



## Section 7

## Intrinsically Safe Valves

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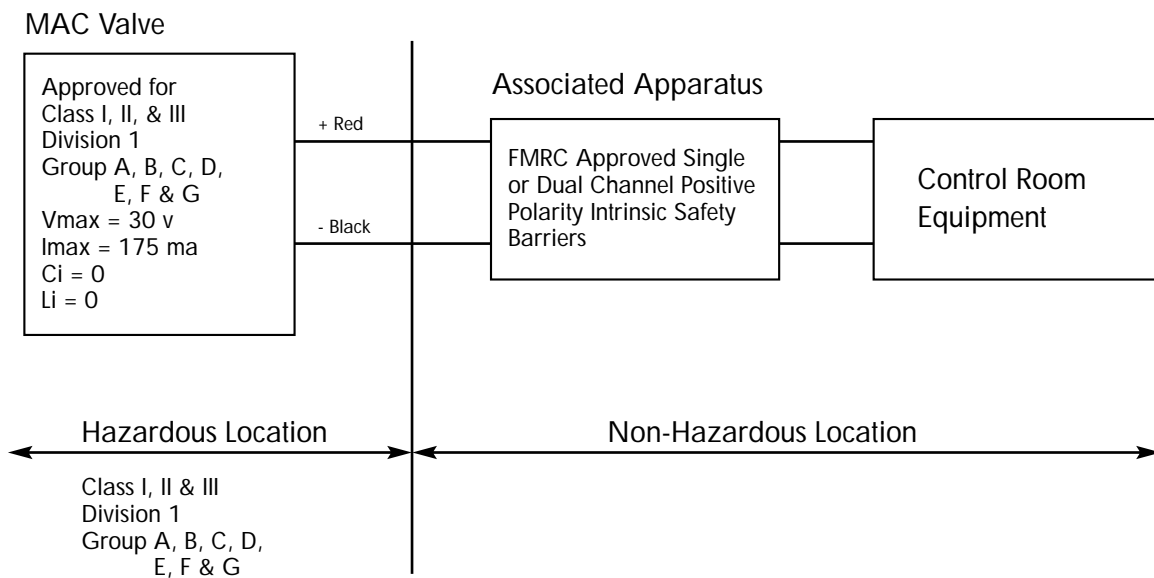
## Specifications for Intrinsically Safe Valves

	35 series
	45 series
	100 series
	56 series
	57 series
	58 series
	800 series
	900 series
	82 series
	6300 series
	6500 series
	6600 series
	ISO 1, 2 & 3
	MAC 125 & MAC 250
	*Dimensional information (35, 57, & 58 series)

\*Dimensional information differs from "Standard Valve" dimensions.

## INTRINSICALLY SAFE CIRCUIT

In order to use an intrinsically safe valve in a hazardous location, the installation must be in accordance with the following installation diagram :



There are 3 basic parts to an intrinsically safe circuit :

### 1. FIELD DEVICE

This is defined as the device that will be used in the hazardous location. In this case, the field device will be the intrinsically safe valve.

### 2. ASSOCIATED APPARATUS

This will be an energy limiting device also known as a barrier.

### 3. FIELD WIRING

Wiring used to connect the two above devices.

When the MAC intrinsically safe valves were tested for approval, they were tested and approved for the following atmospheres.

Class I, II, III  
Division 1  
Groups ; A, B, C, D, E, F, G

under the following parameters :

Vmax : 30 VDC  
Imax : 175 ma  
Ci : 0  
Li : 0



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What this means is that the intrinsically safe valves were tested against each atmosphere with up to 30 VDC and 175 ma of current across the solenoid and found to still be safe. The other two parameters are values to indicate how much energy can be stored or created by the valve :

Ci : Internal capacitance of the solenoid.

This indicates how much energy the solenoid is capable of storing.

Li : Internal inductance of the solenoid.

This indicates the solenoid's ability to create or increase energy beyond what is supplied.

When applying an intrinsically safe valve in a hazardous location, a proper barrier must first be selected. The barrier selection process must first take into account the parameters the valve was approved for and compared in the following way :

- Vmax must be greater than or equal to Voc of the barrier.  
Voc = Voltage open circuit or maximum allowed out of the barrier
- Imax must be greater than or equal to Isc of the barrier.  
Isc = Current short circuit or the maximum current allowed out of the barrier
- Ci plus field wiring must be less than Ca of the barrier.  
Ca = Allowed capacitance
- Li plus field wiring must be less than La of the barrier.  
La = Allowed inductance

When properly combined, the barrier will never allow more energy to the intrinsically safe valve than what it was tested and approved for.

The following page can be used as your guide to help ask the right questions when working with an intrinsically safe circuit. Also included is a partial list of intrinsically safe barriers that have been tested with the MAC intrinsically safe valves.



# Intrinsically Safe Valves

**Approval :** Factory Mutual Research 2X7A8.AX (3610)

Approved as intrinsically safe apparatus and associated apparatus for use in Class I, II, III - Division 1, Group : A, B, C, D, E, F & G.

**Parameters :** Vmax : 30 VDC

I<sub>max</sub> : 175 ma

C<sub>i</sub> : 0

L<sub>i</sub> : 0

Operating voltage greater than 11.5 volts

Coil resistance : Approximately 250 ohms

Current draw : 50 ma

Wattage : 0.6 watts

### Circuit Check Lists :

- Is Vmax greater than or equal to Voc ?
- Is I<sub>max</sub> greater than or equal to I<sub>sc</sub> ?
- Is C<sub>i</sub> less than C<sub>a</sub> ?
- Is L<sub>i</sub> less than L<sub>a</sub> ?
- Is the barrier capable of handling 50 ma draw ?
- Is the internal resistance of the barrier 250 ohms or less ?

If all answers to the above questions are “yes” the barrier may be a good choice in combination with the MAC intrinsically safe valve.

To calculate voltage across the solenoid, plug values into the following equations :

$$\text{Plug } I_{\text{TOTAL}} \text{ in below } I_{\text{TOTAL}} = \frac{\text{SUPPLY VOLTAGE}}{250 + \text{BARRIER RESISTANCE}} = \text{_____} \leftarrow \text{Plug } I_{\text{TOTAL}} \text{ in below _____}$$

$$\text{Voltage at Solenoid} = I_{\text{TOTAL}} \times 250 \text{ ohms} = \text{_____} \text{ volts}$$

Manufacturer	Model #	Barrier Res.	Voltage w/o Light	Voltage w/Light	Groups	Type
Turck	MK72-S01-EX		11.2 v	10.2 v*	A-G	T.I.B.
Crouse-Hinds	SB19140-M2410		13.2 v	12.6 v	C-G	Zener
IMO Industries (Gems Sensors)	114072	234 OHMS	12.0 v	11.4 v	C-G	Zener
Pepperl & Fuchs	KHZ-922/EX-1	270 OHMS	11.6 v	11.06 v	A-G	Zener
	KHZ-922/EX-2	270 OHMS	11.6 v	11.06 v	A-G	Zener
	KHZ-922/EX-3	270 OHMS	11.6 v	11.06 v	A-G	Zener
Stahl	9001/01-280-165-10		13.5 v	12.9 v	C-G	Zener
	9351/10-14-10	80 OHMS	13.7 v	13.4 v	A-G	T.I.B.
Ronan	X57-229P	200 OHMS	12.7 v	12.05 v	C-G	Zener
Measurement Technology	MTL728P+	250 OHMS	11.9 v	11.4 v	A-G	Zener
	MTL3022		15.0 v	14.5 v	C-G	T.I.B.

Above data is based on a 24 v DC supply voltage to the input of the barrier. A 12 v DC, 243 OHM, .6 watt intrinsically safe solenoid is used. The measurement with light is an LED with a current limiting resistor.

Groups indicate what atmosphere the barrier has been approved for. All MAC intrinsically safe valves have been approved for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G indoor hazardous locations.

