First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

The R9 delivers the liquid flow capabilities of a 16 mm valve with a 9 mm envelope. A 44 % reduction in width with unrivaled flows and pressures to 100 psi. Designed to offer low carryover performance with particulate and crystallization resistance, this valve is ideally suited for today's demanding liquid handling applications. The R9 supports the performance requirements of current and future laboratory and portable instrumentation.

Features

- 3-way, 2 position valve (Universal, NC)
- High pressure options available up to 100 psi (6.9 bar)
- Easy mounting on 9 mm centers side to side, accommodating dispense over 96 well microplates
- Low unswept volume to minimize carryover
- Particulate and crystallization resistant
- 100 % tested leak rate ensures a leak tight seal on every valve
- Life cycle rating of 10 million

Certificates

- CE
- RoHS
- Reach

Media compatibility

Liquids

Applications

- Sampling
- Reagent addition
- Flow control
- Wash
- Waste

First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Product specifications

Parameter		
Operating temperature	**EPDM**	**32 ... 122 °F (0 ... 50 °C)**
	FFKM, 100 psi, 40 psi	**50 ... 122 °F (10 ... 50 °C)**
	FFKM, 60 psi, 20 psi	**59 ... 122 °F (15 ... 50 °C)**
Storage temperature		**4 ... 158 °F (-20 ... 70 °C)**
Weight	**T9...0**	**1.35 oz (38.4g)**
	T9...4, T9...9	**1.63 oz (46.1g)**
Internal volume	**T9...0**	**39.4 µl**
	T9...4, T9...9	**116.6 µl**

Wetted materials

Parameter	
Seals	**EPDM or FFKM**
Body	**PEEK (polyetheretherketone)**
Manifold	**PEEK (polyetheretherketone)**

Filtration

5 micron recommended

Performance characteristics

Part no.	Pressure [1]	Orifice size	Leak rate	Response
T9...P100...12...	**0 to 100 psi**	**0.030 in (0.76 mm)**	**Bubble tight**	**< 18 ms**
T9...P100...24...				
T9...P060...12...	**0 to 60 psi**			
T9...P060...24...				
T9...P040...12...	**0 to 40 psi**	**0.061 in (1.55 mm)**		
T9...P040...24...				
T9...P020...12...	**0 to 20 psi**			
T9...P020...24...				

Specification note

(1) Proof pressure face seal version: 200 PSI (13.8 bar),
Proof pressure 1/4-28 and M6 versions: 150 PSI (10.3 bar).

