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NELSON

800 SERIES CONTROL VALVE — CONTROL FUNCTION and MAINTENANCE MANUAL ON-OFF AND RATE-OF-FLOW

VALVE CONTROL FUNCTION:

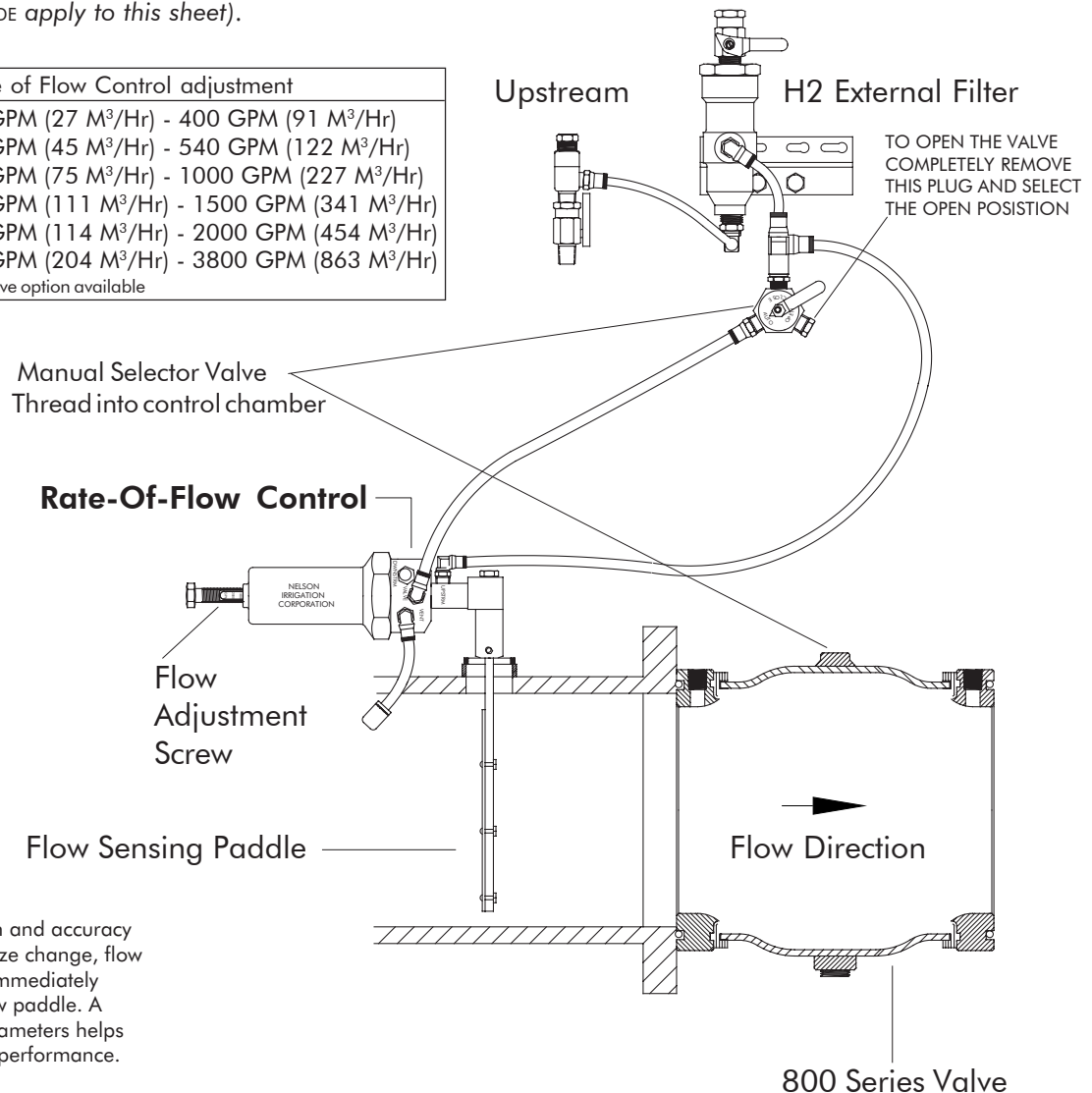
The **MANUAL ON/OFF** and **RATE-OF-FLOW** model of the 800 Series Control Valve is a hydraulically operated sleeve type valve with a manual control and a Rate-Of-Flow control. The flow through the valve is controlled by a rubber sleeve which is actuated by hydraulic pressure responding to the controls as listed here:

- When the selector is pointed to the "AUTO" position then the Rate-Of-Flow will control the valve. Pointing the manual selector handle to "OPEN" will override the "AUTO" control and bypass the Rate-Of-Flow function. Pointing the manual selector valve to "CLOSE" will always close the valve.
- The Rate-Of-Flow control senses the flow by means of a paddle. The Rate-Of-Flow function depends on flow rate and not on pressure. The Rate-Of-Flow adjustment screw is normally set to 120% of design flow to limit the flow during system start up. The valve will eventually open fully. If the Rate-Of-Flow setting is less than design flow rate then the Rate-Of-Flow retains control to hold the flow rate down and keep the valve from opening fully. The resulting downstream pressure will remain lower than upstream pressure.
- Pointing the Manual Selector handle mid way between "OPEN" and "CLOSE" will lock the valve sleeve in position.

The information on this sheet is for the **MANUAL ON-OFF** and **RATE-OF-FLOW** control function with both internal and external filter options (*items D18, E1, H2 & H3 control function on the VALVE SELECTION GUIDE apply to this sheet*).

(See inside for **TROUBLE SHOOTING** information and back page for a schematic with an internal filter.)

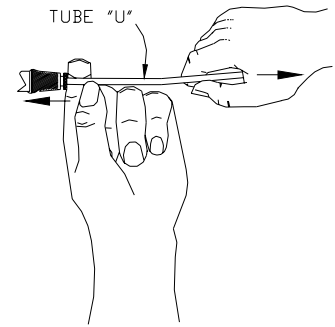
Size*	Range of Flow Control adjustment
3"	120 GPM (27 M ³ /Hr) - 400 GPM (91 M ³ /Hr)
4"	200 GPM (45 M ³ /Hr) - 540 GPM (122 M ³ /Hr)
6" <small>low flow</small>	330 GPM (75 M ³ /Hr) - 1000 GPM (227 M ³ /Hr)
8" <small>low flow</small>	490 GPM (111 M ³ /Hr) - 1500 GPM (341 M ³ /Hr)
6" **	500 GPM (114 M ³ /Hr) - 2000 GPM (454 M ³ /Hr)
8" **	900 GPM (204 M ³ /Hr) - 3800 GPM (863 M ³ /Hr)
*Pipe diameter	**In-Valve option available



NOTE: Better valve operation and accuracy will result by avoiding pipe size change, flow meters, pumps and elbows immediately upstream of the Rate-Of-Flow paddle. A straight length of five pipe diameters helps improve accuracy and valve performance.

SYMPTOM: Valve will not close when the manual selector valve is in the "CLOSE" position.

- CHECK ITEMS:**
- ✓ Check for leaks on all tube lines and fittings. If it is necessary to remove any control tube lines from the fittings then use an opposing force as shown here. Pull the tube while pressing in the opposite direction on the fitting ring.
 - ✓ Check that water can flow through the tube "U" which connects the upstream (high pressure) side of the main valve to the "CLOSE" port of the manual selector valve. Refer to the control function diagram. If little or no flow, find the reason for the blockage and clear it.



CAUTION! BE CAREFUL TO SHUT DOWN PRESSURE ON THE SYSTEM BEFORE SERVICING THIS VALVE! IF THE VALVE IS CLOSED AND UNDER PRESSURE, DISCONNECTING THE CONTROL TUBE "U" (8970-005) WILL CAUSE RAPID OPENING OF THE VALVE! SYSTEM DAMAGE COULD OCCUR!

- ✓ Check the filter to assure it can pass adequate water flow. This can be deceptive because when you unhook the line from the filter some water can still flow. A partially blocked filter will reduce the valve closing response time. If little or no flow is present then clean the filter. If the valve is equipped with an external filter open the valve on the filter to clean the filter.

- ✓ Check the sleeve for damage. To do this, point the manual selector valve to the "OPEN" position. The total volume of water that should flow from the sleeve chamber through the "OPEN" port is the same as the volume required to fully open or close the valve. If more than this volume of water continues to flow, then the sleeve has been punctured and must be replaced.

WATER VOLUME REQUIRED TO FULLY OPEN OR CLOSE VALVE

8"	4 Quarts (3.8 L)
6"	2 Quarts (2.0 L)
4"	1 Pint (460 ml)
3"	1 Cup (230 ml)
2"	5 oz (145 ml)

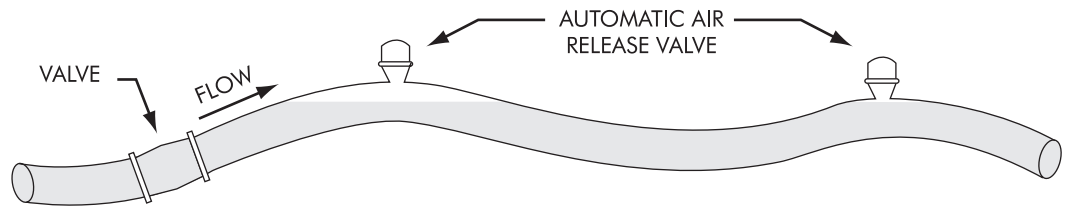
SYMPTOM: Valve will not open or has excessive pressure drop when the manual selector valve is in the "OPEN" position.

- CHECK ITEMS:**
- ✓ Check all tube lines and fittings for blockages and kinks. If there are no obstructions then check that upstream pressure is adequate. The 200 psi rated valve starts to open at 8 psi and is fully open at 30 psi. The 80 psi rated valve starts to open at 10 psi and is fully open at 18 psi. The 50 psi rated valve starts to open at 8 psi and is fully open at 10 psi.
 - ✓ Check the total volume of water in the sleeve chamber to verify that enough water volume (see table) flows between fully open and fully closed. This water volume can be measured as it flows from the "OPEN" port. If there is still a large pressure drop across the valve then debris could be caught blocking the flow on the upstream side of the cage. This type of obstruction will require removing the valve from the line and cleaning out the debris.

SYMPTOM: The downstream is unstable (*fluctuating high and then low several times a minute*) and water is discharged from the exhaust port during each low pressure cycle.

