

Humphrey 310/410 Solenoid Valves

Humphrey introduces a new series of 0.125-inch ported 3-way and 4-way single solenoid valves. These rugged industrial valves are designed for long hours of operation in tough working conditions.

The new 310/410 Series valves feature a direct-acting molded coil and Class B insulation system for resistance to ambient contamination. Their poppet design is field-proven by years of reliable service in thousands of demanding applications worldwide.

Small size, light weight, and low power make these valves ideal for today's precise, energy-efficient equipment.

Four-way models are available with integral dual flow controls which eliminate the need, expense, and plumbing costs of externally applied flow controls.

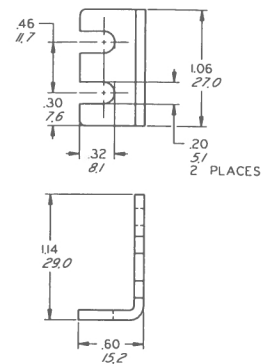
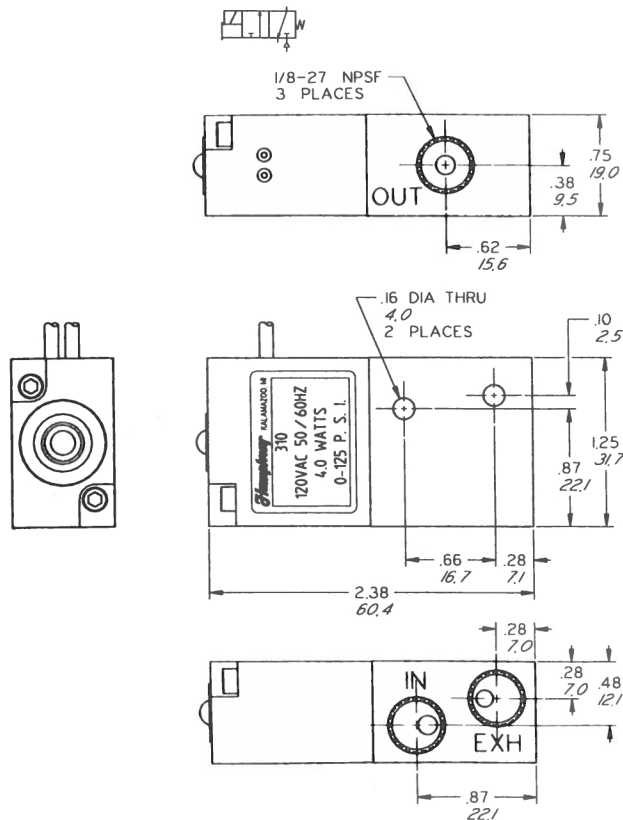


310

Model 310 is a 3-way, 2 position, spring return valve. Direct acting, with a single solenoid and 24 inch (305mm) lead wires exiting the solenoid cover. Continuous duty coil. Non-locking manual override. Three 1/8-27 NPSF ports (IN, OUT, EXH).

8-288A MOUNTING BRACKET

A convenient, optional plated steel mounting bracket kit is designed for use with both 3-way and 4-way valves. This kit consists of a bracket, two #6-32 screws, and two captive lockwasher nuts. Screws are plated steel, 1-inch (25.4mm) long.



