GO® SWITCH

The leader in reliable position sensing
for the most demanding plant conditions.

TOPWORX

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502.969.5911 fax
www.topworx.com

GO SWITCH

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In the most demanding conditions of processing and manufacturing plants, customers require solutions that are

reliable and durable.

To be reliable means ‘capable of being trusted - dependable.’ To be durable means ‘capable of withstanding wear and tear - long-lasting.’

When it comes to position sensing, reliability and durability are the perfect words to describe GO Switch leverless limit switches.

You see, GO Switches have a unique, hybrid design that combines the advantages of mechanical limit switches with the advantages of inductive proximity sensors - and leaves their drawbacks behind.

By combining the best of the two technologies, GO Switch enjoys a “double advantage,” surpassing the capabilities that either technology could achieve by itself.

As a result, GO Switches deliver reliabile, durable performance in demanding conditions that are too extreme for mechanical limit switches or inductive proximity sensors.

So if your plant processes include conditions that are extremely hot, cold, wet, dirty, corrosive, abusive, or explosive, be sure to demand technology with an advantage.

Specify GO Switch leverless limit switches.

experience + expertise

our experience

Automotive
Biotech
Cement
Chemical
Diecasting
Food & Beverage
Hydrocarbon
Mining
Nuclear Power
Oil & Gas
Petrochemical
Power
Pulp & Paper
Steel
Tire & Rubber
Tool & Die
Water/Wastewater

our expertise

Abusive Applications
Because GO Switches have only one moving part and no metal-to-metal contact making it move, there is virtually nothing to wear out! They are built to last for high cycle, dirty, and physically abusive applications.

Corrosive Conditions
Because most GO Switches have stainless steel housings, they are the logical choice for applications around salt water, bleaches, or other caustic chemicals.

Explosive Environments
Because GO Switches use dry contacts, they are ‘simple devices’ suitable for use in Intrinsically Safe applications. And many models are rated for Zone 1 Class I Division 1 hazardous areas.

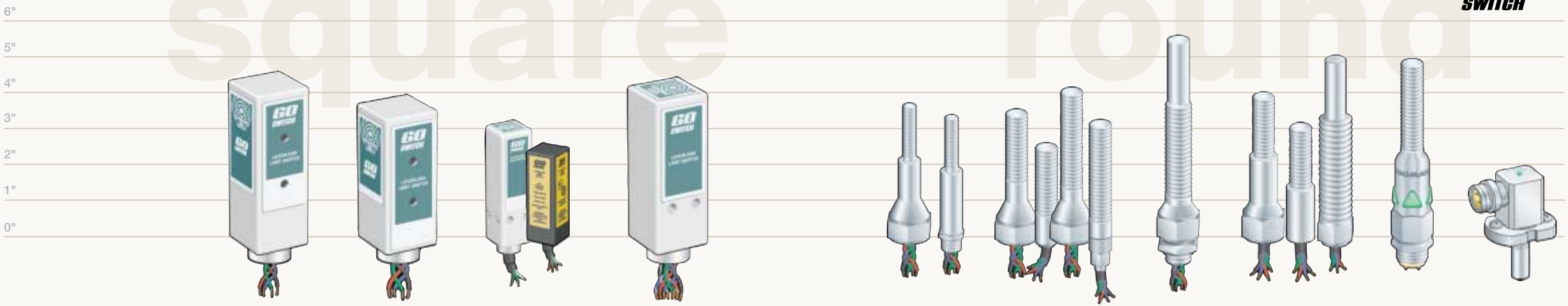
High & Low Temperature
Because of their unique design, GO Switches can operate effectively in extremely hot (up to 400°F) or extremely cold (down to -40°F) plant conditions.

Shock & Vibration
Because GO Switches use permanent magnets that deliver outstanding snap action and contact pressure, they eliminate ‘contact teasing’ and ‘contact chatter’ in high vibration areas.

Washdown & Underwater
Because GO Switches are completely potted and sealed, no moisture can affect their operation. Some models are even rated for use 20,000 feet underwater!

