

SENSORS / SWITCHES



**Sensors
Industrial Switches
and Safety
Technology Products**



INDUSTRIAL MAGZA
DIST. AUTORIZADO

MEX (55) 53 63 23 31 MTY (81) 83 54 10 18
QRO (442) 1 95 72 60 ventas@industrialmagza.com

WARNER ELECTRIC

Sensors, Industrial Switches and Safety Technology Products

Warner Electric has many years of experience in applying sensors in motion control applications. Warner Electric's broad range of innovative and technologically advanced product range offers our customers the exact solution to satisfy their sensing applications.

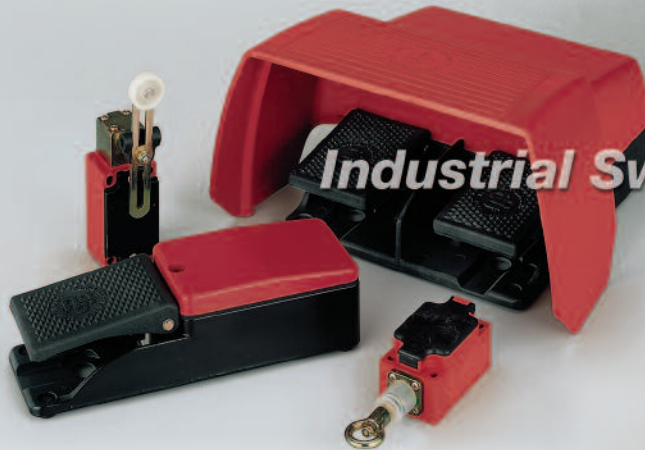
Our full product range is available through more than 800 distributor locations, throughout the United States, Canada and Mexico.

Local Sales Support is provided by a well trained sales force that is backed up by Application Engineering providing immediate technical support.

Non-Contact Sensors



Industrial Switches



Non-Contact Sensors

- Photoelectric Sensors
- Ultrasonic Sensors
- Inductive Proximity Sensors
- Capacitive Sensors
- Magnetic Sensors

Industrial Switches

- Limit Switches
- Foot Switches
- Cable Pull Switches

Safety Technology Products

- Safety Interlocks
- Cable Pull Switches
- Coded Magnetic Monitoring Systems

Safety Technology Products



Approvals and Certification

Each model is individually identified with its own certification. Documentation is available upon request.



Contents

Standard Sensor Products

Choosing the Correct Sensor 2

Photoelectric Sensors

Identification Code 3

OR20 Series 4

OR90 Series 5

MCS-144 / 159 / 165 6

MCS-500 Series 7

Compact Series 8

OT18 Series 9

MCS-638 Series 11



Ultrasonic Sensors

Identification Code 12

With Analog Output 13

With Isolated Solid State Relay Outputs 15

Inductive Proximity Sensors

Identification Code 17

4mm / M4 / M5 / M8 / M12 / M18 / M30

Voltage 10-30 DC, Integral Cable 18

M8 / M12 / M18 / M30. Voltage 10-30 DC, Quick Disconnect 20

M12 / M18 / M30. Voltage AC, Integral Cable and Quick Disconnect 22



Capacitive Sensors

Identification Code 17

M12 / M18 / M30 / M32 / 34mm dia

Integral Cable and Quick Disconnect. Voltage DC and AC. 24

Magnetic Sensors

Sensor Controls

MCS 149 / 680 Series 28

Thermoplastic Limit Switches

Body Styles Ti2 / Bi / I88 / ENK 29

Metal Limit Switches

Body Style ENM2 37

Foot Switches

Single, Two and Three Pedal 39



Safety Technology Products

Safety Position Interlocks

SKT / SKI Body Style 42

SK / SKC Body Style 44

GC Body Style 45

Safety Hinge Switch 46

I88 Style Interlocks 53

Solenoid Locking

SLK Spring and Magnetic Lock (Plastic Housing) 54

SLM Spring and Magnetic Lock (Metal Housing) 55

Coded Magnetic Monitoring Systems

MUZ 602 / 202 56

Coded Magnet Sensors 57

Cable Pull Switches

Single 58

Two Directional to 250 ft. 60

Glossary of Terms 61

Index to Part Numbers 62

Important Safety Warning...

The Non Contact sensors described in this catalog do NOT include the self-checking redundant circuitry necessary to allow them to be used in personnel safety applications. A sensor failure or malfunction can result in either an energized or a de-energized output condition.

Never use these non contact products as sensing devices for personnel protection. Their use as safety devices may create an unsafe condition which could lead to serious bodily injury or death.





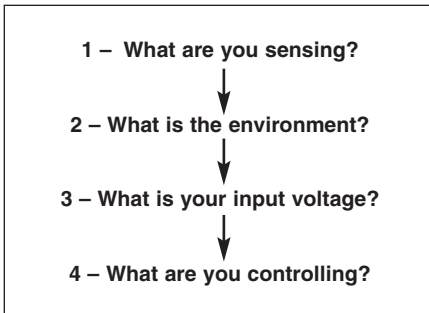
Choosing the correct sensor for your application

Many situations have developed that have resulted in the loss of valuable production hours, due to not enough time being taken to choose the correct sensor for the application.

These situations can be avoided if each application is systematically approached in the following manner.

Which sensor?

Four basic questions should be asked:



1 – What are you sensing?

It is extremely important to know what the material is you are sensing as the material relates directly to the type of sensor chosen.

At this stage, it is also relevant to consider what distance away from the target would suit your application best.

The final information required is to know the size and shape.

To give a general guideline, the following chart gives an indication of each type of sensor relating to sensing distances.

- Range/longest to shortest
- Photoelectric – Through-Beam
- Photoelectric – Retroreflective
- Ultrasonic – Proximity
- Photoelectric – Diffuse Reflective
- Photoelectric – Background Suppression
- Photoelectric – Convergent Beam
- Photoelectric – Fiber Optics
- Magnetic
- Capacitive Proximity
- Inductive Proximity

2 – What is the environment?

Consider the surrounding and working conditions, steam coolant, metal surfaces, temperature both high and low, all can influence the performance of the sensor.

Ensure not only that the sensor can detect the target cleanly and clearly, but how it will be able to withstand maintenance and wash-down situations.

Sensing variables/least to most affected relating to ambient conditions.

- Magnetic
- Inductive Proximity
- Photoelectric – Through-Beam
- Ultrasonic – Proximity
- Photoelectric – Convergent Beam
- Photoelectric – Retroreflective
- Photoelectric – Background Suppression
- Photoelectric – Diffuse Reflective
- Capacitive Proximity

3 – What is your input voltage?

A large factor relating to the exact sensor or sensor system you might eventually choose. A lot of the smaller type sensors need to have power supplies in order that the correct stable D.C. voltage is available.

Eventually this question may not be needed to be taken into account as more and more sensors are becoming available in a multi-voltage AC/DC format, 12-265 AC/DC.

4 – What are you controlling?

Always examine the type of output required and its capability to drive the external circuitry.

The most common problem when dealing with D.C. output circuits relates to “sourcing” or “sinking” PNP or NPN.

Always determine the answer to this question prior to any purchase by examining the specification of the control or counter system you are interfacing with, to ensure compatibility.

AC circuits generally come in two types, solid state and electromechanical relays.

Finally remember, any problems or questions, call Sensor Application Support for help.

APPLICATION ASSISTANCE

CALL
1-800-451-8279

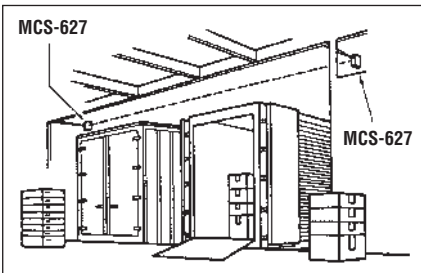
FAX
1-815-389-6678

Photoelectric Applications

- Jam detection and prevention
- Empty line detection
- Counting
- Sorting by size, color or surface
- Automatic routing
- Feed control
- Hopper level control
- Color mark registration
- Edge guiding
- Web break detection
- Positioning
- Cut-off control
- Filling
- Folding and wrapping
- Batch counting
- Missing part detection
- Correct count
- Open flap detection
- Ejected part detection
- Incorrect closure
- Door control
- Sizing

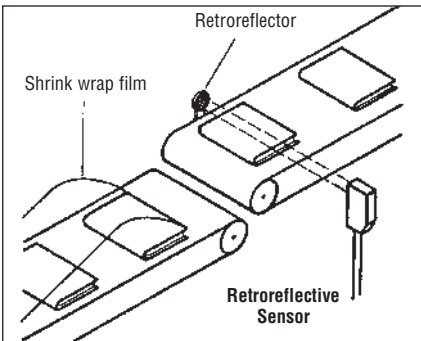
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. +
 Example: **O M 1 2 R T — D H T P — 0 2 0 0 — C L**

| | | | | | |
|------------|--|------------|---|--------------|--|
| 1 | O = Photoelectric Sensor | 9 | Output function
A = Complementary LA/DA (light activated/dark activated)
D = Dark activated (DA)
H = Light activated (LA)
O = No output (through-beam transmitter) | 13-16 | Sensing distance
Sensing distance specifications are always indicated by 4 digits
– mm: without decimal point
– m: with decimal point
e.g. 06.0 = 6 m
e.g. 15.0 = 15 m
e.g. 0500 = 500 mm |
| 2 | M = Metric metal housing
T = Metric thermoplastic housing
R = Rectangular design
Z = Cylindrical design | 3/4 | Specification of housing dimensions
e.g. 12 = M12
18 = M18
20 = 20 series
90 = 90 series | P | Selectable LA/DA (light activated/dark activated) |
| 5/6 | ES = Through-beam sensor (Complete set)
EE = Through-beam, receiver only
SE = Through-beam, transmitter only
LC = Fiber optic control (sensor with fiber optics connection)
RH = Diffuse reflective sensor with background suppression
RS = Retroreflective sensor
RT = Diffuse reflective sensor
FF = Convergent beam sensor, fixed focus
PR = Print registration sensor
PS = Polarized retro sensor | 10 | Output type
A = Analog output
N = NAMUR
O = No output
Q = Triac
R = Relay
S = Others
T = Transistor
Y = Thyristor | X | Customer-specified output |
| 7 | Dash | 11 | N = NPN transistor output (switched to negative)
P = PNP transistor output (switched to positive)
G = Push/Pull
S = Through-beam light source
U = Switch selectable NPN/PNP | 17 | Dash |
| 8 | Voltage type
A = AC
D = DC
M = Multivoltage, AC/DC, UC
P = Programmable voltage (AC or DC) | 12 | Dash | 18 | Connection type
A = Screw termination
B = Plug with screw terminals
C = Cable (standard C = 2 m or length in m)
S = Plug-in connector |
| | | | | 19 | Options
C = Control/diagnostic input
D = LED for output indication
E = Adjustable sensitivity
F = Diagnostic circuit with output and LED for indicator
G = LED for output mode, supply voltage and beam control indication
H = LED for supply voltage and output mode indication
L = LED for output indicator
T = Adjustable timer circuit
V = LED for operating voltage indication
X = Customer-specific options
Z = Fixed timer |



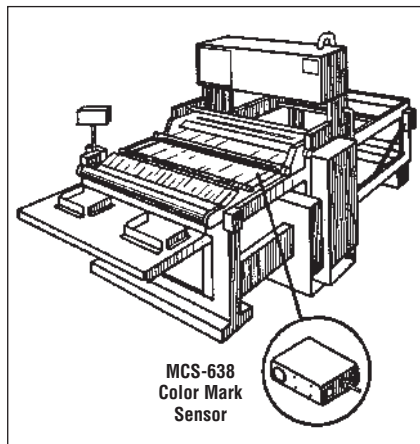
Truck Height Control

A long range through-beam sensor was positioned at a height just below the overhanging roof and a couple of feet in front, so the breaking of the beam would activate an output wired to an alarm alerting the driver to stop.



Conveyor/Material Handling

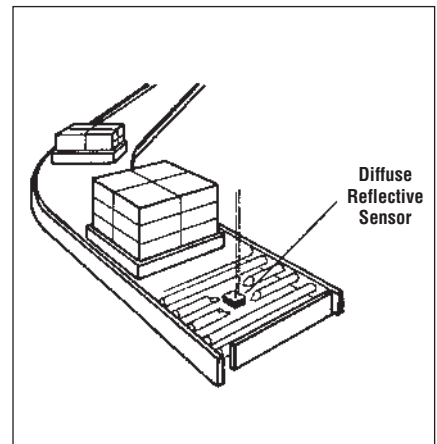
A retroreflective sensor was chosen to look across the conveyor at the retroreflector. When the book blocks the beam, a signal is given to stop the conveyor.



Bag Cutting Machine

Basically, with this being a specialized application, there is only one solution and that is the MCS 638 Series Color/Print Registration Sensor.

These units were designed to solve this application with the sensor being capable of sensing small changes in contrast levels or shade differences.



Object Detection

By placing a diffuse reflective type underneath the conveyor and looking up through the rollers, a safe sensing position has been found for the sensor away from fork lift trucks and other possible damaging actions.

Photoelectric Sensors

OR20 Series

Description

The OR20 Series is a family of self-contained photoelectric sensors, with multi-voltage input and relay output. Standard features include adjustable sensitivity and timing circuits which are easily accessible after removing the "snap cover". Sensing modes available include: Through-Beam, Retro, Polarized, Diffused Reflective and Background Suppression.

- Rectangular high impact plastic housing
- LED indication of output
- NEMA 4
- Sensitivity control
- Programmable timing Delay or Hold
- Timing range 0.1-10 seconds
- Temperature range -4°F to +158°F
- Multi-voltage 12-265 VAC/DC
- Screw terminals for wiring
- Snap shut hinged back cover
- Relay output - 3A

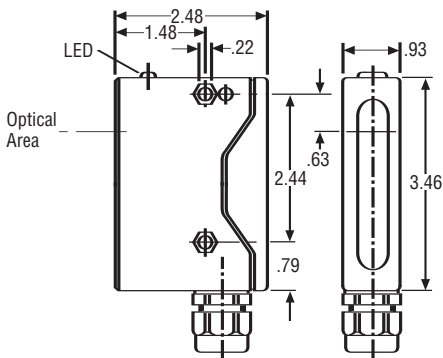


Sensor Selection

| Sensing Principle | Sensing Range | Input Voltage | Switching Function | Output Mode | Maximum Cycle Rate | Output Current | Model | Part Number |
|--------------------|---------------|---------------|--------------------|-------------|--------------------|----------------|------------------------|---------------|
| Through-Beam | 65 ft. | 12-265 VAC/DC | SPDT | Relay | >50 Hz | 3A | OR20 ES-MAR5-20.0-ALET | 655-1686-103* |
| Retro-Reflective | 26 ft. | 12-265 VAC/DC | SPDT | Relay | >50 Hz | 3A | OR20 RS-MAR5-08.0-ALET | 655-4686-001 |
| Polarized Retro | 19 ft. | 12-265 VAC/DC | SPDT | Relay | >50 Hz | 3A | OR20 PS-MAR5-06.0-ALET | 655-5686-001 |
| Diffuse Reflective | 4.9 ft. | 12-265 VAC/DC | SPDT | Relay | >50 Hz | 3A | OR20 RT-MAR5-01.5-ALET | 655-7686-003 |
| Diffuse Reflective | 1.9 ft. | 12-265 VAC/DC | SPDT | Relay | >50 Hz | 3A | OR20 RT-MAR5-0600-ALET | 655-7686-001 |
| BkGnd Suppression | 1.2 ft. | 12-265 VAC/DC | SPDT | Relay | >50 Hz | 3A | OR20 RH-MAR5-0400-ALET | 655-8686-002 |

* A Through-Beam Sensor can be supplied as separate pieces
 Projector = Part # 655-1086-001
 Receiver = Part # 655-1686-003

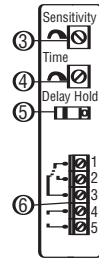
Mechanical Data (Dimensions are in inches)



Notes on operation of OR20 Series Housing types:

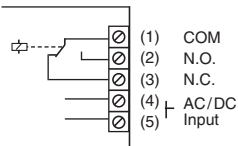
- ① Snap-cover housings (to be opened with screwdriver)

Operation elements:



- ③ Sensitivity potentiometer
 ④ Timer potentiometer
 ⑤ Delay-type switch
 ⑥ Connection terminals

Wiring Data



Relay Output

Accessories

| | |
|-------------------------------|---------------------|
| Reflective Disc – 3 1/4" Dia. | Part # 610-8002-001 |
| Mounting Bracket – Fixed | Part # 7430-448-005 |
| Mounting Bracket Adjustable | Part # 7430-448-010 |

Photoelectric Sensors

OR90 Series

Description

The OR90 Series offers a low cost self-contained family of sensors, housed in a high impact rectangular thermoplastic housing. Termination is made via a 6 ft. long 5 conductor integral cable. Features include, multi-voltage input with relay output, and LED indication of output signal. The series includes 3 sensing modes: Retro, Diffuse and Background Suppression. The OR90 is a simple, low maintenance sensor ideal for material handling applications.

- Totally sealed plastic housing
- LED indication of output
- NEMA 1,3,4,12
- Temperature rating -4°F to +158°F
- 6 ft. cable -5 conductor
- Multi-voltage 12-265 VAC/DC

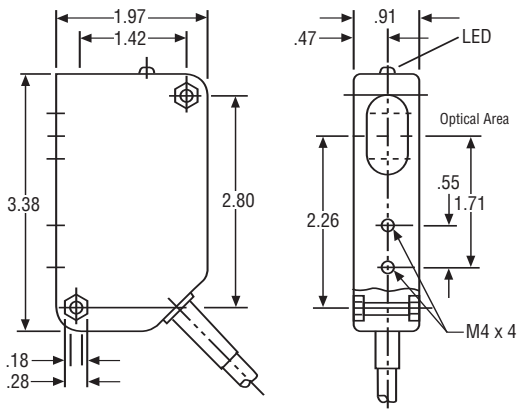


OR90 Series

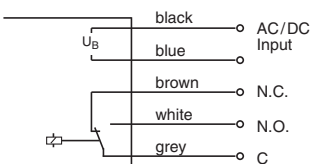
Sensor Selection

| Sensing Principle | Sensing Range | Input Voltage | Switching Function | Output Mode | Maximum Cycle Rate | Output Current | Model | Part Number |
|--------------------|---------------|---------------|--------------------|-------------|--------------------|----------------|----------------------|--------------|
| Retro-Reflective | 26 ft. | 12-265 VAC/DC | SPDT | Relay | >80 Hz | 3A | OR90 RS-MAR5-08.0-CL | 655-4696-001 |
| BkGnd Suppression | 3 in. | 12-265 VAC/DC | SPDT | Relay | >80 Hz | 3A | OR90 RH-MAR5-0080-CL | 655-8696-001 |
| Diffuse Reflective | 23.6 in. | 12-265 VAC/DC | SPDT | Relay | >80 Hz | 3A | OR90 RT-MAR5-0600-CL | 655-7696-001 |

(Dimensions are in inches)



Wiring Data



Relay Output

Accessories

| | |
|-------------------------------|---------------------|
| Reflective Disc – 3 1/4" Dia. | Part # 610-8002-001 |
| Mounting Bracket | Part # 7430-448-007 |



Photoelectric Sensors

MCS-144/159/165

Description

This proven range of photoelectric sensors provides the user with a standard self-contained sensor with the possibility of modular expansion with plug-in timer, counter and output modules. A "plug-in" double pole double throw 7 amp relay is supplied with all units. Features include a light activated/dark activated switch, adjustable sensitivity and LED output indication.



MCS-159/165



MCS-144

- Heavy duty plastic housing
- LED indication of sensing
- Sensitivity control
- Optional timing and counting modules
- Replaceable industrial relay
- Selectable LA/DA operation
- Temperature rating 0°F to 125°F
- Screw terminals for wiring
- NEMA 12
- Screw down back cover

Sensor Selection

| Sensing Principle | Sensing Range | Input Voltage | Switching Function | Output Mode | Maximum Cycle Rate | Output Current | Model | Part Number |
|--------------------|---------------|---------------|--------------------|-------------|--------------------|----------------|-------------|--------------|
| Retro-Reflective | 30 ft. | 110 VAC | DPDT | Relay | >25 Hz | 7A | MCS-144/814 | 7120-448-004 |
| Retro-Reflective | 15 ft. | 110 VAC | DPDT | Relay | >25 Hz | 7A | MCS-165/814 | 7120-448-015 |
| Diffuse Reflective | 6 ft. | 110 VAC | DPDT | Relay | >25 Hz | 7A | MCS-159/814 | 7100-448-002 |

MCS-144, 159 – Plug-in Modules (Order Separately)

Timer Modules

| Model | Part Number | Timing Range |
|-----------|--------------|-------------------|
| MCS-836 | 7400-448-024 | 0.4 to 15 seconds |
| MCS-836-1 | 7400-448-029 | 1 to 30 seconds |

Timer Functions (Programmable)

On Delay / Off Delay / Dual Delay / One-Shot
One-Shot Drop / Delayed One-Shot / Delayed One-Shot Drop

Counter Modules

| Model | Part Number | Counting Range |
|---------|--------------|----------------|
| MCS-831 | 7400-448-019 | 1 to 99 |
| MCS-832 | 7400-448-020 | 1 to 9999 |

Output Module (Supplied as Standard)

| Model | Part Number | Switching Type |
|---------|--------------|----------------|
| MCS-814 | 7410-448-008 | DPDT 7 Amp |

MCS-165 – Plug-in Modules (Order Separately)

Timer Modules

| Model | Part Number | Timing Range |
|-----------|--------------|-------------------|
| MCS-830 | 7400-448-018 | 0.4 to 15 seconds |
| MCS-830-1 | 7400-448-026 | 1 to 30 seconds |

Timer Functions (Programmable)

On Delay / Off Delay / Dual Delay / One-Shot
One-Shot Drop / Delayed One-Shot / Delayed One-Shot Drop

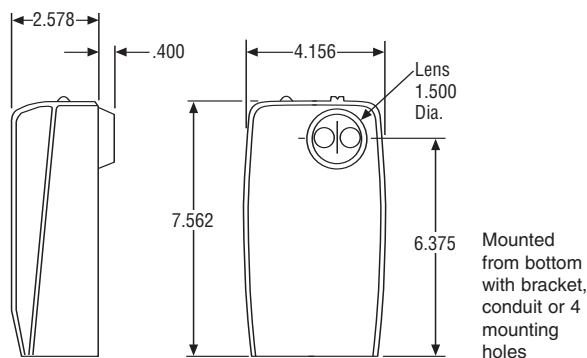
Counter Modules

| Model | Part Number | Counting Range |
|---------|--------------|----------------|
| MCS-833 | 7400-448-021 | 1 to 99 |
| MCS-834 | 7400-448-022 | 1 to 9999 |

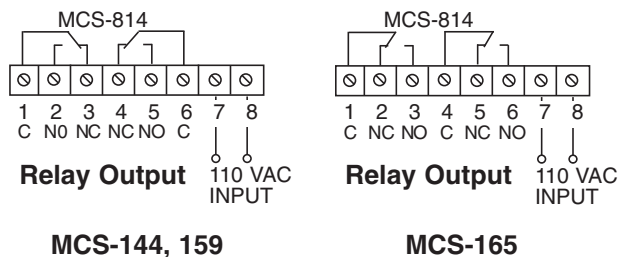
Output Module (Supplied as Standard)

| Model | Part Number | Switching Type |
|---------|--------------|----------------|
| MCS-814 | 7410-448-008 | DPDT 7 Amp |

Mechanical Data (Dimensions are in inches)



Wiring Data



Accessories

| | |
|-------------------------------|---------------------|
| Reflective Disc – 3 1/4" Dia. | Part # 610-8002-001 |
| Mounting Bracket | Part # 7430-448-001 |



Photoelectric Sensors

MCS-500 Series

Description

The MCS-500 Series is a self-contained modular design with many standard features that include programmable multi-function timing circuits, sensitivity adjustment, and LED output indication. Once installed, the base module will accept any of the 3 sensing control heads, which can provide Retro, Polarized and Diffused Reflective modes of sensing. The MCS-850 relay is a plug-in module and is supplied as a standard component when purchased as a complete sensor.

- High impact plastic housing
- Modular design (Control Head/Output Module/Base)
- LED indication of sensing status
- Sensitivity control
- NEMA 12
- Two timing ranges
Low range 0.5-10 seconds
High range 3.0-30 seconds
- Programmable timing
- Temperature range 0°F to 125°F
- Screw terminals for wiring

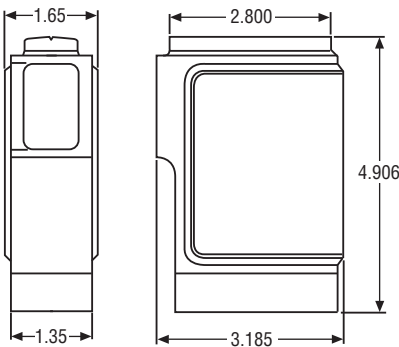


MCS-500 Series

Sensor Selection

| Sensing Principle | Sensing Range | Input Voltage | Switching Function | Output Mode | Maximum Cycle Rate | Output Current | Model | Part Number |
|--------------------|---------------|---------------|--------------------|-------------|--------------------|----------------|-------------|--------------|
| Retro-Reflective | 15 ft. | 110 VAC | SPDT | Relay | >50 Hz | 5A | MCS-500-01 | 7150-448-004 |
| Polarized Retro | 12 ft. | 110 VAC | SPDT | Relay | >50 Hz | 5A | MCS-500P-01 | 7151-448-001 |
| Diffuse Reflective | 6 ft. | 110 VAC | SPDT | Relay | >50 Hz | 5A | MCS-501-01 | 7150-448-003 |

Mechanical Data (Dimensions are in inches)



MCS-500 Timing Functions

Switch selectable, multi-function timing is a standard feature on the MCS-500, MCS-500P and MCS-501.

The timing function can be switched from a low timing range of 0.5 to 5.0 seconds to a high timing range of 3.0 to 30 seconds. When no timing is required, the function can be switched off.

On delay, off delay, dual delay, one shot, and delayed one shot functions are quickly achieved by setting the timing switches on the unit. Easy-access timing adjustment controls are accessible from the top of the unit to allow fine tuning during operation.

Timing functions can be employed for light or dark operation.

Timing Ranges

Low range 0.5 to 5.0 seconds

High range 3.0 to 30 seconds

On-Off switch selectable

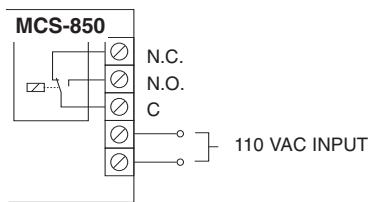
Ordering Information for Individual modules

| Control Module | Part Number |
|------------------|--------------|
| MCS-500-120-CON | 7150-101-004 |
| MCS-500P-120-CON | 7151-101-001 |
| MCS-501-120-CON | 7150-101-003 |

| Base Module | Part Number |
|-----------------|--------------|
| MCS-500-120-BAS | 7150-101-013 |

| Output Module | Part Number |
|----------------------------------|--------------|
| MCS-850-REL-OUT
SPDT Relay 5A | 7150-101-016 |

Wiring Data



Relay Output

Accessories

| | |
|-------------------------------|---------------------|
| Reflective Disc – 3 1/4" Dia. | Part # 610-8002-001 |
| Mounting Bracket | Part # 7150-101-020 |
| Cable Gland | Part # 7420-448-029 |

Photoelectric Sensors

Compact Series

Description

The COMPACT Series of photoelectric sensors are rugged industrial DC voltage input photoelectric sensors with a reliable performance for many general purpose applications. Sensing mode capabilities include: Through-Beam (up to 500 ft.), Retro and Diffuse Reflective. Output standard on all units is light activated/dark activated NPN transistor. LA/DA is selectable at the time of installation by wire selection. All Compact Series of sensors are designed to work with the Warner Electric range of sensor controls.

- Heavy duty zinc die cast housing
- LED indication of output
- NEMA 1, 12
- Temperature rating -40°F to +158°F (MCS-629 only)
- Temperature rating -22°F to +158°F
- 10 ft. cable

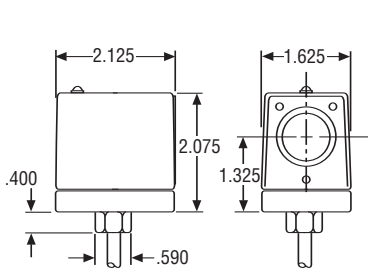


Compact Series

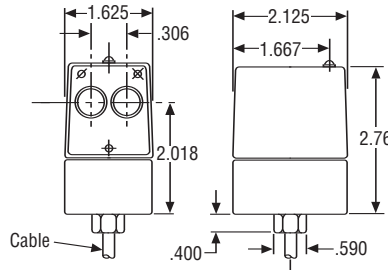
Sensor Selection

| Sensing Principle | Sensing Range | Input Voltage | Switching Function | Output Mode | Maximum Cycle Rate | Output Current | Model | Part Number |
|--------------------|---------------|---------------|--------------------|-------------|--------------------|----------------|-----------|--------------|
| Through-Beam | 500 ft. | 10-30 VDC | LA/DA | NPN | >25 Hz | 250 mA | MCS-629 | 7115-448-005 |
| Through-Beam | 50 ft. | 12-18 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-627 | 7115-448-003 |
| Through-Beam | 50 ft. | 22-28 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-637 | 7115-448-001 |
| Retro-Reflective | 15 ft. | 12-18 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-625 | 7125-448-002 |
| Retro-Reflective | 15 ft. | 22-28 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-635 | 7125-448-003 |
| Diffuse Reflective | 0 to 1 ft. | 12-18 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-626 | 7105-448-002 |
| Diffuse Reflective | 0 to 1 ft. | 22-28 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-636 | 7105-448-005 |
| Diffuse Reflective | .1 to 6 ft. | 12-18 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-626-2 | 7105-448-007 |
| Diffuse Reflective | .1 to 6 ft. | 22-28 VDC | LA/DA | NPN | >250 Hz | 250 mA | MCS-636-2 | 7105-448-011 |

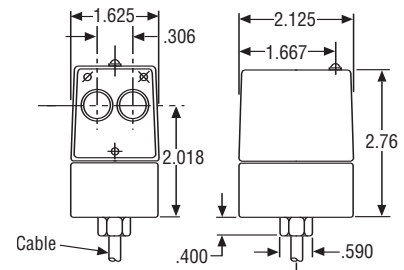
Mechanical Data (Dimensions are in inches)



MCS-627/629

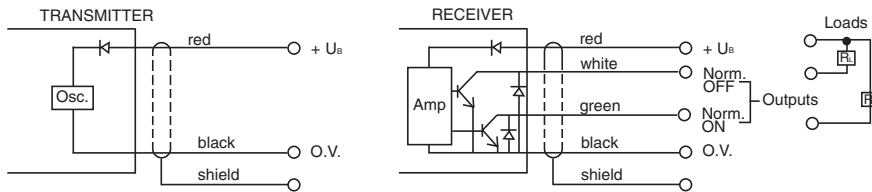


MCS-626/636

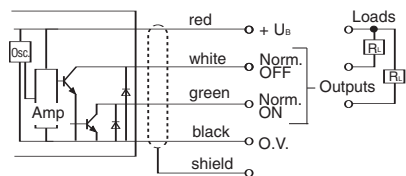


MCS-625/635

Wiring Data



MCS-627/629



MCS-625/635/626/636/626-2/636-2

Accessories

- Reflective Disc – 3 1/4" Dia. Part # 610-8002-001
- Mounting Bracket Part # 7430-448-003



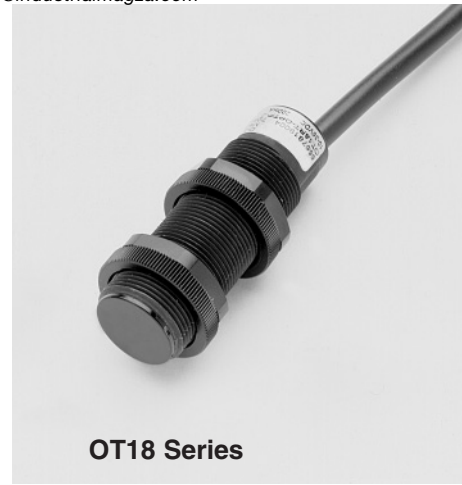
Photoelectric Sensors

OT18 Series

Description

This series of 18mm plastic tubular sensors provides the user with a self-contained DC low voltage sensor with NPN or PNP output. Programmable light activated/dark activated output. Modes of sensing include: Through-Beam, Retroreflective, Polarized Retro-reflective, Diffuse Reflective and Fixed Focus types.

- 18mm diameter cylindrical plastic housing
- Self-contained with 6.5 ft. cable
- IP 67/NEMA 4
- LED indication of output
- Temperature range -20°C to +70°C (-4°F to +158°F)
- 10-36 VDC input voltage
- No-load supply current ≤15 mA (Emitter ≤20 mA)
- Reverse polarity protection
- Short circuit protected
- 200mA switching current
- Voltage drop ≤2 VDC
- Hysteresis ≤15%
- Repeat accuracy ≤10%
- Switching frequency 500 Hz



OT18 Series

Sensor Selection

| Sensing Principle | Sensing Range | Switching Function | Sensitivity | Model Description | Part Number |
|----------------------------|------------------|--------------------|-------------|----------------------|--------------|
| Through-Beam | 26 ft. | NPN | Fixed | OT18ES-DPTN-08.0-CL | 655-1219-102 |
| Through-Beam | 26 ft. | PNP | Fixed | OT18ES-DPTP-08.0-CL | 655-1819-101 |
| Retro-Reflective | 2 in. to 9.5 ft. | NPN | Fixed | OT18RS-DPTN-03.0-CL | 655-4219-002 |
| Retro-Reflective | 2 in. to 9.5 ft. | PNP | Fixed | OT18RS-DPTP-03.0-CL | 655-4819-003 |
| Polarized Retro-Reflective | 0 in. to 8.2 ft. | NPN | Adjustable | OT18PS-DPTN-02.5-CLE | 655-5219-001 |
| Polarized Retro-Reflective | 0 in. to 8.2 ft. | PNP | Adjustable | OT18PS-DPTP-02.5-CLE | 655-5819-003 |
| Diffuse Reflective | 19.6 in. | NPN | Adjustable | OT18RT-DPTN-0500-CLE | 655-7219-006 |
| Diffuse Reflective | 19.6 in. | PNP | Adjustable | OT18RT-DPTP-0500-CLE | 655-7819-006 |
| Diffuse Reflective | 11.8 in. | NPN | Adjustable | OT18RT-DPTN-0300-CLE | 655-7219-005 |
| Diffuse Reflective | 11.8 in. | PNP | Adjustable | OT18RT-DPTP-0300-CLE | 655-7819-005 |
| Fixed Focus | 1.57 in. | NPN | Fixed | OT18FF-DPTN-0040-CL | 655-8219-001 |
| Fixed Focus | 1.57 in. | PNP | Fixed | OT18FF-DPTP-0040-CL | 655-8819-001 |

Through Beam Sensors:

To order separate transmitters and receivers use the following:

Transmitter:

Part Number 655-1019-001
Model: OT18SE-DOOS-08.0-C

Receiver:

Part Number: 655-1219-002
Model: OT18EE-DPTN-08.0-CL
Part Number: 655-1819-001
Model: OT18EE-DPTP-08.0-CL

Accessories

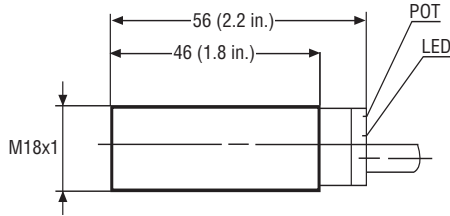
| | |
|-----------------------------|--------------------|
| Reflective Disc-3-1/4" Dia. | Part #610-8002-001 |
| Mounting Bracket | Part #7125-101-001 |

Note: The sensors on this page are also available in nickel-plated brass or stainless steel housings, also available in quick disconnect version. Contact Factory.

