



VACUUM APPLICATIONS 21 SERIES VALVES



PRODUCT CATALOG

Inline Poppet Valves for Vacuum Applications 21 Series

Product Overview

Valves for Vacuum Applications

Vacuum service valves are ideal for lifting, holding, vacuum packaging and moving anything from large objects to tiny particles. They also provide an effective means for leak testing. The vacuum source typically comes from either a vacuum pump or a venturi. In vacuum service applications, the pressure within the valve is reduced below atmospheric pressure. Consequently, atmospheric pressure actually pushes air into the valve, instead of the common belief that air is “sucked” in by the vacuum.

Valves for Full Vacuum Applications

Full vacuum valves are ideal for applications where compressed air is unavailable. Full vacuum valves use the difference in force between atmospheric pressure and the vacuum within the valve to actuate the valve. The full vacuum valve performs with atmospheric pressure in port 1 and 10 to 30 inches of Mercury vacuum in the valve body. For valves for Full Vacuum Applications, please contact ROSS.

Solenoid Pilot Controlled			Pressure Controlled
DIN EN 175301-803	M12	1/2" Conduit with Leads	
			

Illustration examples.

VALVE FEATURES

Perpendicular Poppet Face Seals	Creates High-Flow and Positive Sealing
Differential Piston Design	Delivers Fast and Consistent Response Times
Overwhelming Shifting Forces	Provides No-Stick Operation
High Velocity Air Flow Across Poppet Seats	Allows Self-Cleaning and Strong Dirt Tolerance
Superior Internal Guidance System and Self-Compensating Seals	Delivers Long-Life

For Explosion-Proof solenoid pilot valves, see valves for Hazardous Locations.



Valves with classic heavy-duty solenoid pilot also available.

PRODUCT CREDENTIALS

Safety Integrity Level	Declaration of Conformity		Certificate of Compliance
			

Actuation	Application	Available Inlet Port Sizes									Functions		Maximum Flow C _v (NI/min)	Page
		1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	2/2	3/2		
Solenoid Controlled	Vacuum	●	●	●	●	●	●	●	●	●	●	●	71 (70000)	3 – 7
Pressure Controlled	Vacuum	●	●	●	●	●	●	●	●	●	●	●	71 (70000)	8 – 11
Accessories														12 – 14

STANDARD SPECIFICATIONS					
GENERAL	Function		2/2 Valve	Normally Closed	
				Normally Open	
			3/2 Valve	Normally Closed	
				Normally Open	
	Construction Design		Poppet		
	Actuation		Electrical	Solenoid Pilot Controlled	
			Pneumatic	Pressure Controlled	
	Mounting	Type	Inline		
		Orientation	Any, preferably vertical		
Connection		Threaded Port	NPT		
			G		
Manual Override (Solenoid Controlled valves)		Non-locking button			
OPERATING CONDITIONS	Temperature	Solenoid Pilot Controlled	Standard	Ambient	0° to 122°F (-17° to 50°C)
				Media	
			High	Ambient	0° to 180°F (-17° to 82°C)
				Media	0° to 300°F (-17° to 150°C)
			Low	Ambient	-40° to 122°F (-40° to 50°C)
				Media	-40° to 175°F (-40° to 80°C)
		Pressure Controlled	High	Ambient	0° to 300°F (-17° to 150°C)
				Media	
			Low	Ambient	-40° to 175°F (-40° to 80°C)
			For temperatures below 40° F (4° C) air must be free of water vapor to prevent formation of ice.		
	Flow Media		Vacuum and/or filtered-compressed air		
	Operating Pressure		Vacuum to 150 psig (Vacuum to 10 bar)		
	Pilot Supply Pressure		External only	Must be equal to or greater than inlet pressure, but no less than 30 psig (2 bar)	
ELECTRICAL DATA FOR SOLENOID PILOT VALVES	Solenoids	Current Flow	Power Consumption	Operating Voltage (each solenoid)	
		DC	12 volts	4.5 watts	
			24 volts		
			24 volts (M12)	4.8 watts	
		AC	120 volts, 60 Hz	6.5 VA	
			240 volts, 60 Hz	6.8 VA	
	Rated for continuous duty				
	Enclosure Rating		IP 65		
	Electrical Connection	DIN EN 175301-803		Form A	
				Form B	
M12					
		1/2" Conduit Coil with 30" leads			
CONSTRUCTION MATERIAL	Valve Body		Cast Aluminum		
	Poppet		Aluminum and Stainless Steel		
	Seals	Fluorocarbon	Viton		
		Nitrile Rubber	Buna-N		
SAFETY DATA	Safety Integrity Level (SIL)		Certified by TÜV Rheinland in accordance to IEC 61508 and IEC 61511 safety integrity level 2 (SIL 2) and EN ISO 13849-1, PL c (with application specific diagnosis) in singular application with HFT = 0 and SIL 3 and PL d in redundant application with HFT≥1, for details see certificate.		

