V4295A,S; V8295A,S
Solenoid Gas Valves

APPLICATION

The electrically operated V4295A, S and V8295A, S Solenoid Gas Valves control the flow of natural and LP (liquefied petroleum) gases.

These valves are used on atmospheric boilers, commercial water heaters, roof-top make-up air burners, power burners and boilers.

FEATURES

• V4295A,S are used with 120 Vac controllers; V8295A,S are used with 24 Vac controllers.

• Models available in Normally Closed and Normally Open configurations.

• Normally Closed models, for safety shut-off applications, consist of a direct on/off operator for opening and closing of the valve.

• Normally Open models, for vent (double block and bleed) valve applications, consist of a direct electric on/off operator for closing and opening of the valve.

• Models are suitable for the control of gaseous fluids in gas consuming appliances according to international standards.

• Models have 1/4 inch NPT inlet and outlet pressure taps.

• Models have inlet screen to protect the valve from the entry of dirt.

SPECIFICATIONS

Models
V4295A Normally Closed (N.C.) Safety shut-off Valve, 120V
V4295S Normally Open (N.O.) Vent Valve, 120V
V8295A Normally Closed (N.C.) Safety shut-off Valve, 24V
V8295S Normally Open (N.O.) Vent Valve, 24V

Type of gas
Air, Natural, Manufactured, Mixed and LP gas.

Valve capacities
Refer to Figures 1 and 2

Valve pattern
Straight through, non-offset

Body Material
Die cast aluminum

Electrical terminations
Screw terminal connections

Valve opening time
Less than 1 second
**V4295A, S; V8295A, S SOLENOID GAS VALVES**

**Valve closing time**
Less than 1 second

**Maximum operating pressure**
- 3/8 in. through 3 in. pipe sizes: 2 psi
- 3/8 in. through 2 in. pipe sizes: 5 psi

**Current draw**

<table>
<thead>
<tr>
<th>Pipe size (inch)</th>
<th>V4295A</th>
<th>V8295A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 psi</td>
<td>5 psi</td>
</tr>
<tr>
<td>3/8 and 1/2</td>
<td>0.160 A</td>
<td>0.160 A</td>
</tr>
<tr>
<td>3/4 and 1</td>
<td>0.160 A</td>
<td>0.200 A</td>
</tr>
<tr>
<td>1-1/4</td>
<td>0.340 A</td>
<td>0.550 A</td>
</tr>
<tr>
<td>1-1/2</td>
<td>0.300 A</td>
<td>0.550 A</td>
</tr>
<tr>
<td>2</td>
<td>0.525 A</td>
<td>0.540 A</td>
</tr>
<tr>
<td>2-1/2</td>
<td>0.575 A</td>
<td>n/a</td>
</tr>
<tr>
<td>3</td>
<td>0.675 A</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pipe size (inch)</th>
<th>V4295A</th>
<th>V8295A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>120 Vac</td>
<td>24 Vac</td>
</tr>
<tr>
<td>2 psi</td>
<td>0.160 A</td>
<td>0.80 A</td>
</tr>
<tr>
<td>1-1/4</td>
<td>0.340 A</td>
<td>2.40 A</td>
</tr>
</tbody>
</table>

Table 1. Models Available.

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage/Frequency</th>
<th>Maximum Pressure</th>
<th>Pipe size (inch)</th>
<th>Thread type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V4295A (N.C.)</td>
<td>110/120 Vac, 50/60 Hz</td>
<td>2.0</td>
<td>3/8, 1/2, 3/4, 1, 1-1/4, 1-1/2, 2</td>
<td>NPT</td>
</tr>
<tr>
<td>V4295A (N.C.)</td>
<td>110/120 Vac, 50/60 Hz</td>
<td>5.0</td>
<td>3/8, 1/2, 3/4, 1, 1-1/4, 1-1/2, 2</td>
<td>NPT</td>
</tr>
<tr>
<td>V4295S (N.O.)</td>
<td>110/120 Vac, 50/60 Hz</td>
<td>2.0</td>
<td>3/4, 1, 1-1/4</td>
<td>NPT</td>
</tr>
<tr>
<td>V8295A (N.C.)</td>
<td>24 Vac, 50/60 Hz</td>
<td>2.0</td>
<td>3/8, 1/2, 3/4, 1, 1-1/4, 1-1/2, 2</td>
<td>NPT</td>
</tr>
<tr>
<td>V8295S (N.O.)</td>
<td>24 Vac, 50/60 Hz</td>
<td>2.0</td>
<td>3/4, 1, 1-1/4</td>
<td>NPT</td>
</tr>
</tbody>
</table>

