Section 7 Intrinsically Safe Valves

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

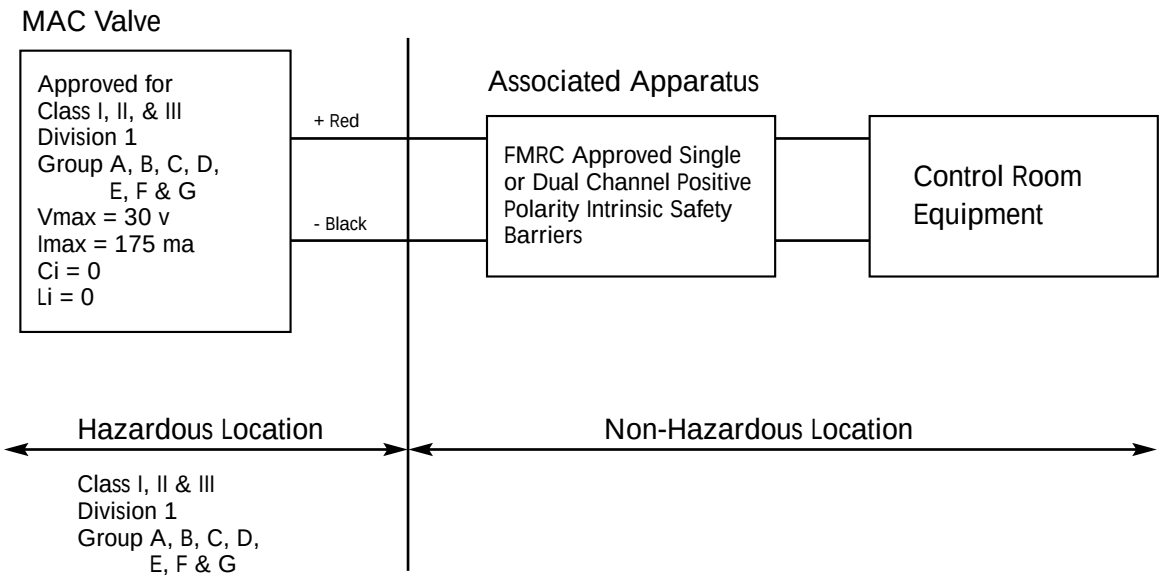
MAC 125 & MAC 250

*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

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.

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
Imax : 175 ma
Ci : 0
Li : 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 Imax greater than or equal to Isc ?
- Is Ci less than Ca ?
- Is Li less than La ?
- Is the barrier capable of handing 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 :

$$\text{ITOTAL} = \text{Plug } I_{\text{ITOTAL in below}} = I_{TOTAL} = \frac{\text{SUPPLY VOLTAGE}}{250 + \text{BARRIER RESISTANCE}} = \underline{\qquad\qquad}$$

← Plug ITOTAL in below ——————

Voltage at Solenoid = I_{TOTAL} x 250 ohms = _____ 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

Reset

BODY OPTIONS | SOLENOID OPTIONS

35A-XXX-(DXXX-XXX)-FM

35A - X X X - (DXXX - XXX) - FM

BODY TYPE

Inline

A	Individual Inline
D	Indiv. Inline w/2 Manifold Mount Ports

Manifold

E	Manifold Body (N.C. Only)
G	Manifold Body w/Gage Port (N.C. Only)

PORT SIZE

O	Manifold Body Only
B	#10-32 UNF (Inline Only)
D	M5 (Inline Only)

VALVE FUNCTION / MANIFOLD TYPE

O	Manifold Body Only
B	3 way N.C. Only (Inline)

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

BODY OPTIONS | SOLENOID OPTIONS

45A-XXX-(DXXX-XXX)-FM

45A - X X X - (DXXX - XXX) - FM

BODY TYPE

Inline

A	4 Port Body
B	5 Port Body
D	4 Port Body "O" Ring Mount -All Bottom Ports
E	5 Port Body "O" Ring Mount -3 Bottom Ports Inlet and Cylinders
F	4 Port Body "O" Ring Mount-Bottom Cylinder Ports Only

