



Medical Industry



*Solutions for Life*



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Medical Technology

## Solenoid valves for medical applications

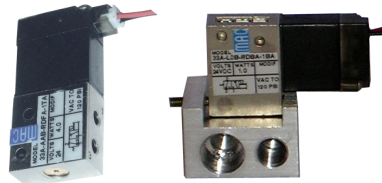
### Small 3 way solenoid valves

Flow between 22 NI/min and 100 NI/min  
3/2 way NO or NC, 2/2 NO or NC

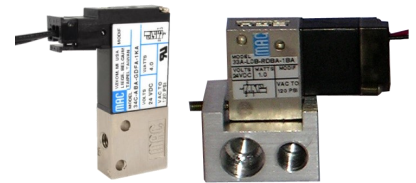
Series 31



Series 33



Series 34



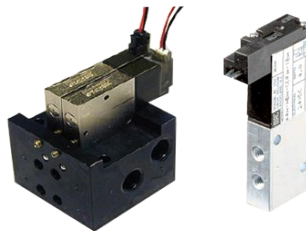
### Small 5 way solenoid valves

Flow between 20 NI/min and 120 NI/min  
5/2 way NO or NC, 2/2 NO or NC

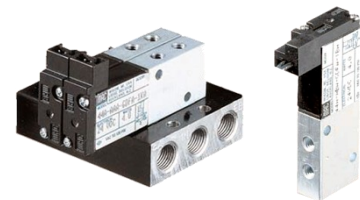
Series 41



Series 43



Series 44



#### Properties

- 6, 8 and 10 mm direct solenoid operated valves
- MAC patented solenoid develops high shifting forces both way.
- 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

#### OPTIONS

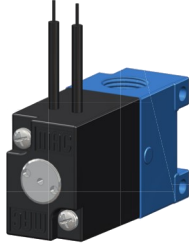
- Low wattage coils
- Low leakage rate modifications
- Noise reduction configurations available
- High temperature modifications
- Low temperature modifications
- Use on lube or non lube service
- Individual or manifold mounting styles available



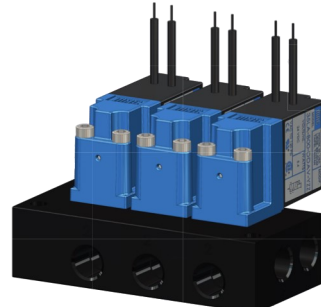
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## *Solenoid valves for medical applications*

### 3 Way Extremely low operation noise solenoid valve



MAC 35LA inline valve



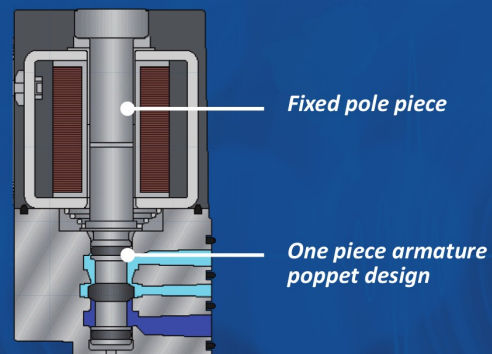
MAC 35LA manifold

#### ***Properties 35 Series***

- *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*

### **LIFTING SOLENOID BENEFITS**

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



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



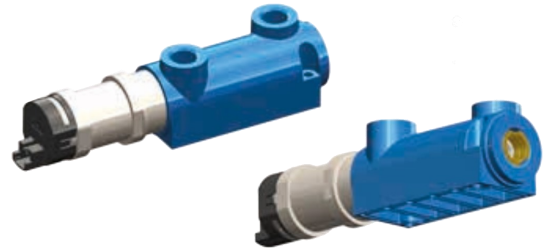
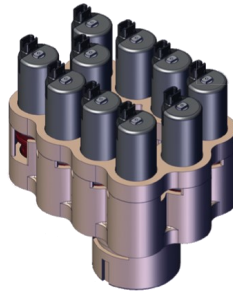
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## *Solenoid valves for medical applications*