IMPORTANT NOTE: Please read carefully and thoroughly all of the CAUTIONS, WARNINGS on the inside back cover.

Ordering Information

2/2 Solenoid Pilot Controlled Valves

MODEL NUMBER CONFIGURATOR2-Way 2-Position Valves

Port Thread

NPT

Leave Blank

G

D

Actuation

Solenoid Controlled

Valve Function

2/2 Normally Closed

1

2/2 Normally Open

2

Body Size

Port Size

In-Out

3/8

1/4

2V5

3/8

3V5

1/2

4V6

3/4

1/2

4V5

3/4

5V5

1

6V6

1-1/4

1

6V5

1-1/4

7V5

1-1/2

8V6

Series

21

7

1

B

2V5

1

W

-

1

Revision Level

Temperature

Coil Type

Standard

DINEN 175301-803

Form A

1

Form B

2

M12

3

1/2" Conduit

4

Low

3/8 & 3/4 Body Size only

DINEN 175301-803

Form B

5*

High

1/2" Conduit

6**

* Buna-N valve seals option required (2)

** Fluorocarbon valve seals option required (1)

Current

Voltage*

DC

12 V

H

24 V

W

AC

120 V, 60 Hz

Z

240 V, 60 Hz

Y

* For other voltages consult ROSS.

Valve Seals

Fluorocarbon

1

Buna-N

2

Model Number examples: 2171B3V51W-1, 2171B4V61Z-3.

Size		Flow Cv (NI/min)		Average Response Constants*			≈ Weight lb (kg)
Body	Port 1, 2	Normally Closed (NC)	Normally Open (NO)	M	F		
		1-2	1-2		NC	NO	
3/8	1/4	1.7 (1700)	1.6 (1600)	10	0.96	0.96	1.9 (0.9)
	3/8	2.2 (2200)	2.5 (2500)	10	0.90	0.93	
	1/2	2.6 (2600)	2.8 (2800)	10	0.82	0.88	
3/4	1/2	6.6 (6500)	6.3 (6200)	14	0.39	0.50	4.3 (2.0)
	3/4	7.7 (7600)	7.4 (7300)	14	0.32	0.37	
	1	8.3 (8200)	7.6 (7500)	14	0.31	0.36	
1-1/4	1	20 (20000)	19 (19000)	26	0.19	0.20	11.1 (5.0)
	1-1/4	29 (29000)	23 (23000)	26	0.14	0.18	
	1-1/2	31 (31000)	23 (23000)	26	0.13	0.17	

* Valve Response Time – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.

Valve Schematic

Normally Closed

Normally Open

Solenoid Pilot

1/8" External Pilot Supply

Manual Override

Port 2 (Outlet)

Port 1 (Inlet)

4

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2/2 Solenoid Pilot Controlled Valves

Piping 2/2 Normally Closed or Normally Open Valves

Pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2).

Note: 2/2 vacuum valves provide only on/off control and do not have an exhaust function.

