Pressure Switch Solutions
Designers of hard-working commercial and home appliances choose MPL to control circuits in dishwashers, dryers, deep fryers, pizza ovens, ice makers, and other applications where rugged, long-life service is a primary design objective. MPL switches control fill level, monitor venting, guard operating cycles, indicate dust bag or filter status, and control pumps, lights, blowers, and burners.

In emergency room, intensive care, surgical, and other life-saving applications, MPL is a trusted supplier to leading industry manufacturers of oxygen concentrators, patient monitors, inhalers, blood pressure, blood filtering, anesthesia and many other critical systems.

About MPL

In 1973, MPL began to produce a highly-sensitive miniature pressure switch, used to control storage tape drives on mainframe computers. Soon, separate pressure, vacuum, and differential versions of the MPL 500 Series began to fulfill a wide range of applications in appliances, automotive systems, and medical equipment.

When customers needed to switch more current, the MPL 600 Series was developed, combining precise, low-pressure sensing with the flexibility of standard snap-action switches. For medium pressures, the MPL 800 Series was introduced.

As MPL began to serve new markets, the MPL product line continued to expand. The MPL 9300 Series was designed for the critical requirements of safety sensors on gas-fired appliance systems. New MPL designs continue to be driven by customer objectives for custom features, improved quality, and reduced cost.

Today, MPL products are used in dishwashers, tractors, inhalers, helicopters, patient monitors, pizza ovens, sports cars, and supercomputers... to name just a few of our customer’s products. MPL application specialists work closely with each customer’s product engineers. Many applications can be fulfilled with a minor variation on a field-proven design. In other cases, we custom-design the right pressure, vacuum, or differential device for each application.

At our new corporate headquarters in Pompano Beach FL, MPL team members utilize state-of-the-art design and manufacturing facilities to provide unique pressure switch solutions. MPL is vertically integrated, with in-house capability to design a new concept, prototype, design production tooling, and integrate precision stamping and molding with automated assembly, calibration, and testing.

From 3-D modeling, to robotic assembly, to painstaking calibration and quality assurance, our work reflects a focus on meeting each customer’s unique application and business requirements.

With millions of sensors at work worldwide, and decades of experience with OEM customers, we know what you expect from us, and we’re proud of our demonstrated ability to answer your exacting service and quality standards with reliable, cost-effective pressure switch solutions.
In the HVAC industry, millions of MPL switches are specified by the leading manufacturers in comfort conditioning and water heating. MPL switches prove airflow, detect blower function, control gas pressure, and detect filter loading or coil icing.

In workplace systems ranging from printers to copiers to large computers, MPL switches control paper handling, ensure cooling for motherboards or storage devices, detect carriage position, scan checks, monitor ink pressure, and control tape speed.

Cars, trucks, tractors, and earth movers use MPL switches for emission control, air and fluid pressure, filter monitoring, and seating adjustment.

Finally, MPL is proud of the wide range of duties our switches fulfill in the defense and aerospace industries, for missile, aircraft, and warship systems. Across many industries and throughout the world, our customers get the right component, at low cost, with award-winning quality.

For more information, please visit our web site, at www.pressureswitch.com
**Product Overview**

*MPL* designs miniature electromechanical pressure, vacuum, and differential switches based on simple, reliable sensing techniques. Their robust design and long operating life make them ideal for monitoring and control of critical circuits.

**MPL 500 Series**
- 0.05 in/H₂O to 20 psi
- 10 to 20 mA
- No Deadband
- -40° to 250°F
- 100,000,000 cycles
- See pages 6-8

**MPL 533**
- 0.05 in/H₂O to 20 psi
- to 5A (resistive)
- No Deadband
- -40° to 185°F
- 100,000,000 cycles
- See pages 6-8

**MPL 600 Series**
- 1.50 in/H₂O to 45 psi
- 0.1 to 25A
- Deadband
- -40° to 185°F
- 1,000,000 cycles
- See pages 9-10

**MPL 808**
- 10 psi to 250 psi (consult factory)
- 0.1 to 25A
- Deadband
- -40° to 185°F
- 1,000,000 cycles
- See page 11