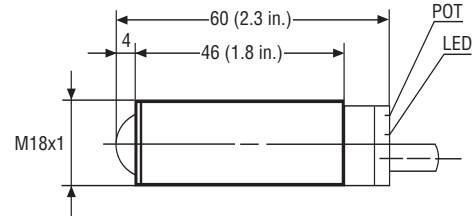
Photoelectric Sensors

OT18 Series

Dimensions and Wiring Details



**Through-Beam, Retro, Diffuse,
Fixed Focus, Sensors**



Polarized Retroreflective Sensors

Wire Colors:

Brown = Plus 10 – 36 Volts DC

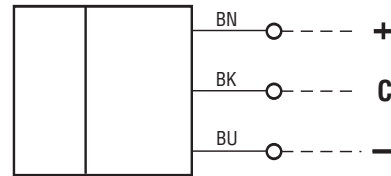
Blue = Zero Volts Common

Black = Output Wire

White = Control Wire

Note: The LED output indicator is on when the output is active.

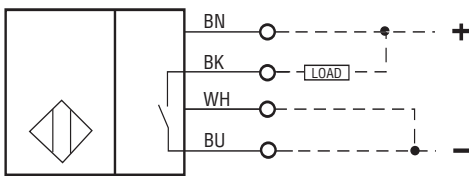
Wiring Diagram of the Through-Beam Emitter



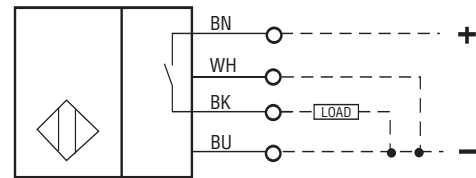
Black = Control Input. The emitter will be turned off when the control wire is connected to minus (common). System Test Function.

Normally Off

NPN – sensors

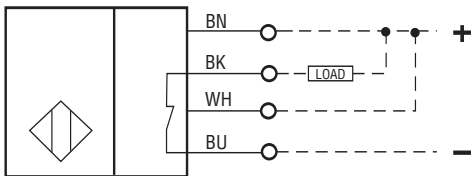


PNP – sensors

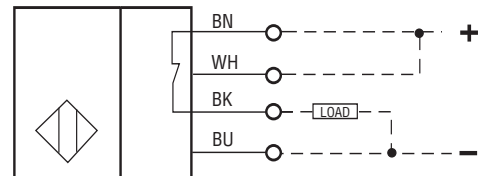


Normally On

NPN – sensors



PNP – sensors



With the Control Wire (White) the output function is programmable. A not connected white wire produces a Normally Open function. Diffuse Reflective and Fixed Focus types are usually operated light active (Normally Off) and other sensors like the Retro, Polarized Retro, and the Through-Beam are usually operated Dark Active (Normally On).

Photoelectric Sensors

MCS-638 Series

Print Registration/Color Mark/Contrast Sensor

- Dual Lens Position
- Automatic selection of best color light source (Green, Red, Blue)
- Static Mode Teach allows one automatic teach step for the target and one automatic teach step for the background.
- Remote Teach Input allows colors to be programmed externally
- Light Operate/Dark Operate modes
- Housing Material Makrolon
- Quick Disconnect (2 Meter Straight Cable included with Sensor)
- Temperature Range -4°F to + 140°F
- LED Indication of Output Status
- Output - Push-Pull (NPN/ PNP)



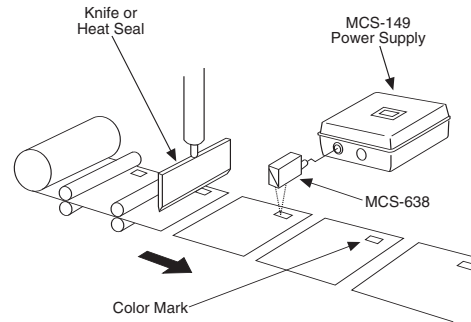
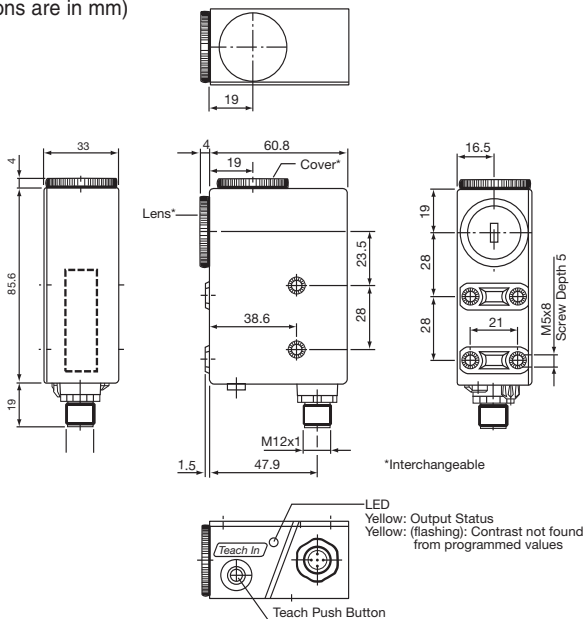
MCS-638 Series

Sensor Selection

| Sensing Range | Input Voltage | Current Consumption | Maximum Cycle Rate | Output Current | Model | Part Number |
|------------------|---------------|---------------------|--------------------|----------------|-----------|--------------|
| 9.5 mm (3/8 in.) | 10 -30 VDC | ≤60 mA | 16.5 KHz | 200 mA | MCS-638-3 | 7135-448-011 |
| 25 mm (1 in.) | 10 -30 VDC | ≤60 mA | 16.5 KHz | 200 mA | MCS-638-4 | 7135-448-012 |

Mechanical Data

(Dimensions are in mm)

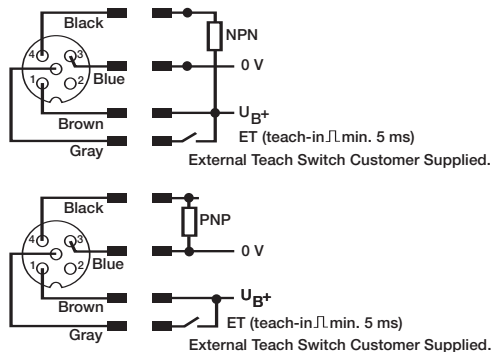


Programming

1. Connect the supply voltage to the wires noted in the wiring diagram.
2. Aim the light spot at the target mark. For glossy or reflective surfaces, the sensor should be angled at 10° to 15° off the perpendicular axis from the target.
3. Press the Teach push button on the sensor or apply V+ to the Teach Input for a minimum of 50 milliseconds. The LED should flash slowly (at a rate of approximately 1 Hz).
4. Aim the light spot at the background.
5. Press the Teach push button on the sensor or apply V+ to the Teach Input for a minimum of 50 milliseconds. The LED will now turn on when the target mark is present and off when it is absent after a successful teach. If the teach was not successful or the contrast was not sufficient, the LED flashes quickly (at a rate of approximately 4 Hz). Programming the MCS-638 as indicated above sets the switching threshold exactly in the middle of the target and background values. The above procedure is for Light Operate mode. For Dark Operate mode, reverse steps 2 and 4.



Wiring Diagram

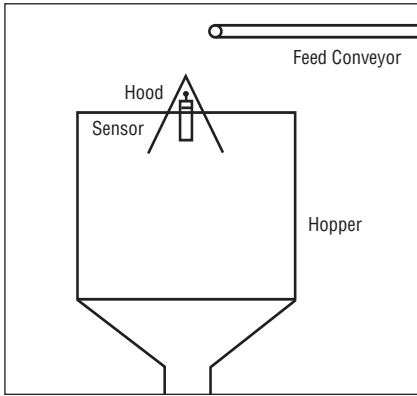




Ultrasonic Sensors

Ultrasonic Applications

- Level Control
- Roll Diameter
- Level Detection
- Liquid Level Control
- Web Break Detection
- Object Detection
- Loop Control
- Thickness and Gauging
- Stacking Height Control



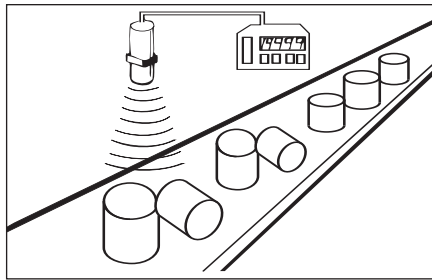
Level Control of Sand in a Hopper

Ultrasonic Sensor Identification Codes

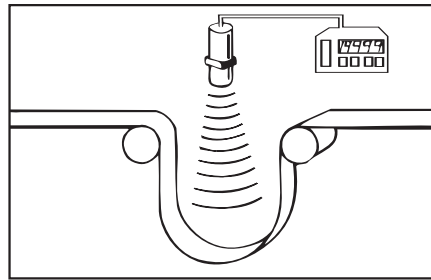
| 1 | 2 | 3 4 | 5 6 | 7 | 8 9 10 11 | 12 | 13 14 15 | 16 | 17 | 18 | 19 20 + |
|----------------|---|-----------------------------|--------------------|------|-----------------|--|------------------|------|---------------------|--|---------|
| Type of Sensor | Type of Housing | Size of Housing Series/Name | Sensing Discipline | Dash | Electrical Spec | Dash | Sensing Distance | Dash | Type of Termination | Functions & Features | |
| 1 | U = Ultrasonic | | | | 10 | Output type | | | 18 | Connection type | |
| 2 | M = Metric threaded barrel metal
T = Metric threaded barrel plastic
R = Rectangular Housing | | | | | A = Analog output
R = Relay
S = Solid state relay | | | | A = Screw termination
S = Quick disconnect
C = Cable (standard 2 m or length in m) | |
| 3/4 | Size of housing e.g. 30 = 30mm Diameter | | | | 11 | 3 = 3-wire output
4 = 4-wire output
5 = 5-wire output
6 = 6-wire output
7 = 7-wire output | | | 19 | Options | |
| 5/6 | UP = Ultrasonic Proximity | | | | 12 | Dash | | | | S = LED with strength indicator
L = LED
T = Adjustable detection setting
H = Adjustable hysteresis setting
I = Current/Voltage inverter circuit
M = Microprocessor calibration and gain control circuit
C = Current inverter circuit
P = PVC housing and PVC sensing face | |
| 7 | Dash | | | | 13-16 | Sensing distance
- mm: without dot
- m: with dot
e.g. 06.0 = 6 m
e.g. 15.0 = 15 m
e.g. 0050 = 50 mm
e.g. 10.0 = 10m
e.g. 13.0 = 13m | | | | | |
| 8 | Voltage type
A = AC
D = DC | | | | 17 | Dash | | | | | |
| 9 | Output function
C = Current/Voltage output
S = 2x NO/NC solid state
B = Current output | | | | | | | | | | |

Quick Selection Guide

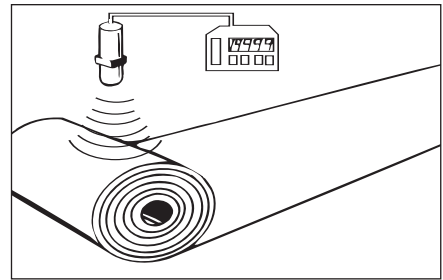
| Model/Part # | Input Voltage | Sensing Distance | Output Type | Page # |
|---------------------------------------|---------------|------------------|---|--------|
| UT30UP-DCA4-1016-CSI
7600-448-001 | 20-30 VDC | 1016 mm/40 in. | 4-20 mA or 0-10 VDC
Inverted & Non-inverted
Short Circuit Protected | 13 |
| UT30UP-DCA4-2032-CSI
7600-448-002 | 20-30 VDC | 2032 mm/80 in. | 4-20 mA or 0-10 VDC
Inverted & Non-inverted
Short Circuit Protected | 13 |
| UT30UP-DSS5-1016-CSHT
7600-448-003 | 20-30 VDC | 1015 mm/40 in. | 2x Solid State Relays | 15 |
| UT30UP-DSS5-2032-CSHT
7600-448-004 | 20-30 VDC | 2032 mm/80 in. | 2x Solid State Relays | 15 |



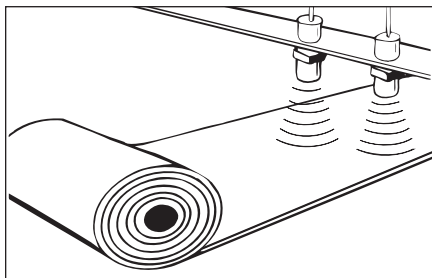
Quality Control Inspection



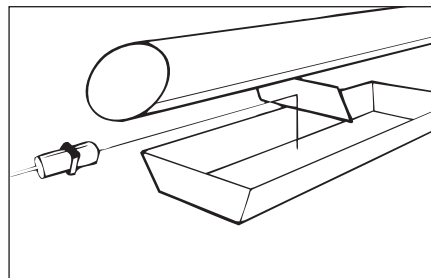
Loop Control



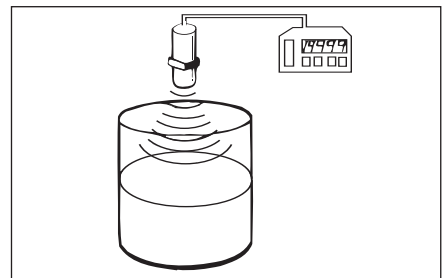
Roll diameter, Tension Wind, Winding and Unwind



Web Break Detection



45° Deflection; Ink Well Level Detection; Hard to Get At Places



Liquid Level Control

Ultrasonic Sensors

with Analog Output

4-20 mA and 0-10 V
 Wire selectable inverted or non-inverted outputs



Threaded plastic barrel
M 30 x 1.5



Threaded plastic barrel
M 30 x 1.5

| | | |
|-----------------------------------|--|--|
| Sensing range | 101..1016 mm (4-40") | 203..2032 mm (8-80") |
| Switching functions/output | Analog 4-20 mA and 0-10 V | Analog 4-20 mA and 0-10 V |
| Ordering Information | Model description
Part number | Model description
Part number |
| | UT30UP-DCA4-1016-CSI
7600-448-001 | UT30UP-DCA4-2032-CSI
7600-448-002 |

Electrical data

| | | | |
|----------------------------|-----------|--|--|
| Voltage range | min./max. | 20-30 VDC reverse polarity protected | 20-30 VDC reverse polarity protected |
| Input current | | 50 mA | 50 mA |
| Transducer frequency | | 212 KHz | 150 KHz |
| Short circuit protected | | Yes | Yes |
| LED - (strength indicator) | | Yes - green to red; see note (d) on pg. 14 | Yes - green to red; see note (d) on pg. 14 |
| Response time | | 30 mSec | 50 mSec |
| Range control | | Zero and span (2 potentiometers) | Zero and span (2 potentiometers) |

Mechanical Data

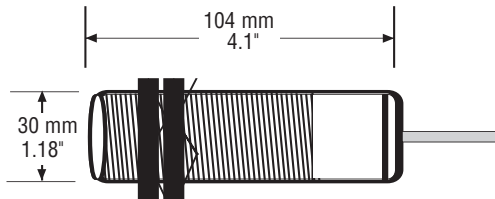
| | | | |
|----------------------|--------------------------------|---|---|
| Temperature range | min./max | 0°C/+60°C / 32°F/140°F | 0°C/+60°C / 32°F/140°F |
| Degree of protection | | IP 65/NEMA 12 | IP 65/NEMA 12 |
| Body material | | Valox plastic | Valox plastic |
| Termination | cable 2 m/6 ft.
Plug/socket | PVC 4 x 22 gauge
Versions available to order | PVC 4 x 22 gauge
Versions available to order |
| Accessories | | 1) Brackets | 1) Brackets |
| Humidity | | 0-95% non-condensing | 0-95% non-condensing |

1) Brackets for M 30 x 1.5

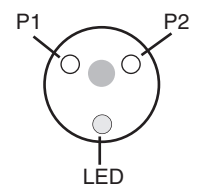
Ordering Information
 Plastic - BKS-D34PA
 Part number 596-0223-041

Metal - M 30 ST
 Part number 7430-448-003

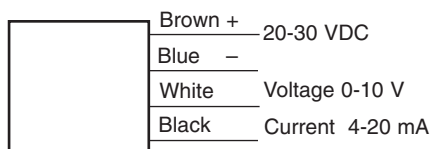
Dimensions



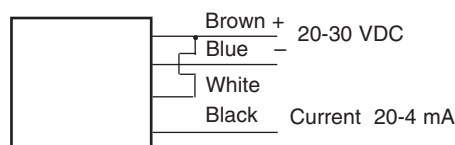
Adjustment Pots Zero and Span Control



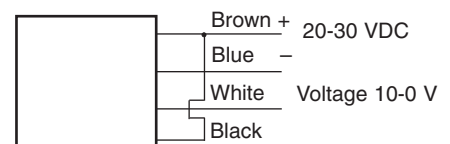
Wiring Data



Non Inverted Output



Current Output Inverted

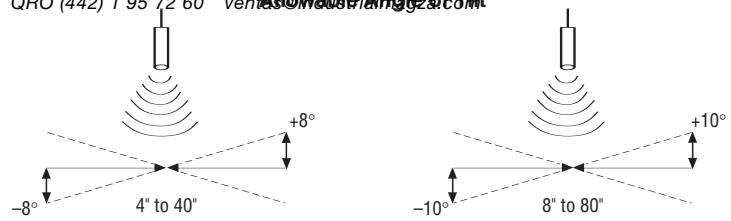


Voltage Output Inverted



Ultrasonic Sensors

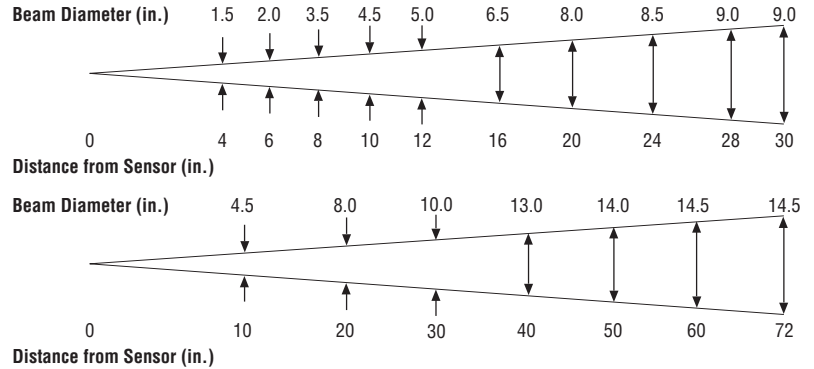
Operation and Set-Up



Minimum Analog Ranging

Minimum analog ranging is when you desire to have the full 4-20 mA or 0-10 V output over the minimum 5 inch sensing span. 5 inches of minimum sensing span can be adjusted anywhere in the sensing range. For example 10"-15" or 25"-30". To make this adjustment, you place your target at the minimum sensing range and adjust P1 to 4 mA. Then move your target to the maximum sensing range and adjust P2 to 20 mA. Re-check the readings and make appropriate adjustments, if necessary. See diagram (A).

Beam Spread vs. Target Distance



Maximum Analog Ranging

Analog sensing in the maximum range means utilizing the entire 36" span (4"-40") and 72" span (8"-80"). To adjust, set your target at the minimum range, either 4" or 8" and adjust P1 to 4 mA. Move the target to the maximum range and adjust P2 to 20 mA. Re-check readings and make appropriate adjustments, if necessary. See diagram (B).

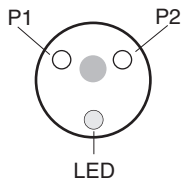
Inverted Analog Outputs

Inverted outputs means that the 4-20 mA or 0-10 V output signal will decrease proportionally with distance. To adjust, place your target at the minimum sensing distance and adjust P1 to 20 mA. Place your target at the maximum sensing distance and adjust P2 to 4 mA. Re-check readings and make appropriate adjustments, if necessary. See diagram (C).

LED Operation (Note D)

The LED is green when the unit is powered up. It will fade to red as a target is detected with increased intensity as more signal is being reflected from the target. Note: Any color other than green equals a workable signal level.

Adjustment Pots
Zero and Span Control



Minimum Analog Ranging

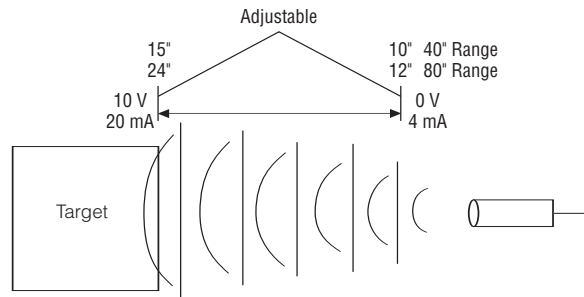


Diagram A

Maximum Analog Ranging

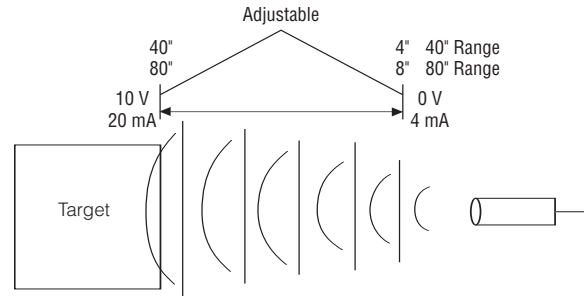


Diagram B

Inverted Analog Ranging

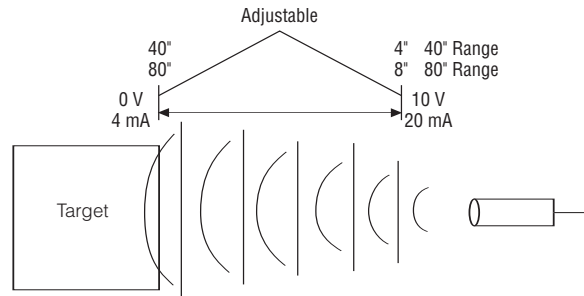


Diagram C

Ultrasonic Sensors

with Isolated Solid State Relay Outputs

fitted with Range and Hysteresis Control



Threaded plastic barrel
M 30 x 1.5



Threaded plastic barrel
M 30 x 1.5

| | | | |
|-----------------------------------|----------------------------------|---|---|
| Sensing range | | 101..1016 mm
(4-40") | 203..2032 mm
(8-80") |
| Switching functions/output | | 2 Solid State Relays | 2 Solid State Relays |
| Ordering Information | Model description
Part number | UT30UP-DSS5-1016-CSHT
7600-448-003 | UT30UP-DSS5-2032-CSHT
7600-448-004 |
| Electrical data | | | |
| Voltage range | min./max. | 20-30 VDC reverse polarity protected | 20-30 VDC reverse polarity protected |
| Input current | | 50 mA | 50 mA |
| Transducer frequency | | 212 KHz | 150 KHz |
| Short circuit protected | | Yes | Yes |
| LED | | Yes - green (not detecting), red (detecting) | Yes - green (not detecting), red (detecting) |
| Response time | | 30 mSec | 50 mSec |
| Range control | | Range and Hysteresis | Range and Hysteresis |
| Mechanical data | | | |
| Temperature range | min./max. | 0°C/+60°C / 32°F/140°F | 0°C/+60°C / 32°F/140°F |
| Degree of protection | | IP 65/NEMA 12 | IP 65/NEMA 12 |
| Body material | | Valox plastic | Valox plastic |
| Termination | cable 2 m/6 ft.
Plug/socket | PVC 4 x 22 gauge
Versions available to order | PVC 4 x 22 gauge
Versions available to order |
| Accessories | | 1) Brackets | 1) Brackets |
| Humidity | | 0-95% non-condensing | 0-95% non-condensing |

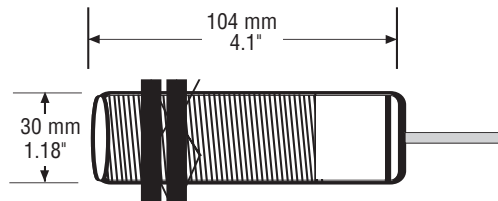
1) Brackets for M 30 x 1.5

Ordering Information

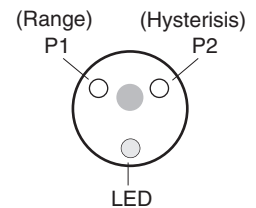
Plastic - BKS-D34PA
Part number 596-0223-041

Metal - M 30 ST
Part number 7430-448-003

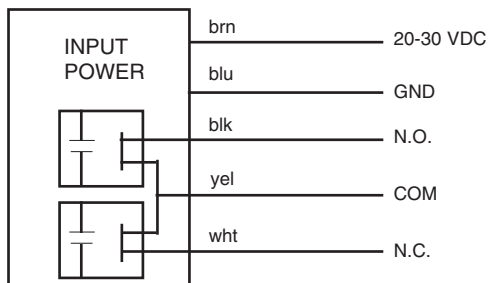
Dimensions



Adjustment Pots Detection and Hysteresis Control



Wiring Data

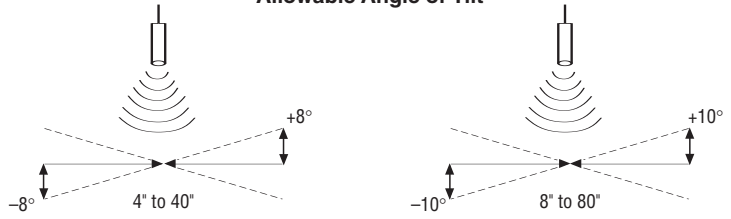


Output Specification

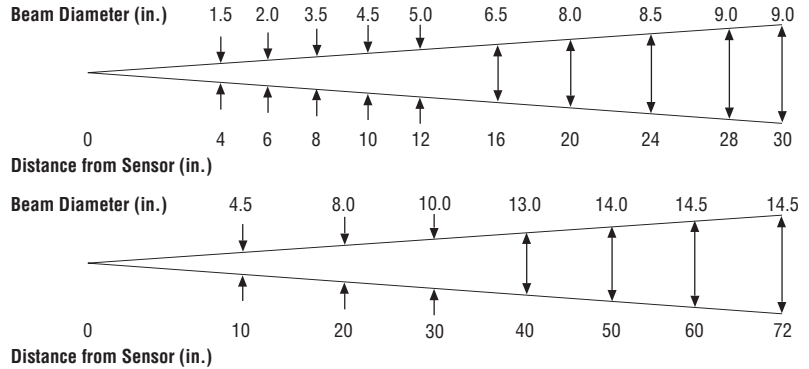
- 2 x Solid state relays N.O. / N. C.
- 160 VAC or VDC 100 mA continuous
- Short circuit protected
- 1500 volts RMS isolation

Ultrasonic Sensors

Operation and Set-Up



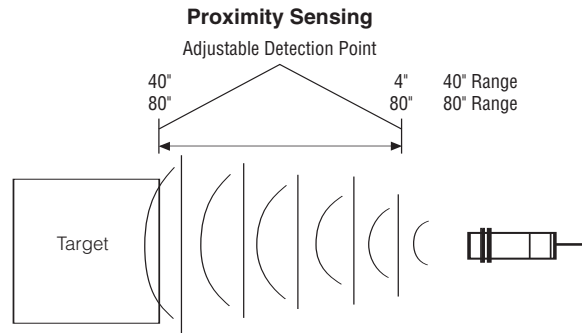
Beam Spread vs. Target Distance



Proximity Sensing

Proximity detection is the detection of an object at a set distance. The sensing range is controlled by the "Range Control" potentiometer. Any object within the desired range is detected while objects beyond the set range are ignored. The sensing distance is dependent upon the sensor chosen, 40" or 80".

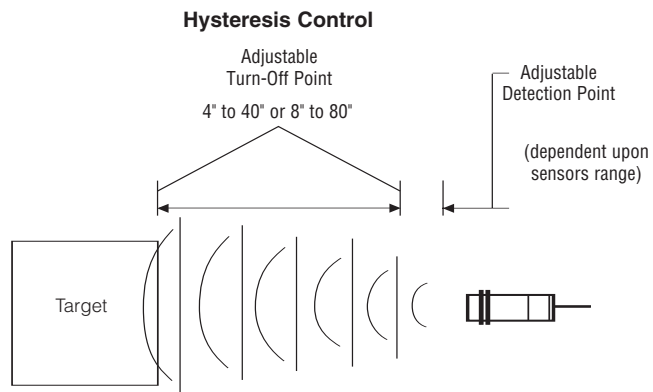
In the proximity mode of operation, the hysteresis potentiometer must be turned to 'off' by turning the pot counterclockwise.



Hysteresis Control

The sensor is also fitted with a hysteresis control potentiometer. This control allows you to adjust the turn off point while the detection potentiometer sets the "turn on" point.

(Example: Range pot set for 10", hysteresis pot set for 20". With these settings the sensor will detect when the target reaches 10" and stays on as the target moves away to 20".) This hysteresis can be adjusted from .5" to 40" from the detect point with the 40" sensor and 1" to 80" with the 80" sensor.





Proximity Sensors

Inductive Sensors

Inductive Proximity Sensors are used when the target or object to be sensed is metal. Inductive types are the most widely used proximity sensors for industrial applications.

Typical Applications

- Parts Detection
- Parts Counting
- Positioning
- Broken Tool Detection
- Indexing
- Robotics and Conveyors
- Motion and Speed Control
- Punch Press Feed and Ejection Control
- Parts Inspection
- Parts Diverting

Capacitive Sensors

Capacitive Sensors can sense conducting and non-conducting materials in solid, powder or liquid form. The higher the dielectric constant of the target material, the greater the sensing range.

Typical Applications

- Liquid Level Control
- Package Inspection (Content and Fill Level)
- Plastic Pellet Detection
- Wire Break Detection

Inductive and Capacitive Proximity Sensors Identification Codes

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---------------|---|---|---|----------------------|---|---|--------|----------------|----|------------------|----|----|----|---------|----|----|
| Product Group | | | — | Type/Size of Housing | | | Output | Type of Output | — | Sensing Distance | | | — | Options | | |

| | | | | | |
|----------|--|----------|--|--------------|---|
| 1 | K = Non-contact proximity sensor | 7 | Example
03 = 3 mm dia
40 = 40 mm dia
format for other shapes:
digits 5, 6 and 7
S03 = 3.5 mm slot sensor
Q05 = 5 x 5 x 25 mm
Q08 = 8 x 8 x 40 mm side sensing
Q80 = 8 x 8 x 40 mm middle sensing
Q12 = 12 x 12 x 55 mm
B40 = Bar sensor
E50 = 50 x 25 x 55 mm
E28 = 28 x 16 x 11 mm
E40 = 40 x 26 x 12 mm
N40 = 40 x 40 x 40 mm
N04 = 40 x 40 x 72.5 mm
N44 = 40 x 40 x 112 mm
E68 = 68 x 30 x 15 mm
E80 = 80 x 30 x 20 mm | 10 | Dash |
| 2 | I = Inductive
C = Capacitive | | | 11-13 | Sensing distance
Example:
1.5 = 1.5 mm
002 = 2.0 mm
040 = 40.0 mm |
| 3 | B = Flush/shielded
N = Non-flush/Non-shielded
A = Adjustable flush/non-flush via sensitivity control
V = Sensor amplifier | | | 14 | Dash |
| 4 | Dash | | | 15 | K = Short circuit protection |
| 5 | M = Metric threaded metal barrel
T = Metric threaded plastic barrel
D = Cylindrical metal smooth barrel
R = Cylindrical plastic smooth barrel
Q = Rectangular metal housing
P = PG threaded metal barrel
E = Rectangular plastic housing
S = Slot type sensor
N = DIN standard housing
B = Bar sensor | | | 16 | L = LED |
| 6 | If the housing is cylindrical or barrel, the two digit code refers to the diameter in millimeters. | 8 | P = PNP
N = NPN
A = AC2-wire
E = Namur
Z = DC2-wire
M = AC/DC-multivoltage
R = Relay
Q = Triac
T = Thyristor AC3-wire
G = Push/Pull
D = NPN/PNP | 17 | Cable length in meters
Example: 2 = 2 meters
6 = 6 meters
S = Socket
E = Sensor with extended sensing range
V = Short body housing
P = Potentiometer
PU = Polyurethane cable
SD = Plug with terminals according to DIN standard usually comes with plug fitted
SM = Mini socket snap fit (quick disconnect)
S8 = M8 quick disconnect screw type
S12 = M12 quick disconnect screw type
SM8 = M8 quick disconnect universal snap and screw
N = Stainless steel
F = High switching frequency
C = High chemical resistance surface
T = High temperature |
| | | 9 | S = Normally open
O = Normally closed
P = Programmable switch selectable NO/NC
A = Analog
U = Complementary 4-wire NO/NC | | |



Inductive Proximity Sensors

4mm dia. - Smooth Metal Barrel
M4, M5, M8, M12, M18, M30 - Threaded Metal Barrel
All with potted - in Cable - 6 Feet Long
Input Voltage: 10-30 Volts DC - 3 Wire
Output Type: NPN (sinking) or PNP (sourcing)
- Normally Open



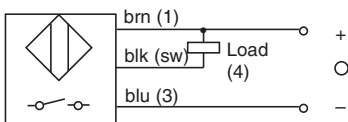
- NEMA 4
- Temperature range -13°F + 158°F
- Short circuit protected
- Reverse polarity protected
- Transient noise protected
- LED function, Output energized

Sensor Selection

| Type and Construction | Sensing Range | Mounting | Switching Function | Switching Freq. Hz | Output Current | Model | Part Number |
|---------------------------------|---------------|-----------|--------------------|--------------------|----------------|---------------------|--------------|
| 4mm Dia. Smooth Metal Barrel | 0.8 mm | Flush | NPN/NO | 3000 | 200 mA | KIB-D04NS/0.8 KL2PU | 650-2399-004 |
| M4 x 0.5 Threaded Metal Barrel | 0.6 mm | Flush | NPN/NO | 3000 | 100 mA | KIB-M04NS/0.6 KL2 | 650-2399-018 |
| M5 x 0.5 Threaded Metal Barrel | 1 mm | Flush | NPN/NO | 3000 | 200 mA | KIB-M05NS/001 KL2 | 650-2399-003 |
| M5 x 0.5 Threaded Metal Barrel | 1 mm | Flush | PNP/NO | 3000 | 200 mA | KIB-M05PS/001 KL2 | 650-2999-003 |
| M8 x 1 Threaded Metal Barrel | 1.5 mm | Flush | NPN/NO | 1000 | 200 mA | KIB-M08NS/1.5 KL2 | 693-2301-001 |
| M8 x 1 Threaded Metal Barrel | 1.5 mm | Flush | PNP/NO | 1000 | 200 mA | KIB-M08PS/1.5 KL2 | 693-2901-001 |
| M12 x 1 Threaded Metal Barrel | 2 mm | Non-Flush | NPN/NO | 1000 | 200 mA | KIN-M08NS/002 KL2 | 650-2316-003 |
| M12 x 1 Threaded Metal Barrel | 2 mm | Non-Flush | PNP/NO | 1000 | 200 mA | KIN-M08PS/002 KL2 | 650-2916-003 |
| M12 x 1 Threaded Metal Barrel | 2 mm | Flush | NPN/NO | 800 | 200 mA | KIB-M12NS/002 KL2 | 693-2303-001 |
| M12 x 1 Threaded Metal Barrel | 2 mm | Flush | PNP/NO | 800 | 200 mA | KIB-M12PS/002 KL2 | 693-2903-001 |
| M18 x 1 Threaded Metal Barrel | 4 mm | Non-Flush | NPN/NO | 400 | 200 mA | KIN-M12NS/004 KL2 | 693-2304-001 |
| M18 x 1 Threaded Metal Barrel | 4 mm | Non-Flush | PNP/NO | 400 | 200 mA | KIN-M12PS/004 KL2 | 693-2904-001 |
| M18 x 1 Threaded Metal Barrel | 5 mm | Flush | NPN/NO | 500 | 200 mA | KIB-M18NS/005 KL2 | 693-2305-001 |
| M18 x 1 Threaded Metal Barrel | 5 mm | Flush | PNP/NO | 500 | 200 mA | KIB-M18PS/005 KL2 | 693-2905-001 |
| M18 x 1 Threaded Metal Barrel | 8 mm | Non-Flush | NPN/NO | 200 | 200 mA | KIN-M18NS/008 KL2 | 693-2306-001 |
| M18 x 1 Threaded Metal Barrel | 8 mm | Non-Flush | PNP/NO | 200 | 200 mA | KIN-M18PS/008 KL2 | 693-2906-001 |
| M30 x 1.5 Threaded Metal Barrel | 10 mm | Flush | NPN/NO | 300 | 200 mA | KIB-M30NS/010 KL2 | 650-2307-135 |
| M30 x 1.5 Threaded Metal Barrel | 10 mm | Flush | PNP/NO | 300 | 200 mA | KIB-M30PS/010 KL2 | 650-2907-068 |
| M30 x 1.5 Threaded Metal Barrel | 15 mm | Non-Flush | NPN/NO | 100 | 200 mA | KIN-M30NS/015 KL2 | 650-2308-001 |
| M30 x 1.5 Threaded Metal Barrel | 15 mm | Non-Flush | PNP/NO | 100 | 200 mA | KIN-M30PS/015 KL2 | 650-2908-002 |

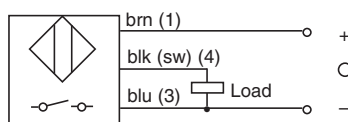
mm x .03937 = inches

Wiring Diagrams



NPN – Normally Open

During operation, output NPN transistor is switched to negative.



