

MAC[®]

V A L V E S

P A T E N T E D

BULLET VALVE[®]

T E C H N O L O G Y



Bullet Valve® (BV) Series

The patented Bullet Valve® represents yet another evolution in air valve technology from MAC.

- **VERY FEW PARTS**
- **LONG LIFE LIFTING SOLENOID**
- **ONE PIECE POPPET / ARMATURE**
- **BALANCED DESIGN**
- **SOLENOID ISOLATED FROM CONTAMINATED AIR**
- **UNIQUE MOUNTING**

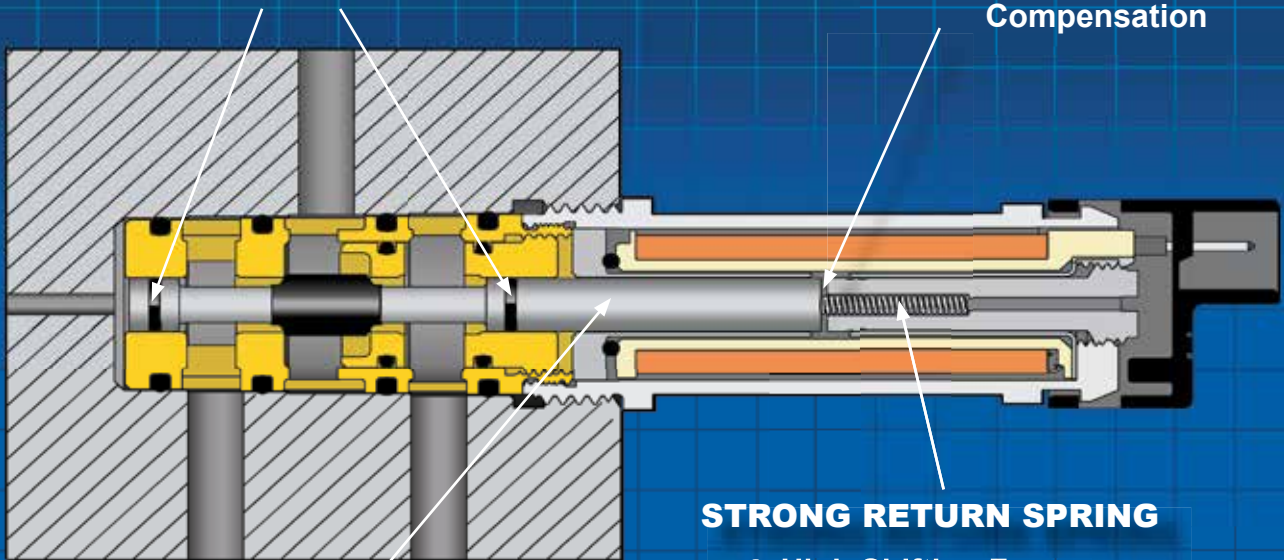
The threaded cartridge configuration allows for a variety of mounting possibilities, such as direct integration into pneumatic actuators or vacuum generators without the need of external tubing or fasteners. 2-way & 3-way models of the BV cartridge are available. A surface manifold mount configuration is also offered.

D-SEAL TECHNOLOGY

- Minimum Friction
- Wiping Action
- Isolates Solenoid From Contaminated Air

LONG LIFE LIFTING SOLENOID

- **SHORT STROKE** - High Shifting Forces (Energized)
- **OVERSTROKE** - Built In Wear Compensation



ONE PIECE POPPET/ARMATURE

- Balanced & Repeatable
- Cushioning - Reduces Solenoid Wear

STRONG RETURN SPRING

- High Shifting Forces (De-energized)

Function	Flow [max]	Manifold mounting	Series
2/2	Up to 70 NI/min	Cartridge	BV209A

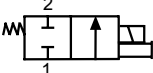
OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE

Type	2 Way	
Cartridge (Standard)	BV209A-CA1-00-xxxx-xxx	
Cartridge (Axial Flow)	BV209A-CG0-00-xxxx-xxx	

SOLENOID OPERATOR

		X XX X - X XX				
Solenoid	Voltage	Lead wire length	Solenoid can (round)	Solenoid cover		
B Round	† GC 24 V=/ 2.5W † GE 24 V=/ 4.0W † GH 12 V=/ 2.5W † GK 12 V=/ 4.0W MC 24 V=/ 2.5W ME 24 V=/ 4.0W MH 12 V=/ 2.5W MK 12 V=/ 4.0W † Not available w/axial flow	†† 0 No lead wire A 45 cm B 60 cm C 90 cm D 120 cm E 180 cm F 245 cm H 365 cm †† Not available for flying leads cover	C For Top Cover Option and Can w/ Outer Threads	JST Connector	Flying Leads	
				TA No ground wire	BA	
				TC Blocking & suppr. diode & LED (no ground)	BC	
				TE Blocking & suppr. diode (no ground)	BE	
				TG LED (no ground)	BG	
				TJ MOV (no ground)	BJ	
				TL LED & MOV (no ground)	BL	

*High wattage - high speed options - consult factory
High wattage configurations require intermittent duty cycles.

** ERC - Energy Reduction Circuitry - Reduces the effective wattage at continuous duty
ERC wattage reduction options - consult factory

CIRCUIT BAR

Bullet valve type	Cyl. port size	Spacing (mm)	Side cylinder port	Bottom cylinder port
Standard	#10-32 UNF	11	CCMV09A-00AAA-xx	CCMV09A-00BAA-xx
	M5	11	CCMV09A-00AAB-xx	CCMV09A-00BAB-xx
	M7	11	CCMV09A-00AAC-xx	CCMV09A-00BAC-xx
Axial flow	#10-32 UNF	11	-	CCMV09A-00BDA-xx
	M5	11	-	CCMV09A-00BDB-xx
	M7	11	-	CCMV09A-00BDC-xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

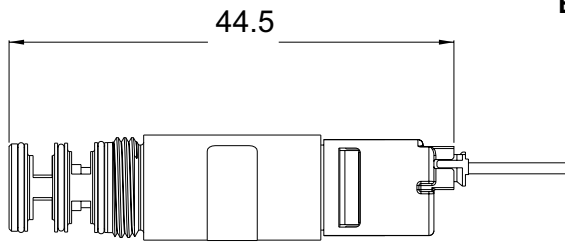
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow (at 6 bar ΔP=1bar):	Up to 70 NI/min
Voltage range:	-15% to +10% of nominal voltage

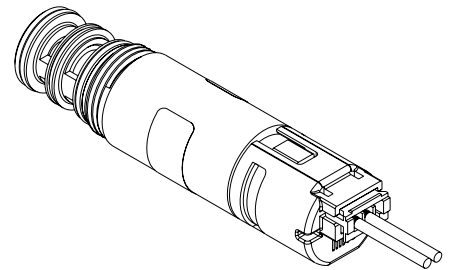
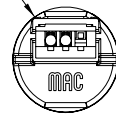
Tools: Manifold cavity step reamer: T-6961 • Insertion/removal socket: AT-1180 (Bit) AT-1185 (Bit Holder) AT-1184 (Handle)

Dimensions

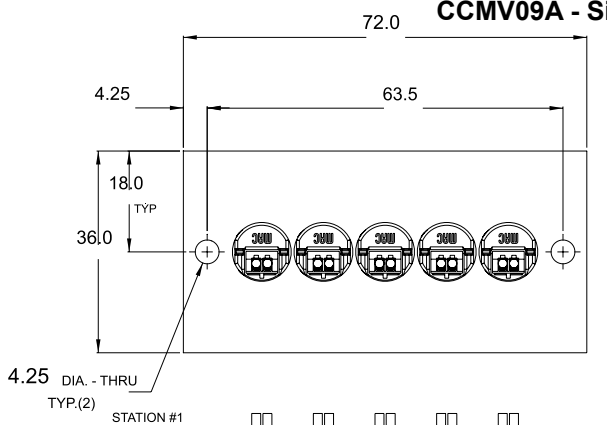
Bullet Valve with "JST" Cover and Circuit Board for LED., MOV., & Diode Options BV209A (2-way) - Standard Watt



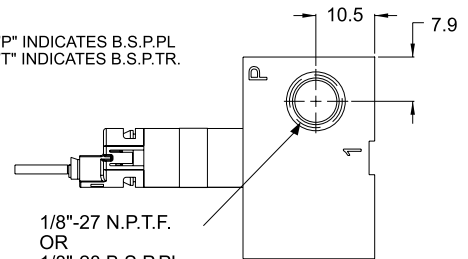
10.5DIA.



CCMV09A - Side ports



"P" INDICATES B.S.P.P.L.
"T" INDICATES B.S.P.T.R.

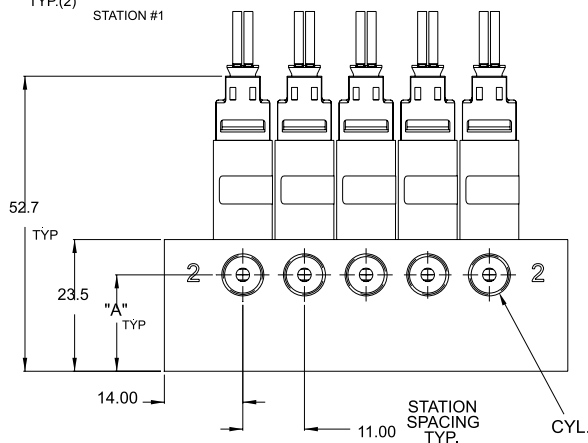


1/8"-27 N.P.T.F.
OR
1/8"-28 B.S.P.P.L.
OR
1/8"-28 B.S.P.T.R.