**MPL 9300 Series**
- 0.15 in/H₂O to 34 in/H₂O to 5A (resistive)
- Deadband
- -40°F to 185°F
- 1,000,000 cycles
- See pages 12-13

**MPL 9380**
- 0.25 psi to 30 psi to 5A (resistive)
- Deadband
- -40°F to 185°F
- 1,000,000 cycles
- See page 13

**MPL 2000**
- low-cost pushbutton for loads to 3/4 HP.
- snap-action, deadband long-life contacts
- self-mounting in panel
- See page 14

**MPL 3200 DM**
- hand-held digital manometer
- ranges from 0-0.5 to 0-30 psi (other units of measurement are available)
- accurate to +/- 1%
- full scale adjustable zero balance
- See page 14

**Custom Applications**
- application engineering assistance
- standard models modified to spec
- multiple sensing/switching methods
- broad, multi-industry experience
- custom OEM solutions
How They Work

MPL 500 Series

Fluid pressure acting against the diaphragm causes the cantilevered (moving) contact blade to deflect. The amount of deflection is a function of contact thickness and pressure.

The moving blade deflects until it contacts the points of the adjustment (fixed) blade, completing the circuit. The relative position of the blades can be changed with an adjustment screw.

In a pressure switch, the medium is connected to the side of the diaphragm opposite the contacts (see drawing, above). As pressure rises, the diaphragm is pushed against the moving contact blade.

In a vacuum switch, the medium is connected to the same side of the diaphragm as the contacts. As vacuum increases, the diaphragm is drawn against the moving contact blade.

In a differential pressure switch, the medium is connected to both sides of the switch. The diaphragm is either pushed or drawn, depending on the changing differential between the two pressure (or vacuum) sources.

Because there are no sliding or levering parts, as with a snap-action switch, the MPL 500 Series switches have virtually no “deadband”, or on-to-off mechanical differential.

MPL 600 Series

Fluid pressure acting against the diaphragm causes a guide disk to push against the actuator button of a snap-action switch. The disk has a stop to prevent overtravel of the actuator.

Adjustment of the setpoint is provided by an adjustment screw and compression spring, acting against the force of the diaphragm.

Because of the action of the snap switch, the MPL 600 Series switches do have a “deadband”, which most designers utilize in their circuit logic.

MPL 9300 Series

Mechanically, the MPL 9300 is similar to the MPL 600. However, the snap action switch is built into a specialized housing, which allows pressure, vacuum, and differential configurations around an oversized, more sensitive diaphragm.

Custom Sensing & Switching Solutions

Specialized OEM applications may employ piston, magnetic, flex circuit, transducer, or other means of sensing and switching. Contact MPL for details.
MPL 500 Series

MPL 500 Series switches offer pressure, vacuum, and differential sensors, sensitive to as low as 0.05 in/H₂O. Their accuracy and reliability offer the designer an excellent general purpose low pressure to electric interface for monitoring and control applications. Miniature size and low cost make the 500 Series ideal for OEM applications.

Description

MPL 500 is diaphragm-operated (See “How They Work”) utilizing low stress deflecting contacts. Elimination of sliding or pivoting parts results in high reliability and long service life. Diaphragm material can be selected for the operating medium, temperature range, and other parameters.

During the development of a specification, actuation point can be moderately adjusted by the designer. In production, a factory setting is required.

MPL 500, 501, 502, and 503 are single-setting models, available as pressure, vacuum, or differential pressure sensors. MPL 504 offers two settings.

MPL 533 adds the capability to switch high current loads, utilizing an integral AC static switch (triac). No power source is required other than the AC load.

