Manufacturer of Air Control Valves

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We are pleased to announce the release and availability of the MI/O-67® Fieldbus Platform. Our initial release includes several different protocol options in addition to several modules to ensure a complete system package. Below are some of the general features of the platform.

- • MI/O-67® will utilize existing MAConnect® technology with MI/O-67® specific part numbers
- • 5 protocols offered for flexibility of different customer systems
- • Digital, Analog and PowerPlus™ modules to accommodate any I/O or additional valves needed
- • Designed to meet IP67 washdown specifications (with appropriate valve series modifications)

The remainder of this bulletin will outline specific details on each module and provide information on ordering for both the MI/O-67® platform and various MAConnect® valve series for the initial release.

MI/O-67® Communications Module

The communications module is the brains of the MI/O-67® platform and will be the minimum required module to implement a fieldbus solution. There will be 5 protocols available upon the initial release:

- • EtherNet/IP®
- • EtherCAT®
- • POWERLINK®
- • PROFINET®
- • Modbus/TCP®

Each communication module will be capable of driving up to 32 solenoids (32 singles, 16 doubles max or any combination of the two up to 32 solenoids) on the MAConnect® stack. The module has a capability of outputting 8 A max (0.5 A max per channel) to the MAConnect® stack. You can connect up to 12 additional modules to each communication module and have 8A shared across those additional modules. All of the MI/O-67® modules will operate on a 24VDC negative common setup. It will be attached to the MAConnect® stack via a valve series specific adapter.

The communications modules will be available in both a 7/8" 4-pin mini and 7/8" 5-pin mini power configuration and will incorporate two Ethernet M12 ports for pass through communication to other network devices. The valve power is brought in on different pins than the electronics power for isolation purposes and both have the capability to handle up to 8A.

In addition to the hardware information laid out above there will be additional software and training tools available for distributor and customer use. These software tools include a digital manual, IP configuration tool and Add On Instructions (AOI) profiles for each module. The associated configuration files (EDS, ESI, etc.) are available on the MAC Valves website. Videos will be posted to the MAC Valves YouTube® page to show simple configuration tips and techniques.

All modules will attach via binding clip assemblies (4 clips come with each communications module and 2 clips come with each additional module). You will not need to order the clips separately for assembly, except to stock spares. Please note that each MI/O-67® assembly requires an end plate kit (M-M0001-01) and associated MI/O-67® valve series adapter.

MI/O-67® Digital I/O Module

The Digital I/O module will help you to differentiate over the competition. While many competitors have digital modules that supply both inputs and outputs in the same module, with the MAC Digital I/O module your customer will be able to change the entire module between NPN and PNP input mode and will also have control over the number of inputs and outputs. The configuration options for I/O include:

- 0 inputs, 16 outputs
- 16 inputs, 0 outputs
- 8 inputs, 8 outputs

Each channel will have 2 I/O points per M12 connector and will have fault detection as a standard. Max output will be 0.5A per channel from the shared 8 A electronics power.

MI/O-67® Analog I/O Modules

The analog I/O modules will also be available on the initial release of the MI/O-67® platform. Unlike the Digital I/O module, these modules are not configurable. Each Analog I/O module comes set at 4 inputs and 4 outputs (one input and one output per M12 connector). You will also need to take note whether your customer is using 4-20 mA or 0-10VDC analog I/O as they are ordered as two separate modules. Each configuration will also include fault detection.

MI/O-67® PowerPlus™ Module

The PowerPlus™ module gives you an additional 12 output points at 0.5 A per channel. The setup is similar to the Digital and Analog modules in that there are two outputs per M12 connector. The PowerPlus™ module requires you to bring in up to an additional 6 A of independent power via a 7/8" 5-pin mini power connector to power these additional outputs for valves and other devices.

MI/O-67®MAConnect® Series

There will be three different MAConnect® series adapters available initially which are the 36/46, 42 and 92 series. In the past with smaller MAConnect® series you were limited to 16 solenoids; with the release of the MI/O-67® MAConnect® series part numbering, you can now order up to 32 solenoid outputs as a standard (only 32 solenoid output boards will be available on MI/O-67® MAConnect® series). Please note that on the new 36/46 and 42 series MAConnect® bases there is a limitation of 26 solenoids that may be energized at a given time if you are using 5.4W coils. Additional releases will be sent out as new adapters are developed. As with previous MAConnect® series releases, bases can be wired for single or double solenoid and you will need to order these as such. Note that a single solenoid valve placed on a base wired for double solenoid will consume two outputs.