GO Switch Product Overview

square round



Series or Model	10 Series	20 Series	31, 32, 33, 35	80 Series	71, 72	73, 74, 75, 76	77	7G, 7H, 7I	7L	7C-7E
Sensing Area	Side	Side	End	End	3/8" or M12x1	5/8" or M18x1.5	3/4"	5/8"	5/8" or M18x1.5	
Maximum Sensing Range	9/16" (14mm)	3/8" (104mm)	1/4" (6mm)	1/4" (6mm)	.040" (1mm)	.100" (2.5mm)	.100" (2.5mm)	.090" (2mm)	.100" (2.5mm)	.090" (2mm)
Maximum Sensing Range with Target Magnet	3 3/4" (95mm)	3 3/8" (86mm)	2 5/8" (66mm)	3 7/8" (98mm)	.15" (4mm)	.35" (9mm)	.35" (9mm)	.20" (5mm)	.35" (9mm)	N/A
Contact Forms Available	SPDT / DMDB Latching	SPDT / DMDB Latching	SPDT	SPDT DPDT	SPDT	SPDT	SPDT	DPDT / SPDT	SPDT	SPST N/O & N/C SPDT
Enclosures Available	Brass Stainless Steel	Brass Stainless Steel	Copper (35 only) Stainless Steel (31, 32, 33)	Brass Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Approvals Available	UL CSA FM MSHA SAA	UL CSA FM MSHA SAA	UL CSA FM SAA	UL CSA SAA	UL CSA BASEEFA SAA	UL CSA BASEEFA SAA	UL CSA BASEEFA SAA	UL CSA BASEEFA SAA	UL CSA	UL CSA
Options Available										
High Temperature	350°F	221°F	221°F	350°F	400°F	400°F	400°F	400°F	160°F	400°F
Underwater	450 feet	450 feet	No	450 feet	No	23,000 feet	23,000 feet	No	No	450 feet
Explosion Proof	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 1 (Class I, Div 1)	Zone 2 (Class I, Div 2)	No
Intrinsically Safe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electrical Ratings										

10 Series

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	125	0.5
		250	0.5

20 Series

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	125	0.5
	-	250	0.5

30 Series

AC		DC	
Volts	Amps	Volts	Amps
120	6	24	2
240	3	48	-
480	-		

35 Series

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1
480	-		

80 Series

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	125	0.5

71, 72

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	-
		125	0.5
		250	0.5

73, 74, 75, 76

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	-
		125	0.5
		250	0.5

77

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	-
		125	0.5
		250	0.5

7G, 7H, 7I

SPDT

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	-
		125	0.5
		250	0.5

DPDT

AC		DC	
Volts	Amps	Volts	Amps
120	3	24	1
240	1.5	48	-
		125	0.5
		250	0.5

7L

.25A@120VAC
.25A@24VDC

7C-7E

with LED's

AC		DC	
Volts	Amps	Volts	Amps
120	0.5	24	0.5
240	0.5	48	0.5
		125	0.5
		250	0.5

without LED's

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	-
480	-	125	0.5
600	-	250	0.5

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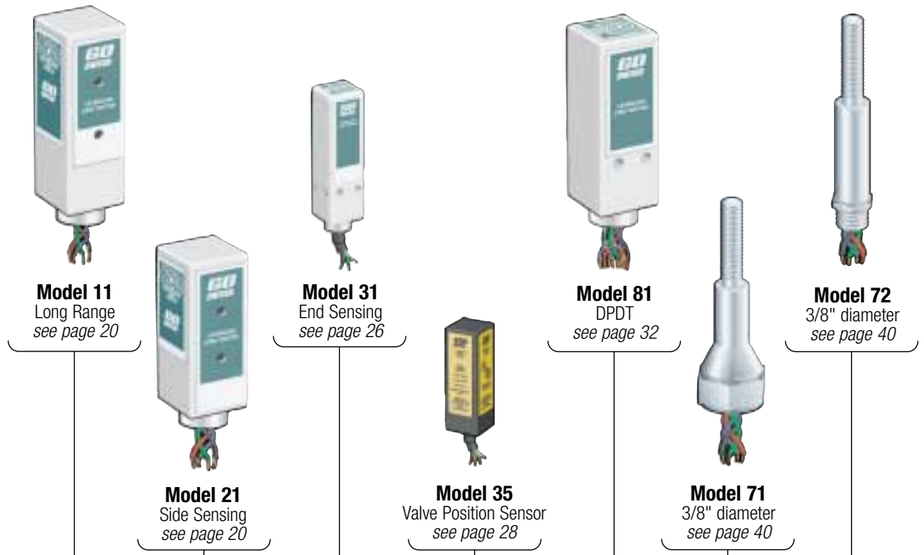
Note: Please consult factory for application specific ratings.