First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

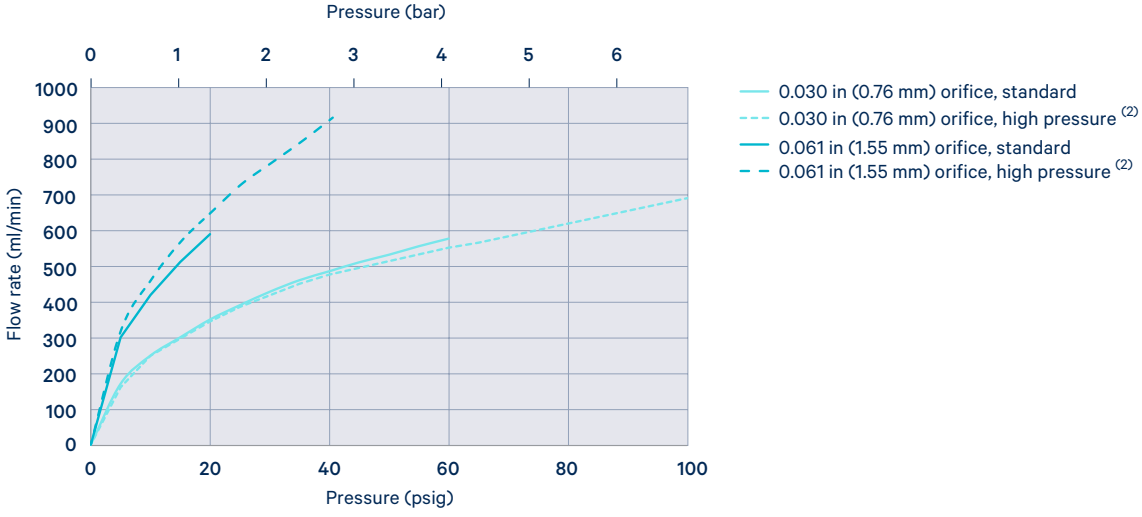
Chemical compatibility chart

	Diaphragm		Other Wetted Materials
Chemical	FFKM	EPDM	PEEK
DI water	**Excellent**	**Excellent**	**Excellent**
Methanol	**Excellent**	**Excellent**	**Excellent**
Isopropanol	**Excellent**	**Excellent**	**Excellent**
Ethanol	**Excellent**	**Excellent**	**Excellent**
Acetonitrile	**Excellent**	**Excellent**	**Excellent**
Tetrahydrofuran	**Excellent**	**Not recommended**	**Excellent**
Toluene	**Excellent**	**Not recommended**	**Excellent**
Organic acids - dilute	**Excellent**	**Excellent**	**Excellent**
Non organic acids - dilute	**Excellent**	**Excellent**	**Excellent**
Bases - dilute	**Excellent**	**Excellent**	**Excellent**
Saline	**Excellent**	**Excellent**	**Excellent**
Bleach 12 %	**Good**	**Good**	**Excellent**
Sodium hydroxide 20 %	**Excellent**	**Excellent**	**Excellent**

Compatibility legend
Excellent: Minimal or no effect
Good: Possible swelling and or loss of physical properties
Doubtful: Moderate or severe swelling and loss of physical properties
Not recommended: Severe effect and should not be considered

Typical flow curve

(Tested with water @ 24 °C)



Note
(2) Requires hit and hold circuit.

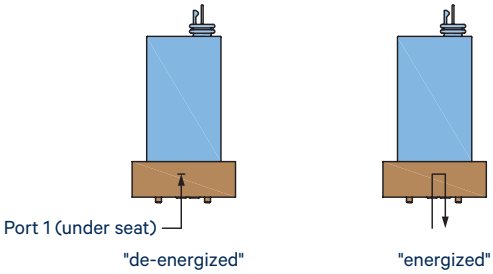
First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Pneumatic schematics – pressure

2-way face seal

Pressure under seat



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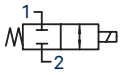
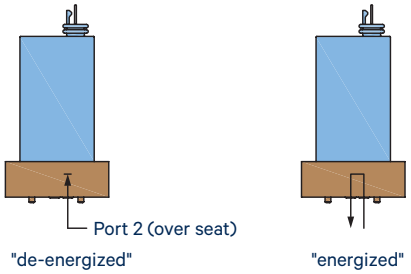
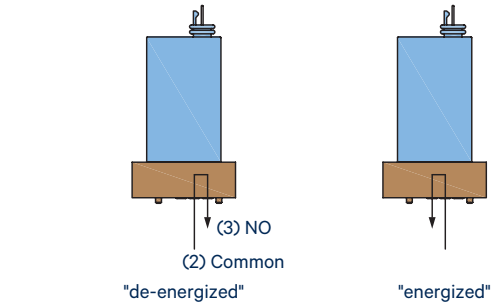


Pressure over seat



3-way face seal

Pressure port 2



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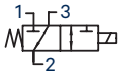
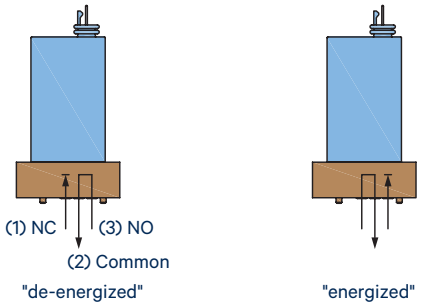
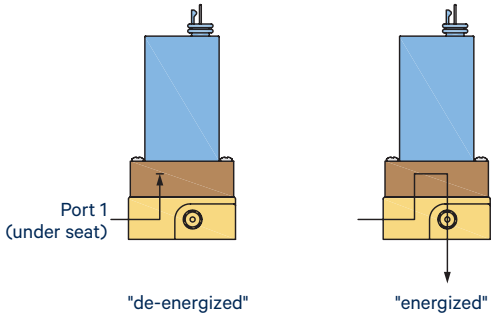


