



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding





# General Purpose Solenoid Valves Skinner™ and Gold Ring™ Valves

**Effective September 2011** 





#### **About Fluid Control Division**

Parker Fluid Control Division (FCD) is a world-wide industry leader of solenoid valves that control motion, flow and pressure in a wide variety of applications in all markets. Since 1947, it has built a strong reputation as a recognized leader in solenoid valve technology and design – first as Skinner Valve Division, then with the addition of Lucifer Division (Geneva) in 1984, Gold Ring (Fluidex Division) in 1986 and SCEM (Italy) in 1989.

With manufacturing facilities strategically placed around the world, FCD is prepared to meet your global needs. Facilities located in the United States, Brazil, Italy, Switzerland, China, South Korea and India are equipped with a complete staff of experienced design engineers – among the best in the business – that are capable of rapidly completing customized valve designs for specific user requirements. Each facility has well equipped evaluation and testing laboratories to ensure proper valve operation, long cycle life, and optimum reliability.

With sales affiliates worldwide, an extensive distribution network and broad product breadth, FCD is in a unique position to service the world's requirements for solenoid valves.

**Together we can** control a wide variety of media, in hundreds of markets, under all conditions with thousands of designs that have been qualified to the most rigorous industry standards.

You'll find our products in OEM equipment for markets such as transportation, food & beverage, medical &





Fluid Control Division Facility, Madison, MS.

instrumentation, fuel dispensing, refrigeration and air conditioning, industrial dishwashing and laundry equipment, as well as being specified on applications in process markets such as oil & gas, food processing, pharmaceutical, pulp & paper, tire & rubber, etc.

**Together we can** work with you to cross over most all major competitive products to our wide variety of standard valves or work with your application specifications to select one of our unique product solutions.

All FCD valves come with an industry leading two year warranty against defects in workmanship.

#### **Distribution**

Our distribution network stocks 2-way, 3-way and 4-way valves that are engineered to control virtually any media over a wide range of applications. For a complete listing of our distribution network, please visit www.parker.com/fcd and select "where to buy."

FCD partners with our extensive distribution network and their end-users to ensure that their needs are met and all systems kept up and running!

#### System Solutions: Engineering Your Success

Besides offering superior products through our distribution network, FCD also works with distribution and OEMs to find value added solutions to satisfy your application's unmet needs.

**Together we can** partner with you and utilize the power of Parker's expertise in technology and innovation to create a world class system solution just for you.

FCD has cutting edge design and prototyping capabilities along with a staff of the industry's top engineers that will assist you with creating your next generation of solenoid valve solutions.

Combine all that with Parker's Premier Customer Service, and you've got a real winning team to partner with.

ISO 9001:2008



#### **WARNING - USER RESPONSIBILITY**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

The product described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

#### **OFFER OF SALE**

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated on the separate page of this document entitled "Terms and Conditions of Sale".

## **Table of Contents**

Catalog Section	Product Description	In this Section	Page
How to Orde			ii
2-Way	2-Way Miniature Direct Acting	20CCxxx, 20CFxxx	A1
	2-Way Direct Acting	7121KBNxx, 7122KBNxx, 71215SNxx, 71225SNxx, 71235SNxx, 71295SNxx, 02F2001xx, 04F20C1xx, 04F2001xx, 04F20C2xx, 06F20C2xx, 08F20C2xx, 08F2002xx, 12F20C2xx, 12F2002xx	A5
	2-Way Direct Lift, Pilot & Remote Operated	7221GBNxx, 7321GBNxx, 7322GBNxx, 72218BNxx, 72228BNxx, 7321KBNxx, 73212BNxx, 73222BNxx, 73218BNxx, 73212BNxx, 73222BNxx, 74232BNxx, 75232BNxx, 04F25C2xx, 04F2502xx, 06F22C2xx, 06F22C2xx, 06F23C2xx, 06F23C2xx, 06F23C2xx, 06F23C2xx, 06F23C2xx, 06F23C2xx, 08F23C2xx, 08F23C2xx, 08F23C2xx, 08F23C2xx, 08F23C2xx, 08F23C2xx, 08F23C2xx, 08F23C2xx, 12F23C2xx,	A27
	2-Way High Pressure Direct & Pilot Operated	16F24O6xx, 16F25C2xx, 16F25O2xx, 20F24C2xx, 20F24O2xx, 24F24C2xx, 24F24C2xx, 24F24C6xx, 24F24O6xx 7121KBNxxF, 7121KBNxxR, 7122KBNxxF, 7321HBNxxN, 7322HBNxxN, 7322HBNxxV, 71215SNxxF, 71216SNxxL, 71216SNxxT 71216SNxxU, 71225SNxxF, 73216BNxxT, 04F28C1xx, 06F28C1xx, 08F28C1xx, 08F28O1xx, 12F28C1xx, 12F28C1xx, 12F28O1xx	A61
	2-Way Anti-Water Hammer & Slow Closing	7221GBNxxxCO, 7321GBNxxxMC, 7321KBNxxxWO, 7322GBNxxxCO	A75
3-Way	3-Way Miniature Direct Acting	30CCxx, 30CFxx, 30CUxx	B1
	3-Way Direct Acting	7131KBNxx, 7131TBNxx, 7131TVNxx, 7132TBNxx, 7133KBNxx, 7133TBNxx, 7133TVNxx, 71315SNxx, 71335SNxx, 71385SNxx, 71395SNxx, A3LB2127, A3LB2127, A3LB2252, A36LB2126, A36LB2176, A36LB2251, A5LB2127, A5LB2177, A56LB2126, A56LB2176, 02F30C1xx, 02F20C3xx, 02F3001xx, 02F30U1xx, 02F30U3xx, 04F30C2xx, 04F30C3xx, 04F30U3xx, 04F30C3xx, 04F30C3xx, 04F30U3xx	B5
	3-Way Pilot & Remote Operated	73312BNxx, 73317BNxx, 73317VNxx, 73322BNxx, 73382BNxx 74317BNxx, 74317VNxx, 74332BNxx, 75332BNxx	B25
	3-Way High Pressure	7131KBNxxF, 7131KBNxxR, 7133KBNxxV, 71335SNxxN	B41
	3-Way Quick Exhaust	7131EBNxx, 71313SNxx, 04F35C1xx, 04F3501xx, 04F38C1xx, 04F3801xx, 06F38C1xx, 06F3801xx	B45
4-Way	4-Way Direct Acting & Pilot Operated	71417BNxx, 71477BNxx, 7341LANxx, 73417BNxx, 73417VNxx, 73419ANxx, 73477BNxx, 73477VNxx, 74417BNxx, 74417VNxx, V933Lxxx, V935Lxxx, V955Lxx, 04F48S2xx	C1
	3-Way/4-way Direct Mount NAMUR	71315AKDKxx, 73417AKDKxx, 73417BKDPxx, 73417VKDKxx, 73477AKDKxx, 73477BKDPxx, 73477VKDKxx, 74417BKDPxx	C17
Specialty	Manifold Mounted Miniature Car	tridge Valves	D3
Valves	MB 3-Way Miniature - Plastic		D9
	Dry Operator 2-Way		D13
	Hot Water & Steam		D17
	Intrinsically Safe Series		D35
	Manual Reset 3-Way		D53
	Hydraulic 2-Way & 3-Way		D57
	Magnelatch® Coil Option		D63
	Fuel Dispensing Valves		D67
	Fuel Selector Manifold		D71
	CNG Valves		D73
	Timer Drain Valves		D75
Coils	Coils and Enclosures	Coil Charts 1-12 as referenced in each Product Section of this Catalog	E1
	Coil Charts 1-6	Gold Ring <sup>™</sup> brand (Includes Part Numbering Schematic)	E2-E9
	Coil Charts 7, 8	Skinner <sup>™</sup> brand (Includes Part Numbering Schematic)	E10-E26
	Coil Chart 9	2-way/3-way Miniature and Manifold Mounted (Includes Part Numbering Schematic)	E27-E30
	Coil Charts 10-12	Skinner™ brand	E31
Technical	Technical Information	Key Technical Reference Information	F1
	Parker-FCD Safety Guide		F26
	Opportunity Data Sheet	Informational Form for New Application Inquiry	F28



# How to order (see coil section for part numbering charts)

## Valves using Coil Charts 1-6 (Gold Ring Series Valves)

**Step 1:** Select the pressure vessel catalog number based on the application requirements. The catalog number is specified in the individual catalog sections.

**Step 2:** Select one enclosure code, one coil termination code and one voltage code. Standard leads are 18-inches long with all enclosures, except splice box where six-inch leads are standard.

**Step 3:** When separate valve and solenoid, the last two digits of the valve must match the first two digits of the solenoid. **Example:** Valve: 04F20C1103AAF Solenoid: AF4C05

**Step 4:** Valves with enclosure Types 7 & 9 must be ordered factory assembled and not as modular.

## Valves using Coil Charts 7, 8, 10, 11 & 12 (Skinner 7000 Series Valves)

#### Ordering items 1 and 2, fully assembled valves

**Step 1:** Select the pressure vessel catalog number based on the application requirements. The catalog number is specified in the individual catalog sections.

**Step 2:** Use the mechanical options table, if required, to write the option code in place of the last two pressure vessel digits - "00."

**Step 3:** Select the appropriate integrated coil, and enter (NO=Nut & Washer as the 13th/14th digits), or enclosure and conventional coil.

**Step 4:** Use the electrical options table, if required, to write the option code in place of the last two coil digits.

**Step 5:** Use the voltage code to specify the correct voltage for the valve.

Item	Description
1	Fully assembled valves with integrated coils
2	Fully assembled valves with conventional coils and enclosures

Pressure Vessels	Enclosure		Voltage Code
7121KBN2NV00	+ N0 -	C111 -	+ P3

Example: 7121KBN2NV00N0C111P3

# **Valves using Coil Chart 9** (Miniature 2-way/3-way valves and Miniature Manifold Mounted Cartridge Valves)

These valves can be ordered in two parts: pressure vessel and solenoid coil

To order modular units, select the pressure vessel, then mix and match one of the three different coil styles to meet your application requirement.

The available modular coils consist of the following coils:

- C4 conduit coil
- B4 leaded coil
- D6 DIN coil

#### To order pressure vessel:

Choose your pressure vessel from the the technical specification pages. The pressure vessel will contain the required coil retaining nut.

#### To order coil:

- Select either the C4 (Conduit), B4 (leaded) or D6 (DIN) coil required.
- Select voltage code
- Add voltage code to end of the coil number
- The coil assembly will contain the O-ring seals.

#### Assembled Valve Units:

To order a complete valve follow these three easy steps:

**Step 1:** Choose your pressure vessel from the technical specification pages.

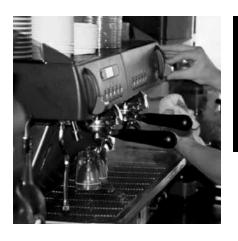
**Step 2:** Select either the encapsulated (Integrated) or conventional coil. Apply that two-digit code to the end of the pressure vessel part number.

**Step 3:** Lastly, go to the voltage code chart and select the one digit voltage code and add the code to the end of the coil code to create the final complete assembled valve part number.



# 2-Way Miniature

Direct Acting Valves 1/8" NPT



## **General Description:**

2-way Miniature Direct Acting valves are available in Normally Closed and Normally Open constructions with interchangeable AC/DC coils. Valves are standard with 303 stainless steel bodies and FKM seals. These compact valves are durable with the potential for long life. Under lab conditions, these valves have survived 20 million cycles.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### **Standard Materials of Construction**

Please refer to page A4

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction.

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50

DC -12, 24

For other voltages – consult factory





#### **Coil Classification:**

Class F standard/Class H available AC & DC coils are interchangeable on the same pressure vessel.

#### **Agency Approvals:**

Standard valves with NEMA 4X are C-UL-US Listed or Recognized. For additional details, consult factory.

NSF Certification available on 2-way Normally Closed Valves. (Consult Factory)

## Maximum Ambient Temperature

135°F (AC)/125°F (DC)

In absence of moisture, applications at temps as low as -20°F are possible. Please refer to page A4 for details.

# Applications:

- Instrumentation equipment
- Analyzers and diagnostic equipment
- Gas analyzers
- Medical and dental equipment
- · Portable welding equipment
- · Spraying equipment
- Lubrication equipment
- Beverage dispensing & vending machines
- Oil burners
- · Humidification and misting equipment
- · Mobile fuel shut off
- Textile and dry cleaning equipment
- Air horns
- Pneumatic fan clutch
- Irrigation equipment

#### 2-Way Miniature Direct Acting - Normally Closed - Stainless Steel

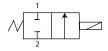
2-Wa	y millia	tui e Di	rect	Acting	- MOLI	Hally	Cluse	u - Stai	illess 3	ieei		
			Operating Pressure Differential (MOPD) PSI			Max.			Refe	rence		
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TEC	CHNICAL	SPECIF	ICATIO	ONS								
1/8	3/64	0.06	0	950	950	950	8.5	240	FKM	20CC02EV4	9	A1
1/8	1/16	0.10	0	625	625	625	8.5	240	FKM	20CC02GV4	9	A1
1/8	5/64	0.15	0	450	450	450	8.5	240	FKM	20CC02JV4	9	A1
1/8	3/32	0.22	0	320	320	320	8.5	240	FKM	20CC02LV4	9	A1
1/8	7/64	0.28	0	245	245	245	8.5	240	FKM	20CC02MV4	9	A1
1/8	1/8	0.32	0	175	175	175	8.5	240	FKM	20CC02PV4	9	A1
1/8	5/32	0.38	0	100	100	100	8.5	240	FKM	20CC02QV4	9	A1
DC TE	CHNICAL	. SPECIF	ICATIO	ONS								
1/8	3/64	0.06	0	390	390	390	8	240	FKM	20CC02EV4	9	A1
1/8	1/16	0.10	0	255	255	255	8	240	FKM	20CC02GV4	9	A1
1/8	5/64	0.15	0	180	180	180	8	240	FKM	20CC02JV4	9	A1
1/8	3/32	0.22	0	130	130	130	8	240	FKM	20CC02LV4	9	A1
1/8	7/64	0.28	0	100	100	100	8	240	FKM	20CC02MV4	9	A1
1/8	1/8	0.32	0	60	60	60	8	240	FKM	20CC02PV4	9	A1
1/8	5/32	0.38	0	30	30	30	8	240	FKM	20CC02QV4	9	A1

#### 2-Way Miniature Direct Acting - Normally Open - Stainless Steel

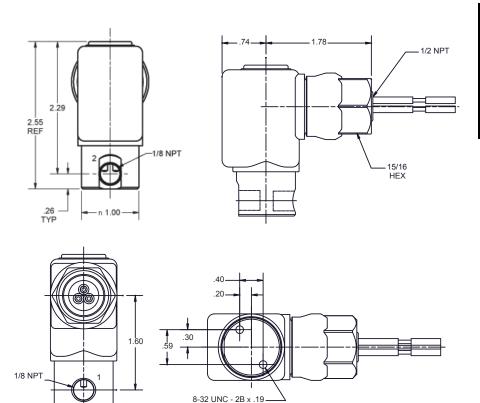
2-way	y minia	ture Di	rect /	Acting	- Norr	nally	upen -	- Stain	less Ste	el		
				Operating Pressure Differential (MOPD) PSI				Max.			Refe	rence
Port	Orifice	Flow		Air,				Media			Keie	
Size	Size	Factor		Inert		Light		Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TEC	CHNICAL	SPECIF	ICATIO	NS								
1/8	1/32	0.02	0	375	375	375	10	240	FKM	20CF02AV4	9	A2
1/8	3/64	0.06	0	230	230	230	10	240	FKM	20CF02EV4	9	A2
1/8	1/16	0.10	0	150	150	150	10	240	FKM	20CF02GV4	9	A2
1/8	5/64	0.14	0	105	105	105	10	240	FKM	20CF02JV4	9	A2
1/8	3/32	0.20	0	80	80	80	10	240	FKM	20CF02LV4	9	A2
DC TEC	CHNICAL	SPECIF	ICATIO	ONS								
1/8	1/32	0.02	0	375	375	375	8	240	FKM	20CF02AV4	9	A2
1/8	3/64	0.06	0	230	230	230	8	240	FKM	20CF02EV4	9	A2
1/8	1/16	0.10	0	150	150	150	8	240	FKM	20CF02GV4	9	A2
1/8	5/64	0.14	0	105	105	105	8	240	FKM	20CF02JV4	9	A2
1/8	3/32	0.20	0	80	80	80	8	240	FKM	20CF02LV4	9	A2



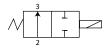




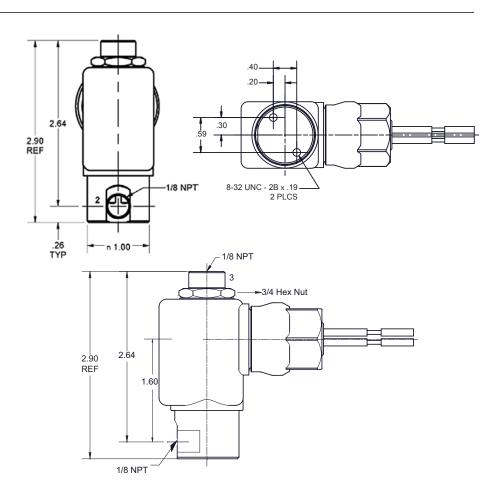
2-Way Normally Closed: 20CCxx Port Identification: 2-In/1-Out







2-Way Normally Open: 20CFxx Port Identification: 2-In/3-Out





#### 2-Way Miniature Direct Acting Materials of Construction\*\*

Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
										_	
20CC02	8.5 (AC)	2WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
20CC02	8 (DC)	2WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F
20CF02	10 (AC)	2WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
20CF02	8 (DC)	2WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F

<sup>\*</sup> Shows the first 6 digits of the pressure vessel part number.

Check out the 2-Way and 3-Way Manifold Mounted Miniature Cartridge valves in the Specialty Section of this catalog.





## **Product Features:**

- · Space saving approach
- Less manifold machining means lower overall manifold cost
- No manifold orifices to machine or press in
- Cartridge valves are 100% tested
- Easy to assemble & disassemble with a 5/32" hex wrench. (Torque = 25-35 in-lbs).
- No loose parts: sleeve, plunger, spring and orifice are pressed together as one unit
- Available with all coils and enclosures shown on Chart 9 in Coil Section of this catalog.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# 2-way

Direct Acting Valves 1/8" - 3/4" NPT



## **General Description:**

2-way Direct Acting valves are used in a wide variety of applications that require zero pressure differential and medium to high pressures and flow. These valves are available in a variety of elastomers as well as, brass and stainless construction.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

### Standard Materials of Construction

Please refer to page A24

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water and Light Oil (300 SSU). Additional fluids compatible with alternate materials of construction (consult factory).

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120 For other Voltages - consult factory



#### **Coil Classification:**

Class F standard Class H available

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

# **Maximum Ambient Temperature** 150°F

Please refer to page A24 for details.

## Applications:

- Instrumentation equipment
- Analyzers and diagnostic equipment
- Medical and dental equipment
- Portable welding equipment
- Spraying equipment
- Lubrication equipment
- Beverage dispensing & vending machines
- Oil burners
- Humidification and misting equipment
- Mobile fuel shut off
- Textile and dry cleaning equipment
- Air horns
- Pneumatic fan clutch
- Irrigation equipment



#### 2-Way Direct Acting - Normally Closed- Brass

_ '''	iy bii e		יי כי	J. IIIat	ty Clus		. 433					
					Pressu (MOPD)			Max.			D-f-	non a -
Port	Orifice	Flow		Air,				Media			Refe	rence
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	ECHNICA	AL SPEC	IFICA	TIONS								
1/8	1/16	0.11	0	1000	1000	1000	10	165	PCTFE	7121KBN1GF00	7	A13
1/8	1/8	0.31	0	365	365	365	10	165	PCTFE	7121KBN1NF00	7	A13
1/4	3/64	0.06	0	750	750	500	6	180	NBR	04F20C1103AAF	1	A3
1/4	1/16	0.11	0	1000	1000	1000	10	165	PCTFE	7121KBN2GF00	7	A13
1/4	3/32	0.17	0	360	340	160	6	180	NBR	04F20C1106AAF	1	A3
1/4	1/8	0.31	0	365	365	365	10	165	PCTFE	7121KBN2NF00	7	A13
1/4	1/8	0.31	0	145	145	145	10	185	FKM	7121KBN2NV00	7	A13
1/4	1/8	0.35	0	300	300	200	11	180	NBR	04F20C1108ACF	4	A16
1/4	1/8	0.35	0	140	165	90	6	180	NBR	04F20C1108AAF	1	A3
1/4	5/32	0.50	0	180	200	145	11	180	NBR	04F20C2110ACF	4	A4
1/4	5/32	0.52	0	120	120	120	10	185	FKM	7121KBN2QV00	7	A13
1/4	7/32	0.72	0	100	100	100	16	180	NBR	04F20C2114BDF	5	A4
1/4	13/64	0.76	0	80	80	80	10	185	FKM	7121KBN2SV00	7	A13
1/4	9/32	0.88	0	90	100	90	16	200	NBR	04F20C2118BDF	5	A4
3/8	5/32	0.52	0	150	150	145	11	180	NBR	06F20C2110ACF	4	A7
3/8	7/32	0.72	0	100	100	100	16	200	NBR	06F20C2114BDF	5	A7
3/8	1/4	0.83	0	55	55	55	10	185	FKM	7121KBN3UV00	7	A13
3/8	9/32	0.85	0	90	80	80	16	200	NBR	06F20C2118BDF	5	A7
3/8	5/16	1.10	0	20	20	-	11	180	NBR	06F20C2120ACF	4	A7
3/8	5/16	1.10	0	15	12	_	6	180	NBR	06F20C2120AAF	1	A8
1/2	7/16	2.50	0	35	35	35	22	185	FKM	7121KBN44V00	8	A14
1/2	7/16	2.50	0	17.5	17.5	17.5	10	185	FKM	7121KBN44V00	7	A14
1/2	7/16	2.80	0	15	15	-	16	200	NBR	08F20C2128ADF	5	A9
3/4	3/4	5.00	0	4	4	_	16	200	NBR	12F20C2148ADF	5	A9



#### 2-Way Direct Acting - Normally Closed- Brass (Continued)

2-44	ay Dire	LL ACUII	19 - N	ormai	ty Clus	eu- D	rass (	Contin	ueuj			
			Operating Pressure Differential (MOPD) PSI			Max.			Refe	rence		
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
DC TE	CHNICA	L SPECI	FICAT	ONS								
1/8	1/16	0.11	0	700	700	700	22	165	PCTFE	7121KBN1GF00	8	A13
1/8	1/16	0.11	0	435	435	435	10	165	PCTFE	7121KBN1GF00	7	A13
1/8	1/8	0.31	0	205	205	205	22	165	PCTFE	7121KBN1NF00	8	A13
1/8	1/8	0.31	0	125	125	125	10	165	PCTFE	7121KBN1NF00	7	A13
1/4	3/64	0.06	0	500	500	500	9.5	120	NBR	04F20C1103A1F	3	A3
1/4	1/16	0.11	0	700	700	700	22	165	PCTFE	7121KBN2GF00	8	A13
1/4	1/16	0.11	0	435	435	435	10	165	PCTFE	7121KBN2GF00	7	A13
1/4	3/32	0.17	0	150	125	125	9.5	120	NBR	04F20C1106A1F	3	A3
1/4	1/8	0.31	0	205	205	205	22	165	PCTFE	7121KBN2NF00	8	A13
1/4	1/8	0.31	0	125	125	125	10	185	FKM	7121KBN2NV00	7	A13
1/4	1/8	0.31	0	125	125	125	22	185	FKM	7121KBN2NV00	8	A13
1/4	1/8	0.31	0	125	125	125	10	165	PCTFE	7121KBN2NF00	7	A13
1/4	1/8	0.35	0	75	70	70	11.5	150	NBR	04F20C1108A3F	6	A16
1/4	1/8	0.35	0	65	60	60	9.5	120	NBR	04F20C1108A1F	3	A3
1/4	5/32	0.52	0	75	75	75	22	185	FKM	7121KBN2QV00	8	A13
1/4	5/32	0.52	0	60	60	60	10	185	FKM	7121KBN2QV00	7	A13
1/4	13/64	0.76	0	40	40	40	22	185	FKM	7121KBN2SV00	8	A13
1/4	13/64	0.76	0	30	30	30	10	185	FKM	7121KBN2SV00	7	A13



#### 2-Way Direct Acting - Normally Closed- Brass (Continued)

			Operating Pressure Differential (MOPD) PSI					Max.			Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
DC TE	CHNICA	L SPECI	FICATI	ONS								
3/8	7/32	0.72	0	25	25	25	11.5	150	NBR	06F20C2114A3F	6	A7
3/8	1/4	0.83	0	20	20	20	10	185	FKM	7121KBN3UV00	7	A13
3/8	1/4	0.83	0	20	20	20	22	185	FKM	7121KBN3UV00	8	A13
3/8	9/32	0.85	0	14	14	14	9.5	150	NBR	06F20C2118A1F	3	A8
3/8	5/16	1.10	0	9	9	-	11.5	150	NBR	06F20C2120A3F	6	A7
3/8	5/16	1.10	0	3	3	=	9.5	120	NBR	06F20C2120A1F	3	A8
1/2	7/16	2.50	0	5	5	5	10	185	FKM	7121KBN44V00	7	A14
1/2	7/16	2.50	0	10	10	10	22	185	FKM	7121KBN44V00	8	A14
1/2	7/16	2.80	0	3	3	-	11.5	180	NBR	08F20C2128A3F	6	A9

#### 2-Way Direct Acting - Normally Closed- Stainless Steel

2-44	ay Dil e	CI ACIII	19 - 11	VI IIIat	ty Clus	eu- 3	taiiite	33 3166	7 L			
					Pressu (MOPD)			Max.			Refe	rence
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	ECHNICA	L SPECI	IFICATI	ONS								
1/8	3/64	0.06	0	1000	1000	1000	10	165	PCTFE	71215SN1EF00	7	A10
1/8	3/64	0.06	0	450	450	450	10	185	NBR	71215SN1EN00	7	A10
1/8	1/16	0.10	0	700	700	700	10	165	PCTFE	71215SN1GF00	7	A10
1/8	1/16	0.10	0	350	350	350	10	185	NBR	71215SN1GN00	7	A10
1/8	3/32	0.18	0	650	650	650	22	165	PCTFE	71215SN1KF00	8	A10
1/8	3/32	0.18	0	260	260	260	10	165	PCTFE	71215SN1KF00	7	A10
1/8	3/32	0.18	0	275	275	275	10	185	NBR	71215SN1KN00	7	A10
1/8	1/8	0.28	0	520	520	520	22	165	PCTFE	71215SN1MF00	8	A10
1/8	1/8	0.28	0	200	200	200	10	185	NBR	71215SN1MN00	7	A10
1/8	1/8	0.28	0	200	200	200	10	165	PCTFE	71215SN1MF00	7	A10
1/8	5/32	0.40	0	150	150	150	22	185	NBR	71215SN1QN00	8	A10
1/8	5/32	0.40	0	110	110	110	10	185	NBR	71215SN1QN00	7	A10
1/8	3/16	0.50	0	90	90	90	22	185	NBR	71215SN1SN00	8	A10
1/8	3/16	0.50	0	80	80	80	10	185	NBR	71215SN1SN00	7	A10
1/8	1/4	0.75	0	70	70	70	22	185	NBR	71215SN1VN00	8	A10
1/8	1/4	0.75	0	40	40	40	10	185	NBR	71215SN1VN00	7	A10



#### 2-Way Direct Acting - Normally Closed- Stainless Steel (Continued)

	iy Dil e	COACHI	9 11	Ji iliat	iy otos	cu 5	taiiite.	33 3100	et (Contin	iucu,		
			Operating Pressure Differential (MOPD) PSI					Max.			Refe	erence
Port	Orifice	Flow		Air,				Media			11010	
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F <sup>.</sup>	Seal	Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS								
1/4	3/64	0.06	0	1000	1000	1000	10	165	PCTFE	71215SN2EF00	7	A10
1/4	3/64	0.06	0	450	450	450	10	185	NBR	71215SN2EN00	7	A10
1/4	1/16	0.10	0	700	700	700	10	165	PCTFE	71215SN2GF00	7	A10
1/4	1/16	0.10	0	350	350	350	10	185	NBR	71215SN2GN00	7	A10
1/4	3/32	0.18	0	650	650	650	22	165	PCTFE	71215SN2KF00	8	A10
1/4	3/32	0.18	0	275	275	275	10	185	NBR	71215SN2KN00	7	A10
1/4	3/32	0.18	0	260	260	260	10	165	PCTFE	71215SN2KF00	7	A10
1/4	1/8	0.28	0	520	520	520	22	165	PCTFE	71215SN2MF00	8	A10
1/4	1/8	0.28	0	200	200	200	10	165	PCTFE	71215SN2MF00	7	A10
1/4	1/8	0.28	0	200	200	200	22	185	NBR	71215SN2MN00	8	A10
1/4	5/32	0.40	0	150	150	150	22	185	NBR	71215SN2QN00	8	A10
1/4	5/32	0.40	0	110	110	110	10	185	NBR	71215SN2QN00	7	A10
1/4	3/16	0.50	0	90	90	90	22	185	NBR	71215SN2SN00	8	A10
1/4	3/16	0.50	0	80	80	80	10	185	NBR	71215SN2SN00	7	A10
1/4	1/4	0.75	0	70	70	70	22	185	NBR	71215SN2VN00	8	A10
1/4	1/4	0.75	0	40	40	40	10	185	NBR	71215SN2VN00	7	A10
1/4	5/16	1.10	0	55	55	55	22	185	NBR	71215SN21N00	8	A20
1/4	5/16	1.10	0	20	20	20	10	185	NBR	71215SN21N00	7	A20
3/8	3/8	2.00	0	25	25	25	22	185	NBR	712155N33N00	8	A15
3/8	3/8	2.00	0	6	6	6	10	185	NBR	71215SN33N00	7	A15
3/8	3/8	2.00	5	11	11	11	10	185	NBR	71215SN33NHP**	7	A15

<sup>\*\* 71215</sup>SN33NHP: 5-11 PSI is the operating range for bubble tight sealing. Valves may leak slightly if pressure differential falls below 5 PSI.



#### 2-Way Direct Acting - Normally Closed- Stainless Steel (Continued)

2-11	ay Dil e	LLACIII	<u> </u>	UI IIIat	Ly Clus	eu- 3	laiiile	:55 JIE	et (Conti	ilueu)		
					Pressu							
			Diff	T .	(MOPD)	PSI		Max.			Refe	rence
Port	Orifice Size	Flow Factor		Air,		Light		Media		Pressure		
Size NPT	in.	Cv	Min.	Inert Gas	Water	Oil	Watt	Temp. °F	Seal	Vessel Number	Coil	Valve
	ECHNICA											
1/8	3/64	0.06	0	1000	1000	1000	22	165	PCTFE	71215SN1EF00	8	A10
1/8	3/64	0.06	0	520	520	520	10	165	PCTFE	71215SN1EF00	7	A10
1/8	3/64	0.06	0	450	450	450	10	185	NBR	71215SN1EN00	7	A10
1/8	1/16	0.10	0	700	700	700	22	165	PCTFE	71215SN1GF00	8	A10
1/8	1/16	0.10	0	350	350	350	10	185	NBR	71215SN1GN00	7	A10
1/8	1/16	0.10	0	350	350	350	10	165	PCTFE	71215SN1GF00	7	A10
1/8	3/32	0.18	0	300	300	300	22	165	PCTFE	71215SN1KF00	8	A10
1/8	3/32	0.18	0	275	275	275	10	185	NBR	71215SN1KN00	7	A10
1/8	3/32	0.18	0	130	130	130	10	165	PCTFE	71215SN1KF00	7	A10
1/8	1/8	0.28	0	200	200	200	22	185	NBR	71215SN1MN00	8	A10
1/8	1/8	0.28	0	200	200	200	22	165	PCTFE	71215SN1MF00	8	A10
1/8	1/8	0.28	0	150	150	150	10	185	NBR	71215SN1MN00	7	A10
1/8	1/8	0.28	0	100	100	100	10	165	PCTFE	71215SN1MF00	7	A10
1/8	5/32	0.40	0	130	130	130	22	185	NBR	71215SN1QN00	8	A10
1/8	5/32	0.40	0	60	60	60	10	185	NBR	71215SN1QN00	7	A10
1/8	3/16	0.50	0	70	70	70	22	185	NBR	71215SN1SN00	8	A10
1/8	3/16	0.50	0	25	25	25	10	185	NBR	71215SN1SN00	7	A10
1/8	1/4	0.75	0	30	30	30	22	185	NBR	71215SN1VN00	8	A10
1/8	1/4	0.75	0	10	10	10	10	185	NBR	71215SN1VN00	7	A10
1/4	3/64	0.06	0	1000	1000	1000	22	165	PCTFE	71215SN2EF00	8	A10
1/4	3/64	0.06	0	520	520	520	10	165	PCTFE	71215SN2EF00	7	A10
1/4	3/64	0.06	0	450	450	450	10	185	NBR	71215SN2EN00	7	A10
1/4	1/16	0.10	0	700	700	700	22	165	PCTFE	71215SN2GF00	8	A10
1/4	1/16	0.10	0	350	350	350	10	165	PCTFE	71215SN2GF00	7	A10
1/4	1/16	0.10	0	350	350	350	10	185	NBR	71215SN2GN00	7	A10
1/4	3/32	0.18	0	300	300	300	22	165	PCTFE	71215SN2KF00	8	A10
1/4	3/32	0.18	0	275	275	275	10	185	NBR	71215SN2KN00	7	A10
1/4	3/32	0.18	0	130	130	130	10	165	PCTFE	71215SN2KF00	7	A10
1/4	1/8	0.28	0	200	200	200	22	165	PCTFE	71215SN2MF00	8	A10
1/4	1/8	0.28	0	200	200	200	22	185	NBR	71215SN2MN00	8	A10
1/4	1/8	0.28	0	150	150	150	10	185	NBR	71215SN2MN00	7	A10
1/4	1/8	0.28	0	100	100	100	10	165	PCTFE	71215SN2MF00	7	A10
1/4	5/32	0.40	0	60	60	60	10	185	NBR	71215SN2QN00	7	A10
				_		_			·			



#### 2-Way Direct Acting - Normally Closed- Stainless Steel (Continued)

_							-					
					Pressu (MOPD)			Max.			Refe	rence
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
DC TE	CHNICA	L SPECI	FICATI	ONS								
1/4	5/32	0.40	0	130	130	130	22	185	NBR	71215SN2QN00	8	A10
1/4	3/16	0.50	0	70	70	70	22	185	NBR	71215SN2SN00	8	A10
1/4	3/16	0.50	0	25	25	25	10	185	NBR	71215SN2SN00	7	A10
1/4	1/4	0.75	0	30	30	30	22	185	NBR	71215SN2VN00	8	A10
1/4	1/4	0.75	0	10	10	10	10	185	NBR	71215SN2VN00	7	A10
1/4	5/16	1.10	0	10	10	10	22	185	NBR	71215SN21N00	8	A20
1/4	5/16	1.10	0	3	3	3	10	185	NBR	71215SN21N00	7	A20
3/8	3/8	2.00	0	5	5	5	22	185	NBR	71215SN33N00	8	A15



#### 2-Way Direct Acting - Normally Open- Brass

Z-W	ay Dire	CACUII					133	1			<del>,                                     </del>	
					Pressu							
			וזוט	i	(MOPD)	<b> </b>	-	Max.			Refe	rence
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
	ECHNICA	L SPECI						l				
1/8	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN1GF00	7	A13
1/8	3/32	0.15	0	275	200	150	6	180	NBR	02F20O1106AAF	1	A17
1/8	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN1LF00	7	A13
1/8	1/8	0.21	0	125	100	85	6	180	NBR	02F20O1108AAF	1	A17
1/4	3/64	0.06	0	750	700	700	11	180	NBR	04F20O1103ACF	4	A5
1/4	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN2GF00	7	A13
1/4	3/32	0.17	0	300	250	230	11	180	NBR	04F20O1106ACF	4	A5
1/4	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN2LF00	7	A13
1/4	1/8	0.35	0	130	110	100	11	180	NBR	04F20O1108ACF	4	A5
1/4	5/32	0.49	0	85	75	60	11	180	NBR	04F20O2110ACF	4	A6
1/4	9/32	0.96	0	30	25	20	11	180	NBR	04F20O2118ACF	4	A6
1/2	7/16	2.20	0	15	15	-	16	200	NBR	08F20O2128ADF	5	A18
3/4	3/4	5.50	0	2	2	-	11	180	NBR	12F20O2148ACF	4	A18
DC TE	ECHNICA	L SPECI	FICATI	ONS								
1/8	1/16	0.09	0	400	250	150	9.5	120	NBR	02F20O1104A1F	3	A17
1/8	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN1GF00	7	A13
1/8	3/32	0.15	0	190	110	110	9.5	120	NBR	02F20O1106A1F	3	A17
1/8	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN1LF00	7	A13
1/8	1/8	0.21	0	80	60	50	9.5	120	NBR	02F20O1108A1F	3	A17
1/4	3/64	0.06	0	500	500	500	11.5	140	NBR	04F20O1103A3F	6	A5
1/4	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN2GF00	7	A13
1/4	3/32	0.17	0	200	150	125	11.5	150	NBR	04F20O1106A3F	6	A5
1/4	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN2LF00	7	A13
1/4	1/8	0.35	0	80	60	60	11.5	150	NBR	04F20O1108A3F	6	A5
1/4	5/32	0.49	0	45	30	30	11.5	150	NBR	04F20O2110A3F	6	A6
1/4	9/32	0.96	0	15	15	15	11.5	150	NBR	04F20O2118A3F	6	A6



#### 2-Way Direct Acting - Normally Open- Stainless Steel

				perating erential				Max.			Refe	rence
Port	Orifice	Flow		Air,				Media			INCIC	Tence
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
	CHNICA											
1/8	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN1EF00	7	A12
1/8	3/64	0.05	0	400	400	400	10	185	NBR	71295SN1ENJ1	7	A11
1/8	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN1GF00	7	A12
1/8	1/16	0.11	0	325	325	325	10	185	NBR	71295SN1GNJ1	7	A11
1/8	3/32	0.15	0	250	250	250	10	185	NBR	71295SN1KNJ1	7	A11
1/8	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN1KF00	7	A12
1/4	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN2EF00	7	A12
1/4	3/64	0.05	0	400	400	400	10	185	NBR	71295SN2ENJ1	7	A11
1/4	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN2GF00	7	A12
1/4	1/16	0.11	0	325	325	325	10	185	NBR	71295SN2GNJ1	7	A11
1/4	3/32	0.15	0	250	250	250	10	185	NBR	71295SN2KNJ1	7	A11
1/4	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN2KF00	7	A12
DC TE	ECHNICA	L SPECI	FICATI	ONS								
1/8	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN1EF00	7	A12
1/8	3/64	0.05	0	400	400	400	10	185	NBR	71295SN1ENJ1	7	A11
1/8	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN1GF00	7	A12
1/8	1/16	0.11	0	325	325	325	10	185	NBR	71295SN1GNJ1	7	A11
1/8	3/32	0.15	0	250	250	250	10	185	NBR	71295SN1KNJ1	7	A11
1/8	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN1KF00	7	A12
1/4	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN2EF00	7	A12
1/4	3/64	0.05	0	400	400	400	10	185	NBR	71295SN2ENJ1	7	A11
1/4	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN2GF00	7	A12
1/4	1/16	0.11	0	325	325	325	10	185	NBR	71295SN2GNJ1	7	A11
1/4	3/32	0.15	0	250	250	250	10	185	NBR	71295SN2KNJ1	7	A11
1/4	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN2KF00	7	A12



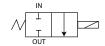
#### 2-Way Direct Acting - Bi-Directional\* - Stainless Steel

	·, - · · ·		<u> </u>									
					g Pressu . (MOPD)			Max.			Refe	rence
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS								
1/4	1/32	0.02	0	400	400	400	10	185	NBR	71235SN2AN00	7	A19
1/4	3/64	0.06	0	180	180	180	10	185	NBR	71235SN2EN00	7	A19
1/4	1/16	0.10	0	110	110	110	10	185	NBR	71235SN2GN00	7	A19
1/4	3/32	0.17	0	70	70	70	10	185	NBR	71235SN2KN00	7	A19
1/4	1/8	0.28	0	45	45	45	10	185	NBR	71235SN2MN00	7	A19
DC TE	CHNICA	L SPECI	FICATI	ONS								
1/4	1/32	0.02	0	400	400	400	10	185	NBR	71235SN2AN00	7	A19
1/4	3/64	0.06	0	180	180	180	10	185	NBR	71235SN2EN00	7	A19
1/4	1/16	0.10	0	110	110	110	10	185	NBR	71235SN2GN00	7	A19
1/4	3/32	0.17	0	70	70	70	10	185	NBR	71235SN2KN00	7	A19
1/4	1/8	0.28	0	45	45	45	10	185	NBR	71235SN2MN00	7	A19

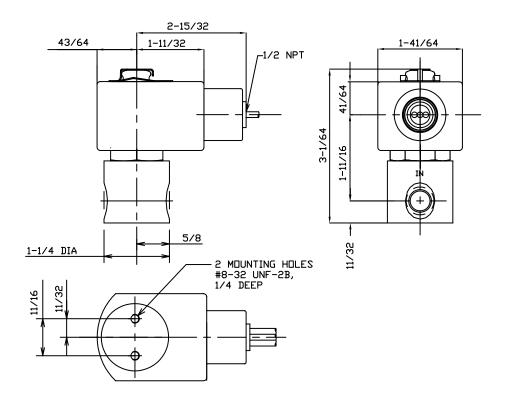
<sup>\*</sup>Pressure can be applied to either inlet or outlet.



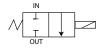




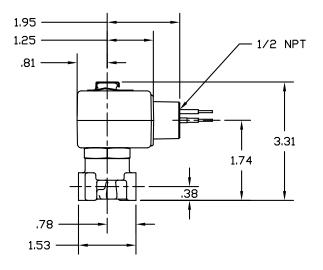
2-Way Normally Closed: Port Identification: In-In/Out-Out

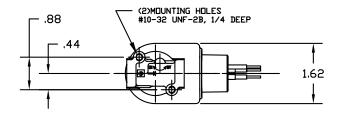






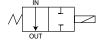
2-Way Normally Closed: Port Identification: In-In/Out-Out



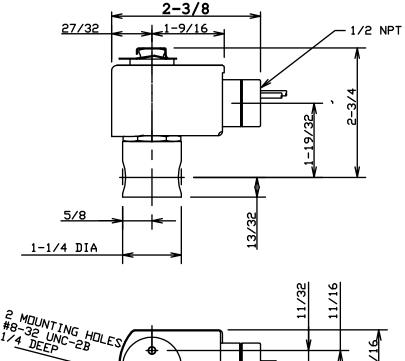


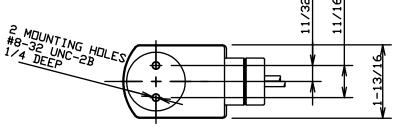




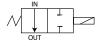


2-Way Normally Open Port Identification: In-In/Out-Out

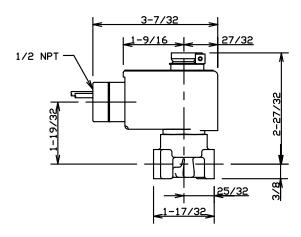


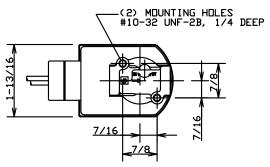






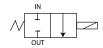
2-Way Normally Open Port Identification: In-In/Out-Out



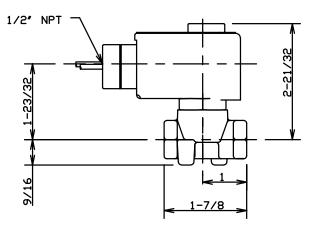


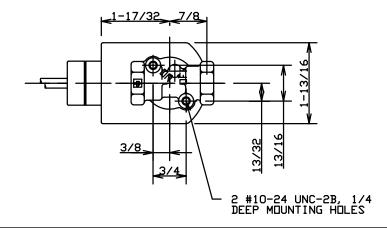




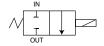


2-Way Normally Closed Port Identification: In-In/Out-Out

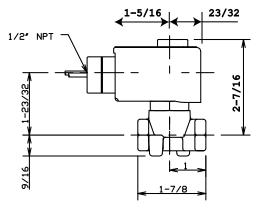


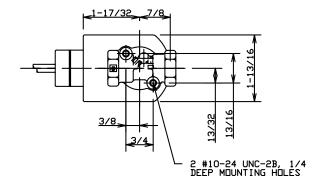






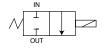
2-Way Normally Closed Port Identification: In-In/Out-Out



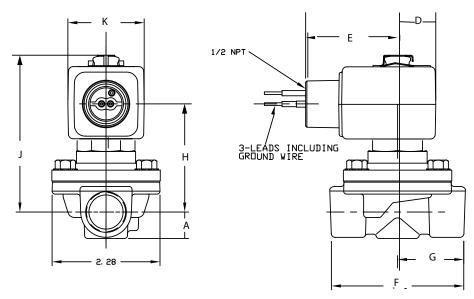






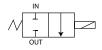


2-Way Normally Closed Port Identification: In-In/Out-Out

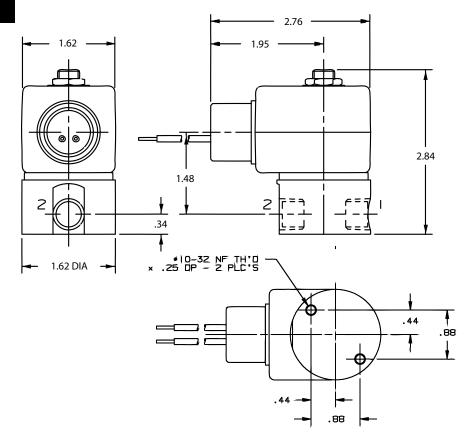


Part				Dime	nsions			
Number	A	D	E	F	G	Н	J	K
08F20C2128AAF	9/16	23/32	1 - 25/32	2 - 13/16	1-13/32	1-15/16	2-25/32	1-9/16
08F20C2128ADF 08F20C2128A3F	9/16	7/8	1 - 15/16	2 - 13/16	1-13/32	2-1/4	3-9/32	1-13/16
12F20C2148ADF	11/16	7/8	1 - 15/16	2 - 29/32	1-15/32	2-11/32	3-3/8	1-13/16



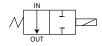


2-Way Normally Closed Port Identification: 2-IN / 1-OUT

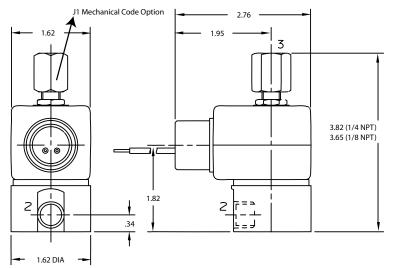


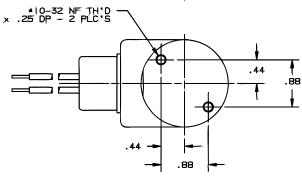




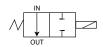


2-Way Normally Open Port Identification: 2-IN / 3-OUT

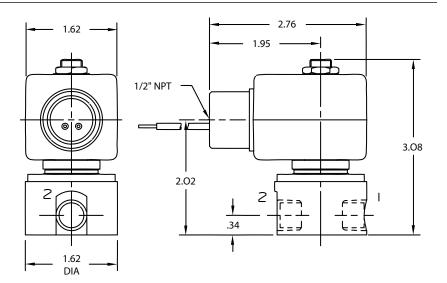


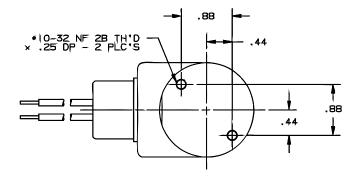






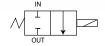
2-Way Normally Open Port Identification: 1-OUT / 2-IN



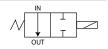




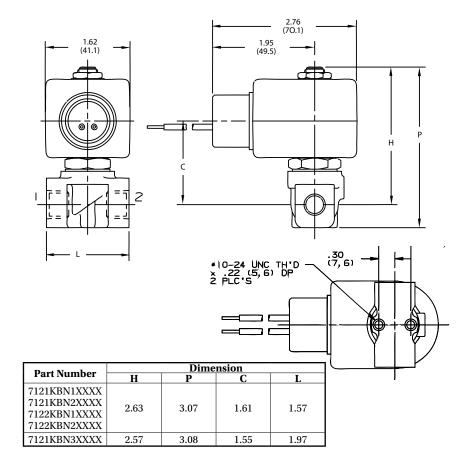




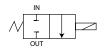
2-Way Normally Closed 7121KBN Port Identification: 1-IN / 2-OUT



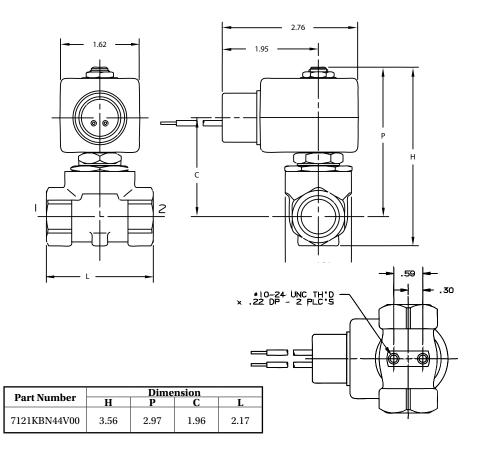
2-Way Normally Open 7122KBN Port Identification: 1-IN / 2-OUT







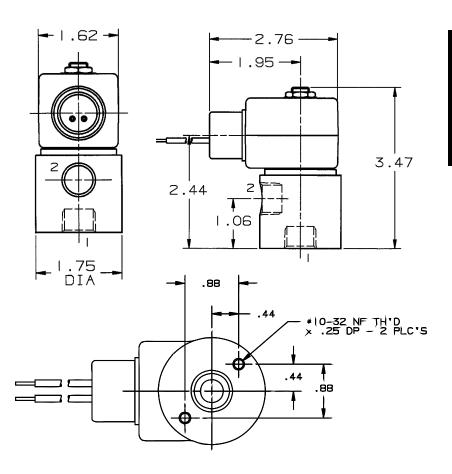
2-Way Normally Closed Port Identification: Flow arrow on body indicates flow direction. Ports are not marked.



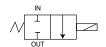




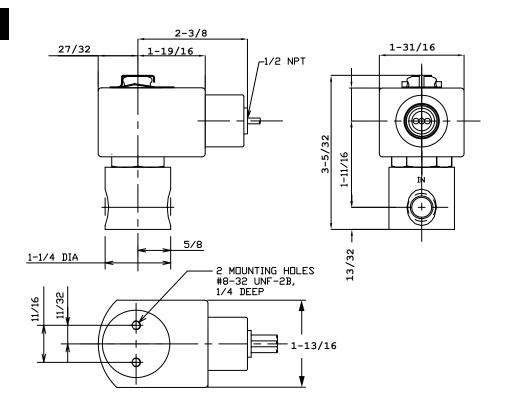
2-Way Normally Closed Port Identification: 2-IN / 1-OUT







2-Way Normally Closed Port Identification: IN-IN / OUT-OUT

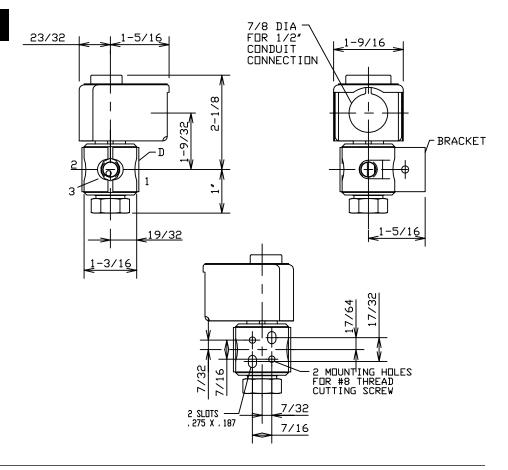




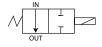




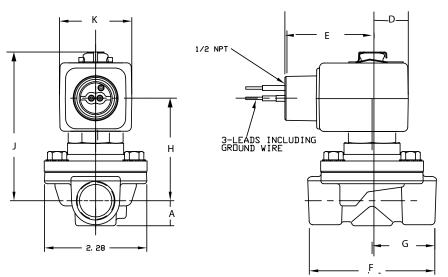
2-Way Normally Open Port Identification: IN-IN/OUT-OUT







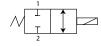
2-Way Normally Open Port Identification: IN-IN/OUT-OUT



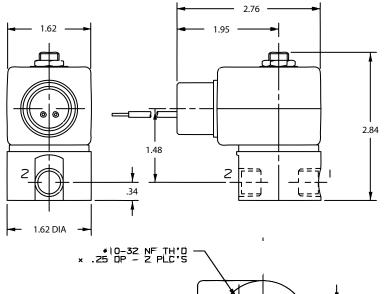
			Dime	nsions			
A	D	E	F	G	Н	J	K
9/16	7/8	1 - 15/16	2 - 13/16	1- 13/32	2- 1/8	3 - 9/32	1 - 13/16
11/16	7/8	1 - 15/16	2 - 29/32	1 - 15/32	2 - 7/32	3 - 3/8	1 - 13/16





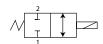


2-Way Bi-Directional Port Identification: Pressure can be applied to either port.

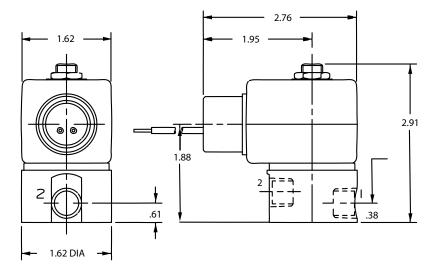


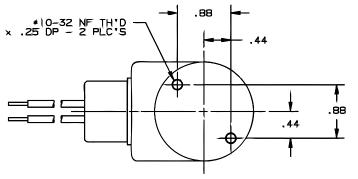
# × .25 DP - 2 PLC'S





2-Way Normally Closed Port Identification: 2 IN/1 OUT







#### 2-Way Direct Acting Materials of Construction\*\*

Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
02F20O1	6	2WNO	1/8	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
02F20O1	9.5, 10	2WNO	1/8	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
04F20C1	6, 11	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
04F20C1	9.5, 10, 16	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
04F20C2	6, 11	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
04F20C2	9.5, 10, 16	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
04F20O1	6, 11	2WNO	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
04F20O1	9.5, 10, 16	2WNO	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
04F20O2	6, 11	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
04F20O2	9.5, 10, 16	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
06F20C2	6, 11	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
06F20C2	9.5, 10, 16	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
08F20C2	6, 11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
08F20C2	9.5, 10, 16	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
08F20O2	6, 11	2WNO	1/2	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
08F20O2	9.5, 10, 16	2WNO	1/2	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
12F20C2	6, 11	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
12F20C2	9.5, 10, 16	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F
12F20O2	6, 11	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
12F20O2	3, 9.5, 10, 16	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	77°F

<sup>\*</sup> Shows the first 7 digits of pressure vessel part number.



<sup>\*\*</sup>Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog

#### 2-Way Direct Acting Materials of Construction (Continued)\*\*

Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
71215SN	10	2WNC	1/8 - 3/8	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71215SN	22	2WNC	1/8 - 3/8	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
71216SN	10	2WNC	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71216SN	22	2WNC	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7121KBN	10	2WNC	1/8 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7121KBN	22	2WNC	1/8 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
71225SN	10	2WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71225SN	22	2WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7122KBN	10	2WNO	1/8 - 1/4	Brass	304SS	430FR	430F	430FR/4106	301SS	Copper	150°F
7122KBN	22	2WNO	1/8 - 1/4	Brass	304SS	430FR	430F	430FR/4106	301SS	Copper	77°F
71235SN	10	2WDP	1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71235SN	22	2WDP	1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
71295SN	10	2WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71295SN	22	2WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F

<sup>\*</sup> Shows the first 7 digits of pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

Notes	



# 2-Way

Direct Lift, Pilot & Remote Operated Valves 1/4"-2" NPT



# **General Description:**

2-Way Direct Lift, Pilot & Remote Operated valves are designed for higher flow and medium to high pressure applications. Pilot operated valves require the minimum pressure differential specified for proper valve operation.

#### Installation

Valves should be mounted with solenoid coil vertical and upright.

#### **Standard Materials of Construction**

Please refer to page A55

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water and Light Oil (300 SSU). Additional fluids compatible with alternate materials of construction (consult factory).

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60

120/60-110/50

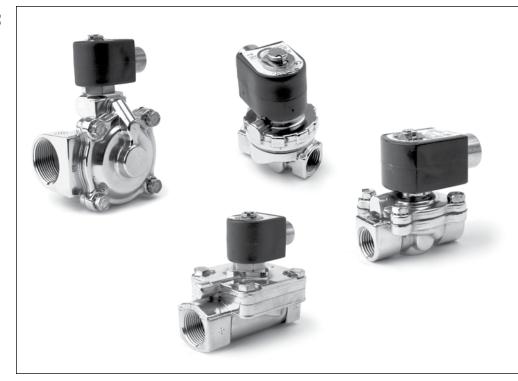
240/60-220/50

DC -12, 24 & 120

For other voltages - consult factory

#### **Coil Classification:**

Class F standard Class H available



#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

# **Maximum Ambient Temperature** 150°F

Please refer to page A55 for details.

# Applications:

- Irrigation systems
- Fire suppression equipment
- Molding equipment
- Cooling of machine tools
- Sterilizers
- Car wash
- Water treatment and purification
- Air compressors and dryers
- Floor cleaning equipment
- Hospital equipment
- Automated systems
- Food processing



#### 2-Way Internal Pilot Operated - Normally Closed - Brass

		nat Pit	0	perating	g Pressu (MOPD)	re			-			
Port	Orifice	Flow		Air,	1 (1.101.5)	<del></del>		Max. Media			Refe	rence
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS								
1/4	1/4	0.76	5	300	300	300	10	185	NBR	73212BN2MN00	7	A35
1/4	11/32	1.20	5	300	300	300	6	180	NBR	04F25C2122CAF	1	A54
1/4	7/16	2.00	3	150	150	150	10	185	NBR	7321KBN2RN00	7	A46
					_							
3/8	11/32	1.20	5	300	300	300	6	180	NBR	06F25C2122CAF	1	A54
3/8	1/2	2.40	5	300	300	300	10	185	NBR	73212BN3SN00	7	A32
3/8	7/16	2.50	3	150	150	150	10	185	NBR	7321KBN3SN00	7	A46
3/8	5/8	3.00	5	300	300	300	16	175	NBR	06F22C2140ADF	5	A22
3/8	1/2	3.00	1	300	235	235	11	180	NBR	06F25C2132ACF	4	A21
3/8	5/8	3.00	5	200	135	135	6	180	NBR	06F22C2140AAF	1	A23
3/8	5/8	3.00	5	150	150	150	10	185	NBR	73218BN3TN00	7	A43
3/8	5/8	3.00	0	150	150	150	11	180	NBR	06F23C2140ACF*	4	A22
3/8	5/8	3.00	0	100	100	100	10	185	NBR	72218BN3TN00*	7	A36
3/8	19/32	4.40	0	230	230	230	10	185	NBR	7221GBN3VN00*	7	A47
			,			,						
1/2	7/16	2.50	3	150	150	150	10	185	NBR	7321KBN4SN00	7	A46
1/2	1/2	2.80	5	300	300	300	10	185	NBR	73212BN4TN00	7	A32
1/2	1/2	3.60	1	300	235	235	11	180	NBR	08F25C2132ACF	4	A21
1/2	5/8	4.00	5	300	300	300	16	175	NBR	08F22C2140ADF	5	A22
1/2	5/8	4.00	5	250	220	220	11	180	NBR	08F22C2140ACF	4	A22
1/2	5/8	4.00	5	200	135	135	6	180	NBR	08F22C2140AAF	1	A23
1/2	5/8	4.00	5	150	150	150	10	185	NBR	73218BN4UN00	7	A43
1/2	5/8	4.00	0	150	150	150	11	180	NBR	08F23C2140ACF*	4	A22
1/2	5/8	4.00	0	100	100	100	10	185	NBR	72218BN4UN00*	7	A36
1/2	19/32	4.40	0	230	230	230	10	185	NBR	7221GBN4VN00*	7	A47
3/4	3/4	5.00	5	150	150	150	10	185	NBR	73218BN5VN00	7	A43
3/4	3/4	5.00	0	150	150	150	11	180	NBR	12F23C2148ACF*	4	A25
3/4	3/4	5.00	5	125	125	125	6	180	NBR	12F22C2148AAF	1	A24
3/4	3/4	5.00	0	100	100	100	10	185	NBR	72218BN5VN00*	7	A36
3/4	19/32	5.50	0	230	230	230	10	185	NBR	7221GBN51N00*	7	A47
3/4	3/4	6.50	5	250	150	250	6	180	NBR	12F24C2148AAF	1	A27
3/4	3/4	7.30	5	300	300	300	10	185	NBR	73212BN52N00	7	A33
3/4	3/4	7.40	1	300	235	235	11	180	NBR	12F25C2148ACF	4	A28
3/4	25/32	9.60	5	230	230	230	10	185	NBR	7321GBN53N00	7	A48

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way Internal Pilot Operated - Normally Closed - Brass (Continued)

					g Pressu . (MOPD)			Max.			Refe	erence
Port	Orifice	Flow		Air,				Media			IXCIC	
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICAL	SPECIF	ICATIO	NS								
1	19/32	5.50	0	230	230	230	10	185	NBR	7221GBN61N00*	7	A47
1	1	11.0	5	300	300	300	10	185	NBR	73212BN63N00	7	A33
1	1	11.7	0	230	230	230	10	185	NBR	7221GBN64N00*	7	A47
1	1	12.2	1	300	300	-	11	180	NBR	16F25C2164ACF	4	A30
1	1	12.5	5	230	230	230	10	185	NBR	7321GBN64N00	7	A48
1	1	13.0	5	150	150	100	6	180	NBR	16F24C2164AAF	1	A29
1	1 1/16	13.5	5	125	125	125	10	185	NBR	73218BN64N00	7	A44
1 1/4	1 1/8	15.0	5	150	150	100	6	180	NBR	20F24C2172AAF	1	A29
1 1/4	1 1/8	15.0	5	125	125	125	10	185	NBR	73218BN75N00	7	A44
1 1/4	1 1/8	19.3	5	230	230	230	10	185	NBR	7321GBN76N00	7	A48
1 1/4	1 9/16	29.0	5	230	230	230	10	185	NBR	7321GBN88N00	7	A48
1 1/2	1 1/4	22.5	5	150	150	100	6	180	NBR	24F24C2180AAF	1	A31
1 1/2	1 1/4	22.5	5	125	125	125	10	185	NBR	73218BN87N00	7	A42
2	1 9/16	38.6	5	230	230	230	10	185	NBR	7321GBN99N00	7	A48

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way Internal Pilot Operated - Normally Closed - Brass (Continued)

			0	perating	Pressu	re				itiliueuj		
			Diff		. (MOPD)	PSI		Max.			Refe	rence
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
	CHNICA											
1/4	1/4	0.76	5	300	300	300	10	185	NBR	73212BN2MN00	7	A35
1/4	11/32	1.20	5	275	275	275	11.5	150	NBR	04F25C2122C3F	6	A54
1/4	7/16	2.00	3	150	150	150	22	185	NBR	7321KBN2RN00	8	A46
1/4	7/16	2.00	3	60	60	60	10	185	NBR	7321KBN2RN00	7	A46
3/8	11/32	1.20	5	275	275	275	11.5	150	NBR	06F25C2122C3F	6	A54
3/8	1/2	2.40	5	300	300	300	10	185	NBR	73212BN3SN00	7	A32
3/8	7/16	2.50	3	150	150	150	22	185	NBR	7321KBN3SN00	8	A46
3/8	7/16	2.50	3	60	60	60	10	185	NBR	7321KBN3SN00	7	A46
3/8	5/8	3.00	5	150	150	150	10	185	NBR	73218BN3TN00	7	A43
3/8	1/2	3.00	1	130	130	130	11.5	150	NBR	06F25C2132A3F	6	A21
3/8	5/8	3.00	5	125	100	100	11.5	150	NBR	06F22C2140A3F	6	A22
3/8	5/8	3.00	0	40	40	40	22	185	NBR	72218BN3TN00*	8	A36
3/8	5/8	3.00	0	40	40	=	11.5	150	NBR	06F23C2140A3F*	6	A22
3/8	19/32	4.40	0	100	100	100	22	185	NBR	7221GBN3VN00*	8	A47
1/2	7/16	2.50	3	150	150	150	22	185	NBR	7321KBN4SN00	8	A46
1/2	7/16	2.50	3	60	60	60	10	185	NBR	7321KBN4SN00	7	A46
1/2	1/2	2.80	5	300	300	300	10	185	NBR	73212BN4TN00	7	A32
1/2	1/2	3.60	1	130	130	130	11.5	150	NBR	08F25C2132A3F	6	A21
1/2	5/8	4.00	5	150	150	150	10	185	NBR	73218BN4UN00	7	A43
1/2	5/8	4.00	5	125	100	100	11.5	150	NBR	08F22C2140A3F	6	A22
1/2	5/8	4.00	0	40	40	40	22	185	NBR	72218BN4UN00*	8	A36
1/2	5/8	4.00	0	40	40	_	11.5	150	NBR	08F23C2140A3F*	6	A22
1/2	19/32	4.40	0	100	100	100	22	185	NBR	7221GBN4VN00*	8	A47
3/4	3/4	5.00	5	150	150	150	10	185	NBR	73218BN5VN00	7	A43
3/4	3/4	5.00	5	100	90	75	11.5	180	NBR	12F22C2148A3F	6	A25
3/4	3/4	5.00	0	40	40	40	22	185	NBR	72218BN5VN00*	8	A36
3/4	3/4	5.00	0	40	40	-	11.5	150	NBR	12F23C2148A3F*	6	A25
3/4	19/32	5.50	0	100	100	100	22	185	NBR	7221GBN51N00*	8	A47
3/4	3/4	6.50	5	125	125	125	11.5	150	NBR	12F24C2148A3F	6	A26
3/4	3/4	7.30	5	300	300	300	10	185	NBR	73212BN52N00	7	A33
3/4	25/32	9.60	5	230	230	230	10	185	NBR	7321GBN53N00	7	A48

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way Internal Pilot Operated - Normally Closed - Brass (Continued)

			Operating Pressure Differential (MOPD) PSI					Max.			Reference	
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
DC TECHNICAL SPECIFICATIONS												
1	19/32	5.50	0	100	100	100	22	185	NBR	7221GBN61N00*	8	A47
1	1	11.0	5	300	300	300	10	185	NBR	73212BN63N00	7	A33
1	1	11.7	0	85	85	85	22	185	NBR	7221GBN64N00*	8	A47
1	1	12.2	1	275	275	275	11.5	180	NBR	16F25C2164A3F	6	A30
1	1	12.5	5	230	230	230	10	185	NBR	7321GBN64N00	7	A48
1	1	13.0	5	125	125	125	11.5	150	NBR	16F24C2164A3F	6	A29
1	1 1/16	13.5	5	125	125	125	10	185	NBR	73218BN64N00	7	A44
1 1/4	1 1/8	19.3	5	230	230	230	10	185	NBR	7321GBN76N00	7	A48
1 1/4	1 1/8	15.0	5	125	125	125	11.5	150	NBR	20F24C2172A3F	6	A29
1 1/4	1 1/8	15.0	5	125	125	125	10	185	NBR	73218BN75N00	7	A44
1 1/2	1 1/4	22.5	5	125	125	125	11.5	150	NBR	24F24C2180A3F	6	A31
1 1/2	1 1/4	22.5	5	125	125	125	10	185	NBR	73218BN87N00	7	A42
1 1/2	1 9/16	29.0	5	230	230	230	22	185	NBR	7321GBN88N00	8	A48
1 1/2	1 9/16	29.0	5	200	200	200	10	185	NBR	7321GBN88N00	7	A48
2	1 9/16	38.6	5	230	230	230	22	185	NBR	7321GBN99N00	8	A48
2	1 9/16	38.6	5	200	200	200	10	185	NBR	7321GBN99N00	7	A48

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way Internal Pilot Operated - Normally Closed - Stainless Steel

			Operating Pressure									
Do-t	Orifica	Ela	Diff		(MOPD) PSI			Max.			Refe	rence
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	0il	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS												
1/4	1/4	0.76	5	300	300	300	10	185	NBR	73212SN2MN00	7	A38
3/8	5/8	3.00	5	300	300	300	16	175	NBR	06F22C6140ADF	5	A22
3/8	5/8	3.00	0	150	150	150	11	180	NBR	06F23C6140ACF*	4	A22
3/8	5/8	3.00	0	100	100	100	10	185	FKM	72218RN3TV00*	7	A36
						-						
1/2	1/2	4.00	5	300	300	300	16	175	NBR	08F22C6140ADF	5	A22
1/2	1/2	4.00	0	150	150	150	11	180	NBR	08F23C6140ACF*	4	A22
1/2	5/8	4.00	0	100	100	100	10	185	FKM	72218RN4UV00*	7	A36
0/4	0/4	F 00		200	200	200	16	175	NDD	100000140405		A05
3/4	3/4	5.00	5 0	300 150	300 150	300	16 11	175 180	NBR	12F22C6148ADF 12F23C6148ACF*	5 4	A25 A25
3/4	3/4	5.00	0	100	100	150		185	NBR FKM	72218RN5VV00*	7	A25 A36
- 3/4	3/4	5.00		100	100	100	10	100	FIXIVI	7221001037700	- 1	A30
1	1	13.00	5	150	150	100	6	180	NBR	16F24C6164AAF	1	A29
	•	10.00		100	100	100		100	NOIT	101 2400 1047 1 11		7120
1 1/2	1 1/4	22.50	5	150	150	100	6	180	NBR	24F24C6180AAF	1	A31
DC TE	ECHNICA	L SPECI	FICATI	ONS								
1/4	1/4	0.76	5	300	300	300	10	185	NBR	73212SN2MN00	7	A38
3/8	5/8	3.00	5	125	100	100	11.5	150	NBR	06F22C6140A3F	6	A22
3/8	5/8	3.00	0	40	40	40	22	185	FKM	72218RN3TV00*	8	A36
3/8	5/8	3.00	0	40	40	-	11.5	150	NBR	06F23C6140A3F*	6	A22
1/2	1/2	4.00	5	125	100	100	11.5	150	NBR	08F22C6140A3F	6	A22
1/2	5/8	4.00	0	40	40	40	22	185	FKM	72218RN4UV00*	8	A36
1/2	1/2	4.00	0	40	40	-	11.5	150	NBR	08F23C6140A3F*	6	A22
3/4	3/4	5.00	5	100	90	75	11.5	150	NBR	12F22C6148A3F	6	A25
3/4	3/4	5.00	0	40	40	40	22	185	FKM	72218RN5VV00*	8	A36
3/4	3/4	5.00	0	40	40	-	11.5	150	NBR	12F23C6148A3F*	6	A25
		40.00		405	405	405	44.5	450	NES	1050100101105		400
1	1	13.00	5	125	125	125	11.5	150	NBR	16F24C6164A3F	6	A29
1 1/0	1 1/4	22.50		105	125	125	11 =	150	NIDD	24F24C6180A3F	6	A31
1 1/2	1 1/4	22.50	<u> </u>	125	125	125	11.5	150	NBR	24F24U018UA3F	о	AJI

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way Internal Pilot Operated - Normally Open - Brass

	-		0	perating	Pressu (MOPD)	re	-	Max.			Refe	rence
Port	Orifice	Flow		Air,				Media		_		
Size NPT	Size in.	Factor Cv	Min.	Inert Gas	Water	Light Oil	Watt	Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
$\overline{}$	CHNICAL				Water	010	watt	'	Scat	Vesset (Valliber	1 0011	valve
1/4	1/4	0.76	5	200	200	200	10	185	NBR	73222BN2MN00	7	A35
1/4	11/32	1.20	5	300	300	300	11	180	NBR	04F25O2122CCF	4	A54
3/8	1/2	2.40	5	200	200	200	10	185	NBR	73222BN3SN00	7	A49
3/8	1/2	3.00	1	200	175	175	11	180	NBR	06F25O2132ACF	4	A21
3/8	5/8	3.00	0	150	150	150	11	150	NBR	06F23O2140ACF*	4	A51
3/8	5/8	3.00	5	150	150	150	10	185	NBR	73228BN3TN00	7	A40
3/8	5/8	3.00	0	125	125	125	22	185	FKM	72228BN3TV00*	8	A37
1/2	1/2	2.80	5	200	200	200	10	185	NBR	73222BN4TN00	7	A49
1/2	1/2	3.60	1	200	175	175	11	180	NBR	08F25O2132ACF	4	A21
1/2	5/8	4.00	5	150	150	150	10	185	NBR	73228BN4UN00	7	A40
1/2	5/8	4.00	0	150	150	150	11	150	NBR	08F23O2140ACF*	4	A51
1/2	1/2	4.00	0	125	125	125	22	185	FKM	72228BN4UV00*	8	A37
3/4	3/4	5.00	5	150	150	150	10	185	NBR	73228BN5VN00	7	A40
3/4	3/4	5.00	0	125	125	125	22	185	FKM	72228BN5VV00*	8	A37
3/4	3/4	5.50	0	150	150	150	11	180	NBR	12F23O2148ACF*	4	A52
3/4	3/4	6.50	5	250	200	200	11	180	NBR	12F24O2148ACF	4	A26
3/4	3/4	7.30	5	200	200	200	10	185	NBR	73222BN52N00	7	A50
3/4	3/4	7.40	1	275	275	275	11	180	NBR	12F25O2148ACF	4	A28
3/4	25/32	9.60	5	230	230	230	10	185	NBR	7322GBN53N00	7	A48
1	1	11.00	5	200	200	200	10	185	NBR	73222BN63N00	7	A50
1	1	12.20	1	300	250	230	11	180	NBR	16F25O2164ACF	4	A30
1	1	12.50	5	230	230	230	10	185	NBR	7322GBN64N00	7	A48
1	1	13.00	5	125	125	125	11	180	NBR	16F24O2164ACF	4	A29
1	1 1/16	13.50	5	125	125	125	10	185	NBR	73228BN64N00	7	A41
1 1/4	1 1/8	15.00	5	125	125	125	11	180	NBR	20F24O2172ACF	4	A29
1 1/4	1 1/8	15.00	5	125	125	125	10	185	NBR	73228BN75N00	7	A41
1 1/4	1 1/8	19.30	5	230	230	230	10	185	NBR	7322GBN76N00	7	A48
				. = =						0.450.00		
1 1/2	1.25	22.50	5	125	125	125	11	180	NBR	24F24O2180ACF	4	A31
1 1/2	1.25	22.50	5	125	125	125	10	185	NBR	73228BN87N00	7	A42
1 1/2	1 9/16	29.00	5	170	170	170	10	185	NBR	7322GBN88N00	7	A48
	1.0/16	20.60	F	170	170	170	-10	105	NDD	7222CDN100N100	7	Λ 4 Ω
2	1 9/16	38.60	5	170	170	170	10	185	NBR	7322GBN99N00	7	A48

<sup>\*</sup>See note on A32.