GO Switch Quick Selection Guide



Model 11
Long Range
see page 20

Model 21
Side Sensing
see page 20

Model 31
End Sensing
see page 26

Model 35
Valve Position Sensor
see page 28

Model 81
DPDT
see page 32

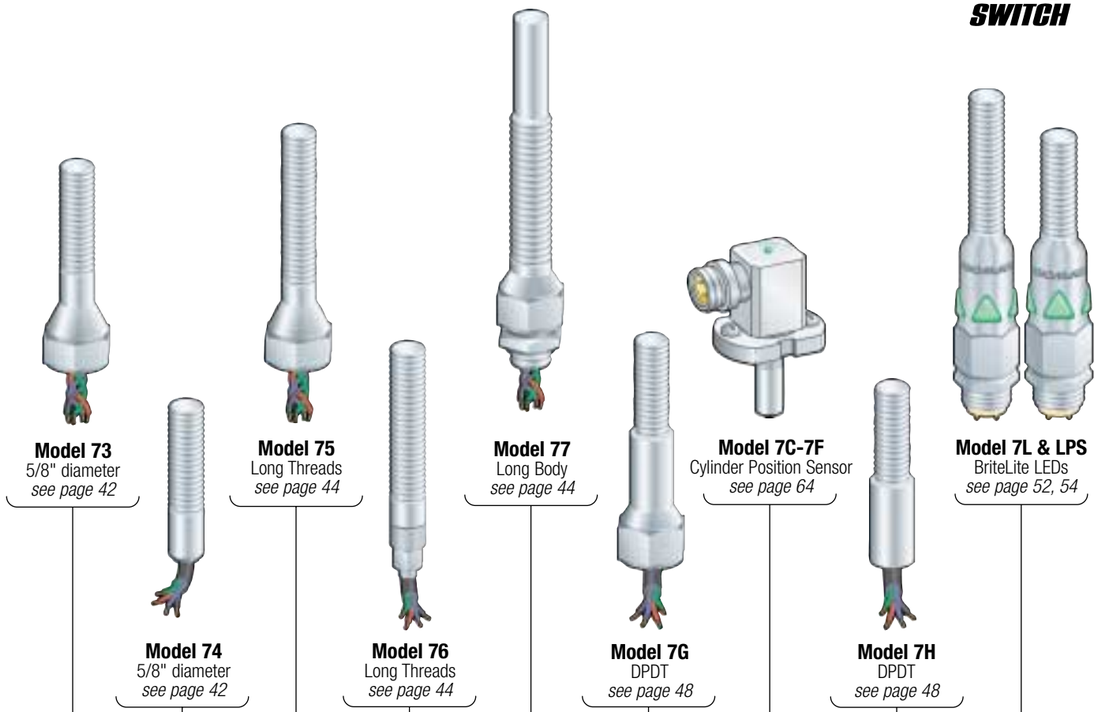
Model 71
3/8" diameter
see page 40

Model 72
3/8" diameter
see page 40

Industrial Environment

- General Purpose
- Zone 0 (Class I, Div 1) Intrinsically Safe
- Zone 1 (Class I, Div 1) Explosion Proof
- Zone 2 (Class I, Div 2) Non-Incendive
- Underwater
- High Temperature
- Cylinder Position Sensors

Square Position Sensors



Model 73
5/8" diameter
see page 42

Model 74
5/8" diameter
see page 42

Model 75
Long Threads
see page 44

Model 76
Long Threads
see page 44

Model 77
Long Body
see page 44

Model 7G
DPDT
see page 48

Model 7C-7F
Cylinder Position Sensor
see page 64

Model 7H
DPDT
see page 48

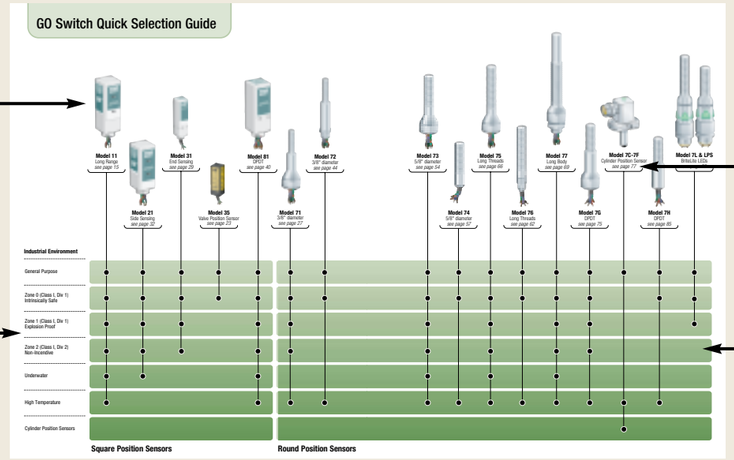
Model 7L & LPS
BriteLite LEDs
see page 52, 54

Round Position Sensors

Ordering made simple.

