



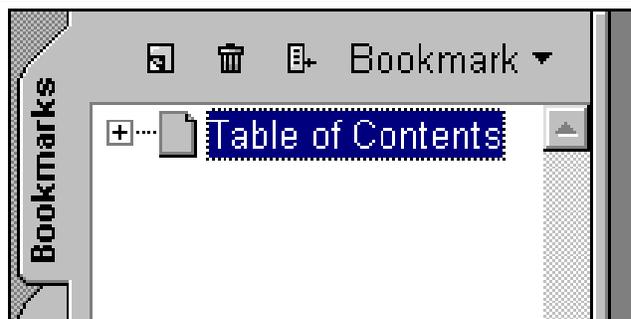
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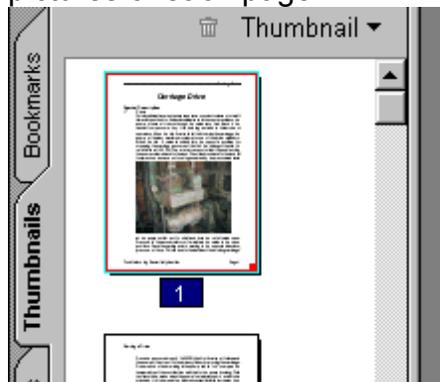
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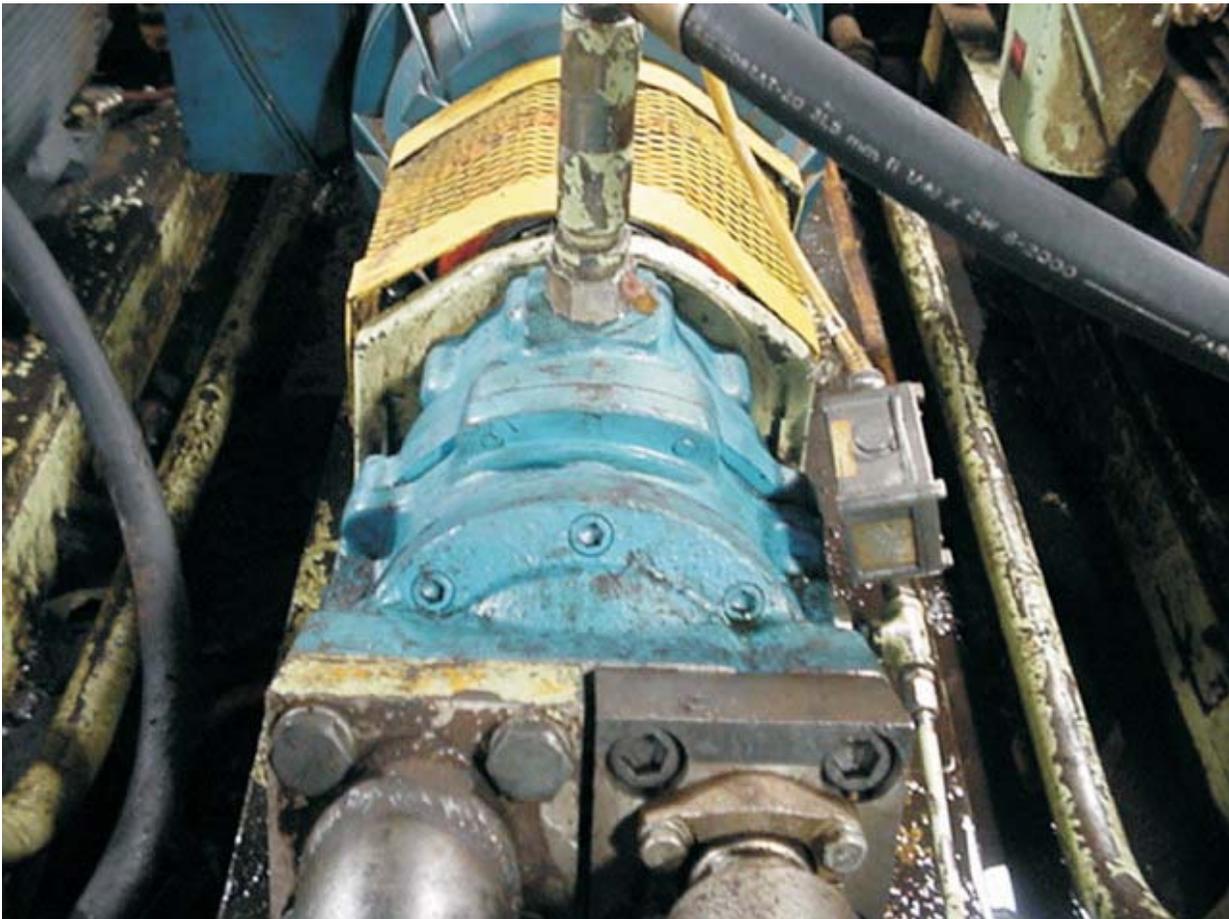
Hot Press