36/46 Series

BOM for Above Stack:

1. (1) M-M0001-01   End-Plate Kit for MI/O-67®
2. (1) MIO67A-CM-EN-01   MI/O-67® EtherNet/IP® Communications Module
3. (1) M-46019-01   46 Series MI/O-67® MAConnect® Interface Adapter
4. (16) 46A-LMA-1C-JDAP-1FA   46 Series Valves with MI/O-67® Bases
5. (1) M-46018-01-16   46 Series MAConnect® End-Plate Kit

42 Series

BOM for Above Stack:

1. (1)   M-M0001-01   End-Plate Kit for MI/O-67®
2. (1)   MIO67A-CM-EN-01   MI/O-67® EtherNet/IP® Communications Module
3. (1)   M-42023-01-08   42 Series MI/O-67® MAConnect® Interface Adapter
4. (7)   42A-AMA-D11-GDAP-1DJ   42 Series Middle Station Valves with MI/O-67® Bases
5. (1)   42A-AMA-D31-GDAP-1DJ   42 Series End Station Valve with MI/O-67® Base

92 Series

BOM for Above Stack:

1. (1) M-M0001-01   End-Plate Kit for MI/O-67®
2. (1) MIO67A-DG-01-01   MI/O-67® Digital I/O Module
3. (1) MIO67A-CM-EN-01   MI/O-67® EtherNet/IP® Communications Module
4. (1) M-92048-01-06   92 Series MI/O-67® MAConnect® Interface Adapter
5. (5) 92B-BAB-B1K-DM-DDAP-1DM   92 Series Middle Station Valves with MI/O-67® Bases
6. (1) 92B-BAB-B3K-DM-DDAP-1DM   92 Series End Station Valve with MI/O-67® Base

92 Series Loaded Stack

BOM for Above Stack:

1. (1) M-M0001-01   End-Plate Kit for MI/O-67®
2. (1) MIO67A-DG-01-01   MI/O-67® Digital I/O Module
3. (1) MIO67A-PP-01-01   MI/O-67® PowerPlus™ Module
4. (1) MIO67A-AN-01-01   MI/O-67® 0-10 VDC Analog I/O Module
5. (1) MIO67A-AN-02-01   MI/O-67® 4-20 mA Analog I/O Module
6. (1) MIO67A-CM-EN-01   MI/O-67® EtherNet/IP® Communications Module
7. (1) M-92048-01-06   92 Series MI/O-67® MAConnect® Interface Adapter
8. (5) 92B-BAB-B1K-DM-DDAP-1DM 92 Series Middle Station Valves with MI/O-67® Bases
9. (1) 92B-BAB-B3K-DM-DDAP-1DM 92 Series End Station Valve with MI/O-67® Base

How To Order
MI/O-67® Module

MIO67A - CM - XX - XX

Protocol

EN EtherNet/IP
EC EtherCAT
PL POWERLINK
PN PROFINET
MB MODBUS/TCP

Power Connector

01 7/8" 5 Pin Power Connector
02 7/8" 4 Pin Power Connector

Additional Modules

MIO67A-DG-01-01	Configurable Digital I/O
MIO67A-AN-01-01	0-10 VDC Analog I/O
MIO67A-AN-02-01	4-20 mA Analog I/O
MIO67A-PP-01-01	Power Plus
M-M0001-01	End Plate Assembly
N-M0001	Binding Clip Assembly

How To Order
92 Series MAConnect® for MI/O-67®

92B - X X X - X X X - DX - D XX X - X XX

Pilot Valve

Valve Function

0	Base Only
A	Sgl Sol Sgl Pressure
B	Dbl Sol Sgl Pressure
C	Sgl Sol Dual Pressure
D	Dbl Sol Dual Pressure
E	Dbl Sol 3 Pos Closed Center
F	Dbl Sol 3 Pos Open Center
G	Dbl Sol 3 Pos Press Center
H	Dbl Sol 3 Pos Dual Press Press Cen
J	Dbl Sol 3 Pos Dual Press Close Cen
K	Dbl Sol 3 Pos Dual Press Open Cen
L	Sgl Sol Sgl Press w/Mem Spring
N	Sgl Sol Dual Press w/Mem Spring