CHECK ITEMS:

- ✓ Check for trapped air in the pipe system down stream from the 800 Series valve. This problem is not easily detected. The installation of a Nelson ACV200 automatic air release valve will help rid the system of trapped air. It is recommended this type of air release valve be installed at high elevation points on the system where air could accumulate. Typical location for the accumulated air is shown.



SYMPTOM: The valve opens to let an excessive amount of water flow through the valve (more than the Rate-Of-Flow setting).

- ✓ Check the Rate-Of-Flow sensing paddle for damage, If damage is found then repair the paddle.

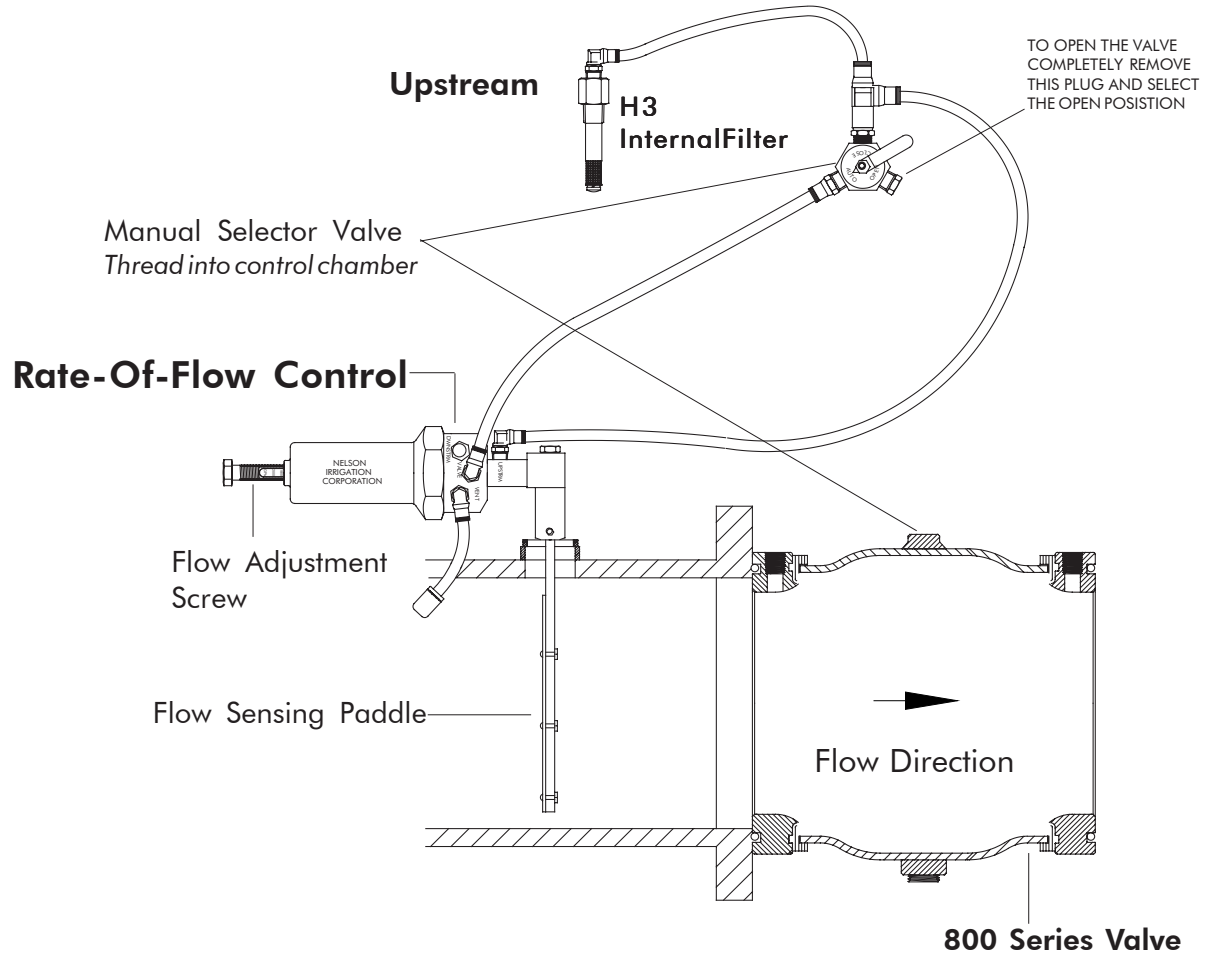
SYMPTOM: The valve will not open adequately to build the desired pressure on the downstream side of the valve.

CHECK ITEMS:

- ✓ Check that the Rate-Of-Flow adjustment screw setting is set slightly greater than the design flow rate (usually 120% of design). If the setting is lower than the design flow then the down stream pressure will not rise adequately to reach the pressure desired. One method to evaluate the control status is to feel the control tube connected to the "VALVE" port on the Rate-Of-Flow to determine if it is pressurized. If it is pressurized then the Rate-Of-Flow is in control of the valve. Change the adjustment setting of the pressure reducing control and/or the Rate-Of-Flow control to get the desired results.

- ✓ Check that the Rate-Of-Flow sensing paddle is free of debris which could cause it to incorrectly sense flow. If debris is found then clean the paddle.

Note: Be sure to drain the system to reduce the potential of winter freeze damage.



WARRANTY AND DISCLAIMER: Nelson 800 Series Control Valves and Accessories are warranted for one year from the date of original sale to be free of defective material and workmanship when used within the working specifications for which the products was designed and under normal use and service. The manufacturer assumes no responsibility for installation, removal or unauthorized repair of defective parts and the manufacturer will not be liable for any crop or other consequential damages resulting from any defects or breach of warranty. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES AND OF ALL OTHER OBLIGATIONS OR LIABILITIES OF MANUFACTURER. No agent, employee or representative of the manufacturer has authority to waive, alter or add to the provisions of this warranty nor to make any representations or warranty not contained herein.

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800 SERIES CONTROL VALVE — CONTROL FUNCTION and MAINTENANCE

ELECTRIC ON/OFF AND RATE-OF-FLOW

VALVE CONTROL FUNCTION

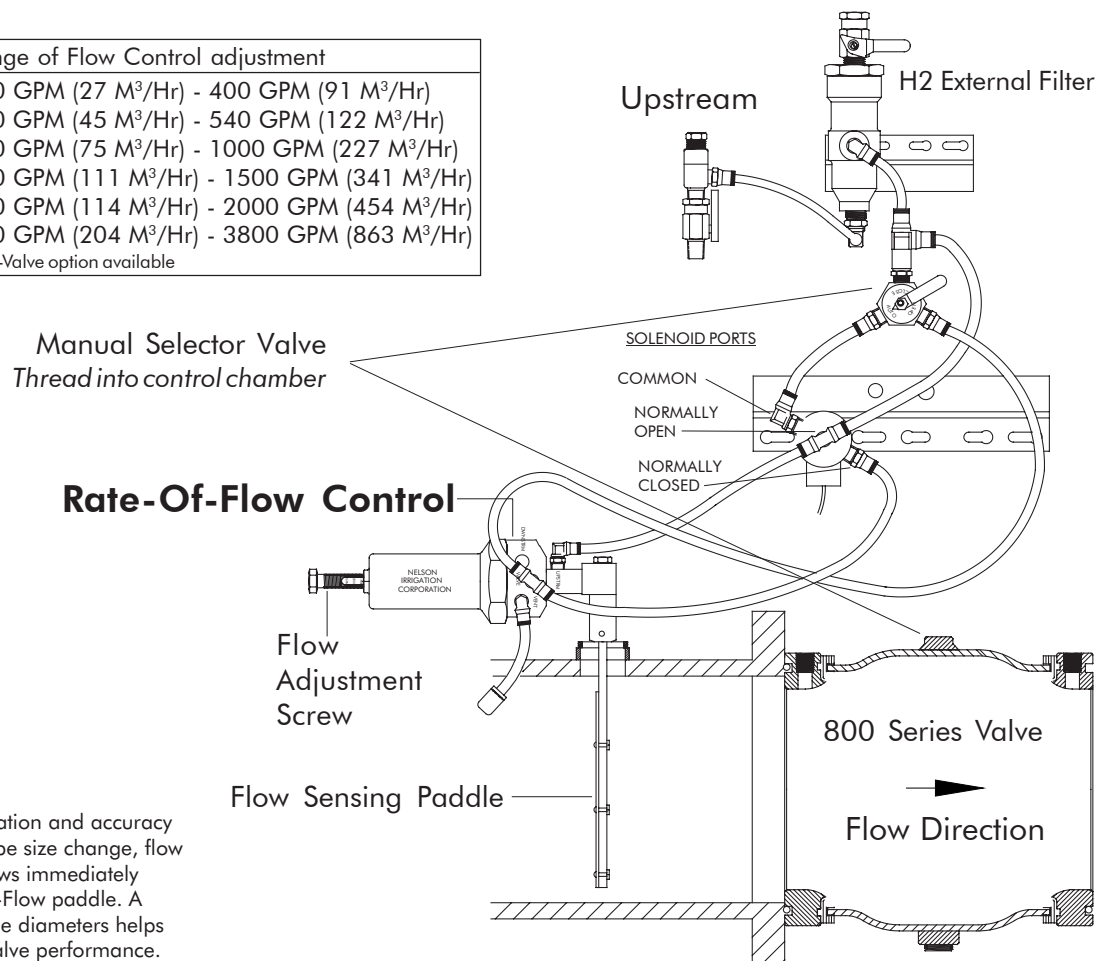
The **ELECTRIC ON/OFF** and **RATE-OF-FLOW** model of the 800 Series Control Valve is a hydraulically operated sleeve type valve with a electric solenoid control and a Rate-Of-Flow control. The flow through the valve is controlled by a rubber sleeve which is actuated by hydraulic pressure responding to the controls as listed here:

- When the selector is pointed to the "AUTO" position then the electric solenoid is used to automatically open or close the valve. The 3-way electric solenoid must be energized to open the valve and de-energized to close the valve. Pointing the manual selector handle to "OPEN" will override the "AUTO" control and bypass the electric solenoid function. In the 'open' position the Rate-Of-Flow will still control the flow rate through the valve. Pointing the manual selector valve to "CLOSE" will always close the valve.
- The Rate-Of-Flow control senses the flow by means of a paddle. The Rate-Of-Flow function depends on flow rate and not on pressure. The Rate-Of-Flow adjustment screw is normally set to 120% of design flow to limit the flow during system start up. The valve will eventually open fully. If the Rate-Of-Flow setting is less than design flow rate then the Rate-Of-Flow retains control to hold the flow rate down and keep the valve from opening fully. The resulting downstream pressure will remain lower than upstream pressure.
- Pointing the Manual Selector handle mid way between "OPEN" and "CLOSE" will lock the valve sleeve in position.