Base Mount

O	For Base Only - No Valve
L	Base Mount Body
M	Base Mount Body with Gage Port

PORT SIZE

O	Manifold Body Only
A	1/8" NPT
B	#10-32 UNF
C	1/8" BSPPL
D	M5 (Metric)
F	#10-32 UNF Bottom Ports
G	M5 Bottom Ports
H	"O" Ring Mount Ports
J	1/8" NPT Bottom Ports
K	1/8" BSPPL Bottom Ports

VALVE FUNCTION / MANIFOLD TYPE

Inline

1	No Flow Controls

Bases - Regulators

O	Valve Only - No Base
A	Individual Base
C	Manifold Base
E	Manifold w/Regulator w/Slotted Stem
G	Manifold w/Regulator w/Locking Slotted Stem
J	Manifold w/Regulator w/Locking Knob

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

SOLENOID OPTIONS

D - X X X - X X X - FM

VOLTAGE

FR	12VDC (0.6 W)
FS	24VDC (0.6 W)

LEAD LENGTH

A	18" Leads
B	24" Leads
C	36" Leads
D	48" Leads
E	72" Leads
J*	6" Leads

*Use "J" for external plug-in connectors

MANUAL OPERATOR

0	No operator
1	Non-locking Recessed
2	Locking Recessed
3	Non-locking Extended
4	Locking Extended

ELECTRICAL CONNECTION

BA	Grommet
CA	Conduit 1/2" NPS†
CM	Metal Conduit 1/2" NPS†
CN	Metal Conduit w/grd. 1/2" NPS†

External Plug-in

FM	Plug-in (For ECD & ECE Bar)
JB	Rectangular Plug-in†
JM	Rectangular Male only†
KA	Mini Plug-in
KJ	Mini Plug-in Male only
TA	Dual Tabs (.110) Plain
TJ	Dual Tabs (.110) Plain

† Available on individual valves and circuit bars.

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.

Reset

HOW TO ORDER

1XXB-(XXXXX)-FM MOD XXXX

BODY OPTIONS

1 X X B - (XXYZZ) - FM - SOLENOID OPTIONS

SERIES — REVISION LEVEL — SEE BELOW

VALVE FUNCTION	
6	N.C. only ind. inline
7	N.C. only manifold
8	Stacking body

PORT SIZE/BODY STYLE	
0	Manifold valve less base
1	1/8" NPTF ind.inline
2	1/8" NPTF manifold
3	1/4" NPTF ind.inline
4	1/8" NPTF stacking, 3-way N.C. only
5	1/4" NPTF stacking, 3-way N.C. only
6	1/8" BSPP inline
7	1/4" BSPP inline
8	1/8" BSPP stacking, 3-way N.C. only
9	1/4" BSPP stacking, 3-way N.C. only

SOLENOID OPTIONS

EXAMPLE : XX Y ZZ - FM

XX	DC VOLTAGE
A5	12 VDC (0.6 W)
A6	24 VDC (0.6 W)

Y	MANUAL OPERATOR
0	No operator
1	Non-locking Recessed (std.)
2	Locking Recessed
3	Non-locking Extended
4	Locking Extended

ZZ	ENCLOSURE
AA	JIC w/1/2" NPS Conduit
BA	Grommet
CA	Conduit 1/2" NPS
CC	Conduit 1/2" NPT (CSA threads)
JB	Rectangular Plug-in
JM	Rectangular Male only
NA	Conduit 1/2" NPS w/ground wire
RA	Conduit 3/8" NPS for Manifold models
MA	Com. Conduit 1" NPS (Manifold models)
MB	Com. Conduit 1" NPS (Stacking models)

(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	Additionnal 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

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

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).