Table 2. Capacity in CFH at Pressure Drop of 1-Inch Water Column sp. gr. = 0.64 for V4295A, V8295A (N.C.).

<table>
<thead>
<tr>
<th></th>
<th>3/8 in.</th>
<th>1/2 in.</th>
<th>3/4 in.</th>
<th>1 in.</th>
<th>1-1/4 in.</th>
<th>1-1/2 in.</th>
<th>2 in.</th>
<th>2-1/2 in.*</th>
<th>3 in.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 psi</td>
<td>230</td>
<td>250</td>
<td>645</td>
<td>790</td>
<td>1,450</td>
<td>2,190</td>
<td>3,465</td>
<td>5,070</td>
<td>6,100</td>
</tr>
<tr>
<td>5 psi</td>
<td>210</td>
<td>290</td>
<td>610</td>
<td>825</td>
<td>1,950</td>
<td>2,270</td>
<td>3,740</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

* V4295A only

Table 3. Capacity in CFH at Pressure Drop of 1-Inch Water Column sp. gr. = 0.64 for V4295S, V8295S (N.O.).

<table>
<thead>
<tr>
<th></th>
<th>3/4 in.</th>
<th>1 in.</th>
<th>1-1/4 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350</td>
<td>420</td>
<td>1,100</td>
</tr>
</tbody>
</table>
Fig. 1. Capacity curves for V4295A and V8295A, 2 psi versions.

Fig. 2. Capacity curves for V4295A, 5 psi versions.
V4295A,S; V8295A,S SOLENOID GAS VALVES

Ambient temperature rating
-40°F to 145°F (-40°C to 63°C)

Maximum fluid temperature rating
-40°F to 145°F (-40°C to 63°C)

Mounting position
Vertical to 90 degrees from vertical, refer to Fig. 5.

Dimensions and weight
Refer to Figures 3 and 4.

Approvals
Underwriters Laboratories, Inc., File Number MH 18476,
Guide number YLOZ
AGA and CGA, File Number C2030014
Complies with standard ANSI Z21.21-CA6.5
Automatic Valves for gas appliances and automatic safety shut-off gas valves (revised edition of the former ANSI Z21.21, CAN/CGA-6.5-M89, CAN/CGA-3.9-M87)
Factory Mutual:
V4/8295A: 5 psi rated, 3/8 in. to 2 in.
V4/8295S: All
CSD-1 Acceptable.

Fig. 3. Dimensions (normally closed).

Fig. 4. Dimensions (normally open).