T.I.B. = Transformer Isolated Barrier

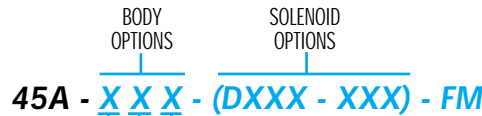
\* = Not a recommended combination

**HOW TO ORDER**



BODY TYPE	PORT SIZE	VALVE FUNCTION/MANIFOLD TYPE
<b>Inline</b>	<b>O</b> Manifold Body Only	<b>O</b> Manifold Body Only
<b>A</b> Individual Inline	<b>B</b> #10-32 UNF (Inline Only)	<b>B</b> 3 way N.C. Only (Inline)
<b>D</b> Indiv. Inline w/2 Manifold Mount Ports	<b>D</b> M5 (Inline Only)	
<b>Manifold</b>		
<b>E</b> Manifold Body (N.C. Only)		
<b>G</b> Manifold Body w/Gage Port (N.C. Only)		

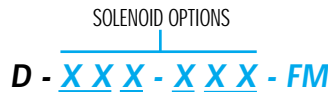
Note : there is no manifold base for the 35 series.  
The manifold valve can only mount to a circuit bar, see note below



BODY TYPE	PORT SIZE	VALVE FUNCTION/MANIFOLD TYPE
<b>Inline</b>	<b>O</b> Manifold Body Only	<b>Inline</b>
<b>A</b> 4 Port Body	<b>A</b> 1/8" NPT	<b>1</b> No Flow Controls
<b>B</b> 5 Port Body	<b>B</b> #10-32 UNF	<b>Bases - Regulators</b>
<b>D</b> 4 Port Body "O" Ring Mount -All Bottom Ports	<b>C</b> 1/8" BSPPL	<b>O</b> Valve Only - No Base
<b>E</b> 5 Port Body "O" Ring Mount -3 Bottom Ports Inlet and Cylinders	<b>D</b> M5 (Metric)	<b>A</b> Individual Base
<b>F</b> 4 Port Body "O" Ring Mount-Bottom Cylinder Ports Only	<b>F</b> #10-32 UNF Bottom Ports	<b>C</b> Manifold Base
	<b>G</b> M5 Bottom Ports	<b>E</b> Manifold w/Regulator w/Slotted Stem
	<b>H</b> "O" Ring Mount Ports	<b>G</b> Manifold w/Regulator w/Locking Slotted Stem
	<b>J</b> 1/8" NPT Bottom Ports	<b>J</b> Manifold w/Regulator w/Locking Knob
	<b>K</b> 1/8" BSPPL Bottom Ports	
<b>Base Mount</b>		
<b>O</b> For Base Only - No Valve		
<b>L</b> Base Mount Body		
<b>M</b> Base Mount Body with Gage Port		

**MANIFOLD MOUNT ACCESSORIES**

- M-45008-01** End Plate Kit
- 16455** Pressure Seal Between Manifold
- 19753** Tie Rod
- N-45008** Isolator Kit - Inlet and Exhaust
- N-45009** Isolator Kit - Inlet only
- N-45010** Isolator Kit - Exhaust only
- N-45015** End Cover Plate - Plain
- N-45016** End Cover Plate w/Flow Controls
- N-45017** Flow Control Needle Assembly



VOLTAGE	LEAD LENGTH	MANUAL OPERATOR	ELECTRICAL CONNECTION
<b>FR</b> 12VDC (0.6 W)	<b>A</b> 18" Leads	<b>0</b> No operator	<b>BA</b> Grommet
<b>FS</b> 24VDC (0.6 W)	<b>B</b> 24" Leads	<b>1</b> Non-locking Recessed	<b>CA</b> Conduit 1/2" NPS†
	<b>C</b> 36" Leads	<b>2</b> Locking Recessed	<b>CM</b> Metal Conduit 1/2" NPS†
	<b>D</b> 48" Leads	<b>3</b> Non-locking Extended	<b>CN</b> Metal Conduit w/grd. 1/2" NPS†
	<b>E</b> 72" Leads	<b>4</b> Locking Extended	<b>External Plug-in</b>
	<b>J*</b> 6" Leads		<b>FM</b> Plug-in (For ECD & ECE Bar)
			<b>JB</b> Rectangular Plug-in†
			<b>JM</b> Rectangular Male only†
			<b>KA</b> Mini Plug-in
			<b>KJ</b> Mini Plug-in Male only
			<b>TA</b> Dual Tabs (.110) Plain
			<b>TJ</b> Dual Tabs (.110) Plain

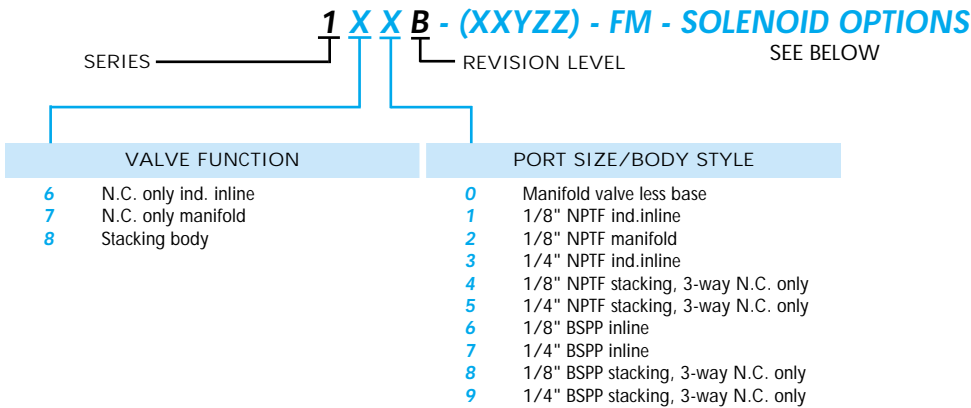
\*Use "J" for external plug-in connectors

NOTE : For valves mounted to a circuit bar reference MAC circuit bar Catalog for ordering info.  
For the 35 series circuit bar, use MOD FM01 after circuit bar part number.

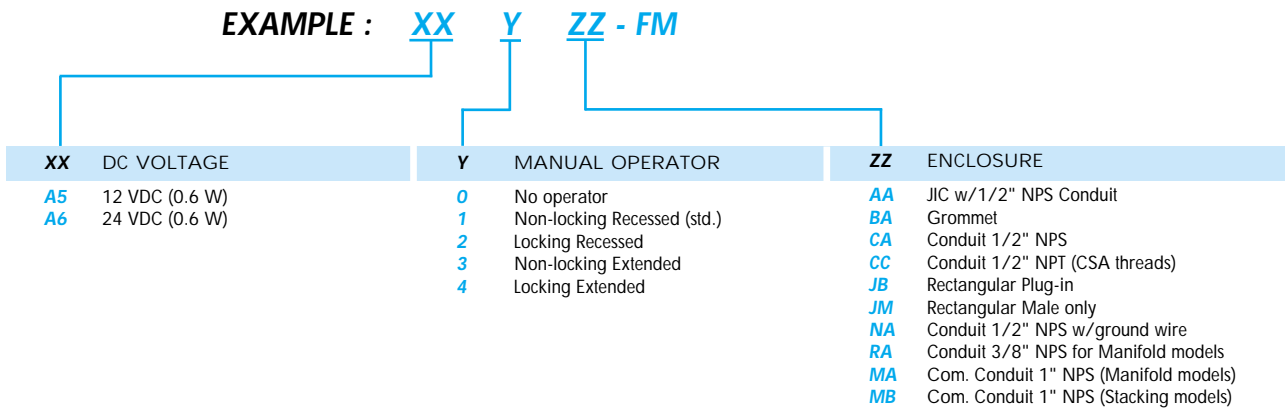
† Available on individual valves and circuit bars.

