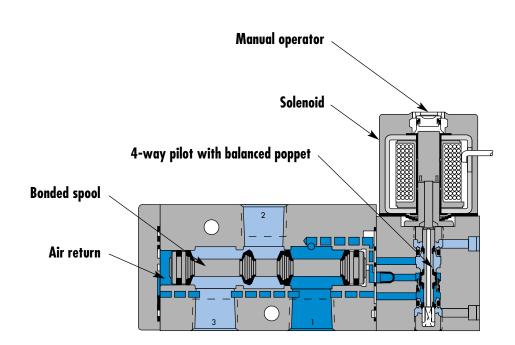


# Direct solenoid and solenoid pilot operated valves

# Circuit bar mounting

cylinder ports in valve
----------------------------



# **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.
- Normally closed or normally open valve function.
- May be plugged for 2-way operation.
- Internal or external pilot.



Function		Port size	Flow (Max)	Circuit bar mountin	Q	
3/2 NO-NC		1/8" - 1/4"	1200 NL/mi	n cylinder ports in valve		
<ol> <li>OPERATIONAL BENEFITS</li> <li>The 4-way pilot development of the second spool, immalso provides high ff</li> <li>Short stroke with hig</li> <li>Bonded spool with n glass-like finished be</li> <li>Pilot with balanced provides the sponse of the second sec</li></ol>	elops maximum s lable. nune to variation ow. h flow. ninimum friction, ore. poppet, high flow times. ates sticking.	ns of pressure, shifting in a				
SOLENOID OPERA						
Port size	Pilot air	Single o NO valve	operator NC valve	Doub NO valve	le operator NC valve	
1 /0// BCDD						

		<del>∀3 ≬1</del>	<del>√3 ≬1</del>	<del>∀3 ≬1</del>	<b>∀3 01</b>
1/8" BSPP	Internal	52A-31-COA-DM-Dxxx-xxx	52A-11-COA-DM-Dxxx-xxx	52A-41-COA-DM-Dxxx-xxx	52A-21-COA-DM-Dxxx-xxx
1/4" BSPP		52A-31-DOA-DM-Dxxx-xxx	52A-11-DOA-DM-Dxxx-xxx	52A-41-DOA-DM-Dxxx-xxx	52A-21-DOA-DM-Dxxx-xxx
1/8" BSPP	External	52A-31-COC-DM-Dxxx-xxx	52A-11-COC-DM-Dxxx-xxx	52A-41-COC-DM-Dxxx-xxx	52A-21-COC-DM-Dxxx-xxx
1/4" BSPP		52A-31-DOC-DM-Dxxx-xxx	52A-11-DOC-DM-Dxxx-xxx	52A-41-DOC-DM-Dxxx-xxx	52A-21-DOC-DM-Dxxx-xxx

## SOLENOID OPERATOR ►

# $D \underline{XX} \underline{X} - \underline{X} \underline{XX}^{T}$

xx	Voltage	x	Wire length	X	Manual operator	XX	Electrical connection
JA	120/60, 110/50	A	45 cm (Flying leads)	1	Non-locking	КА	Square connector
JB	240/60, 220/50	J	Connector	2	Locking	KD	Square connector with light
JC	24/60, 24/50					JB	Rectangular connector
DA	24VDC (5.4 W)					JD	Rectangular connector with light
FB	24VDC (1.8 W)					BA	Flying leads
DF	24VDC (12.7 W)						
HOW TO	O ORDER CIRCUIT BAR * *	(					
	Port size		Pilot air		Spacing standard 19,5 mm	(Re	Spacing 26 mm ctangular connector)
	3/8" BSPP		Internal		CBM052A-00AAB-XX		CBM052A-02AAB- <b>xx</b>
			External		CBM052A-00CAB-XX		CBM052A-02CAB-XX

Number of stations (03=3 stations) \*\* Other options available. Consult factory.

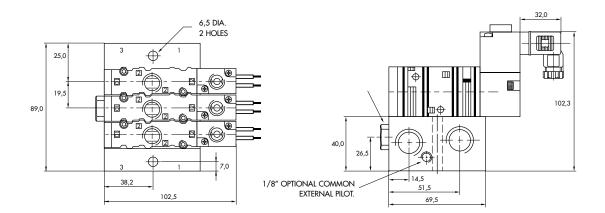
52A-31-AOA-DM-Dxxx-xxx

- clic for memory spring (replace by 4).





	Compressed air, vacuu	m, inert gases				
re range :		Internal pilot : 1.3 - 8.5 BAR				
		External pilot : vacuum to 8.5 BAR				
pressure :	1.3 - 8.5 BAR					
cation :	Not required, if used	Not required, if used select a medium aniline point lubricant (between 80°C to 100°C)				
ation :	40 µ	40 µ				
perature range :	0°F to 120°F (-18°C to	• +50°C)				
e:	7.3 mm					
:	1200 NL/min					
k rate :	50 cm³/min					
:	General purpose class	A, continuous duty, encaps	ulated			
ige range :	-15% to +10% of nomi	nal voltage				
ection :	NEMA 4					
r:	~ Inrush : 10.9 VA = 1.8 to 12.7 W	Holding : 7.7 VA				
onse times :	24 V=/5.4 W	Energize : 7.3 ms	De-energize : 5.3ms			
	60Hz/6 W	Energize : 8-12 ms	De-energize : 7-11 ms			





Function		Port size	Floш (Max)	Circuit bar mounting		
3/2 NO-NC		1/8" - 1/4"	1200 NL/mi	add-on style cylinder ports in valve		
OPERATIONAL BENEFITS						
<ol> <li>The 4-way pilot deviboth ways.</li> <li>Memory spring avail</li> <li>Balanced spool, immalso provides high fl</li> <li>Short stroke with hig</li> <li>Bonded spool with rig</li> <li>Bonded spool with rig</li> <li>Pilot with balanced provisitent response</li> <li>Wiping effect elimin</li> <li>Long service life.</li> </ol> HOW TO ORDER	ilable. nune to variation low. gh flow. minimum friction, ore. poppet, high flow times. nates sticking.	shifting in a				
Port size	Pilot air	Single o NO valve	perator NC valve	Double ( NO valve	operator NC valve	
1/8″ BSPP	Internal	52A-31-COA-DM-Dxxx-xxx	52A-11-COA-DM-Dxxx-xxx	52A-41-COA-DM-Dxxx-xxx	52A-21-COA-DM-Dxxx-xxx	-
1/4" BSPP	_	52A-31-DOA-DM-Dxxx-xxx	52A-11-DOA-DM-Dxxx-xxx	52A-41-DOA-DM-Dxxx-xxx	52A-21-DOA-DM-Dxxx-xxx	-
1/8" BSPP	External	52A-31-COC-DM-Dxxx-xxx	52A-11-COC-DM-Dxxx-xxx	52A-41-COC-DM-Dxxx-xxx	52A-21-COC-DM-Dxxx-xxx	-
1/4" BSPP		52A-31-DOC-DM-Dxxx-xxx	52A-11-DOC-DM-Dxxx-xxx	52A-41-DOC-DM-Dxxx-xxx	52A-21-DOC-DM-Dxxx-xxx	-