PNP – Normally Open

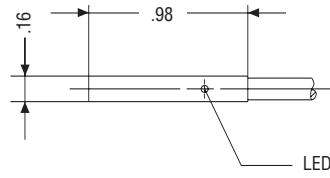
During operation, output of PNP transistor is switched to positive.

brn = Brown
 blk = Black
 blu = Blue
 sw = Switch

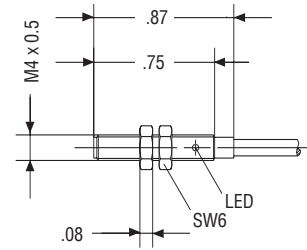
For Brackets see Page 23.



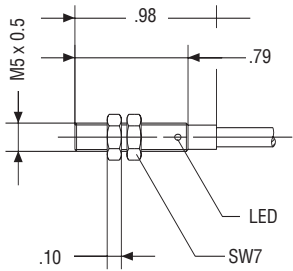
Mechanical Data (Dimensions are in inches)



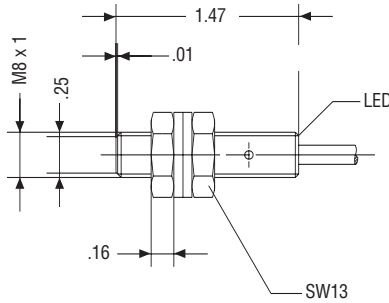
4 mm Dia.



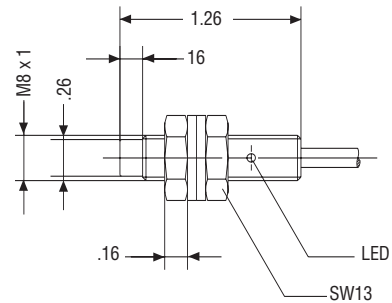
M4 x 0.5



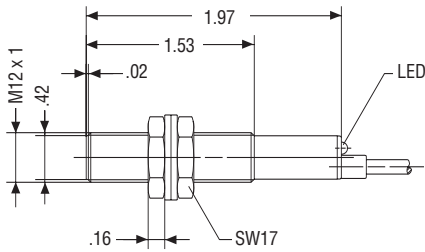
M5 x 0.5



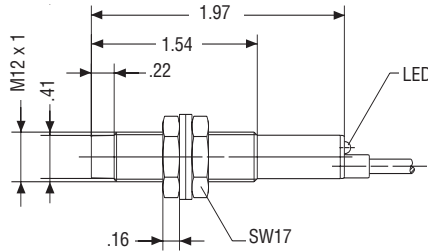
M8 x 1 Flush



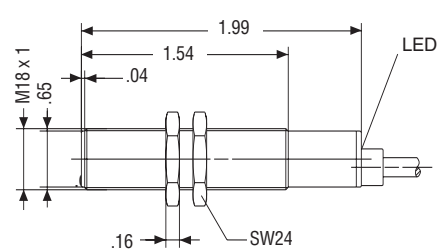
M8 x 1 Non-Flush



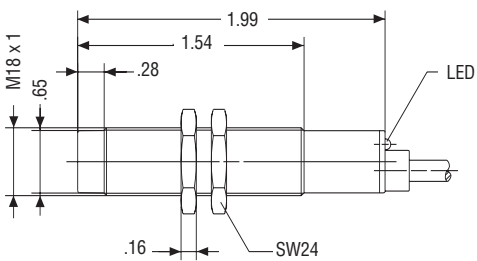
M12 x 1 Flush



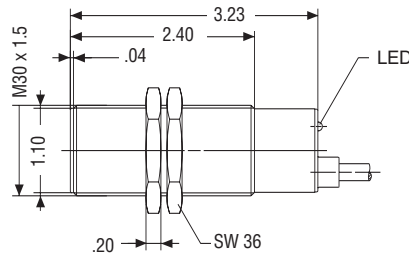
M12 x 1 Non-Flush



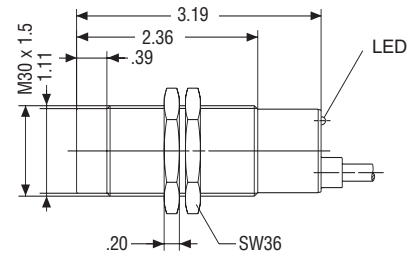
M18 x 1 Flush



M18 x 1 Non-Flush



M30 x 1.5 Flush



M30 x 1.5 Non-Flush

Inductive Proximity Sensors

M8, M12, M18, M30 - Threaded Metal Barrel
M12 x 1 Quick Disconnect/M8 x 1 Quick Disconnect
Input Voltage: 10-30 Volts DC-3 Wire
Output Types: NPN (sinking) or PNP (sourcing)
- Normally Open

- NEMA 4
- Temperature range -13°F + 158°F
- Short circuit protected
- Reverse polarity protected
- Transient noise protected
- LED function, Output energized



Sensor Selection

| Type and Construction | Sensing Range | Mounting | Switching Function | Switching Freq. Hz | Output Current | Model | Part Number |
|-----------------------|---------------|-----------|--------------------|--------------------|----------------|----------------------|--------------|
| M8 x 1* | 1.5 mm | Flush | NPN/NO | 1000 | 200 mA | KIB-M08NS/1.5 KLSM8* | 693-2342-001 |
| Threaded Metal Barrel | 1.5 mm | Flush | PNP/NO | 1000 | 200 mA | KIB-M08PS/1.5 KLSM8* | 693-2942-001 |
| Quick Disconnect | 2 mm | Non-Flush | NPN/NO | 1000 | 200 mA | KIN-M08NS/002 KLSM8* | 650-2342-004 |
| * USE M8 QD | 2 mm | Non-Flush | PNP/NO | 1000 | 200 mA | KIN-M08PS/002 KLSM8* | 650-2942-006 |
| M12 x 1 | 2 mm | Flush | NPN/NO | 800 | 200 mA | KIB-M12NS/002 KLS12 | 693-2343-001 |
| Threaded Metal Barrel | 2 mm | Flush | PNP/NO | 800 | 200 mA | KIB-M12PS/002 KLS12 | 693-2943-001 |
| Quick Disconnect | 4 mm | Non-Flush | NPN/NO | 400 | 200 mA | KIN-M12NS/004 KLS12 | 693-2344-001 |
| | 4 mm | Non-Flush | PNP/NO | 400 | 200 mA | KIN-M12PS/004 KLS12 | 693-2944-001 |
| M18 x 1 | 5 mm | Flush | NPN/NO | 500 | 200 mA | KIB-M18NS/005 KLS12 | 693-2305-004 |
| Threaded Metal Barrel | 5 mm | Flush | PNP/NO | 500 | 200 mA | KIB-M18PS/005 KLS12 | 693-2905-004 |
| Quick Disconnect | 8 mm | Non-Flush | NPN/NO | 200 | 200 mA | KIN-M18NS/008 KLS12 | 693-2306-004 |
| 10-60 VDC | 8 mm | Non-Flush | PNP/NO | 200 | 200 mA | KIN-M18PS/008 KLS12 | 693-2906-004 |
| M30 x 1 | | | | | | | |
| Threaded Metal Barrel | 10 mm | Flush | PNP/NO | 300 | 200 mA | KIB-M30PS/010 KLS12 | 650-2939-004 |
| Quick Disconnect | | | | | | | |
| 10-60 VDC | 15 mm | Non-Flush | PNP/NO | 100 | 200 mA | KIN-M30PS/015 KLS12 | 650-2935-005 |

mm x .03937 = inches

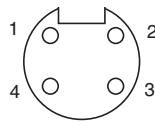
Quick Disconnect Selection (Available in 2M or 5M Cable Lengths)

M12 x 1

Quick Disconnects with Lock Nuts

Terminal Code

- 1 = brown
- 2 = black
- 3 = blue

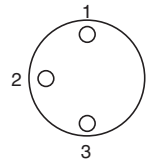


M8 x 1

Quick Disconnects with Lock Nuts

Terminal Code

- 1 = brown
- 2 = black
- 3 = blue



For M12 and M18 Sensors

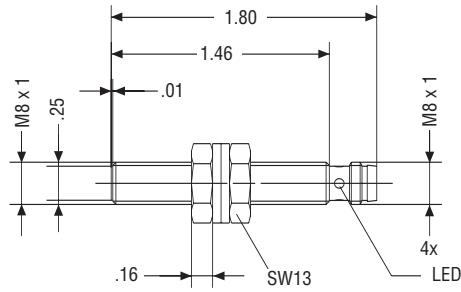
For M8 Sensors

| Cable Length | Model | Part # | 3-wire | 3-wire |
|--------------|-----------------|--------------|---------------------|---------------------|
| 2 Meters | WDK-M12US/S00-2 | 413-9100-280 | GDK-M08US/S00-2.5PU | WDK-M08US/S00-2.5PU |
| | | | 413-9100-261 | 413-9100-278 |
| 5 Meters | WDK-M12US/S00-5 | 413-9100-281 | GDK-M08US/S00-5PU | WDK-M08US/S00-5PU |
| | | | 413-9100-263 | 413-9100-279 |

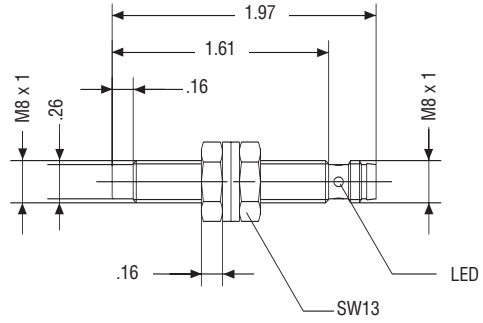
For Brackets see Page 23.



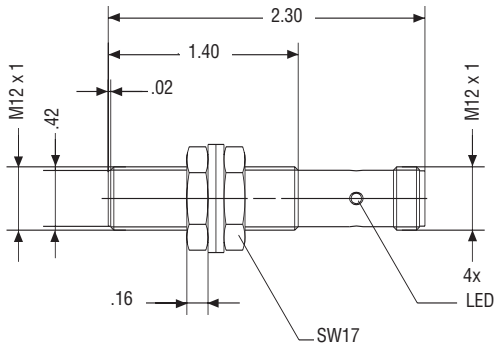
Mechanical Data (Dimensions are in inches)



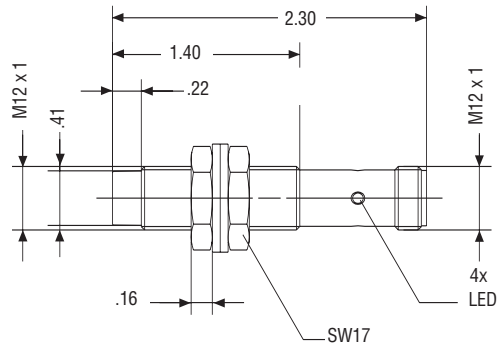
M8 x 1 Flush



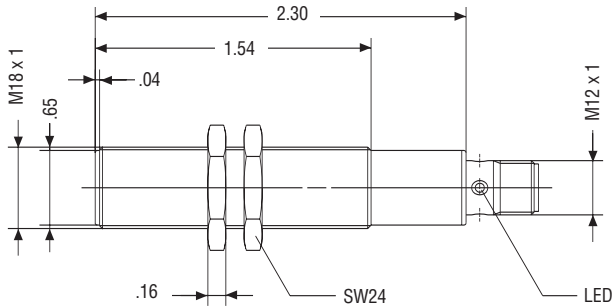
M8 x 1 Non-Flush



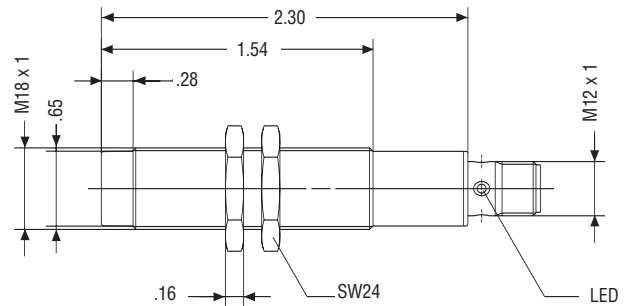
M12 x 1 Flush



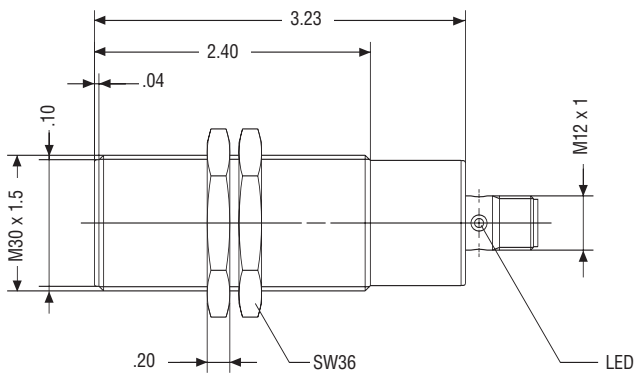
M12 x 1 Non-Flush



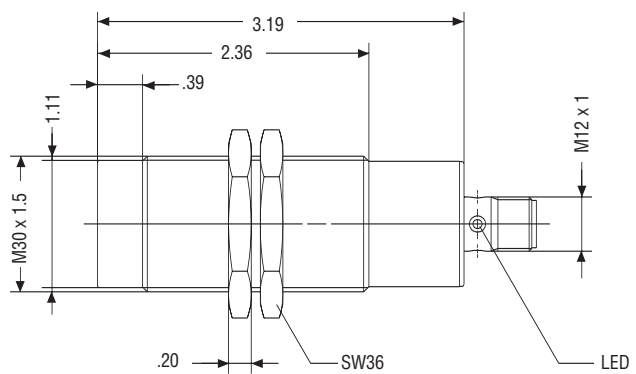
M18 x 1 Flush



M18 x 1 Non-Flush



M30 x 1.5 Flush



M30 x 1.5 Non-Flush



Inductive Proximity Sensors

2 Wire AC

M12, M18, M30 - Threaded Metal Barrel

With Potted - in Cable - 6 Feet Long

M18 - Threaded Metal Barrel

With M12 x 1 Quick Disconnect

Input Voltage: 2 Wire AC

Output: Normally Open

- NEMA 4
- Temperature range -13°F + 158°F
- Cable length, 2 meters (standard length)
- LED function, Output energized on cable version only
- Switching frequency 10 hertz



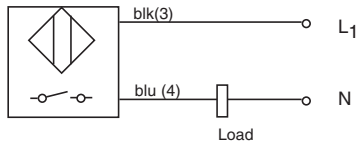
Sensor Selection

| Type and Construction | Sensing Range | Mounting | Switching Function | Input Voltage | Output Current | Model | Part Number |
|--------------------------|---------------|-----------|--------------------|---------------|----------------|------------------|--------------|
| M12 x 1 Integral Cable | 2 mm | Flush | NO | 90-250 VAC | 4/180 mA | KIB-M12AS/002 L2 | 650-3503-001 |
| Threaded Metal Barrel | 4 mm | Non-Flush | NO | 90-250 VAC | 4/180 mA | KIN-M12AS/004 L2 | 650-3504-001 |
| M18 x 1 Integral Cable | 5 mm | Flush | NO | 20-250 VAC | 4/400 mA | KIB-M18AS/005 L2 | 650-3505-004 |
| Threaded Metal Barrel | 8 mm | Non-Flush | NO | 20-250 VAC | 4/400 mA | KIN-M18AS/008 L2 | 650-3506-002 |
| M30 x 1.5 Integral Cable | 10 mm | Flush | NO | 20-250 VAC | 4/400 mA | KIB-M30AS/010 L2 | 650-3507-378 |
| Threaded Metal Barrel | 15 mm | Non-Flush | NO | 20-250 VAC | 4/400 mA | KIN-M30AS/015 L2 | 650-3508-246 |

mm x .3937 = inches

Wiring Diagram

For Sensors with Integral Cable



blk = black
blu = blue

AC – 2-wire Normally Open

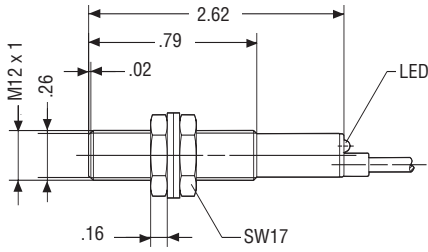
During operation, a thyristor which is positioned above a rectifier bridge applies the load to the operating voltage.

For Brackets see Page 23.

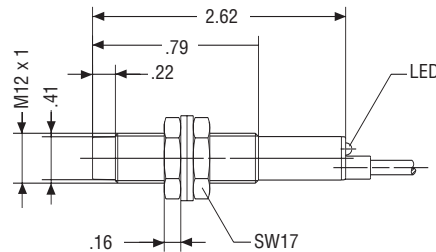


Mechanical Data (Dimensions are in inches)

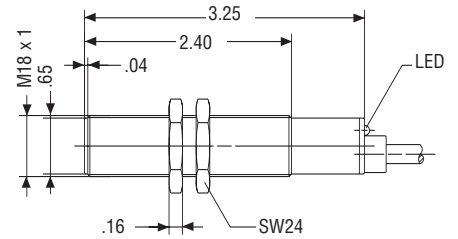
2 Wire AC



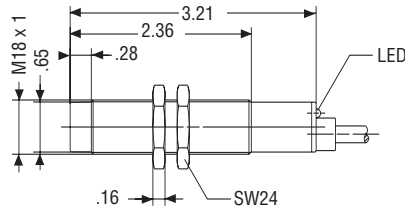
M12 x 1 Flush



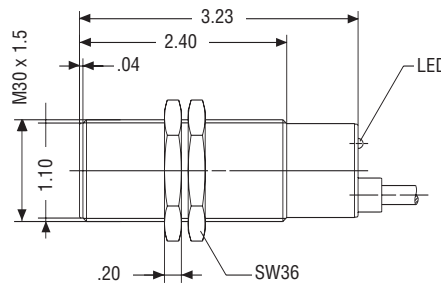
M12 x 1 Non-Flush



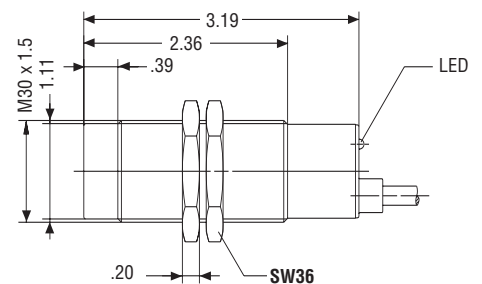
M18 x 1 Flush



M18 x 1 Non-Flush

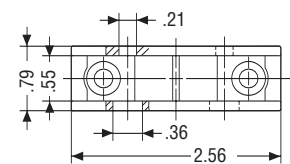
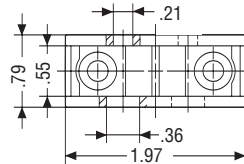
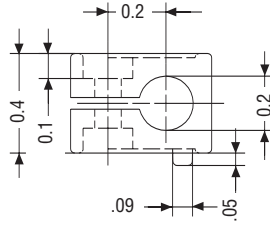
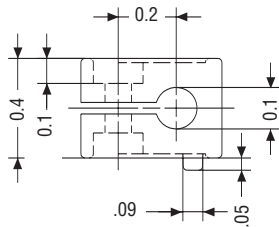
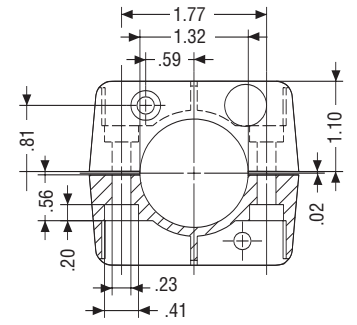
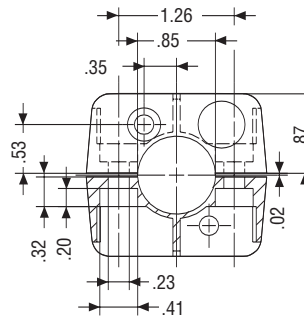
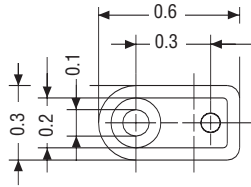
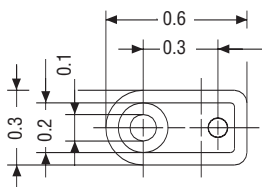


M30 x 1.5 Flush



M30 x 1.5 Non-Flush

Brackets



Model BKB-D04PA
Part # 596-0223-069

Model BKS-D05PA
Part # 596-0223-070

Model BKS-D22PA
Part # 596-0223-040

Model BKS-D34PA
Part # 596-0223-041

Capacitive Sensors

Barrel Sizes: M12, M18, M30, M32, 34mm Dia
Input Voltage: 3 Wire DC and 2 Wire AC
Integral Cable and Quick Disconnect Versions
All Sensors Fitted With Sensitivity Adjustment

- NEMA 12
- LED output indication
- Temperature range -13°F + 158°F
- Short circuit protected
- Reverse polarity protected
- Transient noise protected



Sensor Selection

| Type and Construction | Sensing Range | Input Voltage | Switching Function | Switching Freq. Hz | Output Current | Model | Part Number |
|-----------------------|---------------|---------------|--------------------|--------------------|----------------|----------------------|--------------|
| M12 x 1 | 4 mm *** | 10-36 VDC | NPN/NO | 25 | 200 mA | KCN-T12NS/004 KLP2 | 650-7319-001 |
| Threaded Plastic Body | 4 mm *** | 10-36 VDC | PNP/NO | 25 | 200 mA | KCN-T12PS/004 KLP2 | 650-7919-001 |
| M18 x 1 | 8 mm *** | 10-60 VDC | NPN/NO | 100 | 200 mA | KCA-T18NS/008 KLP2 | 650-7321-723 |
| Threaded Plastic Body | 8 mm *** | 10-60 VDC | PNP/NO | 100 | 200 mA | KCA-T18PS/008 KLP2 | 650-7921-724 |
| Quick Disconnect | 8 mm *** | 20-250 VAC | NO | 15 | 5/300 mA | KCN-T18AS/008 LP2 | 650-8521-001 |
| Quick Disconnect | 8 mm *** | 10-60 VDC | NPN/NO | 25 | 200 mA | KCN-T18NS/008 KLPSM8 | 650-7321-002 |
| Quick Disconnect | 8 mm *** | 10-60 VDC | PNP/NO | 25 | 200 mA | KCN-T18PS/008 KLPSM8 | 650-7921-002 |
| Quick Disconnect | 8 mm *** | 20-250 VAC | NO | 15 | 5/300 mA | KCN-T18AS/008 LPS12A | 650-8521-004 |
| M30 x 1.5 | 20 mm*** | 10-60 VDC | NPN/NO | 25 | 400 mA | KCN-T30NS/020 KLP2 | 650-7323-001 |
| Threaded Plastic Body | 20 mm*** | 10-60 VDC | PNP/NO | 25 | 400 mA | KCN-T30PS/020 KLP2 | 650-7923-727 |
| Quick Disconnect | 20 mm*** | 20-250 VAC | NO | 15 | 5/300 mA | KCN-T30AS/020 LP2 | 650-8523-001 |
| M32 x 1.5 | 30 mm*** | 10-60 VDC | NPN/PNP* | 25 | 400 mA | KCN-T32DP/030 KLP2 | 650-7013-001 |
| Threaded Plastic Body | | | NO/NC | | | | |
| M32 x 1.5 | 15 mm** | 10-60 VDC | NPN/PNP* | 25 | 400 mA | KCB-M32DP/015 KLP2 | 650-7013-011 |
| Threaded Metal Body | Flush | | NO/NC | | | | |
| 34mm dia. | 30 mm*** | 10-60 VDC | NPN/NO | 10 | 400 mA | KCN-R34NS/030 KLP2 | 650-7315-001 |
| Smooth Plastic Body | 30 mm*** | 10-60 VDC | PNP/NO | 10 | 400 mA | KCN-R34PS/030 KLP2 | 650-7915-001 |
| | 30 mm*** | 48-250 VAC | NO | 10 | 10/300 mA | KCN-R34AS/030 LP2 | 650-8515-001 |

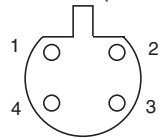
* See Wiring Diagram PNP/NPN Switch Selectable

** This sensor can be mounted flush.

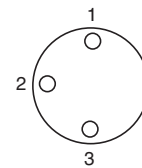
*** These Capacitive Sensors are Non-Flush Mount, Adjustable by Sensitivity Adjustment

Quick Disconnect Selection (Available in 2 M or 5 M Cable Lengths)

M12 x 1
Quick Disconnect
AC Input Voltage



M8 x 1
Quick Disconnect
DC Input Voltage

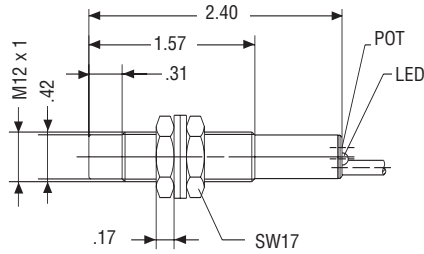


| | 2-wire | 2-wire | 3-wire | 3-wire |
|---------------|-----------------|-----------------|---------------------|---------------------|
| Model | GDK-M12AS/S00-2 | WDK-M12AS/S00-2 | GDK-M08US/S00-2.5PU | WDK-M08US/S00-2.5PU |
| Part # | 413-9100-248 | 413-9100-250 | 413-9100-261 | 413-9100-278 |
| Model | GDK-M12AS/S00-5 | | GDK-M08US/S00-5PU | WDK-M08US/S00-5PU |
| Part # | 413-9100-249 | | 413-9100-263 | 413-9100-279 |

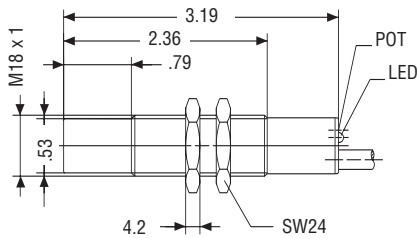
For Brackets see Page 23.



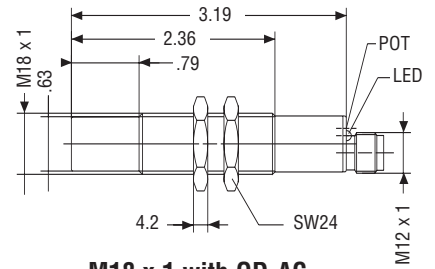
Mechanical Data (Dimensions are in inches)



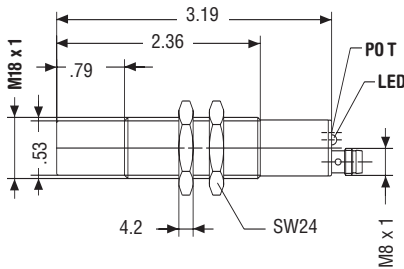
M12 x 1 with Cable



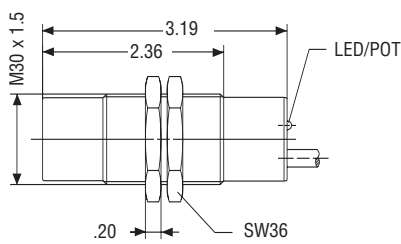
M18 x 1 with Cable



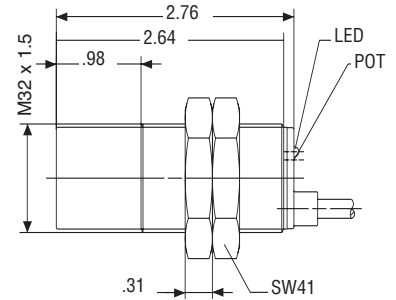
M18 x 1 with QD-AC



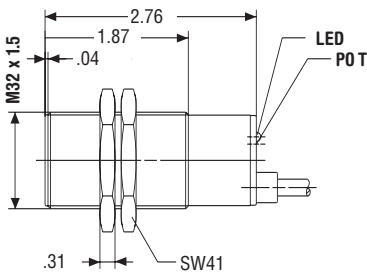
M18 x 1 with QD-DC



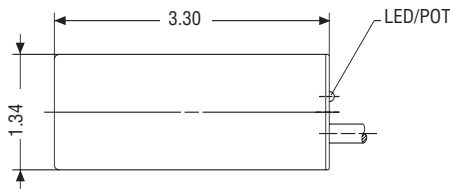
M30 x 1.5 with Cable



M32 x 1.5 Plastic with Cable

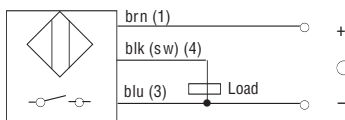


M32 x 1.5 Metal with Cable



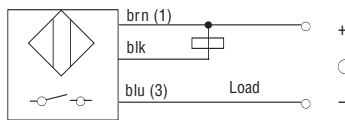
34 mm Dia. with Cable

Wiring Diagram



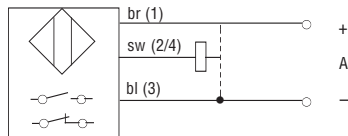
PNP Normally Open

During operation, output of PNP transistor is switched to positive .



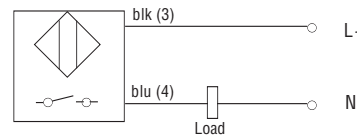
NPN Normally Open

During operation, output of NPN transistor is switched to negative.



*PNP/NPN Switch selectable

Two integrated switches selection between PNP/NPN switching and normally open/ normally closed functions.



2 Wire AC Normally Open

During operation, a thyristor which is positioned above a rectifier bridge applies the load to the operating voltage.

brn = Brown
blk = Black
blu = Blue
sw = Switch

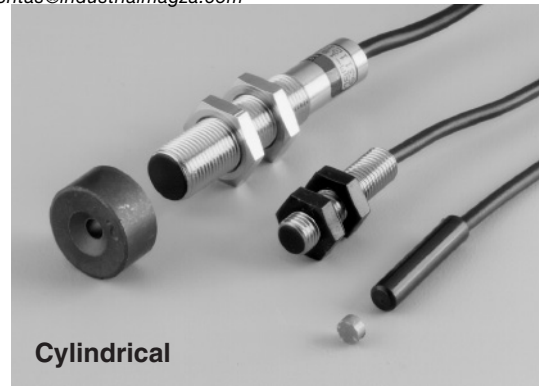
Magnetic Sensors

Description

A magnetic sensor is a simple, inexpensive sensing device that can be used in very harsh environments because its completely sealed housing makes it unaffected by heavy dust or corrosive atmospheres.

The basic sensor system consists of a sensor and a magnet and can be typically used in food production, printing, and packaging industries. Their rugged construction also makes magnetic sensors suitable for agricultural applications.

The operating component in the magnetic sensor is a reed switch.



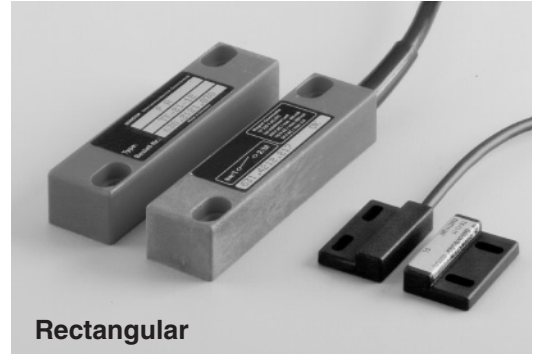
Cylindrical

Operation of a Magnetic Sensor

These sensors are used mainly as proximity switches. The magnet and sensor must be positioned correctly so the strength of the flux magnet and the sensitivity of the sensor operate to the specified sensing distance. Sensor operation does not depend on direction or angle of travel.

Features

- NEMA 4, 4X
- Temperature range -13°F + 158°F
- Cable length, 3 feet (standard length)
- Extremely stable switching point
- Repeatability better than 0.025 inch
- Life expectancy 10⁷ switching operations
- Extremely cost effective
- Operating voltage up to 250 VAC



Rectangular

Sensor Selection

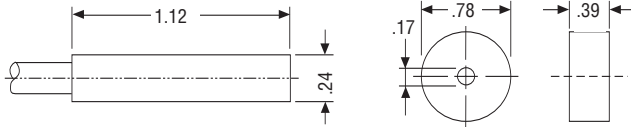
| Sensor and Magnet Combination | *Sensing Range | Max Supply Volts | **Switching Function | Max Power/Current | Output Current At 120VAC | Model | Part Number |
|--|----------------|------------------|----------------------|-------------------|--------------------------|------------------------|------------------------------|
| Smooth Plastic Barrel/MA-30
Magnet T-67 N/S | 0.1 inch | 250 VAC | NO | 10 VA/0.5 A | 80 mA | MAK-3012-B
T-67 N/S | 631-1230-571
630-1167-054 |
| Threaded Metal Barrel/MA-08
Magnet T-62 N/S | 0.6 inch | 250 VAC | NO | 10 VA/0.5 A | 80 mA | MAN-0812-B
T-62 N/S | 631-1208-596
630-1262-039 |
| Threaded Metal Barrel/MA-23
Magnet T-62 N/S | 0.3 inch | 250 VAC | NO | 100 VA/3 A | 830 mA | MAM-2312-F
T-62 N/S | 631-4223-268
630-1262-039 |
| Rectangular Plastic/MA-11
Magnet TK-11-11 | 0.4 inch | 250 VAC | NO | 10 VA/0.5 A | 80 mA | MAK-1112-B
TK-11-11 | 631-1211-541
630-2111-047 |
| Rectangular Plastic/MA-12
Magnet TK-21-12 | 0.8 inch | 250 VAC | NO | 100 VA/0.3 A | 830 mA | MAK-1212-F
TK-21-12 | 631-4212-217
630-2121-030 |
| Rectangular Plastic/MA-45
Magnet TK-45 | 0.4 inch | 250 VAC | NO | 10 VA/0.5 A | 80 mA | MAK-4512-B
TK-45 | 631-1245-539
630-2145-048 |
| Rectangular Plastic/MA-42
Magnet TK-42 | 1.0 inch | 250 VAC | NO | 100 VA/3 A | 830 mA | MAK-4212-F
TK-42 | 631-4242-533
630-2142-049 |

*Sensing range is based on the use of the specified magnet.

