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

<table>
<thead>
<tr>
<th>SERIES</th>
<th>3-WAY NORMALLY CLOSED</th>
<th>3-WAY NORMALLY OPEN</th>
<th>SELECTOR</th>
<th>DIVERTER</th>
<th>2 WAY N.O.</th>
<th>2 WAY N.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td><img src="image1" alt="3-WAY NORMALLY CLOSED" /></td>
<td><img src="image2" alt="3-WAY NORMALLY OPEN" /></td>
<td><img src="image3" alt="SELECTOR" /></td>
<td><img src="image4" alt="DIVERTER" /></td>
<td><img src="image5" alt="2 WAY N.O." /></td>
<td><img src="image6" alt="2 WAY N.C." /></td>
</tr>
<tr>
<td>415</td>
<td><img src="image7" alt="3-WAY NORMALLY CLOSED" /></td>
<td><img src="image8" alt="3-WAY NORMALLY OPEN" /></td>
<td><img src="image9" alt="4-WAY DIRECTIONAL WITH SPEED CONTROL" /></td>
<td><img src="image10" alt="1-WAY NORMALLY CLOSED" /></td>
<td><img src="image11" alt="1-WAY NORMALLY OPEN" /></td>
<td></td>
</tr>
</tbody>
</table>
**315/415 SPECIFICATIONS**

**Features:**
- **Line Mounted**
- **Line Mount (2 & 3 - Gallery Bar Stock Manifold)**

<table>
<thead>
<tr>
<th>Port Sizes</th>
<th>Line Mounted</th>
<th>Line Mount (2 &amp; 3 - Gallery Bar Stock Manifold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315 1/8&quot; NPSF</td>
<td>315 1/8&quot; NPSF</td>
<td>1/4&quot; NPSF Inlet &amp; Exhausts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port Identifications</th>
<th>Line Mounted</th>
<th>Line Mount (2 &amp; 3 - Gallery Bar Stock Manifold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315 Valves</td>
<td>315 Manifold: Pressure = 1; Exhaust = 5;</td>
<td>315 Manifold: Pressure = 1; Exhaust = 5;</td>
</tr>
<tr>
<td></td>
<td>415 Valves: Pressure = 1; Exhaust = 5;</td>
<td>415 Manifold: Pressure = 3; Exhaust = 5;</td>
</tr>
<tr>
<td></td>
<td>2 - Cylinder 4 - Exhausts</td>
<td>3 &amp; 5 Exhaust = 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CFM @ 100 psig</th>
<th>&gt; 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Tolerance</td>
<td>Plus 10%, minus 15% of rated voltage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manifold Type</th>
<th>315 Series, 415 Series: Fixed Length Bar Stock (2 - 12 Stations) (2 - 12 NPSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandwich Speed Control</td>
<td>315: No / 415: Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coil Temperature Rise (any voltage)</th>
<th>95°F</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Rotatable Coil</th>
<th>Yes - Field Adjustable 180º</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Valve Function</th>
<th>415: 2-Position / 2-Position / 3-Way / 5-Ported / 4-Way</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Manual Override</th>
<th>Flush Non-Locking</th>
</tr>
</thead>
</table>

| Electrical Connections | 22 AWG Black Cross Linked Polyethylene insulated lead wire 7 x 30 stranded tinned copper conductor; 125ºC / 600 V. UL Style 3173, S271, CSA Type CL, D & DIN 43860 C15mm style connector |

<table>
<thead>
<tr>
<th>Lubrication</th>
<th>Non required</th>
</tr>
</thead>
</table>

| Voltages | 12VDC, 24VDC, 24 56/60, 120 50/60, 240 50/60 |

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**FLOW RATES / CV**

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 Cv as a comparison standard.

Consequently, Humphrey offers these types of flow data. The National Fluid Power Association's (NFPA) standards for Cv, the SCFM flow rate determined by flowing to atmospheric, and Humphrey's preferred "fill/exhaust" times are:

<table>
<thead>
<tr>
<th>Model</th>
<th>SCFM @ 100 PSIG</th>
<th>Fill Time (Sec)</th>
<th>Exhaust Time (Sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0 to 90 PSIG)</td>
<td>Chamber (cu. in.)</td>
<td>Chamber (cu. in.)</td>
</tr>
<tr>
<td>315</td>
<td>0.42</td>
<td>0.028</td>
<td>0.025</td>
</tr>
<tr>
<td>415</td>
<td>0.42</td>
<td>0.028</td>
<td>0.025</td>
</tr>
</tbody>
</table>

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**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 (3) (coil de-energized) to point (4) (10% of supply pressure exhausted from outlet port).
- **T4** times are measured from point (4) (detection of pressure drop) to point (6) (90% of supply pressure exhausted).