Compare our full line of products to find the one that's best for you.

Select products by Area Classification or Special Capability.

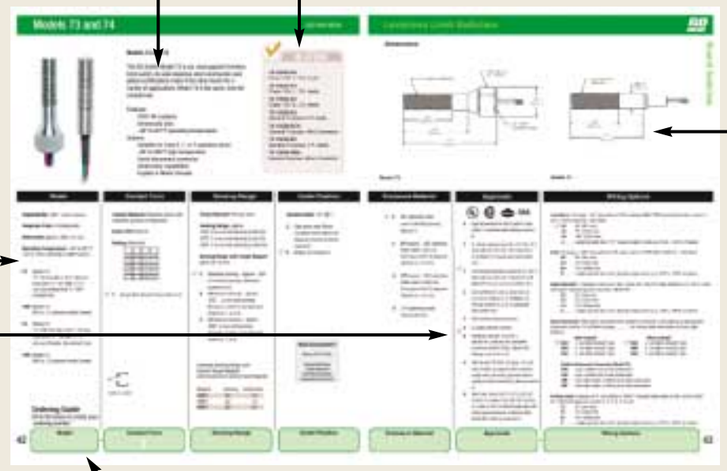


Page numbers make for fast access to info.

Convenient Chart Analysis

Read a full description of the product and any special features it may include.

A complete list of our most popular 'Fast Track Delivery' models.



Convenient technical dimensions.

Detailed specifications are right where you need them.

Look for the checkmark. It denotes the most common options and the models most likely to be in stock.

Custom build your product using our easy ordering guide! Choose your options, write the codes in the spaces provided, and simply give us a call to order!

FAST TRACK DELIVERY

TopWorx is committed to satisfying customer delivery requirements with speed and excellence. The products listed within the Fast Track Delivery program are standard products likely to be available for immediate shipment for normal size orders.

To Order
502.969.8000

Square Housing

General Purpose

11-12518-A2	SPDT, 9/16", Brass, Bottom Leads
81-20518-A2	DPDT, 1/4", Brass, Bottom Leads

Explosion Proof - Class I, Division 1

21-11524-A2	SPDT, 3/8", Stainless, Bottom Leads
81-20524-A2	DPDT, 1/4", Stainless, Bottom Leads

Non-Incendive - Class I, Division 1

11-11110-00	SPDT, 3/8", Brass, Side Terminal
11-12110-00	SPDT, 9/16", Brass, Side Terminal
11-12510-00	SPDT, 3/8", Brass, Bottom Terminal
21-11110-00	SPDT, 3/8", Brass, Side Terminal
21-11510-00	SPDT, 3/8", Brass, Bottom Terminal
21-11516-A2	SPDT, 3/8", Brass, Bottom Leads
81-20516-A2	DPDT, 1/4", Brass, Bottom Leads

Round Housing

General Purpose

73-13528-A2	SPDT, 0.100", Stainless, Leads
73-13528-DCA	SPDT, 0.100", Stainless, Mini
74-13528-B2	SPDT, 0.100", Stainless, Cable
74-13528-DBA	SPDT, 0.100", Stainless, Micro
7G-23528-A2	DPDT, 0.090", Stainless, Leads
7LR-13568-A2	SPDT, 0.100", 316SS, Leads, Red LED
7LG-13568-A2	SPDT, 0.100", 316SS, Leads, Green LED

Explosion Proof - Class I, Division 1

73-13523-A2	SPDT, 0.100", Stainless, Leads
73-13524-A2	SPDT, 0.100", Stainless, Leads
7G-23523-A2	DPDT, 0.090", Stainless, Leads