### Compact ultra fast operating and solenoid cartridge valves



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



**MAC 5/2-way Bullet Valve®**

#### ***Properties Bullet Valves***

*flow up to 600 NI/min*

*2-way, 2-way axial flow, 3-way universal, 5/2 way versions available*

*Direct operated valves. Solenoid isolated from contaminated air*

*Balanced design, unaffected by pressure variations*

*High flow in a compact package*

*Short response times with very high repeatability*

*Extremely long life and wiping effect eliminates sticking*

*Unique mounting - No fastener or screw required*

*Multiple cover and electrical connection options - LED available*

*nnovative design with very few parts*

### **OPTIONS AVAILABLE**

- ✓ 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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## High Speed liquid micro dosing solenoid valves

### **THE BULLET VALVE® Properties**

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

### **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



**MAC Liquid Bullet Valve®**

### **BENEFITS OF THE MAC BV® TECHNOLOGY IN LIQUID DISPENSING**

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

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## Solenoid valves for medical applications

### High precision proportional flow control



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

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

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## Fast and accurate proportional pressure controllers

### PPC 5C

- Flow up to 600 NI/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



### PPC BV210

- 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, covers available upon request
- Reduced weight
- Individual, manifold and DIN rail mounting configurations available







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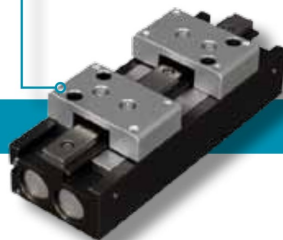
# Actuators for medical applications

## Grippers



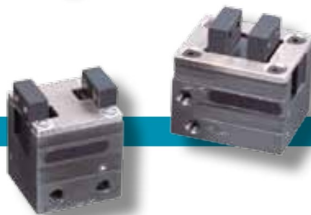
### Three Position Gripper ML#308248

- High precision
- Three position
- Long travel
- Low operation of pressure
- High load capacity
- Single 2 way valve for all 3 positions
- Compact size



### Series GRF

- MRO drop-in replacement
- Next day shipment
- High grip force
- Four sizes
- Two jaw travels
- Two jaw styles



### Stainless Steel/PET Gripper ML#302657

- Stainless steel jaws
- PET body
- Designed for chlorine solution
- Fluoro-elastomer seals



### Angular Replacement Gripper ML#307584

- Direct replacement with unique jaws
- Hard coated body
- Stainless steel jaws



### Long Travel Gripper - ML#307562

- PET body
- Stainless steel jaws
- Direct replacement
- Overwrapping of IV bags



### Series 8400 Gripper

- Compact size
- Double acting - internal/external gripping
- Cost effective
- 2 day delivery



### PET Angular Gripper ML#310141

- PET body and stainless jaws
- Deionized water environment
- Stainless steel jaws
- Single acting





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# Actuators for medical applications

## Parallel Replacement Gripper - ML#308454



- Direct replacement
- PET body
- Stainless steel jaws



## Unique GRS Gripper - ML#306058

- Purge/Scavenge port for extreme environments
- Modified standard Series GRS Gripper



## 3 Position Bio Plate Gripper ML#308123



- 3 positions with only 2 air lines
- No springs
- Lightweight and compact
- Equivalent 12 mm bore grip forces



## Series GRT



- 3 Jaw design provides self centering and maximum contact between part and jaw tooling
- 8 sizes available
- Field tested for over 10 million cycles
- 2 day delivery



## Polymer (PET) Gripper with Stainless Jaws - ML#300263



- Passivated stainless jaws for improved attachment of tooling
- Designed for part production in a deionized water and/or high moisture environment
- Parallel jaw motion is ideal for gripping parts of varying sizes



## Electric Gripper with Foldback Motor - ML#301149



- Eliminates length problem with rear mounted motor
- Small envelope size



## Series PA Swing Arm Clamp

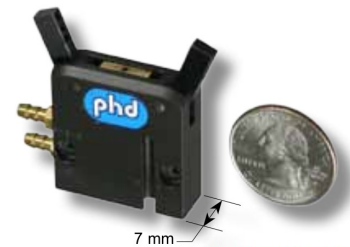
- Compact
- 5 sizes
- Left and right rotations
- Multiple mounting surfaces
- Steel and copper arms



## Series GRA Gripper



- Compact size
- Manifold porting
- Internal speed control
- Directly competes with MPG, MHZ2, HGP



## Compact Angular Gripper ML#311973



- Compact size
- Manifold porting
- Internal speed control





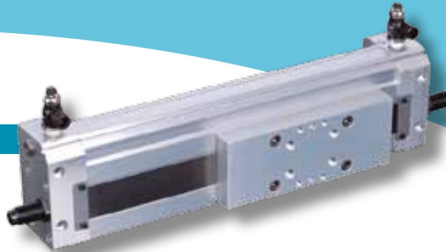
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# Actuators for medical applications