**NO = Normally Open



Mechanical Data (Dimensions are in inches)



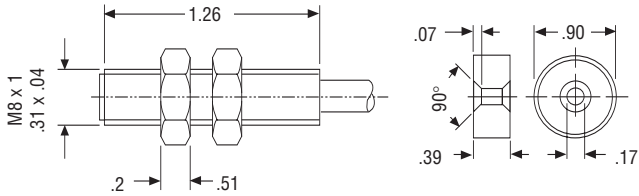
Sensor MA-30
Part # 631-1230-571

Magnet T-67 N/S
Part # 630-1167-054

Mounting Instructions for Mounting a Magnetic Sensor on Ferrous Materials

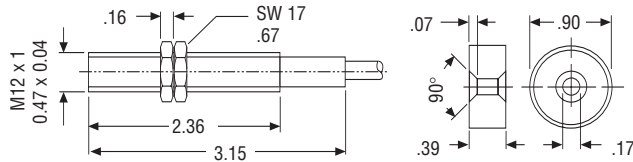
If a magnet and magnetic sensor are mounted on ferrous materials, the specified sensing distance will be reduced. To ensure good operation, the magnet and switch should be a minimum of 0.6 inch from the ferrous material.

Sensor and Magnets are purchased independently.



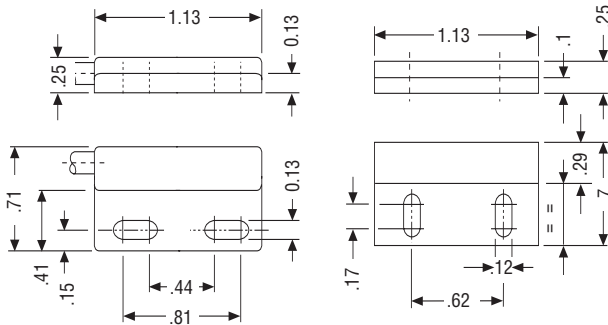
Sensor MA-08
Part # 631-1208-596

Magnet T-62 N/S
Part # 630-1262-039



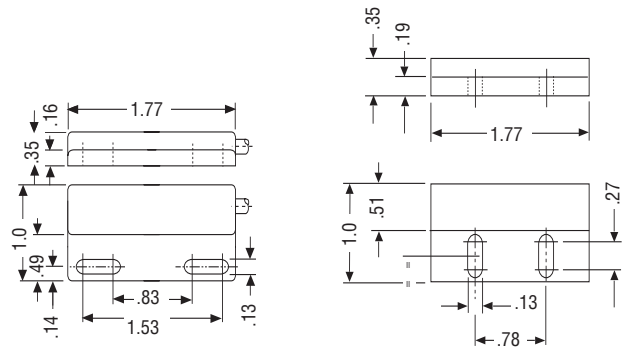
Sensor MA-23
Part # 631-4223-268

Magnet T-62 N/S
Part # 630-1262-039



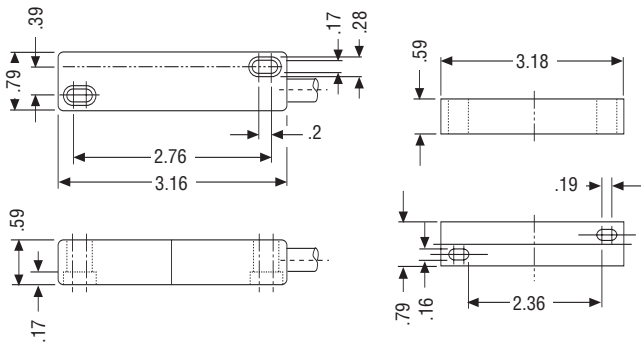
Sensor MA-11
Part # 631-1211-541

Magnet TK-11-11
Part # 630-2111-047



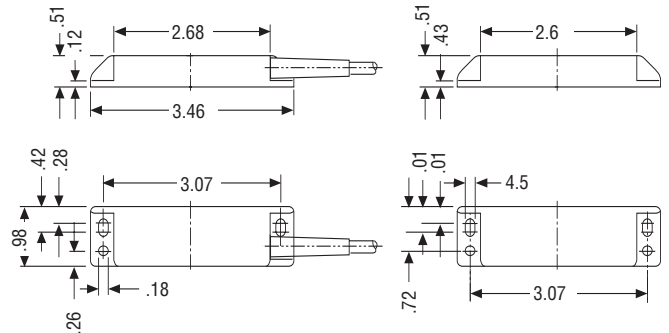
Sensor MA-45
Part # 631-1245-539

Magnet TK-45
Part # 630-2145-048



Sensor MA-12
Part # 631-4212-217

Magnet TK-21-12
Part # 630-2121-030



Sensor MA-42
Part # 631-4242-533

Magnet TK-42
Part # 630-2142-049

Sensor Controls

Description

The Warner Electric range of sensor controls are designed to aid the use of sensors in fulfilling applications by adding an extra dimension to a sensor's capability.

These controls act as a simple interface to allow the output signal of the sensor to be converted from a solid state transistor to a relay.

All controls offered have 110 VAC input voltage capability and, in the case of the MCS-149/814 'plug-in' modules are available with added timing and counting features. (see note 1 below)

All the MCS-680 Series controls are 'DIN-rail' mount, with the MCS 680-1 being the only control to offer a programmable timing circuit as standard. (see note 2 below)



Control Selection

| Model Part Number | MCS-149/814
6210-448-003 | MCS-680
7500-448-008 | MCS-680-1
7500-448-009 | MCS-680-3
651-2101-045 |
|-----------------------|-----------------------------|--------------------------|---------------------------|---------------------------|
| Function | 1 x Input
1 x Output | 1 x Input
1 x Output | 1 x Input
1 x Output | 1 x Input
1 x Output |
| Operating Voltage | 120 VAC | 120/240 VAC | 120/240 VAC | 120 VAC |
| DC Output | 12V at 250 mA | 12V at 90 mA | 12V at 90 mA | 10-20 VDC |
| Input Signal Accepted | NPN | NPN | NPN | NPN or PNP |
| Output Relay | MCS-814
7 Amp DPDT | MCS-850
5 Amp SPDT | MCS-850
5 Amp SPDT | 1 x 10 A
SPDT |
| Timing Functions | Optional (note 1) | N/A | integral (note 2) | N/A |
| Operating Temperature | -30°F to 140°F | -4°F to 140°F | -4°F to 140°F | -4°F to 140°F |
| Mounting | 4 Mounting
Holes | TS 35 DIN
Screw Mount | TS 35 DIN
Screw Mount | TS 35 DIN |
| NEMA Rating | NEMA 12 | NEMA 1 | NEMA 1 | NEMA 1 |

MCS-149/814 (Note 1)

Plug-in Modules (Order Separately)

Timer Modules

| Model | Part Number | Timing Range |
|-----------|--------------|-------------------|
| MCS-836 | 7400-448-024 | 0.4 to 15 seconds |
| MCS-836-1 | 7400-448-029 | 1 to 30 seconds |

Timing Functions (Programmable)

Delay Pull, Delay Drop, Dual Delay, One-Shot, One-Shot Drop, Delayed One-Shot, Delayed One-Shot Drop

Counter Modules

| Model | Part Number | Switching Type |
|---------|--------------|----------------|
| MCS-831 | 7400-448-019 | 1 to 99 |
| MCS-832 | 7400-448-020 | 1 to 9999 |

Output Module (Supplied as Standard)

| Model | Part Number | Switching Type |
|---------|--------------|----------------|
| MCS-814 | 7410-448-008 | DPDT 7 Amp |

MCS-680-1 (Note 2)

Timer Functions (Integrated)

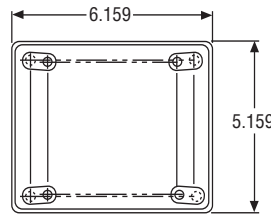
Delay Pull / Delay Drop / One Shot

Timing Range - 0.1 to 10 seconds

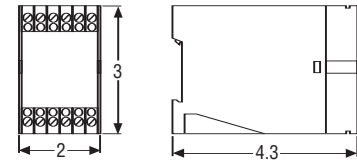
Output Relay (Supplied as Standard)

| Model | Part Number | Switching Type |
|---------|--------------|----------------|
| MCS-850 | 7150-101-016 | SPDT 5 Amp |

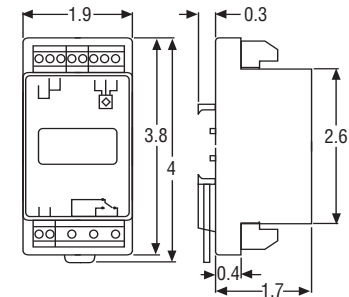
Mechanical Drawing (Dimensions are in inches)



MCS-149/814



MCS-680-1/2



MCS-680-3



Limit Switches

Thermoplastic International Style



Ti2 Body Style

Body Style Ti2

- Insulating plastic housing and integral cover
- Mounting and dimensions conform to DIN EN 50047
- Actuator head position can be changed in 90° increments
- Contacts galvanically isolated
- One cable entry point
- Conduit adapter or cord grip provided
- Manufactured per IEC 947-5-1 and VDE 0660 T200
- UL, CSA and BG approved
- Can be used as component in safety applications

Enclosure Body: PBT, Glass Fiber Reinforced (UL 94-V0)
Enclosure Cover: PA6.6 (Black)
Protection Class: NEMA 4
Mechanical Life: 3 x 10⁶
Temperature: -22°F to + 176°F
Switch Rate: 100 per minute max.

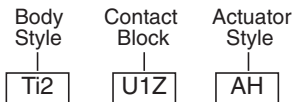
Contact Block Technical Data

| Type | Contacts | Action | Forced Disconnect | Voltage (max.) | Current (max.) |
|------|---------------|--------|-------------------|----------------|----------------|
| U1Z | 1 N.C. 1 N.O. | Slow | Yes | 250 VAC | 10 A |
| SU1Z | 1 N.C. 1 N.O. | Snap | Yes | 250 VAC | 10 A |

Notes:

1. All Contact Blocks Break-Before-Make
2. Normally Closed Contacts (⊖) Forced Disconnect per IEC 947-5-1 Ch.3 (As Indicated)

Model Identification



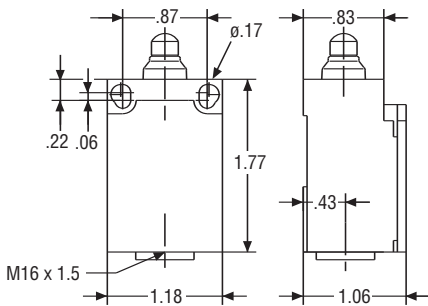
Switch Selection

| Model | Part Number |
|--------------|--------------|
| Ti2-U1 AD | 608-8137-027 |
| Ti2-U1Z AH | 608-8135-021 |
| Ti2-SU1Z AH | 608-8185-022 |
| Ti2-SU1Z FF | 608-8190-040 |
| Ti2-U1Z Hw | 608-8121-015 |
| Ti2-SU1Z Hw | 608-8171-016 |
| Ti2-U1Z w | 608-8103-001 |
| Ti2-SU1Z w | 608-8153-002 |
| Ti2-U1Z Riw | 608-8117-007 |
| Ti2-SU1Z Riw | 608-8167-008 |

SUVA Approved for Safety Applications

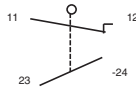
Mechanical Data

(Dimensions are in inches)

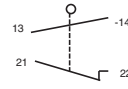


Contact Block Wiring Details

U1Z - Slow Make-and-Break



SU1Z Snap Action

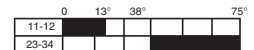
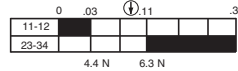


Types of Contact Block and Action

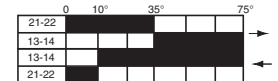
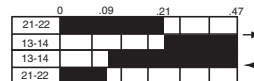
Linear Type Actuator

Rotary Type Lever

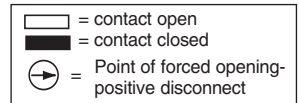
U1Z Break-Before-Make the NC contact opens before the NO contact closes



SU1 Snap action → arrow indicates direction of travel



11-12, 21-22, 23-24 Indicates terminal identification for wiring.
 Operating force shown in Newtons. Newtons x .2248 = lbs.
 Graduation Tolerance ± 3.5°
 Accuracy of switching point ± .009
 Tolerance of switching pressure ± 10%



Switching Action Explanation

Slow Action

- Used in precision applications for switching on and off at the exact point
- Contact closes at the same speed as actuator/lever

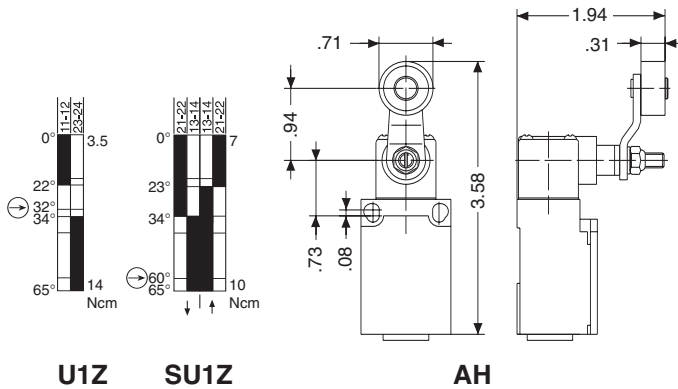
Snap Action

- Used when good solid contact is required
- Used with inductive loads to prevent arcing

Mechanical Drawing Data

Contact Block Data

Mechanical Data (Dimensions are in inches)



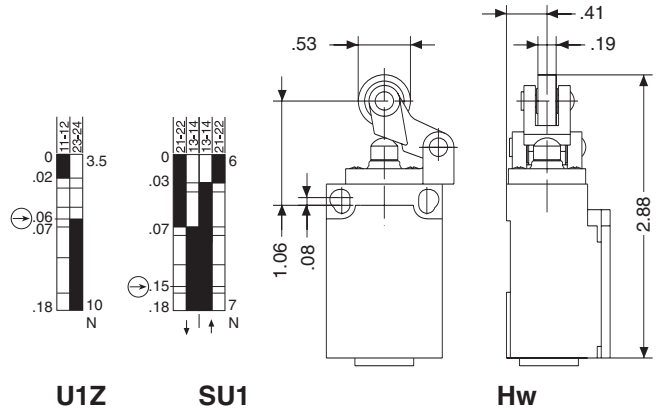
U1Z

SU1Z

AH

Contact Block Data

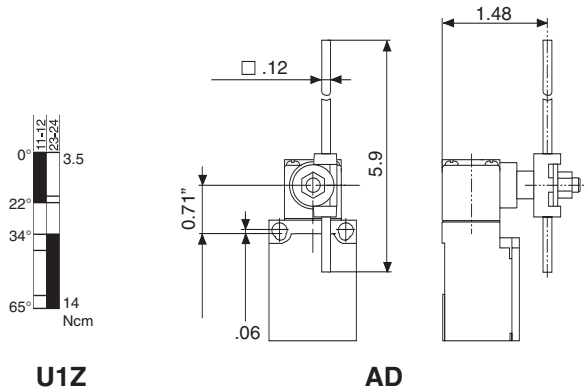
Mechanical Data (Dimensions are in inches)



U1Z

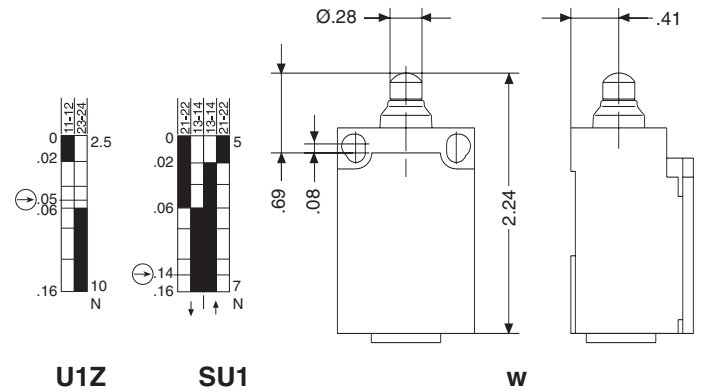
SU1

Hw



U1Z

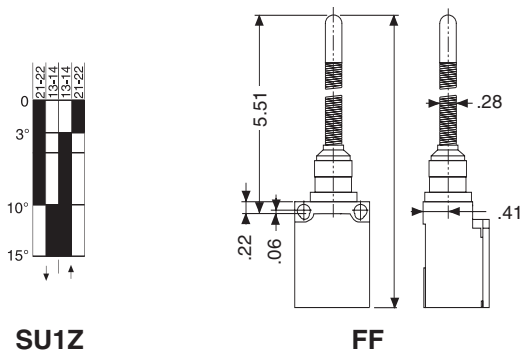
AD



U1Z

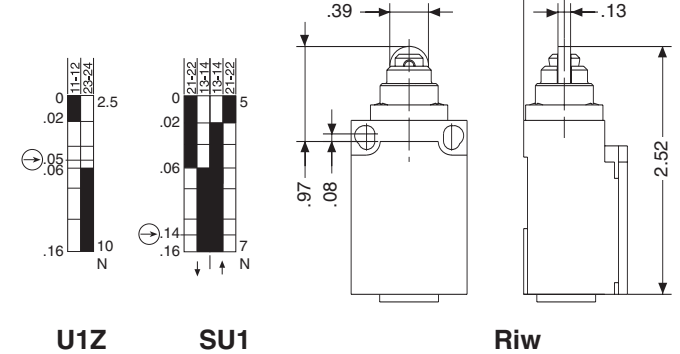
SU1

w



SU1Z

FF



U1Z

SU1

Riw

☉ = Point of Forced Opening, Positive Disconnect
 U1Z = Slow Make-and-Break with Positive Disconnect
 SU1Z = Snap Action with Positive Disconnect

Mechanical Limit Switches

Thermoplastic International Style



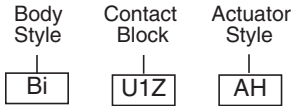
Body Style Bi

- Insulating plastic housing and integral cover
- Mounting and dimensions conform to DIN EN 50047
- Actuator head position can be changed in 90° increments
- Contacts galvanically isolated
- Two cable entry points
- Conduit adapter or cord grip provided
- Manufactured per IEC 947-5-1 and VDE 0660 T200
- UL, CSA and SEV approved

Enclosure Body: PA 6 Thermoplastic (UL 94-V0)
Enclosure Cover: PC Thermoplastic (UL 94-V0)
Protection Class: NEMA 4
Mechanical Life: 10 x 10⁶ Cycles
Temperature: -22°F to + 176°F
Switch Rate: 100 per minute max.

Bi Body Style

Model Identification



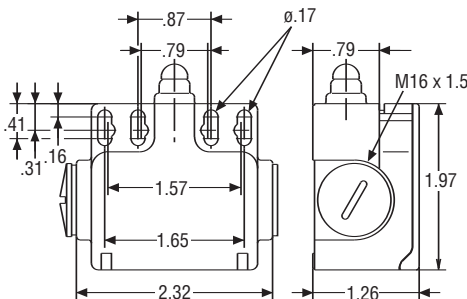
Switch Selection

| Model | Part Number |
|--------------|--------------|
| Bi-U1 AD | 608-5137-007 |
| Bi-SU1Z AH* | 608-5185-012 |
| Bi-SU1 AV | 608-5186-013 |
| Bi-SU1 FF | 608-5190-015 |
| Bi-SU1Z Hw* | 608-5171-017 |
| Bi-U1Z w* | 608-5103-001 |
| Bi-SU1Z w* | 608-5153-008 |
| Bi-U1Z Riw* | 608-5117-002 |
| Bi-SU1Z Riw* | 608-5167-009 |

*SUVA approved for safety applications
 Many more styles of actuators available.
 Contact local factory for more information.

Mechanical Data

(Dimensions are in inches)



Contact Block Technical Data

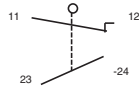
| Type | Contacts | Action | Forced Disconnect | Voltage (max.) | Current (max.) |
|------|---------------|--------|-------------------|----------------|----------------|
| U1Z | 1 N.C. 1 N.O. | Slow | Yes | 500 VAC | 10 A |
| SU1Z | 1 N.C. 1 N.O. | Snap | Yes | 500 VAC | 10 A |
| SU1 | 1 N.C. 1 N.O. | Snap | No | 500 VAC | 10 A |

Notes:

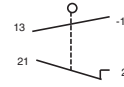
1. All Contact Blocks Break-Before-Make
2. Normally Closed Contacts Forced Disconnect per IEC 947-5-1 Ch.3 (As Indicated)

Contact Block Wiring Details

U1Z - Slow Make-and-Break

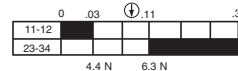


SU1Z Snap Action



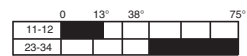
Types of Contact Block and Action

U1Z Break-Before-Make the NC contact opens before the NO contact closes

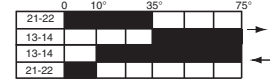


Linear Type Actuator

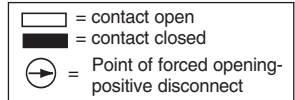
Rotary Type Lever



SU1Z Snap action indicates direction of travel



11-12, 21-22, 23-24 Indicates terminal identification for wiring.
 Operating force shown in Newtons. Newtons x .2248 = lbs.
 Graduation Tolerance ± 3.5°
 Accuracy of switching point ± .009
 Tolerance of switching pressure ± 10%



Switching Action Explanation

Slow Action

- Used in precision applications for switching on and off at the exact point
- Contact closes at the same speed as actuator/lever

Snap Action

- Used when good solid contact is required
- Used with inductive loads to prevent arcing



INDUSTRIAL MAGZA

MEX (55) 53 63 23 31 MTY (81) 83 54 10 18

Mechanical Data

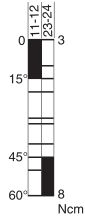
(Dimensions are in inches)

Contact Block Data

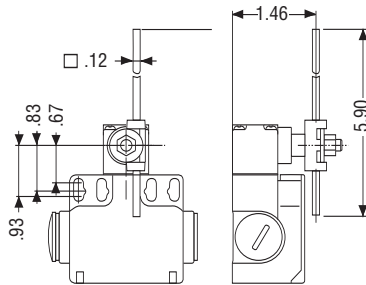
Contact Block Data

Mechanical Data

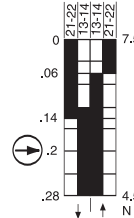
(Dimensions are in inches)



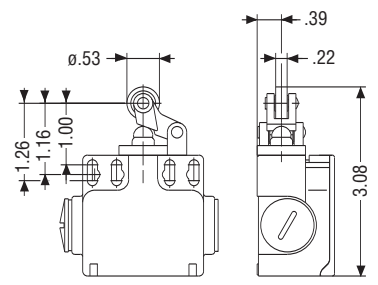
U1



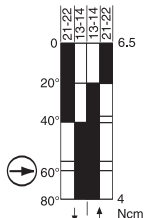
AD



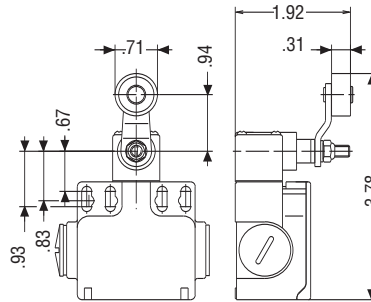
SU1Z



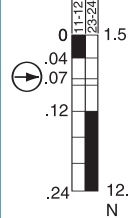
Hw



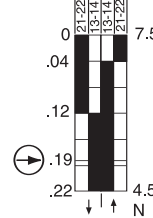
SU1Z



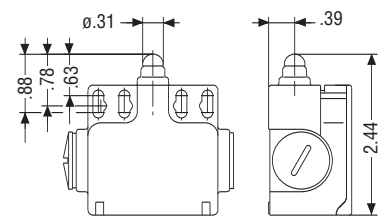
AH



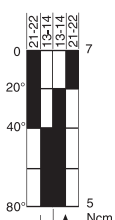
U1Z



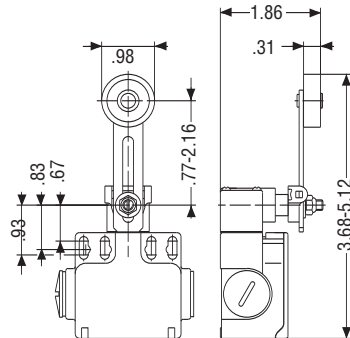
SU1Z



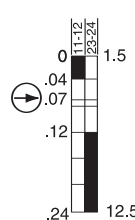
w



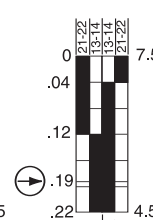
SU1



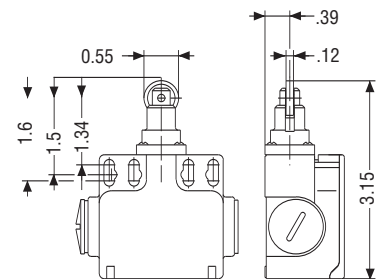
AV



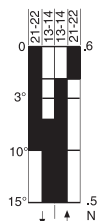
U1Z



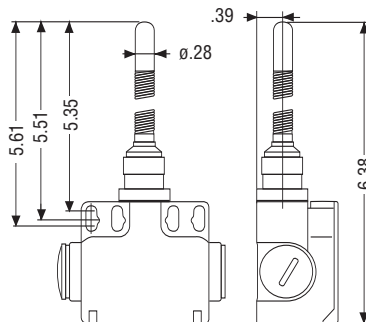
SU1Z



Riw



SU1



FF

- ⊕ = Point of Forced Opening, Positive Disconnect
- U1Z = Slow Make-and-Break
- SU1Z = Snap Action with Positive Disconnect
- SU1 = Snap Action



Mechanical Limit Switches

Thermoplastic International Style

Body Style I88

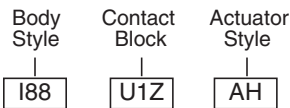
- Insulating plastic housing and integral cover
- Mounting and dimensions conform to DIN EN 50047
- Actuator head position can be changed in 90° increments
- Contacts galvanically isolated
- One cable entry point
- Conduit adapter or cord grip provided
- Manufactured per IEC 947-5-1 and VDE 0660 T200
- UL, CSA and SEV Approved

Enclosure Body: PA 6 Thermoplastic (UL 94-V0)
Enclosure Cover: PC Thermoplastic (UL 94-V0)
Protection Class: NEMA 4
Mechanical Life: 10 x 10⁶ Cycles
Temperature: -22°F to + 176°F
Switch Rate: 100 per minute max.



I88 Body Style

Model Identification



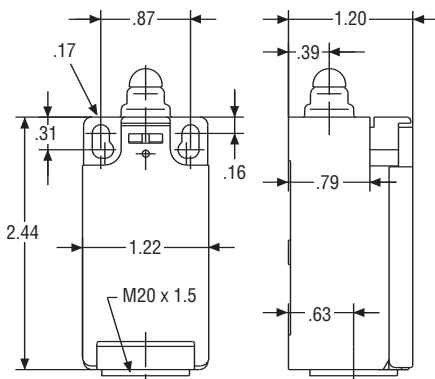
Switch Selection

| Model | Part Number |
|----------------|--------------|
| I88-SU1 AD | 608-6187-042 |
| I88-U1Z AH* | 608-6135-033 |
| I88-SU1Z AH* | 608-6185-034 |
| I88-SU1 AF | 608-6139-054 |
| I88-U1 AV | 608-6136-037 |
| I88-SU1Z Hw* | 608-6171-022 |
| I88-U1Z Hw* | 608-6121-021 |
| I88-U1Z w* | 608-6103-008 |
| I88-SU1Z w* | 608-6153-012 |
| I88-U1Z RiWk* | 608-6117-017 |
| I88-SU1Z RiWk* | 608-6167-018 |

* SUVA Approved for safety applications. Many more styles of actuators available. Contact local factory for more information.

Mechanical Data

(Dimensions are in inches)



Contact Block Technical Data

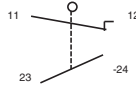
| Type | Contacts | Action | Forced Disconnect | Voltage (max.) | Current (max.) |
|------|---------------|--------|-------------------|----------------|----------------|
| U1Z | 1 N.C. 1 N.O. | Slow | Yes | 500 VAC | 10 A |
| SU1Z | 1 N.C. 1 N.O. | Snap | Yes | 500 VAC | 10 A |
| SU1 | 1 N.C. 1 N.O. | Snap | No | 500 VAC | 10 A |

Notes:

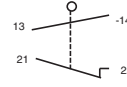
1. All Contact Blocks Break-Before-Make
2. Normally Closed Contacts (⊖) Forced Disconnect per IEC 947-5-1 Ch.3 (as indicated)

Contact Block Wiring Details

U1Z - Slow Make-and-Break



SU1Z Snap Action

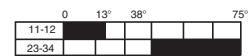
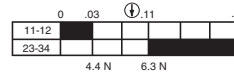


Types of Contact Block and Action

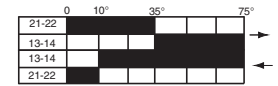
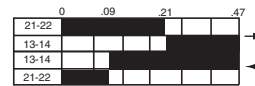
Linear Type Actuator

Rotary Type Lever

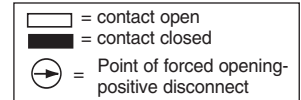
U1Z Break-Before-Make the NC contact opens before the NO contact closes



SU1Z Snap action → arrow indicates direction of travel



11-12, 21-22, 23-24 Indicates terminal identification for wiring. Operating force shown in Newtons. Newtons x .2248 = lbs. Graduation Tolerance ± 3.5° Accuracy of switching point ± .009 Tolerance of switching pressure ± 10%



Switching Action Explanation

Slow Action

- Used in precision applications for switching on and off at the exact point
- Contact closes at the same speed as actuator/lever

Snap Action

- Used when good solid contact is required
- Used with inductive loads to prevent arcing

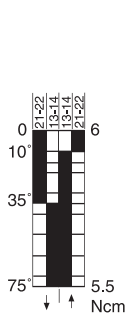


Contact Block Data

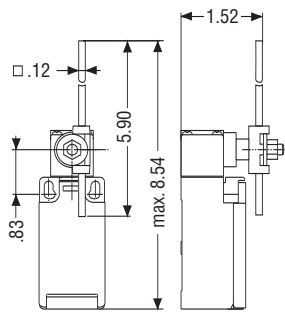
Mechanical Data
(Dimensions are in inches)

Contact Block Data

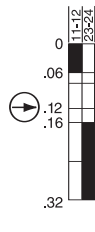
Mechanical Data
(Dimensions are in inches)



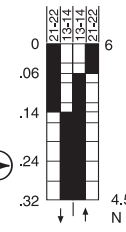
SU1



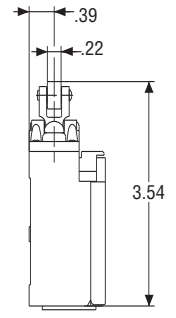
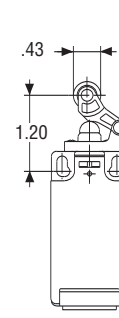
AD



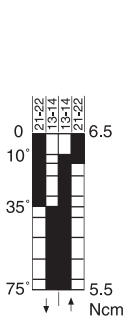
U1Z



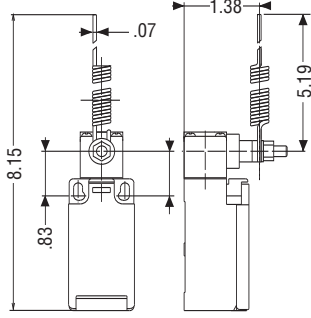
SU1Z



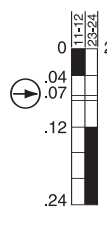
Hw



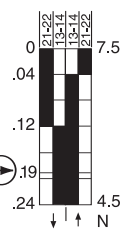
SU1



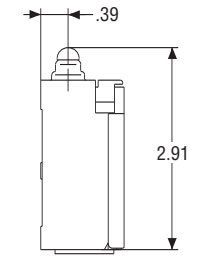
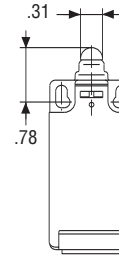
AF



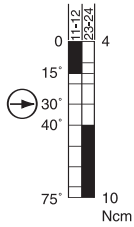
U1Z



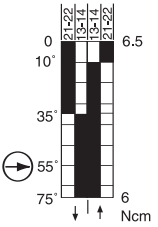
SU1Z



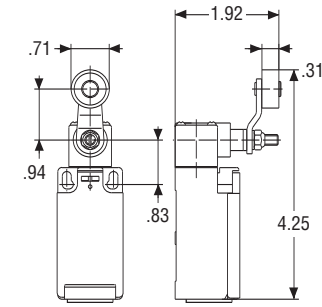
w



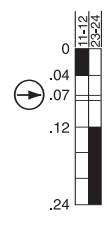
U1Z



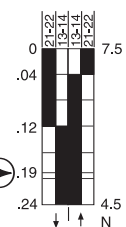
SU1Z



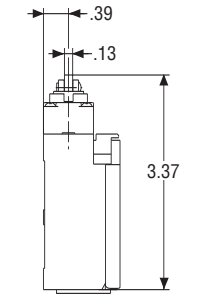
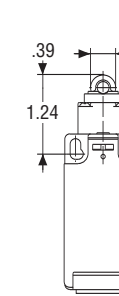
AH



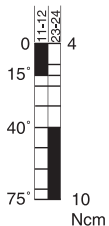
U1Z



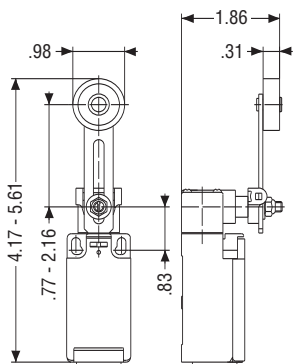
SU1Z



RiwK



U1



AV

- ⊕ = Point of Forced Opening, Positive Disconnect
- U1Z = Slow Make-and-Break
- SU1Z = Snap Action with Positive Disconnect
- SU1 = Snap Action

Mechanical Limit Switches

Thermoplastic International Style

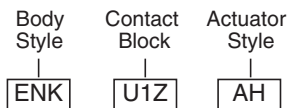


Body Style ENK

- Insulating plastic housing and integral cover
- Mounting and dimensions conform to DIN EN 50041
- Actuator head position can be changed in 90° increments
- Contacts galvanically isolated
- One cable entry point
- Conduit adapter or cord grip provided
- Manufactured per IEC 947-5-1 and VDE 0660 T200
- UL, CSA and SEV Approved

Enclosure Body: PA 6 Thermoplastic (UL 94-V0)
Enclosure Cover: PC Thermoplastic (UL 94-V0)
Protection Class: NEMA 4
Mechanical Life: 10 x 10⁶ Cycles
Temperature: -22°F to + 176°F
Switch Rate: 100 per minute max.