#### 2-Way Internal Pilot Operated - Normally Open - Brass (Continued)

	way iliter liat Fitot Operateu - Norilla						<u>open</u>		, (OOIICI	ilucu)		
			Operating Pressure Differential (MOPD) PSI									
			Diff		(MOPD)	PSI		Max.			Refe	rence
Port	Orifice	Flow		Air,				Media		_		
Size NPT	Size in.	Factor Cv	Min.	Inert Gas	Water	Light Oil	Watt	Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
	CHNICAL				Water	Oit	Watt	<u> </u>	Scat	Vesset (Vallise)	1 0010	vatve
1/4	1/4	0.76	5	200	200	200	10	185	NBR	73222BN2MN00	7	A35
1/4	11/32	1.20	5	160	160	160	11.5	150	NBR	04F25O2122C3F	6	A54
3/8	1/2	2.40	5	200	200	200	10	185	NBR	73222BN3SN00	7	A49
3/8	5/8	3.00	5	150	150	150	10	185	NBR	73228BN3TN00	7	A40
3/8	5/8	3.00	0	125	125	80	11.5	150	NBR	06F23O2140A3F*	6	A51
3/8	5/8	3.00	0	125	125	125	22	185	FKM	72228BN3TV00*	8	A37
1/2	1/2	2.80	5	200	200	200	10	185	NBR	73222BN4TN00	7	A49
1/2	5/8	4.00	5	150	150	150	10	185	NBR	73228BN4UN00	7	A40
1/2	1/2	4.00	0	125	125	125	22	185	FKM	72228BN4UV00*	8	A37
1/2	5/8	4.00	0	125	125	80	11.5	150	NBR	08F23O2140A3F*	6	A51
1/2	1/2	12.70	5	200	175	175	11.5	180	NBR	08F25O2132C3F	6	A21
3/4	3/4	5.00	5	150	150	150	10	185	NBR	73228BN5VN00	7	A40
3/4	3/4	5.00	0	125	125	125	22	185	FKM	72228BN5VV00*	8	A37
3/4	3/4	5.50	0	125	125	80	11.5	150	NBR	12F23O2148A3F*	6	A52
3/4	3/4	7.30	5	200	200	200	10	185	NBR	73222BN52N00	7	A50
3/4	25/32	9.60	5	230	230	230	10	185	NBR	7322GBN53N00	7	A48
1	1	11.00	5	200	200	200	10	185	NBR	73222BN63N00	7	A50
1	1	12.50	5	230	230	230	10	185	NBR	7322GBN64N00	7	A48
1	1	13.00	5	125	125	125	11.5	180	NBR	16F24O2164A3F	6	A29
1	1 1/16	13.50	5	125	125	125	10	185	NBR	73228BN64N00	7	A41
											1	
1 1/4	1 1/8	15.00	5	125	125	125	10	185	NBR	73228BN75N00	7	A41
1 1/4	1 1/8	19.30	5	230	230	230	10	185	NBR	7322GBN76N00	7	A48
1 1/2	1 1/4	22.50	5	125	125	125	11.5	180	NBR	24F24O2180A3F	6	A31
1 1/2	1 1/4	22.50	5	125	125	125	10	185	NBR	73228BN87N00	7	A42
1 1/2	1 9/16	29.00	5	170	170	170	10	185	NBR	7322GBN88N00	7	A48
2	1 9/16	38.60	5	170	170	170	10	185	NBR	7322GBN99N00	7	A48

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way Internal Pilot Operated - Normally Open - Stainless Steel

	2-way internat Fitot Operated - Normat					- indicty	open					
					) Pressu							
			Diff	erential	(MOPD)	PSI		Max.			Refe	rence
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TE	CHNICAL	SPECIF	ICATIO	NS								
1/4	1/4	0.76	5	200	200	200	10	185	NBR	73222SN2MN00	7	A39
3/8	5/8	3.00	0	150	150	150	11	175	NBR	06F23O6140ACF*	4	A51
3/8	5/8	3.00	0	125	125	125	22	185	FKM	72228RN3TV00*	8	A37
1/2	1/2	4.00	0	150	150	150	11	175	NBR	08F23O6140ACF*	4	A51
1/2	1/2	4.00	0	125	125	125	22	185	FKM	72228RN4UV00*	8	A37
												,
3/4	3/4	5.00	0	150	150	150	11	175	NBR	12F23O6148ACF*	4	A52
3/4	3/4	5.00	0	125	125	125	22	185	FKM	72228RN5VV00*	8	A37
1	1	13.00	5	125	125	125	11	180	NBR	16F24O6164ACF	4	A29
	· ·	10.00							.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	10121001011101	•	
1 1/2	1 1/4	22.50	5	125	125	125	11	180	NBR	24F24O6180ACF	,	A31
,_	, .				.20				.,,	21121001007101		7.01
DC TE	CHNICAL	SPECIE	ΙCΔΤΙ	าพร								
1/4	1/4	0.76	5	200	200	200	10	185	NBR	73222SN2MN00	7	A39
	1/ -	0.70		200	200		10	100	NDIT	7022201421411400		
3/8	5/8	3.00	0	125	125	125	22	185	FKM	72228RN3TV00*	8	A37
3/8	5/8	3.00	0	125	125	80	11.5	150	NBR	06F23O6140A3F*	6	A51
	5/6	3.00		125	125		11.5	150	NDN	00F23O0140A3F		ASI
1/0	1 /0	4.00		105	105	105		105	TIZN 4	70000DN41N/00*		A 0.7
1/2	1/2	4.00	0	125	125	125	22	185	FKM	72228RN4UV00*	8	A37
1/2	1/2	4.00	0	125	125	80	11.5	150	NBR	08F23O6140A3F*	6	A51
3/4	3/4	5.00	0	125	125	125	22	185	FKM	72228RN5VV00*	8	A37
3/4	3/4	5.00	0	125	125	80	11.5	150	NBR	12F23O6148A3F*	6	A52
1	1	13.00	5	125	125	125	11.5	150	NBR	16F24O6164A3F	6	A29
1 1/2	1 1/4	22.50	5	125	125	125	11.5	150	NBR	24F24O6180A3F	6	A31

<sup>\*</sup>Direct Lift Valves (0 minimum pressure differential) will open at zero differential pressure, however, full flow through the valve will be achieved at approximately 5 psi differential.



#### 2-Way External Pilot Operated\* - Universal - Brass

										1	1		
					g Pressu l (MOPD)			Man					
			<u> </u>		T (1.101.2)	1		Max.			Refe	rence	
Port	Orifice	Flow	İ	Air,				Media					
Size	Size	Factor		Inert		Light		Temp.		Pressure			
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve	
AC TE	CHNICAL	SPECIF	ICATIO	NS									
3/8	1/2	2.40	0	150	150	150	10	185	NBR	74232BN3SNJ1	7	A45	
1/2	1/2	2.80	0	150	150	150	10	185	NBR	74232BN4TNJ1	7	A45	
3/4	3/4	7.30	0	150	150	150	10	185	NBR	74232BN52NJ1	7	A34	
1	1	11.00	0	150	150	150	10	185	NBR	74232BN63NJ1	7	A34	
DC TE	CHNICAL	SPECIF	ICATIO	ONS									
3/8	1/2	2.40	0	150	150	150	10	185	NBR	74232BN3SNJ1	7	A45	
1/2	1/2	2.80	0	150	150	150	10	185	NRR	74232BN4TN.I1	7	A45	

<sup>74232</sup>BN41NJ1 7.30 150 3/4 3/4 150 150 10 185 **NBR** 74232BN52NJ1 A34 1 1 11.00 0 150 150 150 10 185 **NBR** 74232BN63NJ1 A34

#### 2-Way Remote Pressure Operated Valves - Universal - Brass, NBR Seals

					g Pressu . (MOPD)			Max.			Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
3/8	1/2	2.4	0	190	190	190		185		75232BN3SN00	-	A55
1/2	1/2	2.8	0	190	190	190		185		75232BN4TN00	-	A55
3/4	3/4	7.3	0	190	190	190		185		75232BN52N00	_	A55

#### 2-Way Remote Operated Valve Port Connections

V-1		Remo	ote Control Valve H	ookup	3-W	ay Pilot Valve Hool	кир
Valve Type	Main Line Supply	IN Port	OUT Port	Pilot Inlet Port 1/8" NPT	Normally Closed Port	Normally Open Port	Common Port
Normally Open	0-190 PSIG	IN	OUT		Main Line Pressure +10 PSI Min.	Pilot Exhaust	
Normally Open	Vacuum	Non-Vacuum Pump	Vacuum Pump	Common Port of 3-Way Pilot	Main Line Pressure +10 PSI Min.	Vacuum	Pilot IN Port (1/8" NPT) of Remote
Normally Closed	0-190 PSIG	IN	OUT	Valve			Control Valve
Normally Closed	Vacuum	Non-Vacuum Pump	Vacuum Pump				

<sup>\*</sup> To assure long, trouble free life, the Pilot IN to main pressure differential should not exceed 200 PSIG.

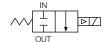
NOTE: This valve is its normal state, without piloting, is normally open.

NOTE: These vavles do not have an electrical operator, therefore, No enclosure and/or coil selection is required.

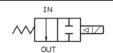


<sup>\*</sup>External pilot pressure valves require a minimum external pilot pressure equal to the main line pressure plus 10 psi. Maximum external pilot pressure is 145 psi for vacuum applications and 160 psi for pressure applications. (Pressure ratings may be reduced, however. Consult factory for details.)

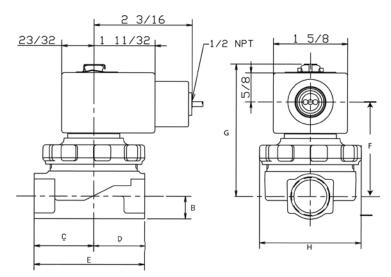




2-Way Normally Closed 06F25C, 08F25C



2-Way Normally Open 06F250, 08F250 Port Identification: In-In/Out-Out

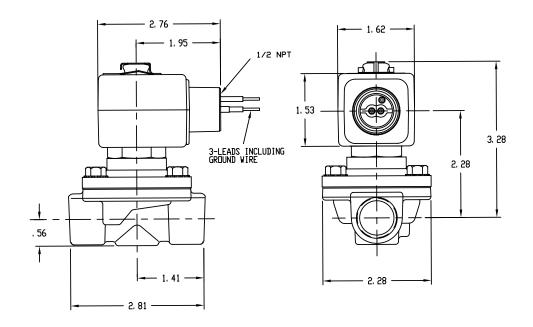


		Dimensions									
Valve	В	С	D	E	F	G	Н				
06F25C2132ACF											
08F25C2132ACF	1/2	1 5/16	1 1/8	27/16	2 5/16	2 29/32	2 1/4				
06F25C2132A3F	1/2	1 5/16	1 1/6	2 7/10	2 3/16	2 29/32	21/4				
08F25C2132A3F											
06F25O2132ACF											
08F25O2132ACF	1/2	1 5/16	1 1/8	2 7/16	2 7/32	2 29/32	2 1/4				
08F25O2132A3F											



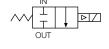


2-Way Normally Closed Port Identification: In-In/Out-Out

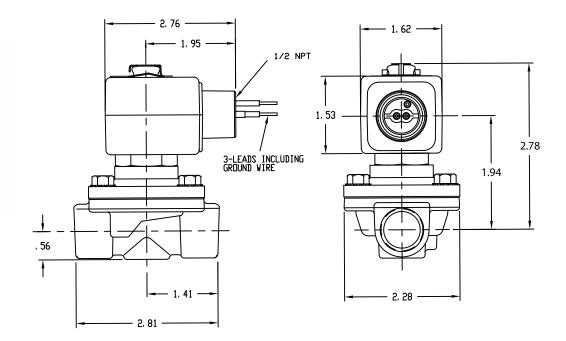




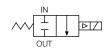




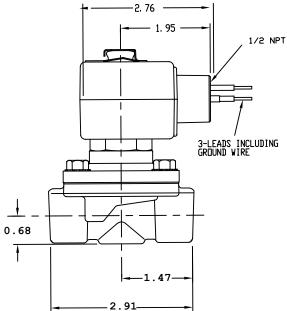
2-Way Normally Closed Port Identification: In-In/Out-Out

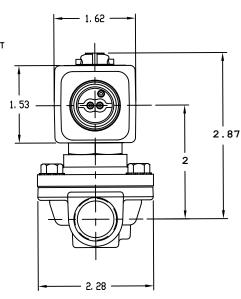




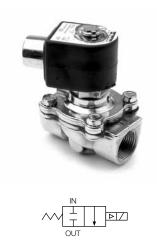


2-Way Normally Closed Port Identification: In-In/Out-Out

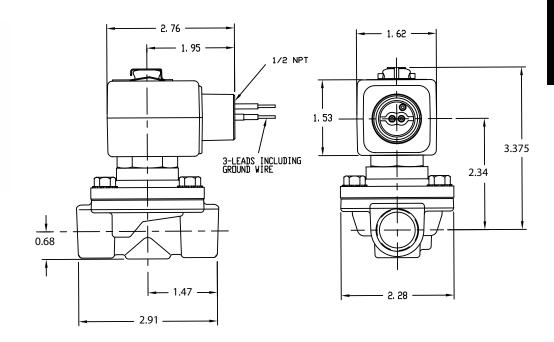




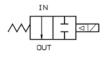




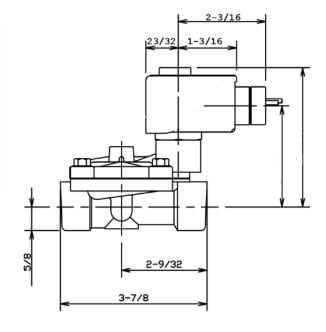
2-Way Normally Closed Port Identification: In-In/Out-Out

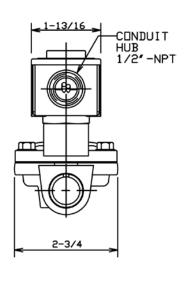




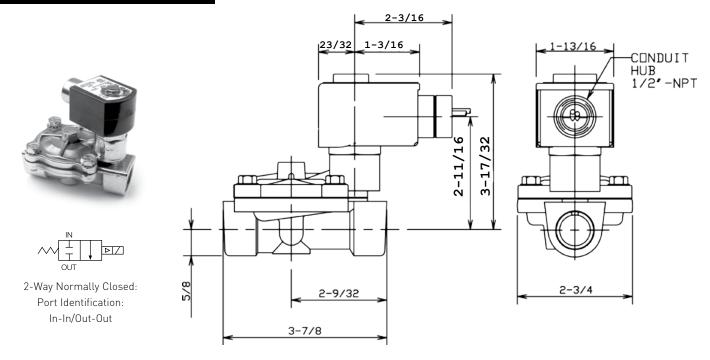


2-Way Normally Open Port Identification: In-In/Out-Out



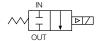




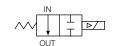


#### Valve Reference A28

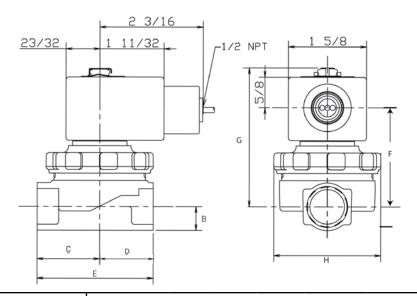




2-Way Normally Closed: 12F25Cxx



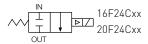
2-Way Normally Open: 12F250xx Port Identification: In-In/Out-Out



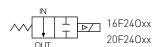
		Dimensions										
Valve	В	B C D E F G H										
12F25C2148ACF	5/8	1 5/8	1 1/2	3 1/8	2 11/32	3 15/32	3 1/2					
12F25O2148ACF	5/8	1 5/8	1 1/2	3 1/8	2 1/4	3 15/32	2 29/32					





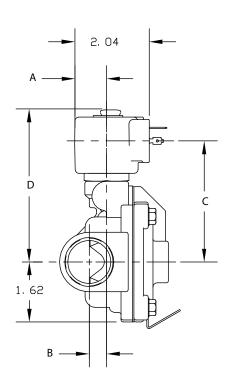


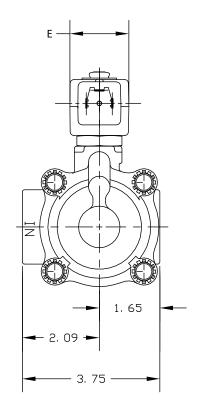
2-Way normally closed:



2-Way normally open:

Port Identification: In-In/Out-Out

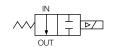




		I	Dimensio	ns	
Valve	A	В	С	D	E
16F24C2164AAF 16F24C6164AAF	23/32	15/32	3 1/8	3 31/32	1 9/16
16F24C2164A3F 16F24C6164A3F	7/8	15/32	3 9/32	4 3/16	1 13/16
20F24C2172AAF	23/32	17/32	3 1/8	3 31/32	1 9/16
20F24C2172A3F	7/8	17/32	3 9/32	4 3/16	1 13/16
16F24O2164ACF 16F24O2164A3F	02/20	15/20	4.5/20	4.2/10	1.12/16
16F24O6164ACF 16F24O6164A3F	23/32	15/32	4 5/32	4 3/16	1 13/16
20F24O2172ACF 20F24O2172A3F	7/8	17/32	4 3/8	4 13/16	1 13/16

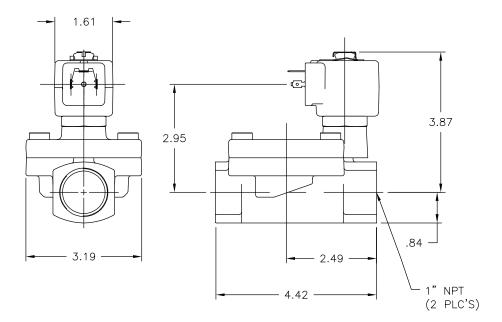




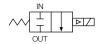


2-Way Normally Open: 16F250xx

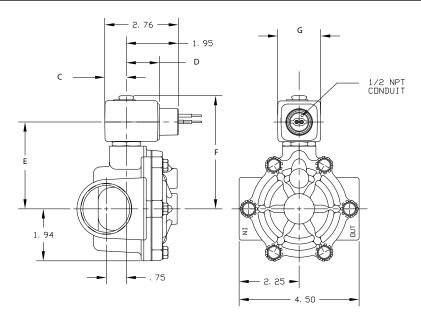
Port identification: In-In/Out-Out







2-Way Normally Closed Port identification: In-In/Out-Out



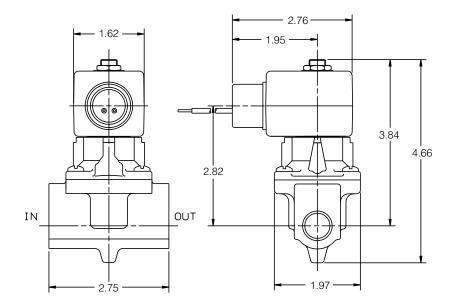
Part Number	Dimension									
Part Number	С	D	E	F	G					
24F24C2180AAF 24F24C180AAF	23/32	1 5/16	3 5/16	4 5/32	1 9/16					
24F24C2180A3F	7/8	1 17/32	3 17/32	4 3/8	1 13/16					
24F2402180ACF 24F2402180A3F 24F2406180ACF	7/8	1 17/32	3 3/8	4 3/8	1 13/16					







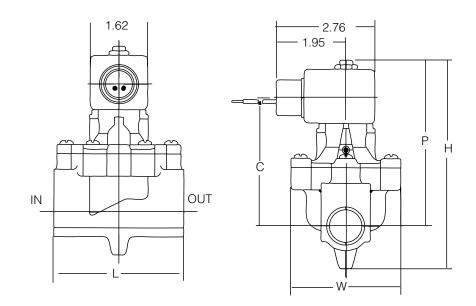
2-Way Normally Closed Port Identification: IN-IN/OUT-OUT







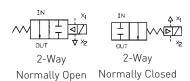
2-Way Normally Closed Port identification: In-In/Out-Out 73212BN52 P-IN/A-OUT 73212BN63



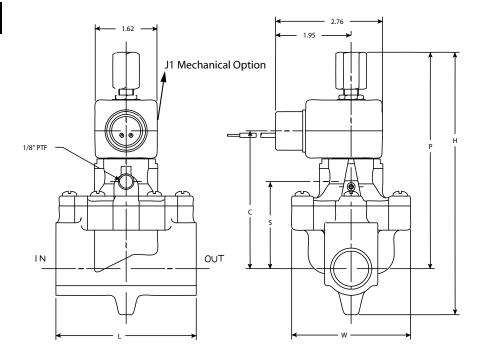
Part Number		D	imensio	n		Port Indentification			
Part Number	Н	P	С	L	W	IN	OUT		
73212BN52NOO	5.81	4.62	3.59	3.62	3.09	IN	OUT		
73212BN63NOO	6.22	4.89	3.87	4.31	3.45	P	A		







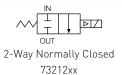
2-Way Univeral
Valve may be Normally Closed or
Normally Open, depending on piping
of external pilot.

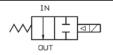


			Port Iden	tification				
Part Number	Н	P	С	L	W	S	IN	OUT
74232BN52NJ1	6.78	5.59	3.59	3.62	3.09	2.28	IN	OUT
74232BN63NJ1	7.19	5.86	3.87	4.31	3.45	2.56	P	A

#### Valve Reference A35

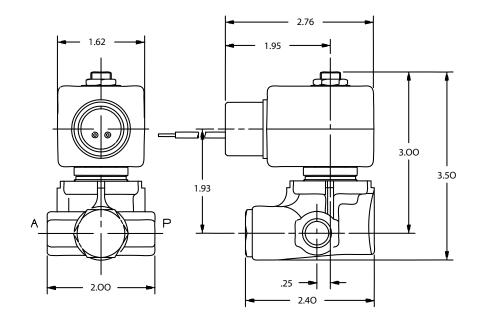






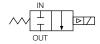
2-Way Normally Open: 73222xx

Port Identification: IN-IN/--OUT

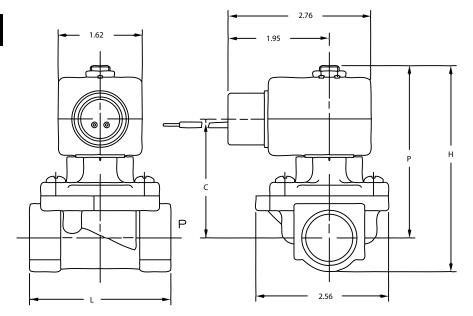






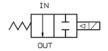


2-Way Normally Closed Port Identification: P-IN/--OUT

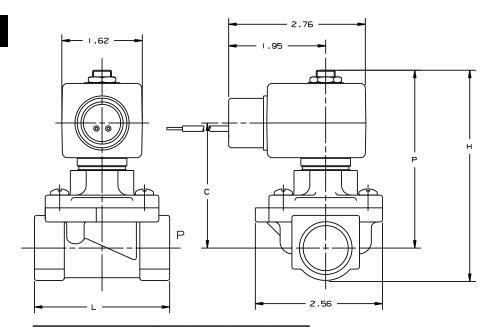


	Dimensions				
Valve	Н	P	С	L	
72218BN3TXXX	2.70	2.02	0.01	0.64	
72218BN4UXXX	3.78	3.23	2.21	2.64	
72218RN3TXXX					
72218RN4UXXX	3.99	3.33	2.31	2.71	
72218BN5VXXX	3.99			2.71	
72218RN5VXXX					





2-Way Normally Open Port Identification: P-IN/--OUT

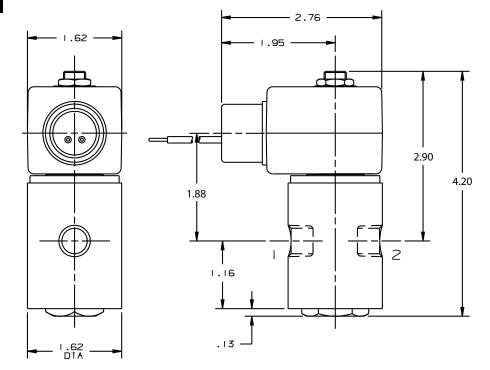


	Dimensions			
Valve	H	P	C	L
72228BN3TXXX				
72228BN4UXXX	4.04	3.49	2.43	2.64
72228RN3TXXX	4.04			2.04
72228RN4UXXX				
72228BN5VXXX	4.24	2.50	2.52	2.72
72228RN5VXXX	4.24	3.58	2.52	2.72

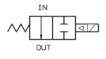




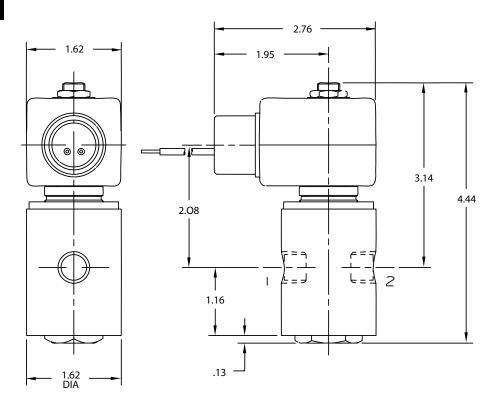
2-Way Normally Closed Port Identification: 2-IN/1-OUT





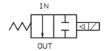


2-Way Normally Open Port Identification: 2-IN/1-OUT

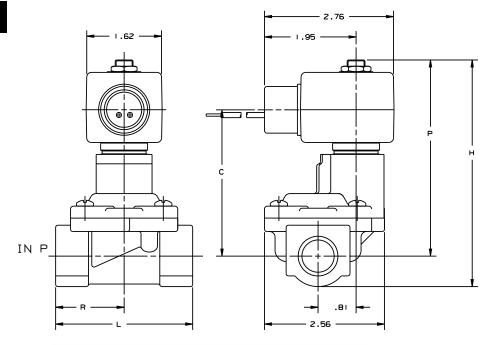








2-Way Normally Open Port Identification: P-IN/--OUT

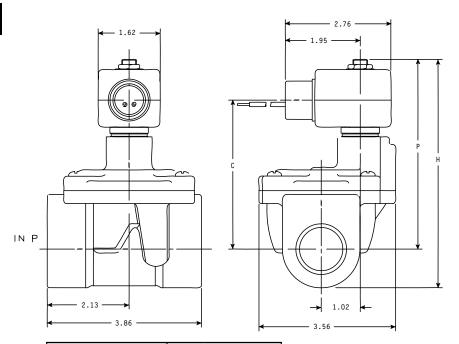


	Dimensions						
Valve	Н	P	С	L	R		
73228BN3TN00 73228BN4UN00	4.62	4.07	3.01	2.64	1.39		
73228BN5VN00	4.83	4.17	3.11	2.72	1.43		





2-Way Normally Open Port Identification: P-IN/--OUT



	Dimensions			
Valve	Н	P	С	
73228BN64N00 73228BN64V00	5.69	4.83	3.77	
73228BN75N00 73228BN75V00	5.97	4.97	3.91	

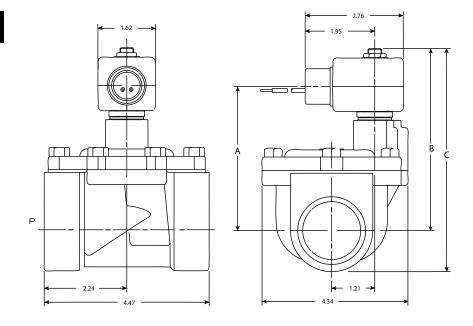




2-Way Normally Closed 73218xx

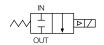


2-Way Normally Open 73228xx Port Identification: In-In/--Out

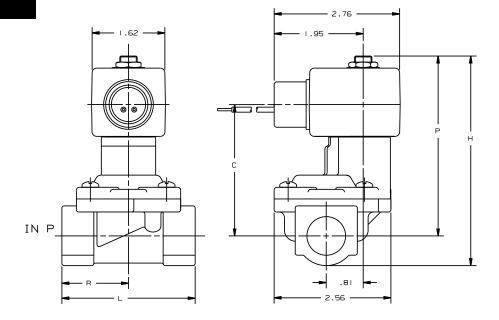


	Dimensions				
Valve	A	В	C		
73218xxx	3.87	4.89	6.05		
73228xxx	4.07	5.13	6.28		





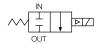
2-Way Normally Closed 73218xx Port Identification: P-IN/--OUT



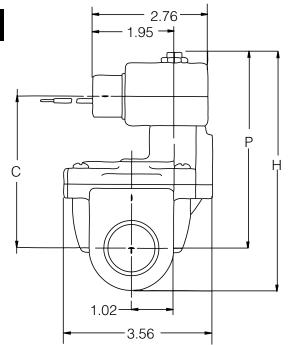
	Dimensions					
Valve	Н	P	С	L	R	
73218BN3TXXX 73218BN4UXXX	4.38	3.84	2.81	2.64	1.39	
73218BN5VXXX	4.59	3.94	2.91	2.72	1.43	

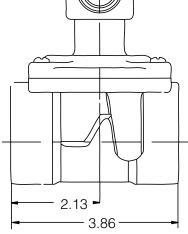






2-Way Normally Closed Port Identification: P-IN/--OUT





	Dimensions			
Valve	H	P	C	
73218BN64XXX	5.45	4.59	3.57	
73218BN75XXX	5.74	4.73	3.71	

"X" denotes multiple digit combinations for brevity

#### Valve Reference A45

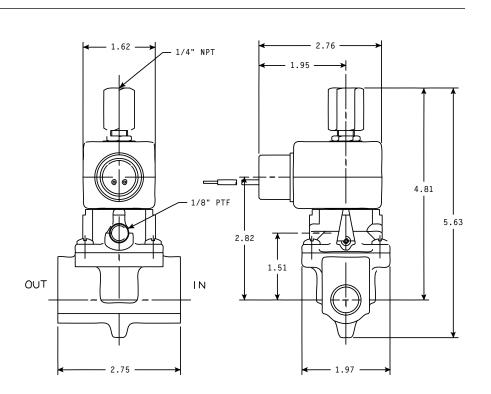






2-Way Normally Open 2-Way Normally Closed

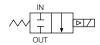
2-Way Universal Valve may be normally closed or normally open, depending on piping of external pilot. Port identification: In-In/Out-Out



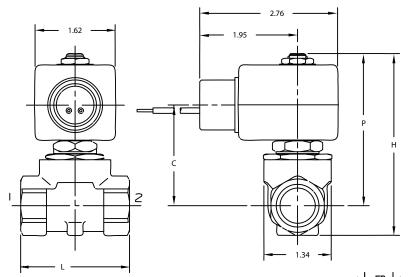




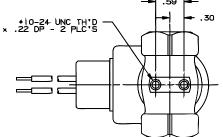




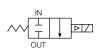
2-Way Normally Closed Port Identification: Flow arrow on body indicates flow direction. Ports are not marked.



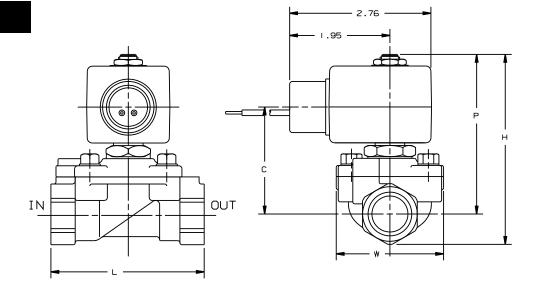
	Dimensions				
Valve	Н	P	С	L	
7321KBN2RXXX 7321KBN3SXXX	3.56	2.97	1.96	1.97	
7321KBN4SXXX	3.56	2.97	1.96	2.17	







2-Way Normally Closed Port Identification: Flow arrow on body indicates flow direction Ports are not marked



	Dimensions						
Valve	Н	P	С	L	W		
7221GBN3VXXX 7221GBN4VXXX	3.66	3.07	2.06	2.95	2.09		
7221GBN51XXX	3.75	3.07	2.06	3.15	2.09		
7221GBN61XXX	4.03	3.15	2.12	3.35	2.09		
7221GBN64XXX	4.25	3.35	2.34	3.94	2.75		





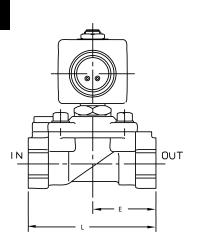


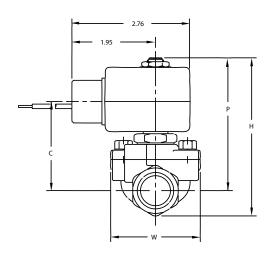
2-Way Normally Closed 7321GBNxx



2-Way Normally Open 7322GBNxx

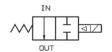
Port Identification: Flow arrow on body indicates flow direction. Ports are not marked.



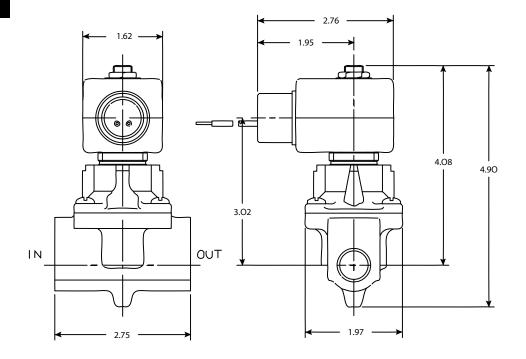


	Dimensions						
Valve	Н	P	C	L	E	W	
7321GBN53XXX 7322GBN53XXX 7321GBN64XXX 7322GBN64XXX	4.75	3.86	2.84	3.94	1.97	2.75	
7321GBN76XXX 7322GBN76XXX	5.41	4.11	3.09	4.33	2.17	2.75	
7321GBN88XXX 7322GBN88XXX	5.66	4.37	3.35	5.51	2.95	3.90	
7321GBN99XXX 7322GBN99XXX	6.25	4.60	3.58	5.91	3.15	3.90	





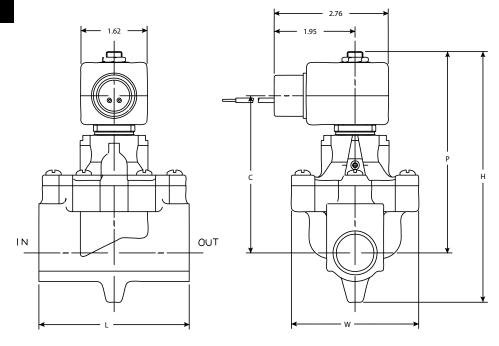
2-Way Normally Open Port Identification: IN-IN/ OUT-OUT







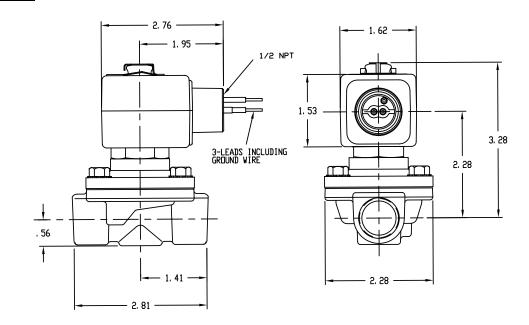
2-Way Normally Open Port Identification: IN-IN/ OUT-OUT (7322BN52xx) P-IN/A-OUT (7322BN63xx)



	Dimensions					
Valve	H	P	C	L	W	
73222BN52N00	6.04	4.85	3.79	3.62	3.09	
73222BN63N00	6.46	5.13	4.07	4.31	3.45	

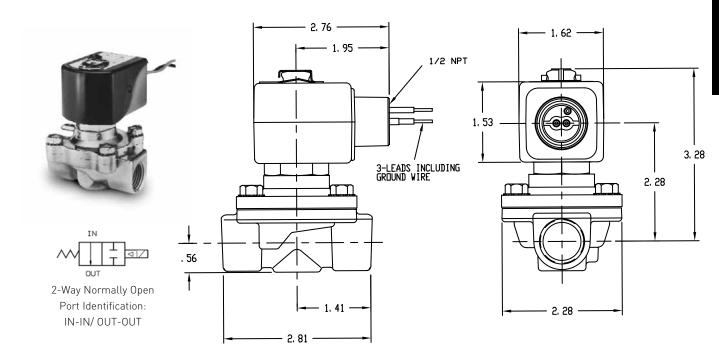


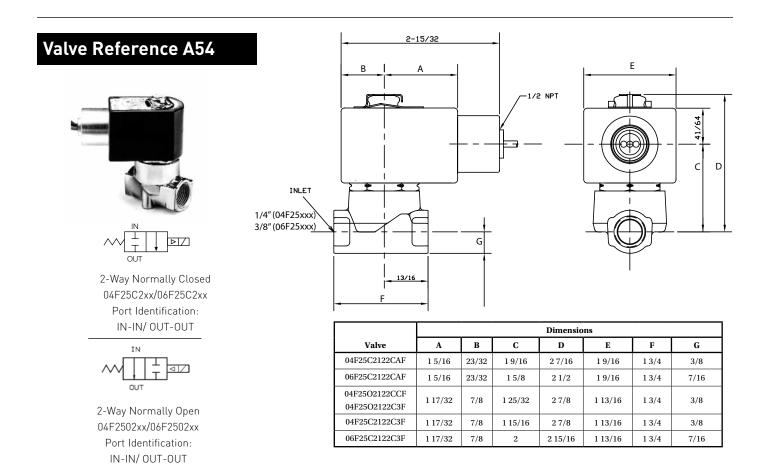
2-Way Normally Open Port Identification: IN-IN/ OUT-OUT



Explosion-proof watertight shown in outline





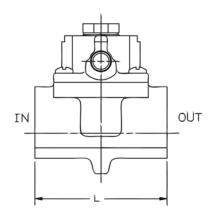


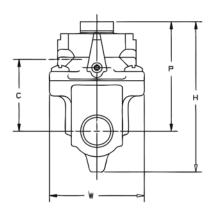






2-Way Normally Open Remote Pilot Port Identification: 3/8, 1/2, 3/4 IN-IN/ OUT-OUT Port Identification - 1" P - IN/A - OUT





	Dimensions						entification
Valve	Н	P	С	L	W	IN	OUT
75232BN3SN00	3.17	2.35	1.51	2.75	1.97	IN	оит
75232BN4TN00	3.17	2.35	1.51	2.75	1.97	IN	оит
75232BN52N00	4.31	3.12	2.28	4.62	3.09	IN	оит

- Valve can be normally closed or normally open depending on piping of external pilot.
- Pilot port is marked "C."



#### 2-Way Pilot Operated Materials of Construction\*\*

Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
04F25C2	6	2WNC	1/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
04F25C2	11.5	2WNC	1/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	77°F
04F25O2	11	2WNO	1/4	Brass	305SS	430FR	416/430FR	430FR	302SS	Copper	130°F
04F25O2	11.5	2WNO	1/4	Brass	305SS	430FR	416/430FR	430FR	302SS	Copper	77°F
06F22C2	6	2WNC	3/8	Brass	305SS	430FR	Brass	430FR	302SS	Copper	77°F
06F22C2	11.5, 16	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
06F22C6	6	2WNC	3/8	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
06F22C6	11.5, 16	2WNC	3/8	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
06F23C2	11	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
06F23C2	11.5	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
06F23C6	11	2WNC	3/8	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
06F23C6	11.5	2WNC	3/8	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
06F23O2	11	2WNO	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
06F23O2	11.5	2WNO	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
06F23O6	11	2WNO	3/8	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
06F23O6	11.5	2WNO	3/8	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
06F25C2	6,11	2WNC	3/8	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
06F25C2	11.5	2WNC	3/8	Brass	305SS	430FR	Brass	430FR	302SS	Copper	77°F
06F25O2	11	2WNO	3/8	Brass	305SS	430FR	416/430FR	430FR	302SS	Copper	130°F
06FH5C2	11	2WNC	3/8	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
08F22C2	6	2WNC	1/2	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
08F22C2	11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
08F22C2	11.5, 16	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
08F22C6	11.5, 16	2WNC	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
08F23C2	11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
08F23C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
08F23C6	11	2WNC	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
08F23C6	11.5	2WNC	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
08F23O2	11	2WNO	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
08F23O2	11.5	2WNO	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
08F23O6	11	2WNO	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
08F23O6	11.5	2WNO	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
08F25C2	11	2WNC	1/2	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
08F25C2	11.5	2WNC	1/2	Brass	305SS	430FR	Brass	430FR	302SS	Copper	77°F
08F25O2	11	2WNO	1/2	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
08F25O2	11.5	2WNO	1/2	Brass	305SS	430FR	Brass	430FR	302SS	Copper	77°F
08FH5C2	11	2WNC	1/2	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
12F22C2	6	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
12F22C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F22C6	11.5, 16	2WNC	3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
12F23C2	11	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
12F23C2	11.5	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F23C6	11	2WNC	3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
12F23C6	11.5	2WNC	3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
12F23O2	11	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

, .	орс.	4104.		<del></del>				•			
Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
12F23O2	11.5	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F23O6	11	2WNO	3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
12F23O6	11.5	2WNO	3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
12F24C2	6	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
12F24C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F24O2	11	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
12F25C2	11	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
12F25O2	11	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
12FH5C2	11	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
16F24C2	6	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
16F24C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
16F24C6	6	2WNC	3/4	316SS	305SS	430FR	303	430FR	302SS	Silver	130°F
16F24C6	11.5	2WNC	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
16F24O2	11.5	2WNO	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
16F24O2	11	2WNO	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
16F24O6	11.5	2WNO	1	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
16F24O6	11	2WNO	1	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
16F25C2	11.5	2WNC	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
16F25C2	11	2WNC	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
16F25O2	11	2WNO	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
16FH5C2	16	2WNC	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

								•			
Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
20F24C2	6	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
20F24C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
20F24O2	11	2WNO	11/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
24F24C2	6	2WNC	3/4	Brass	305SS	430FR	Brass	430FR	302SS	Copper	130°F
24F24C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
24F24C6	6	2WNC	3/4	316SS	305SS	430FR	303	430FR	302SS	Silver	130°F
24F24C6	11.5	2WNC	1/2	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
24F24O2	11.5	2WNO	1½	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
24F24O2	11	2WNO	1½	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
24F24O6	11.5	2WNO	1½	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	77°F
24F24O6	11	2WNO	1½	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Silver	130°F
72218BN	10	2WNC	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72218BN	22	2WNC	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
72218RN	10	2WNC	3/8 - 3/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72218RN	22	2WNC	3/8 - 3/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7221GBN	10	2WNC	3/8 - 1	Brass	304SS	430FR	430F	430FR/ 4106	301SS	Copper	150°F
7221GBN	22	2WNC	3/8 - 1	Brass	304SS	430FR	430F	430FR/ 4106	301SS	Copper	77°F
72228BN	10	2WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72228BN	22	2WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
72228RN	10	2WNO	3/8 - 3/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72228RN	22	2WNO	3/8 - 3/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73212BN	10	2WNC	1/4 - 1	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73212BN	22	2WNC	1/4 - 1	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
73212SN	10	2WNC	1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73212SN	22	2WNC	1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73218BN	10	2WNC	3/8 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73218BN	22	2WNC	3/8 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7321GBN	10	2WNC	3/4 - 2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7321GBN	22	2WNC	3/4 - 2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7321KBN	10	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7321KBN	22	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73222BN	10	2WNO	1/4 - 1	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73222BN	22	2WNO	1/4 - 1	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73222SN	10	2WNO	1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73222SN	22	2WNO	1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73228BN	10	2WNO	3/8 - 11/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73228BN	22	2WNO	3/8 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7322GBN	10	2WNO	3/4 - 2	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7322GBN	22	2WNO	3/4 - 2	Brass	304SS	430FR	430F	430FR	301SS	Copper	77°F
74232BN	10	2WDP	3/8 - 1	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
74232BN	22	2WDP	3/8 - 1	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
75232***	-	UNIV	3/8-2	Brass	N/A	N/A	N/A	N/A	N/A	N/A	

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

<sup>\*\*\*</sup> Pilot Orifice is 303SS. These are remotely piloted valves. No coil required.

Notes	



# 2-Way

Direct Acting & Pilot Operated High Pressure 1/8" - 3/4" NPT



#### **General Description:**

2-Way Direct Acting and Pilot Operated High Pressure valves are generally installed where high pressure and large flow requirements dictate the use of piston valves and/or valves with more robust seals such as PTFE and Ruby discs\*. Pilot Operated valves require the minimum pressure differential specified for proper valve operation.

#### Installation

Pilot Operated Valves should be mounted with solenoid coils vertical and upright. Direct Acting valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

# **Standard Materials of Construction** Please refer to page A73.

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and other non-compressible media.

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120

For other voltages – consult factory



#### **Coil Classification:**

Class F standard Class H available

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

# **Maximum Ambient Temperature** 150°F

Please refer to page A73 for details.

#### Applications:

- Blow molding
- Compressors
- Car washing equipment
- Pumps

#### \*Table 1:

Allowable Max. Seat Leakage Chart										
Valve	Leakage on gases									
06F28, 08F28, 12F28	472 cc/min									
73216	50 cc/min									
7321H, 7322H	25 cc/min									



#### 2-Way Direct Acting - High Pressure - Normally Closed - Brass

			0	perating	Pressu	re			1 - DI 45			
Port	Orifice	Flow	- Diii	Air,	(14101 15)			Max. Media			Refe	rence
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal*	Vessel Number	Coil	Valve
AC TE	CHNICAL	SPECIF	ICATIO	NS								
1/8	1/16	0.11	0	1000	1000	1000	10	165	PCTFE	7121KBN1GF00	7	A65
1/8	3/32	0.24	0	725	725	725	22	210	RUBY	7121KBN1LR00	8	A65
1/8	3/32	0.24	0	500	500	500	10	210	RUBY	7121KBN1LR00	7	A65
1/8	1/8	0.31	0	365	365	365	10	165	PCTFE	7121KBN1NF00	7	A65
1/4	1/16	0.11	0	1450	1450	1450	22	210	RUBY	7121KBN2GR00	8	A65
1/4	1/16	0.11	0	1100	1100	1100	10	210	RUBY	7121KBN2GR00	7	A65
1/4	1/16	0.11	0	1000	1000	1000	10	165	PCTFE	7121KBN2GF00	7	A65
1/4	5/64	0.17	0	1030	1030	1030	22	210	RUBY	7121KBN2JR00	8	A65
1/4	5/64	0.17	0	700	700	700	10	210	RUBY	7121KBN2JR00	7	A65
1/4	3/32	0.24	0	725	725	725	22	210	RUBY	7121KBN2LR00	8	A65
1/4	3/32	0.24	0	500	500	500	10	210	RUBY	7121KBN2LR00	7	A65
1/4	1/8	0.31	0	525	525	525	22	210	RUBY	7121KBN2NR00	8	A65
1/4	1/8	0.31	0	365	365	365	10	165	PCTFE	7121KBN2NF00	7	A65
1/4	1/8	0.31	0	365	365	365	10	210	RUBY	7121KBN2NR00	7	A65
						•						
DC TE	CHNICAL	SPECIF	ICATIO	ONS								
1/8	1/16	0.11	0	700	700	700	22	165	PCTFE	7121KBN1GF00	8	A65
1/8	1/16	0.11	0	435	435	435	10	165	PCTFE	7121KBN1GF00	7	A65
1/8	3/32	0.24	0	320	320	320	22	210	RUBY	7121KBN1LR00	8	A65
1/8	3/32	0.24	0	175	175	175	10	210	RUBY	7121KBN1LR00	7	A65
1/8	1/8	0.31	0	205	205	205	22	165	PCTFE	7121KBN1NF00	8	A65
1/8	1/8	0.31	0	125	125	125	10	165	PCTFE	7121KBN1NF00	7	A65
1/4	1/16	0.11	0	800	800	800	22	210	RUBY	7121KBN2GR00	8	A65
1/4	1/16	0.11	0	700	700	700	22	165	PCTFE	7121KBN2GF00	8	A65
1/4	1/16	0.11	0	435	435	435	10	210	RUBY	7121KBN2GR00	7	A65
1/4	1/16	0.11	0	435	435	435	10	165	PCTFE	7121KBN2GF00	7	A65
1/4	5/64	0.17	0	460	460	460	22	210	RUBY	7121KBN2JR00	8	A65
1/4	5/64	0.17	0	260	260	260	10	210	RUBY	7121KBN2JR00	7	A65
1/4	3/32	0.24	0	320	320	320	22	210	RUBY	7121KBN2LR00	8	A65
1/4	3/32	0.24	0	175	175	175	10	210	RUBY	7121KBN2LR00	7	A65
1/4	1/8	0.31	0	220	220	220	22	210	RUBY	7121KBN2NR00	8	A65
1/4	1/8	0.31	0	205	205	205	22	165	PCTFE	7121KBN2NF00	8	A65
1/4	1/8	0.31	0	125	125	125	10	210	RUBY	7121KBN2NR00	7	A65
1/4	1/8	0.31	0	125	125	125	10	165	PCTFE	7121KBN2NF00	7	A65

<sup>\*</sup>RUBY Seals: Allowable Seat leakage is 90 cc/min on air and inert gas at rated pressure: 7121KBNxxRxx



#### 2-Way Direct Acting - High Pressure - Normally Closed - Stainless Steel

	יום עני	CACCIII	9 - 1111	giirie	33ui C	- 1101	illatty	CLUSEL	- Stailit	ess steet		
					Pressu							
			Diff	1	. (MOPD) T	1251 T		Max.			Refe	rence
Port   Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal*	Vessel Number	Coil	Valve
	CHNICAL							·			1	
1/8	1/32	0.021	0	3000	3000	3000	10	185	NYLON	71216SN1BL00	7	A60
1/8	3/64	0.037	0	1500	1500	1500	10	185	RULON	71216SN1FU00	7	A60
1/8	3/64	0.060	0	1000	1000	1000	10	165	PCTFE	71215SN1EF00	7	A60
1/8	1/16	0.070	0	1250	1250	1250	10	185	NYLON	71216SN1GL00	7	A60
1/8	1/16	0.100	0	700	700	700	10	165	PCTFE	71215SN1GF00	7	A60
1/8	5/64	0.090	0	500	500	500	10	185	PTFE	71216SN1JT00	7	A60
1/8	3/32	0.180	0	650	650	650	22	165	PCTFE	71215SN1KF00	8	A60
1/8	3/32	0.180	0	260	260	260	10	165	PCTFE	71215SN1KF00	7	A60
1/8	1/8	0.280	0	520	520	520	22	165	PCTFE	71215SN1MF00	8	A60
1/8	1/8	0.280	0	200	200	200	10	165	PCTFE	71215SN1MF00	7	A60
1/4	1/32	0.021	0	3000	3000	3000	10	185	NYLON	71216SN2BL00	7	A60
1/4	3/64	0.037	0	1500	1500	1500	10	185	RULON	71216SN2FU00	7	A60
1/4	3/64	0.060	0	1000	1000	1000	10	165	PCTFE	71215SN2EF00	7	A60
1/4	1/16	0.070	0	1250	1250	1250	10	185	NYLON	71216SN2GL00	7	A60
1/4	5/64	0.090	0	500	500	500	10	185	PTFE	71216SN2JT00	7	A60
1/4	1/16	0.100	0	700	700	700	10	165	PCTFE	71215SN2GF00	7	A60
1/4	3/32	0.180	0	650	650	650	22	165	PCTFE	71215SN2KF00	8	A60
1/4	3/32	0.180	0	260	260	260	10	165	PCTFE	71215SN2KF00	7	A60
1/4	1/8	0.280	0	520	520	520	22	165	PCTFE	71215SN2MF00	8	A60
1/4	1/8	0.280	0	200	200	200	10	165	PCTFE	71215SN2MF00	7	A60
DC TE	CHNICAL	SPECIF	ICATIO	ONS								
1/8	1/32	0.020	0	3000	3000	3000	22	185	NYLON	71216SN1BL00	8	A60
1/8	1/32	0.020	0	2500	2500	2500	10	185	NYLON	71216SN1BL00	7	A60
1/8	3/64	0.040	0	1000	1000	1000	10	185	RULON	71216SN1FU00	7	A60
1/8	3/64	0.060	0	1000	1000	1000	22	165	PCTFE	71215SN1EF00	8	A60
1/8	3/64	0.060	0	520	520	520	10	165	PCTFE	71215SN1EF00	7	A60

<sup>\*</sup> NYLON Seals: Allowable Seat leakage is 50 cc/min on air and inert gas at rated pressure: 71216SNxxLxx RULON Seals: Allowable Seat leakage is 20 cc/min on air and inert gas at rated pressure: 71216SNxxUxx PTFE Seals: Allowable Seat leakage is 20 cc/min on air and inert gas at rated pressure: 71216SNxxTxx



#### 2-Way Direct Acting - High Pressure - Normally Closed - Stainless Steel (Continued)

2-110	iy Direc	CACCIII	9 - 111	giirie	33ui <del>C</del>	- 1101	illatty	Clused	- Staillit	ess Steet (Continue	u)	
					Pressu							
			Diff		(MOPD)	PSI		Max.			Refe	rence
Port	Orifice	Flow		Air,				Media		D		
Size NPT	Size in.	Factor Cv	Min.	Inert Gas	Water	Light Oil	Watt	Temp. °F	Seal*	Pressure Vessel Number	Coil	Valve
	CHNICAL				Water	<u> </u>	, water	•	Seat	V C S S C I V U II S C I	0011	vatve
1/8	3/64	0.04	0	1500	1500	1500	22	185	RULON	71216SN1FU00	8	A60
1/8	1/16	0.07	0	1000	1000	1000	22	185	NYLON	71216SN1GL00	8	A60
1/8	1/16	0.07	0	500	500	500	10	185	NYLON	71216SN1GL00	7	A60
1/8	5/64	0.09	0	400	400	400	22	185	PTFE	71216SN1JT00	8	A60
1/8	5/64	0.09	0	200	200	200	10	185	PTFE	71216SN1JT00	7	A60
1/8	1/16	0.10	0	700	700	700	22	165	PCTFE	71215SN1GF00	8	A60
1/8	1/16	0.10	0	350	350	350	10	165	PCTFE	71215SN1GF00	7	A60
1/8	3/32	0.18	0	300	300	300	22	165	PCTFE	71215SN1KF00	8	A60
1/8	3/32	0.18	0	130	130	130	10	165	PCTFE	71215SN1KF00	7	A60
1/8	1/8	0.28	0	200	200	200	22	165	PCTFE	71215SN1MF00	8	A60
1/8	1/8	0.28	0	100	100	100	10	165	PCTFE	71215SN1MF00	7	A60
1/4	1/32	0.02	0	3000	3000	3000	22	185	NYLON	71216SN2BL00	8	A60
1/4	1/32	0.02	0	2500	2500	2500	10	185	NYLON	71216SN2BL00	7	A60
1/4	3/64	0.06	0	1000	1000	1000	22	165	PCTFE	71215SN2EF00	8	A60
1/4	3/64	0.06	0	520	520	520	10	165	PCTFE	71215SN2EF00	7	A60
1/4	3/64	0.04	0	1500	1500	1500	22	185	RULON	71216SN2FU00	8	A60
1/4	3/64	0.04	0	1000	1000	1000	10	185	RULON	71216SN2FU00	7	A60
1/4	1/16	0.07	0	1000	1000	1000	22	185	NYLON	71216SN2GL00	8	A60
1/4	1/16	0.07	0	500	500	500	10	185	NYLON	71216SN2GL00	7	A60
1/4	5/64	0.09	0	400	400	400	22	185	PTFE	71216SN2JT00	8	A60
1/4	5/64	0.09	0	200	200	200	10	185	PTFE	71216SN2JT00	7	A60
1/4	1/16	0.10	0	700	700	700	22	165	PCTFE	71215SN2GF00	8	A60
1/4	1/16	0.10	0	350	350	350	10	165	PCTFE	71215SN2GF00	7	A60
1/4	3/32	0.18	0	300	300	300	22	165	PCTFE	71215SN2KF00	8	A60
1/4	3/32	0.18	0	130	130	130	10	165	PCTFE	71215SN2KF00	7	A60
1/4	1/8	0.28	0	200	200	200	22	165	PCTFE	71215SN2MF00	8	A60
1/4	1/8	0.28	0	100	100	100	10	165	PCTFE	71215SN2MF00	7	A60

<sup>\*</sup> NYLON Seals: Allowable Seat leakage is 50 cc/min on air and inert gas at rated pressure: 71216SNxxLxx RULON Seals: Allowable Seat leakage is 20 cc/min on air and inert gas at rated pressure: 71216SNxxUxx PTFE Seals: Allowable Seat leakage is 20 cc/min on air and inert gas at rated pressure: 71216SNxxTxx



#### 2-Way Direct Acting - High Pressure - Normally Open - Brass

					Pressu (MOPD)			Max.			Refe	erence
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICAL	SPECIF	ICATIO	NS								
1/8	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN1GF00	7	A65
1/8	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN1LF00	7	A65
1/4	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN2GF00	7	A65
1/4	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN2LF00	7	A65
DC TE	CHNICAL	SPECIF	ICATIO	ONS								
1/8	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN1GF00	7	A65
1/8	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN1LF00	7	A65
1/4	1/16	0.11	0	435	435	435	10	165	PCTFE	7122KBN2GF00	7	A65
1/4	3/32	0.21	0	175	175	175	10	165	PCTFE	7122KBN2LF00	7	A65

#### 2-Way Direct Acting - High Pressure - Normally Open - Stainless Steel

		ı							ı		1	
					Pressu							
			Diff	erential	(MOPD)	PSI		Max.			Refe	erence
Port	Orifice	Flow		Air,				Media				
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICAL	. SPECIF	ICATIO	NS								
1/8	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN1EF00	7	A64
1/8	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN1GF00	7	A64
1/8	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN1KF00	7	A64
1/4	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN2EF00	7	A64
1/4	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN2GF00	7	A64
1/4	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN2KF00	7	A64
DC TE	CHNICAL	SPECIF	ICATIO	ONS								
1/8	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN1EF00	7	A64
1/8	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN1GF00	7	A64
1/8	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN1KF00	7	A64
1/4	3/64	0.05	0	750	750	750	10	165	PCTFE	71225SN2EF00	7	A64
1/4	1/16	0.11	0	400	400	400	10	165	PCTFE	71225SN2GF00	7	A64
1/4	3/32	0.15	0	170	170	170	10	165	PCTFE	71225SN2KF00	7	A64



#### 2-Way Internal Pilot Operated - High Pressure - Normally Closed - Brass

			Operating Pressure Differential (MOPD) PSI				Max.			Refe	rence	
Port	Orifice	Flow		Air,				Media			Itere	rence
Size	Size	Factor		Inert		Light		Temp.		Pressure	l	
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal*	Vessel Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS												
1/4	1/4	0.76	5	1500	1500	1500	10	210	PTFE	73216BN2MT00	7	A61
1/4	5/16	1.50	15	1500	1500	1500	11	200	DEL	04F28C1D20ACF	4	A56
1/4	5/16	2.50	5	600	600	600	10	185	NBR	7321HBN2SN00	7	A63
-	_											
3/8	5/16	1.50	15	1500	1500	1500	11	200	DEL	06F28C1D20ACF	4	A57
3/8	7/16	3.50	5	600	600	600	10	185	NBR	7321HBN3TN00	7	A63
1/2	3/8	3.20	25	1500	1500	1500	11	200	DEL	08F28C1D24ACF	4	A58
1/2	9/16	4.10	5	600	600	600	10	185	NBR	7321HBN4UN00	7	A63
3/4	3/4	7.80	25	1000	1000	1000	11	200	DEL	12F28C1D48BCF	4	A59
			,									
DC TE	CHNICAL	SPECIF	ICATIO	ONS								
1/4	5/16	2.50	5	600	600	600	22	185	NBR	7321HBN2SN00	8	A63
1/4	5/16	2.50	5	435	435	435	10	185	NBR	7321HBN2SN00	7	A63
1/4	1/4	0.76	5	1500	1500	1500	22	210	PTFE	73216BN2MT00	8	A61
1/4	1/4	0.76	5	800	800	800	10	210	PTFE	73216BN2MT00	7	A61
3/8	7/16	3.50	5	600	600	600	22	185	NBR	7321HBN3TN00	8	A63
3/8	7/16	3.50	5	435	435	435	10	185	NBR	7321HBN3TN00	7	A63
1/2	3/8	3.20	25	500	500	500	11.5	150	DEL	08F28C1D24A3F	6	A58
1/2	9/16	4.10	5	600	600	600	22	185	NBR	7321HBN4UN00	8	A63
1/2	9/16	4.10	5	435	435	435	10	185	NBR	7321HBN4UN00	7	A63
								,				
3/4	3/4	7.80	25	450	450	450	11.5	150	DEL	12F28C1D48A3F	6	A59

<sup>\*</sup> PTFE Seals: Allowable Seat leakage is 50 cc/min on air and inert gas at rated pressure: 73216BNxxTxx DELRIN Seals: Allowable Seat leakage is 472 cc/min on air and inert gas at rated pressure: xxF28C1Dxxxx



#### 2-Way Internal Pilot Operated - High Pressure - Normally Closed - Stainless Steel

					g Pressu . (MOPD)			Max.			Reference	
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure	Refe	Tenee
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal*	Vessel Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS												
1/4	1/4	0.76	5	1500	1500	1500	10	210	PTFE	73216SN2MT00	7	A62
DC TECHNICAL SPECIFICATIONS												
1/4	1/4	0.76	5	1500	1500	1500	22	210	PTFE	73216SN2MT00	8	A62
1/4	1/4	0.76	5	800	800	800	10	210	PTFE	73216SN2MT00	7	A62

<sup>\*</sup> PTFE Seals: Allowable Seat leakage is 50 cc/min on air and inert gas at rated pressure: 73216BNxxTxx DELRIN Seals: Allowable Seat leakage is 472 cc/min on air and inert gas at rated pressure: xxF28C1Dxxxx

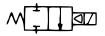
#### 2-Way Internal Pilot Operated - High Pressure - Normally Opened - Brass

			Operating Pressure Differential (MOPD) PSI					Max.			Refe	rence
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal*	Vessel Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS												
1/4	5/16	2.50	5	600	600	600	10	185	FKM	7322HBN2SV00	7	A63
3/8	7/16	3.50	5	600	600	600	10	185	NBR	7322HBN3TN00	7	A63
1/2	3/8	3.20	25	1000	1000	1000	11	200	DEL	08F28O1D24ACF	4	A58
1/2	9/16	4.10	5	600	600	600	10	185	NBR	7322HBN4UN00	7	A63
3/4	3/4	7.80	25	500	500	500	11	200	DEL	12F28O1D48BCF	4	A59
DC TECHNICAL SPECIFICATIONS												
1/4	5/16	2.50	5	600	600	600	10	185	FKM	7322HBN2SV00	7	A63
3/8	7/16	3.50	5	600	600	600	10	185	NBR	7322HBN3TN00	7	A63
1/2	9/16	4.10	5	600	600	600	10	185	NBR	7322HBN4UN00	7	A63

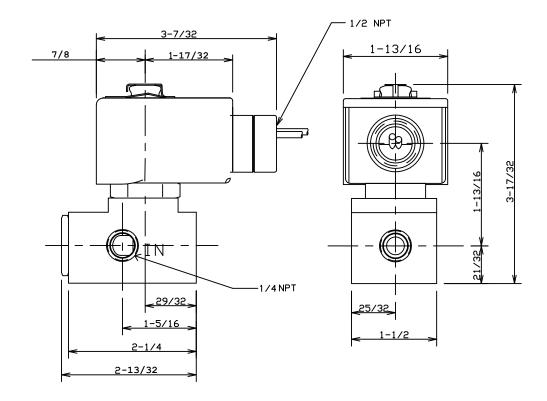
<sup>\*</sup> PTFE Seals: Allowable Seat leakage is 50 cc/min on air and inert gas at rated pressure: 73216BNxxTxx DELRIN Seals: Allowable Seat leakage is 472 cc/min on air and inert gas at rated pressure: xxF28O1Dxxxx







2-Way Normally Closed 04F28Cxxx Port Identification: IN-IN/ OUT-OUT

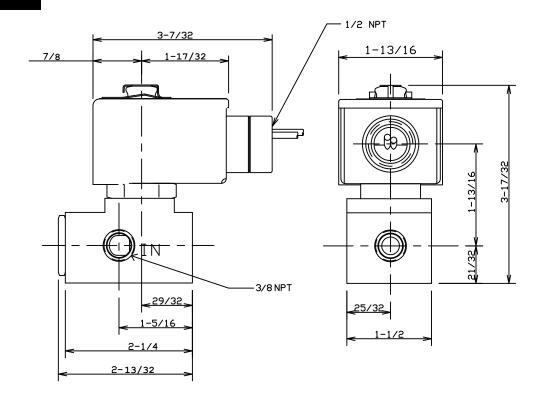


#### Valve Reference A57





2-Way Normally Closed 06F28Cxxx Port Identification: IN-IN/ OUT-OUT

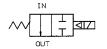




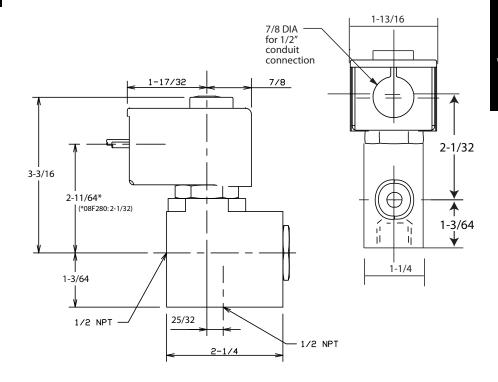




2-Way Normally Closed 08F28Cxx



2-Way Normally Open 08F280xx Port Identification: IN-IN/ OUT-OUT

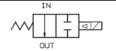


## Valve Reference A59



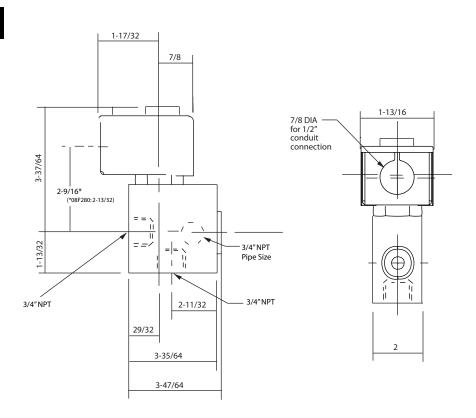


2-Way Normally Closed 12F28Cxx



2-Way Normally Open 12F280xx

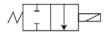
Port Identification: IN-IN/ OUT-OUT



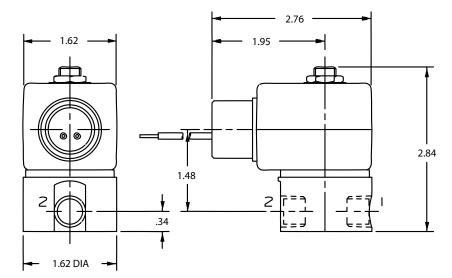


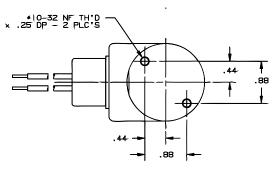




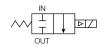


2-Way Normally Closed Port Identification: 1-OUT/ 2-IN

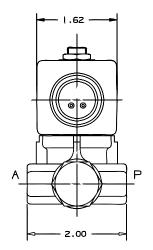


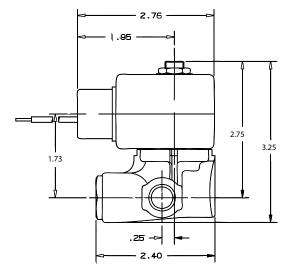






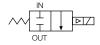
2-Way Normally Closed Port Identification: P-IN/ A-OUT



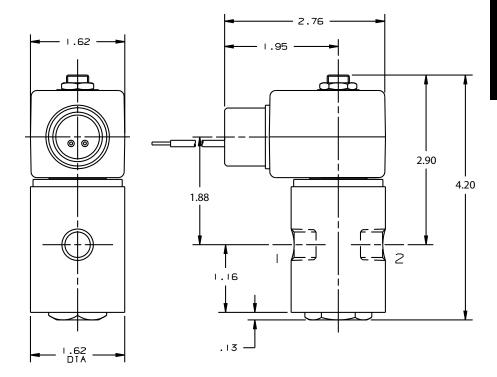








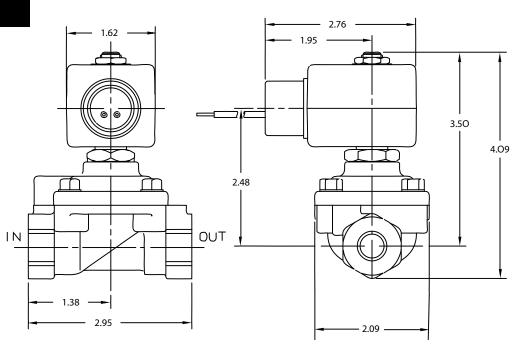
2-Way Normally Closed Port Identification: 2-IN/ 1-OUT



## Valve Reference A63

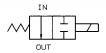


Port Identification: Flow arrow on body indicates flow direction. Ports are not marked.

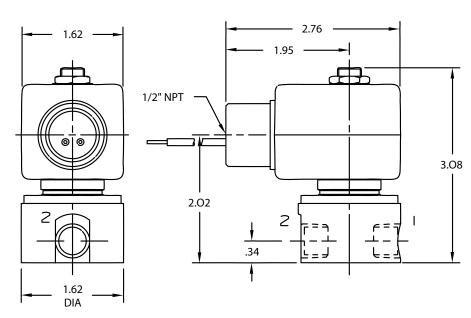


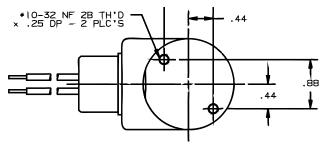






2-Way Normally Open Port Identification: 2-IN/ 1-OUT

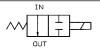




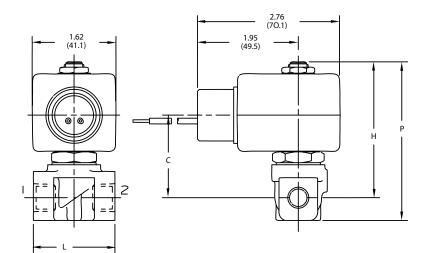




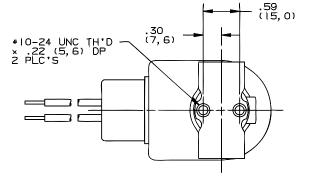
2-Way Normally Closed 7121KBNxx



2-Way Normally Open 7122KBNxx Port Identification: 1-IN/2-OUT



	Dimensions								
Valve	Н	Р	С	L					
7121KBN1XXXX 7121KBN2XXXX 7122KBN1XXXX 7122KBN2XXXX	2.63	3.07	1.61	1.57					
7121KBN3XXXX	2.57	3.08	1.55	1.97					





#### 2-Way Direct Acting Materials of Construction\*\*

Product*	Wattage	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
71215SN	10	2WNC	1/8 - 3/8	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71215SN	22	2WNC	1/8 - 3/8	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
71216SN	10	2WNC	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71216SN	22	2WNC	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7121KBN	10	2WNC	1/8 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7121KBN	22	2WNC	1/8 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
71225SN	10	2WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71225SN	22	2WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7122KBN	10	2WNO	1/8 - 1/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7122KBN	22	2WNO	1/8 - 1/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	77°F
73216BN	10	2WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73216BN	22	2WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73216SN	10	2WNC	1/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73216SN	22	2WNC	1/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7321HBN	10	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7321HBN	22	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	301SS	Copper	77°F
7322HBN	10	2WNO	1/4 - 1/2	Brass	304SS	430FR/ 4106	430F/ 4144	430FR	301SS	Copper	150°F
7322HBN	22	2WNO	1/4 - 1/2	Brass	304SS	430FR/ 4106	430F/ 4144	430FR	301SS	Copper	77°F
04F28C1	11	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
06F28C1	11	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
08F28C1	11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
08F28C1	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
08F28O1	11	2WNO	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
12F28C1	11.5	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F28C1	11	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F
12F28O1	11	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	130°F

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

Notes	



## 2-Way

Anti-Water Hammer & Slow Closing Valves 3/8" - 2" NPT



## **General Description:**

2-way Anti-Water Hammer and Slow Closing valves are designed for liquid applications where the installation is susceptible to shock waves caused by the abrupt closing of the valves. Anti-water hammer valves have integral speed control so that the valve closes in a more controlled and slower manner, thus eliminating the shock to the system piping. Pilot operated valves require the minimum pressure differential specified for proper valve operation.

#### Installation

Valves should be mounted with solenoid coils vertical and upright.

#### **Standard Materials of Construction**

Please refer to page A80

#### **Compatible Fluids**

Water, hydraulic fluids and other non-compressible media.

# Electrical Characteristics:

#### Standard Voltages:

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120

For other voltages - consult factory



#### **Coil Classification:**

Class F standard Class H available

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory

## **Maximum Ambient Temperature** 150°F

Please refer to page A80 for details.

## Applications:

 Used in applications on water or other non-compressible liquids where normal operation may cause a 'water hammer' effect which results in shockwaves to the system that can damage the piping or other components.



#### 2-Way Pilot Operated - Anti-Water Hammer - Normally Closed - Brass

	19 1 1101	oper at	<u>-u - r</u>	tiiti-watei naiiiiilei	<u> </u>	matty C	toseu	Di 033		
			Operating Pressure Differential (MOPD) PSI Water and other				•			
Port	Orifice	Flow	l Di	Water and other	-	Max. Media			Refe	rence
Size	Size	Factor		non-compressible		Temp.		Pressure		
NPT	in.	Cv	Min.	media	Watt	°F	Seal	Vessel Number**	Coil	Valve
	CHNICA									
3/8	7/16	2.5	3	150	10	185	NBR	7321KBN3SNW0	7	A66
1/2	7/16	2.5	3	150	10	185	NBR	7321KBN4SNW0	7	A66
_										
3/4	19/32	5.5	0	230	10	185	NBR	7221GBN51NC0*	7	A67
3/4	25/32	9.6	5	230	10	185	NBR	7321GBN53NMC	7	A68
1	1	12.5	5	230	10	185	NBR	7321GBN64NMC	7	A68
1	1	11.7	0	230	10	185	NBR	7221GBN64NC0*	7	A67
1 1/4	1 1/8	19.3	5	230	10	185	NBR	7321GBN76NMC	7	A68
1 1/2	1 9/16	29.0	5	230	10	185	NBR	7321GBN88NMC	7	A68
2	1 9/16	38.6	5	230	10	185	NBR	7321GBN99NMC	7	A68
DC TE	ECHNICA	L SPECI	FICATI	IONS						
3/8	7/16	2.5	3	150	22	185	NBR	7321KBN3SNW0	8	A66
3/8	7/16	2.5	3	60	10	185	NBR	7321KBN3SNW0	7	A66
1/2	7/16	2.5	3	150	22	185	NBR	7321KBN4SNW0	8	A66
1/2	7/16	2.5	3	60	10	185	NBR	7321KBN4SNW0	7	A66
3/4	3/4	9.6	5	230	10	185	NBR	7321GBN53NMC	7	A68
3/4	19/32	5.5	0	100	22	185	NBR	7221GBN51NC0*	8	A67
1	1	12.5	5	230	10	185	NBR	7321GBN64NMC	7	A68
1	1	11.7	0	85	22	185	NBR	7221GBN64NC0*	8	A67
1 1/4	1 1/8	19.3	5	230	10	185	NBR	7321GBN76NMC	7	A68
1 1/2	1 9/16	29.0	5	230	22	185	NBR	7321GBN88NMC	8	A68
1 1/2	1 9/16	29.0	5	200	10	185	NBR	7321GBN88NMC	7	A68
2	1 9/16	38.6	5	230	22	185	NBR	7321GBN99NMC	8	A68
2	1 9/16	38.6	5	200	10	185	NBR	7321GBN99NMC	7	A68
_	_	_								_

<sup>\*</sup> These are direct lift valves that will open at zero pressure differential, but not fully open until approximately 5 psi differential is achieved.

