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Jameco Part Number 1846323

Sensing and Control

# Industrial Switches and Sensors



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Global switches

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Heavy duty switches

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Compact switches

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**Product solutions on the Interactive Catalogue**



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Precision switches

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Hazardous location switches

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Safety switches

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Relays

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Position products

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Ultrasonic distance sensors

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Pressure sensors

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# Inside front cover

**⚠ WARNING**

**PERSONAL INJURY**

DO NOT USE these products\* as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury.

*\* Does not apply to 24CE/924CE Series (page 23), GSS Series (page 80), GK Series (pages 78, 83, 85) or CPS Series (page 89)*

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

**⚠ WARNING**

**MISUSE OF DOCUMENTATION**

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

**Honeywell**

[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

<b>Introduction - How to use this catalogue</b>	Page 2	<b>HDLS Series</b>	Page
<b>EVN2000 Series</b>	Page	<b>Heavy Duty Limit Switches</b>	
<b>Fast Install Limit Switches</b>		Suitable for special applications in corrosive environments. Housed in a rugged die-cast zinc body and epoxy coated for protection, they are available with a range of switching and head options.	
A recent addition to our range. Saves over 50 % in installation time with a design that eliminates the need to gain access to the inside of the housing in order to connect the switch.			
<b>SZL-VL Series</b>	Page	<b>Explosion Proof Switches</b>	Page
<b>Limit Switches</b>		A range of switches designed for use in hazardous applications in potentially explosive atmospheres. Most are UL-CSA listed and some meet the requirement of the new European Directive 94/9/EC (commonly referred to as the ATEX Directive).	
New, economic, compact, rugged, dependable limit switches.			
<b>GL Series EN50041/47</b>	Page	<b>Levers for Limit Switches</b>	Page
<b>Global Limit Switches</b>		A range of levers for use with Honeywell's Limit Switches. Select the best one for your application.	
A complete range of CENELEC approved products, suitable for most industrial applications.			
<b>SL1 Series</b>	Page	<b>Safety Switches for machine guarding</b>	Page
Space saving size for machine miniaturization, different contact and actuators available.		Safety interlock switches, limit switches and cable-pull limit switches for industrial machine safety.	
<b>14/914CE Series</b>	Page	<b>Relays</b>	Page
<b>Miniature Enclosed Switches</b>		Designed for a wide range of applications including power as well as logic control for factory machines and control panels.	
Miniature, rugged, pre-wired switches, meeting the requirements of the Low Voltage directive. They come with a range of head styles and sealing options.			
<b>24/924CE Series</b>	Page	<b>Linear and Rotary Position</b>	Page
<b>Miniature Enclosed Switches</b>		A wide selection of Hall-effect, magnetoresistive, and potentiometric devices for detecting the presence of a magnetic field or linear and rotary position.	
Miniature, rugged, direct opening action contacts. This switch is available with a variety of actuators and is pre-wired.			
<b>LS Series</b>	Page	<b>Opto Sensors</b>	Page
<b>Compact Limit Switches</b>		<b>Ultrasonic Distance Sensors</b>	Page
A range of compact limit switches designed for accurate repeatability under the most stringent conditions. Special oil resistant and high temperature versions are available.		Ultrasonic position sensors for presence/absence sensing, precision distance sensing or tracking for areas where other sensing technologies have difficulty, such as clear or shiny objects, foggy or particle laden air, or splashing liquids.	
<b>BF Series</b>	Page	<b>Pressure sensors</b>	Page
<b>Medium Duty Limit Switches</b>		We offer stainless steel and silicon pressure sensors depending on the application, as well as a variety of high purity pressure sensors.	
Rugged plastic enclosure, with large internal cavity for ease of wiring.			
<b>BZE/DTE Series</b>	Page	<b>Honeywell Sensing and Control products</b>	Page
<b>Medium Duty Limit Switches</b>		<b>Index</b>	Page
Side or flange mount, momentary or maintained contact, sealed or unsealed actuators, removal of bottom enclosure for ease of wiring.			
<b>BAF/DTF Series</b>	Page		
<b>High Capacity Enclosed Switches</b>			
Rugged cast aluminium housed switches, sealed for wash-down applications. Momentary or maintained contacts, right or left hand actuators, 3 hole mounting.			

### **HONEYWELL INDUSTRIAL SWITCHES AND SENSORS**

Honeywell Industrial Switches and Sensors provide a wide selection of products and technologies for applications in most industrial applications. This catalogue contains our most popular listings. To view our complete range of products, visit our website at <http://www.honeywell.com/sensing>.

Honeywell is a worldwide leader in advanced switching and sensing technology. Our reputation for technology, quality and reliability is second to none. We have more than 60 years of experience; and extensive knowledge of Industrial applications, an extensive customer service and support network. Honeywell manufactures the original MICROSWITCH brand switch and we offer one of the most complete lines of global electro-mechanical heavy duty limit switches. Sealed versions keep out moisture and other contaminants. Explosion proof types are designed for use in hazardous locations. Safety versions provide direct opening action contacts for machine guarding and emergency stops.

We are a recognized technology leader in the development and manufacture of pressure and position-sensing transducers and controls. We use the latest in manufacturing technology to produce hundreds of thousands of transducers a year. Millions of units are currently performing in a multitude of continuous-duty applications around the world, where they typically outlast the systems they support. We have ISO 9001 certified facilities and Class 10 cleanroom capability, and we manufacture a full line of high purity pressure sensing and control products; each individually tested, inspected and certified to be in full compliance with the product specification.

A comprehensive and diverse line of speed and position sensors for the Industrial market place is also available. With the combined capabilities of three well-known product brands - Data Instruments, Clarostat, Electro and New England Instruments - Honeywell continuously strives to solve customers' application problems. Whether you need custom designed sensors for proprietary OEM applications or off-the-shelf sensor solutions, our extensive in-house design, manufacturing and environmental testing capabilities offer solutions and alternatives to meet your needs.

### ***How to use this catalogue***

For each referenced listing, key specification parameters, descriptions and mounting drawing information are presented. These illustrate our capabilities while the specifications include allow easy differentiation between similar products.

There are, of course, many more product options available. Full product specification may be accessed on our website ([www.honeywell.com/sensing](http://www.honeywell.com/sensing)). At the Home page enter the catalogue listing reference in the SEARCH box and click GO! This will take you directly to the interactive catalogue/specification search tables for this listing. Alternatively select and click the interactive catalogue icon on the Home page and then choose a product category against which to do a specification search.

Also on the website you can access installation instructions, application notes, Frequently Asked Questions (FAQs), selection guides and additional technical information.

### ***Mounting dimensions***

Mounting dimensions shown in each product section are for reference only. For exact information, request an engineering drawing from your nearest Honeywell sales office or visit our website and access it through the interactive catalogue. Where dual dimensions are shown on mounting drawings, the first or upper one is millimetres (mm) and the second or lower is inches (in). Where single dimensions are shown, they are millimetres (mm), unless otherwise stated.

### ***To order these products***

Simply contact your local Honeywell Sales Representative, your Honeywell Distributor or your local Honeywell office.

### ***If you need a product not listed in this catalogue***

One of Honeywell's strengths is in application-specific packaging of sensing technology. Honeywell provides many variations of our basic switches and sensors. For more information, either browse the full interactive catalogue available on our website, or telephone the following numbers:

USA	1-800-537-6945/1-815-537-6945		
UK	+44 (0)1698 481 481	Germany	+49 69 8064 444
France	+33 1 60 19 80 40	Italy	+39 02 92146 450/456

More information on Honeywell Sensing & Control products and how to contact us can be found on our website.



**Interactive Catalog**  
[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

### ***Select the right product – select the right supplier Delivering excellence in system critical sensing solutions***

A system is critical if the quality, reliability, delivery and customer service associated with a component part is essential to the performance of the operation or end product. If a sensor or a switch is critical to the performance, cost effectiveness, delivery or safety of a product or operation then it's systems critical. It is therefore a defining element in the performance of the system under whatever conditions apply. Failure of the component - or failure of delivery of the component - results in lost productivity, increased costs or a catastrophic event such as a shutdown. Therefore selecting the right product is essential. It can make the difference between success and failure.

### ***Honeywell Sensing and Control – delivering excellence***

To select the right product, first select the right supplier. To deliver the right products for our customers' applications we listen to them to understand their needs. Using techniques such as "Voice of the Customer and "Concept Engineering" we make sure that the products and solutions we deliver are the right ones. As part of Honeywell we can use local knowledge and understanding combined with global expertise and resources to achieve this. We can deploy many key technologies to bring innovative solutions to customers' problems.

Our products are manufactured to work well and to last. We use Six Sigma Plus productivity to ensure this is the case. We have award winning manufacturing facilities around the world and recognised world class business excellence in manufacturing and supply chain management to deliver on time, anywhere in the world.

Our e-business approach offers instant access to product information, technical support and application knowledge through out Internet site. Check out our powerful new interactive catalogue that can search and find the right products for customers' needs and deliver a drawing ready for incorporation in a CAD system direct to your desk.

And of course, we manage our whole business for the benefit of our customers, using an acknowledged world-class business excellence approach that incorporates Six Sigma principles.

### ***Expanded Product Lines***

As well as many new and innovative switches, this catalogue includes an expanded range of Pressure and Position Sensors, previously known under the Clarostat, NEI and Electrocorporation brand names.

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# Industrial Electromechanical Limit Switches

Honeywell offers an advanced line of heavy duty limit switches and a wide selection of application-proven enclosed switches (precision snap-acting switches sealed in rugged metal housing). Sealed versions keep out moisture and other contaminants. Our products meet or exceed critical standards allowing for global use. Our rugged switches are suitable for use in harsh-duty, wash-down environments. We offer a variety of circuitry, terminations and actuators to ensure that can match your choice of switch to your application.

Limit and enclosed switches are the cost effective switches of choice for detecting objects which can be touched. When an object comes in contact with an actuator, the switch operates. Rugged and dependable, these switches are offered in a variety of sizes, with different seals, enclosures, actuation, circuitries and electrical ratings. Enclosed switches are known for high precision and low cost. Limit Switches are especially rugged and well sealed. Explosion proof switches are designed for use in hazardous locations.

The Honeywell switches featured here are all proven in a broad range of Industrial applications - machine tools, packaging machinery, lifting gear, presses and construction machinery.

More information about our complete product range - and the depth of product available within each product line - can be found on our interactive catalogue at [www.honeywell.com/sensing](http://www.honeywell.com/sensing).

## ***MICRO SWITCH Brand products***

Honeywell has been at the forefront of switching technology since we were the first to develop the precision snap-action switch more than 60 years ago. Ever since we introduced the MICRO SWITCH Brand Products in 1937, we have been recognized as the performance standard that all other switches are measured against. We continue in that tradition by constantly improving the technology, cost-effectiveness, and delivery of these hardworking, versatile electromechanical switches.





## Proper application of limit switches

The following are guidelines for the correct application of Limit Switches. Never use the Limit Switch as a physical end stop. Mechanical damage or incorrect operation may occur if this is done. Always ensure that the mechanical actuator is protected from excessive mechanical shock. Never release the actuator suddenly - gradual actuation and release will ensure that stress on the mechanics of the switch is kept to a minimum. This has the added benefit that the switch life will be improved. The diagrams illustrate how to actuate your limit switch for optimum performance.

## Standards and Electrical rating

**IEC/EN 60947-1** explains the general rules relating to **Low Voltage switchgear and controlgear**. The purpose of this standard is to harmonize as much as possible the product performance and test requirements for equipment where the rated voltage does not exceed 1,000 Vac or 1,500 Vdc.

**IEC 60947-5-1** is part 5 of the general rules which relates to **Control-circuit devices and switching elements**, where rated voltage does not exceed 1,000 Vac or 600 Vdc. There are special requirements for control switches with positive opening operation. These switches are marked on the outside with this symbol:



The Contact Element form defines the configuration and number of contacts within the switch.

Form Za – both contact elements have the same polarity

Form Zb – the two contact elements are electrically separated.

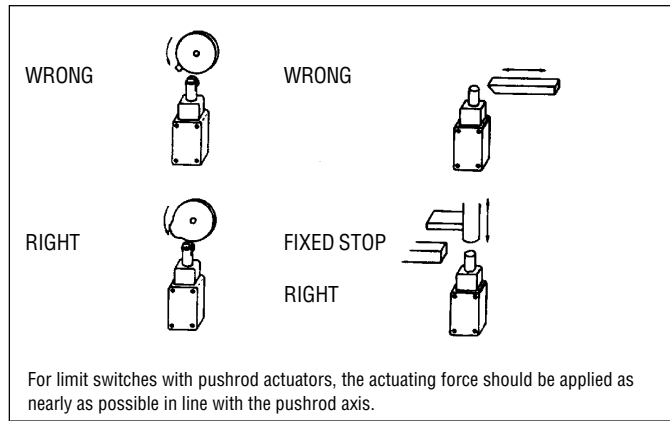
The **Utilization Category** defines the type of current carried – ac or dc – and the typical application where the switch is used.

The contact rating **Designation** relates to the Utilization Categories and defines the conventional thermal current Ith (a) rated operational current Ie (A) at rated operational voltages Ue and the VA rating.

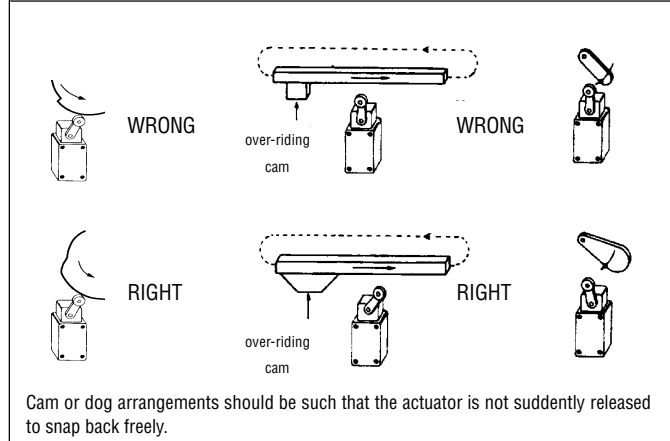
## Actuators

A range of actuators is available for limit switches. Illustrations of actuator types available from this catalogue are shown at the beginning of each product family. Other actuators may be available - for more information please contact your local Honeywell office.

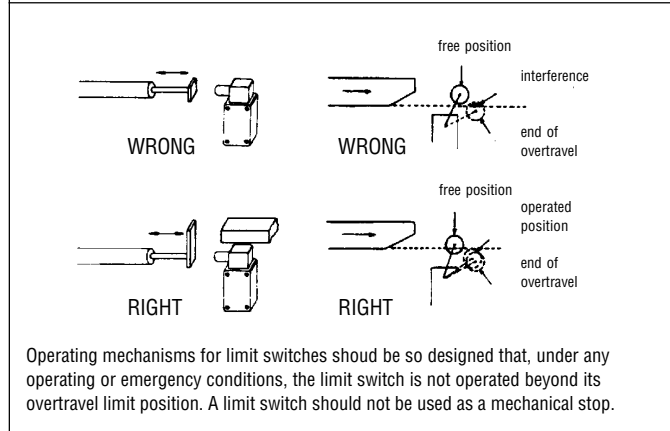
Roller lever 	Top roller lever 	Adjustable roller lever 	Top pin plunger 	Top pin plunger, boot seal 	
Top roller plunger 	Top roller plunger, boot seal 	Top roller plunger, perpendicular 	Top roller plunger, perpendicular, boot seal 	Ball bearing plunger 	
Side pin plunger 	Side roller plunger 	Roller lever 	Yoke lever 	Rod lever 	Wobble head 



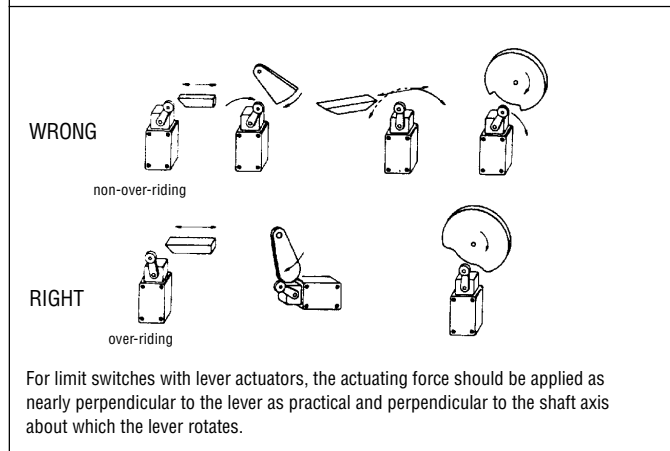
For limit switches with pushrod actuators, the actuating force should be applied as nearly as possible in line with the pushrod axis.



Cam or dog arrangements should be such that the actuator is not suddenly released to snap back freely.



Operating mechanisms for limit switches should be so designed that, under any operating or emergency conditions, the limit switch is not operated beyond its overtravel limit position. A limit switch should not be used as a mechanical stop.



For limit switches with lever actuators, the actuating force should be applied as nearly perpendicular to the lever as practical and perpendicular to the shaft axis about which the lever rotates.

## A Note on Degrees of Protection

### IP Classification

The IEC 529 standard describes a system for classifying the degree of protection provided by the enclosures of electrical equipment. The level of protection given by the enclosure is indicated by the IP code. This code system uses the letters “IP” (International Protection) followed by up to four digits. Normally only the first two digits are used.

**IP** 1st Digit    2nd Digit    3rd Digit    4th Digit

**The first digit** is numerical and indicates the level of protection within the enclosure against the ingress of solid foreign objects and access to hazardous parts by persons.

**The second digit** is also numerical and indicates the level of protection against the ingress of **WATER** into the enclosure.

**The third digit** is a letter and indicates a higher level of protection for persons against access to hazardous parts.

**The fourth digit** is also a letter and is used in exceptional cases for supplementary information.

If the first or second digit is not required to be specified, then it is replaced by the letter “X” (“XX” if both digits are not required). While the tables below serve as a guide to the level of protection, Honeywell recommends that customers refer to the full official IEC specification for the exact definitions. If in doubt about the degree of protection required for a particular application, please consult your local Honeywell office.

#### Note:

The IEC 529 standard does not relate to protection against rust, corrosion, icing or corrosive solvents (e.g. cutting fluids) and that product coded IP 67 may not necessarily meet IP 66 requirements.

#### First Digit Protection against ingress of solid objects

##### IP TEST

- 0 no protection
- 1 protected against solid objects with a diameter greater than 50 mm
- 2 protected against solid objects with a diameter greater than 12 mm
- 3 protected against solid objects with a diameter greater than 2.5 mm
- 4 protected against solid objects with a diameter greater than 1 mm
- 5 protected against dust-limited ingress (no harmful deposit)
- 6 totally protected against dust

#### Second Digit Protection against ingress of water

##### IP TEST

- 0 no protection
- 1 protected against vertically falling drops of water
- 2 protected against vertically falling drops of water when the enclosure is tilted at an angle up to 15 degrees
- 3 protected against water sprayed at an angle of 60 degrees from the vertical
- 4 protected against splashing water from all directions – limited ingress (no harmful effects)
- 5 protected against low pressure jets of water from all directions – limited ingress permitted
- 6 protected against powerful jets of water from all directions – limited ingress permitted
- 7 protected against the effects of temporary immersion in water
- 8 protected against the effects of continuous immersion in water

### NEMA Classification (USA)

NEMA (National Electrical Manufacturer’s Association) prepares standards which define a product, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, quality, electrical rating, testing and the service for which designed. This standard provides degrees of protection for Enclosures for Electrical Equipment (1000 Volts Maximum) similar to that of the IEC 529 standard. The reference standard herein reflects the latest data in the NEMA Standards Publication when this information went to print. Please check for the latest information.

#### Non-hazardous locations

**Type 1** enclosures are intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment.

**Type 3** enclosures are intended for outdoor use primarily to provide a degree of protection against windblown dust, rain, sleet, and external ice formation.

**Type 4** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, and hose-directed water.

**Type 4X** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose-directed water.

**Type 6** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth.

**Type 6P** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against the entry of water during prolonged submersion at a limited depth.

**Type 12** enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping noncorrosive liquids.

**Type 13** enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying water, oil and noncorrosive coolant.

#### Note:

Enclosures are based, in general, on the broad definitions outlined in NEMA Standards. Therefore, it will be necessary to ascertain that a particular enclosure will be adequate when exposed to the specific conditions that might exist in intended applications.

Except as might otherwise be noted, all references to products relative to NEMA enclosure type are based on Honeywell evaluation and Underwriter’s Laboratory (UL) tested. This NEMA Standards Publication does test for environmental conditions such as corrosion, rust, icing, oil, and coolants. The IEC 529 does not, and does not specify degree of protection against mechanical damage of equipment. For this reason, and because the tests and evaluations for other characteristics are not identical, the IEC Enclosure Classification Designations cannot be exactly equated with NEMA Enclosure Type Numbers.

# EVN2000 Series EN 50047 Global Limit Switches



### Actuators



The EVN2000 series limit switch is an innovative product which has been developed to address a need highlighted by Original Equipment Manufacturers (OEM), where "Ease of Wiring" is required. With the new design there is no need for access to the inside of the housing and therefore the housing cover, cover screws and gasket become obsolete. Furthermore, the integrated cable gland eliminates the need for additional conduit or cable gland hardware. All Normally Closed (NC) contacts are Direct Opening.

**Mechanical life:**

**Sealing:**

**Operating temperature:**

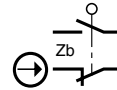
**Approvals:**

10 million  
IP 66/67, NEMA 1, 12, 13  
-25 °C to 85 °C (-13 °F to 185 °F)  
IEC/EN 60947-5-1  
EN 60529  
EN81-1  
AC15 A300  
DC13 Q300  
UL, CE  
Plastic  
Insulation Displacement Terminals (IDT)  
Single Pole, Double Throw,  
Snap action contacts (1NC/1NO)

**Housing material:**

**Termination:**

**Switching options:** SPDT

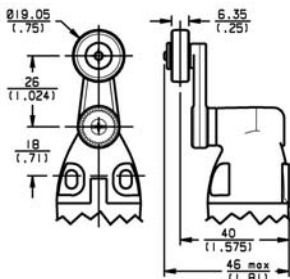


### Operating characteristics

Actuator type	Operating torque/force (OF)	Free position (FP)	Pretravel (PT)	Travel to positive opening (PO)	Overtravel (OT)	Differential travel (DT)	Operating point (OP)
Side rotary <b>A</b>	0,120 N m (1.10 lb in)	0°	25°	45°	45°	12°	25°
Top pin plunger <b>B</b>	16,0 N (3.60 lb)	20,0 mm (0.79 in)	2,0 mm (0.08 in)	3,5 mm (0.14 in)	4,0 mm (0.16 in)	1,0 mm (0.04 in)	18,0 mm (0.71 in)
Top roller plunger, parallel <b>C</b>	16,0 N (3.60 lb)	30,0 mm (1.18 in)	2,0 mm (0.08 in)	3,5 mm (0.14 in)	4,0 mm (0.16 in)	1,0 mm (0.04 in)	28,0 mm (1.10 in)
Top roller plunger, perpendicular <b>D</b>	16,0 N (3.60 lb)	30,0 mm (1.18 in)	2,0 mm (0.08 in)	3,5 mm (0.14 in)	4,0 mm (0.16 in)	1,0 mm (0.04 in)	28,0 mm (1.10 in)

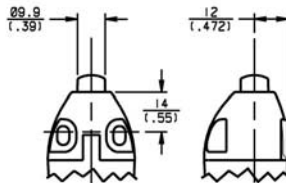
### OPTIONS

#### Side rotary plastic roller



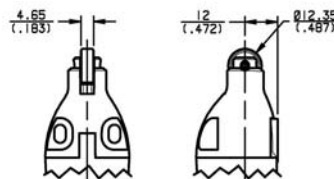
REFERENCE  
EVN2000A

#### Top pin plunger



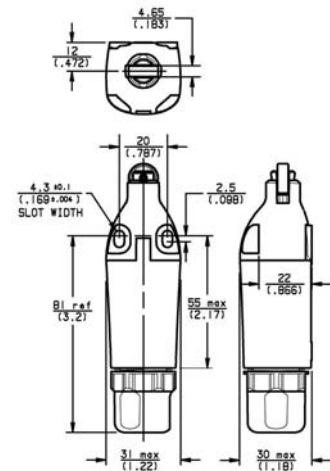
REFERENCE  
EVN2000B

#### Top roller plunger, perpendicular



REFERENCE  
EVN2000D

#### Top roller plunger, parallel



REFERENCE  
EVN2000C

# VL Series General Purpose Compact Limit Switches

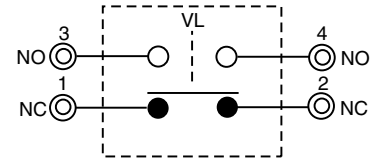


### Actuators



The new economical SZL-VL Series miniature type limit switches are specially designed for applications of small mounting space. These miniature switches are ideal for OEM machinery which requires a rugged and reliable limit switch that is capable of being mounted in space restricted applications. A wide range of actuators and optional neon lamp indicators add additional flexibility. A special pre-molded flexible cable gland allows for fast and simple wiring termination.

<b>Mechanical life:</b>	up to 10 million operations
<b>Sealing:</b>	IP 64
<b>Operating temperature:</b>	-20 °C to 60 °C (-4 °F to 140 °F)
<b>Approvals:</b>	UL, C-UL, CE
<b>Termination:</b>	Cable gland
<b>Contacts:</b>	Gold plated silver
<b>Electrical ratings:</b>	250 Vac 125 Vdc max.
<b>Ampere rating:</b>	5 A @ 250 Vac max./0.4 A @ 125 Vdc max.
<b>Switching options:</b>	Single Pole, Double Throw, Double break (1NC/1NO)

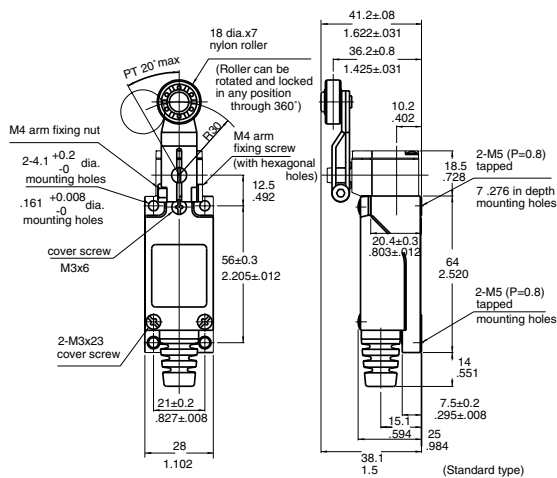


## Side rotary actuated switches

<b>Pretravel max. (PT):</b>	20°
<b>Overtravel min. (OT):</b>	75°
<b>Differential travel max. (DT):</b>	10°

### OPTIONS

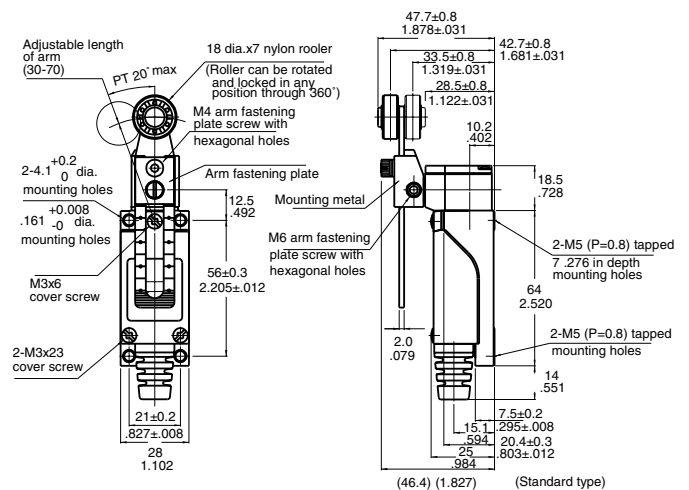
#### Roller lever



Operating torque max.: 5,88 N (1.32 lb)

REFERENCE  
SZL-VL-A

#### Roller lever, adjustable

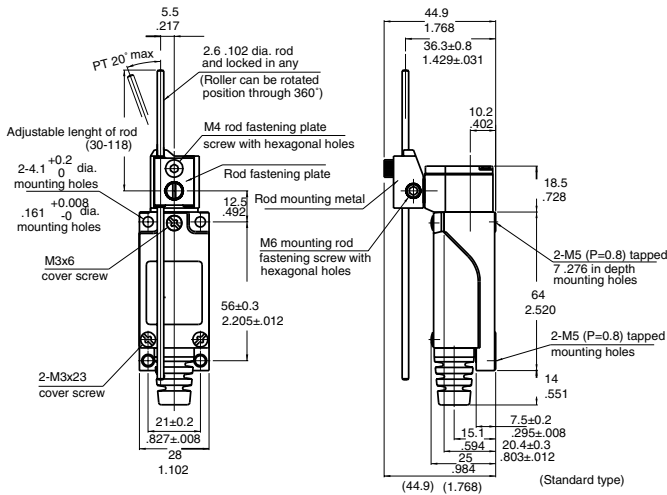


Operating torque max.: 3,35 N to 7,84 N (0.75 lb to 1.76 lb)

REFERENCE  
SZL-VL-B

**VL Series**  
**Side rotary actuated switches (continued)**

*Adjustable rod*



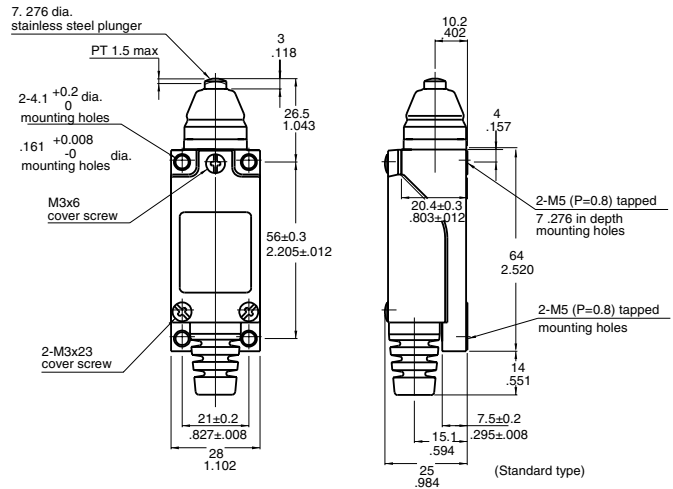
**Operating torque max.:** 2 N to 7,84 N  
 (0.45 lb to 1.76 lb)

**REFERENCE**  
 SZL-VL-C

**Plunger actuated switches**

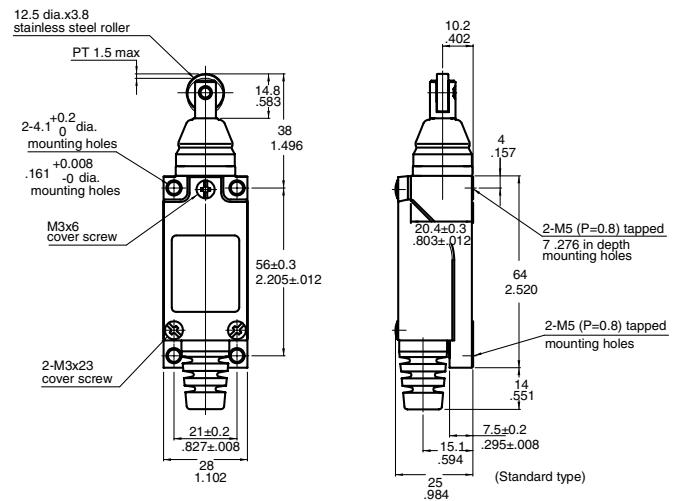
**Pretravel max. (PT):** 1,5 mm (0.060 in)  
**Overtravel min. (OT):** 4,0 mm (0.158 in)  
**Differential travel max. (DT):** 0,7 mm (0.028 in)  
**Operating force max. (OF):** 8,83 N (2 lb)

*Top pin plunger*



**REFERENCE**  
 SZL-VL-D

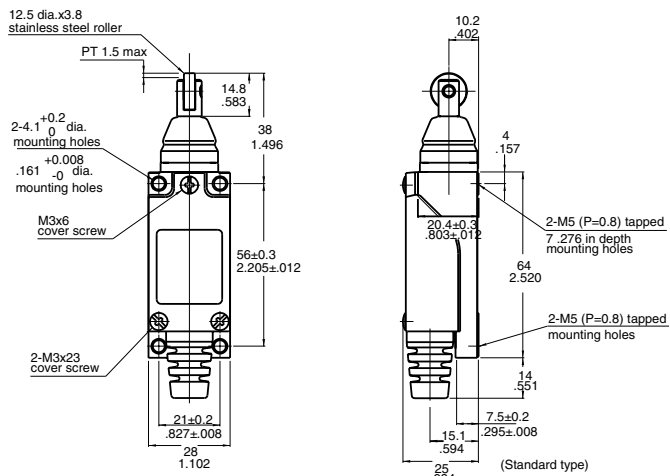
*Top roller plunger*



**REFERENCE**  
 SZL-VL-H

## Plunger actuated switches (continued)

### Cross roller plunger

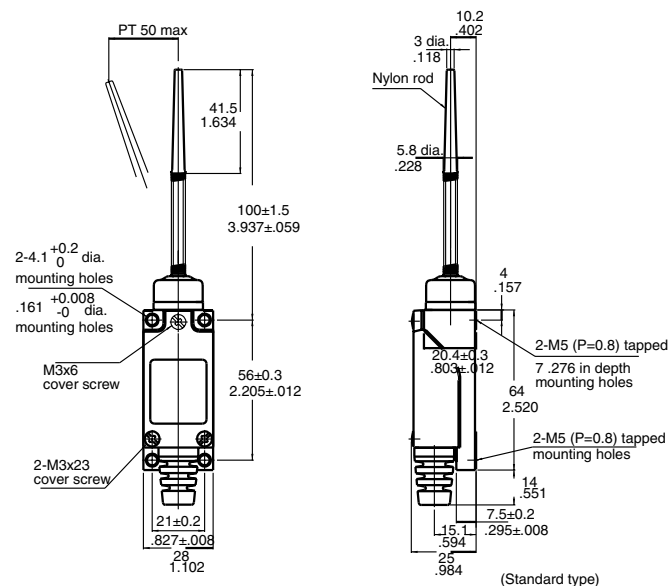


REFERENCE  
SZL-VL-E

## Wobble actuated switches

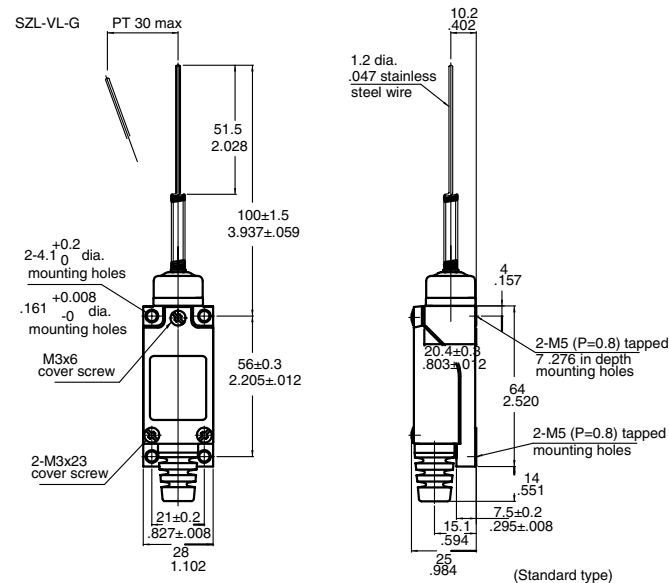
Pretravel max. (PT): 30 mm (1.18 in)  
 Overtravel min. (OT): 20 mm (0.788 in)  
 Operating force max. (OF): 0,88 N (0.2 lb)

### Plastic rod, coil spring



REFERENCE  
SZL-VL-F

### Coil spring



REFERENCE  
SZL-VL-G

# GLS Series Global Limit Switches



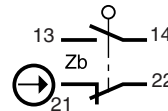
GLS Series switches offer a complete range of CENELEC approved products, and are suitable for most industrial applications.

The standard product EN 50041 norm defines the switch mounting centres as 30 mm x 60 mm and also defines the switching characteristics of the side rotary head with fixed lever, top pin plunger and top roller plunger. This means that the switch can be interchanged in the application with other EN 50041 switches with mounting and switching characteristics maintained. Honeywell offers many more head styles and switching options.

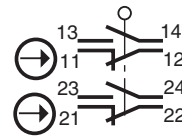
The miniature EN 50047 product range offers the user a choice of plastic, metal and three conduit versions which are all mounting (20 mm x 22 mm) compatible with each other. The EN 50047 standard defines how the switches are mounted and the switching characteristics for fixed side rotary lever, top pin plunger and top roller plunger.

**Switching options:**

SPDT Single Pole, Double Throw, Snap action contacts (1NC/1NO)



DPDT Double Pole, Double Throw Snap action contacts (2NC/2NO)



**Electrical ratings**

IEC947-5-1/EN60947-5-1									
Designation & Utilization Category		Rated operational current Ie (A) at rated operational voltage Ue						VA rating	
		120V	240V	380V	480V	500V	600V	Make	Break
AC15	A600	6	3	1.9	1.5	1.4	1.2	7200	720
AC15	A300	6	3	-	-	-	-	7200	720
AC15	B300	3	1.5	-	-	-	-	3600	360
AC14	D300	0.6	0.3	-	-	-	-	432	72
		125V	250V						
DC13	Q300	0.55	0.27						
DC13	R300	0.22	0.1						

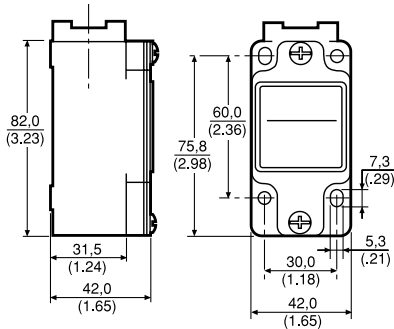
**Operating characteristics**

Actuator type	Body size	Operating torque/force (OF)		Free position (FP)		Pretravel (PT)		Travel to positive opening (PO)		Overtravel (OT)		Differential travel (DT)		Operating point (OP)	
		SPDT	DPDT	SPDT	DPDT	SPDT	DPDT	SPDT	DPDT	SPDT	DPDT	SPDT	DPDT	SPDT	DPDT
Lever types A, A*A, A*B, A4J	EN50041 (GLA)	0,330 N m (2.90 lb in)		0°		26°		55°		59°		12°		26°	
	EN50047 (GLC, GLD, GLE)	0,120 N m (1.10 lb in)	0,165 N m (1.50 lb in) GLE only							49°		11.5° 8°			
Top pin plunger B	EN50041 (GLA)	16,0 N (3.60 lb)		37,5 mm (1.48 in)		2,5 mm (0.10 in)		4,5 mm (0.18 in)		4,5 mm (0.18 in)		0,9 mm (0.035 in)		35,0 mm (1.38 in)	
	EN50047 (GLC, GLD, GLE)	16,0 N (3.60 lb)	13,0 N (2.90 lb) GLE only	21,0 mm (0.83 in)		3,0 mm (0.12 in)		5,0 mm (0.20 in)		3,0 mm (0.12 in)		0,9 mm (0.035 in) 0,6 mm (0.024 in)		18,0 mm (0.71 in)	
Top roller plunger C	EN50041 (GLA)	16,0 N 3.60 lb		50,5 mm (2.00 in)		2,5 mm (0.10 in)		4,5 mm (0.18 in)		4,5 mm (0.18 in)		0,9 mm (0.035 in)		48,0 mm (1.89 in)	
	EN50047 (GLC, GLD, GLE)	16,0 N (3.60 lb)	13,0 N (2.90 lb) GLE only	31,0 mm (1.22 in)		3,0 mm (0.12 in)		5,0 mm (0.20 in)		3,0 mm (0.12 in)		0,9 mm (0.035 in) 0,6 mm (0.024 in)		28,0 mm (1.10 in)	
Top roller lever D	EN50041 (GLA)	9,5 N (2.10 lb)		65,2 mm (2.57 in)		4,2 mm (0.165 in)		8,3 mm (0.33 in)		9,0 mm (0.35 in)		1,7 mm (0.067 in)		61,0 mm (2.40 in)	
	EN50047 (GLC, GLD, GLE)	11,0 N (2.4 lb)	9,0 N (1.9 lb) GLE only	39,25 mm (1.55 in)		3,45 mm (0.14 in)		6,9 mm (0.27 in)		5,2 mm (0.205 in)		1,3 mm (0.19 in)		35,8 mm (1.41 in)	
Wobble head E7B, E7D, K8B, K8C	EN50041 (GLA)	0,1 N (0.90 in lb)		0°		18°		—		—		8°		—	
	EN50047 (GLC, GLD, GLE)	1,3 N (0.29 lb)	1,1 N (0.25 lb) GLE only			16°		—		—		10° 7°		—	

**Actuators**

# GLA EN 50041

## Standard metal body

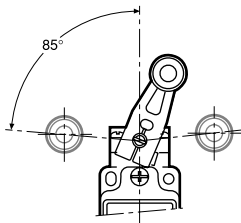


**Mechanical life:** up to 15 million  
**Sealing:** IP 67, NEMA 1, 4, 12, 13  
**Operating temperature:** -25 °C to 85 °C (-13 °F to 185 °F)  
**Approvals:** IEC/EN 60947-5-1, AC15 A300/A600, DC13 Q300, UL, CSA, CE

**Switching options:**  
 SPDT Single Pole, Double Throw  
 DPDT Snap action contacts (1NC/1NO)  
 DPDT Double Pole, Double Throw  
 DPDT Snap action contacts (2NC/2NO)

### HEAD OPTIONS

#### Side rotary



#### No lever

**Levers:** Levers for side rotary types are ordered separately (see pages 69-71 for details)

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01A
DPDT	½ in NPT	GLAA20A
SPDT	PG 13,5	GLAB01A

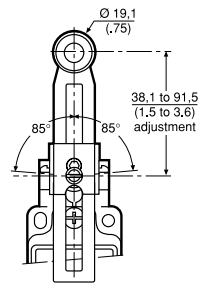
#### Plastic roller

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01A1A
DPDT	½ in NPT	GLAA20A1A
SPDT	PG 13,5	GLAB01A1A
DPDT	PG 13,5	GLAB20A1A
SPDT	20 mm	GLAC01A1A
DPDT	20 mm	GLAC20A1A

#### Metal roller

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01A1B
DPDT	½ in NPT	GLAA20A1B
SPDT	PG 13,5	GLAB01A1B
DPDT	PG 13,5	GLAB20A1B
SPDT	20 mm	GLAC01A1B
DPDT	20 mm	GLAC20A1B

#### Side rotary adjustable roller



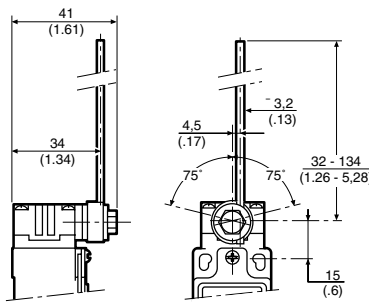
#### Plastic roller

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01A2A
DPDT	½ in NPT	GLAA20A2A
SPDT	PG 13,5	GLAB01A2A
DPDT	PG 13,5	GLAB20A2A
SPDT	20 mm	GLAC01A2A

#### Metal roller

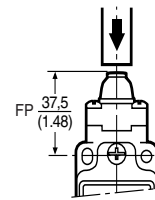
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01A2B
DPDT	½ in NPT	GLAA20A2B
SPDT	PG 13,5	GLAB01A2B
DPDT	PG 13,5	GLAB20A2B
SPDT	20 mm	GLAC01A2B
DPDT	20 mm	GLAC20A2B

#### Side rotary adjustable metal rod



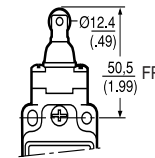
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01A4J
DPDT	½ in NPT	GLAA20A4J
SPDT	PG 13,5	GLAB01A4J
DPDT	PG 13,5	GLAB20A4J
SPDT	20 mm	GLAC01A4J

#### Top pin plunger



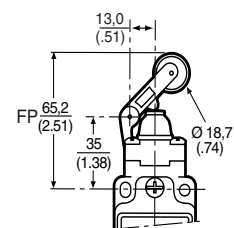
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01B
DPDT	½ in NPT	GLAA20B
SPDT	PG 13,5	GLAB01B
DPDT	PG 13,5	GLAB20B
SPDT	20 mm	GLAC01B
DPDT	20 mm	GLAC20B

#### Top roller plunger



CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01C
DPDT	½ in NPT	GLAA20C
SPDT	PG 13,5	GLAB01C
DPDT	PG 13,5	GLAB20C
SPDT	20 mm	GLAC01C
DPDT	20 mm	GLAC20C

#### Top roller lever

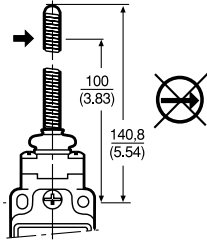


CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01D
DPDT	½ in NPT	GLAA20D
SPDT	PG 13,5	GLAB01D
DPDT	PG 13,5	GLAB20D
SPDT	20 mm	GLAC01D
DPDT	20 mm	GLAC20D



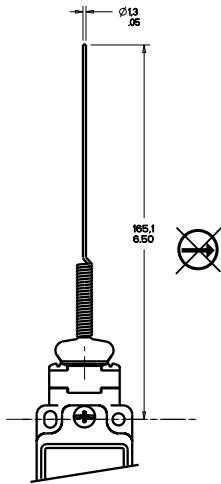
**GLA EN 50041**  
Standard metal body  
(continued)

*Wobble, coil actuator*



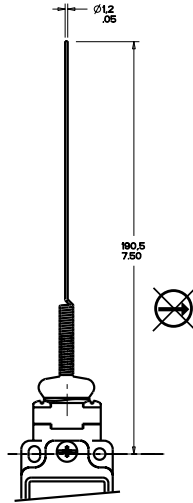
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01E7B
SPDT	PG 13,5	GLAB01E7B
DPDT	PG 13,5	GLAB20E7B
SPDT	20 mm	GLAC01E7B
DPDT	20 mm	GLAC20E7B

*Coil wobble head, stainless steel spring actuator*



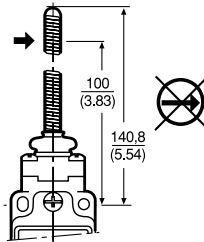
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01E7D

*Wobble, cat whisker*



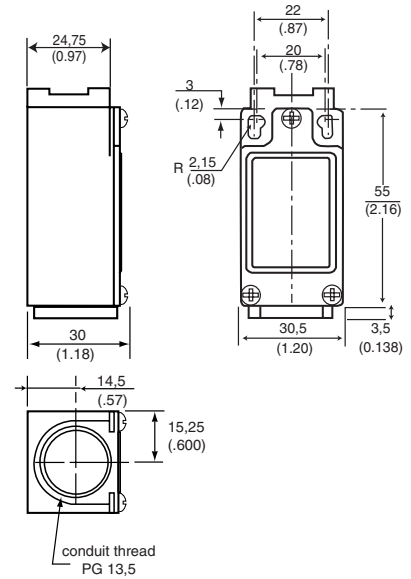
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01K8B
SPDT	PG 13,5	GLAB01K8B

*Wobble, cat whisker, coil actuator*



CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLAA01K8C
DPDT	½ in NPT	GLAA20K8C
SPDT	PG 13,5	GLAB01K8C

**GLC EN 50047**  
Standard metal body

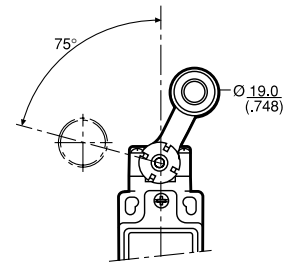


**Mechanical life:** up to 10 million  
**Sealing:** IP 66, NEMA 1, 4, 12, 13  
**Operating temperature:** -25 °C to 85 °C  
 -13 °F to 185 °F  
**Approvals:** IEC/EN 60947-5-1  
 AC15 A300  
 DC13 Q300  
 UL, CSA, CE

**Switching options:**  
 SPDT Single Pole, Double Throw  
 Snap action contacts (1NC/1NO)

**HEAD OPTIONS**

*Side rotary*



*Plastic roller*

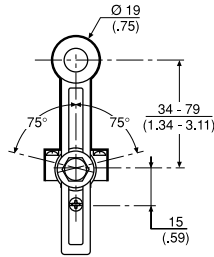
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01A1A
SPDT	PG 13,5	GLCB01A1A

*Metal roller*

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01A1B
SPDT	PG 13,5	GLCB01A1B
SPDT	20 mm	GLCC01A1B

**GLC EN 50047**  
**Standard metal body**  
**(continued)**

*Side rotary adjustable*



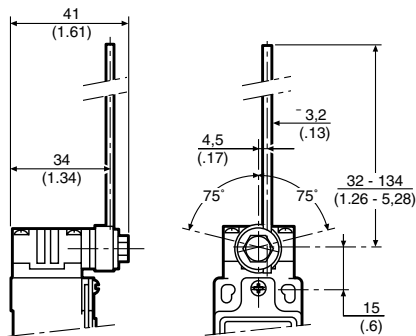
**Plastic roller**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01A2A
SPDT	PG 13.5	GLCB01A2A

**Metal roller**

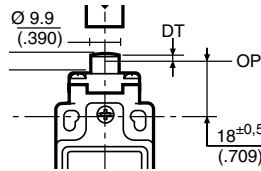
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01A2B
SPDT	PG 13.5	GLCB01A2B
SPDT	20 mm	GLCC01A2B

*Side rotary adjustable, metal rod*



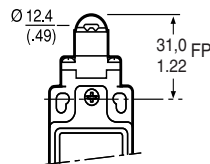
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01A4J
SPDT	PG 13.5	GLCB01A4J

*Top pin plunger*



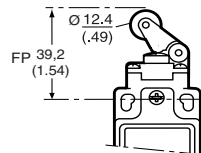
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01B
SPDT	PG 13.5	GLCB01B
SPDT	20 mm	GLCC01B

*Top roller plunger*



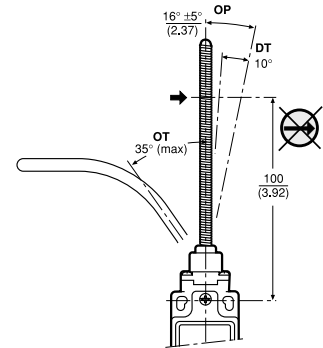
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01C
SPDT	PG 13.5	GLCB01C
SPDT	20 mm	GLCC01C

*Top roller lever*



CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01D
SPDT	PG 13.5	GLCB01D
SPDT	20 mm	GLCC01D

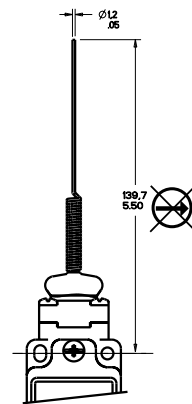
*Wobble, coil actuator*



**Mechanical life:** up to 5 million

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01E7B
SPDT	PG 13.5	GLCB01E7B
SPDT	20 mm	GLCC01E7B

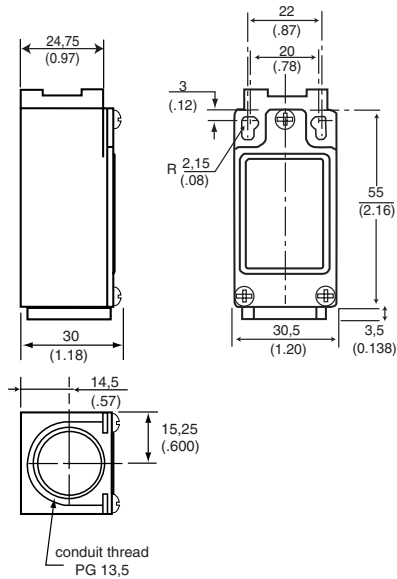
*Wobble, cat whisker*



**Mechanical life:** 5 million

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLCA01K8A
SPDT	PG 13.5	GLCB01K8A

**GLD EN 50047**  
**Double insulated**  
**standard body**



**Mechanical life:** See GLC section  
**Sealing:** IP 66, NEMA 1, 2, 13  
**Operating temperature:** -25 °C to 85 °C  
 -13 °F to 185 °F  
**Approvals:** IEC/EN 60947-5-1  
 AC15 A600  
 DC13 Q300  
 UL, CSA, CE

**Switching options:**  
 SPDT Single Pole, Double Throw  
 Snap action contacts (1NC/1NO)

**HEAD OPTIONS**

See GLC section for dimension illustrations

**Side rotary**

**Plastic roller/lever**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01A1A
SPDT	PG 13,5	GLDB01A1A

**Metal roller/lever**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01A1B
SPDT	PG 13,5	GLDB01A1B
SPDT	20 mm	GLDC01A1B

**Side rotary adjustable**

**Plastic roller/metal lever**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01A2A
SPDT	PG 13,5	GLDB01A2A

**Metal roller/metal lever**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01A2B
SPDT	PG 13,5	GLDB01A2B
SPDT	20 mm	GLDC01A2B

**Side rotary adjustable metal rod**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01A4J
SPDT	PG 13,5	GLDB01A4J

**Top pin plunger**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01B
SPDT	PG 13,5	GLDB01B
SPDT	20 mm	GLDC01B

**Top roller plunger**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01C
SPDT	PG 13,5	GLDB01C
SPDT	20 mm	GLDC01C

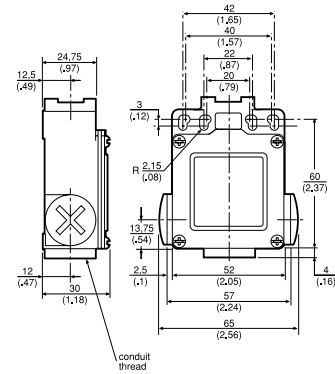
**Top roller lever**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01D
SPDT	PG 13,5	GLDB01D
SPDT	20 mm	GLDC01D

**Wobble, coil actuator**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLDA01E7B
SPDT	PG 13,5	GLDB01E7B
SPDT	20 mm	GLDC01E7B

**GLE EN 50047 Compatible**  
**3 conduit**  
**metal standard body**

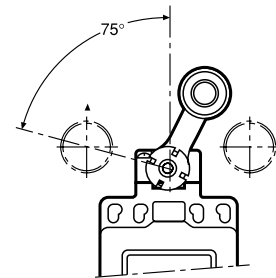


**Mechanical life:** up to 10 million  
**Sealing:** IP 66, NEMA 1, 4, 12, 13  
**Operating temperature:** -25 °C to 85 °C  
 -13 °F to 185 °F  
**Approvals:** IEC/EN 60947-5-1  
 AC15 A300  
 DC13 Q300  
 UL, CSA, CE

**Switching options:**  
 SPDT Single Pole, Double Throw  
 Snap action contacts (1NC/1NO)  
 DPDT Double Pole, Double Throw  
 Snap action contacts (2NC/2NO)

**HEAD OPTIONS**

**Side rotary**



**Plastic roller**

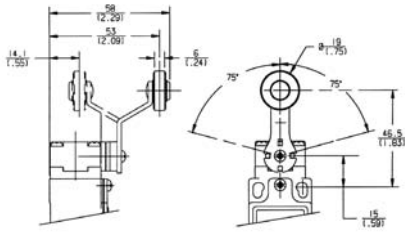
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01A1A
SPDT	PG 13,5	GLEB01A1A
DPDT	PG 13,5	GLEB24A1A

**Metal roller**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01A1B
DPDT	½ in NPT	GLEA24A1B
SPDT	PG 13,5	GLEB01A1B
DPDT	PG 13,5	GLEB24A1B
SPDT	20 mm	GLEC01A1B

**GLE EN 50047 Compatible**  
**3 conduit**  
**metal standard body**  
**(continued)**

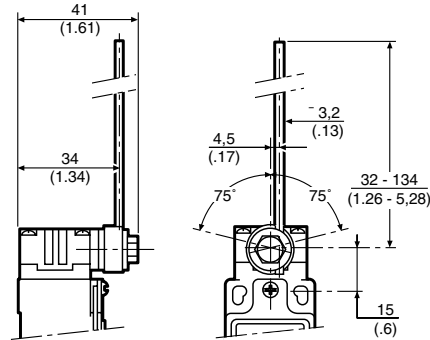
*Offset side rotary roller*



**Plastic roller**

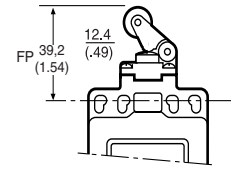
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01A5A
SPDT	PG 13,5	GLEB01A5A

*Side rotary adjustable metal rod*



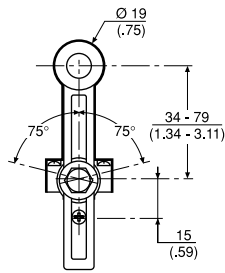
CONTACT	CONDUIT	REFERENCE
SPDT	PG 13,5	GLEB01A4J
DPDT	PG 13,5	GLEB24A4J

*Top roller lever*



CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01D
DPDT	½ in NPT	GLEA24D
SPDT	PG 13,5	GLEB01D
DPDT	13,5	GLEB24D
SPDT	20 mm	GLEC01D
DPDT	20 mm	GLEC24D

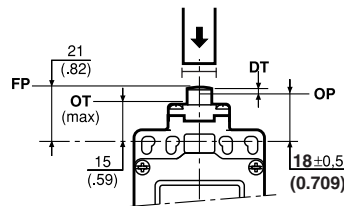
*Side rotary adjustable*



**Plastic roller**

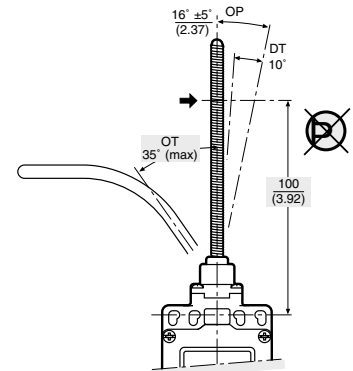
CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01A2A
DPDT	½ in NPT	GLEA24A2A
SPDT	PG 13,5	GLEB01A2A

*Top pin plunger*



CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01B
DPDT	½ in NPT	GLEA24B
SPDT	PG 13,5	GLEB01B
DPDT	PG 13,5	GLEB24B

*Wobble, coil actuator*



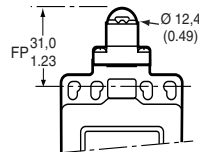
**Mechanical life:** up to 5 million

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01E7B
DPDT	½ in NPT	GLEA24E7B
SPDT	PG 13,5	GLEB01E7B
DPDT	PG 13,5	GLEB24E7B

**Metal roller**

CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01A2B
SPDT	PG 13,5	GLEB01A2B
DPDT	PG 13,5	GLEB24A2B

*Top roller plunger*



CONTACT	CONDUIT	REFERENCE
SPDT	½ in NPT	GLEA01C
DPDT	½ in NPT	GLEA24C
SPDT	PG 13,5	GLEB01C
DPDT	PG 13,5	GLEB24C
DPDT	20 mm	GLEC24C

# SL1 Series Compact Limit Switches

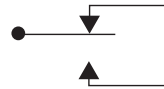


The SL1 Series compact limit switches are sealed, sensitive and have a long life. The compact size makes them suitable for the total miniaturization of machinery or equipment.

<b>Mechanical life:</b>	10 million
<b>Sealing:</b>	IP 67, NEMA 3, 4, 13
<b>Operating temperature:</b>	-10 °C to 70 °C (14 °F to 160 °F)
<b>Approvals:</b>	UL, CSA, CE
<b>Termination:</b>	Cable gland
<b>Operating force max. (OF):</b>	11,76 N (2.64 lb)
<b>Pretravel max. (PT):</b>	1,5 mm (0.060 in)
<b>Overtravel min. (OT):</b>	3,0 mm (0.118 in)
<b>Differential travel max. (DT):</b>	0,10 mm (0.004 in)
<b>Electrical rating/contact:</b>	5A - 125, 250 Vac 0.1 A - 125 Vac; 0.1 A - 30 Vdc
	Silver Gold clad cross point

**Switching options:**  
SPDT

Single Pole, Double Throw,  
Snap action contacts (1NC/1NO)

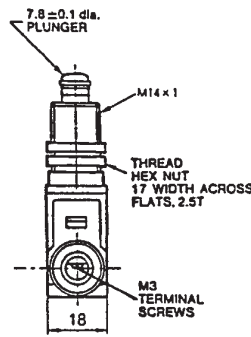
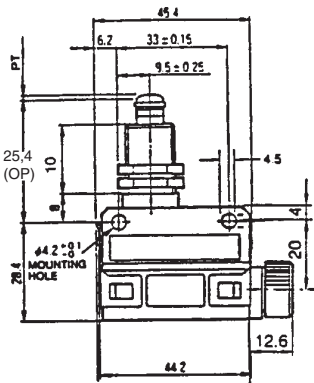


## Actuators



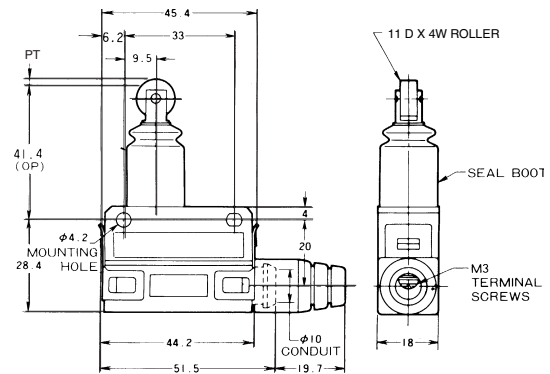
## OPTIONS

### Top pin plunger



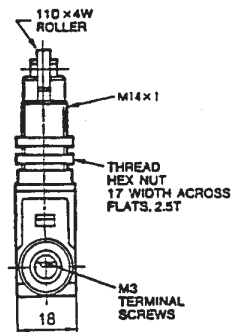
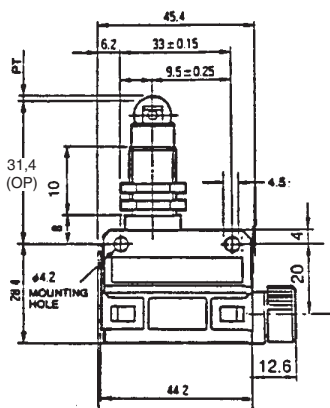
<b>CONTACT</b>	<b>REFERENCE</b>
Silver	SL1-H
Gold clad cross point	SL1-HK

### Top roller plunger, parallel, boot seal



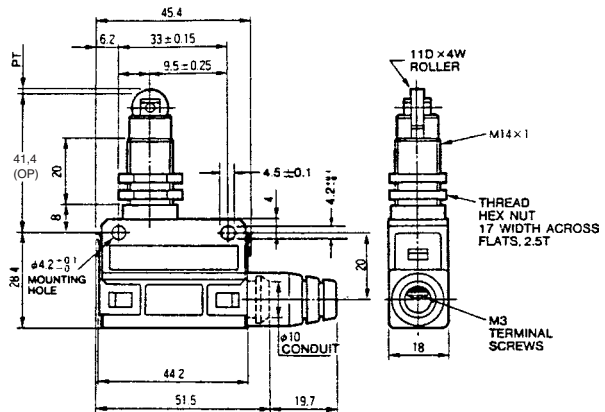
<b>CONTACT</b>	<b>REFERENCE</b>
Silver	SL1-B
Gold clad cross point	SL1-BK

### Top roller plunger, parallel



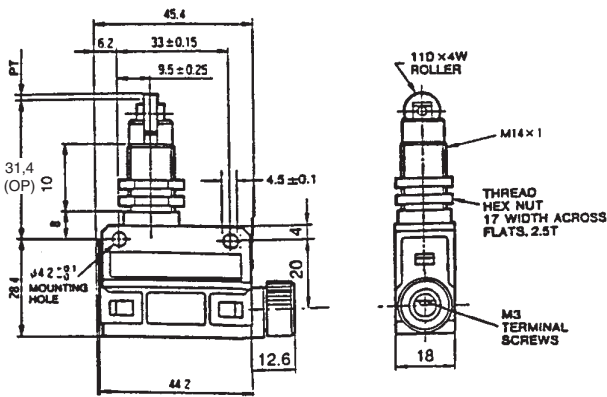
<b>CONTACT</b>	<b>REFERENCE</b>
Silver	SL1-A
Gold clad cross point	SL1-AK

### Top roller plunger, long, parallel



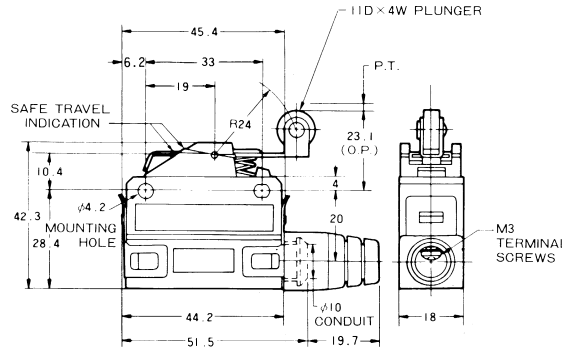
<b>CONTACT</b>	<b>REFERENCE</b>
Silver	SL1-E
Gold clad cross point	SL1-EK

**Top roller plunger, perpendicular**



CONTACT	REFERENCE
Silver	SL1-D
Gold clad cross point	SL1-DK

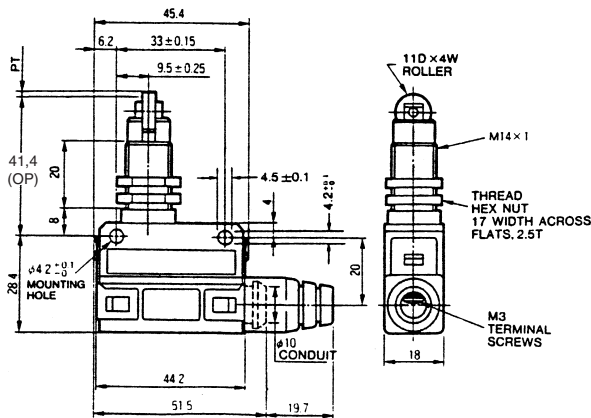
**Top roller lever**



<b>Operating force max. (OF):</b>	3,92 N (0.88 lb)
<b>Pretravel max. (PT):</b>	2,0 mm (0.079 in)
<b>Overtravel min. (OT):</b>	4,0 mm (0.158 in)
<b>Differential travel max. (DT):</b>	0,3 mm (0.012 in)

CONTACT	REFERENCE
Silver	SL1-P
Gold clad cross point	SL1-PK

**Top roller plunger, long, perpendicular**



CONTACT	REFERENCE
Silver	SL1-K
Gold clad cross point	SL1-KK

# 14CE/914CE Series Miniature Enclosed Switches



### Actuators



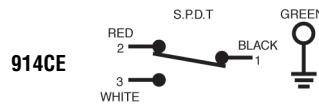
The 14CE/914CE Series offers a miniature, rugged, compact, pre-wired switch which has proved itself successful and gained wide market acceptance. The entire range of 14CE and 914CE switches has been approved to meet the requirements of the Low Voltage directive and is therefore CE marked.