TYP.(2)
(1) EACH SIDE

BV209A SIDE PORTS

CYL.	DIMENSION "A"
#10-32	17.20
M5x0.8	17.20
M7x1.0	17.20



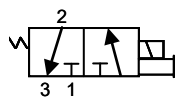
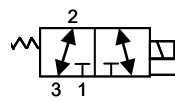
Function	Flow [max]	Manifold mounting	Series
3/2 NC, Universal	Up to 60 NI/min	Cartridge	BV309A

OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order VALVE

Type	3 Way N.C.	3 Way Universal
		
Cartridge	BV309A-CC1-00- xxxx-xxx	BV309A-CD1-00- xxxx-xxx

SOLENOID OPERATOR

X XX X - X XX				
Solenoid	Voltage	Lead wire length	Solenoid can (round)	Solenoid cover
B Round	GA 24V =/ 1.0W GB 24V =/ 1.8W GC 24V =/ 2.5W GD 24V =/ 3.0W GE 24V =/ 4.0W GF 12V =/ 1.0W GG 12V =/ 1.8W GH 12V =/ 2.5W GJ 12V =/ 3.0W GK 12V =/ 4.0W	† 0 No lead wire A 45 cm B 60 cm C 90 cm D 120 cm E 180 cm F 245 cm H 365 cm	C For Top Cover Option and Can w/ Outer Threads	JST Connector Flying Leads TA No ground wire BA TC Blocking & suppr. BC diode & LED (no ground) TE Blocking & suppr. BE diode (no ground) TG LED (no ground) BG TJ MOV (no ground) BJ TL LED & MOV BL (no ground)
		† Not available for flying leads cover		

* High wattage - high speed options - consult factory

** ERC wattage reduction options - consult factory

CIRCUIT BAR

Port size	Spacing (mm)	Side cylinder port
# 10-32 UNF	11	CCMV09A-00ABA- xx
M5	11	CCMV09A-00ABB- xx
M7	11	CCMV09A-00ABC- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

* High wattage configurations require intermittent duty cycles.

** ERC - Energy Reduction Circuitry - Reduces the effective wattage at continuous duty.

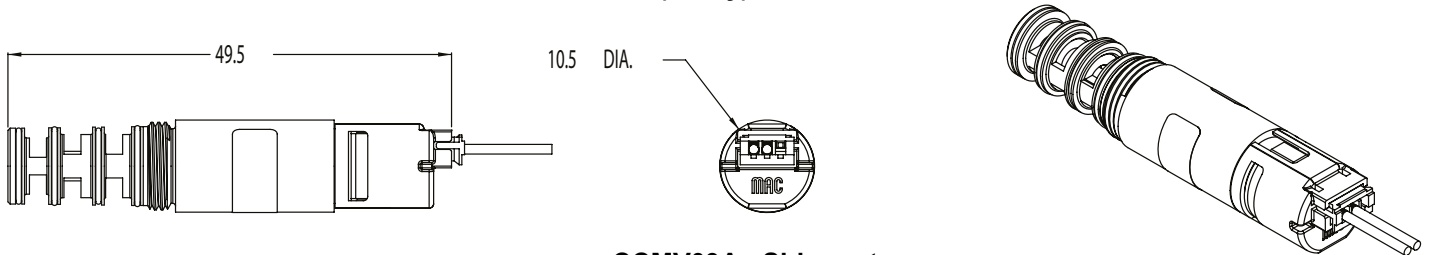
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow (at 6 bar ΔP=1bar):	Up to 60 NI/min
Voltage range:	-15% to +10% of nominal voltage

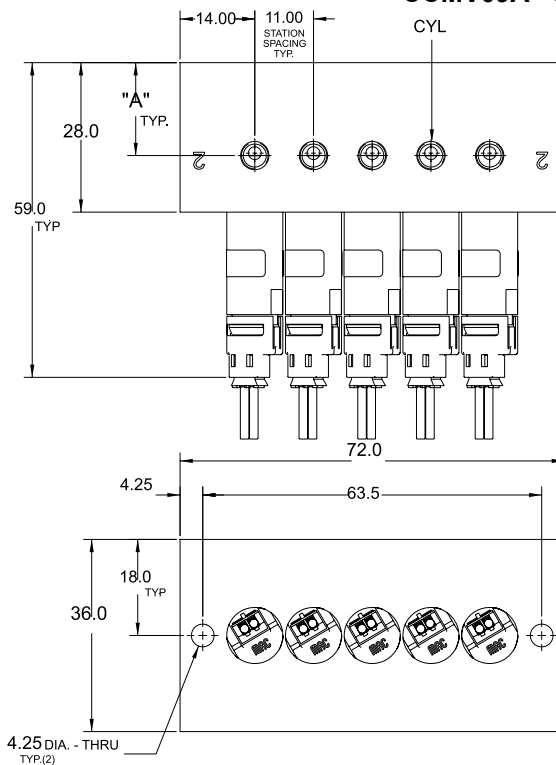
Tools: Manifold cavity step reamer: T-6962 • Insertion/removal socket: AT-1180 (Bit) AT-1185 (Bit Holder) AT-1184 (Handle)

Dimensions

Bullet Valve with "JST" Cover and Circuit Board for LED., MOV., & Diode Options BV309A (3-way) - Standard Watt



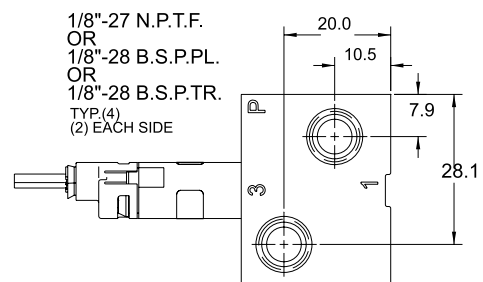
CCMV09A - Side ports



BV309A SIDE PORTS

CYL	DIMENSION "A"
#10-32	17.4
M5 X 0.8	17.4
M7 X 1.0	18.9

"P" INDICATES B.S.P.PL.
"T" INDICATES B.S.P.TR.



Function	Flow [max]	Manifold mounting	Series
2/2	Up to 80 NI/min	Cartridge	BV210A

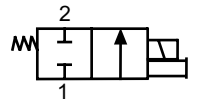
OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE	
Type	2 Way
Cartridge (Standard)	BV210A-CA1-00- XXXX-XXX
Cartridge (Axial Flow)	BV210A-CB0-00- XXXX-XXX



SOLENOID OPERATOR

Solenoid		Voltage	Lead wire length	Solenoid can (round)	Solenoid cover		
B Round	EH 24 V=/ 2.5W EG 24 V=/ 4.0W EK 12 V=/ 2.5W EJ 12 V=/ 4.0W		0 † No lead wire A 45 cm B 60 cm C 90 cm D 120 cm E 180 cm F 245 cm H 365 cm	C For Top Cover Option and Can w/ Outer Threads	JST TA TC TE TG TJ TL PN	Pico PC PE PG PJ PL	Flying Leads BA No ground wire BC Blocking & suppr. diode & LED (no ground) BE Blocking & suppr. diode (no ground) BG LED (no ground) BJ MOV (no ground) BL LED & MOV (no ground) Transfer Board

XXXX - XXX

† Not available for flying leads cover
Only option for Pico cover

* High wattage - high speed options - consult factory
High wattage configurations require intermittent duty cycles.

** ERC - Energy Reduction Circuitry - Reduces the effective wattage at continuous duty
ERC wattage reduction options - consult factory

Note: Pico covers PC-PL have a 3rd Pin which is a location pin

CIRCUIT BAR

Bullet valve type	Cyl. port size	Spacing (mm)	Side cylinder port	Bottom cylinder port
Standard	#10-32 UNF	12	CCMV10A-00AAA- xx	CCMV10A-00BAA- xx
	M5	12	CCMV10A-00AAB- xx	CCMV10A-00BAB- xx
	M7	12	CCMV10A-00AAC- xx	CCMV10A-00BAC- xx
Axial flow	#10-32 UNF	12	-	CCMV10A-00BDA- xx
	M5	12	-	CCMV10A-00BDB- xx
	M7	12	-	CCMV10A-00BDC- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

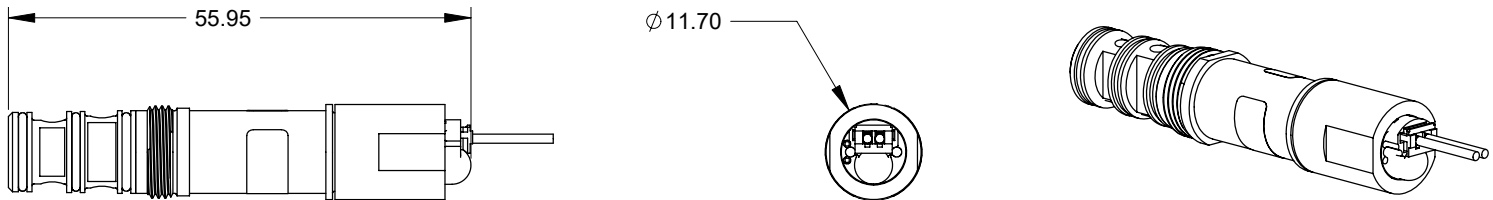
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow (at 6 bar ΔP=1bar):	Up to 80 NI/min
Voltage range:	-15% to +10% of nominal voltage