<sup>\*\*</sup> Mechanical Options indicated in pressure vessel catalog number (eleventh and twelfth digits) are as follows:

C0=four-step adjustable closing, MC=manual override with four-step adjustable closing, W0=non-adjustable control



#### 2-Way Pilot Operated - Anti-Water Hammer - Normally Open - Brass

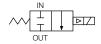
_ '''	iy Filol	opeia	<i>,</i>	Allti-Water Hallillei		matty	open	D: 433		
				perating Pressure ferential (MOPD) PSI		Max.			Refe	erence
Port	Orifice	Flow		Water and other		Media			- 11010	1 01100
Size	Size	Factor		non-compressible		Temp.		Pressure Vessel		1
NPT	in.	Cv	Min.	media	Watt	°F	Seal	Number**	Coil	Valve
AC TE	CHNICA	L SPECII	FICATION	ONS						
3/4	25/32	9.6	5	230	10	185	NBR	7322GBN53NC0	7	A68
1	1	12.5	5	230	10	185	NBR	7322GBN64NC0	7	A68
1 1/4	1 1/8	19.3	5	230	10	185	NBR	7322GBN76NC0	7	A68
1 1/2	1 9/16	29.0	5	170	10	185	NBR	7322GBN88NC0	7	A68
1 1/2	1 0/10	20.0		170		100	TABIT	70220011001100		
	1 9/16	38.6	5	170	10	185	NBR	7322GBN99NC0	7	A68
	1 9/10	36.0		170	10	100	INDI	73220011991100		
DO TE		LODEOL		ONIO						
	ECHNICA								_	
3/4	25/32	9.6	5	230	10	185	NBR	7322GBN53NC0	7	A68
1	1	12.5	5	230	10	185	NBR	7322GBN64NC0	7	A68
1 1/4	1 1/8	19.3	5	230	10	185	NBR	7322GBN76NC0	7	A68
1 1/2	1 9/16	29.0	5	170	10	185	NBR	7322GBN88NC0	7	A68
	1 9/16	38.6		170	10	185	NBR	7322GBN99NC0	7	A68
	1 3/10			170	-10	100	INDIT	70220011001100		

<sup>\*\*</sup>Mechanical Options indicated in pressure vessel catalog number (eleventh and twelfth digits) are as follows: C0=four-step adjustable closing, MC=manual override with four-step adjustable closing, W0=non-adjustable control

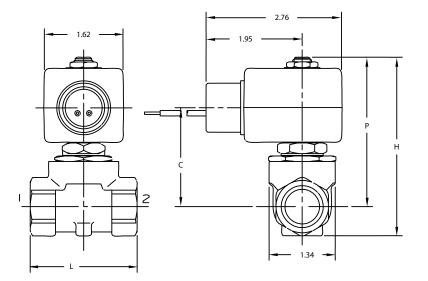
	Response Time			
Valve Type	Opening Time Range (Seconds)	Closing Time Range (Seconds)		
7221GBN51NC0	0.03	0.2-1.7		
7221GBN64NC0	0.07-0.17	0.5-4.0		
7321KBN3SNW0	0.015	0.85		
7321KBN4SNW0	0.015	0.85		
7321GBN53NMC	0.1 - 0.25	0.6-4.5		
7321GBN64NMC	0.1 - 0.25	0.6-4.5		
7321GBN76NMC	0.2 - 0.5	0.8-5.8		
7321GBN88NMC	0.2 - 0.4	1.5-9.0		
7321GBN99NMC	0.25 - 0.45	1.5-9.5		
7322GBN53NC0	0.1 - 0.25	0.6-4.5		
7322GBN64NC0	0.1 - 0.25	0.6-4.5		
7322GBN76NC0	0.2 - 0.5	0.8-5.8		
7322GBN88NC0	0.2 - 0.4	1.5-9.0		
7322GBN99NC0	0.25 - 0.45	1.5-9.5		

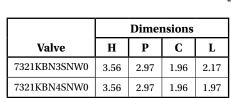


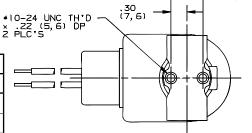




2-Way Normally Closed Port Identification: Flow arrow on body indicates flow direction ports are not marked

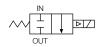




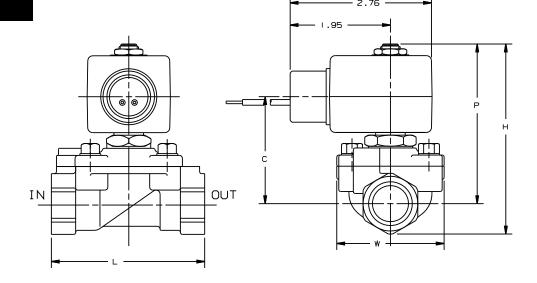


.59 (15, 0)





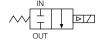
2-Way Normally Closed Port Identification: Flow arrow on body indicates flow direction ports are not marked



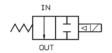
		Dimensions							
Valve	Н	P	С	L	W				
7221GBN51XXX	3.75	3.07	2.06	3.15	2.09				
7221GBN64XXX	4.25	3.35	2.34	3.94	2.75				





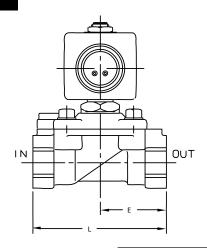


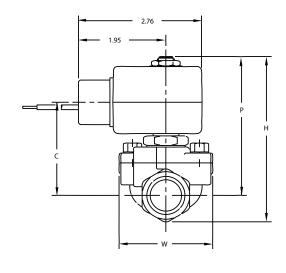
2-Way Normally Closed 7321GBNxx



2-Way Normally Open 7322GBNxx

Port Identification: Flow arrow on body indicates flow direction ports are not marked





			Dime	nsions		
Valve	Н	P	C	L	E	W
7321GBN53NMC 7322GBN53NCO 7321GBN64NMC 7322GBN64NCO	4.75	3.86	2.84	3.94	1.97	2.75
7321GBN76NMC 7322GBN76NCO	5.41	4.11	3.09	4.33	2.17	2.75
7321GBN88NMC 7322GBN88NCO	5.66	4.37	3.35	5.51	2.95	3.90
7321GBN99NMC 7322GBN99NCO	6.25	4.60	3.58	5.91	3.15	3.90

#### 2-Way Pilot Operated Anti-Water Hammer-Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
7221GBN	10	2WNC	3/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7221GBN	22	2WNC	3/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	77°F
7321GBN	10	2WNC	3/4 - 2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7321GBN	22	2WNC	3/4 - 2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7321KBN	10	2WNC	3/8 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7321KBN	22	2WNC	3/8 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7322GBN	10	2WNO	3/4 - 2	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7322GBN	22	2WNO	3/4 - 2	Brass	304SS	430FR	430F	430FR	301SS	Copper	77°F

<sup>\*</sup> Shows the first 7 digits of the pressure vessel part number.

Notes			



<sup>\*\*</sup>Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# 3-Way Miniature

Direct Acting Valves 1/8" NPT



## General Description:

3-way Miniature Direct Acting valves are suitable for low to medium pressure applications that do not require a minimum operating pressure differential, for actuation. Available in normally open, normally closed, or universal operation. Tested to 20 million cycles under lab conditions. Standard with 303 stainless steel bodies and FKM seals.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### Standard Materials of Construction

Please refer to page B4.

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction.

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60

120/60-110/50

240/60-220/50 DC -12, 24

For other voltages – consult factory



#### **Coil Classification:**

Class F standard Class H available AC & DC coils are interchangeable on the same pressure vessel.

#### **Agency Approvals:**

Standard valves with NEMA 4X are C-UL-US listed and CSA certified. For additional details, consult factory.

#### **Maximum Ambient Temperature**

135°F (AC); 125°F (DC) In the absence of moisture, applications as low as -20°F are possible.

Please refer to Page B4 for details.

## Applications:

- Single acting spring return cylinder control
- Selection or diversion of process media
- HVAC damper control
- Instrumentation
- Pneumatic positioning
- Automatic dispensing equipment
- Small compressors
- Water treatment
- Air dryers
- Medical & dental equipment
- Damper control



#### 3-Way Miniature Direct Acting - Normally Closed - Stainless Steel

3-44	/ay Miniature Direct Acting - Normally Closed - Stainless Steel													
	Orific	e Size				•	g Pressu							
	lı	า.	С	v	Diff	erentia	l (MOPD	) PSI		Max.			Refe	rence
Port						Air,				Media				
Size				l		Inert		Light		Temp.		Pressure Vessel		
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TE	ECHNI	CAL SI	PECIFI	CATION	NS									
1/8	1/32	1/32	0.02	0.02	0	250	250	250	10	240	FKM	30CC02AV4	9	B1
1/8	3/64	3/64	0.05	0.05	0	200	200	200	10	240	FKM	30CC02EV4	9	B1
1/8	1/16	1/16	0.09	0.10	0	130	130	130	10	240	FKM	30CC02GV4	9	B1
1/8	5/64	5/64	0.15	0.14	0	90	90	90	10	240	FKM	30CC02JV4	9	B1
1/8	3/32	3/32	0.19	0.20	0	75	75	75	10	240	FKM	30CC02LV4	9	B1
1/8	7/64	3/32	0.25	0.20	0	50	50	50	10	240	FKM	30CC02MV4	9	B1
1/8	1/8	3/32	0.32	0.20	0	40	40	40	10	240	FKM	30CC02PV4	9	B1
1/8	5/32	3/32	0.38	0.20	0	25	25	25	10	240	FKM	30CC02QV4	9	B1
				,	,									
DC TE	ECHNI	CAL S	PECIFI	CATION	NS									
1/8	1/32	1/32	0.02	0.02	0	250	250	250	8	240	FKM	30CC02AV4	9	B1
1/8	3/64	3/64	0.05	0.05	0	200	200	200	8	240	FKM	30CC02EV4	9	B1
1/8	1/16	1/16	0.09	0.10	0	130	130	130	8	240	FKM	30CC02GV4	9	B1
1/8	5/64	5/64	0.15	0.14	0	90	90	90	8	240	FKM	30CC02JV4	9	B1
1/8	3/32	3/32	0.19	0.20	0	75	75	75	8	240	FKM	30CC02LV4	9	B1
1/8	7/64	3/32	0.25	0.20	0	50	50	50	8	240	FKM	30CC02MV4	9	B1
1/8	1/8	3/32	0.32	0.20	0	40	40	40	8	240	FKM	30CC02PV4	9	B1
1/8	5/32	3/32	0.38	0.20	0	25	25	25	8	240	FKM	30CC02QV4	9	B1

#### 3-Way Miniature Direct Acting - Normally Open - Stainless Steel

0 11	way rilliatare birect Acting Horinatty								Ju		,,,,,,			
	Ori <sup>.</sup> Size	fice In.		Factor v			g Pressı l (MOPD			Max.			Refe	rence
Port Size						Air, Inert		Light		Media Temp.		Pressure Vessel	itere	
NPT	ln	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TI	ECHNI	CAL SI	PECIFIC	CATION	IS									
1/8	1/32	1/32	0.02	0.02	0	375	375	375	10	240	FKM	30CF02AV4	9	B1
1/8	3/64	3/64	0.05	0.05	0	230	230	230	10	240	FKM	30CF02EV4	9	B1
1/8	1/16	1/16	0.10	0.09	0	150	150	150	10	240	FKM	30CF02GV4	9	B1
1/8	5/64	5/64	0.14	0.15	0	105	105	105	10	240	FKM	30CF02JV4	9	B1
1/8	3/32	3/32	0.20	0.19	0	80	80	80	10	240	FKM	30CF02LV4	9	B1
DC TI	ECHNI	CAL S	PECIFIC	CATION	IS									
1/8	1/32	1/32	0.02	0.02	0	375	375	375	8	240	FKM	30CF02AV4	9	B1
1/8	3/64	3/64	0.05	0.05	0	230	230	230	8	240	FKM	30CF02EV4	9	B1
1/8	1/16	1/16	0.10	0.09	0	150	150	150	8	240	FKM	30CF02GV4	9	B1
1/8	5/64	5/64	0.14	0.15	0	105	105	105	8	240	FKM	30CF02JV4	9	B1
1/8	3/32	3/32	0.20	0.19	0	80	80	80	8	240	FKM	30CF02LV4	9	B1



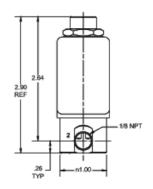
#### 3-Way Miniature Direct Acting - Universal - Stainless Steel

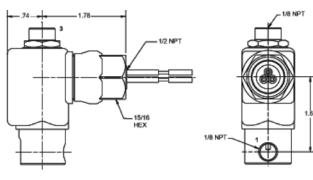
	,													
	Ori Size	fice In.		Factor V	l '		g Pressı l (MOPD			Max.			Rofo	rence
Port						Air,				Media			Here	I
Size						Inert		Light		Temp.		Pressure Vessel		
NPT	NC	N0	NC	NO	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TI	ECHNI	CAL SI	PECIFIC	CATION	IS									
1/8	1/32	1/32	0.02	0.02	0	200	200	200	10	240	FKM	30CU02AV4	9	B1
1/8	3/64	3/64	0.05	0.05	0	150	150	150	10	240	FKM	30CU02EV4	9	B1
1/8	1/16	1/16	0.09	0.10	0	100	100	100	10	240	FKM	30CU02GV4	9	B1
1/8	5/64	5/64	0.15	0.14	0	70	70	70	10	240	FKM	30CU02JV4	9	B1
1/8	3/32	3/32	0.19	0.20	0	50	50	50	10	240	FKM	30CU02LV4	9	B1
1/8	7/64	3/32	0.25	0.20	0	40	40	40	10	240	FKM	30CU02MV4	9	B1
1/8	1/8	3/32	0.32	0.20	0	30	30	30	10	240	FKM	30CU02PV4	9	B1
1/8	5/32	3/32	0.38	0.20	0	20	20	20	10	240	FKM	30CU02QV4	9	B1
DC TI	ECHNI	CAL SI	PECIFIC	CATION	NS									
1/8	1/32	1/32	0.02	0.02	0	200	200	200	8	240	FKM	30CU02AV4	9	B1

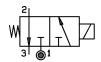
DC T	ECHNI	CAL SI	PECIFIC	CATION	IS									
1/8	1/32	1/32	0.02	0.02	0	200	200	200	8	240	FKM	30CU02AV4	9	B1
1/8	3/64	3/64	0.05	0.05	0	150	150	150	8	240	FKM	30CU02EV4	9	B1
1/8	1/16	1/16	0.09	0.10	0	100	100	100	8	240	FKM	30CU02GV4	9	B1
1/8	5/64	5/64	0.15	0.14	0	70	70	70	8	240	FKM	30CU02JV4	9	B1
1/8	3/32	3/32	0.19	0.20	0	50	50	50	8	240	FKM	30CU02LV4	9	B1
1/8	7/64	3/32	0.25	0.20	0	40	40	40	8	240	FKM	30CU02MV4	9	B1
1/8	1/8	3/32	0.32	0.20	0	30	30	30	8	240	FKM	30CU02PV4	9	B1
1/8	5/32	3/32	0.38	0.20	0	20	20	20	8	240	FKM	30CU02QV4	9	B1

## Valve Reference B1







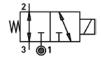


3-Way Normally Closed 30CCxx Port Identification:

Press - 1/CYL - 2 /EXH - 3

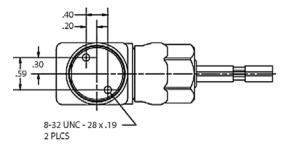
3 1 3-Way Normally Open 30CFxx

Port Identification: Press -3/ CYL - 2 /EXH - 1



3-Way Universal 30CUxx Port Identification:

Pressure can be applied at either port.





#### 3-Way Miniature Direct Acting Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
30CC02	10 (AC)	3WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
30CC02	8 (DC)	3WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F
30CF02	10 (AC)	3WNO	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
30CF02	8 (DC)	3WNO	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F
30CU02	10 (AC)	3WU	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
30CU02	8 (DC)	3WU	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F

<sup>\*</sup> Shows the first 6 digits of the pressure vessel part number.

Check out the 2-Way and 3-Way Manifold Mounted Miniature Catridge valves in the Specialty Section of this catalog.





## **Product Features:**

- Space saving approach
- Less manifold machining equals lower manifold cost
- No manifold orifices to machine or press in
- Easy to assemble & disassemble with a 5/32" hex wrench (Torque = 25-35 in-lbs)
- Cartridge valves are 100% tested
- No loose parts: sleeve, plunger, spring and orifice are pressed together as one unit
- Available with all coils/enclosures from Chart 9 in the Coil Section of this catalog



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# 3-Way

Direct Acting Valves 1/8" - 1/4" NPT



## **General Description:**

3-way Direct Acting valves are suitable for low to medium pressure applications that do not require a minimum operating pressure differential. Available in normally open, normally closed and universal operation.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### **Standard Materials of Construction** Please refer to page B23.

#### **Compatible Fluids**

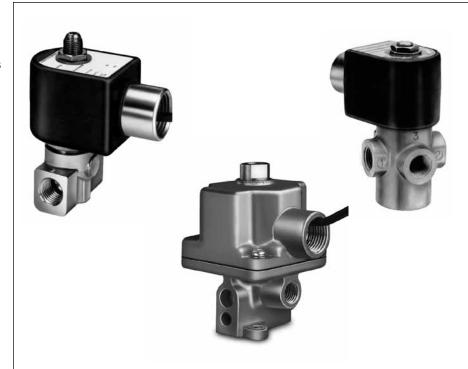
Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction.

Use of non-lubricated gaseous media can affect valve life.

## **Electrical** Characteristics:

#### Standard Voltages:

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120 For other Voltages - Consult Factory



#### **Coil Classification:**

Class F Standard, Class H Available Class B Coils (Std. on A-Series Valves)

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

SIL-3 Capable (Models 7131Txx, 7132Txx, 7133Txx). See Certificate in Technical Section Page F19.

#### **Maximum Ambient Temperature** 167°F

Please refer to Page B23 for details.

## **Applications:**

- Single acting spring return cylinder control
- Selection or diversion of process media
- HVAC damper control
- Instrumentation
- Pneumatic positioning
- Automatic dispensing equipment
- Gas sampling
- Small compressors
- Water treatment
- Air dryers



#### 3-Way Direct Acting - Normally Closed - Brass

	Orific Ir		Flow I	actor			g Pressu l (MOPD)			Max.			Refe	rence
Port						Air,				Media				
Size NPT	In	Exh.	In	Exh.	Min.	Inert Gas	Water	Light Oil	Watt	Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
$\overline{}$		AL SPE				Oas	water	Oit	watt	Г	Jeat	Nullibei	Con	valve
1/8	3/64	3/64	0.05	0.05	0	200	200	200	6	180	NBR	02F30C1103AAF	1	B8
1/8	1/16	1/16	0.08	0.08	0	125	125	125	6	180	NBR	02F30C1104AAF	<u>·</u> 1	 B8
1/8	1/16	1/16	0.11	0.11	0	215	215	215	10	185	FKM	7131KBN1GV00		 B12
1/8	3/32	3/32	0.12	0.12	0	100	100	100	6	180	NBR	02F30C1106AAF	1	B8
1/8	1/8	1/8	0.21	0.21	0	40	40	40	6	180	NBR	02F30C1108AAF	1	B8
1/8	3/32	3/32	0.24	0.24	0	100	100	100	10	185	FKM	7131KBN1LV00	7	B12
1/4	1/32	1/32	0.02	0.02	0	580	580	580	10	165	PCTFE	7131KBN2BF00	7	B12
1/4	1/16	1/16	0.08	0.08	0	125	125	125	6	180	NBR	04F30C2104AAF	1	B16
1/4	1/16	1/16	0.09	0.09	0	235	235	235	16	200	NBR	04F30C2104ADF	5	B17
1/4	1/16	1/16	0.11	0.11	0	215	215	215	10	185	FKM	7131KBN2GV00	7	B12
1/4	3/32	3/32	0.12	0.12	0	140	140	140	11	200	NBR	04F30C2106ACF	4	B17
1/4	5/64	5/64	0.17	0.24	0	150	150	150	10	185	FKM	7131KBN2JV00	7	B12
1/4	5/64	1/8	0.17	0.31	0	150	150	150	10	185	FKM	7131TBN2JV00	7	B13
1/4	3/32	3/32	0.21	0.21	0	250	250	250	16	180	NBR	A3LB2252	*	B18
1/4	3/32	9/64	0.24	0.38	0	110	110	110	10	185	FKM	7131TBN2LV00	7	B13
1/4	3/32	3/32	0.24	0.24	0	100	100	100	10	185	FKM	7131KBN2LV00	7	B12
1/4	1/8	1/8	0.25	0.25	0	70	70	70	11	200	NBR	04F30C2108ACF	4	B17
1/4	1/8	1/8	0.35	0.35	0	175	175	175	16	180	NBR	A3LB2177	*	B18
1/4	11/64	11/64	0.35	0.35	0	40	40	40	11	200	NBR	04F30C2111ACF	4	B17
1/4	5/32	5/32	0.45	0.45	0	125	125	125	16	180	NBR	A3LB2127	*	B18
1/4	3/16	1/4	0.49	0.63	0	30	30	30	10	185	FKM	7131TBN2RV00	7	B13

#### \*Ordering A Series Valves:

A Series Valves must be ordered as complete part numbers (These are Class B coils).

- 1) Select pressure vessel part number from above (i.e. A3LB2252)
- 2) Choose coil/enclosure part number from table below for required voltage

Voltage	24/60	120/60	240/60	12VDC	24VDC
Coil Code	AB2A44	AB6A46	AB8A48	DC1A22	DC2A23
Coil Part Number*	AB720S24	AB728S24	AB731S24	A7724F24	A7727F24

<sup>\*</sup>When ordering a replacement coil, use Coil Part Number (not Coil Code)

3) Complete P/N for 120/60 is A3LB2252AB6A46



#### 3-Way Direct Acting - Normally Closed - Brass

3-11	ay Dii	CCI A	Lilly	14011	Hatty	Cluse	u - Di	uss						
		e Size า.		Factor v		•	g Pressu l (MOPD)			Max.			Dofe	**************************************
Port Size						Air, Inert		Light		Media Temp.		Pressure Vessel		erence
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
DC TI	ECHNIC	CAL SP	ECIFIC	ATION	S									
1/8	3/64	3/64	0.05	0.05	0	200	200	200	9.5	120	NBR	02F30C1103A1F	3	B8
1/8	1/16	1/16	0.08	0.08	0	125	125	125	9.5	120	NBR	02F30C1104A1F	3	B8
1/8	1/16	1/16	0.11	0.11	0	215	215	215	10	185	FKM	7131KBN1GV00	7	B12
1/8	3/32	3/32	0.12	0.12	0	100	100	100	9.5	120	NBR	02F30C1106A1F	3	B8
1/8	3/32	3/32	0.24	0.24	0	100	100	100	10	185	FKM	7131KBN1LV00	7	B12
1/8	1/8	1/8	0.21	0.21	0	40	40	40	9.5	120	NBR	02F30C1108A1F	3	B8
1/4	1/32	1/32	0.02	0.02	0	580	580	580	10	165	PCTFE	7131KBN2BF00	7	B12
1/4	1/16	1/16	0.08	0.08	0	125	125	125	9.5	120	NBR	04F30C2104A1F	3	B16
1/4	1/16	1/16	0.09	0.09	0	160	160	160	11.5	150	NBR	04F30C2104A3F	6	B17
1/4	1/16	1/16	0.11	0.11	0	215	215	215	10	185	FKM	7131KBN2GV00	7	B12
1/4	3/32	3/32	0.12	0.12	0	115	115	115	11.5	150	NBR	04F30C2106A3F	6	B17
1/4	5/64	5/64	0.17	0.24	0	150	150	150	10	185	FKM	7131KBN2JV00	7	B12
1/4	5/64	1/8	0.17	0.31	0	150	150	150	10	185	FKM	7131TBN2JV00	7	B13
1/4	3/32	3/32	0.21	0.21	0	250	250	250	14	180	NBR	A36LB2251	*	B18
1/4	3/32	9/64	0.24	0.38	0	110	110	110	10	185	FKM	7131TBN2LV00	7	B13
1/4	3/32	3/32	0.24	0.24	0	100	100	100	10	185	FKM	7131KBN2LV00	7	B12
1/4	1/8	1/8	0.25	0.25	0	60	60	60	11.5	150	NBR	04F30C2108A3F	6	B17
1/4	1/8	1/8	0.35	0.35	0	175	175	175	14	180	NBR	A36LB2176	*	B18
1/4	11/64	11/64	0.35	0.35	0	25	25	25	11.5	150	NBR	04F30C2111A3F	6	B17
1/4	5/32	5/32	0.45	0.45	0	125	125	125	14	180	NBR	A36LB2126	*	B18
1/4	3/16	1/4	0.49	0.63	0	30	30	30	10	185	FKM	7131TBN2RV00	7	B13

#### \*Ordering A Series Valves:

A Series Valves must be ordered as complete part numbers (These are Class B coils).

- 1) Select pressure vessel part number from above (i.e. A3LB2252)
- 2) Choose coil/enclosure part number from table below for required voltage

Voltage	24/60	120/60	240/60	12VDC	24VDC
Coil Code	AB2A44	AB6A46	AB8A48	DC1A22	DC2A23
Coil Part Number*	AB720S24	AB728S24	AB731S24	A7724F24	A7727F24

<sup>\*</sup>When ordering a replacement coil, use Coil Part Number (not Coil Code)

3) Complete P/N for 120/60 is A3LB2252AB6A46



#### 3-Way Direct Acting - Normally Closed - Stainless Steel

	Orific		Flow I	Factor v			g Pressi Il (MOPD			Max.			Pofe	erence
Port						Air,				Media			Kele	rence
Size			_			Inert		Light		Temp.		Pressure Vessel		
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
			ECIFICA		0	050	050	050	40	405	NDD	74.04.50014.501.14	7	Dr
1/8	3/64	1/16	0.060	0.095	0	250	250	250	10	185	NBR	71315SN1ENJ1	7	B5
1/8	3/64	1/16	0.060	0.095	0	250	250	250	10	185	NBR	71315SN1EN00	7	B5
1/8	3/64	3/64	0.060	0.060	0	200	200	200	6	180	NBR	02F30C3103AAF	1	B8
1/8	1/16	1/16	0.090	0.090	0	125	125	125		180	NBR	02F30C3104AAF	1	B8
1/8	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN1GNJ1	7	B5
1/8	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN1GN00	7	B5
1/8	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN1KNJ1	7	B5
1/8	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN1KN00	7	B5
1/8	1/8	3/32	0.230	0.170	0	90	90	90	10	185	NBR	71315SN1MNJ1	7	B5
1/8	1/8	3/32	0.230	0.170	0	90	90	90	10	185	NBR	71315SN1MN00	7	B5
1/8	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN1SNJ1	7	B5
1/8	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN1SN00	7	B5
*1/8	1/4	3/32	0.670	0.170	0	VAC	N/A	N/A	10	185	NBR	71315SN1VNJ1	7	B5
1/4	3/64	1/16	0.062	0.095	0	250	250	250	10	185	NBR	71315SN2ENJ1	7	B5
1/4	3/64	1/16	0.062	0.095	0	250	250	250	10	185	NBR	71315SN2EN00	7	B5
1/4	1/16	1/16	0.090	0.090	0	125	125	125	6	180	NBR	04F30C3104AAF	1	B14
1/4	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN2GNJ1	7	B5
1/4	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN2GN00	7	B5
1/4	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	7131TVN2GV00	7	B11
1/4	3/32	3/32	0.120	0.120	0	150	150	150	11	200	NBR	04F30C3106ACF	4	B15
1/4	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN2KNJ1	7	B5
1/4	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN2KN00	7	B5
1/4	5/64	5/64	0.180	0.180	0	150	150	150	10	185	FKM	7131TVN2JV00	7	B11
1/4	3/32	3/32	0.190	0.190	0	110	110	110	10	185	NBR	7131TVN2LV00	7	B11
1/4	1/8	3/32	0.230	0.170	0	90	90	90	10	185	NBR	71315SN2MNJ1	7	B5
1/4	1/8	1/8	0.230	0.170	0	90	90	90	10	185	NBR	71315SN2MN00	7	B5
1/4	1/8	1/8	0.250	0.250	0	85	85	85	11	200	NBR	04F30C3108ACF	4	B15
1/4	1/8	1/8	0.320	0.320	0	70	70	70	10	185	FKM	7131TVN2NV00	7	B11
1/4	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN2SNJ1	7	B5
1/4	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN2SN00	7	B5
*1/4	1/4	3/32	0.670	0.170	0	VAC	N/A	N/A	10	185	NBR	71315SN2VNJ1	7	 B5

\*Note: Vacuum source should be connected to outlet/cylinder port.



#### 3-Way Direct Acting - Normally Closed - Stainless Steel (Continued)

		e Size		Factor	0	peratin	g Pressu							
	Ir			V V		-	l (MOPD			Max.			٦,	
Port						Air,				Media			Refe	erence
Size						Inert		Light		Temp.		Pressure Vessel		
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
DC T	ECHNI	CAL SF	PECIFIC	CATION	IS									
1/8	3/64	3/64	0.060	0.060	0	200	200	200	9.5	120	NBR	02F30C3103A1F	3	B8
1/8	3/64	1/16	0.062	0.095	0	250	250	250	10	185	NBR	71315SN1ENJ1	7	B5
1/8	3/64	1/16	0.062	0.095	0	250	250	250	10	185	NBR	71315SN1EN00	7	B5
1/8	1/16	1/16	0.090	0.090	0	125	125	125	9.5	120	NBR	02F30C3104A1F	3	B8
1/8	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN1GNJ1	7	B5
1/8	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN1GN00	7	B5
1/8	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN1KNJ1	7	B5
1/8	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN1KN00	7	B5
1/8	1/8	3/32	0.230	0.170	0	90	90	90	10	185	NBR	71315SN1MNJ1	7	B5
1/8	1/8	3/32	0.230	0.170	0	90	90	90	10	185	NBR	71315SN1MN00	7	B5
1/8	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN1SNJ1	7	B5
1/8	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN1SN00	7	B5
*1/8	1/4	3/32	0.670	0.170	0	VAC	N/A	N/A	10	185	NBR	71315SN1VNJ1	7	B5
1/4	3/64	1/16	0.062	0.095	0	250	250	250	10	185	NBR	71315SN2ENJ1	7	B5
1/4	3/64	1/16	0.062	0.095	0	250	250	250	10	185	NBR	71315SN2EN00	7	B5
1/4	1/16	1/16	0.090	0.090	0	125	125	125	9.5	150	NBR	04F30C3104A1F	3	B14
1/4	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN2GNJ1	7	B5
1/4	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	71315SN2GN00	7	B5
1/4	1/16	1/16	0.110	0.095	0	200	200	200	10	185	NBR	7131TVN2GV00	7	B11
1/4	3/32	3/32	0.120	0.120	0	115	115	115	11.5	150	NBR	04F30C3106A3F	6	B15
1/4	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN2KNJ1	7	B5
1/4	3/32	3/32	0.170	0.170	0	125	125	125	10	185	NBR	71315SN2KN00	7	B5
1/4	3/32	3/32	0.190	0.190	0	110	110	110	10	185	NBR	7131TVN2LV00	7	B11
1/4	5/64	5/64	0.180	0.180	0	150	150	150	10	185	FKM	7131TVN2JV00	7	B11
1/4	1/8	3/32	0.230	0.170	0	90	90	90	10	185	NBR	71315SN2MNJ1	7	B5
1/4	1/8	1/8	0.230	0.170	0	90	90	90	10	185	NBR	71315SN2MN00	7	B5
1/4	1/8	1/8	0.250	0.250	0	60	60	60	11.5	150	NBR	04F30C3108A3F	6	B15
1/4	1/8	1/8	0.320	0.320	0	70	70	70	10	185	FKM	7131TVN2NV00	7	B11
1/4	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN2SNJ1	7	B5
1/4	3/16	3/32	0.380	0.170	0	25	25	25	10	185	NBR	71315SN2SN00	7	B5
*1/4	1/4	3/32	0.670	0.170	0	VAC	N/A	N/A	10	185	NBR	71315SN2VNJ1	7	B5
							outlot/ov							

\*Note: Vacuum source should be connected to outlet/cylinder port.



#### 3-Way Direct Acting - Normally Open - Brass

	Orifice Size In.		Factor v			g Pressu l (MOPD)			.,					
Port	- "				Dill	Air,	C (MOLD)	1 31		Max. Media			Refe	erence
Size						Inert		Light		Temp.		Pressure Vessel		., .
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC T	ECHNIC	CAL SF	PECIFIC	CATION	IS									
1/8	3/64	3/64	0.06	0.06	0	200	200	200	6	180	NBR	02F30O1103AAF	1	B8
1/8	1/16	1/16	0.09	0.09	0	125	125	125	6	180	NBR	02F30O1104AAF	1	B8
1/8	3/32	3/32	0.12	0.12	0	100	100	100	6	180	NBR	02F30O1106AAF	1	B8
1/4	1/16	1/16	0.09	0.09	0	235	250	250	16	200	NBR	04F30O2104ADF	5	B17
1/4	3/32	3/32	0.12	0.12	0	140	140	140	11	200	NBR	04F30O2106ACF	4	B17
1/4	1/8	1/8	0.25	0.25	0	70	70	70	11	200	NBR	04F30O2108ACF	4	B17
1/4	1/8	1/8	0.35	0.35	0	175	175	175	16	180	NBR	A5LB2177	*	B18
1/4	11/64	11/64	0.35	0.35	0	40	40	40	11	200	NBR	04F30O2111ACF	4	B17
1/4	5/32	5/32	0.45	0.45	0	125	125	125	16	180	NBR	A5LB2127	*	B18
1/4	5/32	1/8	0.31	0.41	0	150	150	150	22	185	FKM	7132TBN2NV00	8	B4
DC T	ECHNI	CAL SF	PECIFIC	CATION	IS									
1/8	3/64	3/64	0.06	0.06	0	200	200	200	9.5	120	NBR	02F30O1103A1F	1	B8
1/8	1/16	1/16	0.09	0.09	0	200	200	200	9.5	120	NBR	02F30O1104A1F	1	B8
1/8	3/32	3/32	0.12	0.12	0	100	100	100	9.5	120	NBR	02F30O1106A1F	1	B8
1/4	1/16	1/16	0.09	0.09	0	160	160	160	11.5	150	NBR	04F30O2104A3F	6	B17
1/4	3/32	3/32	0.12	0.12	0	100	100	100	11.5	150	NBR	04F30O2106A3F	6	B17
1/4	1/8	1/8	0.25	0.25	0	55	55	55	11.5	150	NBR	04F30O2108A3F	6	B17
1/4	1/8	1/8	0.35	0.35	0	175	175	175	14	180	NBR	A56LB2176	*	B18
1/4	11/64	11/64	0.35	0.35	0	30	30	30	11.5	150	NBR	04F30O2111A3F	6	B17
1/4	5/32	5/32	0.45	0.45	0	125	125	125	14	180	NBR	A56LB2126	*	B18

#### \*Ordering A Series Valves:

A Series Valves must be ordered as complete part numbers (These are Class B coils).

- 1) Select pressure vessel part number from above (i.e. A3LB2252)
- 2) Choose coil/enclosure part number from table below for required voltage

Voltage	24/60	120/60	240/60	12VDC	24VDC
Coil Code	AB2A44	AB6A46	AB8A48	DC1A22	DC2A23
Coil Part Number*	AB720S24	AB728S24	AB731S24	A7724F24	A7727F24

<sup>\*</sup>When ordering a replacement coil, use Coil Part Number (not Coil Code)

3) Complete P/N for 120/60 is A3LB2252AB6A46



#### 3-Way Direct Acting - Normally Open - Stainless Steel

								Jieei	-				
					•	•			Max.			Rofe	erence
ln	Exh.	In	Exh.	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
ECHNI	CAL SF	PECIFIC	ATION	is								•	
3/64	1/16	0.052	0.10	0	250	250	250	10	185	NBR	71395SN1ENJ1	7	B6
1/16	1/8	0.100	0.28	0	150	150	150	10	185	NBR	71395SN1GNJ1	7	B6
3/32	1/8	0.280	0.28	0	125	125	125	10	185	NBR	71395SN1KNJ1	7	В6
3/64	1/16	0.052	0.10	0	250	250	250	10	185	NBR	71395SN2ENJ1	7	В6
1/16	1/8	0.100	0.28	0	150	150	150	10	185	NBR	71395SN2GNJ1	7	В6
3/32	3/32	0.120	0.12	0	150	140	140	11	200	NBR	04F30O3106ACF	4	B15
3/32	1/8	0.170	0.28	0	125	125	125	10	185	NBR	71395SN2KNJ1	7	В6
1/8	1/8	0.250	0.25	0	70	70	70	11	200	NBR	04F30O3108ACF	4	B15
ECHNI	CAL SI	PECIFIC	CATION	IS									
3/64	1/16	0.052	0.10	0	250	250	250	10	185	NBR	71395SN1ENJ1	7	B6
1/16	1/8	0.100	0.28	0	150	150	150	10	185	NBR	71395SN1GNJ1	7	B6
3/32	1/8	0.280	0.28	0	125	125	125	10	185	NBR	71395SN1KNJ1	7	B6
3/64	1/16	0.052	0.10	0	250	250	250	10	185	NBR	71395SN2ENJ1	7	B6
1/16	1/8	0.100	0.28	0	150	150	150	10	185	NBR	71395SN2GNJ1	7	B6
3/32	3/32	0.120	0.12	0	100	100	100	11.5	150	NBR	04F30O3106A3F	6	B15
3/32	1/8	0.170	0.28	0	125	125	125	10	185	NBR	71395SN2KNJ1	7	B6
1/8	1/8	0.250	0.25	0	55	55	55	11.5	150	NBR	04F30O3108A3F	6	B15
	In SECHNIC 3/64 1/16 3/32 1/8 SECHNIC 3/64 1/16 3/32 3/64 1/16 3/32 3/64 1/16 3/32 3/32 3/32	3/64 1/16 1/16 1/8 3/32 1/8  3/64 1/16 1/16 1/8 3/32 3/32 3/32 1/8 1/8 1/8  ECHNICAL SI 3/64 1/16 1/16 1/8 3/32 1/8  3/64 1/16 1/16 1/8 3/32 1/8  3/64 1/16 1/16 1/8 3/32 3/32 3/32 3/32 3/32 1/8	In Exh. In  ECHNICAL SPECIFIC  3/64 1/16 0.052  1/16 1/8 0.100  3/32 1/8 0.280  3/64 1/16 0.052  1/16 1/8 0.100  3/32 3/32 0.120  3/32 1/8 0.250  ECHNICAL SPECIFIC  3/64 1/16 0.052  1/16 1/8 0.100  3/32 1/8 0.280   ECHNICAL SPECIFIC  3/64 1/16 0.052  1/16 1/8 0.100  3/32 1/8 0.280  3/64 1/16 0.052  1/16 1/8 0.100  3/32 3/32 0.120  3/32 3/32 0.120  3/32 3/32 0.120  3/32 1/8 0.170	In Exh. In Exh.  ECHNICAL SPECIFICATION  3/64 1/16 0.052 0.10  1/16 1/8 0.100 0.28  3/32 1/8 0.280 0.28  3/32 3/32 0.120 0.12  3/32 1/8 0.250 0.25  ECHNICAL SPECIFICATION  3/64 1/16 0.052 0.10  1/16 1/8 0.170 0.28  1/8 1/8 0.250 0.25  ECHNICAL SPECIFICATION  3/64 1/16 0.052 0.10  1/16 1/8 0.100 0.28  3/32 1/8 0.280 0.28  3/32 1/8 0.280 0.28  3/32 1/8 0.100 0.28  3/32 3/32 0.120 0.12  3/32 3/32 0.120 0.12  3/32 3/32 0.120 0.12  3/32 3/32 0.120 0.12  3/32 1/8 0.170 0.28	In Exh. In Exh. Min.  ECHNICAL SPECIFICATIONS  3/64 1/16 0.052 0.10 0  1/16 1/8 0.100 0.28 0  3/32 1/8 0.280 0.28 0  3/32 3/32 0.120 0.12 0  3/32 1/8 0.250 0.25 0  ECHNICAL SPECIFICATIONS  3/64 1/16 0.052 0.10 0  1/16 1/8 0.170 0.28 0  1/8 1/8 0.250 0.25 0  ECHNICAL SPECIFICATIONS  3/64 1/16 0.052 0.10 0  1/16 1/8 0.100 0.28 0  3/32 1/8 0.250 0.25 0  3/32 1/8 0.100 0.28 0  3/32 1/8 0.100 0.28 0  3/32 1/8 0.280 0.28 0  3/32 1/8 0.280 0.28 0  3/32 3/32 0.120 0.12 0  3/32 3/32 0.120 0.12 0  3/32 3/32 0.120 0.12 0  3/32 3/32 0.120 0.12 0  3/32 1/8 0.170 0.28 0	In.	In.	In   Exh.   In   Exh.   Min.   Gas   Water   Oil	In.	In   Exh.   In   Exh.   Min.   Gas   Water   Oil   Watt   Temp.   %F	In	In   Exh.   In   Exh.   Min.   Air,   Inert   Gas   Water   Oit   Watt   Femp.   Seat   Pressure Vesset   Number	In   Exh.   In   Exh.   Min.   Gas   Water   Oil   Watt   F   Seal   Number   Coil



#### 3-Way Direct Acting - Universal - Brass

					Operating Pressure									
	Orifice Size In.		Flow Factor Cv		Differential (I		-			May			l	
Port						Air,	(1101 2)			Max. Media			Refe	rence
Size						Inert		Light		Temp.	Pressure Vessel			
NPT	N.C.	N.O.	N.C.	N.O.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS														
1/8	3/64	3/64	0.06	0.06	0	175	175	175	10.2	180	NBR	02F30U1103ABF	2	В8
1/8	1/16	1/16	0.09	0.09	0	100	100	100	10.2	180	NBR	02F30U1104ABF	2	В8
1/8	1/16	1/16	0.11	0.11	0	150	150	150	10	185	FKM	7133KBN1GVJ1	7	В9
1/8	3/32	3/32	0.12	0.12	0	50	50	50	6	180	NBR	02F30U1106AAF	1	B8
1/8	5/64	5/64	0.15	.015	0	100	100	100	10	185	FKM	7133KBN1JVJ1	7	В9
1/8	1/8	1/8	0.21	0.21	0	30	30	30	10.2	180	NBR	02F30U1108ABF	2	B8
1/4	1/32	1/32	0.02	0.02	0	435	435	435	10	185	FKM	7133KBN2BVJ1	7	В9
1/4	1/16	1/16	0.09	0.09	0	125	130	130	11	200	NBR	04F30U2104ACF	4	B17
1/4	1/16	1/16	0.10	0.10	0	150	150	150	10	185	FKM	7133KBN2GVJ1	7	В9
1/4	3/32	3/32	0.12	0.12	0	100	100	100	16	200	NBR	04F30U2106ADF	5	B17
1/4	5/64	5/64	0.15	0.15	0	100	100	100	10	185	FKM	7133KBN2JVJ1	7	В9
1/4	5/64	5/64	0.17	0.17	0	100	100	100	10	185	FKM	7133TBN2JV00	7	B10
1/4	1/8	1/8	0.25	0.25	0	50	50	50	16	200	NBR	04F30U2108ADF	5	B17
1/4	1/8	1/8	0.31	0.31	0	30	30	30	10	185	FKM	7133TBN2NV00	7	B10
1/4	11/64	11/64	0.35	0.35	0	20	20	20	11	200	NBR	04F30U2111ACF	4	B17
1/4	5/32	5/32	0.45	0.45	0	75	75	75	16	180	NBR	A4LB2077	*	B18
DC T	ECHNI	CAL SF	PECIFIC	CATION	IS									
1/8	3/64	3/64	0.06	0.06	0	125	130	130	9.5	120	NBR	02F30U1103A1F	3	B8
1/8	1/16	1/16	0.09	0.09	0	65	65	65	9.5	120	NBR	02F30U1104A1F	3	B8
1/8	1/16	1/16	0.11	0.11	0	150	150	150	10	185	FKM	7133KBN1GVJ1	7	В9
1/8	3/32	3/32	0.12	0.12	0	50	50	50	9.5	120	NBR	02F30U1106A1F	3	B8
1/8	5/64	5/64	0.15	.015	0	100	100	100	10	185	FKM	7133KBN1JVJ1	7	В9
1/8	1/8	1/8	0.21	0.21	0	20	20	20	9.5	120	NBR	02F30U1108A1F	3	B8
1/4	1/32	1/32	0.02	0.02	0	435	435	435	10	185	FKM	7133KBN2BVJ1	7	B9
1/4	1/16	1/16	0.09	0.09	0	75	75	75	11.5	150	NBR	04F30U2104A3F	6	B17
1/4	1/16	1/16	0.10	0.10	0	150	150	150	10	185	FKM	7133KBN2GVJ1	7	B9
1/4	3/32	3/32	0.12	0.12	0	60	60	60	11.5	150	NBR	04F30U2106A3F	6	B17
1/4	5/64	5/64	0.15	0.15	0	100	100	100	10	185	FKM	7133KBN2JVJ1	7	B9
1/4	5/64	5/64	0.17	0.17	0	100	100	100	10	185	FKM	7133TBN2JV00	7	B10
1/4	1/8	1/8	0.25	0.25	0	25	25	25	11.5	150	NBR	04F30U2108A3F	6	B17
1/4	1/8	1/8	0.31	0.31	0	30	30	30	10	185	FKM	7133TBN2NV00	7	B10
1/4	11/64	11/64	0.35	0.35	0	12	12	12	11.5	150	NBR	04F30U2111A3F	6	B17
1/4	5/32	5/32	0.45	0.45	0	75	75	75	14	180	NBR	A46LB2076	*	B18

<sup>\*</sup>Refer to "Ordering A Series Valves" on bottom of page B10.



#### 3-Way Direct Acting - Universal - Stainless Steel

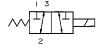
3-W	3-way Direct Acting - Universal - Stainless Steel													
	Orific	e Size	Flow Factor		Operating Pressure									
	Ir	In. Cv		Differential (MOPD) PSI					Max.			Refe	erence	
Port						Air,				Media				
Size NPT	N.C.	N.O.	N.C.	N.O.	Min.	Inert	Water	Light Oil	Watt	Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
			PECIFIC			Gas	water	Oit	vvall		Seat	Number	Con	valve
1/8	3/64	3/64	0.052		0	180	180	180	10	185	NBR	71335SN1ENJ1	7	B3
1/8	1/16	1/16	0.032			100	100	100	10.2	180	NBR	02F30U3104ABF		 
1/8	1/16	1/16	0.095			115	115	115	10.2	185	NBR	71335SN1GNJ1	7	B3
1/8	3/32	3/32	0.170			80	80	80	10	185	NBR	71335SN1KNJ1		 B3
1/8	1/8	1/8		0.210	0	30	30	30	10.2	180	NBR	02F30U3108ABF		 B8
170	170	170	0.210	0.210					10.2	100	INDIT	021 0000 100001		
1/4	1/32	1/32	0.024	0.024	0	400	400	400	10	185	NBR	71335SN2ANJ1	7	B3
1/4	3/64	3/64	0.052	0.052	0	180	180	180	10	185	NBR	71335SN2ENJ1	7	В3
1/4	1/16	1/16	0.090	0.090	0	100	100	100	10.2	180	NBR	04F30U3104ABF	2	B14
1/4	1/16	1/16	0.095	0.095	0	115	115	115	10	185	NBR	71335SN2GNJ1	7	В3
1/4	1/16	1/16	0.095	0.095	0	150	150	150	10	185	FKM	7133TVN2GV00	7	B2
1/4	3/32	3/32	0.120	0.120	0	100	100	100	16	200	NBR	04F30U3106ADF	5	B15
1/4	3/32	3/32	0.170	0.170	0	80	80	80	10	185	NBR	71335SN2KNJ1	7	В3
1/4	5/64	5/64	0.180	0.180	0	100	100	100	10	185	FKM	7133TVN2JV00	7	B2
1/4	1/8	1/8	0.250	0.250	0	50	50	50	16	200	NBR	04F30U3108ADF	5	B15
1/4	1/8	1/8	0.320	0.320	0	30	30	30	10	185	FKM	7133TVN2NV00	7	B2
					-									
			PECIFIC										_	
1/8	3/64	3/64	0.052		0	180	180	180	10	185	NBR	71335SN1ENJ1	7	B3
1/8	1/16	1/16	0.090		0	65	65	65	9.5	120	NBR	02F30U3104A1F	3	B8
1/8	1/16	1/16	0.095		0	115	115	115	10	185	NBR	71335SN1GNJ1	7	B3
1/8	3/32	3/32	0.170		0	80	80	80	10	185	NBR	71335SN1KNJ1	7	B3
1/8	1/8	1/8	0.210	0.210	0	25	25	25	9.5	120	NBR	02F30U3108A1F	3	B8
1/4	1/32	1/32	0.024	0.024	0	400	400	400	10	185	NBR	71335SN2ANJ1	7	
1/4	3/64	3/64	0.024		0	180	180	180	10	185	NBR	71335SN2ENJ1	<del></del>	 B3
1/4	1/16	1/16	0.032		0	65	65	65	9.5	120	NBR	04F30U3104A1F	3	 B14
1/4	1/16	1/16	0.095		0	150	150	150	10	185	FKM	7133TVN2GV00	7	B2
1/4	1/16	1/16	0.095			115	115	115	10	185	NBR	71335SN2GNJ1	7	 B3
1/4	3/32	3/32		0.120	0	60	60	60	11.5	150	NBR	04F30U3106A3F		B B15
1/4	3/32	3/32		0.170		80	80	80	10	185	NBR	71335SN2KNJ1	7	B3
1/4	5/64	5/64		0.170		100	100	100	10	185	FKM	7133TVN2JV00		B3
1/4	1/8	1/8		0.100	0	25	25	25	11.5	150	NBR	04F30U3108A3F		 B15
1/4	1/8	1/8		0.320	0	30	30	30	10	185	FKM	7133TVN2NV00	7	B2
-1/4	-1/0	-1/0	0.020	0.020		- 50			- 10	100	1 1 1 1 1 1 1	1 1001 VINZIN V UU		



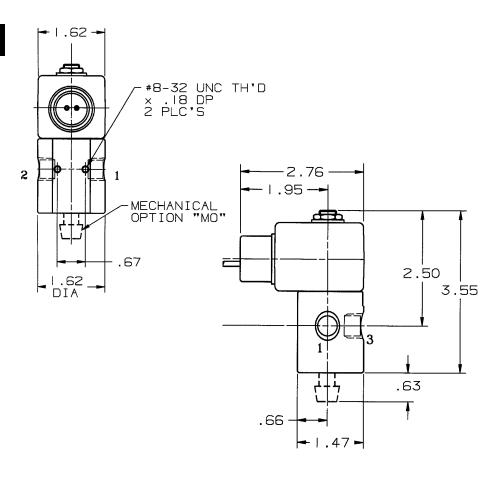
#### 3-Way Direct Acting - Diverting - Stainless Steel

	Orifice Size In.		Flow Factor Cv		Operating Pressure Differential (MOPD) PSI				Max.			Reference		
Port Size	N C	N O	N.C	N O	Min	Air, Inert	Mata.	Light	Watt	Media Temp. °F	Caal	Pressure Vessel		
NPT	N.C.	N.O.	N.C.	N.O.	Min.	Gas	Water	Oil	wall	_ ·F	Seal	Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS														
1/8	1/8	3/32	0.230	0.170	0	125	125	125	10	185	NBR	71385SN1MNJ1	7	B7
1/4	1/16	1/16	0.095	0.095	0	235	235	235	10	185	NBR	71385SN2GNJ1	7	B7
1/4	1/8	3/32	0.230	0.170	0	125	125	125	10	185	NBR	71385SN2MNJ1	7	B7
DC TI	ECHNIC	CAL SP	ECIFICA	ATIONS										
1/8	1/8	3/32	0.230	0.170	0	125	125	125	10	185	NBR	71385SN1MNJ1	7	B7
1/4	1/16	1/16	0.095	0.095	0	235	235	235	10	185	NBR	71385SN2GNJ1	7	В7
1/4	1/8	3/32	0.230	0.170	0	125	125	125	10	185	NBR	71385SN2MNJ1	7	B7





3-Way Universal Port Identification 1-NC / 2-COMMON / 3-NO

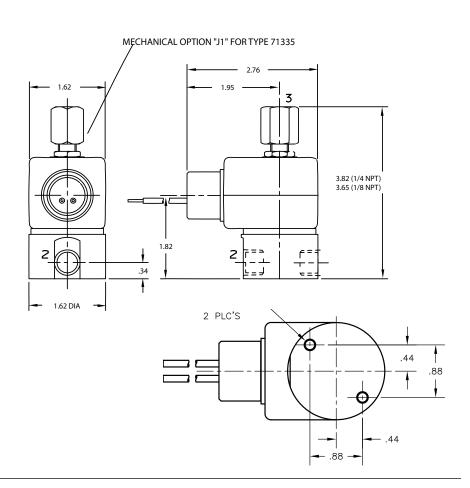








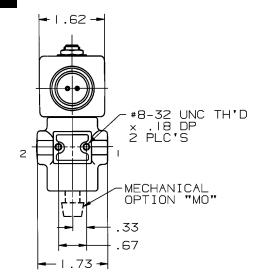
3-Way Universal Port Identifiation 1-NC / 2-COMMON / 3-NO

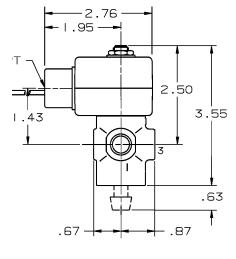


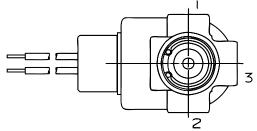




3-Way Normally Open
Port Identification
1-Exhaust/ 2-Cylinder/ 3-Pressure



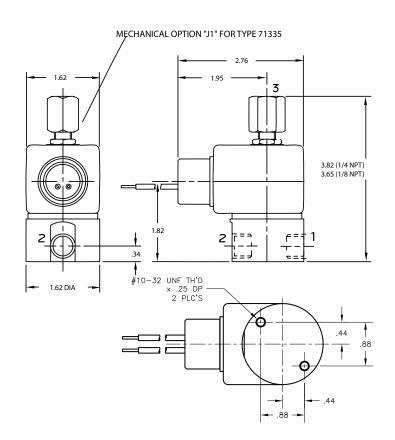








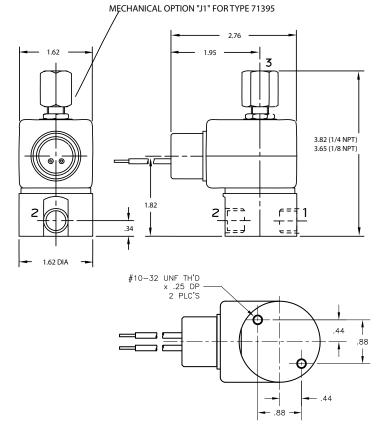
3-Way Normally Closed Port Identification 1-Pressure / 2-Cylinder / 3-Exhaust





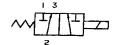


3-Way Normally Open
Port Identification
1-Exhaust / 2-Cylinder / 3-Pressure

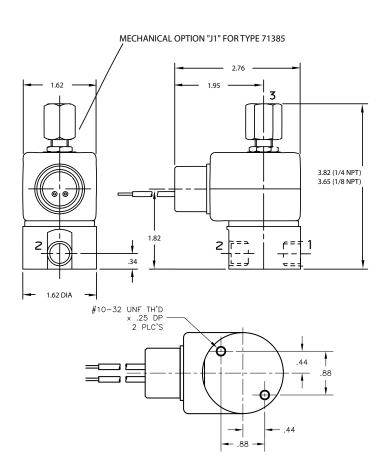








3-Way Normally Diverting Port identification: 1-NC/ 2-IN/ 3-NO



1 5/8

## Valve Reference B8



02F30Cxx Port Identification:

Press - 2 /CYL-11 / EXH-3

3-Way Normally Open 02F300xx

Port Identification:

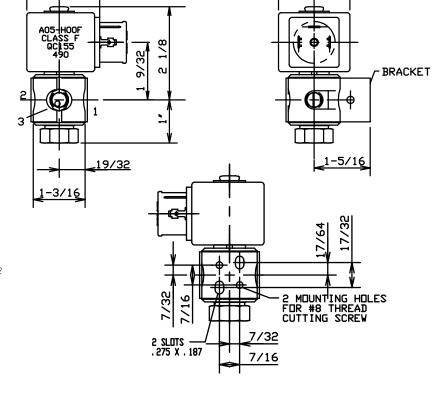
Press - 3 / CYL -1 / EXH - 2



Port Identification:

Pressure can be applied at either port







3/4 | 15/16

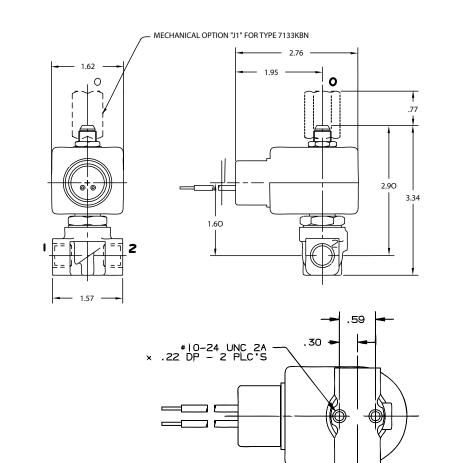




3-Way Universal

Port Identification

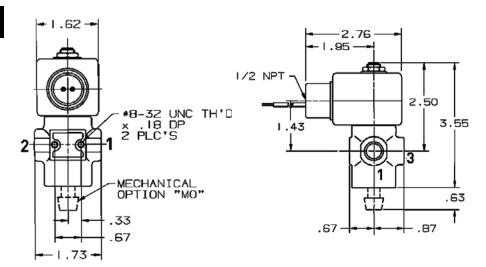
Pressure can be applied at either port

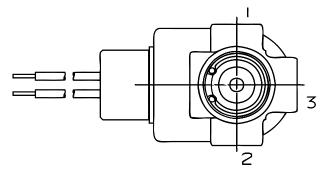






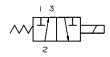
3-Way Universal
Port Identification
Pressure can be applied at either port



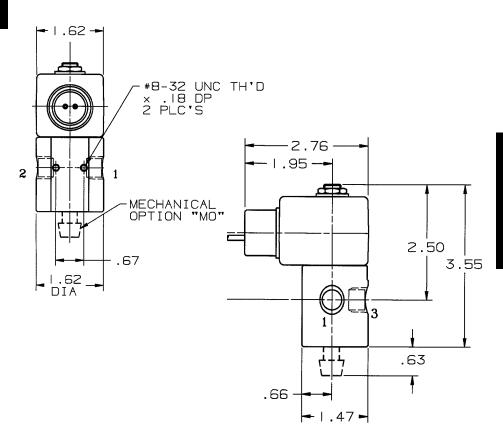








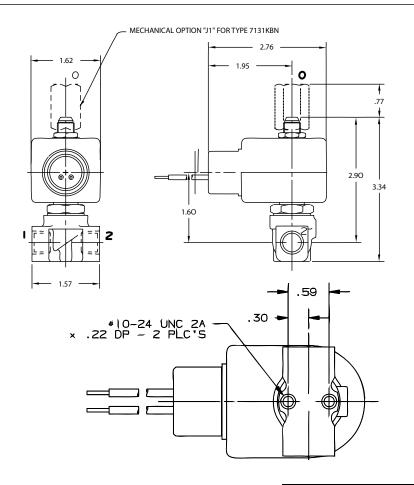
3-Way Normally Closed
Port Identification
1-Pressure / 2-Cylinder/ 3-Exhaust





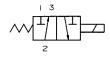


3-Way Normally Closed
Port Identification
1-Cylinder/ 2-Pressure/ 0-Exhaust

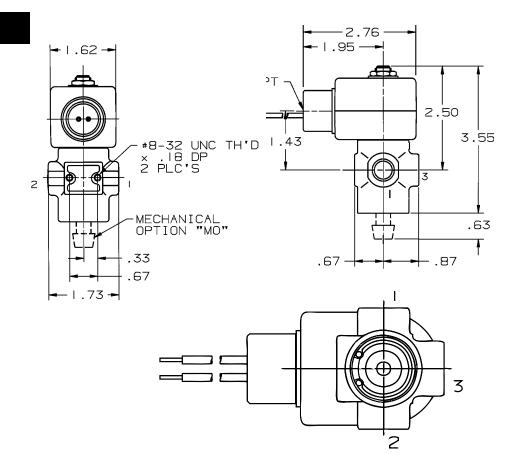








3-Way Normally Closed
Port Identification
1-Pressure/ 2-Cylinder/ 3-Exhaust



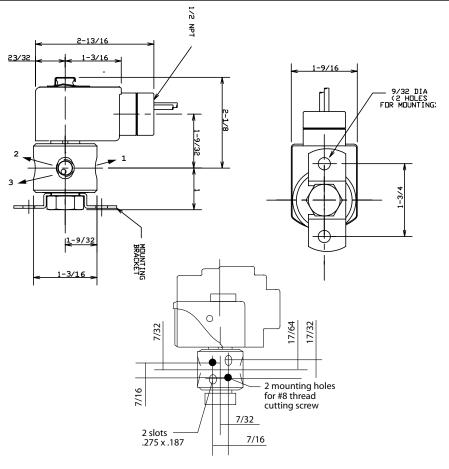




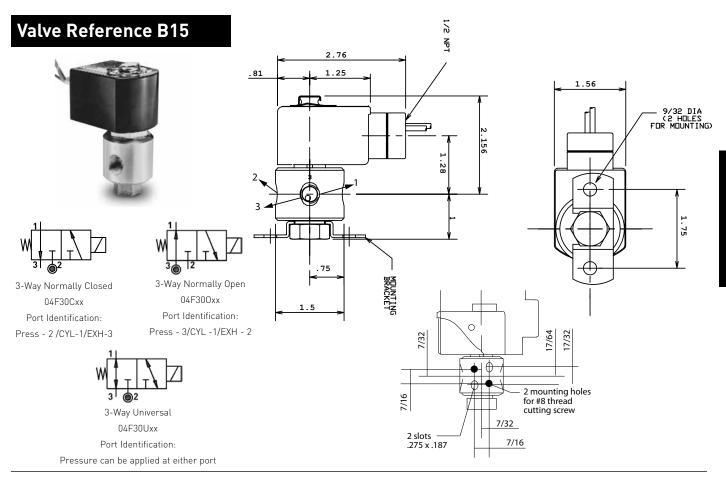
3-Way Universal
Port Identification
Pressure can be applied to either port.

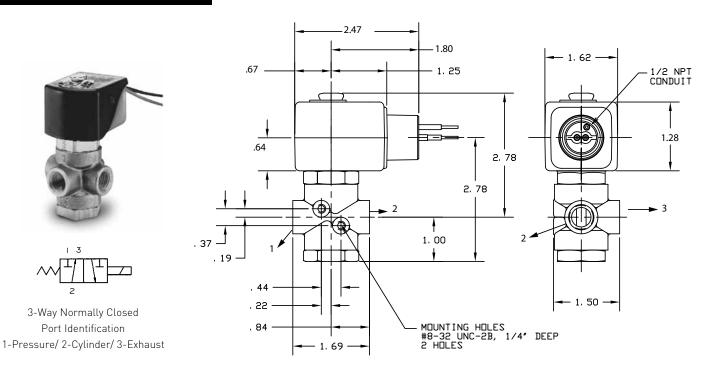


3-Way Normally Closed Port Identification Press - 2 | CYL-1 | EXH-3

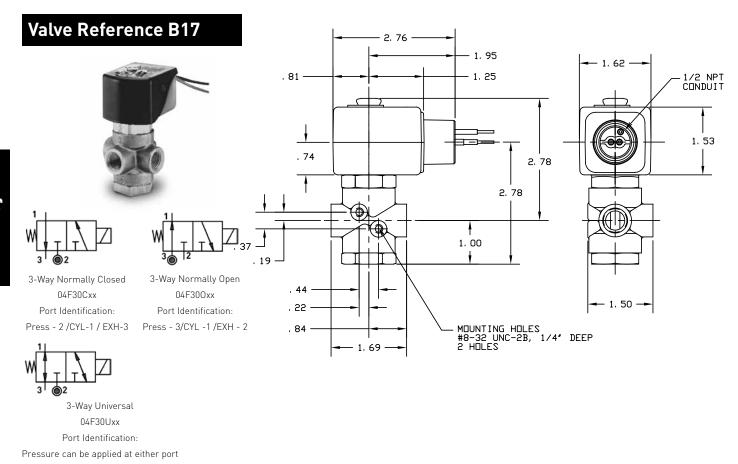














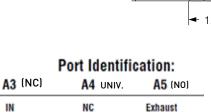




3-Way Normally Closed А3



3-Way Normally Open Α5

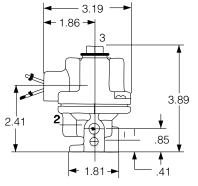


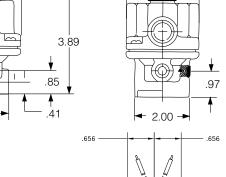
Common

NO

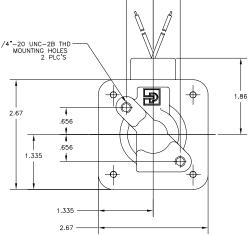








2.67





Cylinder

IN

#### 3-Way Direct Acting Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
02F30C1	9.5	3WNC	1/8	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	77°F
02F30C3	9.5	3WNC	1/8	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
02F30C3	6	3WNC	1/8	303SS	305SS	430FR	12L14 Plated	430FR	17-7PH	Silver	130°F
02F30O1	9.5	3WNO	1/8	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	77°F
02F30O1	6	3WNO	1/8	Brass	305SS	430FR	12L14 Plated	430FR	17-7PH	Copper	130°F
02F30O3	9.5	3WNO	1/8	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
02F30O3	6	3WNO	1/8	303SS	305SS	430FR	12L14 Plated	430FR	17-7PH	Silver	130°F
02F30U1	9.5	3WU	1/8	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	77°F
02F30U3	6	3WU	1/8	303SS	305SS	430FR	12L14 Plated	430FR	17-7PH	Silver	130°F
02F30U3	10.2	3WU	1/8	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
04F30C3	11.5	3WNC	1/4	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
04F30C3	10.2	3WNC	1/4	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
04F30C3	11	3WNC	1/4	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	130°F
04F30O2	11.5	3WNO	1/4	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	77°F
04F30O2	11	3WNO	1/4	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	130°F
04F30O2	16	3WNO	1/4	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	77°F
04F30O3	11.5	3WNO	1/4	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
04F30O3	11	3WNO	1/4	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	130°F
04F30U2	11.5	3WU	1/4	Brass	305SS	430FR	416/ 430FR	430FR	17-7PH	Copper	77°F
04F30U3	16	3WU	1/4	303SS	305SS	430FR	416/ 430FR	430FR	17-7PH	Silver	77°F
71315SN	10	3WNC	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F

<sup>\*</sup> Shows first 7 digits of pressure vessel.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

#### 3-Way Direct Acting Materials of Construction (Continued)\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
7131KBN	10	3WNC	1/8 - 1/4	Brass	304SS	430FR	430F	430FR/ 4106	301SS	Copper	150°F
7131TBN	10	3WNC	1/4	Brass	304SS	430FR	430F	430FR/ 4106	301SS	Copper	150°F
7131TVN	10	3WNC	1/4	303	304SS	430FR	430F	430FR/ 4106	18-8SS	Copper	150°F
7133KBN	10	3WU	1/8 - 1/4	Brass	304SS	430FR	430F	430FR/ 4106	301SS	Copper	150°F
7133TBN	10	3WU	1/4	Brass	304SS	430FR	430F	430FR/ 4106	301SS	Copper	150°F
7133TVN	10	3WU	1/4	303	304SS	430FR	430F	430FR/ 4106	18-8SS	Copper	150°F
71335SN	10	3WU	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71385SN	10	3WD	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
71395SN	10	3WNO	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
A3	16	3WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
A36	14	3WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	None	122°F
A4	16	3WU	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
A46	14	3WU	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	None	122°F
A5	16	3WNO	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
A56	14	3WNO	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	None	122°F

<sup>\*</sup> Shows first 7, 2 or 3 digits of pressure vessel.

# Notes \_\_\_\_\_\_



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# 3-Way

Pilot & Remote Operated Valves 1/4" - 3/4" NPT



### **General Description:**

3-Way Pilot Operated valves are used in general industrial applications and control valve pilot actuation where higher pressures and flows are required. Pilot operated valves require the minimum operating pressure differential specified to ensure proper operation.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

# **Standard Materials of Construction** Please refer to page B40.

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction, as listed in the product specifications charts.

Use of non-lubricated gaseous media can affect valve life.

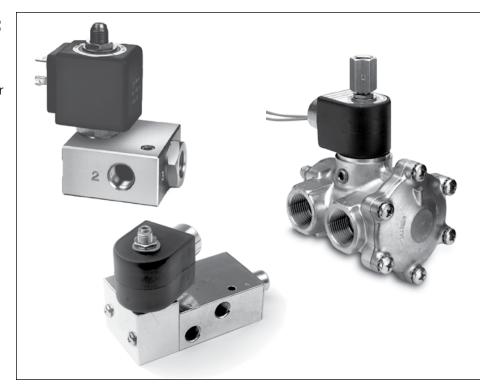
# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12.24 & 120

For other voltages – consult factory





#### **Coil Classification:**

Class F Standard - Class H Available

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified.

SIL-3 Capable (Models 73317xx, 74317xx). See Certificate in Technical Section Page F20 For additional details, consult factory.

# **Maximum Ambient Temperature** 167° F

#### **Mininum Ambient Temperature**

-40°F for Models 73317xx and 74317xx. Dew Point must be more than 7°F below ambient.

# Applications:

- Pilot valve actuation of larger control valves
- Oil and gas including off-shore installations
- Single acting spring return cylinder control
- Compressor unloaders
- Turbines

#### **External Piloted 74332xxx**

- Controlling Contaminated Fluids
- Controlling Pressures under 10 PSI
- Operating valves on vacuum

Please refer to page B40 for details

### 3-Way Internal Pilot Operated - Normally Closed - Brass

			Operating Pressure Differential (MOPD) PSI			Max.			Pofe	erence		
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure Vessel	Kere	rence
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TEC	CHNICAL	SPECIFIC	CATION	NS	<u> </u>							
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73312BN3RNJ0	7	B19
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73312BN3RNJ1	7	B24
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73312BN4UNJ0	7	B19
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73312BN4UNJ1	7	B24
							,					
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73312BN52NJ0	7	B25
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73312BN52NJ1	7	B26
DC TE	CHNICAL	SPECIFI	CATIO	NS								
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73312BN3RNJ0	7	B19
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73312BN3RNJ1	7	B24
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73312BN4UNJ0	7	B19
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73312BN4UNJ1	7	B24
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73312BN52NJ0	7	B25
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73312BN52NJ1	7	B26

### 3-Way Internal Pilot Operated - Normally Open - Brass

	•					•						
				Operating Pressure Differential (MOPD) PSI				Max.			Rofo	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
AC TE	CHNICAL	SPECIF	ICATIO	ONS								
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73322BN3RNJ0	7	B27
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73322BN3RNJ1	7	B28
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73322BN4UNJ0	7	B27
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73322BN4UNJ1	7	B28
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73322BN52NJ0	7	B29
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73322BN52NJ1	7	B20
					·							



### 3-Way Internal Pilot Operated - Normally Open - Brass (Continued)

				Operating Pressure Differential (MOPD) PSI				Max.			Refe	erence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
DC TEC	CHNICAL	SPECIFI	CATIO	NS S								
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73322BN3RNJ0	7	B27
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73322BN3RNJ1	7	B28
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73322BN4UNJ0	7	B27
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73322BN4UNJ1	7	B28
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73322BN52NJ0	7	B29
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73322BN52NJ1	7	B20

### 3-Way Internal Pilot Operated - Diverting - Brass

U 11 U	Tray internation operated Diverti						<b>D</b> : <b>u o</b> ·					
			Operating Pressure Differential (MOPD) PSI			Max.			Refe	erence		
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
	L CHNICAL				Water	Oit	- Trucc	'	Seat	ramber	10010	vatve
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73382BN3RNJ1	7	B30
-												
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73382BN4UNJ1	7	B30
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73382BN52NJ1	7	B21
DC TEC	CHNICAL	SPECIFI	CATIO	NS								
3/8	3/8	2.10	10	180	180	180	10	185	NBR	73382BN3RNJ1	7	B30
1/2	1/2	3.60	10	180	180	180	10	185	NBR	73382BN4UNJ1	7	B30
3/4	3/4	7.30	10	180	180	180	10	185	NBR	73382BN52NJ1	7	B21



### 3-Way External Pilot Operated\* - Universal - Brass

			Operating Pressure Differential (MOPD) PS				Max.			Rofe	rence	
Port Size	Orifice Size	Flow Factor		Air, Inert		Light		Media Temp.		Pressure Vessel	Reic	Tence
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TECHNICAL SPECIFICATIONS												
3/8	3/8	2.10	0	170	170	170	10	185	NBR	74332BN3RNJ1	7	B31
1/2	1/2	3.60	0	170	170	170	10	185	NBR	74332BN4UNJ1	7	B31
3/4	3/4	7.30	0	170	170	170	10	185	NBR	74332BN52NJ1	7	B32
DC TE	CHNICA	L SPECI	FICATI	ONS								
3/8	3/8	2.10	0	170	170	170	10	185	NBR	74332BN3RNJ1	7	B31
1/2	1/2	3.60	0	170	170	170	10	185	NBR	74332BN4UNJ1	7	B31
3/4	3/4	7.30	0	170	170	170	10	185	NBR	74332BN52NJ1	7	B32

<sup>\*</sup>Minumum external pilot pressure must be main line pressure plus 10 psi; 180 psi maximum; 165 psi maximun for vacuum applications.

#### External Pilot Pressure Valves

When an application requires the separation of the fluid in the main line from the pilot operator, it is necessary to control the pilot externally.

Examples include:

- Controlling contaminated fluids up to 170 PSI
- Controlling pressures below the minimum
- Operating valves on vacuum

For such applications, the following 3-way multipurpose valves are provided with connections for external pressure to operate the pilot. The minimum external pilot pressure required is the main line pressure plus 10 PSI. The maximum external pilot pressure is 180 PSI for pressure applications, and 165 PSI for vacuum applications.

For vacuum service the vacuum line must be connected to the normally open port, and pilot pressure must be connected to the normally closed pilot port.



### 3/2, 3-Way 2 Position Single Solenoid - In Line - Brass

			Pre: Diffe	rating ssure rential PD) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	erence
Port	Orifice	Flow		Air,		Media		Pressure Vessel		Number with	11010	l
Size	Size	Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/DO	TECHN	VICAL S	PECIF	ICATIC	NS							
1/4	11/64	0.55	30	150	10	167	NBR	73317BN2KN00	73317BN2KNM0	73317BN2KN7A	7	B22
1/4	11/64	0.55	30	150	1.5	150	NBR	73317BN2KN00	73317BN2KNM0	73317BN2KN7A	11	B22
1/4	1/4	1.20	30	150	10	167	NBR	73317BN2PN00	73317BN2PNM0	73317BN2PN7A	7	B22
1/4	1/4	1.20	30	150	1.5	150	NBR	73317BN2PN00	73317BN2PNM0	73317BN2PN7A	11	B22
1/4	1/4	1.20	30	150	0.6	150	NBR	73317BN2PN90	-	-	12	B22
1/2	5/8	4.00	30	150	10	167	NBR	73317BN4UN00	-	-	7	B33
1/2	5/8	4.00	30	150	1.5	150	NBR	73317BN4UN00	-	-	11	B33
1/2	5/8	4.00	30	150	0.6	150	NBR	73317BN4UN90	-	-	12	B33

### 3/2, 3-Way 2 Position Single Solenoid - Brass - External Pilot\*

-, -,	o way	•		. •9			Dias	5 Externati				
			Pre: Diffe	rating ssure rential PD) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port	Orifice	Flow		Air,		Media		Pressure Vessel	Number with	Number with	Reic	l
Size	Size	Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D0	C TECH	NICAL	SPEC	IFICAT	IONS							-
1/4	11/64	0.55	0	150	10	167	NBR	74317BN2KN00	-	-	7	B34
1/4	11/64	0.55	0	150	1.5	150	NBR	74317BN2KN00	-	-	11	B34
1/4	1/4	1.20	0	150	10	167	NBR	74317BN2PN00	-	-	7	B34
1/4	1/4	1.20	0	150	1.5	150	NBR	74317BN2PN00	-	-	11	B34
1/2	5/8	4.00	30	150	10	167	MBR	74317BN4UN00	-	-	7	B35
1/2	5/8	4.00	30	150	1.5	167	MBR	74317BN4UN00	-	-	11	B35

<sup>\*</sup> External pilot pressure to operate valve must be 30 - 150 psi



<sup>\*</sup> These valves operate at 0 PSI, however a 2 PSI pressure differential is required to actuate the pressure operated quick exhaust poppet.