Body Type and Exhaust Options

0	Base Only
A	Plug-In Std Exh
C*	Plug-In w/Pilot Exh to Main Exhaust

*Must use "DU" Pilot Body

Body Electrical Options

0	Base Only
A	No Light in Top
B	Light in Top
F	Suppression Diode, Blocking Diode & Light

Port Size and Thread Type

0	Valve Only
B	1/4" NPTF
C	3/8" NPTF
E	1/4" BSPPL
F	3/8" BSPPL
H	1/4" BSPTR
J	3/8" BSPTR

Manifold Configuration

0	Valve Only
1	Side Cyl. Ports (Middle Station)
2	Bottom Cyl. Ports (Middle Station)
3	Side Cyl. Ports (End Station)
4	Bottom Cyl. Ports (End Station)
5	Side Cyl. Ports- Selector Manifold (Middle Station)

Int/Ext Pilot
MAConnect® Plug-In for MI/O-67®

0	Valve Only

Internal Pilot

J	Sgl. Solenoid Plug-In (32 Outputs)
K	Dbl. Solenoid Plug-In (32 Outputs)

External Pilot

S	Sgl. Solenoid Plug-In (32 Outputs)
T	Dbl. Solenoid Plug-In (32 Outputs)

Note:
MI/O-67® Modules Are Always On The Left With The Stack To The Right And Cylinder Ports Facing You.

Order Example

1	M-M0001-01	MI/O-67® End Plate Assembly
1	MIO67A-CM-EN-01	MI/O-67® EtherNet/IP
1	M-92048-01-07	Interface Adapter (Int Pilot, NPT Threads, For 7 Valves) Assembly
6	92B-AAB-C1J-DM-DDAP-1DM	6 Middle Station Valves, Sgl Sol, Light In Top, Int Pilot, Side Cyl, 3.8" NPTF
1	92B-AAB-C3J-DM-DDAP-1DM	1 End Station Valve, Sgl Sol, Light In Top, Int Pilot, Side Cyl, 3/8" NPTF

How To Order
MI/O-67® 92 Series Pilot Valve

DX - D XX P - X XX

Pilot Style

DM	Muffled Exhaust
DP	Piped Exhaust
DU	Pilot Exhaust Out Main Exhaust

Voltage

DA	24 VDC (5.4W)
FB	24 VDC (1.8W)
FF	24 VDC (2.4W)

Valve/Base Connector

P	Plug-In

Manual Operator

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

Electrical Connector

DM	Plug-In
DN	Plug-In w/ Diode

How To Order
MI/O-67® Interface Adapter for 92 Series

M - 92048 - XX - XX X

Pilot

01	Internal Pilot
02	External Pilot

Stations

01	Adapter As Individual Part
02 thru 32	Number Of Stations If Factory Gang

Threads

Blank	NPTF Threads
P	BSPPL Threads
T	BSPTR Threads

How To Order
36 Series MAConnect® for MI/O-67®

36A - X X X - X X - J XX P - X XX

Body Type
0	Base Only
J	Base Mount Body Universal Valve N.C.
K	Base Mount Body Universal Valve N.O.
L	Base Mount Body N.C. Only Valve

Electrical Type
0	Valve Only
M	MAConnect®

Port Size and Thread Type
0	Valve only
A	1/8" NPT
C	1/8" BSPPL
E	1/8" BSPTR
F	5/32" O.D. Tube Receptacle

Base Electrical
0	Valve Only
1	Plug-In (32 Outputs)