## SOLENOID OPERATOR ►

SOLENOID OPERATOR >			D 🔀				
xx	Voltage	X	Wire length	 ×	Manual operator	xx	Electrical connection
JA	120/60, 110/50	А	45 cm (Flying leads)	1	Non-locking	КА	Square connector
JB	240/60, 220/50	J	Connector	2	Locking	KD	Square connector with light
JC	24/60, 24/50					JB	Rectangular connector
DA	24VDC (5.4 W)					JD	Rectangular connector with light
FB	24VDC (1.8 W)					BA	Flying leads
DF	24VDC (12.7 W)						
HOW TO	O ORDER CIRCUIT BAR * *	(					
	Port size		Pilot air		Spacina standard		Spacina 26 mm

#### 19,5 mm (Rectangular connector) 3/8" BSPP CBM052A-00ABB-XX CBM052A-02ABB-XX Internal External CBM052A-00CBB-XX CBM052A-02CBB-XX

Number of stations (03=3 stations) \* \* Other options available. Consult factory. Note : add-a-unit stations may be added to above bars. Clic here for model numbers.

O P T I O N S

### 52A-31-AOA-DM-Dxxx-xxx

clic for memory spring (replace by 4).

Consult "Precautions" before use, installation or service of MAC Valves.



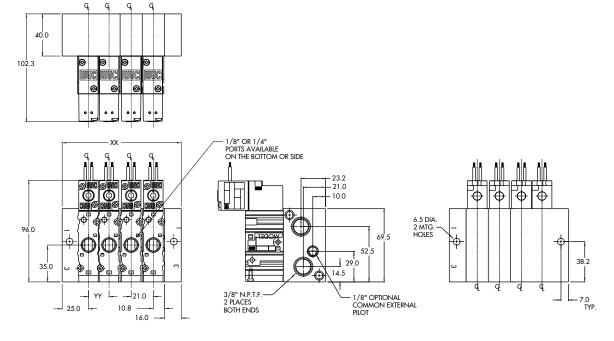


luid :	Compressed air, vacuu	ım, inert gases				
Pressure range :	Internal pilot : 1.3 - 8.5 BAR					
	External pilot : vacuum to 8.5 BAR					
Pilot pressure :	1.3 - 8.5 BAR					
Lubrication :	Not required, if used select a medium aniline point lubricant (between 80°C to 100°C)					
Filtration :	40 μ					
Temperature range :	0°F to 120°F (-18°C to +50°C)					
Orifice :	7.3 mm					
Flow :	1200 NL/min					
Leak rate :	50 cm³/min					
Coil :	General purpose class	A, continuous duty, encaps	ulated			
Voltage range :	-15% to +10% of nomi	nal voltage				
Protection :	NEMA 4	_				
Power :	~ Inrush : 10.9 VA	Holding : 7.7 VA				
	= 1.8 to 12.7 W	-				
Response times :	24 V=/5.4 W	Energize : 7.3 ms	De-energize : 5.3ms			
	60Hz/6 W	Energize : 8-12 ms	De-energize : 7-11 ms			

Options :

• End plate kit (External) : M-52002-01. • NPTF threads. • Isolation of inlet and/or exhaust.









Inction	FL	ort size		Flow (Max	) Individual	muuliiliy		
/2 NO-NC	1,	/8″ - 1/4″		1200 N	IL/min cylinder por in base	ts		
PERATIONAL BENEFITS								
The 4-way pilot develop both ways. Memory spring availabl Balanced spool, immune also provides high flow. Short stroke with high flo Bonded spool with mining glass-like finished bore. Pilot with balanced popi consistent response time Wiping effect eliminates Long service life.	le. e to variations c ow. mum friction, sh pet, high flow, s ss.	of pressure, nifting in a						
OW TO ORDER VALVE Pilot air	FOR CIRCUIT		) operator			Double o	novele v	
Pliot dir	NO	valve	perator NC val	ve	NO valve	Double o	perator NC valve	
Internal	52A-33-OO	A-DM-Dxxx-xxx 52A-13-OOA-DM-E		M-Dxxx-xxx	x 52A-43-OOA-DM-Dxxx-x)		₹3 °1 52A-23-OOA-DM-Dxxx-xxx	
External		C-DM-Dxxx-xxx	52A-13-00C-D/		52A-43-OOC-DM-Dx		52A-23-OOC-DM-Dxxx-xxx	
LENOID OPERATO		X Wire		<u>x</u> - <u>x</u> x 	Manual operator	XX	Electrical connection	
JA 120/60, 110/	/50	A 45 cm	(Flying leads)	1	Non-locking	КА		
JB 240/60, 220/		J Connec			Locking	KD	· · · ·	
JC 24/60, 24/50	)					JB	Rectangular connector	
DA 24VDC (5.4 W	∨)					JD	Rectangular connector with light	
FB 24VDC (1.8 W	∨)					BA	Flying leads	
DF 24VDC (12.7	W)							
OW TO ORDER CIRCU	IIT BAR * *	$\square$						
Port size (BSP	P)	Pilo	t air	Spe	acing standard 19,5 mm	(1	Spacing 26 mm Rectangular connector)	
1/8" SIDE PO	RT	Inte	rnal	CBF	052A-00AAB- <b>xx</b>		CBP052A-02AAB-xx	
1/4" SIDE PO	RT			CBF	052A-00AAE- <b>xx</b>		CBP052A-02AAE-XX	
1/8" SIDE PO	RT	Exte	ernal	CBF	P052A-00EAB- <b>xx</b>	_	CBP052A-02EAB-XX	
1/4" SIDE PO	RT				052A-00EAE- <b>xx</b>		CBP052A-02EAE-XX	
		Inte	rnal		P052A-00BAB- <b>xx</b>		CBP052A-02BAB-XX	
1/8" BOTTOM P		Internal		CBF	P052A-00BAE- <b>XX</b>		CBP052A-02BAE-XX	
1/4" BOTTOM P		External		CBP052A-006AE-XX CBP052A-00FAB-XX			CDD0 50 1 55515	
-	PORT	Exte	ernal		P052A-00FAB- <b>XX</b> P052A-00FAE- <b>XX</b>		CBP052A-02FAB- <b>xx</b> CBP052A-02FAE- <b>xx</b>	