CE switches have different degrees of protection from IP66 to IP68 for the fully booted head styles. The cable entry is fully potted using a special compound to ensure that ingress is virtually impossible.

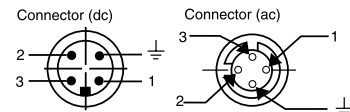
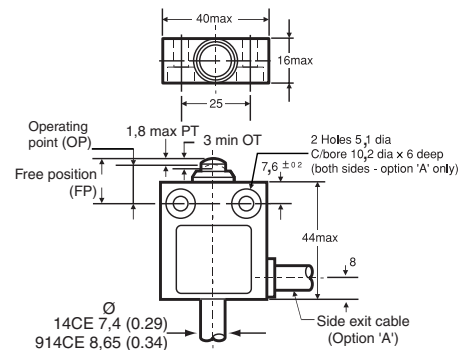
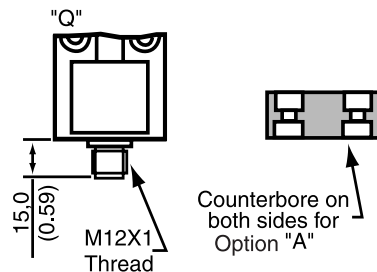
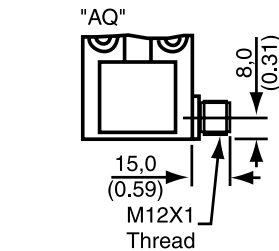
<b>Mechanical life:</b>		10 million
<b>Sealing:</b>		IP66, IP67, IP68
<b>Operating temperature:</b>	14CE	NEMA 1, 2, 3, 3R, 4, 6, 6P, 12 (boot seal), 13
	914CE	0 °C to 70 °C (32 °F to 158 °F)
<b>Approvals:</b>	14CE	0 °C to 105 °C (32 °F to 221 °F)
	914CE	CE
		CSA, UL, CE
<b>Operating force (OF):</b>		11,8 N (2,65 lb) max.
<b>Pretravel (PT):</b>		1,8 mm (0,71 in) max.
<b>Overtravel (OT):</b>		3,0 mm (0,118 in) min.
<b>Differential travel (DT):</b>		0,1mm (0,004 in) max.
<b>Contact/Rating:</b>	(9)14CE* -*	Silver A
	(9)14CE* -*G	Gold B
	(9)14CE* -Q, -AQ, -AQ1	Silver C

<b>Connection:</b>		Harmonised CENELEC 4 x 0,75 mm <sup>2</sup> cable (14CE)
		SJTO 4 x 0,75 mm <sup>2</sup> (18 AWG) cable (914CE)
		Connector (dc), 4 pin male, M12 thread (-Q)
		Connector (ac), 4 pin male, ½ in x 20 thread (-Q1)
		Single Pole, Double Throw
		Snap action contacts (1NC/1NO)

**Switching options:** SPDT



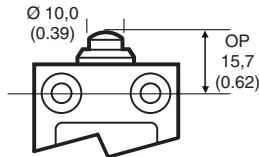
		Amps	
		Make	Break
A	240 Vac, ind.	1,2	0,2
	240 Vac, res.	5	5
	28 Vdc, res.	3	3
	28 Vdc, ind.	3	3
UL/CSA:		5 A, 1/10 Hp, 125 or 250 Vac	
B	UL:	1 A res., 0,5 A ind., 30 Vdc	
		1 A, 125 Vac	
C	UL/CSA:	3 A, 125 or 250 Vac	



# Plunger actuated switches

## OPTIONS

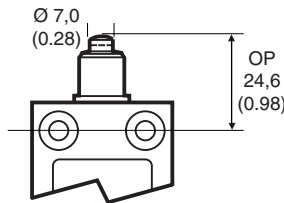
### Top pin plunger



NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE1-3
3 ft cable, side exit	914CE1-3A
3 ft cable, bottom exit, gold contacts	914CE1-3G
6 ft cable, bottom exit	914CE1-6
6 ft cable, bottom exit, gold contacts	914CE1-6G
9 ft cable, bottom exit	914CE1-9
Connector (dc), bottom exit	914CE1-Q
Connector (ac), bottom exit	914CE1-Q1

EUROPE	REFERENCE
1 metre cable, bottom exit	14CE1-1
1 metre cable, side exit	14CE1-1A
1 metre cable, bottom exit, gold contacts	14CE1-1G
2 metre cable, bottom exit	14CE1-2
3 metre cable, bottom exit	14CE1-3
3 metre cable, side exit	14CE1-3A
3 metre cable, bottom exit, gold contacts	14CE1-3G
Connector (dc), side exit	14CE1-AQ
Connector (dc), bottom exit	14CE1-Q

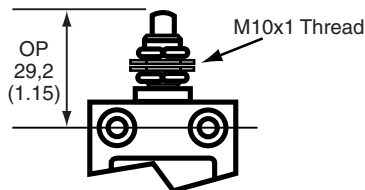
### Top pin plunger, boot seal



NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE18-3
3 ft cable, side exit	914CE18-3A
6 ft cable, bottom exit	914CE18-6
9 ft cable, bottom exit	914CE18-9
9 ft cable, side exit	914CE18-9A
Connector (ac), side exit	914CE18-AQ1
Connector (dc), bottom exit	914CE18-Q
Connector (ac), bottom exit	914CE18-Q1

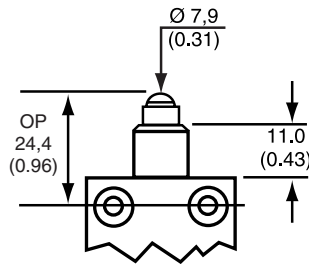
EUROPE	REFERENCE
1 metre cable, bottom exit	14CE18-1
3 metre cable, bottom exit	14CE18-3
Connector (dc), bottom exit	14CE18-Q

### Top pin plunger, panel mounted



NORTH AMERICA/GLOBAL	REFERENCE
Connector (dc), bottom exit	914CE27-Q

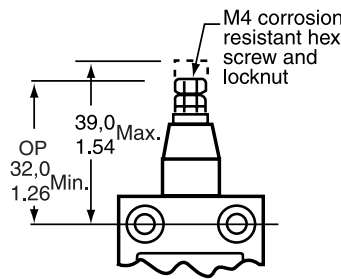
### Ball bearing plunger



NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE66-3
6 ft cable, bottom exit	914CE66-6

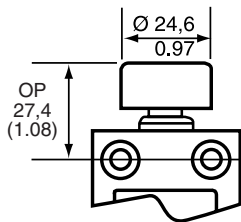
EUROPE/	REFERENCE
1 metre cable, bottom exit	14CE66-1
2 metre cable, bottom exit	14CE66-2

### Adjustable plunger



NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE19-3
9 ft cable, bottom exit	914CE19-9

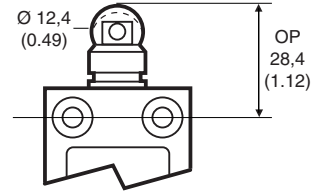
### Manually operated



Operating force (OF): 9,0 N (2.02 lb)

NORTH AMERICA/GLOBAL	REFERENCE
6 ft cable, bottom exit	914CE22-6

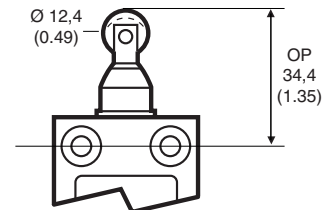
### Top roller plunger, parallel



NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE2-3
3 ft cable, side exit	914CE2-3A
3 ft cable, bottom exit, gold contacts	914CE2-3G
6 ft cable, bottom exit	914CE2-6
6 ft cable, side exit	914CE2-6A
9 ft cable, bottom exit	914CE2-9
Connector (dc), side exit	914CE2-AQ
Connector (dc), bottom exit	914CE2-Q
Connector (ac), bottom exit	914CE2-Q1

EUROPE	REFERENCE
1 metre cable, bottom exit	14CE2-1
1 metre cable, side exit	14CE2-1A
1 metre cable, bottom exit, gold contacts	14CE2-1G
2 metre cable, bottom exit	14CE2-2
2 metre cable, side exit	14CE2-2A
3 metre cable, bottom exit	14CE2-3
3 metre cable, side exit	14CE2-3A
3 metre cable, bottom exit, gold contacts	14CE2-3G
Connector (dc), side exit	14CE2-AQ
Connector (dc), bottom exit	14CE2-Q

### Top roller plunger, parallel, boot seal

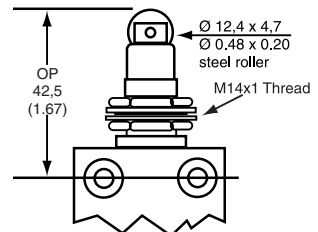


Operating force (OF): 17,5 N (3.82 lb)

NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE31-3
6 ft cable, bottom exit	914CE31-6

EUROPE	REFERENCE
1 metre cable, bottom exit	14CE31-1
3 metre cable, bottom exit	14CE31-3

### Top roller plunger, parallel, panel mounted

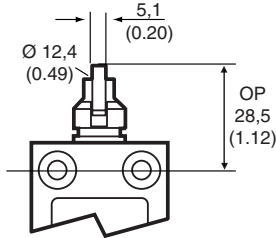


NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE28-3
6 ft cable, bottom exit	914CE28-6
Connector (dc), bottom exit	914CE28-Q



**14CE/914CE Series  
Plunger actuated switches  
(continued)**

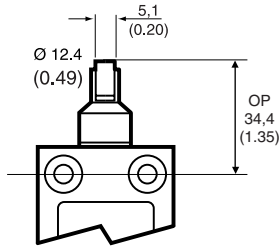
*Top roller plunger, perpendicular*



NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE3-3
6 ft cable, bottom exit	914CE3-6
6 ft cable, side exit	914CE3-6A
9 ft cable, bottom exit	914CE3-9
Connector (dc), bottom exit	914CE3-Q
Connector (ac), bottom exit	914CE3-Q1

EUROPE	REFERENCE
1 metre cable, bottom exit	14CE3-1
2 metre cable, bottom exit	14CE3-2
3 metre cable, bottom exit	14CE3-3

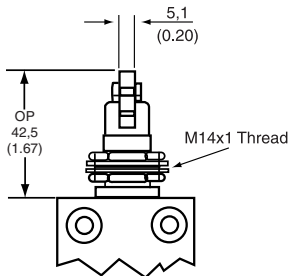
*Top roller plunger, perpendicular,  
boot seal*



Operating force (OF): 17,5 N (3.82 lb)

NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE55-3
3 ft cable, side exit	914CE55-3A

*Top roller plunger, perpendicular,  
panel mounted*



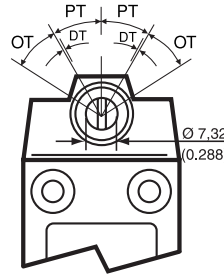
NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE29-3
6 ft cable, bottom exit	914CE29-6

**Side rotary and wobble  
actuated switches**

**OPTIONS**

**Rotary motion**

(actuating lever not included - use any  
LSZ51\*, LSZ52\*, LSZ54\*, LSZ55\* or LSZ61\*  
Series shown on page ??)

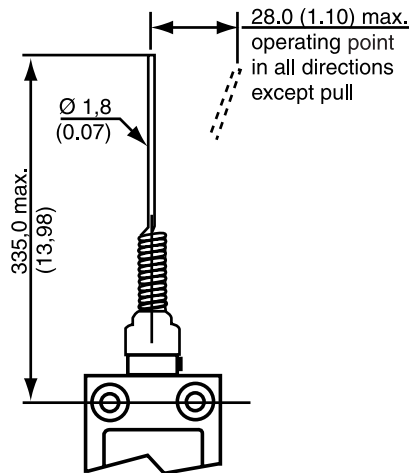


Operating torque: 0,3 Nm (2.66 in lb)  
Pretravel (PT): 30° max.  
Overtravel (OT) mm: 40° min.  
Differential travel: 3°

NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE16-3
3 ft cable, side exit	914CE16-3A
6 ft cable, bottom exit	914CE16-6
9 ft cable, bottom exit	914CE16-9
Connector (dc), bottom exit	914CE16-Q

EUROPE	REFERENCE
1 metre cable, bottom exit	14CE16-1
2 metre cable, bottom exit	14CE16-2
3 metre cable, bottom exit	14CE16-3

**Wobble Spring wire**

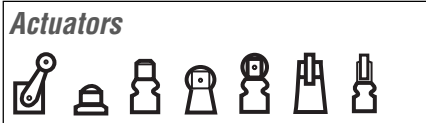


Operating Force (OF): 0,55 N (0.12 lb)

NORTH AMERICA/GLOBAL	REFERENCE
3 ft cable, bottom exit	914CE20-3
6 ft cable, bottom exit	914CE20-6
9 ft cable, bottom exit	914CE20-9
Connector (dc), bottom exit	914CE20-Q

EUROPE	REFERENCE
1 metre cable, bottom exit	14CE20-1
3 metre cable, bottom exit	14CE20-3

# 24CE/924CE Series Miniature Safety Electromechanical Switches



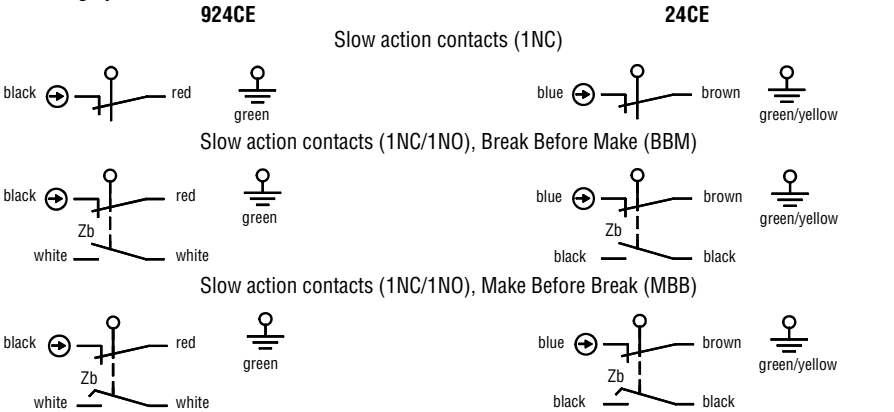
For position sensing and switching applications requiring direct acting, positive opening contacts the 24CE and 924CE ranges are ideal. They have been tested and approved to meet the requirements of the Low Voltage directive and positive opening safety contacts per IEC/EN 60947-5-1-3. The devices are CE marked. The red colour clearly differentiates this safety component in the application. The 924CE range also has UL and CSA approval.

It is possible for the end user to enhance the safety level of these switches from Category 1 on their own to Categories 2, 3 or 4 when the switches are used in conjunction with our wide range of FF-SR safety relays to form a safety system.

Typical applications for these switches would use the roller plunger 24CE2- or 24CE3- style in conjunction with cams on doors with hinges; or our fixed side rotary 24CE16- style for detection of sliding doors. Also available are a range of panel mounting or top mounting versions to ensure that small space or difficult mounting can be simply achieved.

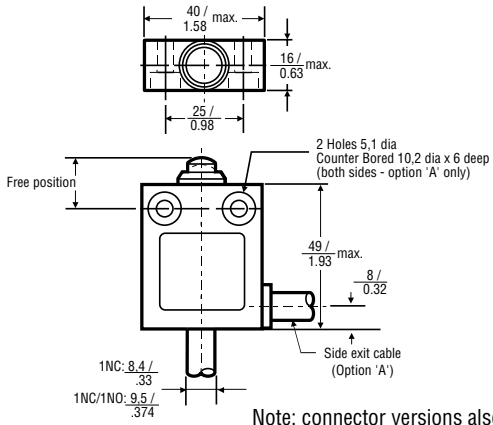
Several contact arrangements are available.

<b>Mechanical life:</b>		10 million
<b>Sealing:</b>		standard type: IP66; with boot seal type: IP67
<b>Operating temperature:</b>	24CE	0 °C to 70 °C (32 °F to 158 °F)
		Low temperature: -40 °C (-40 °F)
	924CE	0 °C to 105 °C (32 °F to 221 °F)
<b>Approvals:</b>	24CE	CE
		AC15 B300
		DC13 R300
	924CE	CE, CSA, CE
		per UL file #E41859, 10 A 250 Vac; 1/3 Hp 125-250 Vac
		AC15 B300
		DC13 R300
<b>Connection:</b>		Harmonised CENELEC 3 or 5 x 0,75 mm <sup>2</sup> cable (24CE)
		SJT0 3 or 5 x 18 AWG cable (924CE)
<b>Contacts:</b>		Silver
<b>Switching options:</b>		



**Electrical ratings:**

		IEC 60947-5-1/EN 60947-5-1							
Designation & Utilization Category		Rated operational current Ie (A) at rated operational voltage Ue						VA rating	
		120 V	240 V	380 V	480 V	500 V	600 V	Make	Break
AC15	B300	3	1.5	-	-	-	-	3600	360
		125 V		250 V					
DC13	R300	0,22	0,1					28	28

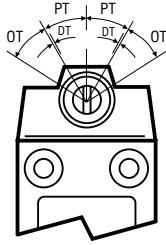


Note: connector versions also available

**24CE/924CE Series**

**OPTIONS**

*Side rotary*



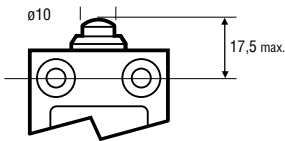
**North America/Global**

CABLE LENGTH	CONTACT	REFERENCE
3 ft	1NC, BBM	924CE16-S3
9 ft	1NC, BBM	924CE16-S9
3 ft	1NC, MBB	924CE16-T3
3 ft	1NC	924CE16-Y3
9 ft	1NC	924CE16-Y9

**Europe**

CABLE LENGTH	CONTACT	REFERENCE
1 m	1NC/1NO, BBM	24CE16-S1
1 m	1NC	24CE16-Y1
6 m	1NC	24CE16-Y6

*Top pin plunger*



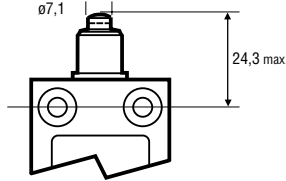
**North America/Global**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
3 ft	1NC, BBM		924CE1-S3
6 ft	1NC, BBM		924CE1-S6
9 ft	1NC, BBM		924CE1-S9
25 ft	1NC, MBB	side exit	924CE1-T25A
3 ft	1NC, MBB		924CE1-T3
3 ft	1NC, MBB	side exit	924CE1-T3A
6 ft	1NC, MBB	side exit	924CE1-T6A
9 ft	1NC, MBB		924CE1-T9
9 ft	1NC, MBB	side exit	924CE1-T9A
3 ft	1NC		924CE1-Y3
9 ft	1NC		924CE1-Y9

**Europe**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
12 m	1NC/1NO, BBM	low temperature	24CE1-S12B
2 m	1NC/1NO, BBM		24CE1-S2
2 m	1NC/1NO, BBM	side exit	24CE1-S2A
2 m	1NC/1NO, BBM	low temperature	24CE1-S2B
3 m	1NC/1NO, BBM		24CE1-S3
6 m	1NC/1NO, BBM		24CE1-S6
1 m	1NC	side exit	24CE1-Y1A
2 m	1NC		24CE1-Y2
3 m	1NC		24CE1-Y3

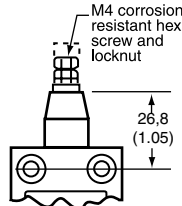
*Top pin plunger, boot sealed*



**North America/Global**

CABLE LENGTH	CONTACT	REFERENCE
6 ft	1NC/1NO, BBM	924CE18-S6

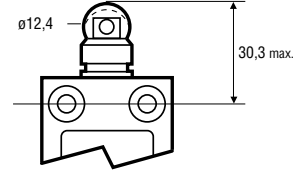
*Adjustable plunger*



**North America/Global**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
3 ft	1NC/1NO, BBM	low temperature	924CE19-S3L1

*Top roller plunger, parallel*



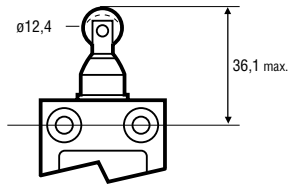
**North America/Global**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
15 ft	1NC, BBM		924CE2-S15
21 ft	1NC, BBM		924CE2-S21
3 ft	1NC, BBM		924CE2-S3
6 ft	1NC, BBM		924CE2-S6
6 ft	1NC, BBM	side exit	924CE2-S6A
9 ft	1NC, BBM		924CE2-S9
25 ft	1NC, MBB		924CE2-T25
25 ft	1NC, MBB	side exit	924CE2-T25A
3 ft	1NC, MBB		924CE2-T3
6 ft	1NC, MBB		924CE2-T6
9 ft	1NC, MBB		924CE2-T9
3 ft	1NC		924CE2-Y3
9 ft	1NC		924CE2-Y9

**Europe**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
1 m	1NC/1NO, BBM		24CE2-S1
2 m	1NC/1NO, BBM		24CE2-S2
2 m	1NC/1NO, BBM	side exit	24CE2-S2A
2 m	1NC/1NO, BBM	low temperature	24CE2-S2B
3 m	1NC/1NO, BBM		24CE2-S3
6 m	1NC/1NO, BBM		24CE2-S6
2 m	1NC/1NO, MBB		24CE2-T2
1 m	1NC		24CE2-Y1
2 m	1NC		24CE2-Y2
2 m	1NC	side exit	24CE2-Y2A
4 m	1NC		24CE2-Y4
6 m	1NC	side exit	24CE2-Y6A

**Top roller plunger, parallel, boot sealed**



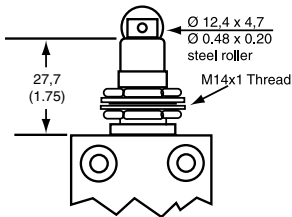
**North America/Global**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
3 ft	1NC, BBM		924CE31-S6
20 ft	1NC		924CE31-
Y20			
3 ft	1NC	low temperature	924CE31-
Y3L1			

**Europe**

CABLE LENGTH	CONTACT	OPTION	REFERENCE
1 m	1NC/1NO, BBM		24CE31-S1
2 m	1NC/1NO, BBM		24CE31-S2
2 m	1NC/1NO, BBM	low temperature	24CE31-S2B
5 m	1NC/1NO, BBM		24CE31-S5
1 m	1NC		24CE31-Y1
2 m	1NC		24CE31-Y2
3 m	1NC		24CE31-Y3

**Top roller plunger, parallel, panel mounted**



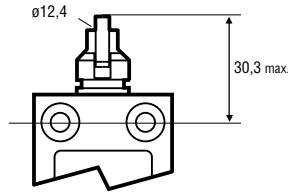
**North America/Global**

CABLE LENGTH	CONTACT	REFERENCE
15 ft	1NC, BBM	924CE28-S15

**Europe**

CABLE LENGTH	CONTACT	REFERENCE
2 m	1NC/1NO, BBM	24CE28-S2

**Top roller plunger, perpendicular**



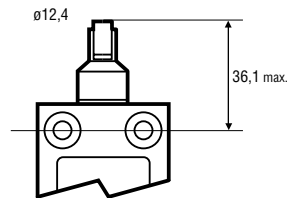
**North America/Global**

CABLE LENGTH	CONTACT	REFERENCE
3 ft	1NC, BBM	924CE3-S3
6 ft	1NC, BBM	924CE3-S6
9 ft	1NC, BBM	924CE3-S9
9 ft	1NC, MBB	924CE3-T9

**Europe**

CABLE LENGTH	CONTACT	REFERENCE
2 m	1NC/1NO, BBM	24CE3-S2
1 m	1NC	24CE3-Y1
2 m	1NC	24CE3-Y2

**Top roller plunger, perpendicular, boot sealed**



**Europe**

CABLE LENGTH	CONTACT	REFERENCE
1 m	1NC/1NO, BBM	24CE55-S1
2 m	1NC/1NO, BBM	24CE55-S2
1 m	1NC	24CE55-Y1

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# LS Series Compact Limit Switches

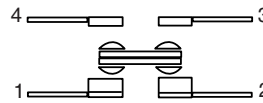
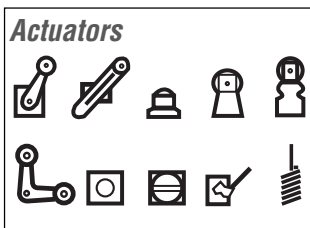


LS Series compact limit switches are carefully designed for accurate repeatability under the most stringent conditions. Compact size and field adjustable features greatly extend the flexibility of these switches. Heads may be positioned at 90° increments. Side rotary models can be adjusted for clockwise and/or counter-clockwise operation. Actuators can be set and locked in any position through 360°.

The rugged housings and actuator heads are constructed from cast aluminium, capable of withstanding physical abuse. Protection against oil, water and dust is achieved by O-ring seals on the actuator shaft; a ring seal between head and body; and a seated compression seal between cover and case.

The LS fits in many places too small for any other fully adjustable limit switch.

<b>Conduit:</b>		½ in - 14 NPT 20 mm
<b>Sealing:</b>	½ in - 14 NPT conduit 20 mm conduit	NEMA 1, 3, 4, 6, 13 IP67
<b>Operating temperature:</b>	Standard High	-29 °C to 71 °C (-20 °F to 160 °F) -29 °C to 121 °C (-20 °F to 250 °F)
<b>Approvals:</b>	LS-L	UL, CSA
<b>Contacts:</b>	Electrical ratings A, B, C, D, E Electrical ratings F, G	Silver Cadmium Oxide <sup>(1)</sup> Fine Silver
<b>Switching options:</b>	SPDT	Single Pole, Double Throw Snap action contacts (1NC/1NO)



<b>Electrical ratings:</b>	<b>A</b>	10 A, 120, 240 or 480 Vac; 1/3 hp, 120 Vac; 3/4 hp, 240 Vac; 0.8 A, 115 Vdc**; 0.4 A, 230 Vdc**; 0.1 A, 550 Vdc**; Pilot Duty, 600 Vac max.
	<b>B</b>	10 A, 120, 240 or 480 Vac; 1/4 hp, 120 Vac; 1/2 hp, 240 Vac. Pilot Duty, 600 Vac max.
	<b>C</b>	10 A, 120 Vac; 1/3 hp, 120 Vac.
	<b>D</b>	10 A, 120, 240, 480 Vac; 1/4 hp, 120 Vac; 1/2 hp, 240 Vac; 0.8 A, 115 Vdc**; 0.4 A, 230 Vdc**; 0.1 A, 550 Vdc**; Pilot Duty, 600 Vac max.
	<b>E</b>	10 A, 120, 240 or 480 Vac; 1/3 hp, 120 Vac; 3/4 hp, 240 Vac. Pilot Duty, 600 Vac max.
	<b>F</b>	UL Rating: 10 A, 125, 250, or 480 Vac; 1/3 hp, 125 Vac; 3/4 hp, 250 Vac; 0.8 A, 125 Vdc**; 0.4 A, 250 Vdc**
	<b>G</b>	UL Rating: 10 A, 125, 250 or 480 Vac; 1/4 hp, 125 Vac; 1/2 hp, 250 Vac; 0.8 A, 125 Vdc**; 0.4 A, 250 Vdc**

\*\* Resistive rating

<sup>(1)</sup> Designed for use with inductive loads such as relays, contactors, motors and solenoids. Honeywell does **not** recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp.

**LS Series**  
**Side rotary actuated switches**

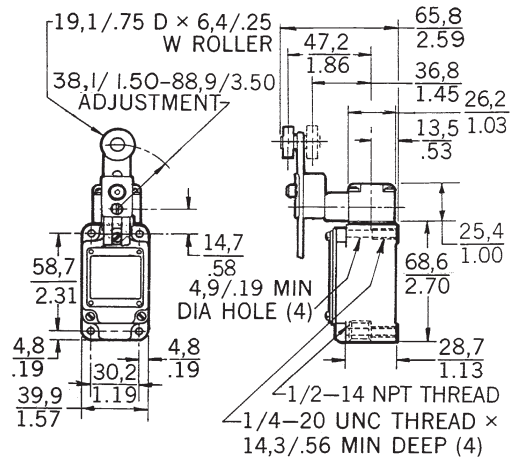
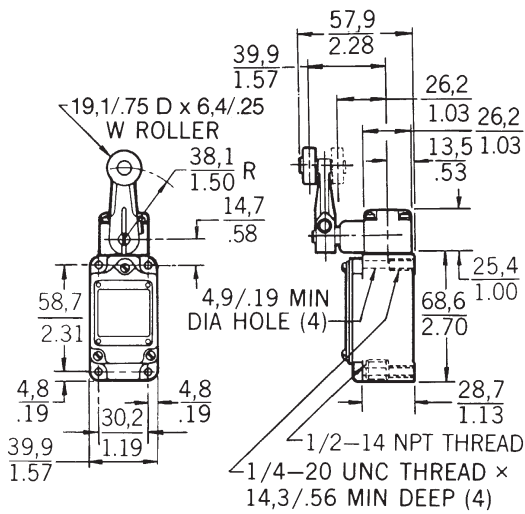
**OPTIONS**

*Fixed length lever*

<b>Operating force max. (OF):</b>	Standard	13,3 N (3.0 lb)
	Low	5,0 N (18 oz)
<b>Pretravel max. (PT):</b>	Standard	20°
	Low	5°
<b>Overtravel min. (OT)</b>		30°
<b>Differential travel max. (DT):</b>	Standard	12°
	Low	4°
<b>Switching options:</b>		SPDT
<b>Lever:</b>		Aluminium, steel roller

*Adjustable roller lever*

<b>Operating force max. (OF):</b>	Standard	13,3 N (3.0 lb)
	Low	5,0 N (18 oz)
<b>Pretravel max. (PT):</b>	Standard	20°
	Low	5°
<b>Overtravel min. (OT)</b>		30°
<b>Differential travel max. (DT):</b>	Standard	12°
	Low	4°
<b>Switching options:</b>		SPDT
<b>Lever:</b>		Aluminium, nylon roller



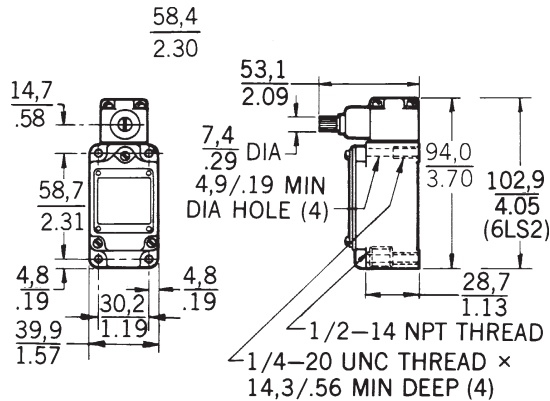
CONDUIT	ELECTRICAL RATING	REFERENCE
	A	1LS1
	F	1LS1-L
	A	1LS1-4C
Low PT/OF	B	1LS131
Low PT	B	1LS19
Low PT	B	1LS19-4C
High temperature	A	1LS243
High temperature	A	1LS243-4C
Indicator light	C	1LS501
Low OF	A	1LS6

CONDUIT	ELECTRICAL RATING	REFERENCE
	A	1LS3
	F	1LS3-L
20 mm	A	1LS3-4C
Low PT	B	1LS58
Low OF/PT/DT	B	1LS59

**No lever**

**Note: Levers are ordered separately (see pages 69-71 for details)**

<b>Operating force max. (OF):</b>	Standard	0,51 N m (4.5 in lb)
	Low with standard PT	0,21 N m (30 in oz)
<b>Pretravel max. (PT):</b>	Standard	20°
	Low	5°
<b>Overtravel min. (OT)</b>	Maintained contact	55°
	Standard	30°
<b>Differential travel max. (DT):</b>	Maintained contact	35°
	Standard	12°
<b>Switching options:</b>	Low PT	4°
	Maintained contact	20°
		SPDT
		Maintained contact



**SPDT contact**

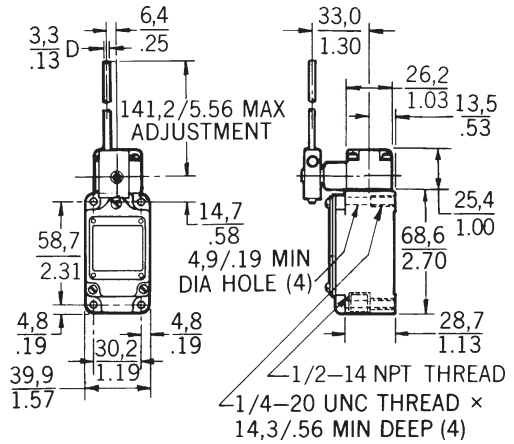
CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	1LS2
	F	1LS2-L
	A	1LS2-4C
	A	1LS23
Low OF	B	1LS56
Low OF/PT	B	1LS9

**Maintained contact**

CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	6LS2
	F	6LS2-L

**Adjustable rod**

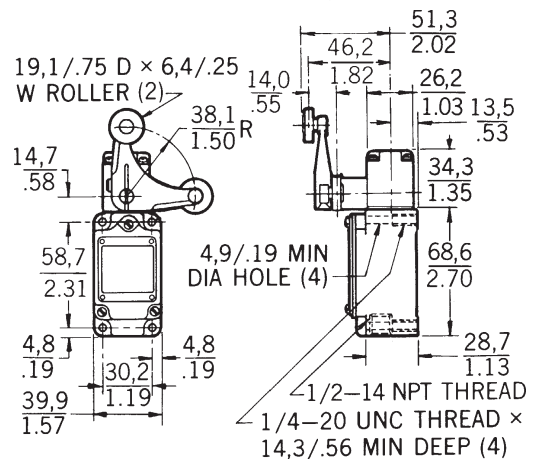
<b>Operating force max. (OF):</b>	Standard	1,39 N (5 oz)
	Low	0,83 Nm (3 oz)
<b>Pretravel max. (PT):</b>	Standard	20°
	Low	5°
<b>Overtravel min. (OT)</b>		30°
<b>Differential travel max. (DT):</b>	Standard	12°
	Low	4°
<b>Switching options:</b>		SPDT
<b>Lever:</b>		Aluminium rod



CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	1LS10
	F	1LS10-L
	A	1LS10-4C
	B	1LS47
Low PT	B	1LS53
Low PT/OF/DT	B	

**Side rotary, yoke lever, maintained contact**

<b>Operating force max. (OF):</b>	8,9 N (2.0 lb)
<b>Pretravel max. (PT):</b>	55°
<b>Switching options:</b>	Maintained
<b>Lever:</b>	6LS1 Steel rollers on opposite sides of arm
	6LS3 Nylon rollers on same side of arm



CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	6LS1
	A	6LS1-4C
	A	6LS3

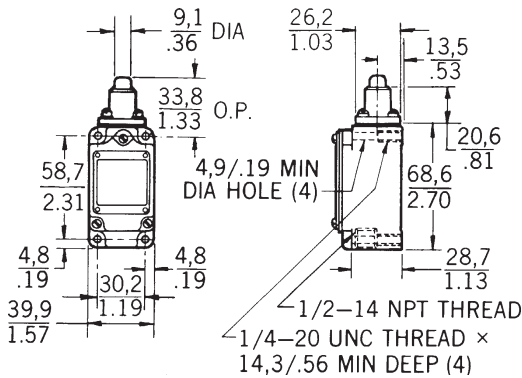


**LS Series  
Plunger actuated switches**

**OPTIONS**

*Top pin plunger*

<b>Operating force max. (OF):</b>	Standard	31,14 N (7 lb)
	Low	10 N (36 oz)
<b>Pretravel max. (PT):</b>		1,65 mm (0.065 in)
<b>Overtravel min. (OT)</b>	Standard	6,35 mm (0.25 in)
	Low	5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>	Standard	0,51 mm (0.020 in)
	Low	0,23 mm (0.009 in)
<b>Switching options:</b>		SPDT

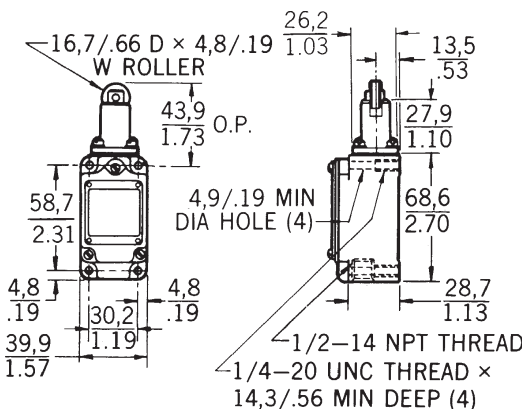


CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	2LS1
	F	2LS1-L
	A	2LS1-4C
	E	2LS111

Low OF/OT/DT

*Top roller plunger*

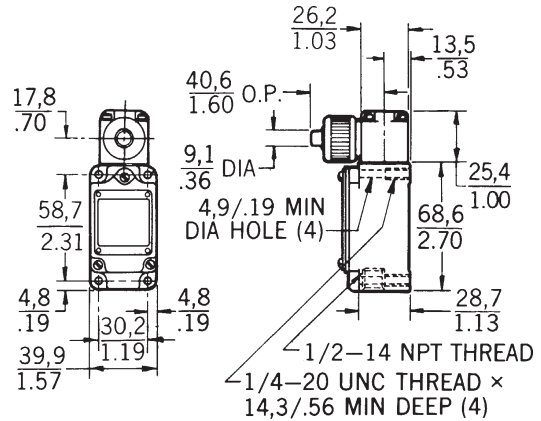
<b>Operating force max. (OF):</b>		31,14 N (7 lb)
<b>Pretravel max. (PT):</b>		1,65 mm (0.065 in)
<b>Overtravel min. (OT)</b>		5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>		0,51 mm (0.020 in)
<b>Switching options:</b>		SPDT



CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	5LS1
	F	5LS1-L
	A	5LS1-4C

*Side pin plunger*

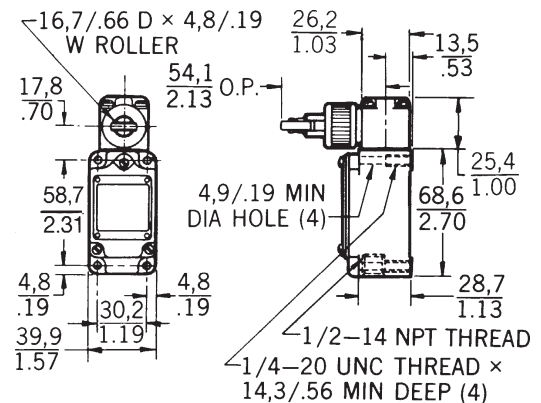
<b>Operating force max. (OF):</b>		40,03 N (9 lb)
<b>Pretravel max. (PT):</b>		2,8 mm (0.110 in)
<b>Overtravel min. (OT)</b>		6,35 mm (0.25 in)
<b>Differential travel max. (DT):</b>		1,02 mm (0.040 in)
<b>Switching options:</b>		SPDT



CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	4LS1
	A	4LS1-4C

*Side roller plunger*

<b>Operating force max. (OF):</b>		40,03 N (9 lb)
<b>Pretravel max. (PT):</b>		2,8 mm (0.110 in)
<b>Overtravel min. (OT)</b>		5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>		1,02 mm (0.040 in)
<b>Switching options:</b>		SPDT



CONDUIT	ELECTRICAL RATING	REFERENCE
20 mm	A	3LS1
	A	3LS1-4C

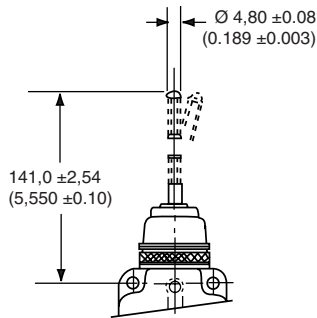
## Wobble actuated switches

*These switches will operate by moving actuator in any direction except direct pull.*

Operating force max. (OF): 1,39 N (5 oz)  
 Pretravel max. (PT): 28,6 mm (1,125 in)  
 Switching options: SPDT

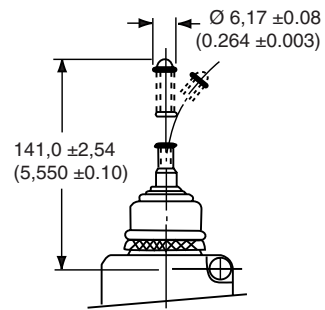
### OPTIONS

#### Flexible cable



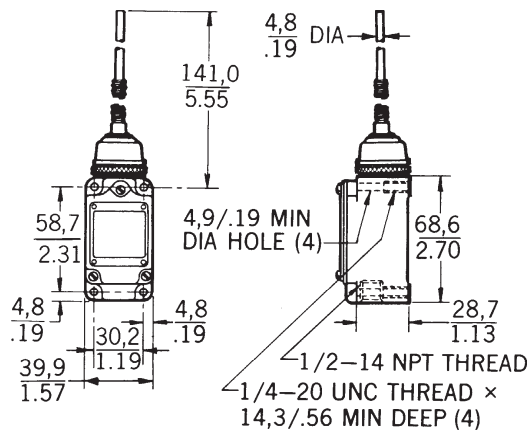
CONDUIT	ELECTRICAL RATING	REFERENCE
	D	8LS1
	G	8LS1-L
20 mm	D	8LS1-4C

#### Coil spring



CONDUIT	ELECTRICAL RATING	REFERENCE
	D	8LS152
20 mm	D	8LS152-4C

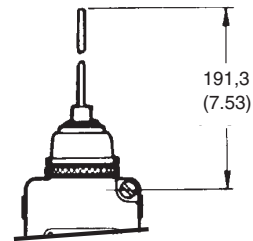
#### Spring rod



CONDUIT	ELECTRICAL RATING	REFERENCE
	D	8LS3
20 mm	D	8LS3-4C

#### Steel wire

Operating force max. (OF): 0,28 N (1 oz)  
 Pretravel max. (PT): 63,5 mm (2.5 in)



CONDUIT	ELECTRICAL RATING	REFERENCE
	D	8LS125
20 mm	D	8LS125-4C

# BF Series Plastic Enclosed Basic Switches



BF Series Plastic Enclosed Basic Switches are available with a wide variety of actuators, and are designed for easy mounting and wiring. BF switches are designed to allow mounting with the cover either towards or away from the mounting surface.

Switches with lever type actuators are adjustable in two directions. The entire actuator can be rotated around its mounting bushing, and the angle of the lever can also be changed.

**Sealing:**

**Operating temperature:**

**Approvals:**

**Termination:**

**Contacts:**

**Electrical ratings:**

**Switching options:**  
SPDT

NEMA 1, 3, 4, 13

-32 °C to 71 °C (-25 °F to 160 °F)

UL

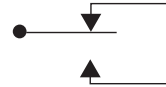
½ in - 14NPT

Silver

11 A - 125 Vac, 250 Vac or 277 Vac

5 A - 125 Vac, 250 Vac or 277 Vac

Single Pole, Double Throw,  
Snap action contacts (1NC/1NO)



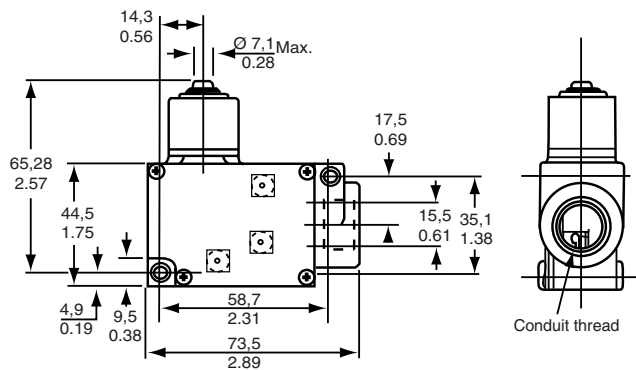
## Actuators



## Plunger actuated switches

### OPTIONS

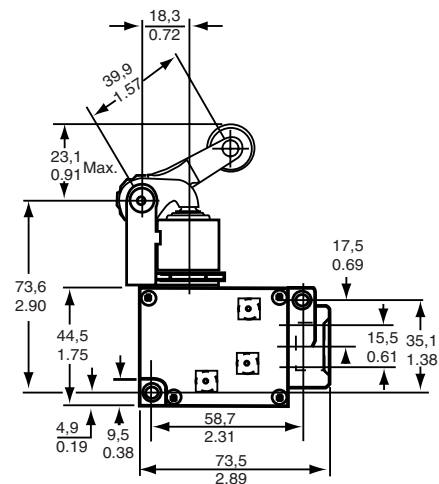
#### Top pin plunger



**Operating force max. (OF):** 12,23 N (44 oz)  
**Differential travel max. (DT):** 0,64 mm (0.025 in)

ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left	B	BFL1-BP1
Right	B	BFR1-BP1

#### Top roller arm, adjustable

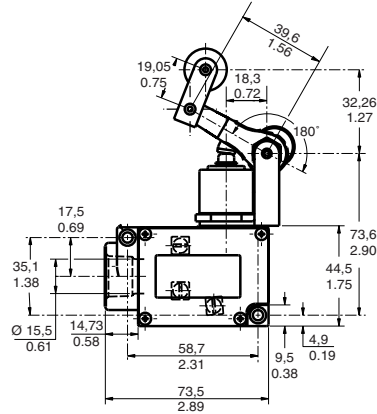


**Operating force max. (OF):** 10,56 N (38 oz)  
**Differential travel max. (DT):** 1,65 mm (0.065 in)

ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left	B	BFL1-BL1
Right	B	BFR1-BL1

**Plunger actuated switches  
(continued)**

*Top roller arm, adjustable, one way*



**Operating force max. (OF):**  
 Left 3,61 N (13 oz)  
 Right 10,56 N (38 oz)

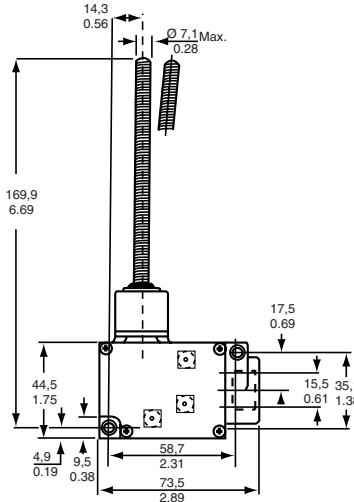
ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left	B	BFL1-BL3
Right	B	BFR1-BL3

**Wobble actuated switches**

Operating force max. (OF): 1,95 N (7 oz)

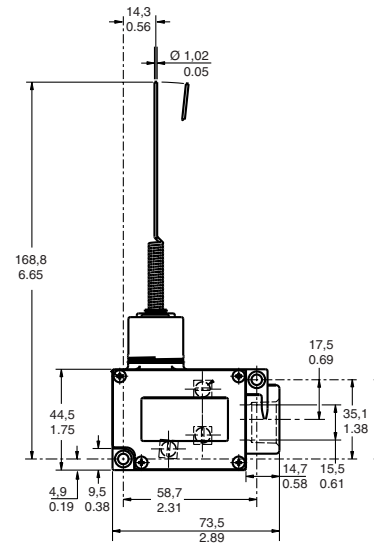
**OPTIONS**

*Coil spring*



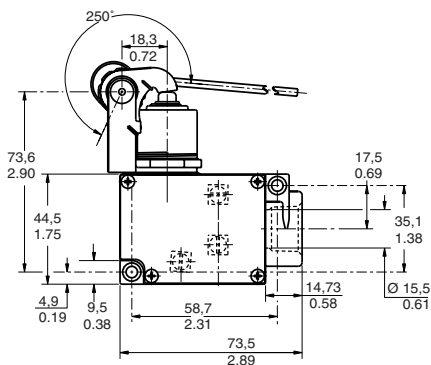
ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left	A	BFL1-AW1
Left	B	BFL1-BW1
Right	B	BFR1-BW1

*Spring wire*



ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left	B	BFL1-BW4
Right	B	BFR1-BW4

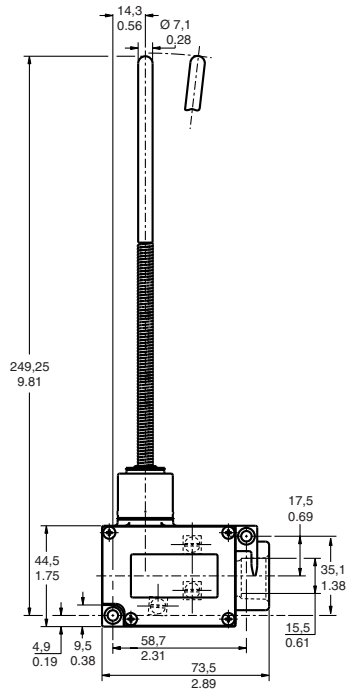
*Low force rod*



**Operating force max. (OF):**  
 Left 10,56 N (38 oz)  
 Right 3,61 N (13 oz)

ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left	B	BFL1-BL2
Right	B	BFR1-BL2

*Plastic*



**Type -BW3**

ACTUATOR POSITION	ELECTRICAL RATING	REFERENCE
Left, 179,3 mm (7.06 in) length rod	A	BFL1-AW2
Left, 249,25 mm (9.8 in) length rod	B	BFL1-BW3

# BZE/DTE Series Compact Enclosed Switches



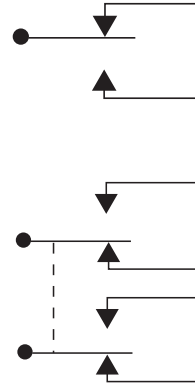
**Actuators**



The BZE/DTE Series general purpose enclosed limit switches offer precision operation and sturdy actuation in a compact but rugged aluminium housing. The large wiring enclosure means that the user can get access to wire the device simply. The switch incorporates high repeatability of the switch point early in the travel of the switch. This is achieved through a very tolerant over-travel mechanism which ensures that application drift will not affect long term accuracy of the switch.

<b>Conduit:</b>	E6	½ in - 14 NPT
<b>Sealing:</b>	V6	NEMA 1
		NEMA 1, 3
<b>Operating temperature:</b>	Standard	-32 °C to 71 °C (-25 °F to 160 °F)
	Low	-40 °C to 71 °C (-40 °F to 160 °F)
<b>Approvals:</b>		UL, CSA, CE
<b>Contacts:</b>	Electrical ratings A, B, C	Silver
	Electrical rating D	Gold
<b>Switching options:</b>		
SPDT		Single Pole, Double Throw Snap action contacts (1NC/1NO)

DPDT



Double Pole, Double Throw  
Snap action contacts (2NC/2NO)

**Electrical ratings:**

A	UL/CSA Rating:	15 A, 125, 250 or 480 Vac; 2 A, 600 Vac; ⅛ Hp, 125 Vac; ¼ Hp, 250 Vac; ½ A, 125 Vdc; ¼ A, 250 Vdc
B	UL/CSA Rating:	10 A, 125 or 250 Vac; 0.3 A, 125 Vdc; 0.15 A, 250 Vdc
C	UL/CSA Rating:	15 A, 125, 250 or 480 Vac; ¼ Hp, 125 Vac; ½ Hp, 250 Vac; ½ A, 125 Vdc; ¼ A, 250 Vdc
D	UL/CSA Rating:	1 A - 125 Vac

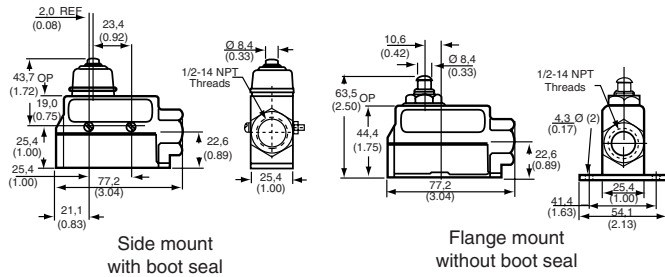
## E6/V6

E6 (side mount) and V6 (flange mount) switches are offered with or without actuator seal boots. Both have a combination insulator/ seal cemented inside the bottom enclosure. Lead washers are used to seal the mounting holes on side mount switches. All side mount switches are installed with #6 screws, except the BZE6-2RN7 (#8 screws). Removal of the bottom enclosure exposes the terminals for easy wiring.

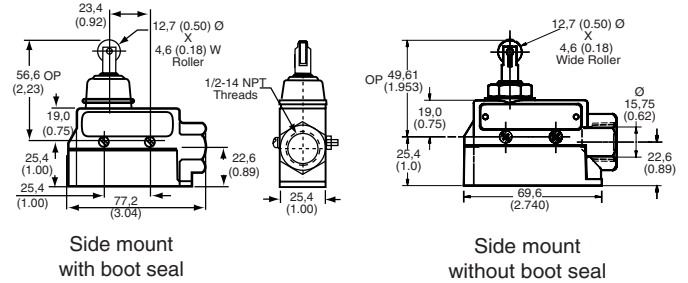
## Momentary contact

### OPTIONS

#### Top pin plunger



#### Top roller plunger, parallel



#### With boot seal

<b>Operating force max. (OF):</b>	SPDT Standard	2,50 N to 6,67 N (9 oz to 24 oz)
	SPDT Low temperature	4,17 N to 10,84 N (15 oz to 39 oz)
	DPDT	6,95 N to 16,4 N (25 oz to 59 oz)
<b>Pretravel max. (PT):</b>	SPDT	1,98 mm (0.078 in)
	DPDT	2,8 mm (0.110 in)
<b>Overtravel min. (OT):</b>	SPDT	5,56 mm (0.219 in)
	DPDT	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	SPDT	0,05 mm (0.002 in)
	DPDT	1,52 mm (0.060 in)

#### With boot seal

<b>Operating force max. (OF):</b>	SPDT	2,50 N to 6,67 N (9 oz to 24 oz)
	DPDT	5,56 N to 13,34 N (20 oz to 48 oz)
<b>Pretravel max. (PT):</b>	SPDT	1,98 mm (0.078 in)
	DPDT	2,8 mm (0.110 in)
<b>Overtravel min. (OT):</b>	SPDT	5,56 mm (0.219 in)
	DPDT	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	SPDT	0,01 mm to 0,05 mm (0.0004 in to 0.0020 in)
	DPDT	1,52 mm (0.060 in)

#### Side mount

	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	BZE6-2RN
	DPDT	B	DTE6-2RN
Low temperature/High OF	SPDT	A	BZE6-2RN34
#8 screws	SPDT	A	BZE6-2RN7
Gold contacts	SPDT	D	BZE6-2RN72

#### Side mount

	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	BZE6-2RN80
	DPDT	B	DTE6-2RN80

#### Flange mount

	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	BZV6-2RN
	DPDT	B	DTV6-2RN

#### Flange mount

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	SPDT		A	BZV6-2RN80

#### Without boot seal

<b>Operating force max. (OF):</b>	SPDT	2,50 N to 3,61 N (9 oz to 13 oz)
	DPDT	5,56 N to 11,12 N (20 oz to 40 oz)
<b>Pretravel max. (PT):</b>	SPDT	0,38 mm (0.015 in)
	DPDT	3,81 mm (0.150 in)
<b>Overtravel min. (OT):</b>	SPDT	5,56 mm (0.219 in)
	DPDT	2,24 mm (0.088 in)
<b>Differential travel max. (DT):</b>	SPDT	0,05 mm (0.002 in)
	DPDT	1,52 mm (0.060 in)

#### Without boot seal

<b>Operating force max. (OF):</b>	SPDT	2,50 N to 3,61 N (9 oz to 13 oz)
	DPDT	6,67 N to 13,34 N (24oz to 48 oz)
<b>Pretravel max. (PT):</b>	SPDT	0,38 mm (0.015 in)
	DPDT	3,58 mm (0.141 in)
<b>Overtravel min. (OT):</b>	SPDT	3,55 mm (0.140 in)
	DPDT	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	SPDT	0,05 mm (0.002 in)
	DPDT	1,52 mm (0.060 in)

#### Side mount

	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	BZE6-2RQ
	DPDT	B	DTE6-2RQ

#### Side mount

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	SPDT		A	BZE6-2RQ8
Field adjustable roller	SPDT		A	BZE6-2RQ9
Field adjustable roller	DPDT		B	DTE6-2RQ9

#### Flange mount

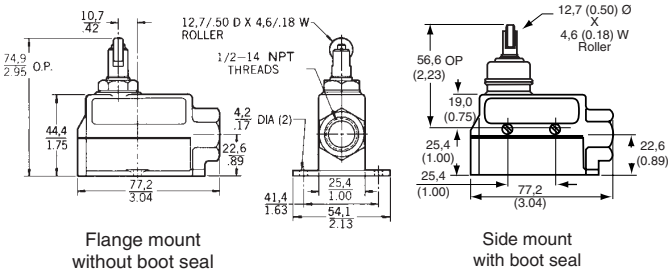
	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	BZV6-2RQ

#### Flange mount

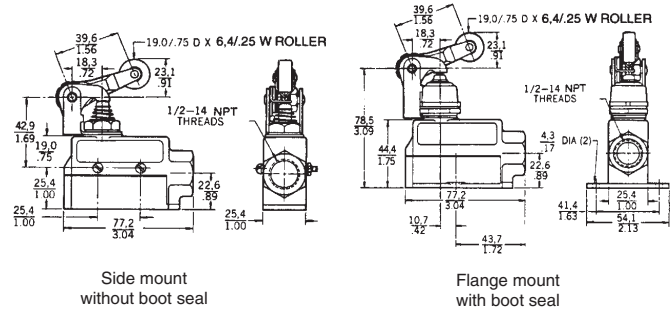
	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	SPDT		A	BZV6-2RQ8

**BZE/DTE Series  
E6/V6 Momentary contact (continued)**

*Top roller plunger, perpendicular*



*Roller arm, adjustable*



**With boot seal**

<b>Operating Force max. (OF):</b>	2,60 N to 6,67 N (9 oz to 24 oz)
<b>Pretravel max. (PT):</b>	1,98 mm (0.078 in)
<b>Overtravel min. (OT):</b>	5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>	0,01 mm to 0,05 mm (0.0004 in to 0.0020 in)

<b>Operating temperature:</b>	Standard	-32 °C to 71 °C (-25 °F to 160 °F)
	Low	-40 °C to 71 °C (-40 °F to 160 °F)
<b>Roller:</b>		Steel

**Side mount**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	BZE6-2RN81

**With boot seal**

<b>Operating Force max. (OF):</b>	2,78 N to 5,56 N (10 oz to 20 oz)
<b>Pretravel max. (PT):</b>	4,78 mm (0.188 in)
<b>Overtravel min. (OT):</b>	5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>	0,15 mm (0.006 in)
	4,19 mm (0.165 in)
	SPDT
	DPDT

**Without boot seal**

<b>Operating Force max. (OF):</b>	SPDT	2,50 N to 3,61 N (9 oz to 13 oz)
	DPDT	6,67 N to 13,34 N (24 oz to 48 oz)
<b>Pretravel max. (PT):</b>	SPDT	0,38 mm (0.015 in)
	DPDT	3,58 mm (0.141 in)
<b>Overtravel min. (OT):</b>	SPDT	3,55 mm (0.140 in)
	DPDT	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	SPDT	0,05 mm (0.002 in)
	DPDT	1,52 mm (0.060 in)

**Side mount**

<b>Operating Force max. (OF):</b>	DPDT	13,34 N (48 oz)
<b>Pretravel max. (PT):</b>	DPDT	7,92 mm (0.312 in)

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	BZE6-2RN2
DPDT	B	DTE6-2RN2
Low temperature SPDT	A	BZE6-2RN234

**Side mount**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	BZE6-2RQ81
DPDT	B	DTE6-2RQ81

**Flange mount**

<b>Operating Force max. (OF):</b>	DPDT	2,78 N to 8,34 N (10 oz to 30 oz)
<b>Pretravel max. (PT):</b>	DPDT	6,76 mm (0.266 in)

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	BZV6-2RN2
DPDT	B	DTV6-2RN2

**Flange mount**

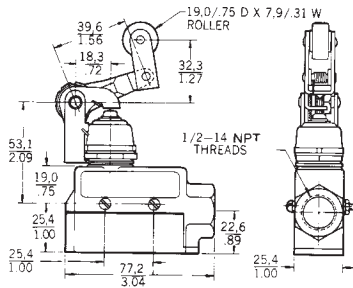
CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	BZV6-2RQ81

**Without boot seal**

<b>Operating Force max. (OF):</b>	2,78 N to 5,00 N (10 oz to 20 oz)
<b>Pretravel max. (PT):</b>	4,78 mm (0.188 in)
<b>Overtravel min. (OT):</b>	5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>	0,15 mm (0.006 in)

	CONTACT	ELECTRICAL RATING	REFERENCE
Side mount	SPDT	A	BZE6-2RQ2
Flange mount	SPDT	A	BZV6-2RQ2

**One way roller lever**



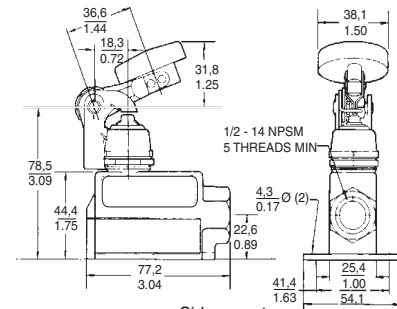
Side mount with boot seal

**With boot seal**

**Operating Force max. (OF):** 2,22 N to 5,56 N (8 oz to 20 oz)  
**Pretravel max. (PT):** 5,94 mm (0.234 in)  
**Overtravel min. (OT):** 5,56 mm (0.219 in)  
**Differential travel max. (DT):** 0,15 mm (0.006 in)

	CONTACT	ELECTRICAL RATING	REFERENCE
Side mount	SPDT	A	BZE6-2RN28

**Manual palm button**



Side mount with boot seal

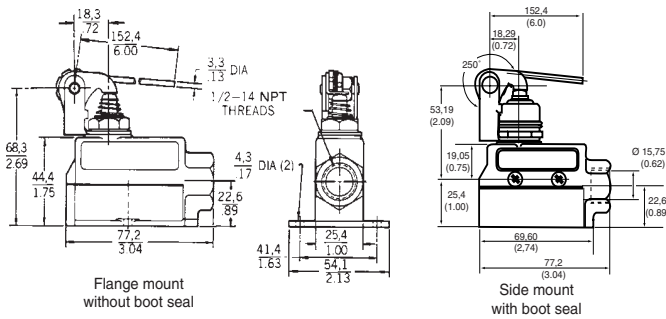
**With boot seal**

**Operating force max. (OF):** 2,78 N to 5,56 N (10 oz to 20 oz)  
**Pretravel max. (PT):** 4,78 mm (0.188 in)  
**Overtravel min. (OT):** 5,56 mm (0.219 in)  
**Differential travel max. (DT):** 0,15 mm (0.006 in)

	CONTACT	ELECTRICAL RATING	REFERENCE
Flange mount	SPDT	A	BZV6-2RN4

**Rod lever**

**Pretravel max. (PT):** 18,24 mm (0.718 in)  
**Overtravel min. (OT):** 21,29 mm (0.838 in)  
**Differential travel max. (DT):** 5,82 mm (0.229 in)

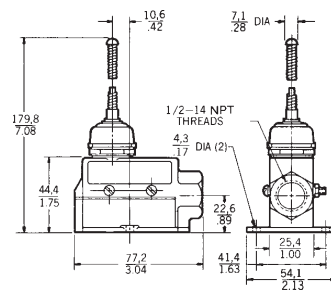


Flange mount without boot seal

Side mount with boot seal

**Wobble, coil spring**

These switches will operate by moving actuator in any direction except direct pull.