Pressure ports 1 & 3



2-way 1/4-28 or M6

Pressure under seat



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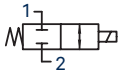
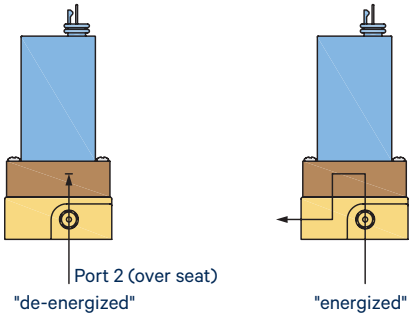
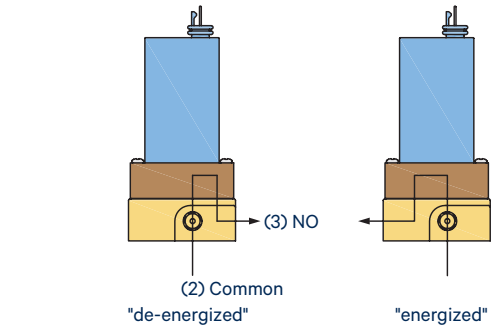


Pressure over seat



3-way 1/4-28 or M6

Pressure port 2



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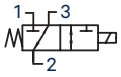
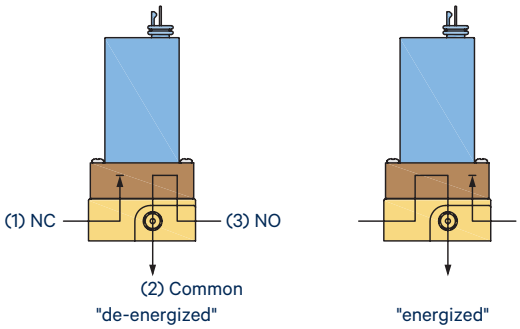


Pressure ports 1 & 3



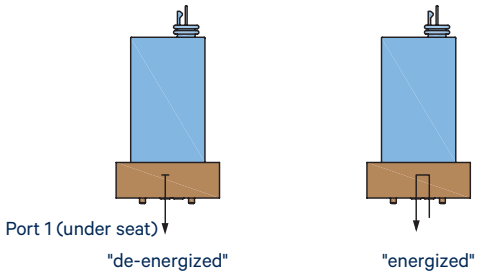
First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Pneumatic schematics – vacuum

2-way face seal

Vacuum under seat



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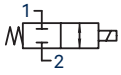
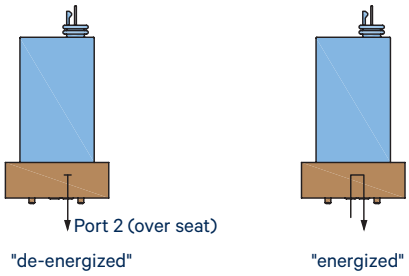
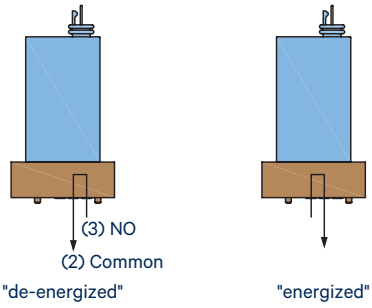


Vacuum over seat



3-way face seal

Vacuum port 2



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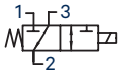
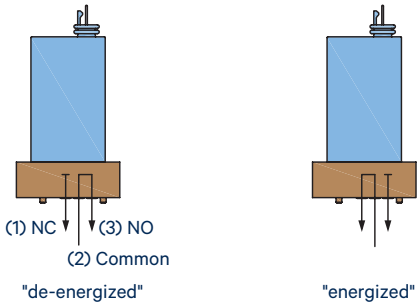
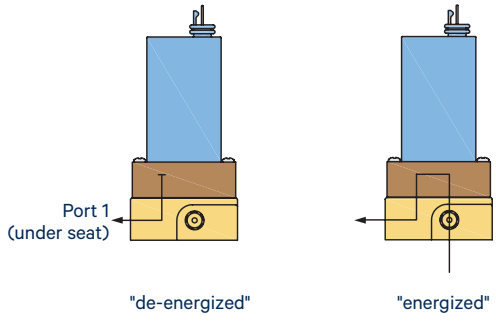


