New 5/2-Way Bullet Valves® for Medical Applications

NEW: 5/2-WAY BV

MAC Valves Bullet Valves® 410 - 414 - 421

- Flow up to 600 Nl/min (0.6 Cv)
- 5/2-way valves
- Direct operated valves. Solenoid isolated from contaminated air
- Lifting solenoid technology
- Balanced design, unaffected by pressure variations
- High flow in a compact package
- Short response times with very high repeatability
- Extremely long life
- Wiping effect eliminates sticking
- Unique mounting - No fastener or screw required (cartridge style)
- Multiple cover and electrical connection options - LED available
- Innovative design with very few parts

MAC 5/2-way Bullet Valve®

OPTIONS

- ✓ Adjustment of flow and response times
- ✓ Very high flexibility in manifold footprints and materials
- ✓ Manifolds options with side or bottom cylinder ports
- ✓ Wide range of wattages available
- ✓ Bullet Valves® also available with plastic bodies (BVP versions)

3D DRAWING OVERVIEW

Dimension of the BV421 for illustration purposes only
All dimensions are metric

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Small 3-Way Valves for Medical Applications

MAC Valves Series 31 - 33 - 34

- Flow between 20 Nl/min and 120 Nl/min
- 3/2 way NO or NC, 2/2 NO or NC
- 6, 8 and 10 mm direct solenoid operated valves
- MAC patented solenoid develops high shifting forces both ways
- Balanced design, unaffected by pressure variations
- Short stroke with high flow in a small package
- Very fast response times
- Extremely precise repeatability
- Reduced weight
- Extremely high cycle rate capability
- Superior reliability

MAC 34 series

MAC 33 series

MAC 31 series

OPTIONS

- ✓ Low wattage coils
- ✓ Low leakage rate modifications
- ✓ Noise reduction configurations available
- ✓ High temperature modifications
- ✓ Low temperature modifications
- ✓ Use on lube or non lube service
- ✓ Individual or manifold (plug in or non plug-in) mounting styles available

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Small 3-Way Valves for Medical Applications

MAC Valves Series 31 - 33 - 34

TECHNICAL DATA

	31 series	33 series	34 series
Fluid:	Compressed air, vacuum, inert gases		
Pressure range:	Vacuum to 8 bar / 0 to 120 PSI		
Lubrication:	Not required if used select a medium aniline point lubricant (between 80°C and 100°C / 180°F and 210°F)		
Filtration:	40 microns		
Flow:	Up to 50 Nl/min (Cv 0.05)	Up to 80 Nl/min (Cv 0.08)	Up to 120 Nl/min (Cv 0.12)
Temperature:	-18°C to +50°C / 0°F to 120°F (Wider temperature range available - Consult factory)		
Voltage range:	-15% to +10% of nominal voltage		
Power:	1.8 to 4.0 W	1.0 to 4.0 W	1.8 to 4.0 W
Response times:	ERT: 1.8 ms - DRT: 0.8 ms	ERT: 2.2 ms - DRT: 1.1 ms	ERT: 3.4 ms - DRT: 1.5 ms

3D DRAWING OVERVIEWS

All dimensions are metric

31 series

33 series

34 series

MAC SOLUTIONS - HOW TO ORDER

According to your application requirements, your distributor will help you codifying the appropriate valve to meet your needs.

3500 factory certified specialists in over 45 countries focused on optimizing customers needs

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Small 5-Way Valves for Medical Applications

MAC Valves Series 41 - 43 - 44

- Flow between 22 Nl/min and 100 Nl/min
- 5/2 way valves
- 6, 8 and 10 mm direct solenoid operated valves
- MAC patented solenoid develops high shifting forces both ways
- Balanced design, unaffected by pressure variations
- Short stroke with high flow in a small package
- Very fast response times
- Extremely precise repeatability
- Reduced weight
- Extremely high cycle rate capabilities
- Superior reliability

MAC 44 series

MAC 43 series

MAC 41 series

OPTIONS

- ✓ Low wattage coils
- ✓ Low leakage rate modifications
- ✓ Noise reduction configurations available
- ✓ High temperature modifications
- ✓ Low temperature modifications
- ✓ Use on lube or non lube service
- ✓ Individual or manifold (plug-in or non plug-in) mounting styles available

