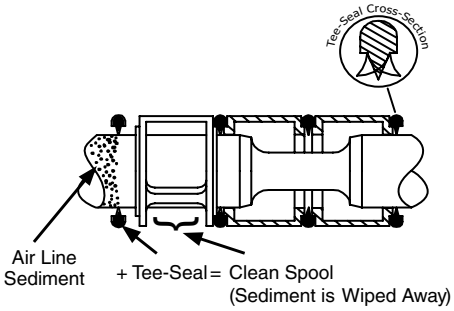
Automatic™ Valve

Valve Assembler

Product Catalog

ROSS™ a global family



Valves

- Proven design with over 25 years OEM experience
- Many options available to meet your requirements including:
  - Explosion-proof and intrinsically-safe operators
  - Stainless Steel
  - Fluoroelastomer Seals
- Easily converted from 4-way to 3-way operation
- Specific application needs? We will build it for you.

Tapered Tee-Seal ..... Eats Dirt

- Bidirectional tapered Tee-Seal eliminates sticking problems
  - Flexes to clean spool
  - Mechanically Locked
  - No Spiral Twist
  - No Extrusion
  - Air Line Sediment is Wiped Away.
- Tested tough and proven reliable according to SAE specifications: Rust and water injected every 864,000 cycles for 20-million cycles.

Solenoid ... Guaranteed Against Burnout

- 3-way pilot uses full air line pressure to shift the valve
- Pilot is internally supplied when the pressure at port one is 35 to 150 psig (2.4 to 10.3 bar)
- Coil is hermetically sealed as an integral watertight molded unit
- Intrinsically-safe and explosion-proof versions available
- Push Non-Locking Override is standard. (Extended Turn and Turn-Locking available)

Products Certified to:

- CSA - (C22.2 and UL STD 429)
- Factory Mutual - Explosion-Proof Environments
- ATEX - Explosion-Proof Environments
- CE - EMF and Low Voltage Directives

NAMUR Interface Weather-Proof Solenoid Pilot Valves
Product Overview

NAMUR interface valves are designed to easily mount directly to pneumatic valve actuators, and are used as pilot valves to control the actuator in many flow processes.

3/2 & 5/2

Illustration examples.

VALVE FEATURES

Compact Design	Balanced spool construction, compact size, low profile and high performance
Solenoid Pilot	Pilot uses full air line pressure to shift the valve Solenoid guaranteed against burnout
Weather-Proof Coil	Hermetically sealed as an integral water tight molded unit; robust enclosures to function in rugged environments
Tapered Tee-Seal	Bidirectional tapered Tee-Seal eliminates sticking problems Tested tough & proven reliable according to SAE specifications: rust & water injected every 864,000 cycles for 20-million cycle
Manual Override	Allows the solenoid valve to be used manually in case of electrical failure, or for quick cycle testing
External Pilot Supply	Easily field convertible to external pilot supply

Custom options available, consult AVI.

Actuation	Function	Port Size	Series		Maximum Flow C_V (Nl/min)	Page
		1/4	D06	D20		
Solenoid Pilot	3/2	●	●	●	1.8 (1800)	6 – 7
	5/2	●		●	1.8 (1800)	8 – 9
	5/3	●		●	1.4 (1400)	10 – 11
Accessories						28 – 32

STANDARD SPECIFICATIONS

GENERAL	Function	3/2 Valve	Normally Closed	
		5/2 Valve		
		5/3 Valve	Closed Center	
			Open Center	
			Power Center	
	Construction Design	Spool		
	Actuation	Electrical	Solenoid Pilot Controlled	
	Mounting	Direct Mount; NAMUR Interface (according to the standard VDI/VDE 3845)		
	Connection	Threaded Port	NPT	
	Manual Override	Push, Non-Locking		
OPERATING CONDITIONS	Temperature	Ambient	-20° to 123°F (-29° to 50°C)	
		Media		
		For temperatures below 40°F (4°C) air must be free of water vapor to prevent formation of ice.		
	Flow Media	Filtered air		
	Operating Pressure	3/2 Valves	D06 Series	0 to 10.3 bar (0 to 150 psig)
			D20 Series	2.4 to 10.3 bar (35 to 150 psig)
		5/2 Valves	35 to 150 psig (2.4 to 10.3 bar)	
		5/3 Valves	50 to 150 psig (3.4 to 10.3 bar)	
	External Pilot Supply Pressure	3/2 & 5/2 Valves	35 to 150 psig (2.4 to 10.3 bar)	
		5/3 Valves	50 to 150 psig (3.4 to 10.3 bar)	

ELECTRICAL DATA FOR SOLENOID PILOT	Solenoids	Current Flow	Operating Voltage	Power Consumption (each solenoid)
		DC	24 volts	4.8 watts
			12 volts	
			125 volts	5.9 watts
		AC	110-120 volts, 50/60 Hz	6.9 VA
			200-240 volts, 50/60 Hz	6.4 VA
			22-24 volts, 50/60 Hz	6.9 VA
		Rated for continuous duty		

CONSTRUCTION MATERIAL	Valve Body	Bar Stock Aluminum
	Solenoid Body	Polyamid 66
	Spool	Stainless Steel
	Seals	Buna-N

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

PRODUCT CREDENTIALS

Functional Safety Approval	Safety Integrity Level Per IEC 61508:2001	Declaration of Conformity	Certificate of Compliance
SGS TÜV SAAR FUNKTIONALE SICHERHEIT GEPRÜFT FUNCTIONAL SAFETY APPROVED	*Up to* **SIL 3** **Functional Safety**	CE	CSA C US

Ordering Information

3/2 Weather-Proof Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 3-Way 2-Position Valves

D20	03	G	AWR	–	DB								

Valve Function

3/2 Normally Closed

Series	Port Size	Valve Body Height	
D06	1/4	1"	03
D20	1/4	1-1/4"	03
		1"	13

Series	Actuation – Location	
D06	Single Solenoid – Top	AWR
D20	Single Solenoid – Left	CWR
	Single Solenoid – Right	AWR

Current	Voltage*	
DC	24 V	DB
	12 V	DA
AC	120 V, 60 Hz	AA
	240 V, 60 Hz	AB

* For other voltages consult AV.

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Coil and Dustproof Options		
None (Leave Blank)		
Coil *	DIN EN 175301-803 Form B (Leave Blank)	
	1/2" Conduit coil with 30" leads	C
	Conduit – High Temperature 0° to 180°F (-18° to 82°C)	CT
With Dustproof (Vent Ports)		D
Coil *	Molded Coil with 18" Flying Leads	G
	2.5 Watt (with Standard Push, Non-Locking Override only)	L
	0.7 Watt (24 V DC only) (with Extended Turn-Locking Override option 2 only)	LL

Add option codes in alphabetical order.
* Only one type of Coil can be selected.

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

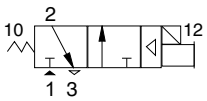
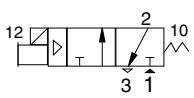
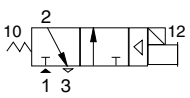
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2013GAWR-DB, D2003GAWR-DBACDW19.

Valve Schematics	Single Solenoid	Single Solenoid – Left Pilot	Single Solenoid – Right Pilot
			

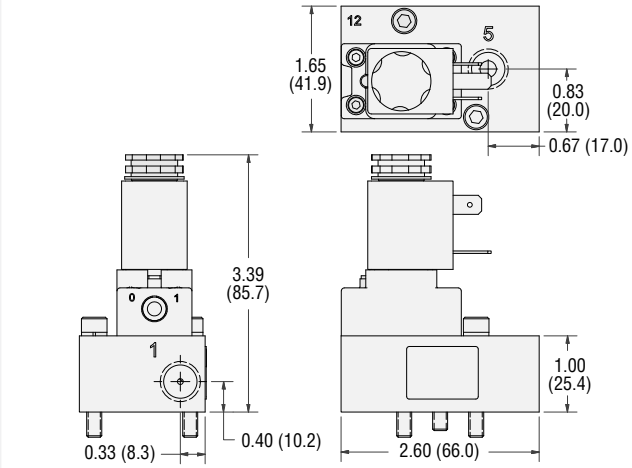
3/2 Weather-Proof Solenoid Pilot Valves

Series	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3		
D06	1/4	1/4	0.06 (59)	0.58 (0.26)
D20	1/4	1/4	1.8 (1770)	0.70 (0.32)

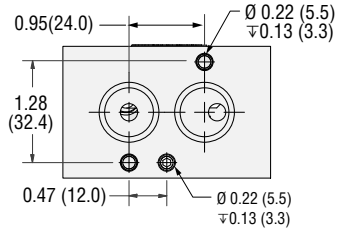
DIMENSIONS

Inches (mm)

D06 Series

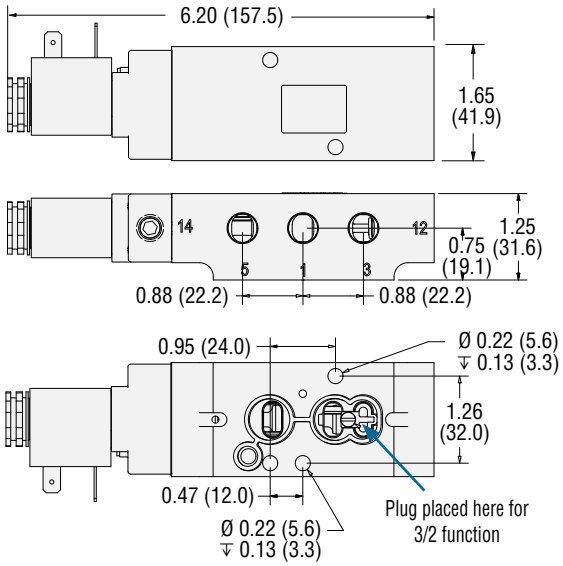


Bottom View

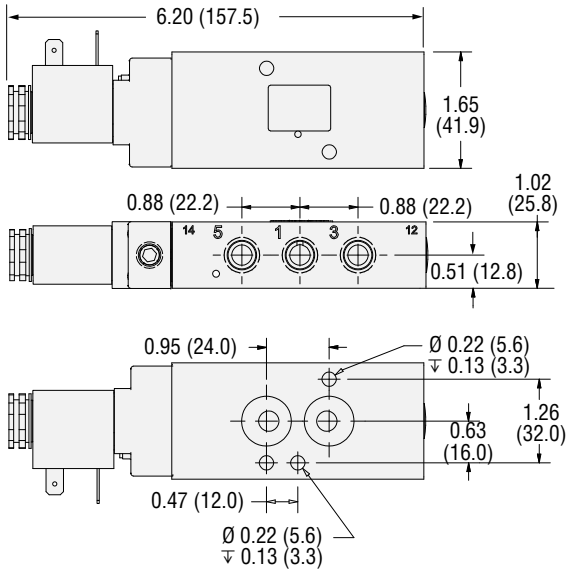


D20 Series

D2003 Model



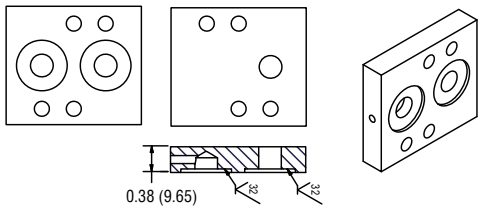
D2013 Model



Downloadable CAD models available.

3/2 Valve Conversion Plate (Included)

2013 Models only



Ordering Information

5/2 Weather-Proof Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 5-Way 2-Position Valves

D20	03	G	AWR	–	DB								
Series	Valve Function												

Valve Function

5/2

Port Size	Valve Body Height	
1/4	1-1/4"	03
	1"	13

Actuation – Location	
Single Solenoid – Left	CWR
Single Solenoid – Right	AWR
Double Solenoid	BWW

Current	Voltage*	
DC	24 V	DB
	12 V	DA
AC	120 V, 60 Hz	AA
	240 V, 60 Hz	AB

* For other voltages consult AV.

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Coil and Dustproof Options		
None (Leave Blank)		
Coil *	DIN EN 175301-803 Form B (Leave Blank)	
	1/2" Conduit coil with 30" leads	C
	Conduit – High Temperature 0° to 180°F (-18° to 82°C)	CT
With Dustproof (Vent Ports)		D
Coil *	Molded Coil with 18" Flying Leads	G
	2.5 Watt (with Standard Push, Non-Locking Override only)	L
	0.7 Watt (24 V DC only) (with Extended Turn-Locking Override option 2 only)	LL

Add option codes in alphabetical order.
* Only one type of Coil can be selected.

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

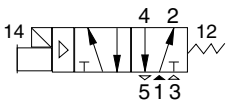
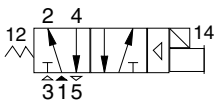
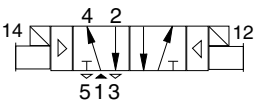
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2013AAWR-DB, D2003AAWR-DBACDW19.

Valve Schematics	Single Solenoid – Left Pilot	Single Solenoid – Right Pilot	Double Solenoid
			

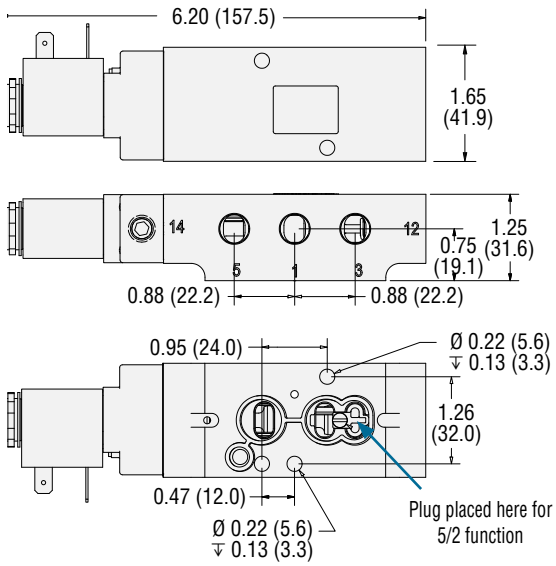
5/2 Weather-Proof Solenoid Pilot Valves

Solenoid	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3, 5		
Single	1/4	1/4	1.8 (1770)	0.70 (0.32)
Double	1/4	1/4	1.8 (1770)	0.75 (0.34)

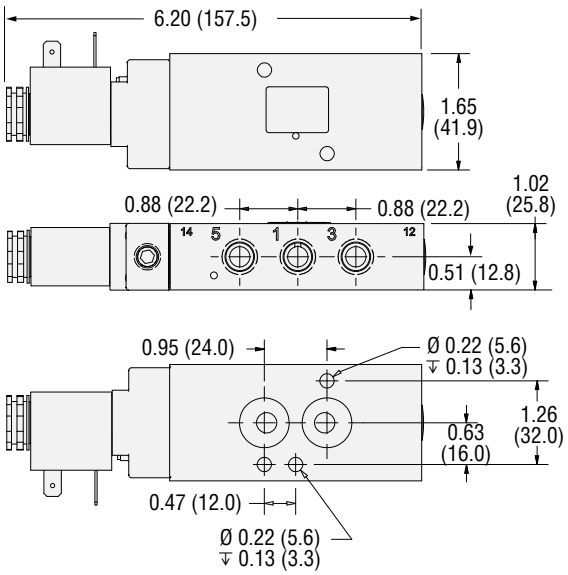
DIMENSIONS — Inches (mm)