Vacuum ports 1 & 3



2-way 1/4-28 or M6

Vacuum under seat



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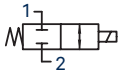
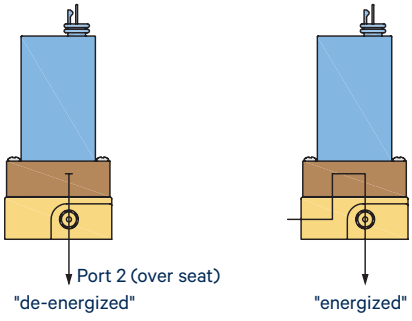
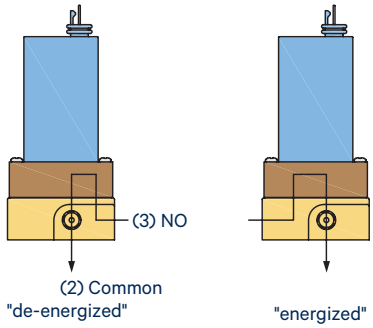


Vacuum over seat



3-way 1/4-28 or M6

Vacuum port 2



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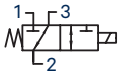
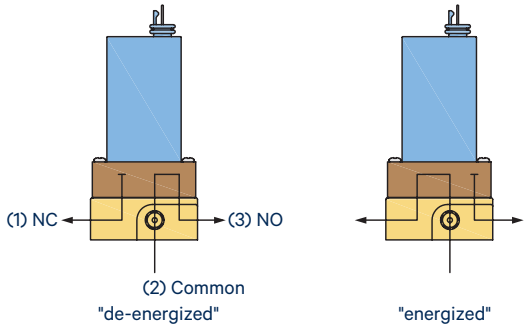


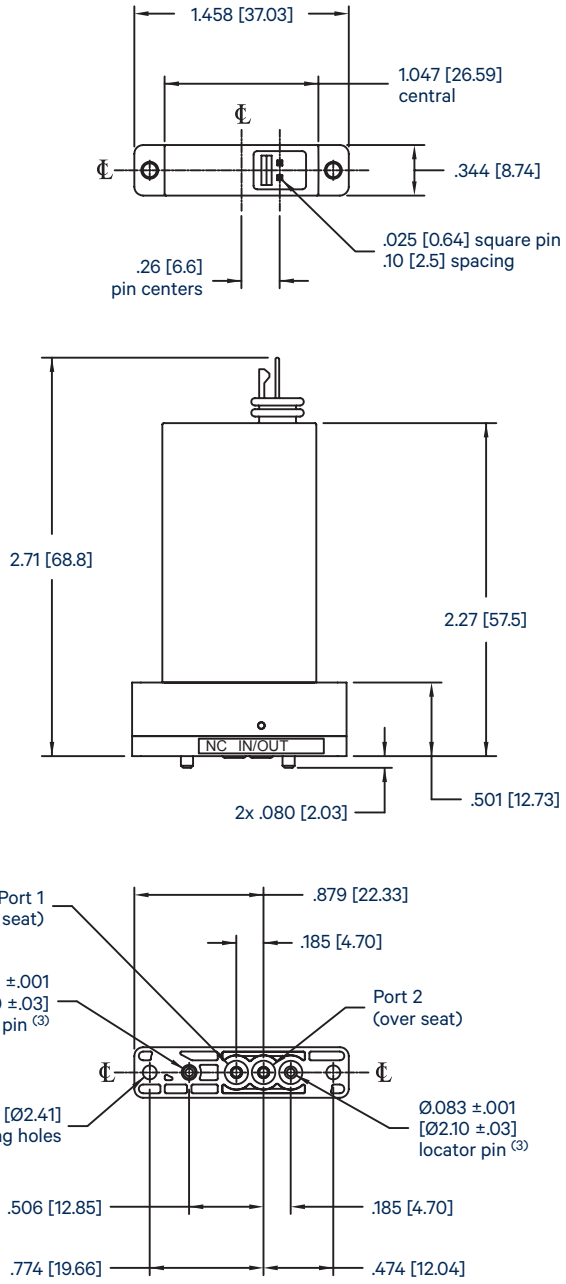
Vacuum ports 1 & 3



R9 Valve – 9 mm miniature diaphragm isolation valve

Dimensional drawing

2-way face seal



dimensions in inch [mm]