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Small 5-Way Valves for Medical Applications

MAC Valves Series 41 - 43 - 44

TECHNICAL DATA

	41 series	43 series	44 series
Fluid:	Compressed air, vacuum, inert gases		
Pressure range:	Vacuum to 8 bar / 0 to 120 PSI		
Lubrication:	Not required if used select a medium aniline point lubricant (between 80°C and 100°C / 180°F and 210°F)		
Filtration:	40 microns		
Flow:	Up to 35 Nl/min (Cv 0.035)	Up to 70 Nl/min (Cv 0.07)	Up to 100 Nl/min (Cv 0.1)
Temperature:	-18°C to +50°C / 0°F to 120°F (Wider temperature range available - Consult factory)		
Voltage range:	-15% to +10% of nominal voltage		
Power:	1.8 to 4.0 W	1.8 to 4.0 W	1.0 to 4.0 W
Response times:	ERT: 3.5 ms - DRT: 2.0 ms	ERT: 3.5 ms - DRT: 2.0ms	ERT: 4.0 ms - DRT: 2.0 ms

3D DRAWING OVERVIEWS

All dimensions are metric

41 series

43 series

44 series

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Lifting Solenoid Valve for Medical Applications

MAC Valves Series 35

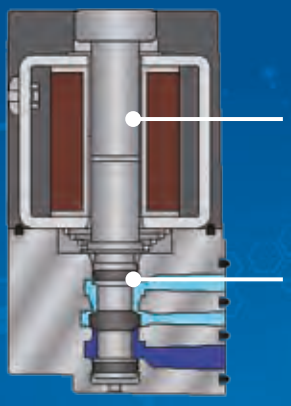
- Extremely low operating noise
- Balanced design, unaffected by pressure variations
- Very high repeatability
- Limited wear points
- Long life time
- Extremely high cycle rate capability
- Bonded balanced poppet for optimized flow and consistent operation
- Versatility in function - Can be used as 2- or 3-way, NO or NC, for vacuum, divertor or selector applications

MAC 35LA inline valve

MAC 35LA Manifold

BENEFITS OF THE LIFTING SOLENOID

- ✓ Repeatability benefits inherent in valve design resulting in longer life
- ✓ Fixed pole piece - Solenoid wear point virtually eliminated
- ✓ One piece armature poppet design



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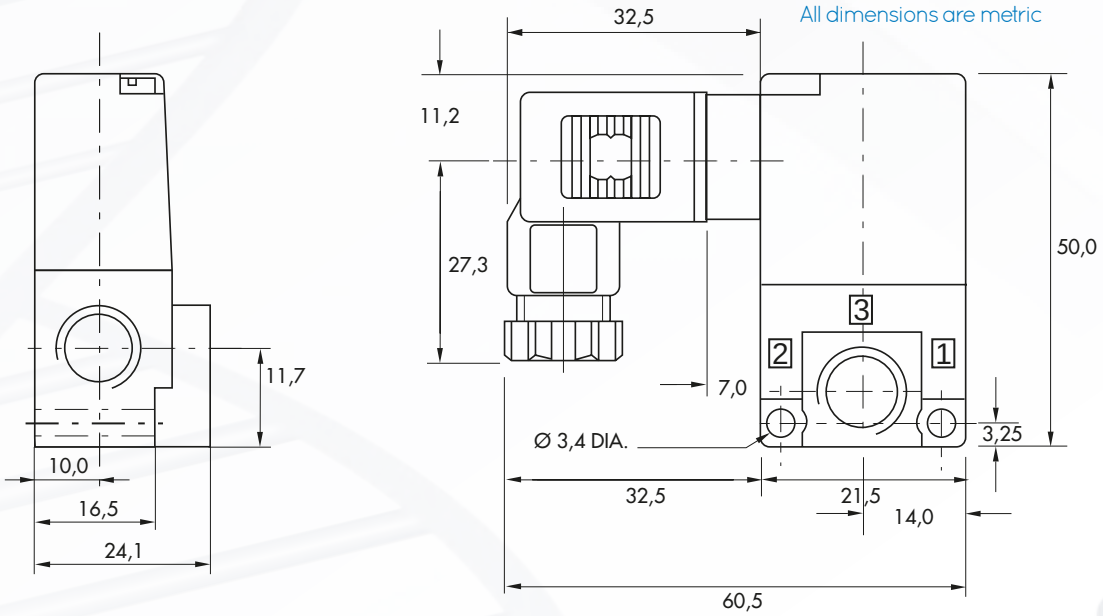
Lifting Solenoid Valve for Medical Applications