DIMENSIONS	Inches (mm)
Body Size 3/8	with DIN EN 175301-803 Coil
	Technical drawings of the Body Size 3/8 valve. The front view shows a total height of 5.90 (150) inches, a mounting bracket height of 2.16 (55) inches, a body width of 2.81 (71) inches, and a base width of 3.56 (90) inches. A pilot port diameter is specified as Ø 0.34 (8). The side view shows a total height of 1.47 (37) inches and a base width of 3.03 (77) inches. A mounting bracket height of 1.53 (39) inches is also indicated.
Body Size 3/4	Technical drawings of the Body Size 3/4 valve. The front view shows a total height of 6.61 (168) inches, a mounting bracket height of 2.75 (70) inches, a body width of 3.25 (83) inches, and a base width of 4.45 (113) inches. A pilot port diameter is specified as Ø 0.34 (8). The side view shows a total height of 1.82 (46) inches and a base width of 3.03 (77) inches. A mounting bracket height of 1.53 (39) inches is also indicated.
Body Size 1-1/4	Technical drawings of the Body Size 1-1/4 valve. The front view shows a total height of 10.64 (270.4) inches, a mounting bracket height of 4.48 (113.7) inches, a body width of 4.66 (118.4) inches, and a base width of 6.49 (164.8) inches. A pilot port diameter is specified as Ø 0.53 (13.5). The side view shows a total height of 7.65 (194.2) inches and a base width of 4.10 (104.1) inches. A mounting bracket height of 3.07 (77.9) inches is also indicated.
	Downloadable CAD models available.

Ordering Information

3/2 Solenoid Pilot Controlled Valves

MODEL NUMBER CONFIGURATOR

3-Way 2-Position Valves

Port Thread

NPT

Leave Blank

G

D

Actuation

Solenoid Controlled

Valve Function

3/2 Normally Closed

3

3/2 Normally Open

4

Body Size

Port Size

In-Out

Exhaust

3/8

1/4

1/2

2V5

3/8

1/2

3V5

1/2

1/2

4V6

3/4

1/2

1

4V5

3/4

1

5V5

1

1

6V6

1-1/4

1

1-1/2

6V5

1-1/4

1-1/4

1-1/2

7V5

1-1/2

1-1/2

8V6

Series

21

7

3

B

2V5

1

W

-

1

Revision Level

Temperature

Coil Type

Standard

DINEN 175301-803

Form A

1

Form B

2

M12

3

1/2" Conduit

4

Low

3/8 & 3/4 Body Size only

DINEN 175301-803

Form B

5*

High

1/2" Conduit

6**

* Buna-N valve seals option required (2)

** Fluorocarbon valve seals option required (1)

Current

Voltage*

DC

12 V

H

24 V

W

AC

120 V, 60 Hz

Z

240 V, 60 Hz

Y

* For other voltages consult ROSS.

Valve Seals

Fluorocarbon

1

Buna-N

2

Model Number examples: 2173B2V01W-1, 2173B6V11Z-3.

Size			Flow C _v (NI/min)				Average Response Constants*				≈ Weight lb (kg)	
Body	Port 1, 2	Port 3	Normally Closed (NC)		Normally Open (NO)		M	F				
								NC		NO		
			1-2	2-3	1-2	2-3		1-2	2-3	1-2		2-3
3/8	1/4	1/2	1.7 (1700)	3.2 (3100)	1.7 (1700)	2.4 (2400)	10	1.76	2.08	1.60	2.30	1.9 (0.9)
	3/8	1/2	2.5 (2500)	4.4 (4300)	2.7 (2700)	2.6 (2600)	10	0.95	1.07	1.03	1.60	
	1/2	1/2	2.6 (2600)	4.6 (4600)	3.0 (3000)	2.8 (2800)	10	0.94	0.98	11.00	2.00	
3/4	1/2	1	6.0 (5900)	8.8 (8700)	5.9 (5800)	7.6 (7500)	11	0.58	0.64	0.50	0.70	4.3 (2.0)
	3/4	1	7.5 (7400)	11 (11000)	7.5 (7400)	8.0 (7900)	11	0.38	0.41	0.43	0.67	
	1	1	7.9 (7800)	12 (12000)	8.3 (8200)	8.4 (8300)	11	0.24	0.36	0.42	0.60	
1-1/4	1	1-1/2	20 (20000)	27 (27000)	19 (19000)	23 (23000)	28	0.16	0.18	0.17	0.20	11.1 (5.0)
	1-1/4	1-1/2	28 (28000)	33 (32000)	22 (22000)	25 (25000)	28	0.12	0.17	0.15	0.19	
	1-1/2	1-1/2	29 (29000)	33 (32000)	22 (22000)	26 (26000)	28	0.12	0.16	0.13	0.18	

* Valve Response Time – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.

