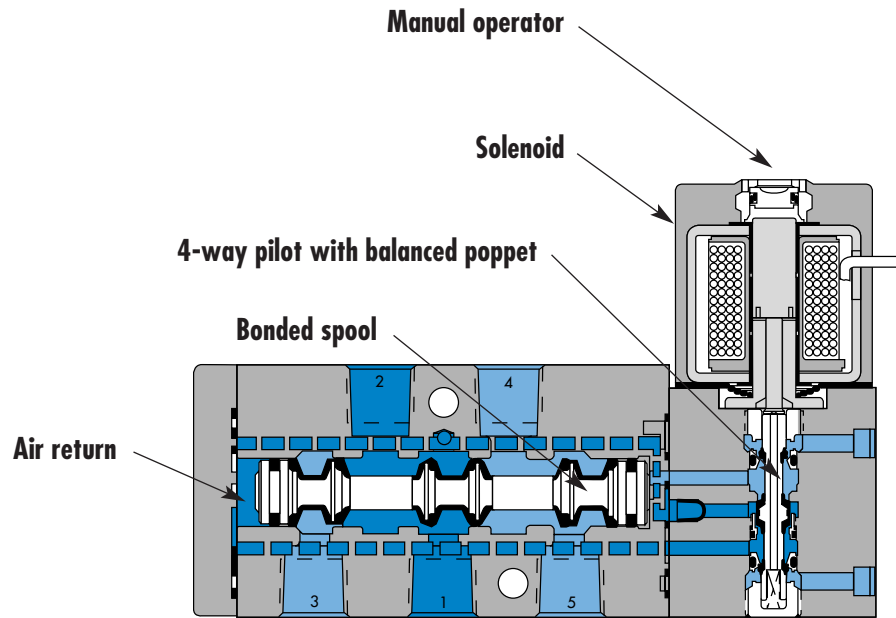


Individual mounting

Inline	Sub-base non "plug-in"
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Series



33

34

36

32

37

38

52

67

69

44

46

42

47

48P

48

48

**400**

92

**SERIES FEATURES**

- Patented MACSOLENOID® for fastest possible response times and virtually burn-out proof AC solenoid operation.
- Optional low watt DC solenoids.
- Various manual operators.
- Optional memory spring.
- 2 position or 3 position valve configurations.
- Internal or external pilot.