The information on this sheet is for the **ELECTRIC ON-OFF** and **RATE-OF-FLOW** control function with both internal and external filter options (items D18, E20-E70, H2 & H3 control function on the VALVE SELECTION GUIDE apply to this sheet).

(See inside for TROUBLE SHOOTING information and back page for a schematic with an internal filter.)

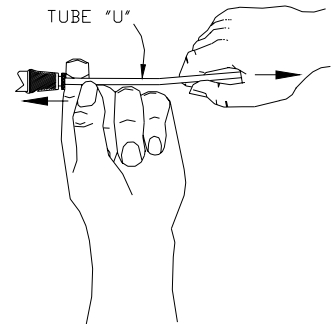
Size*	Range of Flow Control adjustment
3"	120 GPM (27 M ³ /Hr) - 400 GPM (91 M ³ /Hr)
4"	200 GPM (45 M ³ /Hr) - 540 GPM (122 M ³ /Hr)
6" low flow	330 GPM (75 M ³ /Hr) - 1000 GPM (227 M ³ /Hr)
8" low flow	490 GPM (111 M ³ /Hr) - 1500 GPM (341 M ³ /Hr)
6" **	500 GPM (114 M ³ /Hr) - 2000 GPM (454 M ³ /Hr)
8" **	900 GPM (204 M ³ /Hr) - 3800 GPM (863 M ³ /Hr)
*Pipe diameter	**In-Valve option available



NOTE: Better valve operation and accuracy will result by avoiding pipe size change, flow meters, pumps and elbows immediately upstream of the Rate-Of-Flow paddle. A straight length of five pipe diameters helps improve accuracy and valve performance.

SYMPTOM: Valve will not close when the manual selector valve is in the "CLOSE" position.

- CHECK ITEMS:**
- ✓ Check for leaks on all tube lines and fittings. If it is necessary to remove any control tube lines from the fittings then use an opposing force as shown here. Pull the tube while pressing in the opposite direction on the fitting ring.
 - ✓ Check that water can flow through the tube "U" which connects the upstream (high pressure) side of the main valve to the "CLOSE" port of the manual selector valve. Refer to the control function diagram. If little or no flow, find the reason for the blockage and clear it.



CAUTION! BE CAREFUL TO SHUT DOWN PRESSURE ON THE SYSTEM BEFORE SERVICING THIS VALVE! IF THE VALVE IS CLOSED AND UNDER PRESSURE, DISCONNECTING THE CONTROL TUBE "U" (8970-005) WILL CAUSE RAPID OPENING OF THE VALVE! SYSTEM DAMAGE COULD OCCUR!

- ✓ Check the filter to assure it can pass adequate water flow. This can be deceptive because when you unhook the line from the filter some water can still flow. A partially blocked filter will reduce the valve closing response time. If little or no flow is present then clean the filter. If the valve is equipped with an external filter open the valve on the filter to clean the filter.

- ✓ Check the sleeve for damage. To do this, point the manual selector valve to the "OPEN" position. The total volume of water that should flow from the sleeve chamber through the "OPEN" port is the same as the volume required to fully open or close the valve. If more than this volume of water continues to flow, then the sleeve has been punctured and must be replaced.

WATER VOLUME REQUIRED TO FULLY OPEN OR CLOSE VALVE

8"	4 Quarts (3.8 L)
6"	2 Quarts (2.0 L)
4"	1 Pint (460 ml)
3"	1 Cup (230 ml)
2"	5 oz (145 ml)

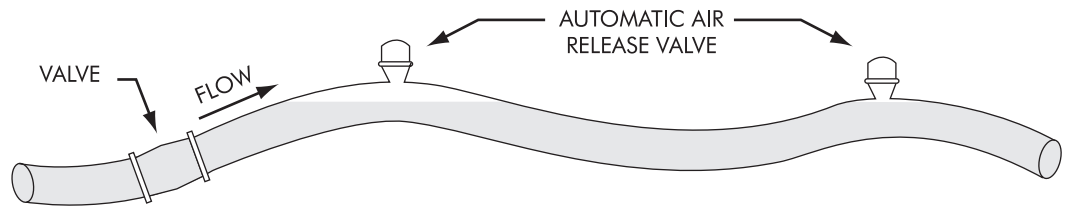
SYMPTOM: Valve will not open or has excessive pressure drop when the manual selector valve is in the "OPEN" position.

- CHECK ITEMS:**
- ✓ Check all tube lines and fittings for blockages and kinks. If there are no obstructions then check that upstream pressure is adequate. The 200 psi rated valve starts to open at 8 psi and is fully open at 30 psi. The 80 psi rated valve starts to open at 10 psi and is fully open at 18 psi. The 50 psi rated valve starts to open at 8 psi and is fully open at 10 psi.
 - ✓ Check the total volume of water in the sleeve chamber to verify that enough water volume (see table) flows between fully open and fully closed. This water volume can be measured as it flows from the "OPEN" port. If there is still a large pressure drop across the valve then debris could be caught blocking the flow on the upstream side of the cage. This type of obstruction will require removing the valve from the line and cleaning out the debris.

SYMPTOM: The downstream is unstable (*fluctuating high and then low several times a minute*) and water is discharged from the exhaust port during each low pressure cycle.

CHECK ITEMS:

- ✓ Check for trapped air in the pipe system down stream from the 800 Series valve. This problem is not easily detected. The installation of a Nelson ACV200 automatic air release valve will help rid the system of trapped air. It is recommended this type of air release valve be installed at high elevation points on the system where air could accumulate. Typical location for the accumulated air is shown.



SYMPTOM: The valve opens to let an excessive amount of water flow through the valve (more than the Rate-Of-Flow setting).

- ✓ Check the Rate-Of-Flow sensing paddle for damage, If damage is found then repair the paddle.

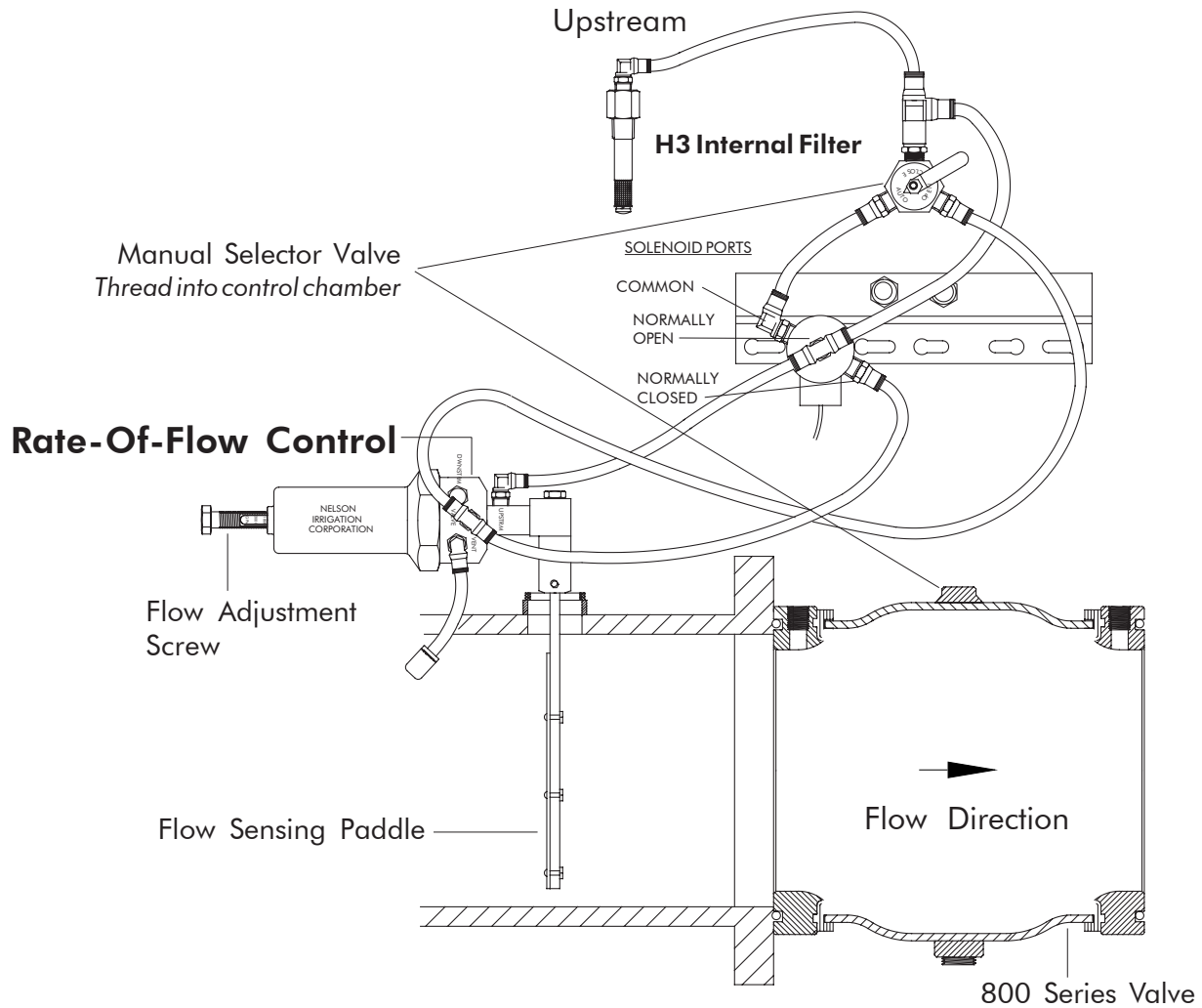
SYMPTOM: The valve will not open adequately to build the desired pressure on the downstream side of the valve.

CHECK ITEMS:

- ✓ Check that the Rate-Of-Flow adjustment screw setting is set slightly greater than the design flow rate (usually 120% of design). If the setting is lower than the design flow then the down stream pressure will not rise adequately to reach the pressure desired. One method to evaluate the control status is to feel the control tube connected to the "VALVE" port on the Rate-Of-Flow to determine if it is pressurized. If it is pressurized then the Rate-Of-Flow is in control of the valve. Change the adjustment setting of the pressure reducing control and/or the Rate-Of-Flow control to get the desired results.