Valve Schematic

Normally Closed

Normally Open

Solenoid Pilot

Port 3 (Exhaust)

Port 2 (Outlet)

Port 1 (Inlet)

X-1 1/8" External Pilot Supply

3/2 Solenoid Pilot Controlled Valves

Piping 3/2 Normally Closed Valves

In this valve configuration, pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2), and the normal air pressure exhaust port becomes the atmosphere port (port 3).

Piping 3/2 Normally Open Valves

To obtain a 3/2 Normally Open vacuum valve, simply pipe the 3/2 normally closed body slightly differently. Connect the vacuum source or pump to port 3, the normal exhaust. Leave port 1 open to atmosphere, and the normal outlet remains as the work port (port 2).

DIMENSIONS		Inches (mm)
with DINEN 175301-803 Coil		
Body Size 3/8		
Body Size 3/4		
Body Size 1-1/4		
Downloadable CAD models available.		

Ordering Information

2/2 Pressure Controlled Valves

MODEL NUMBER CONFIGURATOR2-Way 2-Position Valves

Port Thread

NPT

Leave Blank

G

D

Series

21

5

1

B

2V5

1

Actuation

Pressure Controlled

Valve Function

2/2 Normally Closed

1

2/2 Normally Open

2

Revision Level

Temperature

High

Low

Valve Seals

Fluorocarbon

Buna-N

1

2

Body Size

3/8

3/4

1-1/4

Port Size

In-Out

1/4

3/8

1/2

1/2

3/4

1

1

1-1/4

1-1/2

2V5

3V5

4V6

4V5

5V5

6V6

6V5

7V5

8V6

Model Number examples: 2151B6V11, 2151B2V01.

Size		Flow C _v (NI/min)		Average Response Constants*			≈ Weight lb (kg)
Body	Port 1, 2	Normally Closed (NC)	Normally Open (NO)	M	F		
		1-2	1-2		NC	NO	
3/8	1/4	1.7 (1700)	1.6 (1600)	10	0.91	0.91	1.2 (0.6)
	3/8	2.2 (2200)	2.5 (2500)	10	0.70	0.76	
	1/2	2.6 (2600)	2.8 (2800)	10	0.64	0.72	
3/4	1/2	6.6 (6500)	6.3 (6200)	16	0.37	0.43	1.9 (0.9)
	3/4	7.7 (7600)	7.4 (7300)	16	0.34	0.39	
	1	8.3 (8200)	7.6 (7500)	16	0.34	0.37	
1-1/4	1	20 (20000)	19 (19000)	27	0.17	0.17	6.3 (2.9)
	1-1/4	29 (29000)	23 (23000)	27	0.19	0.19	
	1-1/2	31 (31000)	23 (23000)	27	0.18	0.18	

* Valve Response Time – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.

Valve Schematic

Normally Closed

2 (WORK)

1 (PUMP)

Normally Open

2 (WORK)

1 (PUMP)

1/4" Signal Port

Port 2 (Outlet)

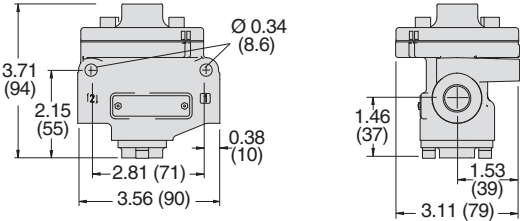
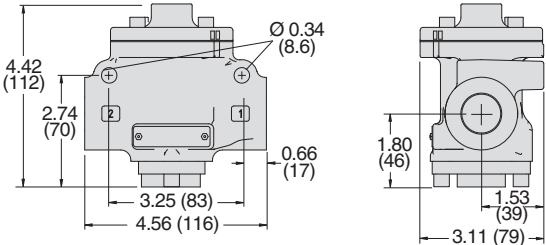
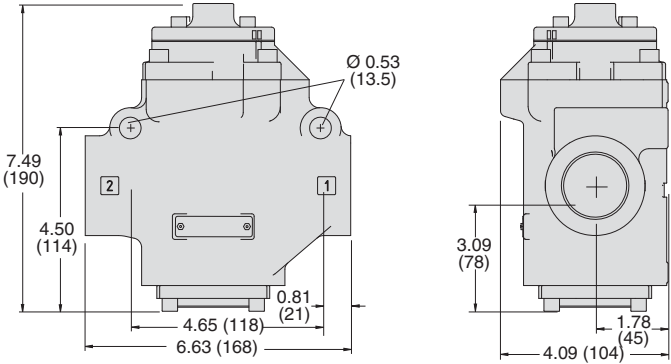
Port 1 (Inlet)

