

Operating & Maintenance

ELECTRIC POWER

Check the electrical voltage to ensure that it matches the control panel and motor voltage ratings. If the unit is furnished with a fusible disconnect switch for each motor, furnish and install the correctly rated fuses (dual element fuses are recommended). Insure that control circuit power is provided to the control circuit disconnect switch (control circuit voltage is the same as that of the motor power supply).

PUMP ROTATION

Using the “hand” position of the “hand-off-automatic” switch, ‘bump’ each pump (turn it on for a second) to be sure that the pump is Rotating in the direction of the rotation arrow on the pump casing.

SYSTEM PRESSURE

Determine the required system pressure at the discharge of the pressure booster system.

SWITCH SETTINGS

With the control panel wiring complete, turn the “hand-off-automatic” switch of one pump to the “hand” position, permitting the pump to run continuously. The other “hand-off-automatic” switch should remain in the “off” position.

VALVING

Insure that all gate valves on the pump suction and discharge connections are fully open. If there is a valved bypass line around the pressure system, the bypass line valve should be completely closed.

ADJUSTING THE CLAYTON CONTROL VALVES

To properly adjust the clayton control valves to provide the correct system pressure, there should be a water flow of

approximately 25 to 35 gpm during adjustment. This can be achieved by opening five or more fixtures in the building. To adjust the control valve (for the pump that is running), remove the plastic cover from the CRD pressure reducing control mounted on the main valve body (see the clayton installation sheets attached). Back off the locking jam nut (item #3) and turn the adjusting screw (item #2) clockwise to increase the system pressure or count-r-clockwise to lower the system pressure. Watch the pressure gauge on the discharge header for several minutes until the required system pressure shows steadily. Tighten the jam nut on the adjusting screw and replace the plastic cover on the CRD control. To adjust the other pump and its control valve, follow the same procedure utilized for the first pump and valve. Both pumps and valves must be adjusted as close as possible to the required system pressure, as shown on the discharge header pressure gauge.

ADJUSTING THE PURGE VALVE

A penn (div. of Johnson Controls, Inc.) Series V-47 modulating water regulating valve (temperature purge valve) is provided to prevent over-heating of the water in the pump casing during periods of little or no building water demand. Turn the range adjusting screw on the top of the regulating valve clockwise until there is a flow of water thru the valve. Then turn the range adjusting screw counter-clockwise until the flow of water stops. Then turn the range adjusting screw counter-clockwise an additional three full turns. This should properly set the valve. Pipe the purge valve discharge to the nearest floor drain.

ADJUSTING THE LOW SUCTION SWITCH

If the unit is furnished with a Penn series P70 low suction pressure cut-off switch, adjust the Penn switch to stop the pump at approximately 10# to 20# below the normal available suction pressure. See the Penn (Johnson Controls, Inc.) instruction sheet attached.



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ADJUSTING THE LAG PUMP CONTROL SWITCH

A Mercoid DA-31-2 pressure switch is provided on the unit to start the lag pump, which will run simultaneously with the lead pump when building water usage is great, or if the lead pump is not providing enough flow for any reason. The mercoid switch contacts open on a system pressure rise and close on a system pressure drop. Set the lower pointer of the pressure switch about 5# lower than the required system pressure. Then set the upper pointer as close as possible to the lower pointer setting, providing the minimum possible differential between the two pointers. (See the mercoid instruction sheet attached). Then making these adjustments, refer to the pressure gauge on the system discharge header and not to the scale on the front of the mercoid pressure switch.

ADJUSTING OTHER SWITCHES

If the system is furnished with a high system pressure switch, a low system pressure switch and/or a high suction pressure switch (for providing cut-out and/or alarm signals), each switch should be adjusted in the same way as the low suction pressure cut-off switch described above, and set at 5# to 10# above or below the required pressure.

TIME DELAYS

Set both "hand-off-automatic" switches in the "automatic" position, permitting the system to operate normally. The lead pump should be running alone and maintaining the required system pressure. The lag pump should not be running. If both pumps are running, check the mercoid pressure switch which controls the operation of the lag pump (second pump) to make sure that it is properly adjusted as described above. If properly adjusted, wait about 10 minutes for the time delay in the control panel to complete its cycle. Assuming the water demand in the building at the time of start-up is not heavy, and if the lag pump does not shut off after 10 minutes, it indicates improper adjustment of the "second pump off" time delay. This delay prevents

rapid on-off cycling of the lag pump, and is field adjustable from 15 seconds to 30 minutes. An adjustment to provide a 10 minute delay is recommended. The delays are labeled in the panel. Back off on the jam nut of the "second pump off" delay (turn counter-clockwise) until the lag pump stops. Turn all disconnect switches (including the control circuit disconnect switch) to "off" and then back to "on" to start a new pumping cycle. Repeat the procedure while turning the adjusting screw on the time delay clockwise until a 10 minute run period is achieved. Then tighten the jam nut by turning it clockwise. (See the table of time delays at the end of these instructions. All delays can be adjusted as indicated above.)

STANDARD MANUAL TRANSFER SWITCH

The standard control panel is furnished with a push button type "lead-lag" manual transfer switch. The lead pump should be switched at least once a week to equalize the wear on the pumps.

OPTIONAL AUTOMATIC ALTERNATOR

Some units have a 24-hour time clock in lieu of the standard manual transfer switch which will automatically alternate the lead and lag pumps every 24 hours. This alternator is preset and cannot be adjusted.