## Slides

### Series SFP

- Lowest deflection and highest moment capacity in the industry
- Smooth, precise movement
- Rodless cylinder
- 4 day delivery



### Series STP

- Smooth precise linear motion
- High capacity
- 2-3x payload
- 2 day delivery



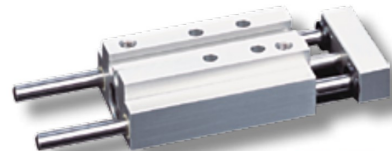
### Series SIP, SHP

- Compact size
- Precision rail bearing technology
- Multiple mounting surfaces
- 2 day delivery



### Series SAH Slide

- No metal to metal contact
- Cost effective
- 9 Bore sizes, 8 mm - 63 mm
- Next day shipping



### Plastic Slide - ML#307784

- FDA approved material
- Harsh environment capabilities



### Burp Slide - ML#303439

- Stainless steel plugs, guideshafts, and rod seal retainer
- PET rod bushing
- 303 stainless steel piston
- Fluoro-elastomer seals, rod and guideshaft scrapers



### Corrosion Resistant ML#307246

- 100% corrosion resistant
- Nytuuff hardcoat aluminum for maximum corrosion resistance
- Long life
- Field repairable
- Large guide shafts
- Heavy duty, rugged
- Stainless steel stop collars
- Bumpers



### Slide - ML#308918

- Drop-in replacement for competitor unit
- Superior delivery





## Rotary Actuators

### Series RCC

- Low cost
- Compact size
- Low profile
- High thrust loads
- 2 day shipping



### Series RFS

- Compact size
- Low profile
- High thrust loads
- 2 day shipping



### Series RL

- Low cost
- High axial & radial bearing load
- High torque/compact size
- 1 day shipping



### Series RA

- Zero backlash
- High axial & radial bearing
- 1 day shipping



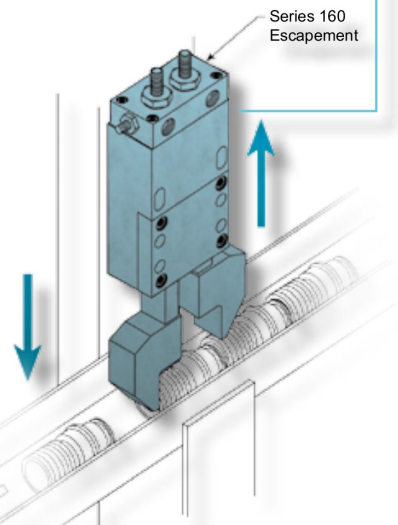
## Escapements

### Series 160

- Ideal for isolating and feeding individual parts from vibratory feeders, magazines, hoppers, or conveyors.
- Internally ported design requires only one 4-way valve
- Next day delivery



Series 160  
Escapement



## Electric Grippers

### Electric Long Travel Gripper ML#309746

- 2.756 in 70 mm jaw travel
- Open motor architecture  
-Your Motor, Your Way



### Electric Rail Style Gripper ML#310629

- Open motor architecture  
-Your Motor, Your Way
- Switch ready
- Grip force = 30 lbf at surface of jaw



### Electric Plastic Gripper - ML#211729

- Built-in motor
- 1.9 mm jaw travel
- Stainless steel fasteners



### Electric Variable Pick Head ML#306079

- Ideal for final packaging process
- Motor driven pitch





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## Moving Coil Actuators for Bio - Medical applications



### The Ability to Do Work, Verify Its Accuracy & Feedback the Data

**SMAC moving coil actuators' technology** has been adopted by nanotechnology companies, genomics research laboratories, and universities for its high accuracy, repeatable positioning, and programmable speed. We understand demands for high precision and high reliability. SMAC's **programmable actuators** allow for precision positioning and placement for the process for manufacturing and quality control of the products in Medical, Bio-Science and Pharmaceutical industry.

