



**Medical industry**



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

#### MAC 33 series solenoid valve

The MAC 33 Series is a compact 3-way solenoid valve that delivers maximum performance in a minimal footprint. With a width of just 8 mm and an impressive flow rate of 84 L/min, this valve combines speed and efficiency. Every component is designed for reliability in even the most demanding applications.



##### Features

- Function: 3/2 NG-NO
- Max. flow rate: 84 NI/min
- Connections: M3
- Configurations: Base plate mounting, Individual

#### MAC 34 series solenoid valve

The MAC 34 Series is a compact 3-way solenoid valve that delivers maximum performance in a minimal footprint. With a width of just 10 mm and an impressive flow rate of 120 L/min, this valve combines speed and efficiency. Every component is designed for reliability in even the most demanding applications.



##### Features

- Function: 3/2 NG-NO
- Max. flow rate: 120 NI/min
- Connections: M5
- Configurations: Cartridge, Individual

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

#### MAC 43 series solenoid valve

The MAC 43 series is a direct-acting 5-way valve with a width of 8 mm. A direct-acting 5-way valve of this size with such a high flow rate is unique in the market.

The valve features an oval spool and a balanced valve with conical seats. These features result in high switching forces, fast, consistent response times, high flow rates, and a long service life in a compact housing.

##### Features

- Function: 5/2
- Max. flow rate: 70 L/min
- Connections: M3
- Configurations: Base plate mounting, Individual



#### MAC 44 series solenoid valve

The MAC 44 series is a direct-acting 5-way valve with a width of 10 mm. A direct-acting 5-way valve of this size with such a high flow rate is unique in the market.

The valve features an oval coil and a balanced spool with conical seats. These features result in high switching forces, fast, consistent response times, high flow rates, and a long service life in a compact housing.

##### Features

- Function: 5/2
- Max. flow rate: 100 L/min
- Connections: M5
- Configurations: Base plate mounting, Individual





MAC Valves BV series assembled on plastic manifold

## Ball Valve Features

- Flow rate up to 600 NI/min
- 2-way, 2-way axial flow, 3-way universal, and 5/2-way versions available
- Direct-acting valves. Solenoid isolated from contaminated air
- Balanced design, insensitive to pressure fluctuations
- High flow rate in a compact housing
- Short response times with very high repeatability
- Extremely long service life and sweeping action prevents sticking
- Unique mounting—no fasteners or screws required
- Multiple cover and electrical connection options—LED available
- Innovative 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<sup>®</sup> also available with plastic bodies (BVP versions)



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

## THE BULLET VALVE<sup>®</sup> Features

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



## ADAPTED FOR FLUID APPLICATIONS!

MAC Liquid Bullet Valve<sup>®</sup>

- A wide range of fluids already in use
- Pressure range: 0 to 8 bar
- A wide range of available orifices
- The diaphragm technology perfectly isolates the fluid from the coil and guarantees a leak-free valve

### BENEFITS OF THE MAC BV<sup>®</sup> 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*





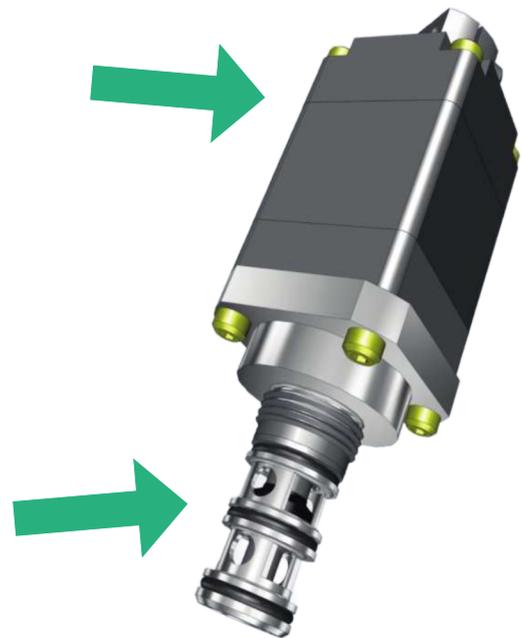
## THE PRECISION OF STEPPER MOTOR TECHNOLOGY

