



PATTERN CHANGER INSTALLATION GUIDE

PC Series - Spool valve to (change or control) joystick operation

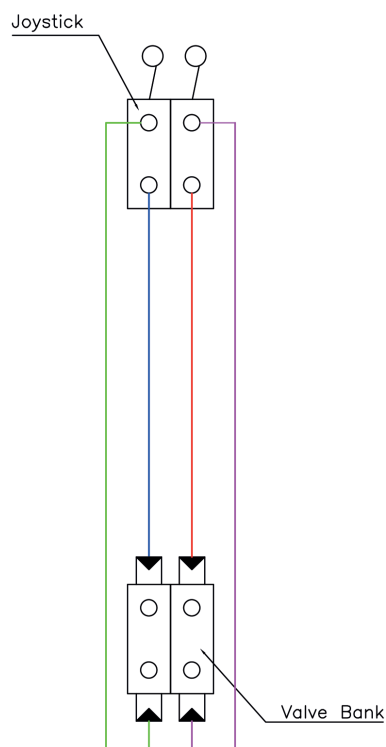
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There are 2 primary joystick patterns commonly used to control excavator functions. They are commonly referred to as the SAE pattern and the ISO pattern. The differences between the two are in which hands control the boom and stick operation. In the SAE pattern, the right hand controls the stick and bucket operation, and the left hand controls the boom and swing functions. In the ISO pattern the right hand controls the boom and bucket, and the left hand controls the stick and swing. While the bucket and swing operation remains unchanged in both patterns, the boom and stick functions are opposite. In the ISO pattern the boom is lowered by pushing the right joystick forward and raised by pulling it back. Likewise, the stick is extended out by pushing the left joystick forward and retracted in by pulling it back. The boom and stick operation are reversed using the SAE pattern. By pushing the right joystick forward, the stick is extended and is retracted by pulling the joystick back. The boom is lowered by pushing the left joystick forward and is raised by pulling the left joystick back.

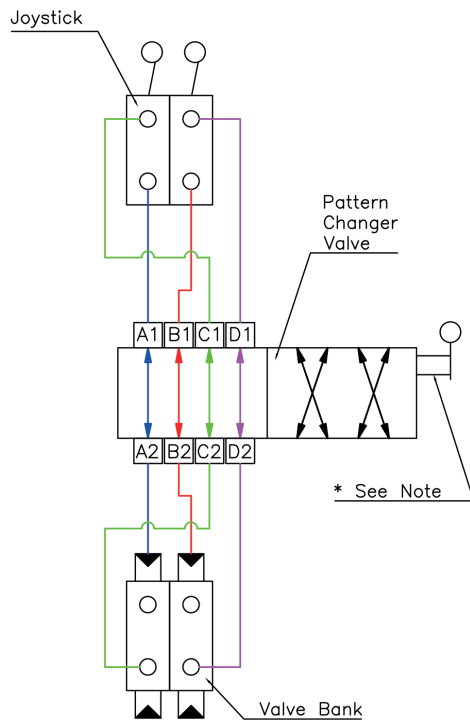
For equipment operators familiar with one joystick pattern versus the other, this can not only be confusing but also pose a safety hazard. By installing the Holmbury Pattern Changer valve, the joystick operation can be quickly and safely reversed to meet the needs of the operator. For simplicities sake we will refer to the joystick lines as forward and backwards instead of by what function they control. Below is a diagram of the joystick and valve before the installation of the valve.

