# **Potentiometers** Line Guide

Potentiometers convert rotary motion or linear displacement into a change of resistance, supplying a smooth transition of voltage or current levels. The resulting voltage output may be used to control position transducers in a wide variety of potential transportation, industrial and medical applications.

Rotary Potentiometers are compact, rugged, thick-film devices that use either conductive plastic, or cermet or wirewound elements. Developed for potential military applications, our proprietary conductive plastic offers extensive temperature range and infinite resolution, and is designed to provide precision

position measurement. Cermet and wirewound elements are stable over a range of operating temperatures and provide high power dissipation and improved resistance temperature coefficient.

**Linear Potentiometers** feature rugged extruded aluminum housings to withstand harsh chemicals and immersion in oils or water. Construction features include extended life PTFE bearings, precious-metal multi-finger contact wipers, and MystR® conductive plastic thick-film elements.

### **FEATURES**

#### **ROTARY POTENTIOMETERS**

#### CONDUCTIVE PLASTIC POTENTIOMETERS 308, 408 Series.

Features: Compact • Modular package

Conductive plastic element

 0.5 W power rating
 Nickel-plated brass shaft and bushings • Enhanced performance • 408: sealed for board washing • PC and solder-hook terminals • CW audio and linear tapers available

Benefits: Reduced cost potentiometer that offers 0.5 W power rating in a compact body. Potential applications include manual controls, audio and lighting consoles, medical equipment, precision joysticks, and telecommunications.

#### 380, 385, 53C, 485, RV4 Series.

Features: Cost-effective • Wide range of resistance values (100 Ohm to 5 MOhm, inclusive) • Wide variety of tapers

Benefits: Supplies good performance at a reasonable price • Wide range of resistance values promotes flexibility in the applications • Wide variety of tapers creates flexibility in the output signal

profile, allowing use in a wide variety of applications. Potential applications include use on audio and visual equipment, foot pedal controls, machine controls, welding equipment, gear shifters, joysticks, and throttles.

#### 381 Series.

Features: Conductive plastic element

• 1 W power rating • Solder lug terminals Metal case and nickel-plated brass shaft and bushings . Locking-style bushing, rotary switch, or dual section options available • Linear taper

Benefits: Robust construction in a low-cost industrial package. Potential applications include manual and audio controls, and telecommunications.

#### 392. RV6 Series.

Features: Wave solderable • PCB washable • Cost-effective • Wide range of resistance values (100 Ohm to 5 MOhm, inclusive) • Small package size

**Benefits:** Devices may be automatically soldered on a PCB using the wave soldering process instead of being manually soldered, saving time and

yielding consistent results. The PCB containing the soldered devices may be washed after soldering, saving time and yielding consistent results. Good performance at a reasonable price. Wide range of resistance values promotes flexibility in the applications. May be used where space constraints may be present. Potential applications include audio and visual equipment, light switches, hand-held multimeters and mobile monitoring devices, test and measurement equipment, communications equipment, thermostats, hand-held medical equipment and mobile monitoring devices, medical laboratory and diagnostic equipment, and vehicle manual controls.

#### 574 Series.

Features: Conductive plastic element • 0.5 W power rating • Reduced mounting profile • Quiet electrical output • Vertical mounting with support bracket • PC style mounting • Smooth feel • Robust construction • All plastic construction

• Metric bushing • Linear taper



### **Potentiometers Line Guide**

### Quality. Reliability. Enhanced life. Global reach.

Honeywell S&C rotary position sensors deliver the features you need and quality you demand. Even better, we offer worldwide support and manufacturing.

#### Potentiometers: The

Honeywell S&C lineup is legendary in military and aerospace industries for reliability, durability, and enhanced life. Our potentiometer designs allow customization to your specs and cost requirements without sacrificing reliability and accuracy. Measuring rotary position or linear displacement, these units easily withstand exposure to harsh chemicals and high temperatures.