52A-33-OOA-DM-Dxxx-xxx

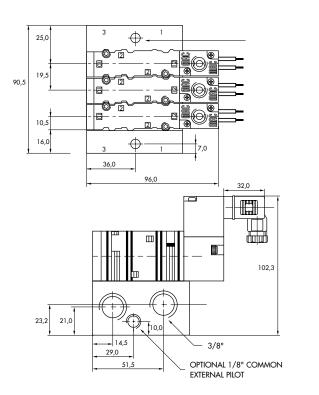
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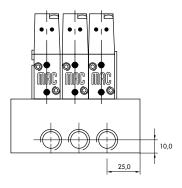
clic for memory spring (replace by 6).





TECHNICAL							
D A T A							
Fluid :	Compressed air, vacuum, inert gases						
Pressure range :	Internal pilot : 1.3 - 8.5 BAR						
	External pilot : vacuum to 8.5 BAR						
Pilot pressure :	1.3 - 8.5 BAR						
Lubrication :	Not required, if used select a medium aniline point lubricant (between 80°C to 100°C)						
Filtration :	40 µ						
Temperature range :	0°F to 120°F (-18°C to +50°C)						
Orifice :	7.3 mm						
Flow :	1200 NL/min						
Leak rate :	50 cm³/min	50 cm³/min					
Coil :	General purpose class A, continuous duty, encapsulated						
Voltage range :	-15% to +10% of nominal voltage						
Protection :	NEMA 4						
Power :	~ Inrush : 10.9 VA Holding : 7.7 VA						
	= 1.8 to 12.7 W						
Response times :	24 V=/5.4 W Energize : 7.3 ms De-energize : 5.3ms						
	60Hz/6 W Energize : 8-12 ms De-energize : 7-11 ms						
Spare parts :	<ul> <li>Pilot valve : DM-DXXX-XXX-1, including mounting screws 35043 and seal 16524.</li> </ul>						
opulo pullo i							
Accessories	• Blanking plate : M-52003. • Seal (x3) : 17013-01. • Mounting screw (x2) : 35043.						
Options :	• NPTF threads. • Isolation of inlet and/or exhaust.						







unction		Por	t size		Floш (Mi	) (XE	Individual mour	nting	
8/2 NO	NC	1/	8″ - 1/4″		1 200	NL/min	add-on style cylinder ports in base		
OPERATION	AL BENEFITS						_		
The 4-way both wa Memory Balance also pro Short str Bonded glass-like Pilot with consisten Wiping Long ser	ay pilot develop ys. spring available d spool, immune vides high flow. oke with high flo spool with minir e finished bore. In balanced popy th response time effect eliminates vice life.	e to variations of num friction, shif pet, high flow, sh s. sticking.	fring in a nort and						
	ORDER VALVE	FOR CIRCUIT E		NG e operator			Doub	le ope	erator
		NO	valve	NC val	ve	NC	) valve		NC valve
In	ternal	10 2 10 10 10 10 10 10 10 10 10 10	12 1 -DM-Dxxx-xx0		M-Dxxx-xxx	52A-43-OC	2 3 ° 1 DA-DM-Dxxx-xx	x	10 10 10 12 12 12 12 12 12 12 52A-23-00A-DM-DXXX-XXX
Ex	ternal	52A-33-OOC	-DM-Dxxx-xx	52A-13-OOC-DA	M-Dxxx-xxx	52A-43-00	DC-DM-Dxxx-xx	x	52A-23-OOC-DM-Dxxx-xxx
	ID OPERATO	R ≻	Wir	D XX e length	<b>X - X</b>	XX *  Manual ope	rator		Electrical connection
XX	120/60, 110/	50	~		X 1	Non-locking		XX	
JA JB	240/60, 220/			m (Flying leads) nector	2	Locking		KA KD	Square connector Square connector with light
JC	24/60, 24/50							JB	Rectangular connector
DA	24VDC (5.4 W						_	JD	Rectangular connector with light
FB	24VDC (1.8 W	/)						BA	Flying leads
DF	24VDC (12.7	·							, .
	ORDER CIRCU		$\subset$				)		
	Port size (BSP	P)	P	ilot air	S	pacing standa 19,5 mm	rd	(Re	Spacing 26 mm ctangular connector)
1	/8" SIDE PO	RT	I	nternal	C	BP052A-00ABB-	xx		CBP052A-02ABB-xx
_ 1	/4" SIDE PO	RT				BP052A-00ABE-	хх		CBP052A-02ABE-xx
1	/8" SIDE PO	RT	E	xternal		BP052A-00EBB-	xx		CBP052A-02EBB-XX
1	/4" SIDE PO	RT			(	BP052A-00EBE-	xx		CBP052A-02EBE-XX
	8" BOTTOM P			nternal		BP052A-00BBB-			CBP052A-02BBB-XX
1/	4" BOTTOM P	ORT			(	BP052A-00BBE-	xx		CBP052A-02BBE-XX
1/	8" BOTTOM P	ORT	E	External	(	BP052A-00FBB-	xx		CBP052A-02FBB-XX
1/	4" BOTTOM P	ORT			(	BP052A-00FBE-	xx		CBP052A-02FBE-XX
mber of s	tations (03=3 stat		Other o	pptions available. Consult	·	Note :			be added to above bars.

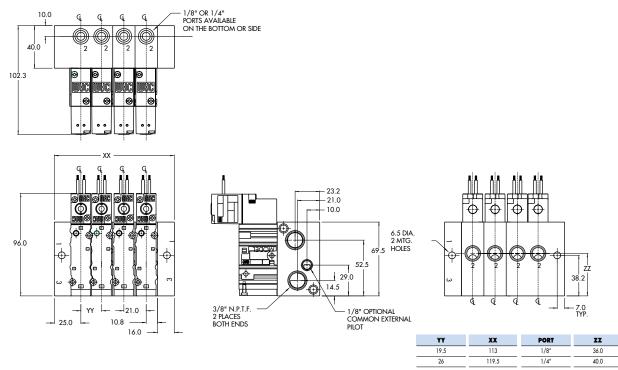
52A-33-OOA-DM-Dxxx-xxx

clic for memory spring (replace by 6).





