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**Title: 315/415 Solenoid Valves**

**ISO Date: April 10, 2006**

**Don't Take Chances**

Compressed air is an extremely powerful medium. Always take maximum precautions when handling any component of a compressed air system. **Never** attempt to construct, replace, operate or service any component of a compressed air system unless you have been specifically and properly trained to do so. **Always** disconnect the supply air, and exhaust the air system before attempting to remove or service a component of that system. Failure to heed these warnings could result in SERIOUS, EVEN FATAL, PERSONAL INJURY.

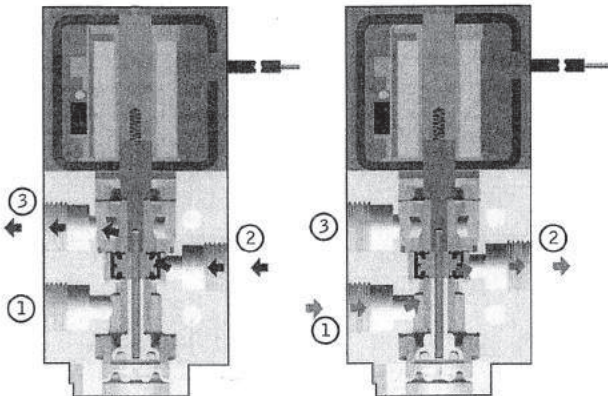
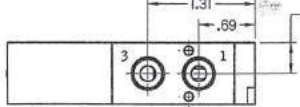
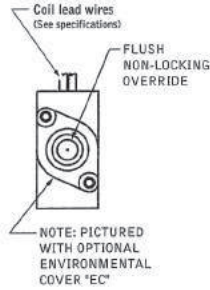
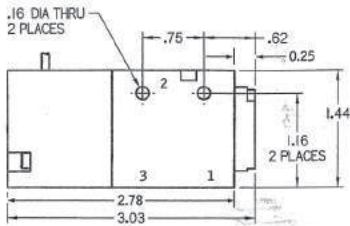
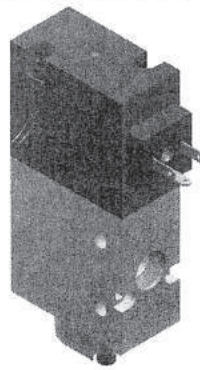
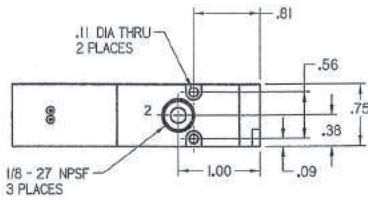
**Design And Specifications**

The design and specifications and other product information contained in this catalog is for general reference purposes based upon customary and usual manufacturing standards and product applications. However, it is difficult to predict or to anticipate the functioning or suitability of the product for any particular application or use. Therefore, nothing herein shall be deemed a representation or warranty of the product design or specifications and Buyer shall have the responsibility for investigating and testing the product in any particular application or use and all risks attendant in such use.

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# 315/415 Series Valves

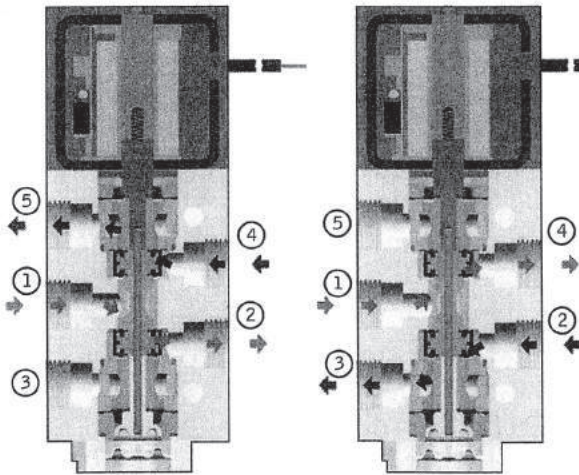
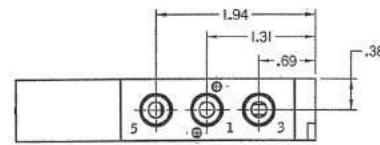
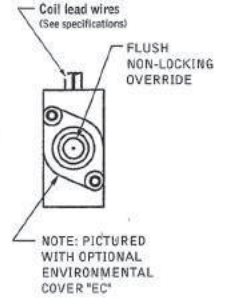
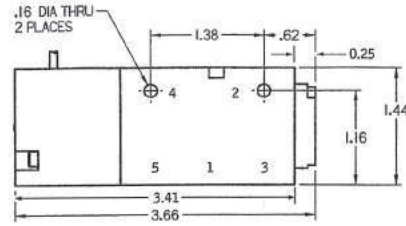
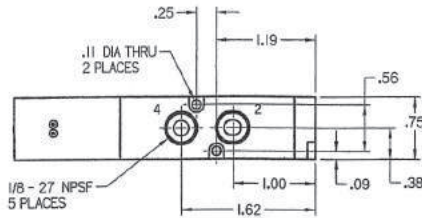
## 315 SERIES