Single Solenoid

D2003 Model

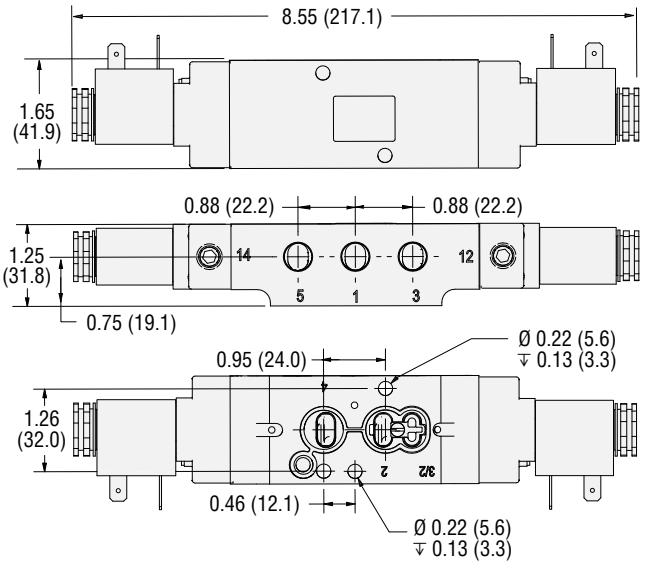


D2013 Model

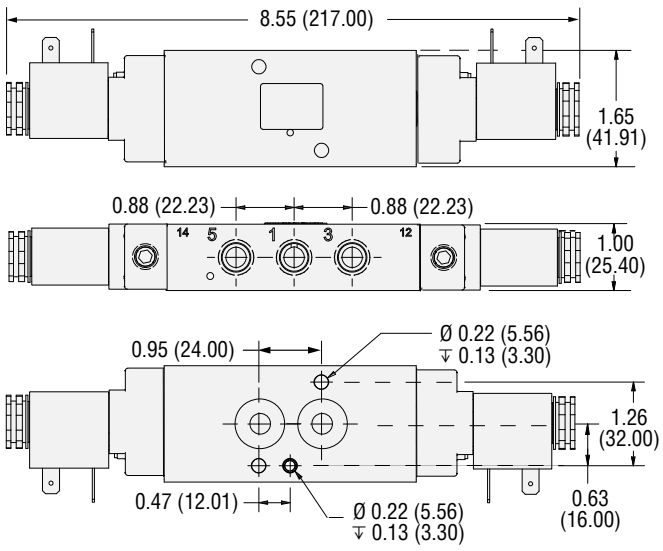


Double Solenoid

D2003 Model



D2013 Model



Downloadable CAD models available.

Ordering Information

5/3 Weather-Proof Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 5-Way 3-Position Valves

D20	03	C	BWDW	–	DB								

Series

Port Size / Valve Body Height

Port Size	Valve Body Height	
1/4	1-1/4"	03
	1"	13

Actuation

Actuation	
Double Solenoid	

Valve Function

Valve Function	
5/3 Closed Center	C
5/3 Open Center	D
5/3 Power Center	E

Current / Voltage*

Current	Voltage*	
DC	24 V	DB
	12 V	DA
AC	120 V, 60 Hz	AA
	240 V, 60 Hz	AB

* For other voltages consult AV.

Seals Material

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply

Pilot Supply	
Internal (Leave Blank)	
External	B

Coil and Dustproof Options

Coil and Dustproof Options		
None (Leave Blank)		
Coil *	DIN EN 175301-803 Form B (Leave Blank)	
	1/2" Conduit coil with 30" leads	C
	Conduit – High Temperature 0° to 180°F (-18° to 82°C)	CT
With Dustproof (Vent Ports)		D
Coil *	Molded Coil with 18" Flying Leads	G
	2.5 Watt (with Standard Push, Non-Locking Override only)	L
	0.7 Watt (24 V DC only) (with Extended Turn-Locking Override option 2 only)	LL

Add option codes in alphabetical order.
* Only one type of Coil can be selected.

Mounting Kit

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

Port Thread

Port Thread	
NPT (Leave Blank)	
G	W

Body Material

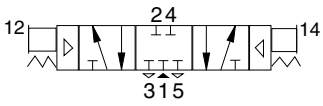
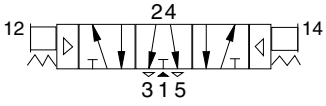
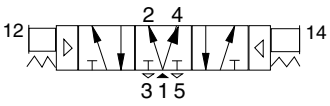
Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2013CBWDW-DB, D2013CBWDW-DBACDW19.

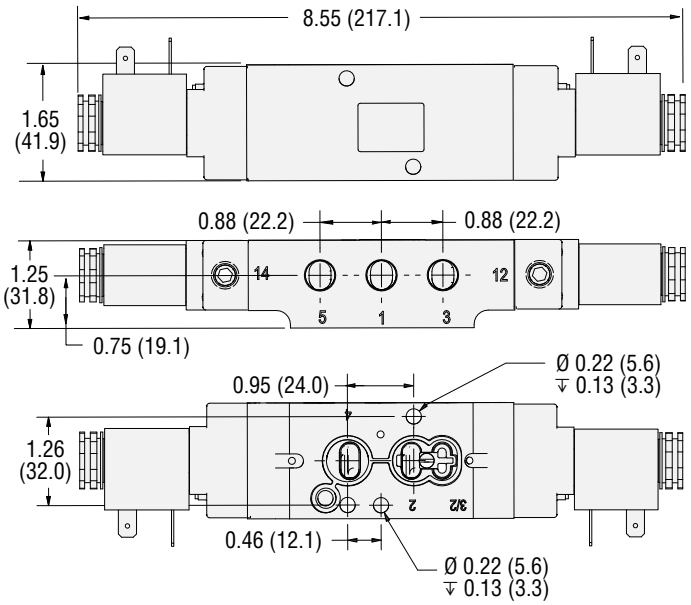
Valve Schematic	Closed Center	Open Center	Power Center
			

5/3 Weather-Proof Solenoid Pilot Valves

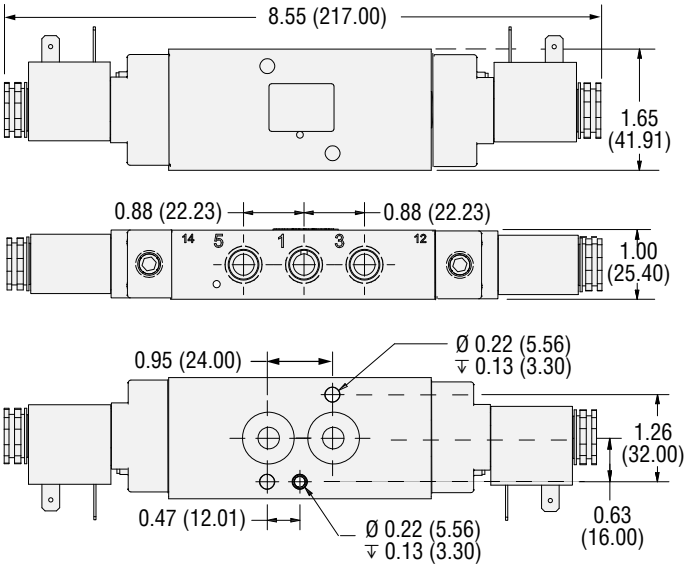
Actuation Pilot Type	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3, 5		
Double	1/4	1/4	1.4 (1381)	0.80 (0.36)

DIMENSIONS — Inches (mm)

D2003 Model



D2013 Model



Downloadable CAD models available.

NAMUR Interface Intrinsically Safe Solenoid Pilot Valves
Product Overview

NAMUR interface valves are direct mounted to pneumatic actuators, and are used as pilot valves to control the actuator in many flow processes.

Intrinsically Safe Valves are used in hazardous locations where a high level of protection from explosion is required, to prevent potentially explosive situations. Intrinsic Safety is a type of protection based on the restriction of electrical energy within an apparatus and of interconnecting wiring exposed to the potentially explosive atmosphere to a level below that which can cause ignition by either sparking or heating effects, either during normal operation or under fault conditions.

AV intrinsically safe solenoid pilot controlled valves are ideal for applications in a wide range of industries and environments where safety from electrical ignition of flammable gases, vapors, flammable liquids, combustible dust, or easily ignitable fibers is a concern.

D06	D20 Single Solenoid	D20 Double Solenoid
		

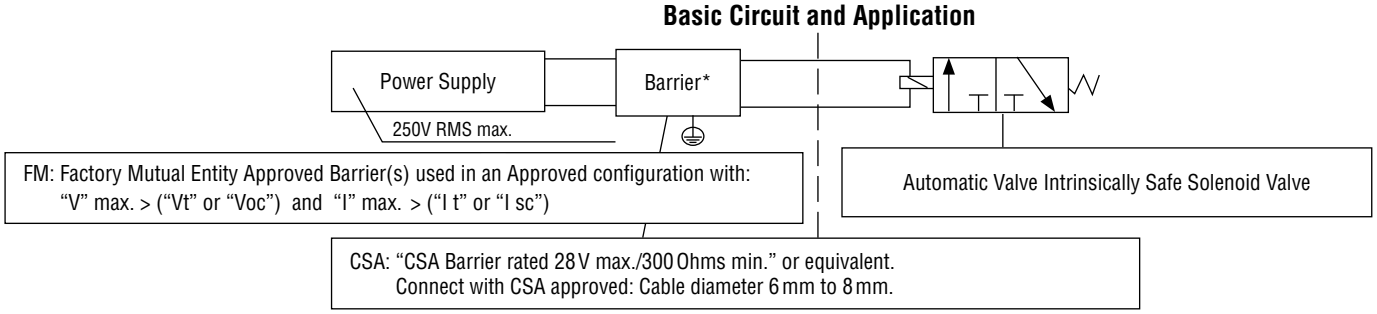
Illustration examples.

VALVE FEATURES

Compact Design	Balanced spool construction, compact size, low profile and high performance
Solenoid Pilot	Pilot uses full air line pressure to shift the valve Solenoid guaranteed against burnout
Intrinsically Safe Coil	Robust enclosures to function in rugged environments
Tapered Tee-Seal	Bidirectional tapered Tee-Seal eliminates sticking problems Tested tough & proven reliable according to SAE specifications: rust & water injected every 864,000 cycles for 20-million cycle
Manual Override	Allows the solenoid valve to be used manually in case of electrical failure, or for quick cycle testing
External Pilot Supply	Easily field convertible to external pilot supply

Custom options available, consult AVI.

Basic Circuit and Application



Actuation	Function	Inlet Port Size	Series		Maximum Flow C_V (Nl/min)	Page
		1/4	D06	D20		
Solenoid Pilot	3/2	●	●	●	1.8 (1800)	6 – 7
	5/2	●		●	1.8 (1800)	8 – 9
	5/3	●		●	1.4 (1400)	18 – 99
Accessories						28 – 32

STANDARD SPECIFICATIONS

GENERAL	Function	3/2 Valve	Normally Closed	
		5/2 Valve		
		5/3 Valve	Closed Center	
			Open Center	
			Power Center	
	Construction Design	Spool		
	Actuation	Electrical	Solenoid Pilot Controlled	
	Mounting	Direct Mount; NAMUR Interface (according to the standard VDI/VDE 3845)		
		Mounting Kit	5 mm Fasteners	
	Connection	Threaded Port	NPT	
	Manual Override	Push, Non-Locking		
OPERATING CONDITIONS	Temperature	Ambient	-29° to 50°C (-20° to 123°F)	
		Media		
	Flow Media	Filtered air		
	Operating Pressure	3/2 Valves	D06 Series	0 to 150 psig (0 to 10.3 bar)
			D20 Series	35 to 150 psig (2.4 to 10.3 bar)
		5/2 Valves	35 to 150 psig (2.4 to 10.3 bar)	
		5/3 Valves	50 to 150 psig (3.4 to 10.3 bar)	
	External Pilot Supply Pressure	3/2 & 5/2 Valves	35 to 150 psig (2.4 to 10.3 bar)	
		5/3 Valves	50 to 150 psig (3.4 to 10.3 bar)	
ELECTRICAL DATA FOR SOLENOID PILOT	Solenoids	Current Flow	Operating Voltage	Power Consumption (each solenoid)
		DC	24 volts	1.6 watts
		Rated for continuous duty		
	Enclosure Rating	IP65		
	Current	Inrush	0.05 Amps	
		Holding		
	Resistance (OHMS @ 25°C)	275		
CONSTRUCTION MATERIAL	Valve Body	Aluminum Bar Stock		
	Solenoid Body	Polyamid 66		
	Spool	Aluminum		
	Seals	Buna-N		
SAFETY DATA	Safety Integrity Level (SIL)	Certified by SGS-TÜV Saar in accordance to IEC 61508 safety integrity level 2 (SIL 2) in singular application with HFT = 0, and SIL 3 and PL e in redundant application with HFT ≥ 1.		

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

PRODUCT CREDENTIALS

Functional Safety Approval	Safety Integrity Level Per IEC 61508:2001	Declaration of Conformity	Certificate of Compliance
SGS TÜV SAAR FUNKTIONALE SICHERHEIT GEPRÜFT FUNCTIONAL SAFETY APPROVED	*Up to* **SIL 3** Functional Safety	CE	C SP US

Ordering Information

3/2 Intrinsically Safe Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 3-Way 2-Position Valves

D20	03	G	AVR	–	DB								

Valve Function

3/2 Normally Closed

Voltage

24 volts DC

Series	Port Size	Valve Body Height	
D06	1/4	1"	03
D20	1/4	1-1/4"	03
		1"	13

Series	Actuation – Location	
D06	Single Solenoid – Top	AVR
D20	Single Solenoid – Left	CVR
	Single Solenoid – Right	AVR

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Dustproof (Vent Ports)	
None (Leave Blank)	
With Dustproof	D

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

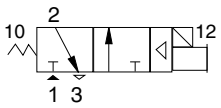
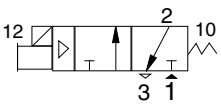
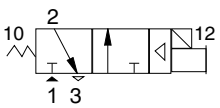
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2013GAVR-DB, D2003GAVR-DBASW.