- High precision
- Precise response times
- Low hysteresis



## THE POWER OF FLUIDS BALL VALVE

- High repeatability
- Precise response times
- High flow flexibility
- Wide range of gases and liquids
- Low leakage performance



## ZEER NAUWKEURIGE PROPORTIONELE DEBIETREGELING

### BENEFITS OF THE MAC BV<sup>®</sup> TECHNOLOGY IN LIQUID DISPENSING

- ✓ Compact size for better integration
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*MAC Valves - Highly engineered solutions for the highest performing applications since 1948*



## PPC 5C

The MAC Proportional Pressure Controller (PPC) is an innovative product that converts an electrical signal into a proportional pneumatic output. The PPC differs from conventional I/P or V/P transducers. It offers significantly greater performance, functionality, and reliability.

The PPC controls the output pressure by continuously measuring the downstream pressure and comparing it to the control signal. When a higher pressure is commanded, the PPC responds quickly by activating the MAC valve, thereby increasing the output pressure until it equals the pressure indicated by the control signal.

### Features

- Flow rate up to 600 NI/min (0.6 Cv)
- 2-way, 2-way axial flow, 3-way universal versions available
- Direct-acting valves. Solenoid valve isolated from contaminated air
- Lifting solenoid technology

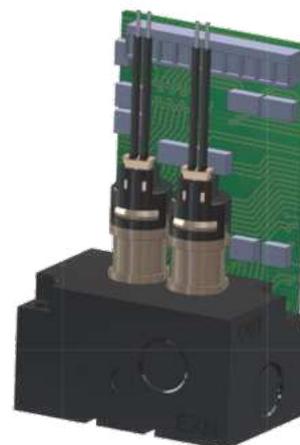


## PPC BV210

Reliable operation, utilizing two Bullet Valves<sup>®</sup> BV210 with a light-activated solenoid design.

### Features

- Balanced design
- Fast response times
- Long service life
- Low power consumption
- Not sensitive to vibrations
- Precise pressure control
- Analog command and output signal
- Compact housing, covers available upon request
- Lightweight
- Individual, manifold, and DIN-rail mounting configurations available



## GRF series grippers

The pneumatic parallel grippers in the GRF MRO series are a high-performance replacement for MRO grippers. Their high gripping forces and low profile make them ideal for applications with limited space. The units feature a sealed, self-lubricating cam drive, jaw liners, and internal switches to prevent contamination.

### Features

- Actuation: Pneumatic, double-acting for internal and external gripping functions.
- Operating pressure (recommended): 2–7 bar air.
- Compact design: Low profile with self-lubricating cam driver and jaw covers for durability and minimal contamination.
- Grip repeatability  $\pm 0.05$  mm ( $\pm 0.002$  in) within original position and  $\geq 6$  million cycle lifespan.



## Three-position gripper ML #308248

The Three-Position Synchronized Rail Gripper offers precise three-position gripping with minimal deflection thanks to its ground rail construction. The integrated pinion synchronization and air-centered intermediate position make it ideal for applications such as microplate transfer and other precision handling tasks.

### Features

- The guide rail provides high precision with minimal deflection
- 12 mm bore with a 1:1 force transmission to the jaws
- Jaws are synchronized via a common gear
- Jaw positions when closed: 0.0 mm, 25.4 mm, and 67.8 mm
- Intermediate jaw positions repeatable to  $\pm 0.13$  mm



## GRW polymer series with stainless steel bowl - ML302657

### Features

- Stainless steel bowl
- PET housing
- Designed for chlorine solution
- Fluoroelastomer seals



## Long-reach gripper ML307562

### Features

- CLASS 5
- Synchronized jaw movement
- Long jaw stroke
- PET plastic housing
- Stainless steel jaws



## Angular replacement gripper ML307584

### Features

- Direct replacement for a competitor's model, with unique jaws
- Hard-coated housing
- Stainless steel jaws



## GRW polymer series with stainless steel bowl - ML302657

### Features

- Stainless steel bowl
- PET housing
- Designed for chlorine solution
- Fluoroelastomer seals



## Long-reach gripper - ML307562

### Features

- PET housing
- Stainless steel jaws
- Direct replacement for competing units
- Wrapping of IV bags



## 8400 Series micro angular gripper

The 8400 Series micro-pneumatic angular grippers feature a robust housing and jaw design in a compact size. Four sizes are available for various applications. The hard-coated aluminum housing is strong and durable.