93

ISO 01

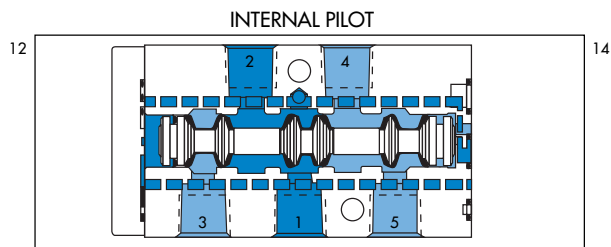
ISO 02

ISO 1

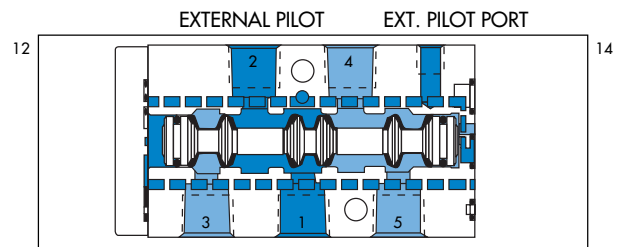
ISO 2

ISO 3

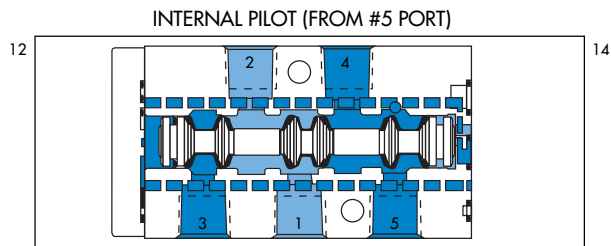
**SPOOL CONFIGURATIONS**



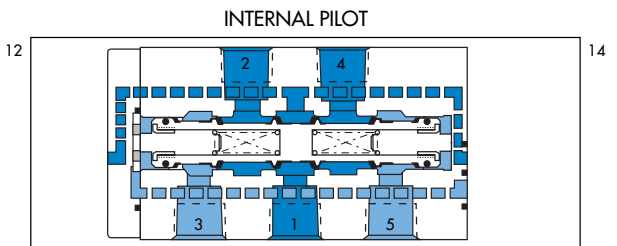
SINGLE OPERATOR - SINGLE INLET  
SHOWN WITH 12 OPERATOR ENERGIZED



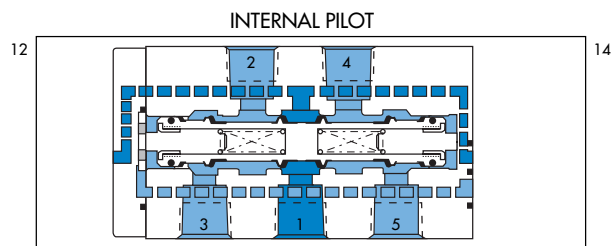
SINGLE OPERATOR - SINGLE INLET  
SHOWN WITH 12 OPERATOR ENERGIZED



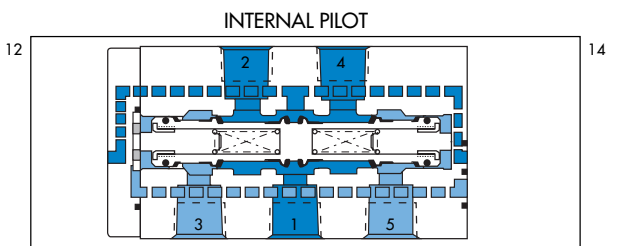
SINGLE OPERATOR - DUAL INLET  
SHOWN WITH 12 OPERATOR ENERGIZED



3 POSITION CLOSED CENTER



3 POSITION OPEN CENTER



3 POSITION PRESSURE CENTER



# Direct solenoid and solenoid pilot operated valves

Function	Port size	Flow [Max]	Individual mounting	Series
<b>5/2, 5/3</b>	<b>1/8" - 1/4"</b>	<b>1.0 C<sub>v</sub></b>	Inline	

### OPERATIONAL BENEFITS

1. The 4-way pilot develops maximum shifting forces both ways.
2. Memory spring available.
3. Balanced spool, immune to variations of pressure, also provides high flow.
4. Short stroke with high flow.
5. Bonded spool with minimum friction, shifting in a glass-like finished bore.
6. Wiping effect eliminates sticking.
7. Long service life.



- 33
- 34
- 36
- 32
- 37
- 38
- 52
- 67
- 69
- 44
- 46
- 42
- 47
- 48P

### HOW TO ORDER

#### SINGLE PRESSURE MODELS

Port size	Pilot air	5/2 Single operator	5/2 Double operator	5/3 Closed center	5/3 Open center	5/3 Pressure center
<b>1/8" NPTF</b>	Internal	411A-A0A-XX-XXXX-XXX	421A-A0A-XX-XXXX-XXX	451A-A0A-XX-XXXX-XXX	461A-A0A-XX-XXXX-XXX	471A-A0A-XX-XXXX-XXX
<b>1/4" NPTF</b>	Internal	411A-B0A-XX-XXXX-XXX	421A-B0A-XX-XXXX-XXX	451A-B0A-XX-XXXX-XXX	461A-B0A-XX-XXXX-XXX	471A-B0A-XX-XXXX-XXX
<b>1/8" NPTF</b>	External	411A-A0B-XX-XXXX-XXX	421A-A0B-XX-XXXX-XXX	451A-A0B-XX-XXXX-XXX	461A-A0B-XX-XXXX-XXX	471A-A0B-XX-XXXX-XXX
<b>1/4" NPTF</b>	External	411A-B0B-XX-XXXX-XXX	421A-B0B-XX-XXXX-XXX	451A-B0B-XX-XXXX-XXX	461A-B0B-XX-XXXX-XXX	471A-B0B-XX-XXXX-XXX