MAC Valves Series 35

TECHNICAL DATA

	35 series
Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 bar / 120 PSI
Lubrication:	Not required. If used select a medium aniline point lubricant (between 80°C and 100°C / 180°F and 210°F)
Filtration:	40 microns
Flow:	-18°C to + 50°C - 0°F to 120°F (Wider temperature range available - Consult factory)
Temperature:	Up to 170 Nl/min - 0.17 Cv
Voltage range:	General purpose class A, continuous duty, encapsulated
Power:	-15% to +10% of nominal voltage
Response times:	Energized: 6 ms - De-energized: 2 ms

DIMENSIONS



UNIVERSAL VALVE - 6 FUNCTIONS

- 3-Way Normally Closed
- 3-Way Normally Open
- Selector Valve
- 2-Way Normally Closed
- 2-Way Normally Closed
- Diverter Valve

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The Power of the BV® for Medical Applications

MAC Valves Bullet Valves®

- Flow up to 600 Nl/min (0.6 Cv)
- 2-way, 2-way axial flow, 3-way universal versions available
- Direct operated valves. Solenoid isolated from contaminated air
- Lifting solenoid technology
- Balanced design, unaffected by pressure variations
- High flow in a compact package
- Short response times with very high repeatability
- Extremely long life
- Wiping effect eliminates sticking
- Unique mounting - No fastener or screw required
- Multiple cover and electrical connection options - LED available
- Innovative design with very few parts

MAC BV series 2-way plastic end, 3-way, 2-way & assembled on plastic manifold

OPTIONS

- ✓ Adjustment of flow and response times
- ✓ Very high flexibility in manifold footprints and materials
- ✓ Side or bottom cylinder ports
- ✓ Wide range of wattages available
- ✓ Bullet Valve® also available with plastic bodies (BVP versions)

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The Power of the BV® for Medical Applications

MAC Valves Bullet Valves®

TECHNICAL DATA

	Bullet Valve®
Fluid:	Compressed air, vacuum, inert gases
Pressure range:	Vacuum to 8 bar / 0 to 120 PSI
Lubrication:	Not required. If used select a medium aniline point lubricant (between 80°C and 100°C / 180°F and 210°F)
Filtration:	40 microns
Flow (at 6 bar, ΔP=1bar):	Up to 600 Nl/min - 0.6 Cv
Temperature:	-18°C to +50°C / 0°F to 120°F (Wider temperature range available - Consult factory)
Voltage range:	-15% to +10% of nominal voltage

FLOW RATE

	BVX09	BVX10	BVX14	BVX21
Flow Nl/min	70	80	240	600
Cv	0.07	0.08	0.24	0.60

3D DRAWING OVERVIEWS

MAC BV 2/2 way valves

MAC BV 3/2 way valves

All dimensions are metric

MAC SOLUTIONS - HOW TO ORDER

According to your application requirements, your distributor will help you codify the appropriate valve to meet your needs. Very high flexibility in manifold footprint.

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MVE005-ME-OCT2017

The Power of LBV®
for Medical Applications
MAC Valves Liquid Bullet Valve®

THE BULLET VALVE®...

- 2- or 3-way direct operated solenoid
- Very fast response times
- High repeatability
- Flexible design
- Balanced design

MAC Liquid Bullet Valve®

...ADAPTED TO LIQUID APPLICATIONS !