Humphrey 410 Solenoid Valves

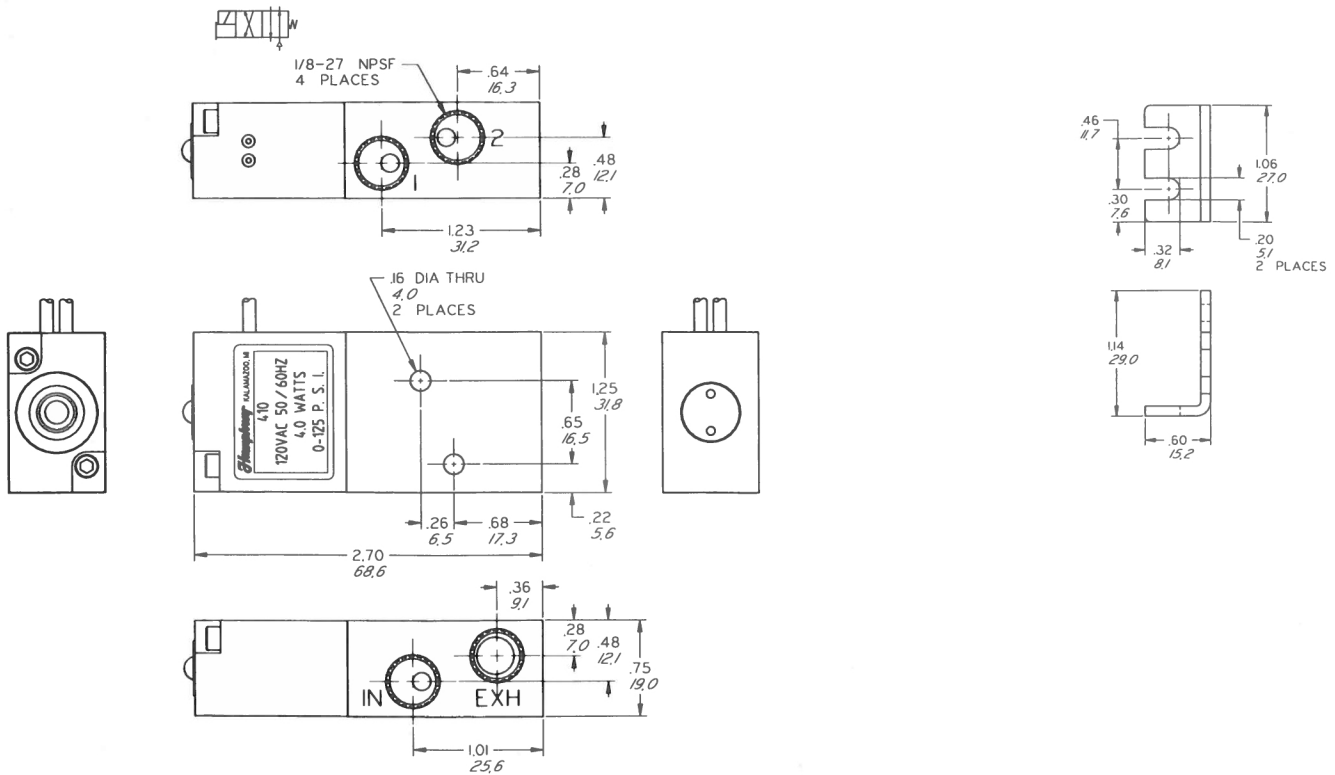


410
 Model 410 is a 4-way, normally open/normally closed, 2 position, spring return valve. Direct acting, with a single solenoid and 24 inch (305mm) lead wires exiting the solenoid cover. Continuous duty coil. Non-locking manual override. Four 1/8-27 NPSF ports (IN, Delivery ports 1 & 2, and single exhaust port—EXH).



8-288A MOUNTING BRACKET

A convenient, optional plated steel mounting bracket kit is designed for use with both 3-way and 4-way valves. This kit consists of a bracket, two #6-32 screws, and two captive lockwasher nuts. Screws are plated steel, 1-inch (25.4mm) long.



Humphrey 410-70 Solenoid Valves



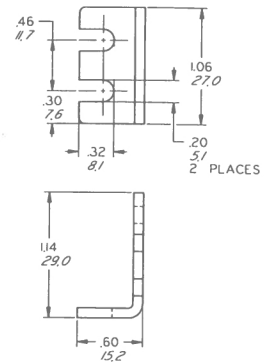
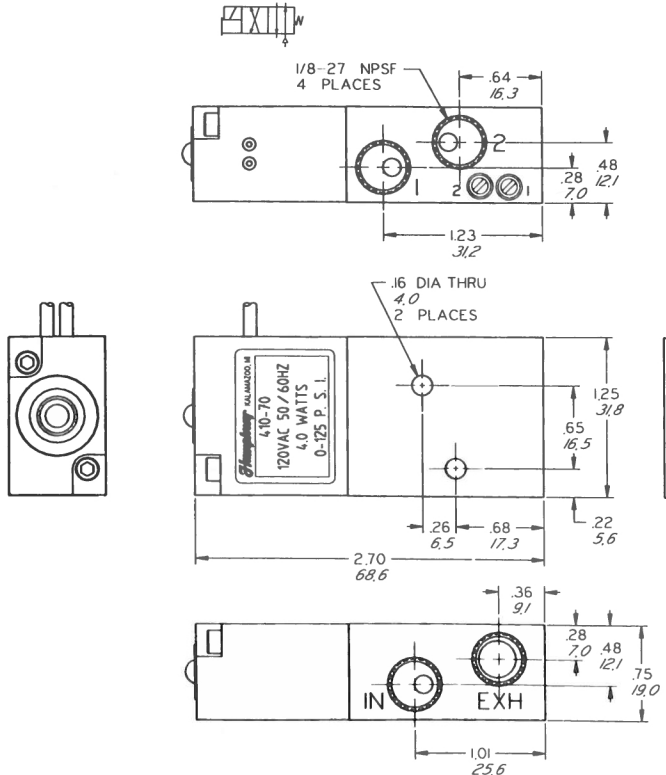
410-70

Model 410-70 is identical to the 410 valve but has integral dual flow controls (Code 70). It independently meters the exhaust of normally open and normally closed cylinder outlet ports and eliminates need for—and expense of—externally mounted flow controls.



8-288A MOUNTING BRACKET

A convenient, optional plated steel mounting bracket kit is designed for use with both 3-way and 4-way valves. This kit consists of a bracket, two #6-32 screws, and two captive lockwasher nuts. Screws are plated steel, 1-inch (25.4mm) long.