3/2, 3-Way 2 Position Single Solenoid - In Line - Stainless Steel

			Differentia	Pressure al (MOPD) SI		Max.			Pressure Vessel Number	Pressure Vessel Number with	Pofo	rence
Port	Orifice	Flow				Media		Pressure Vessel	with Locking	Momentary	iterei	ence
Size	Size	Factor		Air,		Temp.		Number without	Manual	Manual		
NPT	in.	Cv	Min.	Inert Gas	Watt	°F	Seal	Manual Override	Override	Override	Coil	Valve
AC/D	C TECH	HNICAL	SPECIFIC	CATIONS								
1/4	11/64	0.55	30	150	10	167	NBR	73317VN2KN00	-	-	7	B22
1/4	11/64	0.55	30	150	1.5	150	NBR	73317VN2KN00	-	-	11	B22
1/4	11/64	0.55	30	150	0.6	150	NBR	73317VN2KN90	-	-	12	B22
1/4	1/4	1.20	30	150	10	167	NBR	73317VN2PN00	-	-	7	B22
1/4	1/4	1.20	30	150	1.5	150	NBR	73317VN2PN00	-	-	11	B22

### 3/2, 3-Way 2 Position Single Solenoid - Stainless Steel - External Pilot\*

			Differenti	Operating Pressure Differential (MOPD) PSI		Max.			Pressure Vessel Number	Pressure Vessel Number with	Refe	rence
Port	Orifice	Flow				Media		Pressure Vessel	with Locking	Momentary		
Size	Size	Factor		Air, Inert		Temp.		Number without	Manual	Manual		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Override	Coil	Valve
AC/D	C TECI	HNICAL	SPECIFIC	CATIONS								
1/4	11/64	0.55	0	150	10	167	NBR	74317VN2KN00	-	-	7	B34
1/4	11/64	0.55	0	150	1.5	150	NBR	74317VN2KN00	-	-	11	B34

<sup>\*</sup>External pilot pressure to operate valve must be 30-150 psi

### 3-Way Remote Pressure Operated Valves - Universal - Brass, NBR Seals

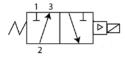
			Differenti	Operating Pressure Differential (MOPD) PSI		Max.			Pressure Vessel Number	Pressure Vessel Number with	Refe	rence
Port Size	Orifice Size	Flow Factor		Air, Inert		Media Temp.		Pressure Vessel Number without	with Locking Manual	Momentary Manual		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Override	Coil	Valve
3/8	3/8	2.1	0	180		185	NBR	75332BN3RN00	-	-	-	B36
1/2	1/2	2.1	0	180		185	NBR	75332BN4UN00	-	-	-	B36
3/4	3/4	3.6	0	180		185	NBR	75332BN52N00	-	-	-	B36

#### **Remote Operated Valve Port Connections**

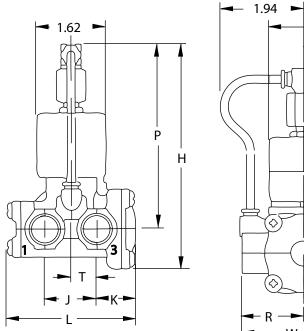
Valve	Main Line		Remote Control	Valve Hookup		3-W	ay Pilot Valve Hoo	kup
Type	Supply	Normally Closed Port	Normally Open Port	Common Port	Pilot Inlet Port 1/8" NPT	Normally Closed Port	Normally Open Port	Common Port
Normally Open	0-180 PSIG	Media Exhaust	Media Inlet	Cylinder		Main Line Pressure +10 PSI Min.	Pilot Exhaust	
	Vacuum	Atmosphere	Vacuum	Cylinder		10 PSI Min.	Vacuum	
Normally Closed	0-180 PSIG	Media Inlet	Media Exhaust	Cylinder	Connect to Common Port	Main Line Pressure +10 PSI Min.	Pilot Exhaust	1/8" NPT Pilot of Remote Control
	Vacuum	Vacuum	Atmosphere	Cylinder	of 3-Way Pilot	10 PSI Min.	Vacuum	Valve
Directional Control	0-180 PSIG	Media Outlet	Outlet Media Outlet Media Inlet			Main Line Pressure +10 PSI Min.	Pilot Exhaust	
	Vacuum	Inlet	Inlet	Vacuum		10 PSI Min.	Vacuum	







3-Way Normally Closed
Port Identification
1-Pressure/ 2-Cylinder/ 3-Exhaust



H

5.62

P

4.41

4.56

2.08

3.38

3.09

_		R → W	\$	2	, C	-
	Ι	Dimensio	ns			
C	L	W	T	R	J	K
1.96	2.97	2.62	0.59	1.44	1.22	0.91

0.69

1.66

1.41

1.06

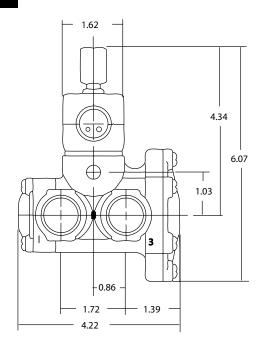
2.76 <sup>—</sup> — 1.95

# Valve Reference B20





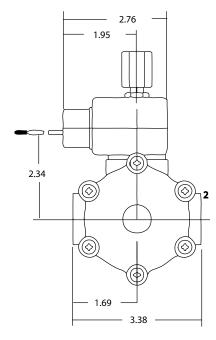
3-Way Normally Open
Port Identification
1-Exhaust/ 2-Cylinder/ 3-Pressure



Valve

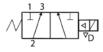
73312BN3RNJ0

73312BN4UNJ0

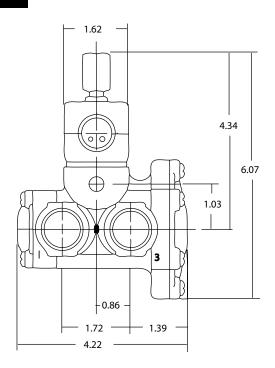


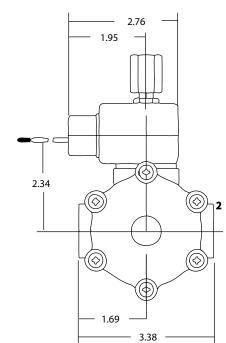




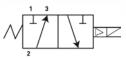


3-Way Diverting Port Identification 1-NC/ 2-IN/ 3-NO

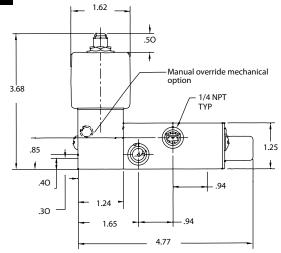


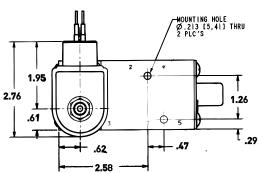


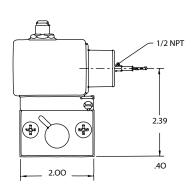


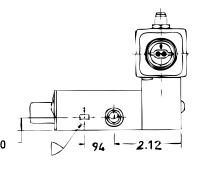


3-Way Normally Closed
Port Identification
2-Cylinder/ 1-Pressure/ 3-Exhaust







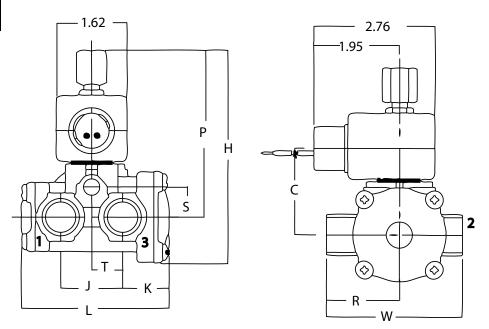




Parker Hannifin Corporation Fluid Control Division 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd



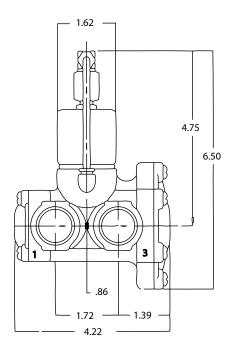
3-Way Normally Closed
Port Identification
1-Pressure/ 2-Cylinder/ 3-Exhaust

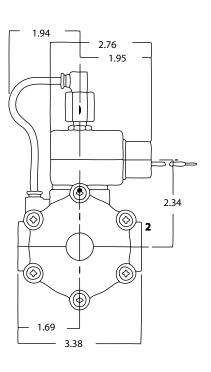


					Dime	nsions				
Valve	Н	P	С	L	W	S	T	R	J	K
73312BN3RNJ1	4.89	3.98	1.96	2.97	2.62	0.65	0.59	1.44	1.22	0.91
73312BN4UNJ1	5.10	4.08	2.08	3.38	3.09	0.78	0.69	1.66	1.44	1.06



3-Way Normally Closed
Port Identification
1-Pressure/ 2-Cylinder/ 3-Exhaust



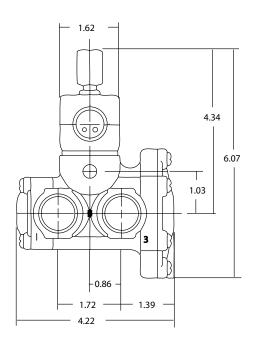


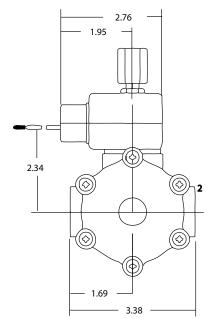






3-Way Normally Closed
Port Identification
1-Pressure/ 2-Cylinder/ 3-Exhaust

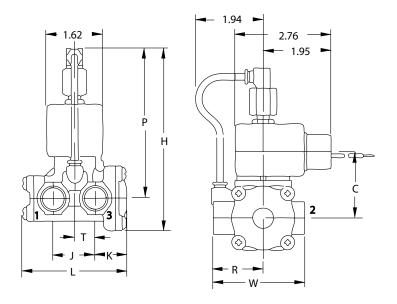








3-Way Normally Open
Port Identification
1-Exhaust/ 2-Cylinder/ 3-Pressure



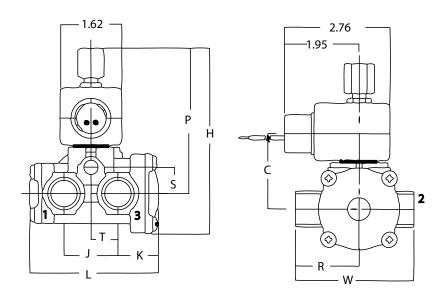
				Di	imensio	ns			
Valve	Н	P	С	L	W	T	R	J	K
73322BN3RNJ0	5.34	4.41	1.96	2.97	2.62	0.59	1.44	1.22	0.91
73322BN4UNJ0	5.62	4.56	2.08	3.38	3.09	0.69	1.66	1.41	1.06







3-Way Normally Open
Port Identification
1-Exhaust/ 2-Cylinder/ 3-Pressure

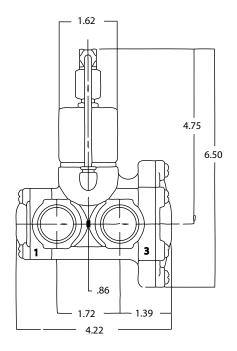


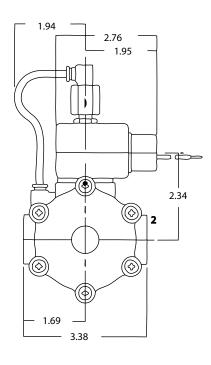
					Dime	nsions				
Valve	Н	P	С	L	W	s	T	R	J	K
73322BN3RNJ1	4.98	3.98	1.96	2.97	2.62	0.65	0.59	1.44	1.22	0.91
73322BN4UNJ1	5.10	4.08	2.08	3.38	3.09	0.78	0.69	1.66	1.44	1.06



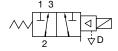


3-Way Normally Open
Port Identification
1-Exhaust/ 2-Cylinder/ 3-Pressure

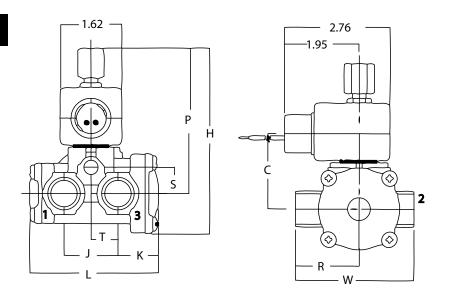








3-Way Diverting Port Identification 1-NC/ 2-IN/ 3-NO

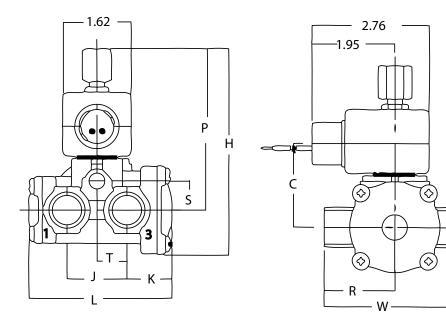


					Dime	nsions				
Valve	Н	P	С	L	W	S	Т	R	J	K
73382BN3RNJ1	4.89	3.98	1.96	2.97	2.62	0.65	0.59	1.44	1.22	0.91
73382BN4UNJ1	5.10	4.08	2.08	3.38	3.09	0.78	0.69	1.66	1.44	1.06

# Valve Reference B31



3-Way Universal
Pressure can be applied at
either port.



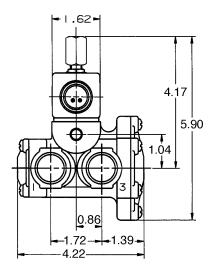
					Dime	nsions				
Valve	Н	P	С	L	W	S	Т	R	J	K
74332BN3RNJ1	4.72	3.79	1.96	2.97	2.62	0.65	0.59	1.44	1.22	0.91
74332BN4UNJ1	4.93	3.91	2.08	3.38	3.09	0.78	0.69	1.66	1.44	1.06

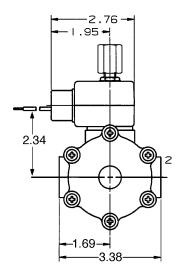


2



3-Way Universal
Pressure can be applied at
either port.

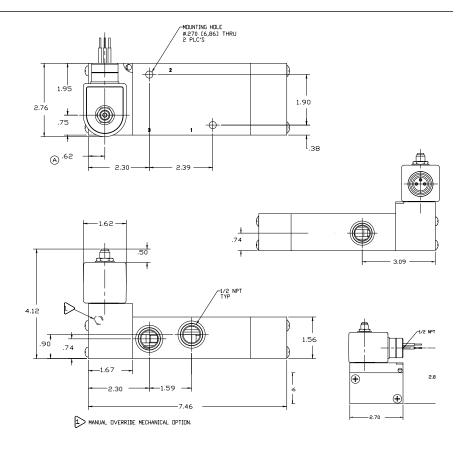






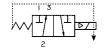


3-Way Normally Closed
Port Identification
2-Cylinder / 1-Pressure/ 3-Exhaust

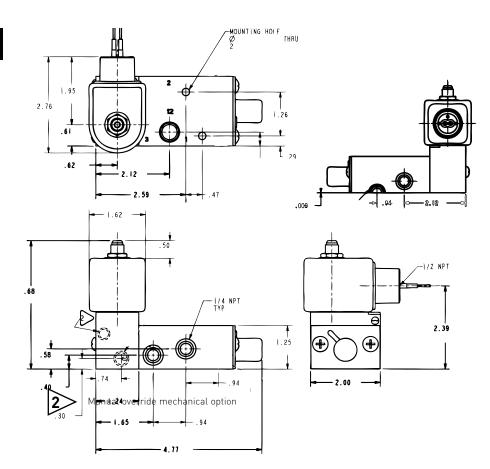




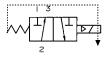




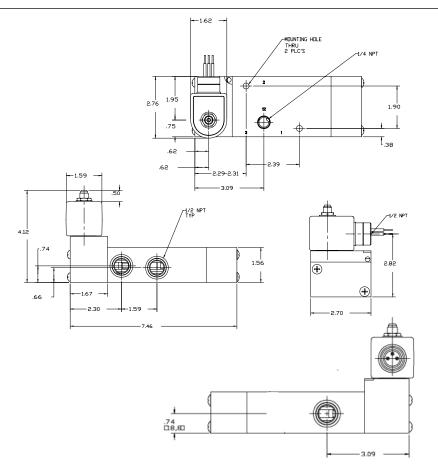
3-Way Normally Closed
Port Identification
1-Pressure/ 2-Cylinder/ 3-Exhaust





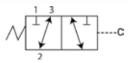


3-Way Normally Closed 1-Pressure/ 2-Cylinder/ 3-Exhaust



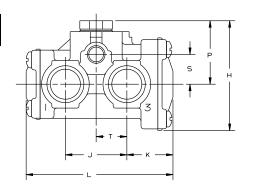


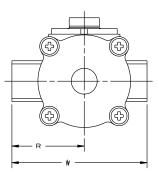


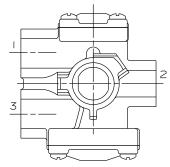


Port Identification

Normally Closed: 1-press/2-cylinder/3-Exh. Normally Open: 3 - press/2- cylinder/3 - Exh. Directional Control: 2 - press/3 - N.O./1 - N.C.







				D	imensio	n			
Valve	Н	P	L	W	S	T	R	J	K
**75332BN3RN00	2.42	1.49	2.97	2.62	.65	.59	1.44	1.22	.91
**75332BN4UN00	2.3	1.61	3.38	3.09	.78	.69	1.66	1.41	1.06
*75332BN52N00	3.60	1.87	4.22	3.38	1.03	.86	1.69	1.72	1.39

 $<sup>^{\</sup>ast}$  6-Bolt cover pattern as shown in photo



<sup>\*\* 4-</sup>bolt cover pattern as shown in dimensional drawings

### 3-Way Pilot Operated Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
73312BN	10	3WNC	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73322BN	10	3WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73382BN	10	3WD	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
74332BN	10	3WU	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73317BN	10	3WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73317BN	10	3WNC	1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73317VN	10	3WNC	1/4	303	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
71315AK	10	3WNC	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
74317VN	10	3WNC	1/4	303	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
75332***		UNIV	3/8 - 1/4	Brass	N/A	N/A	N/A	N/A	18-8SS	N/A	

<sup>\*</sup> Shows first 7 digits of pressure vessel

lotes	



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

<sup>\*\*\*</sup> Pilot orifice is 303SS. These valves are remotely piloted. No coil required.

# 3-Way

# Direct Acting High Pressure Valves 1/8" - 1/4" NPT



### **General Description:**

3-way Direct Acting High Pressure valves are used in general industrial application and control valve pilot actuation where higher pressures and flows are required. No minimum operating pressure differential required to ensure proper operation.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

**Standard Materials of Construction** Please refer to page B44.

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction, as listed in the product specifications charts.

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50

DC -12,24 & 120

For other voltages – consult factory





#### **Coil Classification:**

Class F standard Class H available

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

# **Maximum Ambient Temperature** 150° F

Please refer to Page B44 for details.

# Applications:

- Pilot valve actuation of larger control valves
- Oil and gas including off-shore installations
- Single acting spring return cylinder control
- Compressor unloaders
- Turbines
- Machining equipment
- High pressure compressors



### 3-Way Normally Closed High Pressure - Brass

		ce Size In.		Factor V			g Pressu l (MOPD)			Max.			Rofo	rence
Port Size						Air,		Limbs		Media		Pressure Vessel	Kele	lence
NPT	In	Exh.	In	Exh.	Min.	Inert Gas	Water	Light Oil	Watt	Temp. °F	Seal*	Number	Coil	Valve
AC T	ECHN	ICAL SP	ECIFICA	ATIONS										
1/4	1/32	1/32	0.020	0.020	0	1100	1100	1100	10	210	RUBY	7131KBN2BR00	7	B39
1/4	1/32	1/32	0.020	0.020	0	580	580	580	10	165	PCTFE	7131KBN2BF00	7	B39
DC T	ECHN	ICAL SP	ECIFICA	ATIONS										
1/4	1/32	1/32	0.020	0.020	0	1100	1100	1100	10	210	RUBY	7131KBN2BR00	7	B39
1/4	1/32	1/32	0.020	0.020	0	580	580	580	10	165	PCTFE	7131KBN2BF00	7	B39

### 3-Way Universal High Pressure - Brass

	Orific Ir			Factor V			g Pressu l (MOPD)			Max.			Refe	rence
Port Size						Air, Inert		Light		Media Temp.		Pressure Vessel	Kere	Tence
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC T	ECHNI	CAL SF	ECIFIC	ATIONS								•		
1/4	1/32	1/32	0.020	0.020	0	435	435	435	10	185	FKM	7133KBN2BVJ1	7	B39
DC T	ECHNI	CAL SF	PECIFIC	ATIONS	3									
1/4	1/32	1/32	0.020	0.020	0	435	435	435	10	185	FKM	7133KBN2BVJ1	7	B39

### 3-Way Universal High Pressure - Stainless Steel

	Orific Ir	e Size า.	Flow I				g Pressu l (MOPD)			Max.			Refe	rence
Port Size NPT	In	Exh.	ln	Exh.	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
AC T	ECHNI	CAL SF	PECIFIC	ATIONS										
1/8	1/32	1/32	0.024	0.024	0	400	400	400	10	185	NBR	71335SN1ANJ1	7	B38
1/4	1/32	1/32	0.024	0.024	0	400	400	400	10	185	NBR	71335SN2ANJ1	7	B38
DC T	ECHNI	CAL SF	PECIFIC	ATIONS	1									
1/8	1/32	1/32	0.024	0.024	0	400	400	400	10	185	NBR	71335SN1ANJ1	7	B38
1/4	1/32	1/32	0.024	0.024	0	400	400	400	10	185	NBR	71335SN2ANJ1	7	B38

<sup>\*</sup> PCTFE Seals: Allowable Seat leakage is 20 cc/min on air and inert gas at rated pressure: 7131KBNxxFxx RUBY Seals: Allowable Seat leakage is 100 cc/min on air and inert gas at rated pressure: 7131KBNxxRxx

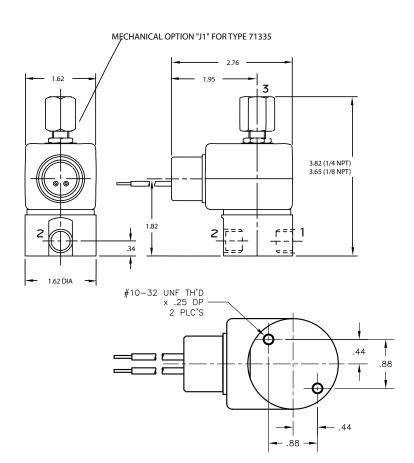






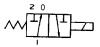
3-Way Universal

Pressure can be applied at
either port.

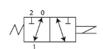


# Valve Reference B39





3-Way Normally Closed
Port Identification
1-Cylinder/ 2-Pressure/ 0-Exhaust



3-Way Universal Port Identification Pressure can be applied at either port

MECHANICAL OPTION "1" FOR TYPE 7133KBN & 7131KBN

2.76

1.95

2.90

3.34

\* 10-24 UNC 2A

\* .22 DP - 2 PLC 5





### 3-Way Direct Acting High Pressure Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
7131KBN	10	3WNC	1/8 - 1/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7133KBN	10	3WU	1/8 - 1/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
71335SN	10	3WU	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F

<sup>\*</sup> Shows first 7, 2 or 3 digits of pressure vessel.

Notes			



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# 3-Way

Direct Acting & Pilot Operated Quick Exhaust Valves 1/4" - 3/8" NPT



### **General Description:**

3-Way Direct Acting & Pilot Operated Quick Exhaust Valves are designed to provide a large orifice for quick exhaust. Increased exhaust capacity significantly reduces cycle time for single acting spring return actuators. Pilot operated valves require the minimum operating pressure differential specified to ensure proper operation. Direct acting valves do not require a pressure differential.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

# **Standard Materials of Construction** Please refer to page B50.

#### **Compatible Fluids**

Lubricated air, inert gases, water, light oil (300 SSU) and additional fluids compatible with materials of construction, as listed in the product specifications.

Use of non-lubricated gaseous media can affect valve life.

# Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120

For other voltages - consult factory.



#### **Coil Classification:**

Class F Standard Class H Available

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

# **Maximum Ambient Temperature** 180° F

Please refer to Page B50 for details.

### **Applications:**

- Pilot valve actuation of larger control valves
- Oil and gas including off-shore installations
- Single acting spring return cylinder control
- Compressor unloaders
- Turbines



### 3-Way Normally Closed - Quick Exhaust - Brass

	Orifice Size In.		Flow Factor Cv		Differential (MOPD) PSI					Max.			Refe	erence	
Port Size NPT	Body NC	Body NO	Sleeve Size	In	Exh.	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
AC TE	CHNIC	CAL SP	ECIFIC	ATION	IS										
1/4	3/32	1/4	-	0.20	0.73	5	150	150	95	11	180	NBR	04F35C1116ACF	4	B41
1/4	3/32	1/4	3/32	0.20	1.10	0	100	100	100	10	185	NBR	7131EBN2LN00*	7	B40
1/4	3/32	1/4	3/32	0.20	1.10	0	100	100	100	10	185	NBR	7131EBN2LNJ1*	7	B40
1/4	9/32	11/32	-	0.80	1.20	10	200	200	200	6	180	NBR	04F38C1122AAF	1	B42
3/8	9/32	11/32	-	0.80	1.20	10	200	200	200	6	180	NBR	06F38C1122AAF	1	B42
DC TE	ECHNIC	CAL SP	ECIFIC	OITA	NS										
1/4	3/32	1/4	-	0.20	0.73	5	115	115	60	11.5	104	NBR	04F35C1116A3F	6	B41
1/4	3/32	1/4	3/32	0.20	1.10	0	100	100	100	10	185	NBR	7131EBN2LN00*	7	B40
1/4	3/32	1/4	3/32	0.20	1.10	0	100	100	100	10	185	NBR	7131EBN2LNJ1*	7	B40
1/4	9/32	11/32	-	0.80	1.20	10	200	200	200	9.5	120	NBR	04F38C1122A1F	3	B42
3/8	9/32	11/32	-	0.80	1.20	10	200	200	200	9.5	120	NBR	06F38C1122A1F	3	B42

### 3-Way Normally Closed - Quick Exhaust - Stainless Steel

	Orifice Size In.			Flow F		Differential (MOPD) PSI					Max.			Refe	rence
Port Size NPT	Body NC	Body NO	Sleeve Size	In	Exh.	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number		Valve
AC TE	CHNIC	AL SPE	CIFICAT	IONS											
1/4	3/64	1/8	3/32	0.052	0.35	0	250	250	250	10	185	NBR	71313SN2EN00*	7	B43
1/4	3/64	1/8	3/32	0.052	0.35	0	250	250	250	10	185	NBR	71313SN2ENJ1*	7	B43
1/4	1/16	1/8	3/32	0.090	0.35	0	200	200	200	10	185	NBR	71313SN2GN00*	7	B43
1/4	1/16	1/8	3/32	0.090	0.35	0	200	200	200	10	185	NBR	71313SN2GNJ1*	7	B43
1/4	3/32	1/8	3/32	0.110	0.35	0	125	125	125	10	185	NBR	71313SN2KN00*	7	B43
1/4	3/32	1/8	3/32	0.110	0.35	0	125	125	125	10	185	NBR	71313SN2KNJ1*	7	B43
1/4	1/8	1/8	3/32	0.130	0.35	0	90	90	90	10	185	NBR	71313SN2MN00*	7	B43
1/4	1/8	1/8	3/32	0.130	0.35	0	90	90	90	10	185	NBR	71313SN2MNJ1*	7	B43

<sup>\*</sup>These valves operate at 0 PSI, however, a 2 PSI pressure differential is required to activate the pressure operated quick exhaust poppet.



### 3-Way Normally Closed - Quick Exhaust - Stainless Steel (Continued)

	Orifice Size In.			Flow Factor Cv		Differential (MOPD) PSI					Max.			Refe	rence
Port Size NPT	Body NC	Body NO	Sleeve Size	ln	Exh.	Min.	Air, Inert Gas	Water	Light Oil	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
DC TE	CHNIC	CAL SP	ECIFIC	ATIONS	3										
1/4	3/64	1/8	3/32	0.052	0.35	0	250	250	250	10	185	NBR	71313SN2EN00*	7	B43
1/4	3/64	1/8	3/32	0.052	0.35	0	250	250	250	10	185	NBR	71313SN2ENJ1*	7	B43
1/4	1/16	1/8	3/32	0.090	0.35	0	200	200	200	10	185	NBR	71313SN2GN00*	7	B43
1/4	1/16	1/8	3/32	0.090	0.35	0	200	200	200	10	185	NBR	71313SN2GNJ1*	7	B43
1/4	3/32	1/8	3/32	0.110	0.35	0	125	125	125	10	185	NBR	71313SN2KN00*	7	B43
1/4	3/32	1/8	3/32	0.110	0.35	0	125	125	125	10	185	NBR	71313SN2KNJ1*	7	B43
1/4	1/8	1/8	3/32	0.130	0.35	0	90	90	90	10	185	NBR	71313SN2MN00*	7	B43
1/4	1/8	1/8	3/32	0.130	0.35	0	90	90	90	10	185	NBR	71313SN2MNJ1*	7	B43

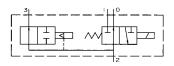
### 3-Way Normally Open - Quick Exhaust - Brass

	Orif	Orifice Size In.		Flow Factor Cv		Differential (MOPD) PSI					Max.			Refe	erence
Port							Air,				Media				
Size	Body	Body	Sleeve				Inert		Light		Temp.		Pressure Vessel		
NPT	NC	NO	Size	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Number	Coil	Valve
AC TE	CHNIC	CAL SP	ECIFIC	ATIONS	3										
1/4	3/32	1/4	-	0.20	0.73	5	160	160	95	11	180	NBR	04F35O1116ACF	4	B41
1/4	9/32	11/32	-	0.80	1.20	10	200	200	200	11	180	NBR	04F38O1122ACF	4	B42
3/8	9/32	11/32	-	0.80	1.20	10	200	200	200	11	180	NBR	06F38O1122ACF	4	B42
DC TE	CHNIC	CAL SP	ECIFIC	ATIONS	3										
1/4	3/32	1/4	-	0.20	0.73	5	100	100	50	11.5	180	NBR	04F35O1116A3F	6	B41
1/4	9/32	11/32	-	0.80	1.20	10	200	200	200	11.5	180	NBR	04F38O1122A3F	6	B42
3/8	9/32	11/32	-	0.80	1.20	10	200	200	200	11.5	180	NBR	06F38O1122A3F	6	B42

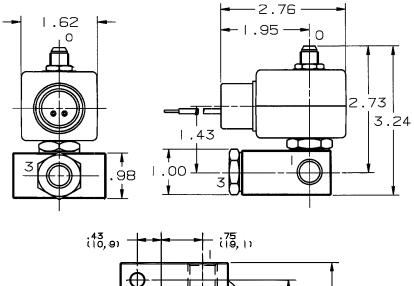
<sup>\*</sup>These valves operate at 0 PSI, however, a 2 PSI pressure differential is required to activate the pressure operated quick exhaust poppet.

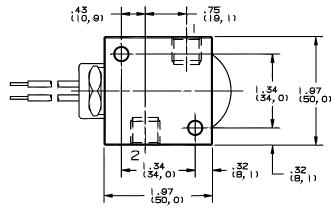






3-Way Normally Closed Port Identification 1-Pressure/ 2-Cylinder/ 3-Exhaust





# Valve Reference B41





3-Way Normally Closed 04F35Cxx

Port identification:

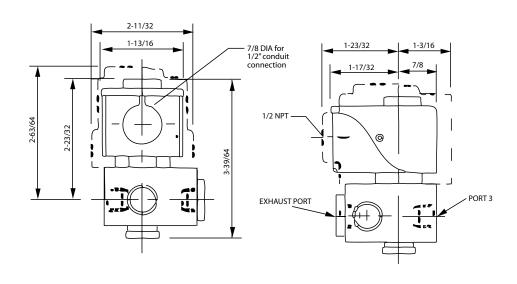
Pressure is at 2 | CYL. 1

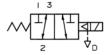


3-Way Normally Open 04F350xx

Port identification:

Pressure is at 3 | CYL. 1





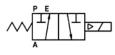
3-Way Universal 04F35Uxx

Port identification:

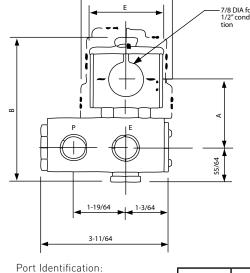
Pressure can be applied at either port





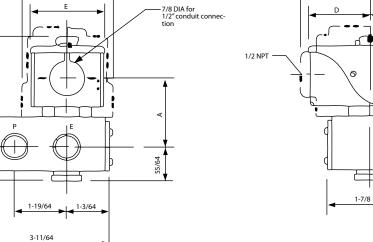


3-Way Normally Closed 04F38Cxx and 06F38Cxx



P - PRESSURE | A - CYL. | E- EXH

2-11/32



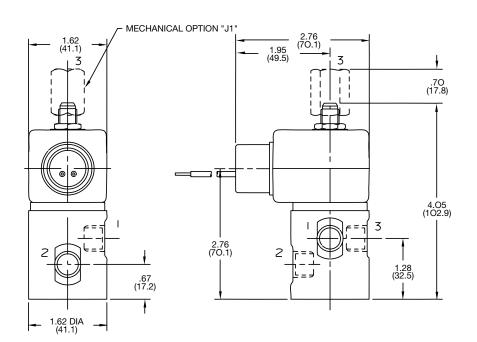
3-Way Normally Open 04F380xx and 06F380xx

	Normally Closed	Normally Open
Α	1 - 21/32	1 - 23/32
В	3 - 33/64	3 - 37/64
С	23/32	7/8
D	1 - 5/16	1 - 17/32
E	1 - 9/16	1 - 13/16

1-23/32



3-way Normally closed Port identification: 1-pressure/2-cylinder/3-exhaust





### 3-Way Quick Exhaust Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
7131EBN	10	3WNC	1/4	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
71313SN	10	3WNC	1/8 - 1/4	430F	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
04F35C1	11.5	3WNC	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	180°F
04F35O1	6	3WNO	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	180°F
04F38C1	6	3WNC	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	180°F
04F38O1	6	3WNO	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	180°F
06F38C1	11.5	3WNC	3/8	Brass	305SS	430FR	430F	430FR	302SS	Copper	180°F
06F38O1	11.5	3WNO	3/8	Brass	305SS	430FR	430F	430FR	302SS	Copper	180°F
04F35C1	11.5	3WNC	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	104°F
04F35O1	11.5	3WNO	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	104°F
04F38C1	11.5	3WNC	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	120°F
04F38O1	11.5	3WNO	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	120°F
06F38C1	11.5	3WNC	3/8	Brass	305SS	430FR	430F	430FR	302SS	Copper	120°F
06F38O1	11.5	3WNO	3/8	Brass	305SS	430FR	430F	430FR	302SS	Copper	120°F

<sup>\*</sup> Shows first 7 digits of pressure vessel.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# 4-Way

# Direct Acting & Pilot Operated Valves 1/8" - 1/2" NPT



### **General Description:**

4-Way Direct Acting and Pilot Operated valves are used in applications for actuation of double acting cylinders and piloting of larger control valves. Pilot operated valves require the minimum operating pressure differential specified to ensure proper operation. Direct Acting valves do not have a minimum pressure differential requirement.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### **Standard Materials of Construction** Please refer to page C15.

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction, as shown in the product specification charts.

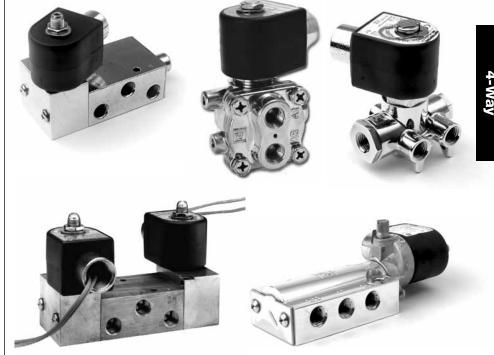
Use of non-lubricated gaseous media can affect valve life.

### **Electrical** Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120

For other voltages - consult factory



#### **Coil Classification:**

Class F standard, Class H available Class B standard on V9xx models

#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. (Consult Factory for Approvals on Models V933, V935 and V955).

SIL-3 Capable (Models 73417xx, 74417xx, 73477xx). See certificate on page F20 in the Technical section of this catalog. For additional details, consult factory.

#### **Maximum Ambient Temperature** 167°F

#### **Minimum Ambient Temperature**

-40°F for models 73417xx, 74417xx and 73477xx. Dew point must be more than 7°F below ambient.

# Applications:

- Pilot valve actuation of control valves
- Oil and gas including off-shore
- Double acting cylinder control
- Air vises and Air motors
- Damper control

Please refer to page C15 for details.



### 4/2, 4-Way 2 Position Single Solenoid - Brass\*

			Pre Diffe	erating essure erential PD) PSI							Refe	erence
Port Size NPT	Orifice Size in.	Flow Factor Cv**	Min.	Air, Inert Gas, Water & light oil	Watt	Max. Media Temp. °F	Seal	Pressure Vessel Number	Pressure Vessel Number with Metering	Pressure Vessel Number with Manual Operator	Coil	Valve
AC T	ECHNI	CAL SF	PECIF	CATION	VS (A	/ailable	ONLY	in AC)				
1/4	3/16	0.75	0	125	24	160	NBR	71417BN2SN00	71417BN2SNR1	71417BN2SNM0	10	C9
3/8	3/16	0.75	0	125	24	160	NBR	71417BN3SN00	71417BN3SNR1	71417BN3SNM0	10	C9

<sup>\*</sup>Minimum ambient temperature: -40°F (-40°C). Dew point must be more than 7° F below ambient temperature.

### 4/2, 4-Way 2 Position Dual Solenoid - Brass\*

			Pre Diffe	erating essure erential PD) PSI							Refe	erence
Port Size NPT	Orifice Size in.	Flow Factor Cv**	Min.	Air, Inert Gas, Water & light oil	Watt	Max. Media Temp. °F	Seal	Pressure Vessel Number	Pressure Vessel Number with Metering	Pressure Vessel Number with Manual Operator	Coil	Valve
AC T	ECHNI	CAL SF	PECIF	ICATION	NS							
1/4	3/16	0.75	0	125	24	160	NBR	71477BN2SN00	71477BN2SNR1	-	10	C9
3/8	3/16	0.75	0	125	24	160	NBR	71477BN3SN00	71477BN3SNR1	-	10	C9

<sup>\*</sup> Minimum ambient temperature: -40°F (-40°C). Dew point must be more than 7° F below ambient temperature.

### 4/2, 4-Way 2 Position Single Solenoid - Brass

					•								
	0ri	fice			Operatin	g Pressu	re		Max.				
Port	Size	e in.	Flow		Differe	ntial PSI			Fluid			Ref	erence
Size			Factor		Air, Inert		Light Oil		Temp.				
NPT	In	Exh.	Cv	Min.	Gas	Water	(300 SSU)	Watt	°F	Seal	Pressure Vessel	Coil	Valve
AC T	ECHI	VICAL	SPECIFI	CATIO	ONS								
1/4	1/16	1.59	0.09	10	150	150	150	11	180	NBR	04F48S2106ACF	4	C8
DC 1	ECHI	VICAL	SPECIFI	CATIO	SNC								
1/4	1/16	1.59	0.09	10	100	100	100	11.5	104	NBR	04F48S2106A3F	6	C8



<sup>\*\*</sup> Cv=0.45 with built-in metering control (Digits 11 and 12 are R1)

<sup>\*\*</sup> Cv=0.45 with built-in metering control (Digits 11 and 12 are R1)

### 4-Way Direct Acting Normally Closed - Normally Closed Aluminum

Port Size NPT	Clo		Fac Valv Norr		Clo		Fac Valve Norr Clo	e #2 nally sed	Pres Differ	rating ssure rential SI Air, Inert Gas	Watt	Max. Fluid Temp. °F	Seal	Pressure Vessel Number without Metering	Pressure Vessel Number with Inlet and Exaust Metering		rence Valve
AC/E	C TEC	CHNIC	AL SI	PECIF	ICATIO	DNS								,			
1/4	3/64	1/16	0.05	0.10	3/64	1/16	0.05	0.10	0	150	10	130	NBR	V933LB2150	V933LEF2150	*	C5
1/4	1/16	3/32	0.10	0.14	1/16	3/32	0.10	0.14	0	100	10	130	NBR	V933LB2100	V933LEF2100	*	C5
1/4	3/32	3/32	0.16	0.14	3/32	3/32	0.16	0.14	0	75	10	130	NBR	V933LB2075	V933LEF2075	*	C5

#### 4-Way Direct Acting Normally Closed - Normally Open Aluminum

	1	fice e in. e #1	Fac	low tor e #1	Size	fice e in. e #2	Fac	low tor e #2	Oper Pres	ating sure							
		nally		nally		nally		nally		er-				D	Pressure	Dafa	
Port	_	sed 	Clo	sed 	Clo	sed I	Clo	sed	entia	l PSI Air,	<u> </u>	Max. Fluid		Pressure Vessel Number	Vessel Number with Inlet	Refei	rence
Size										Inert		Temp.		without	and Exaust		
NPT	In	Exh.	ln	Exh.	In	Exh.	ln	Exh.	Min.	Gas	Watt	°F	Seal	Metering	Metering	Coil	Valve
AC/E	C TE	CHNI	CAL	SPEC	IFICA	TION	S										
1/4	3/64	1/16	0.05	0.10	3/64	1/16	0.05	0.10	0	150	10	130	NBR	V935LB2150	V935LEF2150	*	C5
1/4	1/16	3/32	0.10	0.14	1/16	1/8	0.08	0.18	0	100	10	130	NBR	V935LB2100	V935LEF2100	*	C5
1/4	3/32	3/32	0.16	0.14	3/32	1/8	0.14	0.21	0	75	10	130	NBR	V935LB2075	V935LEF2075	*	C5

#### 4-Way Direct Acting Normally Open - Normally Open Aluminum

	Orif Size Valve Norn	e in. e #1 nally	Fac Valv	nally	Norn	e in. e #2 nally	Norn	tor e #2 nally	Pres Diffe	rating ssure rential		Mau		Pressure	Pressure	Dofo	
L	Clo	seu	Clo	seu	Clo	seu	Clo	seu				Max.			Vessel Number	Relei	rence
Port										Air,		Fluid		Number	with Inlet		
Size										Inert		Temp.		without	and Exaust		
NPT	In	Exh.	In	Exh.	In	Exh.	In	Exh.	Min.	Gas	Watt	°F	Seal	Metering	Metering	Coil	Valve
AC/DO	C TE	CHNI	CAL	SPEC	IFICA	TION	S										
1/4	3/64	1/16	0.05	0.10	3/64	1/16	0.05	0.10	0	150	10	130	NBR	V955LB2150	V955LEF2150	*	C5
1/4	1/16	1/8	0.08	0.18	1/16	1/8	0.08	0.18	0	100	10	130	NBR	V955LB2100	V955LEF2100	*	C5
1/4	3/32	1/8	0.14	0.18	3/32	1/8	0.14	0.21	0	75	10	130	NBR	V955LB2075	V955LEF2075	*	C5

#### \*Fig. 1

Voltage	24/60	120/60	240/60	12VDC	24VDC
Coil Code	AB2A7W	AB6A0Z	AB8B6A	DC1A3X	DC2A4Y
Coil Part Number*	V57724F24	V57731F24	V57734F24	V57727F24	V57730F24

<sup>\*</sup>When ordering a replacement coil, use Coil Part Number (not Coil Code)

Select the series V9 pressure vessel number from above and follow with the coil/enclosure number based on voltage from Fig. 1. Example V935LB2150 for 120/60 becomes part number V935LB2150AB6A0Z.

AC Power Cons	sumption Rating
VA Holding	VA Inrush
17.5	32.5

DC Pov	ver Consumption	n Rating
12 VDC	24 VDC	120 VDC
0.71	0.07	



### 5/2, 4-Way 2 Position Single Solenoid - Brass

			Pres Differ	ating ssure ential D) PSI		Max.			Pressure Vessel	Pressure Vessel	Pofo	rence
	Orifice			Air,		Media		Pressure Vessel	Number with	Number with	itele	Tence
Size NPT	Size in.	Factor Cv	Min.	Inert Gas	Watt	Temp. °F	Seal	Number without Manual Override	Locking Manual Override	Momentary Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICA	TIONS							
1/4	11/64	0.55	30	150	10	167	NBR	73417BN2KN00	73417BN2KNM0	73417BN2KN7A	7	C1
1/4	11/64	0.55	30	150	1.5	150	NBR	73417BN2KN00	73417BN2KNM0	73417BN2KN7A	11	C1
1/4	1/4	1.20	30	150	10	167	NBR	73417BN2PN00	73417BN2PNM0	73417BN2PN7A	7	C1
1/4	1/4	1.20	30	150	1.5	150	NBR	73417BN2PN00	73417BN2PNM0	73417BN2PN7A	11	C1
1/4	1/4	1.20	30	150	0.6	150	NBR	73417BN2PN90	-	-	12	C1
						_						
1/2	5/8	4.00	30	150	10	167	NBR	73417BN4UN00	73417BN4UNM0		7	C10
1/2	5/8	4.00	30	150	1.5	150	NBR	73417BN4UN00	73417BN4UNM0		11	C10
1/2	5/8	4.00	30	150	0.6	150	NBR	73417BN4UN90	-	-	12	C10

### 5/2, 4-Way 2 Position Dual Solenoid - Brass

U, _,	- W	<del>,</del> •	J. 111011	Duut	30101	iviu -	,, u <i>ээ</i>					
			Pres Differ	ating sure ential D) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
	Orifice			Air,		Media		Pressure Vessel	Number with	Number with	Itele	Tence
Size		Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS							
1/4	11/64	0.55	30	150	10	167	NBR	73477BN2KN00	73477BN2KNM0	73477BN2KN7A	7	C3
1/4	11/64	0.55	30	150	1.5	150	NBR	73477BN2KN00	73477BN2KNM0	73477BN2KN7A	11	СЗ
1/4	1/4	1.20	30	150	10	167	NBR	73477BN2PN00	73477BN2PNM0	73477BN2PN7A	7	СЗ
1/4	1/4	1.20	30	150	1.5	150	NBR	73477BN2PN00	73477BN2PNM0	73477BN2PN7A	11	СЗ
1/4	1/4	1.20	30	150	0.6	150	NBR	73477BN2PN90	-	-	12	СЗ
1/2	5/8	4.00	30	150	10	167	NBR	73477BN4UN00	73477BN4UNM0	73477BN4UN7A	7	C11
1/2	5/8	4.00	30	150	1.5	150	NBR	73477BN4UN00	73477BN4UNM0	73477BN4UN7A	11	C11
1/2	5/8	4.00	30	150	0.6	150	NBR	73477BN4UN90	-	-	12	C11
		_										



### 5/2, 4-Way 2 Position Single Solenoid - Brass External Pilot\*

			Pres Differ	ential								
			IMUPI	D) PSI		Max.				Pressure Vessel	Refe	rence
Port	Orifice	Flow		Air,		Media		Pressure Vessel	Number with	Number with		
Size	Size	Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS							
1/4	1/4	1.20	0	150	10	167	NBR	74417BN2PN00	-	-	7	C4
1/4	1/4	1.20	0	150	1.5	150	NBR	74417BN2PN00	-	-	11	C4

<sup>\*</sup> External pilot pressure to operate valve must be 30 - 150 psi.

### 5/2, 4-Way 2 Position Single Solenoid - Stainless Steel

				sure ential		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port Size	Orifice Size	Flow Factor		Air, Inert		Media Temp.		Pressure Vessel Number without	Number with Locking Manual	Number with Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS							
1/4	11/64	0.55	30	150	10	167	NBR	73417VN2KN00	73417VN2KNM0	73417VN2KN7A	7	C1
1/4	11/64	0.55	30	150	1.5	150	NBR	73417VN2KN00	73417VN2KNM0	73417VN2KN7A	11	C1
1/4	11/64	0.55	30	150	0.6	150	NBR	73417VN2KN90	-	-	12	C1
1/4	1/4	1.20	30	150	10	167	NBR	73417VN2PN00	73417VN2PNM0	73417VN2PN7A	7	C1
1/4	1/4	1.20	30	150	1.5	150	NBR	73417VN2PN00	73417VN2PNM0	73417VN2PN7A	11	C1

### 5/2, 4-Way 2 Position Dual Solenoid - Stainless Steel

			-	ting Pre ential (N PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Watt	Media Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual Override	Number with Momentary Manual Override		Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	IONS							
1/4	11/64	0.55	30	150	10	167	NBR	73477VN2KN00	73477VN2KNM0	73477VN2KN7A	7	СЗ
1/4	11/64	0.55	30	150	1.5	150	NBR	73477VN2KN00	73477VN2KNM0	73477VN2KN7A	11	C3
1/4	11/64	0.55	30	150	0.6	150	NBR	73477VN2KN90	-	-	12	C3
1/4	1/4	1.20	30	150	10	167	NBR	73477VN2PN00	73477VN2PNM0	73477VN2PN7A	7	СЗ
1/4	1/4	1.20	30	150	1.5	150	NBR	73477VN2PN00	73477VN2PNM0	73477VN2PN7A	11	C3



### 5/2, 4-Way 2 Position Single Solenoid - Stainless Steel - External Pilot\*

			Pres Differ	ating sure ential D) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
	Orifice			Air,		Media		Pressure Vessel	Number with	Number with		
Size	Size	Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS							
1/4	11/64	0.55	0	150	10	167	NBR	74417VN2KN00	-	-	7	C4
1/4	11/64	0.55	0	150	1.5	150	NBR	74417VN2KN00	-	-	11	C4
1/4	1/4	1.20	0	150	10	167	NBR	74417VN2PN00	-	-	7	C4
1/4	1/4	1.20	0	150	1.5	150	NBR	74417VN2PN00	-	-	11	C4

<sup>\*</sup> External pilot pressure to operate valve must be 30 - 150 psi.

### 5/2, 4-Way 2 Position Single Solenoid - Aluminum

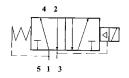
				ting Pre ential (N PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	ence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Watt	Media Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual Override	Number with Momentary Manual Override	Refer	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS							
1/8	5/32	0.35	15	150	10	167	NBR	-	7341LAN1HNM0	-	7	C6
1/4	1/4	1.00	30	150	10	167	NBR	73419AN2NN00	73419AN2NNM0	-	7	C2

### 5/2, 4-Way 2 Position Single Solenoid - Zinc Alloy (Epoxy Coated)

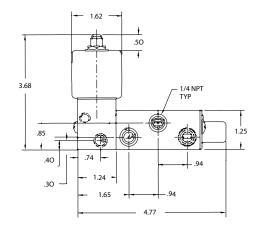
			Operating Pressure Differential (MOPD) PSI			Max.			Pressure Vessel	Pressure Vessel	Reference	
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Watt	Media Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual	Number with Momentary Manual Override		Valve
AC/DC TECHNICAL SPECIFICATIONS												
1/4	5/16	1.40	15	150	10	167	NBR	-	7341LMN2NNM0	-	7	C7

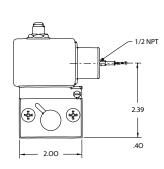


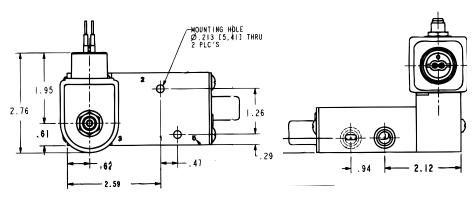




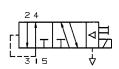
4-Way 2 position single solenoid Port identification: Press-1/Cyl - 2,4/ EXH - 3,5



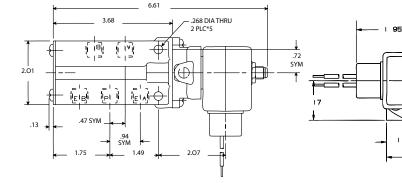


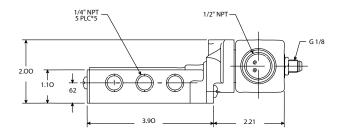






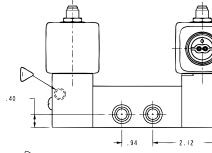
4-Way 2 position single solenoid Port identification: Press-P/A-Cylinder/ EA-Exhaust/ B-Cylinder/ EB- Exhaust

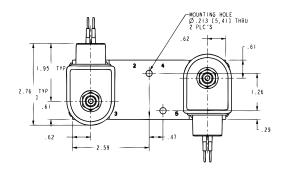




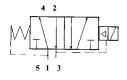




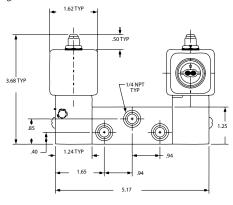


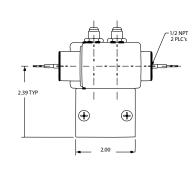


Manual override mechanical option



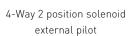
4-Way 2 position dual solenoid Port Identification: Press-1/CYL-2,4/EXH - 3,5



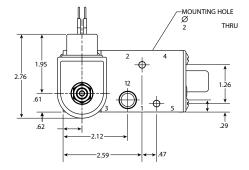


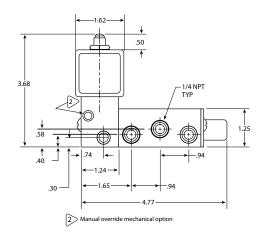


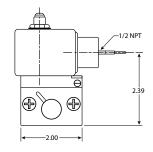


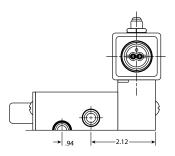


Port Identification: Press-1/CYL-2,4/EXH - 3,5



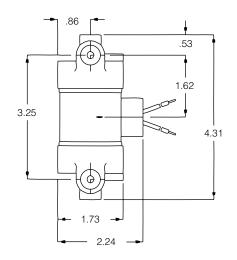


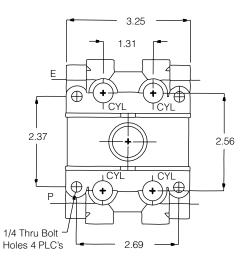






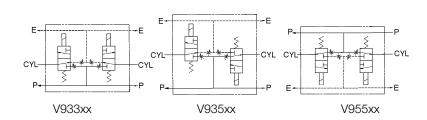






#### 4-way direct acting

V933xx: Normally Closed-Normally Closed v935xx: Normally Closed-Normally Open v955xx: Normally Open-Normally Open

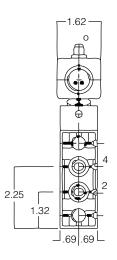


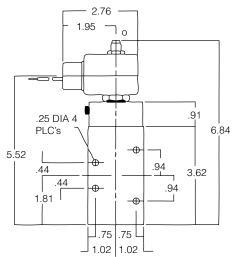
### Valve Reference C6 2.76 1.36 3.70 1.95 2.36 .71 -1/8"-27 NPT 5 PLC's -.91 3.20 .47 .35 .22 DIA .55 Thru 2 PLC's 2.897 1.57 - 1.890 3.183 1/8" NPT 5 PLC'S 4-way 2 position single solenoid Port identification: pressure-1/cyl.A-2/cyl.B-4/exh.A-3/exh. B-5 1.181

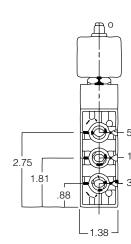


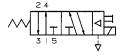




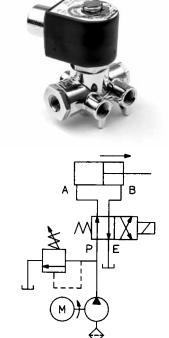


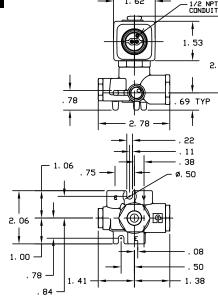


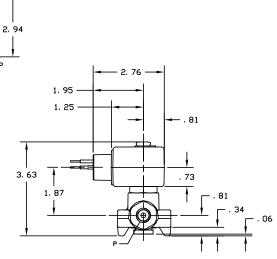




4-Way 2 position single solenoid Port identification: pressure-1/cyl.A-2/cyl.B-4/Exh.A-3/Exh. B-5







4-Way 2 position single solenoid

Port identification:

de-energized: pressure to A

B to exhaust

energized: pressure to B

A to exhaust

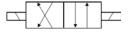


Parker Hannifin Corporation Fluid Control Division 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd

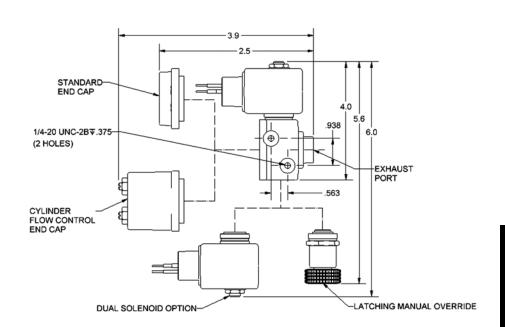
## Valve Reference C9



4-Way 2 position single solenoid

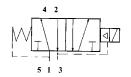


4-Way 2 position dual solenoid Port Identification: Press-P/CYL-A,B/EXH - E

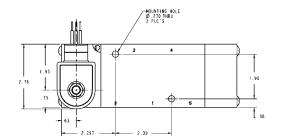


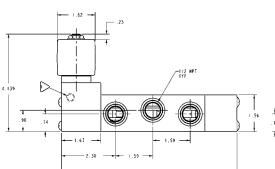
## Valve Reference C10

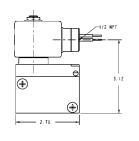


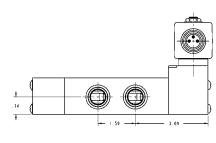


4-Way 2 position single solenoid Port Identification: Press-1/CYL-2,4/EXH - 3,5









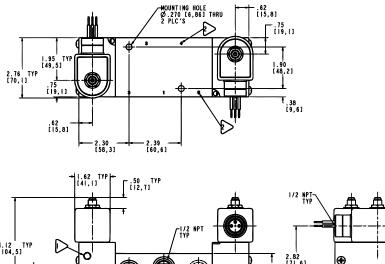
## Valve Reference C11

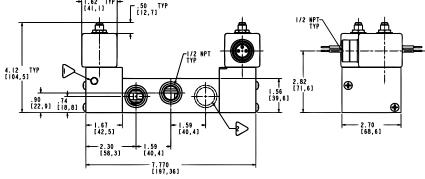


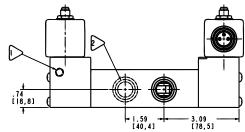


4-Way 2 position dual solenoid

Port Identification:
1-Pressure/2, 4-Cylinder/3, 5-Exhaust





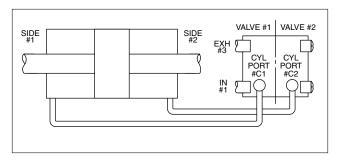


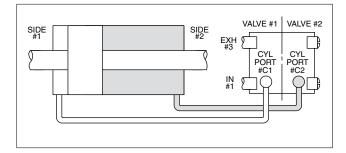


#### V933 Four-Way Normally Closed - Normally Closed Valves

When de-energized, both inlet ports are closed by the two plungers preventing flow from the common inlet through both of the valves. The cylinder port in each valve is open to the

common exhaust, permitting flow from the cylinders to the exhaust. When the coils are energized, both valve plungers rise, opening the inlet orifices, and at the same time closing the orifices in the sleeves. This stops flow from the cylinder ports to the exhaust, and permits flow from the inlet to the cylinder ports.

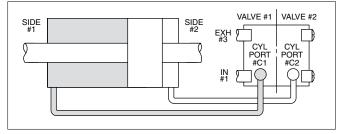




#### Typical cylinder operation with V933 Valves

Both coils de-energized. The inlet pressure is closed to both sides of a double-acting cylinder. Side #1 and Side #2 of the cylinder are open to exhaust through cylinder ports #C1 and #C2. The piston can be shifted manually.

Coil of valve #1 energized; coil of valve #2 de-energized. The inlet pressure is open to side #1 of the double-acting cylinder through cylinder port #C1, the exhaust is closed off by the plunger insert. Side #2 of the cylinder is open to exhaust through cylinder port #C2, the inlet is closed off by the plunger insert. The piston moves to the right.



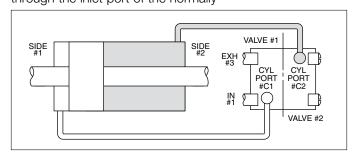
Coil of valve #1 de-energized; coil of valve #1 energized. The inlet pressure is closed off to side #1 of the double-acting cylinder; the exhaust is open through cylinder port #C1. Side #2 of the cylinder is closed to the exhaust and open to inlet pressure through cylinder port #C2. The piston moves to the left.

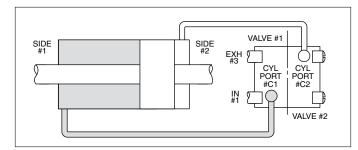
#### **V935 Four-Way Normally Closed - Normally Open Valves**

The plungers of the two valves are at opposite positions in both the energized and de-energized conditions - one normally open while the other is normally closed. When de-energized, fluid flows from the inlet of the valve through the inlet port of the normally

open valve, through the sleeve, and out the cylinder port of the valve. At the same time, the normally closed valve inlet orifice is closed, but the orifice in the sleeve is opened, permitting flow from its cylinder port to the common

exhaust. Therefore, fluid flows from the inlet of the valve to the cylinder port of the normally open valve and from the cylinder port of the normally closed valve to the exhaust. When energized, the two valves reverse in position.





#### Typical cylinder operation with V935 Valves

Both coils de-energized. The inlet pressure is open to side #2 of the doubleacting cylinder through cylinder port #C2 and the plunger insert closes off the exhaust. Side #1 of the cylinder is open to exhaust through cylinder port #C1 and the inlet pressure is closed off. This causes the piston in the cylinder to move to the left. Both coils energized. The inlet pressure is open to side #1 of the cylinder through cylinder port #C1 and the exhaust is closed off. Side #2 of the cylinder is open to the exhaust through cylinder port #C2 and the inlet pressure is closed off by the plunger insert. The piston moves to the right.

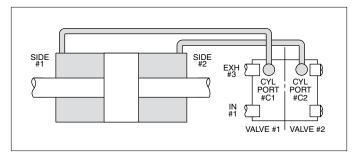


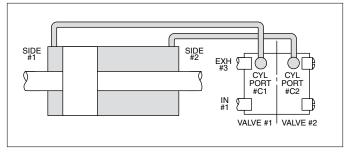
#### V955 Four-Way Normally Open - Normally Open Valves

Both plungers are in the same position when the coils are de-energized. In this condition, fluid flows through the common inlet of the body, up through the sleeves of both valves, and out

the cylinder ports of the valves. Both orifices in the sleeve stops are closed to the exhaust ports by the plunger. In the energized position, both valve plungers operate together to close

the inlet ports, stopping flow into the valve. At the same time, the orifices in the sleeves are opened permitting flow from the cylinder ports to the common exhaust port in the body.





#### Typical cylinder operation with V955 Valves

Both coils de-energized. The inlet pressure is open to both sides of the double-acting cylinder through cylinder port #C2 and the plunger insert closes off the exhaust. Side #1 of the cylinder is open to exhaust through cylinder port #C1 and the inlet pressure is closed off. This causes the piston in the cylinder to move to the left.

Coil of valve #1 energized; coil of valve #2 de-energized. The inlet pressure is closed to side #1 of the double-acting cylinder and open to exhaust through cylinder port #C1. Side #2 of the cylinder is open to the inlet pressure, through cylinder port #C2. The exhaust is closed off by the plunger insert. The piston moves to the left.



## 4-Way Direct Acting Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
71417BN	24	4/2	1/4 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	140°F
71477BN	24	4/2	1/4 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	140°F
V933	20	NC-NC	1/4	Aluminum	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
V935	20	NC-NO	1/4	Aluminum	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
V955	20	NC-NC	1/4	Aluminum	304SS	430FR	430F	430FR	18-8SS	Copper	122°F

## 4-Way Pilot Piped Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
73417AN	10	5/2	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417BN	10	5/2	1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417VN	10	5/2	1/4	303	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73419AN	10	5/2	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
7341LAN	10	5/2	1/8	Alum	304SS	430FR	430F	430FR	301SS	Copper	150°F
7341LMN	10	5/2	1/4	Zinc	304SS	430FR	430F	430FR	301SS	Copper	150°F
73477BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477BN	10	5/2	1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477VN	10	5/2	1/4	303	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
74417BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
04F48S2	11	4/2	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	77°F
04F48S2	11.5	4/2	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	77°F

<sup>\*</sup> Shows first 4 or 7 digits of pressure vessel part number.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

Notes	



## **Direct Mount NAMUR**

3/2, 3-Way — 5/2, 4-Way Direct Acting and Pilot Operated Valves 1/4" - 1/2" NPT



## **General Description:**

The NAMUR mounting interface for direct mount pilot valves has become widely popular around the world. Parker's Direct Mount NAMUR valves meet that global need and are supplied with the necessary mounting hardware and seals as standard to ensure proper mounting, interface sealing and valve function. These valves can be converted between 3-way and 4-way operation by using Parker's patented mounting conversion plate which is unique in the industry. (See Conversion Plate Kit on P. C22)

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright

## **Standard Materials of Construction** Please refer to page C22.

#### **Compatible Fluids**

Lubricated Air and Inert Gases.

Use of non-lubricated gaseous media can affect valve life.

## Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120

For other voltages - consult factory



#### **Coil Classification:**

Class F standard Class H available

#### **Agency Approvals:**

Standard valves with NEMA Type 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

SIL-3 Capable (Models 73417xxx, 73477xxx). See certificate on page F20 in Technical Section of this catalog.

Please refer to page C22 for details.

#### **Minimum Ambient Temperature**

-40° F (Dew point must be more than 7° F below ambient temp.

**Maximum Ambient Temperature** 167° F

## **Applications:**

- Pilot valve actuation of larger control valves
- Oil and gas applications including off-shore installations
- Double acting cylinder control requiring direct pilot mount valves
- Air Vises
- Air Motors
- Damper Control



## 3/2 3-Way 2 Position-Single Solenoid-NAMUR Direct Mount - Aluminum

			Ор	erating						
			Pr	essure						
			Diff	erential		Max.				
Port	Orifice	Flow	(MC	PD) PSI		Fluid			Refe	rence
Size	Size	Factor		Air Inert	Ī	Temp.				
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Pressure Vessel	Coil	Valve
1/4	3/32	0.17	0	150	10	167	NBR	71315AKDKN00	7	C12

3/2 or 5/2, 3- or 4-Way 2 Position - Single Solenoid - NAMUR Direct Mount - Aluminum

			Ор	erating								
			Pr	essure								
			Diff	erential		Max.			Pressure Vessel	Pressure Vessel		
Port	Orifice	Flow	(MO	PD) PSI		Fluid		Pressure Vessel	Number with	Number with	Refe	rence
Size	Size	Factor		Air Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TECI	HNICAL	SPE	CIFICAT	IONS							
1/4	11/64	0.55	30	150	10	167	NBR	73417AKDKN00	73417AKDKNM0	73417AKDKN7A	7	C13
1/4	11/64	0.55	30	150	1.5	150	NBR	73417AKDKN00	73417AKDKNM0	73417AKDKN7A	11	C13
1/4	11/64	0.55	30	150	0.6	150	NBR	73417AKDKN90	-	-	12	C13
1/4	1/4	1.20	30	150	10	167	NBR	73417AKDPN00	73417AKDPNM0	73417AKDPN7A	7	C13
1/4	1/4	1.20	30	150	1.5	150	NBR	73417AKDPN00	73417AKDPNM0	73417AKDPN7A	11	C13
1/4	1/4	1.20	30	150	0.6	150	NBR	73417AKDPN90	-	-	12	C13

3/2 or 5/2, 3- or 4-Way 2 Position - Dual Solenoid - NAMUR Direct Mount - Aluminum

			Ор	erating								·
			Pr	essure								
			Diff	erential		Max.			Pressure Vessel	Pressure Vessel		
Port	Orifice	Flow	(MO	PD) PSI		Fluid		Pressure Vessel	Number with	Number with	Refe	rence
Size	Size	Factor		Air Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/E	C TECH	HNICAL	SPE	CIFICAT	IONS							
1/4	11/64	0.55	30	150	10	167	NBR	73477AKDKN00	73477AKDKNM0	73477AKDKN7A	7	C14
1/4	11/64	0.55	30	150	1.5	150	NBR	73477AKDKN00	73477AKDKNM0	73477AKDKN7A	11	C14
1/4	11/64	0.55	30	150	0.6	150	NBR	73477AKDKN90	-	-	12	C14
1/4	1/4	1.20	30	150	10	167	NBR	73477AKDPN00	73477AKDPNM0	73477AKDPN7A	7	C14
1/4	1/4	1.20	30	150	1.5	150	NBR	73477AKDPN00	73477AKDPNM0	73477AKDPN7A	11	C14
1/4	1/4	1.20	30	150	0.6	150	NBR	73477AKDPN90	-	-	12	C14

3/2 or 5/2, 3- or 4-Way 2 Position - Single Solenoid - NAMUR Direct Mount - Brass

			Ор	erating								
			Pr	essure								
			Diff	erential		Max.			Pressure Vessel	Pressure Vessel		
Port	Orifice	Flow	(MC	PD) PSI		Fluid		Pressure Vessel	Number with	Number with	Refe	rence
Size	Size	Factor		Air Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TECH	HNICAL	SPE	CIFICAT	IONS							
1/4	1/4	1.20	30	150	1.5	150	NBR	73417BKDPN00	73417BKDPNM0	73417BKDPN7A	11	C13
1/4	1/4	1.20	30	150	10	167	NBR	73417BKDPN00	73417BKDPNM0	73417BKDPN7A	7	C13



## 3/2 or 5/2, 3- or 4 - Way 2 Position - Dual Solenoid - NAMUR Direct Mount - Brass

Port Size NPT	Orifice Size in.	Factor	Pr Diff (MC	erating essure erential OPD) PSI Air Inert Gas	Watt	Max. Fluid Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual	Pressure Vessel Number with Momentary Manual Override		rence Valve
AC/D	C TECH	HNICAL	SPE	CIFICAT	IONS							
1/4	1/4	1.20	30	150	1.5	150	NBR	73477BKDPN00	73477BKDPNM0	73477BKDPN7A	11	C14
1/4	1/4	1.20	30	150	10	167	NBR	73477BKDPN00	73477BKDPNM0	73477BKDPN7A	7	C14

## 3/2 or 5/2, 3- or 4-Way 2 Position - Single Solenoid - NAMUR Direct Mount - Stainless Steel

Port	Orifice	Flow	Pr Diff	erating essure erential (PD) PSI		Max. Fluid		Pressure Vessel	Pressure Vessel Number with	Pressure Vessel Number with	Refe	rence
Size	Size	Factor		Air Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICAL	SPE	CIFICAT	IONS							
1/4	11/64	0.55	30	150	1.5	150	NBR	73417VKDKN00	73417VKDKNM0	73417VKDKN7A	11	C13
1/4	11/64	0.55	30	150	10	167	NBR	73417VKDKN00	73417VKDKNM0	73417VKDKN7A	7	C13
1/4	1/4	1.20	30	150	1.5	150	NBR	73417VKDPN00	73417VKDPNM0	73417VKDPN7A	11	C13
1/4	1/4	1.20	30	150	10	167	NBR	73417VKDPN00	73417VKDPNM0	73417VKDPN7A	7	C13

## 3/2 or 5/2, 3- or 4-Way 2 Position - Dual Solenoid - NAMUR Direct Mount - Stainless Steel

Port	Orifice	Flow	Pr Diff	erating essure erential OPD) PSI		Max. Fluid		Pressure Vessel	Pressure Vessel Number with	Pressure Vessel Number with	Refe	rence
Size	Size	Factor		Air Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICAL	SPE	CIFICAT	IONS							
1/4	11/64	0.55	30	150	1.5	150	NBR	73477VKDKN00	73477VKDKNM0	73477VKDKN7A	11	C14
1/4	11/64	0.55	30	150	10	167	NBR	73477VKDKN00	73477VKDKNM0	73477VKDKN7A	7	C14
1/4	1/4	1.20	30	150	1.5	150	NBR	73477VKDPN00	73477VKDPNM0	73477VKDPN7A	11	C14
1/4	1/4	1.20	30	150	10	167	NBR	73477VKDPN00	73477VKDPNM0	73477VKDPN7A	7	C14

## 3/2 or 5/2, 3- or 4-Way 2 Position - Single Solenoid - NAMUR Direct Mount - Brass - External Pilot\*

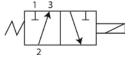
Port Size	Orifice Size	Flow Factor	Pr Diff (MC	erating essure erential OPD) PSI		Max. Fluid Temp.		Pressure Vessel Number without	Number with	Pressure Vessel Number with Momentary	Refe	rence
NPT	in.		Min.		Watt	°F	Seal	Manual Override	3	Manual Override	Coil	Valve
AC/D	C TEC	HNICAL	SPE	CIFICAT	IONS							
1/4	1/4	1.20	0	150	1.5	150	NBR	74417BKDPN00	-	-	11	C15
1/4	1/4	1.20	0	150	10	167	NBR	74417BKDPN00	-	-	7	C15

<sup>\*</sup> External pilot pressure to operate valve must be 30-150 PSI.



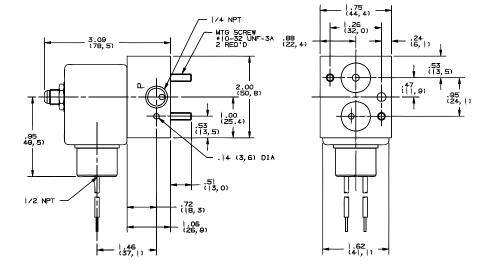
## Valve Reference C12





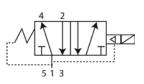
3-Way Normally Closed Port Identification:

1- Pressure/2 - Cylinder/3 - Exhaust



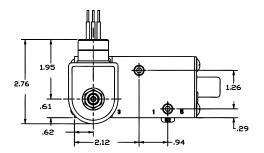
## Valve Reference C13

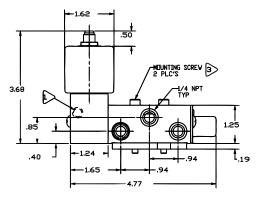


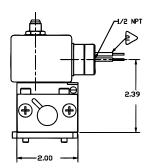


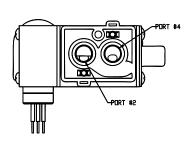
5/2, 4-Way 2 Position Single Solenoid Port Identification:

1- Pressure/2, 4 - Cylinder/3, 5 - Exhaust



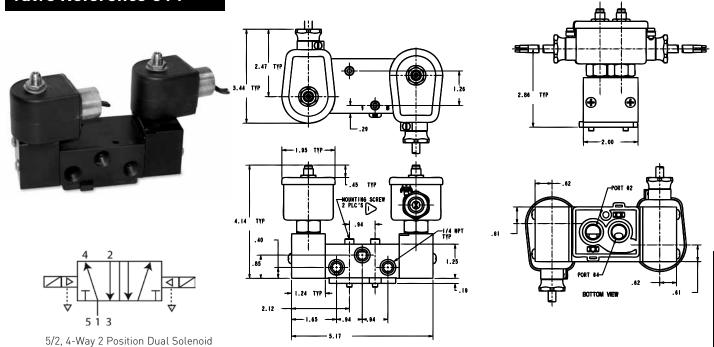






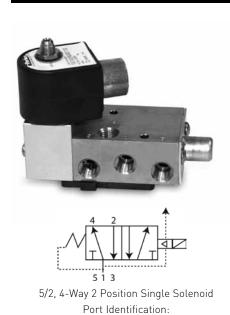


## Valve Reference C14

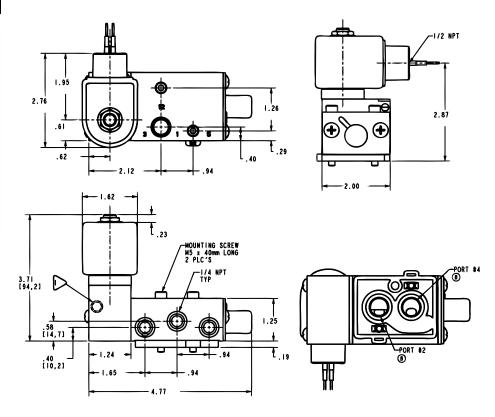


## Valve Reference C15

Port Identification: 1- Pressure/2, 4 - Cylinder/3, 5 - Exhaust



1- Pressure/2, 4 - Cylinder/3, 5 - Exhaust





## 4-Way Pilot Direct Mount Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
71315AK	10	3WNC	NAMUR	Alum	304ss	430FR	430F	430FR	19-8SS	Copper	167°F
73417AK	10	3/2-5/2	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417BK	10	3/2-5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417VK	10	3/2-5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477AK	10	3/2-5/2	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477BK	10	3/2-5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F

<sup>\*</sup> Shows first 7 digits of pressure vessel part number.





This conversion mounting kit, unique in the industry, allows a common valve to be installed and used in either a 3-way or 4-way function.

Available with U.S., or Metric mounting screws. Consult factory for the specific kit number that meets your requirements.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

## **Specialty Service**

Valve Portfolio



## **General Description:**

Parker Fluid Control Division offers a wide variety of products for many Specialty Applications.

#### In this section:

- Manifold mounted miniature cartridge valves
- MB 3-way miniature plastic
- Dry operator 2-way
- Hot water and steam valves.
- Intrinsically safe series
- Manual reset / 3-way
- Hydraulic 2-way & 3-way
- Magnelatch® coil option
- Fuel dispensing valves
- Fuel selector manifold
- CNG valves
- Timer drain valves



Parker's solenoid valves have been sold in many markets for more than 60 years. Over that time, the offering has continually expanded to become a very extensive family of valves for both general purpose and special purpose applications.

This section details Fluid Control Division's special purpose line of valves. These valves were developed from years of experience in these specialty markets along with a thorough understanding of the unique needs required to ensure optimal performance.

The valves in this section have NPT threads as standard, or specialty flange configurations and are equipped with coils and housings when needed that are designed to meet the National Electric Code in the US and Canadian standards. Most all of these valves are UL listed and CSA certified.

Consult factory for further details.



## **Specialty Contents**

Manifold mounted miniature cartridge valves 2-Way & 3-Way	D3
MB 3-Way miniature - plastic	D9
Dry operator 2-Way	D13
Hot water & steam valves	D17
Intrinsically safe series	D35
Manual reset / 3-Way valves	D53
Hydraulic 2-Way & 3-Way	D57
Magnelatch® coil option	D63
Fuel dispensing valves	D67
Fuel selector manifold	D71
CNG valves	D73
Timer drain valves	D75



# Manifold Mounted Miniature Cartridge Valves

2-Way & 3-Way Direct Acting Miniature Cartridge Valves



## General Description:

The manifold mounted miniature Cartridge Valve is offered in twoand three-way models with a stainless steel body. It offers a space-saving approach, with no manifold orifices to machine or press in, since the orifice is integral to the cartridge valve. Ultimately, less machining means lower manifold costs.

These cartridge valves come fully assembled with no loose parts – the sleeve, plunger, spring and orifice are pressed together as one unit.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### **Standard Materials of Construction**

Please refer to page D8.

#### **Compatible Fluids**

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction.

Use of non-lubricated gaseous media can affect valve life.

## Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60

120/60-110/50

240/60-220/50 DC -12. 24

For other voltages – consult factory



#### **Coil Classification:**

Class F standard Class H available

AC & DC coils are interchangeable on the same pressure vessel.

#### **Agency Approvals:**

Standard valves with NEMA 4X are C-UL-US Listed or Recognized. For additional details, consult factory.

## **Maximum Ambient Temperature**

135°F (AC)/125°F (DC)

In absence of moisture, applications at temps as low as -20°F are possible. Please refer to page D8 for details.