- A wide range of liquids already used
- The diaphragm technology perfectly isolates the liquid from the coil and guarantees a non-leaking valve
- Pressure range: 0 to 8 bar
- A wide range of orifices available adaptable to your requirements

BENEFITS OF THE MAC BV® TECHNOLOGY IN LIQUID DISPENSING

- ✓ Compact size for better integration
- ✓ Drop-in solution
- ✓ Minimum leakage
- ✓ Fast response times
- ✓ Adaptable for different liquids
- ✓ Different body materials in option
- ✓ Axial flow and side flow versions available
- ✓ Extreme repeatability from cycle to cycle
- ✓ Food grade modifications on request
- ✓ Balanced design - Unaffected by pressure variations
- ✓ High resistance to contamination
- ✓ Low friction design

MAC Valves - Highly engineered solutions for the highest performing applications since 1948

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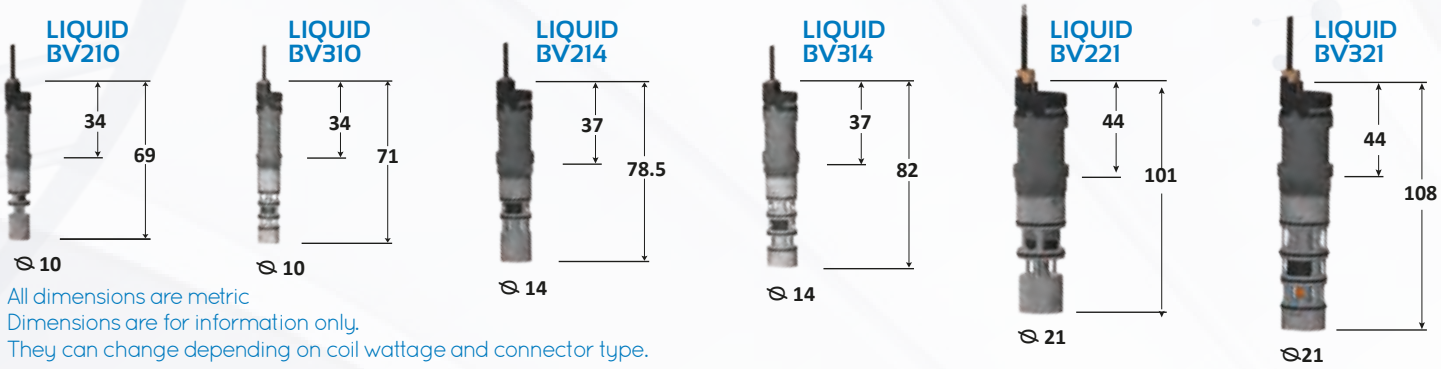
The Power of LBV®
for Medical Applications
MAC Valves Liquid Bullet Valve®

DIMENSIONS OVERVIEW



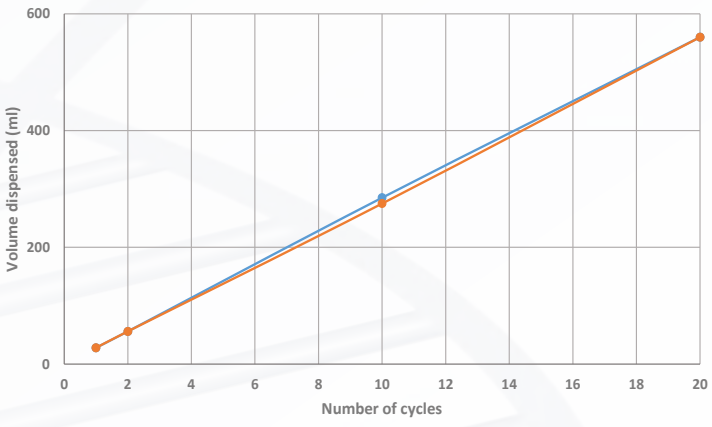
All dimensions are metric
Dimensions are for information only.
They can change depending on coil wattage and connector type.

ORIFICE SIZES

Model	Orifice (mm)
Liquid BV210 & BV310	From 1 to 3
Liquid BV214 & BV314	From 2.5 to 4
Liquid BV221 & BV321	From 3 to 6

The mentioned orifice sizes are indicative values for information only and can be adapted on customer request.

MAC BULLET VALVE® - REPEATABILITY



Thanks to the innovative design, the MAC Bullet Valve® provides an extremely repeatable flow from cycle to cycle and from valve to valve.

Number of cycles	Measured Volume Dispensed (ml)	Requested Volume to Dispense (ml)
1	28	28
2	56	56
10	285	280
20	560	560

CHECK OUT OUR MICRO-DOSING LIQUID BULLET VALVE® VIDEO ON YOUTUBE !