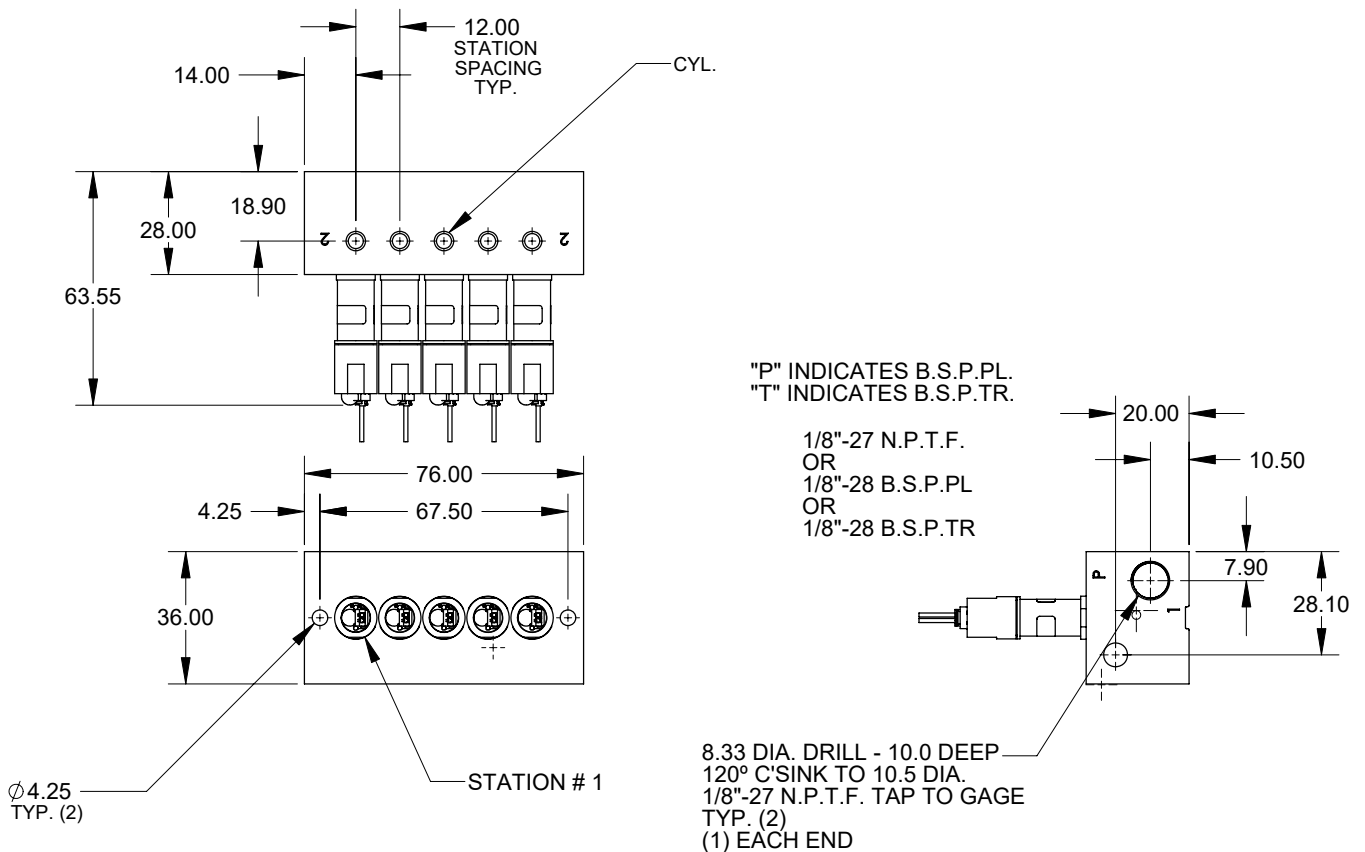
Tools: Manifold cavity step reamer: T-6960 • Insertion/removal socket: AT-1181 (Bit) AT-1185 (Bit Holder) AT-1184 (Handle)

Dimensions

Bullet Valve with "JST" Cover and Circuit Board for LED., MOV., & Diode Options BV210A (2-way) - Standard Watt



CCMV10A - SIDE PORTS



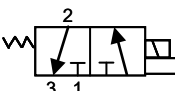
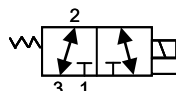
Function	Flow [max]	Manifold mounting	Series
3/2 NC, Universal	Up to 90 NI/min	Cartridge	BV310A

OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE	Type	3 Way N.C.	3 Way Universal
			
	Cartridge (Standard)	BV310A-CC1-00- xxxx-xxx	BV310A-CD1-00- xxxx-xxx

SOLENOID OPERATOR

X XX X - X XX

Solenoid	Voltage	Lead wire length	Solenoid can (round)	Solenoid cover																																																		
B Round	<table border="0"> <tr> <td>HA 24 V=/ 1.0W</td> <td>HF 12 V=/ 1.0W</td> </tr> <tr> <td>HB 24 V=/ 1.8W</td> <td>HG 12 V=/ 1.8W</td> </tr> <tr> <td>HC 24 V=/ 2.5W</td> <td>HH 12 V=/ 2.5W</td> </tr> <tr> <td>HD 24 V=/ 3.0W</td> <td>HJ 12 V=/ 3.0W</td> </tr> <tr> <td>HE 24 V=/ 4.0W</td> <td>HK 12 V=/ 4.0W</td> </tr> </table>	HA 24 V=/ 1.0W	HF 12 V=/ 1.0W	HB 24 V=/ 1.8W	HG 12 V=/ 1.8W	HC 24 V=/ 2.5W	HH 12 V=/ 2.5W	HD 24 V=/ 3.0W	HJ 12 V=/ 3.0W	HE 24 V=/ 4.0W	HK 12 V=/ 4.0W	<table border="0"> <tr> <td>†0 No lead wire</td> <td>C For Top Cover Option and Can w/ Outer Threads</td> </tr> <tr> <td>A 45 cm</td> <td></td> </tr> <tr> <td>B 60 cm</td> <td></td> </tr> <tr> <td>C 90 cm</td> <td></td> </tr> <tr> <td>D 120 cm</td> <td></td> </tr> <tr> <td>E 180 cm</td> <td></td> </tr> <tr> <td>F 245 cm</td> <td></td> </tr> <tr> <td>H 365 cm</td> <td></td> </tr> </table>	†0 No lead wire	C For Top Cover Option and Can w/ Outer Threads	A 45 cm		B 60 cm		C 90 cm		D 120 cm		E 180 cm		F 245 cm		H 365 cm			<table border="0"> <tr> <th colspan="3">JST Pico Flying Leads</th> </tr> <tr> <td>TA</td> <td>BA</td> <td>No ground wire</td> </tr> <tr> <td>TC</td> <td>PC</td> <td>Blocking & suppr. diode & LED(no ground)</td> </tr> <tr> <td>TE</td> <td>PE</td> <td>Blocking & suppr. diode (no ground)</td> </tr> <tr> <td>TG</td> <td>PG</td> <td>LED (no ground)</td> </tr> <tr> <td>TJ</td> <td>PJ</td> <td>MOV (no ground)</td> </tr> <tr> <td>TL</td> <td>PL</td> <td>LED & MOV (no ground)</td> </tr> <tr> <td></td> <td>PN</td> <td>Transfer Board</td> </tr> </table>	JST Pico Flying Leads			TA	BA	No ground wire	TC	PC	Blocking & suppr. diode & LED(no ground)	TE	PE	Blocking & suppr. diode (no ground)	TG	PG	LED (no ground)	TJ	PJ	MOV (no ground)	TL	PL	LED & MOV (no ground)		PN	Transfer Board
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* High wattage - high speed options - consult factory
 ** ERC wattage reduction options - consult factory

† Not available for flying leads cover
 Only option for Pico cover

Note: Pico covers PC-PL have a 3rd Pin which is a location pin

CIRCUIT BAR

Port size	Spacing (mm)	Side cylinder port
# 10-32 UNF	12	CCMV10A-00ABA- xx
M5	12	CCMV10A-00ABB- xx
M7	12	CCMV10A-00ABC- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

* High wattage configurations require intermittent duty cycles.