### Conductive Plastic Pots

Description

**Element type** 

Power rating

Termination

Bushing

Shaft

**Resistance range** 

Housing material

**Electrical taper** 

**Expected rotational life** 

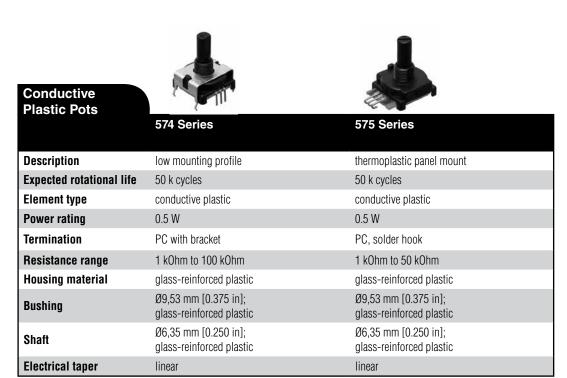


CW audio, linear

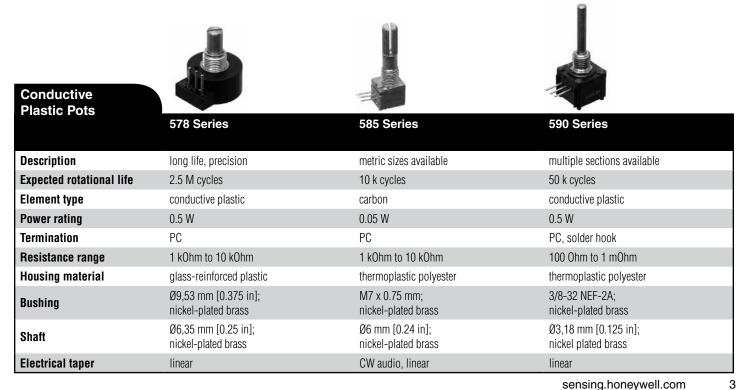


linear, log, reverse log, custom

	308, 408 Series	380, RV4, 485, 53C, 385 Series
	<ul><li> 308: compact modular housing</li><li> 408: sealed for board washing</li></ul>	<ul> <li>380: 2 W conductive plastic pot</li> <li>RV4: Military version of 380</li> <li>485: Custom version of 380</li> <li>53C: Cost-effective version of 380</li> <li>385: Custom version of 53C</li> </ul>
1	50 k cycles	100 k cycles, 25 k cycles
	conductive plastic	conductive plastic
	0.5 W	2 W
	PC, solder hook	solder lug with/without center tap, PC pin, fast-on, custom
	308: 100 Ohm to 1 mOhm 408: 500 Ohm to 10 kOhm	100 Ohm to 5 MOhm, inclusive
	thermoplastic polyester	stainless steel
	1/4-32 NEF-2A or 3/8-32 NEF-2A; nickel-plated brass; standard, locking	3/8-32 NEF-2A; nickel-plated brass; standard, high torque, custom
	Ø3,18 mm [0.125 in], Ø6,35 mm [0.250 in]; nickel-plated brass	Ø6,35 mm [0.250 in]; nickel-plated brass