NORMAL OPERATION BEFORE VALVE INSTALLATION



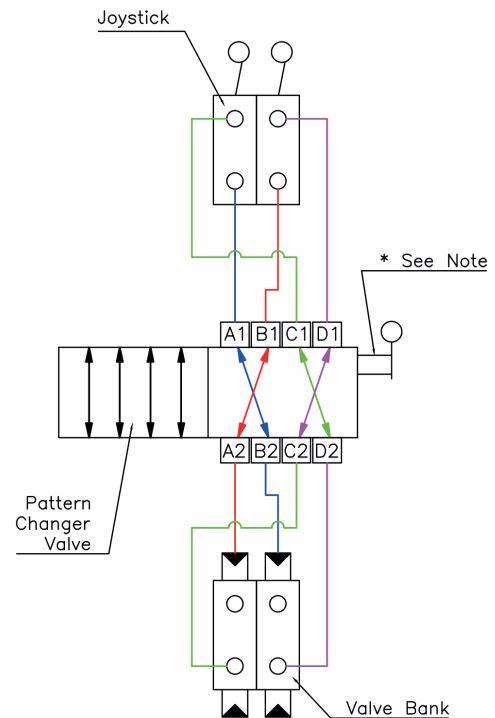
The lines out of the left and right joysticks are connected to corresponding valves which control either the boom or the stick. There is a line for when the joystick is pushed forward or pulled back. The pattern changer valve is placed within these lines in the following manner. The line coming out of the left-hand joystick, back position is connected to A1 ports and A2 port connects to the valve bank. The line from the left-hand forward position line is connected to C1 port and C2 port is connected to the valve bank. The line from the right hand, backward position of the joystick is connected to B1 port and B2 is connected to the valve bank and the line from the right hand, forward position of the joystick is connected to the D1 port. The D2 port is connected to the valve bank. For proper operation, it is important to maintain the correct connections to the valve bank through the pattern changer that was in the original circuit.

NORMAL OPERATION BEFORE AFTER INSTALLATION



When the pattern changer is correctly installed, the joystick patterns that control the boom elevation and stick actuation will be able to be changed from one side of the cab to the other. The following diagram shows schematically what takes place when the handle is rotated on the pattern changer valve.

ALTERNATIVE OPERATION WITH VALVE SHIFTED



The inlet lines A1 and C1 are shifted to the B2 and D2 outlet on the pattern changer valve thus moving the actuation to the opposite control valve. Likewise, the inlet lines B1 and D1 are shifted to A2 and C2 outlet on the pattern changer valve thus shifting the actuation to the opposite control valve. By rotating the pattern changer valve handle 90 degrees the flow is diverted to the opposite control valve thereby shifting the operation of the boom and stick to the opposite sides of the cab regardless of the joystick pattern built into the machine. If installed in this way, the operation of the machine will remain as per specification. When the handle on the pattern changer is rotated, the operation of the boom and dipper will shift to the opposite joystick.

*Note: Rotate valve handle 90 degrees to change joystick pattern.





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Trouble Shooting the Pattern Changer Installation