** ERC - Energy Reduction Circuitry - Reduces the effective wattage at continuous duty.

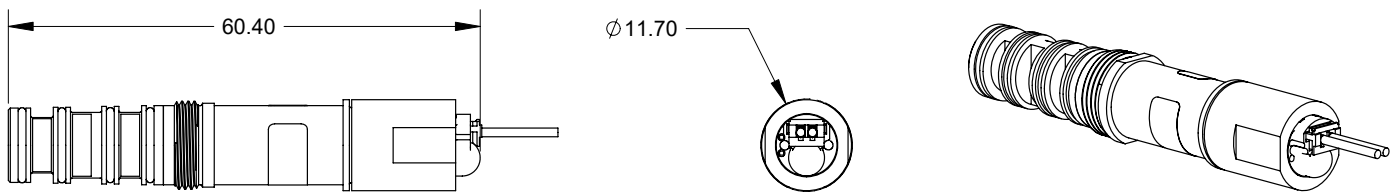
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow (at 6 bar ΔP=1bar):	Up to 90 NI/min
Voltage range:	-15% to +10% of nominal voltage

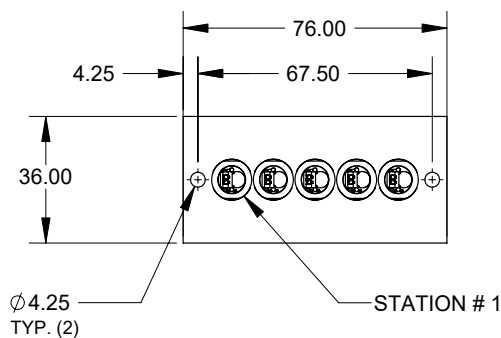
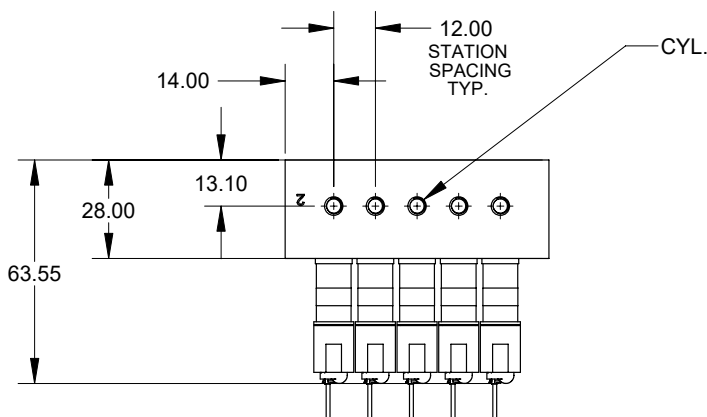
Tools: Manifold cavity step reamer: T-6963 • Insertion/removal socket: AT-1181 (Bit) AT-1185 (Bit Holder) AT-1184 (Handle)

Dimensions

Bullet Valve with "JST" Cover and Circuit Board for LED., MOV., & Diode Options BV310A (3-way) - Standard Watt

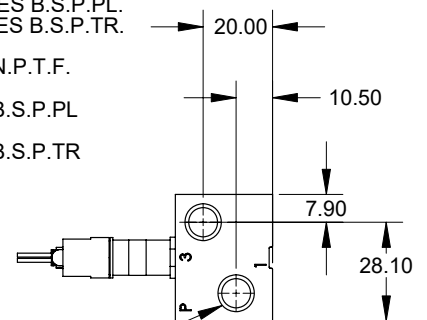


CCMV10A - SIDE PORTS



"P" INDICATES B.S.P.PL.
"T" INDICATES B.S.P.TR.

1/8"-27 N.P.T.F.
OR
1/8"-28 B.S.P.PL
OR
1/8"-28 B.S.P.TR



8.33 DIA. DRILL - 10.0 DEEP
120° C SINK TO 10.5 DIA.
1/8"-27 N.P.T.F. TAP TO GAGE
TYP. (4)
(2) EACH END

Function	Flow [max]	Manifold mounting	Series
3/2 NC, Universal	Up to 80 NI/min	Manifold mount - Non plug-in	BV310A

OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life



How To Order

VALVE	Type	3 Way N.C.	3 Way Universal
	Manifold Mount - Non plug-in	BV310A-LC1-00- xxxx-xxx	BV310A-LD1-00- xxxx-xxx

SOLENOID OPERATOR

Solenoid		Voltage	Lead wire length	Solenoid can (round)	Solenoid cover
B Round	HA 24 V=/ 1.0W HB 24 V=/ 1.8W HC 24 V=/ 2.5W HD 24 V=/ 3.0W HE 24 V=/ 4.0W HF 12 V=/ 1.0W HG 12 V=/ 1.8W HH 12 V=/ 2.5W HJ 12 V=/ 3.0W HK 12 V=/ 4.0W		† 0 No lead wire A 45 cm B 60 cm C 90 cm D 120 cm E 180 cm F 245 cm H 365 cm	B Cover For Manifold Body	JST Pico Flying Leads TA BA No ground wire TC PC BC Blocking & suppr. diode & LED(no ground) TE PE BE Blocking & suppr. diode (no ground) TG PG BG LED (no ground) TJ PJ BJ MOV (no ground) TL PL BL LED & MOV (no ground) PN Transfer Board

* High wattage - high speed options - consult factory

** ERC wattage reduction options - consult factory

Note: Pico covers PC-PL have a 3rd Pin which is a location pin

NON PLUG-IN CIRCUIT BAR

Port size	Spacing (mm)	Side cylinder port	Bottom cylinder port
# 10-32 UNF	12	CBMV10A-00ABA- xx	CBMV10A-00BBA- xx
M5	12	CBMV10A-00ABB- xx	CBMV10A-00BBB- xx
M7	12	CBMV10A-00ABC- xx	CBMV10A-00BBC- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

Options

BV310A- LC 1 -00-**xxxx-xxx**
 Replace with "0" for no manual operator

How to order bar configured for regulator

CBMV10A-00 **A** BB- **xx**
 Replace with **D** for regulator - Side ports
 Replace with **E** for regulator - Bottom ports

Note: Regulator must be ordered separately - see next page

* High wattage configurations require intermittent duty cycles

**ERC - Energy Reduction Circuitry - Reduces the effectiveness wattage at continuous duty

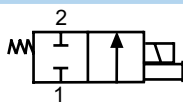
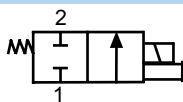
Function	Flow [max]	Manifold mounting	Series
2/2	Up to 240 NI/min	Cartridge	BV214A

OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE	Type	2-Way (standard)	2-Way (axial flow)
			
	Cartridge	BV214A-CA1-00- xxxx-xxx	BV214A-CB0-00- xxxx-xxx

SOLENOID OPERATOR

Solenoid		Voltage	Lead wire length	Solenoid can (round)	Solenoid cover																								
B Round	CA	24 V=/ 1.0W	0* No lead wire	C For Top Cover Option and Can w/ Outer Threads	<table border="1"> <thead> <tr> <th colspan="3">JST Pico Flying Leads</th> </tr> </thead> <tbody> <tr> <td>TA</td> <td>BA</td> <td>No ground wire</td> </tr> <tr> <td>TC</td> <td>PC</td> <td>Blocking & suppr. diode & LED (no ground)</td> </tr> <tr> <td>TE</td> <td>PE</td> <td>Blocking & suppr. diode (no ground)</td> </tr> <tr> <td>TG</td> <td>PG</td> <td>LED (no ground)</td> </tr> <tr> <td>TJ</td> <td>PJ</td> <td>MOV (no ground)</td> </tr> <tr> <td>TL</td> <td>PL</td> <td>LED & MOV (no ground)</td> </tr> <tr> <td>PN</td> <td></td> <td>Transfer Board</td> </tr> </tbody> </table>	JST Pico Flying Leads			TA	BA	No ground wire	TC	PC	Blocking & suppr. diode & LED (no ground)	TE	PE	Blocking & suppr. diode (no ground)	TG	PG	LED (no ground)	TJ	PJ	MOV (no ground)	TL	PL	LED & MOV (no ground)	PN		Transfer Board
	JST Pico Flying Leads																												
	TA	BA	No ground wire																										
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	TE	PE	Blocking & suppr. diode (no ground)																										
	TG	PG	LED (no ground)																										
	TJ	PJ	MOV (no ground)																										
	TL	PL	LED & MOV (no ground)																										
	PN		Transfer Board																										
	CB	24 V=/ 1.8W	A 45 cm																										
CC	24 V=/ 2.5W	B 60 cm																											
CD	24 V=/ 3.0W	C 90 cm																											
CE	24 V=/ 4.0W	D 120 cm																											
CF	12 V=/ 1.0W	E 180 cm																											
CG	12 V=/ 1.8W	F 245 cm																											
CH	12 V=/ 2.5W	H 365 cm																											
CJ	12 V=/ 3.0W																												
CK	12 V=/ 4.0W																												

*Not available for flying leads cover
Only option for Pico cover

CIRCUIT BAR

Bullet valve type	Cyl. port size	Spacing (mm)	Side cylinder port	Bottom cylinder port
Standard	M7	17	CCMV14A-00AAA- xx	CCMV14A-00BAA- xx
	0.32 cm	17	CCMV14A-00AAB- xx	CCMV14A-00BAB- xx
	5/32 tube recpt.	17	CCMV14A-00AAC- xx	CCMV14A-00BAC- xx
Axial flow	M7	17	-	CCMV14A-00BDA- xx
	0.32 cm	17	-	CCMV14A-00BDB- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

† Requires special spacing - - consult factory

Note: Common inlet & exhaust are 0.64 cm NPTF
For BSPPL or BSPTR threads consult factory