Symbol Description

Component's No. CV3A, CV3B, CV4A, CV4B, DP, F2, GP, NV, PISL730, RV1, RV2, RV3, RV4 and SV were previously described in detail in the High Pressure symbol description.

C1 **Pump**

150 GPM, fixed displacement, externally drained, piston type pump. This pump will supply a constant volume of oil to the press rams when closing and pressurizing the mats. When SOL A is energized the pump volume will be directed to the press rams. During various times of the press cycle the solenoid will be de-energized. The pump volume will then be directed back to the tank at low pressure. Very little heat will be created in this mode of operation. The electrical current to the drive motor will also be at a low level.



The manufacturer recommends that a flow rate of 3 GPM be continuously flushed through the pump housing. This is necessary to transfer the heat generated inside the pump to the hydraulic oil. The flushing oil returns to the tank through the case drain line. The PISL740 pressure switch in the flushing pump circuit will indicate if the flushing pressure drops below a specific level.

One method of determining that the pump is delivering the proper volume is to record the temperature difference between the suction and case drain lines. This should be done when a new pump has been installed. A severe increase in this temperature difference indicates that the pump is excessively bypassing.

Another check that can be made is to close the press with the DP pump and the particular C pump being tested. Record the amount of time to mat contact. Again, this test should be made when a new pump is installed to establish a reference. When making this test verify that the temperature of the relief and dump valves' tank line does not increase.

The final test that will determine pump efficiency is to record the current of the electrical drive motor. A severe decrease may mean that the pump is badly worn and bypassing. When making this test verify that the pressure at the pump outlet port will build to maximum level.

CV2 ***Check Valve***

The purpose of this large check valve is to lock fluid in the jackrams when the prefill valves are shifted to pressurize the main rams. This prevents the press from dropping.

FC1 ***Flow Control***

The setting of the valve determines the speed that the prefill valve shifts from the open to the closed position. To properly synchronize all the FC1 valves observe the pressure gauges that are hydraulically connected to the rod sides of the actuators. When the prefill valves

shift the pressure should build simultaneously on all gauges. If one gauge takes longer to build pressure then the FC1 flow control should be opened counterclockwise a small amount. Observe the gauge during the next cycle to see if the pressure rises equally. If not continue opening the flow control gradually until the pressure builds at the same time with the gauges.

The pressure should also drop to 0 at the same time when the prefill valves are fully shifted. This is controlled by the FC2 adjustment. If the pressure on one or more of the gauges takes longer to drop to 0 then the FC2 adjustment should be rotated counterclockwise to allow the actuator to fully extend at a faster speed.

FC2 *Flow Control*

The prefill actuator will extend at fast speed until the cylinder piston blocks the main outlet port. The oil exhausting out of the rod side of the actuator is then forced through the flow control, slowing the piston down. Refer to the FC1 description for the proper synchronization of the FC2 valves. When the SOL R solenoid is energized to open the prefills, the oil will initially flow through the bypass check valve. The flow control and check valve are mounted on the prefill valve itself.

FC3 *Flow Control*

This flow control is mounted on the SOL T valve housing. The flow control setting will determine the speed that the SV9 valve shifts from the closed to the open position. The valve should be set so that the SV9 spool does not slam when the press opens. If this flow control becomes contaminated then the SV9 spool would take a longer period of time to shift the open position.

FC4 *Flow Control*

The setting of this valve determines the speed that the SV9 spool shifts from the open to the closed position. The valve should be adjusted so that the press does not hit hard when fully opened. Turning the valve counterclockwise will allow the SV9 valve to shift closed faster.

FC5 **Flow Control**

The setting of the valve determines the soft landing speed of the press. When the press nears bottom, the ZSO700B limit switch is contacted, which causes SOL T to de-energize. The jackram flow can now only flow through valve SOL U and this flow control and SOL S which ports oil into the DP Pump.