Model Identification



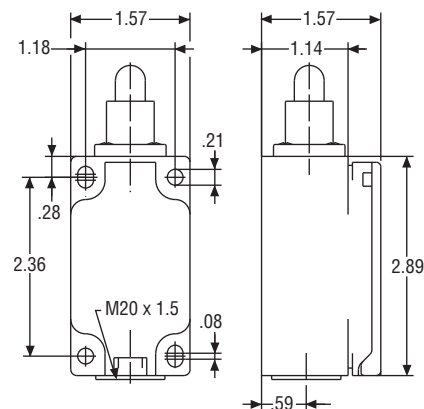
Switch Selection

| Model | Part Number |
|----------------|--------------|
| ENK-U1Z AD | 608-1137-011 |
| ENK-SU1Z AD | 608-1187-017 |
| ENK-U1Z AHS-V | 608-1135-003 |
| ENK-SU1Z AHS-V | 608-1185-009 |
| ENK-U1 AV | 608-1136-012 |
| ENK-SU1 AV | 608-1186-018 |
| ENK-SU1 FF | 608-1190-045 |
| ENK-U1Z Riw* | 608-1117-002 |
| ENK-SU1Z Riw* | 608-1167-008 |
| ENK-U1Z iw* | 608-1102-001 |
| ENK-SU1Z iw* | 608-1152-007 |

* SUVA Approved for safety applications. Many more styles of actuators and contact blocks available. Contact factory for more information.

Mechanical Data

(Dimensions are in inches)



Contact Block Technical Data

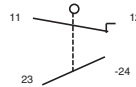
| Type | Contacts | Action | Forced Disconnect | Voltage (max.) | Current (max.) |
|------|---------------|--------|-------------------|----------------|----------------|
| U1Z | 1 N.C. 1 N.O. | Slow | Yes | 500 VAC | 10 A |
| SU1Z | 1 N.C. 1 N.O. | Snap | Yes | 500 VAC | 10 A |
| SU1 | 1 N.C. 1 N.O. | Snap | No | 500 VAC | 10 A |

Notes:

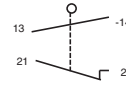
1. All Contact Blocks Break-Before-Make
2. Normally Closed Contacts (⊖) Forced Disconnect per IEC 947-5-1 Ch.3 (As Indicated)

Contact Block Wiring Details

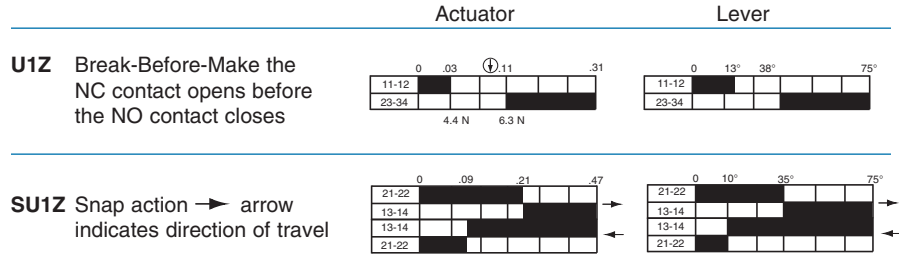
U1Z - Slow Make-and-Break



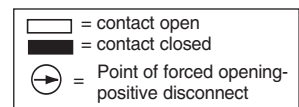
SU1Z Snap Action



Types of Contact Block and Action



11-12, 21-22, 23-24 Indicates terminal identification for wiring. Operating force shown in Newtons. Newtons x .2248 = lbs. Graduation Tolerance ± 3.5° Accuracy of switching point ± .009 Tolerance of switching pressure ± 10%



Switching Action Explanation

Slow Action

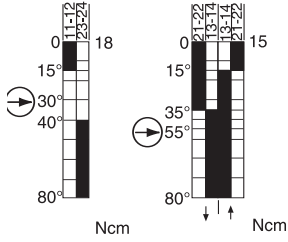
- Used in precision applications for switching on and off at the exact point
- Contact closes at the same speed as actuator/lever

Snap Action

- Used when good solid contact is required
- Used with inductive loads to prevent arcing

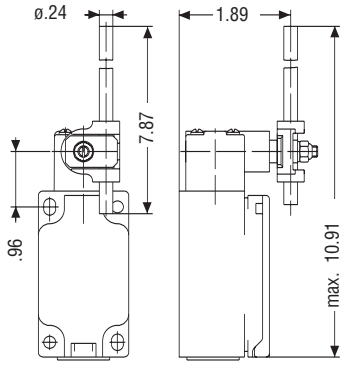
Contact Block Data

Mechanical Data
 (Dimensions are in inches)



U1Z

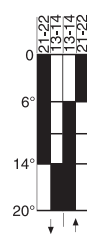
SU1Z



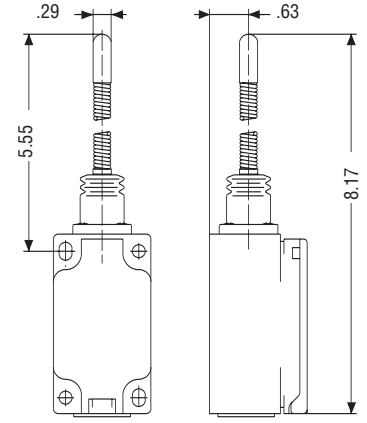
AD

Contact Block Data

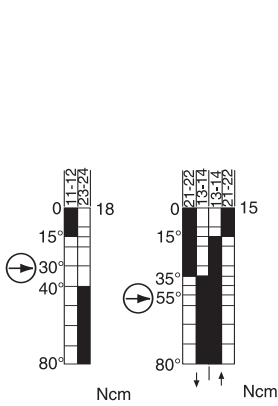
Mechanical Data
 (Dimensions are in inches)



SU1

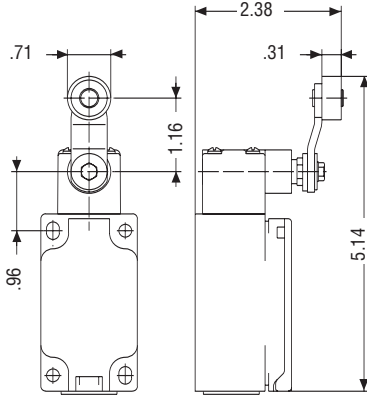


FF

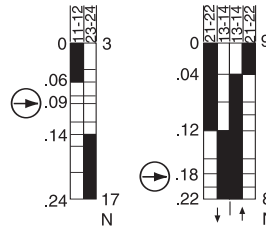


U1Z

SU1Z

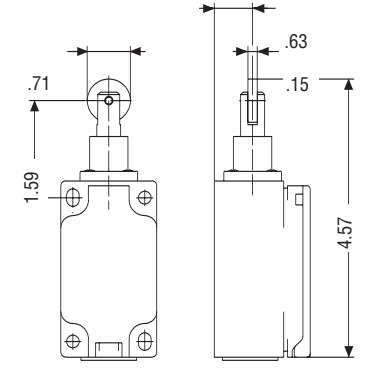


AHS-V

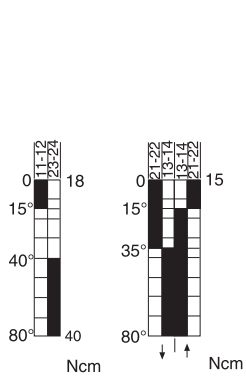


U1Z

SU1Z

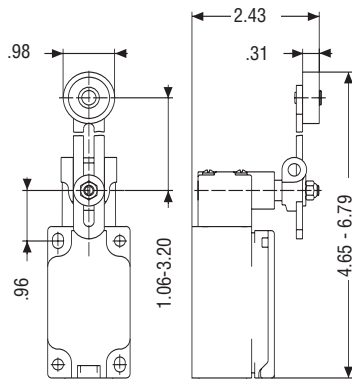


RiW

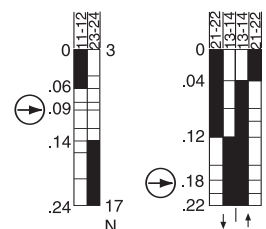


U1

SU1

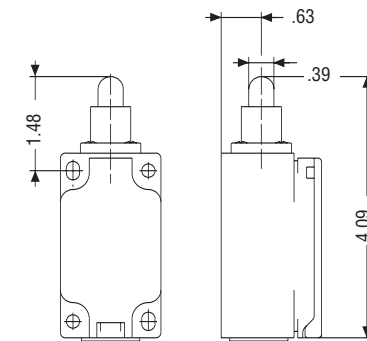


AV



U1Z

SU1Z



iw

☞ = Point of Forced Opening, Positive Disconnect
 U1Z = Slow Make-and-Break
 SU1Z = Snap Action with Positive Disconnect
 SU1 = Snap Action

Mechanical Limit Switches

Metal International Style



ENM2 Body Style

Body Style ENM2

- Metal housing with screw down cover
- Mounting and dimensions conform to DIN EN 50041
- Actuator head position can be changed in 90° increments
- Contacts galvanically isolated
- One cable entry point
- Conduit adapter or cord grip provided
- Manufactured per IEC 947-5-1 and VDE 0660 T200
- UL, CSA and SEV approved

Enclosure Body: Metal
Enclosure Cover: Metal
Protection Class: NEMA 4
Mechanical Life: 10 x 10⁶ Cycles
Temperature: -22°F to + 176°F
Switch Rate: 100 per minute max.

Model Identification



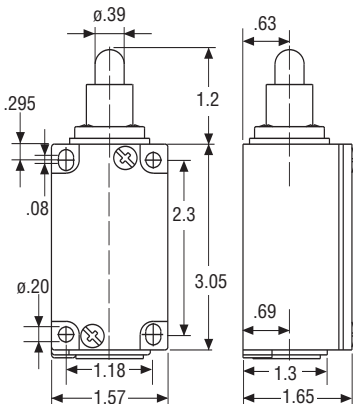
Model Part Number

| | |
|------------------|--------------|
| ENM2-U1Z AD | 608-7137-018 |
| ENM2-SU1Z AD | 608-7387-019 |
| ENM2-U1Z AHS-V* | 608-7135-013 |
| ENM2-SU1Z AHS-V* | 608-7385-014 |
| ENM2-U1 AV | 608-7136-016 |
| ENM2-SU1 AV | 608-7386-017 |
| ENM2-U1Z Riw* | 608-7117-004 |
| ENM2-SU1Z Riw* | 608-7367-005 |
| ENM2-U1Z iw* | 608-7102-001 |
| ENM2-SU1Z iw* | 608-7352-002 |
| ENM2-U1Z DGHw | 608-7121-007 |
| ENM2-SU1Z DGHw | 608-7371-008 |
| ENM2-U1Z DGKw | 608-7127-010 |
| ENM2-SU1Z DGKw | 608-7377-011 |

* SUVA approved for safety applications. Many more styles of actuators and contact blocks available. Contact factory for more information.

Mechanical Data

(Dimensions are in inches)



Contact Block Technical Data

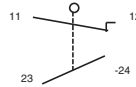
| Type | Contacts | Action | Forced Disconnect | Voltage (max.) | Current (max.) |
|------|---------------|--------|-------------------|----------------|----------------|
| U1Z | 1 N.C. 1 N.O. | Slow | Yes | 400 VAC | 10 A |
| SU1Z | 1 N.C. 1 N.O. | Snap | Yes | 400 VAC | 10 A |
| SU1 | 1 N.C. 1 N.O. | Snap | No | 400 VAC | 10 A |

Notes:

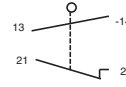
1. All Contact Blocks Break-Before-Make (in metal housing - replaceable)
2. Normally Closed Contacts Forced Disconnect per IEC 947-5-1 Ch.3 (as indicated)

Contact Block Wiring Details

U1Z - Slow Make-and-Break



SU1Z Snap Action

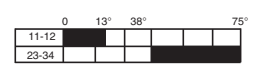
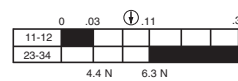


Types of Contact Block and Action

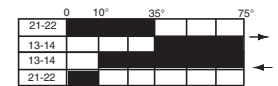
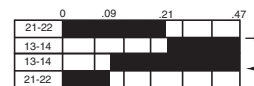
Linear Type Actuator

Rotary Type Lever

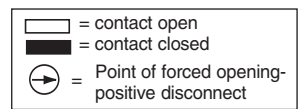
U1Z Break-Before-Make the NC contact opens before the NO contact closes



SU1Z Snap action indicates direction of travel



11-12, 21-22, 23-24 Indicates terminal identification for wiring. Operating force shown in Newtons. Newtons x .2248 = lbs. Graduation Tolerance ± 3.5° Accuracy of switching point ± .009 Tolerance of switching pressure ± 10%



Switching Action Explanation

Slow Action

- Used in precision applications for switching on and off at the exact point
- Contact closes at the same speed as actuator/lever

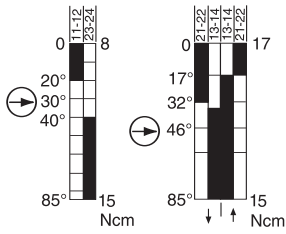
Snap Action

- Used when good solid contact is required
- Used with inductive loads to prevent arcing

Contact Block Data

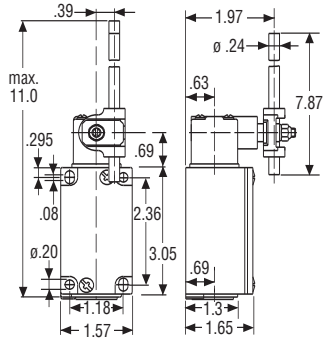
Mechanical Data

(Dimensions are in inches)



U1Z

SU1Z

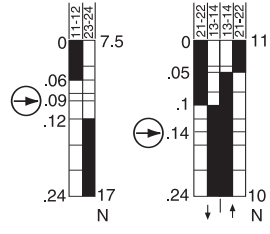


AD

Contact Block Data

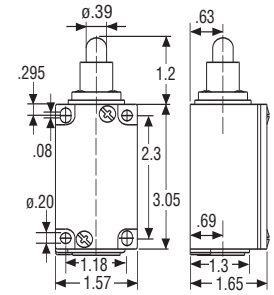
Mechanical Data

(Dimensions are in inches)

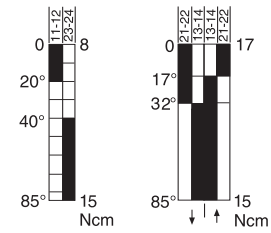


U1Z

SU1Z

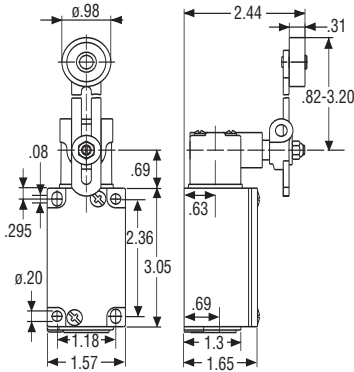


lw

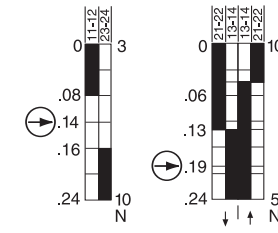


U1

SU1

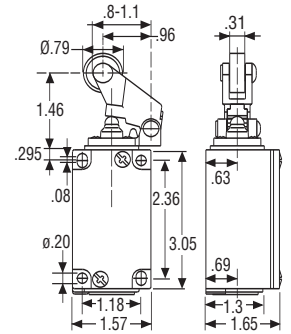


AV

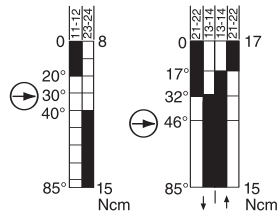


U1Z

SU1Z

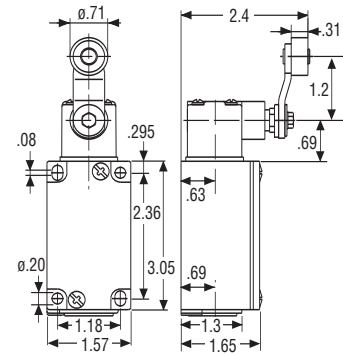


DGHw

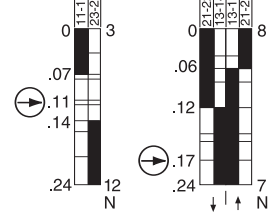


U1Z

SU1Z

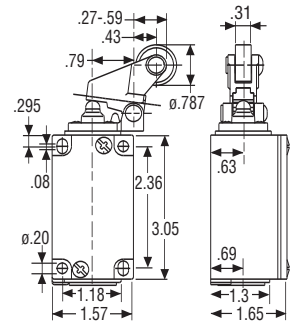


AHS-V

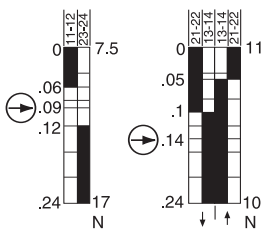


U1Z

SU1Z

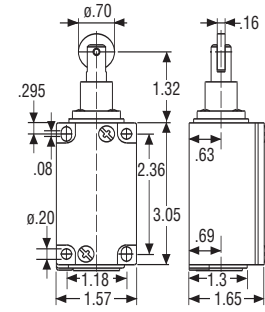


DGKw



U1Z

SU1Z



RiW

■ Closed
 □ Open

⊙ = Point of Forced Opening, Positive Disconnect

U1Z = Slow Make-and-Break

SU1Z = Snap Action with Positive Disconnect

SU1 = Snap Action

Heavy Industrial Foot Switches

Single / Two / Three Pedal

with and without Protective Guard

Operational Modes Available

Momentary: Press pedal to start process. Remove foot and allow pedal to spring back to initial position and process to stop.

Maintained: Press pedal once to start process. Press pedal again to stop process.

Proportional Output: When the pedal is pressed, the output is proportional to the movement of the 10 K Ohm, 2 Watt potentiometer.

Anti-Trip: The Anti-Trip lever is an additional safety feature allowing the pedal to be activated only when the lever has been pushed forward.



Specification Overview

Mechanical Features:

- Case Material:** Aluminum die cast
- Protective Guard:** Aluminum die cast
- Actuator:** Foot lever
- Ambient Air Temperature:** -22° F to 176° F
- Switch Action:** Dependent upon switch selected
- Contacts:** Dependent upon switch selected
- Mechanical Life:** 10 x 10⁶ for on/off version switch operations
- Switching Frequency:** 50 times per minute
- Mounting:** Free standing on rubber bumpers
- Terminals:** 4 screw terminals per contact block (replaceable)
- Cable Entries:** All switches supplied with 1/2" conduit adapter
- Weight:** Approximately - F1 types 1.5 Kg. (3.3 lbs.)

Electrical Features:

- Maximum Voltage:** 500V AC
- Enduring Current:** 20 Amps
- Inrush Current:** Per IEC 947-5-1, AC 15, DC 13
- Standards:** According to VDE 0660, 0113 IEC 947-5-1
- Protection Class:** NEMA 4, according to DIN 40 050
- UL/CSA Approved:** 10 Amp, 300 VAC, A300 (same polarity)

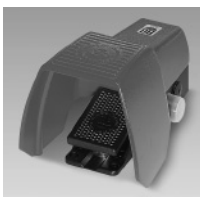
| Type and Construction | Operating Mode | Contact Block | Model | Part Number | Drawing |
|-------------------------------------|----------------|---------------------|----------------------|--------------|---------|
| Single Pedal | Momentary | 1 N.O. - 1 N.C. | F1-SU1Z | 606-1300-011 | a |
| Single Pedal with Guard | Momentary | 1 N.O. - 1 N.C. | F1-SU1Z UN | 606-1800-012 | b |
| Single Pedal with Guard & Anti-Trip | Momentary | 1 N.O. - 1 N.C. | F1 SU1Z AT UN | 616-1800-482 | b |
| Single Pedal | Maintained | 1 N.O. - 1 N.C. | F1-U1Y | 606-1100-001 | a |
| Single Pedal with Guard | Maintained | 1 N.O. - 1 N.C. | F1-U1Y UN | 606-1600-002 | b |
| Single Pedal | Proportional | 10K 0hm, 2W** | F1-SU1 Mi RG | 616-1300-327 | a |
| Single Pedal with Guard | Proportional | 10K 0hm, 2W** | F1-SU1 Mi RG UN | 616-1800-328 | b |
| Two Pedal* | Momentary | 2 x 1 N.O. - 1 N.C. | F2-SU1Z-SU1Z | 606-2330-021 | d |
| Two Pedal with Guard* | Momentary | 2 x 1 N.O. - 1 N.C. | F2-SU1Z-SU1Z UN | 606-2830-022 | e |
| Three Pedal* | Momentary | 3 x 1 N.O. - 1 N.C. | F3-U1Z-U1Z-U1Z | 606-3111-025 | f |
| Three Pedal with Guard* | Momentary | 3 x 1 N.O. - 1 N.C. | F3-SU1Z-SU1Z-SU1Z UN | 606-3833-045 | g |

* On multi-pedal switches, each pedal operates independently.

**Contacts rated at 5 amps

See page 40 of catalog for data on the Safety Foot Switch. F1-SU1Z/UV1DUN Part # 616-1000-203

Other special versions available include, Foot Switches for Medical Applications and Foot Switches for use in explosive areas, these foot switches can be designed and manufactured to order.

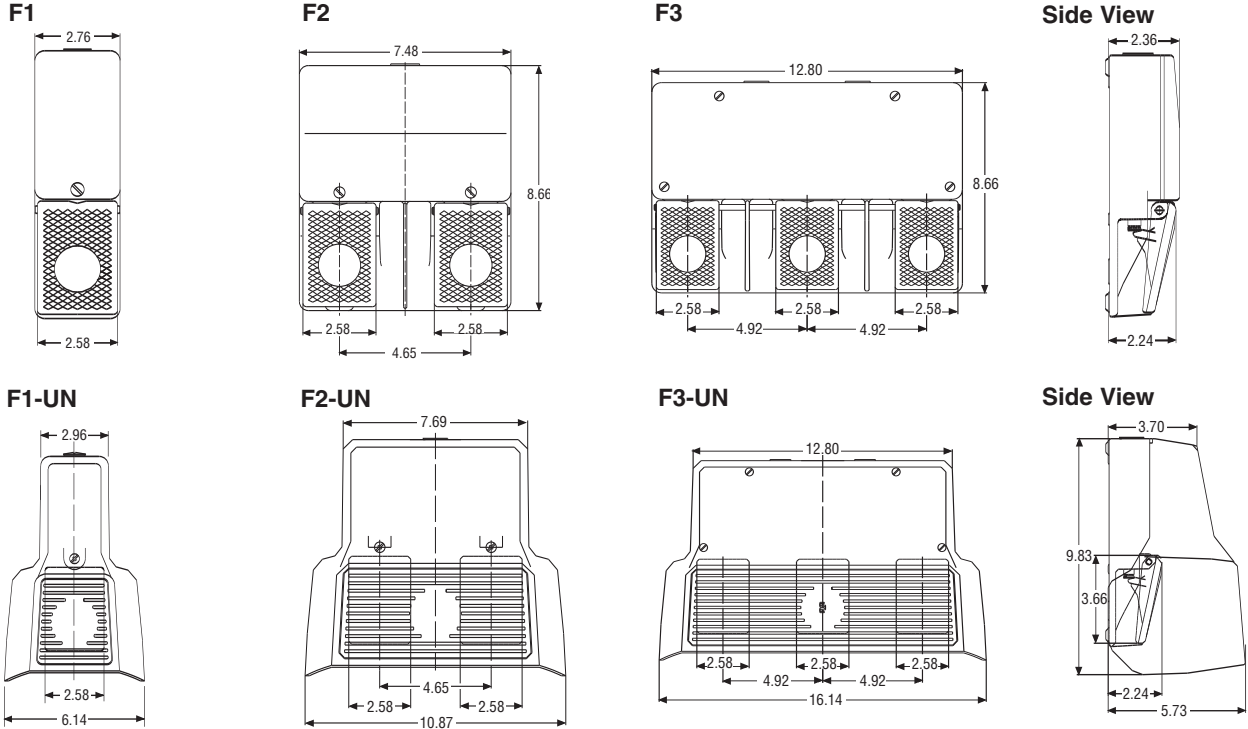


Safety Foot Switches

Safety Foot Switches are “enabling devices” that are generally used on machinery where the operator needs to be able to immediately interrupt any given process in order to avoid bodily harm. Safety Foot Switch on Page 40.



Mechanical Data (Dimensions are in inches)



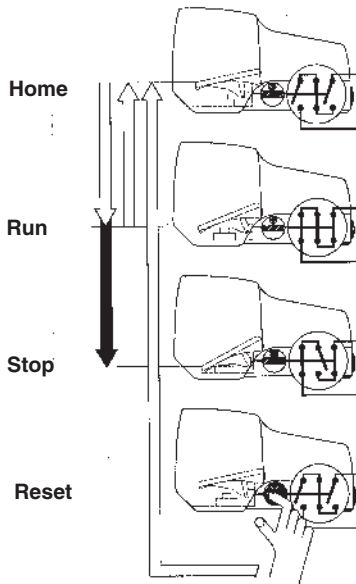
SAFELOCK Safety Foot Switch

A safety foot switch is based on the operation of a standard type momentary action switch, with an additional safety latching switch mechanism.

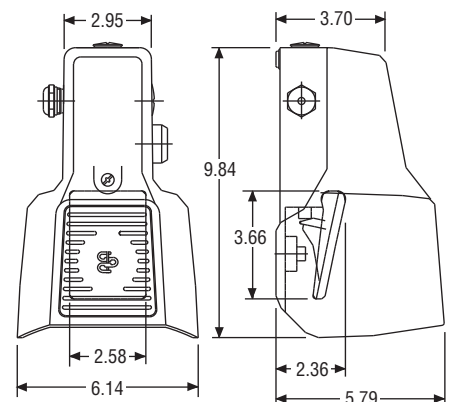
The machine will only operate when the foot switch pedal is pushed down. Releasing the pedal or applying overpressure on the pedal will stop the machine. The foot switch locks in the emergency stop position when pushed through the secondary switch. To prevent accidental restarts, it must be manually reset.

- Rugged, heavy duty, metal housing
- Forced disconnect of the N.C. contact
- Contacts galvanically isolated
- Three cable entry points
- Cord grip provided
- UL, CSA, SEV and BG Approved

Model: F1-SU1Z/UV1 DUN
Part Number: 616-1000-203
Enclosure: Die Cast Aluminum
Contacts: 1 Normally Closed
 ⊕ Forced Disconnect per IEC 947-5-1 Ch. 3
 2 Normally Open
Voltage Rating: 500 VAC (max.)
Current Rating: 10 A (max.)
Protection Class: NEMA 4
Mechanical Life: 10 x 10⁶ Cycles
Temperature: -22°F to +176°F
Switch Rate: 50 per minute max.



(Dimensions are in inches)



SAFELOCK

Safety Switches

Warner Electric offers a large selection of different styles of safety switches. All of the safety switches carry the "CE" mark and are manufactured to all relevant European and International Safety Standards such as, the Machine Directive 89/392/EEC, IEC 947-5, as well as other sub-standards that pertain to specific types of machinery and/or safety installations.



Safety Interlock Switches

Safety Interlock Switches are generally used on the guarding (i.e. protective doors/covers) of industrial machinery, such as test and assembly or packaging machinery in order to shield operators from potential injuries that could result due to unauthorized access.



Solenoid Locking Switches

Solenoid Locking Switches are typically used in applications that require guarding for machines that have coasting rundown cycles after the power supply has been turned off. Application examples include robotic cells, sawmills, as well as stamping presses.



Hinge Interlock Switches

Actuator arms VKS, VKWRE and VKWLI give the user the opportunity to install them as permanently mounted operational arms on flaps and covers or in the case of the AHDB styled actuator to be directly connected to a hinge point of a rotating shaft. The normally closed safety contacts will open after 10 degrees of movement.



Safety Hinge Switches

Safety Hinge Switches are load bearing hinges with the safety contact mounted internally. They are designed for mounting onto extruded aluminum profiles, steel or plastic doors, etc. The switch point of the safety contact is programmable to any point within the 180° operation angle of the switch.



Safety Cable Pull Switches

Safety Cable Pull Switches are used in applications where large exposed areas exist that need to be secured. Application examples include large printing presses and conveyor systems. Safety Cable Pull Switches are required to operate in emergency stop installations and therefore are governed by European Standard EN 418 which governs emergency stop devices.

Attention

Replacement Keys:

Replacement Keys are made available for replacement purposes only and shall not be used for other purposes such as defeating the Safety Function of any Interlock Switch. To do so may create an unsafe situation which could lead to serious injury or death.

For Replacement Keys: Please contact your local Warner Electric Distributor.





SAFELOCK

SKT and SKI Safety Interlock Switches with Separate Actuator

The SKT and SKI safety interlock switches slim compact design according to EN50047 are perfect for safety applications that require a particularly slim and compact switching device while still offering the same advantages, relating to safety, as all other products in this range. The principal function of the SKT and SKI safety interlock switches is to switch the machine drive off when a movable protective guard is opened or removed.



Common Features:

- Limit Switch Design (EN 50047)
-  Insulated device (IEC 60947-5-1) on all models with plastic housing
-  Positive Opening safety contacts (IEC 60947-5-1)
- Rotating head allows actuator engagement from four sides or four top positions; no tools are required to rotate head

| Model | Part Number | Contacts | Voltage (Max.) | Current (Max.) |
|--------------|--------------|-------------------|----------------|----------------|
| SKT-U1Z M3 | 601-6419-059 | 1 NO/1 NC (U1Z) | 250 VAC | 10A |
| SKT-SU1Z M3 | 601-6409-060 | 1 NO/1 NC (SU1Z) | 250 VAC | 10A |
| SKT-A2Z M3 | 601-6469-066 | 2 NC (A2Z) | 250 VAC | 10A |
| SKT-SA2Z M3 | 601-6469-067 | 2 NC (SA2Z) | 250 VAC | 10A |
| SKI-U1Z M3 | 601-6819-052 | 1 NO/1 NC (U1Z) | 250 VAC | 10A |
| SKI-SU1Z M3 | 601-6809-057 | 1 NO/1 NC (SU1Z) | 250 VAC | 10A |
| SKI-A2Z M3 | 601-6869-056 | 2 NC (A2Z) | 250 VAC | 10A |
| SKI-UV15Z M3 | 601-6869-058 | 2 NC/1 NO (UV15Z) | 400 VAC | 6A |

Model Identification

Body Style

SKT = 3.27" tall
SKI = 3.94" tall

Contact Block

U1Z = 1 NC/1 NO Slow Action
SU1Z = 1 NC/1 NO Snap Action
A2Z = 2 NC Slow Action
SA2Z = 2 NC Snap Action
UV15Z = 2 NC/1 NO Slow Action Make before Break
Z = Forced Disconnect per IEC 60947-5-1

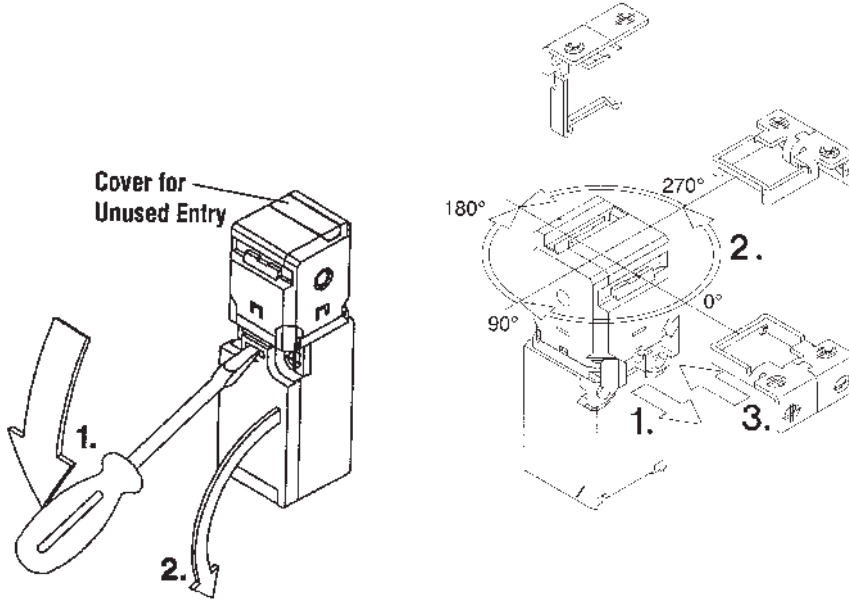
Actuator Style

M3 = Stainless Steel Actuator
For other styles contact factory

Other Specifications

| | |
|---------------------------|---|
| Max Switching Speed | 30 operations per minute |
| Max Actuator Speed | 1 meter per second |
| Minimum Actuator Radius | 150 mm (6 inches) |
| Contact Material | Silver-nickel alloy |
| Actuator Extraction Force | 12 Newtons (2.6 lbs.) |
| Mechanical Life | 1 million operations |
| Operating Temperature | -30° to +80°C (-22° to +176°F) |
| Construction | Glass fiber-reinforced polyamide thermoplastic housing UL94-VO rating |
| Environmental Rating | NEMA 4/IP65 |
| Certifications | CE CSA UL BG |
| Weight | SLT = .26 lb. SLI = .29 lb. |

SKT and SKI Operational Features



Features

Easy Access

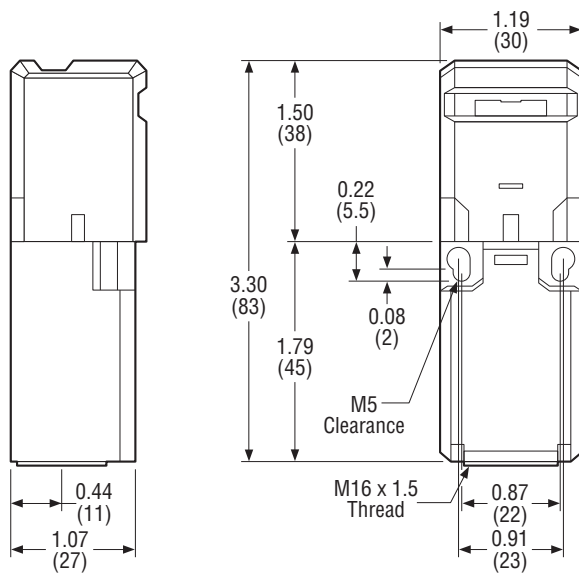
The wiring chamber is accessed via a hinged door. Simply insert a flat-blade screwdriver, as shown, and pry gently down to open.