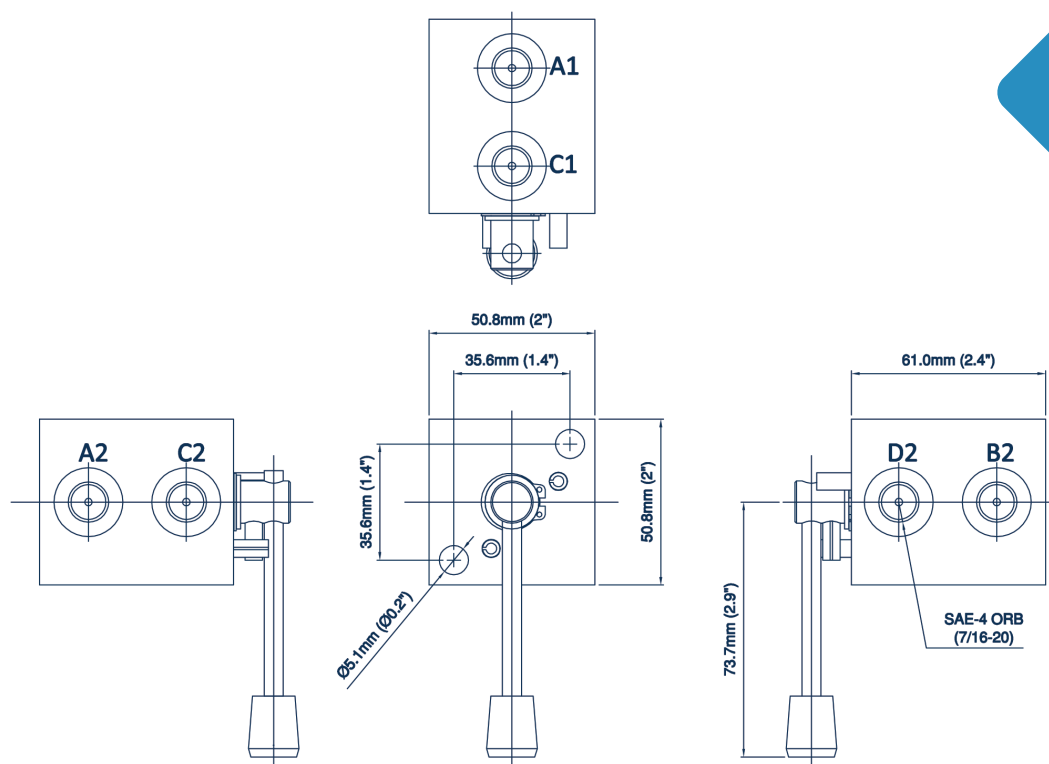


After installing the pattern changer (PC), it is possible that in one position the boom and the stick will operate correctly, but in the alternate position, the boom or the stick or both may operate in the opposite direction than expected. This inevitably means that two hoses at the PC ports need to be switched. If operation has not been corrected after a couple of hose swapping attempts, the following trouble shooting tips/steps may help to resolve the problem. Follow these steps:

1. Turn the lever on the PC to position 1 (Lever pointing to side with D1 and B1 ports). Keep the valve in this position throughout these trouble shooting steps.
2. Confirm that all of the hoses connected to the machine valve bank are connected to the A2, B2, C2, and D2 ports on the PC. None of them should be connected to any of the ports with a "1" on the PC.
3. Confirm that the hoses connected to the A2 and C2 ports on the PC are connected to the left joystick valve section and to the B2 and D2 ports are connected to the right joystick valve section.
4. Once steps 1,2 and 3 are completed correctly, identify which two hoses are connected to the left joystick and which two hoses are connected to the right joystick. Connect the left joystick control hoses to A1 and C1 on the PC. Connect the right joystick control hoses to B1 and D1 on the PC. Then, proceed to step "d". If it is difficult to tell which hoses are connected to each joystick because the blocks are inaccessible, then use the following procedure to help identify it's source:
 - a. Disconnect all the hoses at the A1, B1, C1, and D1 ports at the PC. Do not disconnect them from the joystick block. Put all 4 hose ends into a pail. (Be sure to wear eye protection.)
 - b. With the system on, have an operator actuate the left joystick by pulling back. Tag the hose with flow "A1". Have operator push left joystick forward. Tag the hose with flow "C1".
 - c. Repeat the procedure by pulling the right joystick back. Tag the hose with flow "B1". Push the right joystick forward and tag the hose with flow "D1".
 - d. Turn the system off. Connect A1 hose to A1 port on the PC, B1 hose to B1 port and so on.
 - e. Turn the system on and actuate the left joysticks to assure that it controls the boom or stick depending on the control pattern of the machine. If the boom or stick operate in the proper direction, then move to step f. If it moves in the opposite direction than required, then switch the hoses at the A1 and C1 ports. Now the boom or stick and the left joystick should operate correctly.
 - f. Operate the right joystick. If the boom or stick moves opposite from expectation, then switch the hose ends at B1 and D1 on the PC. Once this is complete, all of the functions while the PC is still in position 1 will work correctly in the regardless if it is SAE or ISO pattern.
5. Only after you have completed steps 4 a-f, the PC position can be switched to position 2 (opposite pattern) and those functions will be working correctly.

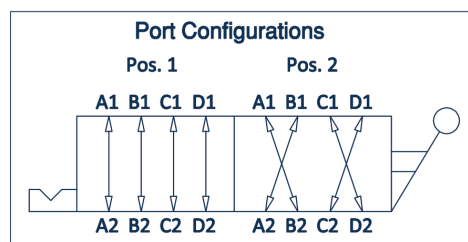
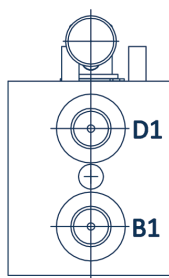
We appreciate your patience and are committed to working with you until you are completely satisfied with the operation of this valve!





PC PERFORMANCE CHARACTERISTICS

Body Size	PC-04-04S
	Pressure in bar - Flow in LPM Pressure in PSI - Flow in GPM
Maximum working pressure	500 7250
Burst pressure	2000 29000
Rated flow	23 6.1



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