**HOW TO ORDER**

**BODY OPTIONS**



**SOLENOID OPTIONS**



(MA & MB common conduit covers require 1#M-01002-01 conduit end plate kit per stack)

**100 SERIES-SUPPLEMENTAL TECHNICAL DATA**

MOD. NO.	DESCRIPTION	MODEL AVAILABILITY
0004	All bottom and side ports	Manifold models only
0009	Bottom and side cylinder ports with side only inlet and exhaust ports	Manifold models only
0210	Additional bottom inlet	Manifold & stacking models
313P	For isolating the common inlet passage between manifold bases	Manifold models only
313E	For isolating the common exhaust passage between manifold bases	Manifold models only

**STACKING BODY ACCESSORIES : STACKING END PLATE KIT-**  
For each gang one kit is required.

**TO ORDER-** Specify number M-01001-01 (1/4" NPTF) or M-01001-01P (1/4" BSPP).  
INLET ISOLATOR PLATE N-01003  
EXHAUST ISOLATOR PLATE N-01004

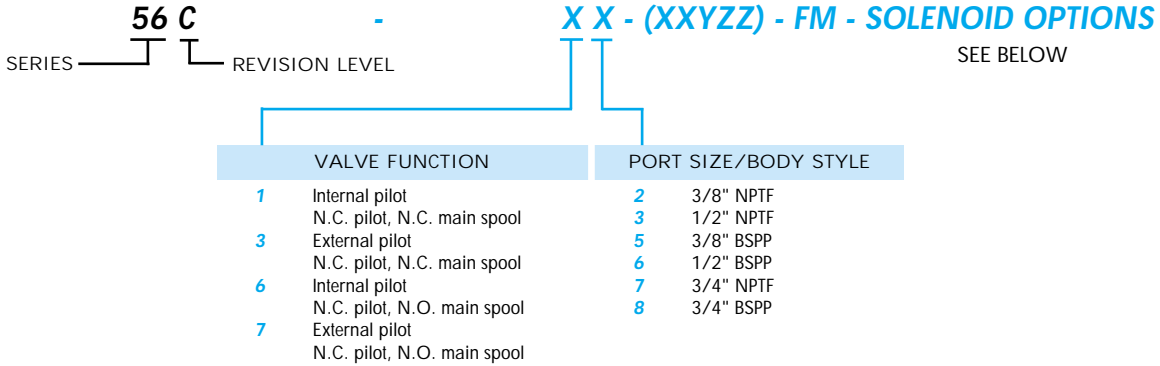
**MANIFOLD ACCESSORIES : MANIFOLD END PLATE KIT-**  
For each gang one kit is required.

**TO ORDER-** Specify number A2-5004-01 (1/4" NPTF) or A2-5004-01P (1/4" BSPP).

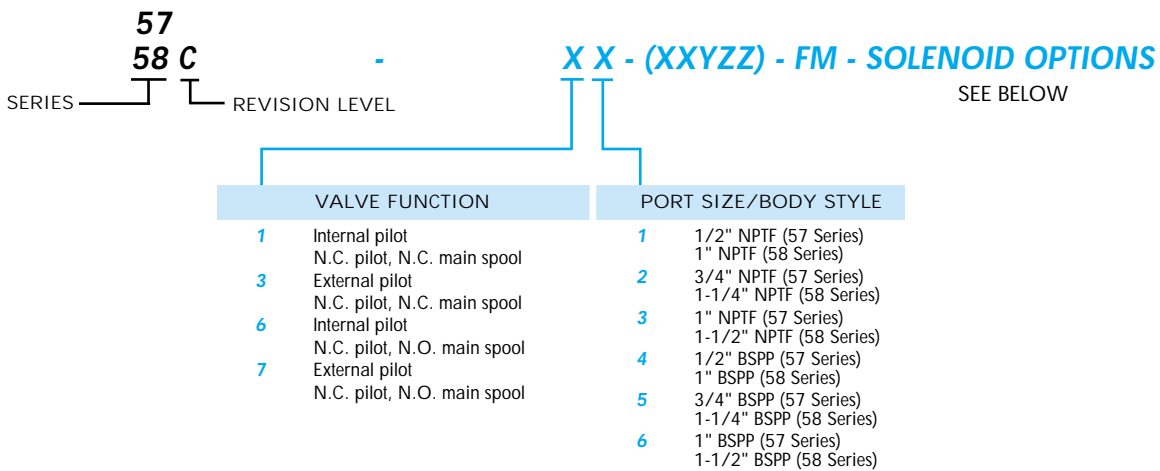
**TO ORDER** Add the appropriate modification number from the table above after the valve number,  
**EXAMPLE :** 172B-A51BA-FM MOD 0004.