Specification note

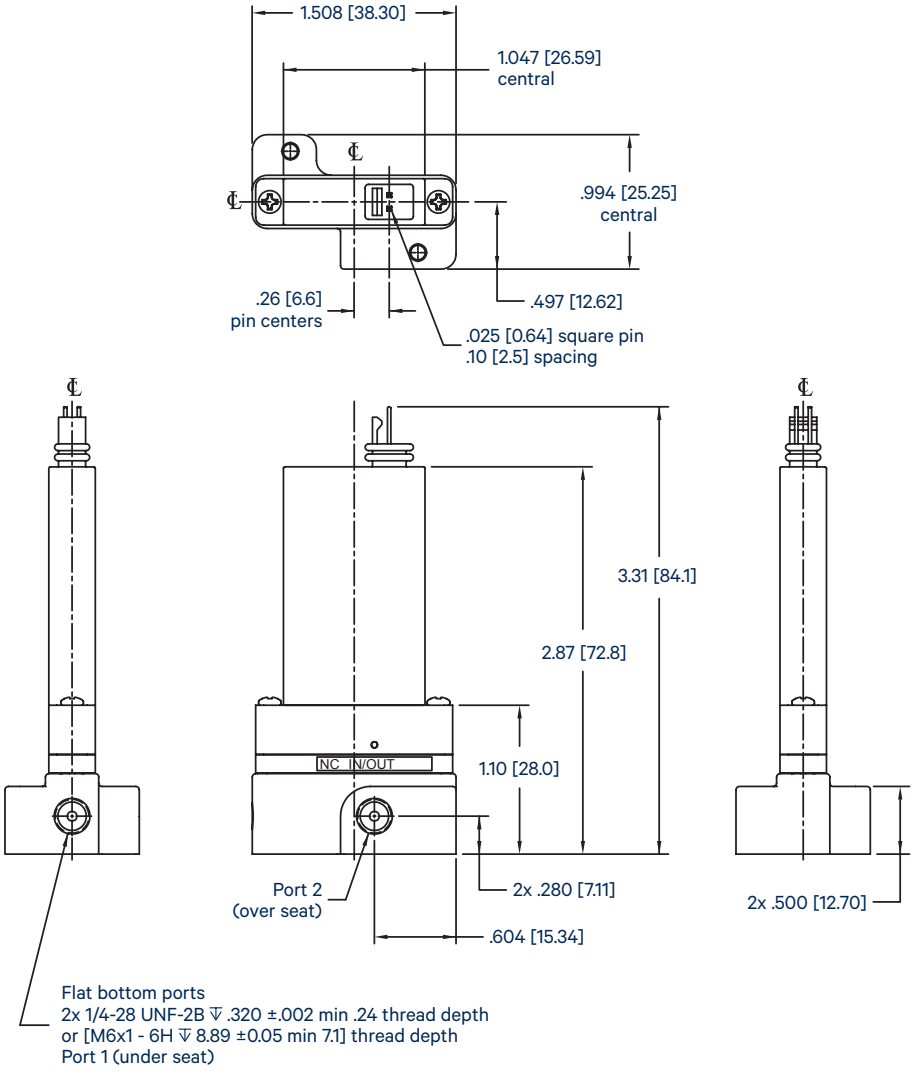
(3) Locator pins help prevent mounting the valve backwards and ensure proper alignment of the ports to the fluid passageways in the manifold. Pins prevent a 2-way valve from being mounted in the place of a 3-way valve and vice-versa.

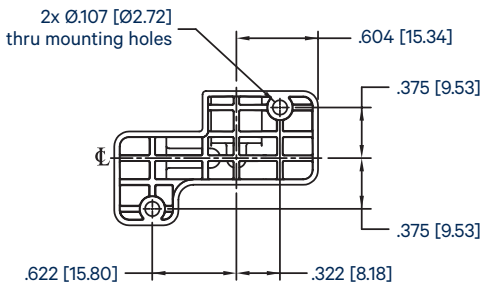
First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Dimensional drawing