NC1 **Manual Valve**

The valve is normally closed and is used when manually opening the press. This valve should be opened after NO1 valve is closed.

NC2 **Manual Valve**

The valve is normally closed and is used when manually opening the press. This valve should be opened only after NO1 valve is closed first and the NC1 valve is opened. The tank line of the valve should normally be cold or cool.

NO1 **Manual Valve**

The valve is normally open and is used when manually opening the press. This valve should be closed first, NC1 should then be opened, followed by opening NC2.

NO2 **Manual Valve**

The valve is open during the normal operation of the press. Closing the valve blocks from the jackrams to the directional valves.

PT700 **Pressure Transducer**

The transducer converts the pressure in the line into a proportional electrical signal. The transducer will also indicate the pressure that the PLC will use for the various pressure trip points in the system.

SV0-SV7 **Prefill Valve**

The prefill valve is very large and is located in the press pit. When closing the press the valve hydraulically connects the reservoir to the main rams. As the jackrams close the press, oil from the reservoir flows into or prefills the rams. The flow from the pumps is blocked

through the valve at this time. After the press is closed, the pressure will build to approximately 1800 PSI and SOL P1-P4 will then energize. Oil in the jackrams is now directed to extend the specific prefill actuator and shift the prefill valve spool into the “closed position”. Flow from the reservoir to the rams is now blocked. Oil flow from the pumps is now directed through the valves and to the main rams. The system pressure will drop and the pumps will pressurize the rams. The valves will remain in this condition until the PTP11 setting is reached in Weight Transfer. SOL P1-P4 are then de-energized. Flow from the DP pump is ported through valve SOL R to the rod side of the actuators. As the specific actuator retracts, the prefill valve spool shifts back to the open position. As the press opens, oil in the main rams returns to the tank through the prefill valves.

RV6 ***Relief Valve***

The valve is used to limit the maximum pressure to the jackram cylinders. When the prefills are shifted closed, pressure is blocked in



the jackrams. A momentary pressure spike may occur. This relief will open and dump the pressurized fluid back to tank. During normal operation the tank line of this valve should be cold or cool.

RV7 **Relief Valve**

This valve limits the maximum pressure downstream of the C pump. This valve should not be set above the maximum pressure rating of the pump (3000 PSI). The system should be designed so that the pump volume dumps back to the tank through the solenoid operated dump valve before the RV7 setting is reached. Heat will be created any time the pump volume is flowing through the valve.

If this valve fails open, then the closing of the press and the pressurizing of the rams will be slower. To check the valve, turn the pump off and check the pressure gauge if available to verify that the pressure has dropped to 0 PSI. The valve can then be taken apart and checked for contamination and broken springs.



SOL A *Directional Valve*

The valve is representative of eleven valves on the press, SOL A-L. When the pressure builds to PTP1 setting when initially closing, the solenoids are energized in a sequence. The pilot pressure, supplied by the GP pump, is directed to shift the main spool closed. Oil from the C pumps is then ported to the jackrams. During various points of the press cycles, pressure and position trip points are reached. The solenoids are then de-energized in sequence.

All the C pumps return to tank at low pressure when the specific solenoid is de-energized. The valve is a normally open, two way, two position, single solenoid controlled, hydraulically piloted, externally drained, spring return, directional control.

There are pilot chokes located between the pilot valve and main spool. By inserting gauges in each side of the main spool, these should be adjusted so that the pilot pressure gradually increases and decreases as the solenoid is energized and de-energized.

SOL P1-P4 *Directional Valves*

The valves are located in the press pit. One valve controls two prefill valves. The valve solenoid is de-energized when initially closing the press. Once the pressure transducer indicates that there is approximately 1800 PSI pressure in the line, SOL P1-P4 are energized. Oil is then ported to extend the actuators which shifts the prefill valve spools. Flow from the pumps is now directed to pressurize the main rams. The pressure will initially drop and once again build. The valves remain energized until the pressure reaches the PTP11 setting in Weight Transfer. Flow from the DP pump is then ported to the rod side of the cylinders. The oil that exhausts out of the full piston side of the cylinders returns to tank through the directional valve. The prefill valves shift back to the open position when this occurs. The valves are two position, three way, single solenoid, spring return, directional control.