**HOW TO ORDER**

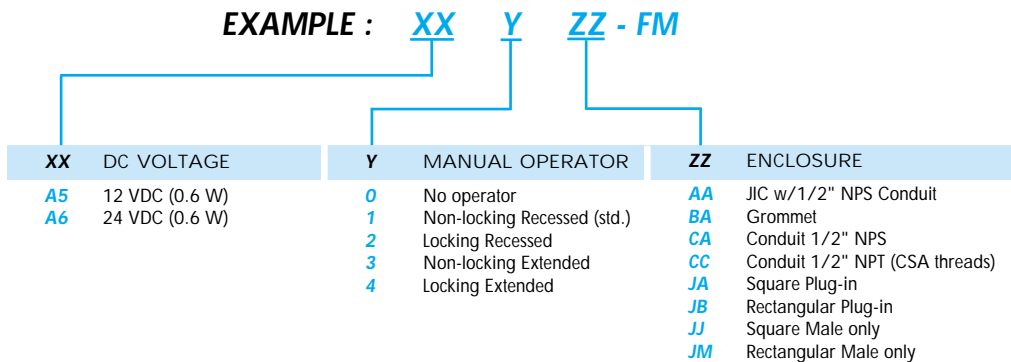
**VALVE BODY ASSEMBLY**



**VALVE BODY ASSEMBLY**

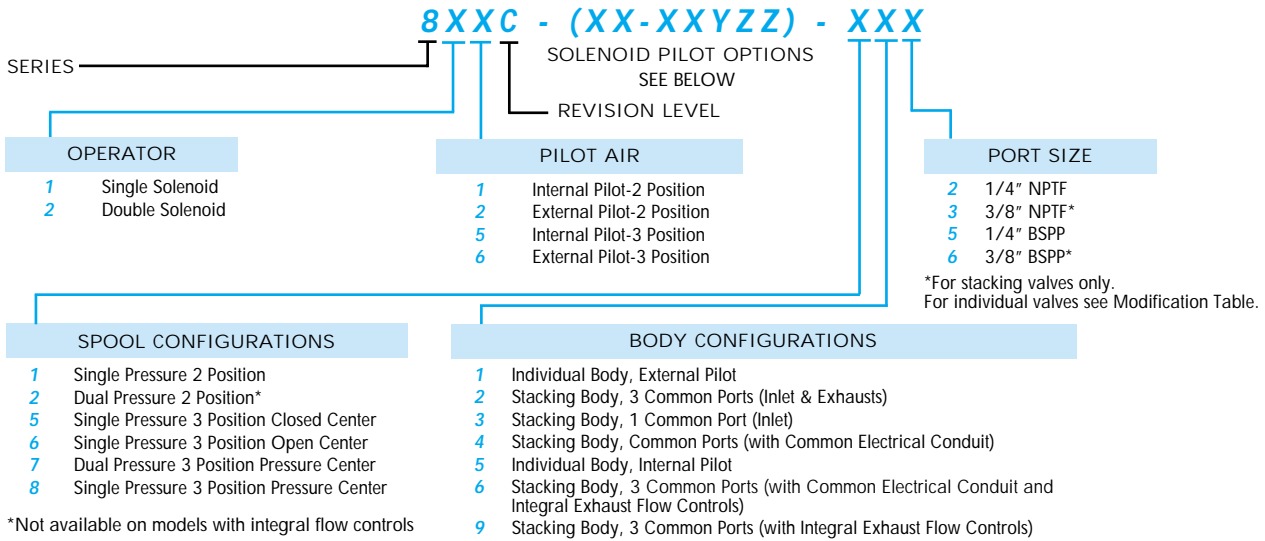


**SOLENOID OPTIONS**

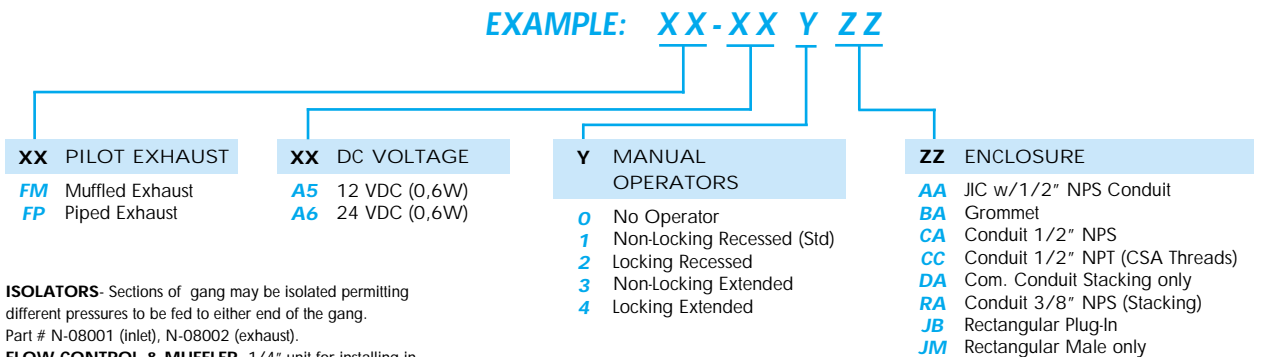


**HOW TO ORDER**

**BODY OPTIONS**



**SOLENOID PILOT OPTIONS**



**ISOLATORS:** Sections of gang may be isolated permitting different pressures to be fed to either end of the gang. Part # N-08001 (inlet), N-08002 (exhaust).

**FLOW CONTROL & MUFFLER:** 1/4" unit for installing in individual exhaust ports. Part #10951.

**DUAL INLET PRESSURE BLOCK:** For 3 common ports or 1 common port stacking valves. Provides 2 additional inlet pressure ports to a stack. Part #M-08003. For Common Conduit Valves. Part #M-00014.

**ACCESSORIES**

MANIFOLD END PLATE KITS (NPTF)*		
INT. PILOT PART NO.	EXT. PILOT PART NO.	MODELS USED WITH
M-08001-01-01	M-08001-02-01	3 com. port or 1 com. port models, stacks of 1 thru 16 valves.
M-08002-01-01	M-08002-02-01	Com. conduit models, stacks of 1 thru 16 valves.
M-00005-01-01	M-00005-02-01	3 com. port or 1 com. port models, stacks of 17 or more valves.
M-00007-01-01	M-00007-02-01	Com. conduit models, stacks of 17 or more valves.

\*Add letter P at end of part number for BSPP threads; EXAMPLE: M-08001-01-01P

**MODIFICATIONS**

MOD. NO.	DESCRIPTION	MODEL AVAILABILITY
0358	3/8" Inlet & Cylinder Ports	Individual Valves

**HOW TO ORDER**

**BODY OPTIONS**

**9XXB - (XX-XXYZZ) - SOLENOID OPTIONS - SEE BELOW**

SERIES ——— REVISION LEVEL

OPERATOR		BODY STYLE/PORTS	
1	Single Solenoid	1	Individual Inline 1/8" NPTF
2	Double Solenoid	2	Individual Inline 1/4" NPTF
		3	Stacking Valve 1/8" NPTF
		4	Stacking Valve 1/4" NPTF
		5	Individual Inline 1/8" BSPP
		6	Individual Inline 1/4" BSPP
		7	Stacking Valve 1/8" BSPP
		8	Stacking Valve 1/4" BSPP
		9	Stacking Valve 3/8" NPTF

For stacking valve 3/8"BSPP ports, use MOD 0005 after complete valve code 919B-FM-A51BA MOD 0005.

**SOLENOID PILOT OPTIONS**

**EXAMPLE: XX-XX Y ZZ**

XX	PILOT EXHAUST	XX	DC VOLTAGE	Y	MANUAL OPERATOR	ZZ	ENCLOSURE
FM	Muffled Exhaust	A5	12 VDC (0,6W)	0	No Operator	AA	JIC w/1/2" NPS Conduit
FP	Piped Exhaust	A6	24 VDC (0,6W)	1	Non-Locking Recessed (Std)	BA	Grommet
				2	Locking Recessed	CA	Conduit 1/2" NPS
				3	Non-Locking Extended	CC	Conduit 1/2" NPT (CSA Threads)
				4	Locking Extended	RA	Conduit 3/8" NPS (Stacking)
						MA	Com. Conduit 1" NPS Requires (1) M-0100201 Conduit End Plate Kit per Stack
						JB	Rectangular Plug-In
						JM	Rectangular Male only

**MODIFICATIONS**

PART. NO.	DESCRIPTION
M-09001-01	Manifold End Plate Kit (3/8" NPTF)
M-09001-01P	Manifold End Plate Kit (3/8" BSPP)
N-09002	Isolator Plate Kit - Inlet & Exhaust
N-09003	Isolator Plate Kit - Exhaust only
N-09004A	Isolator Plate Kit - Inlet only

**MANIFOLD ACCESSORIES:**

**MANIFOLD END PLATE KIT:** For each stack one kit is required.

**ISOLATORS:** Sections of a stack may be isolated permitting different pressures to be fed to either end of the stack.

**TO ORDER:** Select the appropriate part number from the adjacent table.

**HOW TO ORDER**

**82A - XX - XXX - (XX - DXXX - XXX)**

**SPOOL TYPE - VALVE FUNCTION**

- O** Individual base or manifold only
- A** Single Operator - single pressure
- B** Double operator - single pressure
- C** Single operator - dual pressure
- D** Double operator - dual pressure
- E** 3-position closed center
- F** 3-position open center
- G** 3-position single pressure, pressure center
- H** 3-position dual pressure,\* pressure center
- J** Single solenoid single pressure solenoid on B end
- K** Single solenoid dual pressure solenoid on B end
- L** 3-position dual pressure,\* open center
- M** 3-position dual pressure,\* closed center

\* Note: For dual pressure w/o regulators consult factory.

**BODY TYPE**

- A** Plug-in body
- B** Non Plug-in body

**PORT SIZE - THREAD TYPE**

- O** Valve only - no base
- A** 1/8" NPTF
- B** 1/4" NPTF
- C** 3/8" NPTF
- D** 1/8" BSPPL
- E** 1/4" BSPPL
- F** 3/8" BSPPL

**BODY OPTIONS**

**BASE OPTIONS**

**PILOT VALVE**

**IND. & MANIFOLD BASE PORT CONFIG.**

**--Individual Base--**

- O** Valve only - no base
- A** Standard side ports (1/8", 1/4", or 3/8")
- B** Bottom ports only\*
- C** Side and bottom ports\*
- D** Side inlet, side exhaust, bottom cylinder ports\*

\* Bottom ports available in 1/8" & 1/4" only in individual base

**--Manifold Base--**

- K** Standard ports (1/4" or 3/8" only)
- L** Bottom cylinder ports\*
- M** Bottom inlet port
- N** Bottom inlet and cylinder ports\*
- P** Bottom and end cylinder ports\*
- R** Bottom cylinder & end cylinder ports w/bottom inlet port\*
- S** Selector base - standard side ports

\* Bottom parts available in 1/4" & 3/8" only on manifold. Bottom inlet available 1/4" only. For bottom O-ring ports, consult factory.

