G96 Series Multi-functional Gas Control Valve

Installation

IMPORTANT: These instructions are intended as a guide for qualified personnel installing or servicing Johnson Controls products. Carefully follow all instructions in this bulletin and all instructions on the appliance. Limit repairs, adjustments, and servicing to the operations listed in this bulletin or on the appliance.

WARNING: Risk of Fire or Explosion.
The system must meet all applicable codes. Improper installation may cause gas leaks, explosions, property damage, and injuries.

WARNING: Risk of Fire or Explosion.
To prevent leakage of upstream gas, shut off the gas supply at the main manual shutoff valve before installing or servicing the G96 valve.

Mounting

CAUTION: Risk of Equipment Damage.
To prevent damage to the valve when mounting to pipework, do not use a wrench on any surface other than the casting flats provided at the inlet and outlet ends of the valve body.

To install the G96 valve:

1. Ensure that the specified maximum ambient (surface) temperature is not exceeded (see the Technical Data section).
2. Ensure that the power supply voltage is compatible with the required control valve voltage.

3. When installing the valve on the manifold, ensure that the gas flows through the valve body in the direction indicated by the arrow on the valve body. If the valve is installed with the gas flow in the opposite direction of the arrow, leakage can occur.

4. Shut off the gas at the main manual shutoff valve.

5. Mount the valve to the pipework. The G96 valve may be mounted on a horizontal manifold with the solenoid coils pointed up (vertical) or in any position not exceeding 90° from the vertical. The valve also may be mounted on a vertical manifold in any position around its axis (see Figure 1). Do not install the solenoid coil upside down. Install vertically wherever possible.

6. Use an approved pipe joint sealing compound on the male threads before assembly. Remove excess compound after mounting the valve to the pipework. Threads of the pipe and nipples must be smooth and free of tears and burrs. Steam clean all piping to remove foreign substances such as cutting oil or thread chips.

Figure 1: G96 Valve Mounting Position
7. Check for leakage.
   a. Shut off the gas at the main manual shutoff valve and open the pressure connection between the manual shutoff valve and the G96 valve.
   b. Connect air tubing with a maximum pressure of 1-1/2 times the valve’s maximum operating pressure (as indicated on the valve) to the opened pressure connection.
   c. Paint all valve body connections with a rich soap and water solution. If bubbles occur, this is an indication of a leak. To stop a leak, tighten joints and connections. Replace the part if the leak cannot be stopped. If bubbles do not occur, remove the air tubing and close the pressure connection.

8. Make wiring connections. Refer to the Wiring section for specific wiring instructions.

9. Determine outlet pressure. An outlet pressure tap connection is available on the underside of the valve body (see Figure 2). To monitor the outlet pressure, remove the pressure tap plug and install an approved pressure monitoring fitting in the pressure connection.

10. Set the valve to the desired outlet pressure. Refer to the Setup and Adjustments section for specific adjustment procedures. After making valve adjustments, ensure that the leak-limiting seal cap and pressure tap plug are replaced tightly. See Figure 2.

11. Before leaving the installation, observe at least three complete operating cycles to ensure that all components are functioning correctly.

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**Wiring**

**WARNING: Risk of Shock.**
Disconnect the power supply before making electrical connections to avoid electrical shock or equipment damage. Ensure that the operating voltage is identical to the information on the product identification label.

**CAUTION: Risk of Equipment Damage.**
For 24 VAC applications, the ground wire must not be connected to prevent possible grounding of the 24 VAC transformer secondary.

The G96 valve is supplied with 3-pin electrical connections. The pins of the solenoid coil are male tag terminals, and electrical connections should be made using 6.35 x 0.8 mm (1/4 in.) female, fully insulated push-on terminals. The earth ground terminal is clearly labeled with the earth ground symbol.

The electrical wiring to a twin solenoid valve from an electronic intermittent proven pilot ignition system is comprised of two lines; a common and an independent earth ground. Wiring can be done using a single 4-wire cable. The wiring connections for a 4-wire cable are shown in Figure 3.

Route the electrical cable for the valve solenoid from the burner sequence control to the valve and make wiring connections in accordance with Figure 4.

Note: Electrical connections can also be made using pre-wired electrical plugs (DIN 43650 [ISO 4400]). All wiring must be in accordance with national and local electrical codes and regulations.

Note: Do not connect the earth ground when using a 24 VAC model to prevent possible grounding of the 24 VAC transformer secondary.