Fluid :	Compressed air, vacuu	ım, inert gases					
Pressure range :	Internal pilot : 1.3 - 8.	Internal pilot : 1.3 - 8.5 BAR					
	External pilot : vacuum	External pilot : vacuum to 8.5 BAR					
Pilot pressure :	1.3 - 8.5 BAR						
ubrication :	Not required, if used	Not required, if used select a medium aniline point lubricant (between 80°C to 100°C)					
Filtration :	40 µ	40 µ					
Temperature range :	0°F to 120°F (-18°C to	0°F to 120°F (-18°C to +50°C)					
Orifice :	7.3 mm						
Flow :	1200 NL/min						
Leak rate :	50 cm³/min	50 cm³/min					
Coil :	General purpose class	A, continuous duty, encaps	ulated				
Voltage range :	-15% to +10% of nomi	nal voltage					
Protection :	NEMA 4						
Power :	~ Inrush : 10.9 VA	Holding : 7.7 VA					
	= 1.8 to 12.7 W						
Response times :	24 V=/5.4 W	Energize : 7.3 ms	De-energize : 5.3ms				
	60Hz/6 W	Energize : 8-12 ms	De-energize : 7-11 ms				



Note: Bottom & side cylinder ports not available on the same station



Function	Port size	Flow (Max)	Circuit bar mounting
3/2 NO-NC	1/8" - 1/4"	1200 NL/min	add-a-unit stations for CBM052A bar
<ul> <li>OPERATIONAL BENEFITS</li> <li>1. The 4-way pilot develops m both ways.</li> <li>2. Memory spring available.</li> <li>3. Balanced spool, immune to also provides high flow.</li> <li>4. Short stroke with high flow.</li> <li>5. Bonded spool with minimum glass-like finished bore.</li> <li>6. Pilot with balanced poppet consistent response times.</li> <li>7. Wiping effect eliminates stills. Long service life.</li> </ul>	o variations of pressure, m friction, shifting in a t, high flow, short and		

## SOLENOID OPERATOR

Port size	Pilot air	Single operator		Double	operator
		NO valve	NC valve	NO valve	NC valve
		$\begin{bmatrix} 10 & 2 & 12 \\ \hline & & & \\ \hline \\ \hline$	$\begin{bmatrix} 10 & 2 & 12 \\ \hline D & T & T \\ \hline \hline y & 1 \\ \hline y & 0 \end{bmatrix}$		$10 \qquad 2 \qquad 12 \\ 175 \qquad 7 \qquad$
1/8" BSPP	Internal	52A-31-COA-DM-Dxxx-xxx	52A-11-COA-DM-Dxxx-xxx	52A-41-COA-DM-Dxxx-xxx	52A-21-COA-DM-Dxxx-xxx
1/4" BSPP	-	52A-31-DOA-DM-Dxxx-xxx	52A-11-DOA-DM-Dxxx-xxx	52A-41-DOA-DM-Dxxx-xxx	52A-21-DOA-DM-Dxxx-xxx
1/8" BSPP	External	52A-31-COC-DM-Dxxx-xxx	52A-11-COC-DM-Dxxx-xxx	52A-41-COC-DM-Dxxx-xxx	52A-21-COC-DM-Dxxx-xxx
1/4" BSPP	-	52A-31-DOC-DM-Dxxx-xxx	52A-11-DOC-DM-Dxxx-xxx	52A-41-DOC-DM-Dxxx-xxx	52A-21-DOC-DM-Dxxx-xxx

#### SOLENOID OPERATOR ►

# $D \underline{XX} \underline{X} - \underline{X} \underline{XX}^{\dagger}$

xx	Voltage	X	Wire length	x	Manual operator	XX	<b>Electrical connection</b>
JA	120/60, 110/50	A	45 cm (Flying leads)	1	Non-locking	КА	Square connector
JB	240/60, 220/50	J	Connector	2	Locking	KD	Square connector with light
JC	24/60, 24/50					JB	Rectangular connector
DA	24VDC (5.4 W)					JD	Rectangular connector with light
FB	24VDC (1.8 W)					BA	Flying leads
DF	24VDC (12.7 W)						
HOW TO	O ORDER CIRCUIT BAR * *	(					
	Port size		Pilot air		Spacing standard 21 mm	(Re	Spacing 26 mm ctangular connector)
	3/8" BSPP		Internal		CBM052A-01AEB-xx		CBM052A-02AEB-XX
			External		CBM052A-01CEB-XX		CBM052A-02CEB-XX

Number of stations (01=1 station) \*\* Other options available. Consult factory. Note : add-a-unit stations available in lengths up to 4 stations (01, 02, 03 or 04).

O P T I O N S

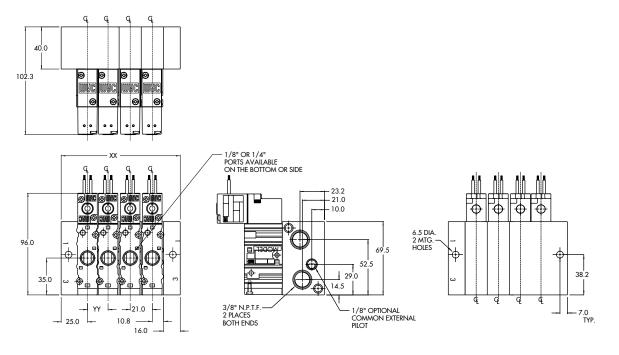
52A-31-AOA-DM-Dxxx-xxx

clic for memory spring (replace by 4).





	Compressed air, vacuu	ım, inert gases	
re range :	Internal pilot : 1.3 - 8.		
	External pilot : vacuum		
pressure :	1.3 - 8.5 BAR		
prication :	Not required, if used	select a medium aniline poi	nt lubricant (between 80°C to 100°C)
ration :	40 µ		
nperature range :	0°F to 120°F (-18°C to	» +50°C)	
fice :	7.3 mm		
v:	1200 NL/min		
ak rate :	50 cm³/min		
il :	General purpose class	A, continuous duty, encaps	ulated
ltage range :	-15% to +10% of nomi	nal voltage	
otection :	NEMA 4		
wer:	~ Inrush : 10.9 VA	Holding : 7.7 VA	
	= 1.8 to 12.7 W		
sponse times :	24 V=/5.4 W	Energize : 7.3 ms	De-energize : 5.3ms
	60Hz/6 W	Energize : 8-12 ms	De-energize : 7-11 ms