**INT. OR EXT. PILOT\***

**--Internal Pilot--**

- O** Valve only - no base
  - A** No light in base
- External Pilot--**
- O** Valve only - no base
  - D** No light in base

\* Use internal for main valve pressures of 25-150 PSIG. Use external for main valve pressures of 28" Hg vacuum - 25 PSIG

**PILOT VALVE OPTIONS - (XX - DXXX - XXX)**

**PILOT EXHAUST**

- FA** Muffled exhaust

**VOLTAGE**

- FR** 12VDC (0.6w)
- FS** 24VDC (0.6w)

**LEAD WIRE LENGTH**

**--Plug-in Valve/Base--**

- P** Plug-in 8" - standard
- 1** 18"    **4** 48"
- 2** 24"    **5** 72"
- 3** 36"    **6** 96"

**--Non Plug-in Valve/Base--**

- A** 18"    **E** 72"
- B** 24"    **F** 96"
- C** 36"    **J** 6\*\*
- D** 48"

\* Lead wire length for external plug-in connectors must be "J"

**ELECTRICAL CONN.**

**--Plug-in Valve/Base--**

- DA** Plug-in (standard)
- CA** Conduit 1/2" NPS
- CM** Metal conduit 1/2" NPS
- CN** Metal conduit w/grd. 1/2" NPS

**--External Plug-in--**

- JB** Rectangular plug-in
- JM** Rectangular male only
- KA** Mini plug-in
- KJ** Mini plug-in male only
- TA** Dual tabs (.110) w/receptables
- TJ** Dual tabs (.110) w/o receptables

**MANUAL OPERATOR**

- O** No manual operator
- 1** Nonlocking operator
- 2** Locking operator
- 3** Nonlocking extended operator
- 4** Locking extended operator

**HOW TO ORDER 82 SERIES FLOW CONTROL MODULE\***

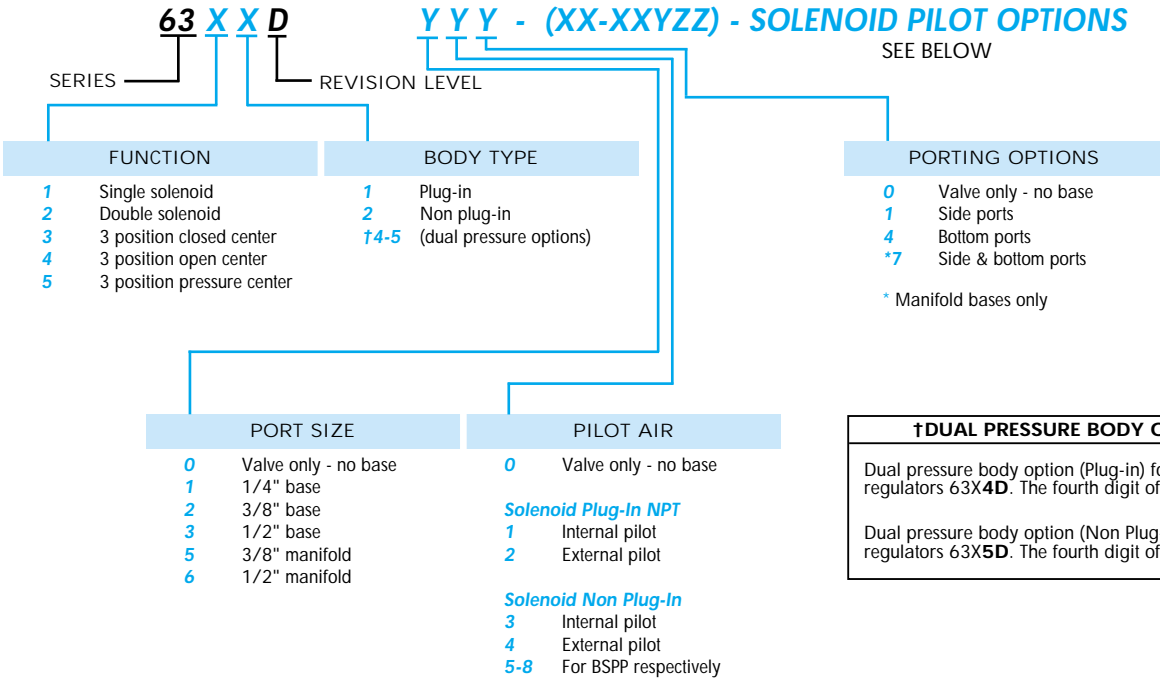
FC 82A-AA	Plug-in flow control assembly
FC 82A-BA	Non plug-in flow control assembly

\*If flow control module is to be installed between valve and base or valve and manifold at the factory, add -9 after the flow control model number, i.e., FC82A-AA-9. The flow control model number should follow the valve model number on which it is to be installed.

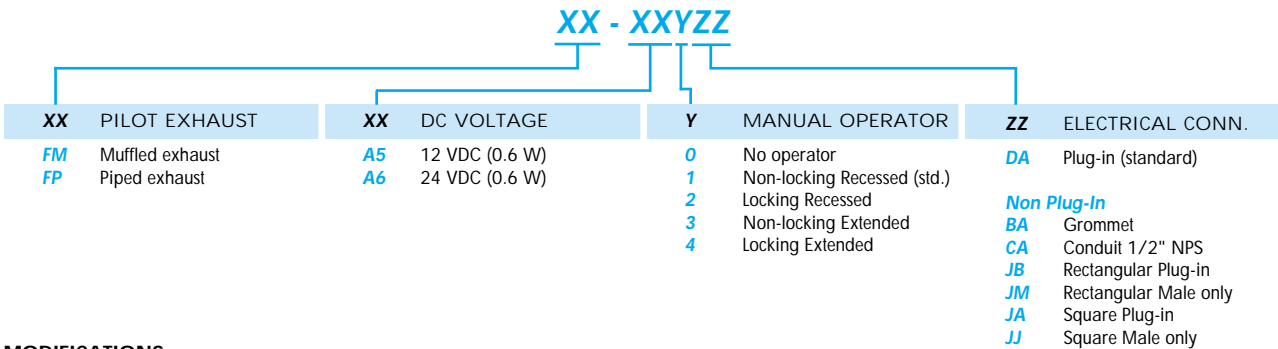
NOTE: Reference regulator ordering section if a sandwich regulator is required.  
NOTE: If a flow control assembly is used with the dual pressure regulator option, only the flow control on the "A" end is functional. (Controls both cylinder ports.)

**HOW TO ORDER**

**BODY/BASE OPTIONS**



**PILOT VALVE OPTIONS**



**MODIFICATIONS**

MOD 0210 Bottom inlet port in addition to side inlet port (manifolds only)