- ✓ Check that the Rate-Of-Flow sensing paddle is free of debris which could cause it to incorrectly sense flow. If debris is found then clean the paddle.

Note: Be sure to drain the system to reduce the potential of winter freeze damage.



WARRANTY AND DISCLAIMER: Nelson 800 Series Control Valves and Accessories are warranted for one year from the date of original sale to be free of defective material and workmanship when used within the working specifications for which the products was designed and under normal use and service. The manufacturer assumes no responsibility for installation, removal or unauthorized repair of defective parts and the manufacturer will not be liable for any crop or other consequential damages resulting from any defects or breach of warranty. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES AND OF ALL OTHER OBLIGATIONS OR LIABILITIES OF MANUFACTURER. No agent, employee or representative of the manufacturer has authority to waive, alter or add to the provisions of this warranty nor to make any representations or warranty not contained herein.

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800 SERIES CONTROL VALVE — CONTROL FUNCTION and MAINTENANCE

PRESSURE REDUCING AND RATE-OF-FLOW

Valve Control Function:

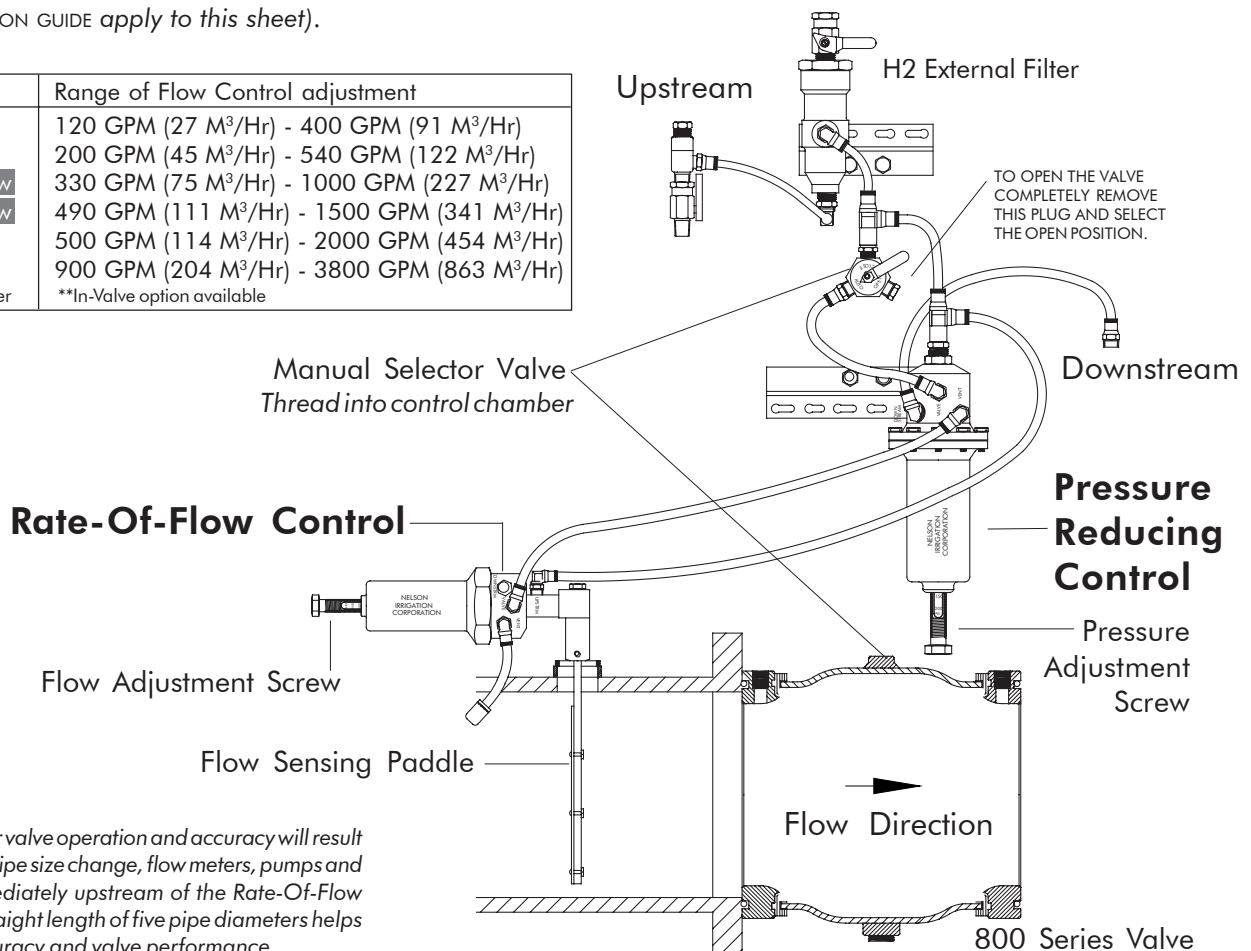
The **PRESSURE REDUCING RATE-OF-FLOW** model of the 800 Series Control Valve is a hydraulically operated sleeve type valve with a pressure reducing pressure control and a Rate-Of-Flow control. The flow through the valve is controlled by a rubber sleeve which is actuated by hydraulic pressure responding to the controls as listed here:

- When the selector is pointed to the "AUTO" position then the control functions will control the valve. Pointing the manual selector handle to "OPEN" will override the "AUTO" control. Pointing the manual selector valve to "CLOSE" will always close the valve.
- The Rate-Of-Flow control senses the flow by means of a paddle. The Rate-Of-Flow function depends on flow rate and not on pressure. The Rate-Of-Flow adjustment screw is normally set to 120% of design flow to limit the flow during system start up. After the system is filled and back pressure is available then the pressure reducing control takes over to control the downstream pressure. If the Rate-Of-Flow setting is less than design flow rate then the Rate-Of-Flow retains control to hold the flow rate down and keep the valve from opening fully. The pressure reducing control serves no function if the Rate-Of-Flow is set less than design flow rate.
- The pressure reducing pilot controls the valve to automatically reduce a higher inlet pressure to a constant lower downstream pressure. The pressure reducing control is adjustable to give the desired constant down stream pressure even with fluctuating upstream pressure.
- Pointing the Manual Selector handle mid way between "OPEN" and "CLOSE" will lock the valve sleeve in position.

The information on this sheet is for the **PRESSURE REDUCING RATE-OF-FLOW** control function with both internal and external filter options (items D2, D3, D4, D12, D13, D18, H2 & H3 control function on the VALVE SELECTION GUIDE apply to this sheet).

(See inside for TROUBLE SHOOTING information and back page for a schematic with an internal filter.)

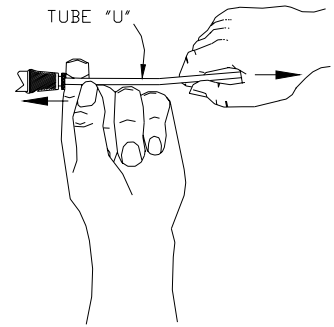
Size*	Range of Flow Control adjustment
3"	120 GPM (27 M ³ /Hr) - 400 GPM (91 M ³ /Hr)
4"	200 GPM (45 M ³ /Hr) - 540 GPM (122 M ³ /Hr)
6" low flow	330 GPM (75 M ³ /Hr) - 1000 GPM (227 M ³ /Hr)
8" low flow	490 GPM (111 M ³ /Hr) - 1500 GPM (341 M ³ /Hr)
6" **	500 GPM (114 M ³ /Hr) - 2000 GPM (454 M ³ /Hr)
8" **	900 GPM (204 M ³ /Hr) - 3800 GPM (863 M ³ /Hr)
*Pipe diameter	**In-Valve option available



NOTE: Better valve operation and accuracy will result by avoiding pipe size change, flow meters, pumps and elbows immediately upstream of the Rate-Of-Flow paddle. A straight length of five pipe diameters helps improve accuracy and valve performance.

SYMPTOM: Valve will not close when the manual selector valve is in the "CLOSE" position.

- CHECK ITEMS:**
- ✓ Check for leaks on all tube lines and fittings. If it is necessary to remove any control tube lines from the fittings then use an opposing force as shown here. Pull the tube while pressing in the opposite direction on the fitting ring.
 - ✓ Check that water can flow through the tube "U" which connects the upstream (high pressure) side of the main valve to the "CLOSE" port of the manual selector valve. Refer to the control function diagram. If little or no flow, find the reason for the blockage and clear it.



CAUTION! BE CAREFUL TO SHUT DOWN PRESSURE ON THE SYSTEM BEFORE SERVICING THIS VALVE! IF THE VALVE IS CLOSED AND UNDER PRESSURE, DISCONNECTING THE CONTROL TUBE "U" (8970-005) WILL CAUSE RAPID OPENING OF THE VALVE! SYSTEM DAMAGE COULD OCCUR!

- ✓ Check the filter to assure it can pass adequate water flow. This can be deceptive because when you unhook the line from the filter some water can still flow. A partially blocked filter will reduce the valve closing response time. If little or no flow is present then clean the filter. If the valve is equipped with an external filter open the valve on the filter to clean the filter.

- ✓ Check the sleeve for damage. To do this, point the manual selector valve to the "OPEN" position. The total volume of water that should flow from the sleeve chamber through the "OPEN" port is the same as the volume required to fully open or close the valve. If more than this volume of water continues to flow, then the sleeve has been punctured and must be replaced.

WATER VOLUME REQUIRED TO FULLY OPEN OR CLOSE VALVE

8"	4 Quarts (3.8 L)
6"	2 Quarts (2.0 L)
4"	1 Pint (460 ml)
3"	1 Cup (230 ml)
2"	5 oz (145 ml)

SYMPTOM: Valve will not open or has excessive pressure drop when the manual selector valve is in the "OPEN" position.