Inction	PU	rt size		Floш (Ма	xj individua	l mounting	
/2 NO-NC	1/	/8" - 1/4"		1200	NL/min add-a-uni stations fo CBP052A b	r	
PERATIONAL BENEFITS							
The 4-way pilot develo	ops maximum shift	ting forces					-
both ways. Memory spring availa	ble						
Balanced spool, immu	ne to variations o	f pressure,					
also provides high flow						a	The P
Short stroke with high Bonded spool with min		ifting in a				a	
glass-like finished bore							
Pilot with balanced pc consistent response tin		short and					
Wiping effect eliminat		Rese	t				
Long service life.							
HOW TO ORDER							
OW TO ORDER VALV	E FOR CIRCUIT	BAR MOUNTING	3				
Pilot air		Single	operator			Double ope	rator
	NO 2	valve	NC va		NO valve		NC valve
			<sup>1</sup> ® ∕ ∖			12 4	
Internal External		A-DM-Dxxx-xxx C-DM-Dxxx-xxx	52A-13-OOA-D 52A-13-OOC-D		- 52A-43-00A-DM-Dx 52A-43-00C-DM-Dx		2A-23-OOA-DM-Dxxx-xxx 2A-23-OOC-DM-Dxxx-xxx
Exiemdi			- JZA 13 000 D				
OLENOID OPERAT	OR >		D XX	(X - X)	XX <sup>*</sup>		
				╶┰╷┹᠂	<u> </u>		
yy Voltage		v Wire	enath		Manual operator		Electrical connection
<b>XX Voltage</b> JA 120/60, 11	0/50	^	(Flying leads)	X	Non-locking	ХХ КА	Square connector
JB 240/60, 22		J Connec		2	Locking	KD	Square connector
<b>10</b> 140,00,11	0,00			-	Locking		with light
JC 24/60, 24/	50					JB	Rectangular connector
							Rectangular connector
DA 24VDC (5.4						JD	•
DA 24VDC (5.4	W)						with light
DA         24VDC (5.4           FB         24VDC (1.8	w) w)					BA	•
DA 24VDC (5.4 FB 24VDC (1.8	w) w)						with light
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1	W) W) 7 W)	_					with light
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC	W) 7 W) CUIT BAR * *					BA	with light Flying leads
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1	W) 7 W) CUIT BAR * *	Pilo	t air	S	pacing standard 21 mm	BA	with light
DA 24VDC (5.4 FB 24VDC (1.8 DF 24VDC (12.) OW TO ORDER CIRC Port size (BS	W) 7 W) Cuit BAR * *				21 mm	BA (Rec	with light Flying leads Spacing 26 mm tangular connector)
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC           Port size (BS           1/8" SIDE P	W) 7 W) CUIT BAR * * SPP) ORT		<b>t air</b> rnal	C	<b>21 mm</b> BP052A-01AEB- <b>xx</b>	BA (Red	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-xx
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC         Port size (BS           1/8" SIDE P         1/4" SIDE P	W) 7 W) 7 W) CUIT BAR ** SPP) ORT ORT	Inte	rnal	C	<b>21 mm</b> BP052A-01AEB- <i>xx</i> BP052A-01AEE- <i>xx</i>	(Rec	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-XX CBP052A-02AEE-XX
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC         Port size (BS           1/8" SIDE P         1/4" SIDE P           1/8" SIDE P         1/8" SIDE P	W) W) ZW) CUIT BAR ** SPP) ORT ORT ORT	Inte		C	21 mm BP052A-01AEB-XX BP052A-01AEE-XX BP052A-01EEB-XX	(Rec	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-XX CBP052A-02AEE-XX CBP052A-02EEB-XX
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC         Port size (BS           1/8" SIDE P         1/4" SIDE P	W) W) 7W) 7W) CUIT BAR ** SPP) ORT ORT ORT ORT	Inte	rnal		<b>21 mm</b> BP052A-01AEB- <i>xx</i> BP052A-01AEE- <i>xx</i>	BA (Rec 0	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-XX CBP052A-02AEE-XX
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC           Port size (BS           1/8" SIDE P           1/8" SIDE P           1/8" SIDE P           1/4" SIDE P           1/4" SIDE P           1/4" SIDE P	W)         7 W)         CUIT BAR **         SPP)         ORT         ORT         ORT         ORT         ORT         ORT         ORT         ORT	Inte	rnal		<b>21 mm</b> BP052A-01AEB-xx BP052A-01AEE-xx BP052A-01EEB-xx BP052A-01EEE-xx	BA (Rec 0	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-XX CBP052A-02AEE-XX CBP052A-02EE-XX CBP052A-02EE-XX
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC           Port size (BS           1/8" SIDE P           1/4" SIDE P           1/8" SIDE P	W)         7 W)         CUIT BAR **         SPP)         ORT         ORT         ORT         ORT         ORT         PORT         PORT	Inte	rnal		21 mm BP052A-01AEB-xx BP052A-01AEE-xx BP052A-01EEB-xx BP052A-01EEE-xx BP052A-01BEB-xx	BA	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-xx CBP052A-02AEB-xx CBP052A-02EE-xx CBP052A-02EE-xx CBP052A-02EE-xx CBP052A-02EE-xx CBP052A-02EE-xx
DA         24VDC (5.4           FB         24VDC (1.8           DF         24VDC (12.1           OW TO ORDER CIRC         Port size (BS           1/8" SIDE P         1/4" SIDE P           1/8" SIDE P         1/4" SIDE P           1/4" SIDE P         1/4" SIDE P           1/4" SIDE P         1/4" SIDE P           1/4" SIDE P         1/4" SIDE P	W)         W)         7 W)         CUIT BAR **         SPP)         ORT         ORT         ORT         PORT         PORT         PORT	Inte	rnal rnal		21 mm           BP052A-01AEB-xx           BP052A-01AEE-xx           BP052A-01EEE-xx           BP052A-01EEE-xx           BP052A-01EEE-xx           BP052A-01EEE-xx           BP052A-01EEE-xx           BP052A-01EEE-xx	BA	with light Flying leads Spacing 26 mm tangular connector) CBP052A-02AEB-xx CBP052A-02AEB-xx CBP052A-02EB-xx CBP052A-02EE-xx CBP052A-02EB-xx CBP052A-02BEB-xx CBP052A-02BEB-xx

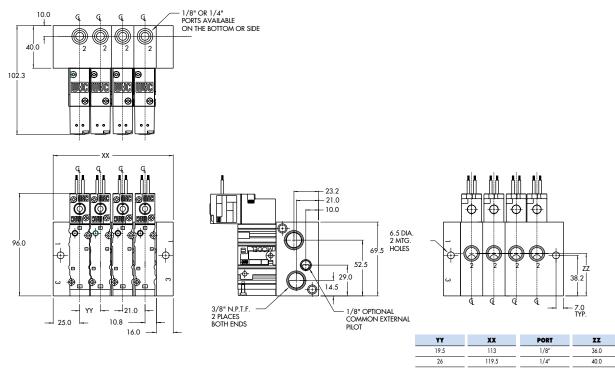
52A-33-OOA-DM-Dxxx-xxx

clic for memory spring (replace by 6).