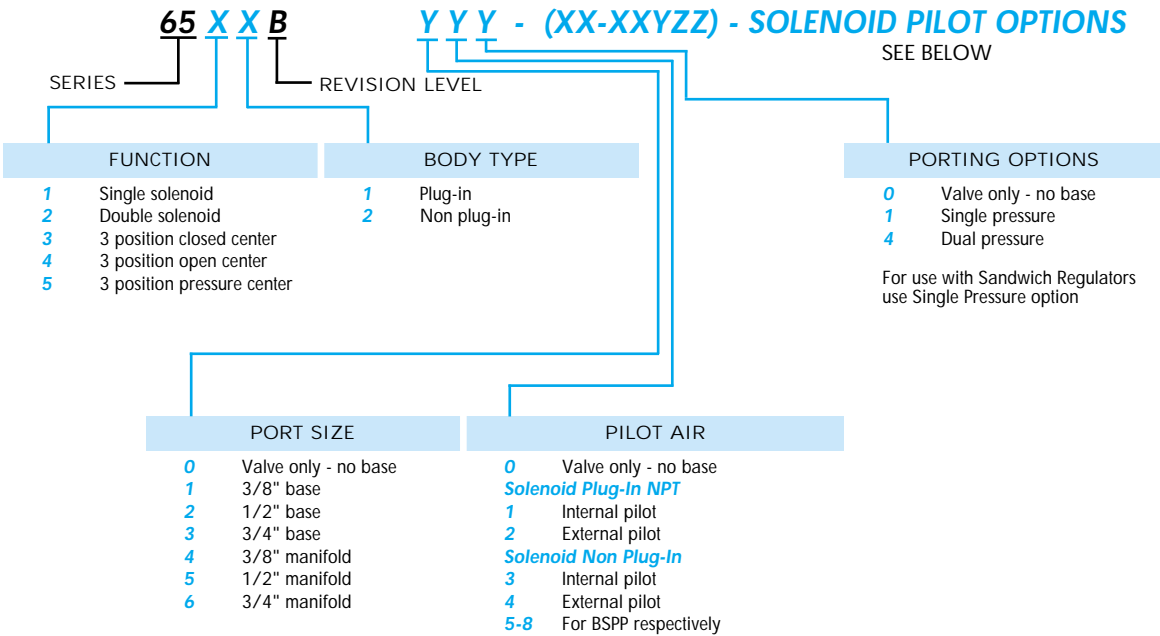
TO ORDER: 6311D-511-FM-A51DA MOD 0210

Manifold Accessories: Inlet Isolators #32839. Exhaust Isolator #28309.

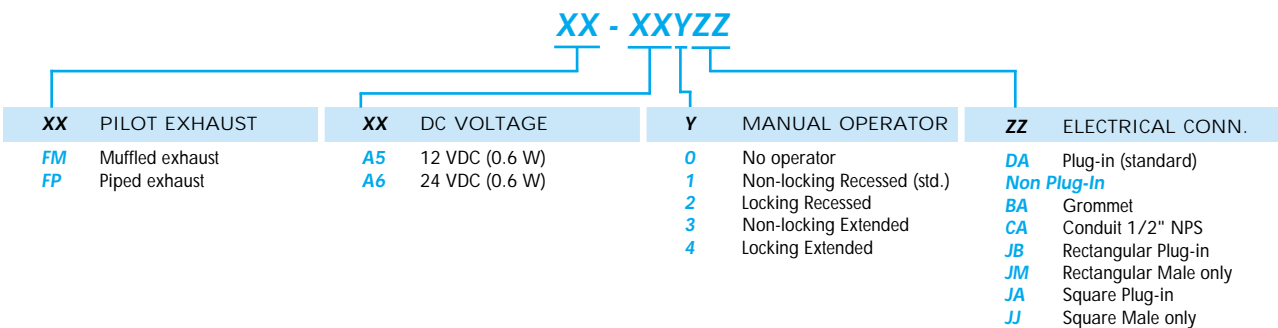
- NOTE:**
1. The valve less base is always the same for internal or external pilot. These options are effected in the base or manifold.
  2. When ordering an external pilot connection for manifold bases, a common external pilot is standard. One connection only is required for all the valves in the manifold whether single or double solenoid.

## HOW TO ORDER

### BODY/BASE OPTIONS



### PILOT VALVE OPTIONS



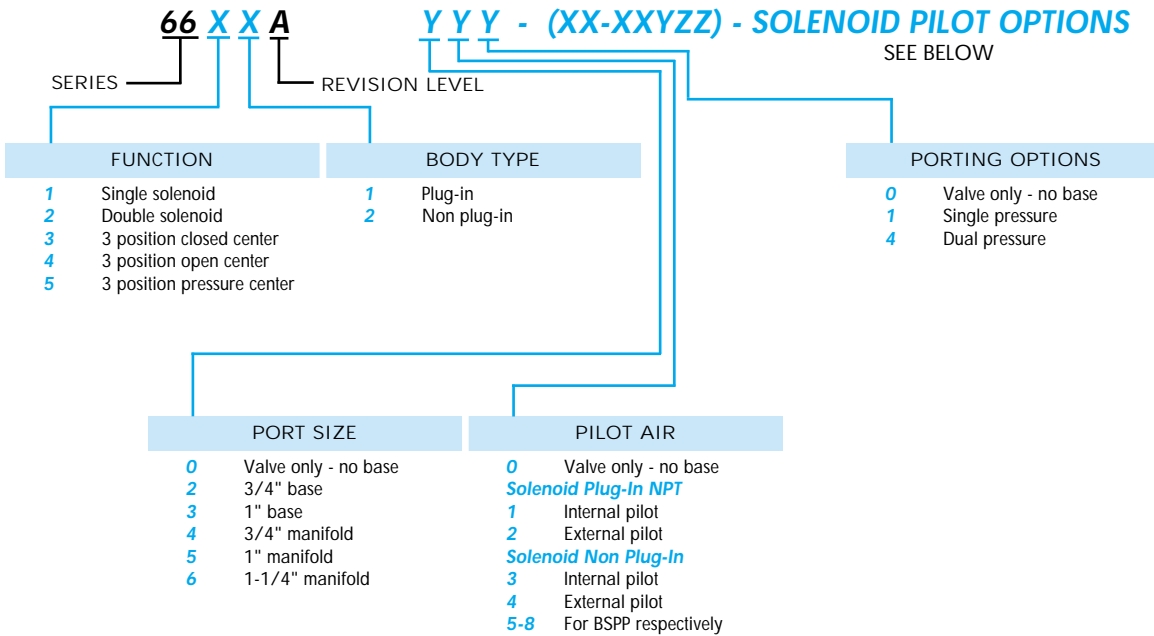
**NOTE:** 1. The valve less base is always the same for internal or external pilot. These options are effected in the base or manifold.  
 2. Bottom ports: Refer to modification table below.  
 3. Manifold Accessories: Inlet Isolator #28309. Exhaust Isolator #28310.

### MODIFICATIONS

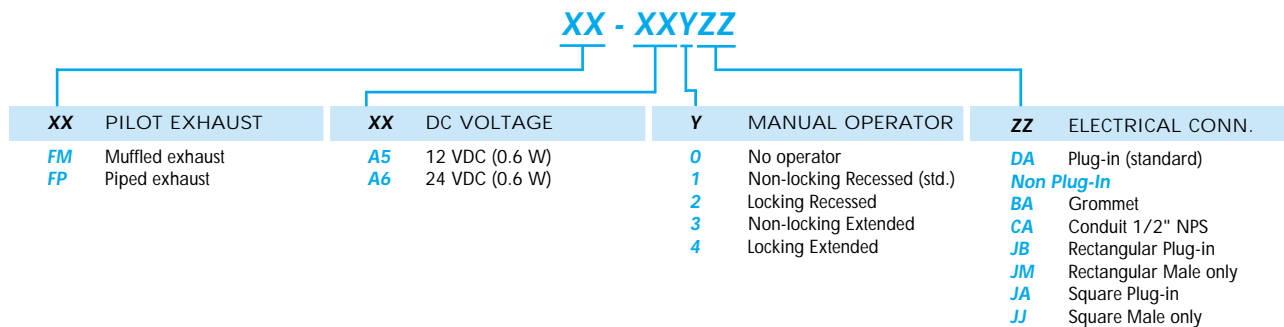
MOD. NO.	DESCRIPTION	MODEL AVAILABILITY
0002	Bottom inlet, exhaust, & cylinder ports (no side ports)	Available on individual base 3/8" & 1/2" only
0004	Full side porting and additional bottom inlet, exhausts, and cylinder ports	Available on individual base 3/8" only
0112	Side inlet & exhaust with bottom cylinder ports (no end cylinder ports)	Available on all manifold models
0210	Porting as ordered in model number plus an additional bottom inlet	Available on all manifold models
0364	Single Pressure - Side inlet & exhaust and additional bottom inlet with bottom cylinder ports (no end cylinder ports) Dual Pressure - Same as single pressure except with two bottom inlets	Available on all manifold models

## HOW TO ORDER

### BODY/BASE OPTIONS



### PILOT VALVE OPTIONS



- NOTE:**
- The valve less base is always the same for internal or external pilot. These options are effected in the base or manifold.
  - Bottom ports: Refer to modification table below.
  - When ordering an external pilot connection for manifold bases, a common external pilot port is standard. One connection only is required for all the valves in the manifold whether single or double solenoid.
  - Manifold Accessories: Inlet & Exhaust Isolator #28367.