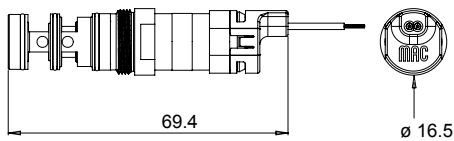
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow (at 6 bar, Δ P=1bar):	Up to 240 NI/min (4.0 W)
Voltage range:	-15% to +10% of nominal voltage

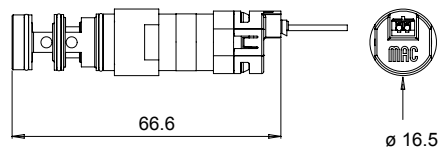
Tools: Manifold cavity step reamer: T-7331 • Insertion/removal socket: AT-1263 (Bit) AT-1185 (Bit Holder) AT-1264 (Handle)

Dimensions

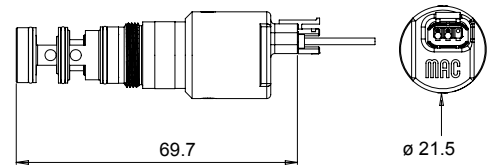
Flying leads



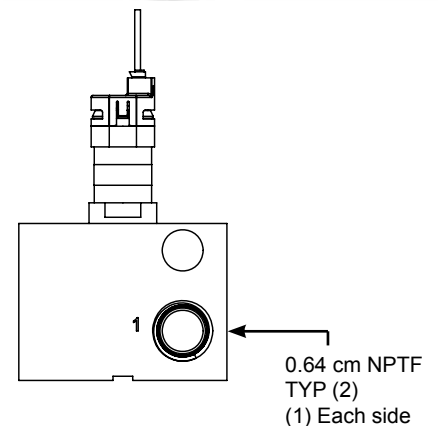
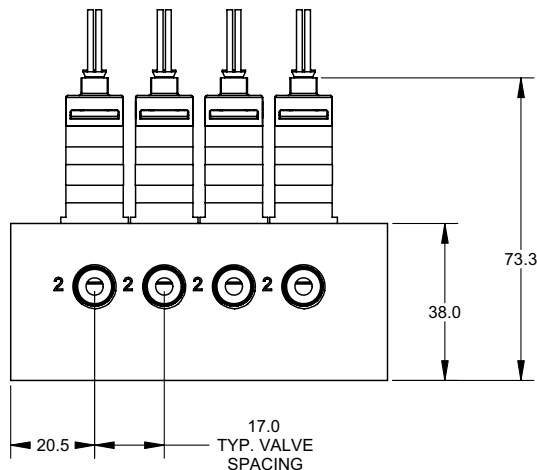
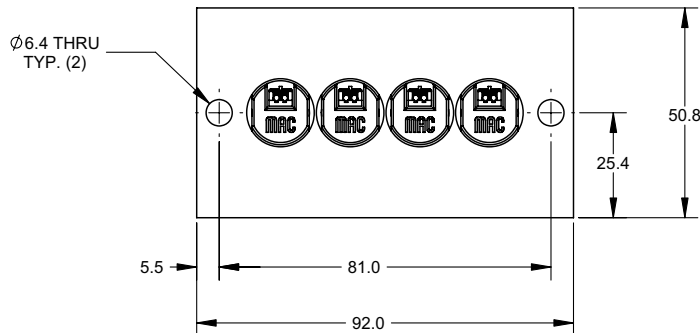
JST Connector



MAC Jac



CCMV14A bar with BV214A valves



Function	Flow [max]	Manifold mounting	Series
3/2	Up to 240 NI/min	Cartridge	BV314A

OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE

Type	3-Way N.C.	3-Way universal valve
Cartridge	BV314A-CC1-00- xxxx-xxx	BV314A-CD1-00- xxxx-xxx

SOLENOID OPERATOR

Solenoid		Voltage	Lead wire length	Solenoid can (round)	Solenoid cover																					
B	Round	CA 24 V=/ 1.0W CB 24 V=/ 1.8W CC 24 V=/ 2.5W CD 24 V=/ 3.0W CE 24 V=/ 4.0W CF 12 V=/ 1.0W CG 12 V=/ 1.8W CH 12 V=/ 2.5W CJ 12 V=/ 3.0W CK 12 V=/ 4.0W	0* No lead wire A 45 cm B 60 cm C 90 cm D 120 cm E 180 cm F 245 cm H 365 cm	C For Top Cover Option and Can w/ Outer Threads	JST Pico Flying Leads <table border="1"> <tr><td>TA</td><td>BA</td><td>No ground wire</td></tr> <tr><td>TC</td><td>PC</td><td>Blocking & suppr. diode & LED(no ground)</td></tr> <tr><td>TE</td><td>PE</td><td>Blocking & suppr. diode (no ground)</td></tr> <tr><td>TG</td><td>PG</td><td>LED (no ground)</td></tr> <tr><td>TJ</td><td>PJ</td><td>MOV (no ground)</td></tr> <tr><td>TL</td><td>PL</td><td>LED & MOV (no ground)</td></tr> <tr><td>PN</td><td></td><td>Transfer Board</td></tr> </table>	TA	BA	No ground wire	TC	PC	Blocking & suppr. diode & LED(no ground)	TE	PE	Blocking & suppr. diode (no ground)	TG	PG	LED (no ground)	TJ	PJ	MOV (no ground)	TL	PL	LED & MOV (no ground)	PN		Transfer Board
TA	BA	No ground wire																								
TC	PC	Blocking & suppr. diode & LED(no ground)																								
TE	PE	Blocking & suppr. diode (no ground)																								
TG	PG	LED (no ground)																								
TJ	PJ	MOV (no ground)																								
TL	PL	LED & MOV (no ground)																								
PN		Transfer Board																								
			*Not available for flying leads cover Only option for Pico cover		† GA MAC JAC Connector																					

CIRCUIT BAR

Cyl. port size	Spacing (mm)	Side cylinder port	Bottom cylinder port
M7	17	CCMV14A-00ABA- xx	CCMV14A-00BBA- xx
0.32 cm	17	CCMV14A-00ABB- xx	CCMV14A-00BBB- xx
5/32 tube receptacle	17	CCMV14A-00ABC- xx	CCMV14A-00BBC- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

† Requires special spacing - - consult factory

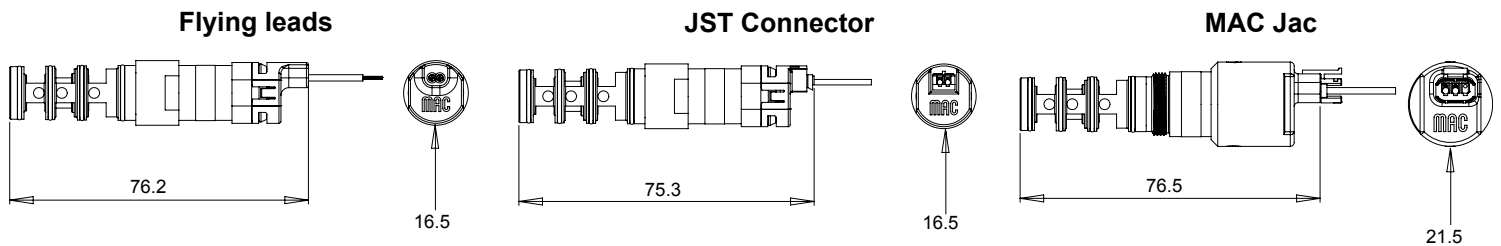
Note: Common inlet & exhaust are 0.64 cm NPTF
For BSPPL or BSPTR threads consult factory

Technical Data

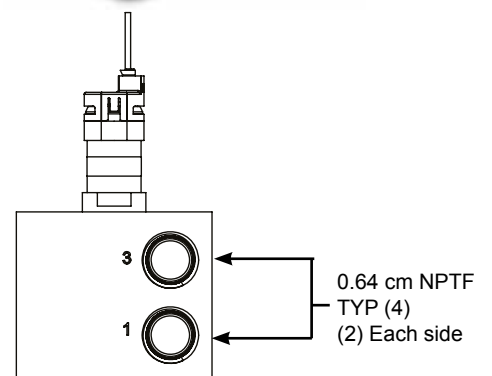
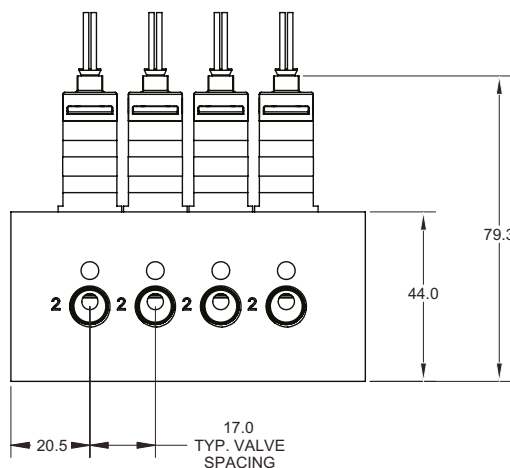
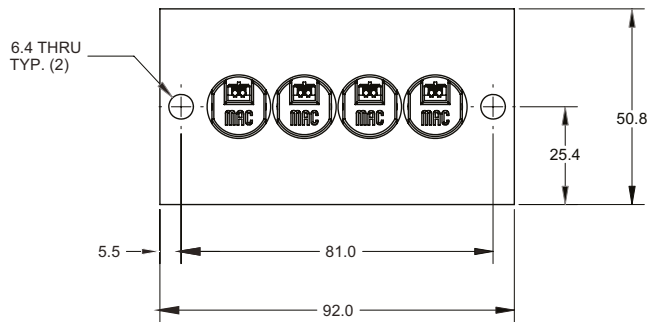
Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow (at 6 bar, Δ P=1bar):	Up to 240 NI/min (4.0 W)
Voltage range:	-15% to +10% of nominal voltage