## Applications:

- Analyzers and diagnostic equipment
- Medical and dental equipment
- Beverage dispensing and vending machines
- Humidification and misting equipment
- Pneumatic positioning
- Automatic dispensing equipment
- Irrigation equipment
- Instrumentation panels
- Lubrication equipment
- Refrigerant reclaim
- Automotive diagnostics/service



1/8

5/32

0.38

## 2-Way Small Direct Acting - Normally Closed - Stainless Steel

			Ope	-	ressure MOPD) P		ntial	Max.			Refe	rence
Port	Orifice	Flow		Air,		liabt		Media		Drogguro	Refe	Terree
Size NPT	Size in.	Factor Cv	Min.	Inert Gas	Water	Light Oil	Watt	Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS C	IUNITNC	ED						
1/8	3/64	0.06	0	950	950	950	8.5	240	FKM	209CL5EV4	9	D1
1/8	1/16	0.10	0	625	625	625	8.5	240	FKM	209CL5GV4	9	D1
1/8	5/64	0.15	0	450	450	450	8.5	240	FKM	209CL5JV4	9	D1
1/8	3/32	0.22	0	320	320	320	8.5	240	FKM	209CL5LV4	9	D1
1/8	7/64	0.28	0	245	245	245	8.5	240	FKM	209CL5MV4	9	D1
1/8	1/8	0.32	0	175	175	175	8.5	240	FKM	209CL5PV4	9	D1
1/8	5/32	0.38	0	100	100	100	8.5	240	FKM	209CL5QV4	9	D1
DC TE	CHNICA	L SPECI	FICAT	IONS C	UNITNC	ED						
1/8	3/64	0.06	0	390	390	390	8	240	FKM	209CL5EV4	9	D1
1/8	1/16	0.10	0	255	255	255	8	240	FKM	209CL5GV4	9	D1
1/8	5/64	0.15	0	180	180	180	8	240	FKM	209CL5JV4	9	D1
1/8	3/32	0.22	0	130	130	130	8	240	FKM	209CL5LV4	9	D1
1/8	7/64	0.28	0	100	100	100	8	240	FKM	209CL5MV4	9	D1
1/8	1/8	0.32	0	60	60	60	8	240	FKM	209CL5PV4	9	D1

## 2-Way Small Direct Acting - Normally Open - Stainless Steel

30

30

30

			Ope	•	ressure MOPD) P		ntial	Max.			Rofo	rence
1	Orifice	Flow		Air,				Media		_	Kere	
Size	Size	Factor		Inert		Light		Temp.		Pressure		
NPT	in.	Cv	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TEC	CHNICA	L SPECI	FICATI	ONS C	UNITNO	ED						
1/8	1/32	0.02	0	375	375	375	10	240	FKM	209FL5AV4	9	D2
1/8	3/64	0.06	0	230	230	230	10	240	FKM	209FL5EV4	9	D2
1/8	1/16	0.10	0	150	150	150	10	240	FKM	209FL5GV4	9	D2
1/8	5/64	0.14	0	105	105	105	10	240	FKM	209FL5JV4	9	D2
1/8	3/32	0.20	0	80	80	80	10	240	FKM	209FL5LV4	9	D2

240

FKM

209CL5QV4

D1

DC TE	CHNICA	L SPECII	FICAT	IONS C	UNITNC	ED						
1/8	1/32	0.02	0	375	375	375	8	240	FKM	209FL5AV4	9	D2
1/8	3/64	0.06	0	230	230	230	8	240	FKM	209FL5EV4	9	D2
1/8	1/16	0.10	0	150	150	150	8	240	FKM	209FL5GV4	9	D2
1/8	5/64	0.14	0	105	105	105	8	240	FKM	209FL5JV4	9	D2
1/8	3/32	0.20	0	80	80	80	8	240	FKM	209FL5LV4	9	D2



## 3-Way Small Direct Acting - Normally Closed - Stainless Steel

Orifice Size Flow Fac					.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	iiutty	010301							
		ce Size n.	l	Factor v	Ope	•	ressure MOPD) P		ntial	Max.			Refe	erence
Port Size						Air, Inert		Light		Media Temp.		Pressure		
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC T	ECHNI	CAL SPI	ECIFICA	ATIONS										
1/8	1/32	1/32	0.02	0.02	0	250	250	250	10	240	FKM	309CL5AV4	9	D2
1/8	3/64	3/64	0.05	0.05	0	200	200	200	10	240	FKM	309CL5EV4	9	D2
1/8	1/16	1/16	0.09	0.10	0	130	130	130	10	240	FKM	309CL5GV4	9	D2
1/8	5/64	5/64	0.15	0.14	0	90	90	90	10	240	FKM	309CL5JV4	9	D2
1/8	3/32	3/32	0.19	0.20	0	75	75	75	10	240	FKM	309CL5LV4	9	D2
1/8	7/64	3/32	0.25	0.20	0	50	50	50	10	240	FKM	309CL5MV4	9	D2
1/8	1/8	3/32	0.32	0.20	0	40	40	40	10	240	FKM	309CL5PV4	9	D2
1/8	5/32	3/32	0.38	0.20	0	25	25	25	10	240	FKM	309CL5QV4	9	D2
DC T	ECHNI	CAL SP	ECIFICA	SNOITA										
1/8	1/32	1/32	0.02	0.02	0	250	250	250	8	240	FKM	309CL5AV4	9	D2
1/8	3/64	3/64	0.05	0.05	0	200	200	200	8	240	FKM	309CL5EV4	9	D2
1/8	1/16	1/16	0.09	0.10	0	130	130	130	8	240	FKM	309CL5GV4	9	D2
1/8	5/64	5/64	0.15	0.14	0	90	90	90	8	240	FKM	309CL5JV4	9	D2
1/8	3/32	3/32	0.19	0.20	0	75	75	75	8	240	FKM	309CL5LV4	9	D2
1/8	7/64	3/32	0.25	0.20	0	50	50	50	8	240	FKM	309CL5MV4	9	D2
1/8	1/8	3/32	0.32	0.20	0	40	40	40	8	240	FKM	309CL5PV4	9	D2

## 3-Way Small Direct Acting - Normally Open - Stainless Steel

0

25

25

25

8

240

FKM

309CL5QV4

9

D2

J-11	ay Jii	iiatt Dii	ect A	cuing -	11011	ilatty	open -	Jian	11633	Jieei				
		ce Size In.	1	Factor Cv	Ope	-	Pressure MOPD) P		ntial	Max.			Refe	erence
Port Size						Air, Inert		Light		Media Temp.		Pressure		
NPT	ln	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	°F	Seal	Vessel Number	Coil	Valve
AC T	ECHNI	CAL SP	ECIFIC <i>A</i>	ATIONS										
1/8	1/32	1/32	0.02	0.02	0	375	375	375	10	240	FKM	309FL5AV4	9	D2
1/8	3/64	3/64	0.05	0.05	0	230	230	230	10	240	FKM	309FL5EV4	9	D2
1/8	1/16	1/16	0.10	0.09	0	150	150	150	10	240	FKM	309FL5GV4	9	D2
1/8	5/64	5/64	0.14	0.15	0	105	105	105	10	240	FKM	309FL5JV4	9	D2
1/8	3/32	3/32	0.20	0.19	0	80	80	80	10	240	FKM	309FL5LV4	9	D2
DC T	ECHN	ICAL SP	ECIFICA	RIONS										
1/8	1/32	1/32	0.02	0.02	0	375	375	375	8	240	FKM	309FL5AV4	9	D2
1/8	3/64	3/64	0.05	0.05	0	230	230	230	8	240	FKM	309FL5EV4	9	D2
1/8	1/16	1/16	0.10	0.09	0	150	150	150	8	240	FKM	309FL5GV4	9	D2
1/8	5/64	5/64	0.14	0.15	0	105	105	105	8	240	FKM	309FL5JV4	9	D2
1/8	3/32	3/32	0.20	0.19	0	80	80	80	8	240	FKM	309FL5LV4	9	D2



1/8 5/32

3/32

0.38

0.20

#### 3-Way Small Direct Acting - Universal - Stainless Steel

3-11	ay Jii	ומנו טוו	eci Ai	.tilly -	OIIIV	er sat	- Staili	1633 -	neer					
	Orific	e Size		actor	Ope	-	ressure		ntial					
	l	n.	С	v		(1)	40PD) P:	SI		Max.			Refe	rence
Port						Air,				Media		_		
Size		F.J.b		F.J.b	Min	Inert	\A/=+==	Light	14/-44	Temp. °F	Caal	Pressure	C-:I	Value
NPT	In	Exh.	In	Exh.	Min.	Gas	Water	Oil	Watt	_ *F	Seal	Vessel Number	Coil	Valve
		CAL SPI		HONS										
1/8	1/32	1/32	0.020	0.020	0	200	200	200	10	240	FKM	309UL5AV4	9	230
1/8	3/64	3/64	0.050	0.050	0	150	150	150	10	240	FKM	309UL5EV4	9	230
1/8	1/16	1/16	0.090	0.100	0	100	100	100	10	240	FKM	309UL5GV4	9	230
1/8	5/64	5/64	0.150	0.140	0	70	70	70	10	240	FKM	309UL5JV4	9	230
1/8	3/32	3/32	0.190	0.200	0	50	50	50	10	240	FKM	309UL5LV4	9	230
1/8	7/64	3/32	0.250	0.200	0	40	40	40	10	240	FKM	309UL5MV4	9	230
1/8	1/8	3/32	0.320	0.200	0	30	30	30	10	240	FKM	309UL5PV4	9	230
1/8	5/32	3/32	0.380	0.200	0	20	20	20	10	240	FKM	309UL5QV4	9	230
DC T	ECHNI	CAL SP	ECIFICA	TIONS										
1/8	1/32	1/32	0.020	0.020	0	200	200	200	8	240	FKM	309UL5AV4	9	230
1/8	3/64	3/64	0.050	0.050	0	150	150	150	8	240	FKM	309UL5EV4	9	230
1/8	1/16	1/16	0.090	0.100	0	100	100	100	8	240	FKM	309UL5GV4	9	230
1/8	5/64	5/64	0.150	0.140	0	70	70	70	8	240	FKM	309UL5JV4	9	230
1/8	3/32	3/32	0.190	0.200	0	50	50	50	8	240	FKM	309UL5LV4	9	230
1/8	7/64	3/32	0.250	0.200	0	40	40	40	8	240	FKM	309UL5MV4	9	230
1/8	1/8	3/32	0.320	0.200	0	30	30	30	8	240	FKM	309UL5PV4	9	230
1/8	5/32	3/32	0.380	0.200	0	20	20	20	8	240	FKM	309UL5QV4	9	230

#### **Port Marking Arrangement**

Function		over seat body flow	under seat body flow	sleeve
2-Way normally closed	Marking	2	1	-
	Function	inlet	outlet	
2-Way normally open	Marking	2	-	3
	Function	inlet		outlet
Port Marking Arranger	ment			

Function		over seat body flow	under seat body flow	sleeve
3-Way normally closed	Marking	2	1	3
	Function	outlet	inlet	exhaust
3-Way normally open	Marking	2	1	3
	Function	outlet	exhaust	inlet
3-Way universal	Marking	2	1	3
	Function	common	NC	NO

## **Product Features:**

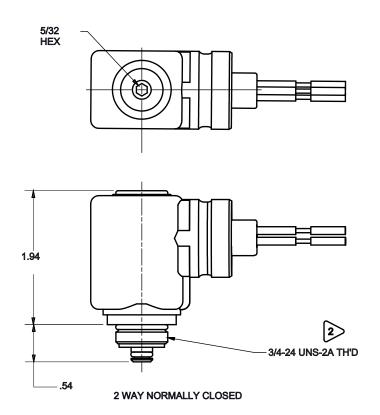
- Space saving approach
- Less manifold machining means lower manifold cost
- No manifold orifices to machine or press in
- Cartridge valves are 100% tested
- Easy to assemble and disassemble with a 5/32" hex wrench to a torque of 25-35 in-lbs.
- Available with all coil options from Chart 9 in coil section.



## Valve Reference D1



2-Way Normally Closed (209CLxx)

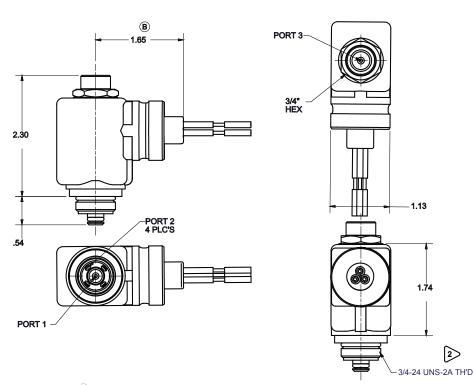


2 Manifold cavity for 3/4-24 UNS-2B thread per VMR-0462 (See page D8)

## Valve Reference D2



- 2-Way Normally Open (209FLxx)
- 3-Way Normally Closed (309CLxx)
- 3-Way Normally Open (309FLxx)
- 3-Way Universal (309ULxx)



Manifold cavity for 3/4-24 UNS-2B thread per VMR-0462 (See page D8)



#### 2-Way Miniature Direct Acting Cartridge Mounted Valve Materials of Construction\*\*

Product*	Wattage	Туре	Sleeve Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
209CL5	8.5 (AC)	2WNC	-	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
209CL5	8 (DC)	2WNC	-	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F
209FL5	10 (AC)	2WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
209FL5	8 (DC)	2WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F

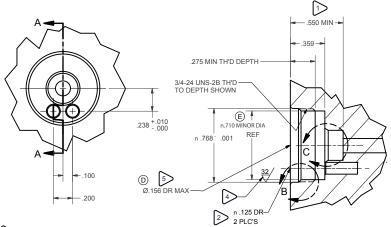
<sup>\*</sup> Shows the first 6 digits of the pressure vessel part number.

#### 3-Way Miniature Direct Acting Cartridge Mounted Valve Materials of Construction\*\*

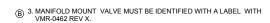
Product*	Watt	Туре	Sleeve Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
309CL5	10 (AC)	3WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
309CL5	8 (DC)	3WNC	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F
309FL5	10 (AC)	3WNO	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
309FL5	8 (DC)	3WNO	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F
309UL5	10 (AC)	3WU	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	135°F
309UL5	8 (DC)	3WU	1/8	303SS	304SS	430FR	430FR	430FR	18-8SS	Copper	125°F

<sup>\*</sup> Shows the first 6 digits of the pressure vessel part number.

## VMR-0462 Cavity Dimensional Drawing

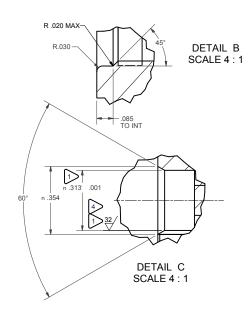






(OVER SEAT)

DIAMETER AND SURFACE FINISH MUST BE MAINTAINED TO DEPTH SHOWN.



Warning: Please contact factory for the latest version of this cavity drawing before proceeding with any manifold machining.



<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

<sup>\*\*</sup> Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

## 3-Way MB (Mini B)

Direct Acting Valves - Miniature #10-32 Ports, 1/8 NPT & Manifolded Plastic Body Valves/Zinc Manifold Base



## **General Description:**

MB Series valves are designed for the actuation of small air cylinders and clamps, and are suited for applications requiring low air flow.

For manifolding, 2 or 3 station bases are offered. Manifolds can be bolted together to provide the desired banking combination.

The valves are direct acting, multipurpose valves with all ports in the body. The valve body is molded from plastic, while the internal parts are nylon, polyester and stainless steel. The valves will operate at up to 150 PSI, consuming only 4 watts per coil on AC operation, 5 watts per coil on DC.

Functional design flexibility is assured given the wide variety of available valve configurations. The listed accessories enable the user to customize MB Series valves as 2-way normally open or normally closed by plugging one port; 3-way normally open, normally closed or directional control.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### **Compatible Fluids**

Lubricated air, non-lubricated air, and inert gases compatible with materials of construction.





#### Standard Materials of Construction

- Body—plastic
- Seals—NBR
- Sleeve—stainless steel (305)
- Plunger—stainless steel (430FR)
- Stop—stainless steel (430FR)
- Spring—stainless (17-7PH)
- Shading ring—copper (AC valves only)
- Manifold base-zinc

#### **Operating Speed**

• Up to 1000 cycles per minute

#### **Coil Classification**

• Class A Taped, leaded coil standard

#### Response Time (approximate):

AC: 3-12 ms to open 5-16 ms to close DC: 8-14 ms to open 5-15 ms to close

# Electrical Characteristics:

- AC-24/60, 120/60, 240/60
- DC 12, 24 &120

#### **Power Consumption**

- 4 watts AC per coil
- 5 watts DC per coil

Maximum allowable internal seat leakage is 3 SCCM @125 psi.

No allowable external leakage.



#### 3-Way Direct Acting Valves

Port Size	Orifice D	Diameter	Cv Factor			Pressure SI)	Wat	tage	Class A Tapped	
	NC Port	NO Port	NC Port	NO Port	Minimum	Maximum	AC	DC	Leaded Coil	Ref.
#10-32 Ports	3/64	3/64	0.032	0.028	0	150	4	5	MBD002	D3
Manifold Mounted	3/64	3/64	0.032	0.028	0	150	4	5	MBD005	

#### Valve Accessories

Accessories	Contents	Part Number	Valve Reference
2-Station Manifold Base Kit	4 Port plugs	MB-60-S001	
(for mounting 2 valves)	4 No. 5 self tapping screws		
3-Station Manifold Base Kit	5 Port plugs	MB-60-S002	
(for mounting 3 valves)	6 No. 5 self tapping screws		
Manifold Interface Kit	1 No. 8 screw	MB-60-S003	
(connects 2 manifold bases)	2 "O" rings		
Manifold Blank Station Kit	1 Plate	MB-60-S004	
(for sealing an unused station)	2 "O" rings		
(101 Sealing all dilused station)	2 Screws		
2-Station Manifold Base	1 MB-01-003 manifold block		
const. ref. 234	2 V1-31-254 nuts assembled	MB-60-S005	D5
3-Station Manifold Base	1 MB-01-004 manifold block		
const. ref. 234	2 V1-31-254 nuts assembled	MB-60-S006	D5

#### Ordering Instructions for Multiple Station Manifolds

Step 1: Determine the number of valve stations required. This will equal the number of subbase valves to order (MBD005).

Step 2: Select the combination of two and three-station manifolds that sum to equal the number of valve stations required (i.e. five stations total = one three-station and one two-station manifold).

Step 3: Choose the accessory kits required to complete the system and determine if you want the valves assembled to the manifolds at the factory.

**Step 4:** Specify the required voltage.

- 1. You have selected a valve which is to be manifolded.
- 2. Your system requires a five-station manifold (i.e. one three-station manifold attached to one twostation manifold).
- 3. You require the manifold bases and an interface kit. You decide to assemble the valves and manifolds. If they were to be assembled by the factory, there would be a price-add.
- 4. Your system is 120/60 watts AC: Your order should read:
  - 5-MBD005, 120/60
  - 1-MB-60-S001
  - 1-MB-60-S002
  - 1-MB-60-S003
  - 1-MB-60-S005
  - 1-MB-60-S006

						T
	Coil Code	AB215A	AB619A	AB820A	DC116A	Γ
Fig. 1	Voltage	24/60*	120/60	240/60*	12VDC	

**DC218A** CMB2234N18 \*When ordering a replacement coil, use Coil Part Number (not Coil Code)

Select the MB series pressure vessel number from above and follow with the coil/enclosure number based on voltage from Fig. 1. Example MBD005 for 120/60 becomes part number MBD005AB619A \*Not active - consult factory

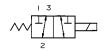
AC Power Con	sumption	DC P	ower Consum	ption
VA holding	VA inrush	12VDC	24VDC	120VDC
6.5   12.0		0.42	0.21	0.04



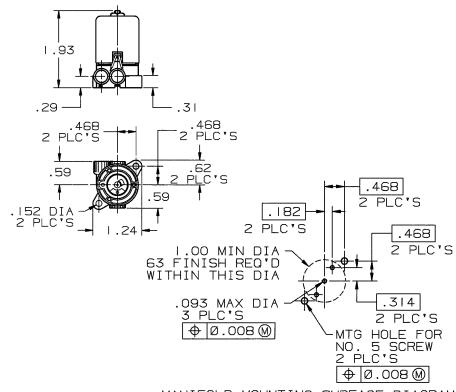
**24VDC** 

## Valve Reference D3





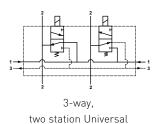
3-Way Universal Port Identification 1-NC / 2-COMMON / 3-NO

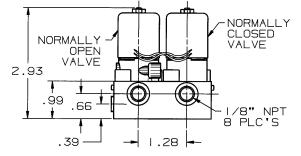


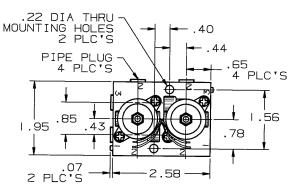
#### MANIFOLD MOUNTING SURFACE DIAGRAM

## Valve Reference D4





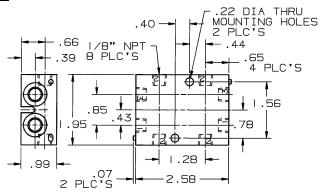


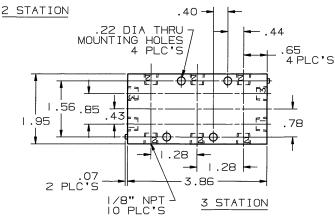






**Zinc Manifold Base** 





## Notes



## 2-Way Dry Operator

Direct Acting Valves 1/4" NPT & 3/8" Barb



## General Description:

2-Way Dry Operator valves are specially designed for non-contaminating and corrosive applications. The valves assure absolute purity and inertness to corrosion when used with a broad range of fluids.

Dry Operator valves feature two basic construction innovations. The operator is physically isolated from the fluid by a diaphragm so only the seal and valve body come in contact with the fluid, and valve bodies of Noryl™ and Teflon™ provide the purity from contamination and resistance to corrosion many industries demand.

#### Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

#### **Compatible Fluids**

Fluids compatible with diaphragm and body materials. See fluid compatibility chart in Technical Section of this catalog.

## **Applications:**

- Medical & Dental Equipment
- Chemical Dispensing
- Photo processing
- Instrumentation
- Hydroponics "nutrient dispensing"
- Food and beverage equipment



## Mechanical Characteristics:

#### **Standard Materials of Construction**

- Body Noryl<sup>™</sup>, Teflon<sup>™</sup> (PTFE), Stainless Steel (303)
- Seals PTFE and FKM as listed
- Sleeve Tube Stainless Steel (304)
- Plunger Stainless Steel (430FR)
- Stop Stainless Steel (430FR)
- Springs Stainless Steel (18-8)
- Shading Ring Copper

## Electrical Characteristics:

#### **Agency Approvals**

 UL and CSA approvals are available on valves with applicable coil/enclosure combinations.

#### **Voltages**

• AC - 24/60

120/60-110/50 240/60-220/50

• DC - 12, 24 & 120

(consult factory for other voltages)

**Maximum Ambient Temperature** 150°F

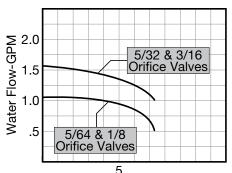


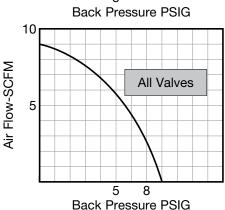
## Important Application Information On Back Pressure Data

Dry operator valves require consideration of back pressure since the back pressure acts on a large area of the diaphragm. Excessive back pressure can keep the valves open on de-energization. The back pressure a standard valve can operate against depends on the orifice size, pressure differential and whether the media is a gas or liquid.

The following two charts provide a method to verify that the valve selected can meet the application back pressure requirements.

For applications involving back pressure that cannot be handled by catalog valves, please consult Parker Fluid Control Division.





## Helpful Application Suggestions:

To keep the back pressure to a minimum, the downstream line should be as short as possible and be of the largest practical size. All restricting or flow controlling elements should be installed upstream.

## Use of Back Pressure Charts:

To use the charts, it is necessary to know the flow and back pressure.

- First calculate the flow in GPM for liquids or SCFM for gases from the flow charts in the Technical Information Section.
- The back pressure is the downstream pressure in the system. A catalog valve may be used if the intersection of flow and back pressure is below the curve for its orifice size.

## Direct Acting Noryl™\*\* Valves — Normally Closed, 3/8" BARB, FKM Seals

	Orifice		Op	erating Pressure D	ifferential (PSI)				
Port Size	Size	Cv		Maximum		Max. Fluid	Pressure Vessel	Refe	rence
NPT	in.	Factor	Min.	AC Ratings	DC Ratings	Temp. °F	Number	   Coil	  Valve
				10 Watt	10 Watt			Con	valve
3/8" BARB	5/32	0.35	0	35	35	140	71214LT3QV00	7	D8
3/8" BARB	3/16	0.47	0	20	20	140	71214LT3SV00	7	D8

## Direct Acting Teflon™\*\*\* Valves — Normally Closed, 1/4" NPT, PTFE or FKM Seals

	Port Size Orifice		Ор	erating Pressure D	ifferential (PSI)			Refe	rence
Port Size	Size	Cv		Maximum		Max. Fluid	Pressure Vessel	11010	
NPT	in.	Factor	Min.	AC Ratings	DC Ratings	Temp. °F	Number	Coil	  Valve
	"".			10 Watt	10 Watt			Cont	Valve
1/4" NPT	5/64	0.16	0	70	70	140	71214TN2KT00	7	D7
1/4" NPT	3/16	0.47	0	20	20	140	71214TN2SV00	7	D7
1/4" NPT	3/16	0.47	0	20	20	140	71214TN2ST00	7	D7

## Direct Acting Stainless Steel Valves — Normally Closed, 1/4" NPT, PTFE Seals

	Orifice		Ор	erating Pressure Di	ifferential (PSI)				
Port Size	Size	Cv		Maxi	mum	Max. Fluid	Pressure Vessel	Refe	rence
NPT	in.	Factor	Min.	AC Ratings	DC Ratings	Temp. °F	Number	Coil	Valve
	''':			10 Watt	10 Watt			Cont	valve
1/4" NPT	3/16	0.47	0	20	20	140	71214VN2ST00	7	D6

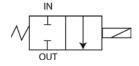
<sup>\*\*</sup>NoryI™- G.E. Plastics (SABIC)

<sup>\*\*\*</sup>Teflon™-E.I. Dupont

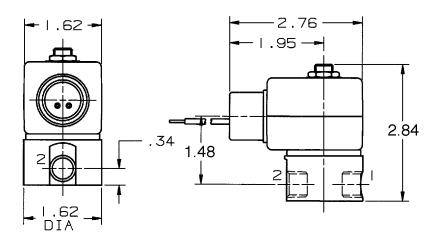


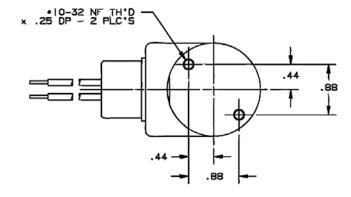
## Valve Reference D6





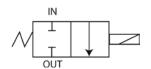
2-Way Normally Closed
Port Identification: 1-0UT/2-IN



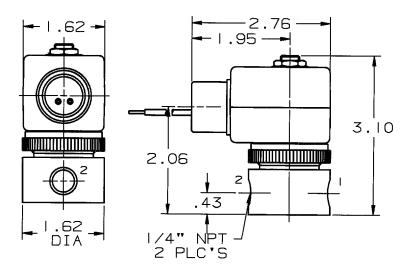


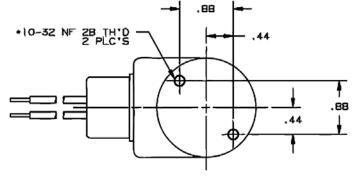
## Valve Reference D7





2-Way Normally Closed
Port Identification: 1-0UT/2-IN

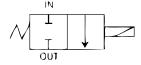




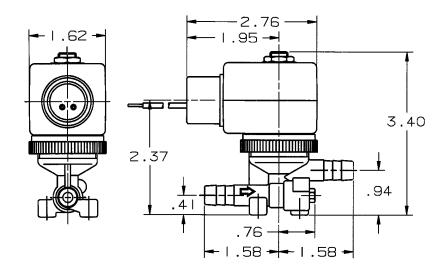


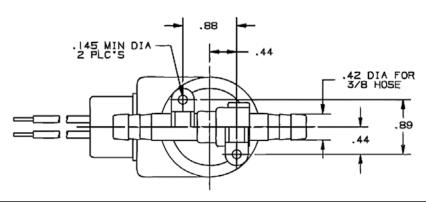
## Valve Reference D8

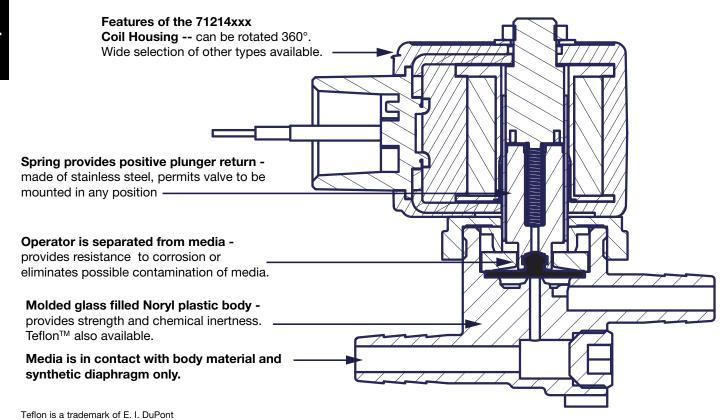




Port Identification: Flow arrow on body indicates flow direction. Ports are not marked.









# 2-Way Hot Water and Steam

Direct Acting & Pilot Operated Valves 1/4" - 1 1/2" NPT



## **General Description:**

2-Way Hot Water and Steam valves are specifically designed to withstand harsh application conditions. Many designs include integral stainless steel main and pilot orifices.

#### Installation

Valves should be mounted vertical and upright.

## **Standard Materials of Construction** Please refer to page D33.

#### **Compatible Fluids**

Ideal for the control of hot water and steam in a variety of applications.

## Electrical Characteristics:

#### **Standard Voltages:**

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120 For other voltages – consult factory

#### **Coil Classification:**

Class F Standard Class H Standard for media temperatures over 297°F

Note: Magnalatch coils are not available on steam valves.



#### **Agency Approvals:**

Standard valves with NEMA 4X or explosion psolenoid enclosures are UL Listed and CSA Certified. For additional details, consult factory.

## **Maximum Ambient Temperature** 150° F

Please refer to Page D33 for details.

## Applications:

- · Industrial laundry machines
- Industrial dish washing machines
- Institutional cooking and food warming equipment
- Steam tables, steam cookers/kettles
- Sterilizers
- Dry cleaning equipment and steam irons
- Hospital equipment
- Steam presses
- Steam baths
- Autoclaves



## 2-Way Hot Water and Steam - Normally Closed - Brass

				rating Pr erential ( PSI			Max.			Refe	rence
Port	Orifice	Flow					Media				
Size NPT	Size in.	Factor Cv	Min.	Hot Water	Steam	Watt	Temp. °F	Seal***	Pressure Vessel Number**	Coil	Valve
	CHNICAL				Steam	wall	<u>                                     </u>	Jeat	Number	Con	valve
1/4	13/64	0.76	0	100	_	10	210	EPDM	7121KBN2SE00	7	D21
1/4	13/64	0.76	0	-	40	10	285	EPDM	7121KBN2SES0	7	 D21
1/4	7/16	2.00	3	150		10	210	EPDM	7321KBN2RE00	7	D21
1/4	7/16	2.00	3	-	45	10	293	EPDM	7321KBN2RES0	7	D22
	7710	2.00				10			7 OZ TRONZITEGO		
3/8	7/16	2.50	3	150	-	10	210	EPDM	7321KBN3SE00	7	D22
3/8	5/8	3.00	0	150	50	11	300	EPDM	06FS3C2340ACF	4	D10
3/8	5/8	3.00	5	150	-	10	210	EPDM	73218BN3TE00	7	D20
3/8	5/8	3.00	0	100	-	10	210	EPDM	72218BN3TE00	7	D14
3/8	19/32	4.40	0	150	-	10	210	EPDM	7221GBN3VE00	7	D23
3/8	5/8	3.00	3	-	125	10	353	PTFE	73218BN3TTS0*	7	D20
3/8	1/2	3.00	1	-	125	11	353	PTFE	06FS5C2432ACH*	4	D9
3/8	1/2	3.00	1	_	80	11	320	PTFE	06FS5C2432ACF	4	D9
3/8	5/8	3.00	0	=	50	10	297	EPDM	72218BN3TES0	7	D14
3/8	5/8	3.00	5	_	50	10	297	EPDM	73218BN3TES0	7	D20
3/8	1/2	3.00	1	_	50	11	300	EPDM	06FS5C2332ACF	4	D9
3/8	19/32	4.40	0	_	45	10	293	EPDM	7221GBN3VES0	7	D23
1/2	7/16	3.00	3	150		10	210	EPDM	7321KBN4SE00	7	D22
1/2	5/8	4.00	5	150		10	210	EPDM	73218BN4UE00	7	D20
1/2	5/8	4.00	0	100		10	210	EPDM	72218BN4UE00	7	D14
1/2	19/32	4.40	0	150	_	10	210	EPDM	7221GBN4VE00	7	D23
1/2	5/8	4.00	0	150	50	11	300	EPDM	08FS3C2340ACF	4	D10
1/2	1/2	3.60	1	<del>-</del>	125	11	353	PTFE	08FS5C2432ACH*	4	D9
1/2	1/2	3.60	1	_	80	11	320	PTFE	08FS5C2432ACF	4	D9
1/2	1/2	3.60	1	<del>-</del>	50	11	300	EPDM	08FS5C2332ACF	4	D9
1/2	7/16	3.00	3	<del>-</del>	45	10	293	EPDM	7321KBN4SES0	7	D22
1/2	5/8	4.00	3		125	10	353	PTFE	73218BN4UTS0*	7	D20
1/2	5/8	4.00	0	_	50	10	297	EPDM	72218BN4UES0	7	D14
1/2	5/8	4.00	5	_	50	10	297	EPDM	73218BN4UES0	7	D20
1/2	19/32	4.40	0	-	45	10	293	EPDM	7221GBN4VES0	7	D23

<sup>\*</sup> High pressure steam valves require Class 'H' coils only from referenced coil chart.

<sup>\*\*\*</sup> Valves with EPDM (Ethylene Propylene) elastomers are limited to pressure range shown (45 or 50 psi) <u>AND</u> temperature rating shown (293-300° F). Do not use on higher pressure steam with pressure reducing valve; this may result in superheated steam.



<sup>\*\*</sup> Models xxS5xx have an integral stainless steel main orifice seat.

Models 72218xxx & 7221Gxxx are direct lift and will open at zero pressure differential but not at full flow.

#### 2-Way Hot Water and Steam - Normally Closed - Brass (Continued)

2-way	HOT W	ater an	a Ste	am - No	rmally	Closed	i - RLas	s (Conti	nueaj		
				rating Pr erential ( PSI			Max.			Rofo	rence
Port	Orifice	Flow					Media			Refe	lence
Size	Size	Factor		Hot			Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Water	Steam	Watt	°F	Seal***	Number**	Coil	Valve
	CHNICAL										
3/4	3/4	5.00	5	150	_	10	210	EPDM	73218BN5VE00	7	D20
3/4	3/4	5.00	0	100	_	10	210	EPDM	72218BN5VE00	7	D14
3/4	19/32	5.50	0	150	_	10	210	EPDM	7221GBN51E00	7	D23
3/4	3/4	5.00	0	150	50	11	300	EPDM	12FS3C2348ACF	4	D11
3/4	5/8	4.50	3	_	125	10	353	PTFE	73218BN5VTS0*	7	D20
3/4	3/4	5.00	0	_	50	10	297	EPDM	72218BN5VES0	7	D14
3/4	3/4	5.00	5	-	50	10	297	EPDM	73218BN5VES0	7	D20
3/4	19/32	5.50	0	-	45	10	293	EPDM	7221GBN51ES0	7	D23
3/4	3/4	7.40	1	-	125	11	353	PTFE	12FS5C2448ACH*	4	D25
3/4	3/4	7.40	1	-	80	11	320	PTFE	12FS5C2448ACF	4	D25
3/4	3/4	7.40	1	-	50	11	300	EPDM	12FS5C2348ACF	4	D25
1	19/32	5.50	0	150	-	10	210	EPDM	7221GBN61E00	7	D23
1	1 1/16	13.50	5	125	-	10	210	EPDM	73218BN64E00	7	D16
1	1	11.70	0	150	-	10	210	EPDM	7221GBN64E00	7	D23
1	1	12.20	1	150	50	11	300	EPDM	16FS5C2364ACF	4	D12
1	19/32	5.50	0	-	45	10	293	EPDM	7221GBN61ES0	7	D23
1	1	11.70	0	-	45	10	293	EPDM	7221GBN64ES0	7	D23
1	1	12.20	1	_	125	11	353	PTFE	16FS5C2464ACH*	4	D12
1	1	12.20	1	-	80	11	320	PTFE	16FS5C2464ACF	4	D12
1	1 1/16	13.50	5	-	125	10	353	PTFE	73218BN64TS0*	7	D17
1	1 1/16	13.50	5	-	50	10	297	EPDM	73218BN64ES0	7	D16
	,	,		,	,		,				
1 1/4	1 1/8	15.00	5	125	_	10	210	EPDM	73218BN75E00	7	D16
1 1/4	1 1/8	15.00	5	150	50	6	300	EPDM	20FS4C2372AAF	1	D13
1 1/4	1 1/8	15.00	5	_	50	10	297	EPDM	73218BN75ES0	7	D16
1 1/4	1 1/8	16.00	5	_	125	10	353	PTFE	73218BN75TS0*	7	D17
-											
1 1/2	1 1/4	22.50	5	125	_	10	210	EPDM	73218BN87E00	7	D19
1 1/2	1 1/2	22.50	5	150	50	6	300	EPDM	24FS4C2380AAF	1	D13
1 1/2	1 1/4	22.50	5	-	50	10	297	EPDM	73218BN87ES0	7	D19
1 1/2	1 1/4	22.50		_	125	10	353	PTFE	73218BN87TS0*	7	D19
,	, .								. 02 102 107 100	•	

<sup>\*</sup> High pressure steam valves require Class 'H' coils only from referenced coil chart.

<sup>\*\*\*</sup> Valves with EPDM (Ethylene Propylene) elastomers are limited to pressure range shown (45 or 50 psi) <u>AND</u> temperature rating shown (293-300° F). Do not use on higher pressure steam with pressure reducing valve; this may result in superheated steam.



www.parker.com/fcd

<sup>\*\*</sup> Models xxS5xx have an integral stainless steel main orifice seat.

Models 72218xxx & 7221Gxxx are direct lift and will open at zero pressure differential but not at full flow.

## 2-Way Hot Water and Steam - Normally Closed - Brass (Continued)

vva,	, 1100 110	Ter and	Jican	1 11011	matty O	Losca	Di 433	Continu	cu,	,	
				ating Pre							
	0-:::		Differe	ntial (MO	ואר נטיץ		Max.			Refe	rence
Port Size	Orifice Size	Flow Factor		Hot			Media Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Water	Steam	Watt	°F	Seal***	Number**	Coil	Valve
DC TEC	CHNICAL	SPECIF	ICATION	S							
1/4	13/64	0.76	0	40	-	10	210	EPDM	7121KBN2SE00	7	D21
1/4	13/64	0.76	0	100	_	22	210	EPDM	7121KBN2SE00	8	D21
1/4	7/16	2.00	3	150	-	22	210	EPDM	7321KBN2RE00	8	D22
1/4	7/16	2.00	3	60	_	10	210	EPDM	7321KBN2RE00	7	D22
1/4	13/64	0.76	0	-	40	22	285	EPDM	7121KBN2SES0	8	D21
1/4	7/16	2.00	3	-	45	22	293	EPDM	7321KBN2RES0	8	D22
3/8	7/16	2.50	3	150	-	22	210	EPDM	7321KBN3SE00	8	D22
3/8	7/16	2.50	3	60	_	10	210	EPDM	7321KBN3SE00	7	D22
3/8	5/8	3.00	0	40	-	22	210	EPDM	72218BN3TE00	8	D14
3/8	5/8	3.00	0	100	-	11.5	150	EPDM	06F22C2340A3F	6	D10
3/8	5/8	3.00	5	150	-	10	210	EPDM	73218BN3TE00	7	D20
3/8	5/8	3.00	5	40	-	11.5	150	EPDM	06F23C2340A3F	6	D10
3/8	19/32	4.40	0	100	-	22	210	EPDM	7221GBN3VE00	8	D23
3/8	19/32	4.40	0	-	45	22	293	EPDM	7221GBN3VES0	8	D23
1/2	7/16	3.00	3	150	_	22	210	EPDM	7321KBN4SE00	8	D22
1/2	7/16	3.00	3	60	-	10	210	EPDM	7321KBN4SE00	7	D22
1/2	5/8	4.00	5	150	_	10	210	EPDM	73218BN4UE00	7	D20
1/2	5/8	4.00	0	100	_	11.5	150	EPDM	08F22C2340A3F	6	D10
1/2	5/8	4.00	5	40	_	11.5	150	EPDM	08F23C2340A3F	6	D10
1/2	5/8	4.00	0	40	_	22	210	EPDM	72218BN4UE00	8	D14
1/2	19/32	4.40	0	100	_	22	210	EPDM	7221GBN4VE00	8	D23
1/2	7/16	3.00	3	_	45	22	293	EPDM	7321KBN4SES0	8	D22
1/2	19/32	4.40	0	_	45	22	293	EPDM	7221GBN4VES0	8	D23
3/4	3/4	5.00	5	150	_	10	210	EPDM	73218BN5VE00	7	D20
3/4	3/4	5.00	0	100	_	11.5	150	EPDM	12F22C2348A3F	6	D11
3/4	3/4	5.00	5	40	_	11.5	150	EPDM	12F23C2348A3F	6	D11
3/4	3/4	5.00	0	40	_	22	210	EPDM	72218BN5VE00	8	D14
3/4	19/32	5.50	0	100	_	22	210	EPDM	7221GBN51E00	8	D23
3/4	19/32	5.50	0	_	45	22	293	EPDM	7221GBN51ES0	8	D23

<sup>\*</sup> High pressure steam valves require Class 'H' coils only from referenced coil chart.

<sup>\*\*\*</sup> Valves with EPDM (Ethylene Propylene) elastomers are limited to pressure range shown (45 or 50 psi) <u>AND</u> temperature rating shown (293-300° F). Do not use on higher pressure steam with pressure reducing valve; this may result in superheated steam.



<sup>\*\*</sup> Models xxS5xx have an integral stainless steel main orifice seat.

Models 72218xxx & 7221Gxxx are direct lift and will open at zero pressure differential but not at full flow.

## 2-Way Hot Water and Steam - Normally Closed - Brass (Continued)

			Operating Pressure Differential (MOPD) PSI			Max.			Reference		
Port	Orifice	Flow					Media			1.0.0	1 01100
Size	Size	Factor		Hot			Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Water	Steam	Watt	°F	Seal***	Number**	Coil	Valve
DC TEC	CHNICAL	SPECIF	ICATION	S							
1	19/32	5.50	0	100	_	22	210	EPDM	7221GBN61E00	8	D23
1	1	11.70	0	100	-	22	210	EPDM	7221GBN64E00	8	D23
1	1 1/16	13.50	5	125	-	10	210	EPDM	73218BN64E00	7	D16
1	19/32	5.50	0	-	45	22	293	EPDM	7221GBN61ES0	8	D23
1	1	11.70	0	_	45	22	293	EPDM	7221GBN64ES0	8	D23
1 1/4	1 1/8	15.00	5	125	-	10	210	EPDM	73218BN75E00	7	D16
1 1/2	1 1/4	22.50	5	125	-	10	210	EPDM	73218BN87E00	7	D19

#### 2-Way Hot Water and Steam - Normally Closed - Stainless Steel

2 way	1100 110	ater and	u Steam	1 - 1101 1	matty C	loseu -	Stallite	33 31661			
				ating Pre ntial (MO			Max.			Refe	rence
Port	Orifice	Flow					Media			110.0	
Size	Size	Factor		Hot			Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Water	Steam	Watt	°F	Seal***	Number**	Coil	Valve
AC TEC	CHNICAL	SPECIF	ICATION	S							
1/4	5/32	0.52	0	-	110	11	344	PTFE	04FS0C3410ACH*	4	D24
3/8	5/8	3.00	0	100	-	10	210	EPDM	72218RN3TE00	7	D14
1/2	5/8	4.00	0	100	_	10	210	EPDM	72218RN4UE00	7	D14
1/2	5/8	4.00	0	-	50	10	297	EPDM	72218RN4UES0	7	D14
3/4	3/4	5.00	0	100	-	10	210	EPDM	72218RN5VE00	7	D14
3/4	3/4	5.00	0	-	50	10	297	EPDM	72218RN5VES0	7	D14
DC TEC	CHNICAL	SPECIF	ICATION	S							
3/8	5/8	3.00	0	40	-	22	210	EPDM	72218RN3TE00	8	D14
1/2	5/8	4.00	0	40	-	22	210	EPDM	72218RN4UE00	8	D14
3/4	3/4	5.00	0	40	-	22	210	EPDM	72218RN5VE00	8	D14

<sup>\*</sup> High pressure steam valves require Class 'H' coils only from referenced coil chart.

<sup>\*\*\*</sup> Valves with EPDM (Ethylene Propylene) elastomers are limited to pressure range shown (45 or 50 psi) <u>AND</u> temperature rating shown (293-300° F). Do not use on higher pressure steam with pressure reducing valve; this may result in superheated steam.



<sup>\*\*</sup> Models xxS5xx have an integral stainless steel main orifice seat.

Models 72218xxx & 7221Gxxx are direct lift and will open at zero pressure differential but not at full flow.

## 2-Way Hot Water and Steam - Normally Open - Brass

				ating Pre			Max.			Pofo	rence
Port	Orifice	Flow					Media			IVEIC	rence
Size	Size	Factor		Hot			Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Water	Steam	Watt	°F	Seal***	Number**	Coil	Valve
	CHNICAL		ICATION								
3/8	5/8	3.0	0	125		22	210	EPDM	72228BN3TE00	8	D18
3/8	5/8	3.0	5	-	125	10	353	PTFE	73228BN3TTS0	7	D15
3/8	5/8	3.0	0	-	50	10	297	EPDM	72228BN3TES0	7	D18
1/2	5/8	4.0	0	125	-	22	210	EPDM	72228BN4UE00	8	D18
1/2	1/2	3.6	1	-	125	11	353	PTFE	08FS5O2432ACH*	4	D9
1/2	5/8	4.0	5	-	125	10	353	PTFE	73228BN4UTS0*	7	D15
1/2	5/8	4.0	0	-	50	10	297	EPDM	72228BN4UES0	7	D18
3/4	3/4	5.0	0	125	-	22	210	EPDM	72228BN5VE00	8	D18
3/4	3/4	5.0	0	-	50	10	297	EPDM	72228BN5VES0	7	D18
3/4	3/4	7.5	5	-	125	10	353	PTFE	73228BN52TS0*	7	D15
3/4	3/4	7.4	1	-	125	11	353	PTFE	12FS5O2448ACH*	4	D25
1	1 1/16	13.5	5	-	125	10	353	PTFE	73228BN64TS0*	7	D17
1 1/4	1 1/8	16.0	5	-	125	10	353	PTFE	73228BN75TS0*	7	D17
1 1/2	1 1/4	22.5	5	-	125	10	353	PTFE	73228BN87TS0*	7	D19
DC TEC	CHNICAL	SPECIF	ICATION	S							
3/8	5/8	3.0	0	125	_	22	210	EPDM	72228BN3TE00	8	D18
	_										
1/2	5/8	4.0	0	125	_	22	210	EPDM	72228BN4UE00	8	D18
3/4	3/4	5.0	0	125	-	22	210	EPDM	72228BN5VE00	8	D18

<sup>\*</sup> High pressure steam valves require Class 'H' coils only from referenced coil chart.



<sup>\*\*</sup> Models xxS5xx have an integral stainless steel main orifice seat.

Models 72218xxx & 7221Gxxx are direct lift and will open at zero pressure differential but not at full flow.

<sup>\*\*\*</sup> Valves with EPDM (Ethylene Propylene) elastomers are limited to pressure range shown (45 or 50 psi) <u>AND</u> temperature rating shown (293-300° F). Do not use on higher pressure steam with pressure reducing valve; this may result in superheated steam.

## 2-Way Hot Water and Steam - Normally Open - Stainless Steel

	Operating Pressure										
			Differential (MOPD) PSI			Max.			Rofo	rence	
Port	Orifice	Flow					Media			Refer	ence
Size	Size	Factor		Hot			Temp.		Pressure Vessel		
NPT	in.	Cv	Min.	Water	Steam	Watt	°F	Seal	Number*	Coil	Valve
AC TECHNICAL SPECIFICATIONS											
3/8	5/8	3.0	0	125	-	22	210	EPDM	72228RN3TE00	8	D18
1/2	5/8	4.0	0	125	_	22	210	EPDM	72228RN4UE00	8	D18
3/4	3/4	5.0	0	125	-	22	210	EPDM	72228RN5VE00	8	D18
DC TEC	DC TECHNICAL SPECIFICATIONS										
3/8	5/8	3.0	0	125	-	22	210	EPDM	72228RN3TE00	8	D18
1/2	5/8	4.0	0	125	-	22	210	EPDM	72228RN4UE00	8	D18
	-						-				
3/4	3/4	5.0	0	125	-	22	210	EPDM	72228RN5VE00	8	D18

<sup>\*</sup>Models 72228xxx is a direct lift and will open at zero pressure differential but not at full flow.



## Valve Reference D9

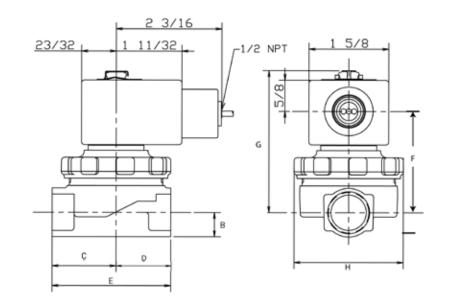




2-Way Normally Closed 06FS5Cxx, 08FS5Cxx



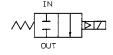
2-Way Normally Open 08FS50xx Port Identification: In-In/Out-Out



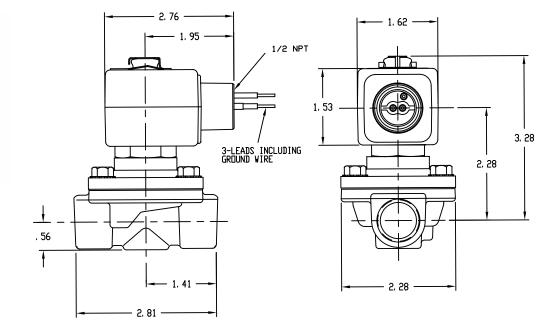
				ons			
Valve	В	С	D	Е	F	G	Н
06FS5C2xxx 08FS5C2xxx	1/2	1 5/16	1 1/8	2 7/16	2 5/16	2 29/32	2 1/4
08FS5O2xxx	1/2	1 5/16	1 1/8	2 7/16	2 7/32	2 29/32	2 1/4

## Valve Reference D10





2-Way Normally Closed Port Identification: In-In/Out-Out

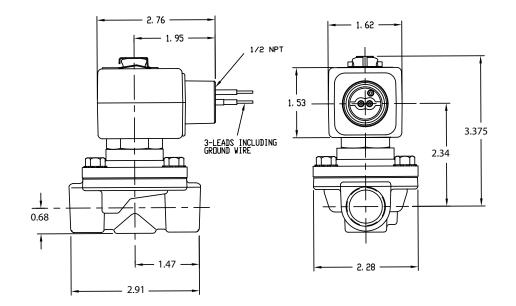








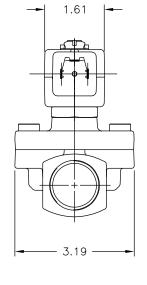
2-Way Normally Closed Port Identification: In-In/Out-Out

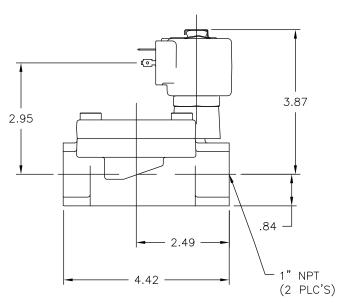


# Valve Reference D12



Port Identification: In-In/Out-Out



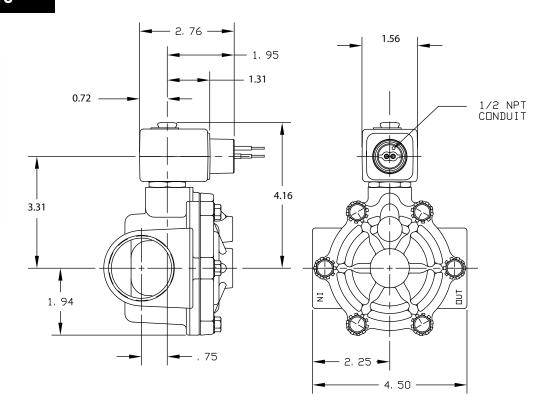








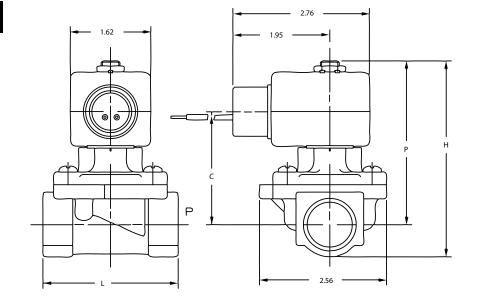
2-Way Normally Closed: Port Identification: In-In/Out-Out







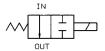
2-Way Normally Closed Port Identification: P-IN/--OUT



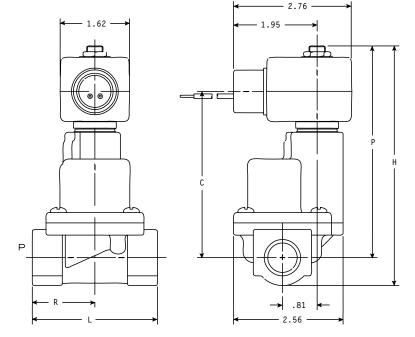
	Dimensions					
Valve	Н	P	C	L		
72218BN3TXXX 72218BN4UXXX	3.78	3.23	2.21	2.64		
72218BN5VXXX 72218RN3TXXX 72218RN4UXXX 72218RN5VXXX	3.99	3.33	2.31	2.72		







2-Way Normally Open: Port Identification: P-IN/--OUT

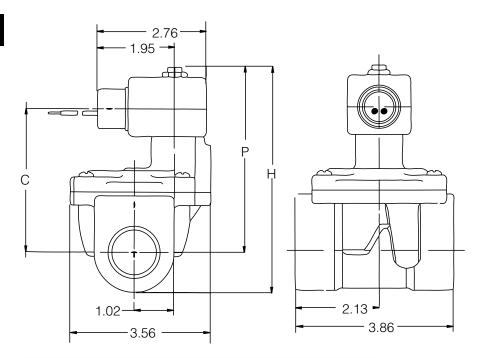


	Dimensions								
Valve	Н	P	C	L	R				
73228BN3TTS0	5.36	4.81	3.75	2.65	1.39				
73228BN4UTS0	E E7	4.91	2.05	2.73	1 42				
73228BN52TS0	5.57	4.91	3.85	2.73	1.43				





2-Way Normally Closed Port Identification: P-IN/--OUT



		Dimensions									
Valve	Н	P	С	В	D	G					
73218BN64Exx	4.56	3.70	2.38	5.58	3.96	2.94					
73218BN75Exx	4.85	3.85	2.52	5.58	3.96	2.94					

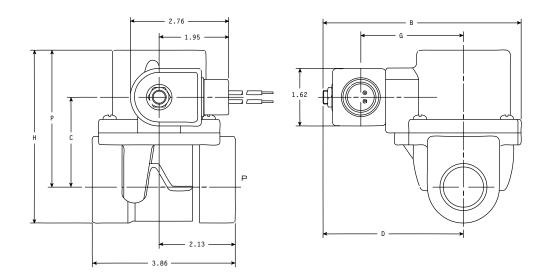




2-Way Normally Closed 73218



2-Way Normally Open: 73228 Port Identification: P-IN/--OUT

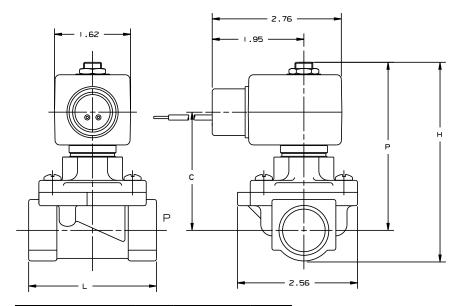


		Dimensions								
Valve	Н	P	С	В	D	G				
73228BN64TS0 73218BN64TS0	4.56	3.70	2.38	5.82	4.20	3.14				
73228BN75TS0 73218BN75TS0	4.85	3.85	2.52	5.82	4.20	3.14				





2-Way Normally Open: Port Identification: P-IN/--OUT



	Dimensions						
Valve	Н	P	С	L			
72228BN3TXXX 72228BN4UXXX 72228RN3TXXX 72228RN4UXXX	4.04	3.49	2.43	2.64			
72228BN5VXXX 72228RN5VXXX	4.24	3.58	2.52	2.72			





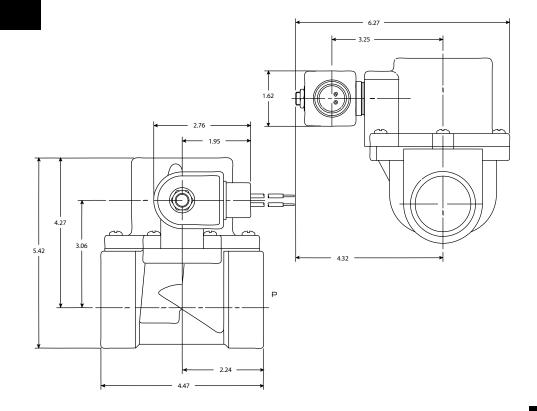


2-Way Normally Closed 73218BN87xx



2-Way Normally Open: 73228BN87xx

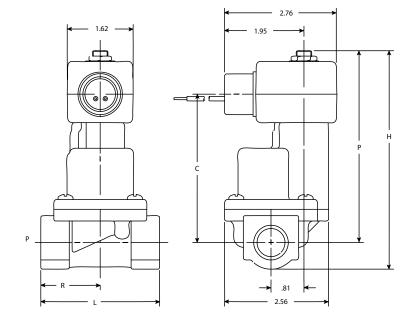
Port Identification: P-IN/--OUT







2-Way Normally Closed Port Identification: P-IN/--OUT



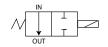
		D	imensio	ns	
Valve	Н	P	С	L	E
73218BN3TXXX 73218BN4UXXX	4.38	3.84	2.81	2.64	1.39
73218BN5VXXX	4.59	3.94	2.91	2.72	1.43





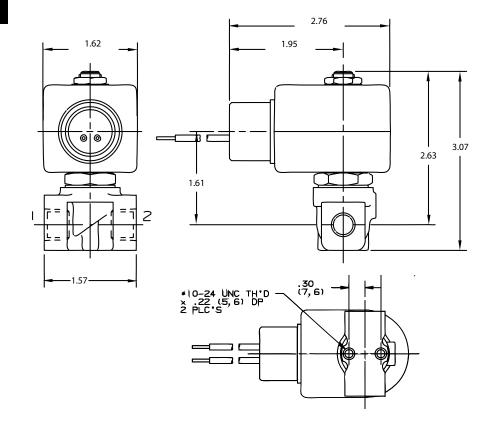


2-Way Normally Closed 7121KBNxx



2-Way Normally Open: 7122KBNxx

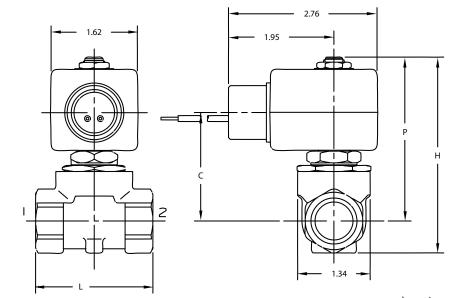
Port Identification: 1-IN/ 2-OUT



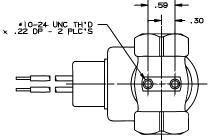




2-Way Normally Closed Port Identification Flow arrow on body indicates flow directionports are not marked.

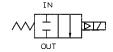


	Dimensions						
Valve	Н	P	C	L			
7121KBN44V00 7321KBN4SXXX	3.56	2.97	1.96	2.17			
7321KBN2RXXX 7321KBN3SXXX	3.56	2.97	1.96	1.97			

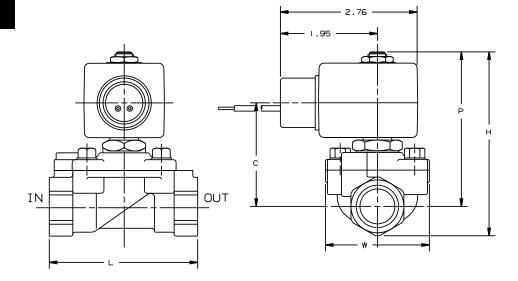






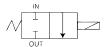


2-Way Normally Closed Port Identification Flow arrow on body indicates flow direction. Ports are not marked.

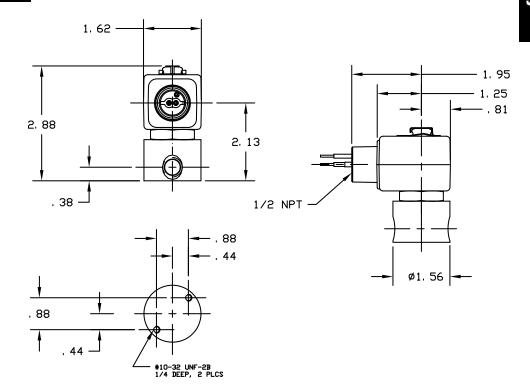


		D	imensio	ns	
Valve	Н	P	С	L	W
7221GBN3VXXX 7221GBN4VXXX	3.66	3.07	2.06	2.95	2.09
7221GBN51XXX	3.75	3.07	2.06	3.15	2.09
7221GBN61XXX	4.03	3.15	2.12	3.35	2.09
7221GBN64XXX	4.25	3.35	2.34	3.94	2.75





2-Way Normally Closed Port Identification: IN-IN/OUT-OUT

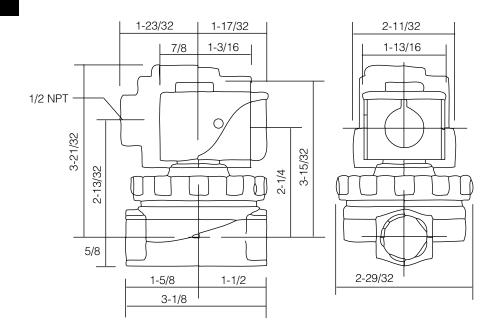








2-Way Normally Open: 12FS250xx Port Identification: IN-IN/OUT-OUT



		Dimensions										
Valve	A	В	С	D	E	F	G	Н				
12FS5C2148ACF	3 5/8	1/2	1 5/16	1 1/8	27/16	2 5/16	3 5/16	2 1/4				
12FS5O2148ACF	3 21/32	5/8	1 5/8	1 1/2	3 1/8	2 1/4	3 15/32	2 29/32				



#### Two-Way 210°F Hot Water with EPDM seals - Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
06F22C2	11.5	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
06F23C2	11.5	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
08F22C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
08F23C2	11.5	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F22C2	11.5	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
12F23C2	11.5	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F
7121KBN	10	2WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7121KBN	22	2WNC	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
72218BN	10	2WNC	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72218BN	22	2WNC	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
72218RN	10	2WNC	3/8 - 3/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72218RN	22	2WNC	3/8 - 3/4	316SS	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7221GBN	10	2WNC	3/8 - 1	Brass	304SS	430FR	430F	430FR	301SS	Copper	150°F
7221GBN	22	2WNC	3/8 - 1	Brass	304SS	430FR	430F	430FR	301SS	Copper	77°F
72228BN	10	2WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
72228BN	22	2WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73218BN	10	2WNC	3/8 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73218BN	22	2WNC	3/8 - 11/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
7321KBN	10	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
7321KBN	22	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73228BN	10	2WNO	1/2 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	150°F
73228BN	22	2WNO	1/2 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F

#### Two-Way High Pressure Steam with PTFE Seals - Materials of Construction\*\*

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
06FS5C2	11	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F
08FS5C2	11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F
08FS5O2	11	2WNO	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F
12FS5C2	11	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F
12FS5O2	11	2WNO	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F
16FS5C2	11	2WNC	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F
73218BN	10	2WNC	3/8 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F
73228BN	10	2WNO	1/2 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F

<sup>\*</sup> Shows first 7 digits of pressure vessel



<sup>\*\*</sup>Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

Two-Way Low Pressure Steam with EPDM Seals - Materials of Construction\*\*

	,		<del></del>	··· · · · · · · · · · · · · · · · · ·								
Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.	
06FS3C2	11	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
06FS5C2	11	2WNC	3/8	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F	
08FS3C2	11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
08FS5C2	11	2WNC	1/2	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F	
12FS3C2	11	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
12FS5C2	11	2WNC	3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F	
16FS5C2	11	2WNC	1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	131°F	
20FS4C2	6	2WNC	11/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
24FS4C2	6	2WNC	1½	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
7121KBN	10	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	122°F	
7121KBN	22	2WNC	1/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
72218BN	10	2WNC	3/8 - 3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	122°F	
72218BN	22	2WNC	3/8 - 3/4	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
72218RN	10	2WNC	3/8 - 3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Copper	122°F	
72218RN	22	2WNC	3/8 - 3/4	316SS	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
7221GBN	10	2WNC	3/8 - 1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	122°F	
7221GBN	22	2WNC	3/8 - 1	Brass	305SS	430FR	12L14 Plated	430FR	302SS	Copper	77°F	
72228BN	10	2WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F	
72228BN	22	2WNO	3/8 - 3/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F	
73218BN	10	2WNC	3/8 - 11/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F	
73218BN	22	2WNC	3/8 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F	
7321KBN	10	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F	
7321KBN	22	2WNC	1/4 - 1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F	
73228BN	10	2WNO	1/2 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	122°F	
73228BN	22	2WNO	1/2 - 1½	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	77°F	

<sup>\*</sup> Shows first 7 digits of pressure vessel



<sup>\*\*</sup>Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

# **Intrinsically Safe Series**

2-way, 3-way and 4-way Valves



## General Description:

# For hazardous and low-power power applications

Today, intrinsically safe systems and products are recommended, or in some cases compulsory, where the highest level of protection from explosion is required. They are also employed in applications that require low power.

A hazardous (classified) location is where fire or explosion hazards exist due to the presence of flammable gases or vapors, flammable liquids, combustible dust, or easily ignitable fibers or flyings.

Parker Fluid Control Division (FCD) has long served industry with innovative and safety related products. Our Intrinsically Safe solenoid valves have approvals for use in the United States and Canada in hazardous classifications for Classes I, II, III, Division 1 and 2, and in the United Kingdom for Division 0, 1 and 2. In Europe our valves are approved according to ATEX standards. All countries in Western Europe now follow common (ATEX) standards. All ATEX member countries should recognize apparatus which have been tested and certified by any ATEX member country.

#### What is an intrinsically safe system?

An intrinsically safe system is most often an assembly of approved intrinsically safe apparatus, associated apparatus, and interconnecting cables. Approved I.S. apparatus are devices that are incapable, during normal operation or under fault conditions, of causing explosive atmospheres to ignite by spark or thermal effect. Explosive atmospheres are mixtures of flammable or combustible material in air in ignitable concentrations.

Solenoid valves are examples of I.S. apparatus and must be approved for use in specific hazardous (classified) locations. Associated apparatus, such as safety barriers, are devices which affect the energy in the I.S. circuit and are relied upon to maintain intrinsic safety.

# How does intrinsic safety apply to solenoid valves?

When related to solenoid valves, intrinsic safety means that the coil's current draw and resulting temperature is held to such a low level (by an approved safety barrier) that the valve no longer has the capability of igniting a mixture of flammable or combustible material, either during normal operation or under fault conditions.

When designed into an intrinsically safe system, FCD's Intrinsically Safe solenoid valves provide a number of significant performance advantages.

#### **Low Power Consumption**

FCD's Intrinsically Safe valves are rated at 24 VDC nominal, and are calibrated to operate at a minimum current draw as low as 29 milliamps (0.029 amps).

#### **Low Temperature Rise**

FCD Intrinsically Safe valve enclosures are designed to maintain a maximum outside surface temperature of less than 85°C. This meets the T6 classification assigned by Underwriters Laboratories Inc.

### Variety of Mounting Possibilities

FCD Intrinsically Safe valves can be mounted in any position and still operate normally.

#### **Media Compatibility**

Intrinsically Safe FCD valves in 2-way constructions are suitable for use with oil, air, water, and inert gases. Our 3-and 4-way valves are suitable for use with air and inert gases only.

#### **Watertight Construction**

All Intrinsically Safe FCD coil enclosures are equivalent to NEMA Type 4X Watertight construction.

**Note:** See chart on page D51 for the allowable valve/coil combinations.



2-Way Direct Acting & Pilot Operated Valves

#### Mechanical Characteristics:

#### **Electrical Characteristics:**

#### Miscellaneous:

Standard Materials of Construction

- Body—Brass
- Seals-FKM, NBR
- Compatible Media
- Air, Inert Gas, Water and Lt. Oil (300 SSU)

Based on coil selected. View the following coil and enclosure pages for detailed electrical information.

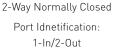
For applications below 32°F, valves must be degreased. Consult Fluid Control Division prior to ordering.

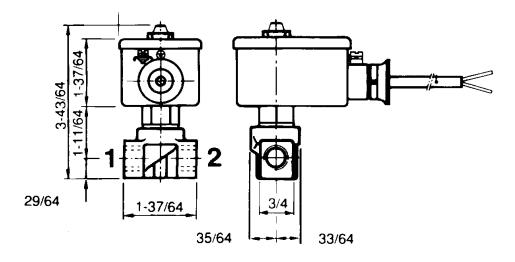
#### Intrinsically Safe Solenoid Valves—Two-Position

Port Size NPTF	Orifice Size	Valve Type	Flow Rate Cv	Operating Pressure Differential (PSI)	Min. Ambient Temp. °F/°C	Max. Fluid Temp. °F/°C	Valve Materials Seal/Body	Part Number	Valve Ref.	Coil Ref.
1/4"	3/64"	2W,NC	0.04	0-150	14/-10	165/75	FKM/Brass	U121K0490	D30	**
1/4"	1.2mm	2W,NC	0.06	0-100	14/-10	165/75	FKM/Brass	U121K0890	D30	**
1/4"	1.5mm	2W,NC	0.11	0-75	14/-10	165/75	FKM/Brass	U121K0690	D30	**
1/2"	5/8"	2W,NC	4.4	5-150	14/-10	165/75	FKM, NBR/Brass	U321H1590	D31	**
3/4"	3/4"	2W,NC	9.8	5-150	14/-10	165/75	FKM, NBR/Brass	U321G3690	D32	**
1 1/2"	1 9/16"	2W,NC	29.5	5-150	14/-10	165/75	FKM, NBR/Brass	U321G3990	D32	**
2"	1 9/16"	2W,NC	39.2	5-150	14/-10	165/75	FKM, NBR/Brass	U321G4090	D32	**

<sup>\*\*</sup> For Coil Information, see page D48







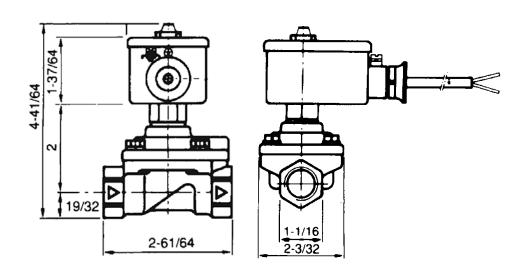




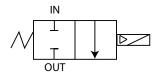
OUT

2-Way Normally Closed

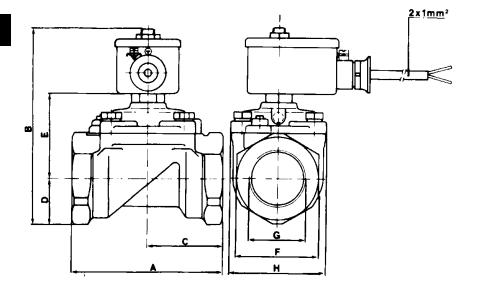
Port Identification: Flow arrow on body indicates flow direction. Ports are not marked







2-Way Normally Closed
Port Identification:
Flow arrow on body indicates flow direction. Ports are not marked



	Dimension											
Valve	A	В	С	D	E	F	G	H				
	IN	IN	IN	IN	IN	IN	NPT	IN				
U321G3690	3-15/16"	5-5/16"	2"	7/8"	2-23/64"	1-5/8"	3/4"	2-3/4"				
U321G3990	5-17/32"	6-7/32"	3"	1-9/32"	2-7/8"	2-3/8"	1-1/2"	3-1/16"				
U321G4090	5-29/32"	6-25/32"	3-5/32"	1-21/32"	3-7/64"	3"	2"	3-1/16"				



3-way Direct Acting, Pilot Operated and Manual Reset Valves

#### Mechanical Characteristics:

#### **Standard Materials of Construction**

- Body-Brass, Stainless Steel or Aluminum
- Seals-FKM, NBR

#### **Compatible Fluids**

Air and inert gases

#### **Electrical Characteristics:**

Based on coil selected. View the following coil and enclosure pages for detailed electrical information.

#### Miscellaneous:

#### **Sleeve Exhaust Adaptor**

• U21-004 must be ordered separately.

For applications below 32°F, valves must be degreased. Consult Fluid Control Division prior to ordering.

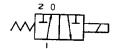
#### Intrinsically Safe Solenoid Valves - Two Position . 3-way - Normally Closed \*\*\*

HILLI	iisicatt	y Sale	Socemon	u valve:	5 - I WU	r usitiui	i , 3-way - Nui ii	natty Closeu		
Port Size NPT	Orifice Size	Cv Flow Factor	Operating Different Minimum	ial (PSI)	Min. Ambient Temp. °F	Max. Fluid Temp. °F	Valve Materials Seal/Body	Pressure Vessel Part Number	Valve Ref.	Coil Ref.
3-Way	7									
1/4"	5/128"	0.04	0	150	14	165	FKM/Brass	U131K0490	D33	**
1/4"	5/128"	0.04	0	150	14	165	FKM/316L S.S.	U131V5490	D34	**
1/4"	3/64"	0.06	0	150	14	165	FKM/Brass	U131K0890	D33	**
1/4"	1.5mm	0.11	0	75	14	165	FKM/Brass	U131K0690	D33	**
1/4"	13/64"	0.5	0	150	-13	165	NBR/S.Steel (316)	U133X5196*	D35	**
1/4"	9/32"	0.70	15	150	14	165	FKM, NBR/ Aluminum	U331B7490	D38	**
1/4"	1/4"	1.2	30	150	14	165	NBR/Brass	73317BN2PN90	D36	**
3-Way	- 4.0 C	v Single	Solenoid							
1/2"	5/8"	4.0	30	150	14	165	NBR/Brass	73317BN4UN90	D37	**
1/2"	5/8"	4.0	30	150	-40	165	NBR/Brass	73317BN4UN9C	D37	**
1/2"	5/8"	4.0	7	150	14	165	FKM, NBR/ Aluminum	U331L2190	D39	**
3-Way	– Manu	al Reset	Valve							
1/4"	13/64"	0.5	0	150	-13	165	FKM/S.Steel (316)	U033X5156*	D40	**

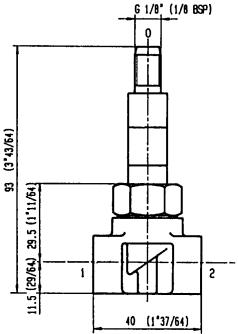
<sup>\*</sup> U133X5196 and U033X5156: Consult factory for available coil/enclosure options.

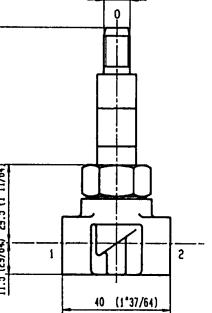
## Valve Reference D33





3-Way Normally Closed Port Identification: 1-Cylinder/2-Pressure/0-Exhaust







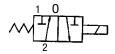
Parker Hannifin Corporation **Fluid Control Division** 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd

1/4"-18 NPT

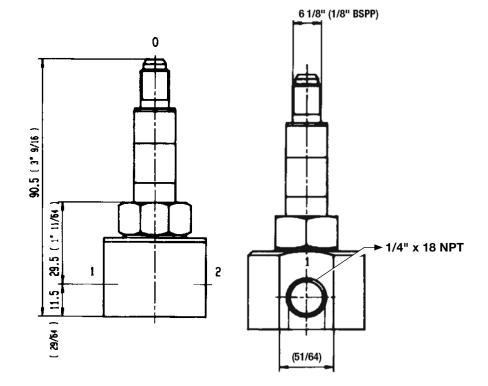
<sup>\*\*</sup> For Coil Information, see page D48

<sup>\*\*\*</sup>U133X5196 is a 3-way, two position, Universal construction.