Flange mount with boot seal

**With boot seal**

**Operating force max. (OF):** 0,83 N to 1,95 N (3 oz to 7 oz)

	CONTACT	ELECTRICAL RATING	REFERENCE
Side mount	SPDT	A	BZE6-2RN62
Flange mount	SPDT	A	BZV6-2RN62

**With boot seal**

**Operating force max. (OF):** 1,95 N (7 oz)  
**Pretravel max. (PT):** 15°

	CONTACT	ELECTRICAL RATING	REFERENCE
Side mount	SPDT	A	BZE6-2RN18
Flange mount	SPDT	A	BZV6-2RN18

**Without boot seal**

**Operating force max. (OF):** 0,56 N to 1,39 N (2 oz to 5 oz)

	CONTACT	ELECTRICAL RATING	REFERENCE
Side mount	SPDT	A	BZE6-2RQ62
Flange mount	SPDT	A	BZV6-2RQ62



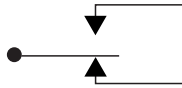
## BZE/DTE Series E6/V6 Maintained contact (reset) switches

The switches shown below provide maintained contact after the operating force on either top or bottom plunger is released.

Note: The top plungers on these switches provide more accurate and uniform operation than the "reset" plungers and should be used when closely held operating characteristics are required.

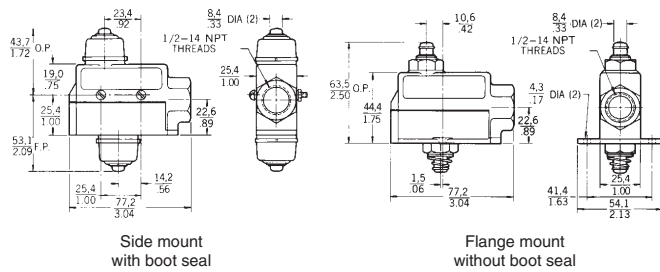
**Switching:**  
SPDT

Single Pole, Double Throw  
(1NC/1NO) Maintained



### OPTIONS

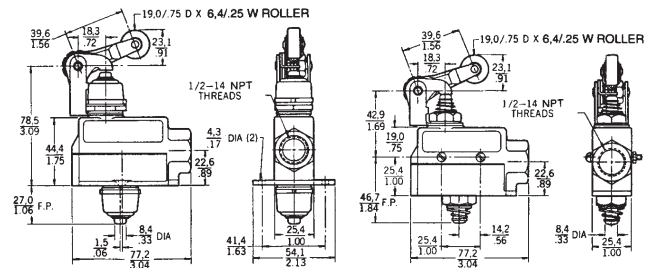
#### Top pin plunger



Side mount with boot seal

Flange mount without boot seal

#### Roller arm, adjustable



Flange mount with boot seal

Side mount without boot seal

#### Side mount

<b>Operating force max. (OF):</b>	With boot seal	1,67 N to 5,56 N (6 oz to 20 oz)
	Without boot seal	1,67 N to 2,64 N (6 oz to 9.5 oz)
<b>Pretravel max. (PT):</b>	With boot seal	1,98 mm (0.078 in)
	Without boot seal	0,30 mm (0.012 in)
<b>Overtravel min. (OT):</b>		4,75 mm (0.187 in)

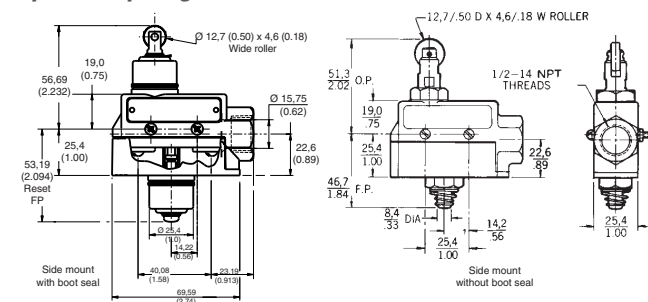
#### Side mount

<b>Operating Force max. (OF):</b>	With boot seal	4,45 N (16 oz)
	Without boot seal	3,34 N (12 oz)
<b>Pretravel max. (PT):</b>		4,78 mm (0.188 in)
<b>Overtravel min. (OT):</b>		5,56 mm (0.219 in)

	CONTACT	ELECTRICAL RATING	REFERENCE
With boot seal	SPDT Maintained	C	BZE6-RNX1
Without boot seal	SPDT Maintained	C	BZE6-RQX2

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
With boot seal	Maintained		C	BZE6-RN2X1
Without boot seal	Maintained		C	BZE6-RQ2X2

#### Top roller plunger



Side mount with boot seal

Side mount without boot seal

#### Side mount

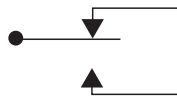
<b>Operating force max. (OF):</b>	With boot seal	3,34 N to 15,57 N (12 oz to 56 oz)
	Without boot seal	1,67 N to 2,64 N (6 oz to 9.5 oz)
<b>Pretravel max. (PT):</b>	With boot seal	1,98 mm (0.078 in)
	Without boot seal	0,30 mm (0.012 in)
<b>Overtravel min. (OT):</b>	With boot seal	4,75 mm (0.187 in)
	Without boot seal	3,55 mm (0.140 in)

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
With boot seal	SPDT		C	BZE6-RN80X2
Without boot seal	SPDT		C	BZE6-RQ8X2

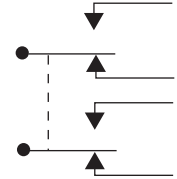
## E7 Metal standard enclosed switch

**Mechanical life:** 10 million  
**Sealing:** Without boot seal IP50 Standard  
 With boot seal IP65 Sealed  
**Operating temperature:** -30 °C to 70 °C (-22 °F to 158 °F)  
**Approvals:** IEC 60947-5-1  
 EN 60947-5-1

**Switching options:**  
 SPDT Single Pole, Double Throw  
 Snap action contacts (1NC/1NO)



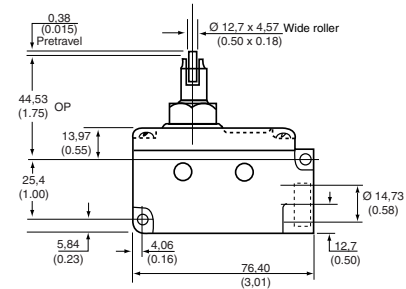
DPDT Double Pole, Double Throw  
 Snap action contacts (2NC/2NO)



### Actuators



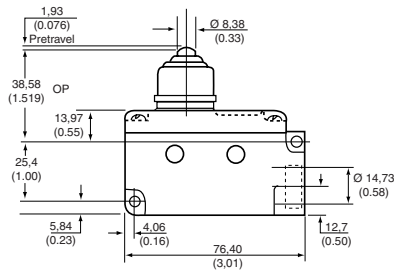
### Top roller plunger, perpendicular, without boot seal



CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	PG 13.5		BZE7-2RQ81-PG

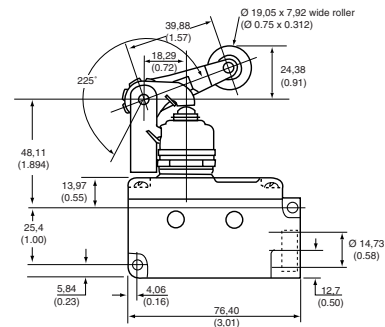
### OPTIONS

#### Top pin plunger With boot seal



CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	PG 13.5		BZE7-2RN-PG
SPDT	20 mm		BZE7-2RN-C
DPDT	PG 13.5		DTE7-2RN-PG

#### Top roller lever, boot seal

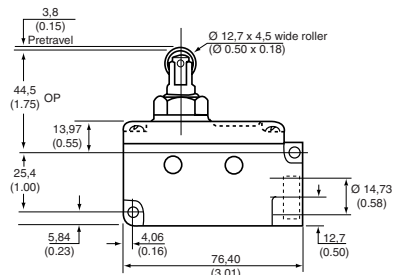


CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	PG 13.5		BZE7-2RN2-PG
SPDT	20 mm		BZE7-2RN2-C

#### Without boot seal

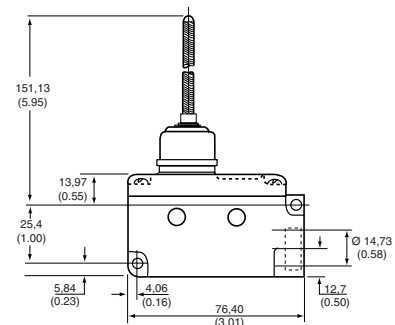
CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	PG 13.5		BZE7-2RQ-PG

#### Top roller plunger, parallel, without boot seal



CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	PG 13.5		BZE7-2RQ8-PG

#### Wobble, coil spring, boot seal



CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	PG 13.5		BZE7-2RN18-PG

# BAF/DTF Series High Capacity Enclosed Switches

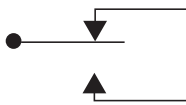


### Actuators

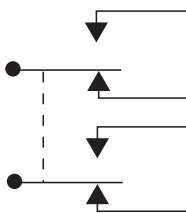


**Approvals:** UL, CSA  
**Sealing:** -2RQ9 NEMA 1, 3, 4, 13 NEMA 1  
**Operating temperature:** -32 °C to 71 °C (-25 °F to 160 °F)  
**Conduit:** ½ in - 14 NPT  
**Contacts:** Silver  
**Electrical ratings:** B UL/CSA Rating: 10 A, 125 or 250 Vac; 0.3 A, 125 Vdc; 0.15 A, 250 Vdc.  
 D UL/CSA Rating: 20 A, 125, 250 or 480 Vac; 1 Hp, 125 Vac; 2 Hp, 250 Vac; ½ A, 125 Vdc; ¼ A, 250 Vdc; Lamp Load - 10 A, 125 Vac.

**Switching options:**  
 D SPDT Single Pole, Double Throw Snap action contacts (1NC/1NO)



B DPDT Double Pole, Double Throw Snap action contacts (2NC/2NO)



The BAF/DTF Series is available with or without boot seals. The elastomer boot on sealed actuator versions protects the actuating mechanism and the internal basic switch from contamination. They are therefore suitable for wash-down applications. Both sealed and unsealed versions are available with the actuators on the right or left hand side.

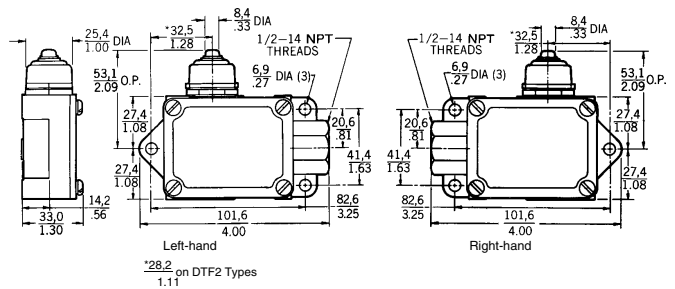
The cover plate is removable to allow ease of wiring and switch replacement without having to dismount the housing.

The BAF/DTF Series is suitable for use in packaging equipment, farm machinery, conveyors, overhead cranes and hoists.

## Momentary contact

### OPTIONS

#### Top pin plunger



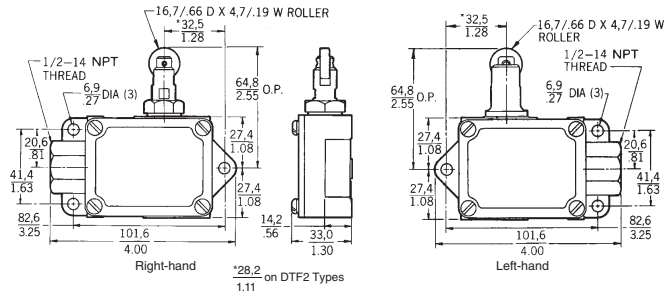
#### With boot seal

<b>Operating force max. (OF):</b>	BAF/DTF	11,2 N (2.5 lb)
<b>Pretravel max. (PT):</b>	BAF	2,39 mm (0.094 in)
	DTF	3,59 mm (0.141 in)
<b>Overtravel min. (OT):</b>	BAF	5,56 mm (0.219 in)
	DTF	3,96 mm (0.156 in)
<b>Differential travel max. (DT):</b>	BAF	0,26 mm (0.010 in)
	DTF	1,53 mm (0.060 in)
<b>Operating position (OP):</b>	BAF	53,19 mm (2.094 in)
	DTF	52,07 mm (2.050 in)

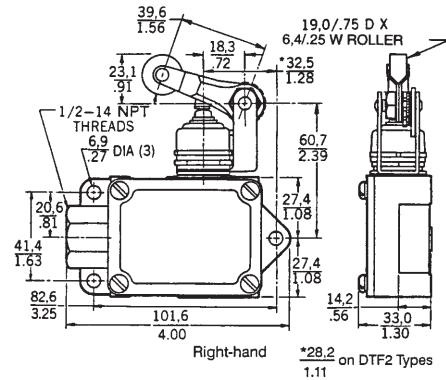
ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RN-RH
Left	SPDT	D	BAF1-2RN-LH
Right	DPDT	B	DTF2-2RN-RH
Left	DPDT	B	DTF2-2RN-LH

## Momentary contact (continued)

### Top roller plunger, parallel



### Roller arm, adjustable



### O-ring actuator seal

<b>Operating force max. (OF):</b>	BAF/DTF	35.6 N (8.0 lb)
<b>Pretravel max. (PT):</b>	BAF/DTF	3,18 mm (0.125 in)
<b>Overtravel min. (OT):</b>	BAF	4,75 mm (0.187 in)
	DTF	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	BAF	0,19 mm (0.0075 in)
	DTF	1,53 mm (0.060 in)
<b>Operating position (OP):</b>	BAF	64,69 mm (2.547 in)
	DTF	63,88 mm (2.515 in)

### With boot seal

<b>Operating force max. (OF):</b>	BAF	8,90 N (2.0 lb)
	DTF	11,1 N (2.5 lb)
<b>Pretravel max. (PT):</b>	BAF	5,56 mm (0.219 in)
	DTF	7,93 mm (0.312 in)
<b>Overtravel min. (OT):</b>	BAF	6,35 mm (0.25 in)
	DTF	5,56 mm (0.219 in)
<b>Differential travel max. (DT):</b>	BAF	0,51 mm (0.020 in)
	DTF	3,05 mm (0.120 in)

ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RQN8-RH
Left	SPDT	D	BAF1-2RQN8-LH
Right	DPDT	B	DTF2-2RQN8-RH
Left	DPDT	B	DTF2-2RQN8-LH

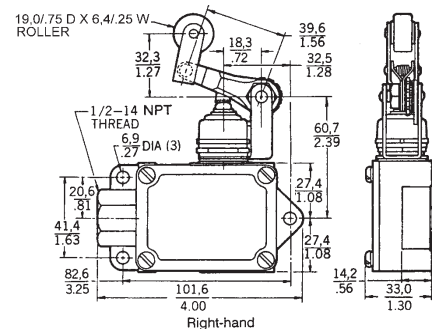
ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RN2-RH
Left	SPDT	D	BAF1-2RN2-LH
Right	DPDT	B	DTF2-2RN2-RH
Left	DPDT	B	DTF2-2RN2-LH

### Field adjustable roller plunger

Adjustable 360° horizontally

<b>Operating force max. (OF):</b>	BAF/DTF	11,2 N (2.5 lb)
<b>Pretravel max. (PT):</b>	BAF	2,39 mm (0.094 in)
	DTF	3,18 mm (0.125 in)
<b>Overtravel min. (OT):</b>	BAF	3,96 mm (0.156 in)
	DTF	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	BAF	0,26 mm (0.010 in)
	DTF	1,53 mm (0.060 in)
<b>Operating position (OP):</b>	BAF	64,69 mm (2.547 in)
	DTF	63,88 mm (2.515 in)

### One way roller lever



ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RQ9-RH
Left	SPDT	D	BAF1-2RQ9-LH
Right	DPDT	B	DTF2-2RQ9-RH
Left	DPDT	B	DTF2-2RQ9-LH

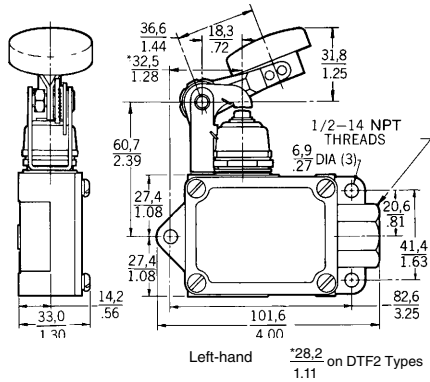
### With boot seal

<b>Operating force max. (OF):</b>		8,90 N (2.0 lb)
<b>Pretravel max. (PT):</b>		5,56 mm (0.219 in)
<b>Overtravel min. (OT):</b>		6,35 mm (0.25 in)
<b>Differential travel max. (DT):</b>		0,51 mm (0.020 in)

ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RN28-RH
Left	SPDT	D	BAF1-2RN28-LH

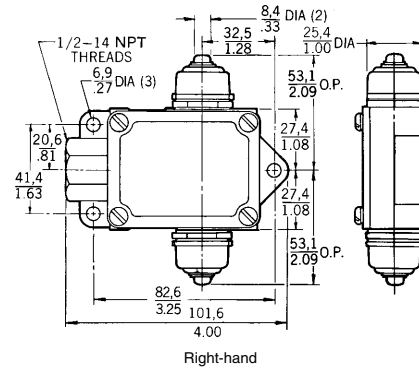
**BAF/DTF Series**  
**Momentary contact (continued)**

*Manual palm button*



**Maintained contact (reset) switches**

*Top pin plunger*



**With boot seal**

**Operating force max. (OF):** 8,90 N (2.0 lb)

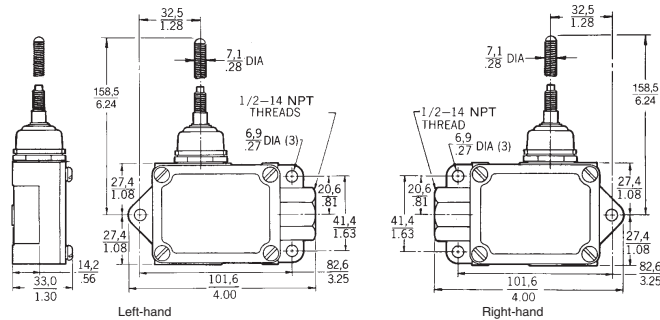
ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RN4-RH
Left	SPDT	D	BAF1-2RN4-LH

**With boot seal**

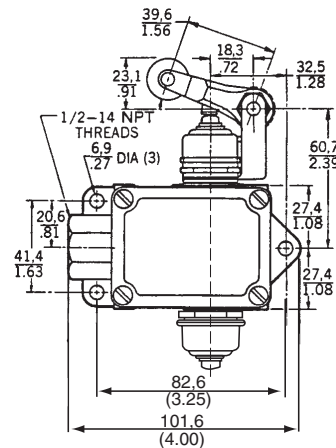
**Operating force max. (OF):** 7,79 N (1.75 lb)  
**Pretravel max. (PT):** 2,39 mm (0.094 in)  
**Overtravel min. (OT):** 5,56 mm (0.219 in)

ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	Maintained SPDT	D	BAF1-3RNX1

*Wobble, coil spring*



*Roller arm, adjustable*



**With boot seal**

**Pretravel max. (PT):** 15°

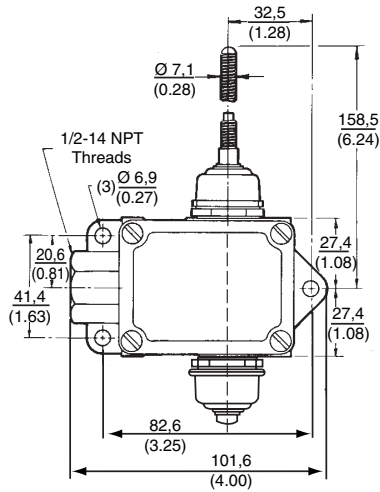
ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	SPDT	D	BAF1-2RN18-RH
Left	SPDT	D	BAF1-2RN18-LH

**With boot seals on roller arm and plunger**

**Operating force max. (OF):** 6,67 N (1.5 lb)  
**Pretravel max. (PT):** 5,56 mm (0.219 in)  
**Overtravel min. (OT):** 6,35 mm (0.25 in)  
**Operating position (OP):** 60,71 mm (2.390 in)

ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	Maintained SPDT	D	BAF1-3RN2X-RH
Left	Maintained SPDT	D	BAF1-3RN2X-LH

*Wobble, coil spring*

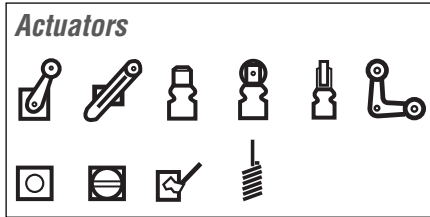


**With boot seals on wobble stick and plunger**

**Pretravel max. (PT):** 15°

ACTUATOR POSITION	CONTACT	ELECTRICAL RATING	REFERENCE
Right	Maintained SPDT	D	BAF1-3CN18X1

# HDLS Series Heavy Duty Limit Switches



**Levers:** Levers for side rotary types are ordered separately (see pages 69-71 for details)

The HDLS Series Heavy Duty Limit Switches offer a wide choice of mounting and actuator options. Housed in a rugged, die-cast zinc body which is epoxy coated for protection, they are perfectly suited to special applications in harsh duty environments where conventional limit switches may not be used. Versatile and full featured, they are designed for long life.

Listings referenced in this section are mainly standard. Low temperature and fluorocarbon (FC, high temperature) construction is available in all forms of HDLS limit switches. For temperature ranges see table opposite. Also available are factory sealed, pre-wired switches.

**Low temperature switches** have fluorosilicone diaphragm, shaft seals and external boot seal (where applicable) plus a low temperature lubricant. If prewired with cable, temperature limits are -10 °C (14 °F) flex and -30 °C (22 °F) no flex.

To order a low temperature version insert the additional letters **Y** and **B** as in the following example:  
LSA1A - standard side rotary plug-in switch  
LSYAB1A - low temperature version.

**Completely fluorocarbon (FC) sealed, high temperature, chemical resistance switches** have a full FC body gasket covering the switch cavity. Rotary types have an extra FC seal on the operating shaft, while plunger versions have FC boot seals. They are for use in applications where the environment includes fire-resistant synthetic fluids. The additional FC seals also promote longer operating life for rotary actuated HDLS switches in applications where the temperatures are normally -12 °C to 121 °C (10 °F to 250 °F). If prewired with cable, temperature limits are 105 °C (221 °F) dry and 60 °C (140 °F) wet.

To order a fluorocarbon (FC) sealed switch insert the additional letters **Y** and **C** as in the following example:  
LSA1A - standard side rotary plug-in switch  
LSYAC1A - completely FC sealed version.

**Factory sealed, pre-wired limit switches** have the entry area completely sealed and are available with 6 ft (1.83 m), ST00W-A cable or 4, 5 or 9-pin connectors. NEMA ratings are, for cable version 1, 4, 6, 6P, 12, for connector version 1, 4, 6, 6P, 12, 13.

To order a factory sealed switch add the appropriate letter:

Circuitry	Cable	½ in Connector (available with ½ in conduit tap only)
SPDT	<b>C</b>	<b>A</b> (4 pin mini) <b>B</b> (5 pin mini) <b>DD</b> (4 pin micro)
DPDT	<b>M</b> (¾ in only)	<b>R</b> (9 pin)

Example:

- LSA1AC - LSA1A with 6 ft of 5 conductor ST00W-A cable
- LSJ2BM-7N - LSJ2B-7N with 6 ft of 9 conductor ST00W-A cable
- LSA1AB - LSA1A with 5 pin receptacle
- LSA1ADD - 4 pin micro-change connector

### Electrical ratings

10 amps continuous carry. Circuits on any one pole must be the same polarity.

#### ac Volts

Pilot duty: 600 Vac, 720 VA

	Vac	Amps at 0.35 Power Factor	
		Make	Break
A	120	60	6
SPDT	240	30	3
NEMA	480	15	1.5
A600	600	12	1.2
B	120	30	3
DPDT	240	15	1.5
NEMA	480	7.5	0.75
B600	600	6	0.60
C	250 Vac or 60 Vdc, 0.050 amp max.		
SPDT/DPDT			

#### dc Volts

Pilot duty: 240 Vdc, 30 watts

	Vdc	Make and Break Amps	
		Inductive	Resistive
A	120	0.25	0.8
SPDT	240	0.15	0.4
B	120	0.25	0.8
DPDT	240	0.15	0.4
C	250 Vac or 60 Vdc, 0.050 amp max.		
SPDT/DPDT			

**Operating temperatures**

	Standard HDLS				Low Temperature HDLS				High Temperature HDLS (Fluorocarbon Sealed*)		
	Low Limit		High Limit		Low Limit		High Limit		Low Limit		High Limit
	10 °F -12 °C	30 °F -1 °C	200 °F 93 °C	250 °F 121 °C	-40 °F -40 °C	-20 °F -29 °C	200 °F 93 °C	250 °F 121 °C	10 °F -12 °C	30 °F -1 °C	250 °F 121 °C
LSA - Side Rotary Momentary	X			X	X			X	X		X
LSB - Top Rotary		X		X		X		X		X	X
LSC - Top Plain Plunger	X		X		X		X		X		X
LSD - Top Roller Plunger	X		X		X		X		X		X
LSE - Side Plain Plunger	X		X			X	X		X		X
LSF - Side Roller Plunger	X		X			X	X		X		X
LSG - Side Plunger Maintained		X	X			X	X			X	X
LSH - Side Rotary, Low P.T., Low Torque		X		X		X		X		X	X
LSJ - Wobble Stick	X		X		X			X	X		X
LSK - Cat Whisker	X		X			X		X	X		X
LSL - Side Rotary Sequence	X			X	X			X	X		X
LSM - Side Rotary Center Neutral		X		X	X			X		X	X
LSN - Side Rotary Maintained		X		X		X		X		X	X
LSP - Side Rotary, Low Pretravel	X			X	X			X	X		X
LSR - Side Rotary, Low Torque		X		X		X		X		X	X
LSU - Side Rotary, Low Pretravel	X			X	X			X	X		X
LSV - Top Adjustable Plunger	X		X		X		X		X		X
LSW - Side Adjustable Plunger	X		X			X	X		X		X

\*For HDLS application wherein the upper temperature limit is normally above 200 °F (93 °C), much longer switch life can be obtained by using

completely fluorocarbon-sealed switches rather than the standard HDLS.

**Environmental seal performance**

Std. Seals	Cellulube	Detergent	5 Star	ASTM #1	ASTM #2	ASTM #3	ASTM #4	Houghto Safe 260, 271	Houghto Safe 1010, 1055, 1120	Mineral Oil	Petr. Oil Crude	Silicon Gr. & Oil	Sunsafe	Beer	Stoddard Solv.	Chlorinated Solvents	Citric Acids	Di-ester Syn. Lubricant	Ozone	Pydraul	Pyroguard	Petr. Base Hydraulic Oil	Lard Oil	Silicate Esters
LSA	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSB	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSC	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSD	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSE	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSF	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSG	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSH	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSJ	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSK	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSL	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSM	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSN	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSP	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSR	4	1	1	1	1	1	2	1	4	1	1	1	1	1	1	4	1	2	4	4	4	1	1	2
LSV	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2
LSW	4	2	2	1	2	4	4	2	4	2	2	1	2	1	2	4	1	4	3	4	4	2	2	2

All HDLS with seals of:

Fluorosilicone (Low Temp. HDLS)	4	1	1	1	1	1	2	2	4	1	1	1	1	1	1	1	1	2	1	4	4	1	1	1
Fluorocarbon (High Temp. HDLS)	1*	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

\*Fluorocarbon seals good for all Cellulubes Except A60 CODE:

1 J Satisfactory  
2 J Fair

3 J Doubtful  
4 J Unsatisfactory



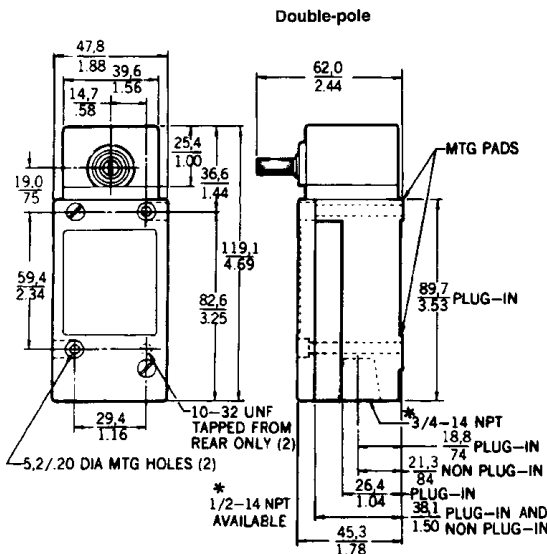
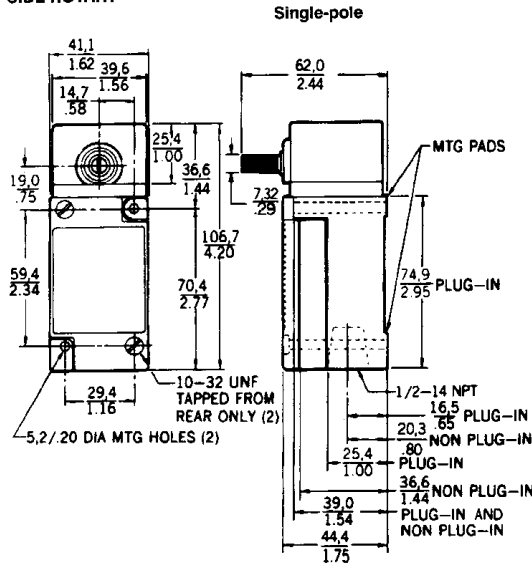
**HDLS Series Side rotary actuated switches**

**Levers:** Levers for side rotary types are ordered separately (see pages 69-71 for details)

<b>Approvals:</b>	NEMA 1, 3, 4, 4X, 6, 6P, 12, 13 UL, CSA, CE
<b>Operating force (Newton meters, N m/in lb):</b>	LSA, LSL, LSM, LSM, LSP, LSU      0,45 N m max. 4 in lb max. LSH, LSR      0,19 N m max. 1.7 in lb max ½ in - 14 NPT      Silver Gold Snap action contacts
<b>Conduit:</b>	
<b>Contacts:</b>	Electrical ratings A, B Electrical rating C
<b>Switching options:</b>	



**SIDE ROTARY**

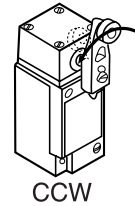
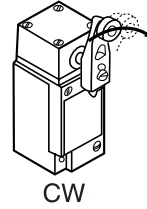


**Side rotary, momentary action**

The momentary action listings shown are factory assembled with the head adjusted for both clockwise (CW) and counterclockwise (CCW) operation. The shaft of side rotary heads face the front (label side of switch).

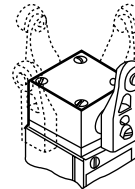
**Actuation direction**

A simple field adjustment converts switch to accept actuation from one or both directions. For ready reference, adjustment instructions are cast into the internal lid of side rotary heads.



**Head orientation**

The head may be orientated and locked in any of four 90° positions.



Momentary action switches can be factory assembled for operation in one direction only and/or with the shaft facing the rear or either side. Contact Honeywell for more information.

**OPTIONS**

**Standard**

<b>Pretravel:</b>		15° max.
<b>Differential travel:</b>	SPDT	5° max.
	DPDT	7° max.
<b>Overtravel:</b>		60° min.

**Plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSA1A
SPDT		C	LSA1E
DPDT	¾ in	B	LSA2B
DPDT		B	LSA6B
DPDT		C	LSA6S
SPDT	20 mm	A	LS4A1A
DPDT	20 mm	B	LS4A2B

**Non plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSA3K
DPDT	¾ in	B	LSA4L
SPDT	20 mm	A	LS4A3K

**Low differential travel**

<b>Pretravel:</b>		9° max.
<b>Differential travel:</b>	SPDT	3° max.
	DPDT	4° max.
<b>Overtravel:</b>		66° min.

**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSP1A
SPDT	C	LSP1E
DPDT	B	LSP2B
DPDT	B	LSP6B
DPDT	C	LSP6S

**Non plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSP3K
DPDT	¾ in	B	LSP4L

**Low torque**

<b>Pretravel:</b>		15° max.
<b>Differential travel:</b>	SPDT	5° max.
	DPDT	7° max.
<b>Overtravel:</b>		60° min.

**Plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSR1A
SPDT		C	LSR1E
DPDT	¾ in	B	LSR2B
DPDT		B	LSR6B
DPDT		C	LSR6S

**Non plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSR3K
DPDT	¾ in	B	LSR4L

**Low differential, low torque**

<b>Pretravel:</b>		9° max.
<b>Differential travel:</b>	SPDT	3° max.
	DPDT	4° max.
<b>Overtravel:</b>		66° min.

**Plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSH1A
SPDT		C	LSH1E
DPDT	¾ in	B	LSH2B
DPDT		B	LSH6B
DPDT		C	LSH6S

**Non plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSH3K
DPDT	¾ in	B	LSH4L

**5° Pretravel**

<b>Pretravel:</b>		5° max.
<b>Differential travel:</b>	SPDT	3° max.
	DPDT	4° max.
<b>Overtravel:</b>		70° min.

**Plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSU1A
SPDT		C	LSU1E
DPDT	¾ in	B	LSU2B
DPDT		B	LSU6B
DPDT		C	LSU6S

**Non plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT		A	LSU3K
DPDT	¾ in	B	LSU4L

**Side rotary, additional circuitry/ action**

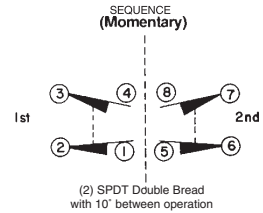
The following listings, sequential, centre neutral and maintained switches, are assembled with the operating shaft facing front. The user can position and lock the head with the shaft to rear or either side. They can also be factory assembled with the shaft to rear or either side. Contact Honeywell for more information.

**OPTIONS**

**Sequential**

One pole operates before the other in each direction, with 10° lever travel between operations.

<b>Pretravel:</b>	1st pole 15° max.
	2nd pole additional 10° max.
<b>Differential travel:</b>	Each pole 5° max.
<b>Overtravel:</b>	48° min.
<b>Switching options:</b>	



**Plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
DPDT	¾ in	B	LSL2C
DPDT		B	LSL6C

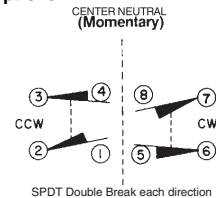
**Non plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
DPDT	¾ in	B	LSL4M
DPDT		B	LSL7M

**Centre neutral**

One pole operates on clockwise rotation, the other on counterclockwise rotation.

<b>Pretravel:</b>	18° max.
<b>Differential travel:</b>	10° max.
<b>Overtravel:</b>	57° min.
<b>Switching options:</b>	



**Plug in**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
DPDT	¾ in	B	LSM2D
SPDT	20 mm	B	LS4M2D
DPDT		B	LSM6D

**Non plug in**

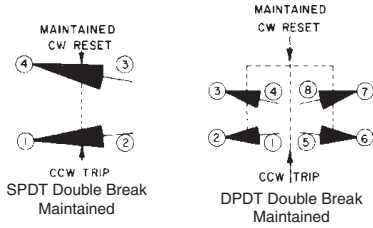
CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
DPDT	¾ in	B	LSM4N
DPDT		B	LSM7N

**HDLS Series  
Side rotary actuated  
switches (continued)**

**Maintained contact, 2 position**

Operation is maintained on counterclockwise rotation, reset on clockwise rotation and vice versa.

**Pretravel:** 65° max.  
**Differential travel:** 40° max.  
**Overtravel:** 20° min.  
**Switching options:** SPDT DPDT



**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSN1A
DPDT	B	LSN6B

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSN3K
DPDT	B	LSN7L

**Plunger actuated switches**

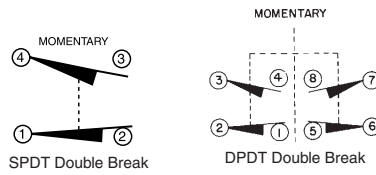
HDLS plunger actuated switches are available with either top or side facing plungers for application flexibility. Switches with adjustable plungers simplify installation. They have a hex setscrew and locknut on the plunger, providing an adjustment range of 0.25 in (6.35 mm).

**Assembled conditions**

The listing shown are factory assembled with side plungers facing front (label side of switch); rollers on side plungers are in horizontal position. Rollers on top plunger switches are parallel to mounting surface. Other options are available. Contact Honeywell for more information.

**Approvals:** NEMA 1, 3, 4, 4X, 6, 6P, 12, 13  
UL, CSA, CE  
**Conduit:** ½ in - 14 NPT

**Contacts:** Electrical ratings A, B Silver  
Electrical rating C Gold  
**Switching options:** Snap action contacts  
SPDT DPDT

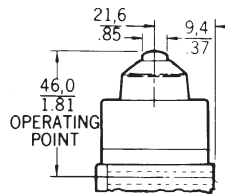


**Top plungers, momentary action**

**Pretravel:** 1,78 mm (0.07 in) max.  
**Differential travel:** SPDT 0,38 mm (0.015 in) max.  
DPDT 0,51 mm (0.02 in) max.  
**Overtravel:** 4,83 mm (0.19 in) max.  
**Operating force:** 17,8 N m (4 lb) max.

**OPTIONS**

**Top pin plunger**



**Operating point:** 45,8 mm ± 0,76  
1.805 in ± 0.030

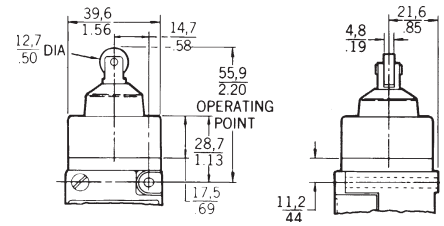
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSC1A
SPDT	C	LSC1E
DPDT	B	LSC6B
DPDT	C	LSC6S

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSC3K
DPDT	B	LSC7L

**Top roller plunger**



**Operating point:** 55,9 mm ± 1,02  
2,20 in ± 0.040

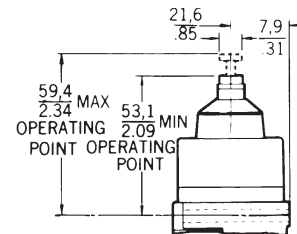
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSD1A
SPDT	C	LSD1E
DPDT	B	LSD6B
DPDT	C	LSD6S

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSD3K
DPDT	B	LSD7L

**Adjustable plunger**



**Operating point:** 53,0 mm to 59,3 mm  
2.085 in to 2.335 in

**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSV1A
SPDT	C	LSV1E
DPDT	B	LSV6B
DPDT	C	LSV6S

**Non plug in**

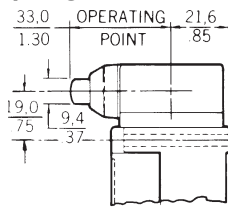
CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSV3K
DPDT	B	LSV7L

**Side plungers, momentary action**

**Pretravel:** 2,54 mm (0.100 in) max.  
**Differential travel:**  
 SPDT 0,64 mm (0.025 in) max.  
 DPDT 0,89 mm (0.035 in) max.  
**Overtravel:** 4,83 mm (0.19 in) min.  
**Operating force:** 26,7 N m (6 lb) max.

**OPTIONS**

**Side pin plunger**



**Operating point:** 33 mm ± 0,76  
 1.300 in ± 0.030

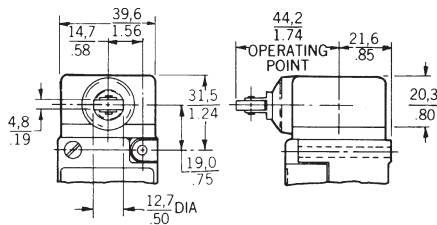
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSE1A
SPDT	C	LSE1E
DPDT	B	LSE6B
DPDT	C	LSE6S

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSE3K
DPDT	B	LSE7L

**Side roller plunger**



**Operating point:** 44,1 mm ± 1,02  
 1.735 in ± 0.040

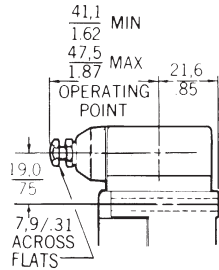
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSF1A
SPDT	C	LSF1E
DPDT	B	LSF6B
DPDT	C	LSF6S

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSF3K
DPDT	B	LSF7L

**Adjustable side roller plunger**



**Operating point:** 41,0 mm to 47,4 mm  
 1.615 in to 1.865 in

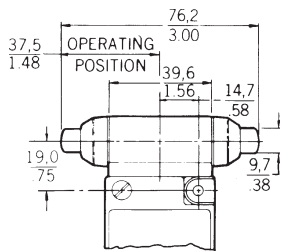
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSW1A
SPDT	C	LSW1E
DPDT	B	LSW6B
DPDT	C	LSW6S

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSW3K
DPDT	B	LSW7L

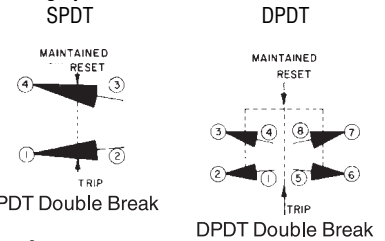
**Side plunger, maintained circuitry**



LSG contact transfer is maintained after either plunger is operated. Operation of other plunger resets switch.

**Pretravel:** 4,32 mm (0.170 in) max.  
**Differential travel:**  
 SPDT 2,29 mm (0.090 in) max.  
 DPDT 2,29 mm (0.090 in) max.  
**Overtravel:** 2,00 mm (0.0.80 in) max.  
**Operating force:** 44,5 N m (10 lb) min.  
**Operating point:** 37,6 ± 0,76 mm  
 1.48 ± 0.030 in

**Switching options:**



**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSG1A
SPDT	C	LSG1E
DPDT	B	LSG6B
DPDT	C	LSG6S

**Non plug in**

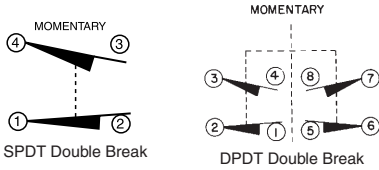
CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSG3K
DPDT	B	LSG7L

**HDLS Series**  
**Wobble actuated switches**

Momentary action wobble actuated switches have flexible levers which may be operated with any movement, except direct pull.

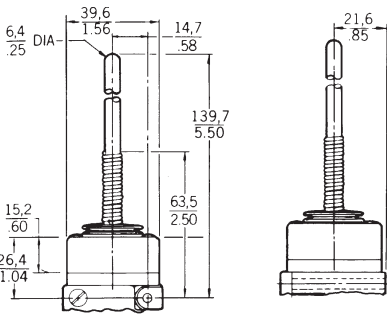
**Approvals:** NEMA 1, 3, 4, 4X, 6, 6P, 12, 13  
UL, CSA, CE  
**Conduit:** ½ in - 14 NPT

**Contacts:** Silver  
**Electrical ratings A, B**  
**Switching options:** Snap action contacts  
SPDT DPDT



**OPTIONS**

**Plastic rod**



**Pretravel (approx) (Radius):** 25,4 mm (1.0 in)  
**Operating force:** 2,78 g (10 oz) max.

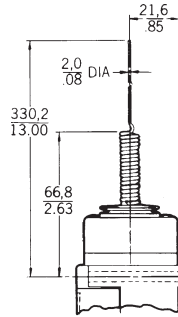
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSJ1A-7A
DPDT	B	LSJ6B-7A

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSJ3K-7A
DPDT	B	LSJ7L-7A

**Spring wire**



**Pretravel (approx) (Radius):** 102,0 mm (4.0 in)  
**Operating force:** 1,39 g (5 oz) max.

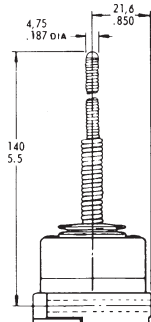
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSJ1A-7M
DPDT	B	LSJ6B-7M

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSJ3K-7M
DPDT	B	LSJ7L-7M

**Cable**



**Pretravel (approx) (Radius):** 38,0 mm (1.5 in)  
**Operating force:** 1,95 N (7.0 oz) max.

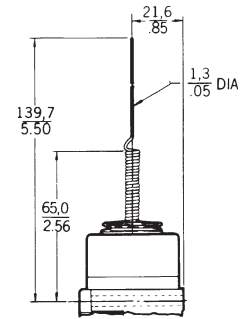
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSJ1A-7N
DPDT	B	LSJ6B-7N

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSJ3K-7N
DPDT	B	LSJ7L-7N

**Cat whisker**



**Pretravel (approx) (Radius):** 51,0 mm (2.0 in)  
**Operating force:** 1,39 N (5.0 oz) max.

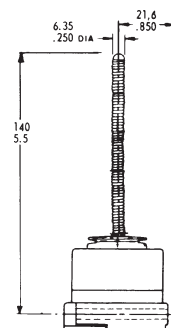
**Plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSK1A-8A
DPDT	B	LSK6B-8A

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSK3K-8A
DPDT	B	LSK7L-8A

**Coil spring**



**Pretravel (approx) (Radius):** 51,0 mm (2.0 in)  
**Operating force:** 1,95 N (7.0 oz) max.

**Plug in**

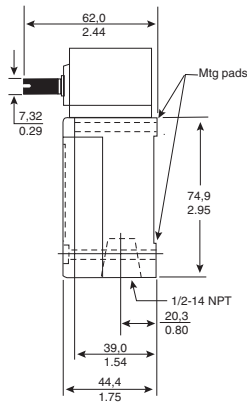
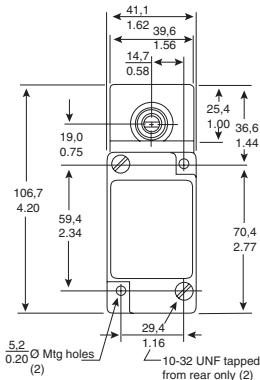
CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSK1A-8C
DPDT	B	LSK6B-8C

**Non plug in**

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LSK3K-8C
DPDT	B	LSK7L-8C

# Fully potted HDLS

Fully potted HDLS are designed to meet the demanding requirements of NEMA 1, 3, 4, 6, 6P and 13 for wet applications where the integrity of the conduit seal must be assured. These switches are the same as the standard HDLS non plug in limit switch except that the conduit entrance is factory sealed to simplify installation and ensure integrity of the conduit seal. They are epoxy filled and supplied with six feet of 5 or 9 conductor 16 gauge STO cable. Fully potted HDLS are built with all Fluorocarbon seals. Sealing exceeds Nema 6P. Low temperature versions are available, see page 4 for temperature range and how to order.



**Approvals:**

Connector NEMA 1, 4, 6, 6P, 12, 13  
 Cable NEMA 1, 4, 6, 6P, 12  
 UL, CSA, CE

**Operating temperature:**

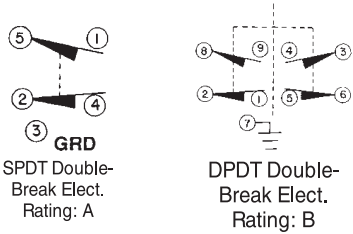
Cable versions -12 °C to 105 °C  
 10 °F to 221 °F  
 Connector versions -12 °C to 121 °C  
 10 °F to 250 °F

**Cable length:**

3,658 m (12 ft)

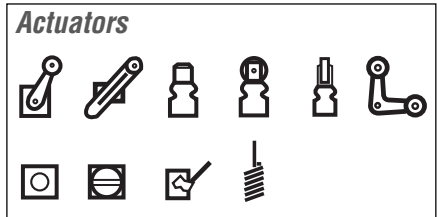
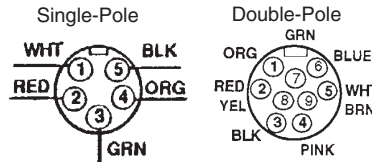
**Contacts:** Electrical ratings A, B Silver

**Switching options:** Snap action contacts



**Wiring diagrams:**

Numbers = Connectors  
 Colours = Cables



## Side rotary actuated switches

**Levers:** Levers for side rotary types are ordered separately (see pages 69-71 for details)

### OPTIONS

**Standard**

<b>Pretravel:</b>		15° max.
<b>Differential travel:</b>	SPDT	5° max.
	DPDT	7° max.
<b>Overtravel:</b>		60° min.
<b>Operating force:</b>		0,45 N m (4 in lb) max.

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSYAC3KP-FP
DPDT Cable	B	LSYAC4LX-FP
SPDT 5-pin Connector	A	LSYAC3KQ-FP
DPDT 9-pin Connector	B	LSYAC7LR-FP

### Low differential travel

<b>Pretravel:</b>		9° max.
<b>Differential travel:</b>	SPDT	3° max.
	DPDT	4° max.
<b>Overtravel:</b>		66° min.
<b>Operating force:</b>		0,45 N m (4 in lb) max.

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSYPC3KP-FP
DPDT Cable	B	LSYPC4LX-FP
SPDT 5-pin Connector	A	LSYPC3KQ-FP
DPDT 9-pin Connector	B	LSYPC7LR-FP

### 5° Pretravel

<b>Pretravel:</b>		5° max.
<b>Differential travel:</b>	SPDT	3° max.
<b>Overtravel:</b>		70° min.
<b>Operating force:</b>		0,45 N m (4 in lb) max.

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSYUC3KP-FP
SPDT 5-pin Connector	A	LSYUC3KQ-FP

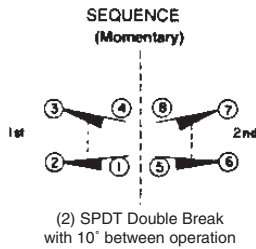
For low temperature versions substitute "Y\_B" for "Y\_C"

**Fully potted HDLS  
(continued)**

**Side rotary actuated switches**

**Sequential**

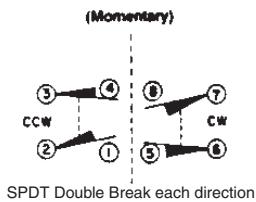
**Pretravel:** 1st pole 15° max.  
2nd pole additional 10° max.  
**Differential travel:** Each pole 5° max.  
**Overtravel:** 48° max.  
**Operating force:** 0,45 N m (4 in lb) max.  
**Switching options:** DPDT



CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
DPDT Cable	B	LSYLC4MX-FP
DPDT 9-pin Connector	B	LSYLC7MR-FP

**Centre neutral**

**Pretravel:** 18° max.  
**Differential travel:** 10° max.  
**Overtravel:** 57° min.  
**Operating force:** 0,45 N m (4 in lb) max.  
**Switching options:** DPDT



CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
DPDT Cable	B	LSYMC4NX-FP
DPDT 9-pin Connector	B	LSYMC7NR-FP

**Plunger actuated switches**

**OPTIONS**

**Top plungers**

**Pretravel:** 1,78 mm (0.07 in) max.  
**Differential travel:** SPDT 0,38 mm (0.015 in) max.  
DPDT 0,51 mm (0.02 in) max.  
**Overtravel:** 4,83 mm (0.19 in) min.  
**Operating force:** 17,8 N m (4 lb) max.

**Top pin plunger**

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSYCC3KP-FP
DPDT Cable	B	LSYCC4LX-FP
SPDT 5-pin Connector	A	LSYCC3KQ-FP
DPDT 9-pin Connector	B	LSYCC7LR-FP

**Top roller plunger**

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSYDC3KP-FP
DPDT Cable	B	LSYDC4LX-FP
SPDT 5-pin Connector	A	LSYDC3KQ-FP
DPDT 9-pin Connector	B	LSYDC7LR-FP

**Side plungers**

**Pretravel:** 2,54 mm (0.100 in) max.  
**Differential travel:** SPDT 0,38 mm (0.015 in) max.  
DPDT 0,51 mm (0.02 in) max.  
**Overtravel:** 4,83 mm (0.19 in) min.  
**Operating force:** 26,7 N m (6 lb) max.

**Side pin plunger**

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSYEC3KP-FP
DPDT Cable	B	LSYEC4LX-FP
SPDT 5-pin Connector	A	LSYEC3KQ-FP
DPDT 9-pin Connector	B	LSYEC7LR-FP

**Wobble actuated switches**

Actuator codes **:	Head style*
7A	Delrin rod J
7M	Spring wire J
8A	Cat whisker K
7N	Cable J
8C	Coil spring K

CONTACT TERMINATION	ELECTRICAL RATING	REFERENCE
SPDT Cable	A	LSY*C3KP-**FP
DPDT Cable	B	LSY*C4LX-**FP
SPDT 5-pin Connector	A	LSY*C3KQ-**FP
DPDT 9-pin Connector	B	LSY*C7LR-**FP

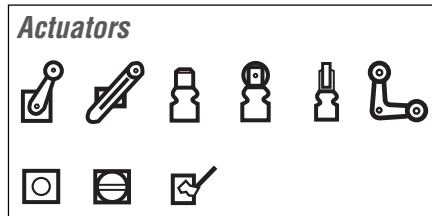
*For low temperature versions substitute "Y\_B" for "Y\_C"*

# Stainless steel HDLS

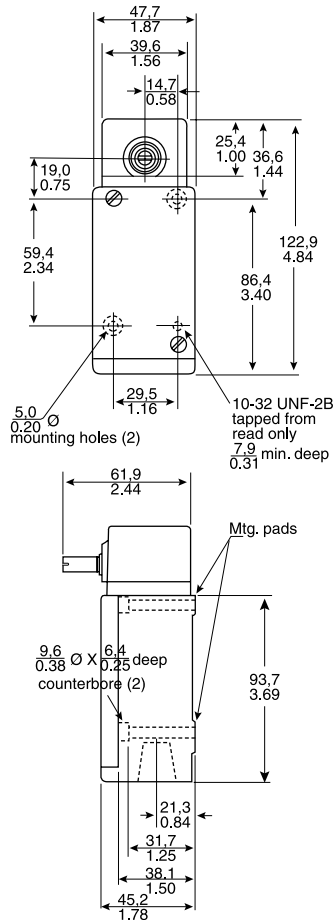
HDLS stainless steel switches are designed for use in highly corrosive environments such as petro-chemical plants, food processing plants, shipboard and dockside locations. The type 316 cast stainless steel body is designed to minimise crevices where food particles could become trapped. The actuator, operating head and screws are also stainless steel. All seals are Fluorocarbon to provide excellent chemical resistance and to withstand operating temperatures up to 121 °C (250 °F) and pressurised steam cleaning.

**Approvals:** NEMA 1, 3, 3R, 4, 4X, 6, 6P, 12, 13  
UL, CSA, CE  
**Operating temperature:** -12 °C to 121 °C  
10 °F to 250 °F  
**Contacts:** Electrical ratings A, B Silver

**Levers:** Levers for side rotary types are ordered separately (see pages 69-71 for details)



## Side rotary actuated switches



### OPTIONS

#### Standard

**Pretravel:** 15° max.  
**Differential travel:** SPDT 5° max.  
DPDT 7° max.  
**Overtravel:** 60° min

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LS2A4K
DPDT	B	LS2A4L

#### Low Torque

**Pretravel:** 9° max.  
**Differential travel:** SPDT 3° max.  
DPDT 4° max.  
**Overtravel:** 60° min.

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LS2H4K
DPDT	B	LS2H4L

#### Centre neutral

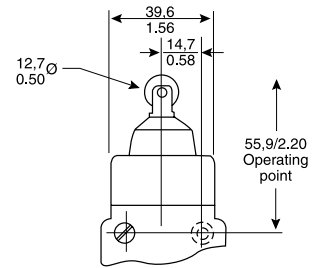
**Pretravel:** 18° max.  
**Differential travel:** DPDT 10° max.  
**Overtravel:** 57° min.

CONTACT	ELECTRICAL RATING	REFERENCE
DPDT	B	LS2M4N

## Plunger actuated switches

### OPTIONS

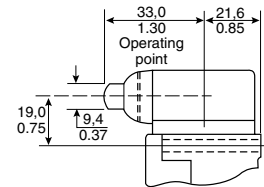
#### Top roller plunger



**Pretravel:** 1.78 mm (0.07 in) max.  
**Differential travel:** 0.38 mm (0.015 in) max.  
**Overtravel:** 4.83 mm (0.19 in) min.  
**Operating point:** 55.9 mm ± 1.02  
2.20 in ± 0.04

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LS2D4K
DPDT	B	LS2D4L

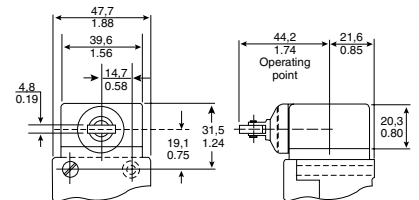
#### Side pin plunger



**Pretravel:** 2.54 mm (1.00 in) max.  
**Differential travel:** 0.64 mm (0.025 in) max.  
**Overtravel:** 4.83 mm (0.19 in) min.  
**Operating point:** 33 mm ± 0.76  
1.3 in ± 0.03

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LS2E4K
DPDT	B	LS2E4L

#### Side roller plunger



**Pretravel:** 2.54 mm (1.00 in) max.  
**Differential travel:** 0.64 mm (0.025 in) max.  
**Overtravel:** 4.83 mm (0.19 in) min.  
**Operating point:** 44.1 mm ± 1.02  
1.73 in ± 0.04

CONTACT	ELECTRICAL RATING	REFERENCE
SPDT	A	LS2F4K
DPDT	B	LS2F4L



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# Explosion proof switches

Honeywell explosion proof switches are designed specifically for use in hazardous locations. To comply with explosion proof requirements, the flame path within the housing is designed to contain and cool the escaping hot gases that otherwise could cause an explosion outside the switch.

Switches are available with UL/CSA for North America. See information below and product pages for details. In Europe, the usage is governed under the European Directive on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/EC) commonly referred to as the ATEX Directive.

The BX, CX and GXE product families comply to the following ATEX Directive: EExd IIC T6 Category II 2 GD

The 14CE100 product family complies to the following ATEX Directive: EExd IIC T6 Category II 2 G

## NEMA TYPE 7, CLASS I FLAMMABLE GASES OR VAPORS

**Type 7 enclosures** are for use indoors in locations classified as Class I, Groups B, C, or D by the National Electrical Code.

Group B — (only switches so noted in the order guides include this listing). Atmospheres containing hydrogen or manufactured gas.

Group C — atmospheres containing diethyl ether, ethylene, or cyclopropane.

Group D — Atmospheres containing gasoline, hexane, butane, naptha, propane, acetone, toluene or isoprene.

### Division 1

Locations in which hazardous agents are present under normal operating conditions.

### Division 2

Locations in which hazardous agents may be present only in case of accidental rupture or breakdown.

All Honeywell listings covered in Division 1 are also covered in the same groups in Division 2.

## NEMA TYPE 9, CLASS II COMBUSTIBLE DUSTS

**Type 9 enclosures** are for use in indoor locations classified as Class II, Groups E, F or G, as defined in the National Electrical Code.

Group E — Atmospheres containing metal dust.

Group F — Atmospheres containing carbon black, coal dust or coke dust.

Group G — Atmospheres containing flour, starch or grain dust.

## ATEX EExd

EExd	II	c	T6	Category II 2	G	D
Flameproof enclosure	Places with potentially explosive atmospheres, other than mines susceptible to fire damp	Atmosphere may contain gases from groups A, B or C from table in EN50014, Annex A	Maximum surface temperature of 85 °C (185 °F)	Areas in which an explosion proof atmosphere is likely to occur	Gas could be present	Dust could be present



# 14CE100 Series Miniature Enclosed, Explosion Proof Switches



### Actuators



The 14CE100 Series has been designed for use in explosive environments. It is approved to meet the requirements of the Low Voltage directive and is CE marked. The prewired construction allows for ease of installation where space is at a premium and external operating conditions can be difficult.

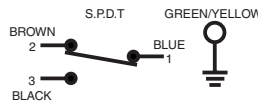
**Mechanical life:** 10 million  
**Sealing:** Standard IP65, NEMA 1, 3  
 Boot sealed IP67, NEMA 1, 3, 4 12, 13  
**Operating temperature:** 0 °C to 70 °C (32 °F to 158 °F)  
**Approvals:** CE, PTB 98 ATEX 1064 X EExd IIC T6 Category II 2 G  
 AC14 D300  
 DC13 R300  
 11,8 N max.

**Operating force (OF):**  
**Pretravel (PT):** 1,8 mm (0.71 in) max.  
**Overtravel (OT):** 3,0 mm (0.118 in) min.  
**Differential travel (DT):** 0,1mm (0.004 in) max.