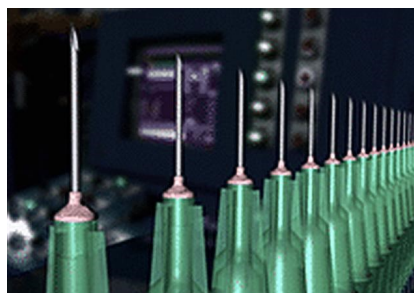
These precise devices eliminate incremental errors that come with the use of open-loop actuators. SMAC's precision actuators are fully close-looped and provide extremely accurate position data and positioning capability with resolution as to five nanometers. Easy setup, compact, all-in-one package is ideal for integration to existing equipment and new developments.

#### Advantages of SMAC's Precision Actuators:

- **Direct linear drive:** Uses no ball screws, no rotary bearings, no motor brushes
- **No backlash:** Cog-free linear motion, which is free from backlash, irregularity, and energy loss that result from converting rotary to linear motion. These attributes result in a high level of smoothness, zero dithering and controllability.
- **No hysteresis** - No influence from moving direction
- **Variable velocity:** A wide range of velocity is available, from millimeters to meters/sec.
- **Controllable velocity:** Obtaining a smooth and consistent velocity
- **Faster Settling Times**
- **Large acceleration:** The high force-to-low moving mass ratio allows large accelerations up to 100 mm/sec.
- **Accuracy & Repeatability:** 5 micron encoder with options of 1, 0.1, 0.5 microns or 50 nanometer encoder. The zero-backlash feature provides a highly repeatable system.
- **Data feedback**
- **Packaged subsystem:** the positioning system is completely integrated – the actuators, positioning sensor, slides, and the controller. Hardware and software for positioning control are already implemented.

#### Application Examples

- Material Testing: Artificial Heart Valve
- Push/Pull Testing: Hypodermic Needles
- Microscope Stage & Moving Optical lens
- Genotyping and Gene Expression Profiling
- Laser materials processing
- Ejection of Mis-orientated Caps
- De-blistering (pushing pills)
- Nanotechnology
- Automated Medical Catheter Assembly



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## Electric Actuators for Bio - Medical applications



Medical & Life Science solutions with servo driven actuators

### Fluid Injection: RSA12 Electric Rod Actuators

**Application Description:** Fluid injection for a medical process.

**Challenge:** A manufacturer of a fluid injection machine required very precise, consistent movement (speed & thrust) to meter injection of fluid. Additionally, because this machine was installed and operated in medical facilities, it required a very compact

**Customer Benefit:** Modified RSA met small footprint requirements allowing for a compact machine design. Complete actuator design allowed the customer to control a process with precision that was previously not available. Use of industrial grade equipment provides the reliability, precision and repeatability to meet the customer's performance requirements.

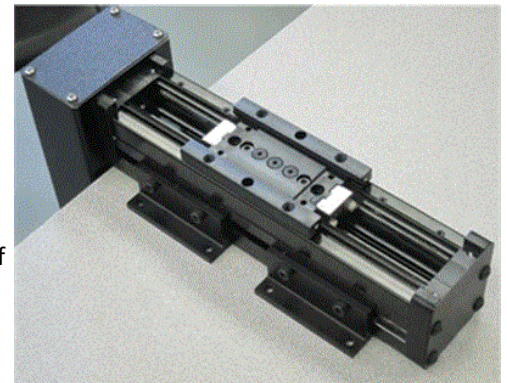


### X-Ray: B3S electric screw drive actuator

**Application Description:** Control energy range of electron beam in high-resolution X-ray device

**Tolomatic Solution:** A custom engineered B3S electric screw drive actuator with a ball screw was selected to control the tungsten blades for this application based on the load and level of precision requirements. Stainless-steel components were used for the load bearings and instead of a belt/pulley combination in the reverse parallel motor mounting configuration, stainless-steel gears were employed. The actuator's sealing band and sensor magnets were removed to eliminate sources of magnetic interference. The reverse parallel mounting shields the stepper motor and brake from gamma rays and the electron beam from the motor and brake's magnetic fields. Tolomatic also assembled the actuator with a radiation compatible grease supplied by the customer.

**Customer Benefit:** Cost-effective, customized solution. Eliminated any source of



### Radiation Treatment: Rod Style Actuator

**Application Description:** Primary adjustment of radiation beams used for the treatment of cancerous cells

**Tolomatic Solution:** Tolomatic worked with the customer to supply a variety of electric rod-style custom designs, including several prototypes that were able to command moves of 1 micron. A custom design was engineered to meet their budget constraints and still meet their requirements for motion, speed and space constraints.