<p>| Table 4. Normally Closed (See Fig. 3). |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|</p>
<table>
<thead>
<tr>
<th>Pipe size</th>
<th>A (inch)</th>
<th>B (inch)</th>
<th>C (inch)</th>
<th>D (inch)</th>
<th>E (inch) (both sides)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 in. NPT</td>
<td>2-7/8</td>
<td>4-7/16</td>
<td>4-7/16</td>
<td>2-3/16</td>
<td>2-3/16</td>
<td>3-3/4</td>
</tr>
<tr>
<td>1/2 in. NPT</td>
<td>2-7/8</td>
<td>4-7/16</td>
<td>4-7/16</td>
<td>2-3/16</td>
<td>2-3/16</td>
<td>3-3/4</td>
</tr>
<tr>
<td>3/4 in. NPT</td>
<td>3-7/16</td>
<td>5-1/4</td>
<td>5-13/16</td>
<td>2-3/16</td>
<td>2-1/2</td>
<td>3-3/4</td>
</tr>
<tr>
<td>1 in. NPT</td>
<td>3-15/16</td>
<td>5-1/4</td>
<td>6-5/16</td>
<td>2-3/16</td>
<td>2-1/2</td>
<td>3-3/4</td>
</tr>
<tr>
<td>1-1/4 in. NPT</td>
<td>5-15/16</td>
<td>8</td>
<td>8-9/16</td>
<td>2-1/2</td>
<td>3-5/16</td>
<td>4-1/16</td>
</tr>
<tr>
<td>1-1/2 in. NPT</td>
<td>5-15/16</td>
<td>8-3/8</td>
<td>8-9/16</td>
<td>3-3/8</td>
<td>3-5/16</td>
<td>4-15/16</td>
</tr>
<tr>
<td>2 in. NPT</td>
<td>6-11/16</td>
<td>8-3/8</td>
<td>9-3/16</td>
<td>3-3/8</td>
<td>3-3/4</td>
<td>4-15/16</td>
</tr>
<tr>
<td>2-1/2 in. NPT</td>
<td>9-1/2</td>
<td>12-3/4</td>
<td>—</td>
<td>4-9/16</td>
<td>—</td>
<td>6-1/8</td>
</tr>
<tr>
<td>3 in. NPT</td>
<td>9-1/2</td>
<td>12-3/4</td>
<td>—</td>
<td>4-9/16</td>
<td>—</td>
<td>6-1/8</td>
</tr>
</tbody>
</table>

<p>| Table 5. Normally Open (See Fig. 4). |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|</p>
<table>
<thead>
<tr>
<th>Pipe size</th>
<th>A (inch)</th>
<th>B (inch)</th>
<th>C (inch)</th>
<th>D (inch)</th>
<th>E (inch) (both sides)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4 in. NPT</td>
<td>3-7/16</td>
<td>5-1/2</td>
<td>2-3/16</td>
<td>3-3/4</td>
<td>2-3/4</td>
<td>4.0</td>
</tr>
<tr>
<td>1 in. NPT</td>
<td>3-15/16</td>
<td>5-1/2</td>
<td>2-3/16</td>
<td>3-3/4</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>1-1/4 in. NPT</td>
<td>5-15/16</td>
<td>8-3/4</td>
<td>2-1/2</td>
<td>4-1/16</td>
<td>4-3/8</td>
<td>12.8</td>
</tr>
</tbody>
</table>
INSTALLATION

When installing this product...
1. Read this instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the rating given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced, flame safeguard control technician.
4. After installation is complete, check out product operation as provided in these instructions.

CAUTION
1. Turn off gas supply before starting installation.
2. Disconnect power supply before beginning installation to prevent electrical shock and equipment damage.
3. Do not remove seal over valve inlet or outlet until ready to connect piping.

Prepare piping and install valve (Fig. 5)
1. Use new, properly reamed pipe which is free from chips.
2. Do not thread pipe too far.
3. Apply good quality pipe dope resistant to the action of LP gas, putting a moderate amount on the male threads only. If pipe dope lodges on the valve seat, it will prevent proper closure.
4. Install valve in a horizontal pipe line, (refer to Fig. 5 for mounting position) with the gas flow matching the direction indicated by the arrow on the casting.
5. Apply a parallel jaw wrench only to the wrench flats of the valve body, next to the pipe being inserted. A wrench applied to the valve body itself or to the end farthest from the pipe being inserted may distort the casting, resulting in malfunction on the gas valve.
6. The gas flow must be in the same direction as the arrow on the body of the valve.

WARNING
If the flow is not in the same direction of arrow, valve may not shut off.

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5. Apply a parallel jaw wrench only to the wrench flats of the valve body, next to the pipe being inserted. A wrench applied to the valve body itself or to the end farthest from the pipe being inserted may distort the casting, resulting in malfunction on the gas valve.
6. The gas flow must be in the same direction as the arrow on the body of the valve.