Specifications

- **Body:** glass-filled polyester, grade SEO, standard
- **Diaphragm:** polyurethane, fluorosilicone, EPDM, Teflon®, and other materials are available
- **Terminals:** brass, gold-plated
- **Contacts:** phosphor bronze with gold inlay standard. Other materials available

**Operating Temperature:**
- –40° to 120°C (–40° to 250°F), depending on components. Consult factory.

**Operating Pressure:**
- 0.05 in/H₂O to 550 in/H₂O (20psi)
- Burst: 25 psi

**Response:**
- MPL 500/501/503/504/533, 160Hz
- MPL 502/528/509, 270Hz

**Life:**
- Over 100,000,000 cycles

**Form:**
- SPST-NO, SPST-NC
- 2x, SPST-NO (Form F) MPL 504

**Resistance:**
- 500 miliohm maximum

**Weight:**
- 10 grams

Electrical

MPL 500 switches are designed for low current and logic applications, such as LED indicators and solid state relays. Typically, a load of 10 to 20mA will ensure reliable switching. For inductive loads, a varistor or R-C snubber circuit is recommended.

To switch heavier loads, use any MPL 500 Series switch with an interface device such as solid state relay. Ask your MPL application engineer about using an AC static switch for loads up to 5A.

MPL 500 Series Basic Dimensions

**MPL 500 Series**

These basic dimensions are common to all models. For clarity, ports have not been included. Please see individual outlines for dimensions not shown.

![MPL 500 Series Basic Dimensions](image-url)
The MPL-533 features an integral triac. Current capacity of the 533 is limited by duty cycle (% on-time) and ambient temperature. However, source voltages from 6 to 240VAC can be used with long life and high reliability.

Finally, for loads up to 25A, see the MPL 600 Series.

**Terminals**

NEMA 0.020” x 0.187” male tabs are standard, for female quick disconnects. Low-profile terminals for 18-22 gage wire are recommended.

Optional bifurcated terminals are also available on all models, which will accept 0.020” x 0.187” or 0.020” x 0.110” female quick disconnects.

Terminals are available for printed circuit board mounting. Custom applications requiring elongated terminals, tinning, and custom wiring can also be accommodated.

**Leakage**

The standard polyurethane diaphragm functions as both sensor and seal. For dynamic applications, such as fan monitoring, the diaphragm alone provides an adequate seal. In static applications (leak detection, liquid level, etc) a secondary internal gasket will ensure an almost bubble tight seal of the pressure cavity.

**Actuation Settings**

All MPL 500 Series sensors are available with factory settings from 0.05 to 550 in/H2O. Tolerance is typically about 10% of the setpoint. Ask your MPL Application Engineer for more information on tolerances.

Six standard ranges are available:

<table>
<thead>
<tr>
<th>Range</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 to 0.75 in/H2O</td>
<td>0.50 to 3.00 in/H2O</td>
<td>2.00 to 13.00 in/H2O</td>
<td>10.00 to 50.00 in/H2O</td>
<td>25.00 to 200.00 in/H2O</td>
<td>100.00 to 550.00 in/H2O</td>
<td></td>
</tr>
</tbody>
</table>

**Special Ports and Mounting**

MPL 508 adds a 1/8” NPT brass fitting to the model 502 features. MPL 528 adds a molded (or die-cast) 1/8” NPT fitting to the model 602 features. MPL 509 adds a 5/32” barbed brass fitting, and a 5/16” nut and washer for panel mounting.
MPL 500 Series Dimensions

MPL 500
TYPE: Differential
MOUNTING: Adjustable
PORTS: Barbed for 5/32" ID Tubing

MPL 501
TYPE: Differential
MOUNTING: Fixed
PORTS: Barbed for 5/32" ID Tubing

MPL 502
TYPE: MPL 502 Differential
MPL 502 P Pressure
MPL 502 V Vacuum
MOUNTING: Fixed
PORTS: Straight tubes for 1/8" ID Tubing or Gasket or O-Ring

Available with three port options.
MPL 502 (Differential 2 Ports)
MPL 502 P (Pressure Port only)
MPL 502 V (Vacuum Port only)

MPL 503
TYPE: Differential
MOUNTING: Fixed (through eyelet holes)
PORTS: Barbed for 5/32" ID Tubing

Available as differential (2 port) model only.
MPL 600 Series

MPL 600 Series switches offer pressure or vacuum sensors which combine the features of the MPL 500 Series with snap action switching for higher current capacity, SPDT contact form, and switch deadbands (also referred to as mechanical differential or hysteresis). Miniature size and low cost make the MPL 600 Series ideal for OEM applications.