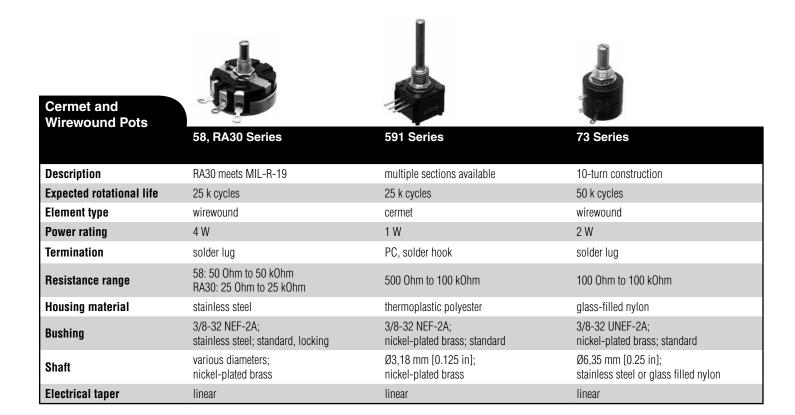
Conductive Plastic Pots	381 Series	392, RV6 Series
Description	0.5 in diameter, 1 W conductive plastic	<ul> <li>392: 0.5 W conductive plastic pot</li> <li>RV6: Military version of 392</li> </ul>
Expected rotational life	25 k cycles	tested to 50 k cycles
Element type	conductive plastic	conductive plastic
Power rating	1 W	0.5 W
Termination	solder lug	solder hook, PC pin, custom
Resistance range	100 Ohm to 5 mOhm	100 Ohm to 5 MOhm, inclusive
Housing material	stainless steel	thermoplastic
Bushing	Ø6,35 mm [0.250 in], Ø9,53 mm [0.375 in]; nickel-plated brass; standard, locking	1/4-32 NEF-2A, nickel-plated brass; metal panel seal: standard, split locking; metal no panel seal: standard, split locking; unthreaded; plastic standard, trimmer; custom
Shaft	Ø3,18 mm [0.125 in]; nickel-plated brass	Ø3,18 mm [0.125 in]; nickel-plated brass or thermoplastic
Electrical taper	CW audio, linear	linear, log, reverse log



### **Potentiometers Line Guide**

Conductive Plastic Pots	640 Series
Description	thru-shaft potentiometer, low profile housing
Expected rotational life	>1 million cycles full cycles
Element type	conductive plastic
Power rating	0.5 W max.
Termination	three or six 20 AWG leadwires
Resistance range	1 kOhm to 1 MOhm, inclusive
Housing material	reinforced thermoplastic
Bushing	none (slotted rotor)
Shaft	none (customer provided)
Electrical taper	linear, linear quadrature

Cermet and Wirewound Pots	<b>309, 409 Series</b>	43, RA20 Series
Description	<ul> <li>309: compact modular house</li> <li>409: sealed for board washing</li> </ul>	RA20 meets MIL-R-19
Expected rotational life	25 k cycles	10 k cycles
Element type	cermet	wirewound
Power rating	1 W	2 W
Termination	PC, solder hook	solder lug
Resistance range	100 Ohm to 5 MOhm	43: 10 Ohm to 50 kOhm RA20: 50 Ohm to 15 kOhm
Housing material	thermoplastic polyester	stainless steel
Bushing	1/4-32 NEF-2A, 3/8-32 NEF-2A; nickel-plated brass; standard	3/8-32 NEF-2A; stainless steel, standard, locking
Shaft	Ø3,18 mm [0.125 in], Ø6,35 mm [0.250 in]; nickel-plated brass	various diameters; nickel plated brass
Electrical taper	linear	linear



### **Potentiometers Line Guide**

Linear Potentiometers	AQLT Series	AQMLT Series
Description	shaftless, waterproof linear position transducer	shaftless, waterproof linear position transducer
Operating temperature range	-40 °C to 80 °C [-40 °F to 176 °F]	-40 °C to 80 °C [-40 °F to 176 °F]
Supply voltage	30 Vdc max.	30 Vdc max.
Linearity	±1 %	±1 %
Starting force	56,7 g [2 oz] max.	28,35 g [1 oz] max.
Backlash	NA	n/a
Total resistance	6 kOhm to 38 kOhm	750 Ohm to 18 kOhm
Measurement range	127 mm to 965 mm [5 in to 38 in]	12,7 mm to 304,8 mm [0.5 in to 12 in]
Shaft	NA	n/a
Total mechanical travel	154,94 mm to 967,74 mm [6.1 in to 38.1 in]	15,24 mm to 307,34 mm [0.6 in to 12.1 in]
Electrical travel	152,4 mm to 965,2 mm [6 in to 38 in]	12,7 mm to 304,8 mm [0.5 in to 12 in]
Housing length	electrical travel + 54,87 mm [2.16 in]	electrical travel + 38,1 mm [1.5 in]
Vibration	20 g/0,75 mm (rms) 5 Hz to 2 kHz	20 g/0,75 mm (rms) 5 Hz to 2 kHz
Shock	50 g 11 ms half sine	50 g 11 ms half sine
Expected operating life	one billion dither operations	one billion dither operations
Resistance tolerance	±20 %	±20 %
Insulation resistance	500 mOhm at 500 Vdc	500 mOhm at 500 Vdc
Dielectric strength	250 V rms	250 V rms
Termination	cable	cable