Manifold Configuration
0	Valve Only
E	N.C. Man Side Cyl. Port
F	N.O. Man Side Cyl. Port
G	N.C. Man Bot Cyl. Port & Reg w/ Slotted Stem
H	N.O. Man Bot Cyl. Port & Reg w/ Slotted Stem
J	N.C. Man Bot Cyl. Port & Reg w/ Adjusting Knob
K	N.O. Man Bot Cyl. Port & Reg w/ Adjusting Knob
S	N.C. Man Bot Cyl. Port & Reg w/ Locking Stem
T	N.O. Man Bot Cyl. Port & Reg w/ Locking Stem

Voltage
DA*	24 VDC (5.4w) Max Cv = 0.3
DC	24 VDC (2.4w)
DE	24 VDC (1.8w)
MA*	24 VDC (5.4w) Max Cv = 0.23

*A Maximum Of 26 Solenoids Can Be Energized At The Same Time When Using a 5.4w Coil.

Valve / Base Connector
P	Plug-In

Manual Operator
0	No Operator
1	Recessed Non-Locking
2	Recessed Locking
3	Extended Non-Locking
4	Extended Locking

Electrical Connector
FA	Base Plug-In
FB	Base Plug-In w/ Diode
FD	Base Plug-In w/ LED
FE	Base Plug-In w/ Diode and LED

Note:
MI/O-67® Modules Are Always On The Left With The Stack To The Right And Cylinder Ports Facing You.

Order Example
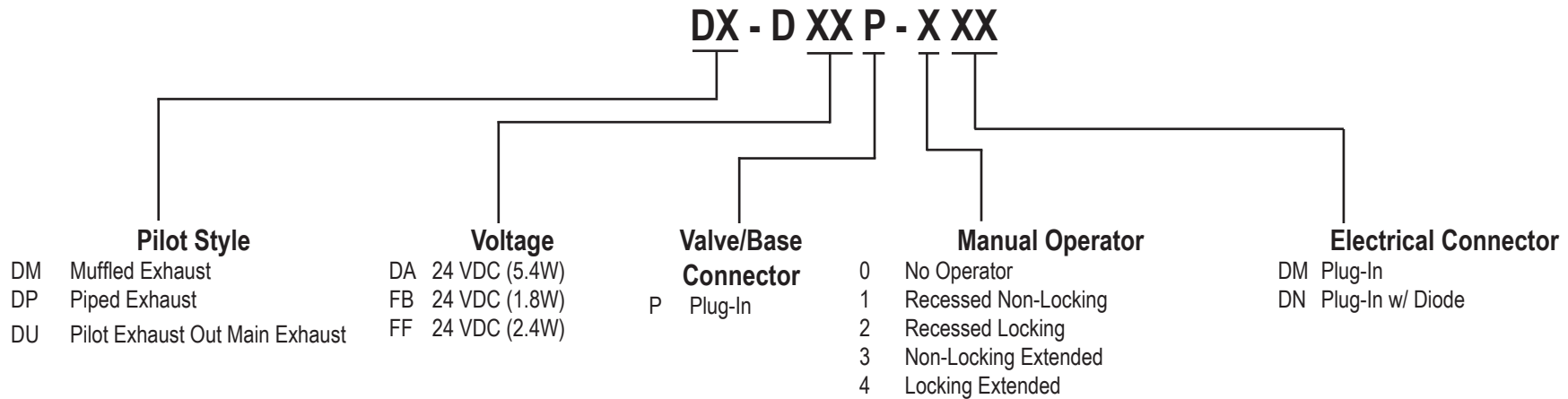|		
1	M-00001-01	MI/O-67® End Plate
1	MIO67A-CM-EN-01	MI/O-67® EtherNet/IP
1	M-46019-01	MI/O-67® Interface Adapter w/ NPTF Ports
6	36A-JMA-1E-JDAP-FA	6 Middle Station Valves, Normally Closed Universal w/ Normally Closed Manifold And NPTF Ports
1	M-46018-01-06	End Plate Assembly w/ NPTF Ports For 6 Valves

