

Operation Manual

Manual Diaphragm Valves

(Models AP3100, AP3102, AP3125, AP3150, AP3157, AP3260, AP3600, AP4600, AP3625, AP4625, AP3650, AP4650, AP3657, AP4657, AP3800, and AP3900)

A. General information

AP Tech manual diaphragm valves are used in gas delivery systems to shutoff gas flow. Many models are available with different pressure ratings, flow capacities, and porting configurations. Refer to the appropriate catalog data sheet for specific product information.

B. System Design/Product Selection

1. When selecting the valve model and configuration, verify the following information.
 - a. Verify the materials of construction are compatible with the intended process gas.
 - b. Verify the pressure and temperature ratings are acceptable for the intended application.
 - c. Verify that the flow capacity (C_v) of the valve is appropriate for the application
2. Valves can be used under a large variety of operation conditions. The system designers shall decide product selection based upon their own analysis and testing to verify acceptable operation with specific equipment.

C. Installation

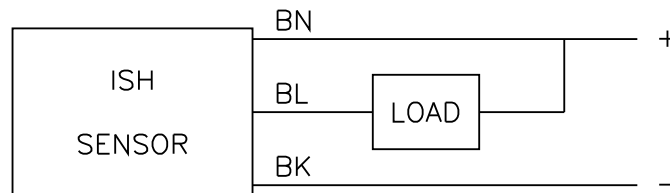
1. Verify the pressure rating is acceptable.
2. Inspect the valve to determine the flow path through the valve and how the valve will be installed in the system.
 - a. An inlet (upstream) port is defined as a port connected to the region below the valve seat and is labeled with an "IN" marked into the body near the port.
 - b. An outlet (downstream) port is defined as a port connected to the region above the seat and below the diaphragm. The outlet port is usually not labeled but may be marked "OUT".
 - c. The traditional flow direction is inlet to outlet, but AP Tech valves may be employed in either traditional flow direction or the reverse.
 - d. On Series DV Monoblock valves the port that is common with the block valves is marked with a "C". No other marking is shown. Technical Bulletin 205 has schematics of the monoblock configurations and more detailed information.
3. Install the valve using the appropriate method described below.
 - a. For tube stub connections, weld connectors or other components to the tube stubs per standard industry practice (reference SEMI standard F78).
 - b. For metal face seal connectors, assemble connections per standard practice described by fitting supplier (typically 1/8 turn past fingertight).
4. After installation, perform a helium leak test of all face seal connections and welds per standard industry practice (reference SEMI standard F1).

D. Indicating Switch Option Installation

1. ISH option for AP3650 or AP4650 (refer to Figure 1):
 - a. Review the following specifications to verify the switch is appropriate for the installation.

Switch model	Honeywell 2SS52M
Switch type	NPN (current sinking)
Operating temperature	-40 to 150 C
Supply voltage	3.8 to 30.0 Vdc
Output voltage	0.4 Vdc max.
Supply current	11 mA max.
Output current	20 mA max.
Life expectancy	up to 5,000,000 cycles at 1.2 VA
Connectors	Stranded 24 AWG wire (blue, black, and brown leads)

- b. Connect black (BK) lead to ground.
- c. Connect brown (BN) lead to supply voltage.
- d. Connect blue lead (BL) to load that is connected to supply voltage.



NPN OUTPUT SENSOR

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Figure 1. ISH Sensor Wiring Diagram

E. Operation

1. Perform the following to close the valve.
 - a. Rotate the valve handle clockwise until an increase in torque indicates that the internal stop in the actuator or in the valve body is reached.
 - b. For AP3157, AP3657, and AP4657 valves, turn the handle fully clockwise until the handle drops down. AP3157, AP3657, and AP4657 valves have a small detent in the open position, which requires a slightly higher torque at the initial portion of the valve travel to exit the detent.
 - c. For AP3900 valves, turn the handle fully clockwise until the handle drops all the way down. The top edge of the flange on the lock stem center piece should be flush with the top surface of the handle when the valve is in the closed position.
 - d. For valves with OPEN/CLOSED status indication, verify that handle indicator shows the valve is in the CLOSED position.
 - e. If an ISH switch option was installed, verify that the output signal changed states.

2. Perform the following to open the valve.
 - a. Rotate the valve handle counterclockwise until an increase in torque indicates that the internal stop in the actuator is reached.
 - b. For AP3157, AP3657, AP4657, and AP3900 valves, pull the handle up and turn counterclockwise to open the valve. This feature prevents the valve from being accidentally opened.
 - c. For valves with OPEN/CLOSED status indication, verify that handle rotation has reached the OPEN indication. On AP3800 and AP3900 valves, only solid dots of increasing size will be visible through the handle window when the valve is fully open.
 - d. If an ISH switch option was installed, verify that the output signal changed states.

Caution: Do not use a tool to apply excessive opening or closing torque to the valve handle as damage may result.

3. When a valve is in the closed position, the inlet ports are isolated from the outlet ports. When a valve is in the open position, all ports are common.

F. Lock Out Tag Out Valves

1. AP3157, AP3657, AP4657, and AP3900 valves have a built in lock out tag out (LOTO) capability. A non-interlocking scissor type padlockable safety lockout hasp with a 1/8 inch or thinner hasp arm thickness is required to use this feature. A Master Lock® No. 420 safety lockout hasp is suggested.
2. If the lock out tag out feature is to be used, verify that the lock stem center piece slot clearances are compatible with the available safety hasp as follows.
 - a. Turn the knob fully clockwise to close the valve. Verify that the lockout hasp can be inserted through the lock stem slot and closed. Remove the hasp.
 - b. Lift up on the knob and turn fully counter-clockwise to open the valve. Verify that the lockout hasp cannot be inserted through the lock stem slot.
3. The valves can be locked out as follows.
 - a. Turn the handle fully clockwise to close the valve. Insert an arm of the safety lockout hasp through the slot in the lock stem located on top of the valve. Close the safety lockout hasp and insert a padlock through one of the padlock holes in the safety lockout hasp.

Please contact the factory or your local representative to answer questions or for further information.