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Figure 2: G96 Model with Right-handed Lever-acting Regulator

Figure 3: Twin Solenoid Wiring Using 4-wire Cable
Non-polarity Sensitive Line and Neutral Connections

Earth Ground

To Pilot Solenoid

L N

To Main Solenoid

L N

Non-polarity Sensitive Line and Neutral Connections

Earth Ground

Figure 4: 3-pin Electrical Connections

Setup and Adjustments

**IMPORTANT:** All adjustments must be made in conjunction with the gas appliance and in accordance with the appliance manufacturer’s instructions. Only authorized personnel should make adjustments.

**WARNING:** Risk of Fire or Explosion.
The minimum flow rate of the valve must not be adjusted below the minimum safe working rate of the appliance.

The G96F, G96M, G96T, and G96V models have a right or left-handed lever-acting spring pressure regulator. Right- or left-hand orientation is determined by the position of the adjustment when looking into the inlet connection of the valve.

The pressure regulator is adjusted from the top of the valve when the valve is in the upright position (solenoid coils on top).

The regulator controls the gas pressure at the valve outlet by positioning the regulator poppet for selected throughput flow and pressure. This is achieved by the valve outlet pressure acting on the regulator diaphragm, which balances against the preset regulator spring. Adjustment of the spring compression determines the valve outlet pressure and the throughput flow rate.

To adjust the outlet pressure, remove the leak-limiting seal cap to expose the adjusting screw (see Figure 2). Turn the screw (using a suitable screwdriver) in a clockwise direction to increase the pressure or in a counterclockwise direction to decrease the pressure.

**Repairs and Replacement**

Field repairs **must not** be made to the G96 valve. For a replacement valve, contact the original equipment manufacturer or the nearest Johnson Controls distributor.
## Technical Data

<table>
<thead>
<tr>
<th>Product</th>
<th>G96 Series Multi-functional Gas Control Valve</th>
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<tr>
<td>Types of Gas</td>
<td>2nd (Natural Gas), and 3rd (LP Gas) Family Gases</td>
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| Maximum Operating Pressure | North America: 0.5 psi  
Europe: 50 mbar; Class B (EN 126 and 161)  
Australia: 3.45 kPa |
| Maximum Differential Pressure | 20 mbar (2 kPa/8 in. W.C.) |
| Reverse Pressure Ratings | 50 mbar (5 kPa/20 in. W.C.) Minimum; Class B (EN 126 and 161) |
| Regulator Classification | Class C (EN 126) |
| Lever-acting Regulator Pressure Range | Natural Gas: 7.5 to 15 mbar (0.75 to 1.5 kPa/3 to 6 in. W.C.)  
LP Gas: 15 to 30 mbar (1.5 to 3.0 kPa/6 to 12 in. W. C.) |
| Regulator Setting | Factory set to customer’s specification |
| Permissible Ambient (Surface) Temperature | 0 to 70°C (32 to 158°F) |
| Body Connections | 1/2 in. Rp or 1/2 in. NPT |
| Valve Torsion Group | Group 2 (EN 126 and EN 161) |
| Pressure Connection | 1/8 in. Rp or 1/8 in. NPT Outlet Tap |
| Pilot Connections | 1/8 in. Rp or 1/8 in. NPT Left-hand and Right-hand |
| Dirt Strainer | 0.5 mm (0.02 in.) Mesh |
| Operating Time Rating | 100% Continuous |
| Valve Timings | Closing Time: ≤1 Second  
Opening Time: ≤1 Second  
Dead Time: ≤1 Second |
| Power Ratings | 16 VA per Coil |
| Electrical Connections | 3-pin Solenoid Coil  
2 x 6.35 mm (1/4 in.) Terminals +  
6.35 mm (1/4 in.) Earth Ground Terminal |
| Coil Insulation Class | Class F |
| Agency Listings | CSA (AGA/CGA) Certificate Number 176835-1029419  
EC Type Examination Certificate Number C87AP58 |
| Specification Standards | EN 126 and EN 161  
Standards Complying with EMC Directive  
Standards Complying with Low Voltage Directive  
ANSI Standards Z21.21 and Z21.78  
Canadian Standards CAN1-6.5 and CAN1-6.20 |

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Refer to the G96 Series Multi-functional Gas Control Valve Product Bulletin (LIT-4350310) for necessary information on operating and performance specifications of this product.