External pilot : vacuum to 8.5 BAR
sure range : Internal pilot : 1.3 - 8.5 BAR External pilot : vacuum to 8.5 BAR
sure range : Internal pilot : 1.3 - 8.5 BAR External pilot : vacuum to 8.5 BAR
External pilot : vacuum to 8.5 BAR
ot pressure : 1.3 - 8.5 BAR
ication : Not required, if used select a medium aniline point lubricant (between 80°C to 100°C)
ration: 40 µ
mperature range : 0°F to 120°F (-18°C to +50°C)
rifice : 7.3 mm
ow : 1200 NL/min
eak rate : 50 cm³/min
sil : General purpose class A, continuous duty, encapsulated
oltage range : -15% to +10% of nominal voltage
otection : NEMA 4
wer: ~ Inrush : 10.9 VA Holding : 7.7 VA
= 1.8 to 12.7 W
esponse times : 24 V=/5.4 W Energize : 7.3 ms De-energize : 5.3ms



Note: Bottom & side cylinder ports not available on the same station



# Section 2 Options



Codification table for voltages / Wire length / Manual operator / Electrical connection

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VALVE CODE  $\blacktriangleright$ 

# $DM - D\frac{XX}{1}\frac{X}{2} - \frac{X}{3}\frac{XX}{4}$

#### **OPTIONS AVAILABLE FOR**

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- pilot operated valves 400, 52 & 92 Series



-D XX X -X XX       VOLTAGE         DB       12 VDC (5.4 W)         DC       12 VDC (7.5 W)         DD       24 VDC (7.3 W)         DE       12 VDC (12.7 W)         DK       110 VDC (5.8 W)         DJ       28 VDC (5.7 W)         DL       64 VDC (6.0 W)         DM       36 VDC (5.8 W)         DN       6 VDC (6.0 W)         DR       90 VDC (6,6 W)         DS       110 VDC (7.3 W), 100 VDC (6.0 W)         DT       75 VDC (5.8 W)         DF       12 VDC (18 W)         F4       12 VDC (18 W)         FF       24 VDC (2.4 W)			1. VOLTAGE
DB         12 VDC (5.4 W)           DC         12 VDC (7.5 W)           DD         24 VDC (7.3 W)           DE         12 VDC (12.7 W)           DK         110 VDC (5.8 W)           DJ         28 VDC (5.7 W)           DL         64 VDC (6.0 W)           DM         36 VDC (5.8 W)           DN         6 VDC (6.0 W)           DR         90 VDC (6.6 W)           DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DF         110 VDC (7.3 W), 100 VDC (6.0 W)           DF         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FF         12 VDC (2.4 W)           FF         24 VDC (2.4 W)			
DC       12 VDC (7.5 W)         DD       24 VDC (7.3 W)         DE       12 VDC (12.7 W)         DK       110 VDC (5.8 W)         DJ       28 VDC (5.7 W)         DL       64 VDC (6.0 W)         DM       36 VDC (5.8 W)         DN       6 VDC (6.0 W)         DR       90 VDC (6.6 W)         DS       110 VDC (7.3 W), 100 VDC (6.0 W)         DT       75 VDC (5.6 W)         DP       48 VDC (5.8 W)         FA       12 VDC (1.8 W)         FE       12 VDC (2.4 W)         FF       24 VDC (2.4 W)	- D XX	X - X XX	VOLTAGE
DD       24 VDC (7.3 W)         DE       12 VDC (12.7 W)         DK       110 VDC (5.8 W)         DJ       28 VDC (5.7 W)         DL       64 VDC (6.0 W)         DM       36 VDC (5.8 W)         DN       6 VDC (6.0 W)         DR       90 VDC (6.6 W)         DS       110 VDC (7.3 W), 100 VDC (6.0 W)         DT       75 VDC (5.6 W)         DP       48 VDC (5.8 W)         FA       12 VDC (1.8 W)         FE       12 VDC (2.4 W)         FF       24 VDC (2.4 W)	DB		12 VDC (5.4 W)
DE         12 VDC (12.7 W)           DK         110 VDC (5.8 W)           DJ         28 VDC (5.7 W)           DL         64 VDC (6.0 W)           DM         36 VDC (5.8 W)           DN         6 VDC (6.0 W)           DR         90 VDC (6.6 W)           DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DC		12 VDC (7.5 W)
DK         110 VDC (5.8 W)           DJ         28 VDC (5.7 W)           DL         64 VDC (6.0 W)           DM         36 VDC (5.8 W)           DN         6 VDC (6.0 W)           DR         90 VDC (6.6 W)           DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DD		24 VDC (7.3 W)
DJ       28 VDC (5.7 W)         DL       64 VDC (6.0 W)         DM       36 VDC (5.8 W)         DN       6 VDC (6.0 W)         DR       90 VDC (6.6 W)         DS       110 VDC (7.3 W), 100 VDC (6.0 W)         DT       75 VDC (5.6 W)         DP       48 VDC (5.8 W)         FA       12 VDC (1.8 W)         FE       12 VDC (2.4 W)         FF       24 VDC (2.4 W)	DE		12 VDC (12.7 W)
DL       64 VDC (6.0 W)         DM       36 VDC (5.8 W)         DN       6 VDC (6.0 W)         DR       90 VDC (6,6 W)         DS       110 VDC (7.3 W), 100 VDC (6.0 W)         DT       75 VDC (5.6 W)         DP       48 VDC (5.8 W)         FA       12 VDC (1.8 W)         FE       12 VDC (2.4 W)         FF       24 VDC (2.4 W)	DK		110 VDC (5.8 W)
DM         36 VDC (5.8 W)           DN         6 VDC (6.0 W)           DR         90 VDC (6.6 W)           DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DJ		28 VDC (5.7 W)
DN         6 VDC (6.0 W)           DR         90 VDC (6,6 W)           DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DL		64 VDC (6.0 W)
DR         90 VDC (6,6 W)           DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DM		36 VDC (5.8 W)
DS         110 VDC (7.3 W), 100 VDC (6.0 W)           DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DN		6 VDC (6.0 W)
DT         75 VDC (5.6 W)           DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DR		90 VDC (6,6 W)
DP         48 VDC (5.8 W)           FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DS		110 VDC (7.3 W), 100 VDC (6.0 W)
FA         12 VDC (1.8 W)           FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DT		75 VDC (5.6 W)
FE         12 VDC (2.4 W)           FF         24 VDC (2.4 W)	DP		48 VDC (5.8 W)
FF 24 VDC (2.4 W)	FA		12 VDC (1.8 W)
	FE		12 VDC (2.4 W)
	FF		24 VDC (2.4 W)
	JD		100/60, 100/50, 110/60