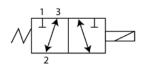


3-Way Normally Closed
Port Identification:
1-Pressure/2-Cylinder/0-Exhaust



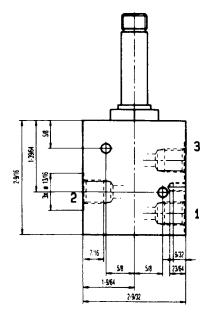
# Valve Reference D35

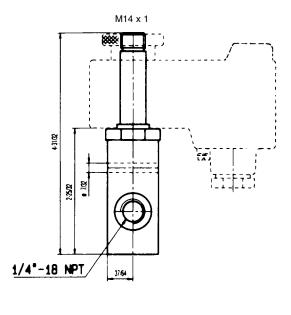




3-Way Universal

Port Identification: 1-Normally Closed/ 2-Common/3-Normally Open

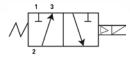




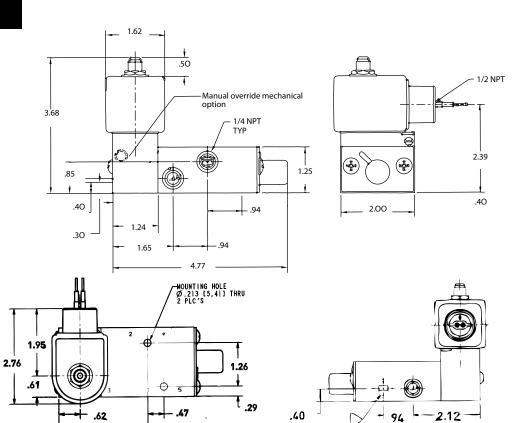






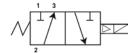


3-Way Normally Closed
Port Identification:
2-Cylinder/ 1-Pressure/ 3-Exhaust

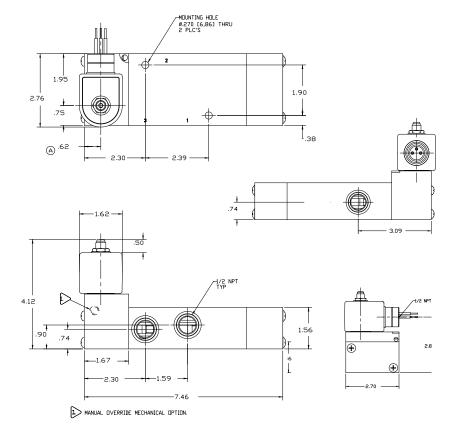


# Valve Reference D37



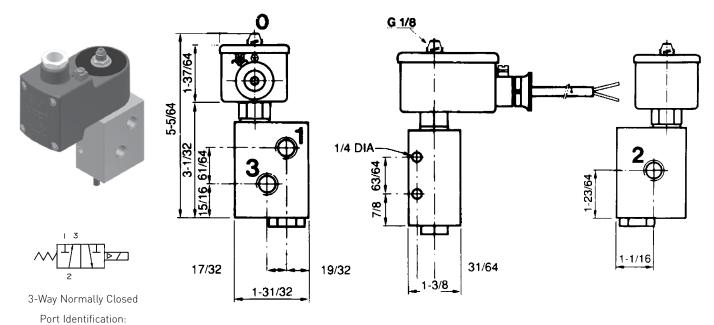


3-Way Normally Closed Port Identification: 2-Cylinder / 1-Pressure/ 3-Exhaust

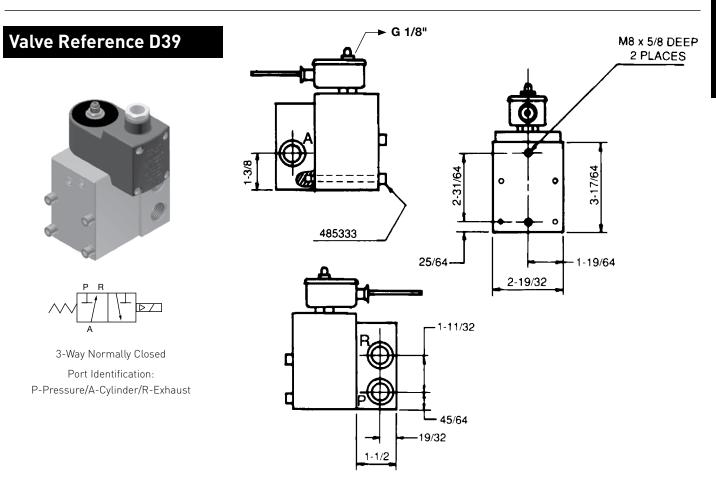




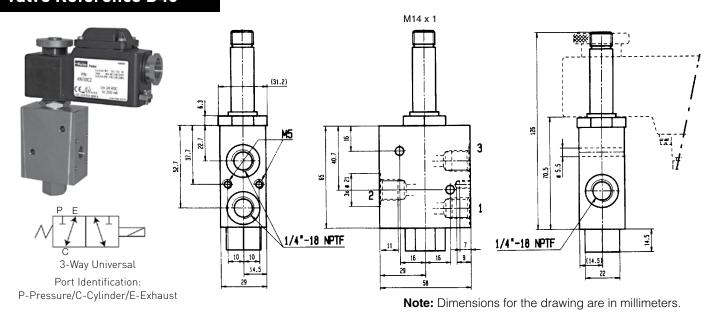
**2.5**8



1- Pressure/2-Cylinder/3-Exhaust







# Intrinsically Safe

4-way Piped and 3/4-way NAMUR Direct Mount Valves

Mechanical Characteristics: Electrical Characteristics:

Compatible FluidsAir and inert gases

Based on coil selected. View the following coil and enclosure pages for detailed electrical information.

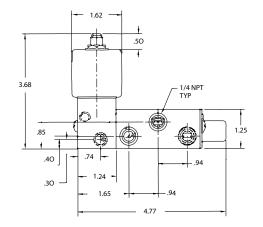
**Skinner Intrinsically Safe Solenoid Valves** 

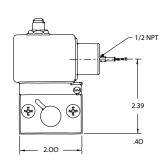
Port Size	Orifice Size	Cv Flow Factor	Operating Differen	tial (PSI)	Min. Ambient	Max. Fluid	Valve Materials Seal/Bodv	Pressure Vessel Part Number	Valve Ref.	Coil Ref.
NPT	3126	1 actor	Minimum	Maximum	Temp. °F	Temp. °F	Jean Douy	VC33ECT at CNUITIBET	1161.	IVEI.
4-Way										
1/4"	5/128"	0.04	0	150	14	167	NBR/Brass	73417BN2KN90	D41	**
1/4"	5/128"	0.04	0	150	14	167	NBR/303 S.S.	73417VN2KN90	D41	**
1/4"	3/64"	0.06	0	150	14	167	FKM-NBR/Alum.	U341B3490	D42	**
1/4"	13/64"	0.5	0	150	14	167	NBR/Brass	73417BN2PN90	D41	**
1/4"	5/16"	1.4	15	150	14	167	NBR/Zinc Alloy	U347L1190	D45	**
-		ngle Solen								
1/2"	5/8"	4.0	30	150	14	167	NBR/Brass	73417BN4UN90	D44	**
1/2"	5/8"	4.0	30	150	-14	167	NBR/Brass	73417BN4UN9C	D44	**
1/2"	9/16	4.0	7	150	14	167	FKM-NBR/Alum.	U341L2190	D43	**
4-Way	<ul><li>Double S</li></ul>	Solenoid								
1/4"	11/64"	0.55	30	150	14	167	NBR/303 S.S.	73477VN2KN90	D49	**
1/4"	1/4"	1.2	30	150	14	167	NBR/Brass	73477BN2PN90	D49	**
4-Way	– 4.0 Cv D	ouble Sole	noid							
1/2"	5/8"	4.0	30	150	14	167	NBR/Brass	73477BN4UN90	D51	**
1/2"	5/8"	4.0	30	150	-14	167	NBR/Brass	73477BN4UN9C	D51	**
NAMU	R 3/4-Way									
1/4"	11/64"	0.55	30	150	14	167	NBR/Brass	73417AKDKN90	D62	**
1/4"	1/4"	1.2	30	150	14	167	NBR/Brass	73417AKDPN90	D62	**
_		Double So	lenoid							
1/4"	11/64"	0.55	30	150	14	167	NBR/Alum.	73477AKDKN90	D63	**
1/4"	1/4"	1.2	30	150	14	167	NBR/Alum.	73477AKDPN90	D63	**

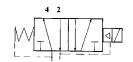
<sup>\*\*</sup> For Coil Information, see page D48



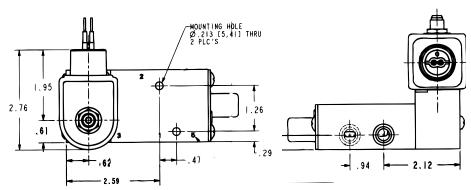




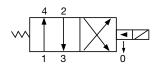




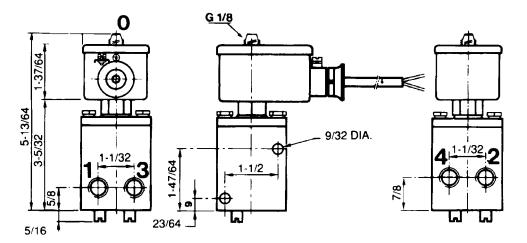
4-Way 2 position single solenoid Port identification: Press-1/Cyl - 2, 4/ EXH 3, 5



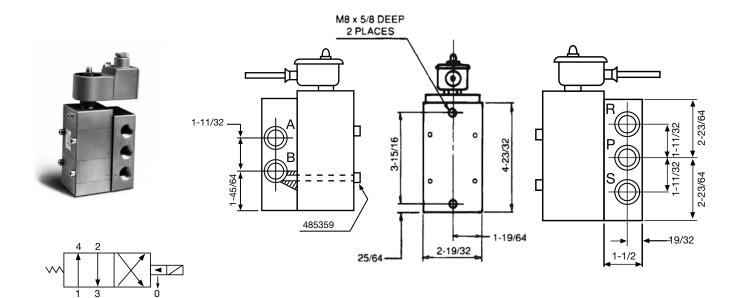




4/2 4-Way Two Position
Port Identification:
1-Pressure/2, 4-Cylinder/3-Exhaust



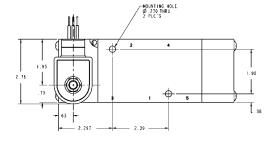


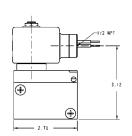


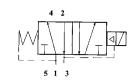
Port Identification: P-Pressure/B, A-Cylinder/S, R-Exhaust

4/2 4-Way Two Position

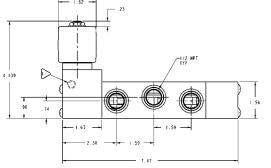


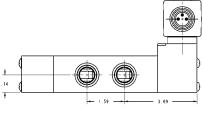






4-Way 2 position single solenoid Port Identification: Press-1/CYL-2,4/EXH 3,5







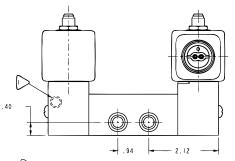
#### Valve Reference D45 481865 G 1/8" 19,5 24 DIN 43650A 38 50 Φ 81,5 Ф 138 266 92 Φ 06,5 46 81,5 4-Way 2 position dual solenoid Port Identification: 133 Press-1/CYL-2,4/EXH 3,5 17,5 17,5 19 19 35 26

# Valve Reference D49

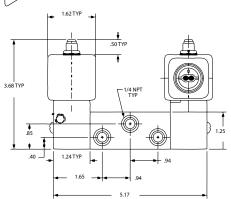


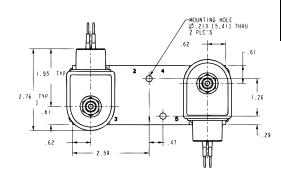


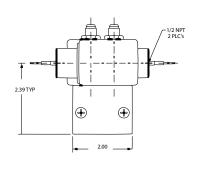
Press-1/CYL-2,4/EXH 3,5



Manual override mechanical option

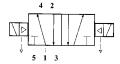








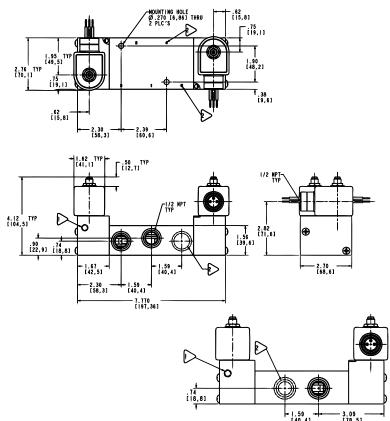




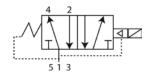
4-Way 2 position dual solenoid

Port Identification:

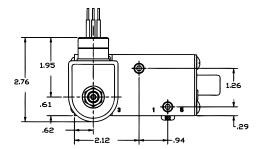
1-Pressure/2, 4-Cylinder/3, 5-Exhaust

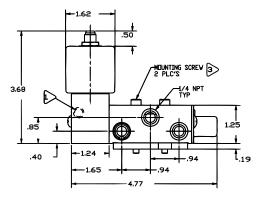


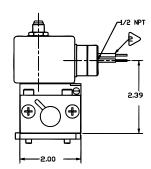


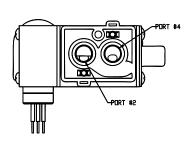


5/2, 4-Way 2 Position Single Solenoid Port Identification: 1-Pressure/2, 4-Cylinder/3, 5-Exhaust



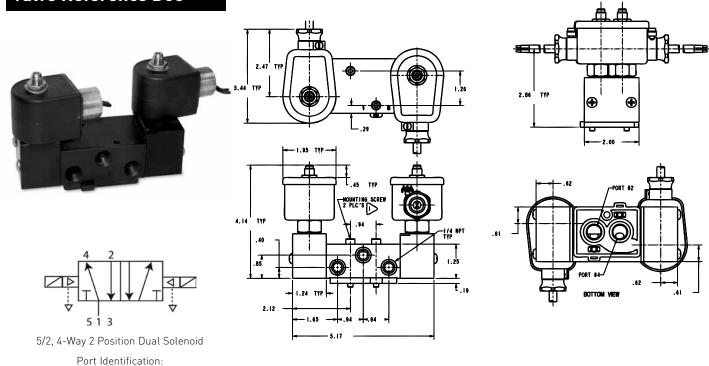








1-Pressure/2, 4-Cylinder/3, 5-Exhaust



#### Coil and Enclosure Information

Important: The intrinsically safe supply circuit should have enough capacity in all environmental and system conditions to insure delivery of at least the minimum specified operating current of the coil. Be sure to include the internal coil resistance and the bridge rectifier resistance (where applicable) when calculating circuit parameters.

# Splice Box Enclosure with Strain Relief Egress Specifications:

#### **Protection Class**

 IP 65 according to DIN 40050 and IEC 529 standards. Equivalent to NEMA 4 Watertight.

#### Construction

 Polyamid with fiberglass enclosure and cover.

#### **Electrical Entry and Connections**

 Cable entry through a blue cable gland M20 X 1.5. Screw terminals for leads 3 x 1.5mm. Additional ground connection possible with external screw terminal.

#### **Enclosure**

 Coil, printed circuit and other parts for I.S. specifications are completely encapsulated within the enclosure using epoxy material.

#### **Dielectric Strength**

• Greater than 500 V rms

#### **Bridge Rectifier Resistance**

Less than 50 ohms at 29mA

#### **Coil Internal Resistance**

• 295 ohms at 20°C

#### Voltage

24 VDC nominal

#### **Minimum Operating Current**

• 29 milliamps

#### **Coil Temperature Rise**

Less than 5°C

#### **Maximum Enclosure Temperature**

 <85°C (corresponding to T6 class) according to ATEX.

#### **Ambient Temperature**

-13°F to + 149°F (-25°C to +65°C)

#### F.M. Entity Parameters

- Vmax = 30 volts
- Imax = 100 mA
- Ci = 0
- Li = 0 mH

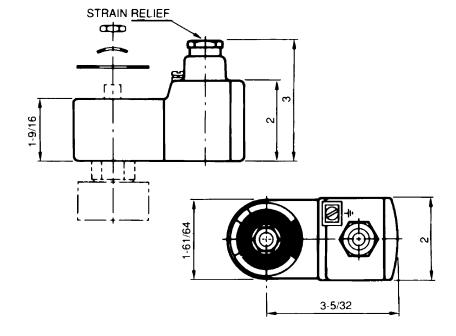
#### **Options**

• 1/2" NPT Conduit Hub Adaptor. Order part number U22-001.

#### **Electrical Parts**

Reference Number	Approvals	Classification
400005	FM/CSA	Class I, Div. 1, Groups A,B,C,D, Class II, Div. 1, Groups E,F,G
490885	LCIE 02 ATEX 6024X	Class III, Div. 1 tD A20 IP66 T80°C
488650.01	LCIE 02 ATEX 6066X	Ex ia IIC T6, tD A20 IP66 T80°C







Coil and Enclosure Information

### Potted Lead Wire Coil with Strain Relief Egress Specifications

#### **Protection Class**

 IP 67 according to DIN 40050 and IEC 529 standards. Equivalent to NEMA 4 Watertight.

#### Construction

 Epoxy coated metal enclosure and cover.

#### **Electrical Entry and Connections**

 Fixed and potted two core (2 x 1mm²) blue connection cable of 2m length. Other cable lengths on request. Entry cable gland pg 11 (18.6mm) (DIN 46320). Additional ground connection possible with external screw terminal.

#### **Enclosure**

 Coil, welded lead connections, printed circuit and other parts for I.S. specifications are completely encapsulated within the enclosure using epoxy material.

#### **Dielectric Strength**

• Greater than 500 V rms

#### **Bridge Rectifier Resistance**

• Less than 50 ohms at 29mA

#### **Coil Internal Resistance**

• 295 ohms at 20°C

#### Voltage

24 VDC nominal

#### **Minimum Operating Current**

• 29 milliamps

#### **Coil Temperature Rise**

• Less than 5°C

#### **Maximum Enclosure Temperature**

 <85°C (corresponding to T6 class) according to ATEX.

#### **Ambient Temperature**

• -40°F to + 149°F (-40°C to +65°C)

#### F.M. Entity Parameters

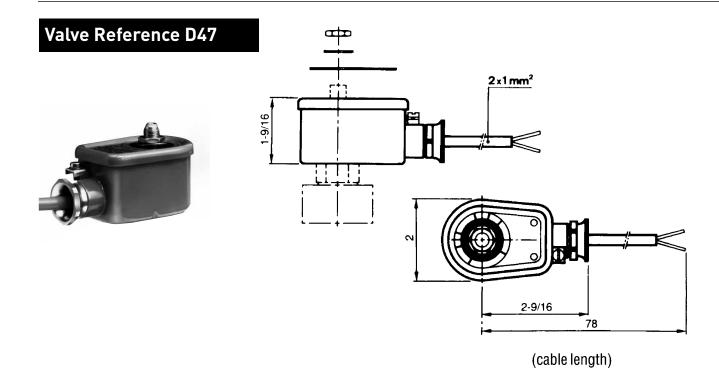
- Vmax = 30 volts
- Imax = 100 mA
- Ci = 0
- Li = 0 mH

#### **Options**

• 1/2" NPT Conduit Hub Adaptor. Order part number U22-001.

#### **Electrical Parts**

Reference Number	Approvals	Classification
		Class I, Div. 1, Grps A,B,C,D
400000	FM/CSA	Class II, Div. 1, Grps E,F,G
490890	LCIE 02 ATEX 6024X	Class III, Div. 1
		tD A20 IP66 T80°C
488660.01	LCIE 02 ATEX 6024X	Ex ia IIC T6





Coil and Enclosure Information

## Splice Box Enclosure with Booster Circuit and Strain Relief Egress Specifications

#### **Protection Class**

 IP 65 according to DIN 40050 and IEC 529 standards. Equivalent to NEMA 4 Watertight.

#### Construction

 Polyamid with fiberglass enclosure and cover.

#### **Electrical Entry and Connections**

 Screw terminals within terminal box. Cable connection through M20x1.5 cable gland. Additional ground connection possible with external ground terminal.

#### **Enclosure**

 Coil, printed circuit and other parts for I.S. specifications are completely encapsulated within the enclosure using epoxy material.

#### **Booster Circuits**

 The electronic booster circuit consists of capacitor, diodes, thyristor and Zener diode.

#### Voltage

- Nominal: 24 VDC nominal
- Maximum: 28 VDC
- Minimum at Attraction: 21.6 VDC Circuit design must ensure that at least 21.6 VDC is available at the solenoid for proper operation.

#### **Minimum Holding Current**

• 60 mA

#### **Coil Temperature Rise**

Less than 5°C

#### **Maximum Enclosure Temperature**

 <85°C (corresponding to T6 class) according to ATEX.

#### **Ambient Temperature**

• 13°F to + 140°F (-25°C to +60°C)

# Required Time Delay for Renewed Valve Actuation after Booster Discharge

Approximately 1-3 seconds at nominal voltage

#### **Duty Cycle**

• 100% solenoid duty

#### **Options**

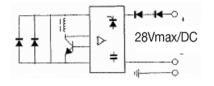
• 1/2" NPT Conduit Hub Adaptor. Order part number U22-001.

#### **Electrical Parts**

Reference Number	Approvals	Classification					
		Ex ia IIC T6, T5, T4,					
495910	LCIE 03 ATEX 6464X	Ex ia IIB T6, T5, T4,					
		tD A20 IP67 T130°C/T95°C/T80°C					

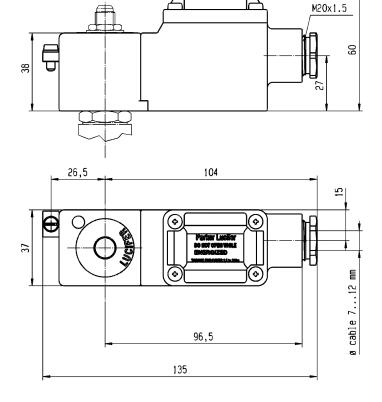
### Valve Reference D48





Wiring Schematic for Booster Circuit

Note: Dimensions are shown in millimeters





Valve ordering information

		Coil Part Numbers* and Descriptions									
	495910N7	490885L8	490890L8	48866001N7	48865001N7						
	Ex ia II T6 IP67 Ex tD A20 T80°C IP67 28VDC max Encapsulated DIN Coil	Ex ia IS I/II/III/1 ABCDEFG 24VDC Nominal Coil with Splice Box	Ex ia IS I/II/III/1 ABCDEFG 24VDC Nominal Potted Coil with Lead	II 1 G-Ex ia IIC T6 II 1 D -80°C 24VDC Nominal Potted Coil with Lead	Ex ia IIC T6 Ex tD A20 T80C IP66 24VDC Nominal Coil with						
Pressure Vessel Part Number	with Terminal Box & Cable Gland Connector with booster circuit	and Strain Relief Egress, rectification diodes, 30VDC max, FM/CSA CI1 Div 1, 3W	Wires and Strain Relief Egress 30VDC max FM/CSA Cl1 Div 1, 3W	Wires and Strain Relief Egress 28VDC max 3W	Splice Box and Strain Relief Egress 28VDC max 3W						
U121K0490	X	X	X	X	X						
U121K0690	X	X	X	X	X						
U121K0890	X	X	X	X	X						
U131E0390	obsolete	obsolete	obsolete	obsolete	obsolete						
U131K0490	X	X	X	X	X						
U131K0690	obsolete	obsolete	obsolete	obsolete	obsolete						
U131K0890	obsolete	obsolete	obsolete	obsolete	obsolete						
U131V5490	X	X	X	X	X						
U321G3690	X	X	X	X	X						
U321G3990	X	X	X	X	X						
U321G4090	X	X	X	X	X						
U321H1590	X	X	X	X	Х						
U331B7490	X	X	X	X	Х						
U331L2190	X	X	X	X	X						
U341B3490	X	X	X	X	Х						
U341L2190	X	X	X	X	X						
U347L1190	X	X	X	X	X						

<sup>\*</sup>Coil Part Numbers ending in 'N7' are ATEX and those ending in 'L8' are FM/CSA listed

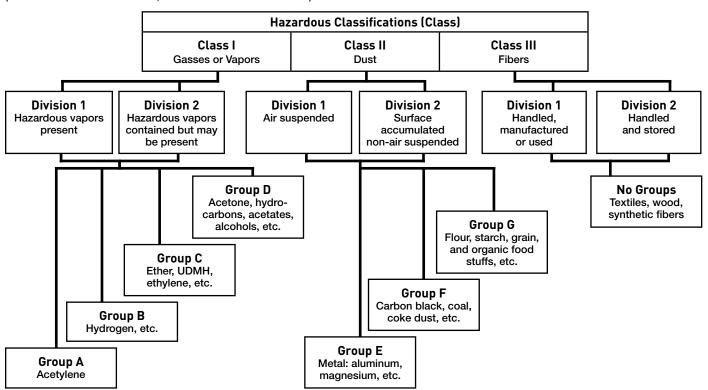
Note: For U133X5196 and U033X5196, consult factory for available coils and enclosures



<sup>\*</sup>Drop the first two digits ('49' or '48') of the coil part number and add to Pressure Vessel Part Number to create the complete valve part number (i.e. U121K0490 with coil 495910N7 becomes U121K04905910N7)

#### Hazardous (Classified) Locations

(In accordance with Article 500, National Electrical Code-1984)



#### **Hazardous Atmosphere Classifications**

#### **UK and ATEX** US National Typical Gasses in (BS5501: Part 1 Electrical Atmosphere Class I EN 50 014) Code Group Ethane, propane, butane, pentane, hexane, heptane, IΙΑ Group D octane, nonane, decane, acetic acid, acetone, methanol, toluene, ethyl acetate Ethylene, Coke, oven gas, dimethyl ether, ΙΙΒ Group C diehyl ether, ethylene oxide IIC Hydrogen Group B No Classification Carbon Disulphide Group A Acetylene Ethyl Nitrate No Classification US National Typical Dusts in **UK and ATEX Electrical Code** Atmosphere Class I Group Metal No Classification Group E Carbon/Coal No Classification Group F Group G Grain No Classification

### Surface Temp/Agency Code Cross Reference

Maximum Surface Temperature	U	S Standard (U. L.)	ATEX
450°C	T1	'	T1
		T2a - 280°C	
300°C	T2	T2b - 260°C	T2
300 C	12	T2c - 230°C	12
		T2d - 215°C	
		T3a - 180°C	
200°C	Т3	T3b - 165°C	T3
		T3c - 160°C	
135°C	T4	T4a - 120°C	T4
100°C	T5	T5	T5
85°C	T6	T6	T6

#### **Hazardous Area Classifications**

Description	US	ATEX
An explosive atmosphere is continuously present	Division I	Zone 0
An explosive atmosphere is intermittently present during normal operations	Division I	Zone 1
An explosive atmosphere is present during abnormal conditions	Division II	Zone 2

Note: These charts are provided for reference only. Consult the U.S. National Electrical Code or rating agencies such as Factory Mutual or Underwriter's Laboratories for specific details.



# 3-Way Manual Reset

# Direct Acting & Pilot Operated Valves



## **General Description:**

3-Way Manual Reset solenoid valves are designed to start and stop the flow of media as the result of an electrical signal. This can be a problem in some power outage situations were the valve must remain in the no voltage supplied position until the system is manually restarted. Manual reset valves have an added safety device to address this issue. When the manual reset device is triggered, the valve remains in the at rest position until the reset mechanism is manually latched.

Pilot operated versions require minimum operating pressure differential for proper operation.

#### Installation:

Valves can be mounted in any position.

# Mechanical Characteristics:

#### **Standard Materials of Construction**

- Body brass or stainless steel (430)
- Seals NBR or FKM seals as listed
- Sleeve tube stainless steel (303 or 304)
- Plunger stainless steel (430FR)
- Shading ring copper
- Stop stainless steel (430FR)
- Springs stainless steel (18-8)
- Pilot orifice stainless steel (303)



#### **Compatible Fluids**

- Depending on the valve used, most common media including air, inert gases or petroleum products.
- Hydraulic Fluids

# Electrical Characteristics:

#### **Voltages**

- AC 120/60-110/50 240/60-220/50
- DC 12, 24 & 120

#### **Power Consumption**

• 10, 22 watts

#### **Agency Approvals**

• cUL listed.

# **Maximum Ambient Temperature** 149°F

#### **Applications:**

- Pilot control on process valves
- Fluid "circuit breakers" requiring manual intervention to reset after being tripped (safety feature).



### 3-Way Direct Acting Stainless Steel Valves — Normally Closed, NBR or FKM Seals

Dort	Port Orifice Size Flow Factor		Eactor	Ор	erating Pi	ressure D	ifferentia	l (PSI)	No Voltago	Valve			
Size					Maximum				No-Voltage Release Pressure				
NPT					Min.*	40 D 1		Vessel Number	Coil		Ref.		
	ln	Exh.	In	Exh.		10 Watt	22 Watt	10 Watt	22 Watt		AC	DC	itei.
1/4"	3/64	3/32	0.062	0.17	0	200			200	70315SN2EVVR	7	8	D51
1/4"	1/16	3/32	0.11	0.17	0	150			150	70315SN2GVVR	7	8	D51
1/4"	3/32	3/32	0.17	0.17	0	90			90	70315SN2KVVR	7	8	D51

### 3-Way Pilot Operated - Brass Valves — Normally Closed or NBR Seals

Port			Ор	erating Pı	ressure D	ifferentia	No-Voltage	Valve			
Size NPT Orifice Size in.	Cv Factor	Min.*		Maxi	Release Pressure						
			AC Ratings		DC Ratings		Vessel Number	Co	oil	Ref.	
				10 Watt	22 Watt	10 Watt	22 Watt		AC	DC	'
1/2"	1/2	3.6	10	180			180	70312BN4UNVR	7	8	D51

<sup>\*</sup> Pilot operated valves require the minimum pressure differential specified for proper valve operation.

### 3-Way Direct Acting Brass Valves — Universal All-Ports-In-Body, FKM Seals

Port			actor	Оро	erating Pr	ressure D		l (PSI)	No-Voltage	Valve			
Size NPT	Ir	۱.	С		Min.*	AC Ra	Maxi ntings		atings	Release Pressure Vessel Number	Co	oil	Ref
	In Exh.		In Exh.			10 Watt	22 Watt	10 Watt	22 Watt		AC	DC	ivei
1/4"	5/64	5/64	0.14	0.14	0	100			100	7033TBN2JVVR	7	8	D51
1/4"	1/8	1/8	0.23	0.23	0	50			50	7033TBN2NVVR	7	8	D51

# 3-Way Direct Acting 316L Stainless Steel Valves — Intrinsically Safe, NBR Seals

Port			Оре	erating Pr	essure D	ifferentia	l (PSI)	No-Voltage Release	Valve	
Size	Orifice Size	Cv Factor			Maxi	mum		Pressure Vessel		
NPT	in.	011 40101	Min.*	AC Ra	ntings	DC Ra	atings	Number	Coil	Ref.
				10 Watt	22 Watt	10 Watt	22 Watt		COIL	IXCI.
1/4"	3/16	0.53	0	145		145		U033X5156*	*	D40

<sup>\*</sup>Consult factory for available coil/enclosure options.



### **Principles of Operation**

#### No Voltage release models

#### 3-Way Normally Closed Valves

These valve types can only be actuated (opened) when the coil is energized and the hand lever is manually moved downward to the latched valve-open position. If the coil is not energized, the mechanism will not become latched in this position, as soon as the hand lever is released, it will return to the unlatched valve-closed position. The hand lever mechanism can only be engaged when the coil is energized. When the solenoid coil is de-energized, the handle and the mechanism are automatically tripped at the valve is returned to its original normally closed, unlatched position.

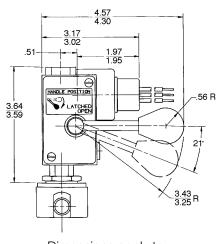
#### 3-way Normally Open Valves

The principles of operation for normally open valves are identical to the normally closed version except the valve's de-energized position is normally open.

### Valve Reference D51

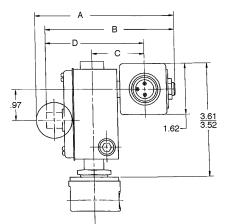


3-Way Normally Closed



Dimensions apply to Manual Reset feature only.

Dimension	No-Voltage	Electrically
	Release	Tripped
Α	4.64	4.40
В	4.31	4.07
С	1.79	1.59
D	3.26	3.06



#### Valve Specifications

ratio opecinicationi		
70312, 7	0315, 7033T Part Numbers	U033 Part Numbers Intrinsically Safe Valves
Valve Function	Multipurpose or Normally Closed	Multipurpose
Port Size	1/4" NPT or 1/2" NPT	1/4" NPT
Body Material	Brass or Stainless Steel	Stainless Steel
Seal Material	FKM or NBR	FKM
Coil Temperature Rating	Class F or Class H	Not Applicable
Power Consumption	10 Watt for AC or 22 Watt for DC	3 Watt
Voltage	120/60 - 110/50, 24 VDC	24 – 28 VDC
Coil Enclosure	½" Conduit for Hazardous Locations	Splice Box Enclosure with Strain Relief
Maximum Fluid Temperature	180°F	167°F
Max Ambient Temperature	104°F	149°F



Notes		



# 2-Way & 3-Way Hydraulic

Direct Acting Valves 1/8" NPT



## **General Description:**

2-Way & 3-Way hydraulic direct acting valves are specifically designed for use in hydraulic systems. These valves are spool type valves that can withstand a static pressure up to 3000 PSI. All internal parts are compatible with most hydraulic fluids.

#### Installation

Valves can be mounted in any position. Preferred orientation is with the coil vertical and upright.

#### **Standard Materials of Construction**

- Body—Stainless Steel (430F)
- Seals—Metal
- Flange Seal—NBR
- Sleeve Tube—Stainless Steel (304)
- Plunger—Stainless Steel (430FR)
- Stop-Stainless Steel (430FR)
- Springs—Stainless Steel (18-8)
- Shading Ring-Copper
- Spool—Stainless Steel (17-4PH)

#### **Compatible Fluids**

Hydraulic Fluids

# Electrical Characteristics:

#### **Voltages**

- AC 24/60 120/60-110/50 240/60-220/50
- DC-12, 24 & 120

#### **Power Consumption**

10, 14, 21 watts

Parker Hannifin Corporation Fluid Control Division 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd



#### **Coil Classification**

- Class F Standard
- Class H available (71211, 71221, 71331)
- Class B Coils Standard on (A11, A12, A13, A15, A16)

#### **Agency Approvals**

- UL and CSA approvals are available on valves with applicable coil/enclosure combinations.
   (Models 71211, 71221 and 71331 only)
- Models A11, A12, A13, A15 & A16 do not carry any agency approvals

#### **Maximum Ambient Temperature**

• 185°F

#### Maximum Allowable Leakage

- Maximum Allowable Internal Seat Leakage at 70° F with MIL-H-5606 oil is 80cc/min at 1000 PSI. (Models 71211, 71221 and 71331)
- Maximum Allowable Internal Seat Leakage at 70° F with MIL-H-5606 oil is 295cc/min at 3000 PSI. (Models A11, A12, A13, A15, A16)
- External None (All models)

### Applications:

- Hydraulic Cylinders
- Lift Trucks
- Machine Tools
- Sky Cranes
- Hydraulic Door Openers



### 2-Way High Pressure Hydraulic Valves - Normally Closed - Stainless Steel

			Oper	ating Pressu	re Different	ial (MOPI	D) PSI	M			Deference	
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Max. Static Pressure (PSI)	Max. Diff Pressure (PSI)	Max. Flow (GPM)	Watt	Max. Media Temp. °F	Seal	Pressure Vessel Number	Refe Coil	verence Valve
AC TE	CHNICA	L SPECI	FICAT	IONS								
1/8	3/32	0.15	0	3000	3000	8.5	21	185	Metal	A12LB13002	*	D28
1/8	7/64	0.21	0	1000	900	6.5	10	185	Metal	71211SN1MM00	7	D26
DC TE	ECHNICA	L SPEC	IFICAT	TONS								
1/8	3/32	0.15	0	3000	3000	8.5	14	185	Metal	A126LB13001	*	D28
1/8	7/64	0.21	0	1000	900	6.5	10	185	Metal	71211SN1MM00	7	

### 2-Way High Pressure Hydraulic Valves - Normally Open - Stainless Steel

			Oner	ating Pressu		ial (MOPI						
			Орсі	- Tessu	- Dillerent	iut (1·101 i	· · · · · · · · · · · · · · · · · · ·	Max.			Refe	rence
Port	Orifice	Flow		Max. Static	Max. Diff	Max.		Media				
Size	Size	Factor		Pressure	Pressure	Flow		Temp.		Pressure		
NPT	in.	Cv	Min.	(PSI)	(PSI)	(GPM)	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS								
1/8	3/32	0.15	0	3000	3000	9.0	21	185	Metal	A11LB13002	*	D28
1/8	7/64	0.21	0	1000	700	5.7	10	185	Metal	71221SN1MM00	7	D26
DC TE	CHNICA	L SPECI	FICATI	ONS								
1/8	3/32	0.15	0	3000	3000	9.0	14	185	Metal	A116LB13001	*	D28
1/8	7/64	0.21	0	1000	700	5.7	10	185	Metal	71221SN1MM00	7	D26

### 3-Way High Pressure Hydraulic Valves - Normally Closed - Stainless Steel

	<u>-,9</u>		<del></del>	ey a a a				, - 101	-	- 14 III 11 11 11 11 11 11 11 11 11 11 11 11		
			Ope	rating Pressu	re Differenti	al (MOPD	) PSI	Max.			Pofo	rence
Port	Orifice	Flow		Max. Static	Max. Diff	Max.		Media			ivere	Tence
Size	Size	Factor		Pressure	Pressure	Flow		Temp.		Pressure		
NPT	in.	Cv	Min.	(PSI)	(PSI)	(GPM)	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS								
1/8	3/32	0.15	0	3000	1000	5.7	21	185	Metal	A13LB13002	*	D29
1/8	3/32	0.15	0	3000	2000	7.0	21	185	Metal	A13LB13002	*	D29
DC TE	CHNICA	L SPECI	FICATI	IONS								
1/8	3/32	0.15	0	3000	1000	5.7	14	185	Metal	A136LB13001	*	D29
1/8	3/32	0.15	0	3000	2000	7.0	14	185	Metal	A136LB13001	*	D29

<sup>\*</sup> For coil information see chart on bottom of the next page.



### 3-Way High Pressure Hydraulic Valves - Normally Open - Stainless Steel

			Oper	Operating Pressure Differential (MOPD) PSI							Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Max. Static Pressure (PSI)	Max. Diff Pressure (PSI)	Max. Flow (GPM)	Watt	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS						_		
1/8	3/32	0.15	0	3000	3000	9.0	21	185	Metal	A15LB13002	*	D29
1/8	3/32	0.15	0	3000	3000	8.5	21	185	Metal	A15LB13002	*	D29
DC TE	CHNICA	L SPECI	FICATI	ONS								
1/8	3/32	0.15	0	3000	3000	9.0	14	185	Metal	A156LB13001	*	D29
1/8	3/32	0.15	0	3000	3000	8.5	14	185	Metal	A156LB13001	*	D29

### 3-Way High Pressure Hydraulic Valves - Directional Control - Stainless Steel

	<u>, , , , , , , , , , , , , , , , , , , </u>											
			Opei	rating Pressu	re Different	ial (MOPI	) PSI	Max.			Rofe	rence
Port	Orifice	Flow		Max. Static	Max. Diff	Max.		Media			IXCIC	Terree
1 ' '	l or mice	1 1000		I Max. Static	Max. Dill	l Max.		I Mcala			1	
Size	Size	Factor		Pressure	Pressure	Flow		Temp.		Pressure		
NPT	in.	Cv	Min.	(PSI)	(PSI)	(GPM)	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TE	CHNICA	L SPECI	FICATI	ONS								
1/8	3/32	0.15	0	3000	2000	7.0	21	185	Metal	A16LB13002	*	D29
1/8	3/32	0.15	0	3000	2000	7.0	21	185	Metal	A16LB13002	*	D29

DC TE	DC TECHNICAL SPECIFICATIONS													
1/8	3/32	0.15	0	3000	1000	7.0	14	185	Metal	A166LB13001	*	D29		
1/8	3/32	0.15	0	3000	2000	7.0	14	185	Metal	A166LB13001	*	D29		

### 3-Way High Pressure Hydraulic Valves - Universal - Stainless Steel

			Oper	ating Pressu	re Different	tial (MOP	D) PSI	Max.			Reference	
Port	Orifice	Flow		Max. Static	Max.		Media			Kere	.i ciicc	
Size	Size	Factor		Pressure						Pressure		
NPT	in.	Cv	Min.	(PSI)	(PSI)	(GPM)	Watt	°F	Seal	Vessel Number	Coil	Valve
AC TEC	CHNICAL	SPECI	FICAT	IONS			•					
1/8	7/64	0.21	0	1000	See Ta	ble 1	10	185	Metal	71331SN1MM00	7	D27
					xt page)							

DC TECHNICAL SPECIFICATIONS											
1/8	7/64	0.21	0	1000	See Table 1 (Top of next page)	10	185	Metal	71331SN1MM00	7	D27

Figure 1\*

*	Voltage	24/60	120/60	240/60	12VDC	24VDC	
	Coil Code	AB2A44	AB6A46	AB8A48	DC1A22	DC2A23	
	Coil Part Number*	AB720S24	AB728S24	AB731S24	A7724F24	A7727F24	

<sup>\*</sup>When ordering a replacement coil, use Coil Part Number (not Coil Code)



www.parker.com/fcd

<sup>\*</sup>Select the Series A pressure vessel model number as shown above and follow with the appropriate coil/enclosure part number based or required voltage from Fig. 1

Example A15LB13002 for 120/60 becomes part number A15LB13002AB6A46 Example A166LB13001 for 12VDC becomes part number A166LB13001DC1A22

### Table 1: 3-Way High Pressure Hydraulic Valves (Series A) Maximum Permissible Flow & Pressure Differentials

Valve Function	Flow Path	Maximum Pressure Differential (PSI)	Maximum Flow (GPM)	
3-Way Normally Closed	Port 1 to Port 2	1000	5.7	
	Port 2 to Port 3	1000	7.0	
3-Way Normally Open	Port 3 to Port 2	3000	9.0	
	Port 2 to Port 1	3000	8.5	
3-Way Universal (Directional)	Port 2 to Port 3	2000	7.0	
	Port 2 to Port 1	2000	7.0	

#### **Flow Limits**

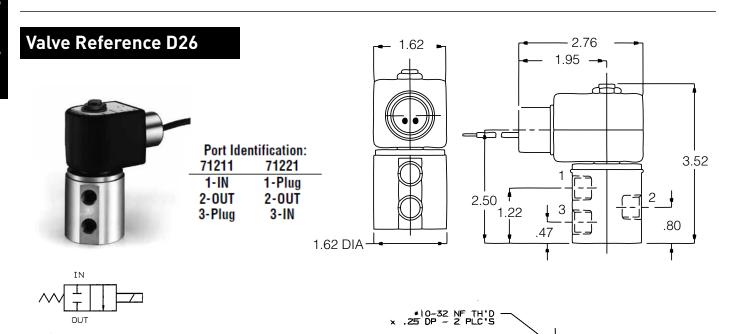
The spool in A10 Series valves will fail to shift when the flow exceeds the maximum rated value. Each catalog listing indicates the flow and pressure drop for which these valves will operate without malfunction.

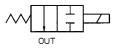
The static pressure listed for each valve will not adversely affect valve operation as long as the rated flows and pressure differentials are not exceeded. The maximum flows (GPM) and pressure differentials (PSI) are based on Mil-H-5606A hydraulic oil at 80°F.

Response Times: AC = Approximately 4-8 ms to open or close

DC = Approximately 15-30 ms to open, 15-25 ms to close.

Operating Speed: Up to 300 cycles per minute





2-Way Normally Closed

71221 2-Way Normally Open

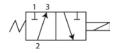


.63

1.25

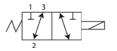
# Valve Reference D27

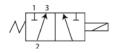




3-Way Normally Closed

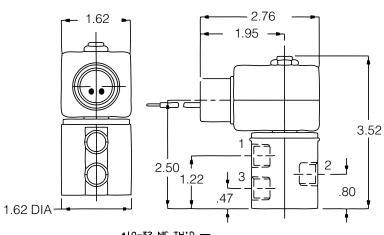
3-Way Normally Open

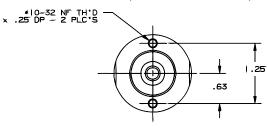




3-Way Universal

3-Way Diverting





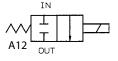
	Port Identification:											
	NC	NO	Universal	<b>Directional Control</b>								
1	Pressure	Exhaust	NC	NC								
2	Cylinder	Cylinder	Cylinder	IN								
3	Pressure	Pressure	NO	NO								

-3.19

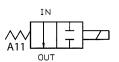
1.86→

# Valve Reference D28

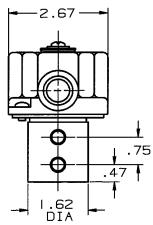


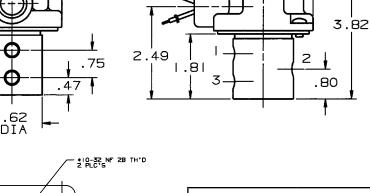


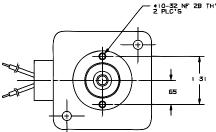
2-Way Normally Closed



2-Way Normally Open



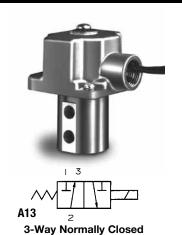


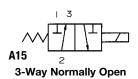


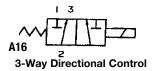
Port Identification				
A11	A12			
1-plugged	1-IN			
2-OUT	2-OUT			
3-IN	3-Plugged			

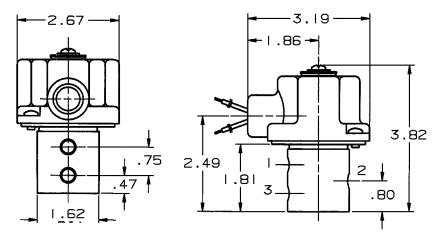


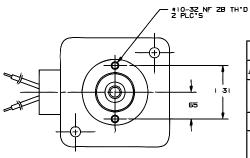
# Valve Reference D29











Port Identification								
A13	A15	A16						
1-IN	1-Exhaust	1-Normally Closed						
2-Cylinder	2-Cylinder	2-In						
3-Exhaust	3-IN	3-Normally Open						

### Notes



# Magnelatch® Coil Option

Magnelatch® coil option eliminates power consumption and heat rise



### **General Description:**

Solenoid valves are typically operated by an on/off coil that remains on, generates heat, and consumes power while operating. Power consumption can be a problem for continuous duty applications.

Parker Fluid Control Division offers a no power solution for your nonsafety shut-off applications. This solution is the Magnelatch® coil option. This coil option is offered on the products in this section.

The Magnelatch® operator contains a permanent magnet that is shifted on (latched) or off (released) by a momentary electrical current pulse of approximately twenty milliseconds (.02 seconds).

The conventional solenoid valve is in one of two positions – off or de-energized, or on – energized. The Magnelatch® requires no continuous power thus the term latch position is used for on and release position for off. Valves with Magnelatch coils remain in their last energized position and do not return to their de-energized position in the event of a power outage.

Magnelatch coils are not available on valves for steam service.

Valves with Magnelatch coils have the same pressure rating as that valve with a 10 watt coil.



# Applications:

### Instrumentation

No heat build up – eliminates constant calibrations and permits confinement and compactness.

Can be used with such sensors as thermistors and thermocouples.

### **Machine Tools**

Operates with simple switches and eliminates holding relays and relayed circuitry required to sequence and position operations.

### **Remote Control Equipment**

pulsing circuitry, low power consumption permit the use of Magnelatch® coils in many custom operations. Operation can be controlled by radio frequency or mechanical timer, etc.

### **Other Applications**

- Medical equipment
- Transportation products
- Material handling equipment
- Solar panels
- Pilot valve on control valve (3-Way)
- Single acting Cylinder Actuation (3-way)
- Natural gas service



# **Wiring Circuits**

Leads/Wires	Description
2	For use with standard duty DC power source

### **Pulse Coils - Current Draw**

Latch	Release
12v DC Latch 2.10 amps.	Release 1.95 amps.

### **Pulse DC Operation**

Minimum pulse for Latching is 10 milliseconds.

Minimum pulse for Releasing is 25 milliseconds.

Maximum "ON" time is 5 minutes with minimum "OFF" time 40 minutes. If the "ON" time is of a shorter duration, the "OFF" time would be shorter proportionally.

2-Way Direct Acting Normally Closed Stainless Steel

			O <sub>I</sub>		Ope	rating							
	Orific	e Size in.	Cv Flo	ow Factor	Pre	Pressure							
Port						Air,	Fluid						
Size						Inert	Temp.		DC				
NPT	IN	Exhaust	IN	Exhaust	Min.	Gas	°F	Seal	Watt	Voltage	Wire	Enclosure	Pressure Vessel Number
DC													
1/8	3/64	N/A	0.06	N/A	0	450	185	NBR	18	24VDC	2	Grommet	71215SN1ENP6M2J011C2

3-Way Direct Acting Normally Closed Stainless Steel

	Orific	e Size in.		Flow actor	Pres	rating ssure PSI)							
	Office	C SIZE III.	1 (	actor	(1								
						Air,							
						Inert							
						Gas,	Max.						
Port						Water,							
									DC				
Size		<u></u>				Light		l					
NPT	IN	Exhaust	IN	Exhaust	Min.	Oil	°F	Seal	Watt	Voltage	Wire	Enclosure	Pressure Vessel Number
1/8	3/64	1/16	0.06	0.09	0	250	185	FKM	18	24VDC	2	Grommet	71315SN1EVJ1M2J011C2
						,							
1/4	3/64	1/16	0.06	0.09	0	250	185	NBR	18	12VDC	2	½" Conduit	71315SN2ENJ1M1J011C1
1/4	1/16	1/16	0.11	0.09	0	200	185	NBR	18	12VDC	2	½" Conduit	71315SN2GNJ1M1J011C1
1/4	3/32	3/32	0.17	0.17	0	125	185	NBR	18	12VDC	2	½" Conduit	71315SN2KNM5M1J011C1*
1/4	3/64	1/16	0.06	0.09	0	235	77	FKM	15	24VDC	3	Hazardous	X5RBM66890DC2A4K
1/4	1/16	1/16	0.11	0.09	0	100	77	NBR	16	12VDC	2	Hazardous	X53RBM2100DC1A9J
1/4	1/16	1/16	0.11	0.09	0	100	77	NBR	16	24VDC	2	Hazardous	X53RBM2100DC2A0K
1/4	1/8	3/32	0.23	0.17	0	50	77	NBR	16	12VDC	3	Hazardous	X5RBM64640DC1A3K

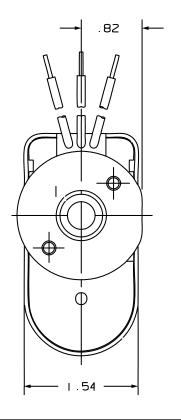
<sup>\*</sup> Valve includes manual override as a standard feature

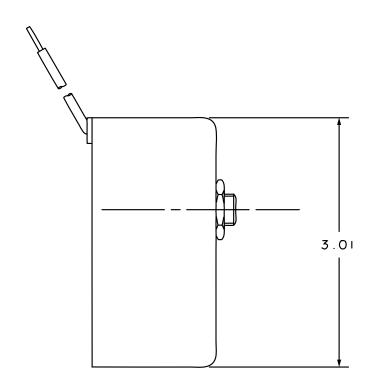
3-Way Direct Acting Universal Stainless Steel

	_ <b>_</b> _			Cv Flow Operating							l		
	l						١.,				l		
	Orifice	Size in.	Fa	actor	Pres	ssure	Max.				<u> </u>		
Port						Air,	Fluid						
Size						Inert	Temp.		DC				
NPT	N.C.	N.O.	N.C.	N.O.	Min.	Gas	°F	Seal	Watt	Voltage	Wire	Enclosure	Pressure Vessel Number
1/4	1/16	1/16	0.10	0.10	0	125	77	NBR	15	12VDC	3	Hazardous	X5RBM55740DC1A3K
1/4	1/16	1/16	0.10	0.10	0	125	77	NBR	15	24VDC	3	Hazardous	X5RBM55740DC2A4K
1/4	1/16	1/16	0.10	0.10	0	115	185	NBR	18	12VDC	3	½" Conduit	71335SN2GNJ1M1G011C1
1/4	3/32	3/32	0.17	0.17	0	80	185	NBR	18	12VDC	2	½" Conduit	71335SN2KNJ1M1J011C1



### Valve Reference D52



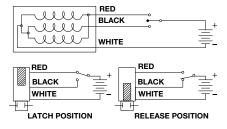


Note: Shown for coil/enclosure dimensional reference only.

Coil Kits	Wire	DC Voltage
M1J011C1	2	12
M2G011C1	3	12
M2G011C2	3	24

### 3 wire - Pulse Power Source

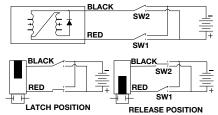
### MAGNELATCH® WIRING SCHEMATIC



AC voltage Magnelatch coils are available, although minimum order quantities may apply. Consult factory for further information.

# 2 wire - Standard Duty Power Source

### MAGNELATCH® WIRING SCHEMATIC



### **Pulse DC Operation**

Minimum pulse for Latching is 10 milliseconds. Minimum pulse for Releasing is 24 milliseconds

Maximum "ON" time is 5 minutes with minimum "OFF" time 40 minutes. If the "ON" time is of a shorter duration, the "OFF" time would be shorter proportionally.

Latch	Release
12VDC Latch 2.10 amps	Release 1.95 amps
24VDC Latch 1.22 amps	Release 1.21 amps

	Nominal Val Duration for Operation (M	Momentary	Nominal Values Cur- rent Drain in Amperes			
Voltage	Latch	Release	Latch	Release		
12VDC	10	12	1.40	.75		
24VDC	10	25	0.710	0.380		



Notes		



# Dual-Flow Dispensing Valve

For the Fuel Dispensing Market



# **General Description:**

Parker Fluid Control Division's Dual-Flow solenoid valves are designed to control two flow rates on command. The valves are actually two valves in one compact assembly using a single dual-wound coil.

The valves accurately dispense a predetermined amount of liquid by providing a high-flow (full-flow) for delivery of the bulk amount, and then switch to the low-flow mode to dispense the final amount required.

### Installation:

Valves can be mounted in any position.

# Mechanical Characteristics:

Flow Sequence

Off-Low-High-Low-Off

# Standard Materials of Construction:

- Body Brass
- Seals fluorocarbon (FKM)
- Sleeve stainless steel
- Plunger stainless steel (430 FR)
- Diaphragm NBR
- Shading Ring copper
- Springs stainless steel

### **Enclosure**

Explosion proof, 1/2" conduit, NEMA Type 7 (UL Class I, Groups C & D)



# Electrical Characteristics:

### **Standard Voltages:**

AC -120/60 110/50 DC & other voltages - consult factory

### **Power Consumption**

- High flow 15 watts
- Low flow 8 watts

### **Agency Approvals**

UL listed and CSA certified (ATEX and IECEx available upon request)

### **Coil Classification**

Class F taped with 3 gasoline vapor resistant lead wires.

# **Applications:**

- Fuel dispensing
  - Pre-pay
- Process industries (blending/mixing/batching)
  - Petrochemical
  - Refining
  - Food
  - Pharmaceutical

# Maximum Ambient and Fluid Temperature

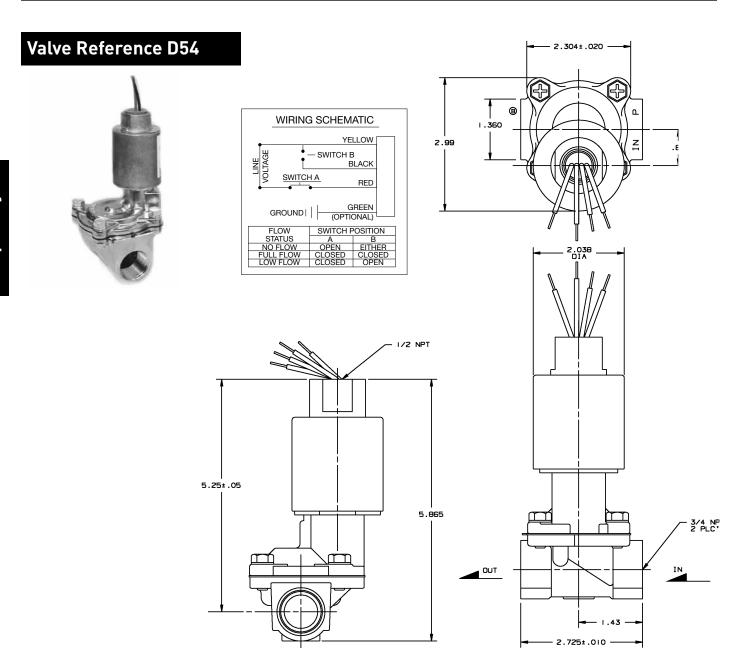
104°F



### 2-Way Normally Closed - XLG Fuel Dispensing - Brass

	Orific	e Size	Flow F	actor Cv	Pre	erating essure ential PSI	Max.			Refe	rence
Port Size NPT	Full Flow	Low Flow	Full Flow	Low Flow	Min.	Max AC	Media Temp. °F	Seal	Pressure Vessel Number	Coil	Valve
3/4	3/4	3/32	5.5	0.17	5	50	140	FKM	XLG20600	*	D54
1	1-1/2	1/16	13	0.12	5	50	140	FKM	XLG201030	*	D61
1-1/2	1-1/4	1/16	21	0.12	5	50	140	FKM	XLG201530	*	D55

<sup>\*</sup>Consult factory for coil/enclosure selection





# Valve Reference D55 5.845 5.785 2.146 2.145 WIRING SCHEMATIC YELLOW BLACK BLACK BLACK BLACK BLACK BLACK BLACK

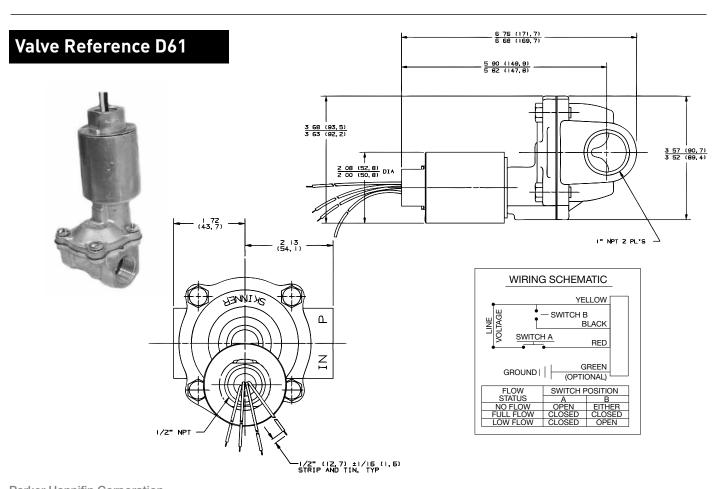
- 2.235 SYM -

SWITCH A

GROUND| |

GREEN (OPTIONAL)

SWITCH POSITION







Notes	



# **Fuel Selector Manifolds**

6 Port Manifold with Manual Override and 5 PSI Check Valve



### General Description:

Parker Fluid Control's Fuel Selector Valve Manifolds are designed for electrically controlled remote tank selection in application with multiple diesel fuel tanks.

Unique in design, the Fuel Selector Valve Manifold permits continuous engine function during tank switching from a safe and convenient location.

These innovative manifold solutions include 2-way, normally closed solenoid operators that are rated for fuel safety shut-off and feature a manual operator (standard) for system operation during a power outage.

### Installation:

Valves can be mounted in any position.

### Standard Materials of construction:

Body – Anodized Aluminum Seals – Fluorocarbon (FKM) Sleeve – 300 Series Stainless Plunger/Stop – 430 FR Stem – Stainless Steel

# **Electrical Characteristics:** Standard Voltages

DC - 12, 24

#### **Coil Classification:**

Class F standard (10 watt)

### **Maximum Ambient Temperature:**

176° F



### **System Specifications:**

- Six Port Diesel Manifolds
  - Four 2-Way normally closed operators ensure fuel shutoff and return flow.
  - 5 PSI (0.34 bar) check valve included with manifold to be installed between engine supply and return ports.

### **Applications:**

- Marine/mobile applications
  - Multiple tank selection
  - Fuel polishing (marine)
- Power generation
  - Multiple tank selection

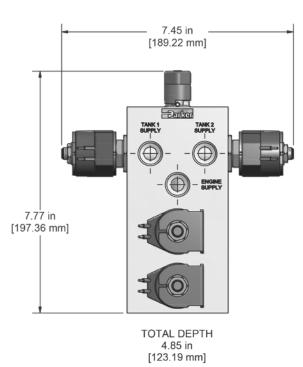
# Mechanical Characteristics:

- Recommended Filtration: 150 micron (not included)
- Flow Capacity:
  - 180 GPH 6 port diesel

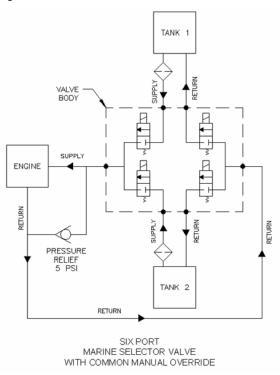


		EN	GLISH UNITS				MET	RIC UNITS	
Port Size	Orifice Size	Cv		Pressure ntial PSI	Complete Valve	Orifice Size	Kv Factor		Pressure tial (bar)
NPT	(in.)	Factor	Min.	Max.	Number*	(mm)	(m³/h)	Min.	Max.
1/2	7/16	2.25	0	3	7121Z027F1J111xx	11.1	1.935	0	0.207

<sup>\*</sup>In place of 'xx' in the part number, use 'C1' for 12VDC or 'C2' for 24VDC voltages.



Dimensional Drawings for the 6 port Fuel Selector Manifold



Schematic shows the ease of incorporating the Fuel Selector Manifold into your system

### **Maximum Ambient Temperature:**

176°F

Per ABYC H23 (Diesel Fuel Systems) and ABYC H-24 (Gasoline Fuel Systems)

### **Maximum Fluid Temperature:**

71°C or 160°F

Current Draw: .83A each coil

**Power Consumption:** 10 watts each coil **Coil:** Molded Class F coil with 18" leads **Electrical Enclosure:** External Yoke

**Body Material:** Aluminum

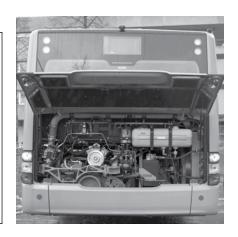
**Seal Material:** FKM

For equivalent 3 port versions of the valve. For gasoline service, please contact Parker Hannifin Fluid Control Division @ 1800-VALVE05.



# **CNG Valve**

High pressure and high flow valves for compressed natural gas



# **General Description:**

In an effort to be environmentally conscious, comply with government emission laws and decrease dependence on foreign oil, clean burning alterative fuels such as CNG (compressed natural gas) have become a viable solution. Parker Fluid Control Division is committed to providing system solutions for these and many other alternative fuel applications.

Parker Fluid Control Division is now pleased to offer the high pressure, high flow, low leakage CNG natural gas valve. This product is designed for integration into compressed natural gas fuel delivery systems (i.e. trucks, buses, & etc...) utilizing single and multi-tank applications.

#### Installation:

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

### **Standard Materials of Construction:**

Body - Stainless steel (430F)

Seals - HNBR (7121Z033xxx)\*

- Nylon (7121Z015xxx)

Plunger/Stop - Stainless steel (430F)

Spring - Stainless steel (17-7 PH)

Sleeve - Stainless steel (305)

\*HNBR is a proprietary seal material



# Electrical Characteristics:

### **Standard Voltages**

DC - 12, 24

### **Coil Classification:**

Class H standard

# **Maximum Ambient Temperature:** 170° F

### **Current Drain:**

- 1.6 amps (12VDC)
- 0.83 amps (24VDC)

# **Product Advantages:**

- Valves range in flow for single and multi-tank systems
- Wide pressure range of 0-4500 PSI for working and maximum operating tank pressure
- Max Allowable Internal Seat Leakage
  - 7121Z033xxx Bubble-tight from 0-4500 psi
  - 7121Z015xxx <100 cc/min from 300-4500 psi

**Note:** Consult Factory for other CNG valves used in installations after the CNG is regulated to a much lower pressure.

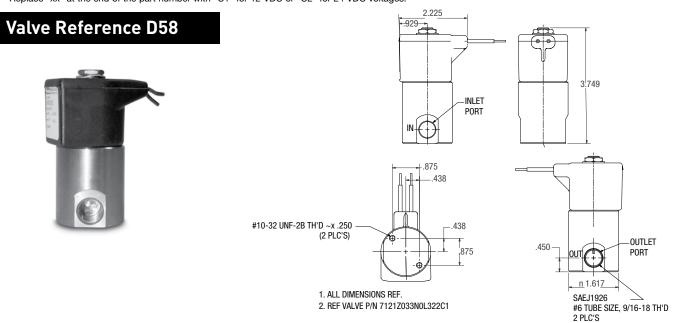


### 2-Way Normally Closed - Stainless Steel

	Orific	e Size	Flo Facto			ting Pressure erential PSI	Min. Media	Max.				Refe	ence
Port						Compressed	Temp.	Media			Valve Assembly		
Size	Pilot	Body	Pilot	Body	Min.	Natural Gas	°F	Temp. °F	Watt	Seal	Part Number**	Coil	Valve
SAE-6	.031	.109	.021	0.2	0	4500	-10	180	22	HBNR*	7121Z033NOL322xx	8	D58

<sup>\*</sup>Proprietary Seal Material

<sup>\*\*</sup> Replace "xx" at the end of the part number with "C1" for 12 VDC or "C2" for 24 VDC voltages.



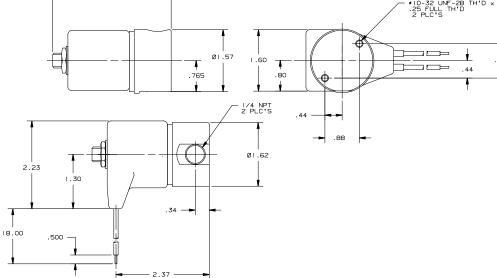
### 2-Way Normally Closed - Stainless Steel

Port		Flow	•	ting Pressure erential PSI	Min. Media	Max. Media				Refer	rence
Size NPT	Orifice Size	Factor Cv	Min.	Compressed Natural Gas	Temp. °F	Temp. °F	Watt	Seal	Valve Assembly Part Number**	Coil	Valve
1/4	0.031	0.021	0	4500	-10	170	22	Nylon	7121Z015NOL322xx	8	D59

D74

### Valve Reference D59







Parker Hannifin Corporation Fluid Control Division 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd

<sup>\*\*</sup> Replace "xx" at the end of the part number with "C1" for 12 VDC or "C2" for 24 VDC voltages.

# **Timer Drain Valves**

# For Compressed Air Systems



### **General Description:**

Parker Fluid Control's Timer Drain Valves automatically eliminate condensate that has collected up in compressed air lines.

These timers can be used on a wide variety of our 2-way solenoid Normally Closed valves as well as 3-way valves for piloting our larger Angle Body control valve, using DIN 43650A / ISO 440 coils.

Timers are available to control both the duration and frequency of the valves energized period during which condensate is evacuated.

### Installation:

Preferred orientation is with the coil vertical and upright.

### **Standard Materials of Construction:**

Body - Brass

Seals - FKM

Plunger/Stop – Stainless steel (430F) Sleeve – Stainless steel (304/305) Springs – Stainless steel (18-8) Shading Ring – Copper

# Electrical Characteristics:

### **Standard Voltages**

AC -24-240/50-60Hz DC -24-240 VDC

### **Coil Classification**

Class F Standard Class H Available

Parker Hannifin Corporation Fluid Control Division 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd



### **Agency Approvals**

- UL listed and CSA certified
- Meets NEMA Type 4X requirements
- CE Certification

### **Maximum Ambient Temperature**

- -23° F to 122°F for Timer
- See Product Page for Valve Temperature Range

### **Applications:**

- Air Compressors
- Air Drying Systems
- Refrigerated Dryer Systems

### **Key Features:**

- Selectable Timer Ranges for duration and frequency to precisely match contaminant load
  - 0.5 10 seconds ON
  - 0.5 45 minutes OFF
- Integral Strainer available to prevent contaminant from affecting valve operation
- Manual reset & test button
- LED's to indicate operation
- Rated for Continuous Duty



### 2-Way Pilot Operated Brass Timer Drain Valves - Normally Closed, FKM Seals

			Operatin	g Pressure Diff	erential (PSi)		
	Orifice			Maxi	mum	Max. Fluid	
Port Size	Size	cv		AC Ratings	DC Ratings	Temp.	
NPT	(inch)	Factor	Min.*	10 watt	10 watt	(F)	Pressure Vessel Number**
1/4"	7/16	1.75	3	150	60	210	7321KBN2NF00N0D1DMxx
1/4"	7/16	1.75	3	300	45	210	7321KBY61640N0D1DMxx
3/8"	7/16	2.5	3	300	45	210	7321KBY63200N0D1DMxx
1/2"	7/16	2.7	3	300	45	210	7321KBY6320AN0D1DMxx

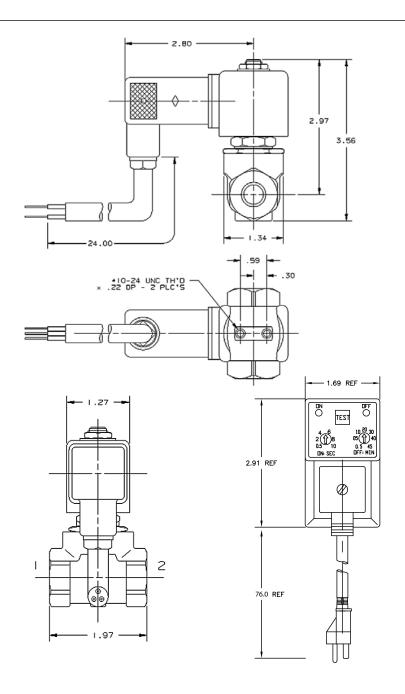
<sup>\*</sup>Pilot operated valves require the minimum pressure differential specified for proper valve operation.

### Valve Reference D60





2-Way Normally Closed Port Identification: Flow arrow on body indicates flow direction. Ports are not marked.





<sup>\*\*</sup> Replace 'xx' at the end of part number with: 'B2' for 24/60, 'P3' for 120/60-110/50, 'Q3' for 240/60-220/50, 'C2' for 24VDC and 'B6' for 120VDC voltages. Consult Factory for List pricing and minimum order quantities that may apply for certain voltages.

# Coil Reference

Coil Portfolio and Solenoid Enclosures (Integrated Modular Coils and Replacement Coils for Non-integrated)



### General Description:

### **Solenoid Enclosure and Coil Information**

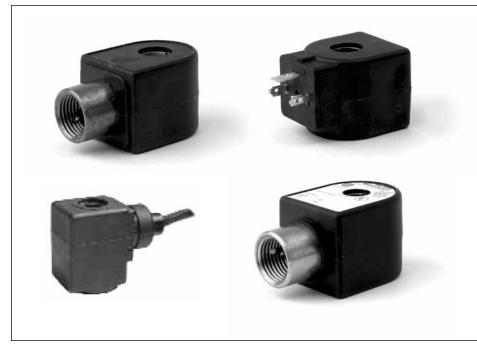
Coils are electrical devices that produce magnetic flux when electrical power is applied to the windings. Surrounding the coil is the metal solenoid enclosure and frame. Together with the plunger and stop, it forms the magnetic circuit that operates the valve. Without the enclosure, the magnetic circuit is not complete. Without a complete magnetic circuit, the magnetic field is reduced and valve performance suffers. Depending on the coil voltage and power rating, the pressure rating of the valve can vary.

Solenoid enclosures come in a variety of constructions offering varying levels of protection against the elements and other forces. NEMA identifies the different enclosures as "Types" and NEC sets standards for their safety and performance.

Integrated coils have an epoxy or thermoplastic "over-molding" creating a one-piece coil/enclosure for modularity and protection from the environment.

The National Electrical Manufacturers Association (NEMA) recommends suitable materials and components to meet each enclosure type. The enclosures listed here will only meet the applicable NEMA recommendations when properly installed and operated to NEMA specifications and in accordance with the NEC.





## **Electrical Characteristics:**

### **Standard Voltages:**

AC -24/60 120/60 110/50 240/60 220/50 DC -12, 24 &120

For other Voltages – Consult Factory

### **Coil Classification:**

Class F Standard Class H Available

### **Agency Approvals:**

Standard valves with NEMA Type 4X or Explosion Proof solenoid enclosures are UL Listed and CSA Certified.
DIN coils are UL Recognized. For additional details, consult factory.

Optional coils feature ATEX and IECEx Approvals.

### **Ultra Low Power Coils (Coil Chart 12)**

are used on valves with a unique solenoid operator designed to keep current draw to a minimum, thus achieving the extremely low power consumption of 0.6 watts with no refresh time required for subsequent energization. These valves are ideally suited for use in automated control systems, applications where minimizing energy consumption is critical or where heat rise in the coil must be kept to a minimum. Due to the low power consumption, an increased number of solenoid valves can be driven from the same power source, reducing the overall installation cost.

				1 1	
	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 1					
	AF4C01		24/60	6	F
	AF4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	6	F
A	AF4C15		240/60, 220/50	6	F
	AH4C01		24/60	6	Н
	AH4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	6	Н
	AH4C15**		240/60, 220/50	6	Н
	AFPH01		24/60	6	F
	AFPH05	DIN 43650A/ISO 4400	120/60, 110/50	6	F
	AFPH15**		240/60, 220/50	6	F
CHART 2					
	BF4C01		24/60	10.2	F
	BF4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	10.2	F
000	BF4C15		240/60, 220/50	10.2	F
	BH4C01**		24/60	10.2	Н
	BH4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	10.2	Н
	BH4C15**		240/60, 220/50	10.2	Н
	BFPH01**		24/60	10.2	F
	BFPH05	DIN 43650A/ISO 4400	120/60, 110/50	10.2	F
	BFPH15	2111 100007 VICO 1100	240/60, 220/50	10.2	F
	BHPH01**		24/60	10.2	Н
	BHPH05	DIN 43650A/ISO 4400	120/60, 110/50	10.2	Н
	BHPH15		240/60, 220/50	10.2	Н
CHART 3					
	1F4C75		12VDC	9.5	F
OFFI	1F4C80	1/2" NPT Conduit/18" Leads	24VDC	9.5	F
	1H4C75**		12VDC	9.5	Н
	1H4C80**	1/2" NPT Conduit/18" Leads	24VDC	9.5	Н
	1FPH75		12VDC	9.5	F
	1FPH/5	DIN 43650A/ISO 4400	24VDC	9.5	F
20	1HPH75**		12VDC	9.5	
		DIN 43650A/ISO 4400			H
	1HPH80		24VDC	9.5	Н

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.



<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 4					
	CF4C01		24/60	11	F
	CF4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	11	F
	CF4C15		240/60, 220/50	11	F
CE I	CH4C01		24/60	11	Н
	CH4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	11	Н
	CH4C15	7/2 THI I GOTTAIN TO LOAG	240/60, 220/50	11	Н
	CFPH01		24/60	11	F
	CFPH05	DIN 43650A/ISO 4400	120/60, 110/50	11	F
	CFPH15		240/60, 220/50	11	F
	CHPH01		24/60	11	Н
	CHPH05	DIN 43650A/ISO 4400	120/60, 110/50	11	Н
	CHPH15		240/60, 220/50	11	Н
CHART 5					
	DF4C01		24/60	16	F
	DF4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	16	F
	DF4C15		240/60, 220/50	16	F
	DH4C01**		24/60	16	Н
	DH4C05	1/2" NPT Conduit/18" Leads	120/60, 110/50	16	Н
	DH4C15**		240/60, 220/50	16	Н
	DFPH01		24/60	16	F
	DFPH05	DIN 43650A/ISO 4400	120/60, 110/50	16	F
	DFPH15		240/60, 220/50	16	F
	DHPH01**		24/60	16	Н
	DHPH05	DIN 43650A/ISO 4400	120/60, 110/50	16	Н
	DHPH15	שנים אינטטטאיזסט 4400 – ביי אינטטטאיזסט 4400 – ביי אינטטטאיזסט	240/60, 220/50	16	Н

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.



<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 6					
	3F4C75	1/2" NPT Conduit / 18" Leads	12VDC	11.5	F
	3F4C80	1/2 NPT Collduit / 16 Leads	24VDC	11.5	F
	3H4C75**		12VDC	11.5	Н
	3H4C80	1/2" NPT Conduit / 18" Leads	24VDC	11.5	Н
	3FPH75	DIN 40050A/ISO 4400	12VDC	11.5	F
	3FPH80	DIN 43650A/ISO 4400	24VDC	11.5	F
	3HPH75**		12VDC	11.5	Н
	3HPH80	DIN 43650A/ISO 4400	24VDC	11.5	Н

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.