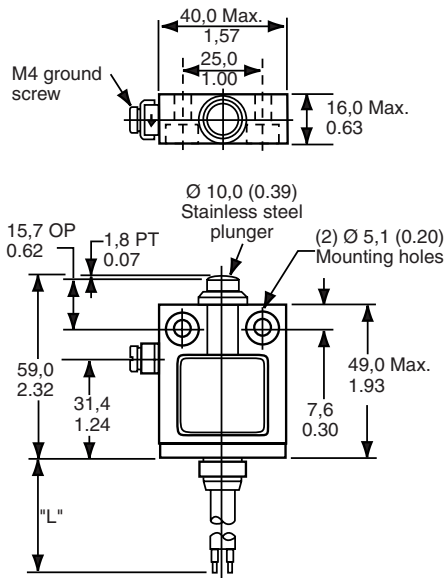
**Contacts:** Standard Silver  
 -\*G Gold

**Connection:** Harmonised CENELEC 4 x 0,75 mm<sup>2</sup> cable

**Switching options:** SPDT  
 Single Pole, Double Throw  
 Snap action contacts (1NC/1NO)

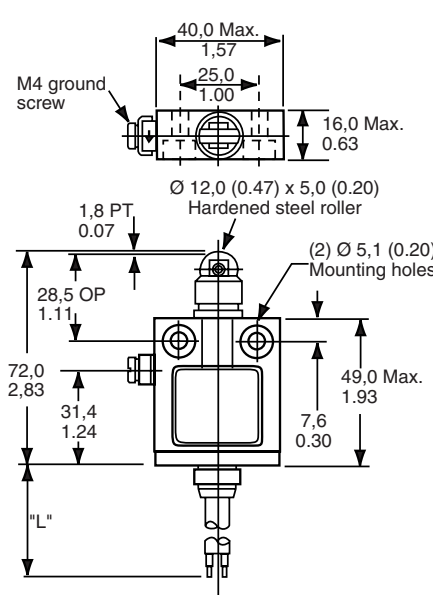


### Top pin plunger



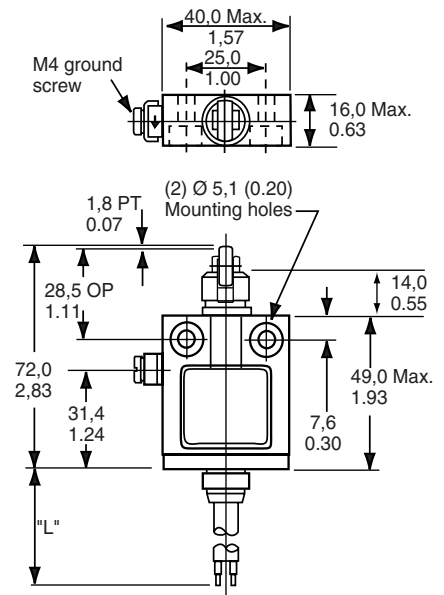
CABLE LENGTH	REFERENCE
1 m (3.3 ft)	14CE101-1
2 m (6.6 ft)	14CE101-2
3 m (9.9 ft)	14CE101-3
4 m (13.2 ft)	14CE101-4
5 m (16.5 ft)	14CE101-5
6 m (19.8 ft)	14CE101-6
10 m (33.0 ft)	14CE101-10

### Top roller plunger, parallel



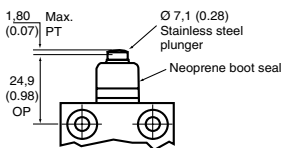
CABLE LENGTH	REFERENCE
1 m (3.3 ft)	14CE102-1
3 m (9.9 ft)	14CE102-3
3 m (9.9 ft)	Gold contacts 14CE102-3G
5 m (16.5 ft)	14CE102-5
6 m (19.8 ft)	14CE102-6
6 m (19.8 ft)	Gold contacts 14CE102-6G
8 m (26.4 ft)	14CE102-8
12 m (39.6 ft)	14CE102-12
15 m (49.5 ft)	14CE102-15

### Top roller plunger, perpendicular



CABLE LENGTH	REFERENCE
1 m (3.3 ft)	14CE103-1
3 m (9.9 ft)	14CE103-3

### Boot sealed



CABLE LENGTH	REFERENCE
1 m (3.3 ft)	14CE118-1
6 m (19.8 ft)	14CE118-6
10 m (33.0 ft)	14CE118-10

# GXE Series Explosion Proof Limit Switches

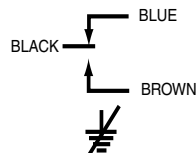


**Actuators**

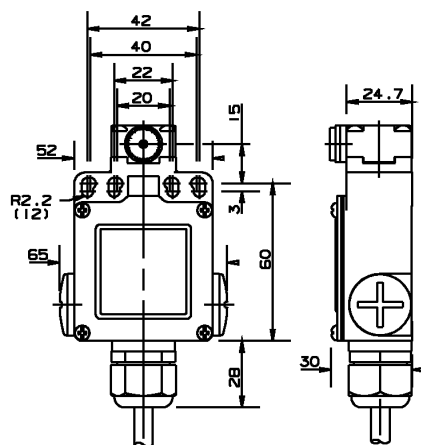


The GXE Series explosion proof limit switches are designed specifically for use in hazardous applications. The GXE enclosure is fully potted and has sealing protection of IP66/67 as per IEC/EN 60529. The entire GXE Series complies with the European Directive on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/EC) commonly referred to as the ATEX Directive.

**Mechanical life:** 2 million  
**Sealing:** IP66/67, EN 60529  
**Operating temperature:** -20 °C to 75 °C (-4 °F to 167 °F)  
**Approvals:** CE, EN 50014, EN 50018, EN 50281-1-1  
 KEMA 00 ATEX 2103 X EExd IIC T6 Category II 2 GD  
 AC15  
 DC13  
 Silver  
**Contacts:** Single Pole, Double Throw  
**Connection:** 5 metre, HO5VV-F, 3 x 0,75 mm<sup>2</sup> cable  
**Switching options:** Snap action contacts (1NC/1NO)  
 SPDT



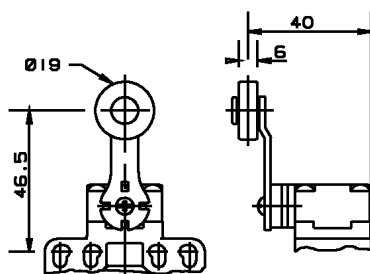
## GXE Series



**Operating force max. (OF):** 16 N (3.6 lb)

## OPTIONS

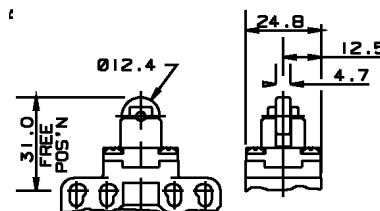
### Side rotary roller lever



**Overtravel min. (OT):** 6,0 mm (0.0236 in)  
**Differential travel max. (DT):** 8°  
**Operating position max. (PT):** 26

REFERENCE  
GXE51A1B

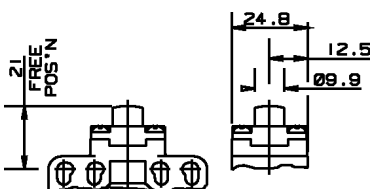
### Top roller plunger, parallel



**Overtravel min. (OT):** 6,0 mm (0.0236 in)  
**Differential travel max. (DT):** 0,5mm (0.020 in)  
**Operating position max. (PT):** 2,0 mm (0.079 in)

REFERENCE  
GXE51C

### Top pin plunger



**Overtravel min. (OT):** 6,0 mm (0.0236 in)  
**Differential travel max. (DT):** 0,5mm (0.020 in)  
**Operating position max. (PT):** 2,0 mm (0.079 in)

REFERENCE  
GXE51B

# EX Series Standard Explosion Proof Switches



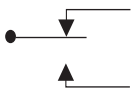
**Actuators**



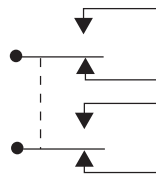
<b>Sealing:</b>	NEMA 1, 7 (Class I, Division I, Groups C, D) 9, (Class II, Division I, Groups E, F, G)
<b>Operating temperature:</b>	Standard -40 °C to 71 °C (-40 °F to 160 °F) High 100 hr @ 400 °F
<b>Approvals:</b>	UL, CSA
<b>Conduit:</b>	½ in - 14NPT
<b>Contacts:</b>	Silver
<b>Electrical ratings:</b>	
A	UL/CSA Rating: 15 A, 125, 250 or 480 Vac; 1/8 Hp, 125 Vac; 1/4 Hp, 250 Vac; 1/2 A, 125 Vdc; 1/4 A, 250 Vdc.
B	UL/CSA Rating: 20 A, 125, 250 or 480 Vac; 10 A, 125 Vac "L"; 1 Hp, 125 Vac; 2 Hp, 250 Vac; 1/2 A, 125 Vdc; 1/4 A, 250 Vdc.
C	UL/CSA Rating: 10 A, 125 or 250 Vac; 0.3 A, 125 Vdc; 0.15 A, 250 Vdc
D	UL/CSA Rating: 10 A, 125, 250 or 480 Vac; 1/2 A, 125 Vdc; 1/4 A, 250 Vdc.
E	UL Rating: 1 A, 125 Vac.

**Switching options:**

SPDT  
Single Pole, Double Throw  
Snap action contacts (1NC/1NO)



DPDT  
Double Pole, Double Throw  
Snap action contacts (2NC/2NO)



The EX Series features the smallest UL listed housings available for use in hazardous locations. Flame paths within the housing cool exploding gases below the kindling temperature before they reach the explosive gases surrounding the housing.

Options available include single or double conduit connection.

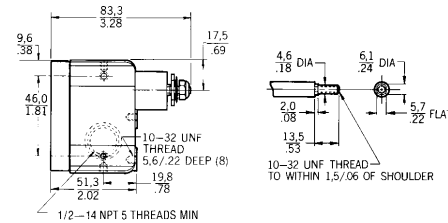
These switches are not sealed against liquids and should not be used where there will be liquid splash. If a weather sealed explosion proof switch is required please select from the CX or LSX/BX series.

## Side rotary actuated switches

### OPTIONS

*No lever*

**Note: Levers are ordered separately (see pages 69-71 for details)**



**Operating force max. (OF):**

Electrical rating A 0,22 N m (31.25 in oz)  
Electrical rating B 3,34 N to 8,90 N (0.75 lb to 2.0 lb)

**Pretravel max. (PT):**

5,56 mm (0.219 in) 8°

**Overtravel max. (OT):**

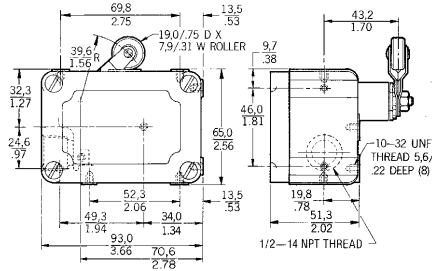
Electrical rating A 90°  
Electrical rating B 25°

**Differential travel max. (DT):**

Electrical rating A 0,18 mm (0.007 in) 0.25°  
Electrical rating B 0,3 mm (0.012 in) 4°

ACTUATION	CONTACT	ELECTRICAL RATING	REFERENCE
CW	SPDT	A	EX-AR20
CCW	SPDT	A	EX-AR230
CW	SPDT	B	EXA-AR20

**Roller lever**



**Roller material:** Bronze

**Operating force max. (OF):**

Electrical rating A  
 Clockwise (CW) 2,22 N to 5,56 N (0.5 lb to 1.25 lb)  
 Counter clockwise (CCW) 11,1 N (2.5 lb)  
 Electrical rating B  
 3,34 N to 8,90 N (0.75 lb to 2.0 lb)

**Pretravel max. (PT):**

Electrical rating A, B  
 Clockwise (CW) 5,56 mm (0.219 in) 8°  
 Counter clockwise (CCW) 1,65 mm (0.065 in) 3.5°

**Overtravel max. (OT):**

Electrical rating A  
 Clockwise (CW) 90°  
 Counter clockwise (CCW) 25°  
 Electrical rating B  
 25°

**Differential travel max. (DT):**

Electrical rating A 0,18 mm (0.007 in) 0.25°  
 Electrical rating B 0,3 mm (0.012 in) 4°

ACTUATION	CONTACT	ELECTRICAL RATING	REFERENCE
CW	SPDT	A	EX-AR
CCW	SPDT	A	EX-AR30
CW/Class 1 Group B	SPDT	A	EX-AR800
CCW/Class 1 Group B	SPDT	A	EX-AR830
CW/High temperature	SPDT	A	EX-AR400
CW	SPDT	B	EXA-AR
CW/No mounting bracket	SPDT	B	EXA-AR62
CW/Nylon roller	SPDT	A	EX-AR182
CW/No mounting bracket	SPDT	A	EX-AR141

**CW or CCW actuation, no return spring, low operating force**

**Operating force max. (OF):** 0,56 N (2 oz)

ACTUATION	CONTACT	ELECTRICAL RATING	REFERENCE
CW/CCW/No mounting bracket	SPDT	A	EX-AR16

**Maintained contact**

**Operating force max. (OF):** 3,34 N (0.75 lb)  
**Pretravel max. (PT):** 5,56 mm (0.219 in) 8°  
**Overtravel max. (OT):** 90°

ACTUATION	CONTACT	ELECTRICAL RATING	REFERENCE
CW	SPDT	A	EX-XR3

**DPDT, Prelead with 0,91 m (3 ft) leadwire**

**Operating force max. (OF):**

Clockwise (CW) 2,22 N to 6,67 N (0.5 lb to 1.5 lb)  
 Counter clockwise (CCW) 12,2 N (2.75 lb)  
**Pretravel max. (PT):** 6,35 mm (0.250 in)  
**Overtravel max. (OT):** 25°  
**Differential travel max. (DT):** 2,77 mm (0.109 in) 4°  
**Sealing:** NEMA Class 1 Group B

ACTUATION	CONTACT	ELECTRICAL RATING	REFERENCE
CW	DPDT	C	EXD-AR-3
CCW	DPDT	C	EXD-AR30-3

**Hermetically sealed**

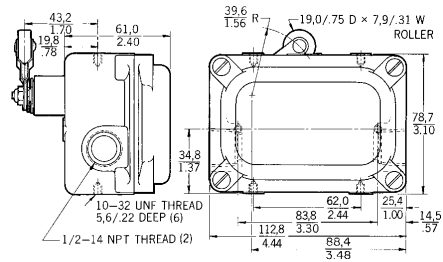
**Operating force max. (OF):**

Clockwise (CW) 2,22 N to 6,67 N (0.5 lb to 1.5 lb)  
 Counter clockwise (CCW) 11,1 N (2.5 lb)  
**Pretravel max. (PT):**

Clockwise (CW) 5,56 mm (0.219 in) 8°  
 Counter clockwise (CCW) 1,65 N (0.065 in) 3.5°  
**Overtravel max. (OT):** 25°  
**Differential travel max. (DT):** 0,64 mm (0.025 in)  
**Sealing:** NEMA Class 1 Group B

ACTUATION	CONTACT	ELECTRICAL RATING	REFERENCE
CW/3,2 m (10.5 ft) leadwire	SPDT	E	EXH-AR3
CCW/0,91 m (3 ft) leadwire	SPDT	E	EXH-AR33
CW/0,91 m (3 ft) leadwire	SPDT	E	EXH-AR7

**2 Conduit openings**



**Operating force max. (OF):**

Electrical rating A 2,22 N to 5,56 N (0.5 lb to 1.25 lb)  
 Electrical rating B 3,61 N to 8,90 N (0.8 lb to 2 lb)  
 Electrical rating C 2,22 N to 6,67 N (0.5 lb to 1.5 lb)  
**Pretravel max. (PT):**

Electrical rating A, B 5,56 mm (0.219 in) 8°  
 Electrical rating C 6,35 mm (0.250 in)  
**Overtravel max. (OT):**

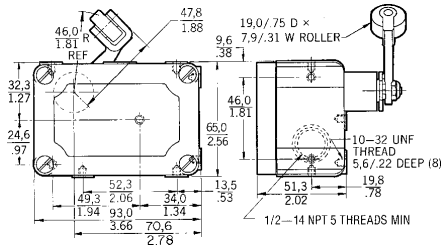
Electrical rating A 90°  
 Electrical rating B, C 25°  
**Differential travel max. (DT):**

Electrical rating A 0,18 mm (0.007 in) 0.25°  
 Electrical rating B 0,3 mm (0.012 in) 0.5°  
 Electrical rating C 2,77 mm (0.109 in) 4°

CONTACT	ELECTRICAL RATING	REFERENCE
DPDT	C	4EX1-3
SPDT	B	2EX1
SPDT	A	1EX1

**EX Series  
Side rotary actuated switches (continued)**

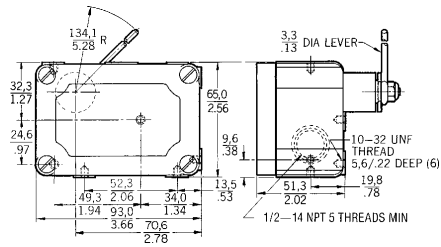
*Cross roller lever, rotated 90°*



**Operating force max. (OF):** 2,22 N to 5,56 N (0.5 lb to 1.25 lb)  
**Pretravel max. (PT):** 5,56 mm (0.219 in) 8°  
**Overtravel max. (OT):** 90°  
**Differential travel max. (DT):** 0,18 mm (0.007 in) 0.25°

CW	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	EX-CR

*Rod lever*



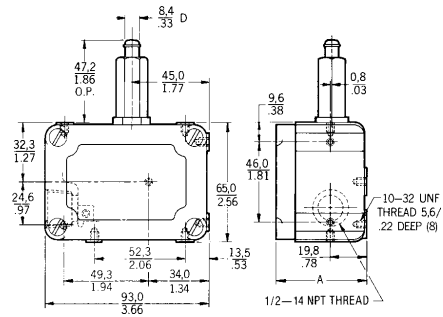
**Operating force max. (OF):** 0,56 N (2 oz)  
**Pretravel max. (PT):** 18°  
**Overtravel min. (OT):** 40°

CW/No mounting bracket	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	EX-AR1613

**Overtravel plunger actuated switches**

**OPTIONS**

*Top pin plunger*



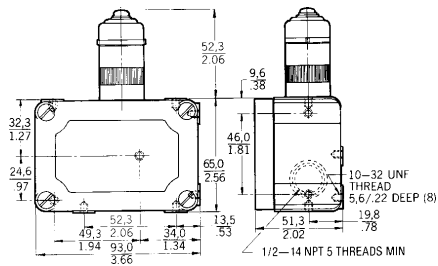
**Operating force max. (OF):** 13,34 N (3.0 lb)  
 Electrical rating A, C 8,90 N (2 lb)  
**Pretravel max. (PT):** 1,98 mm (0.078 in)  
 Electrical rating A 1,27 mm (0.050 in)  
 Electrical rating B 3,96 mm (0.156 in)  
**Overtravel min. (OT):** 4,78 mm (0.188 in)  
 Electrical rating A 3,18 mm (0.125 in)  
 Electrical rating B 3,48 mm (0.141 in)  
**Differential travel max. (DT):** 0,10 mm (0.004 in)  
 Electrical rating A 0,23 mm (0.009 in)  
 Electrical rating B 1,52 mm (0.060 in)  
 Electrical rating C

	CONTACT	ELECTRICAL RATING	REFERENCE
No mounting bracket	SPDT	A	EX-Q
High temperature	SPDT	A	EX-062
Low OF	SPDT	B	EX-Q400
	SPDT	B	EXA-Q

**Sealing NEMA Class 1 Group B**

	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	EX-0800
Preleaded with 0,91 m (3 ft) leadwire	DPDT	C	EXD-Q-3

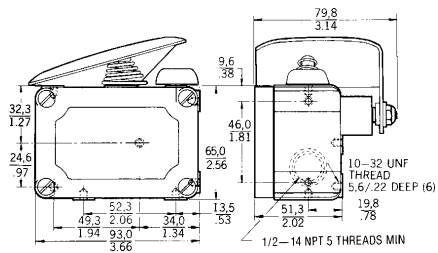
**Boot sealed**



<b>Operating force max. (OF):</b>	
Electrical rating D	13,34 N (3.0 lb)
Electrical rating B	15,57 N (3.5 lb)
<b>Pretravel max. (PT):</b>	
Electrical rating D	1,98 mm (0.078 in)
Electrical rating B	2,77 mm (0.109 in)
<b>Overtravel min. (OT):</b>	
Electrical rating D	4,78 mm (0.188 in)
Electrical rating B	3,18 mm (0.125 in)
<b>Differential travel max. (DT):</b>	
Electrical rating D	0,10 mm (0.004 in)
Electrical rating B	0,23 mm (0.009 in)

	CONTACT	ELECTRICAL RATING	REFERENCE
Class 1 Group B	SPDT	D	EX-M15
	SPDT	B	EXA-N

**Manually actuated**



<b>Operating force max. (OF):</b>	11,1 N (2.5 lb)
-----------------------------------	-----------------

	CONTACT	ELECTRICAL RATING	REFERENCE
	SPDT	A	EX-AR50



# CX Series Weather Sealed Explosion Proof Switches



**Actuators**



CX switches, as are the LSX/BX Series, are built especially for outdoor use in hazardous atmospheres. These enclosures are constructed to withstand the pressure of an internal explosion.

O-ring seals make the enclosure weatherproof but are outside of required flame paths so explosion proof requirements are maintained.

As factory assembled, all basic switches operate on clockwise and counterclockwise rotation. The actuating mechanism can be field adjusted for CW or CCW operation only.

Analog output, 4 mA to 20 mA, is available.

Basic switches operate nearly simultaneously in multiple switch devices.

Shafts of devices without shaft restoring force can be rotated through 360°.

**Sealing:**

NEMA

UL listed

CSA certified

**Operating temperature:**

**Approvals:**

**Housing:**

**Conduit:**

**Contacts:**

**Electrical Ratings:**

A

C

D

F

G

1, 3, 4, 4X, 6, 6P, 7, 9 and 13

Class I, Div. 1, Groups B (16CX, 24CX, 26CX, and 84CX only), C and D; and Class II, Div. 1, Groups E, F and G

Class I, Div. 1, Groups B (16CX, 24CX, 26CX, and 84CX only), C and D; and Class II, Groups E, F and G

-25 °C to 85 °C (-13 °F to 185 °F)

UL, CSA

**CX-E only**

ATEX EExd IIC T6 Category II 2 GD

Aluminium

**80CX**

Bronze

¾ in - 14NPT

A, C, D

Silver

F

Gold

UL/CSA Rating: L96

15 A, 120, 240 or 480 Vac, ind. and res  
1/8 Hp, 120 Vac; 1/4 Hp, 240 Vac  
0.5 A, 125 Vdc, 0.25 A, 250 Vdc, res

UL/CSA Rating: L59

10 A, 120 or 240 Vax, ind. and res  
0.3 A, 125 Vdc, 0.15 A, 250 Vdc, res

UL/CSA Rating: L22

1 A, 120 Vax, ind. and res

UL/CSA Rating: L22

1 A, 125 Vac

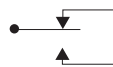
Analog Current Output (4 mA to 20 mA)

12.5 Vdc to 40 Vdc

**Switching options:**

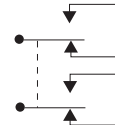
SPDT

Single Pole, Double Throw  
Snap action contacts (1NC/1NO)



DPDT

Double Pole, Double Throw  
Snap action contacts (2NC/2NO)



**Analog position sensing specifications (Electrical rating "G")**

**Current output:**

4 mA to 20 mA

**Voltage compliance range:**

12.5 Vdc to 40 Vdc

**Maximum load resistance:**

RL, Max.,  $\frac{-V \text{ Supply} - 12.5}{20 \text{ mA}}$

**Current signal output:**

4 mA to 20 mA

**Span:**

Adjustable from 15° to 90° of angular rotation

**Null:**

4 mA position may be set at any angular position

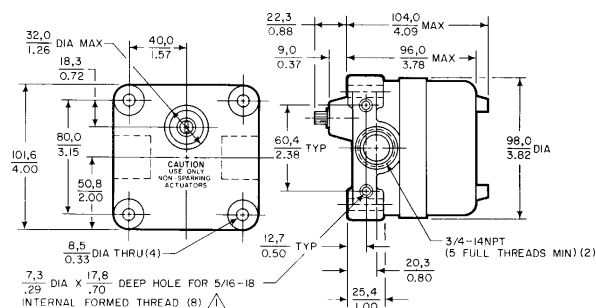
**Operating characteristics**

Basic Switch Type	BZ	BA	DT	HS
Pretravel (max.)*	15°	15°	30°	30°
Differential Travel (max.)	10°	10°	25°	20°
Overtravel (min.)*	90°	90°	75°	75°
Operating Torque (max.)	11.1 in lb/1,25 N m			

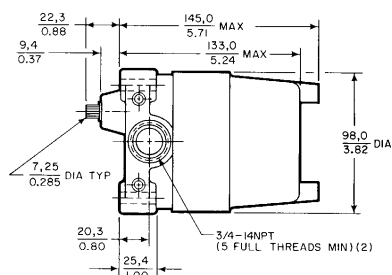
\* May be modified in field to suit application requirements.

**Note: Levers are ordered separately (see pages 69-71 for details)**

**Short housing**



**Standard housing**



**Notes:**

Add the letter "A" to listings with side mounting holes tapped 5/16 (8).

**Example:** 11CX2A

Add the letter "B" to listings with thru mounting holes tapped 3/8-24 (4).

**Example:** 11CX2B

Add the letter "C" to listings for low temperature (-40 °C/°F) applications.

**Example:** 11CX2C

Add "D01" to specify a "direct-couple" listing with 3/8 in. dia by 3/4 in. long flatted shaft.

**Example:** 11CX2-D01

Add the letter "E" to listings for European Atex approvals.

**Example:** 11CX2E

For Replacement Basic Switch Assemblies, change the first number in the listing to "9".

**Example:** 11CX2 becomes 91CX2

**OPTIONS**

HOUSING SIZE	BASIC SWITCHES	CONTACT	ELECTRICAL RATING	SHAFT RESTORING FORCE TO CENTRE	REFERENCE
Short	BZ (2)	SPDT	A	With	11CX2
Short	BZ (2)	SPDT	A	Without	11CX12
Short	BZ (2)	SPDT	A	With	11CX2E
Short	BZ (2)	SPDT	A	Without	11CX12E
Short	BZ (2)	SPDT	F	With	1172CX2
Short	BZ (2)	SPDT	F	Without	1172CX12
Standard	BZ (4)	SPDT	A	With	21CX4
Standard	BZ (4)	SPDT	A	Without	21CX14

**UL listed for Class I, Group B (hydrogen atmospheres)**

HOUSING SIZE	BASIC SWITCHES	CONTACT	ELECTRICAL RATING	SHAFT RESTORING FORCE TO CENTRE	REFERENCE
Standard	DT (2)	DPDT	C	With	24CX2
Standard	DT (2)	DPDT	C	Without	24CX12
Short	HS (2)	SPDT	D	With	16CX2
Short	HS (2)	SPDT	D	Without	16CX12
Standard	HS (4)	SPDT	D	With	26CX4

**Analog output, 4 mA to 20 mA**

HOUSING SIZE	BASIC SWITCHES	CONTACT	ELECTRICAL RATING	SHAFT RESTORING FORCE TO CENTRE	REFERENCE
Short	None	N/A	G	With	18CX0
Short	None	N/A	G	Without	18CX10
Short	None	N/A	G	Without	18CX10E
Standard	BZ (2)	SPDT	A, G	With	281CX2
Standard	BZ (2)	SPDT	A, G	Without	281CX12

**Bronze housing for use in corrosive environments**

80CX switches have rugged bronze housings which are resistant to salt water and other corrosive environments. They comply with the NEMA 4X requirement for protection against corrosion, in addition to NEMA enclosure standards met by other CX switches. O-ring seals make the enclosure weather-proof, but are outside of required flame paths, maintaining explosion-proof requirements.

HOUSING SIZE	BASIC SWITCHES	CONTACT	ELECTRICAL RATING	SHAFT RESTORING FORCE TO CENTRE	REFERENCE
Standard	BZ (2)	SPDT	A	With	81CX2
Standard	BZ (4)	SPDT	A	With	81CX4
Standard	BZ (4)	SPDT	A	Without	81CX14
Standard	DT (2)	DPDT	C	With	84CX2

# LSX/BX Series Weather sealed explosion proof switches



LSX/BX Series weather sealed, explosion proof limit switches are for use either indoor or outdoors in hazardous atmospheres. They are completely sealed and designed for use in explosive gas/dust environments.

LSX/BX products meet the sealing standards of NEMA 1, 3, 4, 6, 7, 9 and 13. BX products are also sealed to IP67 standard and are ATEX approved (see specifications below).

All heads are field adjustable at 90° increments. Heads with side rotary actuators can be adjusted for clockwise and counter clockwise operation.

### Actuators



### Sealing:

LSX NEMA 1, 3, 4, 6, 7 (Class 1, Division 1, Groups B, C, D),  
9 (Class 2, Division 1, Groups E, F, G), 13

BX IP67, NEMA 1, 3, 4, 6, 13

### Approvals:

LSX/BX UL, CSA\*  
BX only EExd IIC T6 category II 2 GD, SIRA 00ATEX 1037X

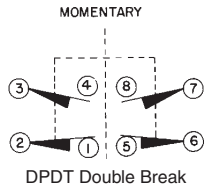
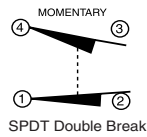
### Contacts:

Electrical ratings A, B Silver  
Electrical rating C Gold

### Switching options:

SPDT  
Single Pole, Double Throw  
Snap action contacts (1NC/1NO)

DPDT  
Double Pole, Double Throw  
Snap action contacts (2NC/2NO)



\* Applies only to listings with 1/2 in NPT or 3/4 in NPT

### Electrical ratings

10 amps continuous carry. Circuits on any one pole must be the same polarity.

### ac Volts

Pilot duty: 600 Vac, 720 VA

	Vac	Amps at 0.35 Power Factor	
		Make	Break
A	120	60	6
SPDT	240	30	3
NEMA	480	15	1.5
A600	600	12	1.2
B	120	30	3
DPDT	240	15	1.5
NEMA	480	7.5	0.75
B600	600	6	0.60

C 250 Vac or 60 Vdc, 0.050 amp max.

SPDT/DPDT

### dc Volts

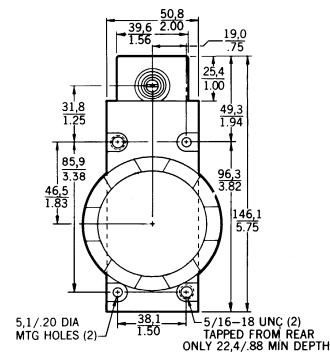
Pilot duty: 240 Vdc, 30 watts

	Vdc	Make and Break Amps	
		Inductive	Resistive
A	120	0.25	0.8
SPDT	240	0.15	0.4
B	120	0.25	0.8
DPDT	240	0.15	0.4

C 250 Vac or 60 Vdc, 0.050 amp max.

SPDT/DPDT

### Rotary actuated switches

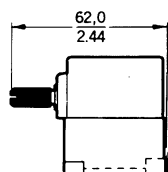


<b>Operating torque max.:</b>	Standard	0,45 N m (4.0 in lb)
	Low	0,19 Nm (1.7 in lb)
<b>Pretravel max. (PT):</b>	Standard	15°
	Low	9°
<b>Overtravel min. (OT):</b>	Standard	60°
	Low	66°
<b>Differential travel max. (DT):</b>	Standard SPDT	5°
	Standard DPDT	7°
	Low SPDT	3°
	Low DPDT	4°

**Note: Levers are ordered separately (see pages 69-71 for details)**

**OPTIONS**

**Side rotary**



**Operating temperature:** -12 °C to 121 °C (10 °F to 250 °F)

**LSX**

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	SPDT	½ in - 14NPT	A	LSXA3K
	SPDT	20 mm	A	LSX4A3K
	SPDT	¾ in - 14NPT	A	LSXA4K
	SPDT	½ in - 14NPT	C	LSXA3E
	DPDT	¾ in - 14NPT	B	LSXA4L
	DPDT	20 mm	B	LSX4A4L
	DPDT	½ in - 14NPT	B	LSXA7L
Low DT	SPDT	½ in - 14NPT	A	LSXP3K

**BX**

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	SPDT	½ in - 14NPT	A	BXA3K
	SPDT	20 mm	A	BX4A3K
	DPDT	¾ in - 14NPT	B	BXA4L

**Operating temperature:** -1 °C to 121 °C (30 °F to 250 °F)

**LSX**

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
Low DT/Low torque	SPDT	½ in - 14NPT	A	LSXH3K
Low DT/Low torque	DPDT	¾ in - 14NPT	B	LSXH4L
Low torque	SPDT	½ in - 14NPT	A	LSXR3K
Low torque	DPDT	¾ in - 14NPT	B	LSXR4L

**BX**

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
Low torque	SPDT	½ in - 14NPT	A	BXR3K
Low torque	SPDT	½ in - 14NPT	C	BXR3E
Low torque	DPDT	¾ in - 14NPT	C	BXR4S

**Centre neutral**

**Operating torque max. :** 0,45 N m (4.0 in lb)

**Pretravel max. (PT):** 18°

**Overtravel min. (OT):** 57°

**Differential travel max. (DT):** 10°

**Operating temperature:** -1 °C to 121 °C (30 °F to 250 °F)

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	DPDT	¾ in - 14NPT	B	LSXM4N
	DPDT	20 mm	B	LSX4M4N

**Maintained contact**

**Operating torque max.:** 0,45 N m (4.0 in lb)

**Pretravel max. (PT):** 65°

**Overtravel min. (OT):** 20°

**Differential travel max. (DT):** SPDT 30°

DPDT 35°

**Operating temperature:** -1 °C to 121 °C (30 °F to 250 °F)

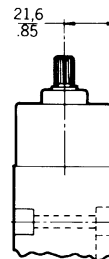
**LSX**

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
Maintained	SPDT	½ in - 14NPT	A	LSXN3K
Maintained	DPDT	¾ in - 14NPT	B	LSXN4L
Maintained	DPDT	½ in - 14NPT	B	LSXN7L

**BX**

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
Maintained	SPDT	½ in - 14NPT	A	BXN3K
Maintained	DPDT	¾ in - 14NPT	B	BXN4L

**Top rotary**



**Operating torque max.:** 0,28 N m (2.5 in lb)

**Pretravel max. (PT):** 25°

**Overtravel min. (OT):** 100°

**Differential travel max. (DT):** SPDT 10°

DPDT 12°

**Operating temperature:** -1 °C to 121 °C (30 °F to 250 °F)

	CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
	SPDT	½ in - 14NPT	A	LSXB3K
	DPDT	¾ in - 14NPT	B	LSXB4L

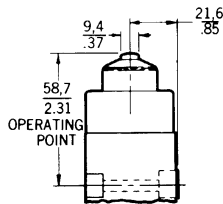
**LSX/BX Series (continued)  
Plunger actuated switches**

*Top plungers*

<b>Operating force max. (OF):</b>	17,79 N (4 lb)
<b>Pretravel max. (PT):</b>	1,78 mm (0.07 in)
<b>Overtravel min. (OT):</b>	4,83 mm (0.19 in)
<b>Differential travel max. (DT):</b>	
SPDT	0,38 mm (0.015 in)
DPDT	0,51 mm (0.02 in)
<b>Operating temperature:</b>	-12 °C to 93 °C (10 °F to 200 °F)

**OPTIONS**

**Top pin plunger**



**Operating point:** 58,5 mm ± 0,76 mm (2.305 in ± 0.03 in)

**LSX**

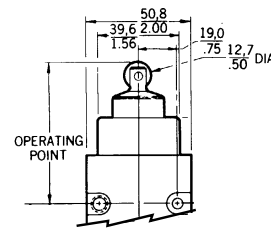
CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXC3K
SPDT	20 mm	A	LSX4C3K
DPDT	¾ in - 14NPT	B	LSXC4L

**BX**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	20 mm	A	BX4C3K
DPDT	¾ in - 14NPT	B	BXC4L
DPDT	20 mm	B	BX4C4L

**Top roller plunger**

Head can be set at 90° increments for cam or slide actuation



**Operating point:** 68,6 mm ± 1.00 mm (2.700 in ± 0.04 in)

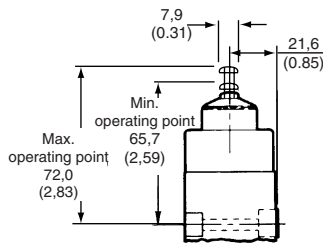
**LSX**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXD3K
SPDT	20 mm	A	LSX4D3K
DPDT	¾ in - 14NPT	B	LSXD4L

**BX**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	20 mm	A	BX4D3K

**Top pin plunger, adjustable**



**Operating point:** 65,66 mm to 72,01 mm (2.585 in to 2.835 in)

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXV3K

**Wobble actuated switches**

**OPTIONS**

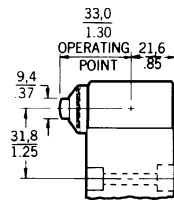
*Plastic rod*

*Side plungers*

Operating force max. (OF): 26,69 N (6 lb)  
 Pretravel max. (PT): 2,54 mm (0.10 in)  
 Overtravel min. (OT): 4,83 mm (0.19 in)  
 Differential travel max. (DT): 1,14 mm (0.045)  
 Operating temperature: -12 °C to 93 °C  
 (10 °F to 200 °F)

**OPTIONS**

**Side pin plunger**

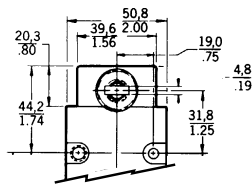


**Operating point:** 33,0 mm (1.30 in)

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXE3K
DPDT	¾ in - 14NPT	B	LSXE4L

**Side roller plunger**

Roller may be set in vertical or horizontal position for cam or slide actuation



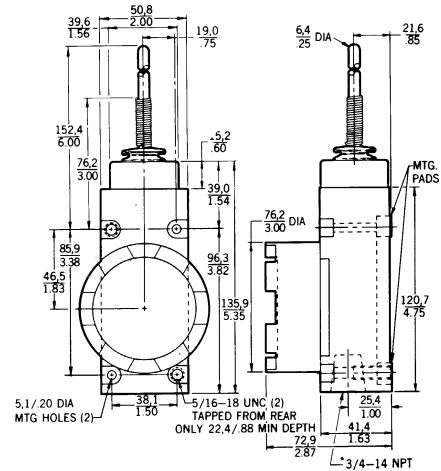
**Operating point:** 44,1 mm (1.735 in)

**LSX**

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXF3K

**BX**

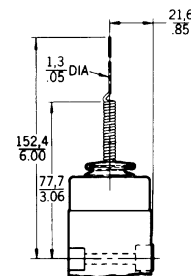
CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	BXF3K



Operating force max. (OF): 2,78 N (10 oz)  
 Pretravel max. (PT): 25,4 mm (1.0 in)  
 Operating temperature: -12 °C to 93 °C  
 (10 °F to 200 °F)

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXJ3K-7A
DPDT	¾ in - 14NPT	B	LSXJ4L-7A

*Cat whisker*



Operating force max. (OF): 1,39 N (5 oz)  
 Pretravel max. (PT): 50,8 mm (2.0 in)  
 Operating temperature: -12 °C to 93 °C  
 (10 °F to 200 °F)

CONTACT	CONDUIT	ELECTRICAL RATING	REFERENCE
SPDT	½ in - 14NPT	A	LSXK3K-8A

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# Levers

Separate levers must be ordered with side rotary types. The table provides a cross reference between product families and the lever order/reference numbers. The following pages describe the levers. Illustrations are for reference only. Exact mounting drawings and dimensions are available from your local sales office or from the website below.

Levers lock in any position, 360° around the shaft. Rollers may be mounted on the front or back of the lever.

All levers are supplied with cap screws.

### Explosion proof switches

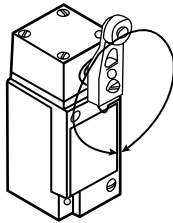
Because of explosion proof requirements, only nylon rollers or other non sparking material should be selected. BX/LSX, CX and EX plunger and cat whisker types are of non sparking material. **Do not mix or substitute.**

### Specification (unless stated otherwise)

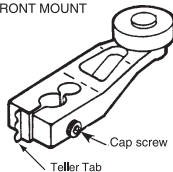
**Lever radius/length:** 1.5 in (38,1 mm)  
**Roller Diameter:** 0.75 in (19,1 mm)  
**Roller Width:** 0.25 in (6,35 mm)  
 -EX 0.312 in (7,92 mm)

### Note:

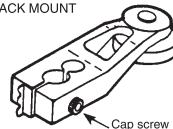
**Not all levers are compatible with all switches**



FRONT MOUNT



BACK MOUNT

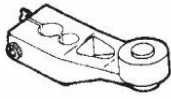


REFERENCE	ROLLER MATERIAL	LIMIT SWITCH SERIES				EXPLOSION PROOF SERIES		
		GLA	HDLS	LS2	LS	BX/LSX	CX	EX
6PA57	Aluminium				❖			
6PA63	Stainless steel				❖			
6PA69	Spring rod				❖			
6PA80	Steel				❖			
6PA82	Steel				❖			
6PA102	Nylon				❖			
6PA144	Ball bearing				❖			
GLZ51A	Nylon	❖						
GLZ51B	Steel	❖						
GLZ52A	Nylon	❖						
GLZ52B	Steel	❖						
GLZ54J	Aluminium	❖						
GLZ55B	Steel	❖						
LSZ51	N/A		❖			❖	❖	
LSZ51A	Nylon		❖		❖	❖	❖	
LSZ51B	Steel		❖		❖			
LSZ51C	Nylon		❖			❖	❖	
LSZ51D	Steel		❖					
LSZ51W	Rubber		❖					
LSZ51Y	Rubber		❖					
LSZ52	N/A		❖					
LSZ52A	Nylon		❖			❖		
LSZ52B	Steel		❖					
LSZ52C	Nylon		❖		❖	❖	❖	
LSZ52D	Steel		❖		❖			
LSZ52J	Nylon		❖		❖	❖	❖	
LSZ52K	Nylon		❖		❖	❖	❖	
LSZ52M	Nylon		❖		❖	❖		
LSZ52N	Nylon		❖			❖		
LSZ52W	Rubber		❖					
LSZ52Y	Rubber		❖					
LSZ53A	Nylon		❖					
LSZ53B	Steel		❖					
LSZ53D	Steel		❖					
LSZ53E	Nylon		❖			❖	❖	
LSZ53P	Steel		❖					
LSZ53S	Nylon		❖			❖	❖	
LSZ53U	Steel		❖					
LSZ54	N/A		❖			❖	❖	
LSZ54M	Aluminium		❖		❖	❖	❖	
LSZ54N	Stainless steel		❖					
LSZ54R	Spring wire		❖					
LSZ54V	Cable		❖					
LSZ55	N/A		❖			❖	❖	
LSZ55A	Nylon		❖			❖	❖	
LSZ55B	Steel		❖					
LSZ55C	Nylon		❖			❖		
LSZ55D	Steel		❖					
LSZ55W	Rubber		❖					
LSZ55Y	Rubber		❖					
LSZ61	Nylatron		❖					
LSZ67AA	Rubber		❖					
LSZ68	Delrin		❖					
6PA5-EX	Bronze							❖
6PA127-EX	Nylon							❖
6PA130-EX	Bronze							❖
6PA131-EX	Bronze							❖
6PA136-EX	Aluminium							❖
6PA138-EX	Nylon							❖
6PA142-EX	Bronze							❖
6PA204-EX	Nylon							❖
Stainless steel levers								
LS2Z51A	Nylon		❖	❖			❖	
LS2Z51B	Steel		❖	❖				
LS2Z52A	Nylon		❖	❖			❖	
LS2Z52B	Steel		❖	❖				
LS2Z54N	Steel		❖	❖				



## OPTIONS \* denotes lever suitable for Explosion Proof Series switches

### Standard fixed lever



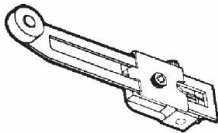
	MOUNTED ON	REFERENCE
Without roller		LSZ51*
Nylon roller	Front	LSZ51A*
Metal roller	Front	LSZ51B
Nylon roller	Back	LSZ51C*
Metal roller	Back	LSZ51D
Nylon roller	Front	GLZ51A
Metal roller	Front	GLZ51B
Bronze roller	Front	6PA5-EX*
Nylon roller	Front	6PA127-EX*
Ball bearing roller	Front	6PA144

### Offset fixed lever



	MOUNTED ON	REFERENCE
Without roller		LSZ55*
Nylon roller	Back	LSZ55A*
Metal roller	Back	LSZ55B
Nylon roller	Front	LSZ55C*
Metal roller	Front	LSZ55D
Metal roller	Front	GLZ55B

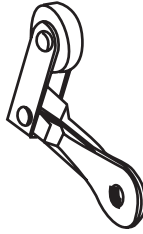
### Adjustable lever



Operating radius/length: 1.5 in to 3.5 in (38,1 mm to 88,9 mm)  
 -EX 1.69 in to 3.0 in (42,9 mm to 76,2 mm)

	MOUNTED ON	REFERENCE
Adjustable lever, without roller		LSZ52
Nylon roller	Back	LSZ52A*
Metal roller	Back	LSZ52B
Nylon roller	Front	LSZ52C*
Metal roller	Front	LSZ52D
Nylon roller, Ø 1.0 in (25,4) x 0.5 in (12,7 mm)	Front	LSZ52J*
Nylon roller, Ø 1.5 in (38,1)	Front	LSZ52K*
Nylon roller, Ø 2.0 in (50,8)	Front	LSZ52M*
Nylon roller, 0.5 in wide (12,7 mm)	Front	LSZ52N*
Nylon roller	Back	GLZ52A
Metal roller	Back	GLZ52B
Nylon roller, Ø 1.0 in (25,4) x 0.5 in (12,7 mm)	Front	6PA138-EX*

### One way roller lever



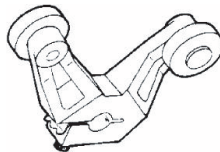
	RADIUS/LENGTH	REFERENCE
Bronze roller, clockwise	1.56 in (39,6 mm)	6PA130-EX*
Bronze roller, counter clockwise	1.56 in (39,6 mm)	6PA142-EX*

### Perpendicular (cross) roller lever



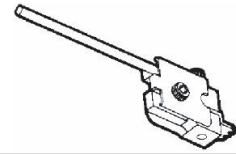
	RADIUS/LENGTH	REFERENCE
Bronze roller	1.81 in (46,0 mm)	6PA131-EX*

### Yoke lever



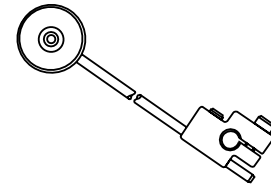
	MOUNTED ON	REFERENCE
Nylon roller	Front/Back	LSZ53A
Metal roller	Front/Back	LSZ53B
Metal roller	Front/Front	LSZ53D
Nylon roller	Back/Front	LSZ53E*
Metal roller	Back/Back	LSZ53P
Nylon roller	Back/Back	LSZ53S*
Metal roller	Back/Front	LSZ53U
Metal roller	Front/Back	6PA80
Metal roller	Front/Front	6PA82
Nylon roller	Front/Front	6PA102

### Adjustable rod



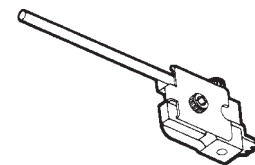
	RADIUS/LENGTH	REFERENCE
Hub only		LSZ54*
Aluminium rod	5.5 in (139,7 mm)	LSZ54M*
Stainless steel rod	13.0 in (330,2 mm)	LSZ54N
Aluminium, spring only	12.0 in (305 mm)	LSZ54R
Aluminium, flexible cable	4.8 in (122 mm)	LSZ54V
Aluminium rod	7.9 in (200 mm)	GLZ54J
Stainless steel rod	13.0 in (330,2 mm)	6PA63
Aluminium rod	5.3 in (134,1 mm)	6PA136-EX*

### Adjustable rod, nylon roller



	RADIUS/LENGTH	REFERENCE
Aluminium rod, nylon roller	12.5 in (317,5 mm)	6PA204-EX*

### Spring rod



	RADIUS/LENGTH	REFERENCE
Ø 0.25 in (6,35 mm)	12.0 in (305 mm)	LSZ68
Ø 0.17 in (4,32 mm)	7.4 in (188 mm)	6PA69

Note: Not all levers are compatible with all switches

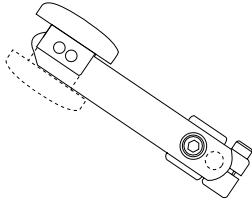
*\* denotes lever suitable for Explosion Proof Series switches*

**Flexible loop**



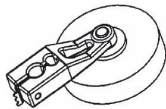
	RADIUS/LENGTH	REFERENCE
Flexible loop	6.0 in (152 mm)	LSZ61

**Hand operated button**



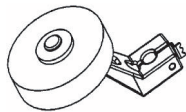
	REFERENCE
Ø 1.5 in (38,1 mm)	6PA57

**\*\*Large rubber roller, fixed lever**



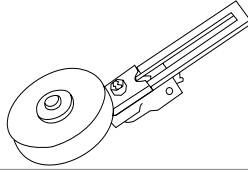
	REFERENCE
Ø 1.6 in X 0.50 in wide roller (40,6 mm X 12,7 mm)	LSZ51W
Ø 2 in X 0.50 in wide roller (50,8 mm X 12,7 mm)	LSZ51Y

**\*\*Large rubber roller, fixed offset lever**



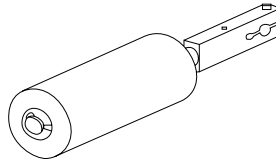
	REFERENCE
Ø 1.6 in X 0.50 in wide roller (40,6 mm X 12,7 mm)	LSZ55W
Ø 2 in X 0.50 in wide roller (50,8 mm X 12,7 mm)	LSZ55Y

**\*\*Large rubber roller, adjustable lever**



	REFERENCE
Ø 1.6 in X 0.50 in wide roller (40,6 mm X 12,7 mm)	LSZ52W
Ø 2 in X 0.50 in wide roller (50,8 mm X 12,7 mm)	LSZ52Y

**\*\*Conveyor roller arm**



**Operating radius/length:** 6.78 in (172,2 mm)

	REFERENCE
Plastic roller, 1.5 in Ø X 3.8 in long (38,1 mm X 96,5 mm)	LSZ67AA

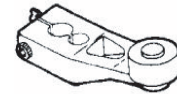
**NOTICE \*\***  
**Large rubber rollers and conveyor roller arm**  
 Because of the lever's mass, the limit switch should be mounted with the lever facing down. This will enable gravity to help restore the switch to the free position.

**Stainless steel levers**

<b>Roller Diameter:</b>	0.75 in (19,1 mm)
<b>Roller Width:</b>	0.25 in (6,35 mm)

**OPTIONS**

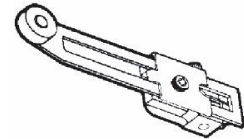
**Standard fixed lever**



**Operating radius/length:** 1.5 in (38,1 mm)

	MOUNTED ON	REFERENCE
Nylon roller	Front	LSZ251A*
Stainless steel roller	Front	LSZ251B

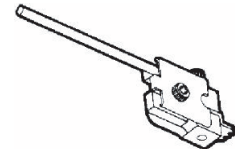
**Adjustable lever**



**Operating radius/length:** 1.5 in to 3.5 in (38,1 mm to 88,9 mm)

	MOUNTED ON	REFERENCE
Nylon roller	Back	LSZ252A*
Stainless steel roller	Back	LSZ252B

**Adjustable rod**



**Operating radius/length:** 13 in (330,2 mm)

	REFERENCE
	LSZ254N

**Note:** Not all levers are compatible with all switches

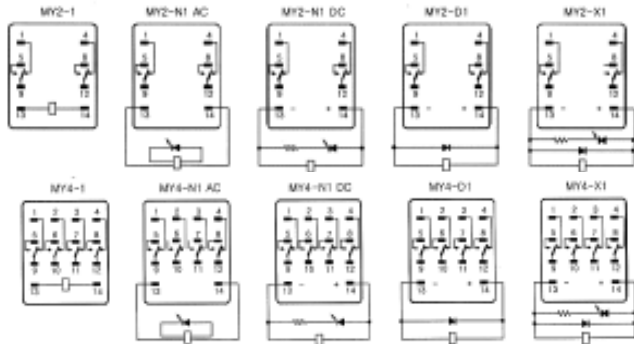
# SZR-MY Series Power Relay



SZR-MY Series general-purpose power relays are designed for a wide range of applications including power, as well as logic control, for factory machines and control panels.

SZR-MY Series relays have a small package design for multiple application needs. Relays are available in two configurations: DPDT with a 5 A load and 4PDT with a 3 A load. One standard and three options are available: LED indicator, internal surge protection diode, and LED indicator/diode protection.

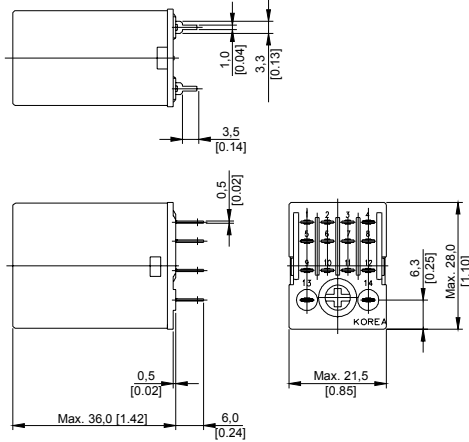
<b>Current rating (SZR-MY2):</b>	5 A
<b>Current rating (SZR-MY4):</b>	3 A
<b>Contact resistance:</b>	50 mOhm max.
<b>Contact material:</b>	Fine silver
<b>Agency approvals:</b>	UL, CE, CSA
<b>Operate time:</b>	20 ms max.
<b>Release time:</b>	20 ms max.
<b>Ambient temperature:</b>	-25 °C to 75 °C (-13 °F to 167 °F)
<b>Ambient humidity:</b>	45% RH to 85% RH
<b>Switching options:</b>	DPDT, 4PDT



## MY2 Series

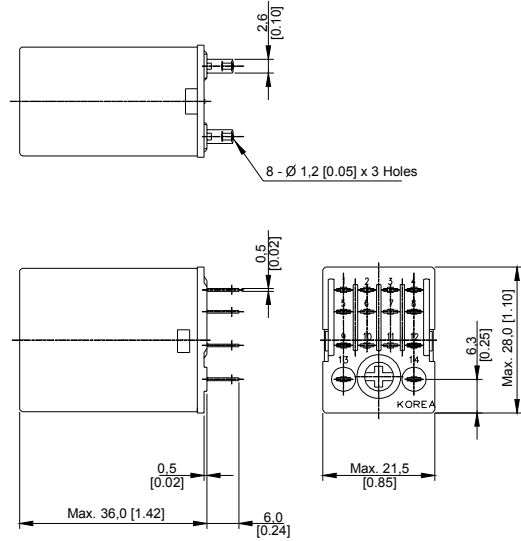
### OPTIONS

#### Standard, PCB Terminal, DPDT



COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/5 amp	SZR-MY2-1P-AC110-120V
220/240 Vac	250 Vac/5 amp	SZR-MY2-1P-AC220V-240V
24 Vdc	125 Vdc/1 amp	SZR-MY2-1P-DC24V

#### Solder/Plug-In Terminal, DPDT



#### Standard

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/5 amp	SZR-MY2-1-AC110-120V
220 Vac	250 Vac/5 amp	SZR-MY2-1-AC220V
12 Vdc	125 Vdc/1 amp	SZR-MY2-1-DC12V
24 Vdc	125 Vdc/1 amp	SZR-MY2-1-DC24V

#### LED Indicator

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/5 amp	SZR-MY2-N1-AC110-120V
220 Vac	250 Vac/5 amp	SZR-MY2-N1-AC220V
12 Vdc	125 Vdc/1 amp	SZR-MY2-N1-DC12V
24 Vdc	125 Vdc/1 amp	SZR-MY2-N1-DC24V

#### Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/1 amp	SZR-MY2-D1-DC24V

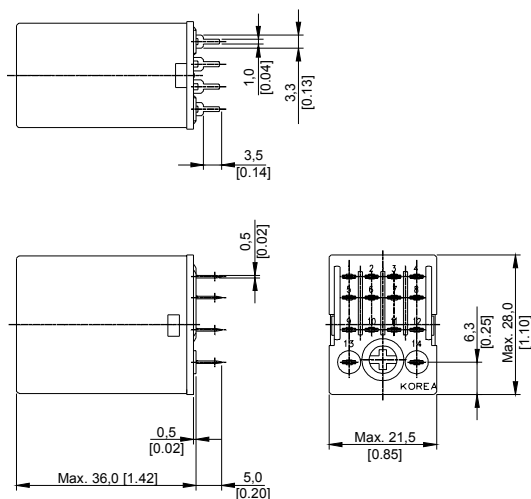
#### LED Indicator/Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/1 amp	SZR-MY2-X1-DC24V

# MY4 Series

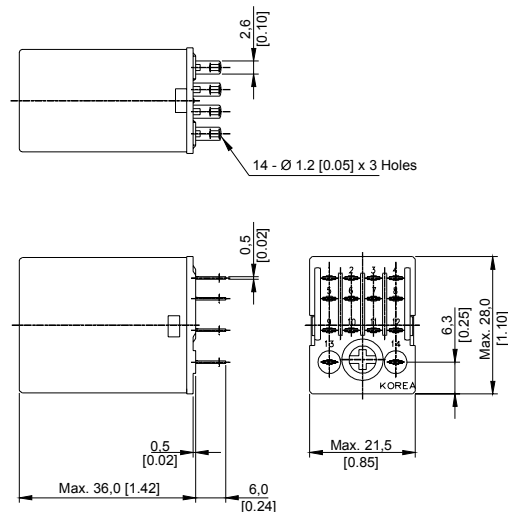
## OPTIONS

### Standard, PCB Terminal, 4PDT



COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/3 amp	SZR-MY4-1P-AC110-120V
220/240 Vac	250 Vac/3 amp	SZR-MY4-1P-AC220V-240V
24 Vdc	125 Vdc/0.6 amp	SZR-MY4-1P-DC24V

### Solder/Plug-In Terminal, 4PDT



### Standard

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/3 amp	SZR-MY4-1-AC110-120V
220 Vac	250 Vac/3 amp	SZR-MY4-1-AC220V
12 Vdc	125 Vdc/0.6 amp	SZR-MY4-1-DC12V
24 Vdc	125 Vdc/0.6 amp	SZR-MY4-1-DC24V

### LED Indicator

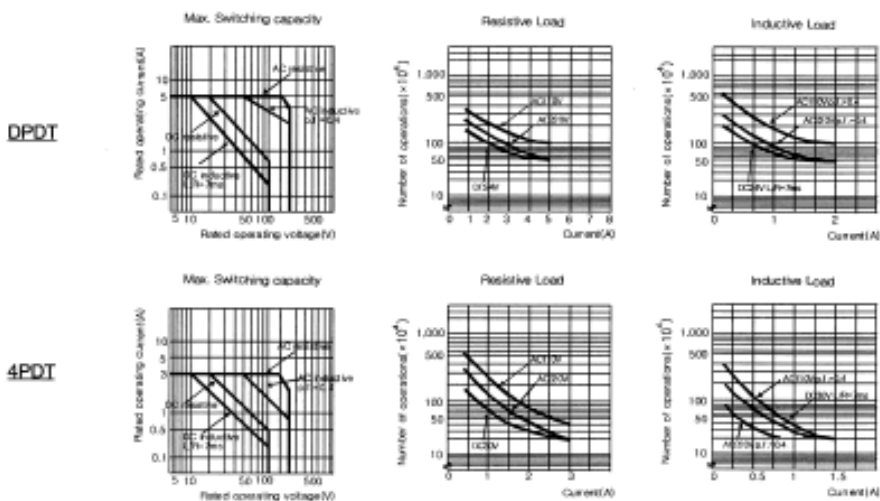
COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/3 amp	SZR-MY4-N1-AC110-120V
220 Vac	250 Vac/3 amp	SZR-MY4-N1-AC220V
12 Vdc	125 Vdc/0.6 amp	SZR-MY4-N1-DC12V
24 Vdc	125 Vdc/0.6 amp	SZR-MY4-N1-DC24V

### Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/0.6 amp	SZR-MY4-D1-DC24V

### LED Indicator/Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/0.6 amp	SZR-MY4-X1-DC24V



# SZR-LY Series Power Relay

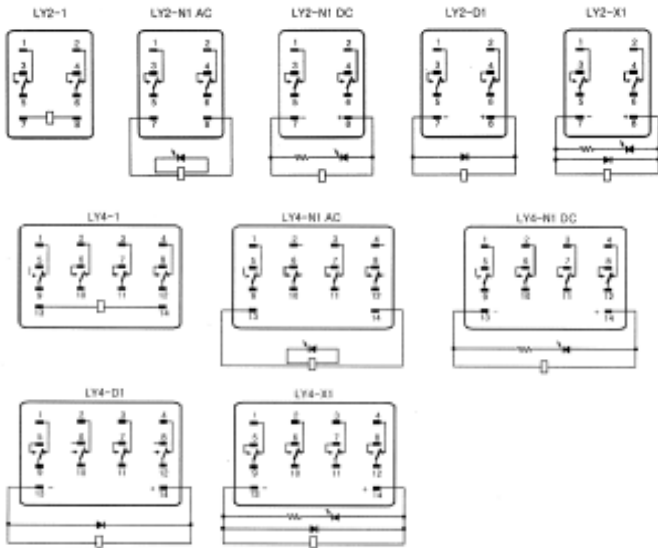


SZR-LY Series general-purpose power relays are designed for a wide range of applications including power, as well as logic control, for factory machines and control panels.

SZR-LY Series relays break 10 A loads are ideal for control panels that require stable and reliable relays.

One standard and three options are available: LED indicator, internal surge protection diode, and LED indicator/diode protection.