Rotating Actuator Head

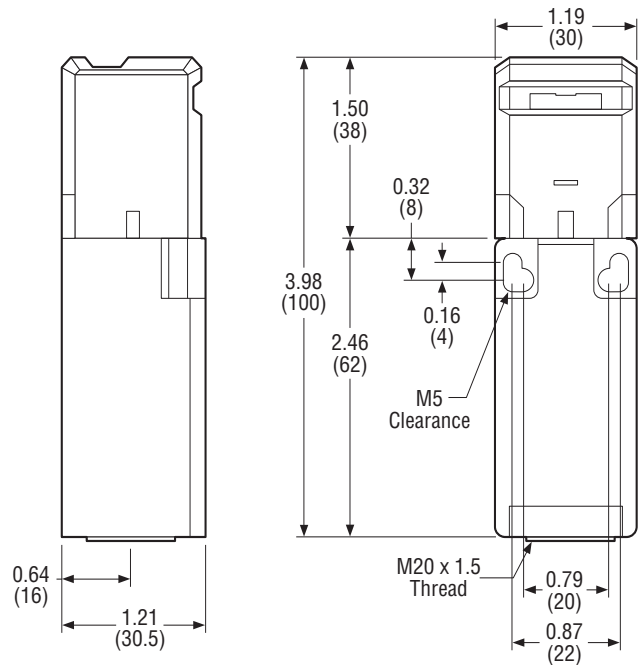
The actuator head may be rotated in 90° increments to create eight possible actuator engagement locations. To rotate the head, pull the holding clamp forward, rotate the head to the desired position, and push the holding clamp back into lock.

SKT Dimensions

inches (mm)



SKI Dimensions



SAFELOCK

SK and SKC Safety Interlock Position Switches with Separate Actuator

Description

The SK and SKC safety position switches offer outstanding performance in personal protective functions.

Constructional safety features of these models have been implemented according to DIN EN 60947-5-1 and test principle GS-ET 15.

The principle function of the SK and SKC safety position switches is to switch the machine drive off when a movable protective guard is opened or removed.

The SKC series is ideal for space limited applications since its overall length is just 2.85 inches (75 mm). A standard SK switch is 3.55 inches (90 mm) long.



SKC

SK

Common Features

- Safety Category:** 4
- Protection Class:** NEMA 4
- Mechanical Life:** 1 x 10⁶ Cycles
- Temperature:** -22°F to +176°F
- Switch Rate:** 30 per minute max.
- Actuator Holding Force:** 2.3 lbs. [10 N] other options available
- Enclosure:** PA 6 Thermoplastic (UL 94-V0)
- Approvals:** UL, CSA, and BG approved

| Model | Part Number | Contacts | Voltage (max.) | Current (max.) | Actuator Style | Drawing |
|--------------|--------------|----------------|----------------|----------------|----------------|---------|
| SKC-A1Z M | 601-6169-039 | 1 N.C. | 500 VAC | 10 A | M | A |
| SK-U1Z M | 601-6119-016 | 1 N.C., 1 N.O. | 500 VAC | 10 A | M | B |
| SK-U1Z MRH | 601-6119-041 | 1 N.C., 1 N.O. | 500 VAC | 10 A | MRH | B |
| SK-U1Z MRV | 601-6119-040 | 1 N.C., 1 N.O. | 500 VAC | 10 A | MRV | B |
| SK-UV15Z M | 601-6169-026 | 2 N.C., 1 N.O. | 400 VAC | 6 A | M | B |
| SK-UV15Z MRH | 601-6169-064 | 2 N.C., 1 N.O. | 400 VAC | 6 A | MRH | B |
| SK-UV15Z MRV | 601-6169-065 | 2 N.C., 1 N.O. | 400 VAC | 6 A | MRV | B |
| SK-UV15Z F | 601-6169-063 | 2 N.C., 1 N.O. | 400 VAC | 6 A | F | B |

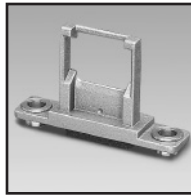
Model Identification

Body Style Contact Block Actuator Style

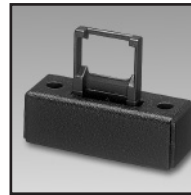
SK **U1Z** **M**

A1Z = 1 N.C., Forced Disconnect
 U1Z = 1 N.C., 1 N.O., Forced Disconnect
 UV15Z = 2 N.C., 1 N.O., Forced Disconnect Make Before Break

Normally Closed Contacts \ominus Forced Disconnect per IEN EN 947-5-1 Ch. 3



Type M Metal Actuator
Cast Stainless Steel



Type F Flexible Actuator
Tolerates Misalignment of Guard Door



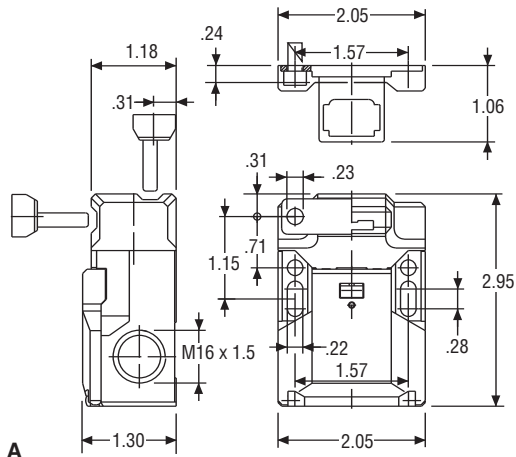
Type MRH Horizontal Short Radius Actuator
Hinge Distance 2" [50 mm] Or More



Type MRV Vertical Short Radius Actuator
Hinge Distance 2" [50 mm] Or More

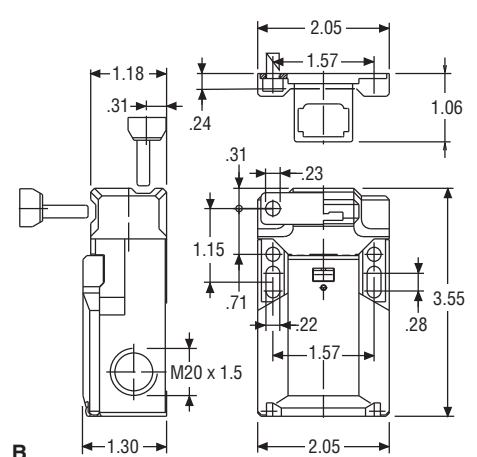
Model SKC

(Dimensions are in inches)



Model SK

(Dimensions are in inches)



Non-Standard Options

- F30: Actuator holding force of 7 lbs. [30 N]
- F100: Actuator holding force of 23 lbs. [100 N]
- FE10: Actuator not retained

Other contact arrangements are also available. Consult the factory for details.

SK and SKC Operational Features

Easy Access

The self retained snap on cover is released by a screw driver (Fig. 1) and can be opened to an angle of 135° providing easy access to the wiring terminals (Fig. 2).

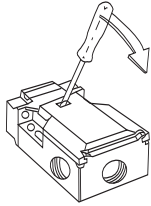


Fig. 1

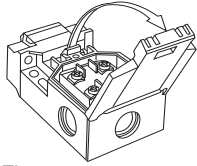
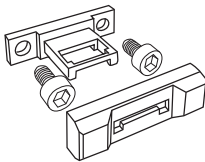


Fig. 2

Removal Protection

A cover cap with one-way latching to seal the assembly screws prevents unauthorized removal of the actuator.



- Triple coding of the actuator for a high level of safety
- Increased functional safety through two interlocks operating independently
- Actuator mates with switch in one of four positions
- Actuator has smooth surface with no protruding sharp parts

Multi Directional Actuation

After opening the switch cover, the head can be removed from the top (Fig. A). After a rotation of 180° (Fig B) the head can be attached again on the enclosure and locked by the switch cover. This results in four directions of approach.

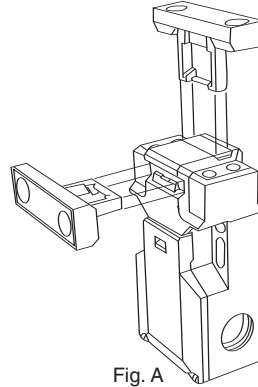


Fig. A

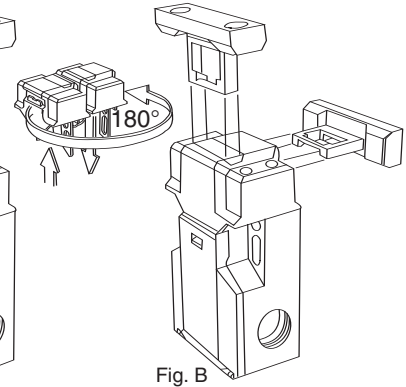


Fig. B

- Forced disconnection of the N.C. contacts
- Three cable entries
- Conduit adapter provided (1/2 NPT)
Cord grip available upon request
- Manufactured to DIN EN 60947-5-1, IEC 947-5-1, and test principle GS-ET 15

GC Safety Interlock Position Switch with Separate Actuator

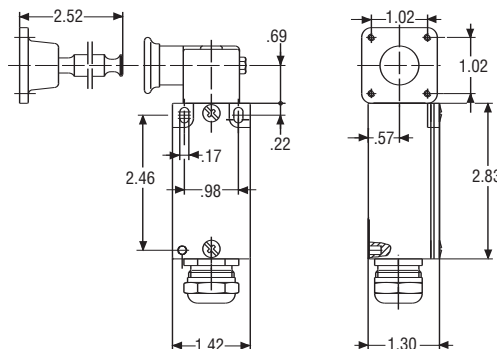
Description

The GC Style Interlock Position Switch is a unique type of switch because of its "Pole" type actuator that fits more like a plug than the other interlock switches. The head offers a flexible spring type adjustment, making it very flexible in operation.

- Rugged, heavy duty metal housing
- Positive forced disconnection of the N.C. contacts
- Contacts galvanically isolated
- Cord grip provided
- UL, CSA, and SUVA Approved



(Dimensions are in inches)



| | |
|--------------------------|--|
| Model: | GC-U1Z VT 90° |
| Part Number: | 612-1100-555 |
| Enclosure: | Die Cast Aluminum |
| Contacts: | 1 Normally Closed
⊕ Forced Disconnect
per IEC 947-5-1 Ch. 3
1 Normally Open |
| Voltage Rating: | 500 VAC (max.) |
| Current Rating: | 10 A (max.) |
| Protection Class: | NEMA 4 |
| Mechanical Life: | 25 x 10 ³ Cycles |
| Temperature: | -22°F to +176°F |
| Switch Rate: | 10 per minute max. |



SAFELOCK

Integral Safety Hinge Switch

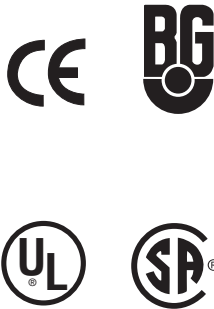
IP 67 Metal housing

Hinged machinery guards and covers as well as safety fence doors may be found in every type of industry.

The safety hinge switch SHS is the integration of a safety switch and load bearing hinge for industrial applications.

Designed to facilitate mounting onto extruded aluminum profiles, steel or plastic doors, the slim profile of the SHS even when fully closed, allows the hinge to be readily mounted where space is constrained.

Traditional safety switches with separate actuator keys are often subject to mechanical wear, particularly when mounted on the closing edge of guards where accumulated tolerances can cause misalignment. The SHS removes this problem with the safety contact mounted internally, inaccessible to the user and therefore providing excellent tamper protection. One or more switches may be used dependent on the category of safety protection required. Matching hinges without safety contacts are also available, allowing the style to be standardized for general use. In operation, consideration must be given to the required contact operation angle, which is determined by guard size and the maximum allowable guard opening distance before actuation.



Safe:

- 2 SHS hinge switches each with a forced disconnect safety contact allow safety category 4 systems to be configured subject to the required risk analysis and safety contact monitoring.

Flexible:

- The hinge operation angle is 0-180°.
- The switch point may similarly be selected through 180°.
- AC/DC to 250 V or 60 VDC versions available.

Fast:

- Industry standard M12 x 1 connectors with axial and radial (rear) mounting available as well as fixed cable version.

Reliable:

- A cast Zinc alloy body allows the SHS a high degree of mounting freedom.
- In its hinge capacity the SHS can bear up to 750 N axially and over 1000 N radially, when the switching point has been set.
- Ingress protection to IP 67

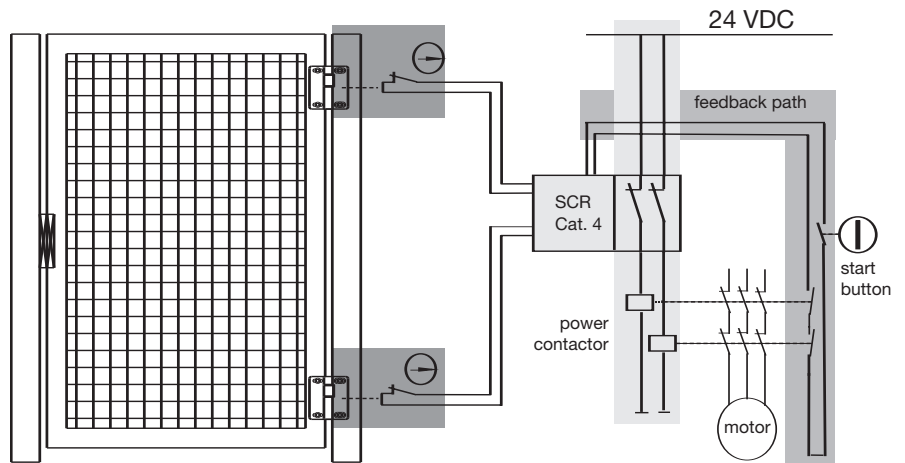
SHS Configuration Summary

| Part No. | Description | Contact Function | Type DC | Type AC/DC | Quick Disconnect | | Fixed Cable | | BG-Type Approval |
|--------------|---------------|------------------------------|---------|------------|------------------|-------------|-------------|-------------|------------------|
| | | | | | axial (SA) | radial (SR) | axial (KA) | radial (KR) | |
| 601-9261-009 | SHS-A1Z-SA | A1Z | — | X | Metal | — | — | — | — |
| 601-9261-010 | SHS-A1Z-SR | A1Z | X | — | — | Plastic | — | — | — |
| 601-9261-011 | SHS-A1Z-KA5 | A1Z | — | X | — | — | X | — | BG |
| 601-9261-014 | SHS-A1Z-KR5 | A1Z | — | X | — | — | — | X | BG |
| 601-9261-015 | SHS-A1Z-SA | A1Z | X | — | Metal | — | — | — | — |
| 601-9261-016 | SHS-A1Z-SR | A1Z | — | X | — | Metal | — | — | — |
| 601-9261-017 | SHS-A1Z-SA-BG | A1Z | — | X | Metal | — | — | — | BG |
| 601-9261-018 | SHS-A1Z-SR-BG | A1Z | — | X | — | Metal | — | — | BG |
| 601-9291-013 | SHS-OZ | Hinge without safety contact | — | — | — | — | — | — | — |

True Category 4 (EN 954-1/2)

- true electrical redundancy
- true mechanical redundant safety
- avoids mechanical common mode failure

Installation example:



Plug M 12 x 1 with molded cable

Terminal code, AC/DC configuration

- 1 = green-yellow
- 2 = black
- 3 = blue

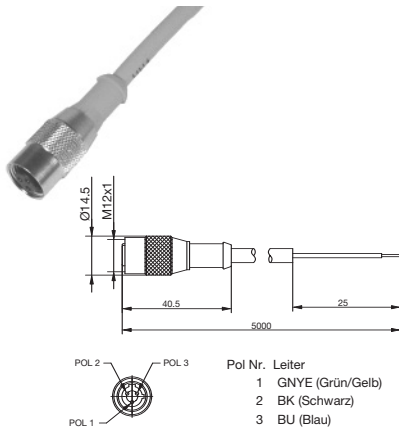
Terminal code, DC configuration

- 1 = brown
- 2 = -
- 3 = blue
- 4 = black

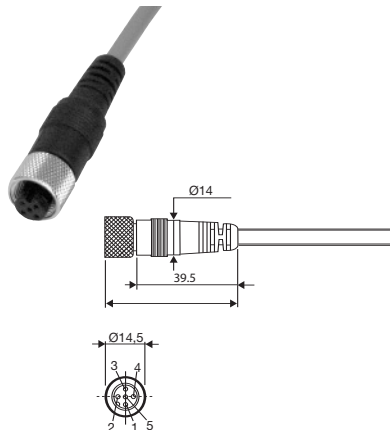
Terminal code, AC/DC configuration

- 1 = brown
- 2 = black
- 3 = blue
- 4 = green-yellow

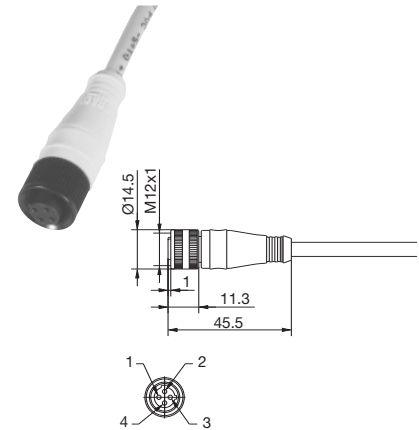
AC/DC Configuration



DC Configuration



AC/DC Configuration

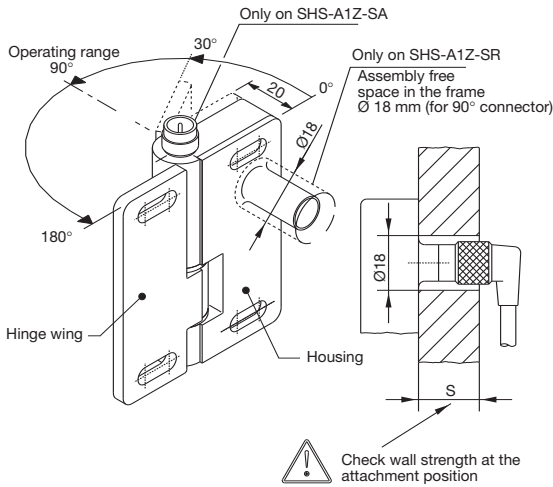


| Straight line | Right-angle |
|--|--|
| on request | on request |
| AN-KAB.SHS 5M AC
325-1103-234 | AN-KAB.SHS 5M
325-1103-236 |
| — | — |
| Material of cable sleeve: PVC (UL)/PVC (UL) | Material of cable sleeve: PVC (UL)/PVC (UL) |
| Material body/Contact carrier: PUR (UL)/PUR (UL) | Material body/Contact carrier: PUR (UL)/PUR (UL) |
| Rated voltage max.: 300 VAC | Rated voltage max.: 300 VAC |
| Current carrying capacity max.: 3 A | Current carrying capacity max.: 3 A |
| Temperature range min./max.: -25 °C/+70 °C | Temperature range min./max.: -25 °C/+70 °C |
| | -13 °F/+158 °F |
| Cable structure mm ² : 3 x 0.5 | Cable structure mm ² : 3 x 0.5 |
| Protection class after installation: IP 67 | Protection class after installation: IP 67 |

| Straight line | Right-angle |
|--|--|
| AN-KAB.SHS 2M DC
325-1003-221 | AN-KAB.SHS 2M DC
325-1003-224 |
| AN-KAB.SHS 5M DC
325-1003-222 | AN-KAB.SHS 5M DC
325-1003-225 |
| AN-KAB.SHS 10M DC
325-1003-223 | AN-KAB.SHS 10M DC
325-1003-226 |
| Material of cable sleeve: PVC/PVC | Material of cable sleeve: PVC/PVC |
| Material body/Contact carrier: PUR/PUR | Material body/Contact carrier: PUR/PUR |
| Rated voltage max.: 60 VAC/75 VDC | Rated voltage max.: 60 VAC/75 VDC |
| Current carrying capacity max.: 1.5 A | Current carrying capacity max.: 1.5 A |
| Temperature range min./max.: -25 °C/+70 °C | Temperature range min./max.: -25 °C/+70 °C |
| | -13 °F/+158 °F |
| Cable structure mm ² : 3 x 0.34 | Cable structure mm ² : 3 x 0.34 |
| Protection class after installation: IP 67 | Protection class after installation: IP 67 |

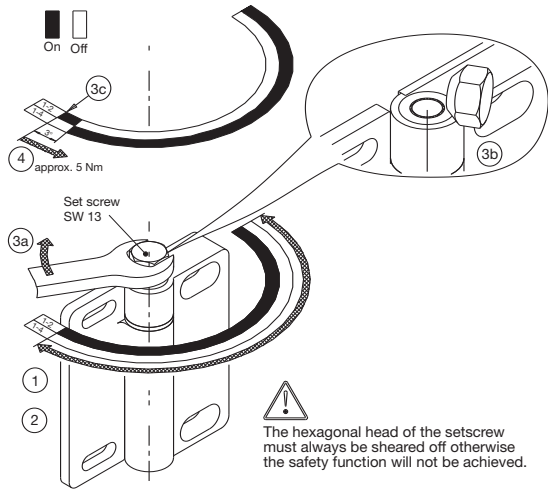
| Straight line | Right-angle |
|--|--|
| — | — |
| AN-KAB.SHS 5M AC
325-1004-219 | AN-KAB.SHS 5M AC
325-1004-220 |
| — | — |
| Material of cable sleeve: PVC/PVC | Material of cable sleeve: PVC/PVC |
| Material body/Contact carrier: PUR/Nylon 6.6 | Material body/Contact carrier: PUR/Nylon 6.6 |
| Rated voltage max.: 300 VAC | Rated voltage max.: 300 VAC |
| Current carrying capacity max.: 4.0 A | Current carrying capacity max.: 4.0 A |
| Temperature range min./max.: -5 °C/+70 °C | Temperature range min./max.: -5 °C/+70 °C |
| | +23 °F/+158 °F |
| Cable structure mm ² : 4 x 0.34 | Cable structure mm ² : 4 x 0.34 |
| Protection class after installation: IP 68 | Protection class after installation: IP 68 |

Safety Hinge Switch Operation and Set Point Programming

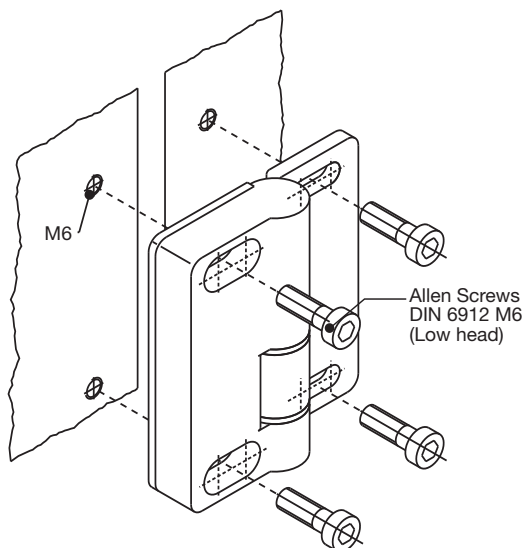


For proper installation the procedure below must be followed.

- SHS without switching point set shall be mounted under no load condition on the guard.
- SHS switching point shall be set in one successive procedure.
- The guard shall be moved only after properly setting the switch point.
- Finally, the set SHS shall be completely fixed on the guard.



- The guard door must turn freely through the total operating range.
- Fix the guard door in the closed position.
 - Tighten the setscrew with a box spanner (SW13/max. 20 mm) until resistance is met.
 - Continue until the setscrew shears. ($M_d = 25Nm$)
 - The set point for the switching angle is now fixed.
- An increased actuation force (torque approx. 5 Nm) is required during the first use of the guard.



Operating angle

0° - 30° = Allen Screw DIN 6912 necessary without washer in the hinge wing

30° - 180° = Allen Screw DIN 912 permissible washer DIN 125 in the hinge wing

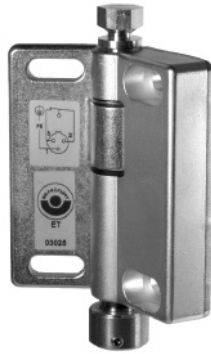


INDUSTRIAL MAGZA
DIST. AUTORIZADO

MEX (55) 53 63 23 31
QRO (442) 1 95 72 60

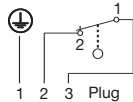
MTY (81) 83 54 10 18
ventas@industrialmagza.com

SAFELOCK SHS Hinge Switches



Designation
Part number
Contact diagram
Forced disconnect to
IEC 947-5-1 annex k
Za: non-galv. separated contact
Zb: galv. separated contact
Slow make and break/snap action
Sealed internally (iw)/ externally (w)

SHS-A1Z-SA-BG
601-9261-017

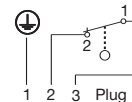


⊖ C

•/-

iw

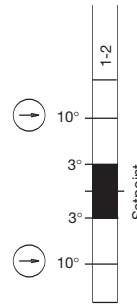
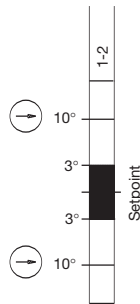
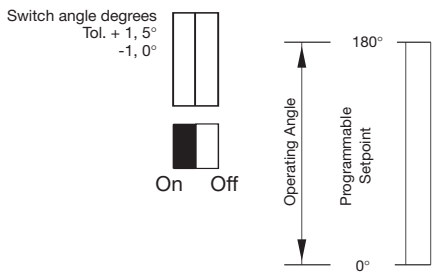
SHS-A1Z-SR-BG
601-9261-018



⊖ C

•/-

iw



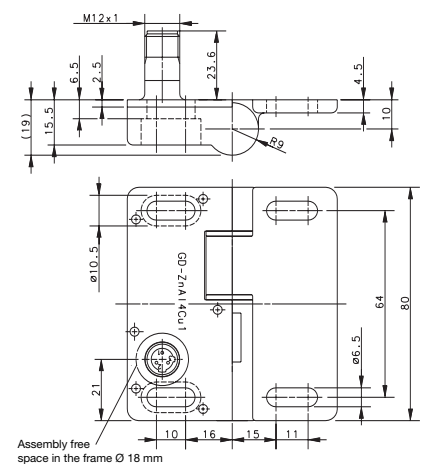
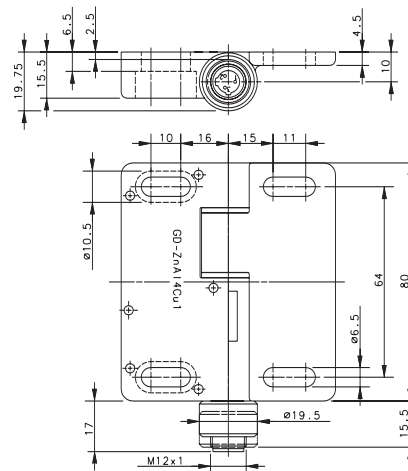
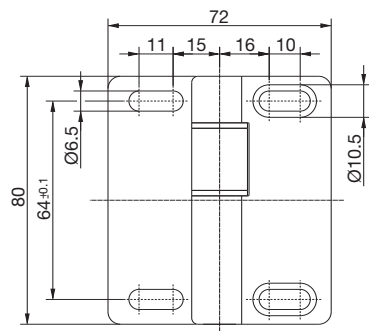
Switching hysteresis: -1.0°

Voltage max. 250 VAC
Thermal current max. 3A
Utilization category per IEC 947-5-1 AC 15/DC 13 60 V/0.5 A
230 VAC/1.5 A
Switching frequency max. 1200/h
Mechanical life - switching operations 1 x 10⁶
Operating temperature min./max. -25 °C/+70 °C
-13 °F/+158 °F
Approvals BG, UL and CSA
Weight 0.4 kg
Delivery: ex-stock/built to order

250 VAC
3A
60 V/0.5 A
230 VAC/1.5 A
1200/h
1 x 10⁶
-25 °C/+70 °C
-13 °F/+158 °F
BG, UL and CSA
0.4 kg
•/-

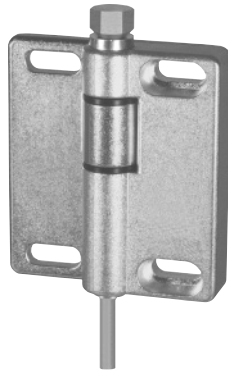
250 VAC
3A
60 V/0.5 A
230 VAC/1.5 A
1200/h
1 x 10⁶
-25 °C/+70 °C
-13 °F/+158 °F
BG, UL and CSA
0.4 kg
•/-

(All dimensions in mm)





SAFELOCK SHS Hinge Switches



Designation

Part number

Contact diagram

Forced disconnect to

IEC 947-5-1 annex k

Za: non-galv. separated contact

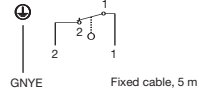
Zb: galv. separated contact

Slow make and break/snap action

Sealed internally (iw)/ externally (w)

SHS-A1Z-KA-5

601-9261-011



GNYE Fixed cable, 5 m

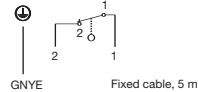
⊖ C

•/-

iw

SHS-A1Z-KR-5

601-9261-014



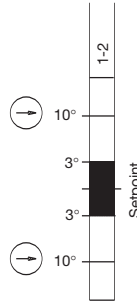
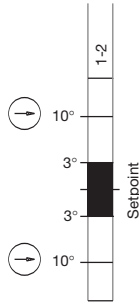
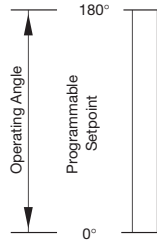
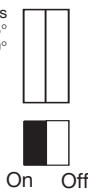
GNYE Fixed cable, 5 m

⊖ C

•/-

iw

Switch angle degrees
Tol. + 1, 5°
-1, 0°

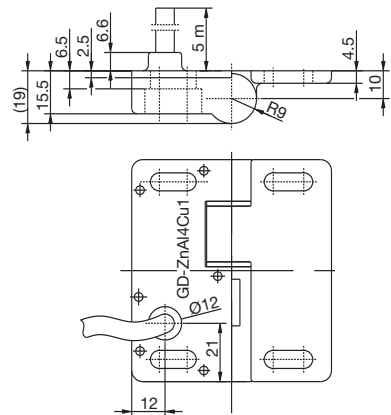
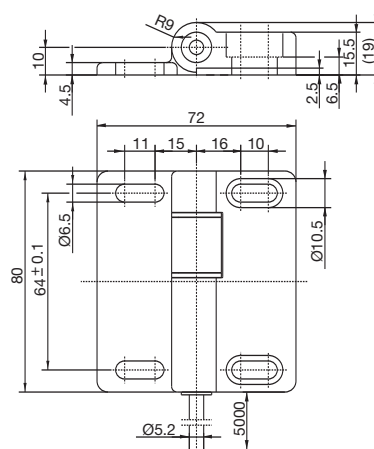
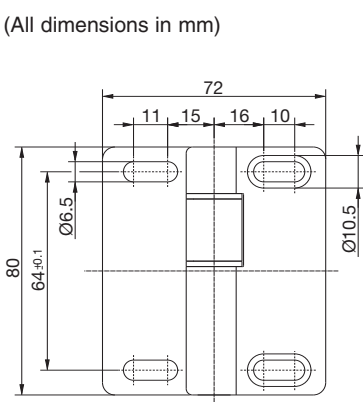


Switching hysteresis: -1.0°

| | | |
|--|-----------|-------------------------------------|
| Voltage | max. | 250 VAC |
| Thermal current | max. | 3A |
| Utilization category per IEC 947-5-1 AC 15/DC 13 | | 60 V/0.5 A
230 VAC/1.5 A |
| Switching frequency | max. | 1200/h |
| Mechanical life - switching operations | | 1 x 10 ⁶ |
| Operating temperature | min./max. | -25 °C / +70 °C
-13 °F / +158 °F |
| Approvals | | BG, UL and CSA |
| Weight | | 0.4 kg |
| Delivery: ex-stock/built to order | | •/- |

| | | |
|--|-----------|-------------------------------------|
| Voltage | max. | 250 VAC |
| Thermal current | max. | 3A |
| Utilization category per IEC 947-5-1 AC 15/DC 13 | | 60 V/0.5 A
230 VAC/1.5 A |
| Switching frequency | max. | 1200/h |
| Mechanical life - switching operations | | 1 x 10 ⁶ |
| Operating temperature | min./max. | -25 °C / +70 °C
-13 °F / +158 °F |
| Approvals | | BG, UL and CSA |
| Weight | | 0.4 kg |
| Delivery: ex-stock/built to order | | •/- |

(All dimensions in mm)





INDUSTRIAL MAGZA
DIST. AUTORIZADO

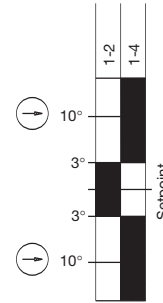
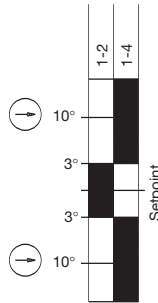
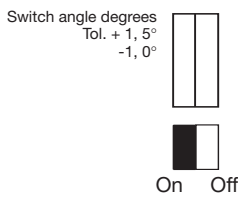
MEX (55) 53 63 23 31 MTY (81) 83 54 10 18
QRO (442) 1 95 72 60 ventas@industrialmagza.com

SAFELOCK

SHS Hinge Switches



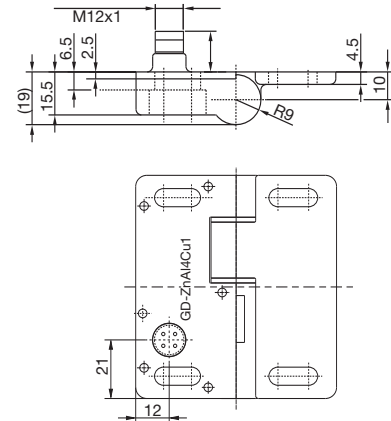
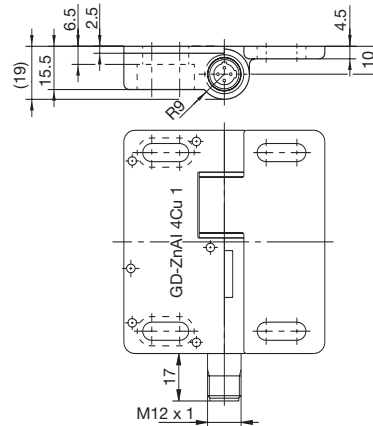
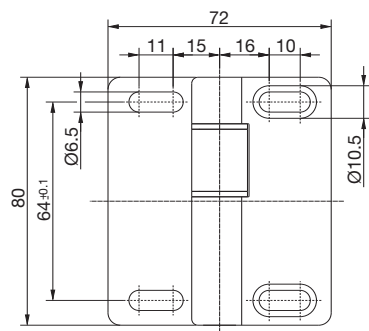
| | | |
|--|--------------|--------------|
| Designation | SHS-A1Z-SA | SHS-A1Z-SR |
| Part number | 601-9261-015 | 601-9261-010 |
| Contact diagram | | |
| Forced disconnect to IEC 947-5-1 annex k | | |
| Za: non-galv. separated contact | | |
| Zb: galv. separated contact | | |
| Slow make and break/snap action | | |
| Sealed internally (iw)/ externally (w) | iw | iw |



Switching hysteresis: -1.0°

| | | | |
|--|-----------|-------------------------------------|-------------------------------------|
| Voltage | max. | 250 VAC | 250 VAC |
| Thermal current | max. | 3A | 3A |
| Utilization category per IEC 947-5-1 AC 15/DC 13 | | 60 V/0.5 A | 60 V/0.5 A |
| Switching frequency | max. | 1200/h | 1200/h |
| Mechanical life - switching operations | | 1 x 10 ⁶ | 1 x 10 ⁶ |
| Operating temperature | min./max. | -25 °C / +70 °C
-13 °F / +158 °F | -25 °C / +70 °C
-13 °F / +158 °F |
| Approvals | | UL and CSA | UL and CSA |
| Weight | | 0.4 kg | 0.4 kg |
| Delivery: ex-stock/built to order | | •/- | •/- |

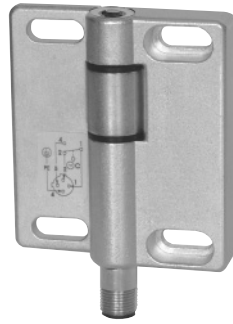
(All dimensions in mm)



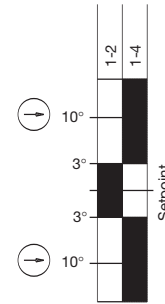
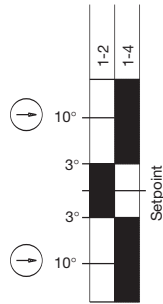
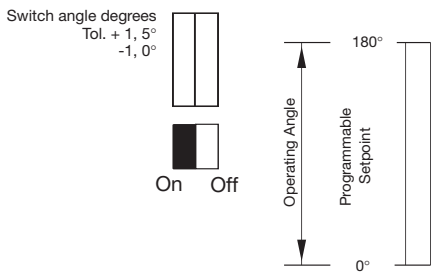


SAFELOCK

SHS Hinge Switches

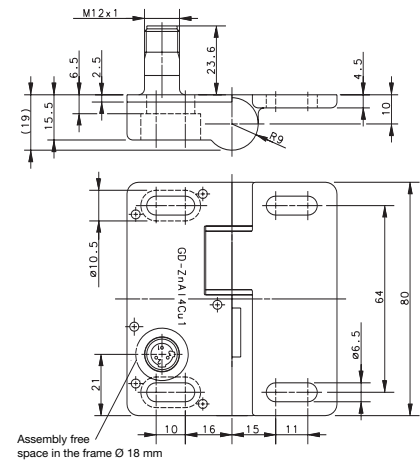
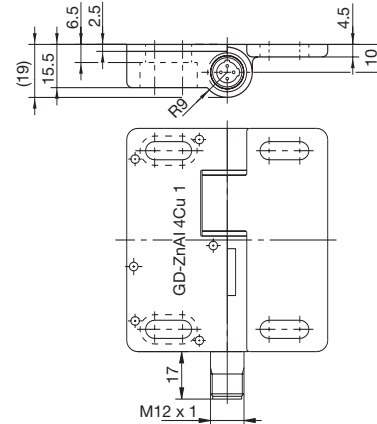
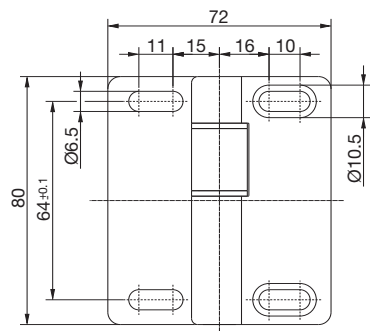


| | | |
|--|--------------|--------------|
| Designation | SHS-A1Z-SA | SHS-A1Z-SR |
| Part number | 601-9261-009 | 601-9261-016 |
| Contact diagram | | |
| Forced disconnect to IEC 947-5-1 annex k | | |
| Za: non-galv. separated contact | | |
| Zb: galv. separated contact | | |
| Slow make and break/snap action | | |
| Sealed internally (iw)/externally (w) | iw | iw |



| | | |
|--|---|---------------------------------|
| Switching hysteresis: -1.0° | | |
| Voltage | max. 250 VAC | 250 VAC |
| Thermal current | max. 3A | 3A |
| Utilization category per IEC 947-5-1 AC 15/DC 13 | 60 V/0.5 A
230 VAC/1.5 A | 60 V/0.5 A
230 VAC/1.5 A |
| Switching frequency | max. 1200/h | 1200/h |
| Mechanical life - switching operations | 1 x 10 ⁶ | 1 x 10 ⁶ |
| Operating temperature | min./max. -25 °C/+70 °C
-13 °F/+158 °F | -25 °C/+70 °C
-13 °F/+158 °F |
| Approvals | UL and CSA | UL and CSA |
| Weight | 0.4 kg | 0.4 kg |
| Delivery: ex-stock/built to order | •/- | •/- |

(All dimensions in mm)





SAFELOCK

I88 Style Position Safety Hinge Interlock Switches

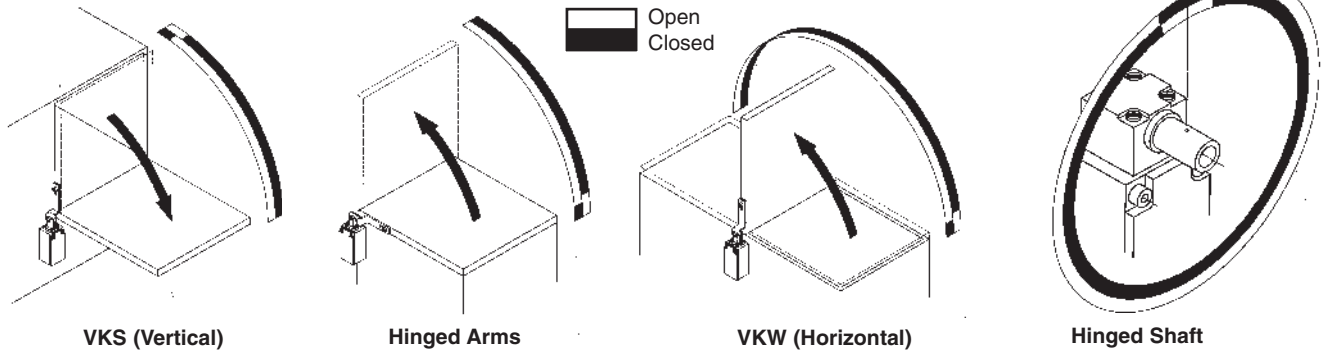
The I88 style Hinge Safety Switch is available with two distinctive types of operational actuators.