### Features

- **Application:** Mounting and adjustment of 4 mm round proximity switches and targets on grippers.
- **Universal mounting:** Kit components fit various gripper series such as the 8400 Series and 19000 Series.
- **Clear mounting procedure:** Includes steps for bracket positioning, threaded locking, and switch distance adjustment.
- **Recommended Torques:** Proximity switch bracket SHCS:  $\approx 0.55$  Nm; Target mounting SHCS:  $\approx 1.1$  Nm.



## GRS series low-profile pneumatic parallel gripper – ML306058

### Features

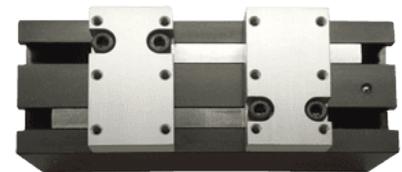
- Compact and available in 5 sizes
- Left- and right-rotating
- Multiple mounting surfaces
- Steel and brass arms



## Three position bio plater gripper – ML308123

### Features

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



## Series GRT Parallel Pneumatic 3-Jaw Gripper

### Features

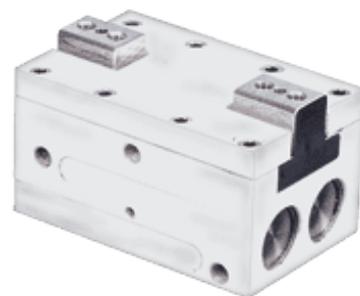
- Three positions with only two air lines
- No springs
- Lightweight and compact
- Gripping forces equivalent to a 12 mm bore



## PET plastic gripper with stainless jaws – ML300263

### Features

- 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 various sizes



## Series PA pneumatic swing clamp

Series PA Pneumatic Swing Clamps feature a simple design, small size, high clamp force, and long life. Five sizes and left and right rotations are offered to accommodate a wide variety of tasks. Series PA Swing Clamps are ideal for automated workholding.

### Features

- Compact and available in 5 sizes
- Left- and right-hand rotation
- Multiple mounting surfaces
- Steel and brass arms



## GRA series parallel pneumatic micro gripper

Series GRA Parallel Pneumatic Micro Grippers provide high precision, moment capacity, and grip force in a small rugged package. A factory set jaw guide system minimizes free-play and reduces deflection. These micro grippers are designed to provide a high level of performance and long life as end effectors for a wide range of small pick and place applications.

### Kenmerken

- Compact and available in 5 sizes
- Left- and right-hand rotation
- Multiple mounting surfaces
- Steel and brass arms



## Series SFP Rodless Gantry Rail

### Pneumatic Slide

Series SFP Rodless Gantry Rail Pneumatic Slides feature rail bearing technology to provide smooth, precise linear motion in a space-saving design. A stainless steel band and saddle seal enclose the system and protect the internal mechanisms from contaminants. Series SFP Gantry Slides provide the lowest deflection and highest moment capacity combination in the industry.



#### Features

- Space-saving design with smooth, precise motion.
- High load capacity with minimal deflection.
- Improved torque capacity.
- Available in two bore sizes (27 mm and 40 mm).

## Serie STP compact rail slide

The STP series pneumatic linear actuators feature stainless steel rail bearings with a double bore for added strength. Optional stroke adjustment enhances motion precision and ensures smooth stops to maximize the actuator's service life.