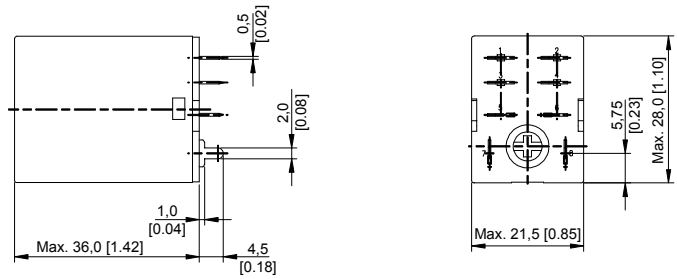
- Current rating:** 10 A
- Contact resistance:** 50 mOhm max.
- Contact material:** Silver cadmium oxide
- Agency approvals:** UL, CE, CSA
- Operating frequency:** 18,000 operations/hour (mechanical)  
1,800 operations/hour (electrical)
- Operate time:** 25 ms max.
- Release time:** 25 ms max.
- Ambient temperature:** -25 °C to 70 °C (-13 °F to 158 °F)
- Ambient humidity:** 45% RH to 85% RH
- Switching options:** DPDT, 4PDT



## LY2 Series

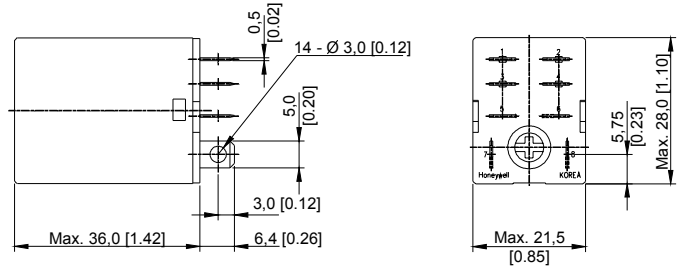
### OPTIONS

*Standard, PCB Terminal, DPDT*



COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/10 amp	SZR-LY2-1P-AC110-120V
24 Vdc	125 Vdc/2 amp	SZR-LY2-1P-DC24V

### Solder/Plug-In Terminal, DPDT



### Standard

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/10 amp	SZR-LY2-1-AC110-120V
220 Vac	250 Vac/10 amp	SZR-LY2-1-AC220V
12 Vdc	125 Vdc/2 amp	SZR-LY2-1-DC12V
24 Vdc	125 Vdc/2 amp	SZR-LY2-1-DC24V

### LED Indicator

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/10 amp	SZR-LY2-N1-AC110-120V
220 Vac	250 Vac/10 amp	SZR-LY2-N1-AC220V
12 Vdc	125 Vdc/2 amp	SZR-LY2-N1-DC12V
24 Vdc	125 Vdc/2 amp	SZR-LY2-N1-DC24V

### Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/2 amp	SZR-LY2-D1-DC24V

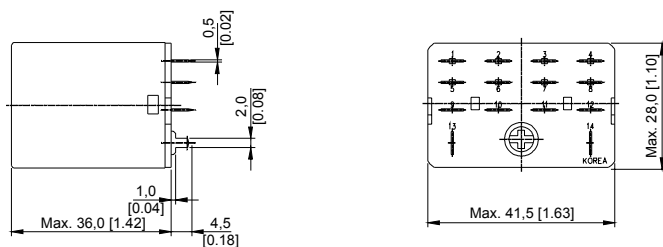
### LED Indicator/Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/ 2 amp	SZR-LY2-X1-DC24V

# LY4 Series

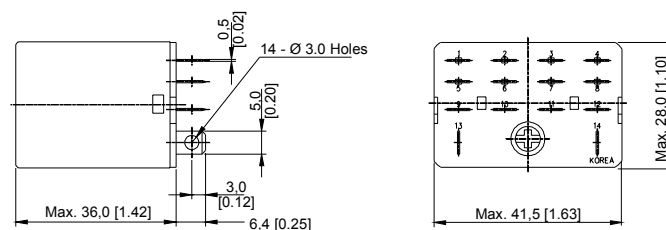
## OPTIONS

### Standard, PCB Terminal, 4PDT



COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/10 amp	SZR-LY4-1P-AC110-120V
220/240 Vac	250 Vac/10 amp	SZR-LY4-1P-AC220V-240V
24 Vdc	125 Vdc/2 amp	SZR-LY4-1P-DC24V

### Solder/Plug-In Terminal, 4PDT



### Standard

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/10 amp	SZR-LY4-1-AC110-120V
220 Vac	250 Vac/10 amp	SZR-LY4-1-AC220V
12 Vdc	125 Vdc/2 amp	SZR-LY4-1-DC12V
24 Vdc	125 Vdc/2 amp	SZR-LY4-1-DC24V

### LED Indicator

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
110/120 Vac	250 Vac/10 amp	SZR-LY4-N1-AC110-120V
220 Vac	250 Vac/10 amp	SZR-LY4-N1-AC220V
12 Vdc	125 Vdc/2 amp	SZR-LY4-N1-DC12V
24 Vdc	125 Vdc/2 amp	SZR-LY4-N1-DC24V

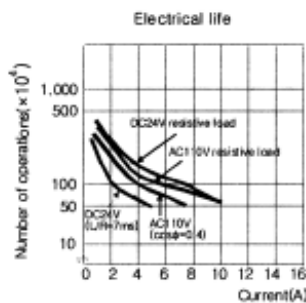
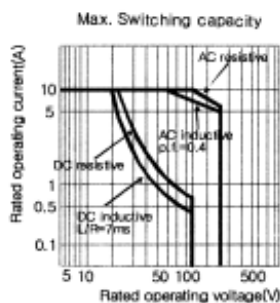
### Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/2 amp	SZR-LY4-D1-DC24V

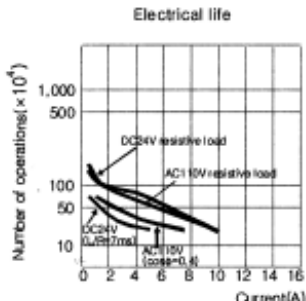
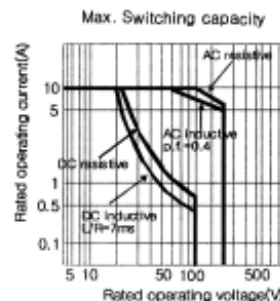
### LED Indicator/Diode Protection

COIL INPUT VOLTAGE	MAX. CONTACT RATING	REFERENCE
24 Vdc	125 Vdc/2 amp	SZR-LY4-X1-DC24V

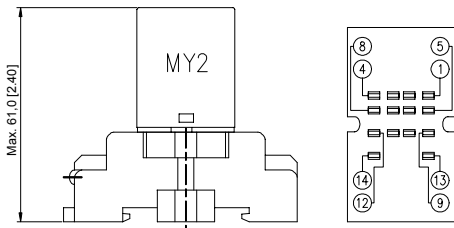
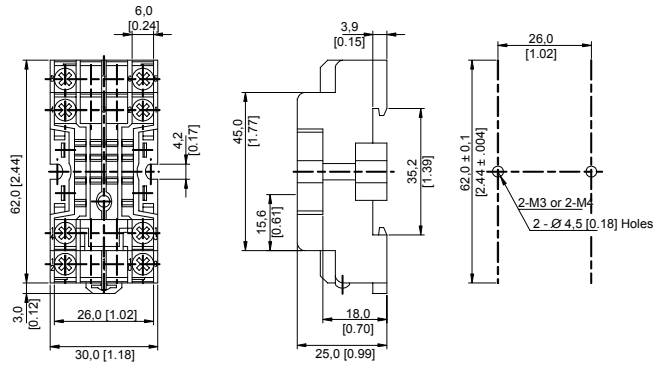
DPDT



4PDT

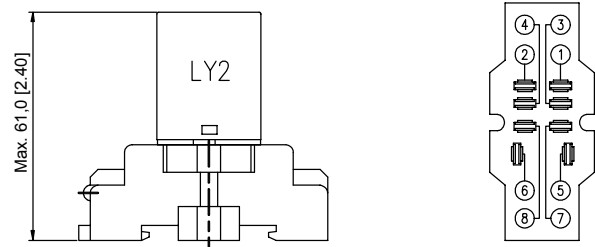
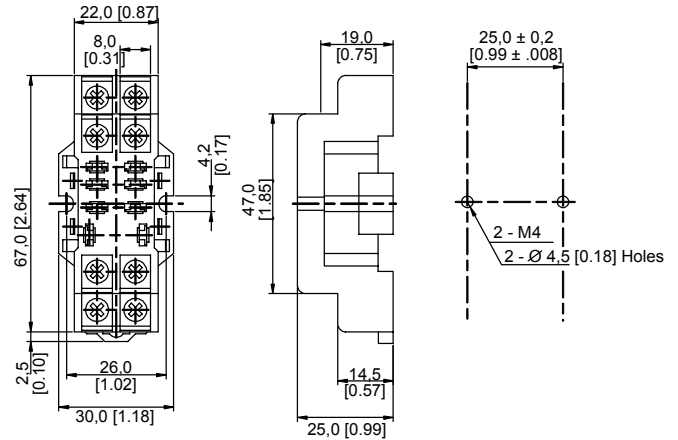


**MY2 Series Socket**



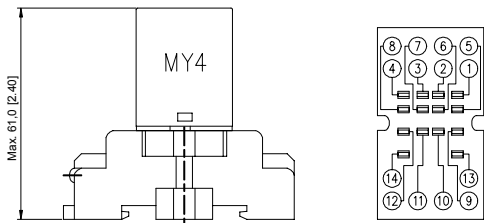
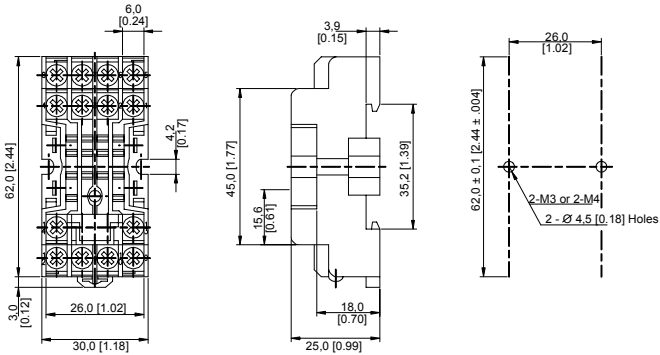
TYPE	POLES	REFERENCE
Rail socket	2	SZX-SMF-08N

**LY2 Series Socket**



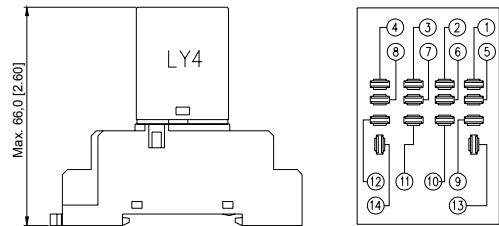
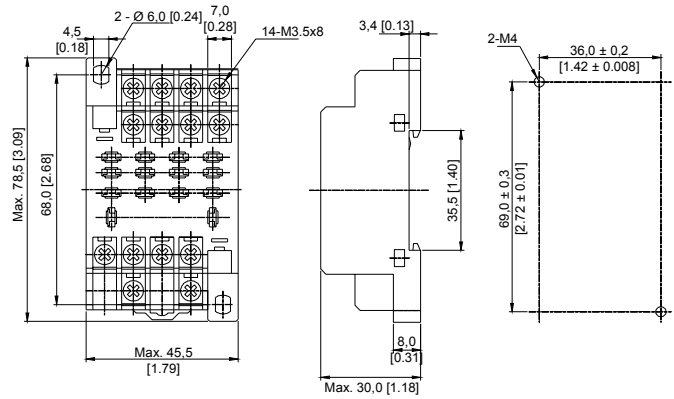
TYPE	POLES	REFERENCE
Rail socket	2	SZX-SLF-08N

**MY4 Series Socket**



TYPE	POLES	REFERENCE
Rail socket	4	SZX-SMF-14N

**LY4 Series Socket**



TYPE	POLES	REFERENCE
Rail socket	4	SZX-SLF-14

# Electromechanical Safety Switches

Honeywell is a worldwide leader in advanced switching and sensing technology - especially in the area of industrial safety. We offer both electromechanical safety switches and electronic safety sensors as well as safety control modules for safety applications in all categories of risk. Customers can count on our diverse product line to meet all of their machine safety applications.

Honeywell products meet or exceed European machine safety standards and have been approved (CE, BG, INRS) for use in Europe for more than 25 years. As North America moves toward harmonizing with global standards, machine builders and users can confidently turn to Honeywell for compliant machine safety solutions. Our products are designed to meet all applicable OSHA and ANSI standards.

Refer to pages 6 and 7 for more information about degrees of protection and electrical ratings.

## *Protective Guarding*

Protective guarding around a dangerous machine can be achieved with tamper-resistant safety switches. Safety switches incorporate positive opening operation such that even a welded contact will be mechanically broken and a stop signaled. These switches monitor the position of moveable guards and doors, which are used to safeguard access to equipment and provide protection from ejected pieces, chips, projectiles or oil. These safeguards require a relatively low investment and provide reliable protection if they are regularly checked and maintained.

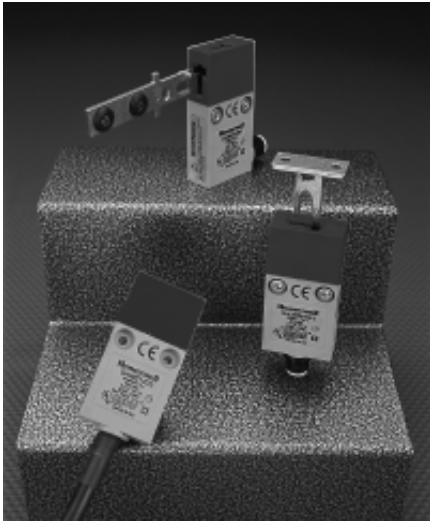


## *Cable Pull Switches*

Cable-pull limit switches serve as a readily accessible means of emergency stop for applications. These cable-pull devices are visible, accessible and easy to use and they immediately open the emergency stop circuit when activated.



# GKM Series Global Miniature Safety Key Operated Switch



Used alone as Category 1 safety components or, in conjunction with other safety switches and our complete range of safety relays, it is possible to construct comprehensive protection schemes with Category 2, 3 or 4 compliance.

The prelead versions allow rapid fit, easy cable routing and function testing which cut costs dramatically in OEM applications. Simple upgrade guarding solution for End User applications.

Low energy basic switches are rated as follows:

Operating Voltage  $U_e$  1 Vdc to 60 Vdc or 1 Vac to 125 Vac  
Operating Current  $I_e$  1 mA to 50 mA

Example of catalog listing using a low energy basic switch - GKMA19

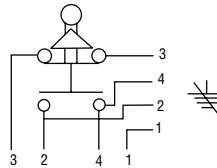
**Mechanical life:** > 1 million  
**Sealing:** IP66/67, EN 60529, NEMA 1, 12, 13  
**Operating temperature:** -25 °C to 85 °C (-13 °F to 185 °F)  
**Approvals:** CE, UL, CSA  
AC15 B300  
DC13 Q300

**Contacts:**

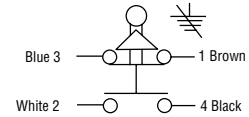
Low energy Silver  
Gold plated  
Slow action contacts

**Switching options:**

1 Normally Closed/1 Normally Open, Break Before Make  
1NC/1NO, BBM - GKMF  
1NC/1NO, BBM, low energy - GKMA, B, C, D

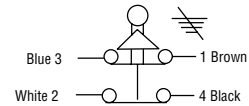
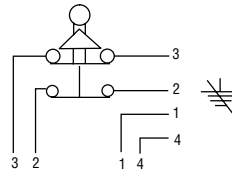


2NC - GKMF



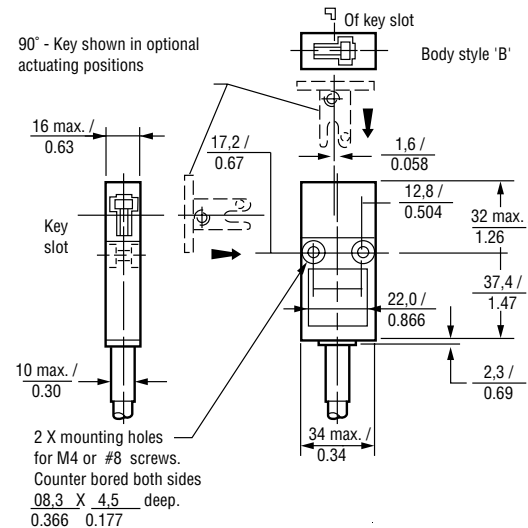
2 Normally Closed

2NC, low energy - GKMA, B, C, D



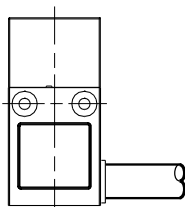
**Electrical ratings:**

IEC 60947-5-1/EN 60947-5-1								
Designation & Utilization Category	Rated operational current $I_e$ (A) at rated operational voltage $U_e$						VA rating	
	120 V	240 V	380 V	480 V	500 V	600 V	Make	Break
AC15 A600	6	3	1,9	1,5	1,4	1,2	7200	720
AC15 A300	6	3	-	-	-	-	7200	720
AC15 B300	3	1,5	-	-	-	-	3600	360
AC14 D300	0,6	0,3	-	-	-	-	432	72
	125 V 250 V							
DC13 Q300	0,55	0,27					69	69
DC13 R300	0,22	0,1					28	28



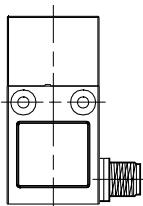
**OPTIONS**

**Side exit cable**



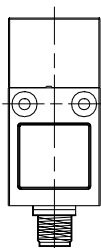
CABLE LENGTH	CONTACT	REFERENCE
1 m	2NC, low energy	GKMA17
1 m	1NC/1NO, BBM, low energy	GKMA19
2 m	1NC/1NO, BBM	GKMA23
2 m	2NC	GKMA26
2 m	2NC, low energy	GKMA27
2 m	1NC/1NO, BBM, low energy	GKMA29
3 m	1NC/1NO, BBM	GKMA33
3 m	2NC	GKMA36
3 m	2NC, low energy	GKMA37
3 m	1NC/1NO, BBM, low energy	GKMA39

**Side exit M12 dc micro-change connector**



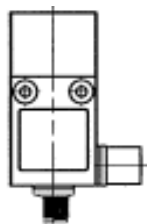
CONTACT	REFERENCE
1NC/1NO, BBM	GKMC03
2NC	GKMC06
2NC, low energy	GKMC07
1NC/1NO, BBM, low energy	GKMC09

**Bottom exit M12 dc micro-change connector**



CONTACT	REFERENCE
1NC/1NO, BBM	GKMD03
2NC, low energy	GKMD07
1NC/1NO, BBM, low energy	GKMD09

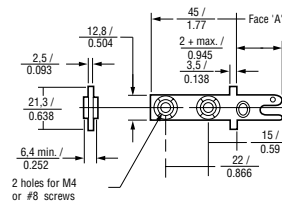
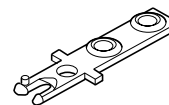
**Dual exit M12 dc micro-change connector**



CONTACT	REFERENCE
1NC/1NO, BBM	GKMF03
2NC	GKMF06
2NC, low energy	GKMF07
1NC/1NO, BBM, low energy	GKMF09

**KEY STYLE**

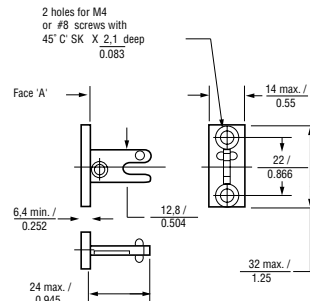
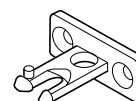
**Straight key**



REFERENCE
GKZ51M

Stainless steel

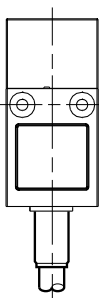
**90° key**



REFERENCE
GKZ52M

Stainless steel

**Bottom exit cable**



CABLE LENGTH	CONTACT	REFERENCE
1 m	1NC/1NO, BBM	GKMB13
1 m	2NC	GKMB16
1 m	2NC, low energy	GKMB17
1 m	1NC/1NO, BBM, low energy	GKMB19
2 m	1NC/1NO, BBM	GKMB23
2 m	2NC	GKMB26
2 m	2NC, low energy	GKMB27
2 m	1NC/1NO, BBM, low energy	GKMB29
3 m	1NC/1NO, BBM	GKMB33
3 m	2NC	GKMB36
3 m	2NC, low energy	GKMB37
3 m	1NC/1NO, BBM, low energy	GKMB39

# GSS Series Hinge Mount Safety Limit Switch



The Hinge Mount Safety Limit Switch is designed for use on machine access doors as an alternative solution to key operated interlocks and safety limit switches. When the access door is opened, a follower pin (not supplied) slides down the slot in the actuator lever, forcing the actuator lever to rotate and positively open the NC safety circuit to shut off the machine. Closing the access door rotates the actuator lever to the reset position, closing the NC safety contacts.

The Hinge Mount Safety Limit Switch minimizes alignment problems because it may be offset-mounted from the hinge point of the door. The tamper-resistant design and the positive opening contacts provide a higher level of safety than the conventional spring-driven limit switches often used to monitor door position.

### Low Energy Switching

In today's demanding age of low energy controls, electromechanical switches are frequently used to interface directly with safety relays, PLCs and other low energy devices. To accommodate this requirement GSS offers a new gold plated contact version of the standard basic switch. This improves reliability of switching at low currents and voltages by protecting the contact surfaces from contamination during operation or storage prior to use.

Standard silver contacts have a disadvantage in that the contact surface may tarnish under certain environmental conditions, e.g. in the presence of moisture.

Low energy basic switches are rated as follows:

Operating Voltage  $U_e$  1 Vdc to 60 Vdc or 1 Vac to 125 Vac

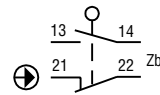
Operating Current  $I_e$  1 mA to 50 mA

Example of catalog listing using a low energy basic switch - GSCB33S2.

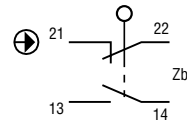
### Switching options:

#### GSC/D

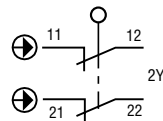
Snap action contacts (1NC/1NO)



Slow action contacts (1NC/1NO) BBM

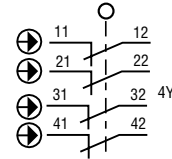


Slow action contacts (2NC)

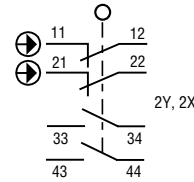


#### GSE

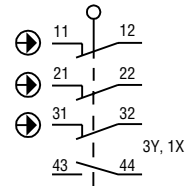
Slow action contacts (4NC)



Slow action contacts (2NC/2NO) BBM



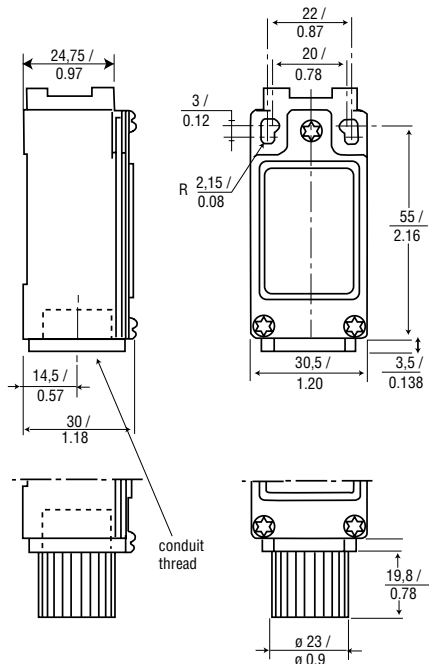
Slow action contacts (3NC/1NO) BBM



### Electrical ratings:

Designation & Utilization Category		IEC 60947-5-1/EN 60947-5-1						VA rating	
		Rated operational current $I_e$ (A) at rated operational voltage $U_e$						Make	Break
		120 V	240 V	380 V	480 V	500 V	600 V		
AC15	A600	6	3	1,9	1,5	1,4	1,2	7200	720
AC15	A300	6	3	-	-	-	-	7200	720
AC15	B300	3	1,5	-	-	-	-	3600	360
AC14	D300	0,6	0,3	-	-	-	-	432	72
		125 V	250 V						
DC13	Q300	0,55	0,27					69	69
DC13	R300	0,22	0,1					28	28

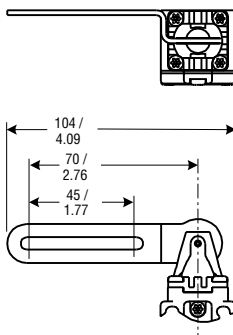
**GSC Metal body  
GSD Plastic body  
EN 50047  
Safety Standard**



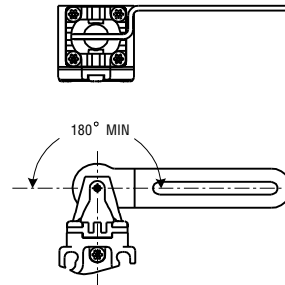
**Mechanical life:** up to 1 million  
**Sealing:** IP 66, NEMA 1, 4 (GSC), 12, 13  
**Operating temperature:** -25 °C to 85 °C  
 (-13 °F to 185 °F)  
**Approvals:** IEC/EN 60947-5-1  
 AC15 A300  
 DC13 Q300  
 UL, CSA, BG

**ACTUATED SWITCHES**

*Rotated 90° to the left  
from center*



*Rotated 90° to the right  
from center*



**GSC - Metal body**

CONTACT	CONDUIT	REFERENCE
1NC/1NO	½ in NPT	GSCA01S1
1NC/1NO, BBM	½ in NPT	GSCA03S1
2NC	½ in NPT	GSCA06S1
2NC, low energy	20 mm	GSCC36S1

**GSD - Plastic body**

CONTACT	CONDUIT	REFERENCE
1NC/1NO, BBM	½ in NPT	GSDA03S1
2NC	½ in NPT	GSDA06S1
1NC/1NO, BBM	PG 13,5	GSDB03S1
2NC	PG 13,5	GSDB06S1
1NC/1NO	20 mm	GSDC01S1

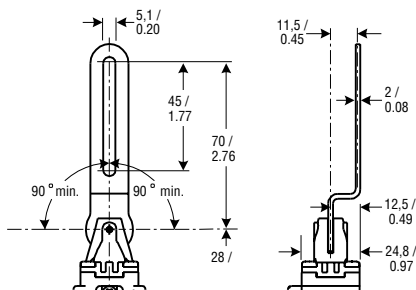
**GSC - Metal body**

CONTACT	CONDUIT	REFERENCE
1NC/1NO	½ in NPT	GSCA01S3
1NC/1NO, BBM	½ in NPT	GSCA03S3
2NC	½ in NPT	GSCA06S3
2NC, low energy	PG 13,5	GSCB36S3

**GSD - Plastic body**

CONTACT	CONDUIT	REFERENCE
1NC/1NO, BBM	½ in NPT	GSDA03S3
2NC	½ in NPT	GSDA06S3
1NC/1NO, BBM	PG 13,5	GSDB03S3
2NC	PG 13,5	GSDB06S3
1NC/1NO	20 mm	GSDC01S3

*Rotated 90° either direction from  
center*



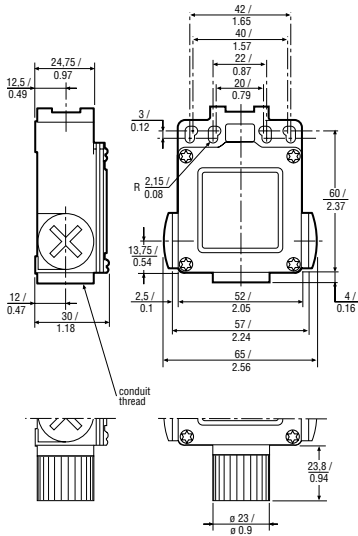
**GSC - Metal body**

CONTACT	CONDUIT	REFERENCE
1NC/1NO	½ in NPT	GSCA01S2
1NC/1NO, BBM	½ in NPT	GSCA03S2
2NC	½ in NPT	GSCA06S2
2NC, low energy	PG 13,5	GSCB36S2

**GSD - Plastic body**

CONTACT	CONDUIT	REFERENCE
1NC/1NO, BBM	½ in NPT	GSDA03S2
2NC	½ in NPT	GSDA06S2
1NC/1NO, BBM	PG 13,5	GSDB03S2
2NC	PG 13,5	GSDB06S2
1NC/1NO	20 mm	GSDC01S2

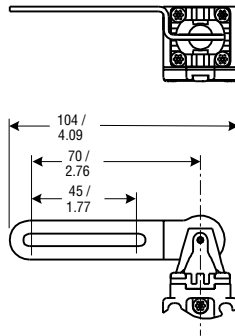
**GSE EN 50047 Compatible  
Safety 3 Conduit Metal  
Standard**



**Mechanical life:** up to 1 million  
**Sealing:** IP 66, NEMA/UL 1, 4, 12, 13  
**Operating temperature:** -25 °C to 85 °C  
 (-13 °F to 185 °F)  
**Approvals:** IEC/EN 60947-5-1  
 AC15 A300  
 DC13 Q300  
 UL, CSA, BG

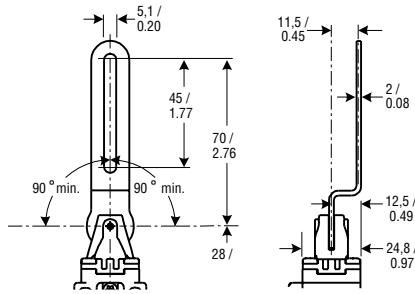
**ACTUATED SWITCHES**

*Rotated 90° to the left  
from center*



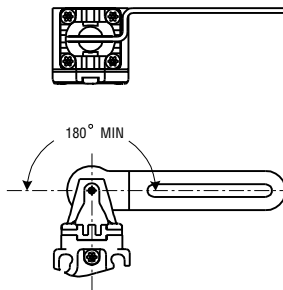
CONTACT	CONDUIT	REFERENCE
2NC/2NO, BBM	½ in NPT	GSEA44S1
3NC/1NO, BBM	½ in NPT	GSEA46S1
4NC, low energy	20 mm	GSEC41S1

*Rotated 90° either direction from  
center*



CONTACT	CONDUIT	REFERENCE
2NC/2NO, BBM	½ in NPT	GSEA44S2

*Rotated 90° to the right  
from center*



CONTACT	CONDUIT	REFERENCE
2NC/2NO, BBM	½ in NPT	GSEA44S3

# GK Series Dual Entry Key Operated Safety Interlock Switch



The GK Series is designed specifically for use on machines where key removal brings the machine to an immediate safe condition. It provides enhanced operator safety when added to hinged or sliding guard doors, screens and protective covers on enclosures. The GK Series is especially well suited for large door applications, typically in the automotive plant floor environment. Its heavy duty construction withstands harsh industrial environments where rugged, long-term durability is required.

Nearly 1000 options are available in a simple to understand part number tree.

A safety lockout device is also available for use with the GK Series. The lockout device (GKZL2) is specifically designed to prevent a key from being inserted either manually, or by the access door being closed while maintenance personnel are working on the machine. When inserted, the lockout device can accommodate up to four padlocks to prevent unauthorised removal of the device.

**Mechanical life:**

**Sealing:**

**Operating temperature:**

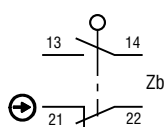
**Approvals:**

up to 15 million  
IP 67, NEMA/UL type 1, 4, 12,13  
-25 °C to 85 °C (-13 °F to 185 °F)  
CE, CSA, UL  
AC15 A300/A600  
DC13 Q300  
Silver  
Gold

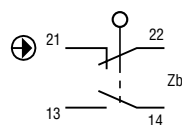
**Contacts:**

**Switching options:**

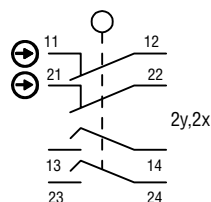
Snap action contacts (1NC/1NO)



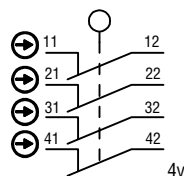
Slow action contacts (1NC/1NO), BBM



Slow action contacts (2NC/2NO), BBM

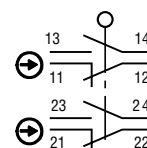


Slow action contacts (4NC)

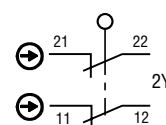


Low energy

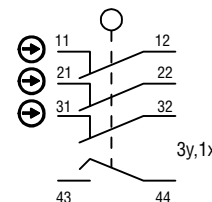
Snap action contacts (2NC/2NO)



Slow action contacts (2NC)



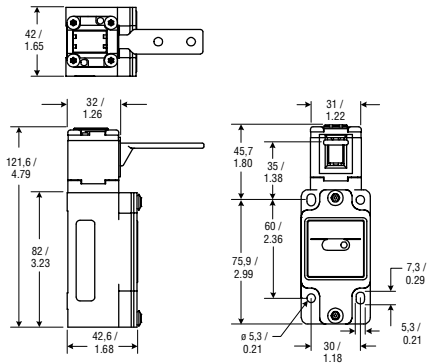
Slow action contacts (3NC/1NO)



**Electrical ratings:**

IEC 60947-5-1/EN 60947-5-1								
Designation & Utilization Category	Rated operational current Ie (A) at rated operational voltage Ue						VA rating	
	120 V	240 V	380 V	480 V	500 V	600 V	Make	Break
AC15 A600	6	3	1,9	1,5	1,4	1,2	7200	720
AC15 A300	6	3	-	-	-	-	7200	720
AC15 B300	3	1,5	-	-	-	-	3600	360
AC14 D300	0,6	0,3	-	-	-	-	432	72
	125 V	250 V						
DC13 Q300	0,55	0,27					69	69
DC13 R300	0,22	0,1					28	28

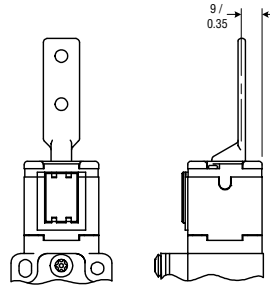
**GK Series (continued)**



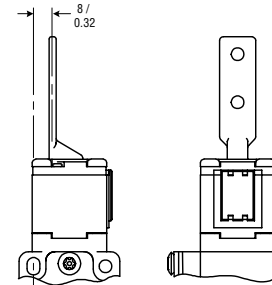
**Head orientation**

**OPTIONS**

*Opening to front and top*



*Opening to right and top*



**Standard**

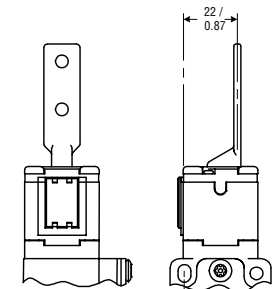
CONDUIT	CONTACT	KEY	REFERENCE
1/2 NPT	1NC/1NO	90°	GKBA1L7
1/2 NPT	1NC/1NO	Up-down	GKBA1L8-F11*
1/2 NPT	1NC/1NO	None	GKBA1LX
1/2 NPT	4NC	90°	GKBA10L7
1/2 NPT	2NC/2NO, BBM	Straight	GKBA14L6
1/2 NPT	2NC/2NO, BBM	90°	GKBA14L7
1/2 NPT	3NC/1NO, BBM	Straight	GKBA16L6
1/2 NPT	3NC/1NO, BBM	90°	GKBA16L7
1/2 NPT	2NC/NO	Straight	GKBA2L6
1/2 NPT	4NC, low energy	None	GKBA30LX
1/2 NPT	3NC/1NO, BBM, low energy	None	GKBA36LX
1/2 NPT	1NC/1NO, BBM	Straight	GKBA3L6
1/2 NPT	1NC/1NO, BBM	90°	GKBA3L7
1/2 NPT	2NC	None	GKBA6LX
PG 13.5	2NC/2NO, BBM	Straight	GKBB14L6
PG 13.5	1NC/1NO, BBM	90°	GKBB3L7
PG 13.5	2NC	90°	GKBB6L7
20 mm	2NC/2NO, BBM	90°	GKBC14L7
20 mm	1NC/1NO	Straight	GKBC1L6
20 mm	1NC/1NO	90°	GKBC1L7
20 mm	1NC/1NO	None	GKBC1LX
20 mm	2NC/NO	None	GKBC2LX
20 mm	4NC, low energy	None	GKBC30LX
20 mm	3NC/1NO, BBM, low energy	None	GKBC36LX
20 mm	2NC	None	GKBC6LX

\* fluorocarbon seal

**Single LED indicator**

CONDUIT	CONTACT	KEY	REFERENCE
1/2 NPT	2NC/2NO, BBM	straight	GKCA14M6

*Opening to left and top*



**Single LED indicator**

CONDUIT	CONTACT	KEY	REFERENCE
1/2 NPT	1NC/1NO	Straight	GKCA1L6
1/2 NPT	1NC/1NO	90°	GKCA1L7
1/2 NPT	1NC/1NO	None	GKCA1LX
1/2 NPT	2NC	None	GKCA6LX
1/2 NPT	4NC	Straight	GKCA10L6
1/2 NPT	2NC/2NO, BBM	Straight	GKCA14L6
1/2 NPT	2NC/2NO, BBM	90°	GKCA14L7
1/2 NPT	2NC/2NO, BBM	Side-side	GKCA14L9
1/2 NPT	4NC, low energy	None	GKCA30LX
1/2 NPT	3NC/1NO, BBM, low energy	None	GKCA36LX
20 mm	1NC/1NO	None	GKCC1LX
20 mm	2NC	None	GKCC6LX
20 mm	4NC, low energy	None	GKCC30LX
20 mm	3NC/1NO, BBM, low energy	None	GKCC36LX

**Single LED indicator**

CONDUIT	CONTACT	KEY	REFERENCE
1/2 NPT	2NC/2NO, BBM	Straight	GKCA14P6
1/2 NPT	1NC/1NO	90°	GKCA1P7

**Double LED indicator**

CONDUIT	CONTACT	KEY	REFERENCE
1/2 NPT	2NC/2NO, BBM	90°	GKDA14P7

**Double LED indicator**

CONDUIT	CONTACT	KEY	REFERENCE
1/2 NPT	2NC/2NO, BBM	90°	GKDA14L7

# GKL/GKR Series Dual Entry Solenoid Key Operated Safety Interlock Switch



The GKR (head to the right) and GKL (head to the left) products offer the user an unrivalled range of standard options.

The GKR/GKL product is a key actuated device incorporating a key trapping mechanism. The switch is used on machinery where instant stop and access to the machinery is either impossible (due to the momentum of the machine) or impractical (due to tool or machine damage or scrapped product if the current machine cycle is interrupted).

The switch incorporates an optional manual override feature which allows removal of the key for emergency access.

Over 1000 options are available in a simple to understand part number tree.

A safety lockout device is also available for use with the GKR/GKL Series. The lockout device (GKZL2) is specifically designed to prevent a key from being inserted either manually, or by the access door being closed while maintenance personnel are working on the machine. When inserted, the lockout device can accommodate up to four padlocks to prevent unauthorised removal of the device.

**Mechanical life:**

**Sealing:**

**Operating temperature:**

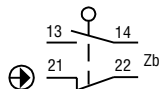
**Approvals:**

up to 1 million  
IP 68, NEMA/UL type 1, 4, 6P, 12,13  
-25 °C to 40 °C (-13 °F to 104 °F)  
CE, CSA, UL  
AC15 A300/A600  
DC13 Q300  
Silver  
Gold-plated

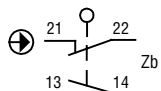
**Contacts:**

**Switching options:**

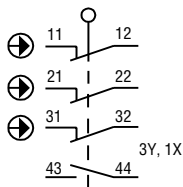
Snap Action  
Type 11NC/1NO Direct Opening



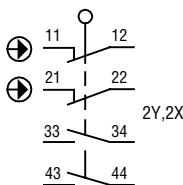
Slow Acting  
Type 3  
1NC/1NO, Break before make (BBM)



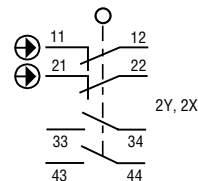
2 Slow Acting  
Type 36  
3NC/1NO, Break before make (BBM), low energy



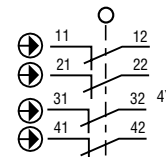
Type 44  
2NC/2NO, Break before make (BBM)



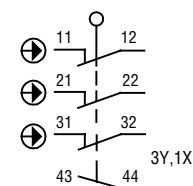
Type 14/15  
2NC/2NO, Break before make (BBM)



Type 40  
4NC



Type 46  
3NC/1NO, Break before make (BBM)





**GKL/GKR Series (continued)**

**Key:** Type 6 Straight  
 Type 9 Side - side, spring loaded  
 Type X No key

**Latching mechanism:** Type A Mechanical (solenoid unlock with screwdriver)  
 Type B Mechanical (without override)  
 Type S Electrical (solenoid unlock with screwdriver)

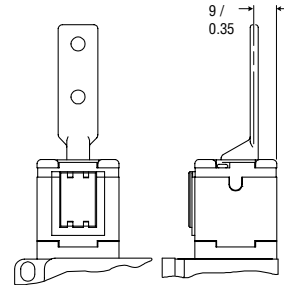
**Solenoid voltage:** Type 2 24 Vdc  
 Type 4 120 Vac

**Electrical ratings:**

IEC 60947-5-1/EN 60947-5-1									
Designation & Utilization Category		Rated operational current I <sub>e</sub> (A) at rated operational voltage U <sub>e</sub>						VA rating	
		120 V	240 V	380 V	480 V	500 V	600 V	Make	Break
AC15	A600	6	3	1,9	1,5	1,4	1,2	7200	720
AC15	A300	6	3	-	-	-	-	7200	720
AC15	B300	3	1,5	-	-	-	-	3600	360
AC14	D300	0,6	0,3	-	-	-	-	432	72
		125 V 250 V							
DC13	Q300	0,55	0,27					69	69
DC13	R300	0,22	0,1					28	28

**OPTIONS**

*Opening to front and top*



**Left**

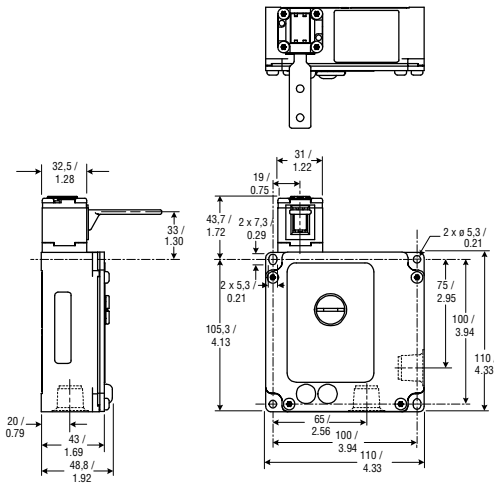
**1/2 in - NPT buna-n seals**

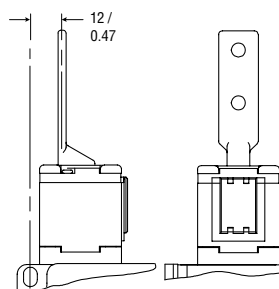
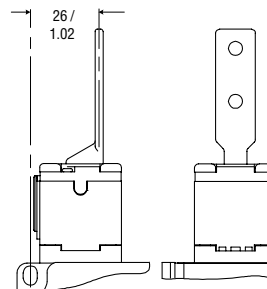
CONTACT TYPE	KEY	LATCHING TYPE	SOLENOID VOLTAGE	REFERENCE
3 (1NC/1NO, BBM)	None	A	24 Vdc	GKLE3LXA2
40 (4NC)	None	A	24 Vdc	GKLE40LXA2
46 (3NC, BBM)	None	A	24 Vdc	GKLE46LXA2

**Right**

**1/2 in - NPT buna-n seals**

CONTACT TYPE	KEY	LATCHING TYPE	SOLENOID VOLTAGE	REFERENCE
40 (4NC)	None	A	24 Vdc	GKRE40LXA2
46 (3NC, BBM)	None	A	24 Vdc	GKRE46LXA2



**Opening to right and top****Opening to left and top****Right****1/2 in - NPT buna-n seals**

CONTACT TYPE	KEY	LATCHING TYPE	SOLENOID VOLTAGE	REFERENCE
3 (1NC/1NO, BBM)	None	A	24 Vdc	GKRE3MXA2
3 (1NC/1NO, BBM)	None	A	120 Vac	GKRE3MXA4
3 (1NC/1NO, BBM)	None	S	24 Vdc	GKRE3MXS2
3 (1NC/1NO, BBM)	None	S	120 Vac	GKRE3MXS4
36 (3NC/1NO, BBM, low energy)	None	A	24 Vdc	GKRE36MXA2
36 (3NC/1NO, BBM, low energy)	None	A	120 Vac	GKRE36MXA4
36 (3NC/1NO, BBM, low energy)	None	S	24 Vdc	GKRE36MXS2

**Left****1/2 in - NPT buna-n seals**

CONTACT TYPE	KEY	LATCHING TYPE	SOLENOID VOLTAGE	REFERENCE
3 (1NC/1NO, BBM)	None	A	24 Vdc	GKLE3PXA2
3 (1NC/1NO, BBM)	None	A	120 Vac	GKLE3PXA4
3 (1NC/1NO, BBM)	None	S	24 Vdc	GKLE3PXS2
3 (1NC/1NO, BBM)	None	S	120 Vac	GKLE3PXS4
36 (3NC/1NO, BBM, low energy)	None	A	24 Vdc	GKLE36PXA2
36 (3NC/1NO, BBM, low energy)	None	A	120 Vac	GKLE36PXA4
36 (3NC/1NO, BBM, low energy)	None	S	24 Vdc	GKLE36PXS2
36 (3NC/1NO, BBM, low energy)	None	S	120 Vac	GKLE36PXS4

**20 mm - buna-n seals**

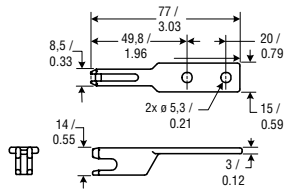
CONTACT TYPE	KEY	LATCHING TYPE	SOLENOID VOLTAGE	REFERENCE
1 (1NC/1NO)	None	A	24 Vdc	GKRG1MXA2
1 (1NC/1NO)	None	A	120 Vac	GKRG1MXA4
1 (1NC/1NO)	None	S	24 Vdc	GKRG1MXS2
1 (1NC/1NO)	None	S	120 Vac	GKRG1MXS4
3 (1NC/1NO, BBM)	None	A	24 Vdc	GKRG3MXA2
36 (3NC/1NO, BBM, low energy)	None	A	24 Vdc	GKRG36MXA2
36 (3NC/1NO, BBM, low energy)	None	A	120 Vac	GKRG36MXA4
36 (3NC/1NO, BBM, low energy)	None	S	24 Vdc	GKRG36MXS2
36 (3NC/1NO, BBM, low energy)	None	S	120 Vac	GKRG36MXS4

**20 mm - buna-n seals**

CONTACT TYPE	KEY	LATCHING TYPE	SOLENOID VOLTAGE	REFERENCE
1 (1NC/1NO)	None	A	24 Vdc	GKLG1PXA2
1 (1NC/1NO)	None	A	120 Vac	GKLG1PXA4
1 (1NC/1NO)	None	S	24 Vdc	GKLG1PXS2
1 (1NC/1NO)	None	S	120 Vac	GKLG1PXS4
3 (1NC/1NO, BBM)	None	S	24 Vdc	GKLG3PXS2
36 (3NC/1NO, BBM, low energy)	None	A	24 Vdc	GKLG36PXA2
36 (3NC/1NO, BBM, low energy)	None	A	120 Vac	GKLG36PXA4
36 (3NC/1NO, BBM, low energy)	None	S	24 Vdc	GKLG36PXS2
36 (3NC/1NO, BBM, low energy)	None	S	120 Vac	GKLG36PXS4
44 (2NC/2NO, BBM)	None	B	24 Vdc	GKLG44PXB2

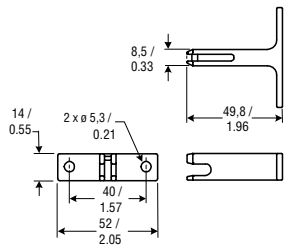
# Keys for GK and GKL/GKR switches

## Straight key



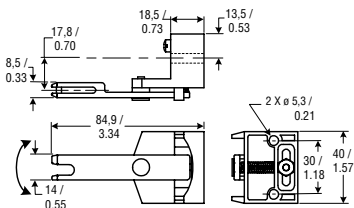
REFERENCE  
GKZ56

## 90° key



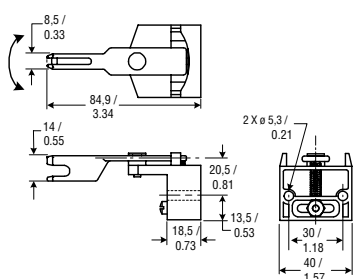
REFERENCE  
GKZ57

## Spring-loaded key: up/down



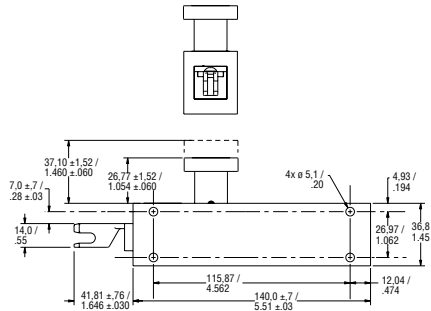
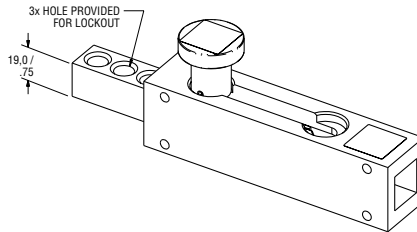
REFERENCE  
GKZ58

## Spring-loaded key: left/right

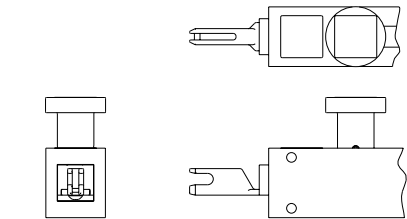


REFERENCE  
GKZ59

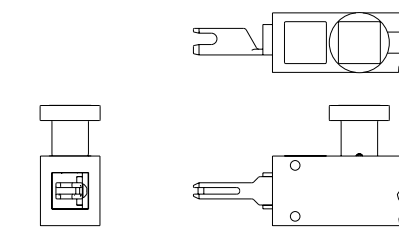
## Locking slider bolt with actuating key



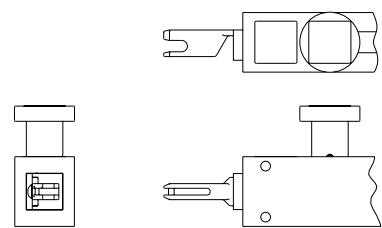
0° key rotation  
REFERENCE  
GKZ71



180° key rotation  
REFERENCE  
GKZ73



90° key rotation  
REFERENCE  
GKZ72



270° key rotation  
REFERENCE  
GKZ74

# CPS Series Cable Pull Safety Switch



CPS Series Cable Pull Safety Switches provide a readily accessible emergency stop signal. This is a cost-effective means compared to using multiple emergency stop push-buttons. (Cable Pull Safety Switches are not, however, to be used as a means of personnel safeguarding. They may be used to prevent further injury or damage to equipment when used for emergency stop signaling.)

The CPS Series Cable Pull Safety switch is designed to provide emergency stop protection for exposed conveyor and assembly lines. The internal mechanism latches on both slackened cable (push) and pulled cable. This capability also enhances productivity by eliminating nuisance stops due to variations in temperature, stretch of cable over time, and other application variables.

The 1CPS is intended for use in applications where the cable span is 76 m (250 ft) or shorter. It is an economical solution for shorter runs or zone protection typical to automated systems. The 2CPS series is intended for use in very long cable runs of 152 m (500 ft) or shorter, such as long conveyor lines found in warehouses.

The CPS complies with: Low Voltage Directive 73/23/EEC, as amended by directive 93/68/EEC; Machinery Directive 98/37/EEC only as the directives relate to the components being used in a safety function; IEC/EN 60947-1; IEC/EN 60947-5-1; IEC/EN 60947-5-5.

**Mechanical life:**

**Sealing:**

**Operating temperature:**

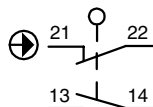
**Approvals:**

**Contacts:**

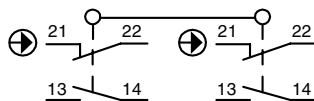
**Switching options:**

	1CPS	1 000 000
	2CPS	IP67, NEMA 1, 4, 12,13
		-25 °C to 80 °C (-13 °F to 176 °F)
		-40 °C to 80 °C (-40 °F to 176 °F)
		AC15 A300
		DC13 Q300
	1CPS	UL, CSA
	2CPS	UL, CSA, BG
	1CPS	Silver
	1CPS, Low energy	Gold plated
	2CPS	Gold plate over silver

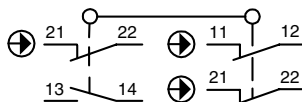
1NC/1NO



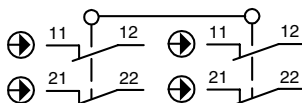
2NC/2NO



3NC/1NO

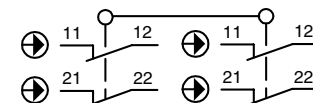
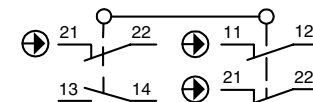
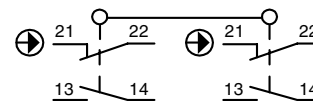


4NC



2CPS

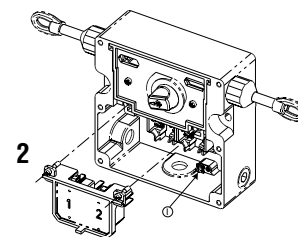
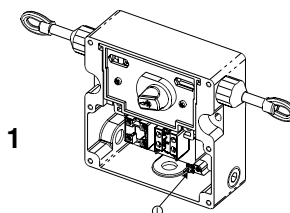
N/A



**2CPS contact block mounting:**

1  
2

To housing  
Removable with heavy duty terminals



**1CPS indicator Light Code:**

No letter  
A

No indicator provided  
24 Vdc red LED  
120 Vac red LED

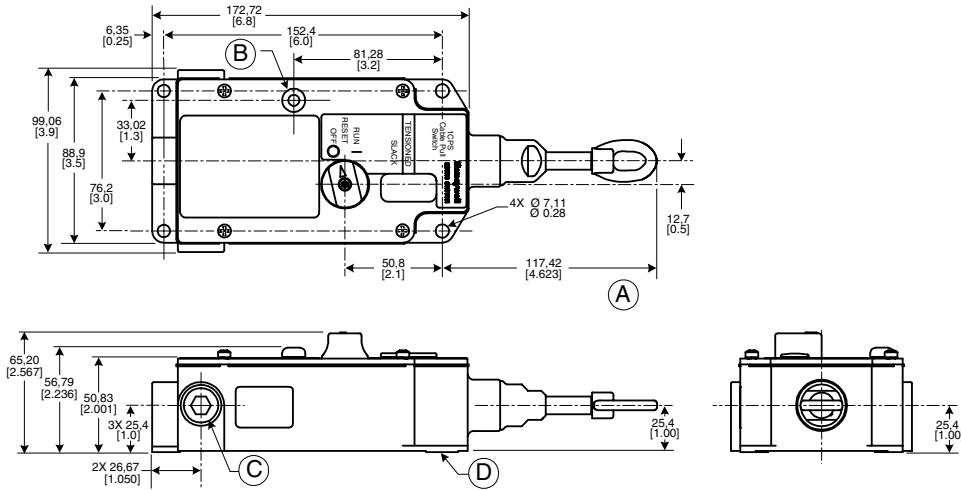
**2CPS indicator Light Code:**

No letter  
A  
B

No indicator provided  
24 Vdc red multi-cluster LED  
120 Vac red multi-cluster LED

**CPS Series (continued)**

**1CPS**



- A Fully extended
- B Optional indicator
- C Conduit thread (3 total)
- D Mounting pad (4 total)

**OPTIONS**

*Cable maintained*

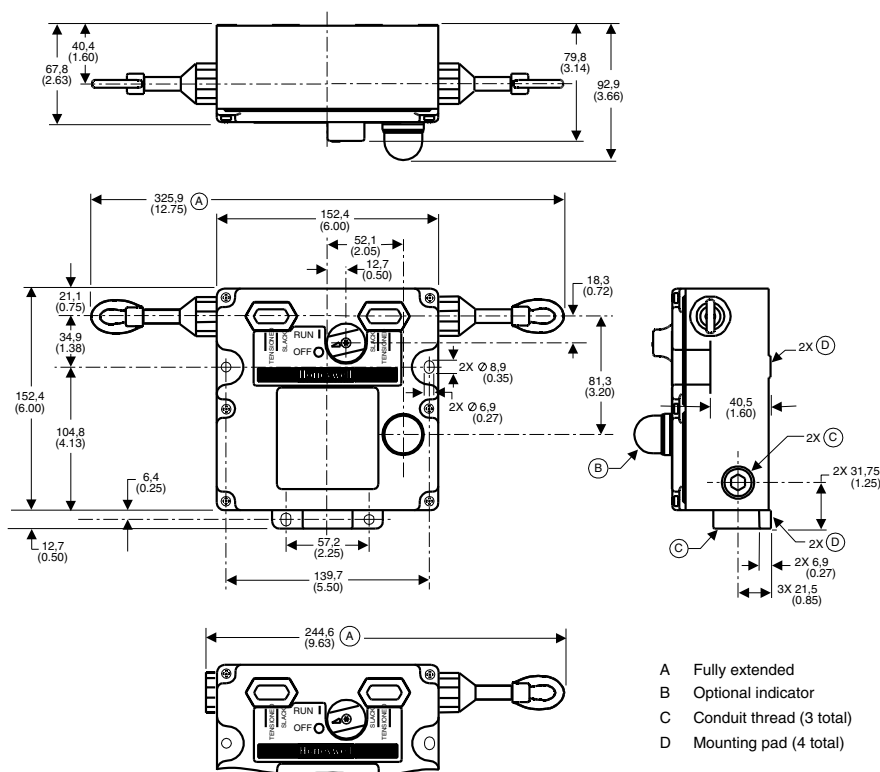
**1/2 in NPT**

CONTACT	INDICATOR	REFERENCE
1NC/1NO	None	1CPSA1
1NC/1NO	24 V	1CPSA1A
1NC/1NO	120 V	1CPSA1B
2NC/2NO	None	1CPSA2
2NC/2NO	24 V	1CPSA2A
2NC/2NO	120 V	1CPSA2B
3NC/1NO	None	1CPSA3
3NC/1NO	24 V	1CPSA3A
3NC/1NO	120 V	1CPSA3B
4NC	None	1CPSA4
1NC/1NO, low energy	None	1CPSA5
2NC/2NO, low energy	None	1CPSA6
2NC/2NO, low energy	24 V	1CPSA6A
2NC/2NO, low energy	120 V	1CPSA6B
3NC/1NO, low energy	None	1CPSA7
4NC, low energy	None	1CPSA8

**20 mm**

CONTACT	INDICATOR	REFERENCE
1NC/1NO	None	1CPSC1
1NC/1NO	24 V	1CPSC1A
2NC/2NO	None	1CPSC2
2NC/2NO	24 V	1CPSC2A
2NC/2NO	120 V	1CPSC2B
3NC/1NO	None	1CPSC3
3NC/1NO	24 V	1CPSC3A
4NC	None	1CPSC4
1NC/1NO, low energy	None	1CPSC5
2NC/2NO, low energy	None	1CPSC6
2NC/2NO, low energy	24 V	1CPSC6A
3NC/1NO, low energy	None	1CPSC7
4NC, low energy	None	1CPSC8

**2CPS**



- A Fully extended
- B Optional indicator
- C Conduit thread (3 total)
- D Mounting pad (4 total)

**Cable maintained both sides**  
**1/2 in NPT**

CONTACT	CONTACT BLOCK MOUNTING	INDICATOR	REFERENCE
2NC/2NO	1	None	2CPSA1A1
2NC/2NO	1	24 Vdc	2CPSA1A1A
2NC/2NO	1	120 Vac	2CPSA1A1B
3NC/1NO	1	None	2CPSA1B1
3NC/1NO	1	24 Vdc	2CPSA1B1A
3NC/1NO	1	120 Vac	2CPSA1B1B
2NC/2NO	2	None	2CPSA2A1
2NC/2NO	2	24 Vdc	2CPSA2A1A
2NC/2NO	2	120 Vac	2CPSA2A1B
3NC/1NO	2	None	2CPSA2B1
3NC/1NO	2	24 Vdc	2CPSA2B1A
3NC/1NO	2	120 Vac	2CPSA2B1B

**20 mm**

CONTACT	CONTACT BLOCK MOUNTING	INDICATOR	REFERENCE
2NC/2NO	1	None	2CPSC1A1
2NC/2NO	1	24 Vdc	2CPSC1A1A
4NC	1	24 Vdc	2CPSC1D1A

**No actuation right side, cable maintained left side**  
**1/2 in NPT**

CONTACT	CONTACT BLOCK MOUNTING	INDICATOR	REFERENCE
2NC/2NO	1	None	2CPSA1A2
2NC/2NO	1	24 Vdc	2CPSA1A2A
2NC/2NO	1	120 Vac	2CPSA1A2B
3NC/1NO	1	None	2CPSA1B2
3NC/1NO	1	24 Vdc	2CPSA1B2A
3NC/1NO	1	120 Vac	2CPSA1B2B
2NC/2NO	2	None	2CPSA2A2
2NC/2NO	2	24 Vdc	2CPSA2A2A
2NC/2NO	2	120 Vac	2CPSA2A2B

**20 mm**

CONTACT	CONTACT BLOCK MOUNTING	INDICATOR	REFERENCE
2NC/2NO	1	None	2CPSC1A2
2NC/2NO	1	24 Vdc	2CPSC1A2A

**No actuation left side, cable maintained right side**  
**1/2 in NPT**

CONTACT	CONTACT BLOCK MOUNTING	INDICATOR	REFERENCE
2NC/2NO	1	None	2CPSA1A3
2NC/2NO	1	24 Vdc	2CPSA1A3A
2NC/2NO	1	120 Vac	2CPSA1A3B
3NC/1NO	1	None	2CPSA1B3
3NC/1NO	1	24 Vdc	2CPSA1B3A
3NC/1NO	1	120 Vac	2CPSA1B3B
2NC/2NO	2	None	2CPSA2A3
2NC/2NO	2	24 Vdc	2CPSA2A3A
2NC/2NO	2	120 Vac	2CPSA2A3B

**20 mm**

CONTACT	CONTACT BLOCK MOUNTING	INDICATOR	REFERENCE
2NC/2NO	1	None	2CPSC1A3
2NC/2NO	1	24 Vdc	2CPSC1A3A

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# Linear and Rotary Position

Position sensors respond to the movement or location of a target, such as a molding press slide or a pulley shaft, by producing either a digital or an analogue output correlated to its location. Honeywell position sensors include digital and analogue Hall-effect position sensors, magnetoresistive digital sensors and potentiometric rotary and linear sensors. Sensors are directly compatible with other electronic circuits for application flexibility.

With the combined capabilities of three well-known brand names - Data Instruments, Clarostat, Electro and New England Instruments - Honeywell the group continuously strives to remain at the forefront of position sensing technology. In this catalogue we present our range of Linear and Rotary Position transducers and Torque Watch gauges, all suitable for use in industrial environments.





# Linear and Rotary Position Transducers

Honeywell Sensing and Control manufactures a variety of potentiometric position sensors. The sensors use a tried and true potentiometric technology originally developed for military applications and more recently applied to industrial markets. MystR® conductive plastic potentiometric sensors are long-life units designed for rugged industrial applications. The proprietary MystR® conductive plastic has an extensive temperature range, infinite resolution and provides absolute position measurement on power-up. Intermediate signal conditioning is not required for normal ratio-metric position sensing. Very small stroke units (5 mm [0.2 in]) and units required to withstand exposure to harsh chemicals or work immersed in many different oils are available. If there is heavy hose down or spray from oil or water, a water resistant or waterproof potentiometer such as the AQ series should be used.

Linear products have CE approval, Intrinsically Safe For Class I, II, III, Division 1, Groups A, B, C, D, E, F, G With Entity. Vmax: 30 Vdc, Imax: 100 mA, Ci: 0.0 micro F, Li: 0.0 mH, T4A @ 105 °C Ambient.

**Mechanical life:**  
**Approvals:**  
**Housing:**  
**Element:**  
**Shaft:**  
**Wiper current:**  
**Resolution:**

1 billion dither operations  
 CE, NEMA 4 - water resistant  
 Anodized aluminium  
 MystR® conductive plastic film  
 Stainless steel  
 < 1 uA  
 Infinite

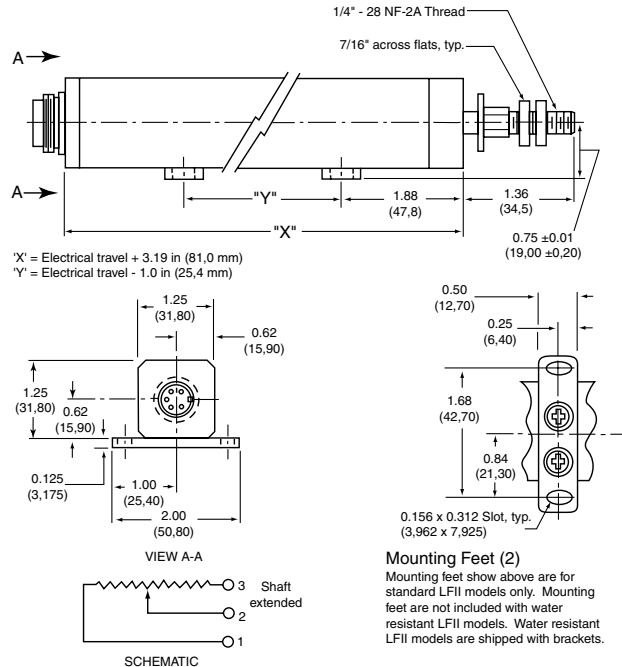
## LFII Series Longfellow II linear position transducer



The new Longfellow II incorporates design innovations to increase transducer life and provide greater resistance to vibration, while providing a smooth high-quality signal for demanding factory control applications. It has a solid stainless steel shaft, longer front-end bearings, a vibration-free damped element, a spring-loaded ball joint and a high precision precious metal wiper. Carrier guides are extruded the full length of the housing to ensure smooth operation even under severe side load conditions.

The newly designed internal components provide improvements based on worldwide testing and field experience.