Description

MPL 600 Series switches utilize high-quality miniature snap-action switches. Like the 500 Series all are diaphragm operated. Diaphragm material can be selected for the operating medium, temperature range, and other parameters.

During the development of a specification, actuation point can be adjusted by the designer. In production, factory setting is required.

MPL 600, 601, and 602 are single setting models. MPL 604 offers two micro switches, each operated by an independent diaphragm

Specifications

Body: glass-filled polyester, grade SEO, standard
Diaphragm: polyurethane, fluorosilicone, EPDM, Teflon®, and other materials available
Snap Switch: UL & CSA listed, wide selection
Operating Temperature: –40° to 85°C (–40° to 185°F), depending on components. Consult factory.
Operating Pressure: Pressure: 1.50 in/H₂O to 45 psi Vacuum: 4.0 in/H₂O to 14 psi
Burst: 45 psi
Life: Mechanical: Over 1,000,000 cycles Electrical: depending upon application
Form: SPDT
Resistance: 1 ohm maximum
Weight: 18 grams (MPL-600); 24g (600-V) 45g (604).

Electrical

MPL 600 switches are designed for heavy current loads. Depending on pressure setting, ratings are available from 3A to 25A, and 0.1HP to 1.0HP. For low-current applications, special contacts are available for milliamp loads.

Terminals

Three 0.020” x 0.187” male tabs are standard (0.032” x 0.250” available). Special OEM terminals are available.

Actuation

MPL 600 pressure models are available from 1.5 in/H₂O to 45 psi. Vacuum models are available from 4.0 in/H₂O to 14 psi. Tolerance is typically +/- 10% of setpoint.

Special Ports and Mounting

MPL 628 adds a molded (or die-cast) 1/8” NPT fitting to the model 602 features. MPL 609 adds a 5/32” barbed brass fitting, with a nut and washer, for panel mounting.
Mounting Legs: are offset 20°, 1.281” (32.54 mm) OC as per other MPL-600 Series switches. Other Options for length are 0.560” (14.22 mm) and 0.425” (10.80 mm). Hole clearance is 0.125” DIA. (3.18 mm).
MPL 800 Series

MPL 808 extends the range of MPL 600-style switches with snap action in an all-metal housing, designed for moderately higher pressures. Actuation may be specified between 10 psi and 250 psi.

**Description**

MPL 808 utilizes a sensor body die cast of aluminum-zinc alloy, with a 1/8” NPT fitting. Like the 600 Series, MPL 808 is diaphragm operated. Diaphragm material can be selected for the operating medium, temperature range, and other factors.

During development of a specification, actuation point can be adjusted by the OEM designer. In production, factory setting is required.

**Electrical**

MPL 808 incorporates standard high reliability snap action switches. Depending on pressure setting, ratings are available from 3A to 25A, and 0.1HP to 1.0HP. Special contacts are available for low current applications.

**Actuation**

MPL 80 pressure models are available from 10 to 250 psi. Tolerance is typically +/- 10% of setpoint.

**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>aluminum-zinc alloy</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>polyurethane standard, other materials available</td>
</tr>
<tr>
<td>Snap Switch</td>
<td>UL &amp; CSA listed, wide selection</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>–40° to 85°C (-40° to 185°F), depending on components. Consult factory.</td>
</tr>
<tr>
<td>Operating Pressure</td>
<td>10 psi to 250 psi</td>
</tr>
<tr>
<td>Burst</td>
<td>500 psi</td>
</tr>
<tr>
<td>Form</td>
<td>SPDT</td>
</tr>
<tr>
<td>Terminals</td>
<td>Three 0.020” x 0.187” male tabs standard. Three 0.032” x 0.250” available. Special OEM terminals available.</td>
</tr>
<tr>
<td>Dimensions</td>
<td>2.0 x 2.0 x 1.0 inch</td>
</tr>
<tr>
<td>Weight</td>
<td>2 ounces (57 grams)</td>
</tr>
</tbody>
</table>
**MPL 9300**

**MPL 9300** Series switches offer pressure, vacuum, and differential models capable of sensing very low setpoints, and switching current up to 5A resistive, 2.5A inductive.