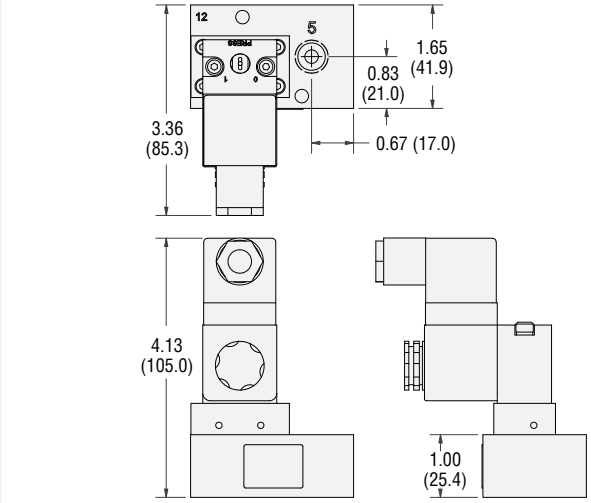
Valve Schematic	Single Solenoid	Single Solenoid – Left Pilot	Single Solenoid – Right Pilot
			

Series	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3		
D06	1/4	1/4	0.06 (59)	0.58 (0.26)
D20	1/4	1/4	1.8 (1800)	0.70 (0.32)

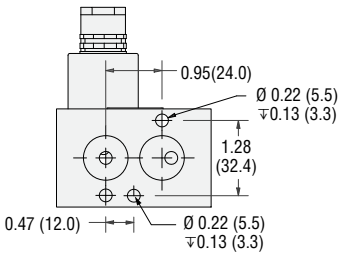
3/2 Intrinsically Safe Solenoid Pilot Valves

DIMENSIONS — Inches (mm)

D06 Series

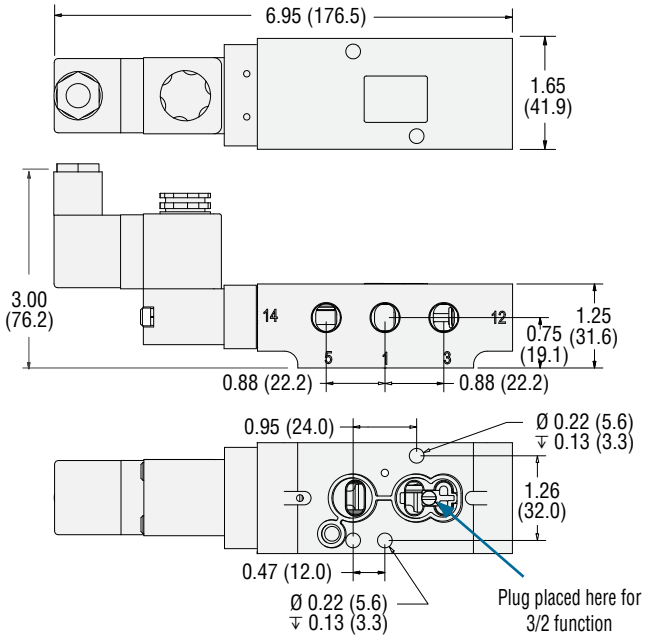


Bottom View

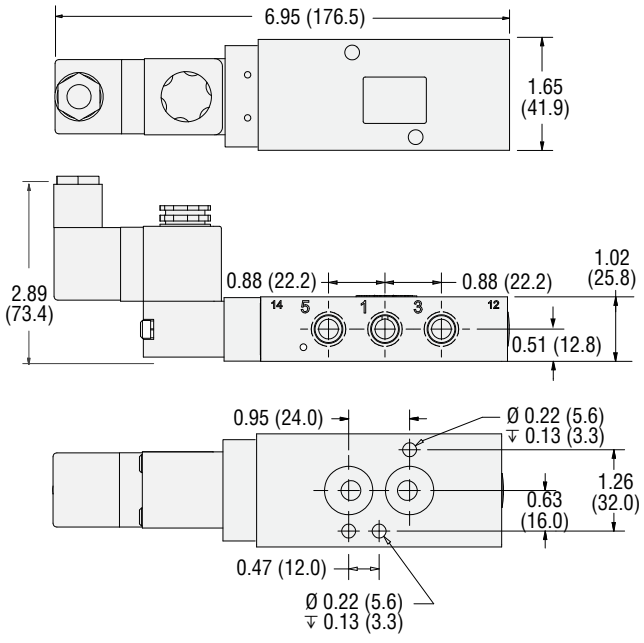


D20 Series

D2003 Model



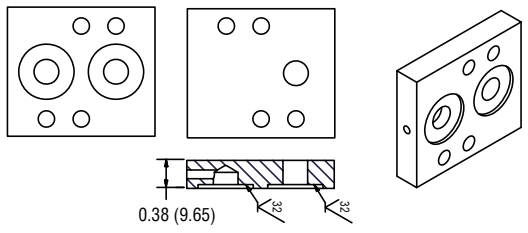
D2013 Model



Downloadable CAD models available.

2013 Models only

3/2 Valve Conversion Plate (Included)



Ordering Information

5/2 Intrinsically Safe Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 5-Way 2-Position Valves

D20	03	A	AVR	–	DB								
Series	Valve Function				Voltage								

Series: D20

Valve Function: 5/2

Voltage: 24 volts DC

Port Size	Valve Body Height	
1/4	1-1/4"	03
	1"	13

Actuation – Location	
Single Solenoid – Left	CVR
Single Solenoid – Right	AVR
Double Solenoid	BVV

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Dustproof (Vent Ports)	
None (Leave Blank)	
With Dustproof	D

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

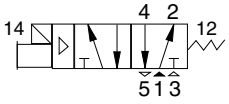
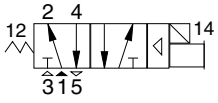
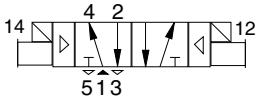
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2003AAVR-DB, D2013AAVR-DBASSW1.

Valve Schematic	Single Solenoid – Left Pilot	Single Solenoid – Right Pilot	Double Solenoid
			

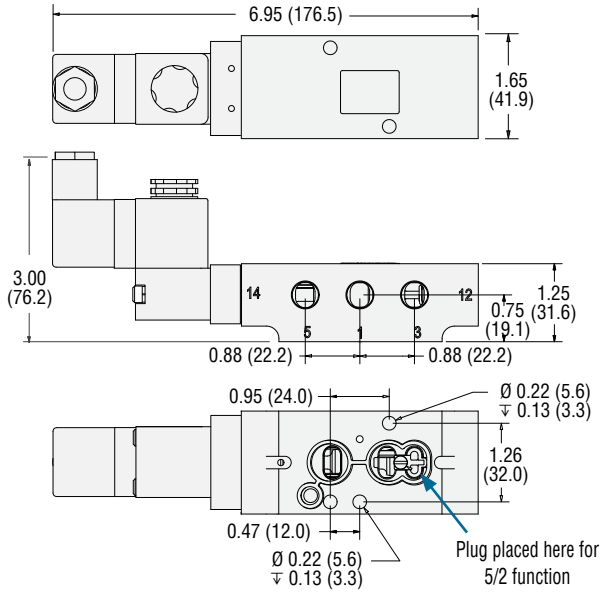
Solenoid	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3, 5		
Single	1/4	1/4	1.8 (1800)	0.70 (0.32)
Double	1/4	1/4	1.8 (1800)	0.75 (0.34)

5/2 Intrinsically Safe Solenoid Pilot Valves

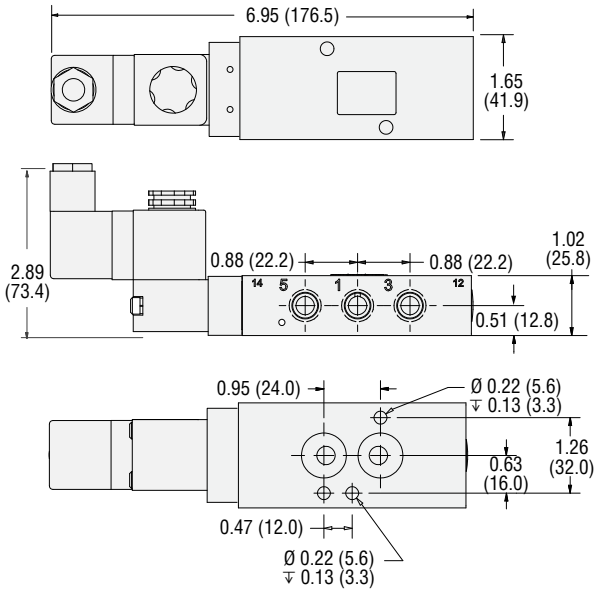
DIMENSIONS — Inches (mm)

Single Solenoid

D2003 Model

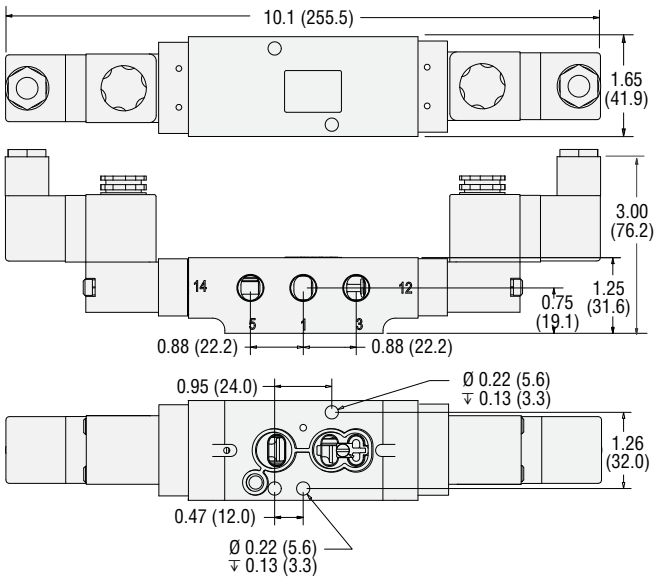


D2013 Model

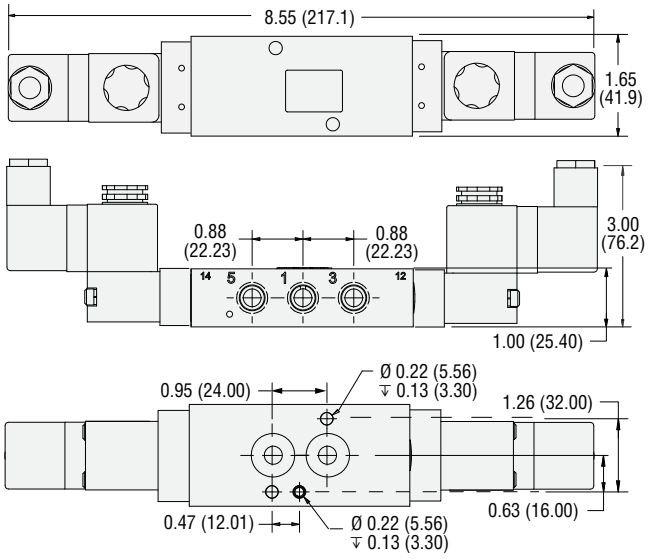


Double Solenoid

D2003 Model



D2013 Model



Downloadable CAD models available.

Ordering Information

5/3 Intrinsically Safe Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 5-Way 3-Position Valves

D20	03	C	BVDV	–	DB								
Series			Actuation										

Actuation

Double Solenoid

Voltage

24 volts DC

Port Size / Valve Body Height

Port Size	Valve Body Height	
1/4	1-1/4"	03
	1"	13

Valve Function

5/3 Closed Center	C
5/3 Open Center	D
5/3 Power Center	E

Seals Material

Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply

Internal (Leave Blank)	
External	B

Dustproof (Vent Ports)

None (Leave Blank)	
With Dustproof	D

Mounting Kit

5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override

Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

Port Thread

NPT (Leave Blank)	
G	W

Body Material

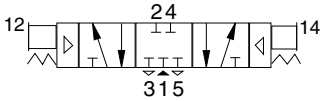
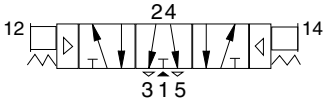
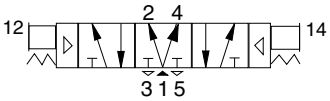
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *

None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2003CBVDV-DB, D2013DBVDV-DBASSW.

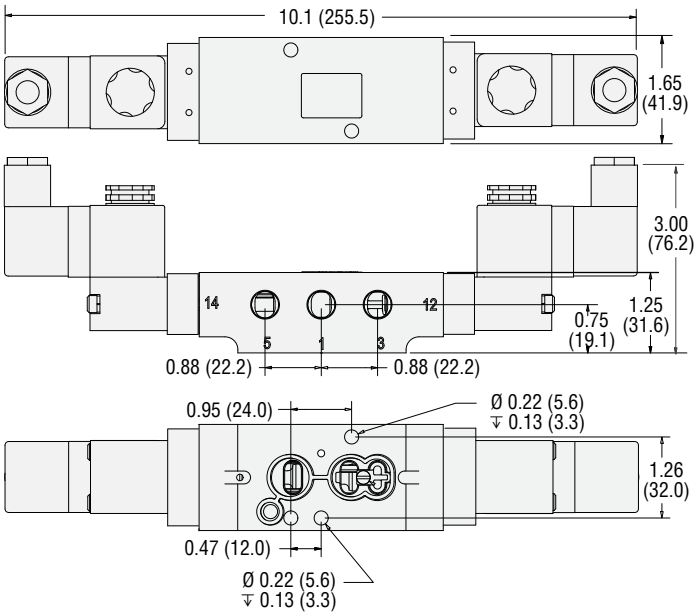
Valve Schematic	Closed Center	Open Center	Power Center
			

Actuation Pilot Type	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3, 5		
Double	1/4	1/4	1.4 (1400)	0.80 (0.36)

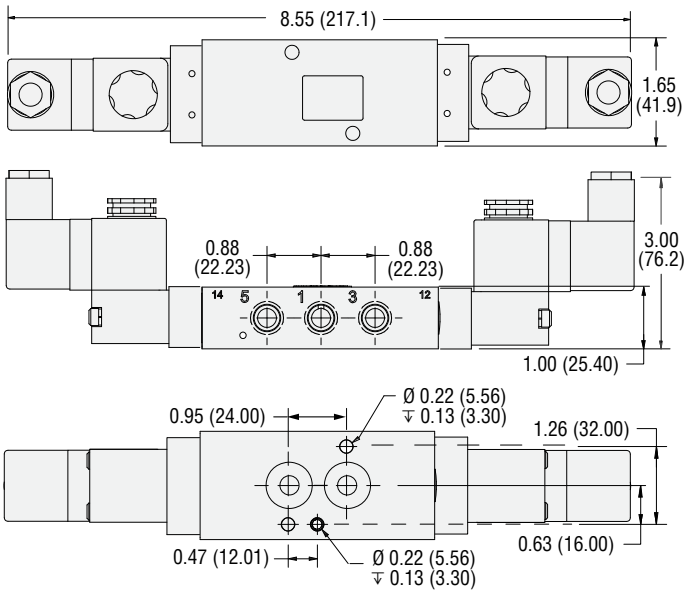
5/3 Intrinsically Safe Solenoid Pilot Valves

DIMENSIONS — Inches (mm)

D2003 Model



D2013 Model



Downloadable CAD models available.

NAMUR Interface Explosion-Proof Solenoid Pilot Valves
Product Overview

NAMUR interface valves are direct mounted to pneumatic actuators, and are used as pilot valves to control the actuator in many flow processes.

Explosion-Proof Valves are used in hazardous locations where a high level of protection from explosion is required, to prevent potentially explosive situations. The AV Explosion-Proof solenoid pilot controlled valves are ideal are ideal for applications in a wide range of industries and environments where safety from electrical ignition of flammable gases, vapors, flammable liquids, combustible dust, or easily ignitable fibers is a concern.

3/2 Valves	5/2 Valves
	

Illustration examples.

VALVE FEATURES	
Compact Design	Balanced spool construction, compact size, low profile and high performance
Solenoid Pilot	Pilot uses full air line pressure to shift the valve Solenoid guaranteed against burnout
Explosion-Proof Coil	Contain any spark originating from within the coil or housing preventing the ignition of any flammable material in the surrounding environment, resulting in a larger explosion
Tapered Tee-Seal	Bidirectional tapered Tee-Seal eliminates sticking problems Tested tough & proven reliable according to SAE specifications: rust & water injected every 864,000 cycles for 20-million cycle
Manual Override	Allows the solenoid valve to be used manually in case of electrical failure, or for quick cycle testing
External Pilot Supply	Easily filed convertible to external pilot supply

Custom options available, consult AVI.