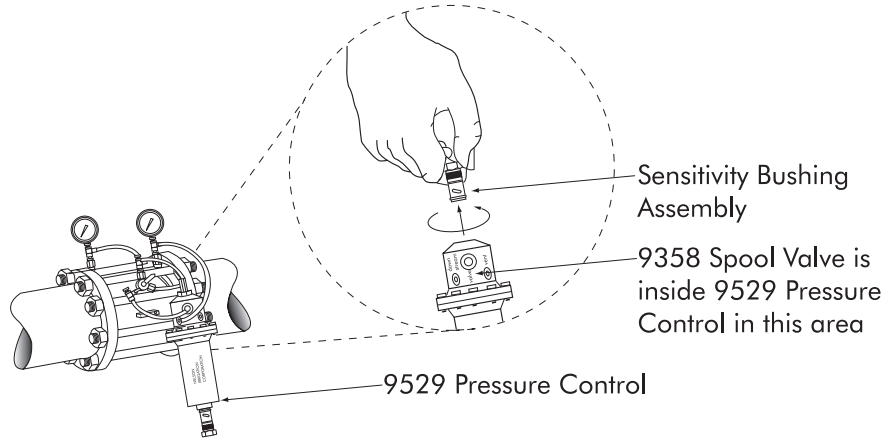
- CHECK ITEMS:**
- ✓ Check all tube lines and fittings for blockages and kinks. If there are no obstructions then check that upstream pressure is adequate. The 200 psi rated valve starts to open at 8 psi and is fully open at 30 psi. The 80 psi rated valve starts to open at 10 psi and is fully open at 18 psi. The 50 psi rated valve starts to open at 8 psi and is fully open at 10 psi.
 - ✓ Check the total volume of water in the sleeve chamber to verify that enough water volume (see table) flows between fully open and fully closed. This water volume can be measured as it flows from the "OPEN" port. If there is still a large pressure drop across the valve then debris could be caught blocking the flow on the upstream side of the cage. This type of obstruction will require removing the valve from the line and cleaning out the debris.

SYMPTOM: The valve opens to let an excessive amount of water flow through the valve (more than the Rate-Of-Flow setting).

- ✓ Check the Rate-Of-Flow sensing paddle for damage. If damage is found then repair the paddle.

SYMPTOM: 800 Series valve will not pressure regulate.

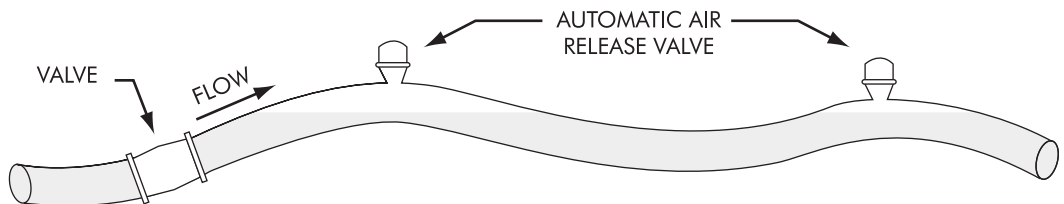
- CHECK ITEMS:**
- ✓ Check all tube lines and fittings are connected as shown on the diagram and that all isolation valves are in the open position.
 - ✓ Check that the regulating 9358 spool valve inside the 9529 pressure control is not stuck. This spool valve must be free to move in response to down stream pressure. Inspect the spool valve by unscrewing the sensitivity bushing assembly as shown in this drawing.



- ✓ Check the filter to assure it can pass adequate water flow. A partially blocked filter will reduce the valve regulating and closing response time. If little or no flow is present then clean the filter.

SYMPTOM: The regulated pressure is unstable (fluctuating high and then low several times a minute) and water is discharged from the exhaust port during each low pressure cycle.

- CHECK ITEMS:**
- ✓ Check for trapped air in the pipe system down stream from the 800 Series valve. This problem is not easily detected. The installation of a Nelson ACV200 automatic air release valve will help rid the system of trapped air. It is recommended this type of air release valve be installed at high elevation points on the system where air could accumulate. Typical location for the accumulated air is shown.

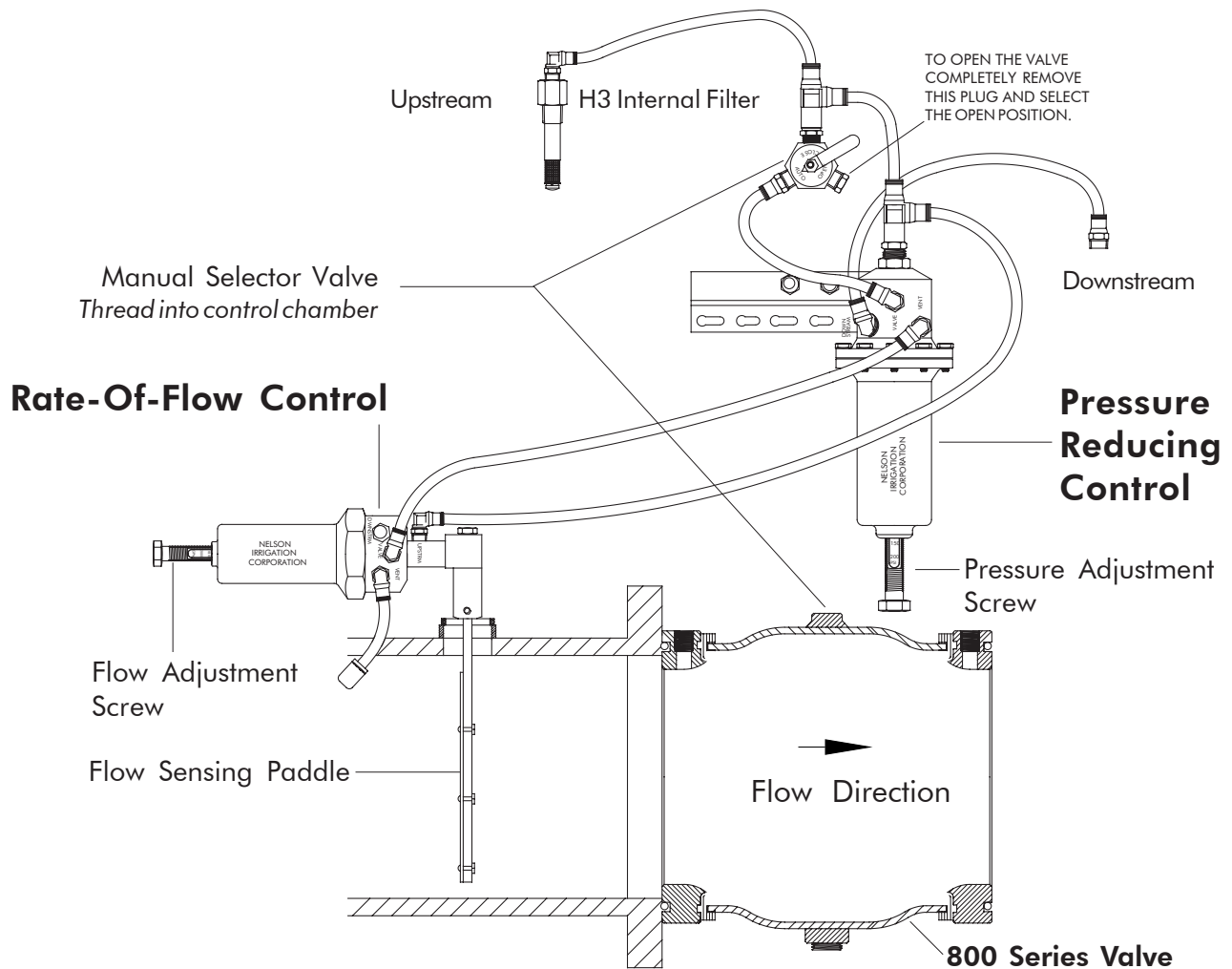


- ✓ Change the BLUE sensitivity bushing to RED or BLACK in order to change the valve response to the pressure swing cycle.

Note: Be sure to drain the system to reduce the potential of winter freeze damage.

SYMPTOM: The valve will not open adequately to build the desired pressure on the downstream side of the valve.

CHECK ITEMS: ✓ Check that the Rate-Of-Flow adjustment screw setting is set slightly greater than the design flow rate (usually 120% of design). If the setting is lower than the design flow then the down stream pressure will not rise adequately to reach the pressure desired. One method to evaluate the control status is to feel the control tube connected to the "VALVE" port on the Rate-Of-Flow to determine if it is pressurized. If it is pressurized then the Rate-Of-Flow is in control of the valve. Change the adjustment setting of the pressure reducing control and/or the Rate-Of-Flow control to get the desired results.



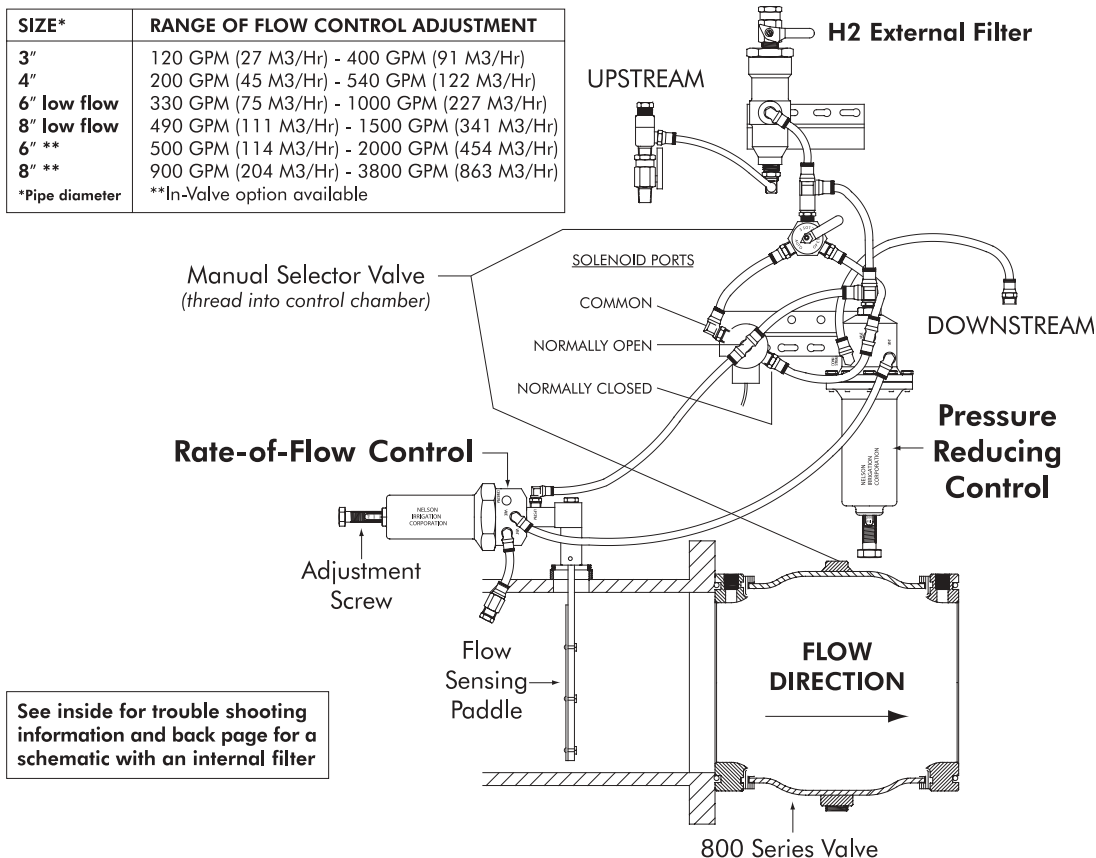
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VALVE CONTROL FUNCTION:

The **PRESSURE REDUCING ELECTRIC RATE-OF-FLOW** model of the 800 Series Control Valve is a hydraulically operated sleeve type valve with a pressure reducing pressure control, an electric solenoid for on/off and a Rate-Of-Flow control. The flow through the valve is controlled by a rubber sleeve which is actuated by hydraulic pressure responding to the controls as listed here:

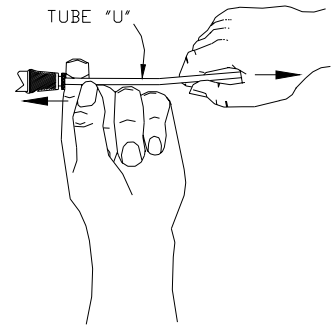
- When the selector is pointed to the **"AUTO"** position then the electric solenoid is used to automatically open or close the valve. The 3-way electric solenoid must be energized to open the valve and de-energized to close the valve. Pointing the manual selector handle to **"OPEN"** will override the **"AUTO"** control and bypass the electric solenoid functions. Pointing the manual selector valve to **"CLOSE"** will always close the valve.
- The Rate-Of-Flow control senses the flow by means of a paddle. The Rate-Of-Flow function depends on flow rate and not on pressure. The Rate-Of-Flow adjustment screw is normally set to 120% of design flow to limit the flow during system start up. After the system is filled and back pressure is available then the pressure reducing control takes over to control the downstream pressure. If the Rate-Of-Flow setting is less than design flow rate then the Rate-Of-Flow retains control to hold the flow rate down and keep the valve from fully opening. The pressure reducing control serves no function if the Rate-Of-Flow is set less than design flow rate.
- The pressure reducing pilot controls the valve to automatically reduce a higher inlet pressure to a constant lower downstream pressure. The pressure reducing control is adjustable to give the desired constant down stream pressure even with fluctuating upstream pressure.
- When the selector is pointed to **"OPEN"** the pressure reducing and Rate-Of-Flow controls still function but the solenoid has no effect.
- Pointing the Manual Selector handle mid way between **"OPEN"** and **"CLOSE"** will lock the valve sleeve in position.

The information on this sheet is for the **PRESSURE REDUCING ELECTRIC RATE-OF-FLOW** control function with both internal and external filter options (*items D2 through D4, D18, E20 - E70, H2 & H3 control function on the VALVE SELECTION GUIDE apply to this sheet*).



SYMPTOM: Valve will not close when the manual selector valve is in the "CLOSE" position.

- CHECK ITEMS:**
- ✓ Check for leaks on all tube lines and fittings. If it is necessary to remove any control tube lines from the fittings then use an opposing force as shown here. Pull the tube while pressing in the opposite direction on the fitting ring.
 - ✓ Check that water can flow through the tube "U" which connects the upstream (high pressure) side of the main valve to the "CLOSE" port of the manual selector valve. Refer to the control function diagram. If little or no flow, find the reason for the blockage and clear it.



CAUTION! BE CAREFUL TO SHUT DOWN PRESSURE ON THE SYSTEM BEFORE SERVICING THIS VALVE! IF THE VALVE IS CLOSED AND UNDER PRESSURE, DISCONNECTING THE CONTROL TUBE "U" (8970-005) WILL CAUSE RAPID OPENING OF THE VALVE! SYSTEM DAMAGE COULD OCCUR!

- ✓ Check the filter to assure it can pass adequate water flow. This can be deceptive because when you unhook the line from the filter some water can still flow. A partially blocked filter will reduce the valve closing response time. If little or no flow is present then clean the filter. If the valve is equipped with an external filter open the valve on the filter to clean the filter.

- ✓ Check the sleeve for damage. To do this, point the manual selector valve to the "OPEN" position. The total volume of water that should flow from the sleeve chamber through the "OPEN" port is the same as the volume required to fully open or close the valve. If more than this volume of water continues to flow, then the sleeve has been punctured and must be replaced.

WATER VOLUME REQUIRED TO FULLY OPEN OR CLOSE VALVE

8"	4 Quarts
6"	2 Quarts
4"	1 Pint
3"	1 Cup
2"	5 oz (145ml)

SYMPTOM: Valve will not open or has excessive pressure drop when the manual selector valve is in the "OPEN" position.

- CHECK ITEMS:**
- ✓ Check all tube lines and fittings for blockages and kinks. If there are no obstructions then check that upstream pressure is adequate. The 200 psi rated valve starts to open at 8 psi and is fully open at 30 psi. The 80 psi rated valve starts to open at 10 psi and is fully open at 18 psi. The 50 psi rated valve starts to open at 8 psi and is fully open at 10 psi.
 - ✓ Check the total volume of water in the sleeve chamber to verify that enough water volume (see table) flows between fully open and fully closed. This water volume can be measured as it flows from the "OPEN" port. If there is still a large pressure drop across the valve then debris could be caught blocking the flow on the upstream side of the cage. This type of obstruction will require removing the valve from the line and cleaning out the debris.

SYMPTOM: The valve opens to let excessive amount of water flow more than the Rate-of-Flow setting.

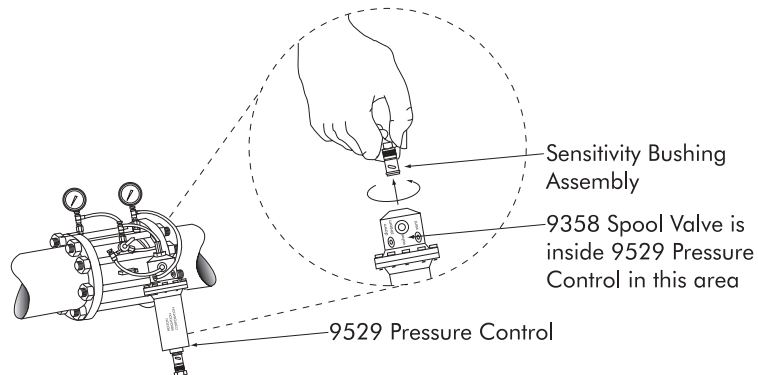
- CHECK ITEMS:**
- ✓ Check the Rate-of-Flow sensing paddle for damage. If damage is found then repair the paddle.

SYMPTOM: Electric solenoid will not open or close the valve when in "AUTO" control mode.

- CHECK ITEMS:**
- ✓ Check that the valve can be opened or closed manually. Verify that there is power to the solenoid. The solenoid must have power to open the valve.
 - ✓ Disassemble the solenoid to make sure the plunger is not stuck and check the coil for continuity. If the solenoid coil is burned out then replace the coil.

SYMPTOM: 800 Series valve will not pressure regulate.

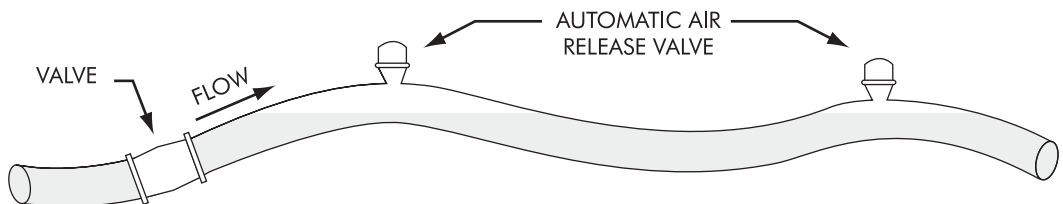
- CHECK ITEMS:**
- ✓ Check all tube lines and fittings are connected as shown on the diagram and that all isolation valves are in the open position.
 - ✓ Check that the regulating 9358 spool valve inside the 9529 pressure control is not stuck. This spool valve must be free to move in response to down stream pressure. Inspect the spool valve by unscrewing the sensitivity bushing assembly as shown in this drawing.



- ✓ Check the filter to assure it can pass adequate water flow. A partially blocked filter will reduce the valve regulating and closing response time. If little or no flow is present then clean the filter.

SYMPTOM: The regulated pressure is unstable (fluctuating high and then low several times a minute) and water is discharged from the exhaust port during each low pressure cycle.

- CHECK ITEMS:**
- ✓ Check for trapped air in the pipe system down stream from the 800 Series valve. This problem is not easily detected. The installation of a Nelson ACV200 automatic air release valve will help rid the system of trapped air. It is recommended this type of air release valve be installed at high elevation points on the system where air could accumulate. Typical location for the accumulated air is shown.