#### DUAL PRESSURE MODELS (INTERNAL PILOT – PILOT PRESSURE SUPPLY FROM #5 PORT)

Port size	Pilot air	5/2 Single operator	5/2 Double operator
<b>1/8" NPTF</b>	Internal	431A-A0A-XX-XXXX-XXX	441A-A0A-XX-XXXX-XXX
<b>1/4" NPTF</b>	Internal	431A-B0A-XX-XXXX-XXX	441A-B0A-XX-XXXX-XXX
<b>1/8" NPTF</b>	External	431A-A0B-XX-XXXX-XXX	441A-A0B-XX-XXXX-XXX
<b>1/4" NPTF</b>	External	431A-B0B-XX-XXXX-XXX	441A-B0B-XX-XXXX-XXX

- 48
- 400
- 92
- 93

#### SOLENOID OPERATOR >

### DM-D XXX-XXX\*

XX Voltage	X Wire length	X Manual operator	XX Electrical connection
<b>JA</b> 110/50, 120/60 (2.9W)	<b>A</b> 18" (Flying leads)	<b>1</b> Non-locking recessed	<b>KA</b> Square connector
<b>JB</b> 220/50, 240/60 (2.9W)	<b>B</b> 24" (Flying leads)	<b>2</b> Locking recessed	<b>KD</b> Square connector with light
<b>JC</b> 24/60 (2.9W)	<b>J</b> Connector		<b>JB</b> Rectangular connector
<b>FB</b> 24 VDC (1.8W)			<b>JD</b> Rectangular connector with light
<b>DA</b> 24 VDC (5.4W)			<b>BA</b> Flying leads
<b>DF</b> 24 VDC (12.7W)			

- ISO 01
- ISO 02
- ISO 1
- ISO 2
- ISO 3

#### SOLENOID OPERATOR >

### GM-G XXX-XXX\*\*

XX Voltage	X Wire length	X Manual operator	XX Electrical connection
<b>DC</b> 24VDC (1.8W)	<b>A</b> 18"	<b>1</b> Non-locking recessed	<b>BA</b> Flying leads
<b>DD</b> 24VDC (2.5W)	<b>B</b> 24"	<b>2</b> Locking recessed	<b>BT</b> Flying leads with light
<b>DF</b> 24VDC (4.0W)	<b>C</b> 36"		<b>KA</b> Plug-in wire Assy.
			<b>KT</b> Plug-in wire Assy. with light

\* Other options available, see page 309.  
 \*\* Other options available, see page 313.

**TECHNICAL DATA**

<b>Fluid :</b>	Compressed air, vacuum, inert gases
<b>Pressure range :</b>	Internal pilot – 2 pos. : 20 to 120 PSI (with memory spring: 30 to 120 PSI) 3 pos.: 35 to 120 PSI External pilot : vacuum to 120 PSI
<b>Pilot pressure :</b>	2 position: 20 to 120 PSI (with memory spring: 30 to 120 PSI) 3 position: 35 to 120 PSI
<b>Lubrication :</b>	Not required, if used select a medium aniline point lubricant (between 180°F and 210°F)
<b>Filtration :</b>	40 μ
<b>Temperature range :</b>	0°F to 120°F (-18°C to +50°C)
<b>Flow :</b>	1.0 C <sub>v</sub>
<b>Coil :</b>	Class A continuous duty, #22 AWG x 12 leads wires
<b>Voltage range :</b>	-15% to +10% of nominal voltage
<b>Protection :</b>	Consult factory
<b>Power :</b>	~Inrush : 10.9 VA      Holding : 7.7 VA = 1.8 to 12.7 W
<b>Response times :</b>	24 V= /5.4W      Energize : 7.3 ms      De-energize : 5.3 ms 120/60      Energize : 8-12 ms      De-energize : 7-11 ms

Options :

- BSPP threads • Namur interface (specify mod. 1080 after model)