Tools: Manifold cavity step reamer: T-7321 • Insertion/removal socket: AT-1263 (Bit) AT-1185 (Bit Holder) AT-1264 (Handle)

Dimensions



CCMV14A bar with BV314A valves



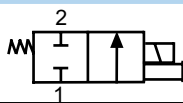
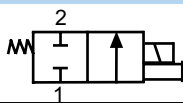
Function	Flow [max]	Manifold mounting	Series
2/2	Up to 600 NI/min	Cartridge	BV221A

OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE	Type	2-Way (standard)	2-Way (axial flow)
			
	Cartridge	BV221A-CA1-00-xxxx-xxx	BV221A-CB0-00-xxxx-xxx

SOLENOID OPERATOR

Solenoid		Voltage	Lead wire length	Solenoid can (round)	Solenoid cover
B Round	CA	24 V=/ 1.0W	0* No lead wire	C For Top Cover Option and Can w/ Outer Threads	M12
	CB	24 V=/ 1.8W	A 45 cm		JST
	CC	24 V=/ 2.5W	B 60 cm		Pico
	CD	24 V=/ 3.0W	C 90 cm		Flying Leads
	CE	24 V=/ 4.0W	D 120 cm		TA
	CF	12 V=/ 1.0W	E 180 cm		BA
	CG	12 V=/ 1.8W	F 245 cm		BC
	CH	12 V=/ 2.5W	H 365 cm		RC
	CJ	12 V=/ 3.0W			TC
	CK	12 V=/ 4.0W			PC
				BE	
				TE	
				PE	
				PG	
				TG	
				PJ	
				TJ	
				PL	
				TL	
				PN	

*Not available for flying leads cover
Only option for Pico and M12 cover

GA MAC JAC Connector

Note:
For CIRCUIT BAR ordering information please consult factory

Note: Pico covers PC-PL have a 3rd Pin which is a location pin

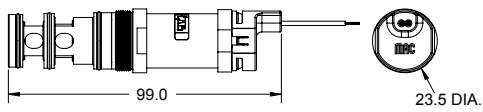
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow:	Up to 600 NI/min (4.0 W)
Voltage range:	-15% to +10% of nominal voltage

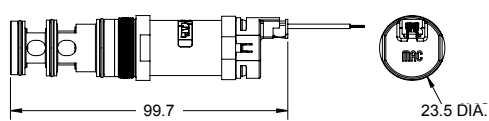
Tools: Manifold cavity step reamer: T-7571 • Insertion/removal socket: AT-1365 (Bit)

Dimensions

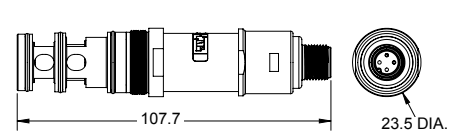
Flying leads



JST Connector



M12



BV221A valves

Function	Flow [max]	Manifold mounting	Series
3/2	Up to 600 NI/min	Cartridge	BV321A

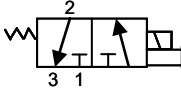
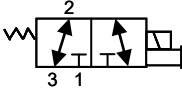
OPERATIONAL BENEFITS

1. Short stroke with high shifting forces
2. Balanced poppet, immune to pressure fluctuations
3. Precise repeatability
4. Solenoid isolated from contaminated air
5. Very few parts
6. Extremely long life
7. Unique mounting - no fasteners or screws required



How To Order

VALVE

Type	3-Way N.C.	3-Way universal valve
		
Cartridge	BV321A-CC1-00- xxxx-xxx	BV321A-CD1-00- xxxx-xxx

SOLENOID OPERATOR

Solenoid		Voltage	Lead wire length	Solenoid can (round)	Solenoid cover			
B Round	CA	24 V=/ 1.0W	0* No lead wire	C For Top Cover Option and Can w/ Outer Threads	M12 JST Pico Flying Leads			
	CB	24 V=/ 1.8W	A 45 cm		TA	BA No ground wire		
	CC	24 V=/ 2.5W	B 60 cm		RC	TC	PC	BC Blocking & suppr. diode & LED(no ground)
	CD	24 V=/ 3.0W	C 90 cm		RE	TE	PE	BE Blocking & suppr. diode (no ground)
	CE	24 V=/ 4.0W	D 120 cm		RG	TG	PG	BG LED (no ground)
	CF	12 V=/ 1.0W	E 180 cm		RJ	TJ	PJ	BJ MOV (no ground)
	CG	12 V=/ 1.8W	F 245 cm		RL	TL	PL	BL LED & MOV (no ground)
	CH	12 V=/ 2.5W	H 365 cm		RN	PN	Transfer Board	
	CJ	12 V=/ 3.0W	*Not available for flying leads cover Only option for Pico and M12 cover		GA MAC JAC Connector			
	CK	12 V=/ 4.0W			Note: Pico covers PC-PL have a 3rd Pin which is a location pin			

CIRCUIT BAR

Cyl. port size	Spacing (mm)	Side cylinder port	Bottom cylinder port
0.32 cm	25	CCMV21A-00ABA- xx	CCMV21A-00BBA- xx
0.64 cm	25	CCMV21A-00ABB- xx	CCMV21A-00BBB- xx

xx = Number of stations

Note: for valves mounted to bar at factory, add -9 to model numbers.

Note: Common inlet & exhaust are 0.95 cm NPTF
For BSPPL or BSPTR threads consult factory

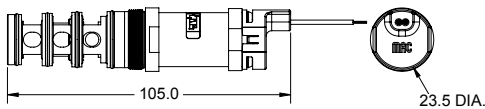
Technical Data

Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 Bar
Lubrication:	Not required, if used select a medium aniline point lubricant (between 80°C and 100°C)
Filtration:	40µ
Temperature range:	-18°C to +50°C / 0°F to 120°F
Flow:	Up to 600 NI/min (4.0 W)
Voltage range:	-15% to +10% of nominal voltage

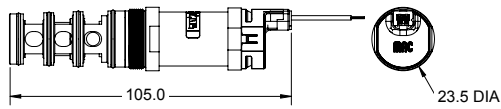
Tools: Manifold cavity step reamer: T-7573 • Insertion/removal socket: AT-1365 (Bit)

Dimensions

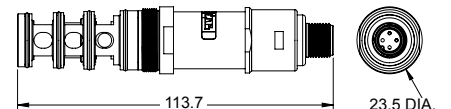
Flying leads



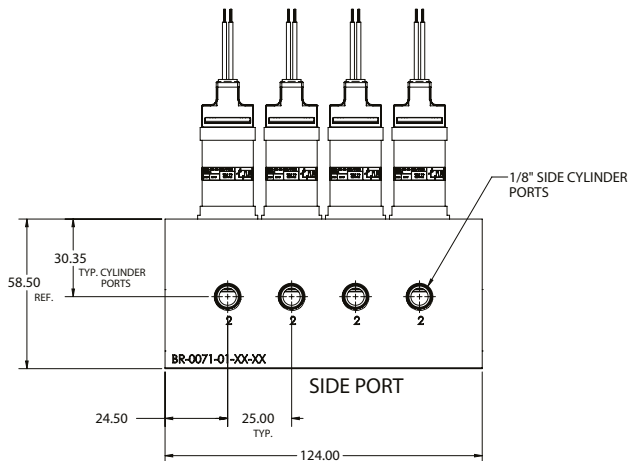
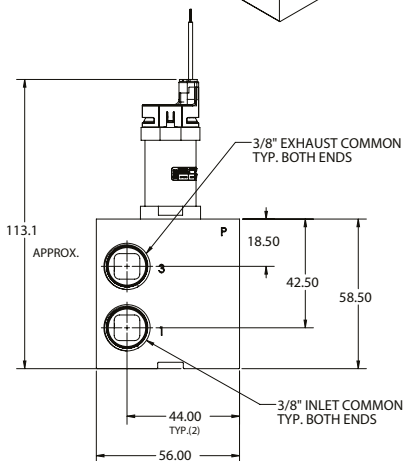
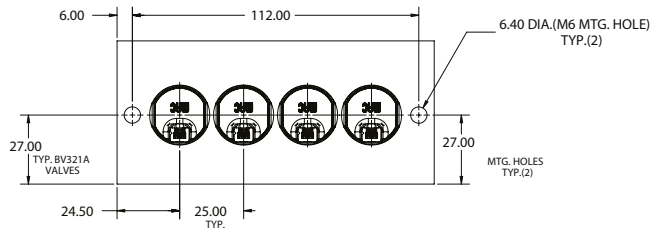
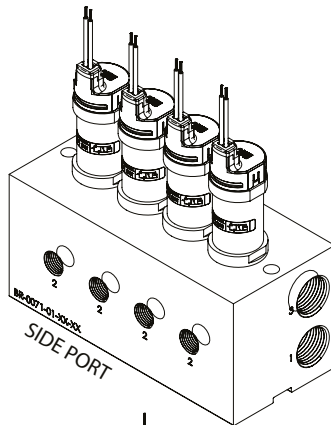
JST Connector