WIRING
1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
2. Installation and wiring must be in conformance with National Electrical Code ANSI/NFPA 70, local codes and regulations.
3. For normal installations, use moisture-resistance No. 14 wire suitable for at least 167°F (75°C) if using a Flame Safeguard Primary Control, or 194°F (90°C) if using a Flame Safeguard Programming Control.
4. For high temperature installations, use moisture resistant No. 14 wire selected for a temperature rating above the maximum operating temperature.
5. Check the power supply circuit. The voltage and frequency must match those of the valve.
6. Refer to Fig. 6 for typical V4295A,S field wiring with RM7800 (typical) Primary Safety Control. Refer to Fig. 7 for typical V8295A,S field wiring with Primary Safety Control. Follow the burner manufacturer's wiring diagram, when provided. Refer to burner controller (primary safety control) wiring diagram for specific wiring terminal designations.
7. Make wiring connections at the electrical terminations provided in the wiring compartment of the valve.
CHECKOUT AND TROUBLESHOOTING

⚠️ WARNING
Do not allow fuel to accumulate in the combustion chamber. If fuel is allowed to enter the chamber for longer than a few seconds without igniting, an explosive mixture could result.

⚠️ CAUTION
1. Do not put the system into service until you have satisfactorily completed all applicable tests described in the Checkout section of the instructions for the flame safeguard control and any other test required by the burner manufacturer.
2. Close all manual fuel shut off valves as soon as trouble occurs.

CHECKOUT

1. Check the performance of the valve by measuring the pressures at the inlet and outlet pressure taps. The pressure reading at the outlet tap may be slightly higher than a downstream measurement due to dynamic gas flow effects. The measurement at the outlet tap is for reference only.
2. Shut off gas supply to valve and make sure valve is closed when setting up pressure measuring equipment.
3. Set thermostat or controller to energize the valve and check final outlet pressure.
4. Start the system and observe its operation through at least one complete cycle to ensure the valve functions as described in the section “Operation” on page 6.

Valve Leak Test (Fig. 8)

This is a test for checking the closure tightness of the gas safety shutoff valve. It should be performed only by trained, experienced flame safeguard control technicians during the initial startup of the burner system or whenever the valve is replaced (see Service Information section). It is recommended that this test also be included in the scheduled inspection and maintenance procedures.

1. De-energize the control system to make sure no power goes to the valve (C, Fig. 8).
2. Close the upstream manual gas cock (A).
3. Make sure the manual test petcock (F) is closed in the leak test tap assembly (D).
4. Remove the leak test tap plug and connect the test apparatus to the leak test tap (D).
5. Close the downstream manual gas cock (E).
6. Open the upstream manual gas cock (A).
7. Run the V4/8295A Valve to is open position (through the safety system); then immediately de-energize the system to close the V4/8295A Valve.
8. Immerse a 1/4 in. (6 mm) tube vertically 1/2 in. (13 mm) into a jar of water.
9. Slowly open the manual test petcock (F).
10. When the rate of bubbles coming through the water stabilizes, count the number of bubbles appearing during a ten-second period. Each bubble appearing represents a flow rate of 0.001 cfh.

**IMPORTANT**

To meet U.S. requirements, make sure leakage does not exceed the rates in Table 6.

Table 6. Valve Allowable Leakage Rate.