	2. WIRE LENGTH
- D XX X - X XX	WIRE LENGTH
В	60 cm
С	90 cm
D	120 cm
E	180 cm
F	240 cm



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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
BK	BA with protection diode
BL	BA with protection varistor
СА	1/2" NPS conduit
JB	Rectangular connector
JD	Rectangular connector with light
JM	Rectangular connector, male only
KA	Square connector
КВ	Square connector with protection diode
КС	Square connector with protection varistor
KD	Square connector with light
KE	Square connector with light and protection diode
KF	Square connector with light and protection varistor
KJ	Square connector (male only)
KK	Square connector with protection diode (male only)
KL	Square connector with protection varistor (male only)
TA	Dual tabs
ТВ	TA with protection diode
TD	TA with light
TE	TA with light and protection diode
TJ	Dual tabs (male only)
ТК	TJ with protection diode
ТМ	TJ with light
TN	TJ with light and protection diode
* <b>DN</b>	Plug-in with diode
* <b>D</b> P	Plug-in with M.O.V.
* DH	Plug-in with diode & ground
* DJ	Plug-in with M.O.V & ground
* These options only app	ly to the 92 series. All others are for the 400 and 52 series.



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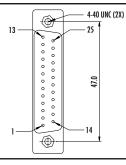
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# Connector SUB\_D 25 (option ZZZY = SUBY; Y = cable length)



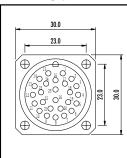


#### TECHNICAL DATA

- Type «SUB\_D»
- Number of contacts : 25
- Solder termination (Dia. 0.6 mm/0.14 mm<sup>2</sup>/26-22 AWG) ٠
- Operating current 5 A/contact
- Rated voltage 125 V~
  Temp. range -40° to +125°C
- Insulation resistance  $\ge 10^{10} \Omega$
- Protection class IP40 (DIN 40050)
- Number of solenoids : 20 max.
- Max. 24 V=/5.4 W per solenoid • 5 common wires
- Female plug supplied with circuit bar

## Connector RND (option ZZZY = RNDY; Y = cable length)



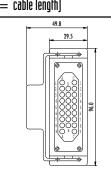


#### TECHNICAL DATA

- Type «Round connector»
- Number of contacts : 26
- Solder termination (Dia. 1 mm/1 mm²/17 AWG) Operating current 7.5 A/contact •
- ٠
- ٠ Rated voltage 250 V~
- Insulation resistance  $\ge 10^8 \ \Omega$
- Cable entry PG16
- Temp. range -40° to +125°C
  Protection class IP65 (DIN 40050)
- Number of solenoids : 24 max.
- 1 common and 1 ground
- All voltages
- Female plug supplied with circuit bar

# Connector HDT (option ZZZY = HDTY; Y = cable length)





# TECHNICAL DATA

- Type «Heavy duty»
- Number of contacts : 25
- Solder termination (Dia. 1.4 mm/0.75 mm<sup>2</sup>/18 AWG)
- Operating current 10 A/contact
- Rated voltage 250 V~
- Insulation resistance  $\ge 10^{10} \Omega$
- Cable entry PG16
- Temp. range -40° to +125°C
- Protection class IP65 (DIN 40050)
- Number of solenoids : 24 max.
- 1 common and 1 ground
- All voltages
- Female plug supplied with circuit bar



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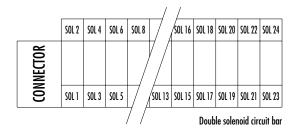
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O P T I O N S
Connector termination details

 VOP
 50L 1
 50L 2
 50L 2
 50L 2
 50L 24
 50L 24





# Connector SUB\_D25 (option ZZZY = SUBY ; Y = cable length) Technical orth previned cable

- Type : LIYY -0.14 mm<sup>2</sup>
- Dia. ca. 9.3 mm
- Insulation resistance : 20  $M\Omega$  for 1000 meter
- Temp. range -5° to +80°C
- Rated voltage : 250 V~
- PVC core insulation and sheath

BROWN	SOL 1
RED	SOL. 2 ∧
PINK	
YELLOW	<u>SOL. 4</u>
WHITE	
GREEN	S SOL. 5 ∧
BLUE	<u>SOL. 6</u>
PURPLE	
GRAY	SOL. 8
WHITE-RED	
BLACK	SOL 9
BROWN-RED	V SOL. 10 ∧
BROWN-BLUE	
BROWN-PINK	V
WHITE-PINK	COMMON

GREEN-BROWN	SOL. 13	_^_
GRAY-BROWN	<sup> 4</sup> SOL. 14	V
RED-BLUE		
GRAY-PINK	li SOL. 16	V
WHITE-YELLOW	24 COMMON	
YELLOW-BROWN		_/ _
BROWN-BLACK	SOL. 18	V

WHITE-GRAY	SOL.19	
WHITE-BLUE	N SOL. 20	V
WHITE-GREEN	<u> </u>	



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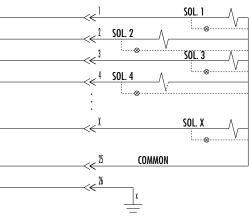
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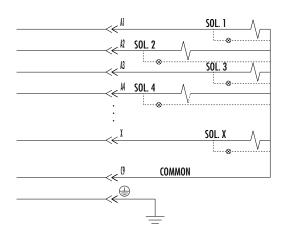
- Type : LIY(C)Y -0.50 mm<sup>2</sup>
- Dia. ca. 10.8 mm (12 core); 12.9 mm (18 core); 16.0 mm (32 core)
- Insulation resistance : 20  $M\Omega$  for 1000 meter
- Temp. range -5° to +80°C
- Rated voltage : 500 V~
- PVC core insulation and sheath
- Tinned copper wire braid