315 Series Normal Condition

315 Series Actuated Condition

## 415 SERIES



415 Series Normal Condition

415 Series Actuated Condition

## ANSI PIPING DIAGRAMS

SERIES	3-WAY NORMALLY CLOSED	3-WAY NORMALLY OPEN	SELECTOR	DIVERTER	2 WAY N.C.	2 WAY N.O.
315						
415						

# 315/415 SPECIFICATIONS

Features:	Line Mounted	Line Mount ( 2 & 3 - Gallery Bar Stock Manifold)
Port Sizes	315 1/8" NPSF 415 1/8" NPSF	1/4" NPSF Inlet & Exhausts
Port Identifications	315 Valve: Pressure = 1; Cylinder = 2; Exhaust = 3; 415 Valve: Pressure = 1; Cylinder = 2; Cylinder = 4; Exhausts Ports = 3 & 5	315 Manifold: Pressure = 1; Exhaust = 3; 415 Manifold: Pressure = 1; Exhaust = 3; Exhaust = 5
$C_v$ (ANSI (NFPA) T3.21.3 - 1990)	0.42	
SCFM @ 100 psig	> 20	
Fill/Exhaust Time 0 - 90 psi	1 cu.in. (.028 / .025 sec.) 10 cu.in. (.19 / .23 sec.) 100 cu.in. (1.3 / 1.9 sec.)	
Voltage Tolerance	Plus 10%, minus 15% of rated voltage	
Manifold Type	315 Series, 415 Series: Fixed Length Bar Stock ( 2 - 12 Stations ) (Tap 1/4" NPSF)	
Sandwich Speed Control	315: N/A	415: Yes
Coil Temperature Rise (any voltage)	95° F	
Rotatable Coil	Yes - Field Adjustable 180°	
Valve Function	315: Multi-purpose 2-Position / 3 -Way	415: 2-Position / 5-Ported / 4 - Way
Manual Override	Flush Non-Locking	
Electrical Connections	22 AWG Black Cross Linked Polyethylene insulated lead wire 7 x 30 stranded/tinned copper conductor; 125° C / 600 V. UL Style 3173,3271, CSA Type CL 1251. & DIN 43650C 15mm style connector	
Lubrication	None required	
Voltagess	12VDC, 24VDC, 24 50/60, 120 50/60, 240 50/60	

Features:	Line Mounted	Line Mount ( 2 & 3 - Gallery Bar Stock Manifold)
Power Consumption (AC/DC)	5 Watts	
Stroke (inches)	315 / 415: 0.022 (nominal)	
Surge Suppression	TSD - Option Code 50	
Weight	315: .315 lbs. (5.04 oz) 415: .390 lbs. (6.24oz)	
Agency Approvals	Consult Factory	
Type of Operation	Direct Acting Solenoid	
Coil	General Purpose Class B, continuous duty rated, encapsulated.	
Mounting Position	Any	
Media	Air, Inert Gases	
Pressure Range	28" Hg Vacuum to 125 psig	
Filtration	40 Micron recommended	
Response Time ON/OFF (Sec.)	315: 0.020 / 0.008 (DC) 415: 0.020 / 0.021 (AC)	
Effective Area (Sq. In.)	0.0123	
Maximum Cycle Rate (CPM)	2142 (DC); 1463 (AC)	
Materials	Buna-N, Brass, Anodized Aluminum, optional fluoroelastomer	
Ambient Temp Range	32° F to 125° F	
Leak Rate (max.)	4 cc/minute @ 100psig	
Package Rating	NEMA 4 (IP-65)	
Dimensions (inches)	315 Series: .75 x 1.44 x 3.03 415 Series: .75 x 1.44 x 3.66	
Coil Testing	All valves are "HiPot" tested between coil windings and coil frame	
DIN Connector Specification	Micro Mini 9mm	
DIN Rail Mounting (35mm)	315: Yes 415: Yes	

## FLOW RATES / $C_v$

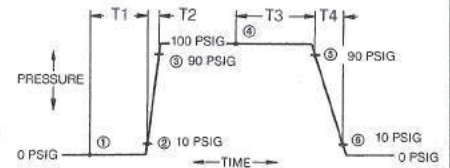
Humphrey recommends "fill/exhaust" times which are related to various chamber sizes, as the best method for calculating total valve and device (i.e., cylinder) response time. Humphrey recognizes the industry's use of flow coefficient  $C_v$  as a comparison standard.