Reset

HOW TO ORDER

XX-(XXXXX)-FM

VALVE BODY ASSEMBLY

56 C -

SERIES — REVISION LEVEL

X X - (XXYZZ) - FM - SOLENOID OPTIONS

SEE BELOW

VALVE FUNCTION		PORT SIZE/BODY STYLE	
1	Internal pilot N.C. pilot, N.C. main spool	2	3/8" NPTF
3	External pilot N.C. pilot, N.C. main spool	3	1/2" NPTF
6	Internal pilot N.C. pilot, N.O. main spool	5	3/8" BSPP
7	External pilot N.C. pilot, N.O. main spool	6	1/2" BSPP
		7	3/4" NPTF
		8	3/4" BSPP

Reset

XX-(XXXXX)-FM

VALVE BODY ASSEMBLY

57
58 C -

SERIES — REVISION LEVEL

X X - (XXYZZ) - FM - SOLENOID OPTIONS

SEE BELOW

VALVE FUNCTION		PORT SIZE/BODY STYLE	
1	Internal pilot N.C. pilot, N.C. main spool	1	1/2" NPTF (57 Series) 1" NPTF (58 Series)
3	External pilot N.C. pilot, N.C. main spool	2	3/4" NPTF (57 Series) 1-1/4" NPTF (58 Series)
6	Internal pilot N.C. pilot, N.O. main spool	3	1" NPTF (57 Series) 1-1/2" NPTF (58 Series)
7	External pilot N.C. pilot, N.O. main spool	4	1/2" BSPP (57 Series) 1" BSPP (58 Series)
		5	3/4" BSPP (57 Series) 1-1/4" BSPP (58 Series)
		6	1" BSPP (57 Series) 1-1/2" BSPP (58 Series)

SOLENOID OPTIONS

EXAMPLE : XX Y ZZ - FM

XX	DC VOLTAGE
A5	12 VDC (0.6 W)
A6	24 VDC (0.6 W)

Y	MANUAL OPERATOR
0	No operator
1	Non-locking Recessed (std.)
2	Locking Recessed
3	Non-locking Extended
4	Locking Extended

ZZ	ENCLOSURE
AA	JIC w/1/2" NPS Conduit
BA	Grommet
CA	Conduit 1/2" NPS
CC	Conduit 1/2" NPT (CSA threads)
JA	Square Plug-in
JB	Rectangular Plug-in
JJ	Square Male only
JM	Rectangular Male only

Reset

HOW TO ORDER

8XXC-(XX-XXXXX)-XXX

BODY OPTIONS

8XXC - (XX-XXYZZ) - XXX

SERIES

SOLENOID PILOT OPTIONS SEE BELOW

REVISION LEVEL

OPERATOR

1	Single Solenoid
2	Double Solenoid

PILOT AIR

1	Internal Pilot-2 Position
2	External Pilot-2 Position
5	Internal Pilot-3 Position
6	External Pilot-3 Position

PORT SIZE

2	1/4" NPTF
3	3/8" NPTF*
5	1/4" BSPP
6	3/8" BSPP*

*For stacking valves only.
For individual valves see Modification Table.

SPOOL CONFIGURATIONS

1	Single Pressure 2 Position
2	Dual Pressure 2 Position*
5	Single Pressure 3 Position Closed Center
6	Single Pressure 3 Position Open Center
7	Dual Pressure 3 Position Pressure Center
8	Single Pressure 3 Position Pressure Center

*Not available on models with integral flow controls

BODY CONFIGURATIONS

1	Individual Body, External Pilot
2	Stacking Body, 3 Common Ports (Inlet & Exhausts)
3	Stacking Body, 1 Common Port (Inlet)
4	Stacking Body, Common Ports (with Common Electrical Conduit)
5	Individual Body, Internal Pilot
6	Stacking Body, 3 Common Ports (with Common Electrical Conduit and Integral Exhaust Flow Controls)
9	Stacking Body, 3 Common Ports (with Integral Exhaust Flow Controls)

SOLENOID PILOT OPTIONS

EXAMPLE: XX-XX Y ZZ

XX PILOT EXHAUST

FM	Muffled Exhaust
FP	Piped Exhaust

XX DC VOLTAGE

A5	12 VDC (0,6W)
A6	24 VDC (0,6W)