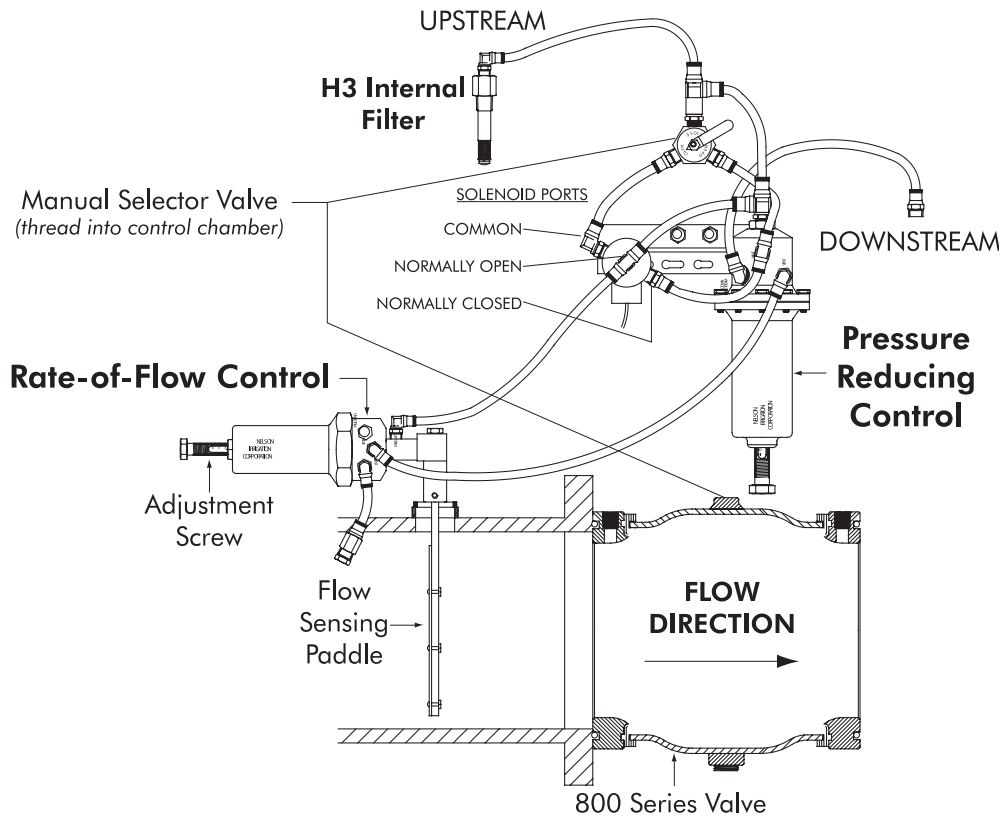
- ✓ Change the BLUE sensitivity bushing to RED or BLACK in order to change the valve response to the pressure swing cycles.

Note: Be sure to drain the system to reduce the potential of winter freeze damage.

SYMPTOM: The valve will not open adequately to build the desired pressure on the downstream side of the valve.

CHECK ITEMS: ✓ Check that the Rate-Of-Flow adjustment screw setting is set slightly greater than the design flow rate (usually 120% of design). If the setting is lower than the design flow then the down stream pressure will not rise adequately to reach the pressure desired. One method to evaluate the control status is to feel the control tube connected to the "VALVE" port on the Rate-Of-Flow to determine if it is pressurized. If it is pressurized then the Rate-Of-Flow is in control of the valve. Change the adjustment setting of the pressure reducing control and/or the Rate-Of-Flow control to get the desired results.

PRESSURE REDUCING ELECTRIC RATE-OF-FLOW SCHEMATIC SHOWING INTERNAL FILTER



WARRANTY AND DISCLAIMER: Nelson Irrigation Corporation 800 Series Control Valves are warranted for one year from date of original sale to be free of defective materials and workmanship when used within the working specifications for which the product was designed and under normal use and service. The manufacturer assumes no responsibility for installation, removal or unauthorized repair. The manufacturer's liability under this warranty is limited solely to replacement or repair of defective parts and the manufacturer will not be liable for any crop or other consequential damages resulting from any defects or breach of warranty. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES AND OF ALL OTHER OBLIGATIONS OR LIABILITIES OF MANUFACTURER. No agent, employee or representative of the manufacturer has authority to waive, alter or add to the provisions of this warranty, nor to make any representations or warranty not contained herein.

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NELSON

800 SERIES CONTROL VALVE — CONTROL FUNCTION and MAINTENANCE

PRESSURE SUSTAINING/RELIEF & RATE-OF-FLOW

Valve Control Function:

The **PRESSURE SUSTAINING/RELIEF RATE-OF-FLOW** model of the 800 Series Control Valve is a hydraulically operated sleeve type valve with a pressure sustaining/relief pressure control and a Rate-Of-Flow control. The flow through the valve is controlled by a rubber sleeve which is actuated by hydraulic pressure responding to the controls as listed here:

- When the selector is pointed to the "AUTO" position then the control functions will control the valve. Pointing the manual selector handle to "OPEN" will override the "AUTO" control. Pointing the manual selector valve to "CLOSE" will always close the valve.
- The pressure sustaining/relief pilot controls the valve to automatically open in the event the upstream pressure goes higher than the control set pressure. Both the sustaining/relief and Rate-Of-Flow controls work together and the valve responds depending upon the adjustment screw setting of both controls and also depending upon the system available flow. Use this table to get the desired results:

Pressure upstream	Water available to Rate-Of-Flow	Valve Status
If lower than pilot set point.	None	Closed.
If higher than pilot set point.	Less than flow setting.	Open - upstream pressure will be maintained.
If higher than pilot set point.	More than flow setting.	Partially open - upstream pressure will go higher than set.*

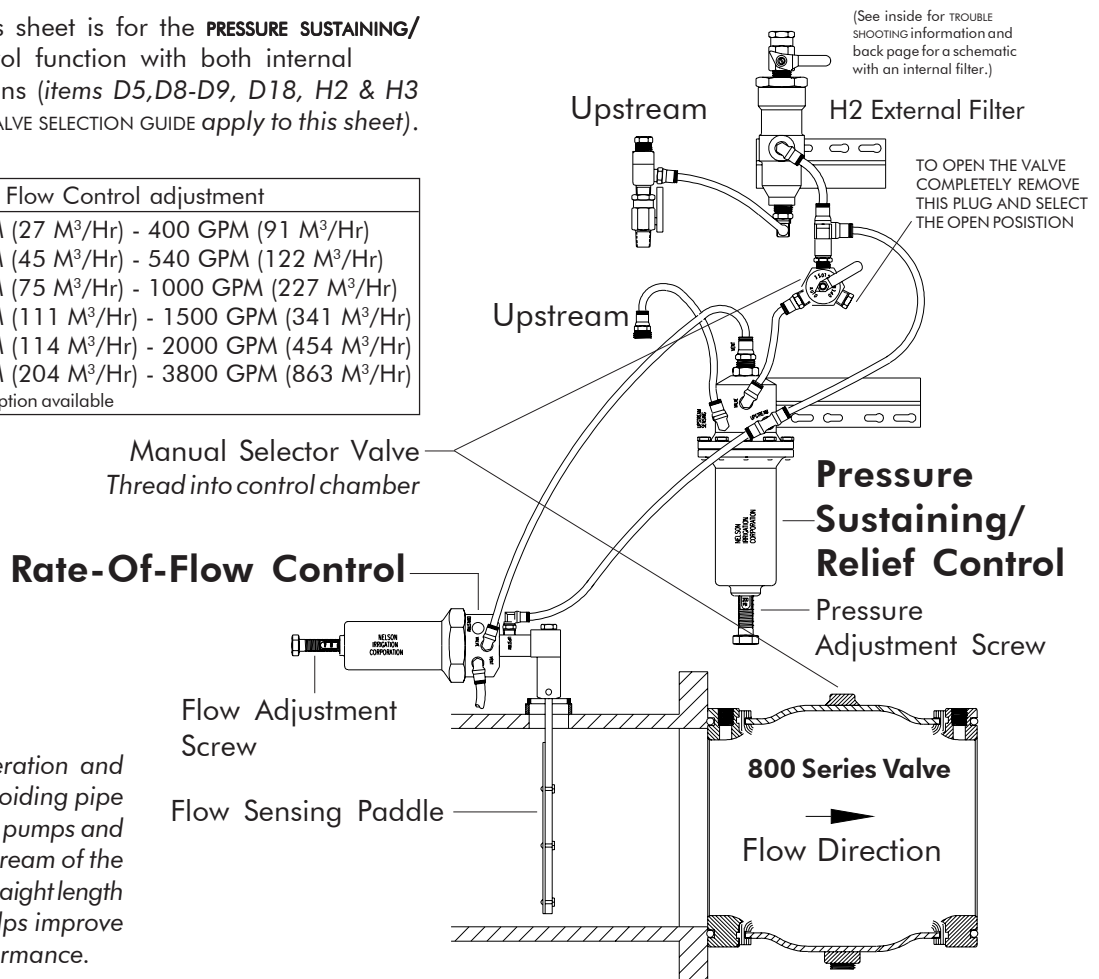
*Caution on this condition if the system pressure is capable of rising to a dangerous point and causing damage.

- The Rate-Of-Flow control senses the flow by means of a paddle. The Rate-Of-Flow function depends on flow rate and not on pressure. The Rate-Of-Flow adjustment screw is normally set to the desired flow to limit the flow through the valve. The Rate-Of-Flow serves no function if the pressure on the upstream side of the valve is lower than the set point of the pressure sustaining/relief pilot.
- Pointing the Manual Selector handle mid way between "OPEN" and "CLOSE" will lock the valve sleeve in position.

The information on this sheet is for the **PRESSURE SUSTAINING/RELIEF RATE-OF-FLOW** control function with both internal and external filter options (*items D5, D8-D9, D18, H2 & H3 control function on the VALVE SELECTION GUIDE apply to this sheet*).

Size*	Range of Flow Control adjustment
3"	120 GPM (27 M ³ /Hr) - 400 GPM (91 M ³ /Hr)
4"	200 GPM (45 M ³ /Hr) - 540 GPM (122 M ³ /Hr)
6" low flow	330 GPM (75 M ³ /Hr) - 1000 GPM (227 M ³ /Hr)
8" low flow	490 GPM (111 M ³ /Hr) - 1500 GPM (341 M ³ /Hr)
6" **	500 GPM (114 M ³ /Hr) - 2000 GPM (454 M ³ /Hr)
8" **	900 GPM (204 M ³ /Hr) - 3800 GPM (863 M ³ /Hr)

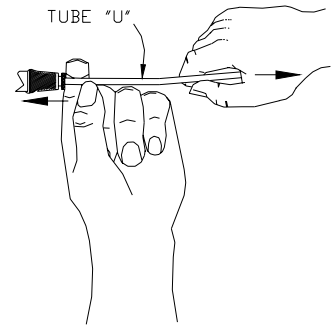
*Pipe diameter **In-Valve option available



NOTE: Better valve operation and accuracy will result by avoiding pipe size change, flow meters, pumps and elbows immediately upstream of the Rate-Of-Flow paddle. A straight length of five pipe diameters helps improve accuracy and valve performance.

SYMPTOM: Valve will not close when the manual selector valve is in the "CLOSE" position.

- CHECK ITEMS:**
- ✓ Check for leaks on all tube lines and fittings. If it is necessary to remove any control tube lines from the fittings then use an opposing force as shown here. Pull the tube while pressing in the opposite direction on the fitting ring.
 - ✓ Check that water can flow through the tube "U" which connects the upstream (high pressure) side of the main valve to the "CLOSE" port of the manual selector valve. Refer to the control function diagram. If little or no flow, find the reason for the blockage and clear it.



