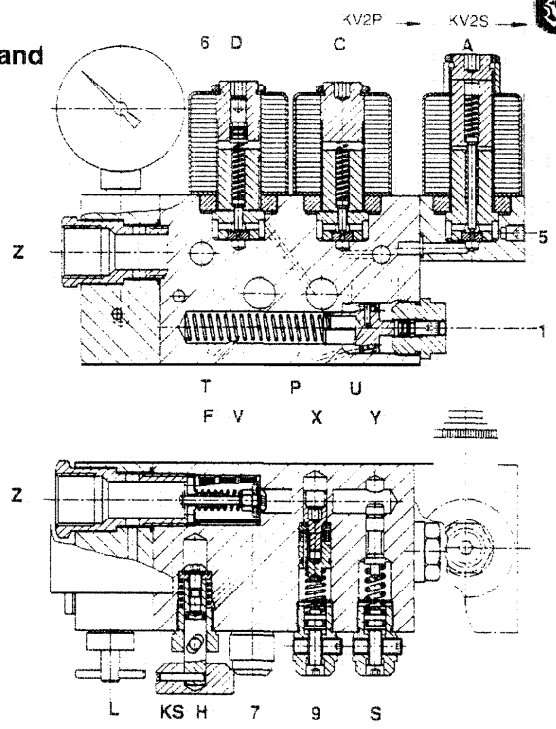
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KV1P and KV1S



Assembly

KV2P and KV2S



Control Elements

- A Solenoid 'Up Stop'
- C Solenoid 'Up Deceleration' & Solenoid 'Down Deceleration'
- D Solenoid 'Down Stop'
- U Bypass Valve
- V Check Valve
- X Down Valve
- Y Down Leveling Valve
- H Manual Lowering
- L Gauge Shut Off Cock
- F Main Filter

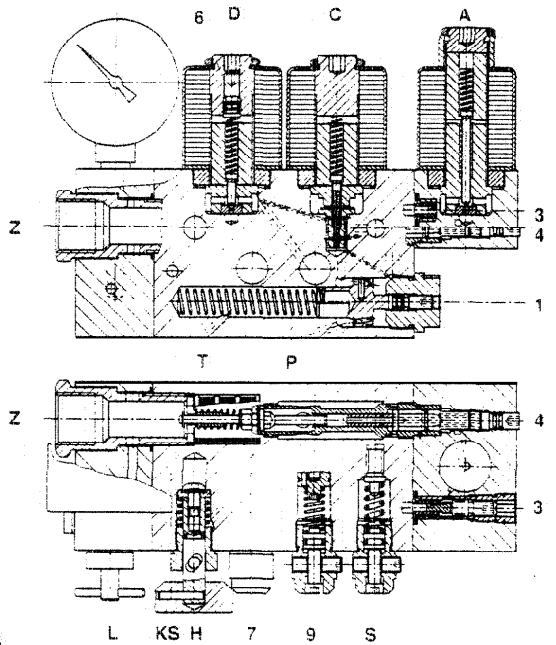
Adjustments

- 1 Bypass
- 3 Deceleration & Soft Stop 'Up'
- 4 Leveling 'Up'
- 5 Soft Stop 'Up'
- 6 Start 'Down'
- 7 Speed 'Down'
- 9 Leveling 'Down'
- S Relief Valve

Connections

- P Pump
- T Tank
- Z Cylinder

KVH



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Measurements