**Customer Benefit:** 25% overall cost savings from previous supplier  
Increased aesthetic product appearance  
All performance and space requirements achieved



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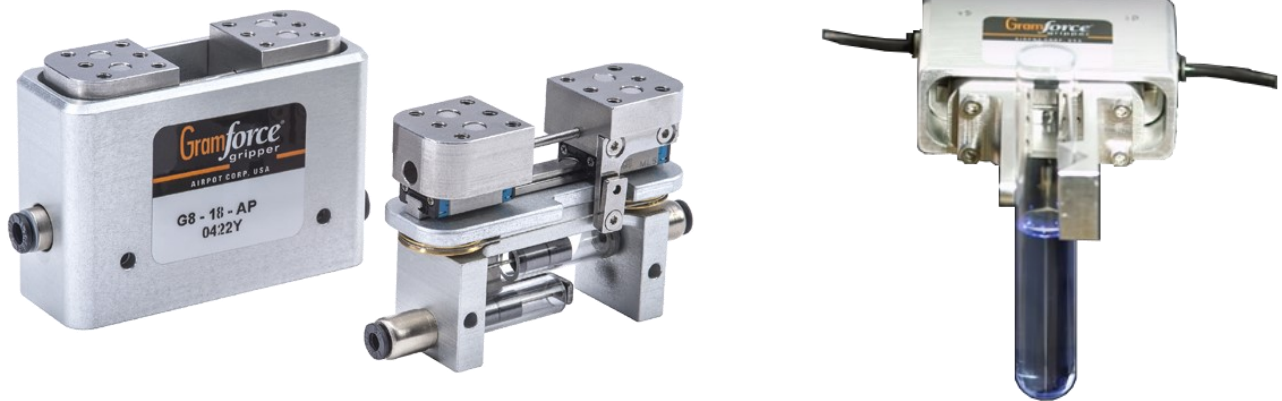
## Actuators for medical applications



Pick & Place the most delicate products with Airpot's family of Accurate Force Pneumatic grippers

At every turn, expect minute friction levels that assure uncompromising force accuracy. With wide operating temperature ranges. And repeatability you can depend on, time after time, for millions of times.

- Lubrication? Never! It's pre-lubricated for life, so it never needs maintenance.
- The small size and a mere 205 grams total mass keeps this gripper light on its feet.
- Its stainless steel mounting blocks accommodate finger lengths up to 75 mm.
- This gripper is synchronous and parallel design, it is counterbalanced to provide unchanging gripping force in any mounting orientation: It's a versatile gripper like no other.



### Applicationscope

Whether the parts you need to work with are exceedingly **fragile, soft, delicate, or sensitive**, you'll see they can now be accurately and safely grasped, held, or positioned with this impressively adroit gripper. It's ideal for precision assembly equipment, test and measurement devices, robotic arm end-effectors, small parts handling, and the most delicate of machining operations you can think up.

### Properties

Inside the Airpot® GramForce® gripper (see below) you'll find it is driven by two tiny 5.6mm bore, ultra-low friction pneumatic Airpot actuators, enhanced with our Airpel® Plus technology. If that doesn't catch your attention, the carriage blocks mounted on an IKO\*precision stainless steel rail will. Along with its ability to **operate at pressures from 0.02 MPa to 0.7 MPa**-all while providing precise **holding forces as low as 0.25 N up to a heftier 8.6 N**.

Plus, the light-weight compact design saves space while allowing easy mounting from the bottom or either side. The versatile finger mounting blocks make it a snap to attach holding jaws of your own design.





## Compact Design Valve for Biopharmaceutical Processing

**Pneumatic Pinch Valves** are designed for biopharmaceutical processing, food and beverage, and industrial applications where sterility and wash down procedures are needed. These robust units offer reliability and performance—especially when working with harder or larger diameter tubing that requires stronger pinch forces.

Designed for disposable tubing, each model contains an easy snap-in tube slot for quick loading and unloading procedures. Panel or base mountable units can also be configured with optional state sensors, controllers, or setup in normally-open or normally-closed default states. Optional safety caps on certain models are also available to address operational hazards.