<b>Operating temperature:</b>	-65 °C to 105 °C (-85 °F to 221 °F)
<b>Supply voltage (max.):</b>	30 Vdc
<b>Linearity:</b>	± 0.1 %
<b>Starting force (max.):</b>	
Standard	0.45 kg (1.0 lb)
Water resistant	2.27 kg (5.0 lb)
<b>Backlash (max.):</b>	0,025 mm (0.001 in)
<b>Total Resistance:</b>	5000 Ohm
<b>Shaft Ø:</b>	1/4 in
<b>Termination:</b>	Connector, Binder Series 681
<b>Housing length:</b>	= Electrical travel + 3.19 in (81,02 mm)
<b>Mechanical travel:</b>	= Electrical travel + 0.09 in (2,29 mm)



### OPTIONS

#### Standard

Mating connector, 3718401, sold separately

#### ELECTRICAL TRAVEL (IN (MM))

6.0 (152,4)	LF2S06N5KB6A
9.0 (228,6)	LF2S09N5KB6A
12.0 (304,8)	LF2S12N5KB6A
14.0 (355,6)	LF2S14N5KB6A
18.0 (457,2)	LF2S18N5KB6A
24.0 (609,6)	LF2S24N5KB6A
30.0 (762,0)	LF2S30N5KB6A
36.0 (914,4)	LF2S36N5KB6A
48.0 (1219,2)	LF2S48N5KB6A

#### REFERENCE

#### Water resistant

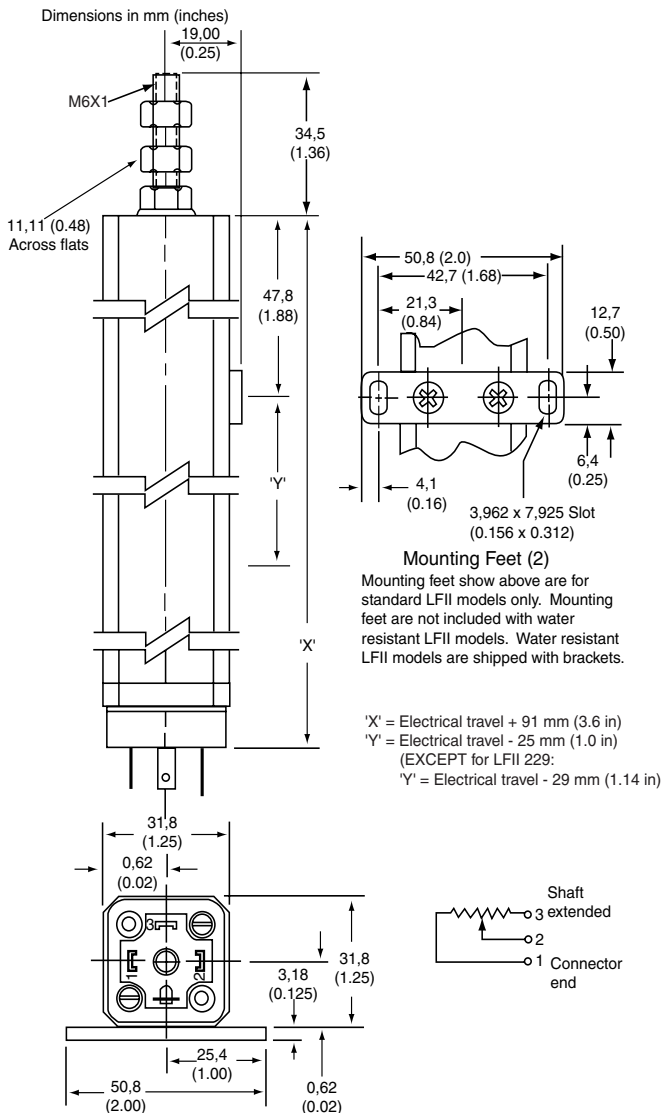
Mating connector, E02903021, sold separately

#### ELECTRICAL TRAVEL (IN (MM))

6.0 (152,4)	LF2W06N5KB6A
9.0 (228,6)	LF2W09N5KB6A
12.0 (304,8)	LF2W12N5KB6A
14.0 (355,6)	LF2W14N5KB6A
18.0 (457,2)	LF2W18N5KB6A
24.0 (609,6)	LF2W24N5KB6A
30.0 (762,0)	LF2W30N5KB6A
36.0 (914,4)	LF2W36N5KB6A
48.0 (1219,2)	LF2W48N5KB6A

#### REFERENCE

**LFII Metric Series**  
**Longfellow II linear position transducer**



**Operating temperature:** -65 °C to 105 °C (-85 °F to 221 °F)  
**Supply voltage (max.):** 30 Vdc  
**Linearity:** ± 0.1 %  
**Starting force (max.):**  
 Standard 0,45 kg (1.0 lb)  
 Water resistant 2,27 kg (5.0 lb)  
**Backlash (max.):** 0,025 mm (0.001 in)  
**Total Resistance:** 5000 Ohm  
**Shaft Ø:** 1/4 in  
**Termination:** Connector  
 A = Binder Series 681  
 G = DIN 43650  
**Housing length:** = Electrical travel + 91,0 mm (3.6 in)  
**Mechanical travel:** = Electrical travel + 2,2 mm (0.09 in)

**OPTIONS**

**Standard - Binder**

Mating connector, 3718401, sold separately

ELECTRICAL TRAVEL (MM (IN))	REFERENCE
152,4 (6.0)	LF2S0152M5KB8A
228,6 (9.0)	LF2S0229M5KB8A
304,8 (12.0)	LF2S0305M5KB8A
355,6 (14.0)	LF2S0355M5KB8A
457,2 (18.0)	LF2S0457M5KB8A
609,6 (24.0)	LF2S0610M5KB8A
762,0 (30.0)	LF2S0762M5KB8A
914,4 (36.0)	LF2S0914M5KB8A
1219,2 (48.0)	LF2S1219M5KB8A

**Standard - DIN 43650**

Mating connector included

ELECTRICAL TRAVEL (MM (IN))	REFERENCE
152,4 (6.0)	LF2S0152M5KB8G
228,6 (9.0)	LF2S0229M5KB8G
304,8 (12.0)	LF2S0305M5KB8G
355,6 (14.0)	LF2S0355M5KB8G
457,2 (18.0)	LF2S0457M5KB8G
609,6 (24.0)	LF2S0610M5KB8G
762,0 (30.0)	LF2S0762M5KB8G
914,4 (36.0)	LF2S0914M5KB8G
1219,2 (48.0)	LF2S1219M5KB8G

**Water resistant - Binder**

Mating connector, E02903021, sold separately

ELECTRICAL TRAVEL (MM (IN))	REFERENCE
152,4 (6.0)	LF2W0152M5KB8A
228,6 (9.0)	LF2W0229M5KB8A
304,8 (12.0)	LF2W0305M5KB8A
355,6 (14.0)	LF2W0355M5KB8A
457,2 (18.0)	LF2W0457M5KB8A
609,6 (24.0)	LF2W0610M5KB8A
762,0 (30.0)	LF2W0762M5KB8A
914,4 (36.0)	LF2W0914M5KB8A
1219,2 (48.0)	LF2W1219M5KB8A

**Water resistant - DIN 43650**

Mating connector included

ELECTRICAL TRAVEL (MM (IN))	REFERENCE
152,4 (6.0)	LF2W0152M5KB8G
228,6 (9.0)	LF2W0229M5KB8G
304,8 (12.0)	LF2W0305M5KB8G
355,6 (14.0)	LF2W0355M5KB8G
457,2 (18.0)	LF2W0457M5KB8G
609,6 (24.0)	LF2W0610M5KB8G
762,0 (30.0)	LF2W0762M5KB8G
914,4 (36.0)	LF2W0914M5KB8G
1219,2 (48.0)	LF2W1219M5KB8G

# DR Series

## Durastar rodless linear position transducer



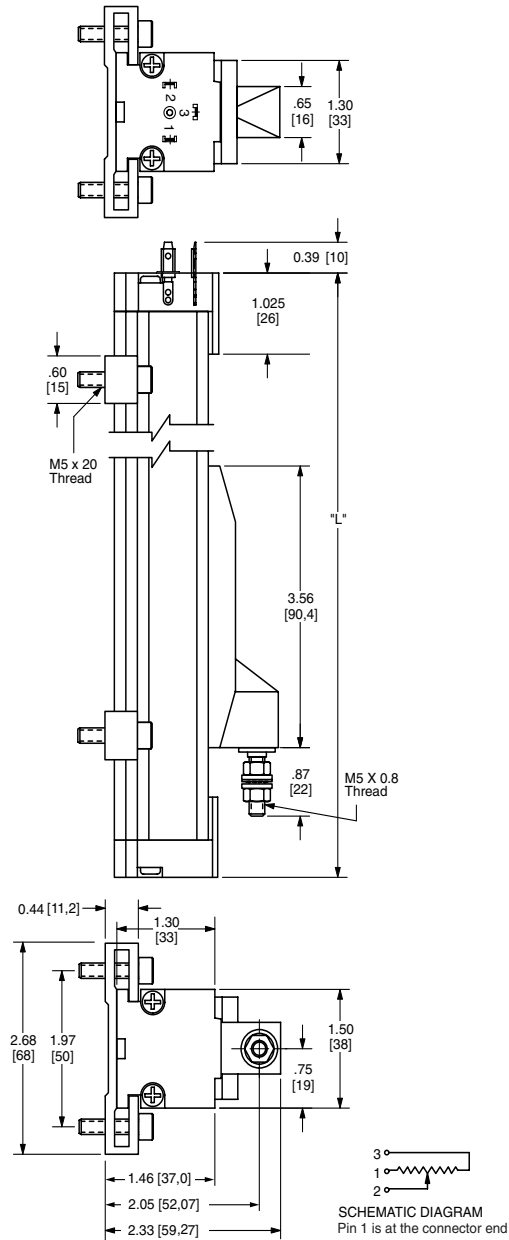
The DuraStar rodless linear position transducer is the longest lasting factory-rugged potentiometer. It allows large misalignment of shaft and housing, while providing whisper-quiet operation and smooth, clean signal output. MystR® provides the DuraStar excellent durability, especially in dither operation which is so often the determining factor in a potentiometer's life. It is an excellent replacement unit to reduce maintenance operations.

The rodless side-sealed DuraStar can also be used to replace a rodded potentiometer in contaminated applications to improve performance while providing long life.

<b>Operating temperature:</b>	-65 °C to 105 °C (-85 °F to 221 °F)
<b>Supply voltage (max.):</b>	75 Vdc
<b>Linearity:</b>	± 0.1 %
<b>Starting force (max.):</b>	0,45 kg (1.0 lb)
<b>Backlash (max.):</b>	0,025 mm (0.001 in)
<b>Shaft:</b>	M5x0.8 metric thread
<b>Termination:</b>	Connector, DIN 43560
<b>Mechanical travel:</b>	= Electrical travel + 5,0 mm (0.2 in)

Mating connector included

ELECTRICAL TRAVEL (MM (IN))	TOTAL RESISTANCE (OHM)	HOUSING LENGTH (MM (IN))	REFERENCE
101,6 (4.0)	2000	250,0 (9.84)	DR04N02KB7G
127,0 (5.0)	2000	280,0 (11.02)	DR05N02KB7G
152,4 (6.0)	5000	300,0 (11.81)	DR06N05KB7G
203,2 (8.0)	5000	352,0 (13.86)	DR08N05KB7G
228,6 (9.0)	5000	375,9 (14.80)	DR09N05KB7G
304,8 (12.0)	5000	452,1 (17.80)	DR12N05KB7G
355,6 (14.0)	5000	514,1 (20.24)	DR14N05KB7G
406,4 (16.0)	5000	553,9 (21.8)	DR16N05KB7G
457,2 (19.0)	5000	605,0 (23.8)	DR18N05KB7G
508,0 (20.0)	5000	656,0 (25.83)	DR20N05KB7G
609,6 (24.0)	10000	757,9 (29.84)	DR24N10KB7G
762,0 (30.0)	10000	910,0 (35.83)	DR30N10KB7G
914,4 (36.0)	10000	1062,5 (41.83)	DR36N10KB7G
1016,0 (40.0)	10000	1164,0 (45.83)	DR40N10KB7G
1270,0 (50.0)	10000	1418,0 (55.83)	DR50N10KB7G



# SLF Series

## Short Longfellow linear position transducer



The Short Longfellow is frequently used for measuring linear position or displacement up to 6 inches (152,4 mm) on a wide variety of manufacturing and process equipment. The mechanical design of the unit's front bearing, anodized extruded aluminum housing, stainless steel shaft and precious metal wipers are suitable for a factory's harsh environment.

Based on the proprietary MystR<sup>®</sup> conductive plastic film, it provides a high resolution, absolute position measurement without external signal conditioners.

<b>Operating temperature:</b>	-65 °C to 105 °C (-85 °F to 221 °F)
<b>Supply voltage (max.):</b>	40 Vdc
<b>Starting force (max.):</b>	
Standard	0,45 kg (1.0 lb)
Water resistant	2,27 kg (5.0 lb)
<b>Backlash (max.):</b>	0,025 mm (0.001 in)
<b>Shaft Ø:</b>	1/4 in
<b>Termination:</b>	Connector, Binder Series 681
<b>Housing length:</b>	= Electrical travel + 3.05 in (77,5 mm)
<b>Mechanical travel:</b>	= Electrical travel + 0.2 in (5,1 mm)

	<b>Electrical Travel (in (mm))</b>	<b>Total Resistance (Ohm)</b>
SLF01 or SLW01	1.0 (25,4)	1500
SLF02 or SLW02	2.0 (50,8)	3000
SLF03 or SLW03	3.0 (76,2)	4500
SLF04 or SLW04	4.0 (101,6)	6000
SLF06 or SLW06	6.0 (152,4)	9000

### OPTIONS

#### Standard

Mating connector, 3718401, sold separately

#### ± 0.1 % Linearity

<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
1.0 (25,4)	SLF01N1500B6A
2.0 (50,8)	SLF02N3000B6A
3.0 (76,2)	SLF03N4500B6A
4.0 (101,6)	SLF04N6000B6A
6.0 (152,4)	SLF06N9000B6A

#### ± 1.0 % Linearity

<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
1.0 (25,4)	SLF01N1500F6A
2.0 (50,8)	SLF02N3000F6A
3.0 (76,2)	SLF03N4500F6A
4.0 (101,6)	SLF04N6000F6A
6.0 (152,4)	SLF06N9000F6A

#### Water resistant

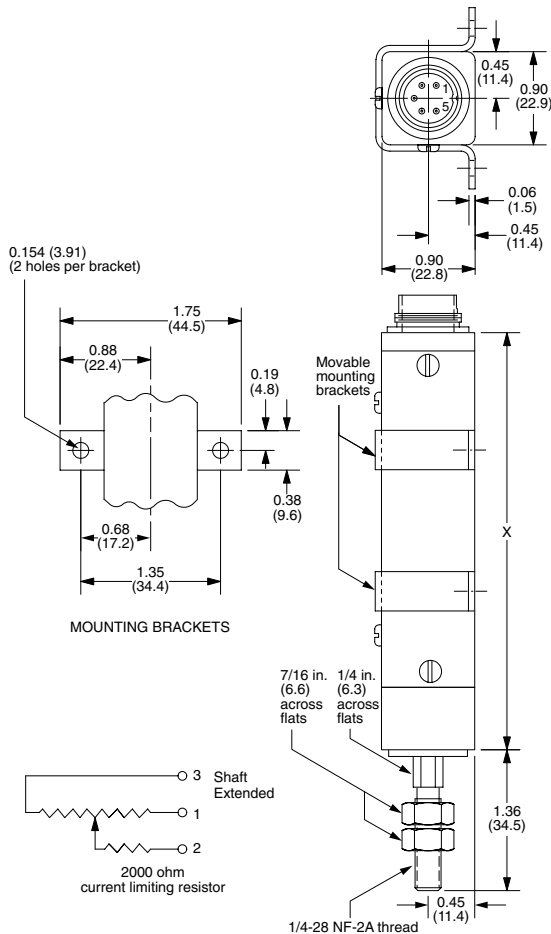
Mating connector, E02903021, sold separately

#### ± 0.1 % Linearity

<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
1.0 (25,4)	SLW01N1500B6A
2.0 (50,8)	SLW02N3000B6A
3.0 (76,2)	SLW03N4500B6A
4.0 (101,6)	SLW04N6000B6A
6.0 (152,4)	SLW06N9000B6A

#### ± 1.0 % Linearity

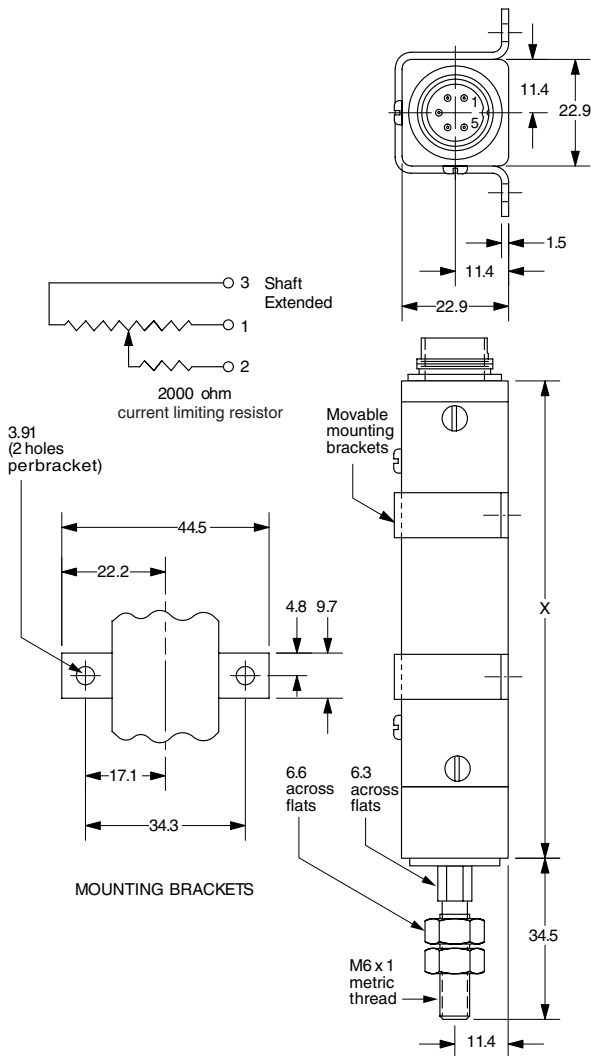
<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
1.0 (25,4)	SLW01N1500F6A
2.0 (50,8)	SLW02N3000F6A
3.0 (76,2)	SLW03N4500F6A
4.0 (101,6)	SLW04N6000F6A
6.0 (152,4)	SLW06N9000F6A



**SLF Metric Series**  
**Short Longfellow linear position transducer**



**Operating temperature:** -65 °C to 105 °C (-85 °F to 221 °F)  
**Supply voltage (max.):** 40 Vdc  
**Starting force (max.):** Standard 0,45 kg (1.0 lb)  
 Water resistant 2,27 kg (5.0 lb)  
**Backlash (max.):** 0,025 mm (0.001 in)  
**Shaft Ø:** M6x1 metric thread  
**Termination:** Connector, Binder Series 681  
**Housing length:** = Electrical travel + 77,5 mm (3.05 in)  
**Mechanical travel:** = Electrical travel + 5,1 mm (0.2 in)



	Electrical Travel (in mm)	Total Resistance (Ohm)
SLF025R4 or SLW025R4	25,4 (1.0)	1500
SLF050R8 or SLW050R8	50,8 (2.0)	3000
SLF076R2 or SLW076R2	76,2 (3.0)	4500
SLF101R6 or SLW101R6	101,6 (4.0)	6000
SLF152R4 or SLW152R4	152,4 (6.0)	9000

**OPTIONS**

**Standard**

Mating connector, 3718401, sold separately

**± 0.1 % Linearity**

ELECTRICAL TRAVEL	REFERENCE
25.4 (1.0)	SLF025R4M1500B8A
50.8 (2.0)	SLF050R8M3000B8A
76.2 (3.0)	SLF076R2M4500B8A
101.6 (4.0)	SLF101R6M6000B8A
152.4 (6.0)	SLF152R4M9000B8A

**± 1.0 % Linearity**

ELECTRICAL TRAVEL	REFERENCE
25.4 (1.0)	SLF025R4M1500F8A
50.8 (2.0)	SLF050R8M3000F8A
76.2 (3.0)	SLF076R2M4500F8A
101.6 (4.0)	SLF101R6M6000F8A
152.4 (6.0)	SLF152R4M9000F8A

**Water resistant**

Mating connector, E02903021, sold separately

**± 0.1 % Linearity**

ELECTRICAL TRAVEL	REFERENCE
25.4 (1.0)	SLW025R4M1500B8A
50.8 (2.0)	SLW050R8M3000B8A
76.2 (3.0)	SLW076R2M4500B8A
101.6 (4.0)	SLW101R6M6000B8A
152.4 (6.0)	SLW152R4M9000B8A

**± 1.0 % Linearity**

ELECTRICAL TRAVEL	REFERENCE
25.4 (1.0)	SLW025R4M1500F8A
50.8 (2.0)	SLW050R8M3000F8A
76.2 (3.0)	SLW076R2M4500F8A
101.6 (4.0)	SLW101R6M6000F8A
152.4 (6.0)	SLW152R4M9000F8A

# LT Series

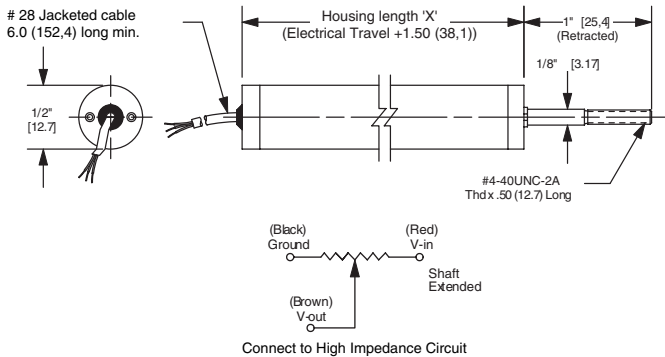
## Linear position transducer, 1/2 in diameter



The LT Series are 1/2 inch diameter, linear position transducers rugged enough to withstand the hostile environment of the factory. The LT can be provided with shaft seals for spray or hose down environments.

- Operating temperature:** -40 °C to 80 °C (-40 °F to 176 °F)
- Supply voltage (max.):** 30 Vdc
- Starting force (max.):**
  - Standard 28,35 g (1.0 oz)
  - Water resistant 340,19 g (12.0 oz)
- Backlash (max.):** 0,00508 mm (0.0002 in)
- Shaft Ø:** 1/8 in
- Termination:** Cable
- Housing length:** = Electrical travel + 1.50 in (38,10 mm)
- Mechanical travel:** = Electrical travel + 0.05 in (1,27 mm)

	Electrical Travel (in (mm))	Total Resistance (Ohm)
LTS01 or LTW01	1.0 (25,4)	1000
LTS02 or LTW02	2.0 (50,8)	2000
LTS03 or LTW03	3.0 (76,2)	3000
LTS04 or LTW04	4.0 (101,6)	4000
LTS05 or LTW05	5.0 (127,0)	5000
LTS06 or LTW06	6.0 (152,4)	6000
LTS07 or LTW07	7.0 (177,8)	7000
LTS08 or LTW08	8.0 (203,2)	8000
LTS09 or LTW09	9.0 (228,6)	9000
LTS10 or LTW10	10.0 (254,0)	10000



### OPTIONS

#### Standard

##### ± 0.1 % Linearity

ELECTRICAL TRAVEL	REFERENCE
1.0 (25,4)	LTS01N01KB5C
2.0 (50,8)	LTS02N02KB5C
3.0 (76,2)	LTS03N03KB5C
4.0 (101,6)	LTS04N04KB5C
5.0 (127,0)	LTS05N05KB5C
6.0 (152,4)	LTS06N06KB5C
7.0 (177,8)	LTS07N07KB5C
8.0 (203,2)	LTS08N08KB5C
9.0 (228,6)	LTS09N09KB5C
10.0 (254,0)	LTS10N10KB5C

##### ± 1.0 % Linearity

ELECTRICAL TRAVEL	REFERENCE
1.0 (25,4)	LTS01N01KF5C
2.0 (50,8)	LTS02N02KF5C
3.0 (76,2)	LTS03N03KF5C
4.0 (101,6)	LTS04N04KF5C
5.0 (127,0)	LTS05N05KF5C
6.0 (152,4)	LTS06N06KF5C
7.0 (177,8)	LTS07N07KF5C
8.0 (203,2)	LTS08N08KF5C
9.0 (228,6)	LTS09N09KF5C
10.0 (254,0)	LTS10N10KF5C

#### Water resistant

##### ± 0.1 % Linearity

ELECTRICAL TRAVEL	REFERENCE
1.0 (25,4)	LTW01N01KB5C
2.0 (50,8)	LTW02N02KB5C
3.0 (76,2)	LTW03N03KB5C
4.0 (101,6)	LTW04N04KB5C
5.0 (127,0)	LTW05N05KB5C
6.0 (152,4)	LTW06N06KB5C
7.0 (177,8)	LTW07N07KB5C
8.0 (203,2)	LTW08N08KB5C
9.0 (228,6)	LTW09N09KB5C
10.0 (254,0)	LTW10N10KB5C

##### ± 1.0 % Linearity

ELECTRICAL TRAVEL	REFERENCE
1.0 (25,4)	LTW01N01KF5C
2.0 (50,8)	LTW02N02KF5C
3.0 (76,2)	LTW03N03KF5C
4.0 (101,6)	LTW04N04KF5C
5.0 (127,0)	LTW05N05KF5C
6.0 (152,4)	LTW06N06KF5C
7.0 (177,8)	LTW07N07KF5C
8.0 (203,2)	LTW08N08KF5C
9.0 (228,6)	LTW09N09KF5C
10.0 (254,0)	LTW10N10KF5C

**MLT Series**  
**Linear position transducer, 3/8 in Diameter**

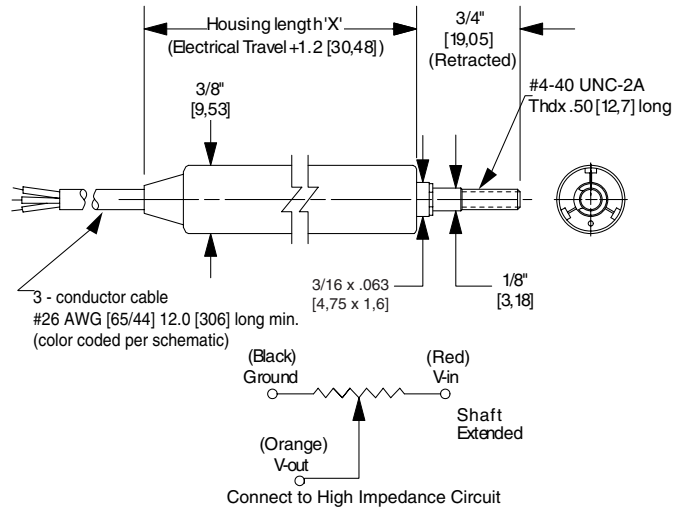


The MLT Series is 3/8 in diameter linear position transducer that is rugged enough to withstand hostile factory environments. Using a proprietary dual wiper, internal ball joint and the MystR® conductive plastic film the MLT provides a usable output at high vibration levels over long periods of time. MLT transducers use precious metal wipers to further enhance reliability.

The MLT's 3/8 inch diameter is among the smallest available and can be used to replace LVDT's in many applications.

- Operating temperature:** -40 °C to 80 °C (-40 °F to 176 °F)
- Supply voltage (max.):** 30 Vdc
- Starting force (max.):** 28,35 g (1.0 oz)
- Backlash (max.):** 0,0127 mm (0.0005 in)
- Shaft Ø:** 1/8 in
- Termination:** Cable
- Housing length:** = Electrical travel + 1.20 in (30,48 mm)
- Mechanical travel:** = Electrical travel + 0.05 in (1,27 mm)

	<b>Electrical Travel (in (mm))</b>	<b>Total Resistance (Ohm)</b>
MLTOR5	0.5 (12,7)	750
MLT001	1.0 (25,4)	1500
MLT002	2.0 (50,8)	3000
MLT003	3.0 (76,2)	4500
MLT004	4.0 (101,6)	6000
MLT005	5.0 (127,0)	7500
MLT006	6.0 (152,4)	9000



**OPTIONS**

**± 0.1 % Linearity**

<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
2.0 (50,8)	MLT002N3000B5C
3.0 (76,2)	MLT003N4500B5C
4.0 (101,6)	MLT004N6000B5C
5.0 (127,0)	MLT005N7500B5C
6.0 (152,4)	MLT006N9000B5C

**± 0.25 % Linearity**

<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
1.0 (25,4)	MLT001N1500D5C

**± 1.0 % Linearity**

<b>ELECTRICAL TRAVEL</b>	<b>REFERENCE</b>
0.5 (12,7)	MLTOR5N0750F5C
1.0 (25,4)	MLT001N1500F5C
2.0 (50,8)	MLT002N3000F5C
3.0 (76,2)	MLT003N4500F5C
4.0 (101,6)	MLT004N6000F5C
5.0 (127,0)	MLT005N7500F5C
6.0 (152,4)	MLT006N9000F5C

# AQLT/AQMLT Series

## Shaftless, waterproof linear position transducer



The AQLT and AQMLT are shaftless waterproof linear potentiometers designed to operate in wet/washdown and in-tank environments.

The AQ series features an external actuator magnetically coupled to a position feedback element. The magnetic actuator replaces the shaft, found in traditional linear transducers, and eliminates the need for additional stroke length mounting space.

Precious metal dual wipers, MystR® proprietary conductive plastic, and anodized aluminum housings provide long life and reliable operation in numerous applications.

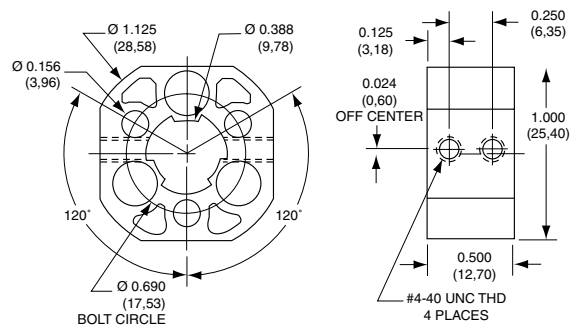
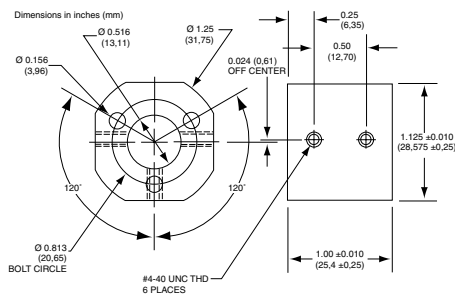
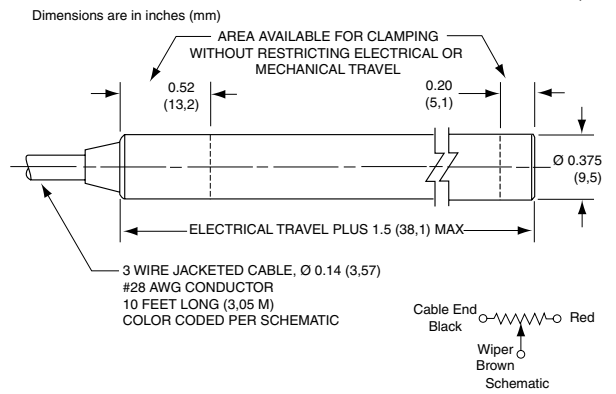
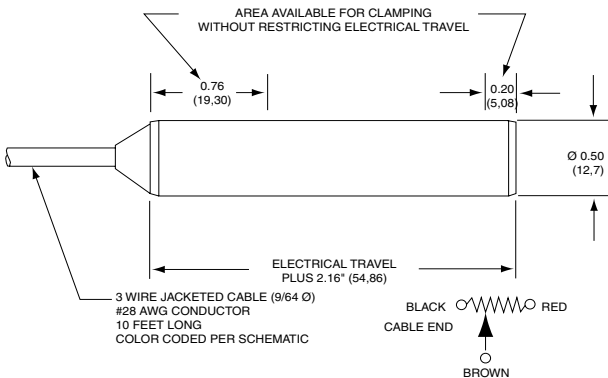
<b>Operating temperature:</b>	-40 °C to 80 °C (-40 °F to 176 °F)
<b>Supply voltage (max.):</b>	30 Vdc
<b>Linearity:</b>	± 1.0 %
<b>Starting force (max.):</b>	AQMT 56,7 g (2.0 oz)
	AQMLT 28,35 g (1.0 oz)
<b>Sealing:</b>	IP68
<b>Termination:</b>	Cable

### AQLT Series

**Housing length:** = Electrical travel + 54,87 mm (2.16 in)  
**Mechanical travel:** = Electrical travel + 2,54 mm (0.1 in)

### AQMLT Series

**Housing length:** = Electrical travel + 38,1 mm (1.5 in)  
**Mechanical travel:** = Electrical travel + 2,54 mm (0.1 in)



ELECTRICAL TRAVEL (MM (IN))	TOTAL RESISTANCE (OHM)	REFERENCE
152,4 (6.0)	6000	AQLT06N06KFC
304,8 (12.0)	12000	AQLT12N12KFC
457,2 (18.0)	18000	AQLT18N18KFC
609,6 (24.0)	24000	AQLT24N24KFC
762,0 (30.0)	30000	AQLT30N30KFC
965,2 (38.0)	38000	AQLT38N38KFC

ELECTRICAL TRAVEL (MM (IN))	TOTAL RESISTANCE (OHM)	REFERENCE
12,7 (0.5)	750	AQMLT05N00750FC
25,4 (1.0)	1500	AQMLT01N01500FC
76,2 (3.0)	3000	AQMLT03N04500FC
152,4 (6.0)	9000	AQMLT06N09000FC
228,6 (9.0)	13500	AQMLT09N13500FC
304,8 (12.0)	18000	AQMLT12N18000FC



# M22 Series Rotary position transducer



The M22 rotary potentiometer, available in servo and bushing mount, utilizes wear-resistant MystR® conductive plastic film combined with precious metal wipers to produce a quiet operating, low-noise, stable signal. Gold plated terminals eliminate soldering problems due to tarnish. The high-quality components are packaged in a cost-effective housing designed with an anodized aluminum face plate or nickel-plated brass bushing to handle assembly and operating loads. The integral internal terminations eliminate the need for internal wires which may break under vibration and thermal stress.

The M22 series rotary potentiometers are used in position-sensing applications which demand high reliability at low cost.

<b>Operating temperature:</b>		-40 °C to 85 °C (-40 °F to 185 °F)
<b>Supply voltage (max.):</b>		30 Vdc
<b>Starting force (max.):</b>	M22B	0.3 oz in (torque)
	M22S	1.0 oz in (torque)
<b>Total resistance:</b>		2000 Ohm
<b>Backlash (max.):</b>		0.1°
<b>Shaft Ø:</b>		3,175 mm (0.125 in)
<b>Termination:</b>		Gold plated solder terminals
<b>Housing size:</b>		22,0 mm (0.87 in)
<b>Bearing type:</b>		Sleeve
<b>Mechanical travel:</b>	M22B	330°
	M22S	Continuous rotation
<b>Electrical travel:</b>	M22B	320°
	M22S	340°

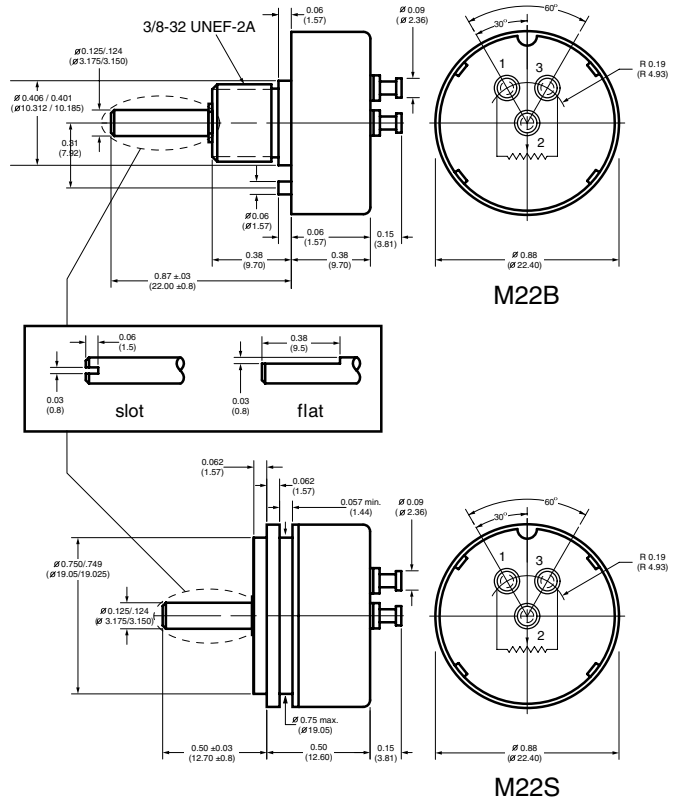
## OPTIONS

### Threaded bushing mount

LINEARITY	REFERENCE
± 0.5 %	M22B2KE1S
± 1.0 %	M22B2KF1S

### Servo mount

LINEARITY	REFERENCE
± 0.25 %	M22S2KD1S
± 0.5 %	M22S2KE1S
± 1.0 %	M22S2KF1S



**WPM Series**  
**Rotary position transducer, servo mount**



Available in servo mount styles, the WPM Series rotary transducer provides long life by utilizing the proprietary MystR® conductive plastic film, precious metal wipers and shielded ball bearings on the stainless steel shaft.

The MystR® film provides exceptionally long rotational and dither life without sacrificing microlinearity or resolution. The shielded ball bearings ensure long life even with side load conditions.

<b>Operating temperature:</b>	-55 °C to 125 °C (-67 °F to 257 °F)
<b>Supply voltage (max.):</b>	60 Vdc
<b>Total resistance:</b>	5000 Ohm
<b>Backlash (max.):</b>	0.01 %
<b>Shaft Ø:</b>	WPM5KA4* 3,175 mm (0.125 in) WPM5KB1* 6,35 mm (0.25 in)
<b>Termination:</b>	Gold plated solder terminals
<b>Bearing type:</b>	Ball bearings
<b>Mechanical travel:</b>	Continuous rotation
<b>Approvals:</b>	MIL-PRF-39023 qualified

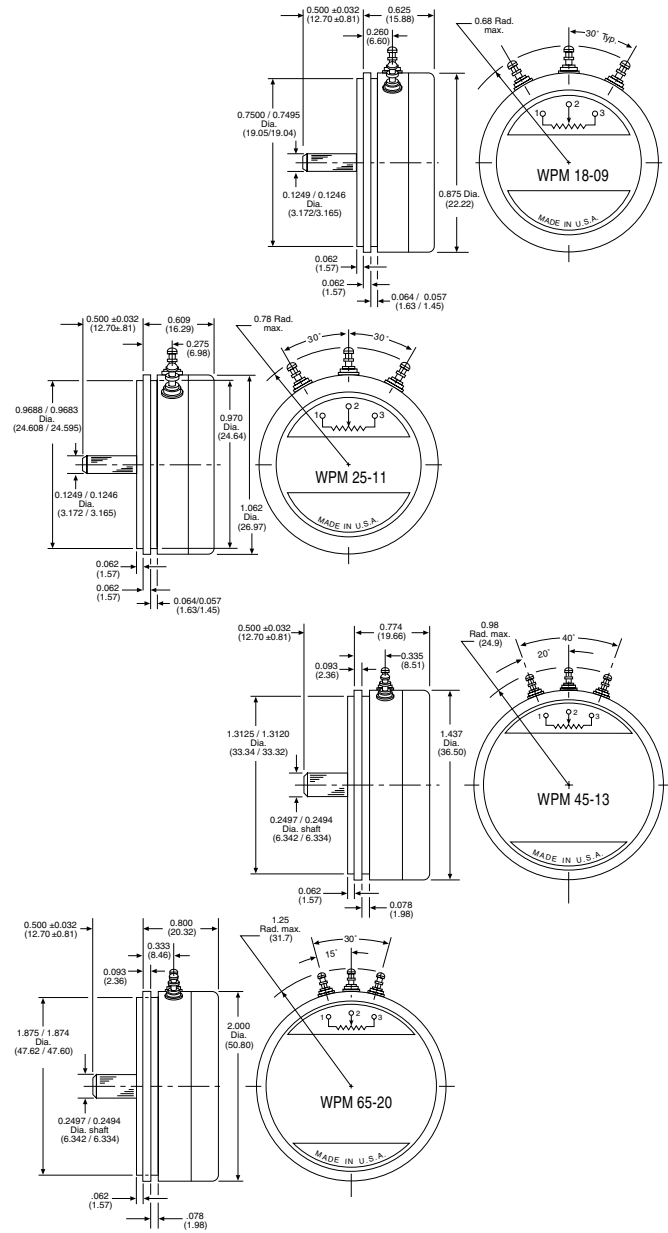
**OPTIONS**

**A4**

ELECTRICAL TRAVEL	STARTING FORCE (MAX.)	LINEARITY	REFERENCE
350°	0.8 oz in (torque)	± 0.075 %	WPM5KA4S4513
353°	1.0 oz in (torque)	± 0.075 %	WPM5KA4S6520

**B1**

ELECTRICAL TRAVEL	STARTING FORCE (MAX.)	LINEARITY	REFERENCE
340°	0.4 oz in (torque)	± 0.1 %	WPM5KB1S1809
345°	0.4 oz in (torque)	± 0.1 %	WPM5KB1S2511



# Torque Watch Guages

The Torque Watch, an industry mainstay when an accurate indication of rotary force is necessary, is simple to use, requiring no special tools or setups. Available in three models they cover ranges from 0.003 to 200 inch-ounces. Attach the gauge to the device being measured, and simply rotate it, for a direct reading dial.

Protection against over-torque is provided by a stainless steel internal rotation stop. The low range 366 Series will prevent damage from over-torque up to three times the normal range, whilst the mid range 641 Series and the high range 940 Series will prevent damage up to twice the normal range.

Models are available in standard (ounce inch), metric (gram centimeter) and System International (Newton meter) measuring options.

## 366 Series Low range 0.003 - 0.60 oz in



The Series 366 Torque Watch accurately measures very low torque. Three miniature adapter chucks allow simple coupling to the device being measured.

### OPTIONS

#### Standard

OUNCE INCHES	REFERENCE
0.06 to 0.6	366-0
0.01 to 0.1	366-2
0.003 to 0.03	366-3

#### Metric

GRAM CENTIMETER	REFERENCE
6 to 42	366-0M
1 to 7.5	366-2M
0.2 to 2	366-3M

## 651 Series Mid range 0.05 - 40.0 oz in



The Series 651 Torque Watch provides accurate measurement of low static torque. A 1/4 inch keyed chuck provides a simple means of coupling to the device under measurement.

### OPTIONS

#### Standard

OUNCE INCHES	REFERENCE
0.05 to 1.2	651C-1
1 to 20	651C-2
2 to 40	651C-3
0.1 to 2.4	651X-2
0.25 to 5	651X-3
0.5 to 10	651X-4

#### Metric

GRAM CENTIMETER	REFERENCE
2.5 to 80	651C-1M
50 to 1.2 K	651C-2M
150 to 2.8 K	651C-3M
5 to 150	651X-2M
10 to 300	651X-3M
25 to 600	651X-4M

#### System International

NEWTON METER	REFERENCE
0.5 to 9	651C-1SI
10 to 140	651C-2SI
15 to 285	651C-3SI
1 to 18	651X-2SI
2 to 36	651X-3SI
5 to 70	651X-4SI

## 940 Series High range 15.0 - 200.0 oz in



The Series 940 Torque Watch accurately measures torque in values that range from 15.0 to 200 oz/in. A 3/8 inch keyed chuck and 3/8 inch square socket driver adapter provide a simple means of coupling to the device under measurement.

### OPTIONS

#### Standard

OUNCE INCHES	REFERENCE
30 to 200	940-1
15 to 100	940-2

#### Metric

GRAM CENTIMETER	REFERENCE
2.5 K to 14.3 K	940-1M
1 K to 7.1 K	940-2M

#### System International

NEWTON METER	REFERENCE
0.25 to 1.4	940-1SI
0.1 to 0.7	940-2SI

# Clarostat Rotary Position Transducers

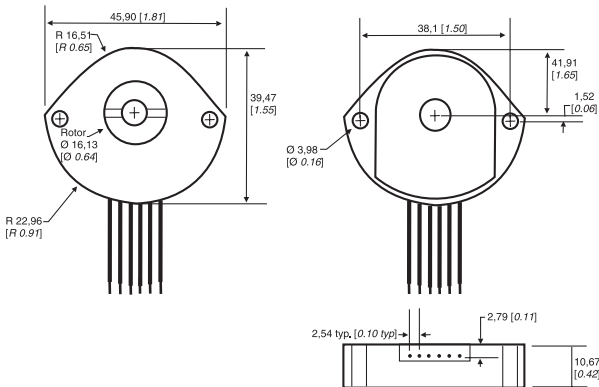
## TH100 Series



The TH-100 Series puts Honeywell's proven variable-resistor technology to work in angle-management applications such as control-lever sensing and equipment position feedback. High performance and low cost make it attractive for a wide range of applications. Special electrical and mechanical configurations, including dual tracks, D-shape rotor holes, etc. are available on special order.

The device provides for angle measurements, has 152.4 mm (6.0 in) wire leads, a 6,35 mm (0.25 in) slotted thru hole and is sealed.

<b>Power rating:</b>	0.5 W max.
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	three 20 AWG
<b>Shaft:</b>	6,35 mm (0.25 in) thru hole with .105 w x .090 d slot
<b>Body:</b>	38,1 mm (1.5 in) x 45,72 mm (1.8 in)
<b>Electrical taper:</b>	Linear
<b>Storage &amp; operating temperature:</b>	-40 °C to 120 °C (-40 °F to 248 °F)
<b>Working voltage (max):</b>	350 Vdc
<b>Linearity:</b>	± 5% standard; to ± 1% special
<b>Total resistance:</b>	10 K
<b>Total resistance tolerance:</b>	± 15%
<b>Rotational cycles:</b>	> 1 million



### OPTIONS

#### 180° Rotation

TAPER	CABLE CONNECTOR	REFERENCE
Linear	No	640CS103A06NAAY

#### 90° Rotation

TAPER	CABLE CONNECTOR	REFERENCE
Linear	No	640ES103A06NAAY

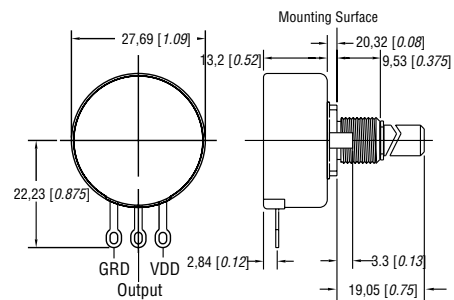
## HRS100 Series, Hall-effect



The HRS100 provides angular position information for a variety of sensing and control applications in the automotive, marine, truck, off-road, industrial implementation, aerospace, and rail industries. The use of magnetically coupled information in place of a mechanical wiper assembly provides a long life, cost-effective solution for harsh environments that include temperature, vibration, dither, moisture and dirt.

This position sensor incorporates Hall-effect to provide a sensing device that will last for more than 50 million operations. The device is packaged in a metal housing with a 9,5 mm (0.375 in) diameter bushing and a 6,35 mm (0.25 in) diameter slotted shaft and solder lug terminals.

<b>Terminal type:</b>	Straight solder lug
<b>Bushing:</b>	9,52 mm (.375 in) FMS, includes C-ring
<b>Shaft:</b>	Slotted 6,32 mm ± 0.03 (0.249 in ± 0.001)
<b>Body:</b>	27,79 mm (1.094 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-40 °C to 85 °C (-40 °F to 185 °F)
<b>Supply voltage (max):</b>	5 Vdc
<b>Linearity:</b>	± 2%
<b>Rotational cycles:</b>	10 million
<b>Mechanical operating angle:</b>	90°



### OPTIONS

#### 90° Rotation

SHAFT	LUG	REFERENCE
Slotted	Straight Solder	HRS100SSAB090

# Clarostat Rotary Potentiometers and Position Transducers

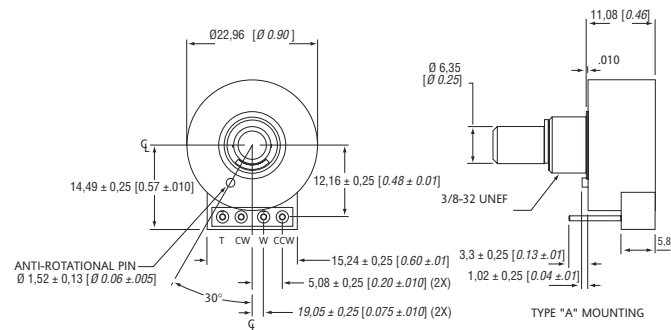
## 578 Series, Precision potentiometer



The 578 Series conductive plastic precision potentiometer puts Honeywell's proven variable resistor technology to work in a high performance, cost-effective device. With its compact size, rugged construction and advanced versatility, the 578 provides superior control for applications such as joy-stick controllers and position-sensing devices.

The model 578 features a 9,5 mm x 9,5 mm (0.375 in x 0.375 in) bushing, 6,35 mm x 19,05 mm (0.25 in x 0.75 in) slotted shaft, linear taper, and type A pc pins (please consult with the factory for custom OEM configurations).

<b>Power rating:</b>	0.5 W @ 70 °C (158 °F)
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	PC pin type A
<b>Bushing:</b>	9,52 mm (0.375 in) D x 9,52 mm (0.375 in) L
<b>Shaft:</b>	6,35 mm x 19,05 mm (0.25 in x 0.75 in) Slotted
<b>Body:</b>	22,86 mm (0.900 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-40 °C to 100 °C (-40 °F to 212 °F)
<b>Working voltage:</b>	400 Vdc
<b>Linearity:</b>	1%
<b>Total resistance tolerance:</b>	± 10%
<b>Revolutions:</b>	5 million
<b>Mechanical rotation:</b>	320° ± 5°



### OPTIONS

#### 1 kOhm Resistance

SHAFT	RESISTANCE TAPER	REFERENCE
Slotted stainless steel	Linear	578X1G48S102SA

#### 5 kOhm Resistance

SHAFT	RESISTANCE TAPER	REFERENCE
Slotted stainless steel	Linear	578X1G48S502SA

#### 10 kOhm Resistance

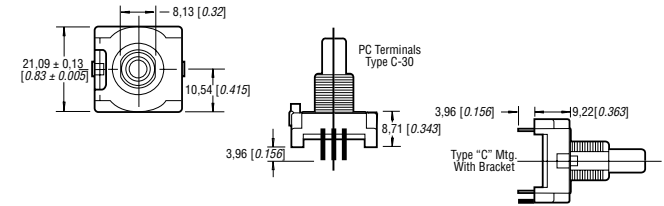
SHAFT	RESISTANCE TAPER	REFERENCE
Slotted stainless steel	Linear	578X1G48S103SA

## 574 Series, Commercial potentiometer



The 574 Series conductive plastic potentiometer offers low mounting profile, smooth feel, and robust construction with a thermoplastic housing, bushing, and shaft. Terminals are PC style with a bracket for vertical mounting. No hardware is included.

<b>Power rating:</b>	0.25 W @ 70 °C (158 °F)
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	PC terminals type C with C mounting bracket
<b>Bushing:</b>	M9 x 6,35 mm (0.25 in) L
<b>Shaft:</b>	6,35 (0.25 in) Ø x 19,05 (0.75 in) L
<b>Body:</b>	21,08 mm (0.830 in) square
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-40 °C to 120 °C (-40 °F to 248 °F)
<b>Working voltage:</b>	350 Vac
<b>Linearity:</b>	± 5%
<b>Total resistance tolerance:</b>	± 20%
<b>Rotational cycles:</b>	50,000
<b>Mechanical rotation:</b>	300° ± 5°



### OPTIONS

#### Flatted Shaft

RESISTANCE	TAPER	REFERENCE
1 kOhm	Linear	574SX1M48F102SD
10 kOhm	Linear	574SX1M48F103SD
100 kOhm	Linear	574SX1M48F104SD
50 kOhm	Linear	574SX1M48F503SD

#### Slotted Shaft

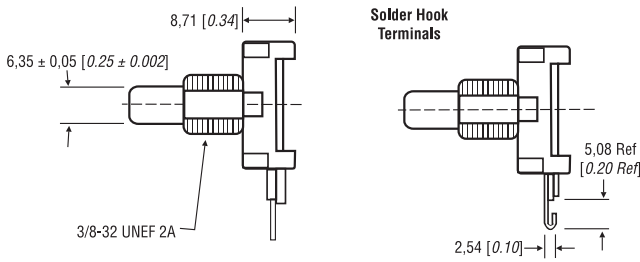
RESISTANCE	TAPER	REFERENCE
1 kOhm	Linear	574SX1M48S102SD
10 kOhm	Linear	574SX1M48S103SD
100 kOhm	Linear	574SX1M48S104SD
50 kOhm	Linear	574SX1M48S503SD

## 575 Series, Commercial potentiometer



The 575 Series conductive plastic potentiometer offers a smooth feel and robust construction, with a thermoplastic housing, bushing, and shaft. Terminals are solder-hook style for panel mounting. No hardware is included.

<b>Power rating:</b>	0.5 W @ 70 °C (158 °F)
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	Solder hook-200 grid
<b>Bushing:</b>	9,52 mm (.375 in) D x 6,35 mm (0.25 in) L
<b>Shaft:</b>	6,35 mm (0.25 in) Ø x 19,05 mm (0.75 in) L
<b>Body:</b>	21,08 mm (0.830 in) square
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-40 °C to 120 °C (-40 °F to 248 °F)
<b>Working voltage:</b>	350 Vac
<b>Linearity:</b>	± 5%
<b>Total resistance tolerance:</b>	± 20%
<b>Rotational cycles:</b>	50,000
<b>Mechanical rotation:</b>	300° ± 5°



### OPTIONS

#### Flatted Shaft

RESISTANCE	TAPER	REFERENCE
1 kOhm	Linear	575SX1A48F102SS
10 kOhm	Linear	575SX1A48F103SS
50 kOhm	Linear	575SX1A48F503SS

#### Slotted Shaft

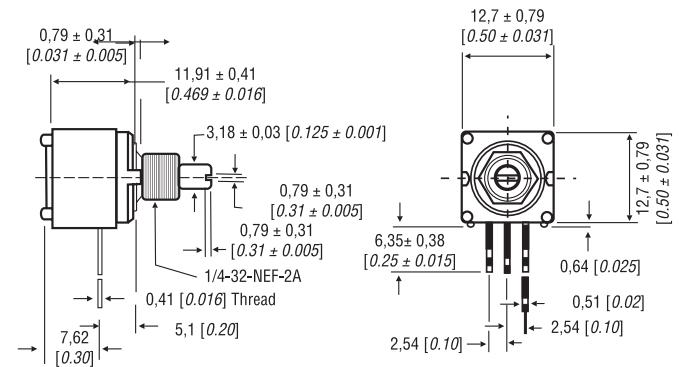
RESISTANCE	TAPER	REFERENCE
1 kOhm	Linear	575SX1A48S102SS
10 kOhm	Linear	574SX1A48S103SS
50 kOhm	Linear	574SX1A48S503SS

## 590 Series, Commercial potentiometer



The 590 Series conductive plastic modular potentiometer features low electrical noise, smooth feel, robust construction, and brass bushing and shaft. Terminals are PC style. Hardware included. Multiple sections (up to three) are available on special order.

<b>Power rating:</b>	0.5 W @ 70 °C (158 °F)
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	PC, 6,35 mm (0.25 in) long
<b>Bushing:</b>	6,35 mm (0.25 in) Ø x 6,35 mm (0.25 in) L
<b>Shaft:</b>	Slotted, 3,17 mm (0.125 in) Ø x 22,23 mm (0.875 in) L
<b>Body:</b>	12,7 mm (0.50 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-40 °C to 120 °C (-40 °F to 248 °F)
<b>Linearity:</b>	± 5%
<b>Total resistance tolerance:</b>	± 10% (up to 500 kOhms) ± 20 % (1 MOhm and over)
<b>Rotational cycles:</b>	50,000
<b>Mechanical rotation:</b>	295° ± 5°



### OPTIONS

#### Slotted Shaft

RESISTANCE	TAPER	REFERENCE
100 Ohm	Linear	590SX1N56S101SP
500 Ohm	Linear	590SX1N56S501SP
1 kOhm	Linear	590SX1N56S102SP
5 kOhm	Linear	590SX1N56S502SP
10 kOhm	Linear	590SX1N56S103SP
100 kOhm	Linear	590SX1N56S104SP
500 kOhm	Linear	590SX1N56S504SP
1 MOhm	Linear	590SX1N56S105SP

## Clarostat Rotary Potentiometers and Position Transducers (continued)

### 380 Series, Industrial potentiometer

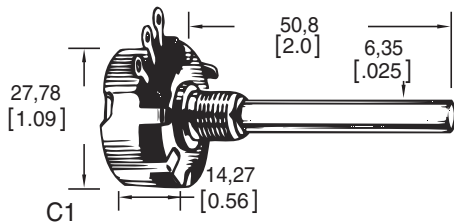


The 380 Series "Quiet One" is a 2-watt conductive plastic potentiometer offering superior dynamic noise and a long rotational life. It meets MIL-R-94 specifications where applicable.

<b>Approvals:</b>	MIL-R-94
<b>Power rating:</b>	2.0 W max.
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	Solder lug
<b>Shaft:</b>	Slotted
<b>Body:</b>	27,79 mm (1.094 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-55 °C to 120 °C (-67 °F to 248 °F)
<b>Working voltage:</b>	500 Vdc
<b>Linearity:</b>	± 5%
<b>Total resistance tolerance:</b>	± 10% (up to 500 kOhms) ± 20 % (1 MOhm and over)
<b>Rotational cycles:</b>	100,000
<b>Mechanical rotation:</b>	312° ± 3°

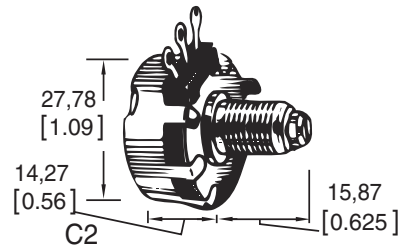
#### OPTIONS

**C1: 2.0 in (50,8 mm) Round Shaft;  
0.375 in (9,5 mm) L bushing**



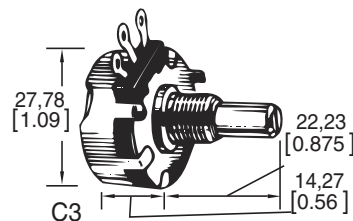
RESISTANCE	REFERENCE
100 Ohm	380C1100
250 Ohm	380C1250
500 Ohm	380C1500
1 kOhm	380C11000
1.5 kOhm	380C11500
2 kOhm	380C12000
2.5 kOhm	380C12500
5 kOhm	380C15000
10 kOhm	380C110K
15 kOhm	380C115K
20 kOhm	380C120K
25 kOhm	380C125K
50 kOhm	380C150K
100 kOhm	380C1100K
200 kOhm	380C1200K
250 kOhm	380C1250K
500 kOhm	380C1500K
1 MOhm	380C11MEG

**C2: 0.625 in (15,88 mm) screwdriver slotted shaft;  
0.5 in (12,7 mm) L locking bushing**



RESISTANCE	REFERENCE
250 Ohm	380C2250
1 kOhm	380C21000
5 kOhm	380C25000
10 kOhm	380C210K
25 kOhm	380C225K
50 kOhm	380C250K
100 kOhm	380C2100K
250 kOhm	380C2250K
1 MOhm	380C21MEG

**C3: 0.875 in (22,23 mm) shaft;  
0.375 in (9,5 mm) L bushing**



RESISTANCE	REFERENCE
100 Ohm	380C3100
250 Ohm	380C3250
500 Ohm	380C3500
1 kOhm	380C31000
2 kOhm	380C32000
2.5 kOhm	380C32500
5 kOhm	380C35000
10 kOhm	380C3310K
25 kOhm	380C325K
50 kOhm	380C350K
100 kOhm	380C3100K
150 kOhm	380C3150K
200 kOhm	380C3200K
250 kOhm	380C3250K
500 kOhm	380C3500K
1 MOhm	380C31MEG
5 MOhm	380C35MEG

## RV4 MIL Series potentiometer

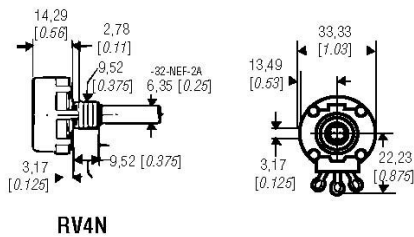


The RV4 is a dual-marked potentiometer with all the fine features of the 380 Series in a more economical package. It is built in strict accordance with MIL-R-94.

<b>Approvals:</b>	MIL-R-94
<b>Power rating:</b>	2.0 W max.
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	Solder lug
<b>Shaft:</b>	Slotted
<b>Body:</b>	27,79 mm (1.094 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-55 °C to 120 °C (-67 °F to 248 °F)
<b>Working voltage:</b>	500 Vdc
<b>Linearity:</b>	± 5%
<b>Rotational cycles:</b>	25,000
<b>Mechanical rotation:</b>	312° ± 3°

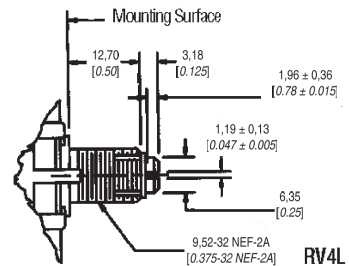
### OPTIONS

**Standard Bushing,**  
**0.875 in (22,23 mm) shaft length**



RV4N

**Locking Bushing**



RV4L

RESISTANCE	TOLERANCE	REFERENCE
100 Ohm	± 10%	RV4NAYS101A
250 Ohm	± 10%	RV4NAYS251A
500 Ohm	± 10%	RV4NAYS501A
1 kOhm	± 10%	RV4NAYS102A
2.5 kOhm	± 10%	RV4NAYS252A
5 kOhm	± 10%	RV4NAYS502A
10 kOhm	± 10%	RV4NAYS103A
25 kOhm	± 10%	RV4NAYS253A
50 kOhm	± 10%	RV4NAYS503A
100 kOhm	± 10%	RV4NAYS104A
250 kOhm	± 10%	RV4NAYS254A
500 kOhm	± 10%	RV4NAYS504A
750 kOhm	± 10%	RV4NAYS754A
1 MOhm	± 10%	RV4NAYS105A
5 MOhm	± 20%	RV4NAYS505B

RESISTANCE	TOLERANCE	REFERENCE
100 Ohm	± 10%	RV4LAYS101A
250 Ohm	± 10%	RV4LAYS251A
500 Ohm	± 10%	RV4LAYS501A
1 kOhm	± 10%	RV4LAYS102A
2.5 kOhm	± 10%	RV4LAYS252A
5 kOhm	± 10%	RV4LAYS502A
10 kOhm	± 10%	RV4LAYS103A
25 kOhm	± 10%	RV4LAYS253A
50 kOhm	± 10%	RV4LAYS503A
100 kOhm	± 10%	RV4LAYS104A
250 kOhm	± 10%	RV4LAYS254A
500 kOhm	± 10%	RV4LAYS504A
750 kOhm	± 10%	RV4LAYS754A
1 MOhm	± 10%	RV4LAYS105A
5 MOhm	± 20%	RV4LAYS505B



**Clarostat Rotary Potentiometers and Position Transducers (continued)**

**RV6/392M MIL Series potentiometer**



RV6/392M Series are economical potentiometers designed to meet wave soldering applications for mounting PC boards. They meet flow solderability and washability test requirements, and MIL-R-94 standard apply.