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The Power of the PFC for Medical Applications

MAC Valves Proportional Flow Control

THE PRECISION OF THE STEPPER MOTOR TECHNOLOGY

- High precision
- Accurate response times
- Low hysteresis

+

THE POWER OF THE LIQUID BULLET VALVE®

- High repeatability
- Accurate response times
- High flow flexibility
- Wide range of gases & liquids
- Low leak performance

HIGH PRECISION PROPORTIONAL FLOW CONTROL

BENEFITS OF THE MAC PROPORTIONAL FLOW CONTROL (PFC) IN LIQUID DISPENSING ALREADY USED IN THE INDUSTRY

- ✓ Customized calibration available with optional driver circuit
- ✓ Very high flexibility in manifold footprint
- ✓ Food grade modification on request
- ✓ Small size for a better integration
- ✓ Drop-in solution

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The Power of the PFC for Medical Applications

MAC Valves Proportional Flow Control

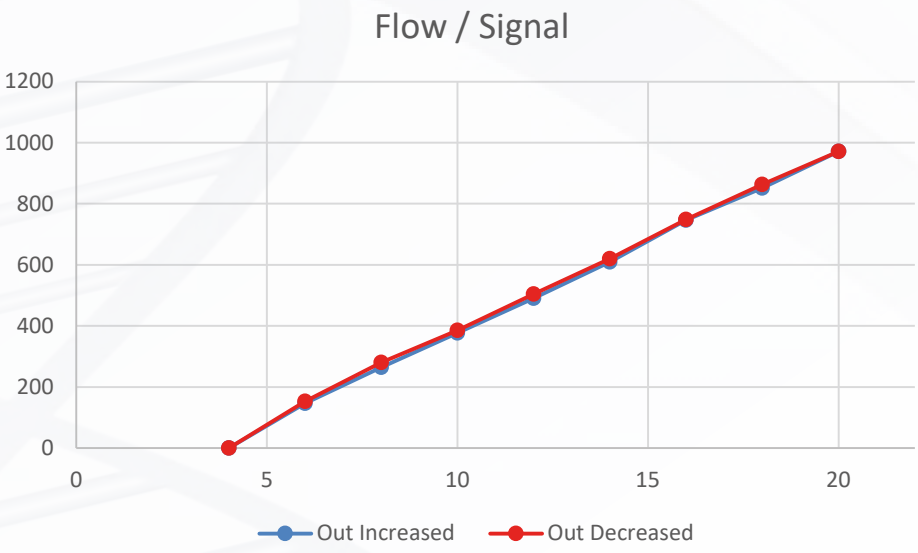
TECHNICAL DATA

	Proportional Flow Control
Function:	2-way
Type:	Cartridge style - Balanced design
Command:	4 to 20 mA - 0 to 10 VDC (with optional driver circuit)
Manifold mounting:	Very flexible cartridge style
Media:	Liquids / fluids D-Flex™ (MAC patented diaphragm technology)

Stepper motor quickly and precisely controls fluid flow through the Bullet Valve® maintaining application requirements.

MAC PROPORTIONAL FLOW CONTROL - LINEARITY

The very low hysteresis cycle of the MAC PFC guarantees a constant flow through the PFC for opening or closing signal.



	ml/min at 2 Bar	
Signal	Out incr.	Out decr.
4	0	0
6	146.4	153.4
8	264.6	280.2
10	377	385.4
12	490.8	504.2
14	609.8	620.4
16	746.4	748
18	851.2	863.2
20	971.8	

Note : Above values result from trials and are for illustration purposes only - Flow and calibration can be adapted to customer requirements.