**411A-A0A-XX-XXX-XXX**

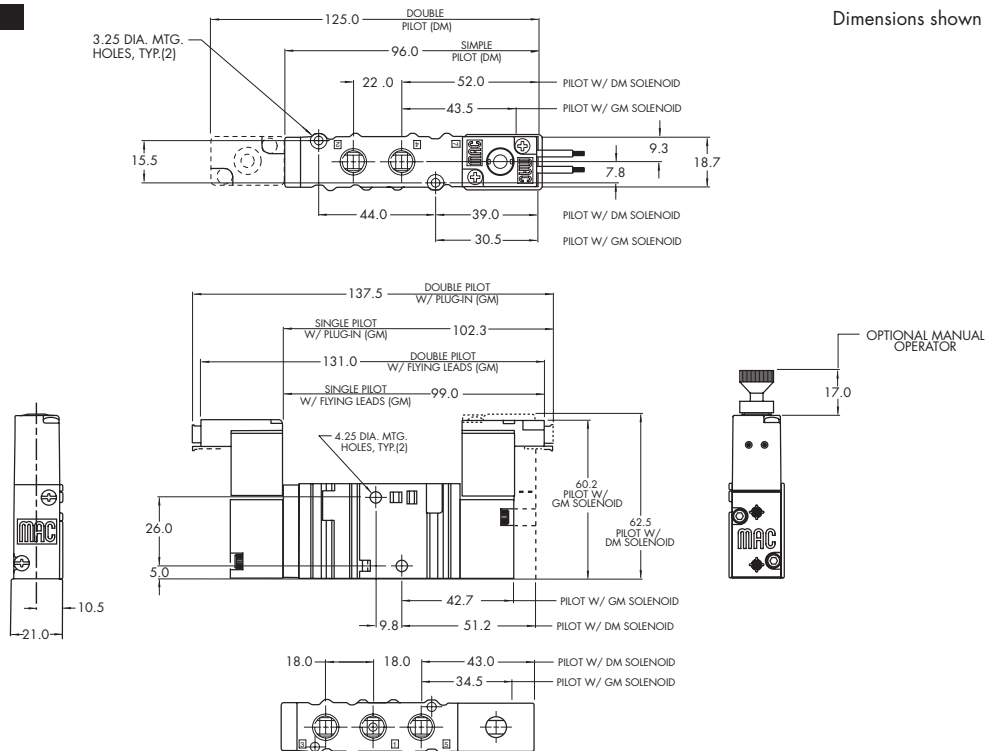
- Dual pressure models, replace by **C** for pilot supply from #3 port
- For memory spring, replace by **4** (single operator models only)
- Replace by **8** for 3 position dual pressure, pressure center

Spare parts :

- DM pilot body pressure seal: 16542 • DM pilot spacer plate: 24168-01.

**DIMENSIONS**

Dimensions shown are metric (mm)





# Direct solenoid and solenoid pilot operated valves

Function	Port size	Flow (Max)	Individual mounting	Series
<b>5/2, 5/3</b>	<b>1/8" - 1/4"</b>	<b>1.0 C<sub>v</sub></b>	Sub-base non "plug-in"	

## OPERATIONAL BENEFITS

1. The 4-way pilot develops maximum shifting forces both ways.
2. Memory spring available.
3. Balanced spool, immune to variations of pressure, also provides high flow.
4. Short stroke with high flow.
5. Bonded spool with minimum friction, shifting in a glass-like finished bore.
6. Wiping effect eliminates sticking.
7. Long service life.