Y MANUAL OPERATORS

0	No Operator
1	Non-Locking Recessed (Std)
2	Locking Recessed
3	Non-Locking Extended
4	Locking Extended

ZZ ENCLOSURE

AA	JIC w/1/2" NPS Conduit
BA	Grommet
CA	Conduit 1/2" NPS
CC	Conduit 1/2" NPT (CSA Threads)
DA	Com. Conduit Stacking only
RA	Conduit 3/8" NPS (Stacking)
JB	Rectangular Plug-In
JM	Rectangular Male only

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

MAC®

Series 900

Reset

HOW TO ORDER

9XXB-(XX-XXXXX)

BODY OPTIONS

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

SERIES — REVISION LEVEL

OPERATOR	
1	Single Solenoid
2	Double Solenoid

BODY STYLE/PORTS	
1	Individual Inline 1/8" NPTF
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	
FM	Muffled Exhaust
FP	Piped Exhaust

XX DC VOLTAGE	
A5	12 VDC (0,6W)
A6	24 VDC (0,6W)

Y MANUAL OPERATOR	
0	No Operator
1	Non-Locking Recessed (Std)
2	Locking Recessed
3	Non-Locking Extended
4	Locking Extended

ZZ ENCLOSURE	
AA	JIC w/1/2" NPS Conduit
BA	Grommet
CA	Conduit 1/2" NPS
CC	Conduit 1/2" NPT (CSA Threads)
RA	Conduit 3/8" NPS (Stacking)
MA	Com. Conduit 1" NPS Requires (1) M-01002-01 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.

Reset

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

HOW TO ORDER

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

BODY OPTIONS | BASE OPTIONS | PILOT VALVE

SPOOL TYPE - VALVE FUNCTION

0	Individual base or manifold only
A	Single Operator - single pressure
B	Double operator - sinle 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

0	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

IND. & MANIFOLD BASE PORT CONFIG.

--Individual Base--

0	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--

0	Valve only - no base
A	No light in base

--External Pilot--

0	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)

--Non Plug-in Valve/Base--

BA	Grommet
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

0	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.)

Reset

HOW TO ORDER

63XXDXXX-(XX-XXXXX)

BODY/BASE OPTIONS

63 X X D — SERIES, REVISION LEVEL

Y Y Y - (XX-XXYZZ) - SOLENOID PILOT OPTIONS — SEE BELOW

FUNCTION

1	Single solenoid
2	Double solenoid
3	3 position closed center
4	3 position open center
5	3 position pressure center

BODY TYPE

1	Plug-in
2	Non plug-in
†4-5	(dual pressure options)

PORTING OPTIONS

0	Valve only - no base
1	Side ports
4	Bottom ports
*7	Side & bottom ports

* Manifold bases only

PORT SIZE

0	Valve only - no base
1	1/4" base
2	3/8" base
3	1/2" base
5	3/8" manifold
6	1/2" manifold

PILOT AIR

0	Valve only - no base

Solenoid Plug-In NPT

1	Internal pilot
2	External pilot

Solenoid Non Plug-In

3	Internal pilot
4	External pilot
5-8	For BSPP respectively

†DUAL PRESSURE BODY OPTIONS

Dual pressure body option (Plug-in) for use with regulators 63X**4D**. The fourth digit of the body is **4**.

Dual pressure body option (Non Plug-in) for use with regulators 63X**5D**. The fourth digit of the body is **5**.

PILOT VALVE OPTIONS

XX - XXYZZ

XX PILOT EXHAUST

FM	Muffled exhaust
FP	Piped exhaust

XX DC VOLTAGE

A5	12 VDC (0.6 W)
A6	24 VDC (0.6 W)

Y MANUAL OPERATOR

0	No operator
1	Non-locking Recessed (std.)
2	Locking Recessed
3	Non-locking Extended
4	Locking Extended

ZZ ELECTRICAL CONN.

DA	Plug-in (standard)

Non Plug-In

BA	Grommet
CA	Conduit 1/2" NPS
JB	Rectangular Plug-in
JM	Rectangular Male only
JA	Square Plug-in
JJ	Square Male only

MODIFICATIONS

MOD 0210 Bottom inlet port in addition to side inlet port (manifolds only)
TO ORDER: 6311D-511-FM-A51DA **MOD 0210**
Manifold Accesories: 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.