SOL R *Directional Valve*

The valve remains in the de-energized condition until the No.5 and decompression timers elapse. The solenoid then energizes directing external pilot pressure to shift the main spool into the “B” position. The pump volume is then directed to the jackrams and rod side of the prefill actuators. When the PTP11 pressure trip point, (1000 PSI) is reached, SOL P1-P4 are de-energized. The prefill valve spools are shifted to the open position when the actuator retracts. SOL R is a normally open, two position, four way, single solenoid controlled, externally piloted and drained, spring return, directional valve. An adjustment on the pilot valve controls the rate that the main spool shifts from the “B” to the “A” position.

SOL S *Directional Valve*

The valve is de-energized until the pressure in the jackrams builds to the PTP4 setting. When the solenoid energizes pilot pressure is directed to shift the main spool into the “open” position. The jackrams and main rams are now hydraulically connected together through this valve. The valve will remain energized until the ZSO 700 switch is actuated on bottom. SOL S is a normally closed, two position, two way, single solenoid controlled, externally piloted, externally drained, spring return, directional valve. A flow control on the valve will control the rate that the spool shifts from the open to the closed position.

SOL T *Directional Valve*

When the press is commanded to close the solenoid is de-energized. Pilot pressure from the gear pump will initially be directed through the valve to extend the SV9 cylinder. When the cylinder extends the valve spool shifts from the open to the closed position. The solenoid remains de-energized until the LS12-19 limit switches are actuated on the prefill valves. When the solenoid energizes pressurized fluid acting on the rod side of the cylinder will shift the SV9 valve from the closed to the open position. The oil that exhaust out of the full piston side of the SV9 piston will flow back to tank first through the FC3 flow control then SOL T. The oil in the jack rams can flow through the SV9 main spool and back to the tank. When the ZS700B limit switch is contacted near the bottom the SOL T solenoid is de-energized. Pilot

pressure from the main line will be directed to extend the SV9 actuator. As the actuator extends oil will be ported through the FC4 flow control. The setting of the flow control determines the speed that the valve shifts from the open to the closed position. Oil in the jack rams is now blocked through the SV9 spool. As the press lowers slow the jackram oil will return to the tank through SOL U and into the DP pump via SOL S.

SOL U ***Directional Valve***

After the prefill valves open, SOL T de-energizes and SOL U energizes. The valves are hydraulically shifted to the open position. Oil in the jackrams flows through the valves as the press lowers. When the ZS700B limit switch is contacted, SOL T is energized shifting the SV9 valve closed. Flow is now blocked through the valve. The jackram flow continues flowing through the SOL U and FC5 valves. The press opening speed will slow down at this time. When the ZS700 limit switch is contacted SOL U is de-energized. It is re-energized once the ZSO 700 switch is actuated when the press is fully open. SOL U is a normally closed, two position, two way, single solenoid, externally piloted and drained, spring return, directional valve.

SOL W ***Directional Valve***

When the No.5 and Decompression timer elapse, the valve solenoid is energized. Pilot pressure is then directed to shift the main spool into the open position. Flow from the DP pump "A" port is then directed out the "B" port of SOL R (SOL R is energized) and to the jackrams through this valve. Once the jackram pressure reaches the PS5 setting, the SOL P1-P4 solenoids are de-energized allowing the prefill valves to shift open. SOL W also de-energizes at this time. SOL W is a normally closed, two position, two way, externally piloted and drained, single solenoid, spring return, directional valve.

SV9 ***Directional Valve***

This valve is controlled by the SOL T pilot valve. Please refer to the SOL T description for the sequencing of the opening and closing of the valve. When the valve is open oil in the jackrams is ported

through the valve and back to the tank at a high flow rate. When the valve is closed all flow is blocked back to the tank.

ZSO 700 **Limit Switch**

When the press opens and the switch is again contacted all solenoid valves, including the neutral valve on the pump, are de-energized. SOL U is energized once this switch is contacted.

ZSO 700A **Limit Switch**

When this switch is contacted, SOL U is de-energized. The only flow path for the oil in the jackrams back to the tank is through the DP pump.

ZSO 700B **Limit Switch**

When the press is opening, SOL T is energized and SOL U is energized. Oil in the jackrams returns to tank through these valves and the FC5 flow control. When this limit switch is contacted SOL T is de-energized, Shifting SV9 blocking flow to the tank. Oil in the jackrams can now only flow through the FC5 valve and through SOL S slowing the opening speed down.