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48P

## HOW TO ORDER

### SINGLE PRESSURE MODELS

Port size	Pilot air	5/2 Single operator	5/2 Double operator	5/3 Closed center	5/3 Open center	5/3 Pressure center
<b>Valve only</b>	Internal	413A-00A-XX-XXXX-XXX	423A-00A-XX-XXXX-XXX	453A-00A-XX-XXXX-XXX	463A-00A-XX-XXXX-XXX	473A-00A-XX-XXXX-XXX
	External	413A-00D-XX-XXXX-XXX	423A-00D-XX-XXXX-XXX	453A-00D-XX-XXXX-XXX	463A-00D-XX-XXXX-XXX	473A-00D-XX-XXXX-XXX
<b>1/8" NPTF</b>	Internal	413A-AAA-XX-XXXX-XXX	423A-AAA-XX-XXXX-XXX	453A-AAA-XX-XXXX-XXX	463A-AAA-XX-XXXX-XXX	473A-AAA-XX-XXXX-XXX
<b>1/4" NPTF</b>		413A-BAA-XX-XXXX-XXX	423A-BAA-XX-XXXX-XXX	453A-BAA-XX-XXXX-XXX	463A-BAA-XX-XXXX-XXX	473A-BAA-XX-XXXX-XXX
<b>1/8" NPTF</b>	External	413A-AAD-XX-XXXX-XXX	423A-AAD-XX-XXXX-XXX	453A-AAD-XX-XXXX-XXX	463A-AAD-XX-XXXX-XXX	473A-AAD-XX-XXXX-XXX
<b>1/4" NPTF</b>		413A-BAD-XX-XXXX-XXX	423A-BAD-XX-XXXX-XXX	453A-BAD-XX-XXXX-XXX	463A-BAD-XX-XXXX-XXX	473A-BAD-XX-XXXX-XXX

### DUAL PRESSURE MODELS (INTERNAL PILOT – PILOT PRESSURE SUPPLY FROM #5 PORT)

Port size	Pilot air	5/2 Single operator	5/2 Double operator
<b>Valve only</b>	Internal	433A-00A-XX-XXXX-XXX	443A-00A-XX-XXXX-XXX
	External	433A-00D-XX-XXXX-XXX	443A-00D-XX-XXXX-XXX
<b>1/8" NPTF</b>	Internal	433A-AAA-XX-XXXX-XXX	443A-AAA-XX-XXXX-XXX
<b>1/4" NPTF</b>		433A-BAA-XX-XXXX-XXX	443A-BAA-XX-XXXX-XXX
<b>1/8" NPTF</b>	External	433A-AAD-XX-XXXX-XXX	443A-AAD-XX-XXXX-XXX
<b>1/4" NPTF</b>		433A-BAD-XX-XXXX-XXX	443A-BAD-XX-XXXX-XXX

48  
400  
92  
93

### SOLENOID OPERATOR >

#### DM-D XXX-XXX\*

XX Voltage	X Wire length	X Manual operator	XX Electrical connection
<b>JA</b> 110/50, 120/60 (2.9W)	<b>A</b> 18" (Flying leads)	<b>1</b> Non-locking recessed	<b>KA</b> Square connector
<b>JB</b> 220/50, 240/60 (2.9W)	<b>B</b> 24" (Flying leads)	<b>2</b> Locking recessed	<b>KD</b> Square connector with light
<b>JC</b> 24/60 (2.9W)	<b>J</b> Connector		<b>JB</b> Rectangular connector
<b>FB</b> 24 VDC (1.8W)			<b>JD</b> Rectangular connector with light
<b>DA</b> 24 VDC (5.4W)			<b>BA</b> Flying leads
<b>DF</b> 24 VDC (12.7W)			

ISO 01  
ISO 02  
ISO 1  
ISO 2  
ISO 3

### SOLENOID OPERATOR >

#### GM-G XXX-XXX\*\*

XX Voltage	X Wire length	X Manual operator	XX Electrical connection
<b>DC</b> 24VDC (1.8W)	<b>A</b> 18"	<b>1</b> Non-locking recessed	<b>BA</b> Flying leads
<b>DD</b> 24VDC (2.5W)	<b>B</b> 24"	<b>2</b> Locking recessed	<b>BT</b> Flying leads with light
<b>DF</b> 24VDC (4.0W)	<b>C</b> 36"		<b>KA</b> Plug-in wire assy.
			<b>KT</b> Plug-in wire assy. with light

\* Other options available, see page 309.  
\*\* Other options available, see page 313.