Reset

HOW TO ORDER

65XXDXXX-(XX-XXXXX)

BODY/BASE OPTIONS

65 X X B — SERIES; REVISION LEVEL

Y Y Y - (XX-XXYZZ) - SOLENOID PILOT OPTIONS — SEE BELOW

FUNCTION

1	Single solenoid
2	Double solenoid
3	3 position closed center
4	3 position open center
5	3 position pressure center

BODY TYPE

1	Plug-in
2	Non plug-in

PORTING OPTIONS

0	Valve only - no base
1	Single pressure
4	Dual pressure

For use with Sandwich Regulators use Single Pressure option

PORT SIZE

0	Valve only - no base
1	3/8" base
2	1/2" base
3	3/4" base
4	3/8" manifold
5	1/2" manifold
6	3/4" manifold

PILOT AIR

0	Valve only - no base
	Solenoid Plug-In NPT
1	Internal pilot
2	External pilot
	Solenoid Non Plug-In
3	Internal pilot
4	External pilot
5-8	For BSPP respectively

PILOT VALVE OPTIONS

XX - XXYZZ

XX PILOT EXHAUST

FM	Muffled exhaust
FP	Piped exhaust

XX DC VOLTAGE

A5	12 VDC (0.6 W)
A6	24 VDC (0.6 W)

Y MANUAL OPERATOR

0	No operator
1	Non-locking Recessed (std.)
2	Locking Recessed
3	Non-locking Extended
4	Locking Extended

ZZ ELECTRICAL CONN.

DA	Plug-in (standard)
	Non Plug-In
BA	Grommet
CA	Conduit 1/2" NPS
JB	Rectangular Plug-in
JM	Rectangular Male only
JA	Square Plug-in
JJ	Square Male only

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

Reset

HOW TO ORDER

66XXDXXX-(XX-XXXXX)

BODY/BASE OPTIONS

66 X X A — SERIES; REVISION LEVEL

Y Y Y - (XX-XXYZZ) - SOLENOID PILOT OPTIONS — SEE BELOW

FUNCTION

1	Single solenoid
2	Double solenoid
3	3 position closed center
4	3 position open center
5	3 position pressure center

BODY TYPE

1	Plug-in
2	Non plug-in

PORTING OPTIONS

0	Valve only - no base
1	Single pressure
4	Dual pressure

PORT SIZE

0	Valve only - no base
2	3/4" base
3	1" base
4	3/4" manifold
5	1" manifold
6	1-1/4" manifold

PILOT AIR

0	Valve only - no base
Solenoid Plug-In NPT	
1	Internal pilot
2	External pilot
Solenoid Non Plug-In	
3	Internal pilot
4	External pilot
5-8	For BSPP respectively

PILOT VALVE OPTIONS

XX - XXYZZ

XX PILOT EXHAUST

FM	Muffled exhaust
FP	Piped exhaust

XX DC VOLTAGE

A5	12 VDC (0.6 W)
A6	24 VDC (0.6 W)

Y MANUAL OPERATOR

0	No operator
1	Non-locking Recessed (std.)
2	Locking Recessed
3	Non-locking Extended
4	Locking Extended

ZZ ELECTRICAL CONN.

DA	Plug-in (standard)
Non Plug-In	
BA	Grommet
CA	Conduit 1/2" NPS
JB	Rectangular Plug-in
JM	Rectangular Male only
JA	Square Plug-in
JJ	Square Male only

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. 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.
4. 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**.