### MODIFICATIONS

MOD. NO.	DESCRIPTION	MODEL AVAILABILITY
0002	Bottom inlet, exhaust, & cylinder ports (no side ports)	Available on individual base 3/4" only
0004	Full side porting and additional bottom inlet, exhausts, and cylinder ports	Available on individual base 3/4" only
0112	Side inlet & exhaust with bottom cylinder ports (no end cylinder ports)	3/4" individual base & 3/4" & 1" manifold base
0210	1-1/4" bottom inlet	Manifold base
0364	1-1/4" bottom inlet & 3/4" or 1" bottom cyl.	Manifold base

**TO ORDER** Add the appropriate modification number after the valve number, **EXAMPLE** : 6611A-211-FM451DA MOD 0002.



# Intrinsically Safe Valves

**MV-A1C ISO 1** MAC ISO valves are built to International Standards Organization (ISO) Std. 5599/1. They are available in 3 sizes; ISO 1, 2 & 3. To select the ISO size required, insert the appropriate ISO number in the 5th position of the model code; EXAMPLE MV-A1C for ISO 1, MV-A2B for ISO 2, or MV-A3B for ISO 3.  
**MV-A2B ISO 2**  
**MV-A3B ISO 3** Bases and manifolds must be ordered separately from the table below.

## HOW TO ORDER

### SOLENOID PILOT OPERATED VALVES LESS BASE SINGLE PRESSURE VALVES

SGL. OPERATOR AIR/SPRING RETURN	DBL. OPERATOR 2-POSITION	PILOT SUPPLY	DBL. OPER. 3-POS. CLOSED CENTER	DBL. OPER. 3-POS. OPEN CENTER
MV-AXB-A111-FM-A51JA MV-AXB-A121-FM-A51JA MV-AXB-A151-FM-A51JA	MV-AXB-A211-FM-A51JA MV-AXB-A221-FM-A51JA MV-AXB-A251-FM-A51JA	Internal Pilot External Pilot External Pilot for use with Regulator	MV-AXB-A312-FM-A51JA MV-AXB-A322-FM-A51JA MV-AXB-A352-FM-A51JA	MV-AXB-A311-FM-A51JA MV-AXB-A321-FM-A51JA MV-AXB-A351-FM-A51JA

### DUAL PRESSURE VALVES

SGL. OPERATOR AIR/SPRING RETURN	DBL. OPERATOR 2-POSITION	PILOT SUPPLY	DBL. OPER. 3-POS. PRESSURE CENTER
MV-AXB-A131-FM-A51JA MV-AXB-A135-FM-A51JA MV-AXB-A141-FM-A51JA	MV-AXB-A231-FM-A51JA MV-AXB-A232-FM-A51JA MV-AXB-A241-FM-A51JA	Int. Pilot-From Port 3 Int. Pilot-From Port 5 External Pilot	MV-AXB-A331-FM-A51JA MV-AXB-A332-FM-A51JA MV-AXB-A341-FM-A51JA

### SOLENOID PILOT VALVE OPTIONS

#### XX - XXYZZ

XX PILOT EXHAUST	XX DC VOLTAGE	Y MANUAL OPERATOR	ZZ EXTERNAL PLUG-IN	ZZ ENCLOSURE
<b>FM</b> Muffled exhaust <b>FP</b> Piped exhaust <b>FC</b> CNOMO Muffled <b>FD</b> CNOMO Piped	<b>A5</b> 12 VDC (0.6 W) <b>A6</b> 24 VDC (0.6 W)	<b>0</b> No operator <b>1</b> Non-locking Recessed (std.) <b>2</b> Locking Recessed <b>3</b> Non-locking Extended <b>4</b> Locking Extended	<b>JA</b> Square without light (on solenoid) <b>JB</b> Rectangular without light (on solenoid) <b>JE</b> Square without light (on body) <b>JF</b> Rectangular without light (on body)	<b>AA</b> JIC w/1/2" NPS Conduit <b>BA</b> Grommet <b>CA</b> Conduit 1/2" NPS <b>CC</b> Conduit 1/2" NPT (CSA Threads)

#### BASE TABLE

ISO TYPE	PORT SIZE	INDIVIDUAL BASE		MANIFOLD BASE	
		BSPP	NPTF	BSPP	NPTF
ISO 1	1/4"	MB-A1C-121	MB-A1C-221	MM-A1C-121	MM-A1C-221
	3/8"	MB-A1C-131	MB-A1C-231	MM-A1C-131	MM-A1C-231
ISO 2	3/8"	MB-A2B-121	MB-A2B-221	MM-A2B-121	MM-A2B-221
	1/2"	MB-A2B-131	MB-A2B-231	MM-A2B-131	MM-A2B-231
ISO 3	1/2"	MB-A3B-121	MB-A3B-221	MM-A3B-121	N/A
	3/4"	MB-A3B-131	MB-A3B-231	MM-A3B-131	N/A

For manifold bases a common external pilot port is available. One connection only is required for all valves in the manifold whether single or double solenoid. Bottom ports are also available; consult factory for ordering information for these options.

**MANIFOLD FASTENING KIT** — For each gang, one kit is required. To order specify par number **N-63002-01**.

**HOW TO ORDER**

**VALVE OPTIONS**

**MAC125A - VXXX - XX - XXYDA - 9 VALVE ASSEMBLED TO BASE**  
**MAC250A**

SERIES  
 REVISION LEVEL

SEE BELOW

FUNCTION	ELECTRICAL CONN. IN TOP PLATE	PILOT
1 Single Operator, 2 Position, Single Pressure	A 5 Pin (Ford Wiring)	1 Internal Pilot
2 Double Operator, 2 Position, Single Pressure	B 5 Pin (Chrysler Wiring)	3 External Pilot
3 Single Operator, 2 Position, Dual Pressure	G 4 Pin Micro	
4 Double Operator, 2 Position, Dual Pressure	E 3 Pin (Ford Wiring)	
5 3 Position, Closed Center	F 5 Pin Micro (Chrysler Wiring)	
6 3 Position, Open Center		
7 3 Position, Dual Pressure, Pressure Center		

**SOLENOID PILOT OPTIONS**

**XX - XX - YDA**

XX	PILOT EXHAUST	XX	DC VOLTAGE	Y	MANUAL OPERATOR
FM	Muffled exhaust	A5	12 VDC (0.6 W)	0	No operator
FP	Piped exhaust	A6	24 VDC (0.6 W)	1	Non-locking Recessed (std.)
				2	Locking Recessed
				3	Non-locking Extended
				4	Locking Extended

ORDERING EXAMPLE: MAC125A-V1A1-FM-A51DA

**BASE/MANIFOLD TABLE**

TYPE	PORT SIZE	INDIVIDUAL BASE	MANIFOLD BASE (btm. cyl. ports)	MANIFOLD BASE** (side & btm. cyl. ports)
MAC125	1/4"	MAC125A-B21A	MAC125A-M21B	MAC125A-M21C
	3/8"	MAC125A-B31A	MAC125A-M31B	MAC125A-M31C
MAC250	1/2"	MAC250A-B21A	MAC250A-M21B	MAC250A-M21C
	3/4"	MAC250A-B31A	MAC250A-M31B	MAC250A-M31C
	1"	MAC250A-B41A	N/A	N/A

Individual base available with side ports only.