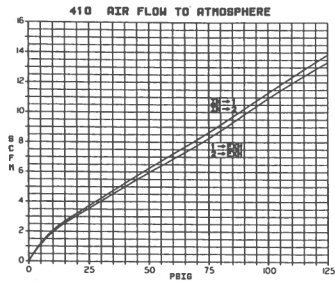
FLOW RATES/C_v

Humphrey recommends "fill/exhaust times", which are related to various chamber sizes, as the best method for calculating total valve and device (specifically, cylinder) response time. Humphrey recognizes the industry's use of flow coefficient C_v as a comparison standard.

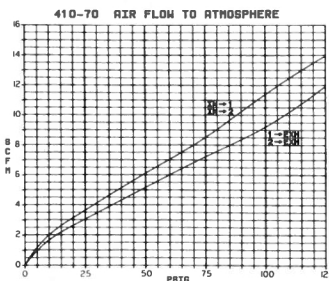
Consequently, Humphrey offers three types of flow data. The National Fluid Power Association's standards for C_v, the scfm flow rate determined by flowing to atmosphere, and Humphrey's preferred "fill/exhaust times."

Model	C _v	SCFM @ 100 psig	Fill Time (Sec)			Exhaust Time (sec)		
			(0 to 99 psig)			(100 to 10 psig)		
			Chamber (cu. in.)			Chamber (cu. in.)		
1	10	100	1	10	100			
310	.167	10.0	.020	.20	2.00	.032	.32	3.20
410	.167	10.0	.020	.20	2.00	.032	.32	3.20
410-70	.167	10.0	.020	.20	2.00	.032	.32	3.20

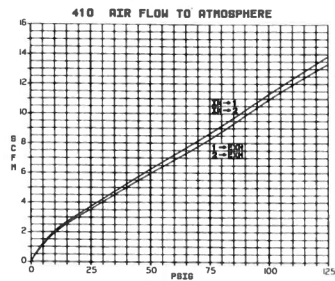
310 AIR FLOW CHART



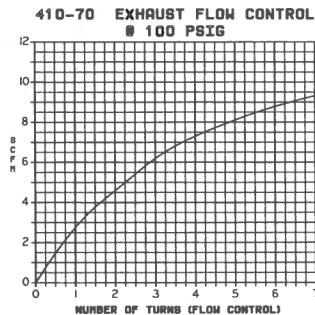
410 AIR FLOW CHART



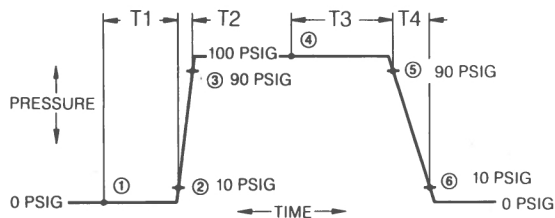
410-70 AIR FLOW CHART



410-70 EXHAUST FLOW CHART



RESPONSE TIMES



Identification of response time areas

T1 times are measured from point ① (valve energization) to point ② (10% of supply pressure detected at valve outlet port).

T2 times are measured from point ② (detection of outlet pressure) to point ③ (90% of supply pressure).

T3 times are measured from point ④ (valve de-energization) to point ⑤ (10% of supply pressure exhausted from outlet port).

T4 times are measured from point ⑤ (detection of pressure drop) to point ⑥ (90% of supply pressure exhausted).

AC/DC Voltages

Coil Voltage	T1	T2	T3*	T4
DC	0.010 sec.	0.0001 sec.	0.005 sec.	0.002 sec.
AC	0.010 sec.	0.001 sec.	0.018 sec.	0.002 sec.

*Measured at 70°F (21°C) with 100% voltage and 100 psig supply. Times shown are nominal performance of valves tested.

Example of how to calculate fill/exhaust times:

Model 310, 24VDC One Air Line (0.125 I.D. x 36-inch long)
100 psig supply Air Cylinder (1.062-inch bore x 4-inch stroke)

Volume = 0.785 x Diameter squared x stroke or length

Cylinder Volume = 3.54 cubic inches

Air Line Volume = 0.44 cubic inches

Total Circuit Volume = 3.98 or 4 cubic inches

T1 Time to Energize Valve = 0.010 sec.

Time to fill 4 cubic inches

40% of 0.2 sec. for 10 cubic inches

T3 Time to De-energize Valve = 0.005 sec.

Time to Exhaust 4 cubic inches

40% of .32 sec. for 10 cubic inches

Total Cycle Time = 0.128 sec.

= 0.223 sec.*

*Although this result is not exact, it is sufficient for most application needs and provides a simple, straight-forward system.

ELECTRICAL SPECIFICATION CHART

Voltage	Resistance (Ohms)	Current (Milliamps)
12VDC	36	333
24VDC	144	167
24VAC	100	200
100VAC	2100	44
120VAC	3025	36
200VAC	8400	22
240VAC	12100	18

- All coils are standard with 24-inch black lead wires. Optional 72-inch lead wires are available.
- All AC coils are rated for 50/60 Hertz.
- All coils conform to Class B insulation systems.
- Resistance and current are nominal values.
- Valve assemblies are "hi-pot" tested at 1750 VAC for one second.
- Ensure proper voltage supply per voltage label rating +10%, -15% for AC or DC voltages.

SOLENOID CIRCUIT SCHEMATICS