M12



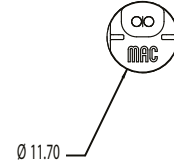
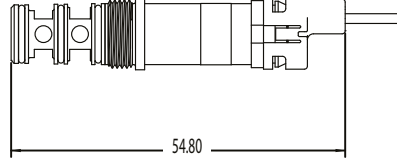
CCMV21A bar with BV321A valves



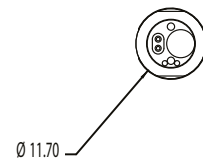
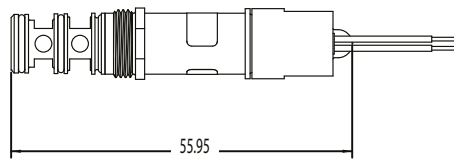
Connector Options

BV210

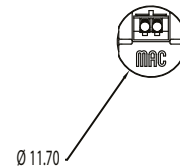
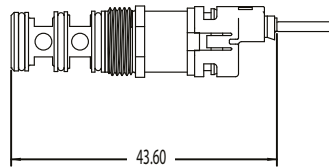
Flying Leads (BA)



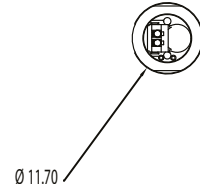
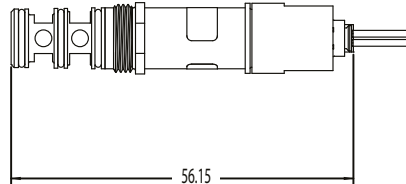
Flying Leads w/ LED (BC, BG, BL)



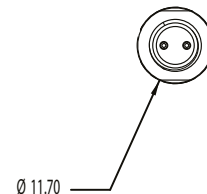
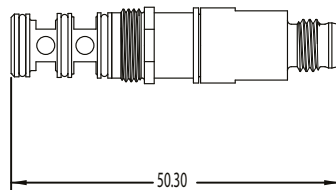
JST Connector (TA)



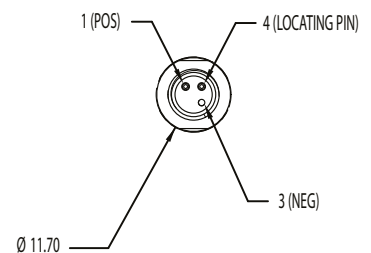
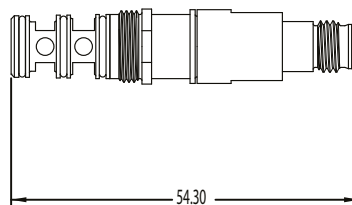
JST Connector w/ LED (TG, TL)



2 Pin PICO (PN)



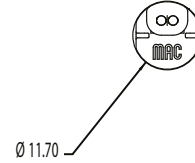
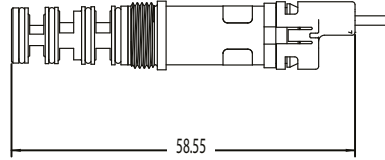
3 Pin PICO (PC, PE, PG, PJ, PL)



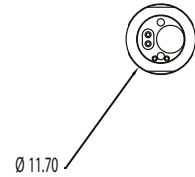
Connector Options

BV310

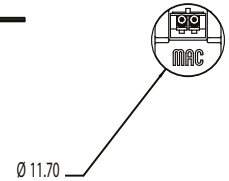
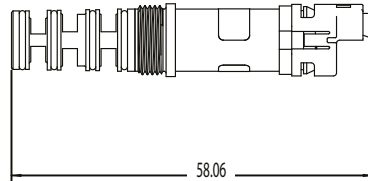
Flying Leads (BA)



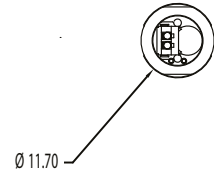
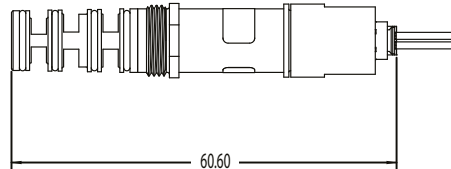
Flying Leads w/ LED (BC, BG, BL)



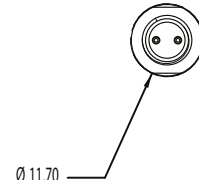
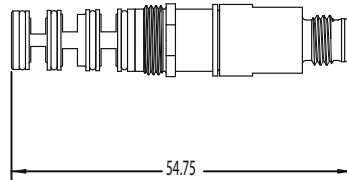
JST Connector (TA)



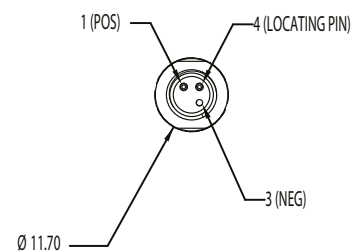
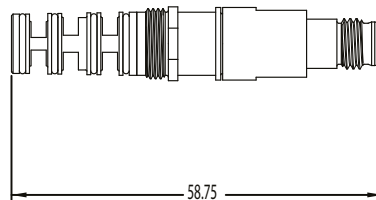
JST Connector w/ LED (TG, TL)



2 Pin PICO (PN)



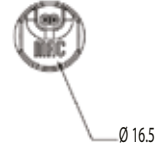
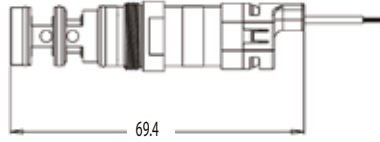
3 Pin PICO (PC, PE, PG, PJ, PL)



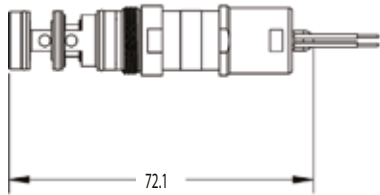
Connector Options

BV214

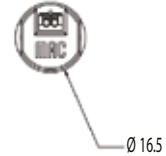
Flying Leads (BA)



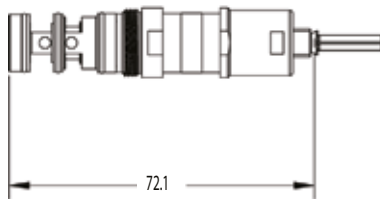
Flying Leads w/ LED (BC, BG, BL)



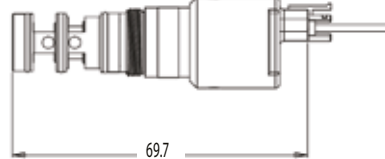
JST Connector (TA)



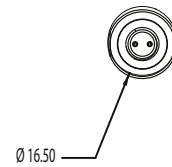
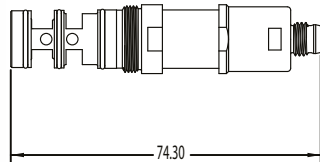
JST Connector w/ LED (TC, TG, TL)



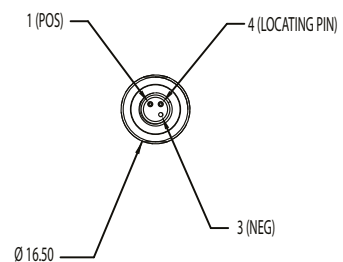
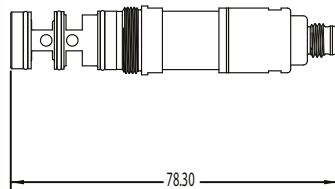
MAC Jac (GA)



2 Pin PICO (PN)



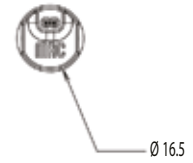
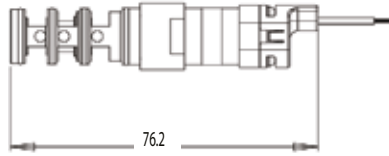
3 Pin PICO (PC, PE, PG, PJ, PL)



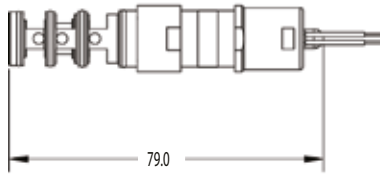
Connector Options

BV314

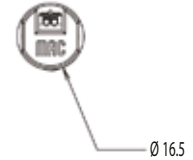
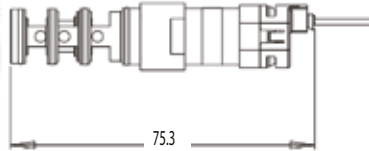
Flying Leads (BA)



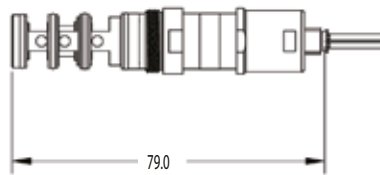
Flying Leads w/ LED (BC, BG, BL)