Consequently, Humphrey offers three types of flow data. The National Fluid Power Association's (NFPA) 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) (0 to 90 PSIG) Chamber (cu. in.)			Exhaust Time (Sec) (100 to 10 PSIG) Chamber (cu. in.)		
			1	10	100	1	10	100
315	0.42	>20	.028	.19	1.3	.025	.23	1.9
415	0.42	>20	.028	.19	1.3	.025	.23	1.9

## RESPONSE TIMES

### Identification of response time areas



**T1** times are measured from point (1) (coil energized) to point (2) (10% of supply pressure).

**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) (coil 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

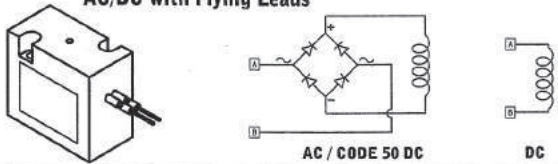
(Same for both 315 & 415 Series Valves)

Voltage	T1	T2	T3	T4
AC	.018	.002	.018	.003
DC	.018	.002	.005	.003

Time in seconds (nominal)

## SOLENOID CIRCUIT SCHEMATICS

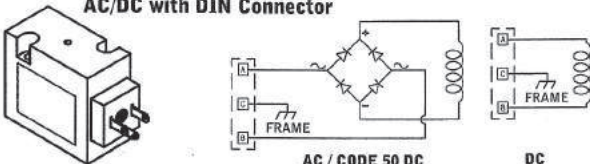
### AC/DC with Flying Leads



AC / CODE 50 DC

DC

### AC/DC with DIN Connector



AC / CODE 50 DC

DC

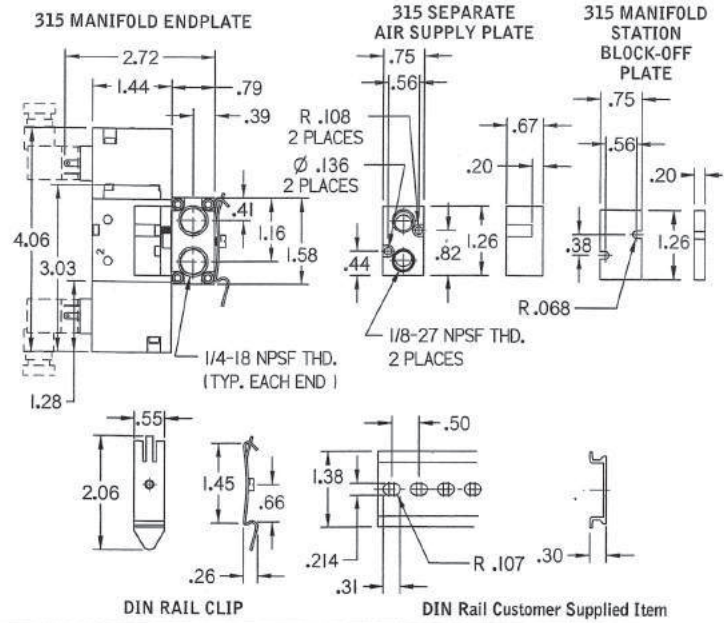
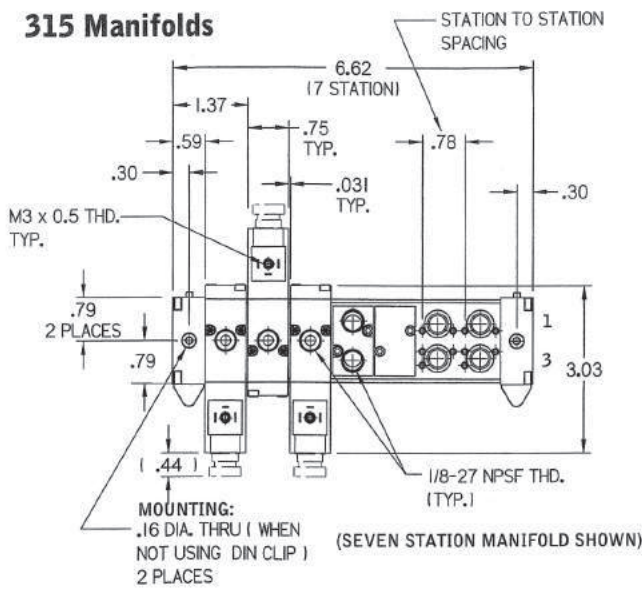
## ELECTRICAL SPECIFICATIONS