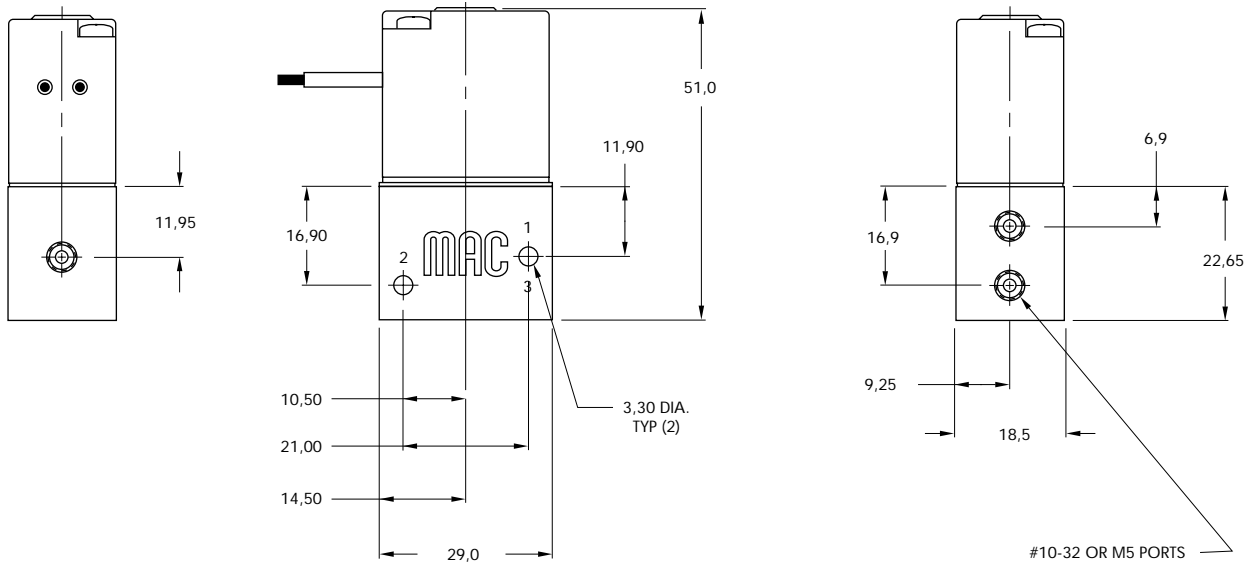
\*\*Requires End Plate Kit M-12002-01 (125 Series), M-25002-01 (250 Series)

Bases & manifolds coded for internal pilot. For external pilot, last number of code is 2. ORDERING EXAMPLE: MAC125A-B22A.

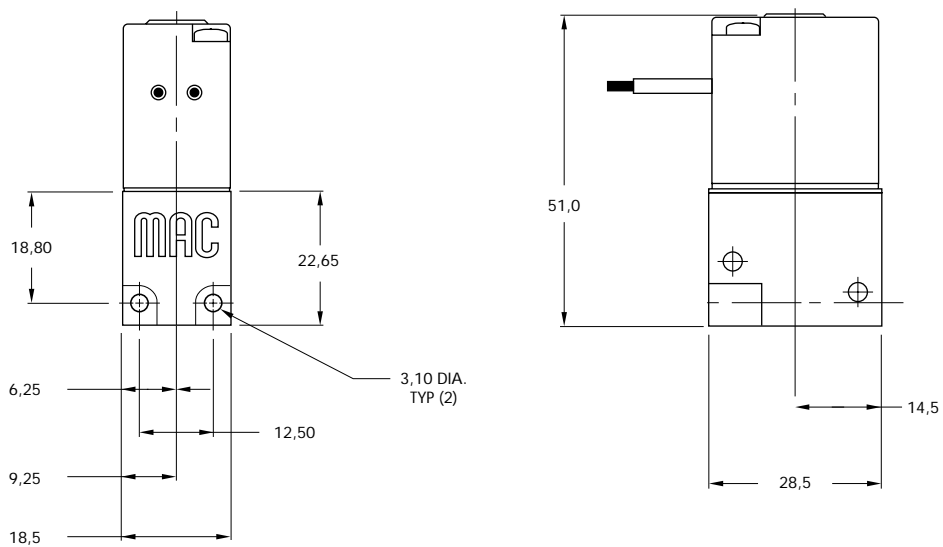


# Intrinsically Safe Valves

## 35 Series Inline



## 35 Series Manifold

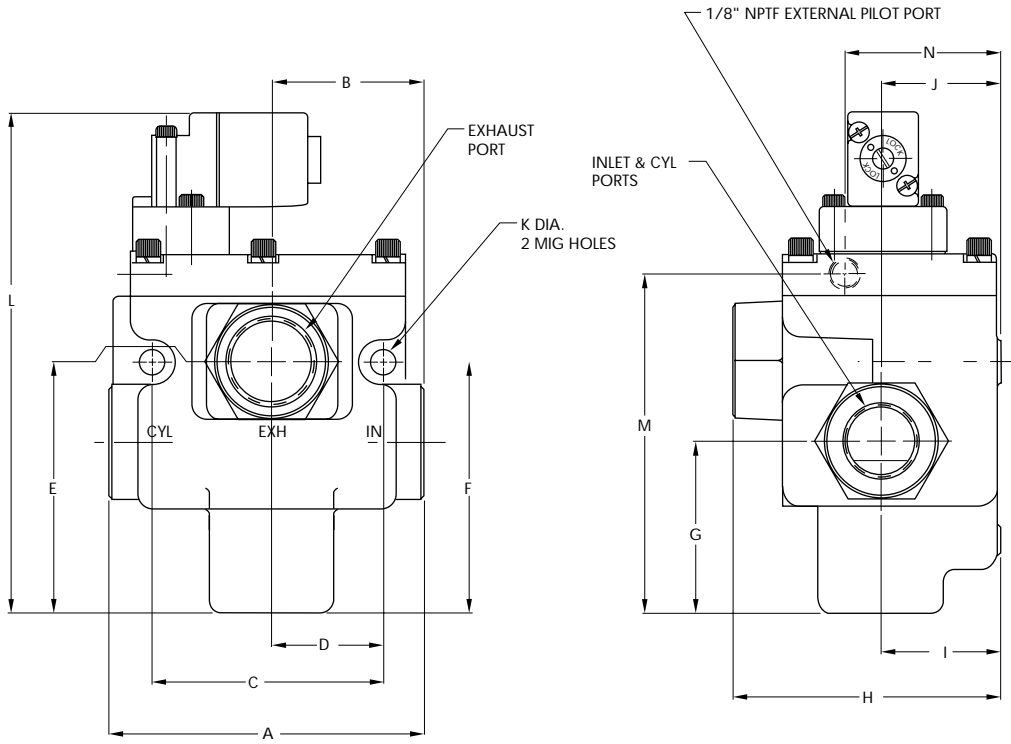




# Intrinsically Safe Valves

## 57 & 58 Intrinsically Safe

Dimensions shown are metric (mm)



DIMENSIONS		A	B	C	D	E	F	G	H	I	J	K	L	M	N
57	Inches	4.42	2.13	3.25	1.56	3.56	3.56	2.43	3.18	1.68	1.80	.34	7.04	4.78	2.19
Series	MM	112.3	54.1	82.6	39.7	90.4	90.4	61.7	96.8	42.7	45.7	8.6	78.9	121.5	55.7
58	Inches	5.66	2.77	4.66	2.27	4.5	4.91	3.31	4.57	1.88	2.00	.53	8.41	6.15	2.39
Series	MM	143.7	70.3	118.4	57.7	114.3	124.7	84.1	116.1	47.8	50.8	13.5	213.6	156.3	60.8