Linear Potentiometers	MLT Series	DR Series
Description	plunger-driven linear transducer	Durastar rodless, space-saving side actuator
Operating temperature range	-40 °C to 80 °C [-40 °F to 176 °F]	-65 °C to 105 °C [-85 °F to 221 °F]
Supply voltage	30 Vdc max.	75 Vdc max.
Linearity	±1 %	0.1 % from 1% to 100% of theoretical electrical travel
Starting force	28,35 g [1 oz] max.	0,45 kg [1.0 lb]
Backlash	0,0127 mm [0.0005 in] max.	0,025 mm [0.001 in] max.
Total resistance	750 Ohm to 9 kOhm	2 kOhm to 10 kOhm
Measurement range	13 mm to 152 mm [0.5 in to 6 in]	102 mm to 1270 mm [4 in to 50 in]
Shaft	Ø3,18 mm [0.125]	M5 x 0.8
Total mechanical travel	13,97 mm to 153,67 mm [0.55 in to 6.05 in]	106 mm to 1275 mm [4.2 in to 50.2 in]
Electrical travel	12,7 mm to 152,4 mm [0.5 in to 6 in]	101,6 mm to 1270 mm [4 in to 50 in]
Housing length	electrical travel + 30,48 mm [1.2 in]	250 mm to 1418 mm [9.84 in to 55.83 in]
Vibration	20 g/0,75 mm (rms) 5 Hz to 2 kHz	20 g/0,75 mm (rms) 5 Hz to 2 kHz
Shock	50 g 11 ms half sine	50 g 11 ms half sine
Expected operating life	one billion dither operations	one billion dither operations
Resistance tolerance	±20 %	±20 %
Insulation resistance	500 mOhm at 500 Vdc	1000 m0hm at 500 Vdc
Dielectric strength	1000 V rms	1000 V rms
Termination	cable	Hirschmann GDM

### **Potentiometers Line Guide**

Linear Potentiometers	LFII Series	SLF Series	LT Series
Description	vibration-resistant, plunger-driven linear transducer	short stroke version of the LFII	plunger-driven linear transducer
Operating temperature range	-65 °C to 105 °C [-85 °F to 221 °F]	-65 °C to 105 °C [-85 °F to 221 °F]	-40 °C to 80 °C [-40 °F to 176 °F]
Supply voltage	30 Vdc max.	40 Vdc max.	30 Vdc max.
Linearity	±1 %	±1 % or ±0.1 %	±1 %
Starting force	0,45 kg [1 lb] (standard); LFIIW: 2,27 kg [5 lb] (water resistant)	1 lb (standard) 5 lb (water resistant)	28,35 g max. [1 oz max.] 12 oz max. (water resistant)
Backlash	0,025 mm [0.001 in] max.	0,025 mm [0.001 in] max.	0,00508 mm [0.0002 in] max.
Total resistance	5 kOhm	1,5 kOhm to 9 kOhm	1 kOhm to 10 kOhm
Measurement range	152 mm to 1219 mm [6 in to 48 in]	25 mm to 152 mm [1 in to 6 in]	25 mm to 254 mm [1 in to 10 in]
Shaft	Ø6,35 mm [0.25 in]	Ø6,35 mm [0.25 in]	Ø3,18 mm [0.125]
Total mechanical travel	154,6 mm to 1221,4 mm [6.09 in to 48.09 in]	30,5 mm to 166,2 mm [1.2 in to 6.15 in]	26,7 mm to 255.3 mm [1.05 in to 10.05 in]
Electrical travel	152,4 mm to 1219,2 mm [6 in to 48 in]	25,4 mm to 152,4 mm [1 in to 6 in]	25,4 mm to 254 mm [1 in to 10 in]
Housing length	electrical travel + 81,02 mm [3.19 in]	electrical travel + 77,5 mm [3.05 in]	electrical travel + 38,10 mm [1.50 in]
Vibration	20 g/0,75 mm (rms) 5 Hz to 2 kHz (for vibration levels up to 50 g rms and higher, additional housing clamps are required)	20 g/0,75 mm (rms) 5 Hz to 2 kHz	20 g/0,75 mm (rms) 5 Hz to 2 kHz
Shock	50 g 11 ms half sine	50 g 11 ms half sine	50 g 11 ms half sine
Expected operating life	one billion dither operations	one billion dither operations	one billion dither operations
Resistance tolerance	±20 %	±20 %	±20 %
Insulation resistance	1000 m0hm at 500 Vdc	n/a	500 mOhm at 500 Vdc
Dielectric strength	1000 V rms	n/a	1000 V rms
Termination	connector, binder series 681	connector, binder series 681	cable

