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Operation Manual

Pneumatic Diaphragm Valves (normally open)

(Models AK/AP/AZ3080, AK/AP/AZ3084, AK/AP/AZ3580, AK/AP/AZ3585, AK/AP/AZ4580, and AP3708)

A. General information

AP Tech normally open (NO) pneumatic diaphragm valves are used in gas delivery systems to control gas flow. Many different models are available with different pressure ratings, flow capacities, and porting configurations.

Refer to the appropriate catalog data sheet for specific product information.

Note: Valves are intended to be used to control gas flow in piping systems. Additional regulations that supplement or limit the intended use may apply depending on the valve model, and media or industry-specific standards. They are not intended for use as a pressure reducer unless the product specifically states it is intended to enable metered flow. Valves are not intended to be operated outside of their specific temperature, pressure, and flow specifications. It is the sole responsibility of the user to determine if the wetted materials are compatible with the process gas.

B. System Design/Product Selection

1. When selecting the valve model and configuration, refer to the current data sheet or AP Tech product catalog for specifications, and 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 the actuation pressure supply is appropriate.
   d. Verify that the flow capacity (Cv) 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 that 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 may be 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. Refer to 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 finger tight).
   c. For compression-type connectors, insert the tube into the fitting until it stops. Tighten the fitting by applying 1-1/4 turns of nut rotation.
      i) For reinstallation, mark the nut and the valve body before disassembly. This will allow the nut to be returned to the original assembly position. Insert the tube and attached ferrules into the fitting until fully seated. Rotate the nut until it is returned to the original assembly position, and tighten slightly beyond marked position.
   d. Most valves can be attached to panels or mounting plates using the 10-32 or M5 female thread mounting holes located in the bottom of the body (valves with M5 mounting holes will be marked with a “5” on the bottom of the body). Special configurations or multi-valve blocks may not have mounting holes or may have different size holes. Refer to the specific data sheet or Technical Bulletin for detailed mounting information.
4. Connect a nitrogen or clean dry air actuation pressure supply to the valve actuator connection. The connection may be a 1/8 NPT female thread, 10-32 female thread, or an M5 female thread depending on the valve model.
5. After installation, perform a leak test of all connections and welds per standard industry practice (reference SEMI standard F1).

D. Indicating Switch Option Installation

1. IS option for AK/AP/AZ3080 and AK/AP/AZ3084:
   a. Review the following specifications to verify the switch is appropriate for the installation.

Switch model	OKI Sensor ORT551
Switch type	SPDT
Operating temperature	-40 to 80 C

Supply voltage	30 VDC max.
Power	3 VA max.
Switching current	0.2 A max.
Carrying current	0.5 A max.
Life expectancy	Up to 5,000,000 cycles at 1.2 VA
Connectors	Stranded 24 AWG wire (blue, black, and brown leads), 10 ft (3 m) long

b. Connect blue lead to common output.
c. Connect black lead to normally closed input (the circuit will be closed when valve is closed).
d. Connect brown lead to normally open input (the circuit will be closed when valve is open).

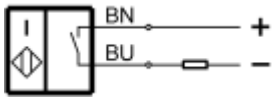
2. ISO and ISC option for AK/AP/AZ3580, AK/AP/AZ4580, or AP3708:
   a. Review the following specifications to verify the switch is appropriate for the installation.

ISO switch model	Alcoswitch MSPM101C104
ISC switch model	Alcoswitch MSPM101B104
Switch type	SPST
Operating temperature	-10 to 80 C
Supply voltage	50 VDC max.
Supply current	100 mA max.
Power	1.0 VA optimum
Initial contact resistance	100 milliohm max.
Life expectancy	up to 5,000,000 cycles at 0.1 VA
Connectors	Lug terminals – can be soldered or will accept .110 quick disconnect receptacles

   b. Connect common input to one lug terminal (solder wire or use .110 quick disconnect receptacle).
   c. Connect signal input to other lug terminal (solder wire or use .110 quick disconnect receptacle). For ISO option, the circuit will be closed when the valve is open. For ISC, the circuit will be closed when the valve is closed.

3. IPO and IPC option for AK/AP/AZ3580, AK/AP/AZ4580, or AP3708:
   a. Review the following specifications to verify the switch is appropriate for the installation.

Switch model	IPO option: BALLUFF BES0021	IPC option: BALLUFF BES03HH
Switch type	Inductive sensor	Inductive sensor
Switching output	Polarized normally open (NO)	Non-polarized normally closed (NC)
Ambient temperature	-25… 70° C	-25… 70° C

Min. operating current Im	5 mA	5 mA
Operating voltage Ub	10…36 VDC	10…36 VDC
Rated insulation voltage Ui	75 V DC	75 V DC
Rated operating current Ie	100mA	100mA
Rated operating voltage Ue DC	24 V	24 V
Rated short circuit current	100 A	100 A
Connection type	Cable, 9.8 ft (3 m), PUR	Cable, 9.8 ft (3 m), PVC
Number of conductors	2	2
Function indicator, LED	Yes	Yes
Wiring diagram		
	For IPO option, the circuit will be closed when the valve is open.	For IPC , the circuit will be closed when the valve is closed.

E. Operation

1. Perform the following to close the valve.
   a. Apply actuation pressure to the valve.
2. Perform the following to open the valve.
   a. Vent the valve actuation pressure to atmospheric pressure.
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.

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