How To Order
MI/O-67® End Plate Kit for 36 Series

M - 46018 - XX - XX X

Ports

01 Standard Inlet and Exhaust Ports (1/4")

Number of Stations

01   Adapter As Individual Part

02 thru 32 Number Of Stations If Factory Gang

Threads

Blank NPTF Threads

P   BSPPL Threads

T   BSPTR Threads

How To Order
MI/O-67® Interface Adapter for 36 Series

M - 46019 - XX X

Ports

01 Standard Inlet and Exhaust Ports (1/4")

Threads

Blank NPTF Threads

P   BSPPL Threads

T   BSPTR Threads

How To Order
46 Series MAConnect® for MI/O-67®

46A - X X X - X X - J XX P - X XX

Body Type
0	Base only
L	Base mount body
M	Base mount body w/ gauge port
N*	Base mount body double solenoid
P*	Base mount body double solenoid w/ gauge port

*Must Order 5.4W (Voltage Code) For Double Solenoids

Electrical Type
0	Valve Only
M	MAConnect®

Port Size and Thread Type
0	Valve only
A	1/8" NPT
C	1/8" BSPPL
E	1/8" BSPTR
F	5/32" O.D. Tube Receptacle

Base Electrical
0	Valve Only
1	Sgl Sol Plug-In (32 Outputs)
2	Dbl Sol Plug-In (32 Outputs)

Manifold Configuration
0	Valve Only
C	Side Cylinder Ports
D	Side Cylinder Ports w / Flow Controls
E	Bottom Cylinder Ports w/ Reg. (Slotted Stem)
F	Bottom Cylinder Ports w/ Reg. (Slotted Stem) & Flow Controls
G	Bottom Cylinder Ports w/ Reg. (Locking Slotted Stem)
H	Bottom Cylinder Ports w/ Reg. (Locking Slotted Stem) & Flow Controls
J	Bottom Cylinder Ports w/ Reg. (adjusting knob)
K	Bottom Cylinder Ports w/ Reg. (adjusting knob) & flow controls
L	Bottom Cylinder Ports
M	Bottom Cylinder Ports w/flow controls

Voltage
DA*	24 VDC (5.4w)
	Max Cv = 0.3
DC	24 VDC (2.4w)
DE	24 VDC (1.8w)
DJ	24 VDC (1.3w)
MA*	24 VDC (5.4w)
	Max Cv = 0.23

*A Maximum Of 26 Solenoids Can Be Energized At The Same Time When Using a 5.4w Coil.

Valve / Base Connector
P	Plug-In

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

Electrical Connector
FA	Base Plug-In
FB	Base Plug-In w/ Diode
FD	Base Plug-In w/ LED
FE	Base Plug-In w/ Diode and LED

Note:
MI/O-67® Modules Are Always On The Left With The Stack To The Right And Cylinder Ports Facing You.
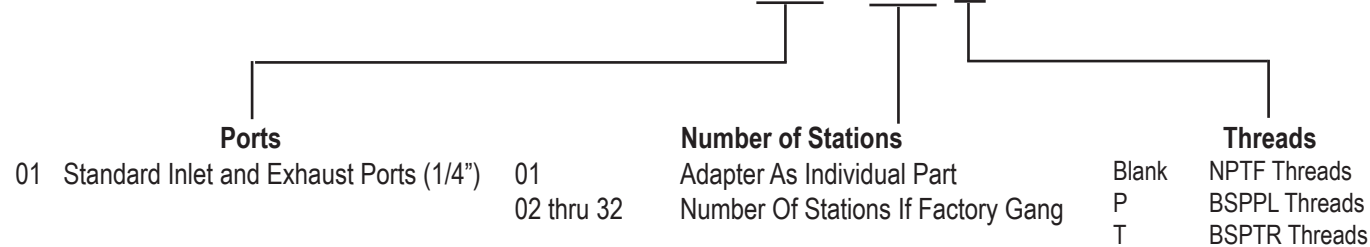
Order Example
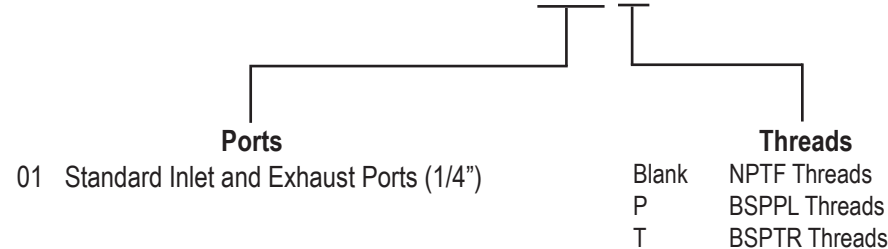|		
1	M-00001-01	MI/O-67® End Plate
1	MIO67A-CM-EN-01	MI/O-67® EtherNet/IP
1	M-46019-01	MI/O-67® Interface Adapter w/ NPTF Ports
6	46A-LMA-1C-JDAP-FA	6 Middle Station Valves, w/ 32 Outputs And NPTF Ports
1	M-46018-01-06	End Plate Assembly w/ NPTF Ports For 6 Valves