# $\label{eq:connector HDT (option ZZZY = HDTY ; Y = cable length)$

# TECHNICAL DATA PREWIRED CABLE

- Type : LIY(C)Y -0.75 mm<sup>2</sup>
- Dia. ca. 12.0 mm (12 core); 13.5 mm (18 core); 18.0 mm (32 core)
- Insulation resistance : 20  $M\Omega$  for 1000 meter
- Temp. range -5° to +80°C
- Rated voltage : 500 V~
- PVC core insulation and sheath
- Tinned copper wire braid



# PRECAUTIONS CONCERNING THE APPLICATION, INSTALLATION AND SERVICE OF MAC VALVES

The precautions below are important to be read and understood before designing into a system any MAC valve, and before installing or servicing any MAC valve. Improper use, installation or servicing of any MAC valve in some systems could create a hazard to personnel or equipment

#### APPLICATION PRECAUTIONS :

#### INDUSTRIAL USF -

MAC valves are intended for use in industrial pneumatic and/or vacuum systems. They are not intended for consumer use or service. They are general purpose industrial valves with literally thousands of different applications in industrial systems. These products are not inherently dangerous, but they are only a component of an overall system. The system in which they are used must provide adequate safeguards to prevent injury or damage in the event failure occurs, whether it be failure of switches, regulators, cylinders, valves or any other component.

#### POWER PRESSES -

MAC valves are not designed nor intended to be used to operate and/or control the operation of clutch and/or brake systems on power presses. There are special products on the market for such use.

#### 2-POSITION VALVES -

Some MAC valves are 2-position, 4-way valves. When air is supplied to the inlet port(s) of these valves, there will always be a flow path from the inlet to one of the outlets regardless of which of the two positions the valve is situated. Therefore, if pressurized air retained in the system would present a hazard in the application or servicing of the valve or system, a separate method in the system must be provided to remove the trapped air.

#### 3- POSITION VALVES-

Some MAC valves are 3-position, 4-way valves. These valves are either double solenoid or double remote air operated.

If either of the two operators is in control, air supplied to the inlet port(s) will pass through the valve to one of the outlets as on 2-position, 4-way valves. However, if neither operator is in control, the valve moves to a center position. Listed below are the various center position functions :

#### A. CLOSED CENTER-

With this type valve, when in the center position all ports are blocked (inlets and exhausis) meaning the air at both outlet ports is trapped. If trapping the cur in both outlet ports would present a hazard in the application or servicing, a separate method in the system must be provided to remove the trapped air or this type valve should not be used

#### B. OPEN CENTER-

With this type valve, when in the center position, the inlet port(s) is blocked and the two outlet ports are open to the exhaust port(s) of the valve. If having no air in either outlet port would present a hazard in the application or servicing, this type valve should not be used.

#### C. PRESSURE CENTER-

With this type valve, when in the center position, the inlet port(s) is connected to both outlet ports of the valve. If having pressurized air to either or both outlet ports would present a hazard in the application or servicing of the valve or system, a separate method in the system must be provided to remove the retained air.

#### **OPERATING SPECIFICATIONS** -

MAC valves are to be installed only on applications that meet all operating specifications described in the MAC catalog for the valve.

#### MANUAL OPERATORS

Most MAC valves can be ordered with manual operators. Manual operators when depressed, are designed to shift the valve to the same position as would the corresponding solenoid or remote air pilot operator if it were activated. Care must be taken to order a type, if any, that will be safe for the physical location of the manual operator in the system. Accidental activation of a manual operator could create a dangerous situation. If intentional or accidental operation of a valve by a manual operator could create a dangerous situation then the "no operator" option should be used

#### REMOTE AIR OPERATED VALVES

Pilot valves supplying signal pressure to remote air operated valves should be 3-way valves with adequate supply and exhaust capacity to provide positive pressurizing and exhausting of the pilot supply line. Pilot lines should be open to exhaust when valves are deenergized.

#### INSTALLATION AND SERVICE PRECAUTIONS :

- A. Do not install or service MAC valves without first making sure both the air and electrical power to the machine are off and that all air has been completely bled from the system.
- B. MAC valves should only be installed and/or serviced by qualified, knowledgeable personnel who understand how the specific valve is to be pneumatically piped and electrically connected (where applicable). Flow paths through the valve are shown in the catalog and on the valve by use of ANSI or ISO type standard and graphic symbols. Do not install unless these symbols and the valve functions and operations are thoroughly understood.
- C. Before service, maintenance, repair or cleaning, consult local distributor or factory for Parts & Operation Sheet and information on proper cleaning and lubrication agents. Do not subject MAC valves' parts to any foreign substance including lubricants and cleaning agents not specifically recommended by MAC valves, Inc.
- D. MAC valves are never to be stepped on while working on a machine. Damage to the valve, or lines to the valve (either air or electrical lines) or accidental activating of a manual operator on the valve could result in a dangerous condition.

#### WARNING :

Under no circumstances are Mac valves to be used in any application where failure of the valve to operate as intended could jeopardize the safety of the operator or any other person.

- Do not operate outside of pressure range listed on valve label or outside of designated temperature range.
   Air supply must be clean. Contamination of valve can affect proper operation.
- An supply hist be creat. Containmation of valve can alter upper operation.
   Before attempting to repair, adjust or clean valve, consult catalog, parts & operation sheet, or factory for proper maintenance procedures, lubrication, and cleaning agents. Never attempt to repair or perform other maintenance with air pressure to valve.
   If aritine lubrication is used, consult catalog, parts & operation sheet, or factory for proper del lubrication sheet.
- recommended lubricants.

#### LIMITATION OF GUARANTEE

This Guarantee is limited to the replacement or rebuilding of any valve which should fail to operate properly. Valves, under the MAC Guarantee, must be returned (with or without bases) transportation prepaid and received at our factory within the Guarantee period. They will be returned to the customer at the expense of MAC Valves, Inc., and will carry the same guarantee as provided under the Flat Rate Rebuild Program.

#### DISCLAIMER OF GUARANTEE

No claims for labor, material, time, damage, or transportation are allowable nor will any valve be replaced or rebuilt under this guarantee which has been damaged by the purchaser not in the normal course of its use and maintenance during the warranty period. The guarantee does not apply to loss or damage caused by fire, theft, riot, explosion, labor dispute, act of God, or other causes beyond the control of MAC Valves, Inc. MAC Valves, Inc. shall in no event be liable for remote, special or consequential damages under the MAC Guarantee, nor under any implied warranties, including the implied warranty of merchantability.

The above Guarantee is our manner of extending the engineering and service resources of the MAC Valves, Inc. organization to assure our customer long, and continued satisfaction.