Actuation	Function	Port Size	Series		Maximum Flow C_v	Page
		1/4	D06	D20		
Solenoid Pilot	3/2	●		●	1.8	22 – 23
	5/2	●		●	4.8	24 – 25
	5/3	●	●	●	3.7	26 – 27
Accessories						28 – 32

Specifications

STANDARD SPECIFICATIONS

GENERAL	Function	3/2 Valve	Normally Closed	
		5/2 Valve		
		5/3 Valve	Closed Center	
			Open Center	
			Power Center	
	Construction Design	Spool		
	Actuation	Electrical	Solenoid Pilot Controlled	
	Mounting	Direct Mount; NAMUR Interface (according to the standard VDI/VDE 3845)		
		Mounting Kit	5 mm Fasteners	
	Connection	Threaded Port	NPT	
	Manual Override	Push, Non-Locking		
OPERATING CONDITIONS	Temperature	Ambient	-29° to 50°C (-20° to 123°F)	
		Media		
	Flow Media	Filtered air		
	Operating Pressure	3/2 Valves	D06 Series	0 to 150 psig (0 to 10.3 bar)
			D20 Series	35 to 150 psig (2.4 to 10.3 bar)
		5/2 Valves	35 to 150 psig (2.4 to 10.3 bar)	
		5/3 Valves	50 to 150 psig (3.4 to 10.3 bar)	
	External Pilot Supply Pressure	3/2 & 5/2 Valves	35 to 150 psig (2.4 to 10.3 bar)	
		5/3 Valves	50 to 150 psig (3.4 to 10.3 bar)	

ELECTRICAL DATA FOR SOLENOID PILOT	Solenoids	Current Flow	Operating Voltage	Power Consumption (each solenoid)
		DC	24 volts	1.6 watts
		Rated for continuous duty		
	Enclosure Rating	IP65		
	Current	Inrush	0.05 Amps	
		Holding		
	Resistance (OHMS @ 25°C)	275		

CONSTRUCTION MATERIAL	Valve Body	Aluminum Bar Stock
	Solenoid Body	Polyamid 66
	Spool	Aluminum
	Seals	Buna-N
SAFETY DATA	Safety Integrity Level (SIL)	Certified by SGS-TÜV Saar in accordance to IEC 61508 safety integrity level 2 (SIL 2) in singular application with HFT = 0, and SIL 3 and PL e in redundant application with HFT ≥ 1.

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

PRODUCT CREDENTIALS

Functional Safety Approval	Safety Integrity Level Per IEC 61508:2001	Certifications		Declaration of Conformity	Certificate of Compliance
SGS TÜV SAAR FUNKTIONALE SICHERHEIT GEPRÜFT FUNCTIONAL SAFETY APPROVED	*Up to* SIL 3 Functional Safety	ATEX	Factory Mutual	CE	CSA C US

Ordering Information

3/2 Explosion-Proof Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 3-Way 2-Position Valves

D20	03	G	AWR	–	DB							Y		

Valve Function

3/2 Normally Closed

Series	Port Size	Valve Body Height	
D06	1/4	1"	03
D20	1/4	1-1/4"	03
		1"	13

Series	Actuation – Location	
D06	Single Solenoid – Top	AWR
D20	Single Solenoid – Left	CWR
	Single Solenoid – Right	AWR

Current	Voltage*	
DC	24 V	DB
	12 V	DA
AC	120 V, 60 Hz	AA
	240 V, 60 Hz	AB

* For other voltages consult AV.

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Dustproof (Vent Ports)	
None (Leave Blank)	
With Dustproof	D

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

Coil Certification	
CSA / FM	Y
ATEX	Z

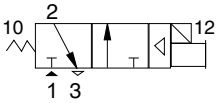
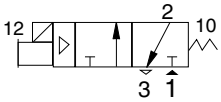
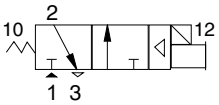
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2013GAWR-DBY, D2003GAWR-DBASWZ.

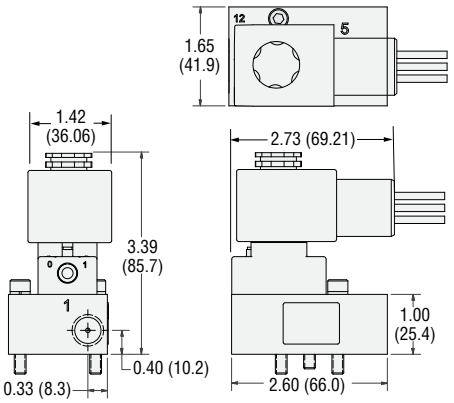
Valve Schematic	Single Solenoid	Single Solenoid – Left Pilot	Single Solenoid – Right Pilot
			

3/2 Explosion-Proof Solenoid Pilot Valves

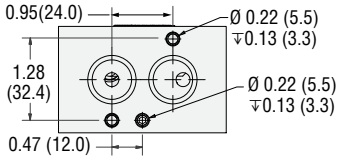
Series	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3		
D06	1/4	1/4	0.06 (59)	0.58 (0.26)
D20	1/4	1/4	1.8 (1800)	0.70 (0.32)

DIMENSIONS — Inches (mm)

D06 Series

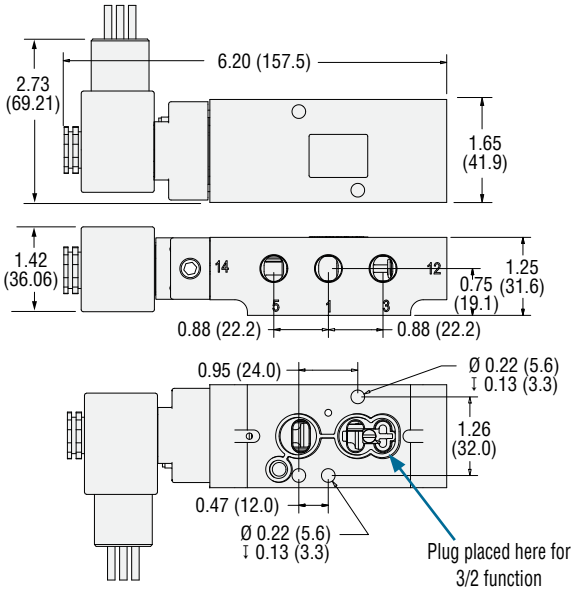


Bottom View

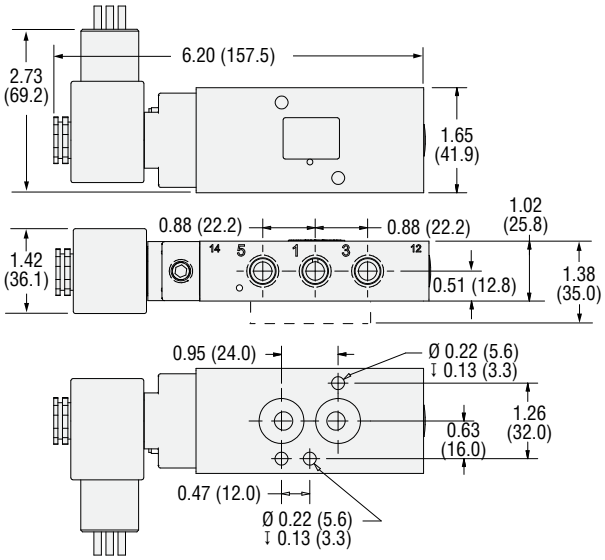


D20 Series

D2003 Model



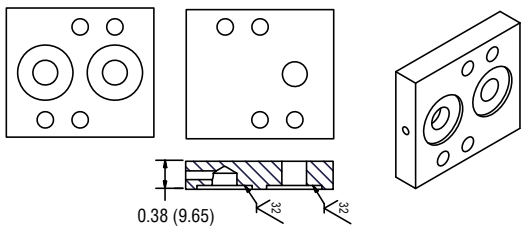
D2013 Model



Downloadable CAD models available.

2013 Models only

3/2 Valve Conversion Plate (Included)



Ordering Information

5/2 Explosion-Proof Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 5-Way 2-Position Valves

D20	03	A	AWR	–	DB							Y		

Series

Valve Function

5/2

Port Size	Valve Body Height	
1/4	1-1/4"	03
	1"	13

Actuation – Location	
Single Solenoid – Left	CWR
Single Solenoid – Right	AWR
Double Solenoid	BWW

Current	Voltage*	
DC	24 V	DB
	12 V	DA
AC	120 V, 60 Hz	AA
	240 V, 60 Hz	AB

* For other voltages consult AV.

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Dustproof (Vent Ports)	
None (Leave Blank)	
With Dustproof	D

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

Coil Certification	
CSA / FM	Y
ATEX	Z

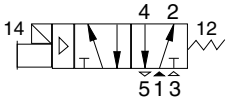
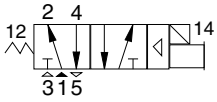
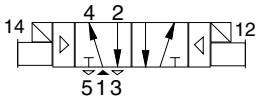
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2003AAWR-DBY, D2013AAWR-DBASSWZ.

Valve Schematic	Single Solenoid – Left Pilot	Single Solenoid – Right Pilot	Double Solenoid
			

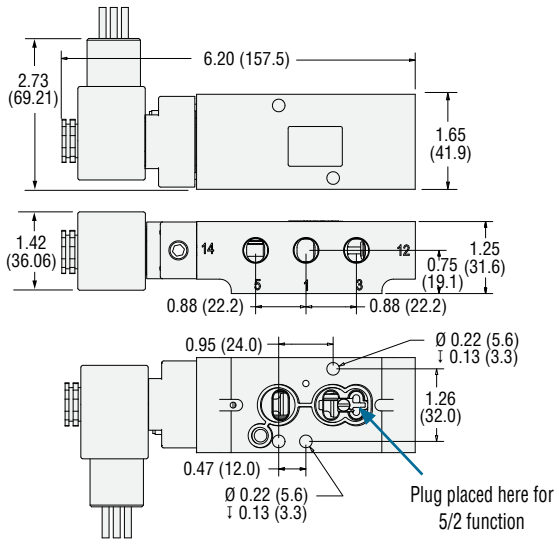
5/2 Explosion-Proof Solenoid Pilot Valves

Solenoid	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3, 5		
Single	1/4	1/4	1.8 (1770)	0.70 (0.32)
Double	1/4	1/4	1.8 (1770)	0.75 (0.34)

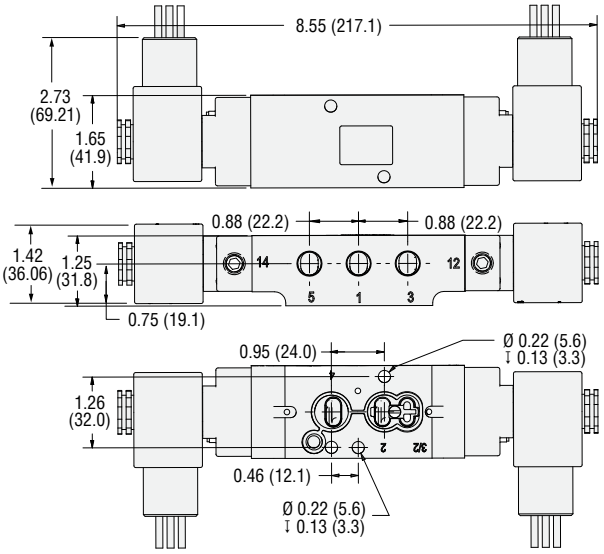
DIMENSIONS — Inches (mm)

D2003 Model

Single Solenoid

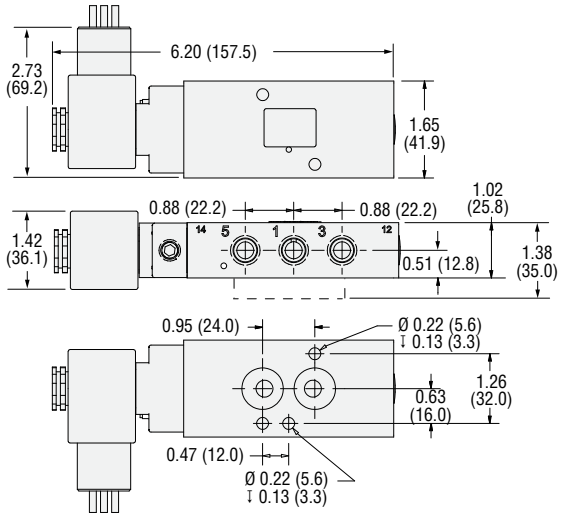


Double Solenoid

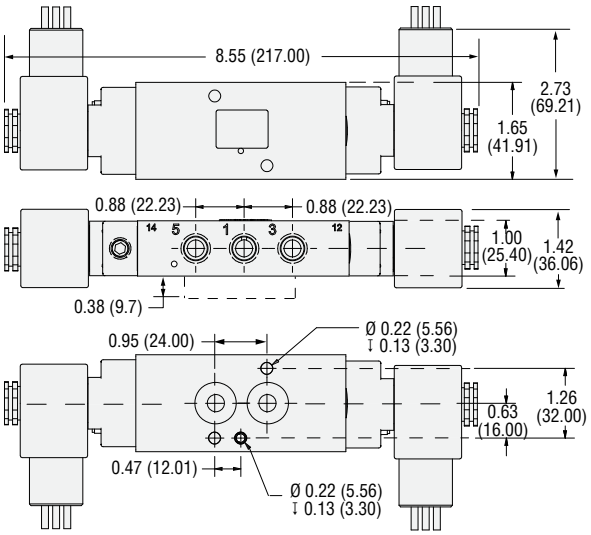


D2013 Model

Single Solenoid

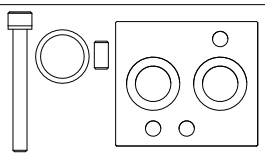


Double Solenoid



Downloadable CAD models available.

Adapter Plate Included (for D2013 Model only)



Ordering Information

5/3 Explosion-Proof Solenoid Pilot Valves

MODEL NUMBER CONFIGURATOR — 5-Way 3-Position Valves

D20	03	C	BWDW	–	DB							Y		

Series

Actuation

Double Solenoid

Port Size	Valve Body Height	
1/4	1-1/4"	03
	1"	13

Valve Function	
5/3 Closed Center	C
5/3 Open Center	D
5/3 Power Center	E

Current	Voltage*	
DC	24 V	DB
	12 V	DA
AC	120 V, 60 Hz	AA
	240 V, 60 Hz	AB

* For other voltages consult AV.

Seals Material	
Buna-N (Leave Blank)	
Fluoroelastomer	A

Pilot Supply	
Internal (Leave Blank)	
External	B

Dustproof (Vent Ports)	
None (Leave Blank)	
With Dustproof	D

Mounting Kit	
5 mm Fasteners (Leave Blank)	
10-24	8
10-32	9

Manual Override	
Push, Non-Locking (Leave Blank)	
Push Turn-Locking	1
Extended Turn-Locking	2
No Override	4

Coil Certification	
CSA / FM	Y
ATEX	Z

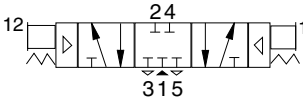
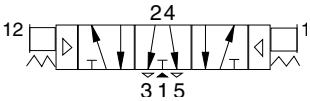
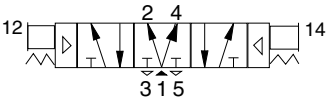
Port Thread	
NPT (Leave Blank)	
G	W

Body Material		
Aluminum Bar Stock (Leave Blank)		
Stainless Steel	Grade 303	S
	Grade 316	SS

Transition Plate *	
None (Leave Blank)	
Transition Plate for D2003 Model only	P

* Designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface.

Model Number examples: D2003CBWDW-DBY, D2013DBWDW-DBASSWZ.