**TECHNICAL DATA**

<b>Fluid :</b>	Compressed air, vacuum, inert gases
<b>Pressure range :</b>	Internal pilot – 2 pos. : 20 to 120 PSI (with memory spring: 30 to 120 PSI) 3 pos.: 35 to 120 PSI External pilot : vacuum to 120 PSI
<b>Pilot pressure :</b>	2 position: 20 to 120 PSI (with memory spring: 30 to 120 PSI) 3 position: 35 to 120 PSI
<b>Lubrication :</b>	Not required, if used select a medium aniline point lubricant (between 180°F and 210°F)
<b>Filtration :</b>	40 µ
<b>Temperature range :</b>	0°F to 120°F (-18°C to +50°C)
<b>Flow :</b>	1.0 C <sub>v</sub>
<b>Coil :</b>	Class A continuous duty, #22 AWG x 12 leads wires
<b>Voltage range :</b>	-15% to +10% of nominal voltage
<b>Protection :</b>	Consult factory
<b>Power :</b>	~Inrush : 10.9 VA Holding : 7.7 VA = 1.8 to 12.7 W
<b>Response times :</b>	24 V= /5.4W Energize : 7.3 ms De-energize : 5.3 ms 120/60 Energize : 8-12 ms De-energize : 7-11 ms

Options :

- BSPP threads

413A-AAA-XX-XXXX-XXX

- Dual pressure models, replace by **C** for pilot supply from #3 port
- For flow control, replace by **B**
- For memory spring, replace by **6**

Base only :

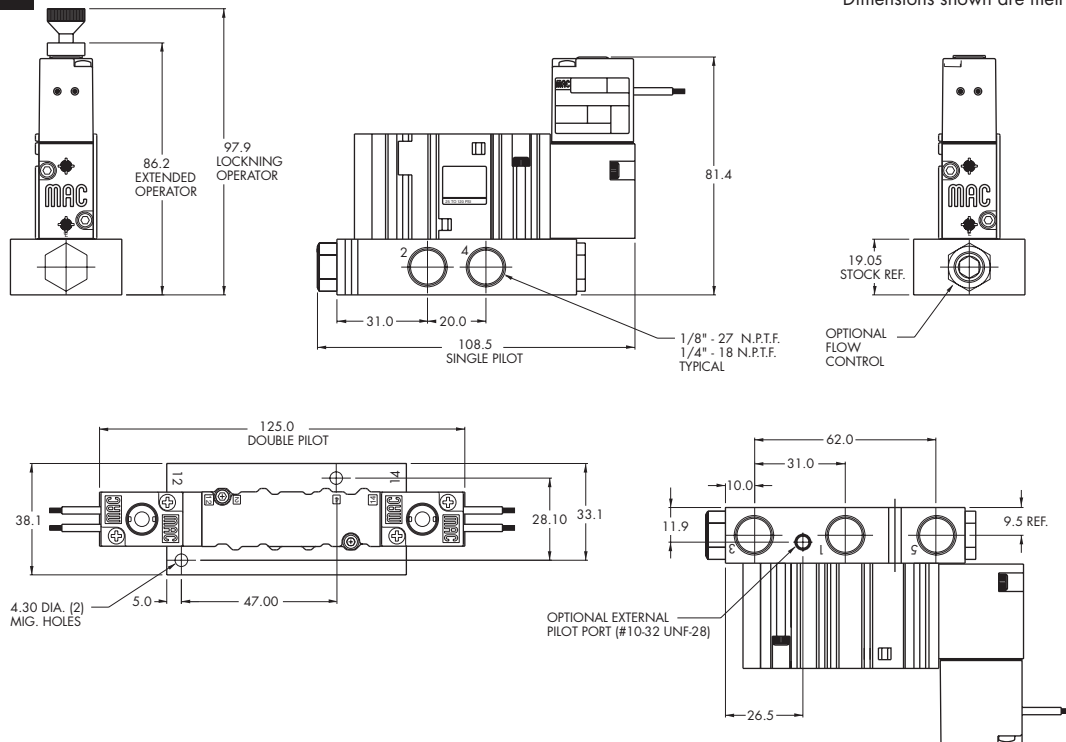
400A-XXX  
(i.e. 400A-AAA)

Spare parts :

- Body to base seal: 16525 • Flow control assembly: N-04001 • Body mounting screws (x2): 35043.