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Compact High Precision Proportional Solutions for Medical Applications

MAC Valves Proportional Pressure Controllers

- Reliable operation, using two MAC 34 series with balanced poppet
- Fast response
- Long life
- High flow
- Low power consumption
- Not affected by vibrations
- Accurate pressure control
- Analog command signal and output
- Rugged enclosure (for PPC5C)
- Can be stand alone or used in combination with our remote air sandwich regulator (for PPC5C)

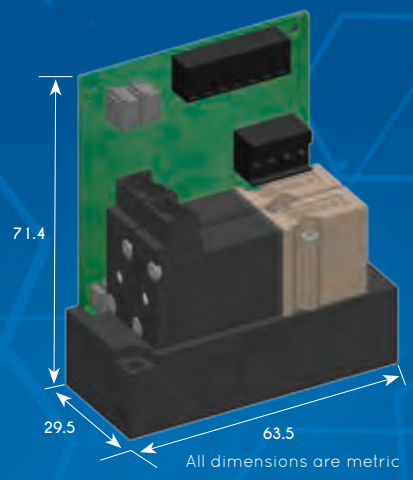
MAC PPC 5C

MAC PPC 34B

OPTIONS

- ✓ Single or dual transducer versions
- ✓ Analog or digital command signal
- ✓ Service configuration pressure or vacuum
- ✓ Covered or uncovered device
- ✓ Washdown enclosures available
- ✓ Two monitor signal options available: Analog Monitor Signal (AMS) and Logic Monitor Signal (LMS)

3D DRAWING OVERVIEW



All dimensions are metric

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Compact High Precision Proportional Solutions for Medical Applications

MAC Valves Proportional Pressure Controllers

*TECHNICAL DATA**

General Data	
Ambiant temperature:	0 to 50°C / 32 to 120°F
LED indicators:	Red: power on - Green: pressure achieved
Vibration:	Not affected
Port size:	G 1/8", 1/8" NPTF - Option: bottom ports
Connector:	7 pin terminal block
Mounting:	Any plane

Electrical Data	
Supply voltage:	20.4 to 26.4 VDC
Supply current:	50 to 275 mA
Command signal:	0 to 10 V or 4 to 20 mA
Command type:	Single-ended or differential
Input impedance:	4.99 kΩ ± 1.0% (voltage) 316 Ω ± 0.1% (current)
Analog Monitor Signal (AMS):	0 to 10 volt
Logic Monitor Signal (LMS):	5 VDC or 24 VDC

Pneumatic Data	
Inlet pressure:	8 bar max (for 10-100 PSI output pressure) 120 PSI max (for 0.66-6.6 bar output pressure)
Fluids:	Compressed air or inert gases
Lubrication:	Not required. However, if used, a medium aniline point oil is recommended
Output pressure:	0 to 0.66, 2, 3, 4, 6.6 bar 0 to 10, 30, 45, 60, 100 PSI
Overall accuracy:	± 1.5% full scale ± 0.5% full scale ± 2.5% full scale
Flow:	70 Nl/min - Cv 0.07
Minimum closed end volume:	16 cm^3 - 1.0 cubic inch

* Note: The data shown are for standard PPC034 models

Compact High Precision Bullet Valves® for Medical Applications

MAC Valves Proportional Pressure Controllers

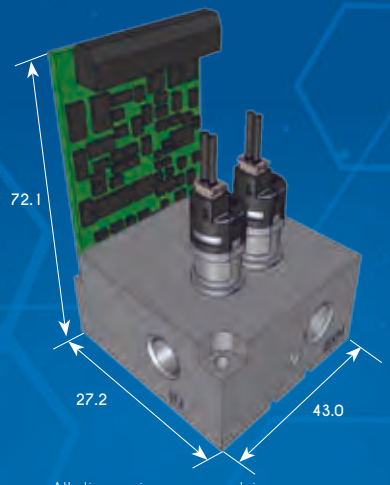
- Reliable operation, using two Bullet Valves® BV210 with lifting solenoid construction
- Balanced design
- Fast response times
- Long life
- Low power consumption
- Not affected by vibrations
- Accurate pressure control
- Analog command signal and output
- Compact package
- Reduced weight
- Individual, manifold and DIN rail mounting configurations available
- Covers available upon request

MAC Proportional Pressure Controllers

TECHNICAL DATA

Flow rate:	Up to 50 Nl/min
Command signal:	0-10 VDC 4-20 mA
Pressure range:	Up to 8 bar
Accuracy options:	± 0.5% F.S. ± 1.5% F.S. ± 2.5% F.S.
Port sizes:	1/8", M4, 5/32

3D DRAWING OVERVIEW



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