How To Order
MI/O-67® End Plate Kit for 46 Series

M - 46018 - XX - XX X

Ports
01   Standard Inlet and Exhaust Ports (1/4")

Number of Stations

01	Adapter As Individual Part
02 thru 32	Number Of Stations If Factory Gang

Threads

Blank	NPTF Threads
P	BSPPL Threads
T	BSPTR Threads

How To Order
MI/O-67® Interface Adapter for 46 Series

M - 46019 - XX X

Ports
01   Standard Inlet and Exhaust Ports (1/4")

Threads

Blank	NPTF Threads
P	BSPPL Threads
T	BSPTR Threads

How To Order
42 Series MAConnect® for MI/O-67®

42A - X X X - X X X - GXXP - X XX

Solenoid Assembly

Valve Function
0	Base Only
A	2 Position Sgl Press Sgl Solenoid
B	2 Position Sgl Press Dbl Solenoid
C	2 Position Dual Press Sgl Solenoid
D	2 Position Dual Press Dbl Solenoid
E	3 Position Closed Center
F	3 Position Open Center
H	3 Position Dual Press Press Center
R	2 Position Sgl Solenoid Universal
S	2 Position Dual Solenoid Universal

Pilot
Exhaust Options
0	Base Only
M	Pilot Exh Muffled
P	Pilot Exh Piped #10-32
R	Pilot Exh Piped M5
U	Pilot Exh Out Main Exh

Internal / External Pilot And Body Plug-In
0	Base Only

Single Solenoid
A	Int Pilot Sgl Press
B	Int Pilot Dual Press (From #3)
C	Int Pilot Dual Press (From #5)
D	Ext Pilot From Base

Double Solenoid
E	Int Pilot Sgl Press w/ LED
F	Int Pilot Dual Press (From #3) w/ LED
G	Int Pilot Dual Press (From #5) w/ LED
H	Ext Pilot From Base w/ LED
J	Int Pilot Sgl Press w/ LED and Diode
K	Int Pilot Dual Press (From #3) w/ LED and Diode
L	Int Pilot Dual Press (From #5) w/ LED and Diode
M	Ext Pilot From Base w/ LED and Diode

Port Size and
Thread Type
0	Valve Only
A	#10-32
B	M5 (NPTF thru ports)
D	6mm O.D. Tube Receptacle (NPTF thru ports)
E	1/4" O.D. Tube Receptacle (NPTF thru ports)
F	M7 (NPTF thru ports)
G	M5 (BSPPL thru ports)
J	6mm O.D. Tube Receptacle (BSPPL thru ports)
K	1/4" O.D. Tube Receptacle (BSPPL thru ports)
L	M7 (BSPPL thru ports)
M	M5 (BSPTR thru ports)
P	6mm O.D. Tube Receptacle (BSPTR thru ports)
R	1/4" O.D. Tube Receptacle (BSPTR thru ports)
S	M7 (BSPTR thru ports)

Manifold Configuration
0	Valve Only
1	Side Cyl. Ports (Middle Station)
2	Bottom Cyl. Ports (Middle Station)
3	Side Cyl. Ports (End Station)
4	Bottom Cyl. Ports(End Station)

Int/Ext Pilot MAConnect®
Plug-In for MI/O-67®
0	Valve Only
1	Int Pilot Sgl. Solenoid Plug-In (32 Outputs)
2	Int. Pilot Dbl. Solenoid Plug-In (32 Outputs)
5	Ext. Pilot Sgl. Solenoid Plug-In (32 Outputs)
6	Ext. Pilot Dbl. Solenoid Plug-In (32 Outputs)