<b>Approvals:</b>	MIL-R-94
<b>Power rating:</b>	0.5 W max.
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	Solder hook
<b>Shaft:</b>	Slotted
<b>Body:</b>	12,7 mm (0.5 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-40 °C to 120 °C (-40 °F to 248 °F)
<b>Working voltage:</b>	350 Vdc
<b>Linearity:</b>	± 5%
<b>Total resistance tolerance:</b>	± 10% (up to 500 kOhms) ± 20 % (1 MOhm and over)
<b>Rotational cycles:</b>	50,000
<b>Mechanical rotation:</b>	295° ± 5°

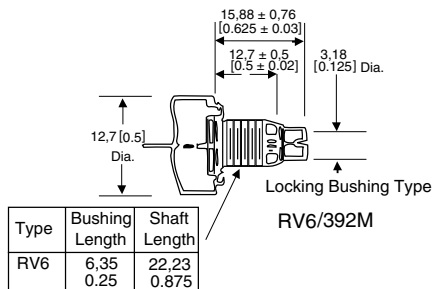
**OPTIONS**

**Standard Bushing, 6,35 mm (0.25 in) L;  
0.875 in (22,23 mm) shaft length**

RESISTANCE	REFERENCE
100 Ohm	RV6NAYS101A
250 Ohm	RV6NAYS251A
500 Ohm	RV6NAYS501A
1 kOhm	RV6NAYS102A
2.5 kOhm	RV6NAYS252A
5 kOhm	RV6NAYS502A
10 kOhm	RV6NAYS103A
25 kOhm	RV6NAYS253A
50 kOhm	RV6NAYS503A
100 kOhm	RV6NAYS104A
250 kOhm	RV6NAYS254A
500 kOhm	RV6NAYS504A
1 MOhm	RV6NAYS105A

**Locking Bushing, 12,7 mm (0.50 in) L;  
0.625 in (15,88 mm) shaft length**

RESISTANCE	REFERENCE
100 Ohm	RV6LAYS101A
250 Ohm	RV6LAYS251A
500 Ohm	RV6LAYS501A
1 kOhm	RV6LAYS102A
2.5 kOhm	RV6LAYS252A
5 kOhm	RV6LAYS502A
10 kOhm	RV6LAYS103A
25 kOhm	RV6LAYS253A
50 kOhm	RV6LAYS503A
100 kOhm	RV6LAYS104A
250 kOhm	RV6LAYS254A
500 kOhm	RV6LAYS504A
1 MOhm	RV6LAYS105A

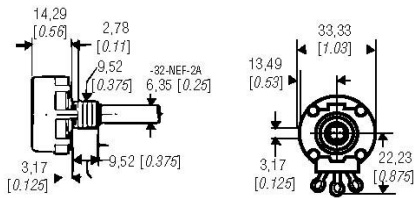


### 53 Series potentiometer



The 53 Series has all the fine features of the Series 380 in a more economical package. It is available with a 50,8 mm [2.0 in] long shaft.

<b>Power rating:</b>	2.0 W max.
<b>Element type:</b>	Conductive plastic
<b>Terminal type:</b>	Solder lug
<b>Shaft:</b>	Slotted, 50,8 mm (2.0 in) L
<b>Body:</b>	27,79 mm (1.094 in) Ø
<b>Electrical taper:</b>	Linear
<b>Operating temperature:</b>	-55 °C to 120 °C (-67 °F to 248 °F)
<b>Working voltage:</b>	500 Vdc
<b>Linearity:</b>	± 5%
<b>Rotational cycles:</b>	25,000
<b>Mechanical rotation:</b>	312° ± 3°



#### OPTIONS

##### Standard Bushing, 2.0 in (50,8 mm) shaft length

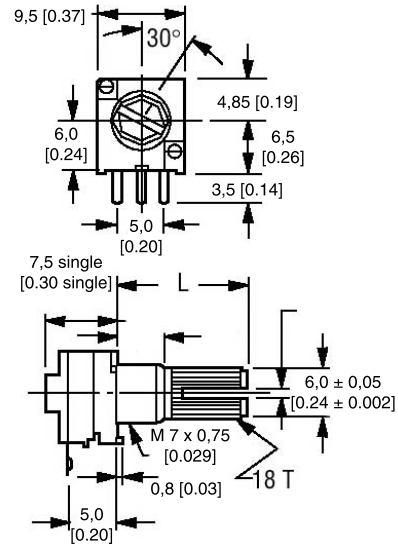
RESISTANCE	TOLERANCE	REFERENCE
100 Ohm	± 10%	53C1100
250 Ohm	± 10%	53C1250
500 Ohm	± 10%	53C1500
1 kOhm	± 10%	53C11K
2.5 kOhm	± 10%	53C12500
5 kOhm	± 10%	53C15K
10 kOhm	± 10%	53C110K
25 kOhm	± 10%	53C125K
50 kOhm	± 10%	53C150K
100 kOhm	± 10%	53C1100K
150 kOhm	± 10%	53C1150K
250 kOhm	± 10%	53C1250K
500 kOhm	± 10%	53C1500K
750 kOhm	± 10%	53C1750K
1 MOhm	± 20%	53C11MEG
2.5 MOhm	± 20%	53C12.5MEG
5 MOhm	± 20%	53C15MEG

### 585 Series, Commercial potentiometer



Our Series 585 offers a robust construction in a low-cost commercial package, using carbon composition elements and a metal shaft and bushing.

<b>Power rating:</b>	0.05 W max. @ 40 °C
<b>Element type:</b>	Carbon composition
<b>Terminal type:</b>	3 in-line
<b>Bushing:</b>	M 7 x 0.75 thread, 7 mm L
<b>Shaft:</b>	6,0 mm (0.24 in) Ø by 25,0 mm (0.98 in) L
<b>Flatted shaft:</b>	12,0 mm (0.47 in) long by 4,5 mm (0.18 in) D standard; round end available
<b>Body:</b>	9,5 mm (0.37 in) square
<b>Operating temperature:</b>	-55 °C to 120 °C (-67 °F to 248 °F)
<b>Resistance tolerance:</b>	± 20%
<b>Rotational cycles:</b>	10,000
<b>Mechanical rotation:</b>	300°



#### OPTIONS

##### Linear taper

RESISTANCE	SECTION	REFERENCE
1 kOhm	Single	585SX4Q25F102SP
5 kOhm	Single	585SX4Q25F502SP
10 kOhm	Single	585SX4Q25F103SP
1 kOhm	Double	585DX4Q25F102SP
5 kOhm	Double	585DX4Q25F502SP
10 kOhm	Double	585DX4Q25F103SP

##### Audio taper

RESISTANCE	SECTION	REFERENCE
1 kOhm	Single	585SX4Q25F102ZP
5 kOhm	Single	585SX4Q25F502ZP
10 kOhm	Single	585SX4Q25F103ZP

# Encoders

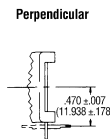
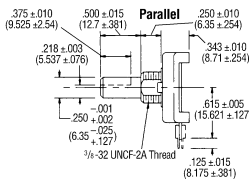
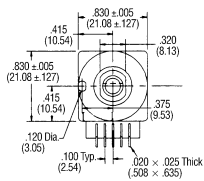
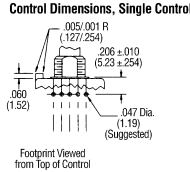
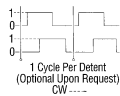
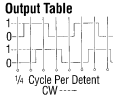
## 510 Series , Mechanical



The 510 Series controls are manually operated, rotary, mechanical encoders that provide a two-bit gray code for relative reference applications and a four-bit gray code for absolute electrical reference applications. The "L" channel leads the "R" channel by 90° electrically in the CW position. It features continuous electrical travel and has a rotational life of more than 100,000 shaft revolutions with a positive detent feel.

This series is small-sized, 21,08 mm<sup>2</sup> by 8,71 mm deep (0.83 in<sup>2</sup> x 0.343 in) long and commonly used in limited-space, panel-mounted applications where the need for costly, front-panel displays can be completely eliminated. Digital gray-code outputs eliminate the need for A/D converters.

**Bushing:** 9,52 mm (0.375 in) Ø x 6,35 mm (0.25 in) L  
**Shaft:** Flatted, 6,35 mm (0.25 in) Ø x 19,05 mm (0.75 in) L  
**Body:** 21,08 mm (0.830 in) square  
**Operating temperature:** -40 °C to 105 °C (-40 °F to 221 °F)  
**Rotational cycles:** 100,000



### OPTIONS

#### Vertical Mount, PC Terminals/bent back

**GREY CODE OPTIONS**

- 2 bit/4 cycles
- 2 bit/6 cycles
- 2 bit/9 cycles
- 4 bit/16 cycles

**REFERENCE**

- 510E1A48F204PC
- 510E1A48F206PC
- 510E1A48F209PC
- 510E1A48F416PC

#### Horizontal Mount, PC Terminals/straight

**GREY CODE OPTIONS**

- 2 bit/4 cycles
- 2 bit/6 cycles
- 2 bit/9 cycles
- 4 bit/16 cycles

**REFERENCE**

- 510E1A48F204PB
- 510E1A48F206PB
- 510E1A48F209PB
- 510E1A48F416PB

### Brackets

**MOUNTING DIRECTION**

- Vertical
- Horizontal

**REFERENCE**

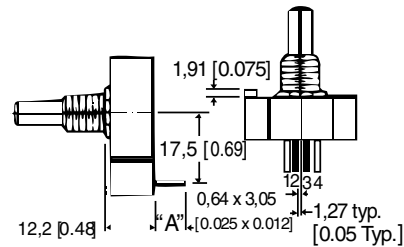
- 510VBKT
- 510HBKT

## 600 Series, Optical



The 600 Series controls are manually operated, rotary, optical encoders that output two square waves in quadrature at a rate of 128 pulse per channel per revolution as a standard with other resolutions down to 60 pulses available. The outputs are TTL compatible. PC terminals or cable leads are available.

**Pulses per revolution:** 128  
**Supply voltage:** 5.0 V  
**Body:** 34,93 mm (1.375 in) Ø  
**Shaft:** 6,35 mm [0.25 in] dia by 22,23 mm [0.875 in] long  
**Bushing:** 9,52 mm [0.375 in] dia by 9,52 mm [0.375 in] long  
**Operating temperature:** -40 °C to 65 °C (-40 °F to 149 °F)  
**Revolutions:** 10 million



### OPTIONS

#### Series 600

**TERMINATION**

- 177,8 mm (7.0 in) long cable
- PC terminals exiting side
- PC terminals exiting rear
- 177,8 mm (7.0 in) long cable with connector

**REFERENCE**

- 600EN-128-CBL
- 600EN-128-B66
- 600EN-128-C24
- 600EN-128-CN1

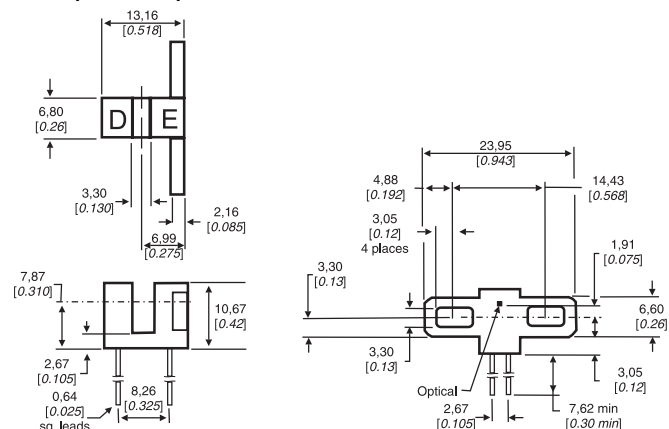
# Slotted Optical Switches

## S-180 Series



The S-180 Series consists of a gallium arsenide IRED and silicon phototransistor mounted in a rigid one-piece polycarbonate housing. All electrical options are available with either PCB mount or 457,0 mm (18.0 in) minimum length wire termination (26 AWG type UL 1429)

<b>Operating temperature:</b>	-40 °C to 85 °C (-40 °F to 185 °F)
<b>IRED continuous forward current:</b>	50 mA
<b>IRED peak forward current:</b>	3 A
<b>IRED reverse voltage:</b>	3 V
<b>IRED power dissipation:</b>	100 mW
<b>Sensor collector-emitter voltage:</b>	30 V
<b>Sensor emitter-collector voltage:</b>	5 V
<b>Sensor power dissipation:</b>	100 mW



### OPTIONS

#### PCB Mount

$V_{CE(sat)}$	$I_L$	REFERENCE
0.4 V max @ $I_F = 20$ mA, $I_C = 0.4$ mA	0.5 mA min @ $I_F = 20$ mA and $V_{CE} = 5$ V	S-180-A55
0.4 V max @ $I_F = 10$ mA, $I_C = 0.8$ mA	1.0 mA min @ $I_F = 10$ mA and $V_{CE} = 5$ V	S-180-B55
0.4 V max @ $I_F = 20$ mA, $I_C = 2.0$ mA	2.0 mA min @ $I_F = 20$ mA and $V_{CE} = 5$ V	S-180-C55

#### Wire Leads

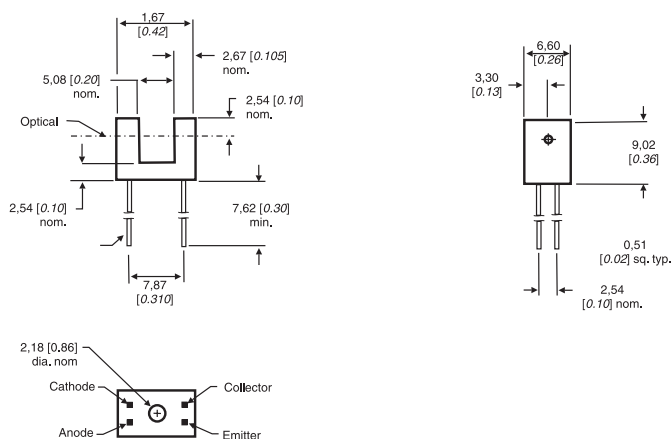
$V_{CE(sat)}$	$I_L$	REFERENCE
0.4 V max @ $I_F = 20$ mA, $I_C = 0.4$ mA	0.5 mA min @ $I_F = 20$ mA and $V_{CE} = 5$ V	S-180-A55W
0.4 V max @ $I_F = 10$ mA, $I_C = 0.8$ mA	1.0 mA min @ $I_F = 10$ mA and $V_{CE} = 5$ V	S-180-B55W
0.4 V max @ $I_F = 20$ mA, $I_C = 2.0$ mA	2.0 mA min @ $I_F = 20$ mA and $V_{CE} = 5$ V	S-180-C55W

## S-510 Series



The S-510 Series consists of a gallium arsenide IRED and silicon phototransistor mounted in a small injection-molded housing. An IR-opaque housing is offered for applications where high levels of ambient infrared radiation may be present and an IR-transparent housing for applications requiring protection from dust and dirt in the apertures. This series is also available with 305,0 mm (12.0 in) minimum length flexible wire leads.

<b>Operating temperature:</b>	-40 °C to 85 °C (-40 °F to 185 °F)
<b>IRED continuous forward current:</b>	50 mA
<b>IRED peak forward current:</b>	3 A
<b>IRED reverse voltage:</b>	3 V
<b>IRED power dissipation:</b>	100 mW
<b>Sensor collector-emitter voltage:</b>	30 V
<b>Sensor emitter-collector voltage:</b>	5 V
<b>Sensor power dissipation:</b>	100 mW



### OPTIONS

#### IR-opaque housing

TERMINATION	ELECTRICAL SELECTION	REFERENCE
PC Board mount	A	S-510-A
Wire	A	S-510-AW
PC Board mount	B	S-510-B
Wire	B	S-510-BW

#### IR-transparent housing

TERMINATION	ELECTRICAL SELECTION	REFERENCE
PC Board mount	A	S-511-A
Wire	A	S-511-AW
PC Board mount	B	S-511-B
Wire	B	S-511-BW

PARAMETER	$I_L$	$V_{CE(sat)}$
A	0.5 mA @ $I_F = 20$ mA and $V_{CE} = 5$ V	0.4 V max @ $I_F = 20$ mA and $I_C = 0.25$ mA
	1.0 mA @ $I_F = 35$ mA and $V_{CE} = 5$ V	0.4 V max @ $I_F = 35$ mA and $I_C = 0.50$ mA
B	1.0 mA @ $I_F = 20$ mA and $V_{CE} = 5$ V	0.4 V max @ $I_F = 20$ mA and $I_C = 0.50$ mA
	2.0 mA @ $I_F = 35$ mA and $V_{CE} = 5$ V	0.4 V max @ $I_F = 35$ mA and $I_C = 1.0$ mA

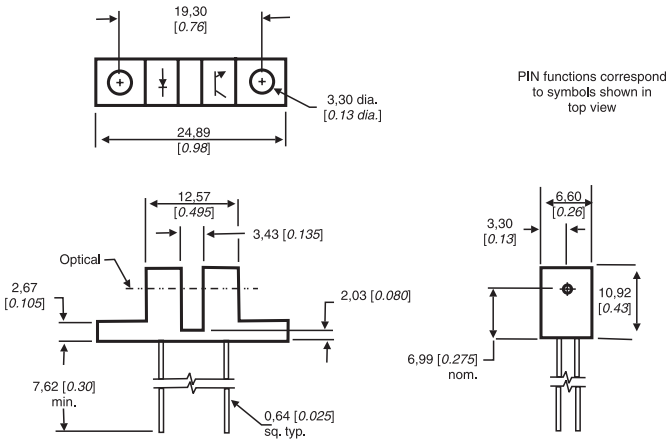
**Slotted Optical Switches (continued)**

**S-860/870 Series**



The S-860/870 family of optical switches offers the designer the most flexible semi-custom specification available in commercial optoelectronics. Electrical, optical and mechanical parameters may be specified allowing the use of this standard product in many applications that would otherwise have to be custom designed.

<b>Operating temperature:</b>	-25 °C to 85 °C (-13 °F to 185 °F)
<b>IREC continuous forward current:</b>	50 mA
<b>IREC peak forward current:</b>	3 A
<b>IREC reverse voltage:</b>	3 V
<b>IREC power dissipation:</b>	100 mW
<b>Sensor collector-emitter voltage:</b>	30 V
<b>Sensor emitter-collector voltage:</b>	5 V
<b>Sensor power dissipation:</b>	100 mW



PARAMETER	$I_L$	$V_{CE(sat)}$
A	0.5 mA @ $I_F = 20$ mA and $V_{CE} = 5$ V	0.4 V max @ $I_F = 20$ mA and $I_C = 0.4$ mA
B	1.0 mA @ $I_F = 10$ mA and $V_{CE} = 5$ V	0.4 V max @ $I_F = 10$ mA and $I_C = 0.8$ mA
C	2.0 mA @ $I_F = 20$ mA and $V_{CE} = 0.4$ V	0.4 V max @ $I_F = 20$ mA and $I_C = 2.0$ mA

**OPTIONS**

**IR Transparent; 5,59 mm (0.220 in) Lead spacing; IREC aperture, 1,27 mm (0.05 in)**

ELECTRICAL PARAMETER	MOUNTING/SENSOR	REFERENCE
A	No Tabs/0,25 mm (0.01 in)	S-865-N51
B	No Tabs/0,25 mm (0.01 in)	S-866-N51
C	No Tabs/0,25 mm (0.01 in)	S-867-N51
A	No Tabs/1,27 mm (0.05 in)	S-865-N55
B	No Tabs/1,27 mm (0.05 in)	S-866-N55
C	No Tabs/1,27 mm (0.05 in)	S-867-N55
A	2 Tabs/0,25 mm (0.01 in)	S-865-T51
B	2 Tabs/0,25 mm (0.01 in)	S-866-T51
C	2 Tabs/0,25 mm (0.01 in)	S-867-T51
A	2 Tabs/1,27 mm (0.05 in)	S-865-T55
B	2 Tabs/1,27 mm (0.05 in)	S-866-T55
C	2 Tabs/1,27 mm (0.05 in)	S-867-T55

**IR Transparent; 8,13 mm (0.320 in) Lead spacing; IREC aperture, 1,27 mm (0.05 in)**

ELECTRICAL PARAMETER	MOUNTING/SENSOR	REFERENCE
A	No Tabs/0,25 mm (0.01 in)	S-860-N51
B	No Tabs/0,25 mm (0.01 in)	S-861-N51
C	No Tabs/0,25 mm (0.01 in)	S-862-N51
A	No Tabs/1,27 mm (0.05 in)	S-860-N55
B	No Tabs/1,27 mm (0.05 in)	S-861-N55
C	No Tabs/1,27 mm (0.05 in)	S-862-N55
A	2 Tabs/0,25 mm (0.01 in)	S-860-T51
B	2 Tabs/0,25 mm (0.01 in)	S-861-T51
C	2 Tabs/0,25 mm (0.01 in)	S-862-T51
A	2 Tabs/1,27 mm (0.05 in)	S-860-T55
B	2 Tabs/1,27 mm (0.05 in)	S-861-T55
C	2 Tabs/1,27 mm (0.05 in)	S-862-T55

**IR Opaque; 5,59 mm (0.220 in) Lead spacing; IREC aperture, 1,27 mm (0.05 in)**

ELECTRICAL PARAMETER	MOUNTING/SENSOR	REFERENCE
A	No Tabs/0,25 mm (0.01 in)	S-875-N51
B	No Tabs/0,25 mm (0.01 in)	S-876-N51
C	No Tabs/0,25 mm (0.01 in)	S-877-N51
A	No Tabs/1,27 mm (0.05 in)	S-875-N55
B	No Tabs/1,27 mm (0.05 in)	S-876-N55
C	No Tabs/1,27 mm (0.05 in)	S-877-N55
A	2 Tabs/0,25 mm (0.01 in)	S-875-T51
B	2 Tabs/0,25 mm (0.01 in)	S-876-T51
C	2 Tabs/0,25 mm (0.01 in)	S-877-T51
A	2 Tabs/1,27 mm (0.05 in)	S-875-T55
B	2 Tabs/1,27 mm (0.05 in)	S-876-T55
C	2 Tabs/1,27 mm (0.05 in)	S-877-T55

**IR Opaque; 8,13 mm (0.320 in) Lead spacing; IREC aperture, 1,27 mm (0.05 in)**

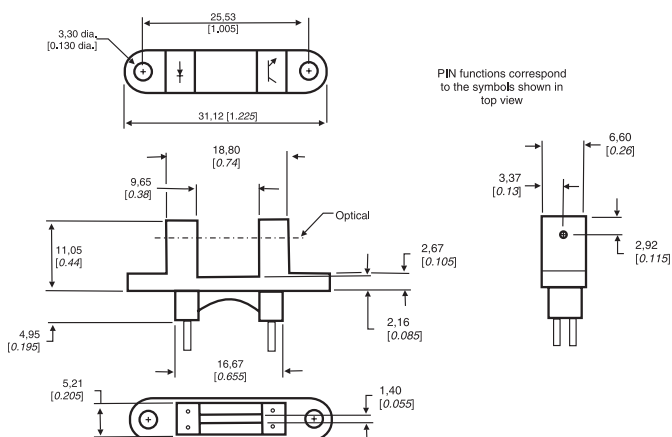
ELECTRICAL PARAMETER	MOUNTING/SENSOR	REFERENCE
A	No Tabs/0,25 mm (0.01 in)	S-870-N51
B	No Tabs/0,25 mm (0.01 in)	S-871-N51
C	No Tabs/0,25 mm (0.01 in)	S-872-N51
A	No Tabs/1,27 mm (0.05 in)	S-870-N55
B	No Tabs/1,27 mm (0.05 in)	S-871-N55
C	No Tabs/1,27 mm (0.05 in)	S-872-N55
A	2 Tabs/0,25 mm (0.01 in)	S-870-T51
B	2 Tabs/0,25 mm (0.01 in)	S-871-T51
C	2 Tabs/0,25 mm (0.01 in)	S-872-T51
A	2 Tabs/1,27 mm (0.05 in)	S-870-T55
B	2 Tabs/1,27 mm (0.05 in)	S-871-T55
C	2 Tabs/1,27 mm (0.05 in)	S-872-T55

## S-800W Series, Wide gap



The S-800W Series of wide gap slotted switches consists of a gallium arsenide IRED and silicon phototransistor in an injection-molded housing. The output current range options allow the design engineer the flexibility to choose from three current minimums to best solve application requirements.

<b>Operating temperature:</b>	-40 °C to 80 °C (-40 °F to 176 °F)
<b>IRED continuous forward current:</b>	50 mA
<b>IRED peak forward current:</b>	3 A
<b>IRED reverse voltage:</b>	3 V
<b>IRED power dissipation:</b>	100 mW
<b>Sensor collector-emitter voltage:</b>	30 V
<b>Sensor emitter-collector voltage:</b>	5 V
<b>Sensor power dissipation:</b>	100 mW



### OPTIONS

$I_L$	$V_{CE(sat)}$	REFERENCE
500 uA min @ $V_{CE} = 10 V$ & $I_F = 20 mA$	0.4 V max @ $I_C = 250 uA$ & $I_E = 20 mA$	S-800W
1.0 mA min @ $V_{CE} = 5 V$ & $I_F = 10 mA$	0.4 V max @ $I_C = 500 uA$ & $I_E = 20 mA$	S-801W
1.8 mA min @ $V_{CE} = 0.6 V$ & $I_F = 20 mA$	0.4 V max @ $I_C = 1.8 mA$ & $I_E = 20 mA$	S-802W

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# Ultrasonic Distance Sensors

Ultrasonic sensing systems offer no-touch distance measurements to an accuracy of 1 mm through dust, smoke and vapour, in areas of high noise level, and with all types of target materials, shapes and colours, with sensing ranges from 100 mm up to 6000 mm.

## High performance no-touch position sensing

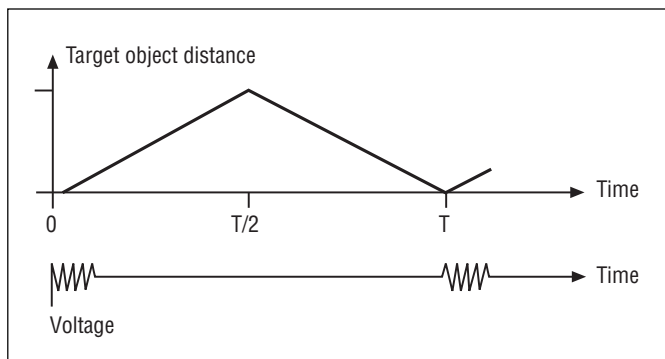
Increased reliability, no contamination. Honeywell ultrasonic sensors operate by exciting an acoustic transducer with voltage pulses, causing the transducer to vibrate ultrasonically. These oscillations are directed at a target and by measuring the time for the echo to return to the transducer, the distance may be calculated. This measurement technique in no way interferes with the object - it does not contaminate the target, nor does it affect the position. And being no-touch, there are no mechanical linkages to wear out.

## Ultrasonic

Factory noise does not affect operation because the operating frequency is well above the frequency of ambient sound. And because sound is used, air pressure, humidity and airborne contamination have little effect on accuracy; target shape, material and colour are also not critical.

## Working method

The sensors work with an ultrasonic transducer used for both transmitting and receiving. In each cycle, ultrasonic pulses will be transmitted. The pulses are then reflected back from the target, and received by the sensor. By means of the temperature compensated measurement of the elapsed time of the acoustic signal, the target distance is determined, with a high degree of accuracy. The resulting measurement can be output either as an analogue or a digital signal.



**Figure 1** shows the elapsed time of the acoustic pulse. The diagram shows how the pulse travels from the transducer to the target, is reflected at time  $T/2$ , and reaches the transducer at time  $T$ . Below is a diagram of the voltage at the ultrasonic transducer. Elapsed time  $T$  is directly proportional to object distance  $a$ .  $a = cT/2$ , where  $c$  is the velocity of sound.

## Application criteria

The maximum sensing range depends on a number of factors such as target shape, surface, inclination to the beam axis, surface composition and environmental influences. The range values included in this catalogue are based on a target made of flat, sound-reflecting material at 25°C and still air, placed vertical to the beam axis.



## Reflective properties

Almost all materials and targets reflect sound, and can therefore be detected. Only sound-absorbing materials such as cotton wool, or foam rubber are either difficult or impossible to detect. Certain materials, such as textiles, weaken the ultrasonic signals, as a result of which the maximum sensing distance is less than half of the nominal value.

## Target shape and surface

All object shapes and surfaces can be measured using ultrasonic sensors, up to the maximum distance at which a sufficient echo reaches the sensor. Cylindrical, conical and small objects reduce the measuring range.

## Inclination to beam angle

If a smooth, flat target is inclined at more than half of the nominal beam angle to the normal beam axis (e.g. 5°), the echo is deflected so far that, under certain conditions, no signal is received by the sensor (see Figure 2 overleaf). At shorter target distances, the target can be inclined up to the beam (e.g. 10°) from the beam axis. In the case of targets with a rough surface, the acoustic beam is reflected diffusely. The angle of inclination to the beam may, under certain circumstances, be up to 50°, but the maximum sensing distance is reduced.



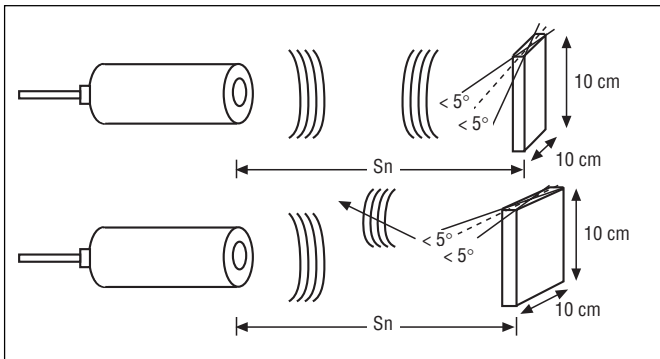


Figure 2: Effect of target inclination on the measurement

## Environmental influences

The velocity of sound in air is temperature-dependent, and increases at a rate of 0.18 %/°C. Honeywell ultrasonic distance sensors have their own temperature transducer, which adjusts both the clock frequency of the elapsed time counter and the carrier frequency. Major temperature fluctuations within the measuring path can, however, lead to sound dispersion and refraction, which disturb the measuring result and limit the stability of the measurement (Figure 3). Air streams, turbulence and air layers of different densities can, in certain conditions, attenuate or deflect the echo to such an extent that the sensor cannot detect it. On the other hand, air humidity and normal atmospheric air pressure fluctuations have virtually no influence on the measurements.

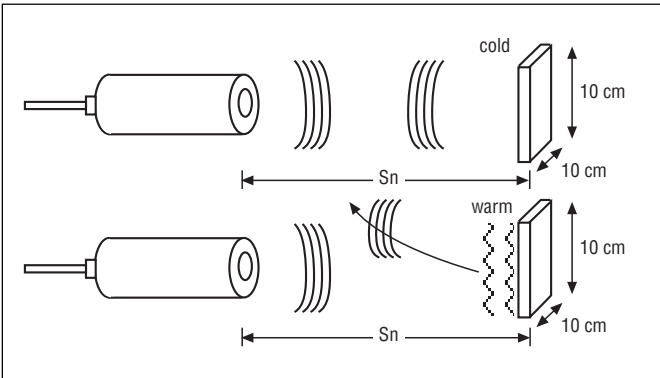


Figure 3: Effect of warm air turbulence on the measurement

## Repeatability

All information concerning repeatability and hysteresis in this data sheet is valid for axial target movements (Figure 4). If a target approaches the sensor from a distance, the output switches at the set value  $\pm$  the given repeatability. If the target moves further away from the sensor, the output switches back into its original condition, at a distance which is equal to the sum of the setpoint and the given hysteresis  $\pm$  the repeatability. If a target moves laterally into the acoustic beam, the echo energy increases. If the measurement threshold of the sensor is reached, the output becomes active. This threshold depends on the target properties and its distance from the sensor. The position can only be determined experimentally.

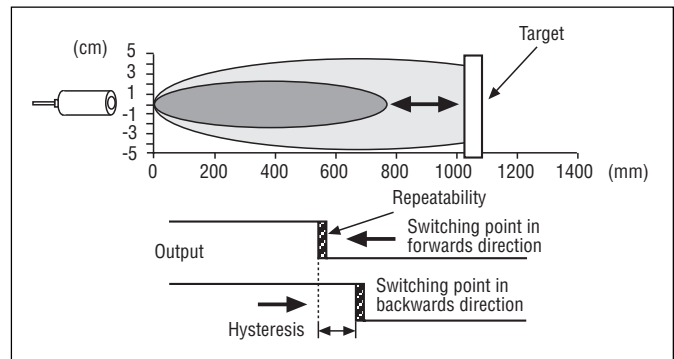


Figure 4: Repeatability and hysteresis

## Mutual interference

Despite pulse coding, if several sensors are used simultaneously in a single application, mutual interference can occur. This phenomenon will, however, only arise if, as a result of the inclination of the object, or the positioning of two sensors opposite one another, false echo signals can be received. By using the inhibitor input, maintaining minimum distances or restricting the beam angle with a focusing reflector, the problem can be almost entirely avoided.

## Synchronisation

The majority of Honeywell ultrasonic distance sensors can be very easily synchronised by interconnecting the appropriate inputs or connecting them with an external synchronisation unit. The transmission of the acoustic pulses then occurs simultaneously. This makes it possible to use the sensors for applications in which the ultrasonic transducers are facing each other, while still avoiding mutual interference.

## Protective measures

All sensors are protected against water and dust, according to the DIN standard IP 65. The transducer is coated with silicone rubber or epoxy, but it can be attacked by aggressive acid or caustic atmospheres. It is also necessary to ensure that the transducer face remains clear of liquid or solid deposits, which could limit the performance of the sensor. Drops of water may be deposited on the transducer surface, as a result of condensation. These could severely reduce the sensor range. Also because of the risk of icing up, and because sensors detect raindrops, the suitability of these sensors for outdoor use, despite the protective measures, is limited.

## Electrical interference

All Honeywell ultrasonic sensors are protected against reverse polarity, short circuits, overloads and voltage spikes. Special protective circuitry makes the sensor almost entirely immune to electromagnetic and radio frequency interference. However, unstable measurements may arise if the sensor is placed in the vicinity of strong electrical fields. In such cases, the interconnection cables should be screened as far as possible, or separated from power cables. The use of regulated power supplies with mains filters, and limiting the maximum cable length to 50 metres can also offer possible solutions. All sensors are CE marked.

## Alignment aid

The majority of Honeywell ultrasonic distance sensors have an LED, the output intensity of which is proportional to the ultrasonic echo received. The brighter the LED, the better aligned the sensor.

Please contact your nearest Honeywell office for details of other models available.

# 940/947 Series Compact, microprocessor controlled with internal temperature compensation

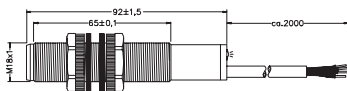


The new 940/947 Series is microprocessor controlled, can be set up quickly and are fitted with epoxy transducers. All the housings are sealed to IP67. The retroreflective versions allow detection of any kind of target without any dead zone. They work with a reflector target.

## OPTIONS

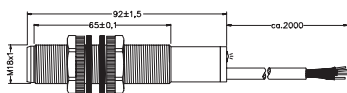
### 1 adjustable switching output PNP NO

**Max. sensing distance:** 600 mm  
**Min. sensing distance:** 100 mm  
**Beam angle:** 8°  
**Repeatability:** 0,3 % or ±1 mm  
**Switching frequency:** 25 Hz  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M18 x 1 mm plastic (PBTB)



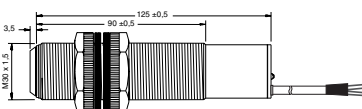
REFERENCE  
940-F4Y-2D-001-300E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 200 mm  
**Beam angle:** 8°  
**Repeatability:** 0,3 % or ±1 mm  
**Switching frequency:** 8 Hz  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M18 x 1 mm plastic (PBTB)



REFERENCE  
940-F4Y-2D-001-180E

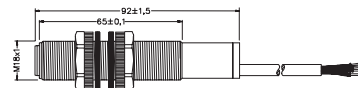
**Max. sensing distance:** 3000 mm  
**Min. sensing distance:** 300 mm  
**Beam angle:** 8°  
**Repeatability:** 0,3% or ±1 mm  
**Switching frequency:** 1 Hz  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)  
**Termination:** Prelead 2 m



REFERENCE  
947-T4Y-2D-001-130E

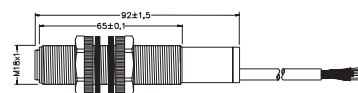
### Analogue voltage output, 0-10 V

**Max. sensing distance:** 600 mm  
**Min. sensing distance:** 100 mm  
**Beam angle:** 8°  
**Repeatability:** 0,2 % or ±2 mm  
**Response time:** 50 ms  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M18 x 1 mm plastic (PBTB)  
**Termination:** Prelead 2 m



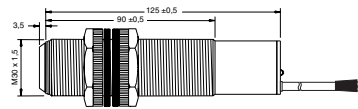
REFERENCE  
947-F4Y-2D-1C0-300E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 200 mm  
**Beam angle:** 8°  
**Repeatability:** 0,2 % or ±2 mm  
**Response time:** 100 ms  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M18 x 1 mm plastic (PBTB)  
**Termination:** Prelead 2 m



REFERENCE  
947-F4Y-2D-1C0-180E

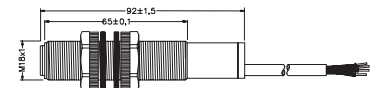
**Max. sensing distance:** 2500 mm  
**Min. sensing distance:** 300 mm  
**Beam angle:** 8°  
**Repeatability:** 0,2 % or ±2 mm  
**Response time:** 90 ms  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)  
**Termination:** Prelead 2 m



REFERENCE  
947-T4Y-2D-1C0-130E

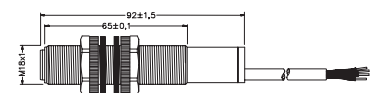
### Retroreflective, PNP NO

**Max. sensing distance:** 600 mm  
**Min. sensing distance:** 0 mm  
**Min. reflector distance:** 300 mm  
**Beam angle:** 8°  
**Switching frequency:** 25 Hz  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M18 x 1 mm plastic (PBTB)  
**Termination:** Prelead 2 m



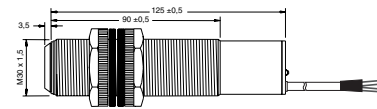
REFERENCE  
947-FSY-2D-001-300E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 0 mm  
**Min. reflector distance:** 400 mm  
**Beam angle:** 8°  
**Switching frequency:** 8 Hz  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M18 x 1 mm plastic (PBTB)  
**Termination:** Prelead 2 m



REFERENCE  
947-FSY-2D-001-180E

**Max. sensing distance:** 2500 mm  
**Min. sensing distance:** 0 mm  
**Min. reflector distance:** 600 mm  
**Beam angle:** 8°  
**Switching frequency:** 1 Hz  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)  
**Termination:** Prelead 2 m



REFERENCE  
947-TSY-2D-001-130E

# 944 Series

## Teach in, Analogue and 2 switching outputs

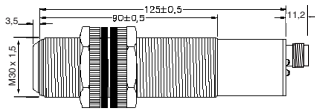


The new 944 series are microprocessor controlled and fully programmable by teach-in, with the simple pressing of a button. They offer analogue and two switching outputs through a standard M-12, 5-pin connector. All the models are IP67 with chemical-resistant body and epoxy face. Parameters are stored in non-volatile memory.

### OPTIONS

#### 2 switching outputs PNP NO Analogue output 0-10 volts

**Beam angle:** 8°  
**Repeatability :** 0,4 % or ±2 mm  
**Supply voltage:** 19 to 30 V  
**Sealing:** IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)



**Max. sensing distance:** 3500 mm  
**Min. sensing distance:** 350 mm  
**Switching frequency:** 0,8 Hz

REFERENCE  
944-T4V-2D-1C1-130E

**Max. sensing distance:** 2000 mm  
**Min. sensing distance:** 250 mm  
**Switching frequency:** 1 Hz

REFERENCE  
944-T4V-2D-1C1-180E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 150 mm  
**Switching frequency:** 1 Hz

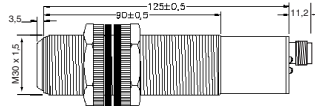
REFERENCE 944-T4V-2D-1C1-200E

**Max. sensing distance:** 350 mm  
**Min. sensing distance:** 60 mm  
**Switching frequency:** 8 Hz

REFERENCE 944-T4V-2D-1C1-300E

#### 2 switching outputs PNP NO Analogue output 4-20 mA

**Beam angle:** 8°  
**Repeatability :** 0,4 % or ±2 mm  
**Supply voltage:** 19 to 30 V  
**Sealing:** IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)



**Max. sensing distance:** 3500 mm  
**Min. sensing distance:** 350 mm  
**Switching frequency:** 0,8 Hz

REFERENCE  
944-T4V-2D-1D1-130E

**Max. sensing distance:** 2000 mm  
**Min. sensing distance:** 250 mm  
**Switching frequency:** 1 Hz

REFERENCE  
944-T4V-2D-1D1-180E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 150 mm  
**Switching frequency:** 1 Hz

REFERENCE  
944-T4V-2D-1D1-200E

**Max. sensing distance:** 350 mm  
**Min. sensing distance:** 60 mm  
**Switching frequency:** 8 Hz

REFERENCE  
944-T4V-2D-1D1-300E

# 948 Series

## Thru scan, 2 part

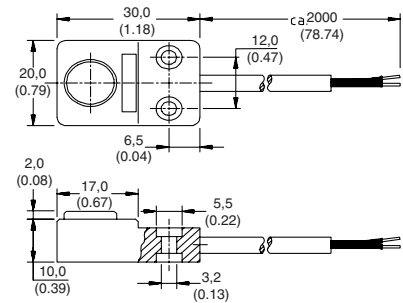


The 948 series perform presence measurement by using an ultrasonic beam. The 948 series is one of the smallest ultrasonic scan through devices in the world. It is especially suited for food and beverage applications, in particular bottle counting. Easy to install, the 948 series is suitable when space is at a premium.

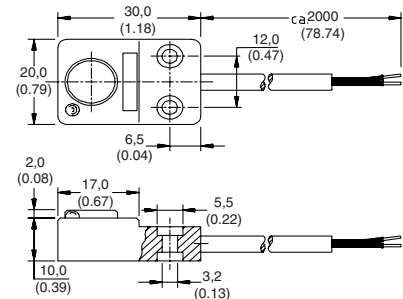
#### 1 switching output NO/NC; NPN/PNP

**Max. sensing distance:** 300 mm  
**Beam angle:** 8°  
**Supply voltage:** 18 to 30 V  
**Sealing:** IP67  
**Housing:** Plastic rectangular

Transmitter/ Sender/ Transmetteur



Receiver/ Empfänger/ Recepteur



SWITCHING	REFERENCE
PNP/NO	948-HSY-2D-001-300E
NPN/NO	948-HSY-2D-002-300E
PNP/NC	948-HSY-2D-003-300E
NPN/NC	948-HSY-2D-004-300E

# 942-T Series with Digital Link, Analogue and 2 switching outputs

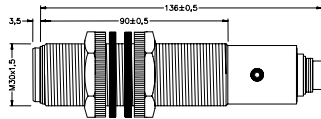


The new, plastic housing (PBTB), programmable 942-T series provides flexibility to customers through independent analogue and 2 switching outputs to suit most of the applications. The programming is easy to do using Window™ based software.

## OPTIONS

**2 switching outputs PNP 2NO/NC  
Analogue output 0-10 volts**

**Beam angle:** 8°  
**Repeatability :** 0,4 % or ±2 mm  
**Supply voltage:** 19 to 30 Vdc  
**Sealing:** Connector IP65  
                   Front face IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)  
**Switching frequency:** 5 to 30 Hz



**Max. sensing distance:** 3500 mm  
**Min. sensing distance:** 350 mm

REFERENCE  
942-T4N-2D-1C1-130E

**Max. sensing distance:** 2000 mm  
**Min. sensing distance:** 250 mm

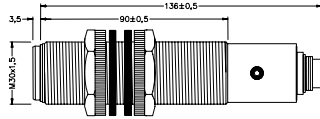
REFERENCE  
942-T4N-2D-1C1-180E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 150 mm

REFERENCE  
942-T4N-2D-1C1-200E

**2 switching outputs PNP 2NO/NC  
Analogue output 4-20 mA**

**Beam angle:** 8°  
**Repeatability :** 0,4 % or ±2 mm  
**Supply voltage:** 19 to 30 Vdc  
**Sealing:** Connector IP65  
                   Front face IP67  
**Housing:** M30 x 1,5 mm plastic (PBTB)  
**Switching frequency:** 5 to 30 Hz



**Max. sensing distance:** 3500 mm  
**Min. sensing distance:** 350 mm

REFERENCE  
942-T4N-2D-1D1-130E

**Max. sensing distance:** 2000 mm  
**Min. sensing distance:** 250 mm

REFERENCE  
942-T4N-2D-1D1-180E

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 150 mm

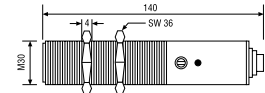
REFERENCE  
942-T4N-2D-1D1-200E

# 942 Series Compact programmable 30 mm diameter sensor



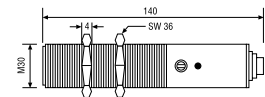
**Voltage output, 0-10 V  
2 switching outputs PNP**

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 150 mm  
**Beam angle:** 10°  
**Repeatability:** 0,4 % or ±2 mm  
**Switching frequency:** 5 to 30 Hz  
**Response time:** 100 ms  
**Supply voltage:** 19 to 30 V  
**Sealing:** IP65  
**Housing:** M30 x 1,5 mm stainless steel



REFERENCE  
942-A4N-2D-1C1-220S

**Max. sensing distance:** 3000 mm  
**Min. sensing distance:** 300 mm  
**Beam angle:** 8°  
**Repeatability:** 0,4 % or ±2 mm  
**Switching frequency:** 5 to 30 Hz  
**Response time:** 100 ms  
**Supply voltage:** 19 to 30 V  
**Sealing:** IP65  
**Housing:** M30 x 1,5 mm stainless steel



REFERENCE  
942-A4N-2D-1C1-130E

# 942 Series

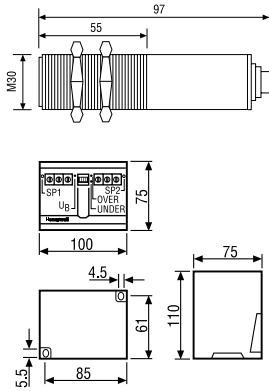
## 2 Piece

### 30 mm diameter sensor with RS232 Interface



**Voltage and current output**  
**2 switching RS232 interface**

**Max. sensing distance:** 1500 mm  
**Min. sensing distance:** 150 mm  
**Beam angle:** 10°  
**Repeatability:** 0,2 % or ±1 mm  
**Switching frequency:** 5 to 8 Hz  
**Response time:** 120 ms  
**Supply voltage:** 19 to 30 V  
**Sealing:** IP65  
**Housing:** M30 stainless steel



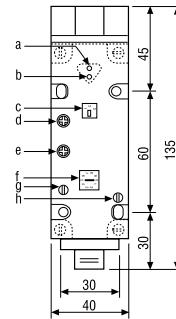
**REFERENCE**  
Complete sensor: 942-M3A-2D-1G1-220S

# 941 Series

## Limit switch style



**Max. sensing distance:** 1500 mm  
**Min. sensing distance (adjustable):** 200 mm  
**Beam angle:** 10°  
**Repeatability:** ±1 mm  
**Supply voltage:** 18 to 50 V  
**Sealing:** IP65  
**Housing:** Zinc die-cast, sea water resistant paint finish



941-C2V-2E-1C0      941-C2V-2E-2C0  
a LED echo            a LED echo  
b LED Vdc            b LED Vdc  
c Output adjustment      c Output adjustment  
d Offset                d Offset  
e Gain                    e Gain  
f Adjustment dead zone      f Adjustment dead zone  
g Adjustment receive sensitivity      g Adjustment receive sensitivity  
h Adjustment slope

**OPTIONS**

**Analogue voltage output, 0-10 V**

**Response time:** 150 ms

**REFERENCE**  
941-C2V-2E-1C0

**Switching**  
**2 adjustable switching outputs PNP NO**

**Switching frequency:** 10 Hz

**REFERENCE**  
941-C2V-2E-001

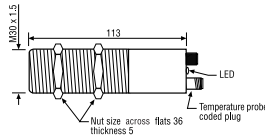
# 946 Series Teach In 30 mm diameter precision output



## OPTIONS

*Analogue voltage (0-10 V) and  
current (4-20 mA) output*

**Beam angle:** 5°  
**Repeatability:** < 0,1 %  
**Supply voltage:** 10 to 30 V  
**Sealing:** IP65  
**Housing:** M30 x 1,5 mm stainless steel  
**Termination:** M12 connector



**Max. sensing distance:** 500 mm  
**Min. sensing distance:** 60 mm  
**Response time:** 35 ms

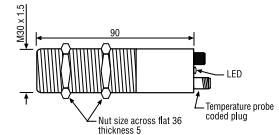
**REFERENCE**  
946-A4V-2D-2C0-380E

**Max. sensing distance:** 2000 mm  
**Min. sensing distance:** 200 mm  
**Response time:** 100 ms

**REFERENCE**  
946-A4V-2D-2C0-175E

*2 adjustable switching outputs  
PNP NO*

**Beam angle:** 5°  
**Repeatability:** < 1 %  
**Supply voltage:** 10 to 30 V  
**Sealing:** IP65  
**Housing:** M30 x 1,5 mm stainless steel  
**Termination:** M12 connector

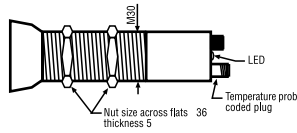


**Max. sensing distance:** 300 mm  
**Min. sensing distance:** 60 mm  
**Switching frequency:** 15 Hz

**REFERENCE**  
946-A4V-2D-001-400E

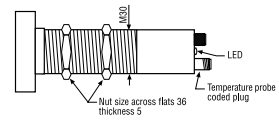
**Max. sensing distance:** 2000 mm  
**Min. sensing distance:** 200 mm  
**Switching frequency:** 5 Hz

**REFERENCE**  
946-A4V-2D-001-175E



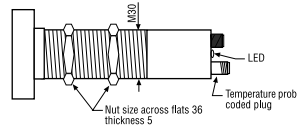
**Max. sensing distance:** 4000 mm  
**Min. sensing distance:** 500 mm  
**Response time:** 300 ms

**REFERENCE**  
946-A4V-2D-2C0-85E



**Max. sensing distance:** 6000 mm  
**Min. sensing distance:** 800 mm  
**Switching frequency:** 1 Hz

**REFERENCE**  
946-A4V-2D-001-65E



**Max. sensing distance:** 6000 mm  
**Min. sensing distance:** 800 mm  
**Response time:** 500 ms

**REFERENCE**  
946-A4V-2D-2C0-65E

# Accessories

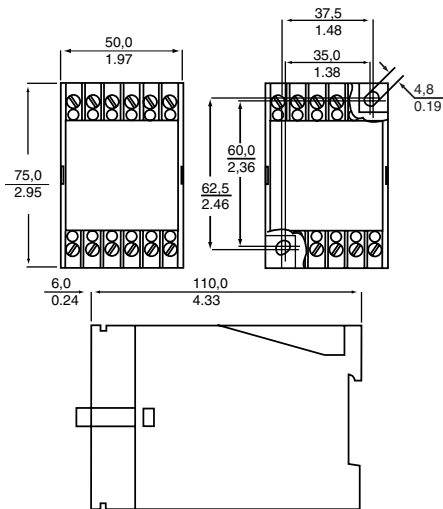
## Power supply

*24 Vdc regulated power supply with output relay*



The FF-MADB24RB is a small and versatile power supply usually used with the ultrasonic distance sensors, but may be used for any purpose. The power supply accepts 115 or 230 Vac input, is regulated to 24 Vdc. An internal SPDT relay may be triggered by NPN or PNP sensor output.

- Use with Series:** 940, 941, 942, 944, 946, 947
- Supply voltage:** 110 Vac or 220 to 240 Vac
- Circuit protection:** Short circuit
- Load current:** 150 mA max.
- LED indication:** Output relay
- Output type:** Relay SPDT 4 A/250 Vac, 3 A/60 Vdc
- Termination:** Screw
- Housing:** Plastic
- Housing type:** DIN rail mount, 2 holes Ø4,5 mm



REFERENCE  
FF-MADB24RB

## Beam Deflectors

Beam deflectors deflect the ultrasonic beam by 90° with virtually no signal loss. They are extremely useful in applications where space is limited; they allow the space required for the dead zone to be accommodated when setting up the sensor. The focusing beam deflector concentrates the ultrasonic beam, preventing unwanted reflection. It reduces the beam angle by approximately half.

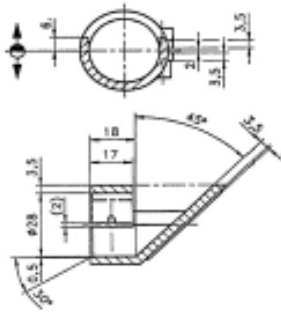
The 43192871 series is made of stainless steel and may be used to fix the sensor. The 66195116-001, made of plastic, is available for M30 sensors only and cannot be used to fix the sensor.



## OPTIONS

### Compact - M30

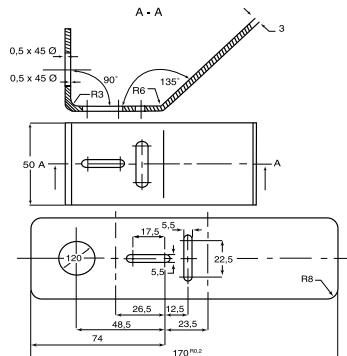
**Use with Series:** 942, 944, 946, 947  
**Housing:** Plastic



REFERENCE  
66195116-001

### M30

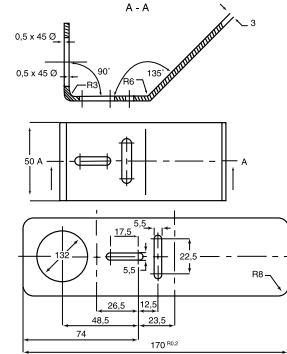
**Use with Series:** 940, 942, 944, 946, 947  
**Housing:** Stainless steel



REFERENCE  
43192871-001  
**Focusing**  
43192871-002

### M18

**Use with Series:** 940, 942, 944, 946, 947  
**Housing:** Stainless steel



REFERENCE  
43192871-003  
**Focusing**  
43192871-004

## M12 Connectors

### OPTIONS

#### WITHOUT CABLES

**M12 female, 5 pin, 5 screw terminals**



The 66195044-001 is used for the 940, 941, 944, 947 series but may be used for any industrial sensor with standard M12 4 pin or 5 pin connector. The 66195044-001 connector is usually included with every sensor of the above series for connectorised models.

**Use with Series:** 940, 941, 944, 947  
**Housing:** Plastic  
**Termination:** Female M12  
**Number of pins:** 5

REFERENCE  
66195044-001

**M12 female, 7 pin (942 Series)**



The 66195074-001 is used for the ultrasonic distance sensor heads 942-A4M. It needs to be wired and soldered at the setup of the sensor. The 66195074-001 is included in every package of the 942 separate series (942 M3A...) but not in the spare ultrasonic heads (942-A4M..).

**Use with Series:** 942  
**Housing:** Stainless Steel  
**Termination:** Female Binder  
**Number of pins:** 7

REFERENCE  
66195074-001

#### WITH CABLES

**M12 female, 5 pin, 2 metre cable (supplied with 946 Series)**



The 55002 is a 5 pin, M12 female, metal, cable connector with 2 metres of cable attached. It is used with the 946 series but may be used for any industrial sensor with standard M12 4 pin or 5 pin connector. The 55002 cable connector is included with every sensor of the 946 series.

**Use with Series:** 940, 941, 944, 946, 947  
**Termination:** Female M12  
**Number of pins:** 5

REFERENCE  
55002

**Female, 8 pin, 2 metre cable (942 Series Compact)**



The 55195126-001 is an 8 pin, female, metal, cable connector with 2 metres of cable attached. It is used with the 942-A4N compact series. This device is useful but not necessary to setup the sensor, as every ultrasonic distance sensor 942-A4N is provided with a female connector without cable, with pins to solder.

**Use with Series:** 942  
**Housing:** Stainless steel  
**Termination:** Female Binder  
**Number of pins:** 8

REFERENCE  
55195126-001

## Mounting Clamps

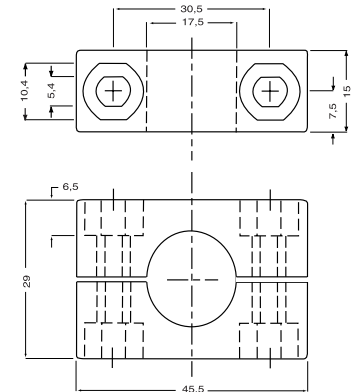


The 43178389 are plastic mounting clamps usually used with the ultrasonic distance sensors, but may be used with any M18 or M30 industrial sensors. The 43178389 feature 2-part plastic clamps with 2 M5x60 mm screws and nuts.

### OPTIONS

#### M18

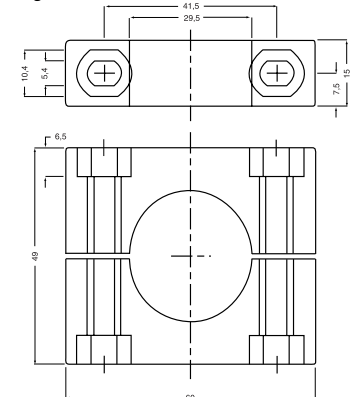
**Use with Series:** 940  
**Housing:** Plastic



REFERENCE  
43178389-018

#### M30

**Use with Series:** 942, 944, 946, 947  
**Housing:** Plastic



REFERENCE  
43178389-030



## Accessories (continued) Programming

### OPTIONS

#### Software

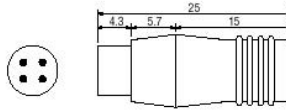
The software package 55195101-101 contains software for programming 942 series separate and 55195101-102 for the 942 series compact . The software runs under Microsoft Windows™ versions 95™ and later.

Both packages contain an RS-232 cable (crossed) with 2 Sub-D 9 pin connectors, to connect to a PC. For 55195101-101 (942 Series separate), the other end of the cable connects to the control box 942-M0A.... by screw terminals. For 55195101-102 (942 Series compact), the other end of the cable connects to programming module 55000005-002.

For sensor series 942T... the programming cable gives easy access to the RS232 interface. The RS232 interface of the connector is directly connected to the Sub-D 9 pin connector, which allows easy connection to a PC. The Windows™ based software is easy to use and is supplied on a floppy disc with the programming cable.

	REFERENCE
942-A Series Separate	55195101-101
942-N Series Compact	55195101-102
942-T Series (includes programming cable)	55000018-001

#### Programming adaptor for 946 Series



<b>Use with Series:</b>	946
<b>Sealing:</b>	IP65
<b>Number of pins:</b>	4

**REFERENCE**  
40779

#### 942 Series Compact programming module



The 55000005-002 is a programming module for the 942-A4N series. Although this device is not necessary to setup the sensor, it is very useful as it provides quick connections for the RS-232 data link and the 'hold' switch.

It features 1 connector din Sub-D 9 pin, compatible with the cable included in the software package 55195101-102, 1 microswitch to put the sensor in 'hold' mode (necessary for the RS-232 link), 1 female and 1 male connector to be inserted between the customer's interface and the 942-A4N sensor.

The 55000005-002 may be used to programme any number of sensors and is not necessary in the usual run of the application. It is not compatible with 942 separate series.

**REFERENCE**  
55000005-002

# Pressure Sensors

Honeywell has over 40 years of experience in the pressure transducer industry. We offer three pressure sensor measurement types - absolute, differential and gage - including vacuum gage and bidirectional types. A wide variety of pressure ranges, along with both amplified and unamplified versions, are available. Silicon-based versions in stainless steel and brass housings allow for use in harsh environmental conditions. A wide choice of mounting, package, and port configurations allows customers to choose from standard off-the-shelf designs.

Pressure sensors contain sensing elements that consist of four piezoresistors buried in the face of a thin, chemically-etched silicon diaphragm. A pressure change causes the diaphragm to flex, inducing a stress or strain in the diaphragm and the buried resistors. The resistor values change in proportion to the stress applied and produce an electrical output.

All Honeywell pressure sensors feature excellent repeatability, high accuracy and reliability under varying environmental conditions. In addition, they feature highly consistent operating characteristics from one sensor to the next and interchangeability without recalibration.

## *Stainless Steel versions*

Honeywell also offers stainless steel pressure transducers that use bonded strain gauge technology with stainless steel media isolation, which eliminates the need for internal seals. Our stainless steel pressure transducers utilize bonded semiconductor strain gauge technology and are designed for demanding environments involving corrosive media. They are manufactured in a variety of packages that are widely used in medical equipment, compressors, hydraulic controls, transportation, agriculture, and refrigeration applications. Laser trimmed and tested, they are fully calibrated and temperature compensated to assure long-term reliability and performance. Stainless steel pressure transducers are fully compensated to eliminate known sources of errors.

Most of our transducers utilize the 'bonded strain gage' technology and are fully stainless steel media isolated, eliminating the need for internal elastomer seals. Our strain gage design is very resistant to the effects of shock, vibration and hostile environments. All of our transducers are fully compensated and tested against the appropriate specifications before shipment.



## *High Purity versions*

High purity pressure sensors are focused on high-purity applications in the wafer-processing segment of the semiconductor industry. With ISO 9001 certified facilities and Class 10 cleanroom capability, Honeywell manufactures a full line of high purity pressure sensing and control products; each individually tested, inspected and certified to be in full compliance with the product specification.

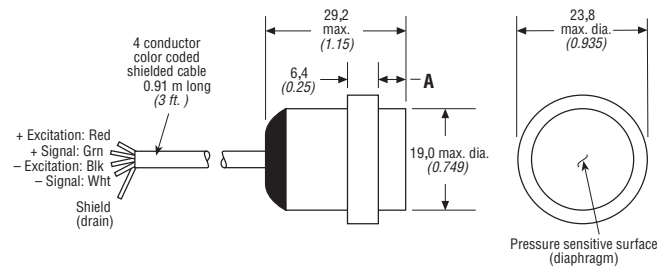
The long life of the high-purity pressure sensors, coupled with long-term stability, greatly reduces or eliminates the need for zero and span adjustments.

# AB/HP Series



The AB-High Performance pressure transducer is extremely accurate down to 0.25% span over a wide compensated temperature range. Both zero and full-scale temperature compensation are held to extremely narrow limits. The transducer's body is made in a configuration permitting its use as a 'flush-mounted' device in situations where ease of cleaning or low-fluid volumes are major requirements. It may also be mounted in an adaptor for more conventional installations. Made from 316L or 15-5PH stainless steel, the AB/HP offer premium performance and flexibility at OEM prices.

**Approvals:** CE  
**Supply voltage:** 5.0 Vdc, 6.0 Vdc max.  
**Signal conditioning:** Unamplified compensation  
**Compensated temperature range:** -1 °C to 71 °C (30 °F to 160 °F)  
**Port style:** Flush Diaphragm  
**Output type:** 0 mV to 100 mV



## OPTIONS

**0,91 m (3 ft) 4-Conductor Shielded Cable**  
**-54 °C to 93 °C (-65 °F to 200 °F)**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psia to 15 psia	ABH015PAC1B
Absolute	0 psia to 50 psia	ABH050PAC1B
Gauge	0 psig to 6 psig	ABH006PGC1B
Gauge	0 psig to 25 psig	ABH025PGC1B
Gauge	0 psig to 15 psig	ABH015PGC1B
Sealed Gauge	0 psis to 100 psis	ABH100PSC1B
Sealed Gauge	0 psis to 200 psis	ABH200PSC1B
Sealed Gauge	0 psis to 500 psis	ABH500PSC1B
Sealed Gauge	0 psis to 1,000 psis	ABH01KPSC1B
Sealed Gauge	0 psis to 2,000 psis	ABH02KPSC1B
Sealed Gauge	0 psis to 3,000 psis	ABH03KPSC1B

**Bendix High Temperature Connector**  
**-54 °C to 149 °C (-65 °F to 300 °F)**

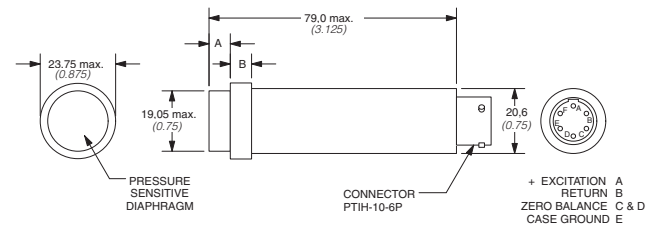
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psia to 25 psia	ABH025PABB
Sealed Gauge	0 psis to 3,000 psis	ABH03KPSBB
Sealed Gauge	0 psis to 10,000 psis	ABH10KPSBB

# BL Series



The BL pressure transmitter has a conventional 4 mA to 20 mA output and is available with accuracies to 0.25%. It has Factory Mutual approval as an intrinsically safe device for use in hazardous areas. Class I, Division I, Groups A through G (when used within approved barriers).