**Benefits:** Reduced cost commercial potentiometer with the benefits of a conductive plastic element. Potential applications include welding/heating controls, joysticks, and manual controls.

#### 575 Series.

Features: Conductive plastic element
0.5 W power rating • Reduced mounting profile • Quiet electrical output • Solder hook terminals for panel mounting
Smooth feel • Robust construction • All plastic construction • Linear taper

**Benefits:** Reduced cost commercial potentiometer with the benefits of a conductive plastic element. Potential applications include welding/heating controls, joysticks, and manual controls.

#### 578 Series.

Features: Conductive plastic element
0.5 W power rating • Variable resistor technology • Low mounting profile
Quiet electrical output • Precision control • PC terminals • Nickel-plated shaft and bushing • Smooth feel • Robust construction • Linear taper • Central tap version available

**Benefits:** Precision-type potentiometer with low torque and very linear tapers delivers enhanced control. Potential applications include off-road vehicles, electric vehicles, marine controls, material handling, personal mobility, manual controls, telecommunications, and audio equipment.

#### 585 Series.

Features: Compact size • Carbon element

- 0.05 W power rating Horizontal mount
- PC terminals Metal shaft and bushings
- Linear taper

**Benefits:** Designed to be used as a low-wattage component that can be panel mounted or PC mounted. Robust construction in a low-cost commercial package, using carbon composition elements. Potential applications include manual and audio controls, heating equipment, and telecommunications.

#### 590 Series.

Features: Compact size • Conductive plastic element • 0.5 W power rating
Linear taper • PC terminals

• Brass shaft and bushing • Linear taper

**Benefits:** Reduced cost potentiometer with the benefits of a conductive plastic element. Potential applications include manual controls, lighting and audio consoles, precision joysticks, welding and heating, and telecommunications.

#### 640 Series.

Features: Thru-shaft configuration actuated by customer-provided actuator shaft • Reinforced, low-profile housing
Dust sealed with splash- or moisturesealed options • Long rotational life of greater than one million cycles

Benefits: Thru-shaft configuration allows use in space-constrained applications where there may not be enough room for a shaft/bushing integral to the sensor. May be used in rugged environments where space constraints may be present. Designed to provide protection against dust or moisture ingress. Long rotational life promotes extended life in the application. Potential applications include position and movement detection in construction/agricultural vehicles/ equipment, vehicle manual controls, pedals, steering equipment, audio/visual equipment, industrial vehicle attachments machine control jovsticks, robotic arms. valve actuators and material handling equipment.