Designed for use in the HVAC industry, where reliable air proving is critical to both performance and customer safety, the **MPL 9300** is a favorite with leading manufacturers of gas-fired warm air furnaces and water heaters.

Smaller and lighter than any other HVAC pressure switch, the **MPL 9300** is built for the same temperature range and operating life as conventional switches made of stamped steel. **MPL 9300** will perform equally well in other applications which demand low OEM unit cost, robust design, setpoint accuracy, and high reliability.

**Description**

**MPL 9300** features a unique integral snap switch, with positive snap action and self-wiping silver contacts for ultra-reliable switching.

The molded silicone diaphragm converts very low pressure or vacuum into movement of an actuator disk, which operates the silver alloy contacts. Contact force in the switch, a key to reliable switching, is higher than in a conventional HVAC pressure switch.

**MPL 9300 Series Dimensions**

Standard pressure connection is a multi-barbed port. Custom ports, mounting, and other options are available. Because the **MPL 9300** is round, and the ports and switch cover are fixed to the body by ultrasonic welding, OEM designers can often specify a desired orientation between the port, bracket, and terminals.

**Electrical**

**MPL 9300** is designed for appliance markets in which typical loads are 2.5 Amps inductive, 5 Amps resistive. The silver alloy contacts provide low contact resistance during dry circuit conditions, as well as long life and reliability.

**MPL 9300** has been subjected to rigorous life cycle and environment testing, and is recognized by UL and CSA for application under Standard 353, Pilot Duty, and Standard 508, Industrial Control.
MPL 9300 Mounting Options

MPL 9300 can be mounted with the diaphragm parallel or perpendicular to level, as required by application. Standard mounting brackets are conventional plated metal (see drawing) or lightweight, cost-saving composite. For optimum cost reduction, snap-in barbs are also available, (at left) eliminating the bracket, the mounting hardware, and some assembly labor.

Specifications

Body: glass-filled polyester, grade SEO
Diaphragm: post-cured silicone rubber
Terminals: 0.032" x 0.250" copper alloy
Contacts: silver alloy, beryllium copper
Actuator: stainless steel
Springs: stainless steel, phosphor bronze
Operating Temperature: –40° to 85°C (–40° to 185°F)
Operating Pressure: 0.15 in/H2O to 34 in/H2O
Proof: 100 in/H2O (3.6 psi)
Burst: 5 psi minimum
Form: SPDT
Resistance: Initial: <50 milliohms

MPL 9370

For vacuum sensing in applications requiring the ultimate in trim size, easy installation, and low cost, MPL offers the model 9370.

MPL 9370 combines all of the functional features of the 9300 series, in a package size even smaller and lighter than the original 9300. MPL 9370 also features perpendicular direct-connect terminals, to simplify OEM production.

MPL 9380

MPL 9380 is a smaller, lighter, alternative to the MPL 600 Series, providing snap-action switching, SPDT form, and the ability to control device logic using switch deadband. Miniature size and low cost make this switch ideal for OEM applications.

Specifications

Body: glass-filled polyester
Ports: single barb, 1/8" NPT, and flow-through
Switch: same as MPL 9300, 9370
Form: SPDT, snap-action
Alternate action available
Operating Temperature: –40°C to +82°C (–40°F to 180°F)
Operating Pressure: 0.25 psi to 30 psi
Electrical: 5A standard
(OEM configuration available)
Terminals: three 0.032" x 0.250"
male tabs standard
PC-mount and other custom available
Weight: 0.57 ounces (16 grams)
MPL 3200

MPL 3200 DM is a low-cost, hand-held digital manometer. Despite its small size, MPL 3200 DM has features comparable to much larger units — including a high-resolution piezoresistive transducer for superior accuracy, and a large, easy-to-read LCD display. A standard 9V battery will power 100 hours of continuous use. Port connections can be made using 1/8” ID tubing.

