

Operation Manual

Pneumatic Diaphragm Valves (normally closed)

(Models AP3000, AP3113, AP3130, AP3260, AP3540, AP3545, AP3550, AP4540, AP4550, AP3700)

A. General information

AP Tech normally closed (NC) pneumatic diaphragm valves are used in gas delivery systems to shutoff 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.

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 the actuation pressure supply is appropriate
 - d. 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.
 - 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 fingertight).
- 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 or 10-32 female thread depending on the valve model.
- 5. 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. IS option for AP3000, AP3113, AP3130, or AP3200:
 - 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)

- b. Connect blue lead to common output.
 - c. Connect brown lead to normally closed input (the circuit will be closed when valve is closed).
 - d. Connect black lead to normally open input (the circuit will be closed when valve is open).
- 2. ISO and ISC option for AP3550, AP4550, or AP3700:

- 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	100 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.

E. Operation

1. Perform the following to close the valve.
 - a. Vent the valve actuation pressure to atmospheric pressure.
 - b. If an indicating switch option was installed, verify that the output signal changed states.
2. Perform the following to open the valve.
 - a. Apply actuation pressure to the valve.
 - b. If an indicating switch option was installed, verify that the output signal changed states.
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.