2/2 Pressure Controlled Valves

Piping 2/2 Normally Closed or Normally Open Valves

Pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The normal outlet port is the work port (port 2).

Note: 2/2 vacuum valves provide only on/off control and do not have an exhaust function.

DIMENSIONS		Inches (mm)
Body Size 3/8		
Body Size 3/4		
Body Size 1-1/4		
Downloadable CAD models available.		

Ordering Information

3/2 Pressure Controlled Valves

MODEL NUMBER CONFIGURATOR 3-Way 2-Position Valves

Port Thread

NPT

Leave Blank

G

D

Series

21

5

3

B

2V5

1

Actuation

Pressure Controlled

Valve Function

3/2 Normally Closed

3

3/2 Normally Open

4

Revision Level

Temperature

High

Low

Valve Seals

Fluorocarbon

Buna-N

1

2

Body Size

3/8

3/4

1-1/4

Port Size

In-Out

Exhaust

2V5

3V5

4V6

4V5

5V5

6V6

6V5

7V5

8V6

Model Number examples: 2153B2V01, 2153B8V11.

Size			Flow Cv (NI/min)				Average Response Constants*				≈ Weight lb (kg)	
Body	Port 1, 2	Port 3	Normally Closed (NC)		Normally Open (NO)		M	F				
								NC		NO		
			1-2	2-3	1-2	2-3		1-2	2-3	1-2		2-3
3/8	1/4	1/2	1.7 (1700)	3.2 (3100)	1.7 (1700)	2.4 (2400)	10	1.76	2.08	1.60	2.30	1.3 (0.6)
	3/8	1/2	2.5 (2500)	4.4 (4300)	2.7 (2700)	2.6 (2600)	10	0.95	1.07	1.03	1.60	
	1/2	1/2	2.6 (2600)	4.6 (4600)	3.0 (3000)	2.8 (2800)	10	0.94	0.98	11.00	2.00	
3/4	1/2	1	6.0 (5900)	8.8 (8700)	5.9 (5800)	7.6 (7500)	11	0.58	0.64	0.50	0.70	2.0 (0.9)
	3/4	1	7.5 (7400)	11 (11000)	7.5 (7400)	8.0 (7900)	11	0.38	0.41	0.43	0.67	
	1	1	7.9 (7800)	12 (12000)	8.3 (8200)	8.4 (8300)	11	0.24	0.36	0.42	0.60	
1-1/4	1	1-1/2	20 (20000)	27 (27000)	19 (19000)	23 (23000)	28	0.16	0.18	0.17	0.20	6.1 (2.8)
	1-1/4	1-1/2	28 (28000)	33 (32000)	22 (22000)	25 (25000)	28	0.12	0.17	0.15	0.19	
	1-1/2	1-1/2	29 (29000)	33 (32000)	22 (22000)	26 (26000)	28	0.12	0.16	0.13	0.18	

* Valve Response Time – Response Time (msec) = M + (F • V). This is the average time required to fill a volume V (cubic inches) to 90% of supply pressure or to exhaust it to 10% of supply pressure. M and F values are shown above.