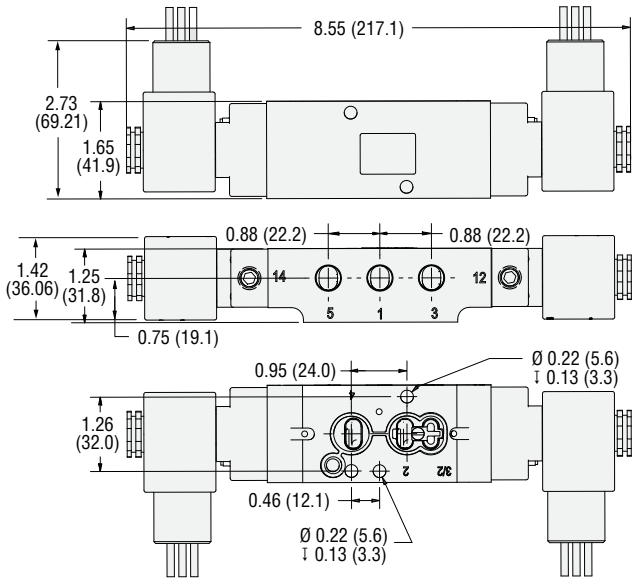
Valve Schematic	Closed Center	Open Center	Power Center
			

5/3 Explosion-Proof Solenoid Pilot Valves

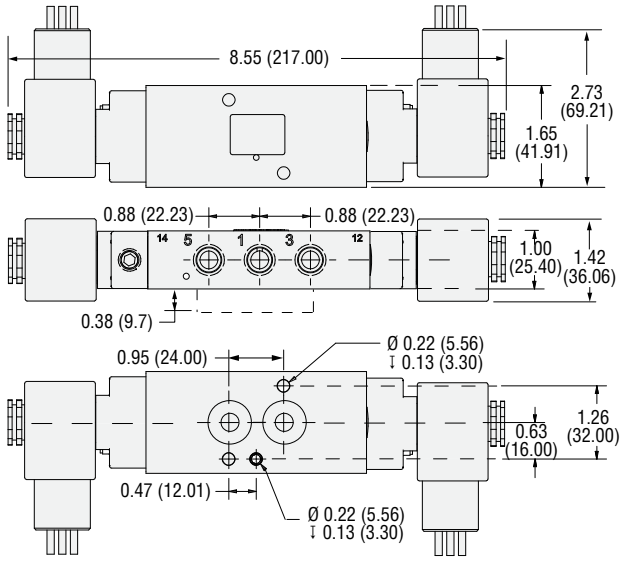
Solenoid	Size		Flow Cv (Nl/min)	Weight lb (kg)
	Port 1	Port 3, 5		
Double	1/4	1/4	1.4 (1400)	0.80 (0.36)

DIMENSIONS — Inches (mm)

D2003 Model

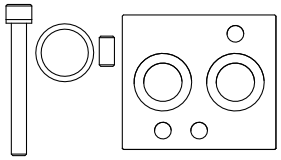


D2013 Model



Downloadable CAD models available.

Adapter Plate Included (for D2013 Model only)



ELECTRICAL CONNECTORS

Connectors

Connector					Model Number #		
Type	Connection	Fitting Connection	Quantity Included	Maximum Cord Diameter mm	Without Light	Lighted Connector	
						6-48 V AC/DC	100-240 V AC 48-120 V DC
DIN 43650 Industrial Form B	Solenoid	Cable grip	1	9mm	7020-001	7020-DB	7020-AA
		1/2" NPT conduit	1	–	7039-001	–	–
# Not polarity dependent.							

PREWIRED ELECTRICAL CONNECTORS

Prewired Connectors

Cable						Model Number		
End 1	End 2	Length feet (meters)	Connection	Quantity Included	Cord Diameter mm	Without Light	Lighted Connector	
Connector	Cord						6-48 V AC/DC	100-240 V AC 48-120 V DC
Molded DIN 43650 Industrial Form B	Flying leads	6 (1.8)	Solenoid	1	6	7020-006	–	–
Cable grip DIN 43650 Industrial Form B	Flying leads	6 (1.8)	Solenoid	1	6	–	7094-007	7094-006

Electrical Connectors			Prewired Electrical Connectors	
7020-001	7020-AA, 7020-DB	7039-001	7020-006	7094-006, 7094-007
				

Illustration examples.

SOLENOID COILS

	Electrical Connection	Enclosure Rating	Maximum Operating Temperature	Model Number	Weight lb (kg)
Weather-Proof Coils	DIN EN 43650 Industrial Form B	IP65	123°F (50°C)	7019-9**	0.12 (0.05)
	Molded Coil with 18" Leads			7019-9**G	
	1/2" Conduit Coil with 30" Leads	IP65	123°F (50°C)	7019-9**C	0.12 (0.05)
			180°F (82°C)	7019-9**CT	
	** *Insert voltage code from below, e.g., 7019DB, 7019-9DB G.*				

Coil Type	Current Flow	Voltage +/- 10%	** Voltage Code	Power		Current Amps		Resistance OHMS @ 25°C
				DC = Watts	AC = VA	Inrush	Holding	
DIN EN 43650 Industrial Form B	DC	12 V	DA	4.8	–	0.380	0.380	32
		24 V	DB	4.8	–	0.200	.0200	121
	AC	120 V 60 Hz	AA	–	6.9	0.075	0.050	32
		240 V 60	AB	–	6.4	0.038	0.025	121
Molded Coil with 18" Leads	DC	12 V	DA	4.8	–	0.380	0.380	32
		24 V	DB	4.8	–	0.200	.0200	121
	AC	120 V 60 Hz	AA	–	6.9	0.075	0.050	32
		240 V 60 Hz	AB	–	6.4	0.038	0.025	121
1/2" Conduit Coil with 30" Leads 123°F (50°C)	DC	12 V	DA	4.8	–	0.400	0.400	32
		24 V	DB	4.8	–	0.200	0.200	121
	AC	120 V 60 Hz	AA	–	6.9	0.078	0.058	840
		240 V 60	AB	–	6.4	0.039	0.028	3900
1/2" Conduit Coil with 30" Leads 180°F (82°C)	DC	12 V	DA	4.8	–	0.400	0.400	32
		24 V	DB	4.8	–	0.200	0.200	121
	AC	120 V 60 Hz	AA	–	6.9	0.078	0.058	840
		240 V 60	AB	–	6.4	0.039	0.028	3950

Solenoid Coils

DIN EN 43650 Industrial Form B	Molded coil with 18" Leads	1/2" Conduit coil with 30" Leads
		

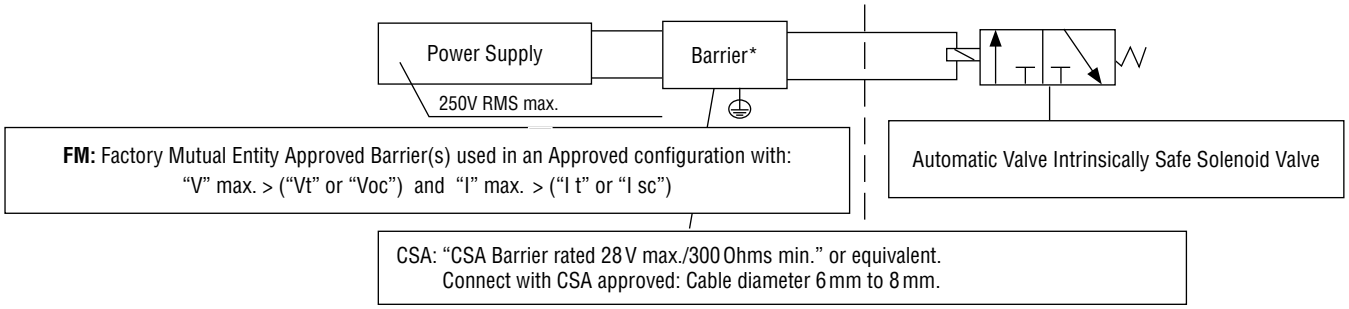
Illustration examples.

SOLENOID COILS

	Instructions	Voltage	Description	Coil Part Number	Weight lb (kg)
Intrinsically-Safe Coil	*Coil and Connector included with valve*	24 V DC	Strain Relief Ex ia CL. I; GR. A,B,C,D CL. II; GR.E,F,G CL. III; Div.1; T5	A7106-374-DB #	0.46 (0.21)
		# Must be Used with an Intrinsically-Safe Barrier, see information below.			

Intrinsic Safety is a type of protection based on the restriction of electrical energy within an apparatus and of interconnecting wiring exposed to the potentially explosive atmosphere to a level below that which can cause ignition by either sparking or heating effects.

Basic Circuit and Application



Coil Electrical Data	Current Flow	Voltage +/- 10%	Power	Current Amps		Resistance OHMS @ 25°C
			DC = Watts	Inrush	Holding	
	DC	24 V	1.6	0.05	0.05	275

Solenoid Coil

DIN EN 43650 Industrial Form B

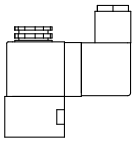


Illustration examples.

SOLENOID COILS

	Certification	Equipment Ratings	Description	Model Number	Weight lb (kg)
Explosion-Proof Coils	CSA / FM	Explosion-proof – CL I, Div. 1, Gr. A, B, D & D, T4, Ta = 60°C Encapsulation/Explosion-proof CL I, Zone 1, Zone 1, AEx m II T4, Ta = 60°C Dust-Ignition-proof – CL II, III, Div. 1, Gr. E, F & G, T4, Ta = 60°C Non-incendive – CL I, Div. 2, Gr. A, B, C, D, T4, Ta = 60°C Suitable for CL II, III, Div. 2, Gr. E, F, G, T4, Ta = 60°C hazardous (classified) locations	1/2" Conduit with 24" Leads	7019-9**Y	0.44 (0.20)
	ATEX	PTB 04 Ex IE CEx 04.0002X PTB 03 ATEX2018X Up to Temperature Class T5	Strain Relief with 10 feet (3 meter) Cord	7152-9**Y	0.78 (0.36)
	**** Insert voltage code from below, e.g., 7019-9DBY, 7152-9DBY.**				

Coil Certification	Current Flow	Voltage +/- 10%	** Voltage Code	Power		Current Amps		Resistance OHMS @ 25°C
				DC = Watts	AC = VA	Inrush	Holding	
CSA / FM	DC	12 V	**DA**	4.5	–	375	375	32
		24 V	**DB**	4.5	–	187	187	128
	AC	120 V 60 Hz	**AA**	–	11.5	0.096	0.054	530
		240 V 60 Hz	**AB**	–	11.5	0.048	0.027	2345
ATEX	DC	12 V	**DA**	3.5	–	0.267	0.267	45
		24 V	**DB**	3.5	–	0.136	0.136	177
	AC	120 V 60 Hz	**AA**	–	3.4	0.039	0.028	1664
		240 V 60 Hz	**AB**	–	3.3	0.019	0.013	6730

Solenoid Coil

CSA / FM Certified

ATEX Certified

Illustration examples.

EXHAUST SILENCERS

Silencers	Material	Port Size	Port Thread	Model Number	Flow C_v (Nl/min)	Dimensions Inches (mm)		Weight lb (kg)	Pressure Range psig (bar)
						Length	Hex Size		
	Aluminum	1/4	NPT - Male	84C-2	2.3 (2060)	1.69 (42.9)	0.56 (14.3)	0.04 (0.02)	0-300 (0-20) maximum
	Sintered Bronze	1/4	NPT - Male	84D-2	0.7 (600)	1.31 (33.3)	0.56 (14.3)	0.03 (0.01)	

EXHAUST RESTRICTOR SILENCER

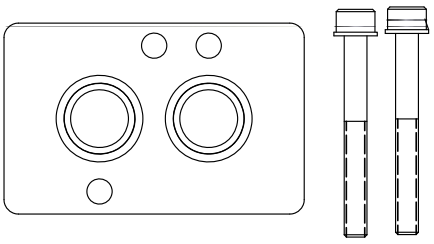
Speed Control Silencers	Material	Port Size	Port Thread	Model Number	Flow C_v (Nl/min)	Dimensions Inches (mm)		Weight lb (kg)	Pressure Range psig (bar)
						Length	Hex Size		
	Sintered Bronze	1/4	NPT - Male	266B-2	0.7 (600)	1.69 (42.9)	0.56 (14.3)	0.07 (0.32)	0-300 (0-20) maximum

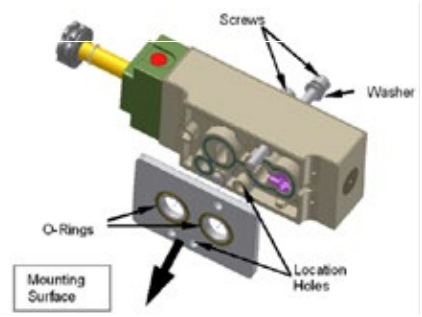
Aluminum Silencer	Sintered Bronze Silencer	Sintered Bronze Restrictor
		

Illustration examples.

TRANSITION PLATE (Option P)

Model Number	
A8021-339	**Option P** – When ordering the plate with a valve. The Transition Plate is designed for use in situations where the sealing face of the solenoid valve extends beyond the mounting surface. The minimum required mounting area measures 6,4 cm x 3,5 cm (2 1/2" x 1 3/8")

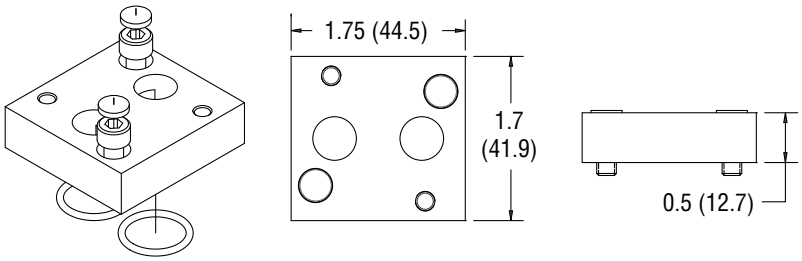




90° MOUNTING PLATE

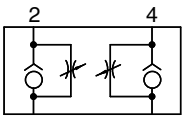
Model Number	
A8022-438	• Allows horizontal installation of the directional control valve • Orientates the valve 90° to the actuator

Dimensions: Inches (mm)



SPEED CONTROL VALVE

Model Number	
A7106-554	• Mounts between the Directional Control Valve and the Actuator • Mounts on the NAMUR pad • Functions as a flow control for both cylinder ports • Is easily adjustable, turn the needles clockwise to decrease speed and counterclockwise to increase speed

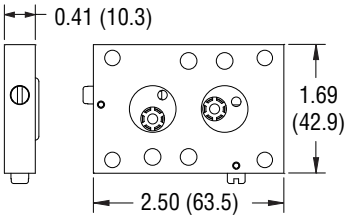


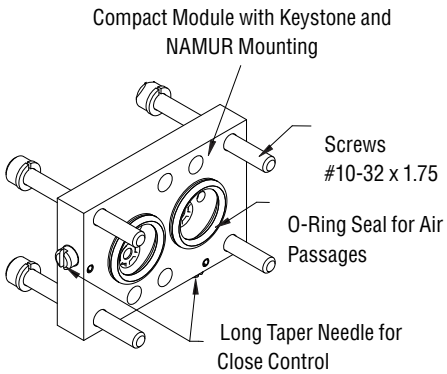
Operating Pressure:
35 to 150 psig (2 to 10 bar)

Operating Temperature:
0°F to +125°F (-18°C to +52°C)

Approximate Weight:
0.16 lb (0.07 kg)

Dimensions: Inches (mm)



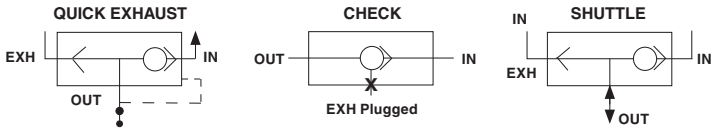


QUICK EXHAUST, CHECK AND SHUTTLE VALVE

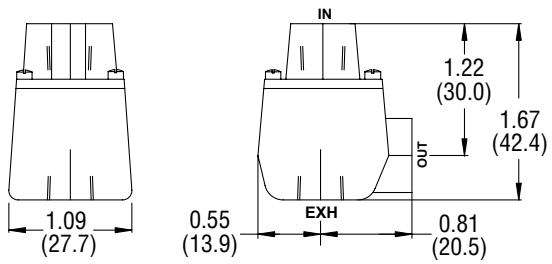
Series	Port Size		Port Thread	Model Number	Flow C_V (Nl/min)	Pressure bar (psig)		Weight lb (kg)
	Inlet, Outlet	Exhaust				Min.	Max.	
MQ2	1/4	1/4	NPTF	370A-22	0.97 (890)	0.3 (4)	10.7 (150)	0.16 (0.07)

Rugged internal construction outlasts and out performs the competition.