Voltage	Resistance (Ohms) +/- 10%	Current (Milliamps)
12VDC	28.8 Ω	420 mA
24VDC	115.2 Ω	210 mA
24 50/60	80.0 Ω	282 mA
120 50/60	2420.0 Ω	47 mA
240 50/60	9680.0 Ω	23 mA

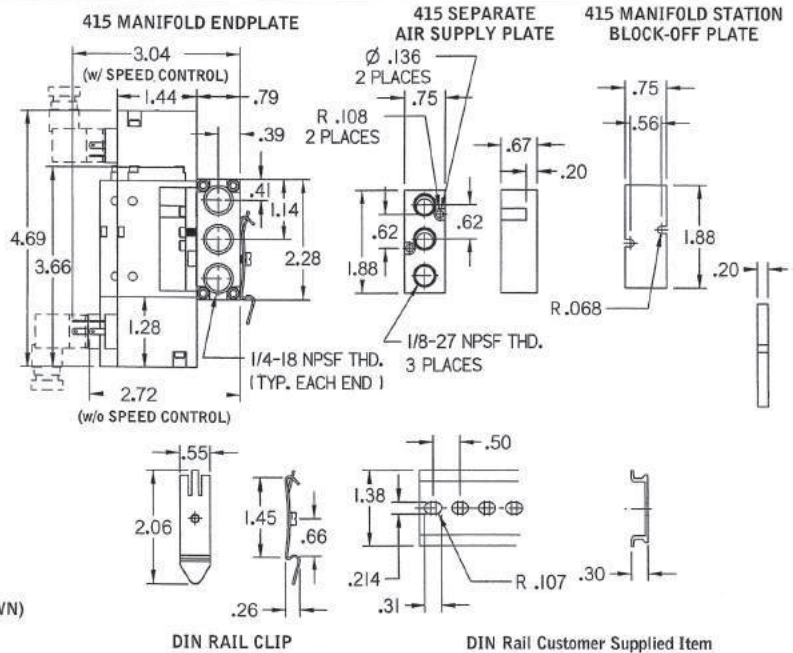
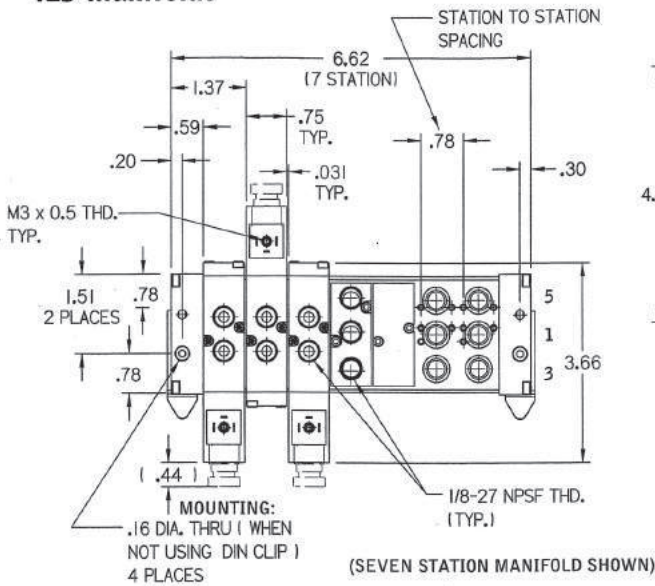
- All coils come standard with 24-inch black lead wires.
- Optional 72-inch lead wires are available Option Code ( LL ).
- Optional DIN connectors (Option Code 39)
- All AC coils are rated for 50/60 Hertz.
- All coils utilize Class B insulation materials.
- Resistance and current are nominal values.
- Valves are "HiPot" tested
- Ensure proper voltage supply per voltage label rating, +10% / -15% for AC or DC voltages.