#### Features

- Designed for precise motion and built for high-speed applications
- Five bore sizes with three stroke lengths per bore size
- Stroke adjustments stop the load evenly, eliminating internal lateral loads for maximum service life

## Series SIP low profile miniature rail

### thruster pneumatic slide

Series SIP Low Profile Miniature Rail Thruster Pneumatic Slides feature stainless steel rail bearings and a small, low profile package. Standard internal shock pads absorb impact forces and optional travel adjustment enables precise movements. Series SIP Slides are designed for high loads and high speeds where a small, low profile package size is needed.



#### Features

- Compact, low-profile design with high load capacity.
- Three bore sizes (12, 16, and 20 mm) are available, and an optional stroke adjustment is offered.
- Profile-ground rail-bearing technology.

## Plastic slide - ML307784

### Features

- FDA-approved material
- Suitable for harsh conditions
- Double bore with high thrust



## Burp slide - ML303439

### Features

- Used to release air from IV bags
- Stainless steel plugs, guide shafts, and rod seal holder
- PET plastic rod bushing and 303 stainless steel piston
- Fluoroelastomer seals, rod and guide shaft scrapers



## SAH Series compact pneumatic slide - ML308918

### Features

- Direct replacement for competing units
- Equipped with dual switch slots for flush switch mounting
- Custom tool plate for easy tool mounting



## Corrosion-resistant slide - ML307246

### Features

- Hard-anodized PTFE-coated aluminum for maximum corrosion resistance
- Large guide pins
- Long service life
- Repairable on-site



## RCC series cable-operated pneumatic rotary actuator

### Features

- Low cost
- Compact size
- Low profile
- High thrust loads



## RFS Series Low-Profile Pneumatic Rotary Actuator

### Features

- Compact design
- Low profile
- High thrust loads



## Series RL compact pneumatic rotary actuator

### Features

- Cost-effective OEM-style rotary motor.
- High axial and radial bearing load capacity.
- High torque/compact dimensions.



## Long-stroke electric gripper - ML309746

### Features

- 70 mm jaw stroke
- Open motor architecture
- Small, compact design



## ML211729 electric plastic gripper

### Features

- Built-in motor
- 19 mm jaw stroke
- Stainless steel fasteners
- Made of PET plastic



## Electric rail gripper – ML310629

### Features

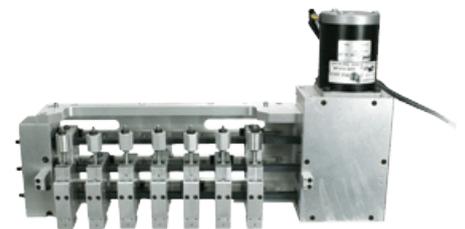
- Open motor architecture
- Compatible with switches
- 13 kg gripping force at the jaw surface



## ML306008 electric variable pick head

### Features

- Ideal for the final packaging process
- Motor-driven feed
- Seven vertical pneumatic actuators





**The ability to perform tasks, verify their accuracy, and provide feedback on the data**

**SMAC's moving-coil actuator technology is used by** nanotechnology companies, genomics research laboratories, and universities due to its high precision, repeatable positioning, and programmable speed. We understand the demand for high precision and reliability. SMAC's programmable actuators enable accurate positioning and placement for manufacturing processes and quality control of products in the medical, life sciences, and pharmaceutical industries.

These precise devices eliminate the incremental errors associated with the use of open-loop actuators. SMAC's precision actuators are fully closed-loop and provide highly accurate position data and positioning capabilities with a resolution of up to five nanometers. Their simple installation and compact, all-in-one package make them ideal for integration into existing equipment and new developments.

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

- **Direct linear drive:** does not use ball screws, slewing bearings, or motor brushes.
- **No backlash:** Gearless linear motion, free of backlash, irregularities, and energy loss resulting from the conversion of rotary to linear motion. These characteristics ensure a high degree of smoothness, no vibrations, and excellent controllability.
- **No hysteresis:** No influence of the direction of motion.
- **Variable speed:** A wide speed range is available, from millimeters to meters per second.
- **Adjustable speed:** Achieve smooth and consistent speed.
- **Faster stabilization times.**
- **High acceleration:** The high force-to-low moving mass ratio enables high accelerations up to 100 mm/second.
- **Accuracy and repeatability:** 5-micron encoder with options for 1, 0.1, 0.5-micron, or 50-nanometer encoders. The zero-backlash feature ensures a highly repeatable system.
- **Data feedback**
- **Packaged subsystem:** The positioning system is fully integrated—the actuators, positioning sensor, slides, and controller. Hardware and software for positioning control are already implemented.