MV-A1C ISO 1
MV-A2B ISO 2
MV-A3B ISO 3

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 th 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.
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
FM Muffled exhaust ***FP*** Piped exhaust ***FC*** CNOMO Muffled ***FD*** CNOMO Piped	***A5*** 12 VDC (0.6 W) ***A6*** 24 VDC (0.6 W)	***0*** No operator ***1*** Non-locking Recessed (std.) ***2*** Locking Recessed ***3*** Non-locking Extended ***4*** Locking Extended	***JA*** Square without light (on solenoid) ***JB*** Rectangular without light (on solenoid) ***JE*** Square without light (on body) ***JF*** Rectangular without light (on body)	***AA*** JIC w/1/2" NPS Conduit ***BA*** Grommet ***CA*** Conduit 1/2" NPS ***CC*** Conduit 1/2" NPT (CSA Threads)

BASE TABLE

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

Series 125-250

Reset

VXXX-XX-XXXDA-9

HOW TO ORDER

VALVE OPTIONS

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

SEE BELOW

SERIES
REVISION LEVEL

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

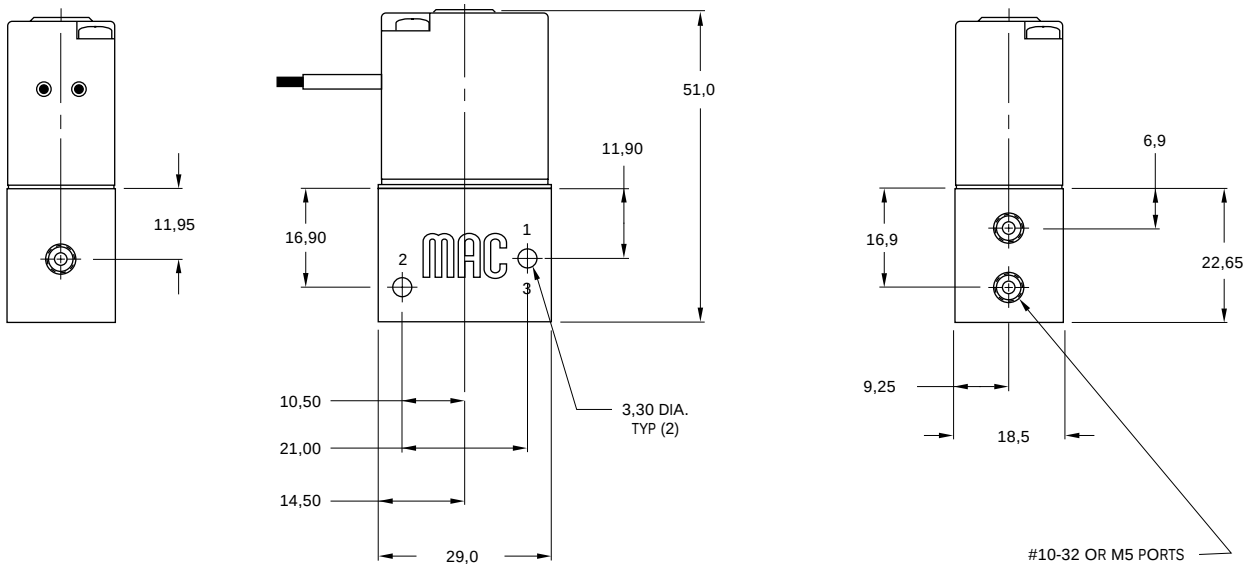
ORDERING EXAMPLE: MAC125A-V1A1-FM-A51DA

BASE/MANIFOLD TABLE

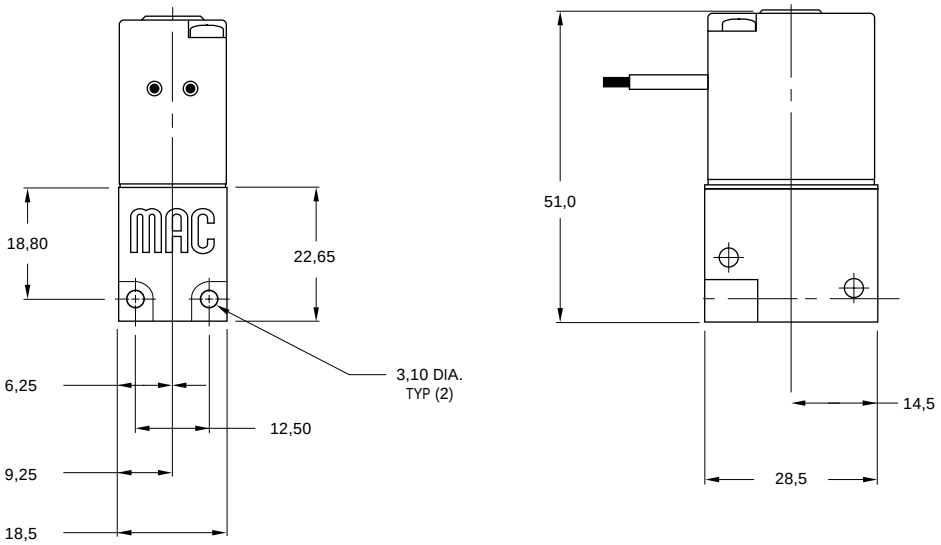
TYPE	PORT SIZE	INDIVIDUAL BASE	MANIFOLD BASE (btm. cyl. ports)	MANIFOLD BASE** (side & btm. cyl. ports)
MAC125	1/4"	MAC125A-B21A	MAC125A-M21B	MAC125A-M21C
	3/8"	MAC125A-B31A	MAC125A-M31B	MAC125A-M31C
MAC250	1/2"	MAC250A-B21A	MAC250A-M21B	MAC250A-M21C
	3/4"	MAC250A-B31A	MAC250A-M31B	MAC250A-M31C
	1"	MAC250A-B41A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

35 Series Inline

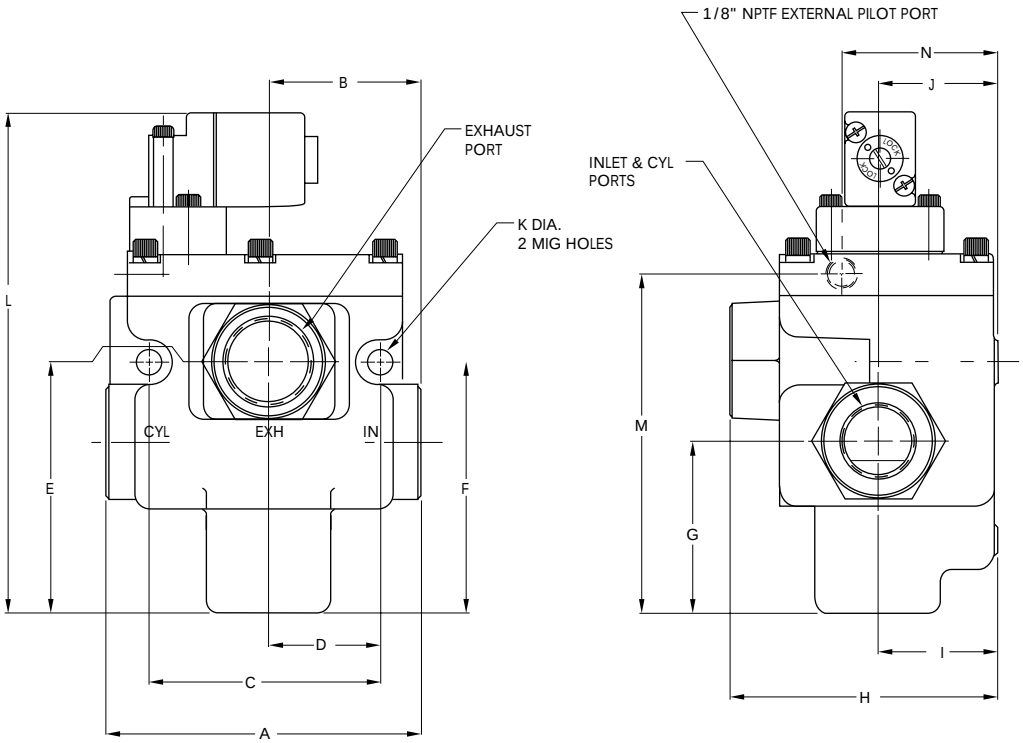


35 Series Manifold



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