2-way 1/4-28 or M6 sub base





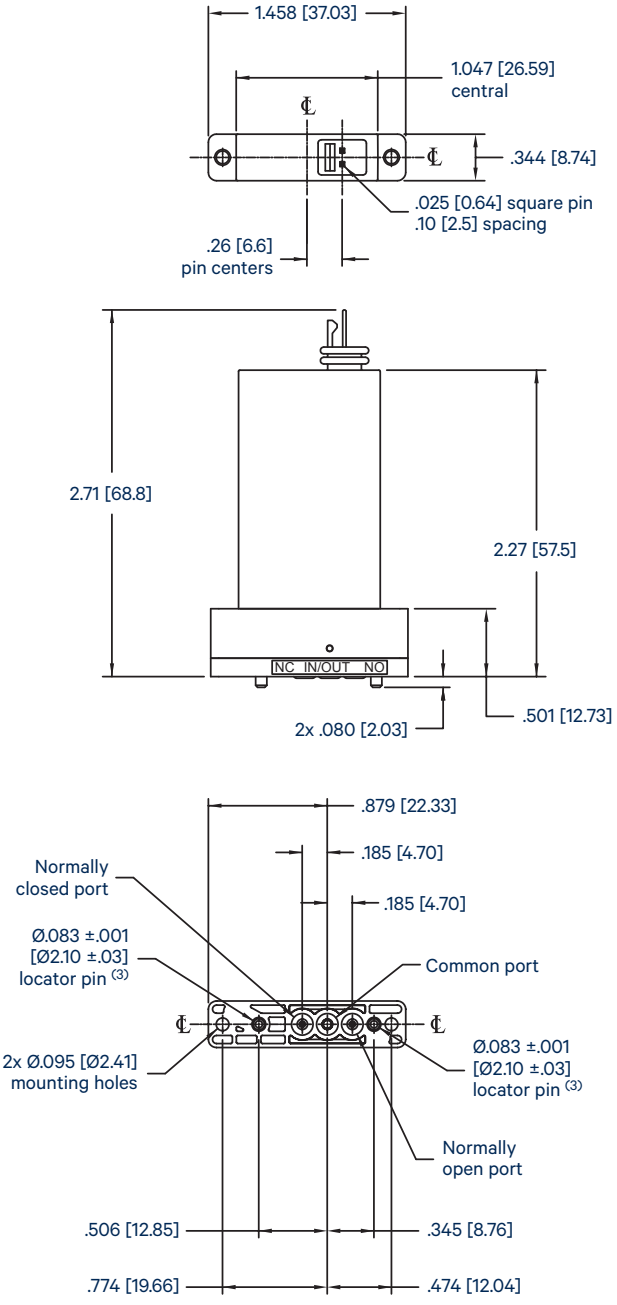
dimensions in inch [mm]

First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Dimensional drawing

3-way face seal



dimensions in inch [mm]

Specification note

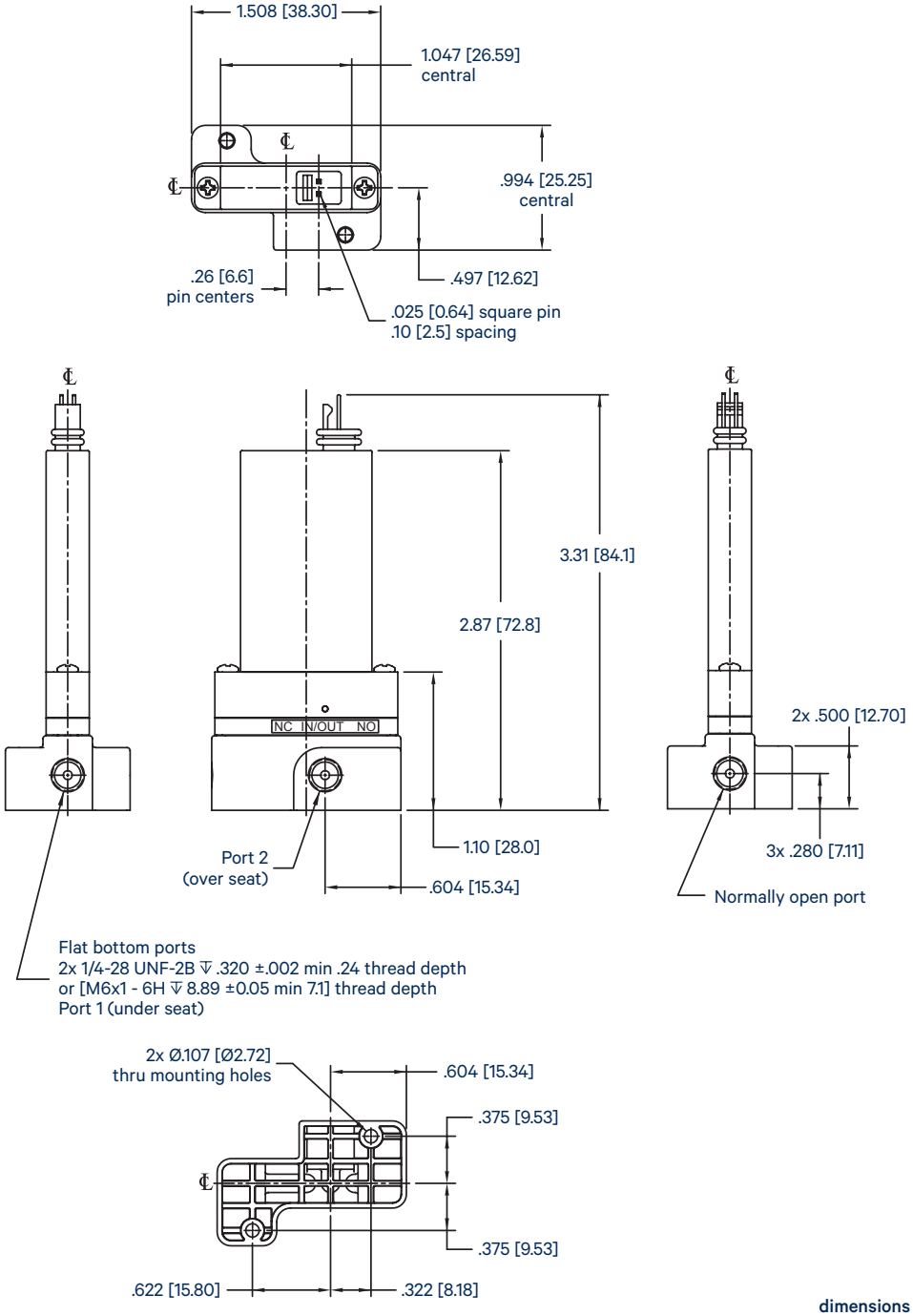
(3) Locator pins help prevent mounting the valve backwards and ensure proper alignment of the ports to the fluid passageways in the manifold. Pins prevent a 2-way valve from being mounted in the place of a 3-way valve and vice-versa.