CHATTERING

If chattering or hammering sounds are noted, check the Clayton valves to be sure that air is not trapped in the valve bodies. If it is, loosen about four of the valve upper cover cap screws and allow the air to escape until water leaks thru the valve gasket area. Then re-tighten the cap screws. If the chattering persists, remove the brass cover from the clayton valve CV flow control (this controls the speed at which the clayton valve responds to pressure changes), and turn the adjusting stem counter-clockwise, allowing the valve to react faster to pressure changes.



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SYSTEMS WITH THE CUSHION-STOP FEATURE

The basic start-up instructions for standard systems apply. Close all valves between the pumps and the cushion-stop tank while making the basic adjustments to the control valves, etc. (See instructions below for charging the cushion-stop tank.) The cushion-stop modification allows for the shut-down of the lead pump during periods of no demand or minimal demand for water in the building. As the water demand decreases, water is automatically diverted to the cushion-stop tank, pressurizing it to a level higher than the required system pressure. The cushion-stop pressure switch then shuts down the lead pump, so that no pump is operating. The water in the tank then provides for the small water demand thru the control valve, until the water chamber of the tank is depleted. At this time, the lead pump will automatically turn on again.

An orifice valve is included in the tank feed line to prevent pressure surges in the tank.

On systems having the standard lead-lag manual transfer switch, only the gate valve between the lead pump and the cushion-stop tank should be open. The gate valve between the lag pump and the tank should be closed. When switching the lead pump, be sure to close one valve and open the other. Cushion-stop systems have a mercoïd cushion-stop control pressure switch. After determining the required system pressure, set this pressure switch to stop the lead pump 20# to 30# above the required system pressure, and to re-start the lead pump 5# to 10# above the required system pressure. The upper pointer of the pressure switch determines the pump stop pressure and the lower pointer determines the pump re-start pressure. When making these adjustments, refer to the pressure gauge on the system discharge header, and not to the pressure scale on the front of the pressure switch.

FOR TRIPLEX TYPE A SYSTEMS

Triplex type A systems are built with three pumps of equal size (the GPM and TDH ratings of all three pumps are the same). Standard procedures for starting up duplex systems also apply to these systems.

The first pump operates continuously to satisfy the building water demand. A mercoïd lag pump control pressure switch turns on the second pump when the first pump cannot satisfy the water demand operating alone. A time delay automatically turns on the third pump after the second pump has been running for a predetermined time period. When the water demand decreases, the lag pump control pressure switch will turn off the second and third pumps at the same time. Standard systems are furnished with a manual transfer switch to interchange the pump sequence of operation (P1-P2-P3; P2-P3- P1; P3-P1-P2). Some systems are furnished with an automatic 24-hour alternator to automatically change the pump sequence. This alternator is not adjustable.

If a triplex type A system is furnished with a cushion-stop tank, be sure that the gate valves between the lag pumps and the tank are closed, and that the gate valve between the lead pump and the tank is open. When manually transferring the pump sequence, open or close the gate valves accordingly.

If the system has a 24-hour automatic alternator, all three valves should be open.

FOR TRIPLEX TYPE B SYSTEMS

Triplex Type B systems are built with three pumps. The jockey pump (first pump) has a small GPM rating and the two main pumps (the second and third pumps) have an equally larger GPM rating. Standard procedures for starting up duplex systems also apply to triplex type B systems.

The jockey pump operates continuously to satisfy the building water demand. A mercoïd main pump control pressure switch turns on the second pump when the jockey pump cannot satisfy the water demand operating alone. A time delay automatically turns on the third pump after the second pump has been operating for a pre-determined time period. When the water demand decreases, the main pump control pressure switch will turn off both main pumps at the same time.

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Standard systems are furnished with a manual transfer switch to interchange the main pump sequence of operation. Some units are furnished with an automatic 24-hour alternator to automatically change the main pump sequence. This alternator is not adjustable. If the Triplex Type B system is furnished with a cushion-stop tank, the tank is fed only by the jockey pump. Be sure that the gate valve between the jockey pump and the tank is open at all times.

AIR CHARGING THE TANK

The following procedures apply to charging all cushion-stop tanks. The tank should be charged to 10# above the required system pressure.

After adjusting the control valves and pressure switches, with all the gate valves between the pumps and the cushion-stop tank closed, open the drain valve on the tank feed line and drain out all the water in the tank. Charge the tank thru the air valve on the top of the tank. The air charge should be to a pressure no more than 10# above the required system pressure. Close the tank drain valve and open the applicable gate valves between the pumps and the tank.

The tank pressure relief valve should be piped to the nearest floor drain.

ADJUSTABLE TIME DELAYS

PUMP	DUPLEX SYSTEM	TRIPLE TYPE A SYSTEM	TRIPLE TYPE B SYSTEM	SYSTEM WITH CUSHION-STOP
First Pump On	Constant run	Constant run	Constant run	No delay
First Pump Off	Constant run	Constant run	Constant run	15 seconds to 30 minutes
Second Pump On	1 second to 1 minute	No delay	No delay	-
Second Pump Off	15 seconds to 30 minutes	15 seconds to 30 minutes	15 seconds to 30 minutes	-
Third Pump On	-	15 seconds to 30 minutes	15 seconds to 30 minutes	-
Third Pump Off	-	Uses same Off delay as second pump	Uses same Off delay as second pump	-