**DIMENSIONS**

Dimensions shown are metric (mm)





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**Codification table for voltages / Manual operator / Electrical connection**

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VALVE CODE > **-DM- D XX X-X XX**  
**1 2 3 4**

**OPTIONS AVAILABLE FOR**

- Pilot operated valves 52, 67, 92, 93, 400, ISO1, ISO2, ISO3 Series

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**1. VOLTAGE**

D-XX X-X XX	VOLTAGE
DA	24 VDC (5.4W)
DB	12 VDC (5.4W)
DC	12 VDC (7.5W)
DD	24 VDC (7.3W)
DE	12 VDC (12.7W)
DF	24 VDC (12.7W)
DK	110 VDC (4.7W)
DJ	28 VDC (5.2W)
DL	64 VDC (6.0W)
DM	36 VDC (5.3W)
DN	6 VDC (6.0W)
DR	90 VDC (6.6W)
DS	110 VDC (7.3W)
DT	75 VDC (5.6W)
DP	48 VDC (5.8W)
FA	12 VDC (1.8W)
FB	24 VDC (1.8W)
FE	12 VDC (2.4W)
FF	24 VDC (2.4W)
JA	120/60, 110/50 (2.9W)
JB	240/60, 220/50 (2.9W)
JC	24/60, 24/50 (3.7W)
JD	100/60, 100/50, 110/60 (3.9W)
JE	220/60 (3.4W)
JF	240/50 (2.8W)
JG	200/60, 200/50 (3.9W)

**2. WIRE LENGTH**

D-XX X-X XX	WIRE LENGTH
0	No wires
A	18"
B	24"
C	36"
D	48"
E	72"
F	96"

**3. MANUAL OPERATOR**

D-XX X-X XX	MANUAL OPERATOR
0	No operator
1	Non-locking recessed
2	Locking recessed
3	Non-locking extended
4	Locking extended

**4. ELECTRICAL CONNECTION**

D-XX X-X XX	ELECTRICAL CONNECTION
BA*	Flying leads (grommet)
BK*	BA with protection diode
BL*	BA with protection varistor
BM**	Flying leads (solenoid plug-in)
BN**	BM with protection diode
BP**	BM with protection varistor
BG**	BM with ground
BH**	BM with protection diode & ground
BJ**	BM with protection varistor & ground
CA*	1/2" NPS conduit with flying leads
CM*	1/2" NPS metal conduit with flying leads
CN*	1/2" NPS metal conduit with flying leads & ground
JB	Rectangular connector
JD	JB with light
JM	Rectangular connector (male only)
KA	Mini square connector
KB	KA with protection diode
KC	KA with protection varistor
KD	KA with light
KE	KA with light and protection diode
KF	KA with light and protection varistor
KG	KA with light & diode
KJ	Mini square connector (male only)
KK	KJ with protection diode (male only)
KL	KJ with protection varistor (male only)
TA	Dual tabs with receptacles
TB	TA with protection diode
TD	TA with light
TE	TA with light and protection diode
TJ	Dual tabs (male only)
TK	TJ with protection diode
TM	TJ with light
TN	TJ with light and protection diode

\* From Lead wire length options choose A through F

\*\* From Lead wire length options choose 0 through F

Note: When coil is above 30 volts, a ground wire is required. Applies to options with flying leads.