### Properties

- Compact design that allows the customer to select preferred tubing within recommended guidelines
- Base or Panel mount ready with snap-in tubing slot
- Optional valve state detection sensors
- Optional 3- or 4-way controllers for pressure venting between states
- Panel splash seals for wash down procedures
- Manual overrides on model 932 and 933
- Offered in Black Anodized Aluminum or 316L stainless steel

The **Versagrip® Solenoid Pinch Valve series** is offered in three model formats. Each model is available in four options: single-tube normally open, single-tube normally closed, dual tubes toggling normally open and closed, or a headless cassette mountable option. All units are panel mount ready and versions that include a head also include a push button override for easy manual tube loading and unloading procedures. The housing and plunger are made from stainless steel and valve heads are supplied as black delrin. A novel patent-pending tube slot design supports easy tube loading and retention for a variety of tube sizes supported by each model. Optional optical position state sensors can be added to each unit to allow feedback to the positional state of the valve.

### Features:

- Supports average tubing durometer up to 60 Shore A and 1 bar media pressure
- Average actuation speeds of 80 milliseconds or less without tube loaded
- Seals prevent liquid penetration supporting easy cleaning or sterilization procedures
- 3 million MTBF\* or 18 month warranty and ROHS2 compliant
- Pending UL429, CSA139 and CE 60601-1 Third edition certifications





### Compact, maintenance free shock and isolations isolators

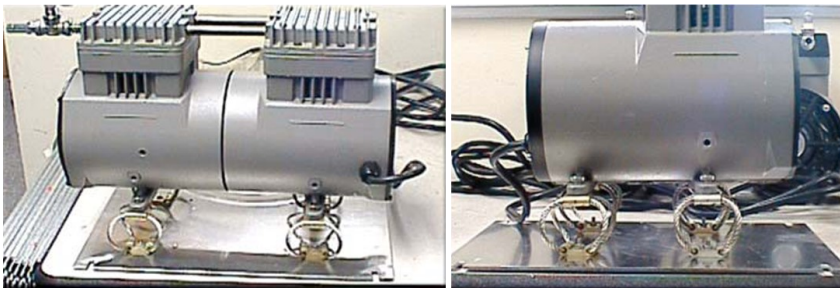
**Wire Rope Isolators** are comprised of stainless steel stranded cable threaded through aluminum alloy retaining bars that are mounted for effective shock and vibration isolation. With their corrosion resistant, all-metal construction, Enidine Wire Rope Isolators are environmentally stable, high-performance shock and vibration isolators that are unaffected by temperature extremes, chemicals, oils, ozone and abrasives.

Featuring a patented crimping pattern, versatile mounting options and a variety of sizes, these helical isolator products can help ensure that your systems can effectively meet performance requirements in Commercial, Industrial, Medical, healthcare and Defense industries.

ITT Enidine Inc.'s WRI products are ideally suited for a broad range of applications. If a standard solution is not available, Enidine Incorporated can custom design an isolator to suit your specifications. Some of the more common alternate materials (for improved corrosion resistance, for example) include the use of 316 SS for retainer bars, cable and hardware as well as the use of coated-



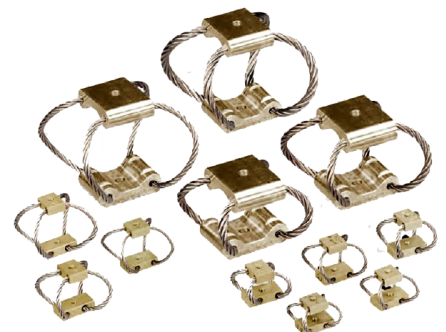
Pump isolation example

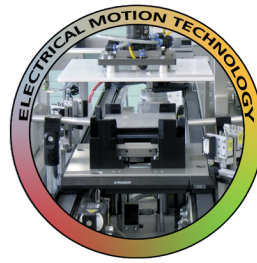
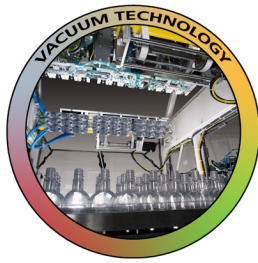


**Compact Ropes**, smaller than traditional wire ropes, these unique isolators provide cost-effective, simultaneous shock and vibration attenuation where package space is at a premium.

Enidine Compact Wire Rope Isolators feature an easy, single-point installation, which allows them to be installed in virtually any application. Their small size also permits the isolation of individual system components, making them ideal for use in sensitive equipment and electronics.

Just as with our standard Enidine Wire Rope Isolators, Enidine Compact Wire Rope Isolators feature a patented, all-metal design and components that ensure maximum





*We look forward to your application.*

**LDA Belgium**

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