#### CERMET AND WIREWOUND POTENTIOMETERS 309/409 Series.

Features: Compact • Modular package

• Cermet element • 1 W power rating

• Enhanced performance • 409 is sealed for board washing • PC and solder-hook terminals

**Benefits:** Reduced cost potentiometer that offers the temperature stability of a cermet element and a 1 watt power rating in a compact body. Stable over operating temperature. Potential applications include audio consoles, lighting controls, precision joysticks, telecom control systems, manual controls, medical equipment, telecommunications, and marine controls.

#### 43/RA20 Series.

Features: Wirewound element
2 W power rating • RA20 meets
MIL-R-19 standards • Rugged metal construction • Nickel-plated brass shaft
Lock-style bushing available • Linear taper

**Benefits:** Very stable over operating temperature. Potential applications include manual controls, welding, and heating.

#### 58/RA30 Series.

- Lock-style bushing available
- Linear taper

**Benefits:** Designed to be stable over operating temperature. Potential applications include manual controls, welding, and heating.

#### 591 Series.

Features: Compact size • Cermet element

- 1 W power rating Temperature stability
- Linear taper PC terminals Brass shaft and bushing Linear taper

**Benefits:** Reduced cost potentiometer with the benefits of a cermet element. Designed to be stable over operating temperature. Potential applications include manual controls, welding and heating, telecommunications.

#### 73 Series.

Features: Wirewound element

- 2 W power rating 10-turn construction
- Nickel-plated brass shaft and bushings
- Linear taper

**Benefits:** Precision-type potentiometer made with a wirewound element. Offers 10 turns for enhanced resolution and accurate output. Potential applications include manual controls.

#### LINEAR POTENTIOMETERS AQLT Series.

Features: 1/2 in body diameter
Multiple finger-wiper design • Extruded wiper block guides • MystR<sup>®</sup> plastic element • Anodized extruded aluminum housing • Sealed construction • Precious metal contact • Absolute continuous measurement • Infinite resolution
Tolerates clamping loads • Tested up to

 one billion operations
 Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/ outdoor) NEMA 4 locations

**Benefits:** Fits in tight spaces and clamps easily to cylinders. Improves shock and vibration performance. Smooth quiet motion; extends operating life. Enhanced performance in hostile environments. Low noise level often. Accurate position at power up. Magnetic actuator replaces the shaft found in traditional linear transducers and often eliminates need for additional stroke length mounting space. Enhanced life and often reliable operation in potential applications including in-tank level sensing, robotic motion control, woodworking guides, seismology, packaging and processing equipment, animated characters, marine steering systems, off-road vehicles, semiconductor process equipment, and medical equipment.

#### **AQMLT Series.**

Features: 3/8 in body diameter
Multiple finger-wiper design • Extruded wiper block guides • MystR<sup>®</sup> plastic element • Anodized extruded aluminum housing • Sealed construction • Precious metal contact • Absolute continuous measurement • Infinite resolution
Tolerates clamping loads • Tested up to

Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/ outdoor) NEMA 4 locations

**Benefits:** Fits in tight spaces and clamps easily to cylinders. Improves shock and vibration performance. Smooth quiet motion; extends operating life. Enhanced performance in hostile environments. Low noise level over entire life. Accurate position at power up. Magnetic actuator replaces the shaft found in traditional linear transducers and often eliminates need for additional stroke length mounting space. Enhanced life and often reliable operation in potential applications including in-tank level sensing, robotic motion control, woodworking guides, seismology, packaging and processing equipment, animated characters, marine steering systems, off-road vehicles, semiconductor process equipment, and medical equipment.

#### LFII Series.

Features: Vibration-damped element
Extruded wiper carrier guides • Precious metal wipers • MystR<sup>®</sup> plastic elements
Stainless-steel shaft • Enhanced dc level output • Enhanced performance bearings
Infinite resolution • Absolute continuous measurement • Shaft seals • Waterresistant option available • Metric Series available • Tested up to one billion operations • Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/outdoor) NEMA 4 locations

**Benefits:** No wiper bounce in high vibration environments. Smooth, easy operation under high side loads and large misalignment. Provides enhanced performance, low noise, no oxidation. Works with simple controllers. Enhanced life even under side load conditions. Often accurate position at power-up. Protects internal components from harsh environments. Potential applications include injection molding machines, printing presses, meat packing equipment, drill presses, woodworking machines, cranes, front-end loaders, and scales.