**AC/DC Voltages**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>0.018</td>
<td>0.002</td>
<td>0.018</td>
<td>0.003</td>
</tr>
<tr>
<td>DC</td>
<td>0.018</td>
<td>0.002</td>
<td>0.005</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Time in seconds (nominal)

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**ELECTRICAL SPECIFICATIONS**

- 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.

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**Solenoid Circuit Schematics**

- AC/DC with Flying Leads
- AC/DC with DIN Connector

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**75**
**MANIFOLDS**

### 315 Manifolds

- **Station to Station Spacing:** 6.62 (7 STATION)
- **Mounting:** 1.6 Dia. Thru (when not using DIN Clip) 2 PLACES
- **(Seven Station Manifold Shown)**

### 415 Manifolds

- **Station to Station Spacing:** 6.62 (7 STATION)
- **Mounting:** 1.6 Dia. Thru (when not using DIN Clip) 4 PLACES
- **(Seven Station Manifold Shown)**

**ACCESSORIES**

- **Speed Control:** 415-SC (includes (2) screws and (3) o-ring seal)
- **Manifold Station Block-off Plates:** 315-BOP; 415-BOP
- **Manifold Plug:** (for use with 315 Series valves when mounted on a 415 Series manifold: 40062-1; 40062-5 (pack of five))
- **315 Manifold End Plate:** 315M-EP (includes (2) end plates, (3) screws and (4) o-ring seal)
- **315 Separate Air Supply Plate:** 315SSP (includes (2) screws and (3) o-ring seal)
- **415 Separate Air Supply Plate:** 415SSP (includes (2) screws and (3) o-ring seal)
- **Isolator Plug:** DP (for applications requiring two different pressures or preset, 1/8 BSPP)
- **DIN Rail Clip:** DRC (6/4 includes (2) clips and (2) screws)

Valve Mounting Kits: 315-MK (includes (2) screws and (3) o-ring seal); 415-MK (includes (2) screws and (3) o-ring seal)
HOW TO ORDER

How to Order Valves

NOTE: Standard valves are furnished with 24-inch flying lead and a panel, non-locking manual override. Option codes marked STD and NA are not used as part of the model number when ordering. STD indicates 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.

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') cable and assembly for use with Option Code 39 (DIN Connector).

Note: DIN Connector Options must be ordered separately.

How to Order Manifolds

315 Manifold
Model / 315 Series
315M-2 315M-3 315M-4 315M-5 315M-6 315M-7
Manifold type 2-galley, fixed length bar stock (2-12 stations)
Tap 1/4" NPSF
Port Identification Pressure = 1 Exhaust = 3

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

415 Manifold
Model / 415 Series
415M-2 415M-3 415M-4 415M-5 415M-6 415M-7
Manifold type 3-galley, fixed length bar stock (2-12 stations)
Tap 1/4" NPSF
Port Identification Pressure = 1 Exhaust = 3 & 5

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

ASSEMBLY AND ACCESSORY USE

415 Series Valves (with optional environmental cover)
Sandwich-style speed control mounts between a 415 Series 4-way valve and a three-galley manifold.

415 Series Valves
(Used to block off an exhaust port when using a 315 Series 3-way valve on a 415 manifold.)

Manifold End Plate
Isolator Plug
(Insert plug into gallery, and when oriented, tighten screw to compress plug, forcing o-ring against gallery wall. Torque screw to 10-13 in-lbs. Be careful not to over-torque the screw.)

Separate Air Supply Plate
Manifold Station Block-off Plates

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.
Troubleshooting
If valve fails to function when electrical power is supplied:
1) Check valve function using manual override. If valve functions by manual actuation, proceed to steps 2 and 3.
If valve does not function, proceed to step 4. For valves without manual override, proceed to steps 2 and 3.
2) Check line voltage and compliance with valve electrical rating.
3) Check valve for inoperative (open) coil, measuring milliamperes per Electrical Specifications Chart.
4) Check that the air supply has been delivered in adequate volume and pressure for proper functioning of the device. Ensure that there are no blockages due to air line contamination or defective/block fitted fittings.