# MANIFOLDS


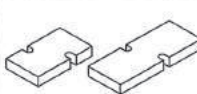

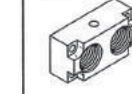


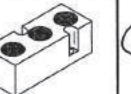


## 315 Manifolds



## 415 Manifolds



## ACCESSORIES

								
<b>Speed Control: 415-SC</b> (Includes (2) screws and (3) o-ring seals)	<b>Manifold Station Block-off Plates: 315-BOP; 415-BOP</b>	<b>Manifold Plug</b> (For use with 315 Series valves when mounted on a 415 Series manifold): <b>40062-1;</b> <b>40062-5</b> (bag of five)	<b>315 Manifold End Plate: 315M-EP</b> (Includes (2) end plates, (3) screws and (4) o-ring seals)	<b>415 Manifold End Plate: 415M-EP</b> (Includes (2) end plates, (8) screws and (6) o-ring seals)	<b>315 Separate Air Supply Plate: 315-SSP</b> (Includes (2) screws and (2) o-ring seals)	<b>415 Separate Air Supply Plate: 415-SSP</b> (Includes (2) screws and (3) o-ring seals)	<b>Isolator Plug: DP</b> (For applications requiring two different pressures, or pressure and vacuum. Refer to Multi-pressure Manifolds section for further information and considerations.)	<b>DIN Rail Clip: DRC</b> (kit includes (2) clips and (2) screws)
<b>Valve Mounting Kits: 315-MK</b> (Includes (2) screws and (2) o-ring seals); <b>415-MK</b> (Includes (2) screws and (3) o-ring seals)								

# HOW TO ORDER

## How to Order Valves

NOTE: Standard valves are furnished with 24-inch flying leads and a push, non-locking manual override. Option codes marked STD and NA are not used as part of the model number when ordering. OS indicates that the Option must be ordered separately and is not used as part of the Model Number.

NA = Not available  
 OS = Order separately, additional charge for this option  
 STD = Standard  
 SP = Specify, additional charge for this option

A 1/8 inch pipe plug is included with each valve unit when ordering Option Code #2.

Model*	Option Code								Specify Voltage
315	2-way	with Mounting Bracket	72" Leads	DIN Connection	DC Surge Suppression	No Manual Override	Environmental Cover	Rotate Coil 180° from Standard**	12VDC 24VDC 24 50/60 120 50/60 240 50/60
	2	21	LL	39	50	87	EC	RC	
415	SP	SP	SP	SP	SP	SP	SP	SP	
	NA	SP	SP	SP	SP	SP	SP	SP	

Standard Valve Order Example: Model 315-21-39-EC-120 50/60

\*\* Coil is field-adjustable 180°, or may be ordered from factory, rotated.

### DIN Connector (Socket) Options

Model HS-2      DIN connector (only) for use with Option Code 39  
 Model HS2 LED      DIN connector with LED for use with Option Code 39 (12V, 24V, 120 VAC; specify voltage.)  
 Model HS2-CLL      Molded (6) ft. cable and assembly for use with Option Code 39 (DIN Connector).

Note: DIN Connector Options must be ordered separately.

## SANDWICH SPEED CONTROL

Speed control sandwich mounts between the 415 Series valve unit and manifold assembly. The Speed Control is intended to be used for the metering of the compressed air flow from cylinder to exhaust (i.e., Port 2 - 3 and Port 4 - 5). For optimal access to the adjustment screws, we recommend that the adjustment screws be positioned on the same end as the valve unit's manual override.

Note: Since the Speed Control unit is symmetrical, it can be positioned on the same end as the solenoid.

## How to Order Manifolds

### 315 Manifold

Manifold type	2-gallery, fixed length bar stock (2- 12 stations)
Tap	1/4" NPSF
Port Identification	Pressure = 1 Exhaust = 3

### Model / 315 Series

315M-2	315M-8
315M-3	315M-9
315M-4	315M-10
315M-5	315M-11
315M-6	315M-12
315M-7	

Example: 315 Series 2 Station Manifold; Order: 315M-2

### 415 Manifold

Manifold type	3-gallery, fixed length bar stock (2- 12 stations)
Tap	1/4" NPSF
Port Identification	Pressure = 1 Exhaust = 3 & 5

### Model / 415 Series

415M-2	415M-8
415M-3	415M-9
415M-4	415M-10
415M-5	415M-11
415M-6	415M-12
415M-7	

Example: 415 Series 6 Station Manifold; Order: 415M-6

## ASSEMBLY AND ACCESSORY USE