Quick Exhaust – When IN is pressurized, flow is from IN to OUT with EXH blocked. When OUT is pressurized, flow is from OUT to EXH with IN blocked.
Check Valve – Free flow from IN to OUT with EXH plugged. No flow from OUT to IN with EXH plugged.
Shuttle Valve – When IN is pressurized, flow is from IN to OUT with EXH blocked. When EXH is pressurized, flow is from EXH to OUT with IN blocked.



Dimensions: Inches (mm)



Downloadable CAD models available.

INTERPOSED LOCKOUT AND VENT VALVE

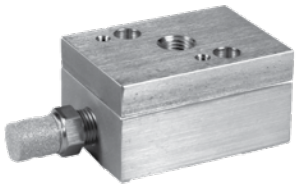
Description	Model Number	Dimensions Inches (mm)				
		Length (min)	Length (max)	Width	Height	
Mounts between the solenoid valve and actuator to prevent unintended air flow during maintenance.	D20-106	124.7 (4.91)	133.5 (5.26)	44.5 (1.75)	24.9 (0.98)	

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

INTERPOSED LOCKOUT AND VENT VALVE

Description	Model Number	Dimensions mm (inches)			
		Length	Width	Height	
Provides 1/4 NPT connections for mounting of remote control valves and accessories.	D20-114	70.0 (2.76)	50.0 (1.97)	19.1 (0.75)	

NAMUR QUICK EXHAUST

Description	Construction Material	Model Number	Dimensions mm (inches)			
			Length	Width	Height	
Mounts between the control valve and actuator to improve closing speed and prevents corrosive atmospheres from being pulled into the spring chamber.	Aluminum	D20-111	95.4 (3.76)	50.0 (1.97)	46.2 (1.82)	
	Stainless Steel	D20-111S				

DUAL FLOW CONTROL

Description	Model Number	Dimensions mm (inches)			
		Length	Width	Height	
Controls the speed of double acting actuator.	D20-112	70.0 (2.76)	50.0 (1.97)	19.1 (0.75)	

DUAL FUNCTION FLOW CONTROL

Description	Model Number	Dimensions mm (inches)			
		Length	Width	Height	
Independently controls opening and closing speeds of spring return actuators.	D20-113	2.76 (70.0)	1.97 (50.0)	0.98 (24.9)	

Integrated Filter/Regulators
Product Overview

The integration of a general purpose filter and a pressure regulator into a single module provides the compactness needed where space is limited. The regulator is the top portion of the assembly and the filter is the bottom portion. All sizes have essentially the same operating characteristics as their corresponding individual filters and regulators.

Integrated filter/regulators are of modular design. Units can be connected to lubricators by special modular connectors which seal the faces between units. They may also be inline mounted with pipe nipples. MINIATURE filter/regulators are designed for inline mounting only.

MINIATURE Series	MD3™ Series		MD4™ Series	
				

Illustration examples.

INTEGRATED FILTER/REGULATOR FEATURES	
Compact Design	Filter and regulator consolidated in a single assembly
Construction Design	MINIATURE Series – Filter – Fiber, Regulator – Diaphragm/Poppet MD3™ Series – Filter – Sintered, Regulator – Diaphragm MD4™ Series – Filter – Fiber, Regulator – Piston
Mounting	MINIATURE Series integrated filter/regulators are designed for inline mounting only MD3™ & MD4™ Series integrated filter/regulators are designed for inline or modular mounting
Pressure Ranges Options	Include regulating springs for various pressure ranges
Filter Elements Options	Sintered bronze filter elements available in several micron ratings

Custom options available, consult AVI.

STANDARD SPECIFICATIONS					
GENERAL	Construction Design	Miniature Series	Filter – Fiber, Regulator – Diaphragm/Poppet		
		MD3™ Series	Filter – Sintered, Regulator – Diaphragm		
		MD4™ Series	Filter – Fiber, Regulator – Piston		
	Panel Mounting	Miniature Series	1-3/16 inch (30 mm) hole required		
		MD3™ Series	2-1/16 inch (52 mm) hole required		
		MD4™ Series			
	Filter Drain	Miniature Series	Manual drain		
		MD3™ Series	Float drain or manual drain		
		MD4™ Series	Automatic or manual		
	Filter Element		Miniature Series	5-micron rated polyethylene	
			MD3™ Series	5-micron rated polyethylene	
				5-, 20-, 40-micron rated sintered bronze	
			MD4™ Series	5-micron rated polyethylene	
				40-micron rated sintered bronze	
OPERATING CONDITIONS	Temperature	Polycarbonate Bowl	Ambient	40° to 125°F (4° to 52°C)	40° to 125°F (4° to 52°C)
			Media		
		Metal Bowl	Ambient	40° to 150°F (4° to 66°C)	40° to 150°F (4° to 66°C)
			Media		
	Fluid Media	Compressed air			
	Operating Pressure	Miniature Series		Polycarbonate Bowl	0 to 150 psig (0 to 10 bar)
				Metal Bowl	0 to 200 psig (0 to 14 bar)
		MD3™ Series	Automatic Drain Models	Polycarbonate Bowl	30 to 150 psig (2 to 10 bar)
				Metal Bowl	30 to 200 psig (2 to 14 bar)
			Manual Drain Models	Polycarbonate Bowl	0 to 150 psig (0 to 10 bar)
				Metal Bowl	0 to 250 psig (0 to 17 bar)
		MD4™ Series	Automatic Drain Models	Polycarbonate Bowl	Up to 150 psig (up to 10 bar)
				Metal Bowl	Up to 200 psig (up to 14 bar)
			Manual Drain Models	Polycarbonate Bowl	0 to 150 psig (0 to 10 bar)
				Metal Bowl	0 to 200 psig (0 to 14 bar)
	Outlet Pressure	Miniature Series	Adjustable up to 100 psig (7 bar).		
		MD3™ Series	Adjustable up to 200 psig (14 bar)		
		MD4™ Series	Adjustable up to 125 psig (9 bar).		
	Pressure Adjustment	MD3™ Series	Locking Key: Removable		
		MD4™ Series			
	Pressure Gauge	Miniature Series	0 to 160 psig (0 to 11 bar); 1/8 NPT gauge ports front and rear		
		MD3™ Series	0 to 200 psig (0 to14 bar) or 0 to 60 psig (0 to 4 bar); 1/4-NPT gauge ports front and rear		
		MD4™ Series	0 to 200 psig (0 to 14 bar); 1/4 NPT gauge ports front and rear		
CONSTRUCTION MATERIAL	Body		Miniature Series	Aluminum	
			MD3™ Series	Zinc	
			MD4™ Series		
	Dome		Miniature Series	Acetal	
			MD3™ Series	Nylon	
			MD4™ Series		
	Knob		All Series	Acetal	
	Seals		All Series	Nitrile	
	Valve		MD3™ Series	Brass	
			MD4™ Series		

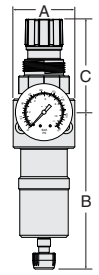
Port Size: 1/4 – Flow to 25 scfm

Port Size	Manual Drain			
	Polycarbonate Bowl		Metal Bowl	
	Model Number		Model Number	
	NPTF Thread	G Thread	NPTF Thread	G Thread
1/4	5X00B2106A	C5X00B2106A	5X00B2105A	C5X00B2105A

Pressure Gauge not included, refer to accessories page.

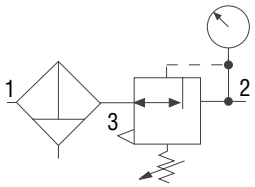
Port Size	Bowl Type	Bowl Capacity	Dimensions inches (mm)				Weight † lb (kg)
			A	B	C	Depth †	
1/4	Polycarbonate	2-oz (60-ml)	1.8 (45)	4.5 (115)	2.6 (66)	1.8 (45)	0.65 (0.30)
	Aluminum	2-oz (60-ml)	1.8 (45)	4.5 (115)	2.6 (66)	1.8 (45)	0.65 (0.30)

† Less gauge.

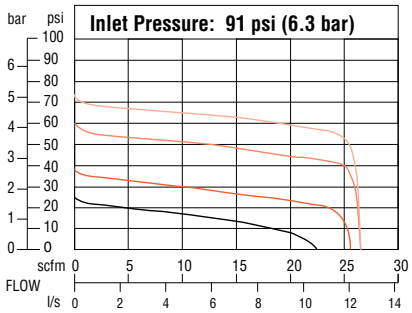


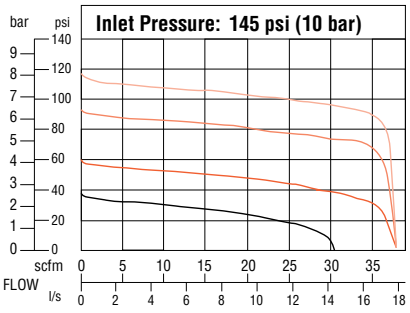
ISO Symbol Filter/Regulator

Manual Drain
Self-Reliving



Flow Charts





Port Sizes: 1/4, 3/8 & 1/2 – Flow to 110 scfm

MODEL NUMBER CONFIGURATOR — MD3™ Series

MD3	53P	B	M	C	2	A	A	1

Series

Bowl		
Size	**Material**	
5.1-oz (151-ml)	Polycarbonate	53P
6-oz (177-ml)	Metal	53M

Filter Element		
Material	**Size**	
Polyethylene	5-µm	B
Sintered Bronze	5-µm	E
	20-µm	F
	40-µm	A

Bowl Drain	
Manual Drain	M
Float Drain	F
Less Drain Fitting (1/4 NPT female instead)	L

Port Thread	Pipe Size	
NPTF	1/4	2
	3/8	3
	1/2	4
G	1/4	B
	3/8	C
	1/2	D

Flow Direction	Adjustment Range psig (bar)	
Standard	0-200 (0-14)*	A
	0-150 (0-10)	B
	0-100 (0-6.9)	C
	0-50 (0-3.4)	D
Reverse Flow	0-200 (0-14)*	F
	0-150 (0-10.3)	G
	0-100 (0-6.9)	H
	0-50 (0-3.4)	J

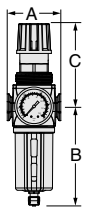
* Must be ordered with metal bowl.

Lockout Valve		
Type	**Location**	
Modular L-O-X®	On outlet side	1
	On the inlet side (must also choose Reverse Flow)	2
Modular L-O-X® with EEZ-ON®	On outlet side	3
	On the inlet side (must also choose Reverse Flow)	4
No Lockout Valve - Leave Blank		

Gauge *	Panel Mount Nut	Pressure Range psig (bar)	
None	None	–	A
Gauge	None	0-200 (0-14)	B
	None	0-60 (0-4)	C
None	Included	–	D
Gauge	Included	0-200 (0-13)	E
		0-60 (0-4)	F

* 1/4 NPT gauge ports front and rear.

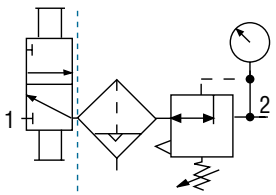
Bowl Type	Dimensions inches (mm)				Weight † lb (kg)
	A	B *	C	Depth †	
Polycarbonate	3.0 (76.2)	5.54 (140.6)	4.68 (119)	2.51 (63.8)	1.98 (0.90)
Aluminum	3.0 (76.2)	6.42 (163.1)	4.68 (119)	2.76 (70.1)	2.17 (0.99)



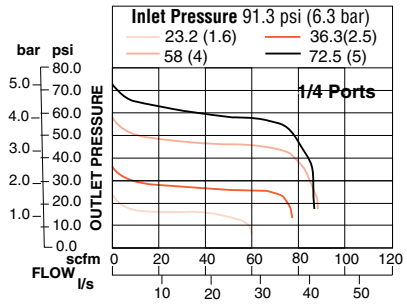
† Lockout: With the lockout valve, add 2.3 (58) to dimension A
* Bowl removal clearance, add 3.1 (79); Dimensions reflect less gauge.

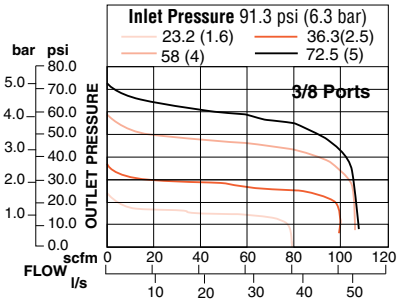
ISO Symbol Filter/Regulator with Lockout

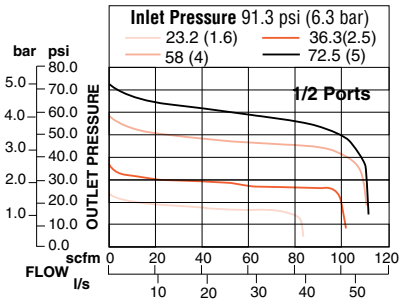
Automatic Drain
Self-Reliving



Flow Charts







Port Sizes: 3/8, 1/2 & 3/4 – Flow to 230 scfm

MODEL NUMBER CONFIGURATOR

MD3™ Series

MD4	53P	B	A	B	3	A	A	1
Series								

Bowl		
Size	Material	
9-oz (266-ml)	Polycarbonate	53P
	Metal	53M

Filter Element		
Material	Size	
Sintered Bronze	40-µm	A
Polyethylene	5-µm	B

Bowl Drain	
Auto Drain	A
Manual Drain	M

Port Thread	Pipe Size	
NPTF	3/8	3
	1/2	4
	3/4	5
G	3/8	C
	1/2	D
	3/4	E

Lockout Valve		
Type	Location	
Modular L-O-X®	On outlet side	1
	On the inlet side (must also choose Reverse Flow)	2
Modular L-O-X® with EEZ-ON®	On outlet side	3
	On the inlet side (must also choose Reverse Flow)	4
No Lockout Valve - Leave Blank		

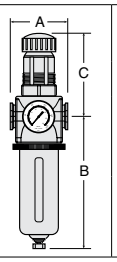
Gauge *	Panel Mount Nut	Pressure Range psig (bar)	
None	None	–	A
Gauge	None	0-200 (0-14)	B
	None	0-60 (0-4)	C
None	Included	–	D
Gauge	Included	0-200 (0-13)	E
		0-60 (0-4)	F

* 1/4 NPT gauge ports front and rear.