<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

### Additional Coil Options for Charts 1-6 (Below are replacement coils only; no enclosures except as noted)

	Part Number	Type of Termination	Voltage	Wattage	Class
	AFSB01		24/60	6	F
	AFSB05	NEMA 1 Splice Box w/ 6" Leaded Coil	120/60, 110/50	6	 F
	AFSB15	NEW TOPING BOX W/ C Educa Com	240/60, 220/50	6	 F
	BFSB01*		24/60	10.2	 F
	BFSB05*	NEMA 1 Splice Box w/ 6" Leaded Coil	120/60, 110/50	10.2	 F
	BFSB15*		240/60, 220/50	10.2	 F
	CFSB01		24/60	11	 F
	CFSB05	NEMA 1 Splice Box w/ 6" Leaded Coil	120/60, 110/50	11	 F
	CFSB15		240/60, 220/50	11	F
	DFSB01*		24/60	16	 F
	DFSB05	NEMA 1 Splice Box w/ 6" Leaded Coil	120/60, 110/50	16	F
	DFSB15*		240/60, 220/50	16	F
	1FSB75**		12 VDC	9.5	F
	1FSB80	NEMA 1 Splice Box w/ 6" Leaded Coil	24 VDC	9.5	F
	3FSB75		12 VDC	11.5	F
	3FSB80	NEMA 1 Splice Box w/ 6" Leaded Coil	24 VDC	11.5	F
	AFEC01*		24/60	6	F
	AFEC05	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	120/60, 110/50	6	F
	AFEC15	nazardous location enclosure	240/60, 220/50	6	F
	BFEC01		24/60	10.2	F
	BFEC05	18" Leaded Coil for NEMA 7/9	120/60, 110/50	10.2	F
	BFEC15	hazardous location enclosure	240/60, 220/50	10.2	F
	CFEC01*		24/60	11	F
	CFEC05	18" Leaded Coil for NEMA 7/9	120/60, 110/50	11	F
	CFEC15	hazardous location enclosure	240/60, 220/50	11	F
	DFEC01*		24/60	16	F
	DFEC05	18" Leaded Coil for NEMA 7/9	120/60, 110/50	16	F
	DFEC15	hazardous location enclosure	240/60, 220/50	16	F
	1FEC75*	18" Leaded Coil for NEMA 7/9	12 VDC	9.5	F
	1FEC80	hazardous location enclosure	24 VDC	9.5	F
	3FEC75	18" Leaded Coil for NEMA 7/9	12 VDC	11.5	F
	3FEC80	hazardous location enclosure	24 VDC	11.5	F

<sup>\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.



### Additional Coil Options for Charts 1-6 Cont. (Below replacement coils only, no enclosures)

	Part Number	Type of Termination	Voltage	Wattage	Class
·	AHEC01* AHEC05* AHEC15*	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	24/60 120/60, 110/50 240/60, 220/50	6	Н
1	BHEC01* BHEC05* BHEC15*	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	24/60 120/60, 110/50 240/60, 220/50	10.2	Н
	CHEC01		24/60		
l	CHEC05	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	120/60, 110/50	11	Н
	CHEC15		240/60, 220/50		
	DHEC01		24/60		
	DHEC05	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	120/60, 110/50	16	Н
	DHEC15		240/60, 220/50		
	IHEC75 IHEC80	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	12 VDC	9.5	Н
	1112000	To Ecaded Con for NEIWAY 773 Hazardous location choicsure	24 VDC	0.0	•••
	3HEC75 3HEC80	18" Leaded Coil for NEMA 7/9 hazardous location enclosure	12 VDC	11.5	Н
		To Ecaded Con for NEWAY 773 Hazardous location enclosure	24 VDC	11.5	П

<sup>\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

### **DIN Electrical Accessories for Charts 1-6**

Part Description
------------------

ELECD1

Cable Gland DIN Plug



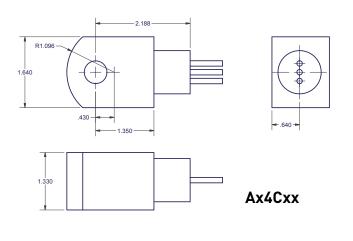
ELECD2

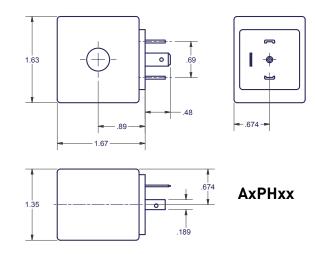
1/2" Conduit DIN Plug

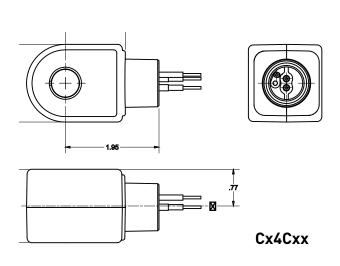


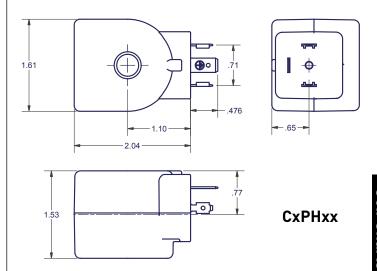


### **Coil Charts 1-6 Integrated Coil Dimensional Values**









# Valves using coil charts 1-6 (Gold Ring™ brand) Part Numbering Information: Reference ONLY

1 & 2 Connection	Туре	4 5 Construction	6 Operation	7 Body Material	8 Trim	9 & 10 Orifice Size	11 Current Design Series Designations
02 1/8 04 1/4 06 3/8 08 1/2 12 3/4 16 1" 20 1 1/2 24 1 1/2 32 2" 48 3"		2 2-way 3 3-way 4 4-way H Diaphragm, Hung 5 Diaphragm, Pivoted Edge S Steam  0 Direct Acting 2 Diaphragm Center pilot 3 Diaphragm Hung 4 Diaphragm Offset pilot 5 Diaphragm Pivoted Edge 6 Piston 8 Piston piloted	C Normally Closed O Normally Open U Universal S 4-Way Single Solenoid	<ol> <li>Brass (Bar Stock)</li> <li>Brass (Forging)</li> <li>303 Stainless Steel (Bar)</li> <li>Brass Nickel Plate</li> <li>316 Stainless Steel (Cast)</li> <li>Aluminum (Bar Stock)</li> <li>316 Stainless Steel (Bar)</li> <li>Bronze (Cast)</li> </ol>	5 Urethane 6 CR 8 FDA EPR 9 Kalrez D Delrin K KEL F	Valve orifice diameter in 1/64-inch increments. Example: a 1/2-inch orifice diameter has an orifice size designation of 32.	

ALERT: Table is for interpreting product specifications only. Consult Parker Fluid Control Division for available combinations not shown in catalog.



# Valves using coil charts 1-6 (Gold Ring™ brand)

	12			13		14		15		16 & 17	7		
Coil Wattage Coil Wattage			Coil Class	Solenoid Enclosure		Coil Termination		Coil		Coil			
AC	(nominal)	DO	C (normal)							Voltage AC		Voltage	
												D	С
Α	6 Watts	1	9.5 Watts	F	Standard (Class 155)	E	Explosion-Proof/	С	18" Leads	01	24/60	70	6
В	10.2 Watts	3	11.5 Watts	Н	High Temperature		Watertight	l	(Standard)	02	24/50	75	12
С	11 Watts				(Class 180)	G	Type 1 Gen. Purpose	Н	DIN	05	110/50	80	24
D	16 Watts					М	316 SS Explosion-Proof/ Watertight	K	Screw		120/60	90	120
						0	Open Frame	S	Spade	10	208/60	95	125
						P	Epoxy Encapsulated			15	220/50 240/60		
						S	Type 1 Splice Box			20	440/50		
						U	316 SS Explosion-Proof/				480/60		
							Watertight			41	24/60		
						W	Submersible Splice Box				rectified		
						Υ	Explosion-Proof/ Watertight with Ground			42	120/60 rectified		
							Lead			44	240/60		
						Z	Grounded M				rectified		
						4	Type 4, 4X			51	120- 240/60		
										53	240- 480/60		

ALERT: Table is for interpreting product specifications only. Consult Parker Fluid Control Division for available combinations not shown in this catalog.



	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 7					
	C111B2		24/60		
	C111P3		120/60, 110/50	-	
	C111Q3	1/2" NPT Conduit / 18" Leads	240/60, 220/50	10	F
	C111C1	172 THE Conduct TO Loads	12VDC		
	C111C2		24VDC		
	C111C6		120VDC		
	C222B2		24/60		
	C222P3		120/60, 110/50		
	C222Q3		240/60, 220/50		
	C222C1	1/2" NPT Conduit / 18" Leads	12VDC	10	Н
	C222C2		24VDC		
	C222C6		120VDC		
	D100B2		24/60		
	D100P3		120/60, 110/50	-	
	D100Q3		240/60, 220/50		_
	D100C1	DIN 43650A/ISO 4400	12VDC	10	F
	D100C2		24VDC	-	
4 THE 1	D100C6**		120VDC		
	D200B2		24/60		
	D200P3		120/60, 110/50		
	D200Q3	DN 400504 400 4400	240/60, 220/50		
	D200C1	DIN 43650A/ISO 4400	12VDC	10	Н
	D200C2		24VDC		
	D200C6**		120VDC		

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.



<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

	Part Number	Type of Termination	Voltage	Wattage	Class
CHART 7 (Continue		,,			
`	,				
	L111B2		24/60		
	L111P3		120/60, 110/50		
<u> </u>	L111Q3	18" Leads	240/60, 220/50	10	F
	L111C1	10 Loads	12VDC	10	
	L111C2		24VDC		
200	L111C6*		120VDC		
	L222B2*		24/60		
	L222P3		120/60, 110/50		
	L222Q3		240/60, 220/50		Н
	L222C1	18" Leads	12VDC	10	
	L222C2		24VDC		
	L222C6		120VDC		
	T100B2*		24/60		F
-	T100P3		120/60, 110/50		
	T100Q3		240/60, 220/50		
	T100C1	1/4" Tab (spade)	12VDC	10	
	T100C2*		24VDC		
	T100C6*		120VDC		
	S100B2*		24/60		
	S100P3		120/60, 110/50		
	S100Q3		220/50, 240/60		
	S100C1*	Screw Terminal	12VDC	10	F
	S100C2		24VDC		
	S100C6		120VDC		
133	S200B2		24/60		
	S200P3		120/60, 110/50		
	S200Q3*		240/60, 220/50		
	S200C1*	Screw Terminal	12VDC	10	Н
	S200C2*		24VDC		
	S200C6*		120VDC		
	S200C6*		120VDC		

<sup>\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory



	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 7 (Continue	ed)				
	H111B2**		24/60		
	H111P3		120/160, 110/50		
	H111Q3	UL Hazardous Locations NEMA Type 7/9 w/ 18" Leaded Coil	240/60, 220/50	10	F
	H111C1		12VDC		
	H111C2		24VDC		
	H111C6**		120VDC		
0	H222B2**		24/60		Н
	H222P3		120/60, 110/50		
	H222Q3	UL Hazardous Locations NEMA Type 7/9	240/60, 220/50	10	
	H222C1**	w/ 18" Leaded Coil	12VDC	10	
	H222C2		24VDC		
	H222C6		120VDC		

<sup>\*</sup> Hazardous location coil approvals: Class I, Div 1 & 2, Groups A, B, C, D; Class II, Div 1 & 2, Groups E,F,G; Class III, Div 1.

### Additional Coil Options for Chart 7 (Below are replacement coils only, no enclosures)

Part Number	Type of Termination	Voltage	Wattage	Class
J111B2		24/60		
J111P3		120/60, 110/50		
J111Q3	Molded coil w/ 18" Leads	240/60, 220/50	10	F
J111C1	Wolded Coll W/ To Leads	12VDC	10	Г
J111C2		24VDC		
J111C6**		120VDC		
J222B2**		24/60		
J222P3		120/60, 220/50		
J222Q3**	Molded coil w/ 18" Leads	240/60, 220/50	10	
J222C1	Moided Coll W/ 18 Leads	12VDC	10	Н
J222C2**		24VDC		
J222C6**		120VDC		

<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.



	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 8					
	C322B2		24/60		
	C322P3		120/60, 110/50		11
-	C322Q3		240/60, 220/50	-	
	C322C1	1/2" NPT Conduit /18" Leads	12VDC	22	Н
	C322C2		24VDC		
	C322C6**		120VDC		
	D300B2**		24/60		
	D300P3	DIN 43650A/ISO 4400	120/60, 110/50	22	Н
OF THE PARTY	D300Q3		240/60, 220/50		
	D300C1		12VDC		
	D300C2		24VDC		
	D300C6**		120VDC		
	L322B2**		24/60		н
	L322P3		110/50, 120/60		
	L322Q3	4 (Oll NIDT Operators /4 Oll 1 and a	220/50, 240/60		
200	L322C1	1/2" NPT Conduit /18" Leads	12VDC	22	
	L322C2		24VDC		
	L322C6**		120VDC		
	S300B2**		24/60		Н
	S300P3		120/60, 110/50		
	S300Q3**	Screw Terminal	240/60, 220/50		
	S300C1**		12VDC	22	
	S300C2**		24VDC		
	S300C6**		120VDC		

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.



 $<sup>^{\</sup>star\star}$  Not in list price book. Minimum order quantities may apply. Consult factory.

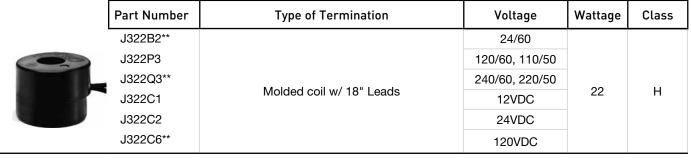
### Coil Options for Chart 8 cont. (Below replacement coils only, no enclosures)



Part Number	Type of Termination*	Voltage	Wattage	Class
H322B2		24/60		
H322P3		120/60, 110/50		
H322Q3	UL Hazardous Locations NEMA	240/60, 220/50	00	
H322C1	Type 7 & 9 w/ 18" Leaded Coil	12VDC	22	Н
H322C2		24VDC		
H322C6**		120VDC		

<sup>\*</sup> Hazardous location coil approvals: Class I, Din I & 2, Groups A,B,C,D; Class II, Div 1 & 2, Groups E, F, G; Class IV, Div 1

### Additional Coil Options for Chart 8 (Below are replacement coils only, no enclosures)



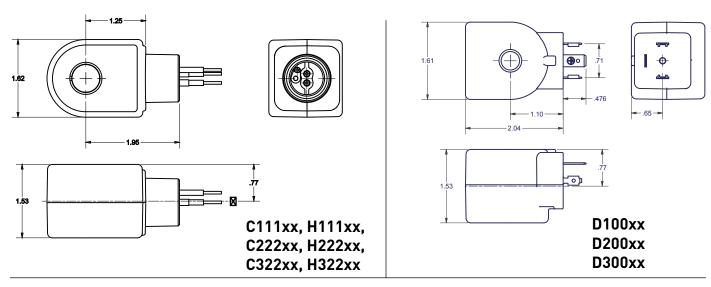
<sup>\*</sup> Hazardous location coil approvals: Class I, Din I & 2, Groups A,B,C,D; Class II, Div 1 & 2, Groups E, F, G; Class IV, Div 1

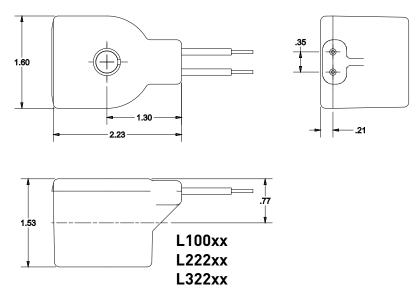


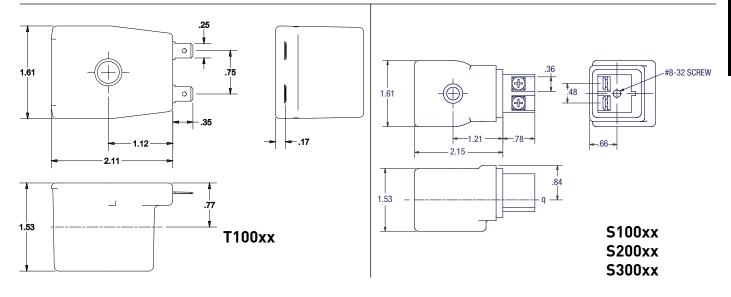
<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

<sup>\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

### Coil Charts 7, 8, 10 & 11 Integrated Coil Dimensional Values









# Valves using coil charts 7, 8, 10, 11 & 12 (7000 Series Skinner™ Brand) Part Numbering Information: Reference ONLY

1	2 Actuation	3 Functional	4 Flow Pattern	5 Family	6 Body	7 Threading	8 Port	9 Orifice	10 Seals/		11 & 12 Mechanical
	Actuation	Type	I tow rattern	aillity	Material	Process	Size	Code	Elastomers		Options
						Connection	(NPT)				
7	0 Manual Reset	2 Two-Way	2-Way Valves	1	A Aluminum	A SAE	1 1/8"	Α	C CR	00	No Option
	1 Direct Acting	3 Three-Way	1 Normally Closed	2	B Brass	E Male NPT	2 1/4"	В	E EPDM F PCTFE	7A	Momentary Manual Override
	2 Direct Lift	4 Four-Way	<ol> <li>Normally Open pressure in/out</li> </ol>	3	L Noryl	F Flange	3 3/8"	С	K PFPM	7C	7A + J1
	3 Pilot Operated Internal Pilot Supply		of body 3 Multi/Dual	5	M Zinc Die Cast	G BSP-Parallel  J Bib Fitting	4 1/2" 5 3/4"	D E	L Nylon M Metal	7F	Captured Exhaust Pilot
	4 Pilot Operated		9 Normally Open pressure in the	6	R 316 SS	K Direct Mount	6 1"	F	N NBR	7G	7F + 7A
	External Pilot Supply		body, pressure out the sleeve	7	S 430F SS T Teflon	N NPT(Female Nat'l Pipe	7 1 1/4" For K	G	R Ruby T PTFE	7H	7F + MO
	5 Remote Pressure		3-Way Valves	8	V 303 SS	thread)	8 1 1/2"	H	U PTFE V FKM	7M	Plugged Manual Override
	Operated		1 Normally	9 E		P NPTF R BSP-Taper	9 2"	J K	VIIII	A2	Silver Shading Ring
	6 Manual/Mech. Operated		Closed 2 Normally Open pressure in/out	F		S Subbase	For K in	L		СВ	Cylinder "B" normally open to
			of body 3 Multi/Dual	G		Mounted T Barbed	Pos. 7	М		00	pressure inlet
			Purpose 8 Diverting	K L		Fitting	E #10-24	N P		C0	4-Step Variable Closing
			9 Normally Open pressure in the sleeve,	Т			F #10-32	Q		ET	Electrically Tripped / Manual Reset
			pressure out the body	X				R S		J0	Pilot Exhaust Return Pipe
			4-Way Valves					Т		J1	Exhaust Adaptor Nut
			1 2-position, single operator					U		M0	Manual Override
			2 3-position, dual operator center closed 3 3-position, dual					V 0 thru 9		M5	Manual Override w/Exhaust Adaptor (M0 + J1)
			operator center open 4 3-position, dual							МС	Manual Override w/Var. Closing
			operator center open 6 2-position,							MJ	Manual Override w/Exhaust Return Pipe
			dual operator bi-stable 7 2-position, dual operator							MR	Manual Override w/Main Stream Metering
			bi-stable, with latching							N0	Cleaned for oxygen service
										R1	Mainstream Metering
										S0	Steam Service Rated
										VR	No Voltage Release / Manual Reset
										W0	Anti-Water Hammer (fixed)

ALERT: Table is for interpreting product specifications only. Consult Parker Fluid Control Division for available combinations not shown in this catalog.



# Valves using coil charts 7, 8, 10, 11 & 12 (7000 Series Skinner™ Brand) Part Numbering Information: Reference ONLY

	13 & 14	15 & 16		17 & 18		19 & 20
	Enclosure	Coil Construction and Type		Terminations and Option Codes		Voltage
A0	7/8" Knockout	Readily Available Integrated Coils	00	Standard DIN, Screw, Tab Coils (no leads)	Bo	24/60
B0	1/2" Conduit	C1 1/2" NPT Conduit, 10 Watt Class F, NEMA 4X	11	Class F Coils with 18" leads		12VDC
F0	Yoke	C2 1/2" NPT Conduit, 10 Watt Class H, NEMA 4X	22	Class H Coils with 18" leads	C2	24VDC
G0	Water Tight	C3 1/2" NPT Conduit, 10 Watt Glass H, NEMA 4X	GL		C4	48VDC
J0	Junction Box	C6 1/2" NPT Conduit, 1.5 Watt, Class F, NEMA 4X	D1	All DIN Coils with Cable Gland Connector	C6	120VDC
M1	Magnelatch 1/2" Conduit		D2	All DIN Coils with 1/2" Conduit Connector	-	24,50/60
M2	Magnelatch Grommet	D1 DIN, 10 Watt Class F	D4			110/50-120/60
N0	Nut and Washer		DIN, 10 Watt Class H		Q3	220/50-240/60
110	Tractana Tracino	D3 DIN, 22 Watt Class H			Q8	440/50-480/6
		· ·		S1,S2,S3 Coils with Terminal Box	2K	
		H2 1/2" NPT Conduit, 10 Watt Class H, NEMA 7, 9	S1	Hazardous stainless steel yoke with 18" leads		125 VDC
		H3 1/2" NPT Conduit, 22 Watt Class H, NEMA 7, 9		and ground lead		
		H7 1/2" NPT Conduit, 0.6 Watt, Class F, NEMA, 7, 9			Flux	ktron Coils*
					2W	110-120,50/60
		Non-Integrated Coils			3W	220-240, 50/60
		L1 18" leads, 10 Watt Class F			C1	12 VDC
		L2 18" leads, 10 Watt Class H			-	24 VDC
		L3 18" leads, 22 Watt Class H			-	48 VDC
		S1 Screw Terminal, 10 Watt Class F			C6	120 VDC
		S2 Screw Terminal, 10 Watt Class H			P0	24/50-60
		S3 Screw Terminal, 22 Watt Class H				
		T1 1/4" Tab Terminal, 10 Watt Class F				
		Conventional Coils				
		J1 18" leads, 10 Watt Class F				
		J2 18" leads, 10 Watt Class H				
		J3 18" leads, 22 Watt Class H				
		Specialty Coils				
		F6 Fluxtron 4-wire, 1 Watt molded				
		J6 Fluxtron 2-wire, 1 Watt molded				
		J7 Fluxtron 2-wire, 2 watt				
		J0 Magnelatch 2-wire DC only				
		G0 Magnelatch 3-wire AC/DC (DC pulse)				

<sup>\*</sup>Fluxtron Only

ALERT: Table is for interpreting product specifications only. Consult Parker Fluid Control Division for available combinations not shown in this catalog.



### **Electrical Accessories for Charts 7-8**

Various electrical accessories are available with 7000 series integrated coils. These accessories are available as individual pieces; see chart. To order a coil with the accessory attached, write the electrical option code in place of the last two digits of the coil code.

Coil Option Picture		Coil Option Code	Description	Coil Types	Coil Codes
	ELECD1	D1*	Cable Gland DIN Plug	DIN	D1D1, D2D1, D3D1
ELECD2		D2*	1/2" Conduit DIN Plug	DIN	D1D2, D2D1, D3D2

<sup>\*</sup> The plug comes complete with gasket.

### **Electrical Accessories for Charts 7-8**

Option Picture	Option Code	Description	Coil Codes
	AO	Standard Connection, 7/8" knockout to accommodate strain relief, adapter or fittings for lead wires, NEMA Type 2	J111, J222,J322, F611, J611
	В0	1/2" Conduit Connection for attachment of conduit, 1/2" NPT fittings or BX cable, NEMA Type 2	F611, J611
	F0	Yoke for use where open enclosure is suitable (Does not carry any NEMA Type approvals)	F611, J611
	GO	Watertight, 1/2" conduit hub accommodating 1/2" NPT fittings or BX cable, NEMA Type 4x	F611, J611
	JO	Splice box, 7/8" knockout allowing for internal splice, NEMA Type 2	J111, J222, J322, F611,J611
00	NO	Nut and Washer	All Integrated Coils

<sup>^</sup> Meets NEMA 4, 4x when connected to a screw terminal or DIN Coil, as applicable. It is provided with a 1/2" NPT conduit thread and ground screw.



# **International Electrotechnical Commission**

### **About the IECEx**

### **IECEx System Objective**

The objective of the IECEx System is to facilitate international trade in equipment and services for use in explosive atmospheres, while maintaining the required level of safety:

- reduced testing and certification costs to manufacturer
- · reduced time to market
- international confidence in the product assessment process
- · one international database listing
- maintaining International Confidence in equipment and services covered by IECEx Certification

### What is an Ex area?

Ex areas can be known by different names such as "Hazardous Locations", "Hazardous Areas" "Explosive Atmospheres", and the like and relate to areas where flammable liquids, vapours, gases or combustible dusts are likely to occur in quantities sufficient to cause a fire or explosion.

The modern day automation of industry has meant an increased need to use equipment in Ex areas. Such equipment is termed "Ex equipment"

# 1. The IECEx Certified Equipment Scheme

This IECEx Scheme is an International Certification Scheme covering product that meets the requirements of International Standards, e.g. IEC Standards prepared by TC 31.

The IECEx Certified Equipment Scheme provides both:

- a) A single International Certificate of Conformity that requires manufacturers to successfully complete:-
  - Testing and Assessment of samples for compliance with Standards
  - Assessment and auditing of manufacturers premises
  - On-going surveillance audits of manufacturers premises

or

- b) A "fast-track" process for countries where regulations still require the issuing of national Ex Certificates or approval. This is achieved by way of global acceptance of IECEx equipment Test and Assessment Reports.
- 3. The Ex Mark of Conformity System This IECEx System is an International Conformity System where a Mark of Conformity will be granted by approved IECEx certifiers (ExCBs) located in IECEx participating countries for equipment that is covered by an IECEx Certificate of Conformity and hence has been

tested and manufactured under systems that are under ongoing surveillance by ExCBs.

It will help governments, safety regulators, and industry to have greater assurance that the equipment being operated or supplied for use in areas where flammable gases and vapours and combustible dusts (termed explosive atmospheres) are present, meet the world's most respected and vigorous safety standards.

The Mark shall only be placed on products or on packaging and promotional material covered by a valid IECEx Certificate of Conformity issued in accordance with the IECEx System rules.

4. IECEx Certified Persons Scheme This IECEx Scheme is an International Conformity Scheme that provides the global Ex industries with a single system for the assessment and qualification of persons meeting the competency prerequisites needed to properly implement the safety requirements based on the suite of IEC International Standards covering explosive atmospheres, e.g. the IEC 60079 and IEC 61241 series of standards.

The Certified Persons Scheme provides the international Ex industries with a qualification system that is transportable across borders.

### **IECEX Worldwide Member Countries**

Australia	Brazil	Canada	China	Croatia
Czech Republic	Denmark	Finland	France	Germany
Hungary	India	Italy	Japan	Korea
Malaysia	Netherlands	New Zealand	Norway	Poland
Republic of Serbia	Romania	Russia	Singapore	Slovenia
South Africa	Sweden	Switzerland	Turkey	United Kigndom
United States				



# Definitions (ref. IEC 60079-10)

### 2.1 Explosive gas environments

Mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapor, mists or dusts in which, after combustion has occurred, combustion spreads to the entire unburned mixture.

### 2.2 Hazardous areas

A hazardous area is an area in which an explosive gas environment is present, or may be expected to be present, in quantities such as to require special precautions for construction, installation and use of electrical apparatus.

### 2.3. Ingredients for an explosion

When combustible materials are mixed with air, an explosive mixture is produced. Danger of explosion therefore exists wherever these hazardous materials are handled: such a condition is to be found on the biggest chemical plant as well as at the smallest filling station.

Nowadays with the use of electronic and electrical instrumentation in process control, the risk of combustion by electrical energy has increased sharply.

To protect personnel and expensive equipment special precautions should be taken to prevent combustion of those dangerous substances. Conditions likely to ignite explosive mixtures are as follows:

- Electrical sparks and arcs produced when circuits are opened and closed (e.g. relay contacts)
- Conductors heated by passage of current or by faulty apparatus.
- Mechanical sparks; moving object hitting stationary object.
- Electrostatic sparks caused by charged components.
- · Chemical action.
- Lightning strikes.
- · Radio waves

### 2.4 Zones

The hazardous areas are classified in zones based on the frequency of the occurrence and the duration of an explosive gas environment as follows:

#### • Zone 0

An area in which an explosive gas environment is present continuously or is present for long periods Type of protection: ia - intrinsic Safety

### • Zone 1

An area in which an explosive gas environment is likely to occur in normal operations. Type of protection: d - flameproof enclosure, e - increased safety, ib - intrinsic safety, m - encapsulation

#### • Zone 2

An area in which an explosive gas environment is not likely to occur and if it does occur it will exist for a short period only. Type of protection: n - protection (IEC 60079-15)

# **ATEX/IECEx General Information**

Parker Fluid Control Division is pleased to announce the addition of several new ATEX coils designed for explosive atmospheres to comply with European directive 94/9/EC and standards IEC / EN 60079 for gases and IEC / EN 61241 for dust. Coil marking complies with the updated standards. Declaration of Conformity documents for specific part numbers are provided with the electrical product and also provided upon request.

### **Background:**

The ATEX directive is a European initiative undertaken to ensure the safety of products used in potentially explosive atmospheres. It is a European mandate that all products that could provide ignition to a potentially explosive atmosphere be produced to specific requirements, under controlled conditions, by a manufacturer certified compliant to the directive by an independent notification body. Certification requires approval of the entire quality management system to the requirements of ISO 9001 with additional

requirements imposed for product verifications, testing and records thereof.

The International Electrotechnical Commission (IEC) is the global organization overseeing the development of international standards for electrical. electronic & related technologies. The IECEx scheme provides a means of International Certification for manufacturers of electrical equipment intended for explosive atmospheres thereby eliminating the need for multiple national certifications in all participating countries. Any recognized certified body can provide a product Certificate of Conformity stating the product design conforms to the relevant IEC standards and the product is manufactured under a quality plan assessed by an accepted certification body. The IECEx scheme is adopting the ATEX principles and this scheme is becoming internationally accepted.

Within North America, UL is the only U.S. accepted certification body (ACB) and an Ex Assessment & Testing Lab (ExTL)

under the IECEx scheme. The United States has recently integrated both the zone and division system requirements into their respective installation codes. Specifically for the U.S., the 1996 National Electric Code Article 505 (NEC).

The Canadian Standards Association (CSA) has implemented the IEC system. All new installations follow the threezone area classification while following the two-division system for existing facilities. To reflect the new system, CSA E79 covers the IEC based standards.

The introduction of zones area classifications in North America as an accepted alternative to divisions sees the introduction of the IECEx scheme and its continued acceptance on a global basis.

The European ATEX and global IECEx standards apply to hazardous environments from intrinsically safe apparatus to flameproof control systems to increased safety requirements.



#### **Classification of Hazardous Location**

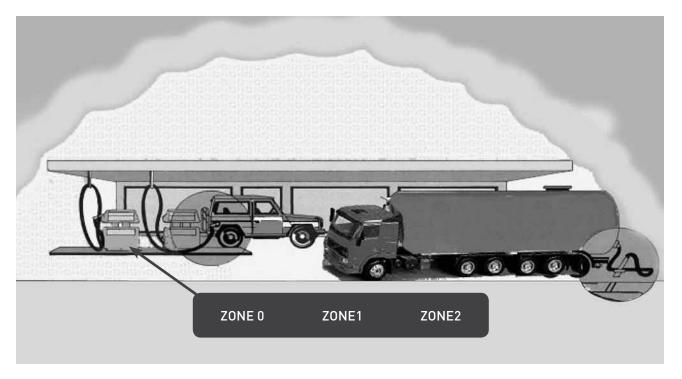
Explosive Environment	Continuos Presence	Intermittent Presence (normal operation conditions)	Occasional Presence (abnormal operation)
IEC	Zone 0 (gas)	Zone 1 (gas)	Zone 2 (gas)
	Zone 20 (dust)	Zone 21 (dust)	Zone 22 (dust)
Europe	Zone 0 (gas)	Zone 1 (gas)	Zone 2 (gas)
	Zone 20 (dust)	Zone 21 (dust)	Zone 22 (dust)
Canada (CEC)* USA (NEC)**	CI. I Div.1 (gas) CI. II Div.1 (dust) CI. III Div.1 (fibres)	CI. I Div.1 (gas) CI. II Div.1 (dust) CI. III Div.1 (fibres)	CI. I Div.1 (gas) CI. II Div.1 (dust) CI. III Div.1 (fibres)

<sup>\* (</sup>CEC): Code Canadian d'Electricite

#### **Zones and Types of Protection (gas applications)**

Some additional tests for gas and dust applications are applied to the product according to the new ATEX directive related to the EN 50281-1-1 and EN 50281-1-2 standards:

#### **Example of Zones Division:**





<sup>\*\* (</sup>NEC): National Electrical Code

## 5 Types of Protection used by Parker

#### 5.1 Flameproof enclosure

## "d"

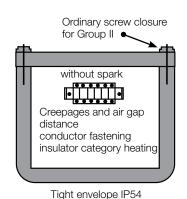
A type of protection where the parts that can ignite an explosive environment are placed in an enclosure which can withstand the pressure developed during an internal explosion of an explosive mixture and which prevents the transmission of the explosion to the explosive environment surrounding the enclosure.

#### engaged min. height engaged **Special Enclosure** 8mm for volume > 100cm<sup>3</sup> IIB IIC Contact Seal IIB diametrical clearance Threaded joint IIC For volume > 2 dm3 For volume > 2 dm3 Mini lenght L = 12.5 mm Mini lenght L = 25 mm Max dia. clearance i = 0.15 mm Max gap i = 0.15 mm

#### 5.2 Increased Safety

## "e"

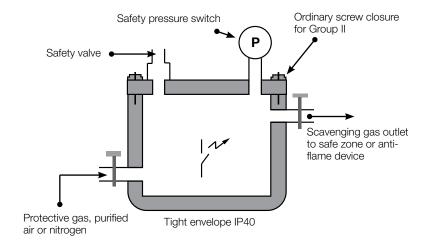
Type of protection applied to electrical apparatus that does not produce arcs or sparks in normal service, in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks.



#### 5.3 Pressurized Apparatus

## "p"

A type of protection by which the entry of a surrounding environment into the enclosure of the electrical apparatus, is prevented by maintaining, inside the said enclosure, a protective gas at a higher pressure than that of the surrounding environment. The overpressure is maintained either with or without a continuous flow of the protective gas.



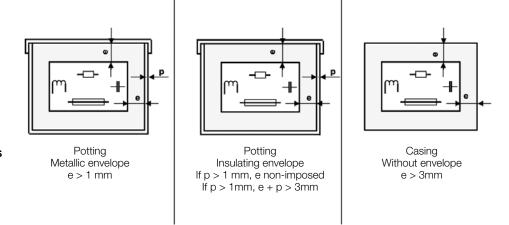


At least 5 threads

#### 5.4 Encapsulation

## "m"

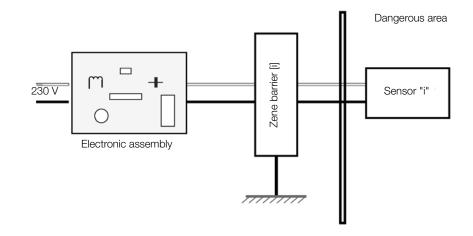
A type of protection in which the parts which could ignite an explosive environment by either sparking or heating are enclosed in a compound in such a way that this explosive environment cannot be ignited. (IEC60079-18)



#### 5.5 Intrinsic Safety

## "i"

A circuit in which no spark or any thermal effect produced in the test conditions prescribed in the standard IEC60079-11 (which include normal operation and specified fault conditions) is capable of causing combustion of a given explosive environment.



#### Coil "T" Ratings

Temperature	Maximum Allowable	Surface Temperature
Classification	•C	οF
T1	450	842
T2	300	572
Т3	200	392
T4	135	257
T5	100	212
Т6	85	185



### ATEX Explosion Proof Rated Coil Offering

ATEX Ex	kplosion Proof	f Rated Coil Offering		
Coil Code*	Wattage/ Cable Length	Protection/Temp. Class	Marking	Certificate of Conformity
HZ04xx	2w/3000mm	Ex mb II T6 tD A21 IP67 T80°C	<b>(€</b> 0344 <b>(Ex)</b> II 2 G / D	LCIE 02 ATEX 6019 X IECEx LCI 08.0026 X
HZ09xx	10w/3000mm	Ex d mb IIC T4/T5 -40°C +65°C/+40°C tD A21 IP65 T130°C/95 °F	<b>C</b> € <sub>0344</sub> <b>Ex</b> <sub>II 2 G / D</sub>	LCIE 02 ATEX 6009 X
HZ10xx	10w/3000mm	Ex mb II T4/T5 tD A21 IP65 T130°C / 95°C	<b>C</b> € <sub>0344</sub> <b>(Ex</b> ) <sub>II 2 G / D</sub>	LCIE 02 ATEX 6020 X IECEx LCI 08.0027 X
HZ11xx	22w/3000mm	Ex mb II T4/T5 tD A21 IP65 T130°C / 95°C	<b>(€</b> <sub>0344</sub> <b>(Ex )</b> <sub>II 2 G / D</sub>	LCIE 02 ATEX 6020 X/03 IECEx LCI 08.0027 X
HZ12xx	1.5w/3000mm	Ex mb II T6 tD A21 IP65 T80°C	<b>C</b> € <sub>0344</sub> <b>Ex</b> II 2 G / D	LCIE 02 ATEX 6021 X IECEx LCI 08.0028 X
HZ13xx	0.6w/3000mm	Ex mb II T6 tD A21 IP65 T80°C	<b>C</b> € <sub>0344</sub> <b>E</b> x <sub>II 2 G / D</sub>	LCIE 02 ATEX 6021 X IECEx LCI 08.0028 X
VZ03xx (492190)	11w(AC), 9w(DC) / screw terminal	Ex e mb II T3/T4/T5/T6 tD A21 IP66 T195°C / 130°C / 95°C / 80°C	<b>C</b> € <sub>0081</sub> <b>(Ex</b> ) <sub>II 2 G / D</sub>	LCIE 02 ATEX 6023 X IECEx LCI 06.0011 X
495900 (HZ95xx)	3w/screw terminal	Ex d mb IIC T4 tD A21 IP67 T130°C	<b>C</b> € <sub>0081</sub> (Ex) <sub>II 2 G / D</sub>	LCIE 03 ATEX 6451 X IECEx LCI 06.0004X
495905 (HZ96xx)	9w/screw terminal	Ex d mb IIC /T4/T5/T6 tD A21 IP67 T130°C	<b>C</b> € <sub>0081</sub> (Ex) <sub>II 2 G / D</sub>	LCIE 03 ATEX 6451 X IECEx LCI 06.0004X
496555	6w/screw terminal	Ex d mb IIC T4 tD A21 IP67 T130°C	<b>C</b> € <sub>0081</sub> (Ex) <sub>II 2 G / D</sub>	LCIE 07 ATEX 6075 X IECEx LCI 07.0014 X
496560	9w/screw terminal	Ex d mb IIC T4 tD A21 IP67 T130°C	<b>C</b> € <sub>0081</sub> <b>(Ex</b> ) <sub>II 2 G / D</sub>	LCIE 07 ATEX 6075 X IECEx LCI 07.0014 X

<sup>\*</sup>For 24VDC use code C2 in place of xx.



For 120/60, use code P3 in place of xx.

For 240/60, 220/50 use code Q3 in place of xx.

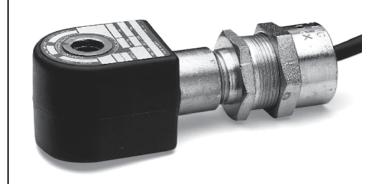
For 230/50, use code F4 in place of xx.

# Coil Referenc Coil Charts 7-

## ATEX (IECEX) Coils



HZ04, HZ10, HZ11, HZ12, HZ13



HZ09



HZ95, HZ96



VZ03, 496555, 496560



#### ATEX Documentation available upon request. Consult Factory'.

#### Fluid Control Division





### **DECLARATION OF CONFORMITY DECLARATION DE CONFORMITE** KONFORMITÄTSERKLÄRUNG

Name: Parker Hannifin Corporation, Fluid Control Division

95 Edgewood Avenue Address: City/State: New Britain, CT 06051

declare under our sole responsibility that the product: déclarons sous notre seule responsabilité que le produit: erkären in alleiniger Verantwortung, daβ das Produkt:

Product Type (1): ...HZ12... or ...HZ13

Certified:

**C**€<sub>0344</sub> ⟨**E**x⟩ <sub>II 2 G/D</sub> Ex mb II T6

Ex tD A21 IP6X T80°C

- (1) Name, type or model, lot, batch or serial number, possibly sources and number
- (1) Nom, type ou modèle, No. de lot, d'échantillon ou de série, eventuell
- (1) Bezeichnung, Typ oder Modell, Los-, Chargen-oder Seriemun stige Angaben.

to which this declaration relates is in conformity with the following standard (s) or other normative document(s): Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s): auf das sieh diese Erklänung bezieht mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt:

EN 60079-0 (2006) EN 60079-18 (2004) EN 61241-0 (2006) EN 61241-1 (2004) IEC 60079-0 (2004)/IEC 60079-18 (2004) IEC 61241-0 (2004) IEC 61241-1 (2004)

( if applicable ) to loving the provisions of directive(s):

(le cas échéant) conformément aux dispositions de(s) directive(s):

( falls zutreffend ) gemäβ den Bestimmungen der Richtlinie(n):

ATEX 94/9/EC – QA Notification No. KEMA 06ATEXQ0143

Date:



Fluid Control Division Quality Manager

Les spécifications mentionnées dans les catalogues Parker Skinner ainsi que toutes les mesures de préventions adéquates doivent être observées afin d'éviter tout accident durant la période d'installation et d'utilisation du produit. Cette garantie cesse si le client ou tierce personne entreprend des modifications ou réparation sans autorisation.

The data supplied in the Parker Skinner Catalogs are to be consulted, and pertinent accident prevention regulations are to be followed during product installation and use. Any unauthorized work performed on the product by the purchaser or by third parties can impair its function, and relieves us of all warranty claims and liability for any resulting damage.

Bei Einbau und Anwendung sind die Parker Skinner Katalogangaben sowie die einschlägigen Unfallverhütungsvorschriften zu beachten. Ein unbefugter Eingriff durch den Käufer oder durch Dritte kann die Funktion beeinträchtigen und enthebt uns von jeglicher Gewährleistung und Haftung für jeden entstehenden Schaden.

CE197000SV - Parker Hannifin Corporation, Fluid Control Division, 95 Edgewood Avenue, New Britain CT 06051 - Tel. (860) 827-2300 - Fax. (860) 827-2384



### **Integrated Coil Offering**

				Wat	tage	
	Part Number	Type of Termination*	Voltage	AC**	DC	Class
CHART 9						
	C4E		24/60			
	C4F		120/60, 110/50			
THE STATE OF THE S	C4G	1/2" NPT Conduit w/ 18" Leads	240/60, 220/50	10	8	F
a -	C4A		12VDC			
	C4B		24VDC			
	D6E		24/60			
	D6F		120/60, 110/50	10	8	
	D6G	DIN 43650A/ISO 4400	240/60, 220/50			Н
	D6A		12VDC			
	D6B		24VDC			
140	B4E		24/60			
1	B4F		120/60, 110/50			
N. Committee	B4G	18" Leads	240/60, 220/50	10	8	F
	B4A		12VDC			
	B4B		24VDC			
	C5E		24/60			
2 m	C5F		120/60, 110/50	10		
E. C.	C5G	1/2" NPT Conduit w/ 18" Leads	240/60, 220/50		8	Н
	C5A		12VDC			
	C5B		24VDC			

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.

## **Electrical Accessories for Chart 9**

Coil Option Picture	Accessory Part #	Coil Option Code	Description	Coil Types	Coil Codes
	ELECD1	D6x*	Cable Gland DIN Plug	DIN	D6E, D6F, D6G, D6A, D6B
	ELECD2	D6x*	1/2" Conduit DIN Plug	DIN	D6E, D6F, D6G, D6A, D6B

<sup>\*</sup> The plug comes complete with gasket.



<sup>\*\* 2-</sup>Way Normally Closed AC Valves are 8.5 Watts (20CCxx)

# 2-Way/3-Way Miniature and Manifold Mounted Valves Using Coil Chart 9 Part Numbering Information: Reference ONLY.

Ser	1 vice Type		2 Design Style		3 Body Material		<b>4</b> Function		<b>5 &amp; 6</b> Port	Orifi	<b>7</b> ce Size
2	2 Way	0	Direct Acting	В	Brass	С	Normally Closed	02	1/8" NPT	Α	1/32
3	3 Way			С	303 Stainless	F	Normally Open	L5	3/4-24	E	3/64
				9	Manifold Mount Cartridge	U	Universal		Manifold Mount Cartridge	G	1/16
								04	1/4" NPT	J	5/64
										L	3/32
										М	7/64
										Р	1/8
										Q	5/32

ALERT: Table is for interpreting product specifications only.

Consult Parker Fluid Control Division for avaliable combinations not shown in this catalog.

Viton<sup>™</sup> is a Dupont Co. Trademark. Teflon<sup>™</sup> is a Dupont Co. Trademark.

#### Additional Coil Options for Charts 9 (Coils ordered will be assembled to the pressure vessel)

	Part	Tune of Tempinekien	Valtara	Wat	tage	Class
	Number	Type of Termination	Voltage	AC*	DC	Class
	B2E		24/60			
Section 1	B2F	Grommet Housing w/ Taped Coil	120/60, 110/50			
anna de la constante de la con	B2G	w/ 18" Leads	240/60, 220/50	10	8	F
	B2A		12VDC			
	B2B		24VDC			
	L2E		24/60Hz		8	
	L2F	Molded Coil with 18" Leads and Yoke	120/60, 110/50	10		
	L2G		240/60, 220/50			F
4	L2A		12VDC			
	L2B		24VDC			
	T2E		24/60			
	T2F		120/60, 110/50		8	
	T2G	Molded Coil with 1/4" Tab and Yoke	240/60, 220/50	10		F
	T2A	Molded Coll With 1/4 Tab and Yoke	12VDC	10		F
	T2B		24VDC			

<sup>\*</sup> Wattage is 8.5 on all 2-Way, Normally Closed (20CCxx) AC valves



### 2-Way/3-Way Miniature and Manifold Mounted Valves Using Coil Chart 9

	8		9		10 & 11		12	13 & 14
	Main Seal Material	(	)perator Size	Coil & Enclosure			Voltage	Optional & Special Features
V	FKM- Viton™	4	0.442 Dia.		1.125" Integrated Modular Coils	Α	12VDC	Consult Factory
	Fluoroelastomer			B4	Integrated, class F, 18" leads, 3-wire	В	24VDC	
Е	EPDM			B5	Integrated, class H, 18" leads, 3-wire	E	24/60	
Ν	Nitrile NBR			C4	Integrated, 1/2" Conduit, class F, 18" leads, 3-wire	F	120/60;	
Т	Teflon™			C5	Integrated, 1/2" Conduit, class H, 18" leads, 3-wire		110/50	
С	Neoprene			D6	Integrated, DIN 43650A class H	G	240/60;	
					1.125" Standard Coils		220/50	
				B2	Leaded with metal enclosure, class F, 18" leads			
				L2	Molded leaded coil with Yoke, class F, 18" leads			
				T2	Molded 1/4" tab with Yoke, class F			

ALERT: Table is for interpreting product specifications only.

Consult Parker Fluid Control Division for available combinations not shown in this catalog.

Viton™ is a Dupont Co. Trademark. Teflon™ is a Dupont Co. Trademark.

Check out the 2-way and 3-way Manifold Mounted Miniature Cartridge valves in the Specialty section of this catalog.





## **Product Features**

- Space saving approach
- Less manifold machining means lower manifold cost
- Cartridge valves are 100% tested 'C4' and 'C5' 1/2" NPT coils have a rotating conduit hub for easier installation
- No loose parts: sleeve, plunger, spring, orifice are pressed to gether as one unit
- Available with all coils/enclosures from Chart 9 above



## **Coil Information**

Encapsulated Watertight Designs. Available as Modular Coils or for Fully Assembled Valves.

### Conduit Coil Coil Code: C4\*

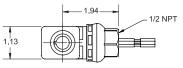


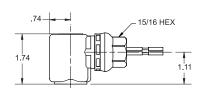
#### Construction:

- Class F
- 18" lead wires
- Ground wire
- 1/2" NPT conduit hub
- NEMA 4X, IP65 protection

AC: 10 Watts except 2 Way Normally Closed is 8.5 Watts

DC: 8 Watts





### Leaded Coil Coil Code: B4\*

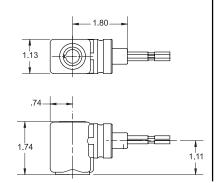


#### Construction:

- Class F
- 18" lead wires
- Ground wire

AC: 10 Watts except 2 Way Normally Closed is 8.5 Watts

DC: 8 Watts



### DIN Coil Coil Code: D6\*

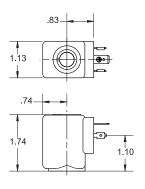


#### Construction:

- Class H
- DIN 43650A/ISO 4400 configuration
- NEMA 4X, IP65 protection with a suitable plug and gasket

AC: 10 Watts except 2 Way Normally Closed is 8.5 Watts

DC: 8 Watts



## **Coil Information**

Conventional Coil & Enclosures for Fully Assembled Valves Only

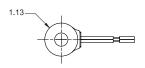
### **Grommet Coil** Coil Code: B2\*

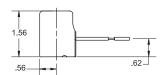


#### Construction:

- Grommet enclosure
- Taped wrapped coil
- Class F
- 18" leads- 2 wire

AC: 7 Watts DC: 8 Watts





## Leaded Coil

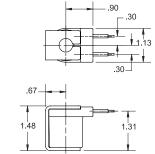


## Construction:

- Open frame enclosure
- Molded leaded coil
- Class F
- 18" leads- 2 wire

AC: 10 Watts except 2 Way Normally Closed is 8.5 Watts

DC: 8 Watts



## Tab Coil Coil Code: T2\*

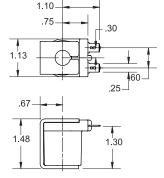


#### Construction:

- Open frame enclosure
- 1/4" tab terminals
- Class F

AC: 10 Watts except 2 Way Normally Closed is 8.5 Watts

DC: 8 Watts



\* ADD VOLTAGE CODE: A= 12VDC B= 24VDC E= 24/60 F= 120/60, 110/50

G= 240/60, 220/50



### **Integrated Coil Offering**

	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 10					
	C8GLB2***		24/60		
	C8GLP3		120/60, 110/50		
	C8GLQ3	1/2" NPT Conduit w/ 18" Leads	240/60, 220/50	24	Н
-	D800B2***		24/60		
	D800P3***	DIN 43650A/ISO 4400	120/60, 110/50	24	Н
	D800Q3***		240/60, 220/50		
	H8GLB2		24/60		
	H8GLP3	UL Hazardous Locations; NEMA	120/60, 110/50		
	H8GLQ3	Types 7 & 9 w/ 18" Leads**	240/60, 220/50	24	Н

#### **LOW POWER COILS**

	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 11					
	H611C2***	UL Hazardous TYPE 7 & 9	24VDC	1.5	F

#### **ULTRA LOW POWER COILS**

	Part Number	Type of Termination*	Voltage	Wattage	Class
CHART 12					
	C711C2	1/2" NPT Conduit Type 4X	24VDC	0.6	F
	H711C2	UL Hazardous TYPE 7 & 9	24VDC	0.6	F

<sup>\* 1/2&</sup>quot; NPT conduit and DIN coils offer NEMA Types 1, 2, 3, 4 and 4X protection with a suitable conduit installation or mating DIN connector and gasket.



<sup>\*\*</sup> Hazardous location coil approvals: Class I, Div 1 & 2, Groups A, B, C, D: Class II, Div 1 & 2, Groups E, F, G: Class III, Div I.

<sup>\*\*\*</sup> Not in list price book. Minimum order quantities may apply. Consult factory.

#### **General Data-Solenoid Coils**

#### **Power and Voltage**

All coils used in Parker FCD solenoid valves are designed for continuous duty except where noted. On AC, inrush current occurs at the moment the solenoid is energized. The continuous current after inrush is holding current. Typical AC current values are shown to the right. DC solenoids have no inrush. Typical amp ratings for DC are determined by dividing DC watts by DC voltage. All Parker FCD solenoid valves are tested to operate at 15% undervoltage and full pressure ratings. AC and DC voltage ratings (nominal) and normal operating ranges, as shown in the following table, are standard. For special voltages, consult the factory.

#### **AC/DC Voltage Range**

All coils used in Parker FCD valves are designed for continuous duty except where noted. They can remain energized continuously without damage from overheating or mechanical failure. AC and DC voltage ratings (nominal) and normal operating ranges, as shown in the following table, are standard.

All coils used in Parker FCD solenoid valves are either Class "F" or Class "H" molded epoxy, and are constructed in accordance with UL, IEEE, NEMA and other accepted standards.

#### Holding and Inrush Current (Reference coil charts 1-5 in coil section)

Small, Direct-Acting 2-Way, 3-Way and 4-Way Series 20, 30, 35, 38, and 48 (1/8 to 3/8")Watt Rating and Volt Amperage

Standard Coil		AC	
Insulation Class	Watts	VA Holding	VA Inrush
F	6	16	26
F	10.2	23	37
F	11	20	34
F	16	31	50

#### 2-Way, Direct-Acting Series 20 (3/8 to 3/4") Watt Rating and Volt Amperage

Standard Coil		AC					
<b>Insulation Class</b>	Watts	VA Holding	VA Inrush				
F	6	16	36				
F	11	20	61				
F	16	31	88				

## Pilot 2-Way Series 22, 23, 24, 25, 26, 28, (3/8 to 1-1/2") Watt Rating and Volt Amperage

Standard Coil	AC					
<b>Insulation Class</b>	Watts	VA Holding	VA Inrush			
F (Offset Pilot)	6	16	26			
F (Center Pilot)	6	16	34			
F	11	20	53			
F	16	31	76			

A	C	DC		
Normal Voltage Rating	Normal Operating Range	Normal Voltage Rating	Normal Operating Range	
24	20-24	12	10.2-12.6	
120	102-120	24	20-25	
240	204-240	120	102-126	

#### **Current Drain**

To determine approximate Holding or Inrush Current for 24/60, 120/60, 240/60 and 480/60 volts in amperes, divide the voltage into the "VA" indicated in the table on this page.

#### DC Inrush/Holding Current (Amperes)

	Coil Type		24 Volt
10 Watt	Integrated Conventional	0.81 0.73	0.41 0.39
16 Watt	DIN	1.3	0.64
22 Watt	Integrated	1.64 1.85	0.83 0.86
8 Watt	Integrated Conventional	0.67	0.33
16 Watt	DIN	1.3	0.64



## AC Power Consumption (Reference Coil Charts 7-12 in Coil Section)

	AC Power Consumption								
	10 Watt Integrated Coils		10 Watt		13 Watt		22 Watt		
Valve Type			Conventi	ional Coils	Integrated Coils		Integra	Integrated Coils	
	VA	VA	VA	VA	VA	VA	VA	VA	
	Holding	Inrush	Holding	Inrush	Holding	Inrush	Holding	Inrush	
71211, 71311, 71321, 71331, 71381, 71221	16	32	13	30	16	32	-	-	
71214	16	29	14	27	16	29	-	-	
71215 (3/64"-1/8" orifice), 73218	16	31	14	28	16	31	35	54	
71215 (5/32"-5/16" orifice)	17	35	14	33	17	35	34	61	
71215 (3/8" orifice)	16	36	14	34	16	36	34	63	
71216, 73216	17	32	15	31	17	32	-	-	
7121F	18	32	16	30	18	32	35	56	
7121K (EPDM seals)	19	36	18	34	19	36	-	-	
7121K (NBR, FKM seals 1/16"-1/8" orifice)	18	32	16	30	18	32	35	56	
7121K (NBR, FKM seals 5/32"-1/4" orifice)	18	36	16	34	18	36	-	-	
7121K (NBR, FKM seals 7/16" orifice)	18	37	16	35	18	37 36	35	65 66	
7121V	19	36	19	36	19	36	39	66	
1221	16	32	13	30	16	32	-	-	
1225	20	32	18	30	20	32	-		
122K	20 17	32	17 16	30	20	32 27	-	-	
71235, 71313, 71335, 71385, 71395, 73312	16	27	16	26	17 16	30	-		
71295, 71315 (0.19"-0.25" orifice) 72218		30	15 15	29		30 41	-	-	
	17 17	41	16	38 39	17 17	41	-		
'221G (NBR, FKM seals) '221G (EPDM seals)	17	41	18	39 39	17	41	-	-	
2228	20	46	18	43	20	46	47	80	
73212 (1/4" orifice)	20 16	31	14	43 28	16	31	35	54	
73212 (1/4" ornice) 73212 (1/2"-1" orifice), 71315 (0.05"-0.11" orifice)	17	27	16	26	17	27		- 54	
73217 (172 - 1 Offlice), 71313 (0.03 -0.11 Offlice)	17	27 27	10	20	17	21	-	-	
73218	16	31	 14	28	 16	31	35	 54	
321G	18	32	16	30	18	32	35 35	56	
7321H	18	32	16	30	18	32	35	56	
'321K (EPDM seals)	19	41	18	39	19	41	-	-	
7321K (NBR, FKM seals)	17	39	15	36	17	39	_		
3222	20	32	18	30	20	32	_	_	
73228	20	32	18	30	20	32	_	_	
7322G	20	32	17	30	20	32	_	_	
7322H	20	32	17	30	20	32	_	_	
74232, 73322, 73383, 73419, 74332	17	27	16	26	17	27	_	_	
7131E, 7341L	17	31	15	29	17	31	_	_	
7131F, 7131K, 7133F, 7133K	17	31	15	29	17	31	_	_	
7131K	17	31	15	29	17	31	-	-	
	17	35	16	33	17	35	_	_	
	17		-	- <del>-</del>	-				
7131T, 7132T, 7133T			20	32	_	-	-	-	
7131T, 7132T, 7133T 70312 (N.V.R), 70315 (N.V.R.), 7033T (N.V.R.)	20	32	20 13	32 28	-	-	-	-	
			20 13 17						

<sup>\*</sup> Available with 1.5 Watt coil also (2.1 VA holding and Inrush)

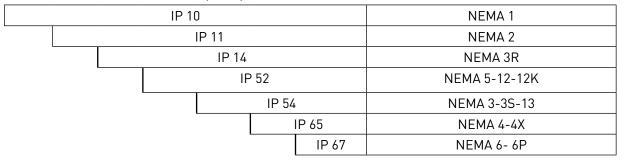


## Degrees of Protection "IP" - IEC/EN 60529

Full enclosure protection is often required, either in the standards concerning "potentially explosive environments" or for other specific needs.

First figure indicates protection against dangerous access and foreign objects	Index	IP	Index	Second figure indiciates protection against water penetration
Non-protected	0		0	Non-protected
Protected against solid objects Ø 50 mm or more	1		1	
Protected against solid objects 12.5 mm or more	2		2	
Protected against solid objects 2.5 mm or more	3	_	3	
Protected against solid objects 1 mm or more	4	5 4 •	4	
Dust protected	5		5	
Dust-tight	6		6	
		-	7	Protected against immersion
			8	Protected aganst continuous immersion

Table 1: Correlation between IP (IEC) and NEMA 250 standards

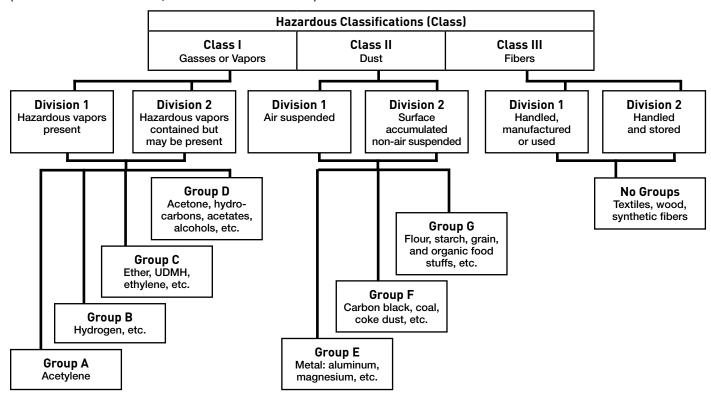


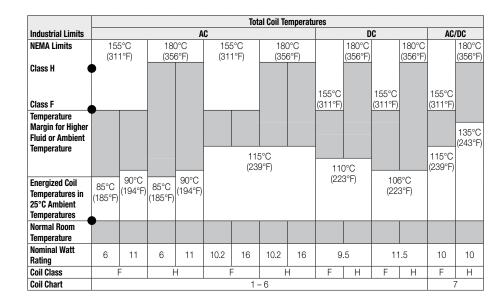
Note; The above correlation between NEMA Type and IP (IEC) is for REFERENCE ONLY.



#### Hazardous (Classified) Locations

(In accordance with Article 500, National Electrical Code-1984)







	(0
	71
	K-
_	
	Ľ
"	4
$\mathbf{C}$	
	7.

Notes		



## **Technical Information**

#### Introduction

Solenoid valves are highly engineered products that can be utilized in many diverse and unique applications. In addition to operational functionality, it is important to consider safety, reliability, media compatibility and suitability for the operating environment when selecting the best product for a given application. This section provides a brief overview of the components and functional varieties of solenoid valves available from Parker.

#### **General Information**

#### **Operation**

Solenoid valves are electrically operated devices used to control flow. They are used for the remote on/off or directional control of liquids, gases and steam. They do not regulate flow.

Solenoid valves consist of two main elements: 1.) An electrical coil in the solenoid, and 2.) A valve body or pressure vessel. The solenoid is the electromagnetic unit that powers (acts to open or close) the valve. The valve is the pressure containing unit that acts to shut off or open media flow.

When the solenoid is energized by an electrical signal, current flow results in the build up of a magnetic field. The field attracts a moveable plunger in the valve. Physical movement of the plunger opens or closes a valve orifice which gives the valve on/off or directional control of media.

In general, solenoid valves are constructed to be: *1.)* Normally-Open, or *2.)* Normally-Closed. Both designations refer to action of the valve on flow when the solenoid is not energized. There would be, for example, no media flow through a normally closed valve until the solenoid is energized.

The most common types of solenoid actuated valves are: *I.*) Direct-Acting, and *2.*) Pilot-Operated. In a direct-acting valve, the plunger is in direct contact with the body main orifice, and opens or closes the orifice. In a pilot-operated valve, the main orifice is not directly controlled by the plunger, but by a diaphragm, piston or spool. Pilot operated valves contain both a pilot and a bleed orifice.

#### **Operational Specifications**

All solenoid valves are individually rated. Pilot-operated solenoid valves may also have an additional specification, *Minimum Operating Pressure Differential (MOP)*. This is the minimum system pressure

differential required to operate the valve and maintain it in the open position. MOP applies only to pilot-operated solenoid valves where system pressure is used to lift the diaphragm off the seat (normally-closed) when the solenoid is energized. Directacting or hung-diaphragm valves do not require a minimum operating pressure.

There will be a pressure differential  $\Delta P$  before the solenoid of a normally-closed valve is energized. Just after flow begins moving through the valve, the pressure differential may decrease. When sizing any normally-closed, normally-open, or universal solenoid valve, pressure differential before and after flow begins must be considered.

Solenoid valves are also rated for *Maximum Fluid (media) Temperature* due to temperature limitations of the various disc or diaphragm materials used in their construction.

**Response Time**, the time necessary for a fully open valve to fully close, or the time necessary for a fully closed valve to fully open, is affected by several factors including: electrical service, media, valve size, system pressure, pressure drop, and operating mode.

The following general response times (nominal) apply for air service using alternating current (AC).

- Large direct-acting valves (3/8 to 3/4-inch)
   20 to 40 milliseconds
- Small Direct Acting Valves (1/8 to 1/4-inch)
   0.5 to 10 milliseconds
- Small pilot (diaphragm) valves (3/8 to 3/4-inch)
   15 to 50 milliseconds
- Large pilot (diaphragm) valves (1 to 3-inch)
   50 to 75 milliseconds

Viscous liquids have very little effect on response time on small direct-acting valves. However, on all other valves, viscous liquids may increase response time by 50 to 100 percent. DC operated solenoid valves will generally increase response time (relative to AC operated solenoids) by as much as 50 percent. Where response time is critical, consult your authorized local Fluid Control Division distributor.

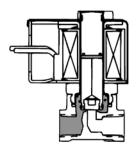
## Two-Way Solenoid Valve Operation

Two-way solenoid valves have one inlet and one outlet connection with one main orifice and flow path. A normally closed valve is closed when the solenoid is de-energized, open when the solenoid is energized. A normally open valve is open when the solenoid is de-energized, closed when the solenoid is energized. Consideration should be given to the desired fail-safe condition of the valve when selecting the type of operation.

#### Operational Sequence: Direct-Acting Normally Closed

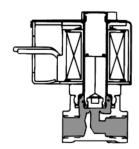


**To Open:** When the solenoid receives an electrical signal, a magnetic field is formed which attracts the plunger. The plunger lifts off the main orifice allowing flow through the valve.



#### Normally Closed, De-Energized

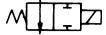
*To Close:* When the solenoid is de-energized, it releases its hold on the plunger. The plunger drops and covers the main orifice.



Normally Closed, Energized

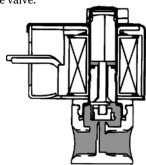


#### Operational Sequence: Direct-Acting Normally Open



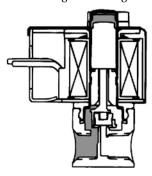
In a normally open valve, the sequence of operation is reversed from that of a normally closed valve. The main orifice is open when the solenoid is de-energized.

**To Close:** When the solenoid is energized, it attracts the plunger. The plunger covers the main orifice stopping media flow through the valve.

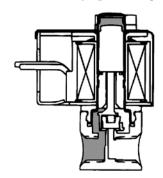


Normally Open, De-energized

**To Open:** When the solenoid is de-energized, it releases its hold on the plunger. The plunger uncovers the main orifice allowing flow through the valve.



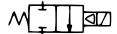
Normally Open, Energized



Normally Closed, Bi-Directional

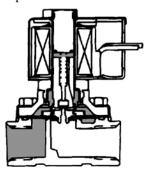
Allows for flow in either direction when energized. (De-energized shown)

## Operational Sequence: Pilot-Operated Normally Closed



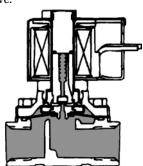
To Open: When the solenoid receives an electrical signal, a magnetic field is formed which attracts the plunger. The plunger covering the pilot orifice lifts off, causing system pressure (holding the diaphragm closed) to drop.

As system pressure on top of the diaphragm is reduced, full system pressure on the opposite side of the diaphragm acts to lift the diaphragm away from the main orifice, thus allowing full media flow through the valve. Since the bleed orifice is dimensionally smaller than the pilot orifice, system pressure cannot rebuild on top of the diaphragm as long as the pilot orifice remains open.



Normally Closed, De-Energized

To Close: When the solenoid is de-energized, it releases its hold on the plunger. The plunger drops and covers the main orifice. System pressure then builds up on top of the diaphragm through the bleed orifice, forcing the diaphragm down until it covers the main orifice and stops media flow through the valve.



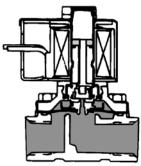
Normally Closed, Energized

## Operational Sequence: Pilot-Operated Normally Open



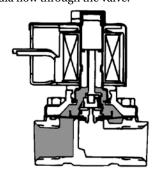
In a normally open valve, the sequence of operation is reversed from that of a normally closed valve. The main orifice is open when the solenoid is de-energized. All other relationships (e.g., the size relationship between the pilot and bleed orifice) still apply.

To Close: When the solenoid is energized, it attracts the plunger. The plunger covers the pilot orifice. System pressure then builds up on top of the diaphragm through the bleed orifice, forcing the diaphragm down until it covers the main orifice and stops media flow through the valve.



Normally Open, De-Energized

To Open: When the solenoid is de-energized, it releases its hold on the plunger. The plunger uncovers the pilot orifice causing system pressure holding the diaphragm closed to drop. As system pressure on top of the diaphragm is reduced, full system pressure on the opposite side of the diaphragm acts to lift the diaphragm away from the main orifice, thus allowing full media flow through the valve.



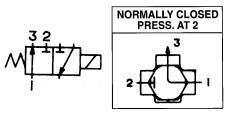
Normally Open, Energized



## Three-Way Solenoid Valve Operation

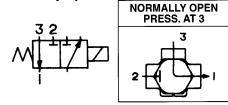
The difference between two-, threeand four-way solenoid valves lies in the construction of the valve body. Three-way valves have three connections and two main orifices. One orifice is always closed, the other always open. Which orifice is open, and which is closed, determines whether the valve is operationally normally open or normally closed.

#### Operational Sequence: Direct-Acting Normally Closed



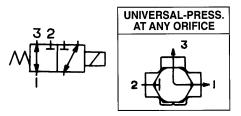
As with a normally closed, two-way valve, the system pressure orifice is closed when the solenoid is de-energized. The second orifice is open to whatever device it is connected to. When energized, the system pressure orifice is opened and the second orifice is closed. This allows system pressure to be applied to the device that was previously being exhausted through the second orifice (now closed).

#### Normally Open



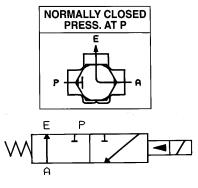
As with a normally open, two-way valve, the system pressure orifice is open when de-energized. The second orifice is closed to whatever device it is connected to. With the solenoid energized, the system pressure orifice is closed, the second orifice opened and the device exhausted.

#### **Universal Construction**



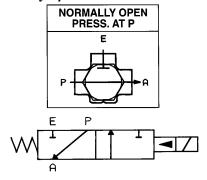
This type of three-way valve may be used in either the normally closed or normally open mode. It can be piped either way. The valve can be used to divert media flow from one outlet connection to the other, or to select one of two inlet flows.

#### Operational Sequence: Pilot-Operated Normally Closed



As with pilot-operated two-way valves, the plunger movement controls the pilot orifice which controls the pressure holding one of the diaphragms closed against the main orifice. As with direct-acting three-way valves, one orifice is closed when the other is open. When de-energized, flow is from the pressurized device to exhaust and the system pressure port is closed. When energized, flow is from the pressure port to the controlled device and the exhaust port is closed.

#### Normally Open

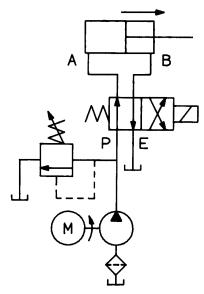


## Four-Way Solenoid Valve Operation

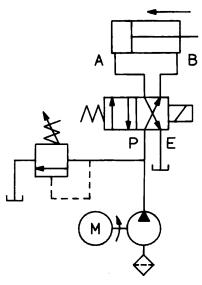
A four-way valve is generally used to operate double-acting cylinders vs. a three-way for single acting cylinders.

A double-acting cylinder has a port at either end of the cylinder body by which fluid can enter and exit. This allows the piston to be moved (propelled) in either direction (double-acting). To distinguish the ports on a double-acting cylinder, one is usually marked "A" and the other "B". A four-way solenoid valve acts to change the direction of fluid flow from the "A" port to the "B" port and, therefore, change direction of the cylinder.

In addition to the "A" and "B" cylinder ports, the four-way valve has a pressure and exhaust port. When de-energized, the pressure port is internally connected to the "A" cylinder port, and the "B" cylinder port is internally connected to the valve's exhaust port. Energizing the four-way valve reverses the system, routing the "A" port to exhaust and the "B" port to pressure. A minimum pressure drop is required for proper operation. Care should be taken not to restrict the exhaust port. Speed controls should be installed in cylinder lines.



De-Energized



Energized



#### **General Data-Solenoid Coils**

#### **Power and Voltage**

All coils used in Parker FCD solenoid valves are designed for continuous duty except where noted. On AC, inrush current occurs at the moment the solenoid is energized. The continuous current after inrush is holding current.

Typical AC current values are shown in the Coil Section of the catalog. DC solenoids have no inrush. Typical amp ratings for DC are determined by dividing DC watts by DC voltage. All Parker FCD solenoid valves are tested to operate at 15% under-voltage and full pressure ratings. AC and DC voltage ratings (nominal) and normal operating ranges, as shown in the following table, are standard. For special voltages, consult the factory.

#### AC/DC Voltage Range

All coils used in Parker FCD valves are designed for continuous duty except where noted. They can remain energized continuously without damage from overheating or mechanical failure.

All coils used in Parker FCD solenoid valves are either Class "F" or Class "H" molded epoxy, and are constructed in accordance with UL, IEEE, NEMA and other accepted standards, unless otherwise noted

#### **Testing**

All Parker FCD solenoid valves are 100% tested. Coil insulation systems must satisfy performance standards set by the National Electrical Manufacturers Association (NEMA) and tested by Under-writer's Laboratories.

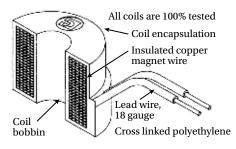
Electrical components of AC and DC coils are tested in accordance with ASTM D2307-78 and become a recognized component under U.L.1446.

The procedure produces data for an evaluation which concludes, a coil with 20,000 hours continuous operation will perform within the same specifications of a zero time coil (new coil).

#### **Coil Construction**

Parker FCD coils are epoxy encapsulated. This compound is waterproof and impervious to oil, dust, moisture and most corrosive fumes and vapors.

Coils used in Parker FCD valves are molded and constructed in accordance with UL, IEEE, NEMA and other accepted standards, and are 100% tested.



#### **Temperature**

Just as fluid (media) temperatures affect valve body trim; ambient, fluid and power input temperatures affect solenoid coils.

Temperature rise due to power input varies with coil design. Temperature rise due to power input and ambient temperature is directly additive and helps determine the class of coil required for specific valve applications.

When ambient temperature is greater than 25°C (77°F), add the difference of ambient and 25°C (77°F) to the energized coil temperature shown in the table.

The effect of higher fluid temperatures needs to be considered only when fluid temperature is greater than 180°F. Do not exceed the catalog maximum temperature limitation for the valve. Add the difference of your fluid temperature and 180°F to the energized coil temperature shown in the table.

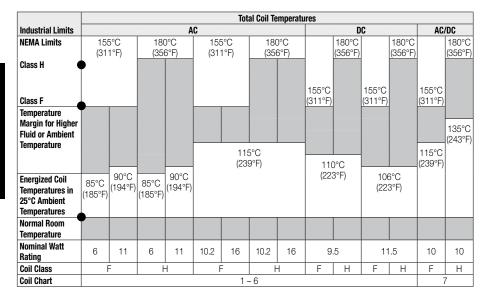
Use the "Saturated Steam Temperature Table" when working with saturated steam. Do not exceed the catalog maximum temperature limitation for the valve. Add the difference of steam temperature and 180°F to the energized coil temperature shown in the table.

Total of additional ambient and fluid or steam temperature to the energized coil temperature shown must not exceed the industrial limit of the coil class selected. Class "H" coil is required if total temperature exceeds "F" Class coil limits. Consult your Fluid Control Division authorized distributor if total temperature exceeds the "H" Class coil limit.

Maximum allowable fluid temperatures are listed for all valves in each section of the catalog.

Minimum allowable fluid temperature is 32° F if moisture is present. Otherwise, -40° F for direct acting valves with NBR seals, -10° F with FKM seals and -10° F for 71214.

Consult factory for confirmation of low fluid temperature limit for specific complete, part number.





#### **Valve Sizing**

Any given application requires proper sizing of the Parker FCD solenoid valve. If the valve selected is too small, flow conditions will not be met. If too large, system cost will be excessive. Parker FCD solenoid valves are tested and rated using the industry accepted Cv method. This method, used in both the U.S. and Europe, is both simple and accurate.

The correct size valve for an application can be determined by either using the engineered formulae shown below, or by using the curves and simplified formulae on the following pages.

#### **Using Flow Formulas**

#### Gases

If  $P_2 > P$  critical

$$Q_{\rm m} = C_{\rm v} \sqrt{\frac{P \! \Delta P}{SG}} \, x \sqrt{\frac{520^*}{T}}$$

If P<sub>2</sub> < P critical

$$Q_{\rm m} = C_{\rm v} \frac{P_{\rm l}}{\sqrt{2SG}} \; x \sqrt{\frac{520^*}{T}} \label{eq:Qm}$$

 $Q_{\rm m}$  = Rate of flow SCFM (Standard Cubic Feet per Minute) at 14.7 psia and 60 degrees F (standard conditions)

 $C_v = Flow coefficient$ 

 $P_1$  = Inlet pressure (PSI)

 $P_2$  = Downstream pressure, psia

P critical is approximate 53% P1

 $\Delta P = Pressure differential (PSI) (P_1-P_2)$ 

SG = Specific gravity of gas, relative to air at 14.7 psi and 60 degrees F (standard conditions)

T = Absolute (degrees Rankin) temperature in degrees F. (460 + degrees F.)