Actuator arms VKS, VKW RE and VKW LI give the user the opportunity to install them as permanently mounted operational arms on flaps and covers, as shown in the drawings below.

The AHDB styled actuator is designed to be directly connected to a hinge point of a rotating shaft. The normally closed safety contacts will open after 10 degrees of movement.



- Insulated plastic housing with hinged cover
- Forced disconnection of the N.C. contacts
- Contacts galvanically isolated
- Conduit adapter



Model: I88-U1Z VKS
Part Number: 608-6100-093
Operation: Central

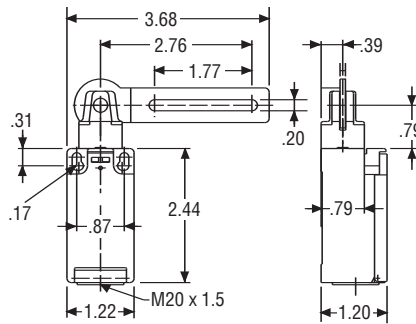
Model: I88-U1Z VKW RE
Part Number: 608-6100-094
Operation: Right

Model: I88-U1Z VKW LI
Part Number: 608-6100-095
Operation: Left

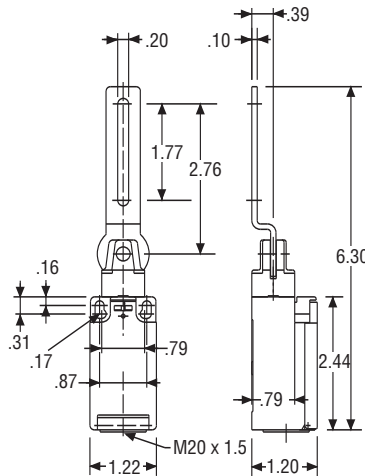
Enclosure: Thermoplastic
 1 Normally Closed
 ⊕ Forced Disconnect per IEC 947-5-1 Ch. 3
 1 Normally Open

Voltage Rating: 500 VAC (max.)
Current Rating: 10 A (max.)
Protection Class: NEMA 4
Mechanical Life: 1 x 10⁶ Cycles
Temperature: -22°F to +176°F
Switch Rate: 50 per minute max.
Approvals: UL, CSA

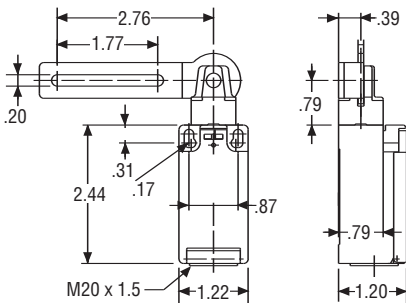
(Dimensions are in inches)



I88-U1Z VKW RE

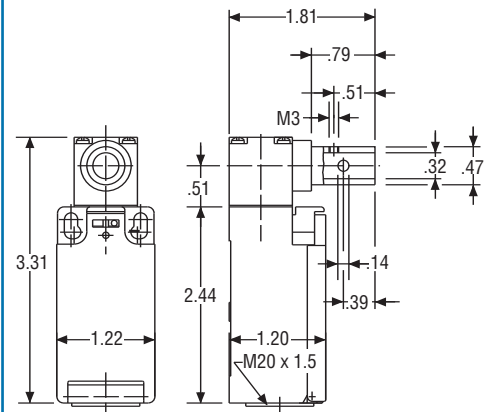


I88-U1Z VKS



I88-U1Z VKW LI

Model: I88-U1Z AHDB
Part Number: 618-6100-267
Enclosure: Thermoplastic
Contacts: 1 Normally Closed
 ⊕ Forced Disconnect per IEC 947-5-1 Ch. 3
 1 Normally Open
Voltage Rating: 500 VAC (max.)
Current Rating: 10 A (max.)
Protection Class: NEMA 4
Mechanical Life: 1 x 10⁶ Cycles
Temperature: -22°F to +176°F
Switch Rate: 50 per minute max.
Approvals: UL, CSA



I88-U1Z AHDB

SAFELOCK

Solenoid Locking Interlock Switches with Separate Actuator



Description

The SLK series of Solenoid Locking Switches are designed to ensure movable protective guards and are kept locked in place on machinery until the operating sequence or machine cycle is completed.

The actuator key is held in position under force, while the interlocking mechanism is activated. The interlocking mechanism is directly connected to the machine's control system.

Safety Interlock Switches perform three functions:

1. Allow the machine/process to operate when the protective guard is in position and locked.
2. Ensure the machine/process cannot operate when the actuator key is not in the locked and closed position.
3. Monitor the switch and the interlocking mechanism during operation.

System Description

Two types of locking methods are available:

Spring Lock...Mechanically locked-power to solenoid unlocks actuator

Magnetic Lock...Power to solenoid locks actuator in position.

Features

- Compact and slim in design
- Rugged plastic insulated housing
- Triple coding of the actuator for a high level of safety
- Flexible mounting options with rotatable actuator head (4X90°) and horizontal or vertical actuator approach
- Three cable entries
- Wiring chamber protected to IP 67/NEMA 4

Electrical Features

Switching Devices

| | |
|---|---|
| Rated isolation voltage max.: | 250 V |
| Thermal Continuous Current max.: | 10 A |
| Category of Use: | AC 15 230 V/4 A |
| Short Circuit protection: | DIAZED-
DIN VDE 0636 Part 1
6 A/inert gl/gG |

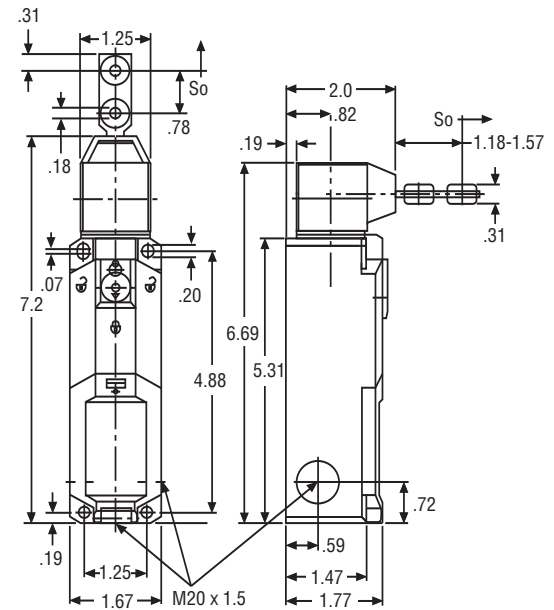
Solenoid

| | |
|-------------------------------------|-------------------|
| Duration of Current: | 3.4/100% ED |
| Temperature Class: | E (120°C) |
| Inrush Power Consumption: | 56 VA (0.2s) |
| Permanent Power Consumption: | 1.1 VA (constant) |
| Switching Frequency: | 600/hr. max. |

Actuation

- Standard actuator allows 8 different mounting positions
 - 4 Horizontal in 90° increments
 - 4 Vertical in 90° increments

(Dimensions are in inches)



Head Mounted Vertical
(Standard Actuator)

Head Mounted Horizontal
(Standard Actuator)

Mechanical Characteristics

| | |
|-----------------------------|---------------------|
| Enclosure: | PA 6 GV (UL94-V0) |
| Actuator Key: | Stainless Steel/PA |
| Ambient Temperature: | -25°C to +70°C |
| Switching Function: | 2 NC; 2 NO contacts |
| Mechanical Life: | 1,000,000 cycles |
| Actuation Radius: | 400mm min. |
| Approach Speed: | V = 0.5m/s max |
| Weight: | approx. 0.3 kg |
| Locking Force: | 1000 N (250 lbs.) |

| Part Number | Designation | Locking Spring Force Magnet Force | Connection Safety Equipment | Assembly Locking | Control Voltage | Add. Functions Auxiliary Release (AR) | LED (L) | Actuator Standard Radial Actuator |
|--------------|------------------------|-----------------------------------|-----------------------------|------------------|------------------------|---------------------------------------|---------|-----------------------------------|
| 601-8119-001 | SLK-FVTU24UC-55-AR | Spring Force | 1 NC ⊕ 1 NO | 1 NC ⊕ 1 NO | 24 VAC/DC | AR | — | Standard |
| 601-8119-002 | SLK-FVTU24-230MC-55-AR | Spring Force | 1 NC ⊕ 1 NO | 1 NC ⊕ 1 NO | 24-48 VDC + 24-230 VAC | AR | — | Standard |
| 601-8119-003 | SLK-MVTU24UC-55 | Magnet Force | 1 NC ⊕ 1 NO | 1 NC ⊕ 1 NO | 24 VAC/DC | — | — | Standard |
| 601-8119-004 | SLK-MVTU24-230MC-55 | Magnet Force | 1 NC ⊕ 1 NO | 1 NC ⊕ 1 NO | 24-48 VDC + 24-230 VAC | — | — | Standard |

SAFELOCK

Solenoid Locking Interlock Switches with Separate Actuator



Description

The SLM series of Solenoid Locking Switches is designed to ensure movable protective guards are kept locked in place on machinery until the operating sequence or machine cycle is completed.

The actuator key is held in position under force, while the interlocking mechanism is activated. The interlocking mechanism is directly connected to the machine's control system.

Safety Interlock Switches perform three functions:

1. Allow the machine/process to operate when the protective guard is in position and locked.
2. Ensure the machine/process cannot operate when the actuator key is not in the locked and closed position.
3. Monitor the switch and the interlocking mechanism during operation.

System Description

Two types of locking methods are available:

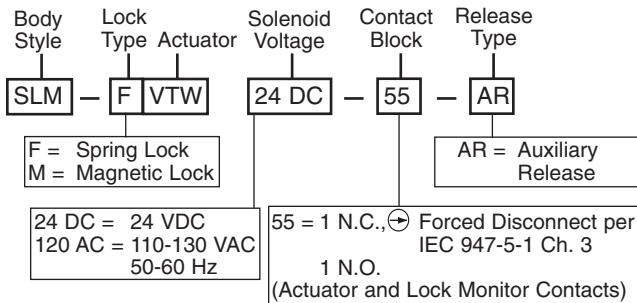
Spring Lock...Mechanically locked-power to solenoid unlocks actuator

Magnetic Lock...Power to solenoid locks actuator in position

Features:

- UL, CSA, and BG approved
- Triple coding of the actuator for a high level of safety
- Rugged, heavy duty, metal housing
- Actuator approach direction can be changed in 90° increments
- Actuator has smooth surface with no protruding sharp parts
- Forced disconnection of the N.C. contacts
- Contacts galvanically isolated
- Two cable entries
- Conduit adapter or cord grip provided
- Manufactured to VDE 0660 part 200, IEC 947-5-1, and test principle GS-ET 19

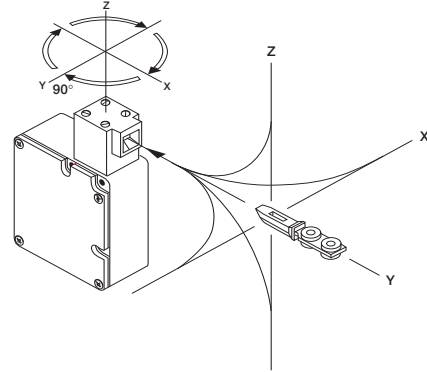
Model Identification



Non-Standard Options

- 230 VAC/50 Hz solenoid voltage
- Key operated auxiliary release (Spring Lock Only)
- Mushroom head auxiliary release with key reset (Spring Lock Only)
- LED indicators for switch status
- Extended length actuator

Consult the factory for details.



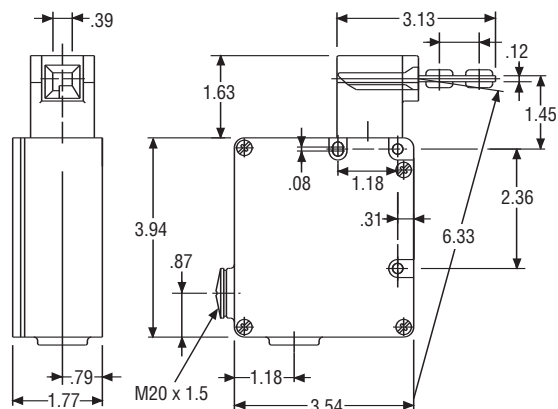
Common Features

| | |
|--------------------------------|--------------------------------------|
| Safety Category: | 4 |
| Contact Voltage: | 250 V (maximum) |
| Contact Current: | 10 A (maximum) |
| Protection Class: | NEMA 4 |
| Mechanical Life: | 1 x 10 ⁶ Switching Cycles |
| Temperature: | -22°F to +140°F |
| Actuator Locking Force: | 225 lbs. [1000 N] |
| Actuator Holding Force: | 4.5 lbs. [20 N] |
| Operating Radius: | 15.7" [400 mm] (minimum) |
| Enclosure: | Die Cast Aluminum |

| Model (Spring Lock) | Part Number | Solenoid Voltage |
|-----------------------|--------------|------------------|
| SLM-FVTW 24 DC-55-AR | 601-7119-020 | 24 VDC |
| SLM-FVTW 120 AC-55-AR | 601-7119-032 | 120 VAC |

| Model (Magnetic Lock) | Part Number | Solenoid Voltage |
|-----------------------|--------------|------------------|
| SLM-MVTW 24 DC-55 | 601-7119-023 | 24 VDC |
| SLM-MVTW 120 AC-55 | 601-7119-033 | 120 VAC |

(Dimensions are in inches)





SAFELOCK

MUZ-602 and MUZ-202

Coded Magnetic Monitoring Systems

BIA Rated for Safety Category 3 EN 954-1
Single Failsafe System With Partial Fault Recognition

Description

The monitoring controls available to Category 3 certification are the MUZ-202, two channel control and the MUZ-602 six channel control. The number of channels indicated refers to the maximum number of Coded Magnetic Sensors that can be used per control.

Both controls can only be used with series MAK-xx36 Coded Magnetic Sensors and corresponding Magnets TK-xx-CD, as shown on page 57.

These systems are intended for use with movable protective guard installations, i.e. flaps, doors, and covers.

Magnetic Coded Monitoring Systems offer an alternative to mechanical interlock switches, especially on machines that operate in areas where cleaning, disinfecting, or contamination play a major role, as the sensor and magnet are fully encapsulated.

Features

- BIA rated for Safety Category 3
- Forced disconnection of the safety contacts
- Control unit mounts to 35 mm DIN rail (TS 35)
- BIA Approved

System Operation

The correct operation of the system is ensured, as the circuitry monitors each sensor and magnet to ensure they are aligned correctly, by using an evaluation circuit with two timing stages.

Only when all the sensors have met this requirement will the controls output relay give the signal for the machine to operate.

Within this series of controls an additional output contact is available, to be used for informational purposes only and not for any safety function.



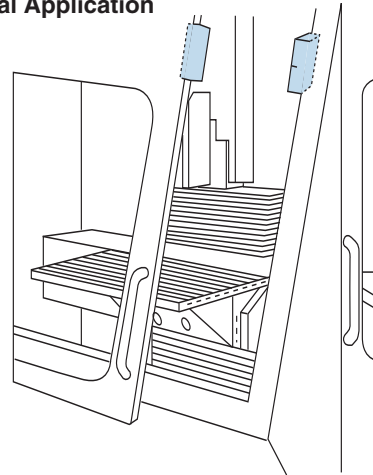
MUZ 202



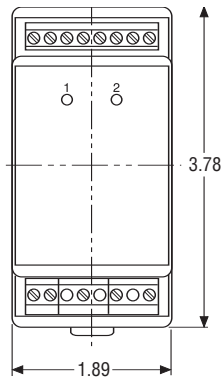
MUZ 602

| Model | MUZ-202/D24-UM | MUZ-602/D24-UM |
|--------------------|--------------------------------------|----------------|
| Part Number | 639-2702-301 | 639-2706-302 |
| Enclosure | PA 6.6 Plastic | |
| Channels | 2 | 6 |
| Safety Contact | 1 Normally Closed, Forced Disconnect | |
| Monitor Contact | 1 Normally Open | |
| Operating Voltage | 24 VDC | |
| Operating Current | 100 mA | |
| Switching Voltage | 250 VAC (max.) | |
| Switching Current | 8 A (max.) | |
| Switching Capacity | 1700 VA (MAX.) | |
| Protection Class | IP 20 (Equivalent to NEMA 1) | |
| Temperature | +32°F to +131°F [0°C to +55°C] | |

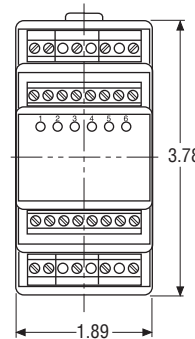
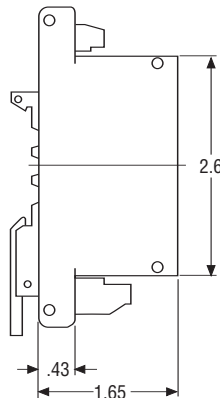
Typical Application



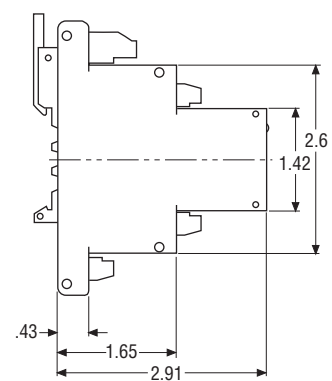
(Dimensions are in inches)



MUZ 202



MUZ 602



SAFELOCK

Coded Magnetic Sensors Coded Magnets

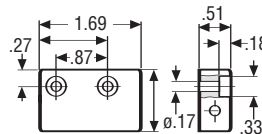
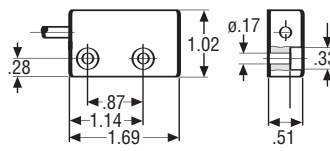
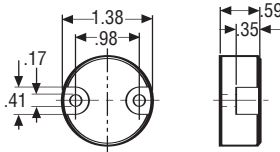
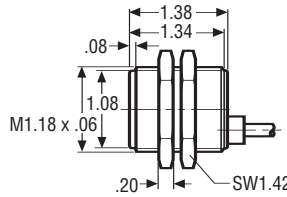
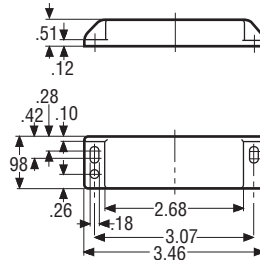
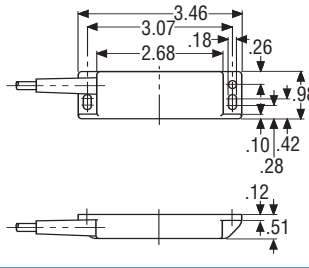
Coded magnetic sensors and coded magnets are designed for use with special purpose safety controllers. They cannot be operated by simple bar magnets.

| Model | Part Number |
|---------------------------|--------------|
| MAK-4236-3 ¹ | 649-0642-301 |
| MAK-4236-STK ² | 649-0642-305 |
| TK-42-CD | 640-2042-301 |

¹Sensor with 10 ft. (3 m) Cable
(19 ft. (6 m) and 29 ft. (9 m) Special Order)
²Sensor with Connector (Cable Sold Separately)
 Uses either a 413-9100-228 or 413-9100-230 cable

Enclosure: PA 6.6 Plastic
Voltage Rating: 30 VDC (max.)
Current Rating: 4 mA (max.)
Protection Class: NEMA 6
Operating Range: 0.12" (3 mm) On (min.)
 0.55" (14 mm) Off (max.)
Temperature: -4°F to +158°F
Controller Type: MUZ-x02/xxx

(Dimensions are in inches)



| Model | Part Number |
|---------------------------|--------------|
| MAK-5336-3 ¹ | 649-0653-310 |
| MAK-5336-STK ² | 649-0653-313 |
| TK-43-CD | 640-2043-023 |

¹ Sensor with 10 ft. (3 m) Cable
(19 ft. (6 m) and 29 ft. (9 m) Special Order)
² Sensor with Connector (Cable Sold Separately)
 Uses cable 413-9100-266

Enclosure: PA 6.6 Plastic
Voltage Rating: 30 VDC (max.)
Current Rating: 4 mA (max.)
Protection Class: NEMA 6
Operating Range: 0.12" (3 mm) On (min.)
 0.28" (7 mm) Off (max.)
Temperature: -4°F to +158°F
Controller Type: MUZ-x02/xxx

| Model | Part Number |
|---------------------------|--------------|
| MAK-5236-3 ¹ | 649-0652-306 |
| MAK-5236-STK ² | 649-0652-309 |
| TK-52-CD-HF | 640-2052-305 |

¹ Sensor with 10 ft. (3 m) Cable
(19 ft. (6 m) and 29 ft. (9 m) Special Order)
² Sensor with Connector (Cable Sold Separately)
 Uses either a 413-9100-228 or 413-9100-230 cable

Enclosure: PA 6.6 Plastic
Voltage Rating: 30 VDC (max.)
Current Rating: 4 mA (max.)
Protection Class: NEMA 6
Operating Range: 0.16" (4 mm) On (min.)
 0.31" (8 mm) Off (max.)
Temperature: -4°F to +158°F
Controller Type: MUZ-x02/xxx

Cables for Sensors with Connectors

Material: PUR (Cable)
 PA 12 (Connector)
Cable Length: 8 ft. (2.5 m)
Protection Class: NEMA 6

| Model | Part Number |
|---------------------|--------------|
| GDK-R06US/S00-2.5PU | 413-9100-228 |
| WDK-R06US/S00-2.5PU | 413-9100-230 |
| WDK-M12UA/S00-2.5PU | 413-9100-266 |



R06 WDK

M12 WDK

Cable Pull Safety Switches

For Cable Lengths of 10, 15, 30 and 75 ft. Single Direction for Standard and Safety Applications

Description

Cable pull switches give personal ready access to a machine stop switch over a long distance by pulling on the cable. They are especially suited for use along conveyors or on the perimeter of large manufacturing machines.

Safety cable pull switches (type Si) are safety devices according to IEC 947-5-1 and VDC 0660, T200. The action of the N.C. emergency stop contacts is forced due to the contact elements being securely attached to the plunger. This safety switch has make-before-break contacts. The machine will stop when the cable is pulled or when the cable breaks. These functions are made possible by the overlapping contacts of the UV type contact blocks. This operation requires the Cable to be held in position under tension. See the Typical Installation drawing on page 59 for further information.

A latch option keeps the stop contact open after the cable has been pulled and released. The latch is reset by operating a push-button on the switch. Machine restarting is not possible until the latch is reset.

The maximum length of the cable is only limited by its weight. The weight of the cable must not exceed the tension force of the switching system. The maximum length of unsupported cable must not exceed 15 ft.



Standard Cable Pull Switch

| Model | Part Number | *Cable Length | Pull Force | Voltage (max.) | Current (max.) | Enclosure | **Drawing |
|-------------|--------------|---------------|------------|----------------|----------------|-----------|-----------|
| SI-U1Z | 601-3812-075 | 10 ft. | 5.5 lbs. | 380 VAC | 10 A | Plastic | A |
| SEK-U1Z | 601-1811-133 | 15 ft. | 18 lbs. | 500 VAC | 10 A | Plastic | B |
| SEM2-U1Z | 601-2811-029 | 15 ft. | 18 lbs. | 500 VAC | 10 A | Aluminum | C |
| SD-U1 | 601-1411-856 | 30 ft. | 27 lbs. | 500 VAC | 16 A | Aluminum | F |
| SD-U1/LATCH | 601-1411-868 | 30 ft. | 27 lbs. | 500 VAC | 16 A | Aluminum | E |

Safety Cable Pull Switch

| Model | Part Number | *Cable Length | Pull Force | Voltage (max.) | Current (max.) | Enclosure | **Drawing |
|------------------|--------------|---------------|------------|----------------|----------------|-----------|-----------|
| SiI-UV1Z | 601-3832-076 | 10 ft. | 5.5 lbs. | 380 VAC | 10 A | Plastic | A |
| SiEK-UV1Z | 601-1831-134 | 15 ft. | 18 lbs. | 500 VAC | 10 A | Plastic | B |
| SiEM2-UV1Z | 601-2831-022 | 15 ft. | 18 lbs. | 500 VAC | 10 A | Aluminum | C |
| SiEM2-UV1Z/LATCH | 601-2831-023 | 15 ft. | 18 lbs. | 500 VAC | 10 A | Aluminum | D |
| SiD-UV1Z | 601-1431-857 | 30 ft. | 27 lbs. | 380 VAC | 16 A | Aluminum | F |
| SiD-UV1Z/LATCH | 601-1431-869 | 30 ft. | 27 lbs. | 380 VAC | 16 A | Aluminum | E |
| SiD-UV1Z | 601-2431-877 | 75 ft. | 45 lbs. | 500 VAC | 16 A | Aluminum | G |
| SiD-UV2Z/LATCH | 601-2441-907 | 75 ft. | 45 lbs. | 380 VAC | 16 A | Aluminum | H |

*Recommended Cable Length

**Drawings shown on page 59

Accessories

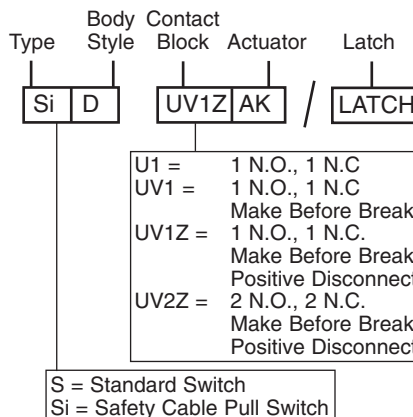
Single Direction Cable Kit

| Cable Length | Part Number |
|--------------|--------------|
| 15 ft. | 8010-448-001 |
| 30 ft. | 8010-448-002 |
| 75 ft. | 8010-448-003 |

Each One Way Cable Kit Includes:

- Length of cable as listed
- 1 Wrought Iron Tension Screw
- 4 Galvanized Clamps
- 4 Galvanized Thimbles
- (Customer to provide Eye Screws)
- Individual accessories are also available.

Model Identification



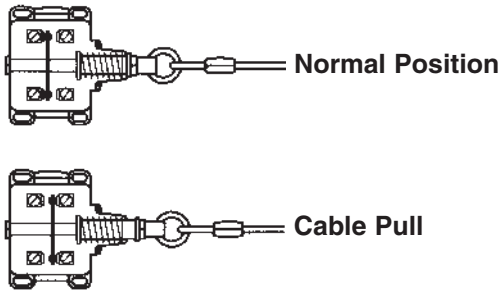
Cable Pull Switches

For Cable Lengths of 10, 15,
 30 and 75 Feet
 Single Direction
 Mechanical and
 Installation Information

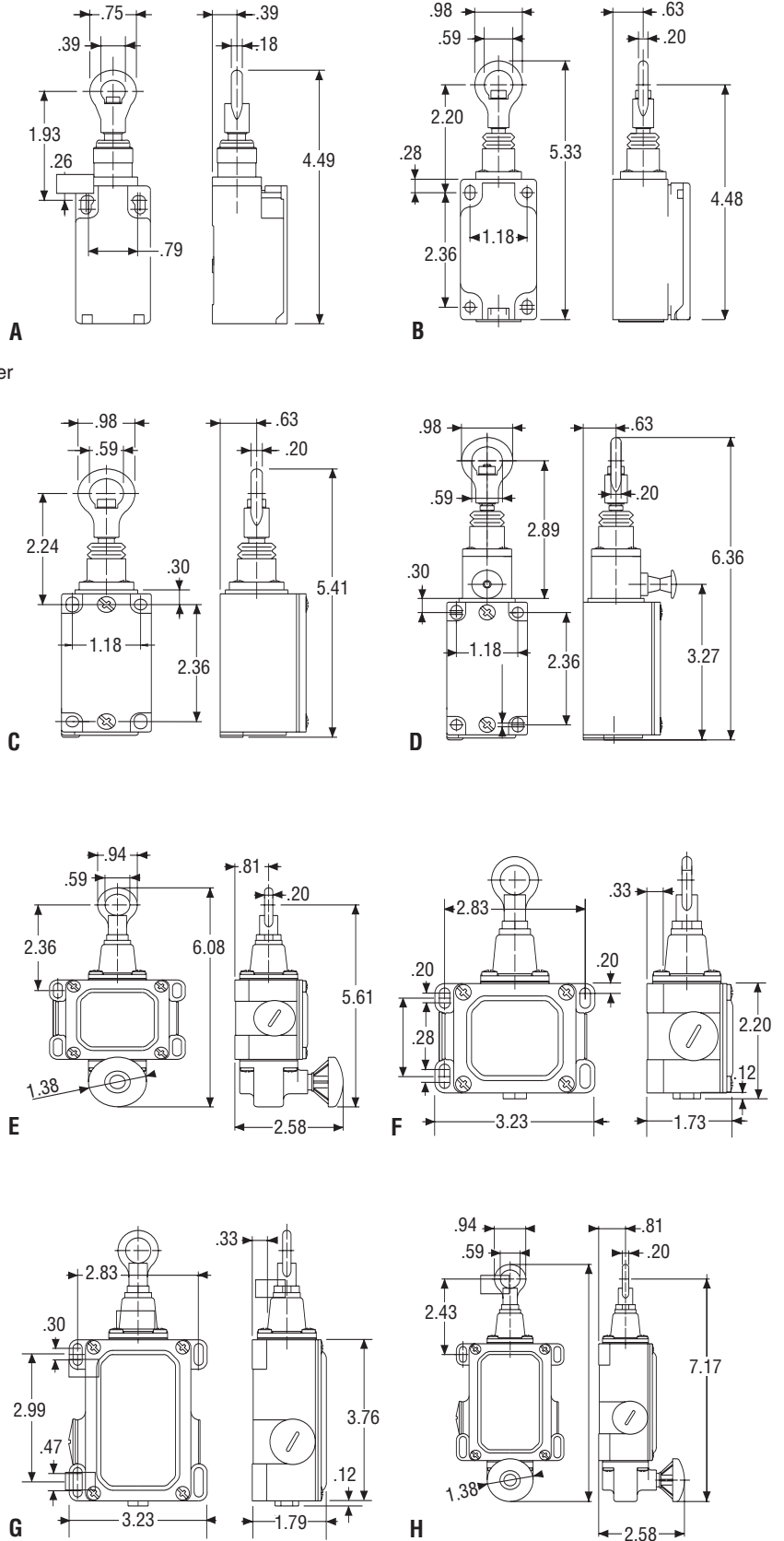
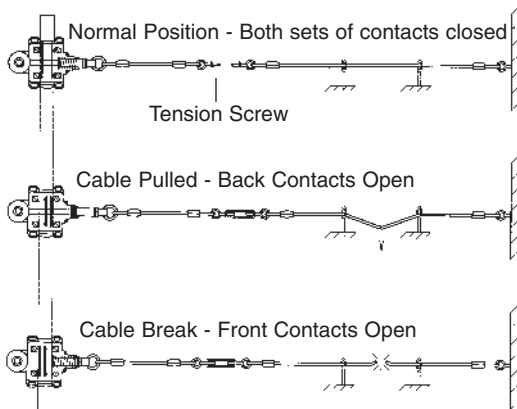
Common Features

- Degree of Protection: NEMA 4
- Temperature: -22°F to +176°F
- Enclosure: Die cast aluminum or glass fiber reinforced thermoplastic
- Approvals: UL, CSA

Standard Switch Installation



Safety Switch Installation



Cable Pull Switches

For Cable Lengths Up To 250 Feet
 Two Way Direction
 For Standard and Safety Applications



Description

For cable runs greater than 75 feet, two directional cable pull switches are recommended. Two directional switches can be used in applications of cable runs up to 250 feet (125 feet on each side of the installed switch). This type of cable pull switch operates with the cables under tension. During prestressing of the cable, both sets of contacts are in their original state. Pulling the cable on either side of the switch will cause the actuator on the switch to be displaced. When the displacement reaches a prespecified angle, the switch will lock and the contacts will not be able to switch back to their original state. The lock-out feature ensures that the machine cannot be restarted until the switch is manually reset by the operator. Cocking springs must be used at both ends of the installation, as shown in the Typical Installation drawing. Any cable length over 15 feet should be supported with an eye screw.