Valve Schematic

Normally Closed

2 (WORK)

(ATM.) 3 1 (PUMP)

Normally Open

10

2

3 1

1/4" Signal Port

Port 3 (Exhaust)

Port 2 (Outlet)

Port 1 (Inlet)

3/2 Pressure Controlled Valves

Piping 3/2 Normally Closed Valves

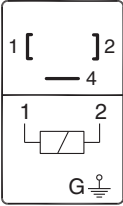
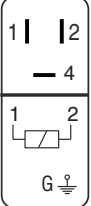
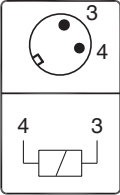
In this valve configuration, pipe the unit into the system by connecting the vacuum source or pump to the normal air pressure inlet port (port 1). The

normal outlet port is the work port (port 2), and the normal air pressure exhaust port becomes the atmosphere port (port 3).

DIMENSIONS	Inches (mm)
Body Size 3/8	Technical drawings of the Body Size 3/8 valve. The front view shows a central port with a diameter of $\varnothing 0.34$ (8.6). Dimensions include a total height of 3.96 (101), a mounting flange diameter of 2.40 (61), a base diameter of 2.34 (59), a base thickness of 0.38 (10), a bottom flange diameter of 1.94 (49), a bottom flange thickness of 2.81 (71), and a total base width of 3.56 (90). The side view shows a total width of 1.71 (43) and a base width of 1.53 (39).
Body Size 3/4	Technical drawings of the Body Size 3/4 valve. The front view shows a central port with a diameter of $\varnothing 0.34$ (8.6). Dimensions include a total height of 4.73 (120), a mounting flange diameter of 3.05 (77), a base diameter of 2.95 (75), a base thickness of 0.67 (17), a bottom flange diameter of 2.38 (60), a bottom flange thickness of 3.25 (83), and a total base width of 4.45 (113). The side view shows a total width of 2.11 (54) and a base width of 1.53 (39).
Body Size 1-1/4	Technical drawings of the Body Size 1-1/4 valve. The front view shows a central port with a diameter of $\varnothing 0.53$ (13.5). Dimensions include a total height of 7.49 (190), a mounting flange diameter of 4.50 (114), a base diameter of 4.28 (109), a base thickness of 0.82 (21), a bottom flange diameter of 3.44 (87), a bottom flange thickness of 4.65 (118), and a total base width of 6.63 (168). The side view shows a total width of 3.09 (78) and a base width of 1.78 (45).
Downloadable CAD models available.	



Solenoid Coils Data

Valve Solenoid Pinouts			
DIN EN 175301-803			M12
Form A	Form B		
		1 - Positive 2 - Negative 4 - Ground	 3 - Positive 4 - Negative

ELECTRICAL CONNECTORS

with Cable Grip, without Light	with Cable Grip, with Light	1/2" NPT Conduit
		

Illustration examples.

Connectors	Connector					Model Number			
	Type	Connection	Fitting Connection	Quantity Included	Maximum Cord Diameter mm	Without Light	Lighted Connector *		
							24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Solenoid	Cable grip	1	8 to 10	937K87	936K87-W	936K87-Z	936K87-Y
			1/2" NPT conduit	1	—	723K77	724K77-W	724K77-Z	724K77-Y
	DIN EN 175301-803 Form B	Solenoid	Cable grip	1	9mm	266K77	267K77-W	267K77-Z	267K77-Y
			1/2" NPT conduit	1	—	2873K77	—	—	—

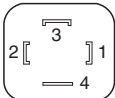
PREWIRED ELECTRICAL CONNECTORS

Prewired Electrical Connectors	
Cable with Connector without Light	Cable with Lighted Connector
	

Illustration examples.

Prewired Connectors	Cable						Model Number			
	End 1	End 2	Connection	Quantity Included	Length feet (meters)	Cord Diameter mm	Without Light	Lighted Connector *		
	Connector	Cord						24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Flying leads	Solenoid	1	6.5 (2)	6	721K77	720K77-W	720K77-Z	720K77-Y
				1	6.5 (2)	10	371K77	383K77-W	383K77-Z	383K77-Y
	DIN EN 175301-803 Form B	Flying leads	Solenoid	1	6.5 (2)	10	372K77	382K77-W	382K77-Z	382K77-Y
	Molded DIN EN 175301-803 Form B	Flying leads	Solenoid	1	6 (1.8)	—	2872K77	—	—	—

Solenoid Connector Pinouts

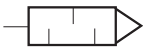
DIN EN 175301-803		
Form A	Form B	
		1 - Black 2 - Black 4 - Green/Yellow (Ground)

* Lights in connectors with a translucent housing can be used as indicator lights to show when solenoids are energized.