<table>
<thead>
<tr>
<th>V4295A/V8295A Pipe Size (in)</th>
<th>Medium</th>
<th>Allowable Leakage SCCH*</th>
<th>Maximum Number of Bubbles in 10 Seconds</th>
<th>Minimum Number of Seconds for 10 Bubbles</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 &amp; 1/2</td>
<td>0.64 gas</td>
<td>294</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>1.57 LP</td>
<td>188</td>
<td>4</td>
<td>20.4</td>
</tr>
<tr>
<td>3/4 &amp; 1</td>
<td>0.64 gas</td>
<td>301</td>
<td>7</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>1.57 LP</td>
<td>192</td>
<td>5</td>
<td>19.9</td>
</tr>
<tr>
<td>1-1/4 &amp; 1-1/2</td>
<td>0.64 gas</td>
<td>532</td>
<td>13</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>1.57 LP</td>
<td>341</td>
<td>8</td>
<td>11.2</td>
</tr>
<tr>
<td>2</td>
<td>0.64 gas</td>
<td>578</td>
<td>15</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td>1.57 LP</td>
<td>370</td>
<td>9</td>
<td>10.3</td>
</tr>
<tr>
<td>1-1/2</td>
<td>0.64 gas</td>
<td>752</td>
<td>19</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>1.57 LP</td>
<td>481</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>0.64 gas</td>
<td>925</td>
<td>24</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>1.57 LP</td>
<td>592</td>
<td>15</td>
<td>6.5</td>
</tr>
</tbody>
</table>

* Based on air at standard conditions, test pressures provided by ANSI Z21.21.
Section 2.42 and a maximum of 235 cc/h per inch of seal-off diameter (not pipe size).

**After the Test**

2. Close the manual test petcock (F), remove the test apparatus, and close the leak test tap (D).
3. Make sure the downstream manual gas cock (E) is closed.
4. Open the upstream manual gas cock (A) and energize the V4/8295A Valve through the safety system.
5. Test with rich soap and water solution to make sure there is no leak at the leak test tap (D) or any pipe adapter/valve mating surfaces.
7. Open the downstream manual gas cock (E).
8. Restore the system to normal operation. If two safety shutoff valves are used, check each valve separately for closure tightness.

**TROUBLESHOOTING**

⚠️ **CAUTION**

Use utmost care during troubleshooting. Line voltage is present at the actuator for V4295A,S and present in controller circuits. Low voltage (24 Vac) is present at the actuator for V8295A,S and present in controller circuits.

**IMPORTANT**

Do not assume that the valve must be replaced until all other sources of trouble have been eliminated.
1. If the valve will not open when the thermostat or controller is calling for heat:
   a. Check that there is voltage at the valve actuator lead wires or terminal block.

   CAUTION
   Line voltage (120 Vac) should be present when the primary safety control energizes the V4295A,S valve actuator. 24 Vac should be present when the primary safety control energizes the V8295A,S valve actuator.

   b. If there is no voltage at the actuator, first ensure line voltage power is connected to the master switch, the master switch is closed and overload protection (circuit breaker, fuse or similar device) has not opened the power line.

   c. If there is still no voltage at the actuator, make sure all appropriate contacts in the thermostat (or controller), limit(s) and flame safeguard control are closed. If one or more are open, determine the cause(s) and correct condition(s) before proceeding.

   d. If there is proper voltage at the actuator but the valve still does not open, first check that the gas pressure is normal.

   e. If the valve still does not open, replace valve.

2. If the valve will not close when one or more of the appropriate contacts in the thermostat (or controller), limit(s) or flame safeguard control is open:
   a. Make sure that the gas flow is in the direction of the arrow on the valve body.
   b. Make sure the valve actuator is wired in the correct circuit. Open the master switch to remove power from the actuator. If the valve closes now, the actuator may not be wired properly.
   c. Look for a short in the electrical circuit.

SERVICE INFORMATION

   CAUTION
   1. Only qualified service technicians should attempt to service or repair flame safeguard control and burner.
   2. Line voltage is present in the electrical circuits to the valve. Open the master switch before replacing the valve.

   CAUTION
   1. Label all wires prior to disconnection when servicing valves. Wiring errors can cause improper and dangerous operation.
   2. Verify proper operation after servicing.

Scheduled inspection and maintenance
For periodic inspection and maintenance, set up a schedule and follow it. Include the burner, valves and all other burner controls. It is recommended that “Valve Leak Test (Fig. 8)” on page 6 be included in the schedule. Refer to the flame safeguard control instructions for more information.