Si1



Si2

Two Way Direction Accessory Cable Kit

| Cable Length | Part Number |
|----------------|--------------|
| 105 ft. [32 m] | 8010-448-004 |
| 200 ft. [61 m] | 8010-448-005 |
| 250 ft. [76 m] | 8010-448-006 |

Each Two Way Direction Cable Kit Includes:

- Length of cable as listed
- 2 Tension Springs
- 4 Galvanized Clamps
- 4 Galvanized Thimbles
- (Customer to provide Eye Screws)
- Individual accessories are also available.

Common Features

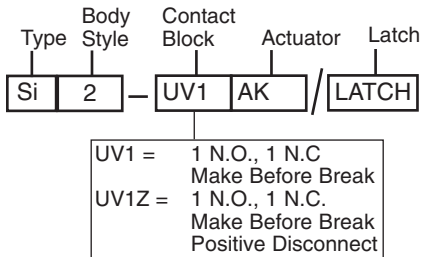
- Degree of Protection:** NEMA 4
- Temperature:** -22°F to +176°F
- Enclosure:** Die cast aluminum
- Latch:** Standard with pull ring reset
- Approvals:** UL, CSA, (Si1 = BG)

Two Way Direction Safety Cable Pull Switch

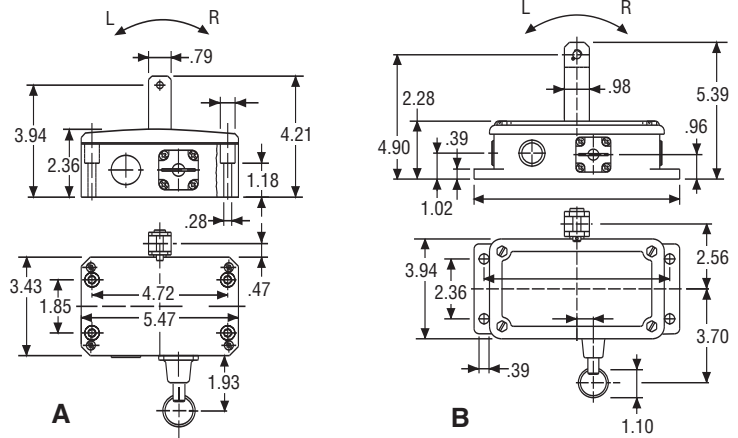
| Model | Part Number | Cable Length* | Switching Angle | Voltage (max.) | Current (max.) | Drawing |
|------------------|--------------|---------------|-----------------|----------------|----------------|---------|
| Si1-UV1ZAK/LATCH | 601-4735-001 | 225 ft. | 30 Degrees | 500 VAC | 10 A | A |
| Si2-UV1AK/LATCH | 601-5735-002 | 250 ft. | 30 Degrees | 500 VAC | 10 A | B |

* Recommended Cable Length

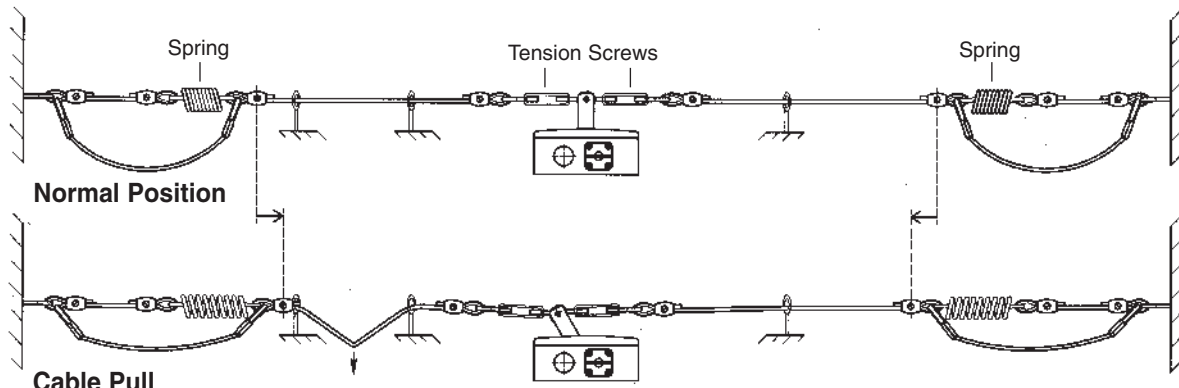
Model Identification



(Dimensions are in inches)



Typical Installation Arrangement





Glossary of Terms

Alignment

The correct relation of emitter to receiver as it is important for optimum performance.

Background Suppression

A general term for diffuse sensors that can be adjusted to ignore the influence of objects/ surfaces behind the target object. Background Suppression Sensors minimize variations in sensing distances because of the difference in reflectivity between highly reflective and dark targets.

Capacitive

A sensing device that is actuated by conductive and nonconductive materials with a dielectric constant greater than 1.

Color Mark Sensor

A sensor specifically designed to differentiate between colored marks or between a mark and a background color.

Converged Beam (Fixed Focus)

The convergent mode is similar to the diffuse sensing mode because an object is sensed when the receiver sees light reflected back to the sensor by the object itself. The emitter and receiver are focused at a fixed point. Because convergent beam sensors make much more efficient use of sensing light energy, they can sense relatively non-reflective materials and objects with small reflective surfaces.

Dark Activated

Operating mode for photoelectric sensors where the output is turned on (transistor becomes conducting, or relay coil is energized) when light is not received.

Diffuse Reflective

Sensor configuration with the emitter and receiver located in the same housing. Sensing of target is based on reflection of light from the target itself.

Hysteresis

The difference between the switch-on and switch-off point for a sensor.

Inductive Sensing

A sensing technology that identifies the presence of metallic objects by detecting eddy current losses in a magnetic field produced at a sensing face.

IP

International Protection; an international standard scale for enclosure ratings.

Kodak 90% Reflective White Card

A standard reference manufactured by Kodak designed to reflect 90% of white light. Used as a standard target for diffuse reflective sensors.

Light Activated

Operating mode for photoelectric sensors where the output is turned on when light is received.

Limit Switch

A switch positioned such that it is actuated by a moving part, in order to shut off or reverse the power to the motor driving the part when it reaches the limit set for its travel.

Magnetic Sensing

A sensing device that is activated when brought into the influence of a magnetic field generated by either a permanent magnet or an electromagnet.

NEMA

National Electrical Manufacturer's Association; Industrial trade organization that publishes testing standards, including enclosure ratings.

NPN

Transistor output designed to provide a path to ground for current passing through the load (sinking). When the NPN output is on, current can then pass from Positive, through the load, and through the NPN transistor to ground, completing the circuit.

Off-Delay

Off delay timers prolong or hold an output signal by a preset time interval after the target leaves the sensing area. The OFF delay can be used as an output pulse extender when target presence is not of sufficient duration for control requirements.

On-Delay

On-Delay timers delay the generation of an output signal by a preset time interval from the appearance of the target. Target presence shorter in duration than the preset delay interval will not generate an output signal.

Polarized Retroreflective Sensing

Visible light from the emitter of a retroreflective photoelectric sensor that is filtered so as to be projected in only one plane. The receiver of a polarized unit is filtered to accept only light that is reflected perpendicular to the emitted light. Corner cube reflectors are required to properly rotate the emitted light source.

PNP

Transistor output that provides a path to "plus" for current passing through the load (sourcing). When the transistor is turned on, current can then pass from Positive, through the PNP transistor, through the load, and to ground, completing the circuit.

Retroreflective Sensing

Detection method where light from the emitter is aimed at, and reflected back to the receiver, from a retroreflective target.

Sensing Distance

The maximum distance at which, under specifications, a sensor can detect a target.

Shielded Sensor

A sensor which senses only to the front of its face and ignores metals to its side.

Switching Frequency

The maximum number of complete on-off cycles that the control output is capable of in one second, usually expressed in Hz (Hertz, cycles per second).

Through-Beam Sensing

Sensor where the emitter and receiver are in separate housings and arranged facing each other. The target would be detected passing between the emitter and receiver, interrupting the beam.

Ultrasonic Sensing

Ultrasonic proximity mode sensors can measure the time delay between the emitted sound and the returned echo, and produce an accurate measurement of sensing distance. Analog Ultrasonic Sensors produce an output that has a highly linear relationship to sensing distance.

Unshielded Sensor

Refers to inductive-type proximity sensors that do not have an internal metallic ring to reduce interference from surrounding metals and other inductive sensors. Non-shielded sensors cannot be flush mounted in metal and must be spaced further away from other inductive sensors than shielded types of sensors.

| Part Number | Descriptive Code | Page Number | Part Number | Descriptive Code | Page Number |
|--------------|---------------------|-------------|--------------|------------------------|-------------|
| 325-1003-221 | AN-KAB-SHS - 2M DC | 47 | 601-6819-052 | SKI-U1Z M3 | 42 |
| 325-1003-222 | AN-KAB-SHS - 5M DC | 47 | 601-6869-056 | SKI-A2Z M3 | 42 |
| 325-1003-223 | AN-KAB-SHS - 10M DC | 47 | 601-6869-058 | SKI-UV15Z M3 | 42 |
| 325-1003-224 | AN-KAB-SHS - 2M DC | 47 | 601-7119-020 | SLM-FVTW24DC-55-AR | 55 |
| 325-1003-225 | AN-KAB-SHS - 5M DC | 47 | 601-7119-023 | SLM-MVTW24DC-55 | 55 |
| 325-1003-226 | AN-KAB-SHS - 10M DC | 47 | 601-7119-032 | SLM-FVTW120AC-55-AR | 55 |
| 325-1004-219 | AN-KAB-SHS - 5M AC | 47 | 601-7119-033 | SLM-MVTW120AC-55 | 55 |
| 325-1004-220 | AN-KAB-SHS - 5M AC | 47 | 601-8119-001 | SLK-FVTU24UC-55-AR | 54 |
| 325-1103-234 | AN-KAB-SHS - 5M AC | 47 | 601-8119-002 | SLK-FVTU24-230MC-55-AR | 54 |
| 325-1103-236 | AN-KAB-SHS - 5M | 47 | 601-8119-003 | SLK-MVTU24UC-55 | 54 |
| 413-9100-228 | GDK-R06US/S00-2.5PU | 57 | 601-8119-004 | SLK-MVTU24-230MC-55 | 54 |
| 413-9100-230 | WDK-R06US/S00-2.5PU | 57 | 601-9261-009 | SHS-A1Z-SA | 46, 52 |
| 413-9100-248 | GDK-M12AS/S00-2 | 24 | 601-9261-010 | SHS-A1Z-SR | 46, 51 |
| 413-9100-249 | GDK-M12AS/S00-5 | 24 | 601-9261-011 | SHS-A1Z-KA5 | 46, 50 |
| 413-9100-250 | WDK-M12AS/S00-2 | 24 | 601-9261-014 | SHS-A1Z-KR5 | 46, 50 |
| 413-9100-261 | GDK-M08US/S00-2.5PU | 20, 24 | 601-9261-015 | SHS-A1Z-SA | 46, 51 |
| 413-9100-263 | GDK-M08US/S00-5PU | 20, 24 | 601-9261-016 | SHS-A1Z-SR | 46, 52 |
| 413-9100-266 | WDK-M12UA/S00-2.5PU | 57 | 601-9261-017 | SHS-A1Z-SA-BG | 46, 49 |
| 413-9100-278 | WDK-M08US/S00-2.5PU | 20, 24 | 601-9261-018 | SHS-A1Z-SR-BG | 46, 49 |
| 413-9100-279 | WDK-M08US/S00-5PU | 20, 24 | 601-9291-013 | SHS-OZ | 46 |
| 413-9100-280 | WDK-M12US/S00-2 | 20 | 606-1100-001 | F1-U1Y | 39 |
| 413-9100-281 | WDK-M12US/S00-5 | 20 | 606-1300-011 | F1-SU1Z | 39 |
| 596-0223-040 | BKS-D22PA | 23 | 606-1600-002 | F1-U1Y UN | 39 |
| 596-0223-041 | BKS-D34PA | 13, 15, 23 | 606-1800-012 | F1-SU1Z UN | 39 |
| 596-0223-069 | BKB-D04PA | 23 | 606-2330-021 | F2-SU1Z-SU1Z | 39 |
| 596-0223-070 | BKS-D05PA | 23 | 606-2830-022 | F2-SU1Z-SU1Z UN | 39 |
| 601-1411-856 | SD-U1 | 58 | 606-3111-025 | F3-U1Z-U1Z-U1Z | 39 |
| 601-1411-868 | SD-U1/LATCH | 58 | 606-3833-045 | F3-SU1Z-SU1Z-SU1Z UN | 39 |
| 601-1431-857 | SiD-UV1Z | 58 | 608-1102-001 | ENK-U1Z iw | 35 |
| 601-1431-869 | SiD-UV1Z/LATCH | 58 | 608-1117-002 | ENK-U1Z RiW | 35 |
| 601-1811-133 | SEK-U1Z | 58 | 608-1135-003 | ENK-U1Z AHS-V | 35 |
| 601-1831-134 | SiEK-UV1Z | 58 | 608-1136-012 | ENK-U1 AV | 35 |
| 601-2431-877 | SiD-UV1Z | 58 | 608-1137-011 | ENK-U1Z AD | 35 |
| 601-2441-907 | SiD-UV2Z/LATCH | 58 | 608-1152-007 | ENK-SU1Z iw | 35 |
| 601-2811-029 | SEM2-U1Z | 58 | 608-1167-008 | ENK-SU1Z RiW | 35 |
| 601-2831-022 | SiEM2-UV1Z | 58 | 608-1185-009 | ENK-SU1Z AHS-V | 35 |
| 601-2831-023 | SiEM2-UV1Z/LATCH | 58 | 608-1186-018 | ENK-SU1 AV | 35 |
| 601-3812-075 | SI-U1Z | 58 | 608-1187-017 | ENK-SU1Z AD | 35 |
| 601-3832-076 | SiI-UV1Z | 58 | 608-1190-045 | ENK-SU1 FF | 35 |
| 601-4735-001 | Si1-UV1ZAK/LATCH | 60 | 608-5103-001 | Bi-U1Z w | 31 |
| 601-5735-002 | Si2-UV1AK/LATCH | 60 | 608-5117-002 | Bi-U1Z RiW | 31 |
| 601-6119-016 | SK-U1Z M | 44 | 608-5137-007 | Bi-U1 AD | 31 |
| 601-6119-040 | SK-U1Z MRV | 44 | 608-5153-008 | Bi-SU1Z w | 31 |
| 601-6119-041 | SK-U1Z MRH | 44 | 608-5167-009 | Bi-SU1Z RiW | 31 |
| 601-6169-026 | SK-UV15Z M | 44 | 608-5171-017 | Bi-SU1Z Hw | 31 |
| 601-6169-039 | SKC-A1Z M | 44 | 608-5185-012 | Bi-SU1Z AH | 31 |
| 601-6169-063 | SK-UV15Z F | 44 | 608-5186-013 | Bi-SU1 AV | 31 |
| 601-6169-064 | SK-UV15Z MRH | 44 | 608-5190-015 | Bi-SU1 FF | 31 |
| 601-6169-065 | SK-UV15Z MRV | 44 | 608-6100-093 | I88-U1Z VKS | 53 |
| 601-6409-060 | SKT-SU1Z M3 | 42 | 608-6100-094 | I88-U1Z VKW RE | 53 |
| 601-6419-059 | SKT-U1Z M3 | 42 | 608-6100-095 | I88-U1Z VKW LI | 53 |
| 601-6469-066 | SKT-A2Z M3 | 42 | 608-6103-008 | I88-U1Z w | 33 |
| 601-6469-067 | SKT-SA2Z M3 | 42 | 608-6117-017 | I88-U1Z RiWk | 33 |
| 601-6809-057 | SKI-SUIZ M3 | 42 | 608-6121-021 | I88-U1Z Hw | 33 |

| Part Number | Descriptive Code | Page Number | Part Number | Descriptive Code | Page Number |
|--------------|------------------|------------------|--------------|-----------------------|-------------|
| 608-6135-033 | I88-U1Z AH | 33 | 639-2706-302 | MUZ-602/D24-UM | 56 |
| 608-6136-037 | I88-U1 AV | 33 | 640-2042-301 | TK-42-CD | 57 |
| 608-6139-054 | I88-SU1 AF | 33 | 640-2043-023 | TK-43-CD | 57 |
| 608-6153-012 | I88-SU1Z w | 33 | 640-2052-305 | TK-52-CD-HF | 57 |
| 608-6167-018 | I88-SU1Z RiwK | 33 | 649-0642-301 | MAK-4236-3 | 57 |
| 608-6171-022 | I88-SU1Z Hw | 33 | 649-0642-305 | MAK-4236-STK | 57 |
| 608-6185-034 | I88-SU1Z AH | 33 | 649-0652-306 | MAK-5236-3 | 57 |
| 608-6187-042 | I88-SU1 AD | 33 | 649-0652-309 | MAK-5236-STK | 57 |
| 608-7102-001 | ENM2-U1Z iw | 37 | 649-0653-310 | MAK-5336-3 | 57 |
| 608-7117-004 | ENM2-U1Z Riw | 37 | 649-0653-313 | MAK-5336-STK | 57 |
| 608-7121-007 | ENM2-U1Z DG Hw | 37 | 650-2307-135 | KIB-M30NS/010-KL2 | 18 |
| 608-7127-010 | ENM2-U1Z DG Kw | 37 | 650-2308-001 | KIN-M30NS/015-KL2 | 18 |
| 608-7135-013 | ENM2-U1Z AHS-V | 37 | 650-2316-003 | KIN-M08NS/002-KL2 | 18 |
| 608-7136-016 | ENM2-U1 AV | 37 | 650-2342-004 | KIN-M08NS/002-KLSM8 | 20 |
| 608-7137-018 | ENM2-U1Z AD | 37 | 650-2399-003 | KIB-M05NS/001-KL2 | 18 |
| 608-7352-002 | ENM2-SU1Z iw | 37 | 650-2399-004 | KIB-D04NS/0.8-KL2PU | 18 |
| 608-7367-005 | ENM2-SU1Z Riw | 37 | 650-2399-018 | KIB-M04NS/0.6-KL2 | 18 |
| 608-7371-008 | ENM2-SU1Z DG Hw | 37 | 650-2907-068 | KIB-M30PS/010-KL2 | 18 |
| 608-7377-011 | ENM2-SU1Z DG Kw | 37 | 650-2908-002 | KIN-M30PS/015-KL2 | 18 |
| 608-7385-014 | ENM2-SU1Z AHS-V | 37 | 650-2916-003 | KIN-M08PS/002-KL2 | 18 |
| 608-7386-017 | ENM2-SU1 AV | 37 | 650-2935-005 | KIN-M30PS/015-KLS12 | 20 |
| 608-7387-019 | ENM2-SU1Z AD | 37 | 650-2939-004 | KIB-M30PS/010-KLS12 | 20 |
| 608-8103-001 | Ti2-U1Z w | 29 | 650-2942-006 | KIN-M08PS/002-KLSM8 | 20 |
| 608-8117-007 | Ti2-U1Z Riw | 29 | 650-2999-003 | KIB-M05PS/001-KL2 | 18 |
| 608-8121-015 | Ti2-U1Z Hw | 29 | 650-2999-004 | KIB-D04PS/0.8-KL2PU | 18 |
| 608-8135-021 | Ti2-U1Z AH | 29 | 650-2999-020 | KIB-M04PS/0.6-KL2 | 18 |
| 608-8137-027 | Ti2-U1 AD | 29 | 650-3503-001 | KIB-M12AS/002-L2 | 22 |
| 608-8153-002 | Ti2-SU1Z w | 29 | 650-3504-001 | KIN-M12AS/004-L2 | 22 |
| 608-8167-008 | Ti2-SU1Z Riw | 29 | 650-3505-004 | KIB-M18AS/005-L2 | 22 |
| 608-8171-016 | Ti2-SU1Z Hw | 29 | 650-3506-002 | KIN-M18AS/008-L2 | 22 |
| 608-8185-022 | Ti2-SU1Z AH | 29 | 650-3507-378 | KIB-M30AS/010-L2 | 22 |
| 608-8190-040 | Ti2-SU1Z FF | 29 | 650-3508-246 | KIN-M30AS/015-L2 | 22 |
| 610-8002-001 | RTS-082KK | 4, 5, 6, 7, 8, 9 | 650-7013-001 | KCN-T32DP/030-KLP2 | 24 |
| 612-1100-555 | GC-U1Z VT 90° | 45 | 650-7013-011 | KCB-M32DP/015-KLP2 | 24 |
| 616-1000-203 | F1-SU1Z/UV1 D UN | 40 | 650-7315-001 | KCN-R34NS/030-KLP2 | 24 |
| 616-1300-327 | F1-SU1 Mi RG | 39 | 650-7319-001 | KCN-T12NS/004-KLP2 | 24 |
| 616-1800-328 | F1-SU1 Mi RG UN | 39 | 650-7321-002 | KCN-T18NS/008-KLP2 | 24 |
| 616-1800-482 | F1-SU1Z AT UN | 39 | 650-7321-723 | KCA-T18NS/008-KLP2 | 24 |
| 618-6100-267 | I88-U1Z AHDB | 53 | 650-7323-001 | KCN-T30NS/020-KLP2 | 24 |
| 6210-448-003 | MCS-149/814 | 28 | 650-7915-001 | KCN-R34PS/030-KLP2 | 24 |
| 630-1167-054 | T67 N/S | 26, 27 | 650-7919-001 | KCN-T12PS/004-KLP2 | 24 |
| 630-1262-039 | T-62 N/S | 26, 27 | 650-7921-002 | KCN-T18PS/008-KLP2 | 24 |
| 630-2111-047 | TK-11-11 | 26, 27 | 650-7921-724 | KCA-T18PS/008-KLP2 | 24 |
| 630-2121-030 | TK-21-12 | 26, 27 | 650-7923-727 | KCN-T30PS/020-KLP2 | 24 |
| 630-2142-049 | TK-42 | 26, 27 | 650-8515-001 | KCN-R34AS/030-LP2 | 24 |
| 630-2145-048 | TK-45 | 26, 27 | 650-8521-001 | KCN-T18AS/008-LP2 | 24 |
| 631-1208-596 | MAN-0812-B | 26, 27 | 650-8521-004 | KCN-T18AS/008-LPS12A | 24 |
| 631-1211-541 | MAK-1112-B | 26, 27 | 650-8523-001 | KCN-T30AS/020-LP2 | 24 |
| 631-1230-571 | MAK-3012-B | 26, 27 | 651-2101-045 | MCS-680-3 | 28 |
| 631-1245-539 | MAK-4512-B | 26, 27 | 655-1019-001 | OT18SE-D00S-08.0-C | 9 |
| 631-4212-217 | MAK-1212-F | 26, 27 | 655-1219-002 | OT18EE-DPTN-08.0-CL | 9 |
| 631-4223-268 | MAM-2312-F | 26, 27 | 655-1219-102 | OT18ES-DPTN-08.0-CL | 9 |
| 631-4242-533 | MAK-4212-F | 26, 27 | 655-1086-01 | Projector | 4 |
| 639-2702-301 | MUZ-202/D24-UM | 56 | 655-1686-003 | OR20EE-MAR5-20.0-ALET | 4 |



Index to Part Numbers

| Part Number | Descriptive Code | Page Number | Part Number | Descriptive Code | Page Number |
|--------------|------------------------|-------------|--------------|-----------------------|-------------|
| 655-1686-103 | OR20ES-MAR5-20.0-ALET | 4 | 7135-488-011 | MCS-638-3 | 11 |
| 655-1819-001 | OT18EE-DPTP-08.0-CL | 9 | 7135-488-012 | MCS-638-4 | 11 |
| 655-1819-101 | OT18ES-DPTP-08.0-CL | 9 | 7150-101-003 | MCS-501-120-CON | 7 |
| 655-4219-002 | OT18RS-DPTN-03.0-CL | 9 | 7150-101-004 | MCS-500-120-CON | 7 |
| 655-4686-001 | OR20RS-MAR5-08.0-ALET | 4 | 7150-101-013 | MCS-500-120-BAS | 7 |
| 655-4696-001 | OR90RS-MAR5-08.0-CL | 5 | 7150-101-016 | MCS-850-REL-OUT | 7, 28 |
| 655-4819-003 | OT18RS-DPTP-03.0-CL | 9 | 7150-101-020 | BWN-MCS-500 | 7 |
| 655-5219-001 | OT18PS-DPTN-02.5-CLE | 9 | 7150-448-003 | MCS-501-01 | 7 |
| 655-5686-001 | OR20PS-MAR5-06.0-ALET | 4 | 7150-448-004 | MCS-500-01 | 7 |
| 655-5819-003 | OT18PS-DPTP-02.5-CLE | 9 | 7151-101-001 | MCS-500P-120-CON | 7 |
| 655-7219-005 | OT18RT-DPTN-0300-CLE | 9 | 7151-448-001 | MCS-500P-01 | 7 |
| 655-7219-006 | OT18RT-DPTN-0500-CLE | 9 | 7400-448-018 | MCS-830 | 6 |
| 655-7686-001 | OR20RT-MAR5-0600-ALET | 4 | 7400-448-019 | MCS-831 | 6, 28 |
| 655-7686-003 | OR20RT-MAR5-01.5-ALET | 4 | 7400-448-020 | MCS-832 | 6, 28 |
| 655-7696-001 | OR90RT-MAR5-0600-CL | 5 | 7400-448-021 | MCS-833 | 6 |
| 655-7819-005 | OT18RT-DPTP-0300-CLE | 9 | 7400-448-022 | MCS-834 | 6 |
| 655-7819-006 | OT18RT-DPTP-0500-CLE | 9 | 7400-448-024 | MCS-836 | 6, 28 |
| 655-8219-001 | OT18FF-DPTN-0040-CL | 9 | 7400-448-026 | MCS-830-1 | 6 |
| 655-8686-002 | OR20 RH-MAR5-0400-ALET | 4 | 7400-448-029 | MCS-836-1 | 6, 28 |
| 655-8696-001 | OR90RH-MAR5-0080-CL | 5 | 7410-448-008 | MCS-814 | 6, 28 |
| 655-8819-001 | OT18FF-DPTP-0040-CL | 9 | 7420-448-029 | .5 IN. CABLE GLAND | 7 |
| 693-2301-001 | KIB-M08NS/1.5-KL2 | 18 | 7430-448-001 | BWN-MCS-144-ETC | 6 |
| 693-2303-001 | KIB-M12NS/002-KL2 | 18 | 7430-448-003 | BWN-M30ST | 8, 13, 15 |
| 693-2304-001 | KIN-M12NS/004-KL2 | 18 | 7430-448-005 | BWN-MCS-161A-ETC | 4 |
| 693-2305-001 | KIB-M18NS/005-KL2 | 18 | 7430-448-007 | BWN-MCS-164-ETC | 5 |
| 693-2305-004 | KIB-M18NS/005-KLS12 | 20 | 7430-448-010 | OR20 BRACKET | 4 |
| 693-2306-001 | KIN-M18NS/008-KL2 | 18 | 7500-448-008 | MCS-680 | 28 |
| 693-2306-004 | KIN-M18NS/008-KLS12 | 20 | 7500-448-009 | MCS-680-1 | 28 |
| 693-2342-001 | KIB-M08NS/1.5-KLSM8 | 20 | 7600-448-001 | UT30UP-DCA4-1016-CSI | 12, 13 |
| 693-2343-001 | KIB-M12NS/002-KLS12 | 20 | 7600-448-002 | UT30UP-DCA4-2032-CSI | 12, 13 |
| 693-2344-001 | KIN-M12NS/004-KLS12 | 20 | 7600-448-003 | UT30UP-DSS5-1016-CSHT | 12, 15 |
| 693-2901-001 | KIB-M08PS/1.5-KL2 | 18 | 7600-448-004 | UT30UP-DSS5-2032-CSHT | 12, 15 |
| 693-2903-001 | KIB-M12PS/002-KL2 | 18 | 8010-448-001 | 15 ft. Accessory Kit | 58 |
| 693-2904-001 | KIN-M12PS/004-KL2 | 18 | 8010-448-002 | 30 ft. Accessory Kit | 58 |
| 693-2905-001 | KIB-M18PS/005-KL2 | 18 | 8010-448-003 | 75 ft. Accessory Kit | 58 |
| 693-2905-004 | KIB-M18PS/005-KLS12 | 20 | 8010-448-004 | 105 ft. Accessory Kit | 60 |
| 693-2906-001 | KIN-M18PS/008-KL2 | 18 | 8010-448-005 | 200 ft. Accessory Kit | 60 |
| 693-2906-004 | KIN-M18PS/008-KLS12 | 20 | 8010-448-006 | 250 ft. Accessory Kit | 60 |
| 693-2942-001 | KIB-M08PS/1.5-KLSM8 | 20 | | | |
| 693-2943-001 | KIB-M12PS/002-KLS12 | 20 | | | |
| 693-2944-001 | KIN-M12PS/004-KLS12 | 20 | | | |
| 7100-448-002 | MCS-159/814 | 6 | | | |
| 7105-448-002 | MCS-626 | 8 | | | |
| 7105-448-005 | MCS-636 | 8 | | | |
| 7105-448-007 | MCS-626-2 | 8 | | | |
| 7105-448-011 | MCS-636-2 | 8 | | | |
| 7115-448-001 | MCS-637 | 8 | | | |
| 7115-448-003 | MCS-627 | 8 | | | |
| 7115-448-005 | MCS-629 | 8 | | | |
| 7120-448-004 | MCS-144/814 | 6 | | | |
| 7120-448-015 | MCS-165/814 | 6 | | | |
| 7125-101-001 | BWN-M18ST | 9 | | | |
| 7125-448-002 | MCS-625 | 8 | | | |
| 7125-448-003 | MCS-635 | 8 | | | |

Warner Electric engineers, manufactures and markets electromechanical components and systems for controlling motion. Designed to help increase productivity, our products are incorporated into new equipment designs and are to upgrade performance on machines already in service. With an international organization of stocking distributors and sales centers, Warner Electric offers the most extensive network of its kind for locally available products and professional, on-the-spot customer service.

Other Products

Packaged Electromagnetic Clutches/Brakes

- C-face Compatible
 - Clutch/Brake Combinations
 - Washdown Versions
 - Ceramic High Performance Versions
- Shaft and Base Mounted
- Electrically Released Brakes
- Clutch/Brake Controls

Catalog P-1234

Basic Design Clutches/Brakes

- Electromagnetic clutches and brakes
- Custom design with off-the-shelf components
- Maximum mounting versatility
- Wide range of sizes, torque ratings, and configurations
- Ideal for space restrictive applications

Catalog P-1264

Tension Control Systems

Up to 21,500 lb. ft. stopping torque

- Complete system for unwind applications
- Patented, new technology electric brakes
- Sophisticated control systems
- Load cell controls
- Accurate, smooth, long life

Catalog P-771

Overrunning Clutches

Torque loads to 700,000 lb. ft. (949200 Nm)

- Overrunning, indexing and backstopping applications
- Instantaneous action, no backlash
- More torque, less space
- Full sprag complement with infinitely changing wear parts

Catalog P-956

ERD

- Designed to keep load in position in the event of power failure
- Sizes from 3.3 in. to 9.9 in., 4 to 221 ft.lbs. of torque
- Stops loads from speeds up to 3600 RPM
- Quiet operation
- Bi-directional stopping capability
- Metric and inch standard bore sizes

Catalog P-1083



INDUSTRIAL MAGZA
DIST. AUTORIZADO

MEX (55) 53 63 23 31 MTY (81) 83 54 10 18
QRO (442) 1 95 72 60 ventas@industrialmagza.com

ALTRA INDUSTRIAL MOTION

Warner Electric

*Electromagnetic Clutches
and Brakes - USA*

South Beloit, IL 61080
815-389-3771

For application assistance:
1-800-825-9050

*Electromagnetic Clutches
and Brakes - Europe*

Allonnes, France
+33 (0)2 43 43 63 63

Precision Electric Coils - USA

Columbia City, IN 46725
260-244-6183

Boston Gear

*Enclosed and Open Gearing,
Electrical and Mechanical P.T.
Components*

Quincy, MA 02171
617-328-3300

For Customer Service:
1-888-999-9860

For Application Assistance:
1-800-816-5608

Formsprag Clutch

*Overrunning Clutches
and Holdbacks*

Warren, MI 48089
586-758-5000

For application assistance:
1-800-927-3262

Stieber Clutch

*Overrunning Clutches
and Holdbacks*

Heidelberg, Germany
+49 (0)6221 30 47 0

Marland Clutch

*Roller Ramp and Sprag Type
Overrunning Clutches
and Backstops*

Burr Ridge, IL 60527
630-455-1752

Nuttall Gear and Delroyd Worm Gear

*Worm Gear and
Helical Speed Reducers*

Niagara Falls, NY 14302
716-731-5180

Wichita Clutch and Industrial Clutch

*Pneumatic and Oil Immersed
Clutches and Brakes - USA*

Wichita Falls, TX 76302
940-723-3400

*Pneumatic Clutches
and Brakes - Europe*

Bedford, UK
+44 (0)1234 350311

Ameridrives Couplings

*Gear Couplings, Mill Spindles,
Universal Joints*

Erie, PA 16512
814-480-5000

Altra Industrial Motion - Asia Pacific

| | |
|-----------|-----------------|
| China | 852 2615 9313 |
| Taiwan | 886 2 2577 8156 |
| Singapore | 65 487 4464 |
| Thailand | 66 2 322 0481 |
| Australia | 612 9894 0133 |

www.warnerelectric.com



Warner Electric

449 Gardner Street • South Beloit, IL 61080
815-389-3771 • Fax: 815-389-2582
www.warnerelectric.com