EXHAUST SILENCERS



Illustration example.

Silencers	SPECIFICATIONS		Silencer Material		Pressure Range psig (bar)		Schematic	
			Aluminum		0-290 (0-20) maximum			
	Port Size	Thread Type	Flow C _v (NI/min)	Model Number		Dimensions inches (mm)		≈ Weight lb (kg)
				NPT Thread	R/Rp Thread	Length	Hex Size (D)	
	1/2	Male	6.8 (6700)	5500A4003	D5500A4003	3.6 (9)	1.25 (32)	0.2 (0.1)
	1	Male	18 (18000)	5500A6003	D5500A6003	5.4 (14)	2.0 (51)	0.9 (0.4)
	1-1/2	Female	39 (38000)	5500A8001	D5500A8001	5.7 (14)	2.5 (64)	1.3 (0.6)

ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, AUTOMATIC VALVE INDUSTRIAL, and MASTER PNEUMATIC, collectively the “ROSS Global Family”.

PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure all sources of energy are turned off, the entire pneumatic system is shut down and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS Global Family Products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any product can be tampered with and/or need servicing after installation, persons responsible for the safety of others or the care of equipment must check ROSS Global Family Products on a regular basis and perform all necessary maintenance to ensure safe operating conditions.
3. All applicable instructions should be read and complied with before using any fluid power system to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use. If you have any questions, call your nearest ROSS Global Family location.
4. Each ROSS Global Family Product should be used within its specification limits. In addition, use only ROSS ROSS Global Family components to repair ROSS Global Family Products.

WARNINGS:

Failure to follow these instructions can result in personal injury and/or property damage.

FILTRATION and LUBRICATION

1. Dirt, scale, moisture, etc., are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, best performance will be realized if a filter is installed to clean the air supply, thus preventing contaminants from interfering with the proper performance of the equipment. The ROSS Global Family recommends a filter with a 5-micron rating for normal applications.
2. All standard ROSS Global Family filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition and hazardous leakage. Immediately replace crazed, cracked, or deteriorated bowls.
3. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum base oils with oxidation inhibitors, an aniline point between 180°F (82°C) and

220°F (104°C), and an ISO 32, or lighter, viscosity. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks personal injury, and/or damage to property.

WARNINGS:

Failure to follow these instructions can result in personal injury and/or property damage.

AVOID INTAKE/EXHAUST RESTRICTION

1. Do not restrict air flow in the supply line. To do so could reduce the pressure of the supply air below minimum requirements for the valve and thereby causing erratic action.
2. Do not restrict a valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and must have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

WARNINGS:

Failure to follow these instructions can result in personal injury and/or property damage.

SAFETY APPLICATIONS

1. Mechanical Power Presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
2. Safe Exhaust (dump) valves without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All Safe Exhaust valve installations should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
3. Per specifications and regulations, the ROSS L-O-X® and L-O-X® with EEZ-ON®, N06 and N16 Series operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.

STANDARD WARRANTY

All products sold by the ROSS Global Family are warranted for a one-year period [with the exception of Air Preparation products which are warranted for a period of seven (7) years] from the date of purchase. All products are, during their respective warranty periods, warranted to be free of defects in material and workmanship. The ROSS Global Family's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Global Family has determined, in its sole discretion, are defective. All warranties become void if a product has been subject to misuse, misapplication, improper maintenance, modification or tampering. Products for which warranty protection is sought must be returned to the ROSS Global Family freight prepaid.

THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND THE ROSS GLOBAL FAMILY EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE ROSS GLOBAL FAMILY MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT IS THE ROSS GLOBAL FAMILY LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF THE ROSS GLOBAL FAMILY MAY EXTEND THE LIABILITY OF THE ROSS GLOBAL FAMILY AS SET FORTH HEREIN.



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