CAUTION! BE CAREFUL TO SHUT DOWN PRESSURE ON THE SYSTEM BEFORE SERVICING THIS VALVE! IF THE VALVE IS CLOSED AND UNDER PRESSURE, DISCONNECTING THE CONTROL TUBE "U" (8970-005) WILL CAUSE RAPID OPENING OF THE VALVE! SYSTEM DAMAGE COULD OCCUR!

- ✓ Check the filter to assure it can pass adequate water flow. This can be deceptive because when you unhook the line from the filter some water can still flow. A partially blocked filter will reduce the valve closing response time. If little or no flow is present then clean the filter. If the valve is equipped with an external filter open the valve on the filter to clean the filter.

- ✓ Check the sleeve for damage. To do this, point the manual selector valve to the "OPEN" position. The total volume of water that should flow from the sleeve chamber through the "OPEN" port is the same as the volume required to fully open or close the valve. If more than this volume of water continues to flow, then the sleeve has been punctured and must be replaced.

WATER VOLUME REQUIRED TO FULLY OPEN OR CLOSE VALVE

8"	4 Quarts (3.8 L)
6"	2 Quarts (2.0 L)
4"	1 Pint (460 ml)
3"	1 Cup (230 ml)
2"	5 oz (145 ml)

SYMPTOM: Valve will not open or has excessive pressure drop when the manual selector valve is in the "OPEN" position.

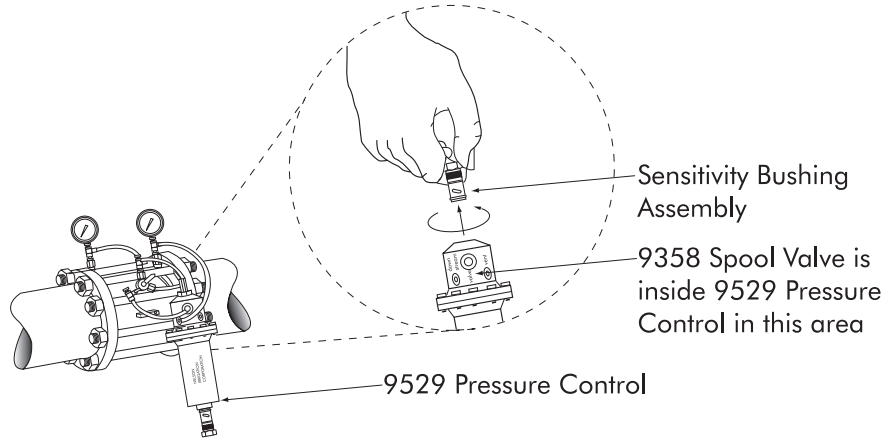
- CHECK ITEMS:**
- ✓ Check all tube lines and fittings for blockages and kinks. If there are no obstructions then check that upstream pressure is adequate. The 200 psi rated valve starts to open at 8 psi and is fully open at 30 psi. The 80 psi rated valve starts to open at 10 psi and is fully open at 18 psi. The 50 psi rated valve starts to open at 8 psi and is fully open at 10 psi.
 - ✓ Check the total volume of water in the sleeve chamber to verify that enough water volume (see table) flows between fully open and fully closed. This water volume can be measured as it flows from the "OPEN" port. If there is still a large pressure drop across the valve then debris could be caught blocking the flow on the upstream side of the cage. This type of obstruction will require removing the valve from the line and cleaning out the debris.

SYMPTOM: The valve opens to let an excessive amount of water flow through the valve (more than the Rate-Of-Flow setting).

- ✓ Check the Rate-Of-Flow sensing paddle for damage. If damage is found then repair the paddle.

SYMPTOM: 800 Series valve will not pressure sustain/relief.

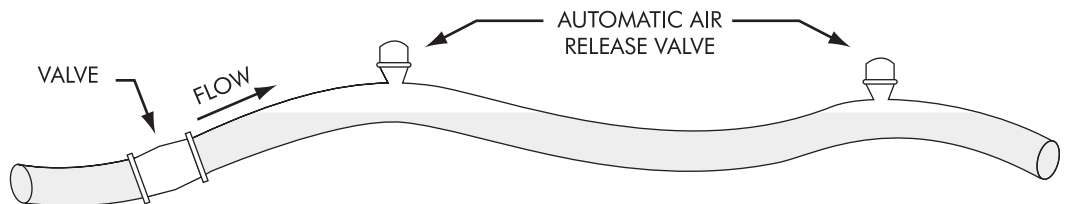
- CHECK ITEMS:**
- ✓ Check all tube lines and fittings are connected as shown on the diagram and that all isolation valves are in the open position.
 - ✓ Check that the # 9358 spool valve inside the 9529 pressure control is not stuck. This spool valve must be free to move in response to upstream pressure. Inspect the spool valve by unscrewing the sensitivity bushing assembly as shown in this drawing.



- ✓ Check the filter to assure it can pass adequate water flow. A partially blocked filter will reduce the valve sustaining/relief and closing response time. If little or no flow is present then clean the filter.

SYMPTOM: The sustaining pressure is unstable (*fluctuating high and then low several times a minute*) and water is discharged from the exhaust port during each low pressure cycle.

- CHECK ITEMS:**
- ✓ Check for trapped air in the pipe system upstream from the 800 Series valve. This problem is not easily detected. The installation of a Nelson ACV200 automatic air release valve will help rid the system of trapped air. It is recommended this type of air release valve be installed at high elevation points on the system where air could accumulate. Typical location for the accumulated air is shown.

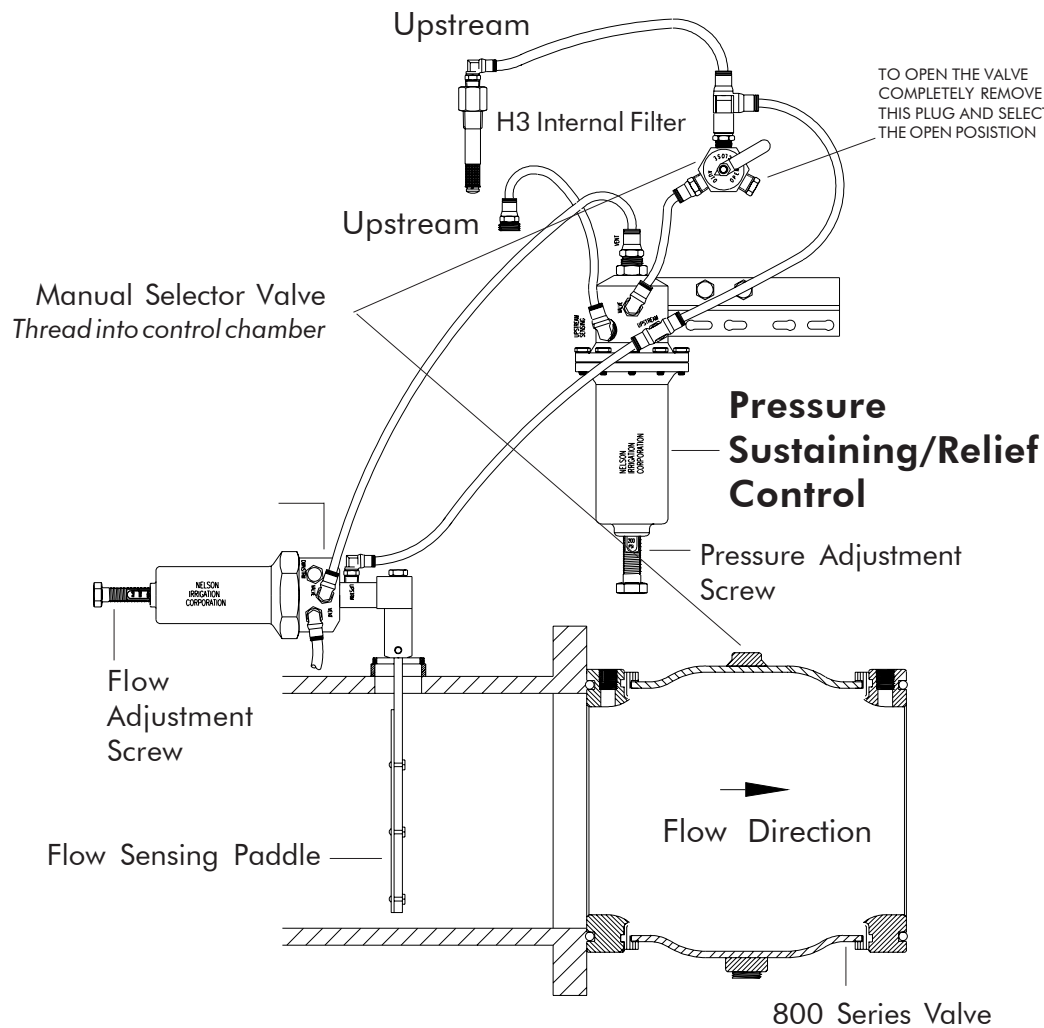


- ✓ Change the BLUE sensitivity bushing to RED or BLACK in order to change the valve response to the pressure swing cycle.

Note: Be sure to drain the system to reduce the potential of winter freeze damage.

SYMPTOM: The valve will not open adequately and then the upstream pressure goes higher than the sustaining/relief pressure control setting.

CHECK ITEMS: ✓ Check that the Rate-Of-Flow adjustment screw setting is set for the correct flow. If the setting is lower than the available flow then the valve will be held partially closed and upstream pressure will rise. One method to evaluate the control status is to feel the control tube connected to the "VALVE" port on the Rate-Of-Flow to determine if it is pressurized. If it is pressurized then the Rate-Of-Flow is in control of the valve. Change the adjustment setting on the Rate-Of-Flow or increase the amount the valve is opened. The pressure sustaining/relief will then maintain the upstream pressure.



WARRANTY AND DISCLAIMER: Nelson 800 Series Control Valves and Accessories are warranted for one year from the date of original sale to be free of defective material and workmanship when used within the working specifications for which the products was designed and under normal use and service. The manufacturer assumes no responsibility for installation, removal or unauthorized repair of defective parts and the manufacturer will not be liable for any crop or other consequential damages resulting from any defects or breach of warranty. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES AND OF ALL OTHER OBLIGATIONS OR LIABILITIES OF MANUFACTURER. No agent, employee or representative of the manufacturer has authority to waive, alter or add to the provisions of this warranty nor to make any representations or warranty not contained herein.