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**Codification table for voltages / Manual operators / Electrical connections**

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VALVE CODE > **-GM- G  $\frac{XX}{1}$   $\frac{X-X}{2}$   $\frac{XX}{3}$   $\frac{XX}{4}$**

**OPTIONS AVAILABLE FOR**

- Solenoid valves 52 & 400 Series

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**1. VOLTAGE**

G-XX X-X XX	VOLTAGE
<b>DC</b>	24 VDC (1.8 W)
<b>DD</b>	24 VDC (2.5 W)
<b>DE</b>	24 VDC (3.0 W)
<b>DF</b>	24 VDC (4.0 W)
<b>DJ</b>	12 VDC (1.8 W)
<b>DK</b>	12 VDC (2.5 W)
<b>DM</b>	12 VDC (3.0 W)
<b>DN</b>	12 VDC (4.0 W)

**2. WIRE LENGTH**

G-XX X-X XX	WIRE LENGTH
<b>0</b>	No lead wire (use only with "KJ" & "KM" electrical connectors)
<b>A</b>	18"
<b>B</b>	24"
<b>C</b>	36"
<b>D</b>	48"
<b>E</b>	72"
<b>F</b>	96"
<b>G</b>	120"
<b>H</b>	144"

**3. MANUAL OPERATOR**

G-XX X-X XX	MANUAL OPERATOR
<b>1</b>	Non-locking recessed
<b>2</b>	Locking recessed
<b>3</b>	Non-locking extended
<b>4</b>	Locking extended

**4. ELECTRICAL CONNECTION**

G-XX X-X XX	ELECTRICAL CONNECTION
<b>BA</b>	Flying leads
<b>BB</b>	BA with ground wire
<b>BC</b>	BA with light parallel to leads
<b>BD</b>	BA with light parallel to leads & ground wire
<b>BE</b>	BA with suppression diode
<b>BF</b>	BA with suppression diode & ground wire
<b>BG</b>	BA with suppression diode plus light parallel to leads
<b>BH</b>	BA with suppression diode plus light parallel to leads & ground wire
<b>*BN</b>	BA with suppression diode plus blocking diode
<b>*BP</b>	BA with suppression diode plus blocking diode & ground wire
<b>*BR</b>	BA with suppression diode plus blocking diode & light parallel to leads
<b>*BS</b>	BA with suppression diode plus blocking diode & light parallel to leads & ground wire
<b>BT</b>	BA with light on top
<b>BU</b>	BA with light on top & ground wire
<b>BV</b>	BA with suppression diode plus light on top
<b>BW</b>	BA with suppression diode plus light on top & ground wire
<b>*BX</b>	BA with suppression diode plus blocking diode & light on top
<b>*BY</b>	BA with suppression diode plus blocking diode & light on top & ground wire

**G-XX X-X XX SOLENOID PLUG-IN CONNECTOR WITH LEADS**

<b>GA</b>	MAC JAC Solenoid plug-in
<b>GB</b>	MAC JAC Solenoid plug-in w/Diode
<b>GC</b>	MAC JAC Solenoid plug-in w/MOV
<b>GD</b>	MAC JAC Solenoid plug-in w/LED
<b>GE</b>	MAC JAC Solenoid plug-in w/Diode & LED
<b>GF</b>	MAC JAC Solenoid plug-in w/MOV & LED
<b>GG</b>	MAC JAC Solenoid plug-in w/Rectifier
<b>GH</b>	MAC JAC Solenoid plug-in w/Rectifier & LED
<b>KA</b>	Plug-in wire assembly
<b>KB</b>	KA with ground wire
<b>KE</b>	KA with suppression diode
<b>KF</b>	KA with suppression diode & ground wire
<b>KJ</b>	Plug-in housing without wire assembly ('KA' without wire assembly)
<b>KM</b>	Plug-in housing without wire assembly ('KB' without wire assembly)
<b>*KN</b>	KA with suppression diode plus blocking diode
<b>*KP</b>	KA with suppression diode plus blocking diode & ground wire
<b>KT</b>	KA with light on top
<b>KU</b>	KA with light on top & ground wire
<b>KV</b>	KA with suppression diode plus light on top
<b>KW</b>	KA with suppression diode plus light & ground wire
<b>*KX</b>	KA with suppression diode plus blocking diode & light on top
<b>*KY</b>	KA with suppression diode plus blocking diode & light on top & ground wire

Note: Blocking diode is located in the lead wire