First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Dimensional drawing

3-way 1/4-28 or M6 sub base

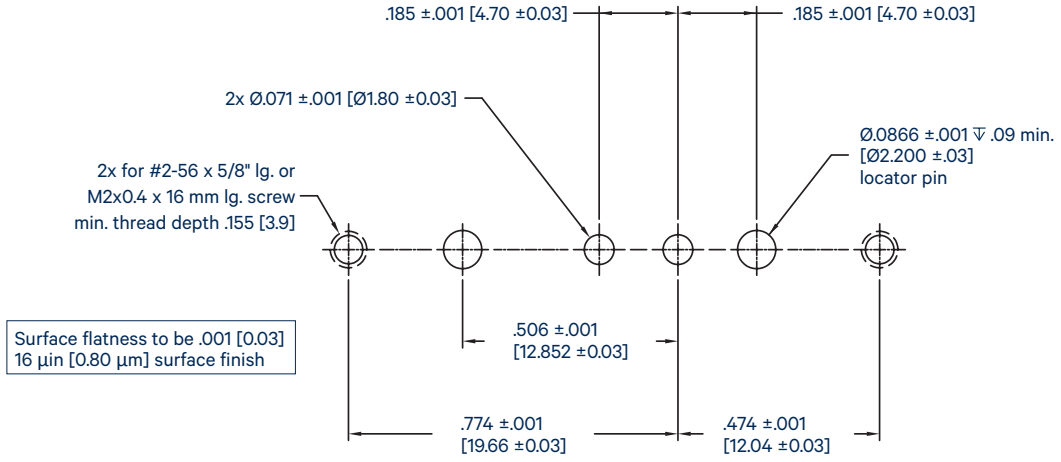


dimensions in inch [mm]