#### **Application examples**

- Material testing: artificial heart valve
- Compression/tensile testing: hypodermic needles
- Microscope stage and moving optical lens
- Genotyping and gene expression profiling
- Laser material processing
- Ejection of misaligned caps
- De-blistering (pushing pills out of blister packs)
- Nanotechnology
- Automated assembly of medical catheters



## Medical and life science solutions with servo-driven actuators

### Fluid injection: RSA12 electric rod actuators

#### Application description: Fluid injection for a medical procedure.

**Challenge:** A manufacturer of a liquid injection machine required highly precise, consistent movements (speed and thrust) to control the dosage of the liquid injection. Furthermore, since this machine was to be installed and used in medical facilities, it had to be extremely compact.

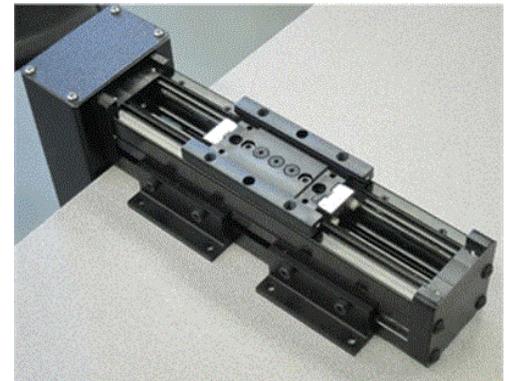
**Customer Benefit:** The customized RSA met the requirements for a small footprint, enabling a compact machine design. Thanks to the actuator's complete design, the customer was able to control a process with a level of precision that was previously unattainable. The use of industrial-grade equipment provides the reliability, precision, and repeatability needed to meet the customer's performance requirements.



### X-ray: B3S electric screw drive

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

**Tolomatic Solution:** Based on the load and the required precision, a custom-designed B3S electric screw drive with a ball screw was selected for this application to control the tungsten blades. Stainless steel components were used for the load bearings, and stainless steel gears were employed instead of a belt-and-pulley combination in the inverted parallel motor mounting configuration. The sealing strip and sensor magnets of the actuator were removed to eliminate sources of magnetic interference. The inverted parallel mounting protects the stepper motor and brake from gamma radiation and shields the electron beam from the magnetic fields of the motor and brake. Tolomatic also assembled the actuator using a radiation-resistant lubricant supplied by the customer.



**Customer benefit:** Cost-effective, custom-designed solution.  
Radiation therapy: Rod-shaped actuator

**Application description:** Primary adjustment of radiation beams for the treatment of cancer cells

**Tolomatic's Solution:** Tolomatic collaborated with the customer to deliver a series of custom electric rod designs, including several prototypes capable of controlling movements as small as 1 micron. A custom design was developed that fit within the budget while still meeting the requirements for motion, speed, and space. Customer benefits: 25% total cost savings compared to the previous supplier  
Improved aesthetic appearance of the product



## Compact valve for biopharmaceutical processing

Pneumatic pinch valves are designed for biopharmaceutical processing, food and beverage, and industrial applications where sterility and cleaning procedures are required. These robust units offer reliability and performance, particularly when working with stiffer tubing or larger-diameter tubing that requires greater clamping force.

Each model is designed for disposable tubing and features a simple snap-on closure for quick loading and unloading procedures. Panel- or base-mountable units can also be configured with optional status sensors, controllers, or set to the standard normally open or normally closed status. Optional safety caps are also available for certain models to address operational hazards.



### Properties

- Compact design that allows the customer to select the desired hose within the recommended guidelines.
- Suitable for mounting on a base or panel with a snap-in hose slot.
- Optional sensors for valve status detection.
- Optional 3- or 4-way regulators for pressure relief between states.
- Panel splash seals for cleaning procedures.
- Manual override on models 932 and 933.
- Available in black anodized aluminum or 316L stainless steel.