Flow Direction	Adjustment Range psig (bar)	
Standard	0-175 (0-12)*	A
	0-125 (0-8.6)	B
	0-50 (0-3.4)	C
	0-20 (0-1.4)	D
Reverse Flow	0-175 (0-12)*	F
	0-125 (0-8.6)	G
	0-50 (0-3.4)	H
	0-20 (0-1.4)	J

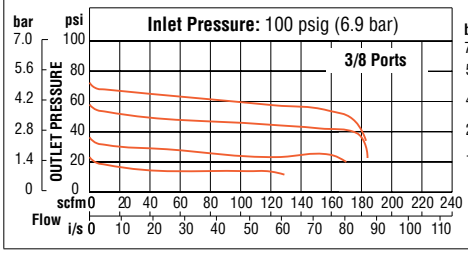
* Must be ordered with metal bowl.

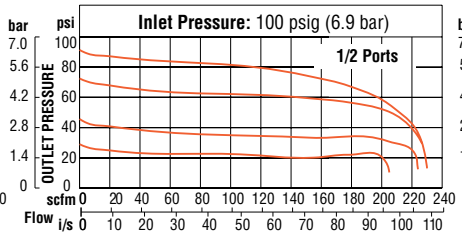
Bowl Type	Dimensions inches (mm)				Weight † lb (kg)
	A	B *	C	Depth †	
Polycarbonate	3.5 (88)	7.7 (195)	5.4 (137)	2.9 (73)	3.69 (1.68)
Aluminum	3.5 (88)	7.6 (193)	5.4 (137)	2.9 (73)	3.69 (1.68)

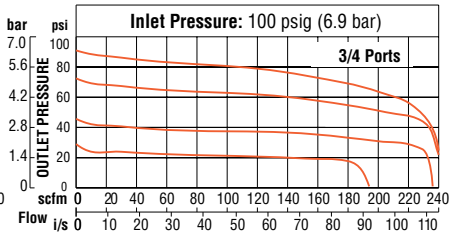


† **Lockout:** With the lockout valve, add 2.3 (58) to dimension A.
* Bowl removal clearance add 3.1 (79).
Dimensions reflect less gauge.

Flow Charts

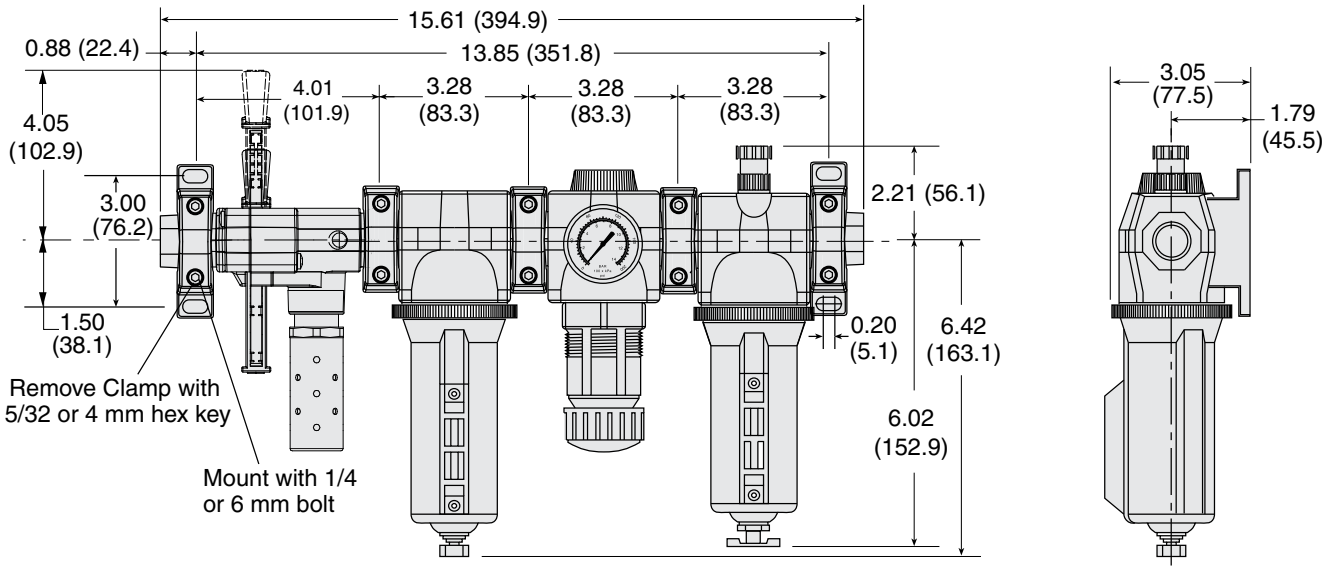




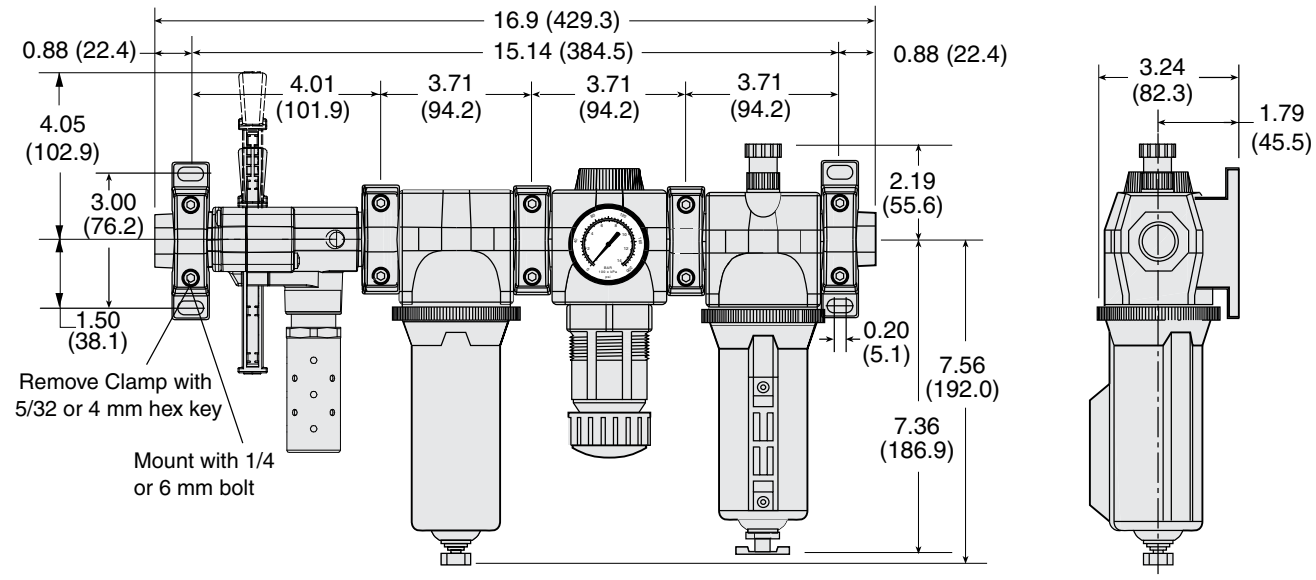


DIMENSIONS

MD3™ Series



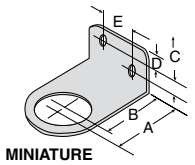
MD4™ Series



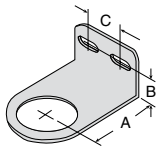
MOUNTING BRACKETS

Usage Models	Model Number			Dimensions inches (mm)					
	Kit	Bracket	Panel Nut	A	B	C	D	E	Panel Mounting Hole Diameter
MINIATURE	873K77	872K77	874K77	1.375 (35)	1.125 (29)	0.31 (8)	0.31 (8)	0.69 (17)	1.19 (30)
MD3™	R-A127-11	–	R-127-11	2.38 (60)	1.00 (25)	1.50 (38)	–	–	2.06 (52)
MD4™	879K77	878K77	880K77						

Integrated filter/regulators can be mounted to a surface with a bracket that attaches to the regulator. Brackets and mounting panel nuts can be ordered separately or in a kit which includes both bracket and mounting panel nut.



MINIATURE



MD3™ & MD4™

MODULAR CONNECTION

Mounting Brackets & Clamp for Module Connections

Options	Model Number
Bracket and Screw	R-A118-103
Module Connecting Clamp	R-A118-105
Bracket, Screw, and Clamp	R-A118-105M

Two brackets are normally used to mount an FRL to a vertical surface. The mounting bracket attaches to the module connecting clamp (see above) with a single screw. Each bracket then employs two bolts (1/4" or 6mm) to connect the assembly to the mounting surface. Specially designed clamps provide a quick and easy assembly or disassembly of MD3™ modules. Two Allen-Head bolts quickly tighten or loosen the clamp using a 5/32 or 4mm hex key. The clamp contains a plate carrying two O-rings to provide positive sealing between modules.

Port Block and End Ports

Options	Port Size	Model Number	
		NPTF Thread	G Thread
Extra Port Blocks *	1/4	R-118-106-2W	R-118-106-2
	3/8	R-118-106-3W	R-118-106-3
	1/2	R-118-106-4W	R-118-106-4
Female End Ports **	1/4	R-118-100-2	R-118-100-2W
	3/8	R-118-100-3	R-118-100-3W
	1/2	R-118-100-4	R-118-100-4W
	3/4	R-118-100-6	R-118-100-6W
Male End Ports **	1/4	R-118-109-2F	R-118-109-2FW
	3/8	R-118-109-3F	R-118-109-3FW
	1/2	R-118-109-4F	R-118-109-4FW
	3/4	R-118-109-6F	R-118-109-6FW

* An extra port block can be placed between modules to provide two auxiliary 1/4 NPTF ports. Its mounting position can be rotated to obtain the most convenient operating orientation. If only one auxiliary port is to be used, the unused port must be closed with a pipe plug. (The inlet and outlet are not threaded.)

** Either male or female end ports can be attached to threaded inlet and outlet lines. This allows all modules of an FRL assembly to be removed easily and quickly without having to unthread the end modules. The end ports are attached to the modules with clamps (see above). End ports can be included in an assembled FRL or ordered separately.

ANALOG PRESSURE GAUGES

Pressure Gauges (Center Back Mounting)

Type/Material	Port Size	Pressure Range psig (bar)	Model Number		Case Diameter inches (mm)
			NPT Thread	G Thread	
Standard Aluminum	1/8	0-160 (0-11)	5400A1002	D5400A1002	1.7 (43)
	1/4	0-60 (0-4)	5400A2010	D5400A2010	2.0 (51)
		0-200 (0-14)	5400A2011	D5400A2011	2.0 (51)
		0-300 (0-20)	5400A2012	D5400A2012	2.0 (51)

EXHAUST SILENCERS

Silencers

Material	Port Size	Thread Type	Model Number		Flow C_v (Nl/min)	Pressure Range psig (bar)
			NPT Thread	R/Rp Thread		
Aluminum	3/4	Male	5500A5013	D5500A5013	5.1 (5000)	0-290 (0-20) maximum
			5500A5003	D5500A5003	12 (12000)	

REPLACEMENT FILTER ELEMENTS

Filter Elements

Filter Series	Element Material	Model Number		
		Element Rating		
		5-µm	20-µm	40-µm
MINIATURE	Polyethylene	933K77	–	–
	Sintered Bronze	R-KA130-27E5	R-KA130-27E4	R-KA130-27E3
MD3™	Polyethylene	R-A60F-03PE5	–	–
	Sintered Bronze	R-A60F-03E5	R-A60F-03E4	R-A60F-03E3
MD4™	Polyethylene	R-A115-106PE5	–	–
	Sintered Bronze	R-A115-106E5	R-A115-106E4	R-A115-106PE3

Energy Isolation for Lockout/Tagout (LOTO)

The Lockout L-O-X® valve is used to block the supply and remove the downstream pressure from the circuit or machine and allow the employee to lockout the pneumatic energy for safe machine access.

Classic	Stainless Steel
	

AVI manual L-O-X® (lockout & exhaust) valves are energy isolation valves and are generally used as the first valve in a line supplying compressed air to equipment.

OSHA and ISO 14118 compliance requires that the valve be padlocked in the closed position to prevent handle from being pulled out inadvertently during maintenance and/or servicing.

VALVE FEATURES	
Unique Appearance	Easily identifiable with a yellow body and a red handle to control ON/OFF positions (non-Stainless Steel)
Quick Energy Dump	Full size exhaust ports (equal to or larger than supply) provide rapid exhaust of downstream air and are threaded for silencers or remote exhaust lines
Locking Protection	Design only allows the valve to be lockable in the OFF (closed) position
PTFE Seals	Fluorocarbon slipper seals for easy shifting, even after long periods of inactivity
Visible Pressure Indication Option	Includes integrated sensing port for pressure verification with either a visual pop-up indicator or electrical pressure switch
Mounting	Inline or Surface

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD SPECIFICATIONS				
GENERAL	Function			3/2 Valve
	Construction Design			Spool
	Actuation			Manual
	Mounting	Type		Inline or Surface
		Orientation		Any, preferably vertical; easy access to the handle
	Connection	Threaded Ports		NPT
				G
	Minimum Operation Frequency			Once per month, to ensure proper function
OPERATING CONDITIONS	Temperature	Classic	Ambient	40° to 175°F (4° to 80°C)
			Media	
		Stainless Steel	Ambient	30° to 175°F (-1° to 80°C)
			Media	
	Flow Media			Filtered air
	Operating Pressure			0 to 300 psig (0 to 20.7 bar)
LOCK HOLE MEASURES	Classic	Diameter		0.27 inch (7.0 mm)
		Length of Hole		0.43 inch (10.9 mm)
	Stainless Steel	Diameter	All Sizes	0.34 inch (8.64 mm)
		Length of Hole	Port Size 1/4	0.44 inch (11.17 mm)
			Port Size 1/2	0.47 inch (11.93 mm)
			Port Size 1 and 2	0.55 inch (13.97 mm)
CONSTRUCTION MATERIAL	Valve Body	Classic		Cast Aluminum
		Stainless Steel		316 Stainless Steel
	Spool			Stainless Steel
	Seals			Fluorocarbon

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

If a system requires gradual buildup of downstream pressure, see manual L-O-X® valves with EEZ-ON® operation.