#### SLF Series.

Features: Precious metal wipers • 0.081 in thick housing with 6 mm [0.25 in] shaft
MystR<sup>®</sup> plastic elements • High level dc output • Enhanced performance bearings
Absolute continuous measurement

• Shaft seals • Infinite resolution • Waterresistant option available • Tested up to one billion operations • Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/ outdoor) NEMA 4 locations

**Benefits:** Provides enhanced performance, low noise. Rugged construction for manufacturing environment. Enhanced life even with side load conditions. Protects internal components from factory environment. Often accurate position at power-up. Works with simple controls. Provides a high resolution, often absolute position measurement without external signal conditioners. Potential applications include injection molding machines, printing presses, meat packing equipment, drill presses, woodworking machines, cranes, and front-end loaders.

#### LT Series.

Features: 1/2 in diameter • Dual-wiper design • Extruded wiper-block guides
MystR<sup>®</sup> plastic element • Stainless-steel shaft • Anodized extruded aluminum housing • Precious metal contact

- Absolute continuous measurementShaft seals for spray-or-hose-down
- environments Infinite resolution

• Enhanced reliability • Tested up to one billion operations • Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/ outdoor) NEMA 4 locations

**Benefits:** Fits into tight spaces, clamps easily to cylinders. Improves shock and vibration performance. Smooth, quiet motion; enhances operating life. Tolerates clamping loads. Rugged construction to withstand hostile environments. Often accurate position at power up. Provides usable output at high vibration levels for long periods. Diameter is among the smallest available and can replace displacement transducers in many applications. Potential applications include animated characters, gauging, fluid flow meters, seismology, semiconductor processing, linear actuators, hospital beds, and other medical equipment.

#### **MLT Series.**

Features: 3/8 in diameter • Dual-wiper design Extruded wiper-block guides
MystR<sup>®</sup> plastic element • Stainless-steel shaft • Internal spring-loaded ball joint
Anodized extruded aluminum housing
Precious metal contact • Absolute continuous measurement • Infinite

resolution • Enhanced reliability • Tested up to one billion operations • Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/outdoor) NEMA 4 locations

Benefits: Fits into tight spaces, clamps easily to cylinders. Improves shock and vibration performance. Smooth, quiet motion; extends operating life. Tolerates clamping loads. Rugged construction to withstand hostile environments. Often accurate position at power up. Provides usable output at high vibration levels for long periods. Reduces error from shaft misalignment. Diameter is among the smallest available and can replace displacement transducers in many applications. Potential applications include animated characters, gauging, fluid flow meters, seismology, semiconductor processing, linear actuators, hospital beds, and other medical equipment.

#### **DR Series.**

Features: Vibration-damped element
Extended side bearing
Extruded wipercarrier guides
Rugged ribbed housing

- Precious metal wipers
   MystR<sup>®</sup> plastic elements
   High dc level output
- Enhanced performance bearings
- Absolute continuous measurement
- Infinite resolution 
   NEMA 4 sealing
- Tested up to one billion operations

• Intrinsically safe for Class I, II and III Division I, Groups A, B, C, D, E, F, and G for hazardous (indoor/outdoor) NEMA 4 locations

Benefits: No wiper bounce in high vibration environments. Improved life under high misalignment. Smooth, whisper-quiet operation under large misalignment. Rugged construction to withstand hostile environments. Provides enhanced performance, low noise, no oxidation. Works with simple controllers. Enhanced life even under side load conditions. Often accurate position at power-up. This long -lasting, rodless, sidesealed transducer may be used to replace rodded potentiometers in contaminated applications. Potential applications include injection molding machines, printing presses, meat packing equipment, drill presses, woodworking machines, cranes, front-end loaders, and scales.

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Failure to comply with these instructions could result in death or serious injury.

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