The Versagrip® series of solenoid valves for pinch valves is available in three models. Each model is available in four options: single-tube normally open, single-tube normally closed, dual-tube normally open and closed, or a headless option for cassette mounting. All units are suitable for panel mounting, and versions with a head also feature a push button for easy manual tube loading and unloading procedures. The housing and plunger are made of stainless steel, and the valve heads are supplied in black Delrin. A new, patented tube slot design facilitates easy loading and retention of tubes for various tube sizes supported by each model. Optional optical position sensors can be added to each unit to provide feedback on the valve's position.

### Features:

- Supports an average tube durometer of up to 60 Shore A and a medium pressure of 1 bar.
- Average activation times of 80 milliseconds or less without tube loading.
- Seals prevent fluid ingress, enabling simple cleaning or sterilization procedures.
- 3 million MTBF\* or 18-month warranty and ROHS2 compliant.
- Pending UL429, CSA139, and CE 60601-1 Third Edition certifications.



## Pick up the most delicate products and place them using Airpot's range of precision pneumatic grippers.

Expect minimal friction with every movement, ensuring uncompromising force accuracy. With a wide temperature range. And repeatability you can rely on time and time again, for millions of cycles.

- Lubrication? Never! It is pre-lubricated for its entire service life, so maintenance is never required.
- Thanks to its compact size and a total mass of just 205 grams, this gripper is nimble.
- The stainless steel mounting blocks accommodate finger lengths up to 75 mm.
- This gripper features a synchronous and parallel design and is balanced to provide constant gripping force in any mounting orientation: it is a versatile gripper like no other.



### Applications

Whether the parts you need to work with are extremely fragile, soft, delicate, or sensitive, you'll find that they can now be gripped, held, or positioned with precision and safety using this impressively agile gripper. It is ideal for precision assembly equipment, test and measurement equipment, robotic arm end-effectors, small-part handling, and the most delicate operations you can imagine.

### Features

Inside the Airpot® GramForce® gripper (see below), you'll find two small pneumatic Airpot actuators with a 5.6 mm bore and ultra-low friction, enhanced with our Airpel® Plus technology. If that doesn't catch your attention, the slide blocks mounted on an IKO\* precision stainless steel rail certainly will. In addition to the ability to operate at pressures ranging from 0.02 MPa to 0.7 MPa, it delivers precise holding forces from just 0.25 N up to 8.6 N.

Furthermore, the lightweight, compact design saves space and allows for easy mounting from the bottom or either side. Thanks to the versatile finger-mounting blocks, you can attach custom-designed clamping jaws in a snap.

## Compact, maintenance-free shock and insulation isolators

Steel cable isolators consist of stainless steel strand cable threaded through aluminum alloy mounting rods, which are mounted for effective shock and vibration isolation. With their corrosion-resistant, all-metal construction, Enidine steel cable isolators are environmentally stable, high-performance shock and vibration isolators that are unaffected by extreme temperatures, chemicals, oils, ozone, and abrasives. With a patented crimping pattern, versatile mounting options, and a variety of sizes, these spiral isolator products ensure that your systems effectively meet performance requirements in the commercial, industrial, medical, healthcare, and defense industries.

ITT Enidine Inc.'s WRI products are ideally suited for a wide range of applications. If no standard solution is available, Enidine Incorporated can design a custom insulator to meet your specifications. Some of the more common alternative materials (for example, for improved corrosion resistance) include the use of 316 SS for mounting rods, cables, and hardware.



### Pump isolation example



Compact wire rope isolators, smaller than traditional steel cables, these unique isolators offer cost-effective, simultaneous shock and vibration damping where space is limited.



Enidine Compact Wire Rope Isolators are easy to install at a single point, making them suitable for virtually any application. Their small size also allows for the isolation of individual system components, making them ideal for use in sensitive equipment and electronics. Like our standard Enidine wire rope isolators, Enidine compact wire rope isolators feature a patented, all-metal design and components that provide maximum



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