R9 Valve – 9 mm miniature diaphragm isolation valve

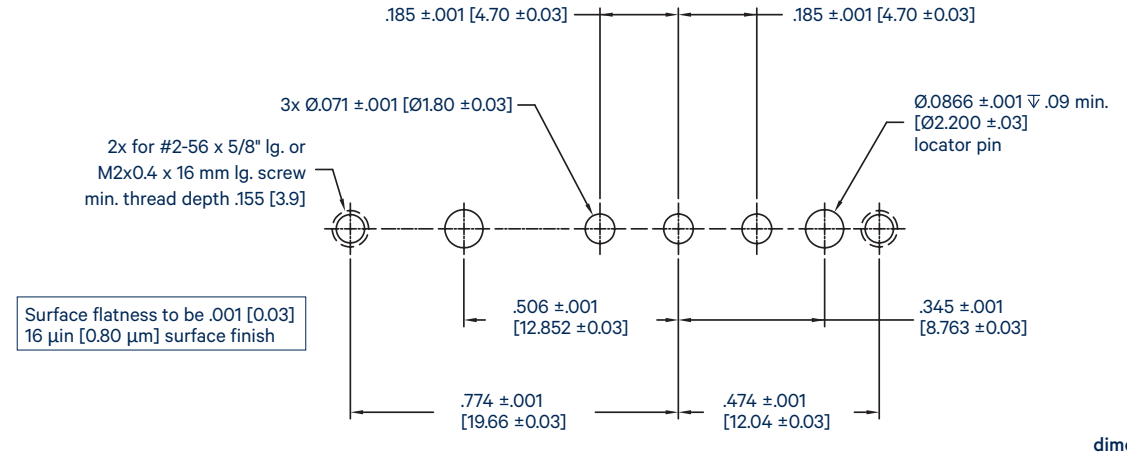
Manifold mount diagram

2-way manifold interface



dimensions in inch [mm]

3-way manifold interface



dimensions in inch [mm]

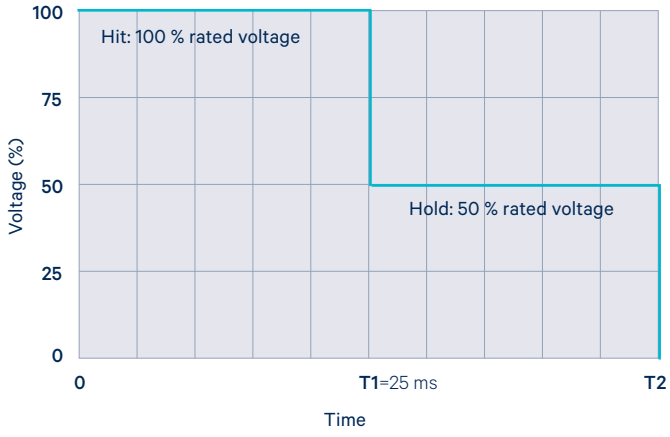
First Sensor

R9 Valve – 9 mm miniature diaphragm isolation valve

Hit and hold specifications

Hit and Hold is a method for driving valves that can be used to reduce power consumption and heat generation while maintaining valve performance specifications. The valve is "hit" with the full rated voltage for some time period to open it (T1 in the graph) and then "held" open with substantially reduced voltage until the desired pulse length is reached (T2 in the graph). The following table shows the possible holding voltages and power consumption for our standard 12 and 24 VDC solenoids. A hit and hold circuit is required for use with the high pressure version.

Typical "Hit" and "Hold" control method



Electrical requirements

Voltage		High pressure versions [2] 100 psi, 40 psi				Standard versions 60 psi, 20 psi			
Rated (VDC)	Hold (VDC)	Hit power (watts)	Hold power (watts)	Resistance (Ω ±5 % @ 20 °C)	Current (mA)	Hit power (watts)	Hold power (watts)	Resistance (Ω ±5 % @ 20 °C)	Current (mA)
12	**6**	**7.1**	**1.8**	**20.5**	**592**	**4.5**	**1.1**	**32**	**375**
24	**12**	**7.1**	**1.8**	**81**	**296**	**4.8**	**1.2**	**120**	**200**

Note
(2) Requires hit and hold circuit.

Ordering information

Part	Ways		Pressure		Function		Elastomer		Voltage		Electrical		Porting	
T9	**2***	2-way	**P020**	20 psi	**C**	NC	**C**	FFKM	**12**	12 VDC	**E**	Pins, 2.54 mm	**0**	Manifold mount
	3**	3-way	**P040**	40 psi	**L**	Universal	**E**	EPDM	**24**	24 VDC	**F**	Flying leads	**4**	1/4-28
	* only as NC		**P060**	60 psi									**9**	M6
	** only as universal		**P100**	100 psi										

Accessories (not supplied with the valve)	
M2-0004-630-PNPH	Mounting screw, SST 18-8, metric, 16 MM LG (2 required)
002-0056-625PNPH	Mounting screw, SST 18-8, 2-56, 5/8" LG (2 required)