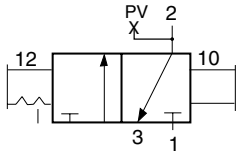
PRODUCT CREDENTIALS		
Safety Category	**EAC Declaration of Conformity**	**Canadian Registration Number (CRN)**
Cat. 1 PL b	EAC	Available for appropriately tested valves

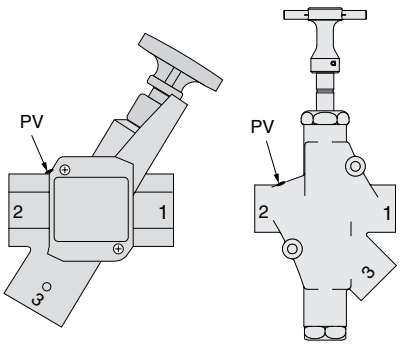
Ordering Information

MANUAL LOCKOUT L-O-X® VALVES					3-Way 2-Position Valves
Valve Style	**Port Size**		**Body Size**	**Valve Model Number**	
	In-Out	**Exhaust**		**NPT Thread**	**G Thread**
Classic	3/8	3/4	1/2	N0604HALM	N0604HALM-W
	1/2	3/4	1/2	N0605HALM	N0605HALM-W
	3/4	3/4	1/2	N0606HALM	N0606HALM-W
		1-1/4	1	N1606HALM	N1606HALM-W
	1	1-1/4	1	N1607HALM	N1607HALM-W
	1-1/4	1-1/4	1	N1608HALM	N1608HALM-W
Stainless Steel	1/4	1/4	1/4	B7149-088	B7149-088-W
	3/8	1/2	1/2	B7149-089	B7149-089-W
	1/2	1/2	1/2	B7149-050	B7149-050-W
	3/4	1	1	B6953-084	B6953-084-W
	1	1	1	B6953-085	B6953-085-W
	1-1/2	2	2	B6953-086	B6953-086-W
	2	2	2	B6953-087	B6953-087-W

Valve Style	**Port Size**		**Body Size**	**Flow** C_v (Nl/min)		**Weight** lb (kg)
	1, 2	**3**		**1-2**	**2-3**	
Classic	3/8	3/4	1/2	4.7 (4600)	3.6 (3500)	2.0 (0.9)
	1/2	3/4	1/2	7.1 (7000)	4.0 (3900)	
	3/4	3/4	1/2	8.3 (8200)	4.1 (4000)	
		1-1/4	1	13 (13000)	9.0 (8900)	3.0 (1.4)
	1	1-1/4	1	17 (17000)	9.5 (9300)	
	1-1/4	1-1/4	1	19 (19000)	9.7 (9600)	
Stainless Steel	1/4	1/4	1/4	2.1 (2100)	2.1 (2100)	3.8 (1.7)
	3/8	1/2	1/2	5.8 (5700)	6.2 (6100)	6.0 (2.7)
	1/2	1/2	1/2	5.8 (5700)	6.2 (6100)	
	3/4	1	1	14 (14000)	17 (17000)	13.0 (5.9)
	1	1	1	14 (14000)	17 (17000)	
	1-1/2	2	2	39 (38000)	45 (44000)	35.0 (15.9)
	2	2	2	39 (38000)	45 (44000)	

Valve Schematic



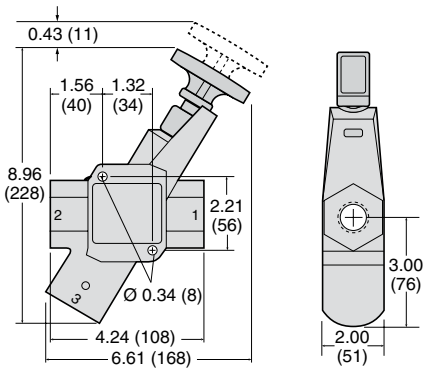


PV = 1/8” Pressure Verification Port
Port 1 (Inlet)
Port 2 (Outlet)
Port 3 (Exhaust)

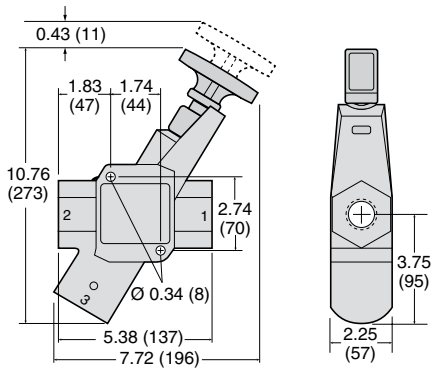
DIMENSIONS — Inches (mm)

Classic

Body Size 1/2

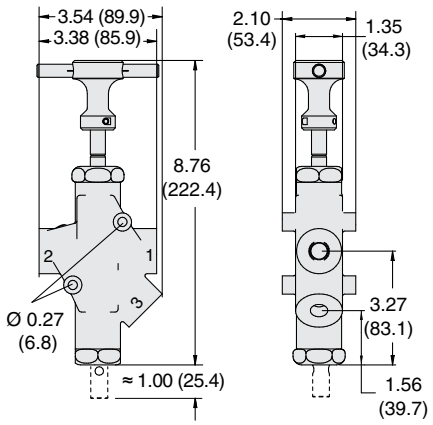


Body Size 1

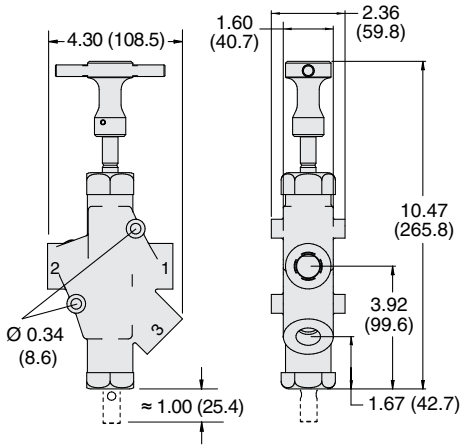


Stainless Steel

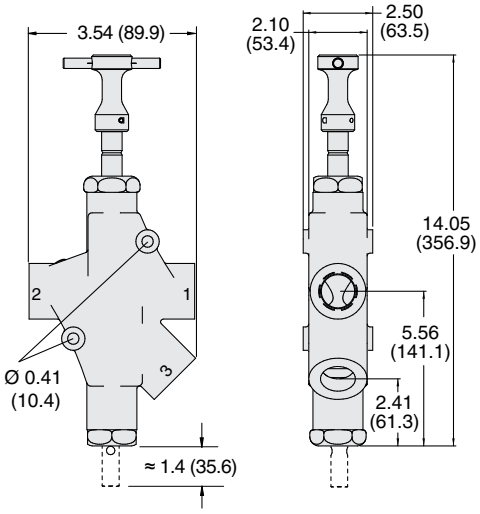
Body Size 1/4



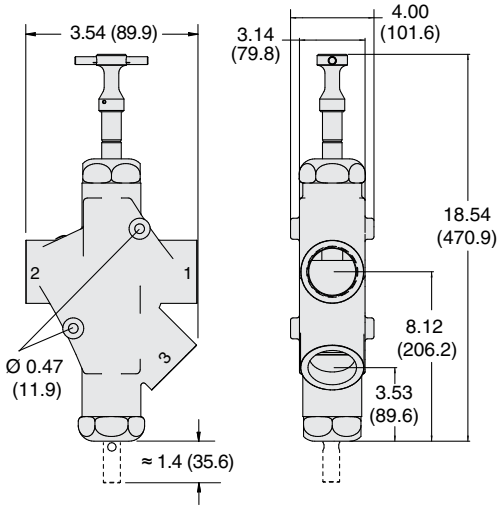
Body Size 1/2



Body Size 1



Body Size 2



Downloadable CAD models available.

ENERGY RELEASE VERIFICATION

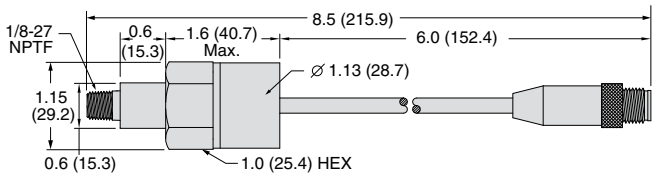
Visual Pressure Indicator		Pressure Switch	
Visual Pop-up Pin	Visual Pop-up	DIN EN 175301-803 Form A	M12
			

Illustration examples.

	Verification Type	Valve Type	Indicator Type	Model Number	Port Thread
Visual Pressure Indicator	Pneumatic	Lockout L-O-X®	Visual Pop-up Pin	988A30	1/8 NPT
		Stainless Steel L-O-X®	Visual Pop-up	1155H30	

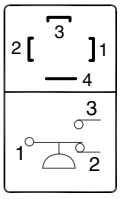
	Verification Type	Valve Type	Connector Type	Model Number	Factory Preset psi (bar)	Port Thread
Pressure Switches	Electrical	Lockout L-O-X®	DIN EN 175301-803 Form A	586A86	5 (0.3) falling	1/8 NPT
		Stainless Steel L-O-X®	M12	1162A30		

M12 Pressure Switch Dimensions– Inches (mm)



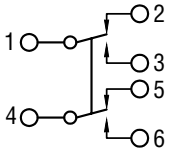
Pinout

DIN EN 175301-803 Form A

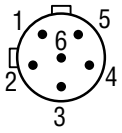


1 - Common
2 - Normally Closed
3 - Normally Open
4 - Ground (Not Used)

M12



1 - Circuit 1, Red/White
2 - All Red
3 - Green
4 - Circuit 2, Red/Yellow
5 - Red/Black
6 - Red Blue

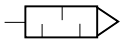


1 - Common
2 - Normally Closed
3 - Normally Open
4 - Common
5 - Normally Closed
6 - Normally Open

EXHAUST SILENCERS

Aluminum	Stainless Steel	316 Stainless Steel Sintered Element
		

Illustration examples.

Silencers	Silencer Material	Pressure Range psig (bar)	Schematic
	Aluminum	0-290 (0-20) maximum	
	Stainless Steel	0-175 (0-12.3) maximum	
	316 Stainless Steel Sintered Element	0-125 (0-8.6)	

Silencer Material	Port Size	Thread Type	Flow C_v (Nl/min)	Model Number		Dimensions inches (mm)		Weight lb (kg)
				NPT Thread	R/Rp Thread	Length	Hex Size (D)	
Aluminum	3/4	Male	7.2 (7100)	5500A5013	D5500A5013	3.6 (9)	1.25 (32)	0.2 (0.1)
			15 (15000)	5500A5003	D5500A5003	5.3 (14)	2.0 (51)	0.9 (0.4)
	1-1/4	Male	24 (23000)	5500A7013	D5500A7013	5.5 (14)	2.0 (51)	0.9 (0.4)
		Female	42 (41000)	5500A7001	D5500A7001	5.7 (14)	2.5 (64)	1.4 (0.6)
	1-1/2	Female	39 (38000)	5500A8001	D5500A8001	5.7 (14)	2.5 (64)	1.3 (0.6)
Stainless Steel	1/4	Male	1.4 (1400)	5500B2004	D5500B2004	1.8 (45)	0.56 (14)	0.05 (0.2)
	1/2	Male	3.0 (3000)	5500B4004	D5500B4004	2.8 (70)	0.87 (22)	0.3 (0.1)
	1	Male	10 (9800)	5500B6004	D5500B6004	3.9 (98)	1.31 (33)	0.5 (0.2)
	2	Male	28 (28000)	5500A9004	D5500A9004	5.5 (140)	2.37 (60)	1.5 (0.7)
316 Stainless Steel Sintered Element	1/4	Male	2.3 (2300)	5500A2005	D5500A2005	2.2 (6)	0.81 (21)	0.07 (0.03)
	1/2	Male	6.8 (6700)	5500A4005	D5500A4005	3.6 (9)	1.25 (32)	0.2 (0.1)
	1	Male	18 (18000)	5500A6005	D5500A6005	5.4 (14)	2.0 (51)	0.9 (0.4)

FEMALE SILENCER CONNECTORS

Hex Nipples	Material	Fitting Pipe Size	Thread Type	Model Number		
				NPT Thread	BSPT Thread	
	Steel	1-1/4	Male - Male	491J27	106J39	

LOCKOUT DEVICE

Lockout Hasp	Valve Model Use	Model Number	
	Lockout L-O-X® Classic Style	356A30	

Compatible Lubricants

Although air line lubrication is not required for most ROSS valves, other mechanisms in the system may need such lubrication. When a lubricator is used, it should be supplied only with oils which are compatible with the materials used in the valves for seals and poppets. Generally speaking, these are petroleum base oils with oxidation inhibitors, and aniline point between 180°F (82°C) and 220°F (104°C) and an ISO 32, or lighter, viscosity. Oils with phosphate type additives, such as zinc dithiophosphate, must be avoided because they can harm polyurethane valve components. The best oils to use in pneumatic systems are those specifically compounded for air line lubricator service.

Cautions on the Use of Polycarbonate Bowls

Use Only with Compressed Air. Filters and lubricators with polycarbonate bowls are specifically designed for compressed air service, and their use with any other fluid (liquid or gas) is a misapplication. The use with or injection of certain hazardous fluids in the system (e.g., alcohol or liquefied petroleum gas) could be harmful to the polycarbonate bowl or result in a combustible condition or hazardous leakage. Before using with a fluid other than air, or for nonindustrial applications, or for life support systems, consult ROSS.

Use Metal Bowl Guard When Supplied. A metal bowl guard is supplied with all but the smallest bowls, and must always be used to minimize danger from fragmentation in the event of failure of a polycarbonate bowl.

Avoid Harmful Substances. Some compressor oils, chemical cleaners, solvents, paints, and fumes will attack polycarbonate bowls and can cause bowl failure. Do not use with or near these materials. When a bowl becomes dirty, replace the bowl or wipe it with a clean dry cloth. Immediately replace any polycarbonate bowl which is crazed, cracked, or deteriorated.

Substances HARMFUL to Polycarbonate Bowls

Acetaldehyde
Acetic acid
Acetone
Acrylonitrile
Ammonia
Ammonium fluoride
Ammonium hydroxide
Ammonium sulfide
Anaerobic adhesives & sealants
Antifreeze
Benzene
Benzoic acid
Benzyl alcohol
Brake fluids
Bromobenzene
Butyric acid
Carbolic acid
Carbon disulfide
Carbon tetrachloride
Caustic potash solution
Caustic soda solution
Chlorobenzene
Chloroform
Cresol
Cyclohexanol
Cyclohexanone
Cyclohexene
Dimethyl formamide
Dioxane
Ethane tetrachloride
Ethyl acetate
Ethyl ether
Ethylamine
Ethylene chlorohydrin
Ethylene dichloride
Ethylene glycol
Formic acid
Freon (refrigerant & propellant)
Gasoline (high aromatic)
Hydrazine
Hydrochloric acid
Lacquer thinner
Methyl alcohol
Methylene chloride
Methylene salicylate
Milk of lime (CaOH)
Nitric acid
Nitrobenzene
Nitrocellulose lacquer
Phenol
Phosphorous hydroxyl chloride
Phosphorous trichloride
Propionic acid
Pyridine
Sodium hydroxide
Sodium sulfide
Styrene
Sulfuric acid
Sulfural chloride
Tetrahydronaphthalene
Thiophene
Toluene
Turpentine
Xylene
Perchlorethylene

Trade Names of Substances HARMFUL to Polycarbonate Bowls

Atlas Perma-Guard
Buna-N
Cellulube #150 & #220
Crylex #5 Cement
Eastman 910
Garlock 98403 (polyurethane)
Haskel 568-023
Hilgard Company's Hil Phene
Houghton & Co. Oil 1120, 1130, 1055
Houtosafe 1000
Kano Kroil
Keystone Penetrating Oil #2
Loctite 271, 290, 601
Loctite Teflon Sealant
Marvel Mystery Oil
Minn. Rubber 366Y
National Compound N11 Nylock VC-3
Parco 1306 Neoprene
Permabond 910
Petron PD287
Prestone
Pydraul AC
Sears Regular Motor Oil
Sinclair oil "Lily White"
Stauffer Chemical FYRQUEL 150
Stillman SR 269-75 (polyurethane)
Stillman SR 513-70 (neoprene)
Tannergas
Telar
Tenneco Anderol 495 & 500 Oils
Titon
Vibra-tite
Zerex

ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, and AUTOMATIC VALVE INDUSTRIAL, collectively the "ROSS Group".

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 Group 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 Group 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 Group location.

4. Each ROSS Group Product should be used within its specification limits. In addition, use only ROSS Group components to repair ROSS Group 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 Group recommends a filter with a 5-micron rating for normal applications.

2. All standard ROSS Group 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 Group are warranted for a one-year period [with the exception of Filters, Regulators and Lubricators ("FRLs") 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 Group's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Group 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 Group freight prepaid.

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