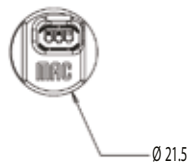
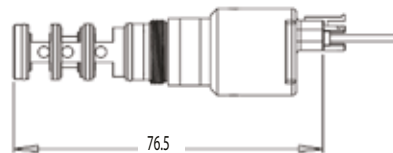
JST Connector (TA)



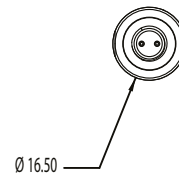
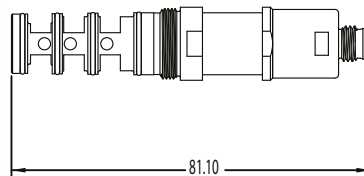
JST Connector w/ LED (TC, TG, TL)



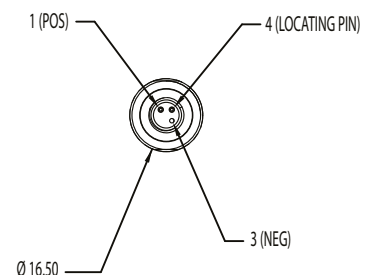
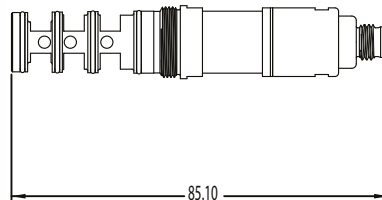
MAC Jac (GA)



2 Pin PICO (PN)



3 Pin PICO (PC, PE, PG, PJ, PL)



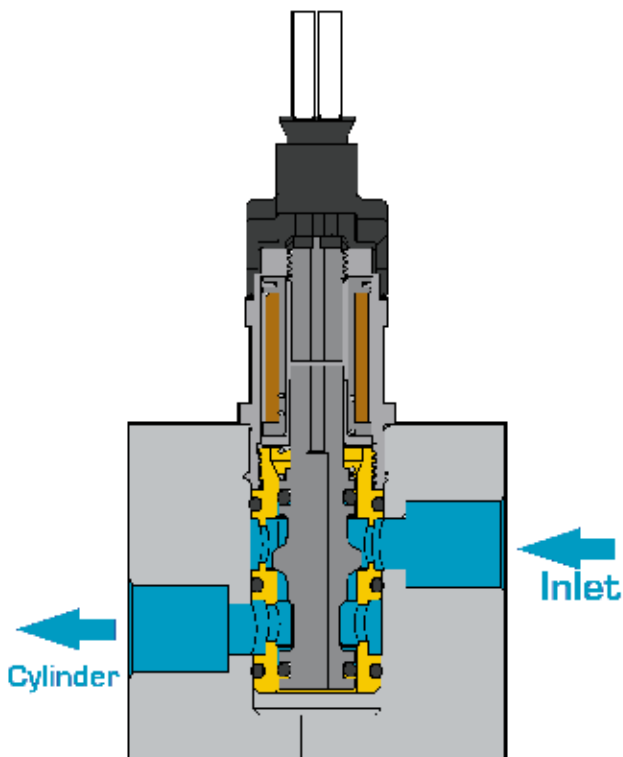
Cartridge Modifications

Our manufacturing process of the Bullet Valve® cartridge body enables flexibility with regards to offering potential modifications that meet your specific application needs. An example of such modifications is the “axial flow” cartridge body we are currently offering for the BV209, BV210 and BV214 series.

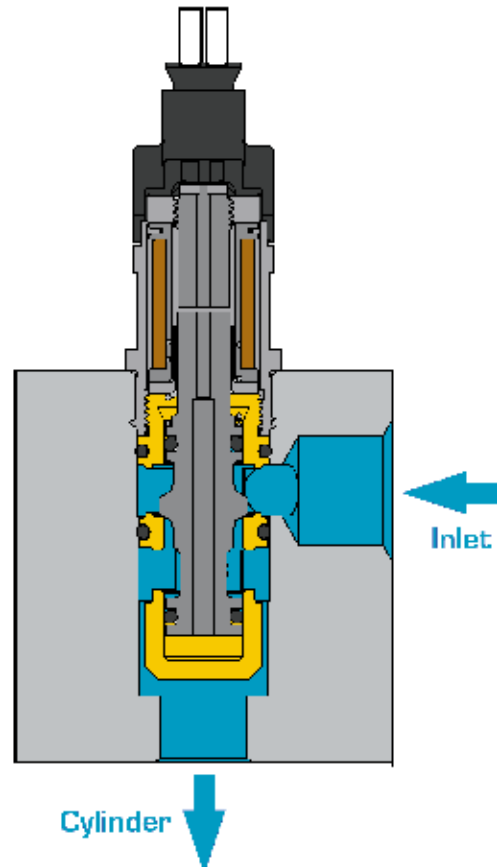
The “axial flow” cartridge enables the valve to flow air between the bottom of the valve body and manifold it is housed in – see figure below. This modification allows for a linear flow path out of the manifold producing measurably higher outlet pulse height (force) in blow off type of applications. We have currently used this modification for applications in the sorting industry with excellent results.

If you have an application that would benefit from utilizing the axial flow cartridge option or wish to discuss other potential cartridge modifications, please consult your local MAC distributor (MDN Associate). By understanding your application and valve requirements we can optimize the valve settings accordingly.

Standard 2 Way Bullet



Axial 2 Way Bullet





Bullet Valve®

N O T E S

PRECAUTIONS AND WARNINGS CONCERNING THE APPLICATION, INSTALLATION AND SERVICE OF MAC VALVES AND OTHER MAC VALVES PRODUCTS

The warnings and precautions below are important to be read and understood before designing into a system any MAC Valves products, and before installing or servicing any MAC Valves product. Improper use, installation or servicing of any MAC Valves product in some systems could create a hazard to personnel or equipment. No distinction in importance should be made between the terms warnings and precautions.

WARNING :

Under no circumstances are MAC Valves products to be used in any application or in any manner where failure of the MAC Valves product to operate as intended could in any way jeopardize the safety of the operator or any other person or property.

- Do not operate outside of pressure range listed on a valve label or outside of the designated temperature range.
- Air supply must be clean and dry. Moisture or contamination can affect proper operation of the valve.
- Before attempting to repair, adjust or clean a MAC Valves product, 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 the valve.
- If air line lubrication is used do not use any lubrication other than those recommended in the catalog, parts & operation sheet or by the factory.

APPLICATION PRECAUTIONS :

INDUSTRIAL USE -

- MAC Valve products are intended for general use in industrial pneumatic and/or vacuum systems. They are general purpose industrial products 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 Valve products 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 exhausts) meaning the air at both outlet ports is trapped. If trapping the air 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 or this type valve should not be used.

OPERATING SPECIFICATIONS -

MAC Valves products are to be installed only on applications that meet all operating specifications described in the MAC catalog for the MAC Valves product.

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. If intentional or accidental operation of a valve by a manual operator could cause personal injury or property damage, a manual operator should not 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 PRECAUTIONS :

- Do not install any MAC Valves product without first turning off air (bleed system completely) and electricity to the machine.
- MAC Valves products should only be installed 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 graphic symbols. Do not install unless these symbols and the valve functions and operations are thoroughly understood.
- If air line lubrication is used do not use any lubrication other than those recommended in the catalog, parts & operation sheet or by the factory.

SERVICE PRECAUTIONS :

- Do not service or remove from service any MAC Valves product without first shutting off both the air and electricity to the valve and making certain no pressurized air which could present a hazard is retained in the system.
- MAC Valves products should only be serviced or removed from service by qualified, knowledgeable personnel who understand how the specific product is used and/or how the specific valve is piped and used and whether there is air retained in the connecting lines to the valve or electric power still connected to the valve.
- Before attempting to repair, adjust or clean a MAC Valves product, 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 the valve.
- MAC Valves products are never to be stepped on while working on a machine. Damage to a MAC valve, or other product or lines to the product (either air or electrical lines) or accidental activation of a manual operator on the valve could result in personal injury or property damage.

MAC

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MAC VALVES, INC.

P.O. BOX 111
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TEL: 1-800-MAC VLVS
TEL: 1 (248) 624-7700
FAX: 1 (248) 624-0549
www.macvalves.com
mac@macvalves.com



MAC VALVES, INC.

5555 ANN ARBOR ROAD
DUNDEE, MI 48131

TEL: 1 (734) 529-5099
FAX: 1 (248) 863-2959



MAC VALVES EUROPE, INC.

RUE MARIE CURIE, 12
B- 4431 ANS (LIEGE)
BELGIUM

TEL: 32 (4) 239 68 68
FAX: 32 (4) 263 19 42
info@macvalves.be



MAC VALVES ASIA, INC.

NO. 45, DONGYUAN ROAD
JHONGLI CITY, TAOYUAN COUNTY
TAIWAN

TEL: 886 (3) 463-6868
FAX: 886 (3) 463-4576
mva@macasia.com.tw



MAC VALVES PACIFIC, INC.

P.O. BOX 12221
PENROSE, AUCKLAND
NEW ZEALAND

TEL: 64 (9) 634-9400
FAX: 64 (9) 634-9401
www.macvalves.co.nz
sales@macvalves.co.nz