**Note\*:** 520 is 460°F + 60°F

#### Liquids

$$Q = C_v \sqrt{\frac{\Delta P}{SG}}$$

Q = Rate of flow, in gallons per minute

Cv = Flow coefficient

 $\Delta P = Pressure differential (PSI) (P_1-P_2)$ 

SG = Specific gravity relative to water at 60 degrees F

#### Steam

If P2 > P critical

$$W = 3C_v \sqrt{\frac{P_i \Delta P}{X}}$$

If  $P_2 < P$  critical

$$W = 3C_v \sqrt{\frac{P_1}{2x}}$$

W = Rate of flow in pounds per hour

 $C_v$  = Flow coefficient

 $P^1$  = Inlet pressure (PSI)

 $P_2$  = Downstream pressure, psia

Parker Hannifin Corporation

#### **Fluid Control Division**

1 800 825 8305 (1 800 Valve05) www.parker.com/fcd

P critical is approximate 57% P<sub>1</sub>

 $\Delta P = Pressure differential (PSI) (P_1-P_2)$ 

X = Quality of steam (Fraction Dry Steam)

Critical pressure has the following significance in the flow of compressible fluids (gases and steam) through valves. Assuming a fixed upstream pressure of  $P_1$ , an increase in flow is obtained as the downstream pressure  $P_2$  is reduced below  $P_1$ . Continuing increases in flow are experienced until P2 is reduced to a critical value (P critical). When  $P_2$  is reduced below P critical, no further increase in flow results. P critical can be expressed as a percentage of  $P_1$  with approximate values (53% to 57%) given above.

**Note:** PSIA is absolute pressure which is gauge pressure plus atmospheric pressure (14.7 psi at sea level).

### **Definition of Symbols**

 $C_v$  = Flow coefficient

 $Q_L = Liquid flow (GPM)$ 

 $Q_g = Gas flow, standard cu-ft-hr (SCFH)$ 

 $Q_s = Steam flow (lb./hr.)$ 

 $P_1$  = Inlet pressure (PSI)

 $P_2$  = Outlet pressure (PSI)

 $\Delta P = Pressure differential (PSI) (P1-P2)$ 

K<sub>L</sub> = Liquid flow curve factor

 $K_g = Gas flow curve factor$ 

K<sub>s</sub> = Steam flow curve factor

 $K_{sg}$  = Specific gravity factor

 $K_t$  = Temperature factor

There will be a pressure differential  $\Delta P$  before the solenoid of a normally closed valve is energized. Just after flow begins moving through the valve, the pressure differential may decrease.

When sizing any normally closed, normally open, or universal solenoid valve, pressure differential before and after flow begins must be considered.

Curves to correct for specific gravity (Ksg) and temperature ( $K_1$ ) are included. These curves apply to liquids and gases only, not saturated steam.

For liquids with viscosity in excess of 300 SSU, consult your Parker FCD authorized distributor or contact the factory.

The simple and easy to read flow curves for liquids, gases and steam will help in properly sizing valves.

There is a constant relationship between gas and saturated steam flow curves. The flow curve for gases can be used for steam by reading the Ks steam scale.

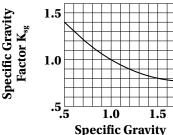
Specific gravity for various compounds are also included.

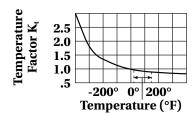
#### **Basic Formulae Using Graphs**

$$\label{eq:cv} \textbf{Liquid} \quad C_v = \quad \frac{Q_L}{K_L \, x \, K_{sg}}$$

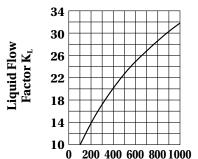
**Steam** 
$$C_v = \frac{Q_s}{K_c}$$

$$Gas C_v = \frac{Q_G}{K_g x K_{sg} x K_t}$$

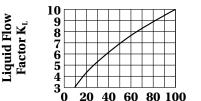




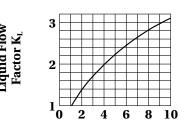
The correction for temperature in the range of 20°F to 150°F is very small, and, therefore, can be ignored in ordinary applications.



Pressure Drop Across Valve ΔP (PSI)

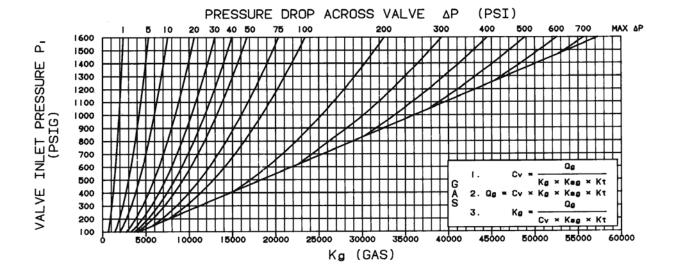


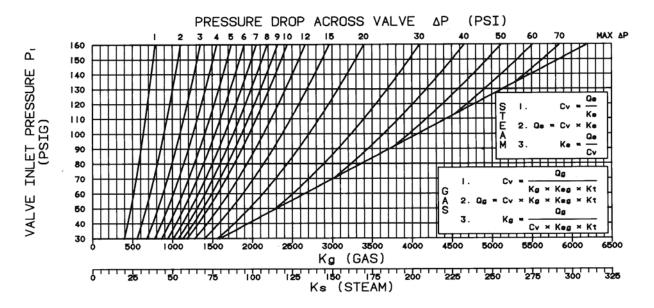
Pressure Drop Across Valve  $\Delta P$  (PSI)

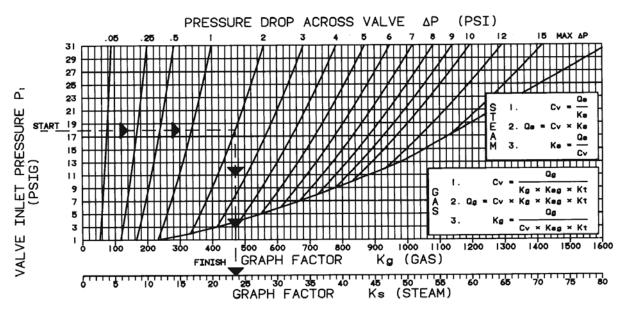


Pressure Drop Across Valve ΔP (PSI)











## Sample Problems Problem: Liquids

Determine Cv when the required flow is 30 GPM, media is light oil with a specific gravity of 0.82, inlet pressure  $(P_1)$  is 36 PSI and outlet pressure (P2) is 0  $(\Delta P = 36 \text{ PSI})$ .

#### Solution

Use the formula:

$$C_v = \; \frac{Q_L}{K_L \, x \, K_{sg}}$$

From the liquid flow curve using the pressure drop (36 PSI), read vertically up to the curve. Read horizontally to  $K_L$ = 6.

From the specific gravity curve using the specific gravity value (0.82), read vertically to the curve. Read horizontally to  $K_{so}$ =1.1.

From the formula:

$$C_v = \frac{30 \text{ (GPM)}}{6 \text{ x } 1.1}$$

$$C_v = \frac{30}{6.6}$$

$$C_{v} = 4.5$$

#### **Problem: Air and Gases**

Determine Cv when the required flow is 700 SCFH, media is air (sg=1.0), inlet pressure ( $P_1$ ) is 70 PSI, outlet pressure ( $P_2$ ) is 55 PSI,  $\Delta P (P_1 - P_2) = 15$  PSI, and air is at 50°F.

#### **Solution**

Use the formula:

$$C_v = \frac{Q_g}{K_g \, x \, K_{sg} \, x \, K_t}$$

From the gas and steam flow curve using the inlet pressure (70 PSI), read horizontally to the curve for pressure drop ( $\Delta P$ =15 PSI). Read vertically down to  $K_g$  = 2025.

Air at (50°F) falls into an area of the temperature correction curve where  $K_t$  is approximately 1 and can be ignored.

$$C_{v} = \frac{700}{2025 \times 1.0}$$

$$C_v = \frac{700}{2025}$$

$$C_v = 0.35$$

#### **Steam**

Determine Cv when the required flow is 30 lb./hr., media is saturated steam, inlet pressure ( $P_1$ ) is 80 PSI, outlet pressure ( $P_2$ ) is 60 PSI and  $\Delta P$  ( $P_1 - P_2$ ) is 20 PSI.

#### **Solution**

Use the formula:

$$C_v = \frac{Q_S}{K_S}$$

Remembering that the gas and steam flow curves have been combined, from the gas and steam flow curve using the inlet pressure value (80 PSI) read horizontally to the curve for the pressure drop ( $\Delta P$ =20PSI). Read vertically down to  $K_S$  = 121.

From the formula:

$$C_v = \frac{30}{121}$$

$$C_v = 0.25$$

#### **Formula Variations**

The examples used here for liquids, gases, and steam show how to determine  $C_{\nu}$ . These same formulae can be transposed to determine other

useful data once a specific value has been selected to meet the desired  $C_{\rm v}$  (see formula variations table below).

Media	Known	Find	Formula	Curve			
	$C_{v}$ , $\Delta P$ , $K_{sg}$	$Q_{L}$	$Q_L = C_V \times K_L \times K_{sg}$	Liquids			
Liquids	$P_1$ , $C_V$ , $Q_g$ , $K_{sg}$	ΔΡ	$K_{L} = \frac{Q_{L}}{C_{v} x K_{sg}}$	Liquids			
		Apply $K_L$ to the liquid factor	or curve with $P_1$ to find $\Delta P_2$				
	$C_V$ , $K_g$ , $K_{sg}$ , $K_t$	$Q_{\mathrm{g}}$	$Q_{g}, C_{V} \times K_{g} \times K_{sg} \times K_{t}$	Gases			
Gases	$P_1$ , $C_V$ , $Q_g$ , $K_{sg}$ , $K_t$	ΔΡ	$K_g = \frac{Q_g}{C_v x K_{sg} x K_t}$	Gases			
	Apply $K_g$ to the gas factor curve with $P_1$ to find $\Delta P$ . After solving for $P$ (pressure differential), a general rule of $2(\Delta P)$ will equal the minimum pressure for a required flow.						
	C <sub>V</sub> , ΔP	$Q_s$	$Q_s = C_V \times K_s$	Gases Steam Scale			
Steam*	$P_1$ , $C_V$ , $Q_s$	ΔΡ	$K_s = \frac{Q_s}{C_v}$	Gases Steam Scale			
	$Apply \ K_s \ to \ the \ gas \ factor \ curve \ with \ P_1 \ to \ find \ \Delta P.$ * In all cases, steam is considered saturated.						



www.parker.com/fcd

## **Specific Gravity for Liquids and Gases**

	Liquid	Gas		Liquid	Gas
Acetic Acid, 10%	1.01	-	Liquid petroleum Gas (LPG)	0.06	2.067
Acetic Acid, Pure	1.06	-	Mercury	13.6	-
Acetone	0.79	-	Methane	0.50	0.554
Acetylene	0.60	0.91	Mineral Oil, USP	0.89	-
Alcohol Amyl	0.81	-	Motor Oil-SAE #10, etc.	0.89	-
Alcohol Ethyl (Ethanol)	0.79	-	Naptha	0.76	-
Alcohol Methyl (Methanol)	0.81	-	Natural Gas	0.55	0.554
Ammonia	0.93	0.596	Oxygen	1.15	1.105
Ammonium Nitrate	1.72	-	Perchloroethylene	1.50	-
Ammonium Phosphate	1.69	-	Petroleum Oils	0.89	-
Argon Gas	1.40	1.379	Potassium Sulfate	1.05	-
Beer	1.01	-	Prestone Anti-Freeze	1.03	-
Benzene Benzol (Benzene)	0.88	-	Propane	1.10	1.56
Butadiene (Gas)	0.65	2.00	Pydraul (Mansanto)	1.28	-
Butane (L.P. Gas)	0.60	2.067	Sodium Hydroxide (100%)	2.13	-
Carbon Dioxide Dry	-	1.53	Sodium Hydroxide (50%) (Caustic Soda)	1.45	-
Carbon Disulfide	1.26	-	Steam Condensate	1.00	0.62
Carbon Tetrachloride	1.59	-	Stoddards Solvent	0.80	-
Cellulube	0.91	-	Sulfuric Acid (10%)	1.08	-
Coffee	1.05	-	Toluene (Toluol)	0.87	-
Corn Oil	0.92	-	Transmission Fluid (Type A)	0.90	-
Cottonseed Oil	0.90	-	Trichloroethylene	1.36	-
Diesel Fuel	0.88	-	Turpentine	0.87	-
Distilled Water	1.00	0.62	Vegetable oils	0.92	-
Ethylene Glycol	1.11	-	Vinegar	1.01	-
Fatty Acids	0.92	-	Water		
Formaldehyde	0.82	-	Carbonated	1.00	0.62
Freon BF (Solvent)	1.57	-	Distilled	1.00	0.62
Freon MF (Solvent)	1.48	-	Fresh	1.01	0.65
Freon TF (Solvent)	1.57	-	Boiler Feed	1.00	0.62
Fuel Oils	0.88	-	Return Condensate	1.00	0.62
Gasoline	0.68	-	Brackish	1.02	0.67
Heptane (Liquid)	0.68	-	Sea	1.03	0.68
Hydraulic Oil	0.91	-			
Hydrogen	0.07	0.0696			
JP4-5 Fuel	0.79	-			
Kerosene	0.81	-			
Linseed Oil	0.94	-			

## **Saturated Steam Temperature Table**

PSIA	PSIG	Temp. °F	Heat of Sat. Liquid (BTU/lb)	Latent Heat of Evap. (BTU/lb)	Total Heat of Steam (BTU/lb)
15	1	213	181.2	969.7	1150.9
20	5	227	196.2	960.1	1156.3
30	15	250	218.9	945.2	1164.1
40	25	267	236.1	933.6	1169.7
50	35	281	250.2	923.9	1174.1
60	45	292	262.2	915.4	1177.6
70	55	302	272.7	907.8	1180.5
80	65	312	282.1	900.9	1183.0
90	75	320	290.7	894.6	1185.3
100	85	327	298.5	888.6	1187.1
110	95	334	305.8	883.1	1188.9
120	105	341	312.6	877.8	1190.4
130	115	347	319.0	872.8	1191.8
140	125	353	325.0	868.0	1193.0
150	135	358	330.6	863.5	1194.1



### Fluid Compatibility

#### **General Information**

The following table lists many of the liquids and gases commonly considered for handling with solenoid valves. In some cases, specific limitations are listed, and in other cases, Parker FCD solenoid valves are not recommended. For media not listed in the tables, consult the factory for specific recommendations.

#### **Trim Materials**

#### Buna "N" (Nitrile) Symbol NBR

A soft synthetic compound, Buna "N" is the most widely used elastomer in industry today. Buna "N" is standard disc and diaphragm material in Parker FCD solenoid valves. It has excellent service characteristics for use with water, light oil and gas in a temperature range of (-10°F) to 180°F.

#### Ethylene Propylene Symbol EPDM

Introduced to the rubber industry in 1961, Ethylene Propylene is used primarily for applications involving hot water or steam service. It has excellent service characteristics for many liquids in a temperature range from (-10°F) to 300°F.

#### Viton\* Symbol FKM

A soft fluoroelastomer, Viton was originally developed to handle hydrocarbons including gasoline, jet engine fuels and various solvents. It handles media in a broader temperature range than Ethylene Propylene. Its temperature range extends from (-10°F) to 350°F. Viton is also an ideal material for handling a wide range of chemical media.

#### Teflon\* Symbol PTFE

Another fluorocarbon, Teflon is available as a solid material or combined with fillers. Teflon will withstand chemical attack from almost any fluid. Its temperature range extends from (-320°F) to 350°F. Because it is not easily fabricated and known to have cold flow characteristics, its applications are limited.

\* DuPont Co. Trademark

#### Neoprene Symbol CR

Most elastomers are resistant to either petroleum lubricants or oxygen. Neoprene has limited resistance to both. Combining wide spectrum of resistance with a temperature range of (-10°F) to 180°F account for its use in many applications.

#### **Urethane Symbol U**

A synthetic compound, Urethane is widely used where high strength and abrasive resistance are required. Its temperature range is similar to Buna "N" (-10°F) to 160°F.

#### Guide to Media and Material Compatibility for Parker FCD Solenoid Valves

Key:

 $A = Aluminum^1$ 

AT = Acetal

BR = Brass

C = Copper

CE = Celcon CR = Neoprene

EP = Ethylene Propylene

NBR = Buna "N"

R = Rubv

S = Silver

SS = Stainless Steel<sup>2</sup>

T = PTFE

U = Urethane

V = FKM

F = KEL-F (PCTFE)

K = Kalrez (PFPM)

DEL = Delrin

<sup>1</sup> Available by special order only.

Factors of temperature, pressure and concentration may render material compatibility unacceptable.

### Fluid Compatibility Chart

The fluid compatibility charts on the next two pages are presented merely as a guide. This data has been compiled from available information obtained from laboratory tests. Actual valve applications may be more severe than the laboratory conditions, so the information presented here should be used as a guideline in choosing materials that are compatible with the fluid to be controlled and the ambient conditions of the installation. This information should by no means be used alone in determining the proper materials of construction of a valve. Please consult factory for further information if needed.

#### **Seal Material Designations**

ASTM Designation	Commercial Designations and/or Trade Names		
NBR	Buna-N, Nitrile		
EPDM	Ethylene Propylene		
FKM	Fluorinated Hydrocarbon, Viton®		
PCTFE	Kel-F		
PTFE	Teflon®, Rulon®		
PFPM	Kalrez		
CR	Neoprene		
U	Urethane		
R	Ruby		
Viton® and Teflon® are Registered Dupont Co. trademarks.			

Rulon®AR is a Furon-Advanced Polymers Division trademark.



<sup>&</sup>lt;sup>2</sup> Stainless Steel 302, 303, 305, 316

### **Fluid Compatibility**

			Meta	ls				Elastomers and Plastics+											
					Stai	nless S	Steel												
Fluids	Aluminum	Brass	Copper	Silver	18-8 302 303 304 305	316	430F	EPDM	FKM	NBR	Nylon	PCTFE	PSF Polysulfone	Ruby	PFPM	CR	PTFE	Noryl	
Acetic Acid 8%	S	NR	NR	S	S	S	S	S	NR	NR	S	S	S	S	S	S	S	S	
Acetone	S	S	S	S	S	S	S	S	NR	NR	S	S	NR	S	S	NR	S	NR	
Acetylene, Dry	S	S	NR	S	S	S	S	S	S	S	S	S	NR	U	S	NR	S	U	
Air, Lubricated 120°C (248°F)	S	S	S	S	S	S	S	NR	S	NR	NR	S	NR	S	S	NR	S	S	
Air, Lubricated 82°C (180°F)	S	S	S	S	S	S	S	NR	S	S	S	S	S	S	S	NR	S	S	
Air, Unlubricated 120°C (248°F)	S	S	S	S	S	S	S	NR	S	NR	NR	S	NR	S	S	NR	S	S	
Air, Unlubricated 82°C (180°F)	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	s	S	S	
Alcohol, Ethyl (Ethanol)	F	F	F	S	F	F	F	S	NR	S	NR	S	U	S	S	S	S	F	
Alcohol, Ethyl (Methanol)	T	F	F	S	S	S	NR	S	NR	S	S	S	U	S	S	S	S	F	
Ammonia Gas, Anhydrous 20	S	NR	NR	F	S	S	S	S	NR	F	F	S	S	S	S	S	S	S	
Argon	S	S	S	S	S	S	S	U	S	S	U	S	U	U	S	S	S	U	
Beer	S	U	F	S	S	S	S	U	S	S	U	S	U	S	U	U	S	S	
Benzene	S	S	S	S	S	S	S	NR	S	NR	S	S	NR	S	S	NR	S	NR	
Boric Acid	NR	NR	F	S	S	S	S	NR	S	NR	S	S	T	S	S	S	S	S	
Citric Acid 10%	NR	NR	NR	S	S	S	S	S	S	S	S	S	Т	S	S	S	S	S	
Cod Liver Oil	S	S	U	S	S	S	S	S	S	S	S	S	S	S	U	NR	S	U	
Coffie	S	S	U	S	S	S	S	S	S	S	S	S	S	S	U	S	S	U	
Diesel Fuel	S	S	S	S	S	S	S	NR	S	Т	S	S	S	S	S	NR	S	NR	
Ethylene Glycol (Antifreeze)	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Freon 12	S	S	S	S	S	S	S	NR	U	S	S	S	S	S	NR	S	S	NR	
Freon 22	S	S	S	S	S	S	S	U	NR	NR	S	S	S	S	S	S	S	NR	
Fuel Oil	S	S	F	S	S	S	S	NR	S	Т	S	S	S	S	S	NR	S	S	
Gasoline, Leaded	S	S	S	S	S	S	S	NR	S	S	S	S	U	S	S	NR	S	NR	
Gasoline, Unleaded	S	S	S	S	S	S	S	NR	S	NR	S	S	U	S	S	NR	S	NR	
Helium	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Hydraulic Fluids - Fire Resistant Cellulube, Phosphate Ester	S	S	S	s	S	s	s	S	NR	NR	S	s	S	S	U	U	S	U	
Pydraul	S	S	S	S	S	S	S	NR	S	NR	S	S	S	S	U	NR	S	U	
Skydrol	S	S	S	S	S	S	S	S	NR	NR	S	S	S	S	U	U	S	NR	
Petroleum	S	S	S	S	S	S	S	NR	S	S	S	S	S	S	U	NR	S	NR	
Jet Fuel	S	S	S	S	S	S	S	NR	S	T	S	U	U	S	S	NR	S	NR	
Kerosene	S	S	S	S	S	S	S	NR	S	S	S	S	S	S	S	NR	S	NR	
Ketones	T	T	U	U	T	S	T	S	NR	NR	S	T	NR	U	S	NR	S	NR	
Lard (Animal Fat)	S	S	T	S	S	S	S	F	S	S	S	U	U	U	S	NR	S	U	
Lead Acetate	NR	NR	NR	F	NR	NR	NR	S	T	NR	S	S	U	U	S	NR	S	F	
Linseed Oil	T	NR	NR	S	S	S	S	NR	S	S	S	U	S	U	S	NR	S	S	
Lime & Water	NR	NR	NR	U	NR	NR	NR	S	S	S	S	S	U	U	S	S	S	U	
Lubricating Oil	S	S	S	S	S	S	S	NR	S	S	S	S	S	S	S	NR	S	T	
Methane	S	S	S	S	S	S	S	NR	S	S	S	S	S	S	S	NR	S	U	
Methanol Alcohol-Methyl	S	S	NR	U	S	S	NR	S	NR	S	NR	S	S	S	S	T	S	T	
Methyl Ethyl Ketone (MEK)	S	S	S	S	F	S	F	S	NR	NR	S	S	S	S	S	NR	S	NR	
Mineral Spirits	S	S	S	S	S	S	S	NR	S	S	U	U	U	U	NR	NR	S	T	
Motor Oil	S	S	S	S	S	S	S	NR	S	S	T	S	U	U	NR	T	S	S	
Naphtha	S	S	S	S	S	S	S	NR	S	NR	S	S	S	S	S	NR	S	NR	
Natural Gas	S	S	S	S	S	S	S	NR	S	S	T	U	U	U	S	S	S	U	
Nickle Nitrate	NR	NR	NR	U	Т	NR	NR	S	S	T	S	U	U	U	S	Т	S	S	



### **Fluid Compatibility**

			Meta	ls				Elastomers and Plastics+										
					Stai	nless S	Steel											
Fluids	Aluminum	Brass	Copper	Silver	18-8 302 303 304 305	316	430F	EPDM	FKM	NBR	Nylon	PCTFE	PSF Polysulfone	Ruby	PFPM	CR	PTFE	Nory
Nitrobenzene	T	NR	T	U	NR	S	NR	T	NR	NR	NR	Т	U	U	S	NR	S	NR
Nitrogen	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Nitrous Oxide	NR	NR	S	U	T	T	T	T	T	S	NR	S	U	U	S	T	S	U
n-Octyl Alcohol	U	U	U	U	U	U	U	S	T	Т	U	U	U	U	S	T	S	U
Olive Oil	S	S	U	U	S	S	NR	NR	S	S	T	U	U	U	S	NR	S	S
Oxygen	S	S	S	S	S	S	S	S	S	NR	NR	S	NR	U	S	S	S	S
Ozone	T	U	U	U	T	S	T	T	T	NR	NR	S	U	U	S	NR	S	U
Perchloroethylene	S	F	F	S	F	S	F	NR	S	NR	S	S	NR	U	NR	NR	S	NR
n-Propyl Acetone	U	U	U	U	U	U	U	S	NR	NR	U	U	U	U	S	NR	S	U
Propyl Alcohol	S	S	NR	U	S	T	S	T	S	Т	NR	U	U	U	S	T	S	U
Pyridine	NR	NR	NR	U	S	S	NR	NR	NR	NR	NR	S	U	U	S	NR	S	Т
Pyrolube	U	U	U	U	U	U	U	NR	S	NR	U	U	U	U	U	NR	U	U
Quick Silver	U	U	U	U	U	U	U	S	S	S	T	U	U	U	U	S	S	U
Red Oil	U	U	U	U	U	U	U	NR	T	S	T	U	U	U	S	NR	S	U
Rust Inhibitors	U	U	U	U	U	U	U	U	S	S	U	U	U	U	U	NR	U	U
Shellac	S	S	S	U	S	S	S	S	S	S	S	U	U	U	S	NR	S	U
Silicone Oil	S	S	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S
Sodium Phosphates	NR	T	S	S	T	T	NR	T	T	S	NR	S	U	U	S	T	S	S
Steam 148°C (298°F)	U	S	S	S	S	S	S	S	NR	NR	NR	S	NR	U	U	NR	S	S
Steam 180°C (356°F)	NR	S	S	S	S	S	S	NR	NR	NR	NR	NR	NR	U	U	NR	S	Y
Stoddard Solvent	S	S	S	U	S	S	S	NR	S	S	T	S	U	U	S	NR	S	NR
Sucrose Solution	U	U	NR	U	S	S	S	S	S	S	T	U	U	U	S	T	S	S
Sulfur	S	NR	NR	U	Т	T	Т	S	S	NR	T	S	U	U	S	U	S	S
Sulfur Hexaflouride	S	S	S	S	S	S	S	S	NR	NR	T	U	U	U	T	S	S	U
Toluene	S	S	S	S	S	S	S	NR	S	NR	S	S	NR	U	S	NR	S	NR
Trichloroethylene	T	NR	T	U	Т	T	Т	NR	T	NR	NR	NR	U	S	S	NR	S	NR
Trimethylpentane	U	U	U	U	U	U	U	NR	S	S	T	U	U	U	S	NR	S	U
Trisodium Phosphate	NR	NR	NR	F	Т	T	T	S	S	F	T	S	U	U	S	F	S	S
Turpentine	S	S	S	S	S	S	S	NR	F	S	S	S	U	U	S	NR	S	S
Urea	T	U	U	S	S	F	U	T	T	Т	T	U	U	U	U	T	S	S
Varnish	S	T	S	U	S	S	S	NR	S	Т	T	S	U	U	S	NR	S	U
Vegetable Oil	S	S	S	U	S	S	S	NR	S	S	S	S	U	U	U	NR	S	U
Vinegar	T	NR	NR	S	T	S	T	T	NR	T	NR	S	U	U	U	T	S	S
Water, Boiler Feed	S	T	Т	S	S	S	S	U	T	S	T	S	U	S	S	NR	S	U
Water, Deionized, Distilled	S	T	Т	S	S	S	S/T	S	S	Т	S	S	S	S	S	NR	S	S
Water, Fresh <82°C (180°F)	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	NR	S	S
Water, Fresh <100°C (212°F)	T	S	S	S	S	S	S	S	S	NR	S	S	S	S	S	NR	S	S
Water, Return Condensate	S	T	T	S	S	S	S	S	T	S	T	S	U	S	S	NR	S	U
Water, Sea/Salt	NR	NR	F	S	Т	S	NR	S	S	S	S	S	S	S	S	NR	S	S
Whiskey	NR	T	NR	U	S	S	NR	S	S	S	S	S	U	U	S	S	S	S
Wine	NR	NR	NR	U	S	S	T	S	S	S	S	S	U	U	S	S	S	S
Xylene	S	S	S	S	S	S	S	NR	S	NR	S	S	NR	S	S	NR	S	NR
Zinc Chloride	NR	NR	NR	F	NR	NR	NR	S	S	S	T	S	U	U	S	S	S	S
Zinc Sulfate	NR	NR	NR	S	T	T	NR	S	S	Т	U	Т	U	U	S	T	S	S

Note: Please read the introduction section before using this chart. The following data should be used as a guide, and not as a final recommendation. When flammable gas applications are being considered, consult Fluid Control Division.

T = Test to Verify; F = Fair; U = No Data Available, Unknown Compatibility; NR = Not Recommended Unless Media are at 100% Concentration and at Room Temperature.



Uni	<b>Unit Conversion Charts</b>							
F	ractional C	onversions						
mm	Inches	Decimal Inches						
0.79	1/32	0.031						
1.59	1/16	0.063						
2.38	3/32	0.094						
3.18	1/8	0.125						
3.97	5/32	0.156						
4.76	3/16	0.188						
5.56	7/32	0.219						
6.35	1/4	.0250						
7.14	9/32	0.281						
7.94	5/16	0.313						
8.73	11/32	0.344						
9.53	3/8	0.375						
10.3	13/32	0.406						
11.1	7/16	0.438						
11.9	15/32	0.469						
12.7	1/2	0.500						
13.5	17/32	0.531						
14.3	9/16	0.563						
15.1	19/32	0.594						
15.9	5/8	0.625						
16.7	21/32	0.656						
17.5	11/16	0.688						
18.3	23/32	0.719						
19.1	3/4	0.750						
19.8	25/32	0.781						
20.6	13/16	0.813						
21.4	27/32	0.844						
22.2	7/8	0.875						
23.0	29/32	0.906						
23.8	15/16	0.938						
24.6	31/32	0.969						
25.4	1	1.000						

#### Measures

1 inch = 25.4mm 1 inch = 2.54cm 1 U.S. gal = 3.785 liters 1 Imperial gallon = 4.546 liters

#### Pressure

1 psi = 0.0703 Kg/square cm 1 psi = 27.73 inches water (@60/F) 1 psi = 2.036 inches of mercury (@32/F) 1 psi = 51.7 mm of mercury (@32/F) 1 psi = 0.0689 bar

#### Vacuum

1 torr = 1 mm mercury 1 micron = 0.001 torr

#### **Volumetric Flow Rate**

1 Cv = 14.28 Kv 1 gpm = 3.785 liters/min (U.S. gallon) 1 cfm = 28.317 liters/min 1 liter/min = 0.0353 cfm

#### **Temperature**

Degrees C = (Degrees F- 32) (5/9)Degrees F = (Degrees C) (9/5) + 32

#### **Torque**

1 in lb. = 0.113 Nm 1 in lb. = 1.15 cm Kg

#### **Glossary of Terms**

**Bleed Orifice** - An internal orifice which controls the closing rate of a pilot operated solenoid valve. Also called the equalizer hole.

**Bubbletight Sealing** - Air leakage between the internal sealed ports of a valve in either the energized or de-energized position is undetectable in a 5 second soap bubble test. Equivalent to 2 cc/min.

**Continuous Duty** - A rating given to a valve that can be energized indefinitely without overheating or failure under normal operating conditions.

**Cover -** The upper half of a diaphragm type solenoid valve.

**Current Drain** - The amount of current (expressed in amperes) that flows through the coil of a solenoid valve when it is energized.

**Cv Factor** - The Cv factor of a valve is the quantity of 60°F water, expressed in gallons per minute, which flows through a valve with one PSI pressure drop. Cv values for Parker solenoid valves are indicated in the catalog listings in each section.

**Cycle** - A complete operation of a solenoid valve. For example: opening a normally closed valve and then closing it is one cycle.

**Cycle Rate** - The number of times a valve is capable of opening and closing its main orifice in a particular time interval.

**Cycles Per Minute (CPM)** - The number of times a valve is capable of opening and closing its main orifice in one minute.

**Dead End Gas Service** - A condition in which a valve is energized but has no cooling fluid flowing through it because of a dead end line (for example: a cylinder pressurized for a long period of time).

**Diaphragm** - An elastomeric or other material seal which covers the main orifice.

**Disc** - A material used in a plunger to seal an orifice.

**Drip-proof** - See NEMA classifications

**Drip-tight** - See NEMA classifications

**Dust-tight** - See NEMA classifications

**Duty Cycle** - The longest time that a valve is energized, followed by the shortest time that it is de-energized. Expressed in

$$percent = \frac{on time}{on time + off time} \times 100$$

**Elastomer** – Material having elastic properties. These materials are generally used for sealing purposes.

**Electromagnet** - Electrical part consisting of a copper windings (solenoid) which, with a magnetic yoke (armature), when electrical current flows through it, generates a magnetic flux attracting the plunger.

**Explosion-Proof Construction** - A solenoid valve constructed to meet the specifications of the appropriate approval agency for operation in hazardous locations. See also NEMA classifications.

Floating Top Seal - A plunger assembly construction in two-way normally open and three-way valves in which the top seal is moveable against a spring within the plunger. The purpose of this construction is to prevent seal swell or shrinkage due to fluid or temperature from interfering with valve operation. It also allows the spring to continue to move the seal against the valve seat in spite of wear.

**Flow** - The continuous movement of fluid caused by a pressure differential.

Flow Capacity -The amount of fluid a valve will pass under given temperature and pressure conditions in gallons per minute or cubic feet per minute as measured at the outport. Cv is a measure of flow capacity.

**Flow-rate** - The amount of fluid that passes a given point at a given period of time.

**Flux Frame** - The magnetic steel frame surrounding the coil which provides for efficient travel of magnetic flux. Also called magnetic frame assembly.

**Flux-plate** - A magnetic steel plate used in the magnetic circuit of a solenoid valve to help carry magnetic flux from the housing to the sleeve assembly.



**Hazardous Locations** - As defined by Underwriter's Laboratories, Inc. most Parker explosion-proof valves are approved for use in the following hazardous locations: Class I, Group C and D, Class II, Group E, F and G. See also NEMA classifications.

Class I locations are those in which flammable gases or vapors are or may be present in the air in sufficient quantities to produce explosive or ignitable mixtures. Group C atmospheres contain: acetal-dehyde, cyclopropane, diethyl ether, ethylene and isoprene. Group D atmospheres contain: gasoline, hexane, naphtha, benzene, alcohols, acetone, lacquer, solvent vapors and natural gas.

Class II locations are hazardous because of the presence of mixtures of combustible dust. Group E atmospheres contain metal dust including aluminum, magnesium, and their commercial alloys, and other metals of similarly hazardous characteristics. Group F atmospheres contain carbon black, coal or coke dust. Group G atmospheres contain flour, starch or grain dust.

Heat Rise - The difference between the temperature of the solenoid coil when energized and de-energized in a constant ambient temperature. As current flows through a coil, heat is generated. The coil temperature rises until the coil housing dissipates heat as fast as it is generated, and the temperature stays at a stabilized level.

**Holding Current** - The current flowing through the coil after it as stabilized, to hold the plunger in the energized position. Value is normally about ½ of inrush current.

Inrush Current - The current at the moment of energization of AC voltage coils. This current is of greater value than holding current due to low inductance at the moment of energization. Supply transformers should be sized using this value.

**Insert** - A material used in a plunger assembly to seal an orifice.

#### **Insert Materials**

**BUNA-N** - A soft synthetic rubber used as the standard insert material in valves having rubber inserts. Also known as nitrile

**Ethylene Propylene** - A soft synthetic insert material used for water above 180°F and steam.

**Delrin** - A thermoplastic used in precision parts requiring high stiffness, low friction and excellent dimensional stability.

**FKM** - A soft synthetic insert material used for high temperature and with many fluids not handled by Buna-N. Standard seal material in several valve series.

**Neoprene** – A soft synthetic rubber used as an insert material on certain types of freons.

Nitrile -See Buna-N.

**PCTFE-** A synthetic material used for many semi corrosive and corrosive media. Also for high temperatures.

**Ruby** - A synthetic corundum (hard stone) with high hardness values and total inertia for all types of fluids. Working temperatures from -40° to +180°C

**Rulon** - A synthetic plastic material used for semi corrosive media.

**Intermittent Duty Coil** - A valve coil not designed for continuous duty but which will perform satisfactorily for a specified duty cycle.

**Leakage, External** - The leakage between the internal part of the valve and the external part of the valve. Parker valves are bubbletight.

**Leakage, Internal** - The leakage between the internal sealed ports of a valve in either the energized or de-energized position. Leakage rate is normally described in cc (cubic centimeters) per minute or as bubbletight.

**Manual Override** - A mechanical device that permits manual opening of normally closed valves or closing of normally opened valves.

**Media** - The fluid flowing through the valve.

**Metering** - A mechanical device that permits manual adjustment of fluid flowing through a valve. Often referred to as speed control.

**NEMA** - National Electrical Manufacturers Association. Recommends suitable materials and constructions to meet coil enclosure installation types.

#### **NEMA Classifications (Enclosures)**

**Drip-proof** - NEMA Type 2 enclosure must prevent failing moisture or dirt from interfering with operation.

**Drip-tight** - NEMA Type 2 enclosure must exclude falling liquids or solids.

**Dust-tight** - NEMA Type 5. Option EX meets this requirement.

**General Purpose** - NEMA Type 1 enclosure suitable for general purpose application indoors under normal atmospheric conditions.

**Hazardous Locations -** NEMA Type 7, 9, 9A explosion proof construction.

Submersible - NEMA Type 6.

Watertight - NEMA Type 4X.

Weather Resistant - NEMA Type 3.

Oxygen Service - Valves specified for use with oxygen are furnished free of any petroleum based oil. Special cleaning may be required and should be so specified.

**Pilot Orifice** - An internal orifice which controls opening characteristics of a pilot operated solenoid valve. In a pilot operated solenoid, the plunger covers the pilot orifice.

**Plunger** - Moveable portion of a solenoid valve operator which controls media flow.

**Plunger Spring (or return spring)** - Used to hold the MP in position and to return it to position after the action of the electromagnet.

**Port** - An opening or passageway for the inlet or outlet of fluid in a valve. The terminus of the port is threaded with National Pipe Threads (NPT) to accommodate line connection. A port designated with an NTPF port indicates one with dry seal threads.

**Port, Cylinder** - A port which provides a passage to or from an actuator. This port is a common port and in multi-purpose valves is called a common port.

**Port, Exhaust** - A port which provides a passage to the atmosphere or downstream piping.



**Port, In** - A port which provides a passage from the source of fluid.

**Port, Out -** The port where the fluid leaves the two-way valve.

**Port, Normally Closed** - The port that is closed to fluid flow when the valve is de-energized.

**Port, Normally Open** - The port that is open to fluid flow when the valve is de-energized.

**Power Consumption** - The number of watts a solenoid valve draws when it is energized.

**Pressure** - A force per unit area used as a propellant of air or fluid. Pressure is induced into a system by means of a pump, compressor or gravity. Absolute pressure is measured in pounds per square inch absolute (PSIA). Absolute pressure is the reference of pressure with atmospheric pressure used as a base (14.7 pounds per square inch absolute at sea level). (0 PSIG = 14.7 PSIA).

#### **Pressure Definitions**

Burst Pressure - The pressure that would cause the weakest section of the valve to fail and cause external leakage when pressure is reduced back to rated pressure. Dependent on the individual valve constructions. For most valves it is at least 5 times rated pressure. (This is a destructive test.) In some of the higher pressure valves (2000 PSI or more) the factor may be slightly lower. Consult factory.

Maximum Operating Pressure
Differential (MOPD) - The maximum
difference in between the pressure at an
INlet port and the pressure at an OUTlet
port at which a solenoid will operate,
either to open or close one or more ports
when energized or de-energized.

**Minimum Operating Pressure (MOP)** - The minimum pressure a pilot operated valve requires for proper operation.

#### **Minimum Operating Pressure**

Differential - The minimum difference between the pressure at an INlet port and the pressure at an OUTlet port required for proper operation of the solenoid valve. The minimum operating pressure must be maintained throughout the operating cycle of pilot-operating valves to assure proper shifting from the closed position to the open position or vice-versa.

**Note:** Two- and three-way pilot-operated valves will start to move to their normal positions when the pressure falls below the minimum operating pressure.

Direct acting valves do not require a minimum pressure to operate.

**Proof Pressure** - The maximum pressure the valve may be exposed to without suffering any damage. It need not be operable at this pressure. For most valves it is at least 1½ times the rated pressure. (This is a non-destructive test).

#### **Pressure Ratings**

Extended Pressure Ratings - Are pressure ratings which can be extended beyond the Higher Than Standard Pressure Ratings by means of mechanical or electrical modifications.

When higher than standard or extended pressure ratings are to be employed, consideration must be given to the possible adverse effect on valve life, flow, and noise level.

**Higher Than Standard Rating** - Are pressure ratings which can be made available through minor changes on a solenoid valve. In most cases, this is possible only when UL approval is not a factor.

**Safe Working Pressure** - Twenty percent of the pressure which causes external leakage. The valve is not expected to operate at this pressure unless the MOPD is a value less than the SWP.

Standard Catalog Ratings - Are pressure ratings established to conform to Underwriter's Laboratories, Inc., and to do so under the most adverse conditions of pressure, low or high voltage, maximum heat rise, etc. The standard ratings listed in this catalog for most applications should be considered conservative.

Response Time - The length of time required for an operating mechanism of a valve to move from the fully closed to the fully open position, or vice versa. Response time will vary according to pressure, media, voltage and system. It also varies with the type of valve (direct operated or pilot operated). For specific valves consult factory with complete application details.

The following general response times (nominal) apply for air service using alternating current (AC).

- Large direct-acting valves (3/8 to 3/4-inch)
   20 to 40 milliseconds
- Small Direct Acting Valves (1/8 to 1/4-inch)
   0.5 to 10 milliseconds
- Small pilot (diaphragm) valves (3/8 to 3/4-inch)
   15 to 50 milliseconds
- Large pilot (diaphragm) valves (1 to 3-inch)
   50 to 75 milliseconds

Viscous liquids have very little effect on response time on small direct-acting valves. However, on all other valves, viscous liquids may increase response time by 50 to 100 percent. DC operated solenoid valves will generally increase response time (relative to AC operated solenoids) by as much as 50 percent. Where response time is critical, consult your authorized local Fluid Control Division distributor.



**Shading Ring** - A single coil located in the stop in which a secondary flux wave is induced during AC current operation.

**Sleeve** - The stainless steel tube of the solenoid operator housing the plunger and stop, and over which the coil is positioned.

**Solenoid** - The electrical portion containing the coil and magnetic frame and/or enclosure.

**Specific Gravity** - The ratio of the density (mass of a unit volume) of a substance to the density of a reference substance. Normally the reference substance is water for liquids and air for gases.

**Spring-Loaded** - The term used to indicate that the valve has a plunger return spring. A spring-loaded plunger permits the valve to be mounted in any position without causing malfunction.

**Standard Construction** - The type of construction used in manufacturing valves listed in this catalog that have grommet or conduit electrical outlets not including explosion-proof type.

**Stop** - The stationary portion of the magnetic attractor inside the sleeve assembly.

Temperature Range - Parker valves are equipped with high quality coils suitable for continuous energization. If the normal ambient temperature of 25°C is continuously exceeded or if 40°C is occasionally exceeded, a higher class coil may be required depending on the fluid temperature, flow rate, duty cycle, other heat sinks and ventilation of the area.

The permissible coil temperature by the change of resistance method for standard coils is 110°C for Class A and 130°C for Class B.

Higher coil classes available are F 155°C and H 180°C.\*

\*Underwriter's Laboratories Inc. requires for listed valves that coil temperature stays lower than the stated limits. The limits are 120°C for Class B, 140°C for Class F and 160°C for Class H.

## Ambient And Media Temperature Limitations

**Minimum Media** - If moisture is present 32°F, otherwise minus 40°F for poppet valves.

Maximum Media And Maximum Ambient - As listed in catalog for each valve.

**Note:** Ambient temperature and coil temperature rise are additive. Media temperature is not.

**Valve Body** - Main part of the pressure vessel with the process connections (fittings), seat and main pilot orifices.

**Velocity** - The speed at which fluid moves, expressed in terms of distance per time, such as feet per second.

**Vibration And Shock** - Most valves will resist 10G's or more. For V40 series valves, consult Parker.

**Viscosity** - The amount of resistance to flow. Specific for each media.



**Port Marking (2-Way Valves)** - A The table below indicates how the ports of 7000 Series solenoid valves are identified.

Walnu Tona	Port M	arking
Valve Type	Inlet	Outlet
71211	1	2
71214 (Noryl Body)	**	*
71214 (Teflon, SS Body)	2	1
71215	2	1
71216B	Р	Α
71216S	2	1
7121F	1	2
7121K (1/8",1/4",3/8" ports)	1	2
7121K (1/2" port)	*	*
71221	3	2
71225	2	1
7122K	1	2
71235	**	**
71295	2	3
72218	Р	-
7221G	*	*
72228	Р	-
73212B (1/4" ports)	Р	Α
73212S (1/4" ports)	2	1
73412 (3/8", 1/2", 3/4" ports)	IN	OUT
73212 (1" ports)	Р	Α
73216B	Р	Α
73216S	2	-
73218	Р	*
7321G	*	*
7321H	*	*
7321K	*	Α
73222B (1/4" port)	Р	1
73222S (1/4" ports)	2	OUT
73222 (3/8", 1/2",3/4" ports)	IN	Α
73222 (1" ports)	Р	-
73228	Р	*
7322G	*	*
7322H	*	*
74232 (3/8",1/2",3/4" ports)	IN	OUT
74232 (1" ports)	Р	Α
75232 (3/8", 1/2",3/4" ports)	IN	OUT
75232 (1" ports)	Р	Α

- \* Flow arrow on body indicates flow direction-ports are not marked.
- \*\* Pressure can be applied at either port.
- Port(s) are not marked.
- # Valves can be normally closed or normally open, depending on piping of external pilot.

**Port Marking (3 & 4-Way Valves)** - A The table below indicates how the ports of 7000 Series solenoid valves are identified.

#### Three-Way Valves: Normally Closed Valves

Value Tune	Po	Port Identification								
Valve Type	Pressure	Cylinder	Exhaust							
71311	1	2	3							
71313	1	2	3							
71315	1	2	3							
7131E	1	2	3							
7131F	2	1	0							
7131K	2	1	0							
7131T	1	2	3							
73312	1	2	3							

#### Normally Open Valves

Value Tune	Port Identification							
Valve Type	Pressure	essure Cylinder						
71321	3	2	1					
73322	3	2	1					
7132T	3	2	1					
71395	3	2	1					

#### **Multipurpose Valves**

Valve Type	Port Identification
71331	
71335	
7133F	
7133K	Pressure can be applied
7133T	at either port.
74332	
75332	

#### **Diverting Valves**

Valva Typa	Port Identification							
Valve Type	N.C.	N.O.						
71381	1	2	3					
71385	1	2	3					
73382	1	2	3					

#### 4-Way Valves

Valva Typa		Port Identification									
Valve Type	Pressure	ressure Cyl. A Exh. A C		Cyl. B	Exh. B	symbol					
73419	Р	Α	EA	В	EB	14					
75419	Р	Α	EA	В	EB	15					
7341LAN	1	2	3	4	5	16					
7341LMN	1	2	3	4	5	17					



	\ <b>1</b>	n de la constante de la consta	Pen St	drage drage file of the state o	coil collective of the collection of the collect	Circuit Anthio	ination were the second	dia fer Media Sautita Sautita II Sautita	ideration (	rie denois de la company de la	dretain	net held white he	edia di	ge ou si	inger h	ride frigger	de die die die die die die die die die d	oce hale in the	and track	gri d Onded d Striked i
Fails to Close/ Shift	X	X	X	, ,	X	X		X	,	X			X		X	X	<u> </u>	X	X	
Fails to Open/ Shift	X	X	X		X	X				X			X	X		X	X	X	X	
Internal Leakage					X					X	X	X	X		X	X				
External Leakage					X	X			X											
Excessive Noise/Hum	X		X			X	X			X			X							
Short Coil Life	X		X	X																
Failure Symptom*				•			Serie	s												
	•						Valve	•						Pi		perat lves	ted	Fl 3 V	igh ow Vay Way	

<sup>\*</sup>Partial list

Note: This check list is intended to serve as a preliminary guide to common valve failure troubleshooting, and is not intended to contain recommendations for proper solenoid valve or systems operation or design. For proper solenoid valve usage, follow manufacturer's recommendations. Improper system design may result in ineffective valve operation.

#### **General Troubleshooting Discussion**

**Note 1)** If the valve fails to operate because of a burn-out or shorted coil, the cause of the burn-out must be determined before the new unit solenoid, or coil for explosion-proof valves, is installed. Usually the cause is in the mechanical portion of the unit body, therefore, the entire solenoid valve must be inspected.

**Note 2)** If the coil has failed, a complete Parker FCD unit solenoid, or coil for explosion-proof valves, should be installed. Be sure to turn off all electrical power in the valve circuit prior to any disassembly.

Note 3) If the solution requires the replacement of a defective part or parts, a complete Parker FCD rebuild kit should be used. Be sure all parts in the rebuild kit are installed in the valve, not only the part or parts deemed defective. As this procedure requires opening the valve body (pressure vessel), be sure to bleed all system pressure to zero. If either the plunger tube assembly or the bonnet screws are loosened to relieve trapped valve pressure, do so carefully. Do not completely remove the plunger tube assembly or the cover screws until the bleeding is complete. Refer to the appropriate I & M Sheet for instructions.

**Note 4)** In most installations, after a solenoid valve has been energized for a short time, the solenoid housing will be hot to the touch. This is not an indication of a failure or possible failure. It is perfectly normal.

Note 5) Regardless of system size, water hammer must be considered and controlled to protect piping systems and solenoid valves from its effects. Water hammer occurs when the flow of a non-compressible fluid in a pipe is abruptly stopped. Water hammer is not always identified by noise and vibration. Examine diaphragms, plunger discs and other internal parts for tears, distortion and other damage. Replace internal parts with a rebuild kit and modify the piping system. Commercially available water hammer arresters range from flexible rubber hose, a simple extension pipe to a type of permanently sealed chamber.

#### Hints

1.) Never replace a burned-out coil or unit solenoid until the cause of the burn-out has been determined, ie: missing parts, plugged plunger tube, worn plunger, over voltage, etc.

- **2.)** Before reassembly of valve body, if possible, flush out inlet to valve.
- **3.)** Use a flat screwdriver placed on top of plunger tube to test magnetic circuit.
- **4.)** If the cause of failure is the presence of foreign matter, install a strainer or filter in the upstream (inlet) side of the valve.

#### **Symptoms**

Five basic symptoms indicate a solenoid valve is not operating properly to specifications:

- 1.) Failure to operate (shift position) when energized.
- **2.)** Failure to operate (shift position) when deenergized.
- 3.) Internal or external leakage.
- 4.) Erratic flow.
- 5.) Excessive solenoid noise when energized even though any of the above symptoms does not exist.

  (In some AC installations, a very slight hum may be noticeable and is normal.)



www.parker.com/fcd

#### **Agency Approvals**

Most solenoid valves are approved by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). Some FCD valves meet the requirements and are SIL3 capable, see sample certificates on the following pages. Consult factory for additional details.

#### Vacuum

While many 2-Way direct acting/direct lift solenoid valves with elastomeric seals listed in this catalog can be used on vacuum, the standard 100% production leakage test does not ascertain that the valves are sufficiently tight for severe vacuum applications. We do, however, design, produce, and test many vacuum valves to meet specific OEM customer requirements. Therefore, we invite you to consult us for your vacuum valve applications.

**Note:** vacuum source should be connected to the outlet port for the proper operation.

#### Fluid Temperature Limitations

32°F Minimum Fluid Temperature if moisture is present. Otherwise minus 40°F for direct acting valves with NBR seals, minus 10°F with FKM seals. For exceptions, consult the factory.

#### **Temperature Classifications**

Temp. Class.	Maximum Allowable Surface Temperature							
Class.	С	F						
T1	450	842						
T2	300	572						
ТЗ	200	392						
T4	135	257						
T5	100	212						
Т6	85	185						

#### Types of Protection of Solenoids for Hazardous Environments

Standards are established by the European Committee for Electro-Technical Standards (ATEX). Degrees of Protection of electrical parts and operating temperatures are defined by various European standards.

The following chart show the Degree of Protection for the selected coils along with the maximum surface temperatures for each temperature code classification.

#### **Types of Protection**

Protection Class	Degree of Protection
IP-65	Protection against ingress of dust (dust proof) Protection against contact with internal parts Protection against a water jet from a nozzle from all directions
IP-67	Protection against ingress of dust (dust proof) Protection against contact with internal parts Protection against a water when the equipment is immersed in water under specific pressure and time conditions

#### **Response Time**

The response time of a solenoid valve depends on many factors such as voltage, frequency, pressure, media, temperature (including coil) and the type of valve. Variations in these factors can have a significant effect on the response time. The following tabulation lists the approximate response times for several different types of valves. The times given are for the valves to go from closed position to open or from open position to closed.

#### Valve Response Time AC\* (on Air)

Valve Type	Response Time (milliseconds)
Direct Acting	4-15
Small Pilot Operated (Piston)	30-90
Large Pilot Operated (Piston)	100-150
Small Pilot Operated (Diaphragm)	30-60
Large Pilot Operated (Diaphragm)	60-160
Direct Lift (Diaphragm)	30-60

## Operating Speed (Cycle Rates)

Operating speed is defined as the maximum number of cycles (On/Off) per minute that a solenoid valve is capable of completing. It is dependent upon the response time characteristics of the valve. Many of our small, short stroke, direct acting valves are capable of operating at rates over 2,000 cycles per minute. However, for normal operation lower cycle rates as shown are usually recommended.

#### Valve Operating Speed AC\* (on Air)

Operating Speed (Cycles/min.)
600
400
150
300
200
200

\*Response times and operating speeds for DC valves used on air or any valves used on liquids can be much greater than listed above. (As much as 50-100% greater in some cases). Consult Factory for exact operating specifications if response time and operating speed are critical to the application.



The manufacturer may use the mark:



#### Reports:

PAR 11-01-15 R003 Assessment Report V1 R1 PAR 11-01-070 R001 FMEDA Report V1 R1

#### Validity:

This assessment is valid for the Series 7000 Solenoid Valves: 7131T, 7132T and 7133T.

This assessment is valid until August 1, 2014.
Revision 1.0 July19, 2011



# Certificate / Certificat Zertifikat / 合格証

PAR 1101070 C001

exida hereby confirms that the:

7000 Series Solenoid Valves
Parker Hannifin Corporation
Fluid Control Division
New Britain, CT, USA

Has been assessed per the relevant requirements of:

IEC 61508: 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Integrity: SIL 3 Capable

Random Integrity: Type A Element

PFD<sub>AVG</sub> and Architecture Constraints must be verified for each application

#### Safety Function:

The Solenoid Valve will move to the designed safe position when de-energized / energized within the specified safety time.

#### Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.



Evaluating Assessor

Certifying Assessor

Page 1 of 2



The manufacturer may use the mark:



#### Reports:

PAR 11-01-15 R003 Assessment Report V1 R1 PAR 11-01-070 R002 FMEDA Report V1 R1

#### Validity:

This assessment is valid for Series 7300 Pilot Operated Solenoid Valves: 73317, 73417, 73477, 74317 and 74417.

This assessment is valid until August 1, 2014.

Revision 1.0 July19, 2011



# Certificate / Certificat Zertifikat / 合格証

PAR 1101070 C002

exida hereby confirms that the:

7300 Series Solenoid Valves

Parker Hannifin Corporation Fluid Control Division New Britain, CT, USA

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Integrity: SIL 3 Capable

Random Integrity: Type A Element

PFD<sub>AVG</sub> and Architecture Constraints must be verified for each application

#### Safety Function:

The Solenoid Valve will move to the designed safe position when de-energized within the specified safety time.

#### Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.



Evaluating Assessor

Certifying Assessor

Page 1 of 2



Model No.	Mounting Bracket Ref. No.	Mounting Bracket P/N		
02F200xxx	1101.110.	1 / 13		
02F30Cxxx				
02F30Oxxx	A	KC99-003		
02F30Uxxx				
06F25Cxxx				
06F25Oxxx				
08F25Cxxx				
08F250xxx	D	NAA 00 007		
06FS5Cxxx	В	MA99-007		
06FS50xxx				
08FS5Cxxx				
08FS50xxx				
04F20C2xx	0	VD00 007		
04F20O2xx	С	KB99-007		
04F30C1xx				
04F30O1xx	D	AB99-002		
04F30U1xx				
06F22xxxx				
08F22xxxx				
12F22xxxx				
06F23xxxx				
08F23xxxx	F	MA99-014		
12F23xxxx	_			
08F20C2xx				
12F20C2xx				
08F20O2xx				
12F20O2xx				
20CC02xxx				
20CF02xxx	_	///025		
30CC02xxx	F	4K007		
30CF02xxx				
30CU02xxx				
73212BN3xx				
73212BN4xx				
73222BN3xx	G	MECHB2		
73222BN4xx				
74232BN3xx				
74232BN4xx				

Model No.	Mounting Bracket Ref. No.	Mounting Bracket P/N		
73218BN3xx		.,,,,		
72218xN3xx				
73218BN4xx				
72218xN4xx				
73218BN5xx				
72218xN5xx				
73218BN64xx				
73218BN75xx		MECHB8		
73218BN87xx	BBN87xx			
73228BN3xx	Н			
72228xN3xx				
73222BN4xx				
72228xN4xx				
73228BN5xx				
72228xN5xx				
73228BN64xx				
73228BN75xx				
73228BN87xx				
04F20C1xx				
04F20O1xx		KB99-016		
04F20C3xx	<b>'</b>	ND77-010		
04F20O3xx				
71214xxxxx				
71215SNxxx				
71225SNxxx				
71235SNxxx				
71295SNxxx		MECHB5		
71315SNxxx		1.1201120		
71335SNxxx				
71385SNxxx				
71395SNxxx				
71216SNxxx				



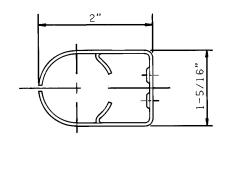
### **Mechanical Options - Mounting Brackets**

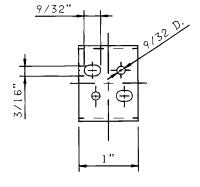
# **Mounting Bracket A**

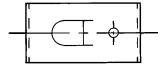
Part No. KC99-003

### For the following valves:

Bracket is available as a standard feature with these valves.





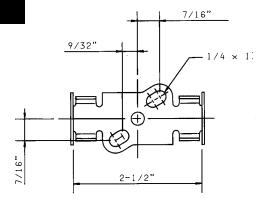


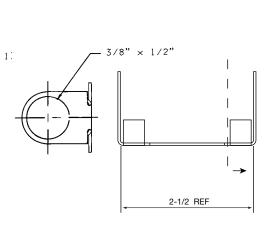
# **Mounting Bracket B**

**Part No. MA99-007** 

### For the following valves:

Bracket is available as an option for these valves. Use a suffix "w" on complete part number.



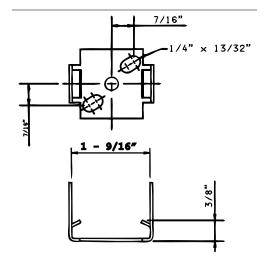


# **Mounting Bracket C**

Part No. KB99-007

### For the following valves:

Bracket is avaiable as an option for these valves. Use a suffix "w" on com.

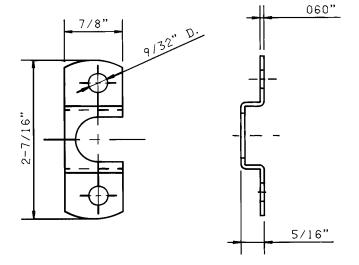




# **Mounting Bracket D**

## Part No. AB99-002 For the following valves:

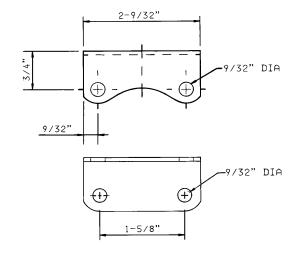
Bracket is available as a standard feature with these valves.



# **Mounting Bracket E**

### Part No. MA99-014 For the following Part Numbers:

Bracket is available as an option for these valves. Use a suffix "w" on the complete valve part number.

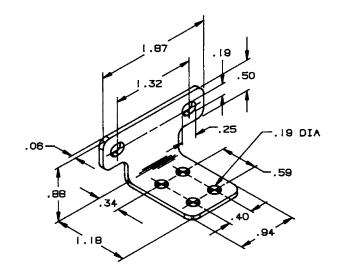


# Mounting Bracket F

### Part No. 4K007

### For the following valves:

Bracket is available as an option.

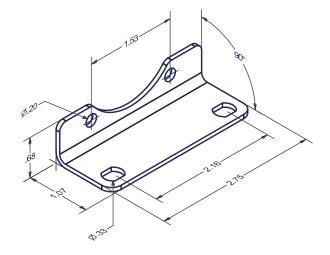




## **Mechanical Options - Mounting Brackets (continued)**

# Mounting Bracket G

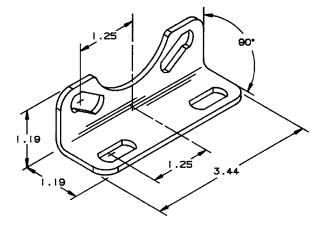
Part No. Mech B2
For the following valves:



# Mounting Bracket H

Part No. Mech B8
For the following valves:

Allows for a flexible side mounting option.

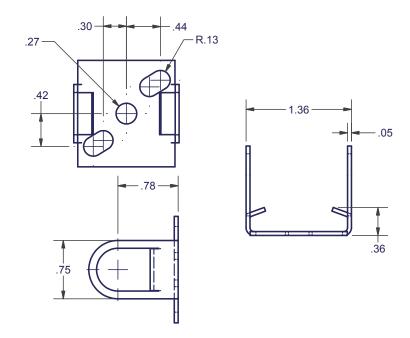




# Mounting Bracket I

# Part No. KB99-016 For the following valves:

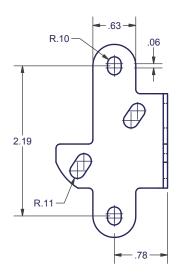
Bracket is available as an option on these valves. Use suffix "w" on complete valve part number.

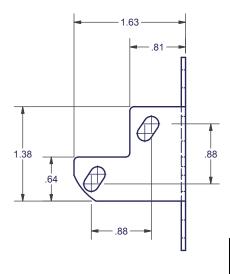


# **Mounting Bracket J**

# Part No. Mech B5 For the following valves:

Available as an option.









# Parker Safety Guide for Selecting and Using Fluid Control Division Products including Valves, Assemblies and Related Accessories

WARNING: Failure or improper selection or improper use of Parker Fluid Control Division Products, including valves, assemblies or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Gas leakage leading to explosion or rupture of a pressure vessel.
- Leakage or other release of toxic or otherwise hazardous liquids or gases.
- Unintended or mistimed cycling or motion of machine members. Or failure of machine members to cycle.
- Sudden moving or falling objects.
- Work piece or component parts being thrown off at high speeds.
- Failure of a device to function properly. For example, failure to clamp or unclamp an associated item or device.
- Electrical shorts, burns, burn out of equipment or fires.

Before selecting or using any of these Products, it isimportant that you read and follow the instructions below.

### 1.0 GENERAL INSTRUCTIONS

- **1.1. Scope:** This safety guide is designed to cover general guidelines on the selection, installation, operation, and maintenance of these Products. This safety guide is a supplement to and is to be used with the specific Parker publication for the valve, assembly or related accessory being considered for use. Parker publications are available at www.parker.comor by calling 1-800-CPARKER.
- **1.2. Fail-Safe:** All Products can and do fail without warning for many reasons. Design all systems in a fail-safe mode so that failure of the Products willnot endanger persons or property.
- **1.3 Distribution:** Provide a copy of this safety guide to each personthat is responsible for installation, operation, and maintenance of these Products. Do not select or use these Products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the Products considered or selected.
- **1.4 User Responsibility:** Due to the wide variety of operating conditions and applications for these Products, Parker and its distributors do not represent or warrantthat any particular Parker Fluid Control Product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a Product. The user, through its own analysis and testing, is solely responsible for:
  - Making the final selection of the Product;
  - Assuring that the user's requirements are met and that the application presents no health or safety hazards;
  - Providing all appropriate health and safety warnings on the equipment on which the Products are used: and
  - Assuring compliance with all applicable government and industry standards.
- **1.5 Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the Product being considered or used, or call 1-800-CPARKER, or go to www.parker.comfor telephone numbers of the appropriate technical service department.

### 2.0 PRODUCT SELECTION INSTRUCTIONS

- **2.1 Selection:** Consult the specific Parker Fluid Control publication for the Product being considered for use. Confirm the choice of Product with Parker Fluid Contol's technical consultants prior to placing orders for the Product or installing and using the Product.
- **2.2** Chemical Compatibility: Elastomer seal material used in the Products must be properly selected based on compatibility with the gases, liquids or additives being conveyed in the Product. Any exposure to non-compatible gases, liquids or additives may result in failure or degradation of the seals and leakage from the Product. Such failure or degradation could happen immediately or at anytime over the life of the Product.

### 3.0 PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- **3.1 Inspection:** Prior to assembly, all components must be checked for correct style, part number, and physical properties such as size or the presence of physical damage. Do NOT use any component that displays any signs of nonconformance.
- **3.1.1** A careful examination of the Unit Valve and Unit Solenoid must be performed. If you purchase a Unit Valve and a Unit Solenoid, be sure that the last two digits of the Unit Valve match the first two digits of the Unit Solenoid. If they do not match then do not install.
- 3.1.2 Check nameplate for correct catalog number, pressure, voltage and service. Do not install if unsuitable.
- **3.1.3** Valves to be installed in Hazardous Locations must be outfitted with Hazardous Location coils only. Verify nameplate data and coil part number before installing the valve.
- **3.2 Product Assembly:** Do not assemble, install or use a Parker Fluid Control Division Product in any end use or application that exceeds the specified operating parameters as listed by Parker such as but not limited to, pressure, voltage and frequency, and medium. Do not mix components or solenoids from a Parker valve with valves or solenoids from another manufacturer. Do not mix components or solenoids from one Parker valve with components or solenoids from another Parker valve.



- **3.2.1 Threaded Connections:** Proper procedures for the application of tape or liquid pipe sealant or thread compound must be followed so these contaminants do not enter the Product.
- **3.2.2 Sweating or Brazing:** Products requiring the sweating or brazing of pipe connections must have precautions taken to protect the internal product components from excessive heat during the sweating or brazing operation. Follow the directions in the specific Parker Fluid ControlDivision publication for the Product in question.
- **3.2.3 Mounting:** Check the specific Parker Fluid Control Division publication for the Product in question for limitations on mounting prior to mounting the Product.
- **3.2.4 Electrical Connection:** Turn off electrical power before connecting or disconnecting the Product to the power source. Wiring must comply with local and national electrical codes.
- **3.2.5 Voltage:** Some coils contain solid state components that can be damaged by voltage spikes, transient voltage, over temperature, over voltage, or improper assembly. To protect against premature failure, please read the instructions in the specific Parker Fluid Control Division publication for the Product in question.
- **3.2.6 Port Connection:** Parker Product operating parameters assume that the user connects the fluid to the proper inlet, outlet and exhaust ports. Connecting to the wrong ports may result in a complete failure or degraded performance. Use caution when applying and activating the fluid connection. Take the necessary precautions to protect personnel and property from injury and damage when turning on the fluid to the Product. Make sure the voltage is in the correct state (on or off) to control the applied pressure as required for the application in question.
- **3.2.7 Screw Terminal Coil and Terminal Box Assembly:** When the DIN or screw terminal coils are used with the terminal box assembly, be sure to apply a wrench to the wrench flats on the conduit hub when installing electrical conduit. **3.2.8 Pressure:** Turn off line pressure and bleed off trapped pressure from the lines before installing, removing or disassembling the Product.

### 4.0 PRODUCT AND SYSTEM OPERATION INSTRUCTIONS

- **4.1 Pressure Differential:** Pressure differential dependent Products require a minimum pressure differential to operate properly. Make sure the chosen Product issized properly for the application to maintain the required pressure differential across the Product.
- **4.2 System Check-out:** Once installed, the Product installation must be tested to insure proper operation and that no external leakage exists. All safety equipment must be in place including but not limited to safety glasses, helmets, ear protection, splash guards, coveralls and any shields on the equipment. All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Product maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potentially hazardous areas while testing and using.

### 5.0 PRODUCT MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- **5.1 Maintenance:** Even with proper selection and installation, Product life or performance may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Product failure, and experience with any Product failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, atminimum, must include instructions 5.1.1 through 5.1.3. **5.1.1 Product Lubrication and filtration:** Almost all products require filtration. Consult the specific Parker Fluid Control
- Division publication for the Product in question. Note, too, that some Products require lubrication or filtration or both as a regular maintenance item due to the nature of the application's environment. Consult the specific Fluid Control Division publication for the Product in question to determine this. Other Products, such as proportional valves, do not require any maintenance if the fluid is properly filtered. If a failure should occur, then these proportional valves should not be repaired but replaced.
- **5.1.2 Cleaning:** Do not expose plastic or elastomeric materials to any type of commercial cleaning fluid. Parts should be cleaned with a mild soap and water solution.
- **5.1.3 Fluid Spills:** Necessary precautions should be taken during maintenance to avoid exposing personnel or the surrounding area to any spilled fluid if the fluid is regulated, harmful, or damaging when exposed to or in contact with personnel or the surrounding environment.

### 5.2 Service and Repair:

- **5.2.1 General:** Do not repair Products unless the specific Fluid Control Division publication for the Product in question allows this procedure. Not all Products can be safely repaired in the field. Repair and replacement must be in accordance with the specific Parker Fluid Control Division publication for the Product in question and any Parker replacement kit instructions.
- **5.2.2 Replacement Parts:** If you purchase any replacement parts they must be original equipment manufactured by Parker Fluid Control Division.
- **5.2.3 Lock-Out / Tag-Out:**Follow all lock-out and tag-out procedures before undertaking service or repairs. This includes de-energizing all electrical, fluid and mechanical energy sources.
- **5.2.4 Hazardous Location Coils** When replacing coils, Products equipped with Hazardous Location coils must use Hazardous Location replacement coils only. Verify nameplate data and coil part number before installing the replacement coil.



# Technica Referenc

### **OPPORTUNITY DATA SHEET**

TARGET ACCOUNT			DATE:		
ADDRESS:		TEI	LEDUONE #		
CONTACT:				ONE #:	
APPLICATION:				JINE #.	
☐ NEW APPLICATION ☐ EXISTING APPLICATIO	N TARO	GET PRICE: \$			
	CRITIC	AL DATES			
FEASIBILITY; SAMPLE DELIVERY:		QUOTATION:		PRODUCTION:	
INITIAL OR VOLUME (UNITS)			YEAR 2	YEAR 3	
TOTAL QUANTITY OF SOLENOID VALVES USED BY THIS COMPA	NY			<del>_</del>	-
PARKER'S SHARE:	(E:				
COMPANY'S MOTIVA	TION TO BUY	PARKER VAI VES (CH	HECK ONLY ONE)		
☐ QUALITY ☐ COST REDUCTION		☐ DIST. SERVICE		☐ SECOND SOUR	RCE
☐ PROBLEM WITH CURRENT SUPPLIER:					
OTHER:					
Valve Type  ☐ 2 Way  ☐ 3 Way  ☐ 4 Way			PRESSU	JRE OR VACUUM	
DE-ENERGIZED POSITION		Maximum Static Pi	ressure		PSI
□ Normally Open □ Directional Control		Maximum Pressure			r si PSI
□ Normally Closed □ Multipurpose		Minimum Pressure			
		Maximum Vacuum			
					_
PORT SIZE FLUID CONNECTION		FLUID BEING HANDLED			
Inch NPT Other		Description			
ORIFICE DIAMETER		If Gas   lubric	ated	☐ Non-lubricated	
nlet or CV		Temperature Min.		F,Max	
Exhaust or CV		Viscosity	2 10 CAE or	100 CCLL at 100E)	
FLOW RATE	(if over no. 10 SAE or 100 SSU at 100F)  ALLOWABLE INTERNAL LEAKAGE				
Gases: SCFM when inlet pressure is	PSIG		ALLOWADEL	IIII EIIIAE EEAIVAGE	
and outlet pressure is		□ None □		cc/min at	PSID
Liquids GPM when inlet pressure is and outlet pressure is	PSIG	-			
	1 310				
VOLTAGE		CURRENT DRAW LIMITATIONS			
Min Nom		Max. Amps		Max. Watts	
AC HZ DC				OU TYPE	
ELECTRICAL ENCLOSURE  ☐ Standard Connection ☐ Conduit ☐ Explosion Proof		☐ Lead Wire		OIL TYPE	AW
☐ Junction Box ☐ Grommet ☐ Watertight		☐ Spade Terr		in. long DIN	
Other				<u> </u>	
DUTY CYCLE		AMBIENT CONDITIONS			
Continuous Duty: Energized more than 1 hour		☐ Temperatu	re Max	F Min	F
Energizedhrs. De-Energized	hrs.	☐ Spade Terr	minal	☐ DIN	
Intermittent Duty: Energized less than 1 hour  Max. Energized Minutes		Other			
Min. De-Energized: Minutes					
CYCLING DATA		Tatal avalage manyo		EXPECTANCY	
Operating SpeedCPM		Total cycles per year Number of Years			
VIBRATION AND SHOCK		APPROVAL REQUIRED			
☐ Not a Factor				CSA ☐ CE ☐ Cenele	ec
Uibration CPS at			nent Recognition		
☐ Shock G's duration for	M. Sec.	☐ Other			
Mounted in ☐ Vertical Plane ☐ Horizontal Plane		NOTE: Agency	/ approval cha	rges may apply. Co	nsult Facto
Additional features desired		•			
Completed by					
Name	Company			Telephone	DATASHET.DO



# **Terms & Conditions of Sale**

Offer Of Sale: The items described in this document are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller"] verbally or in writing, shall constitute acceptance of this offer.

- 1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.
- 2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment. The minimum order amount is \$125.00 net, unless otherwise noted on the quotation.
- 3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery. Shipments are made by common carrier. Any premium freight must be requested and paid for by the Buyer.
- 4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 2 years from the date of shipment to Buyer, or 2,000 hours of use, whichever expires first. Exception to this is the Angle Body Valve line has a 1 year warranty. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTA TION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARIS. ING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEAL ING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.
- 5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.
- 6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.
- 7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the

items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

- 8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.
- 9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.
- 10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

- 11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'events of Force Majeure]. Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.
- 12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

PD4099 9/88 (Rev B)



Notes	



# Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 1 800 C-Parker (1 800 272 7537).



### **AEROSPACE**

- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

### **Key Products**

- Flight control systems & components
- Fluid conveyance systems Fluid metering delivery
- & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



### **CLIMATE CONTROL**

- Agriculture Air conditioning
- Food, beverage & dairy Life sciences & medical
- Precision cooling
- Processing
- Transportation

### **Key Products**

- CO2 controls
- Electronic controllers Filter driers
- Hand shut-off valves
- Hose & fittings Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves

### **ELECTROMECHANICAL**

- Aerospace
- Factory automation
- Food & beverage
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

- AC/DC drives & systems
- Electric actuators
- Controllers
- Gantry robots
- Gearheads
- Human machine interfaces Industrial PCs
- Inverters Linear motors, slides and stages
- Precision stages
- Stepper motors
- Servo motors, drives & controls
- Structural extrusions



### **FILTRATION**

- Food & beverage
- Industrial machinery Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process Transportation

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero



### **FLUID & GAS HANDLING**

- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery Food & beverage
- Fuel & gas delivery Industrial machinery
- Mobile
- Oil & gas
- Transportation Welding

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose PTFE & PFA hose, tubing &
- plastic fittings Rubber & thermoplastic hose
- Tube fittings & adapters
- Quick disconnects



### **HYDRAULICS**

- Aerospace
- Agriculture Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps Hydraulic systems
- Rubber & thermoplastic hose
- & couplings Tube fittings & adapters
- Quick disconnects



- Aerospace
- Conveyor & material handling
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery Transportation & automotive

- **Key Products**
- Field bus valve systems
- Grippers
- Manifolds
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves and controls Rodless cylinders
- Rotary actuators
- Vacuum generators, cups & sensors



### PROCESS CONTROL

- Chemical & refining

- Oil & gas

- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators Instrumentation fittings,
- valves & regulators Medium pressure
- Process control manifolds



### **SEALING & SHIELDING**

- Aerospace Chemical processing
- Consumer
- Energy, oil & gas Fluid power

Telecommunications

- General industrial Information technology
- Life sciences
- Military Semiconductor

## Transportation

- Dynamic seals Elastomeric o-rings
- EMI shielding Extruded & precision-cut,
- fabricated elastomeric seals Homogeneous & inserted elastomeric shapes
- High temperature metal seals Metal & plastic retained
- composite seals Thermal management



- Aerial lift

- Hydraulic valves & controls Power take-offs



### **PNEUMATICS**

- Food & beverage

- Air preparation Compact cylinders
- Guided cylinders
- Miniature fluidics
- Tie rod cylinders



fittings & valves



© 2011 Parker Hannifin Corporation. CAT FCDFL0911 September 2011



# Parker Hannifin Corporation Fluid Control Division

95 Edgewood Avenue New Britain, CT 06051 phone 860 827 2300 fax 860 827 2384 www.parker.com/fcd 147 West Hoy Road Madison, MS 39110 www.parker.com/fcd