**Approvals:** CE, FM  
**Supply voltage:** 12.0 Vdc to 30.0 Vdc  
**Signal conditioning:** Amplified compensated  
**Operating temperature range:** -40 °C to 82 °C (-40 °F to 180 °F)  
**Compensated temperature range:** -1 °C to 54 °C (-30 °F to 130 °F)  
**Port style:** Flush Diaphragm  
**Output type:** 4 mA to 20 mA  
**Termination type:** Bendix Connector



## PRESSURE RANGE (PSI)

Pressure Range (PSI)	Dim. A MAX	Dim. B
0-5	.271 (6.9)	.25 (6.4)
1-15 to 0-50	.232 (5.9)	.25 (6.4)
0-100 to 0-200	.238 (6.1)	.25 (6.4)
0-500 to 0-1000	.238 (6.1)	.19 (4.8)
0-2000 to 0-5000	.273 (6.9)	.19 (4.8)
0-10000	.287 (7.3)	.19 (4.8)
0-20000	.285 (7.5)	.19 (4.8)

## OPTIONS

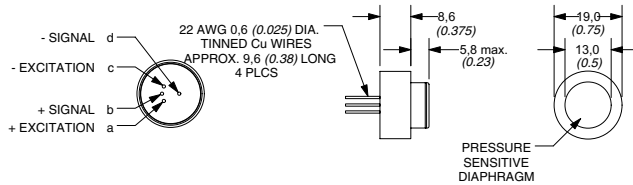
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	BLH015PBG
Gauge	0 psig to 15 psig	BL015PBG
Sealed Gauge	0 psis to 100 psis	BL100PSBG
Sealed Gauge	0 psis to 100 psis	BLH100PSBG
Sealed Gauge	0 psis to 200 psis	BL200PSBG
Sealed Gauge	0 psis to 500 psis	BL500PSBG
Sealed Gauge	0 psis to 5,000 psis	BL05KPSBG
Sealed Gauge	0 psis to 10,000 psis	BLH10KPSBG

## BX Series



The BX pressure sensor is intended for OEMs who need a small, high performance pressure sensor. The unique sensor module design eliminates the need for oil-filled capsules and corrugated diaphragms providing a true, robust sensing surface for long life and superior performance.

**Supply voltage:** 5.0 Vdc  
**Signal conditioning:** Unamplified compensated  
**Operating temperature range:** -40 °C to 100 °C (-40 °F to 212 °F)  
**Compensated temperature range:** 0 °C to 80 °C (32 °F to 130 °F)  
**Port style:** Flush diaphragm  
**Output type:** 0 mV to 50 mV  
**Termination type:** 4 - 22 AWG tinned Cu wires



### OPTIONS

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	BX015PGTA

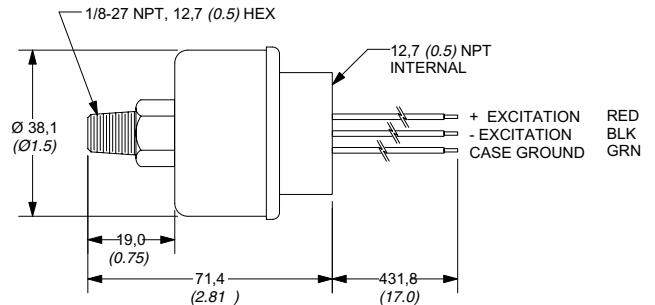
## Datamate Series



The DATAMATE is a two-wire pressure transmitter which is compatible with data loggers and instrumentation used in processing environments. Its 4 mA to 20 mA output is ideal for remote monitoring of both primary and secondary process variables.

The DATAMATE is made of series 300 stainless steel. It is suitable for use with a variety of media that would otherwise require insulators. It is also intrinsically safe (when used within approved barriers) for use in Class I, Division I, Groups A through G hazardous areas.

**Approval:** FM  
**Supply voltage:** 12.0 Vdc to 40.0 Vdc  
**Signal conditioning:** Amplified compensated  
**Operating temperature range:** -40 °C to 100 °C (-40 °F to 212 °F)  
**Compensated temperature range:** -1 °C to 54 °C (30 °F to 130 °F)  
**Port style:** 1/8 - 27 NPT  
**Output type:** 4 mA to 20 mA  
**Termination type:** 3-wire, 24 AWG, 1/2 in. NPT internal conduit



### OPTIONS

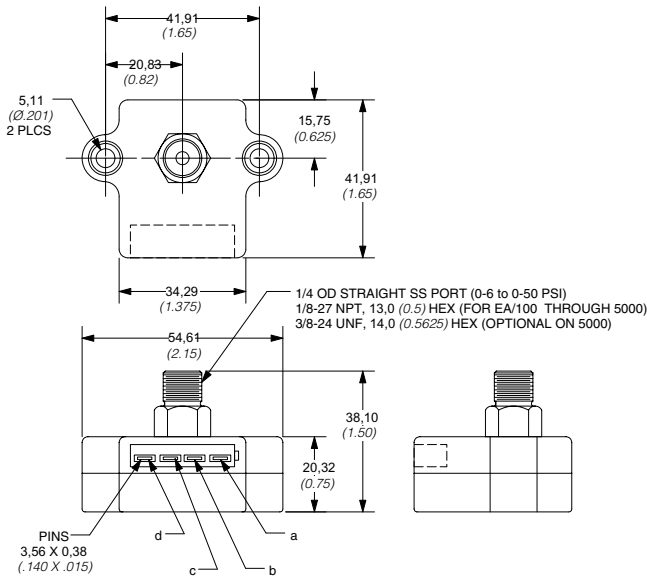
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	DM015PG1WG
Gauge	0 psig to 50 psig	DM050PG1WG
Sealed Gauge	0 psig to 100 psig	DM100PS1WG
Sealed Gauge	0 psig to 200 psig	DM200PS1WG
Sealed Gauge	0 psig to 500 psig	DM500PS1WG
Sealed Gauge	0 psig to 5,000 psig	DM05KPS1WG

# EA Series



The EA Series is designed for OEM users requiring high output and corrosion-resistance. It has operated through millions of pressure cycles without damage and is well suited for the cycling regimes found in automatic equipment, robots, and hydraulic systems.

**Approval:** UL  
**Supply voltage:** 85.0 Vdc  
**Signal conditioning:** Amplified compensated  
**Compensated temperature range:** 1 °C to 85 °C (30 °F to 185 °F)  
**Port style:** 1/8 in - 27 NPT  
**Termination type:** Quick disconnect  
**Measurement type:** Gauge



## OPTIONS

**Output 1 Vdc to 6 Vdc**  
**-55 °C to 100 °C (-67 °F to 212 °F)**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 6 psig	EA006PG1QD
Gauge	0 psig to 15 psig	EA015PG1QD
Gauge	0 psig to 25 psig	EA025PG1QD
Gauge	0 psig to 100 psig	EA100PG1QD
Gauge	0 psig to 200 psig	EA200PG1QD
Gauge	0 psig to 300 psig	EA300PG1QD
Gauge	0 psig to 500 psig	EA500PG1QD
Gauge	0 psig to 1,000 psig	EA01KPG1QD
Gauge	0 psig to 5,000 psig	EA05KPG1QD

**Output 1 kHz to 6 kHz**  
**-40 °C to 85 °C (-40 °F to 185 °F)**

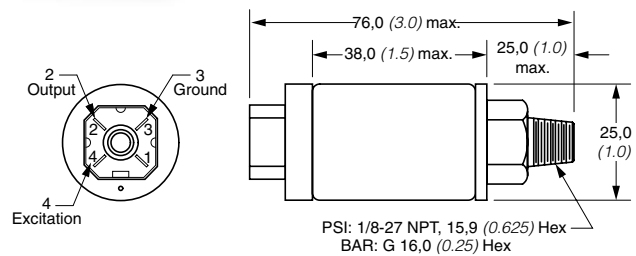
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 300 psig	EA300PG1QF
Gauge	0 psig to 500 psig	EA500PG1QF

# Eclipse Series



The Eclipse (EC) Series pressure transducers are designed for OEMs who require a reliable pressure transducer for industrial or heavy-duty applications. The model EC features our proven all-wetted stainless steel design, rugged packaging, internal signal amplification, and price which makes it an ideal sensor for a variety of applications. The model EC offers a broad selection of pressure ranges, output ranges, process connections, and electrical termination to meet the demanding requirements of customers worldwide.

**Approvals:** UL, CE  
**Supply voltage:** 5.0 Vdc  
**Signal conditioning:** Amplified compensated  
**Operating temperature range:** -40 °C to 105 °C (-40 °F to 221 °F)  
**Compensated temperature range:** -40 °C to 105 °C (-40 °F to 221 °F)



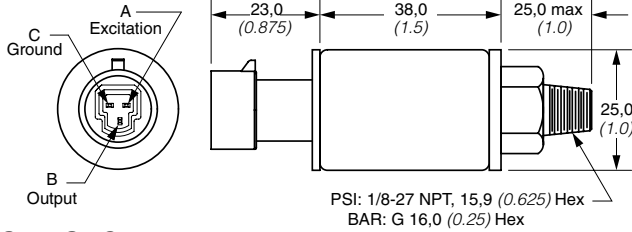
## OPTIONS

The Model Eclipse is available with a mini DIN style electrical connector. This connection is a popular choice throughout the world and offers quick disconnection, but can be rigidly attached with the center screw fastener. The cable exit may be adjusted to any 90° direction.

**Hirschmann - 0.5 Vdc to 4.5 Vdc Output**  
**1/8 in - 27 NPT Connector**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Sealed Gauge	0 psig to 200 psig	EC200PS1HC
Sealed Gauge	0 psig to 500 psig	EC500PS1HC

**Eclipse Series (continued)**



**OPTIONS**

To meet the requirements of automotive applications, the Model Eclipse is offered with the Packard Metri-Pack™ electrical connector. This connector has been specified for the extreme environments found in engine and hydraulic applications. The connector has a locking lug to maintain the connection with the mating plug.

**Packard - 0.5 Vdc to 4.5 Vdc Output  
1/8 in - 27 NPT Connector**

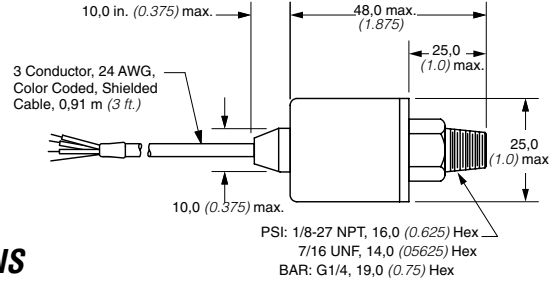
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Sealed Gauge	0 psis to 200 psis	EC200PS1PC
Sealed Gauge	0 psis to 300 psis	EC300PS1PC
Sealed Gauge	0 psis to 500 psis	EC500PS1PC
Sealed Gauge	0 psis to 2,000 psis	EC02KPS1PC
Sealed Gauge	0 psis to 3,000 psis	EC03KPS1PC

**G1/4 in - 19 BSP Connector**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Sealed Gauge	0 bar to 350 bar	EC350BS6PC

**4 mA to 20 mA Output  
G1/4 in - 19 BSP Connector**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 bar to 1 bar	EC001BG6PG



**OPTIONS**

The Model Eclipse can be provided with an all stainless steel case and an integral cable for electrical connection. The advantage of this arrangement is that the environment rating is increased to IP66 and would be recommended for extreme outdoor or industrial environments.

**Model Cable**

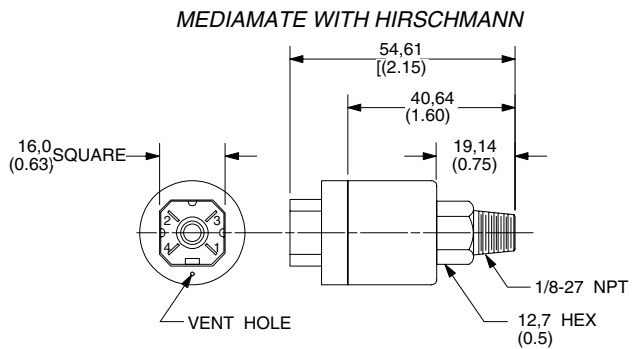
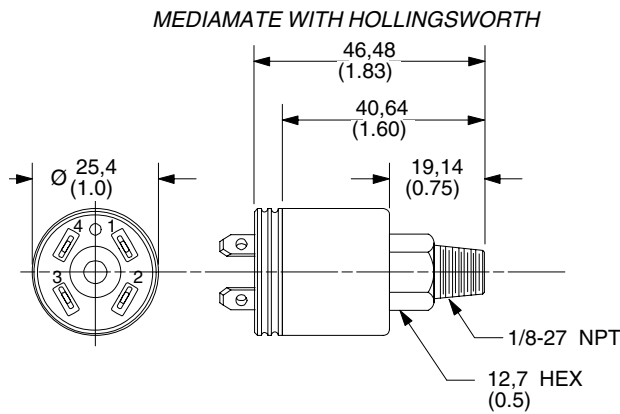
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Sealed Gauge	0 psis to 100 psis	EC100PS1CG
Sealed Gauge	0 psis to 5,000 psis	EC05KPS1CG

# MediaMate Series



The MEDIAMATE pressure transducer provides the user with the corrosion resistance of stainless steel at low OEM pricing. It is fully compensated and completely interchangeable without further calibration. The MEDIAMATE's wetted parts and outer case are made from 300 series stainless steel. It is now being used with a wide variety of corrosive media such as Freon®, ammonia, water, and hydraulic fluids.

**Approvals:** CE  
**Supply voltage:** 5.0 Vdc, 6.0 Vdc max.  
**Signal conditioning:** Unamplified compensated  
**Operating temperature range:** -40 °C to 100 °C (-40 °F to 212 °F)  
**Compensated temperature range:** -1 °C to 82 °C (30 °F to 180 °F)  
**Output type:** 0 mV to 50 mV  
**Measurement type:** Gauge



**PIN CODES ARE FOR OPTIONAL HIRSCHMANN AND HOLLINGSWORTH CONNECTORS**

Hollisworth Pin Code	Hirshmann Pin Code	Function
1	1	+ Signal
2	2	+ Excitation
3	3	- Signal
4	4	- Excitation

## OPTIONS

### Hollingsworth - 1/8 in - 27 NPT Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	MM015PG1QA
Gauge	0 psig to 100 psig	MM100PG1QA
Gauge	0 psig to 200 psig	MM200PG1QA
Gauge	0 psig to 500 psig	MM500PG1QA
Gauge	0 psig to 1,000 psig	MM01KPG1QA
Gauge	0 psig to 5,000 psig	MM05KPG1QA

### Hollingsworth - 3/8 in UNF Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 5,000 psig	MM05KPG3QA

## OPTIONS

### Hirschmann - G-1/8 in BSP Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 25 psig	MM025PG10HA
Gauge	0 psig to 200 psig	MM200PG10HA
Gauge	0 psig to 5,000 psig	MM05KPG10HA
Gauge	0 psig to 7,000 psig	MM07KPG10HA

### Hirschmann - 1/8 in - 27 NPT Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 50 psig	MM050PG1HA
Gauge	0 psig to 100 psig	MM100PG1HA

### Hirschmann - G-1/4 in BSP Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 5,000 psig	MM05KPG6HA

## SA Series



The harsh duty SA pressure transducer has a water resistant, stainless steel case for complete protection from harsh environments. Internal hermetic sealing is used to provide measurement from absolute pressures (psia) or pressures referenced to a sealed chamber (psis). Underwriters Laboratories has approved the SA as a component in float and pressure-operated motor controllers (File #E93356).

**Approvals:** UL (\*C1D products)  
CE (\*C1DE products)

**Supply voltage:** 9.0 Vdc to 24.0 Vdc

**Signal conditioning:** Amplified compensated

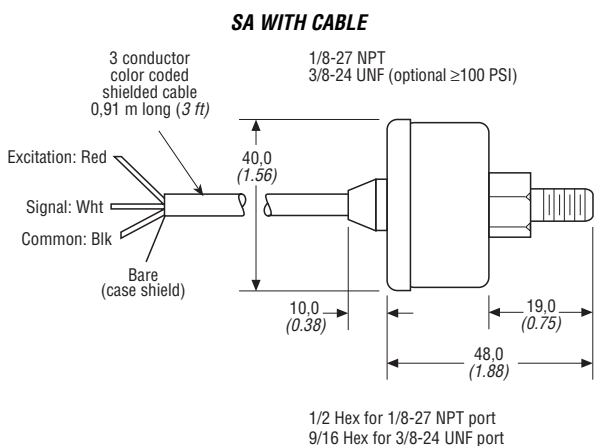
**Operating temperature range:** -55 °C to 105 °C (-48 °F to 221 °F)

**Compensated temperature range:** -1 °C to 85 °C (30 °F to 185 °F)

**Port style:** 1/8-27 NPT

**Output type:** 1 Vdc to 6 Vdc

**Termination type:** 0,91 m (3 ft) 3-conductor shielded cable



## SR Series



The Model SR is intended for OEMs requiring a small pressure sensor with high pressure capability and superior corrosion resistance. Constructed of brazen assembly of 300 series stainless steels, the SR can tolerate a wide variety of corrosive media without risk of leaking. The SR's design provide high working pressures and high overload and burst pressures at no extra cost.

**Supply voltage:** 5.0 Vdc

**Signal conditioning:** Unamplified compensated

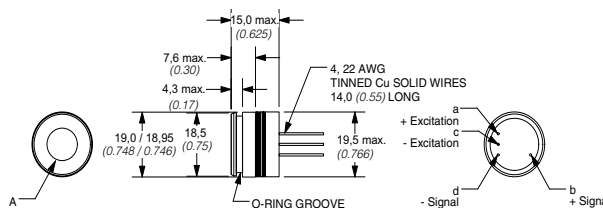
**Operating temperature range:** -40 °C to 100 °C (-40 °F to 212 °F)

**Compensated temperature range:** 0 °C to 75 °C (32 °F to 167 °F)

**Port style:** Capsule

**Output type:** 0 mV to 100 mV

**Termination type:** 4 - 22 AWG tinned Cu wires



**PRESSURE RANGE (PSI)**

Pressure Range (PSI)	* A			
	Bore Dia.	O-Ring	Sealing Depth**	Cavity Depth
15-500	.500 (12.70)	2-012	.21 (5.33)	.22 (5.58)
1000-1500	.375 (9.52)	2-010	.21 (5.33)	.22 (5.58)
2000	.375 (9.52)	2-010	.21 (5.33)	.22 (5.58)

**CAUTION:** Contact with sensing surface at bottom of cavity will affect accuracy and may cause damage. The O-ring groove on 2000 psi unit is wider to accommodate a backup ring behind the O-ring. All dimensions in inches (mm).

## OPTIONS

### UL Approval

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psia to 15 psia	SA015PA1C1D
Absolute	0 psia to 25 psia	SA025PA1C1D
Absolute	0 psia to 50 psia	SA050PA1C1D
Absolute	0 psia to 100 psia	SA100PA1C1D
Gauge	0 psig to 15 psig	SA015PG1C1D
Sealed Gauge	0 psis to 100 psis	SA100PS1C1D
Sealed Gauge	0 psis to 200 psis	SA200PS1C1D
Sealed Gauge	0 psis to 500 psis	SA500PS1C1D
Sealed Gauge	0 psis to 3,000 psis	SA03KPS1C1D

### CE Approval

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psia to 25 psia	SA025PA1C1DE
Absolute	0 psia to 50 psia	SA050PA1C1DE

## OPTIONS

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	SR015PGTB
Gauge	0 psig to 25 psig	SR025PGTB
Gauge	0 psig to 50 psig	SR050PGTB
Gauge	0 psig to 100 psig	SR100PGTB
Gauge	0 psig to 200 psig	SR200PGTB
Gauge	0 psig to 300 psig	SR300PGTB
Gauge	0 psig to 500 psig	SR500PGTB
Gauge	0 psig to 1,000 psig	SR01KPGTB
Gauge	0 psig to 2,000 psig	SR02KPGTB

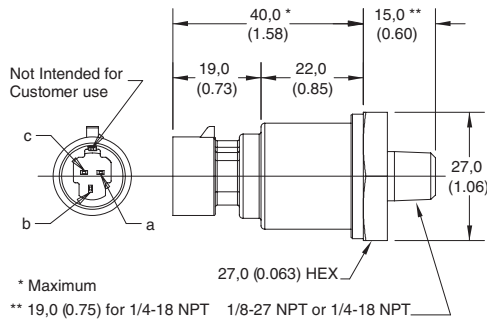


# ML Series



The Model ML pressure transducers combines the latest in ASIC technology with our proven stainless steel design. This digitally compensated transducer offers an unparalleled value and performance combination making it the ideal pressure sensing solution for demanding automotive and industrial applications. Fully temperature compensated, calibrated, and amplified, the ML is available in 100 to 5,000 psis pressure ranges.

**Approval:** UL  
**Supply voltage:** 5.0 Vdc  
**Signal conditioning:** Amplified compensated  
**Operating temperature range:** -40 °C to 105 °C (-40 °F to 221 °F)  
**Compensated temperature range:** -40 °C to 105 °C (-40 °F to 221 °F)  
**Termination type:** Packard Metri-Pack™ Connector  
**Measurement type:** Sealed Gauge

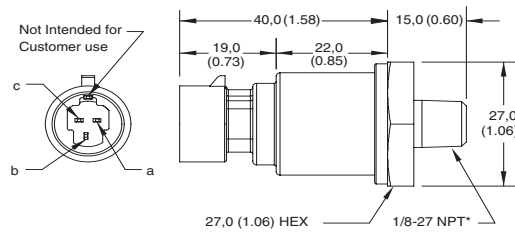


# ST Series



The Model ST pressure transducer combines Honeywell's proven silicon pressure sensing with the latest in ASIC technology in a rugged, industrial package. High value, coupled with outstanding performance, make this an ideal transducer for industrial control applications such as air compressors and pneumatic equipment.

**Signal conditioning:** Amplified compensated  
**Operating temperature range:** -40 °C to 100 °C (-40 °F to 212 °F)  
**Compensated temperature range:** -40 °C to 100 °C (-40 °F to 212 °F)  
**Termination type:** Packard Metri-Pack™ Connector  
**Measurement type:** Gauge



\* 1/4-18 NPT and G1/4-18 BSP configurations are both optional. Contact the factory to discuss other pressure port options.

## OPTIONS

### 0.5 Vdc to 4.5 Vdc Output 1/8 in - 27 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
5.0 Vdc	0 psis to 1,000 psis	ML01KPS1PC
5.0 Vdc	0 psis to 100 psis	ML100PS1PC

### 1/4 in - 18 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
5.0 Vdc	0 bar to 10 bar	ML010BS2PC

### 4 mA to 20 mA Output 1/8 in - 27 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
9.5 Vdc to 35.0 Vdc	0 psis to 100 psis	ML100PS1PG

### 1/4 in - 18 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
9.5 Vdc to 35.0 Vdc	0 psis to 100 psis	ML100PS2PG
9.5 Vdc to 35.0 Vdc	0 psis to 300 psis	ML300PS2PG
9.5 Vdc to 35.0 Vdc	0 bar to 60 bar	ML060BS2PG

## OPTIONS

### 4.0 mA to 20 mA Output 1/8 in - 27 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
9.5 Vdc to 35 Vdc	0 bar to 10 bar	ST010BG1SPGF
9.5 Vdc to 35 Vdc	0 psig to 200 psig	ST200PG1SPGF

### 1/4 in - 18 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
9.5 Vdc to 35 Vdc	0 bar to 10 bar	ST010BG2SPGF
9.5 Vdc to 35 Vdc	0 bar to 2.5 bar	ST2R5BG2SPGF
9.5 Vdc to 35 Vdc	0 bar to 6.0 bar	ST006BG2SPGF

### 0.5 Vdc to 4.5 Vdc Ratiometric Output 1/4 in - 18 NPT Connector

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
5.0 Vdc	0 psig to 50 psig	ST050PG2SPCF

# 19mm Series

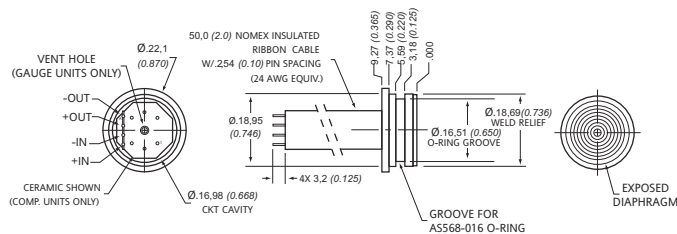


The ICT stainless steel 19C and 19 Vacuum Gauge Series devices are designed for pressure applications that involve measurement of hostile media in harsh environments compatible with 316 stainless steel. The special Vacuum Gauge Series devices are specifically designed for applications that can be exposed to a vacuum.

- Supply voltage:** 1.5 mA or 10.0 Vdc
- Signal conditioning:** Unamplified compensated
- Operating temperature range:** -40 °C to 125 °C (-40 °F to 257 °F)
- Compensated temperature range:** 0 °C to 82 °C (32 °F to 179 °F)
- Output type:** 98 mV to 102 mV
- Termination type:** 50,0 mm (2.0 in) Nomex ribbon cable

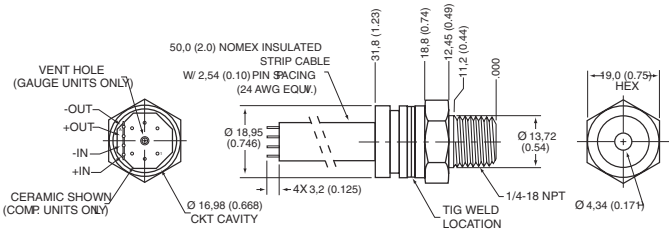
## OPTIONS

### 19 Vacuum Gauge Series - Flush Mount with Flange



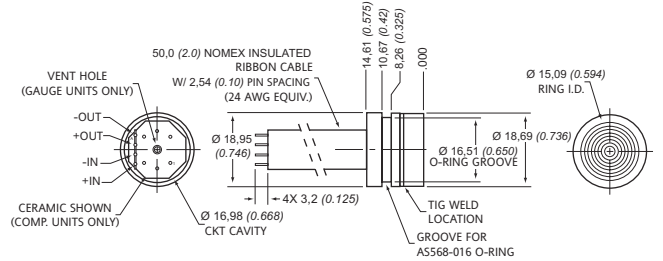
MEASUREMENT	PRESSURE RANGE	REFERENCE
Vacuum Gauge	0 psig to 15 psig	19C015PV3K

### 1/4 in - 18 NPT



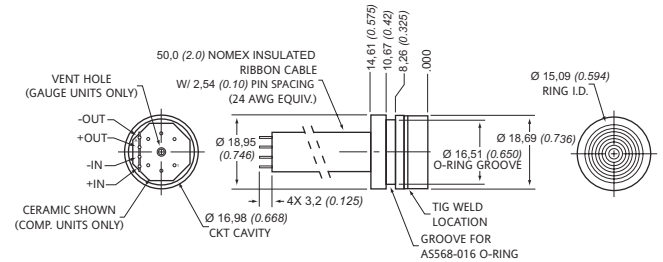
MEASUREMENT	PRESSURE RANGE	REFERENCE
Vacuum Gauge	0 psig to 100 psig	19C100PV5L
Vacuum Gauge	0 psig to 15 psig	19C015PV5L

### Cell with Body Ring, 10 Vdc Excitation



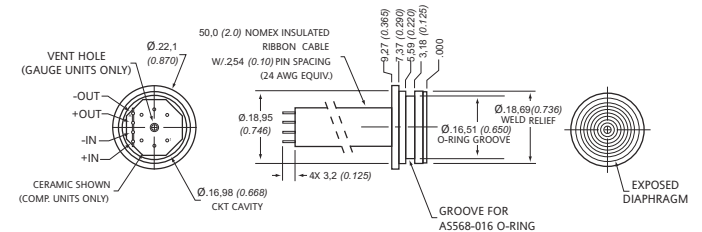
MEASUREMENT	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	19C015PG1K
Gauge	0 psig to 5.0 psig	19C005PG1K

### Cell with Body Ring, 1.5 mA Excitation



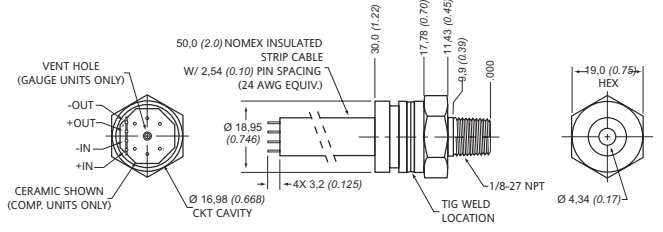
MEASUREMENT	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 100 psig	19C100PG1L
Gauge	0 psig to 300 psig	19C300PG1L
Gauge	0 psig to 3.0 psig	19C003PG1L
Gauge	0 psig to 5.0 psig	19C005PG1L

### Flush Mount with Flange



MEASUREMENT	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 5.0 psig	19C005PG3K

### 1/8 in - 27 NPT



MEASUREMENT	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 15 psig	19C015PG4K
Gauge	0 psig to 300 psig	19C300PG4K

# 13mm Series



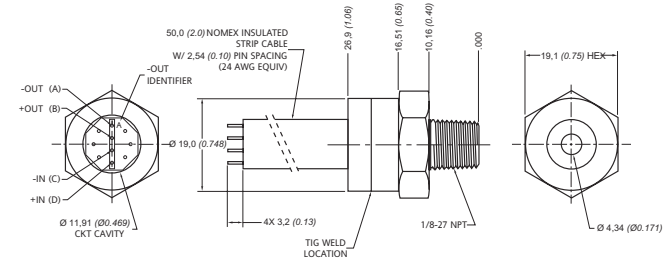
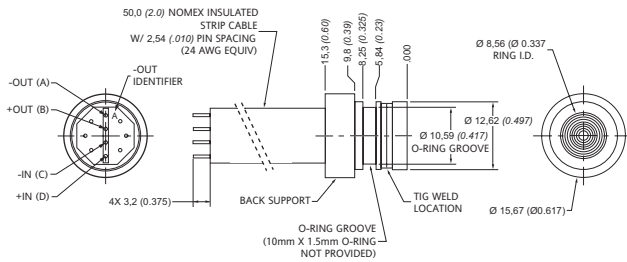
These ICT 13 mm stainless steel devices are designed for high pressure applications that involve measurement of hostile media in harsh environments. This series uses ICT's proven piezoresistive semiconductor sensor chip in an oil-isolated housing with or without an integral ceramic for temperature compensation and calibration. This design has proven to be highly reliable, stable, and accurate.

**Supply voltage:** 1.5 mA or 10 Vdc  
**Signal conditioning:** Unamplified  
**Operating temperature range:** -40 °C to 125 °C (-40 °F to 257 °F)  
**Compensated temperature range:** 0 °C to 82 °C (32 °F to 179 °F)

## OPTIONS

**Compensated Series - Ring with Back Support**  
**50,0 mm (2.0 in) Nomex ribbon**

**1/8 in - 27 NPT**  
**50,0 mm (2.0 in) Nomex ribbon cable**

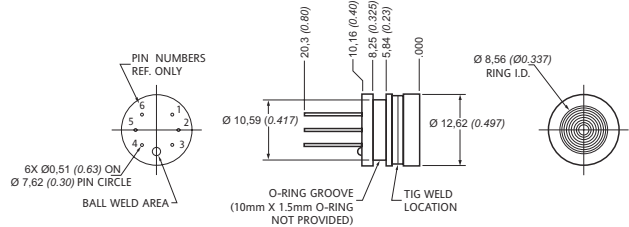
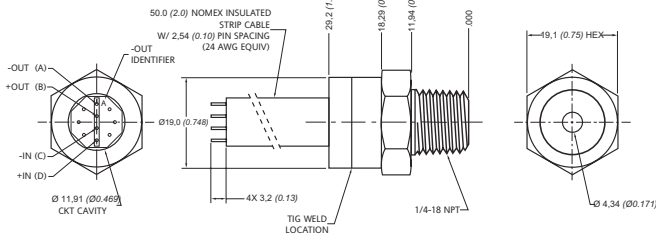


MEASUREMENT TYPE	PRESSURE RANGE	OUTPUT TYPE	REFERENCE
Sealed Gauge	0 psi to 5,000 psi	148 mV to 152 mV	13C5000PS1L
Sealed Gauge	0 psi to 3,000 psi	98 mV to 102 mV	13C3000PS1L
Sealed Gauge	0 psi to 1,000 psi	98 mV to 102 mV	13C1000PS1L

MEASUREMENT TYPE	PRESSURE RANGE	OUTPUT TYPE	REFERENCE
Absolute	0 psi to 5,000 psi	148 mV to 152 mV	13C5000PA4K

**1/4 in - 18 NPT**  
**50,0 mm (2.0 in) Nomex ribbon cable**

**Uncompensated Series**  
**Pin Connector**



MEASUREMENT TYPE	PRESSURE RANGE	OUTPUT TYPE	REFERENCE
Sealed Gauge	0 psi to 1,000 psi	98 mV to 102 mV	13C1000PS5L
Sealed Gauge	0 psi to 5,000 psi	148 mV to 152 mV	13C5000PS5L
Sealed Gauge	0 psi to 3,000 psi	98 mV to 102 mV	13C3000PS5L

MEASUREMENT TYPE	PRESSURE RANGE	OUTPUT TYPE	REFERENCE
Absolute	0 psi to 1,000 psi	175 mV to 300 mV	13U1000PA0K
Absolute	0 psi to 5,000 psi	290 mV to 500 mV	13U5000PA0K

# SPT Series

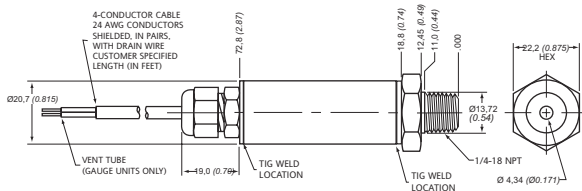


The SPT stainless steel devices are designed for pressure applications that involve measurement of hostile media in harsh environments and will accommodate any media that will not adversely attack 304 or 316 stainless steel wetted parts. The SPT stainless steel devices are rugged and reliable transducers for use in a wide variety of pressure sensing applications where corrosive liquids or gases are monitored.

**Signal conditioning:** Amplified and unamplified compensated  
**Compensated temperature range:** -10 °C to 85 °C (14 °F to 185 °F)  
**Operating temperature range:** -40 °C to 125 °C (-40 °F to 257 °F)  
**Measurement type:** Absolute, Sealed, and Gauge

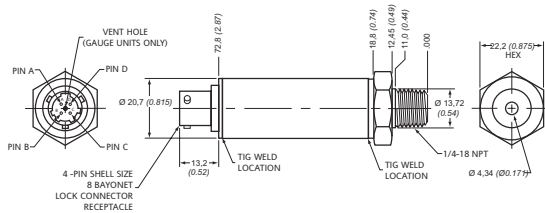
## OPTIONS

**4mA to 20 mA Output**  
**0,609 m (2 ft) 4-Conductor shielded pairs**



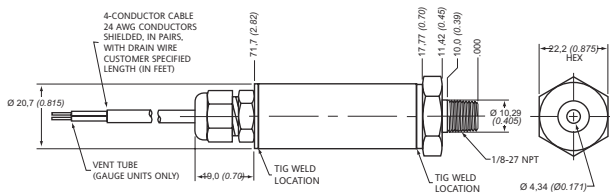
SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
12.5 Vdc to 30.0 Vdc	0 psi to 100 psi	STPMA0100PG5W02
12.5 Vdc to 30.0 Vdc	0 psig to 5.0 psig	SPTMA0005PG5W02

**1/4 in - 18 NPT - 0 mV to 100 mV Output**  
**Bayonet Connector**



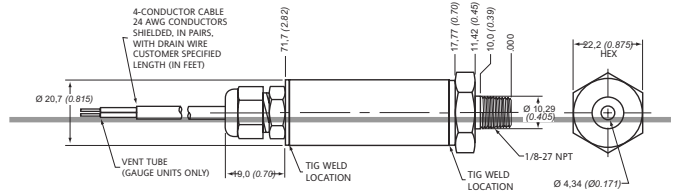
SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
10.0 Vdc	0 psig to 100 psig	STPMA0100PG5B

**1/8 in - 27 NPT - 0 mV to 100 mV Output**  
**0,609 m (2 ft) 4-Conductor shielded pairs**



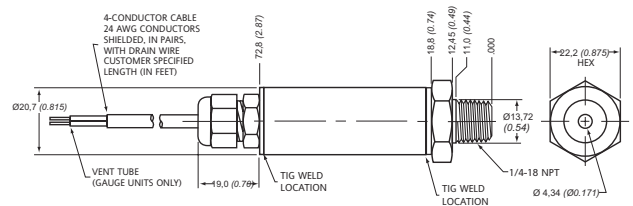
SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
10.0 Vdc	0 psi to 100 psi	SPTMV0100PG4W02

**1/8 in - 27 NPT**  
**0,609 m (2 ft) 4-Conductor shielded pairs**  
**1.0 Vdc to 5.0 Vdc Output**



SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
12.0 Vdc to 30.0 Vdc	0 psi to 15 psi	SPT4V0015PG4W02

**1/4 in - 18 NPT**  
**0,304 m (1 ft) 4-Conductor shielded pairs**  
**1.0 Vdc to 5.0 Vdc Output**

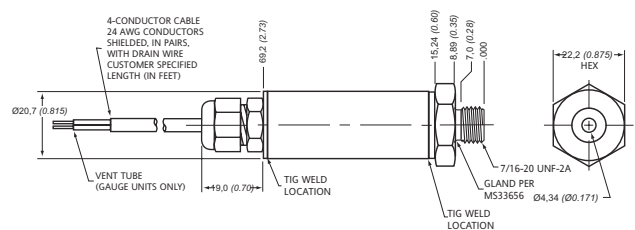


SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
12.0 Vdc to 30.0 Vdc	0 psig to 10 psig	SPT4V0010PG5W01

**1/4 in - 18 NPT**  
**0,609 m (2 ft) 4-Conductor shielded pairs**  
**1.0 Vdc to 5.0 Vdc Output**

SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
12.0 Vdc to 30.0 Vdc	0 psi to 100 psi	STP4V0100PG5W02

**7/16 in UNF**  
**1.0 Vdc to 5.0 Vdc Output**



SUPPLY VOLTAGE	PRESSURE RANGE	REFERENCE
12.0 Vdc to 30.0 Vdc	0 psi to 200 psi	SPT4V0200PG6W02

# F1 Series



All F1 pressure transducers are manufactured in our Class 10 clean room environment. Our flow-through pressure transducers are specifically designed for the semiconductor industry. Their long life, coupled with long-term stability, can greatly reduce or eliminate the need for zero and span adjustments. All Honeywell transducers are CE certified with EMI/RFI protection and are manufactured to an electropolished wetted surface finish of 5 micro inch Ra maximum.

**Approvals:** CE, FM  
**Supply voltage:** 12 Vdc to 36.0 Vdc  
**Signal conditioning:** Amplified compensated  
**Operating temperature range:** -40 °C to 85 °C (-40 °F to 185 °F)  
**Compensated temperature range:** 0 °C to 70 °F (32 °F to 158 °F)

## OPTIONS

**0 Vdc to 5.0 Vdc Output**  
**1/4 in Male Face Seal Connector**  
**Bendix Male Connector**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psi to 1,000 psi	F15VM0100AB
Compound	-14.7 psig to 100 psig	F15VMV100CB

**4.0 mA to 20.0 mA Output**  
**1/2 in Male Face Seal Connector**  
**1,83 m (6 ft) 2-Conductor Cable**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 250 psig	F14WMV250CP

**1/4 in Male Face Seal**  
**Bendix Male Connector**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 250 psig	F14VMV100CB
Compound	-14.7 psig to 250 psig	F14VMV250CP
Compound	-14.7 psig to 250 psig	F14VMV3000CP

**1/4 in Male Face Seal**  
**1,83 m (6 ft) 2-Conductor Cable**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	-14.7 psig to 250 psig	F14VM0250GP
Compound	-14.7 psig to 250 psig	F14VMV250CP
Compound	0 psi to 3,000 psi	F14VMV3000CP

**1/4 in Male Fixed by Female Face Seal**  
**Bendix Male Connector**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 7.0 psig	F14VPV7BCB

**1/4 in Male Fixed by Female Face Seal**  
**1,83 m (6 ft) 2-Conductor Cable**

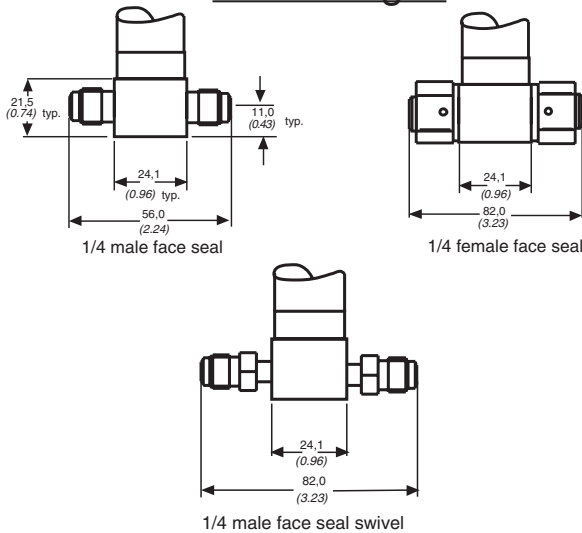
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 100 psig	F14VPV100CP

**1/4 in OD 0.035 wall, 1/4 in long tube stub**  
**Bendix Male Connector**

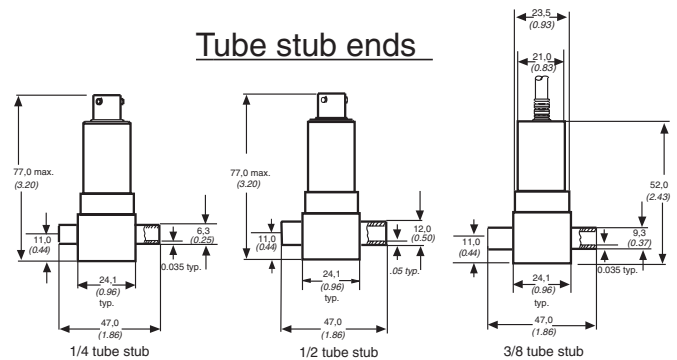
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 100 psig	F14TV4V100CB

### OPTIONAL

### 1/4" fittings



### Tube stub ends



# S1 Series



All S1 pressure transducers are manufactured in our Class 10 clean room environment. Our single port pressure transducers are specifically designed for the semiconductor industry. Their long life, coupled with long-term stability, can greatly reduce or eliminate the need for zero and span adjustments. All Honeywell transducers are CE certified with EMI/RFI protection and are manufactured to an electropolished wetted surface finish of 5 micro in Ra maximum.

**Approvals:**

**Supply voltage:**

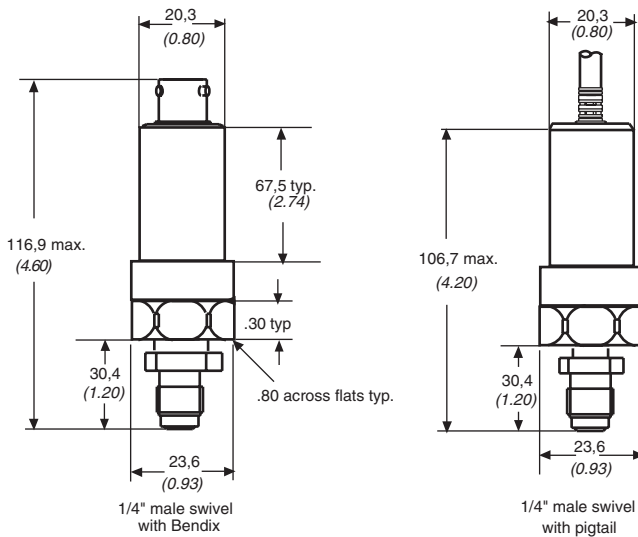
**Signal conditioning:**

**Operating temperature range:**

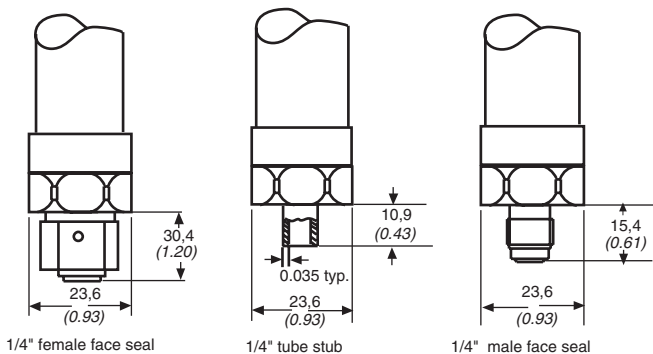
**Compensated temperature range:**

**Output type:**

CE, FM  
 12.0 Vdc to 36.0 Vdc  
 Amplified compensated  
 -40 °C to 85 °C (-40 °F to 185 °F)  
 0 °C to 70 °C (32 °F to 158 °F)  
 4 mA to 20 mA



## Fitting Options



## OPTIONS

### VF 1/4 in Female Face Seal Bendix Male Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 100 psig	S14VFV100CB

### VM 1/4 in Male Face Seal Bendix Male Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 100 psig	S14VMV100CB
Compound	-14.7 psig to 250 psig	S14VMV250CB

### VM 1/4 in Male Face Seal 1,83 m (6 ft) 2-Conductor Cable

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psi to 3,000 psi	S14VMV3000GP
Compound	0 psi to 3,000 psi	S14VMV3000CP

### VS 1/4 in Male Face Seal, Swivel Bendix Male Connector

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 100 psig	S14VSV100CB
Compound	-14.7 psig to 250 psig	S14VSV250CB
Compound	-14.7 psig to 100 psig	S14VSV1755BCB
Compound	-14.7 psig to 100 psig	S14VSV210BCB
Compound	-14.7 psig to 100 psig	S14VSV70BCB
Compound	-14.7 psig to 100 psig	S14VSV7BCB

### VS 1/4 in Male Face Seal, Swivel 1,83 m (6 ft) 2-Conductor Cable

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Compound	-14.7 psig to 100 psig	S14VSV210BCP
Compound	-14.7 psig to 100 psig	S14VSV70BCP

# TLD Series



With space at a premium in semiconductor gas distribution systems, the Series TLD pressure transducer with local display offers an integrated solution that reduces the overall height of the transducer/display assembly to as little as 3.5 in [88.9 mm]. To accomplish this, the transducer's signal amplifier is mounted within the display, with the added benefit of zero and span adjustments conveniently located on the LED display face.

**Supply voltage:**  
**Signal conditioning:**  
**Operating temperature range:**  
**Compensated temperature range:**  
**Termination type:**

12.0 Vdc to 30.0 Vdc  
 Amplified compensated  
 -40 °C to 85 °C (-40 °F to 185 °F)  
 0 °C to 70 °C (32 °F to 158 °F)  
 1,83 m (6 ft) 2-conductor cable

## OPTIONS

### Flow-through/Output Signal 4 mA to 20 mA

MEASUREMENT TYPE	PRESSURE RANGE	CONNECTIONS	REFERENCE
Compound	-14.7 psig to 100 psig	1/4 in. OD 0.035 in. wall, 1/4 in long tube stub	TLDF4CVT4V100CP
Compound	-14.7 psig to 100 psig	1/4 in. female face seal, swivel	TLDF4CVFV100CP
Compound	-14.7 psig to 100 psig	1/4 in. female face seal, swivel	TLDF4BSVFV100CP

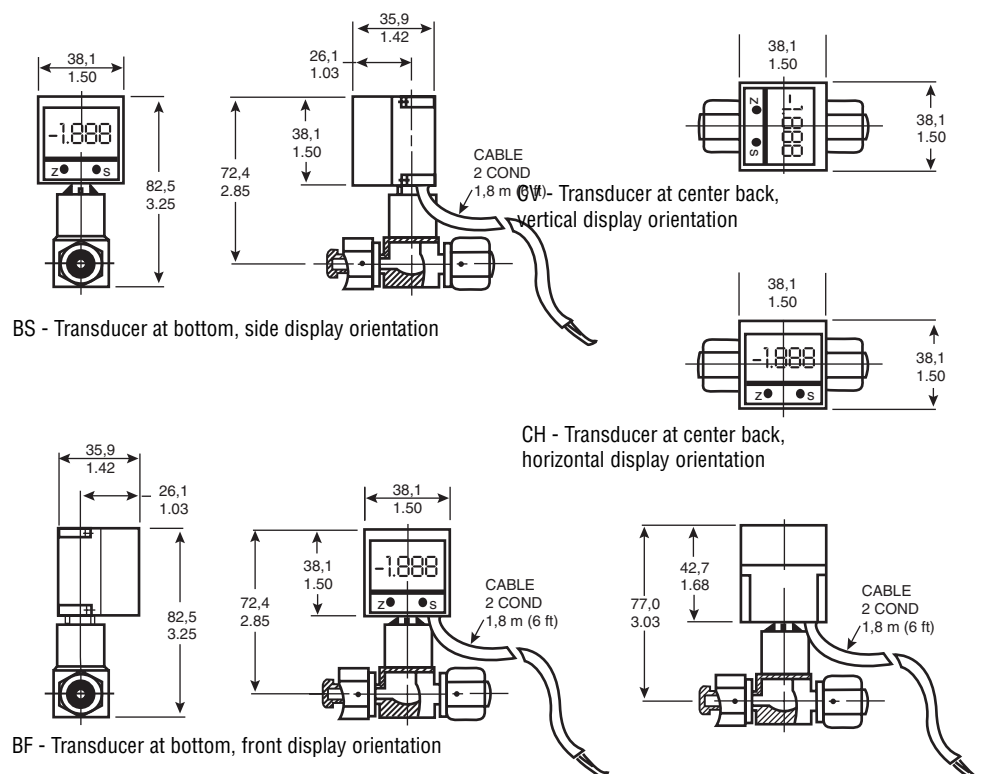
### Flow-through/Output Signal 0 Vdc to 5.0 Vdc

MEASUREMENT TYPE	PRESSURE RANGE	CONNECTIONS	REFERENCE
Compound	-14.7 psig to 100 psig	1/4 in. OD 0.035 in. wall, 1/4 in long tube stub	TLDF5CVT4V100CP

### Single Port/Output Signal 4 mA to 20 mA

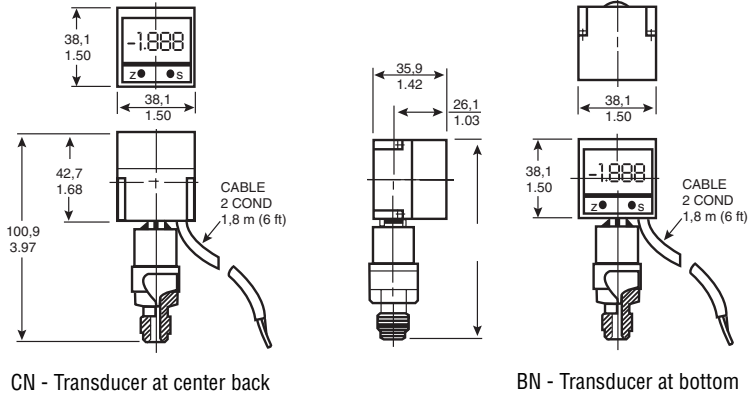
MEASUREMENT TYPE	PRESSURE RANGE	CONNECTIONS	REFERENCE
Compound	-14.7 psig to 100 psig	1/4 in. female face seal, swivel	TLDS4BNVFV100CP

### Flow-through display orientation and transducer location

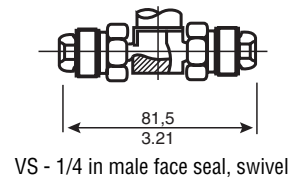
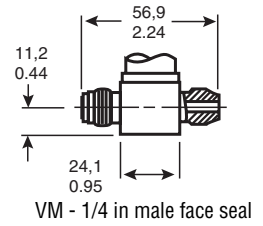
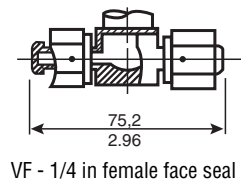
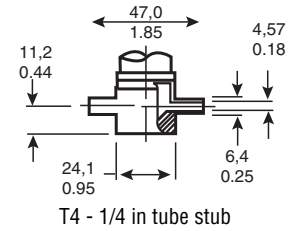


**TLD Series (continued)**

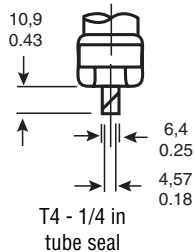
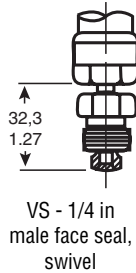
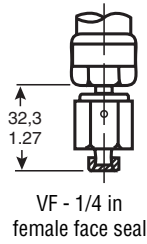
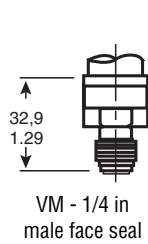
**Single port display orientation and transducer location**



**Flow-through connection options**



**Single port connection options**





# Bonded Element Series

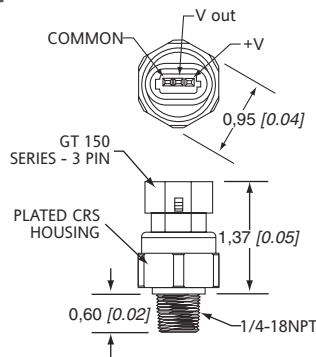


The Bonded Element general-purpose industrial pressure transducers were developed for a variety of pressure applications and industries, providing excellent media compatibility with all stainless steel wetted parts. It is the ideal choice for applications where both media compatibility and high cycle life are essential

**Supply voltage:** 4.75 Vdc to 5.25 Vdc  
**Signal conditioning:** Amplified  
**Operating temperature range:** -40 °C to 125 °C (-40 °F to 257 °F)  
**Compensated temperature range:** -20 °C to 85 °C (-4 °F to 185 °F)  
**Output type:** 0.5 V to 4.5 V Ratio-metric  
**Termination type:** GT 150 Series - 3 pin

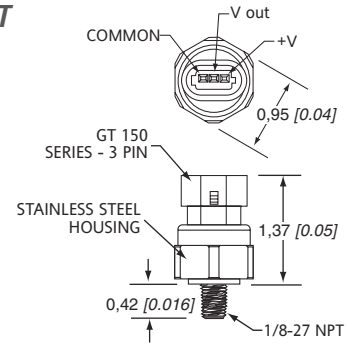
## OPTIONS

### SS Housing - 1/4 in NPT



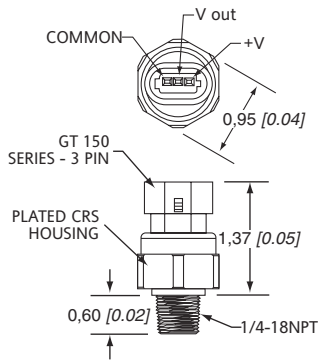
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 125 psig	BE-4R125PG5DS

### SS Housing - 1/8 in NPT



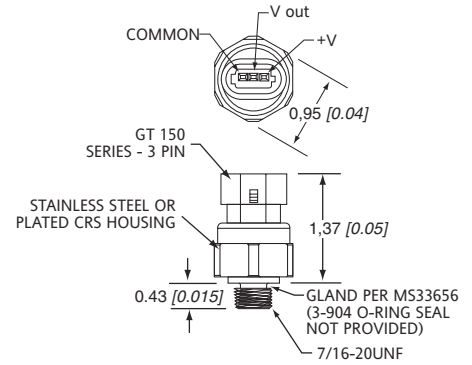
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 500 psig	BE-4R500PG4DS

### CRS Housing - 1/4 in NPT



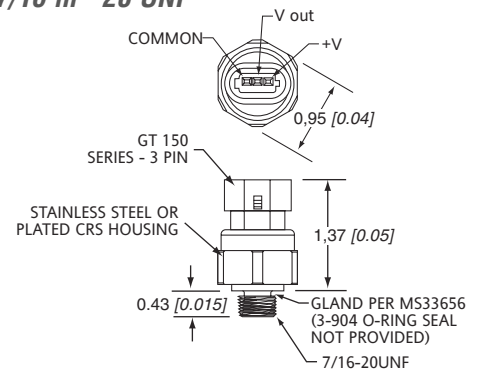
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 125 psig	BE-4R125PG5DC

### SS Housing - 7/16 in - 20 UNF



MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 5,000 psig	BE-4R5000PG6DS

### CRS Housing - 7/16 in - 20 UNF



MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gauge	0 psig to 5,000 psig	BE-4R5000PG6DC

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Selecting the right sensor or switch for your application has never been easier. Honeywell Sensing and Control has one of the broadest product ranges of any supplier in the world, and the depth of our technology and product lines ensure that we are able to supply you with the right product for most applications.

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There you can browse our interactive catalogue and discover our full range of products for use in Industrial, Automotive, Aviation, Transportation, Motion Control, Medical applications and more. Some of our more popular product families include:

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Utilizing Quartz Flexure and Resonating Beam technologies for inertial, control, and industrial applications.

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Speed and position sensors for engine management, wheel speed sensors, and position sensors for comfort, convenience, and motor control applications.

### ***Basic Switches***

Standard size, miniature, subminiature, hermetically sealed, and high temperature snap-action switches for applications requiring compactness, light weight, accurate repeatability and long life.

### ***Current Sensors***

Adjustable linear, null balance, digital, and linear output current sensors for monitoring ac or dc current.

### ***Electronic and Electromechanical Safety products for Machine Safeguarding***

Safety light curtains, laser scanners, mats, door interrupt devices and single and multi-beam optoelectronic devices for industrial machine safety. Safety interlock switches, limit switches and cable-pull limit switches for industrial machine safety. Safety control modules for industrial machine safety.

### ***Environment Sealed Switches and Sensors***

Designed for use in the harsh environments encountered in aerospace, transportation, ordnance and marine applications.

### ***Fibre Optic Sensors***

Active optoelectronic components and sub-assemblies (LEDs/transmitters, fiber-DIPs, receivers and modules) for the datacom market.

### ***Force Sensors***

Precise reliable performance in compact commercial grade packaging.

### ***Hour Meters***

Honeywell's Hobbs brand products are designed for elapsed time measurement for testing, leasing, maintenance and warranty programs. The meter family includes LCD, Counter, Battery Controller, AC Electro-Mechanical and DC Electro-Mechanical.

### ***Humidity Sensors***

Relative humidity/temperature and relative humidity sensors in chemically resistant packages to accommodate harsh environments.

### ***Infrared Sensors***

Optoelectronic standard infrared emitting diodes (IREDs), sensors and assemblies for object presence, limit, and motion sensing, position encoding, and movement counting.

### ***Limit and Enclosed Switches***

Heavy duty limit switches, enclosed switches (precision snap-acting switches sealed in rugged metal housing) and sealed and explosion-proof switches.

### ***Liquid Level Sensors***

Basic and industrial (designed for harsh industrial environments) liquid level sensors used to indicate the presence or absence of liquid.

### ***Mass Airflow Sensors***

Amplified and unamplified microbridge mass airflow sensors provide a sensitive and fast response to the flow of air or other gas over the chip.

### ***Off-Highway Vehicular Lighting***

Honeywell's Hobbs brand halogen sealed beams, composites, custom designer lights, specialty lighting and indicator modules for vehicular and non-vehicular applications.

### ***Position Sensors***

Hall-effect, magnetoresistive, and potentiometric devices for detecting the presence of a magnetic field or linear and rotary position.

### ***Pressure Sensors***

Stainless steel and silicon pressure sensors depending on the application, as well as a variety of high purity pressure sensors.

### ***Proximity Sensors***

Severe environment proximity sensors designed for use in applications with particularly demanding requirements on temperature, vibration, shock, and EMI/lightning resistance.

### ***Pushbuttons, Keyswitches and Indicators***

MICRO SWITCH brand pushbuttons, keyswitches, and indicators for use anywhere manual operation is desired.

### ***Railway Sensors and Control Systems***

Railwheel proximity sensors, interface modules, train departure control systems, solid state sensors, pressure sensors and electromechanical switches for on-board and off-board rail industry applications.

**Relays**

General-purpose power relays and relay sockets designed for a wide range of applications that require stability and reliability.

**Resolvers**

Absolute position sensors which provides high angular accuracy, high resolution and repeatability under severe environmental conditions.

**Temperature Sensors**

Platinum- and silicon-based thin film resistance temperature devices (RTDs) for applications that require small package size, accuracy, and linear outputs.

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Bimetal thermostats, Discrete and Packaged Thermistors, Precision Hi-Rel Negative Temperature Coefficient (NTC) Thermistors., Thermal cut offs and Flexible Heaters

**Thermocouples, Non-contact probes and RTDs**

Megopak thermocouples, thermocouples with protecting tubes, Radiamatic/ Rayotube Sensors, and the platinum RTD 100 Ohm.

**Toggle and Rocker Switches**

MICRO SWITCH brand toggles, rockers and paddle switches for use anywhere manual operation is desired. Military grade and environment sealed options are available.

**Turbidity Sensors**

Wash process turbidity sensors to improve product quality, minimize ingredient consumption, and reduce wastewater discharge in commercial and industrial bath applications.

**Ultrasonic Sensors**

Ultrasonic position sensors for presence/absence sensing, precision distance sensing or tracking for areas where other sensing technologies have difficulty, such as clear or shiny objects, foggy or particle laden air, or splashing liquids.

**VCSEL Products**

Vertical Cavity Surface Emitting Laser sensors for high speed data communication applications and a wide variety of sensor applications.

**VRS Speed and Timing Sensors**

Completely self-powered, VRS (magnetic) sensors are simple, rugged devices that do not require an external voltage source for operation. They are generally used to provide speed, timing or synchronization data to a display (or control circuitry) in the form of a pulse train.

***This list of our products is not exhasustive,  
so check out our full range at***

***[www.honeywell.com/sensing](http://www.honeywell.com/sensing)***

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**HONEYWELL'S SENSOTEC RANGE OF SPECIALIST TEST AND MEASUREMENT PRODUCTS**



The Honeywell Sensotec product range of industrial pressure transducers, load cells and electronic sensor instrumentation is one of the broadest in the world. We have a comprehensive range of strain gauge based, piezoelectric and coil wound transducers. We offer pressure ranges to 170,000 psi and load ranges to 3 million pounds with complete instrumentation and signal conditioning. We achieve accuracies of 0.05 in pressure sensing, and our calibration load cells have accuracies of 0.002 %.

Our unique expertise is in the packaging of our sensor technology, but we can provide you with reliable engineered solutions whether they are standard off-the-shelf transducers developed for general applications or sensors developed to meet unique requirements. The Sensotec range of transducers can be designed to withstand the harshest environments such as temperatures as low as -325 °F or as high as +425 °F, or ambient conditions up to 10,000 ft of seawater.

**For more information about these products visit**

***[www.honeywell.com/sensotec](http://www.honeywell.com/sensotec)***

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Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor or Sales Representative, contact your local sales office or:

INTERNET: [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

E-mail: [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

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