Note:
MI/O-67® Modules Are Always On The Left With The Stack To The Right And Cylinder Ports Facing You.
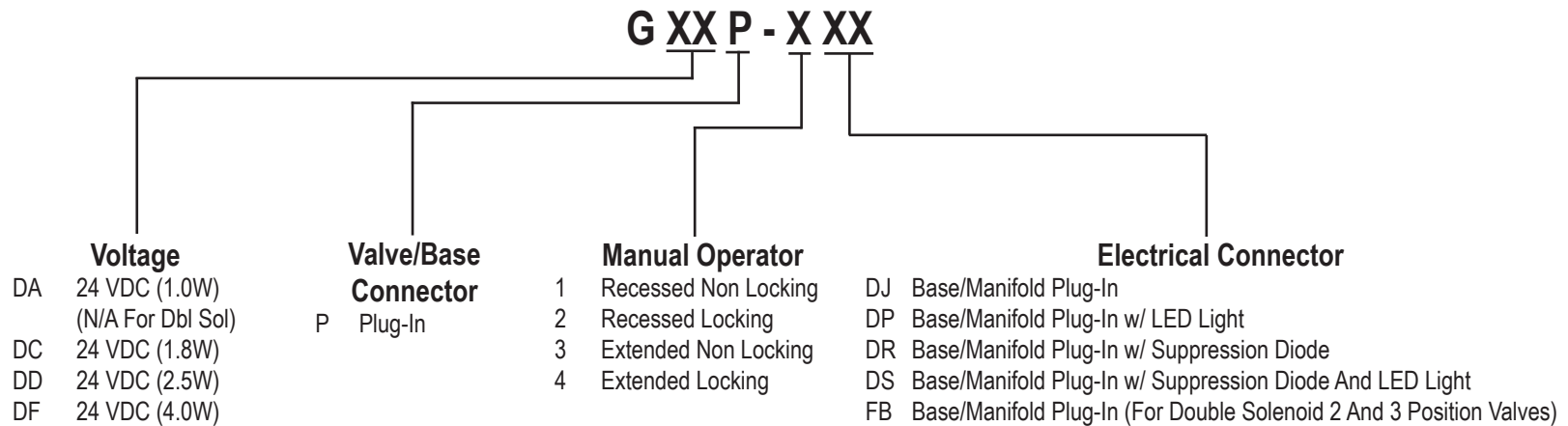
Order Example
1	M-00001-01	MI/O-67® End Plate
1	MIO67A-CM-EN-01	MI/O-67® EtherNet/IP
1	M-42023-01-06	MI/O-67® Interface Adapter, 6 Stations w/ NPTF Ports
5	42A-AMA-A11-GDAP-1DJ	5 Middle Station Valves w/ #10-32 Ports
1	42A-AMA-A31-GDAP-1DJ	End Station Valve w/ NPTF Threads And #10-32 Cylinder Ports

How To Order
MI/O-67® 42 Series Solenoid Assembly

G XX P - X XX

Voltage

DA	24 VDC (1.0W)
	(N/A For Dbl Sol)
DC	24 VDC (1.8W)
DD	24 VDC (2.5W)
DF	24 VDC (4.0W)

Note: A Maximum Of 26 Solenoids Can Be Energized
At The Same Time When Using a 5.4w Coil.

Valve/Base Connector

P   Plug-In

Manual Operator

1	Recessed Non Locking
2	Recessed Locking
3	Extended Non Locking
4	Extended Locking

Electrical Connector

DJ	Base/Manifold Plug-In
DP	Base/Manifold Plug-In w/ LED Light
DR	Base/Manifold Plug-In w/ Suppression Diode
DS	Base/Manifold Plug-In w/ Suppression Diode And LED Light
FB	Base/Manifold Plug-In (For Double Solenoid 2 And 3 Position Valves)

How To Order
MI/O-67® Interface Adapter for 42 Series

M - 42023 - XX - XX X

Pilot

01	Internal Pilot
02	External Pilot

Stations

01	Adapter As Individual Part
02 thru 32	Number Of Stations If Factory Gang

Threads

Blank	NPTF Threads
P	BSPPL Threads
T	BSPTR Threads