Mounting Valves and Accessories to Manifolds
315 & 415 Series Valves: When mounting valves to manifold, ensure that a o-ring seal is properly located in each cavity of the manifold prior to mounting a valve unit. By rotating the 315 Series valve (180°), it can be converted from a 3-way Normally-Closed to 3-way Normally-Open function. Using screws furnished, tighten to 10-13 inch-pounds of torque. Be careful not to over-torque the screws.

Accessories
When installing the 415 Series Speed Control (# 415 SC), take extra care to ensure that the o-rings are installed between the valve and speed control and speed control and manifold block.
When connecting the Separate Air Supply (# 315-SSP or 415-SSP) and/or Block-off Plate (# 315-BOP, 415-BOP), to its manifold, install a o-ring in each cavity of the manifold prior to mounting the accessory item. Using screws furnished, tighten to 10-13 inch-pounds of torque. Be careful not to over-torque the screws. Appropriate o-rings and mounting screws are furnished with each accessory item.

Multi-pressure Manifolds
To create a dual pressure (DP) manifold. Install the Isolator Plug (DP) in-between the appropriate valve stations. See illustration on page 80.
The accessory Isolator Plug (DP) has been pressure-tested to well beyond the rated limits of the valve, manifold and other accessory components. As such, it should remain fully functional in normal dual pressure or pressure/vacuum applications when all components are used within their rated limits. Humphrey Products cannot warrant the satisfactory performance of the Isolator Plug (DP) when any components are subjected to extreme environmental conditions such as excessive vibration, wide temperature variations, or other conditions beyond the control of Humphrey Products that might result in migration, leakage or failure of the Isolator Plug. Please determine the suitability of this product for your intended application prior to ordering and use.

Installation
Valves can be mounted in any position in most environments. In keeping with the specifications, 315/415 valves feature a Class B Insulation system and molded coil for ambient temperatures from 32° F to 125°F (0° to 50° C).
Valves can be mounted by using the mounting holes provided. A DIN rail mounting clip is also available for manifolds. To order the DIN Rail Clip specify the DRC option code. Kit includes two clips and screws.

Lubrication
Humphrey 315/415 Series valves can be operated with or without air line lubrication, depending on the application. If air cylinders or other devices require lubrication, ensure that the lubricating oils are chemically compatible with BUNA-N elastomers and are of sufficient viscosity to assure adequate lubrication. The equivalent to turbine oil Class 1 (ISO VG32) is recommended. Avoid using thin or low viscosity oils (spindle oil, machine oil, etc.) since they do not provide a good residual film of lubrication.

Media / Pressure / Filtration
Humphrey 315/415 Series valves are designed for use with compressed air or inert gases from vacuum service (28° Hg) to 125 psig. Media should be an inert gas and/or clean, dry air. When in doubt, install a filter with filtering capacity of 40 microns or less. Periodically, remove clean or replace filter element. Consult factory if using other media.

Rotating the Solenoid (180 degrees)
Humphrey 315/415 Series valves are designed to allow the end-user to rotate the coil 180 degrees, by the removal of two screws and then simply rotating the coil into position. Prior to rotating the coil, be sure that the supply pressure has been disconnected and properly vented from the valve prior to attempting this conversion. Be careful not to mis-align the gasket or internal spring when tightening the solenoid. Mis-alignment can prevent proper operation and/or shorten the life of the valve. Caution should be taken when doing this in the field.

Warranty
All valves have a one-year warranty from date of manufacture. This warranty includes repair and/or replacement at no charge should the product be deemed defective due to workmanship and/or material. (See detailed Product Warranty in Humphrey's General Valve Catalog.)

Caution! ⚠️
Compressed air is powerful and may be dangerous. Before attempting to remove or service a component from an air line or system, always disconnect the supply air and thoroughly exhaust the line or system. Never attempt to construct, operate, or service anything using compressed air unless you have been properly trained to do so. Failure to heed this warning could result in PROPERTY DAMAGE AND/OR SERIOUS, EVEN FATAL, PERSONAL INJURY. See additional warning on page 252.