MPL 3200 DM is ideal for a wide variety of general purpose pressure and vacuum measuring applications — for air, gas, and other media compatible with silicon, polyester, fluorosilicone, and buna.

Specifications
Ranges: 0-0.5, 0-1, 0-5, 0-15, and 0-30 psi (other units of measurement available).
Accuracy: +/-1% of full scale (@ 25°C).
Operating Temperature: 32° to 104°F (0° to 40°C).
Zero Balance: externally adjustable.
Weight: 5.5 ounces, without battery.
Private labeling is available in OEM quantities.

Custom Configurations

In addition to our wide range of standard products, each of which can be customized to fulfill a specific application, MPL specializes in the design of unique products which are engineered to provide a custom solution.

Many pressure switch manufacturers actually employ third-party switch mechanisms in their products. In contrast, MPL is a primary designer and fabricator of switches. This vertical integration gives us a degree of flexibility in both design and cost that few other pressure switch suppliers can offer.

MPL 2000

MPL 2000 is a rugged, low-cost pushbutton switch, suitable for a wide variety of general purpose switching applications such as indicating a door opening, detecting a device limit, or switching off power when an appliance panel is removed.

Incorporating a robust, snap-action mechanism, MPL 2000 is capable of switching loads up to 3/4 HP. Fine silver contacts ensure high reliability and long life.

MPL 2000 is self-mounting. Locking tabs hold the switch in place in a 0.55” x 1.125” panel cutout. At rest, the standard pushbutton extends 0.875” from the mounting surface. Custom configurations are also available in OEM quantities.

MPL 2000 Dimensions

Our broad industry experience has given MPL a unique body of expertise through which we transform customer needs into cost-effective, reliable control products. Our sensing and switching solutions include diaphragm, piston, flex circuit, and other technologies.

MPL Application Engineers are available to help specify the right switch for any task. For highly specialized OEM applications, MPL Design Engineers will work with your design staff to carry a custom solution from concept through to production.
**HOW TO ORDER**

1. Photocopy the Pressure Switch Specification form on this page.
2. Use the form to tell us about your application, and fax or email to Kenda.

3. Our Application Engineer will call to discuss your requirements.
4. Based on your specification and estimated annual use, our Application Engineer can quote pricing, arrange for samples, and help you further refine your design objective.

---

**PRESSURE SWITCH SPECIFICATION**

Please Contact Your Local Distributor, Kenda Technologies Pte Ltd. For Assistance With Application Data...Sign & Date Form...and Fax to (65) 6543-1182.

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<tr>
<th>Print Name</th>
<th>Title</th>
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<table>
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Signature ________________________________________ Date ____________________________

(Required for processing)

Briefly describe the function the switch will provide:

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

---

**ELECTRICAL:**

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<table>
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<tbody>
<tr>
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<table>
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<tbody>
<tr>
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<thead>
<tr>
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<th>SPDT</th>
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Note: Max Amps: 500 Series/10-20 mA; 600 Series/0.1-25A; 9300 Series/5A resistive, 2.5A inductive

**ENVIRONMENT:**

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<th>Medium:</th>
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<th>Low</th>
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<table>
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<th>No</th>
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<th>Switch Type:</th>
<th>Pressure</th>
<th>Vacuum</th>
<th>Differential</th>
<th>Set Point (show units: psi, in/Hg, etc.)</th>
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<table>
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<tr>
<th>Set For:</th>
<th>Actuate</th>
<th>Deactuate</th>
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<table>
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<tr>
<th>Type of port/fitting required:</th>
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<th>Pressure Specifications:</th>
<th>Operating (Normal)</th>
<th>Proof</th>
<th>Burst</th>
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<th>Actuation range (deadband, on-to-spread) desired?</th>
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**APPROVALS:**

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**PRODUCTION:**

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<th>Estimated Annual Volume</th>
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<th>Recommended MPL PN</th>
<th>Switch PN Used Now</th>
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<th>Customer PN</th>
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<th>Comment</th>
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**For more information contact:**

**MPL**

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67 Loyang Way, Singapore 508757, Tel: (65) 6543-1183 • Fax(65)6543-1182
e-mail: LynnNg@Kenda.net