Non-Incendive - Class I, Division 1

73-13526-A2	SPDT, 0.100", Stainless, Leads
7G-23526-A2	DPDT, 0.090", Stainless, Leads
7LR-1356E-A2	SPDT, 0.100", 316SS, Leads, Red LED
7LG-1356E-A2	SPDT, 0.100", 316SS, Leads, Green LED

Cylinder Position Sensors - Stroke to GO

7C-23658-DCA	SPST, 1.025" probe, Mini Connector
7C-43658-DCA	SPDT, 1.025" probe, Mini Connector
7D-23658-DCA	SPST, 1.250" probe, Mini Connector
7D-43658-DCA	SPDT, 1.250" probe, Mini Connector
7E-23658-DCA	SPST, 2.062" probe, Mini Connector
7E-43658-DCA	SPDT, 2.062" probe, Mini Connector

Position Sensors 101

The purpose of position sensors

In automated manufacturing and processing plants, position sensors help monitor and control plant processes by confirming that critical activities are completed as intended. More specifically, their primary function is to detect the presence, or absence, of a moving object, or "target".

For the purpose of this tutorial, only "mainstream" technologies that sense the presence of metal targets – limit switches, inductive proximity sensors, reed switches, and leverless limit switches – will be discussed.

Key Terminology

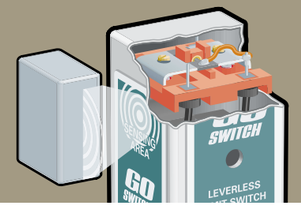
When considering position sensors, it helps to understand the common terminology used by most sensor manufacturers.

Sensing range
the distance from the sensing face to the target that activates the switch

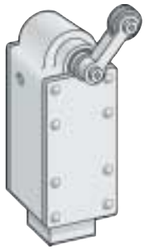
Hysteresis
the distance between the activated and release points of the switch

Repeatability
the switch's ability to detect the same target at the same range repeatedly during the life of the switch

Response Time
the amount of time between the detection of a target and the generation of the output signal



Limit Switches



Limit switches are electro-mechanical devices that detect the position of a target by making direct physical contact with the target.

ADVANTAGES
The advantages of mechanical limit switches:
- Do not require power
- Can handle high current loads
- Wide operating temperature range
- Immune to electrical noise
- Immune to radio frequency interference
- No leakage current
- No voltage drops
- Simple "Normally Open" or "Normally Closed"
- Not polarity or voltage sensitive

DISADVANTAGES
The disadvantages of mechanical limit switches:
- Multiple moving parts to maintain (lever arm, push button, body, base, head, contacts, terminals)
- Moving parts eventually wear and fail
- Physical contact encourages premature failure via damage
- Lever arm connection to internal contacts invites moisture and dust into contact chamber, causing failure or maintenance issues
- Poor repeatability due to wear and tear of moving parts
- Physical contact causes damage to the target
- Poor defense against moisture, dust, and corrosion
- Extra cost for sealed contacts and hazardous area approvals

Reed Switches

Reed Switches are electro-mechanical devices that detect the position of a magnetic target by the attraction of the target's magnetic field.

ADVANTAGES
The advantages of reed switches:

- No physical contact is required
- Do not require power
- Immune to electrical noise
- Immune to radio frequency interference
- No leakage current
- No voltage drops
- Simple "Normally Open" or "Normally Closed"

DISADVANTAGES
The disadvantages of reed switches:
- Require a magnetic target to operate
- Reed element is fragile and can break with physical contact
- High vibration can cause contact chatter and false signals
- Bending metal reeds causes fatigue and premature failures
- Contacts can be "teased" causing uncertainty of target position
- Limited selection of shapes, sizes, and capabilities

Inductive Proximity Sensors

Inductive proximity sensors are solid-state electronic devices that detect the position of metal targets via the disturbance of their energy field.

ADVANTAGES
The advantages of inductive proximity sensors:
- No physical contact is required
- No moving parts to jam, wear, or break results in less maintenance
- Large selection of shapes and sizes for a variety of applications
- Not affected by dust or dirt

DISADVANTAGES
The disadvantages of inductive proximity sensors:
- Require external power to operate
- Cannot handle high current loads
- Limited operating temperature range – cannot be used in extreme heat or cold
- Affected by temperature fluctuations
- Affected by electrical noise
- Affected by radio frequency interference
- Suffer from leakage current and voltage drops
- Only special models are intrinsically safe
- Only rare, expensive models are explosion proof
- Polarity sensitive – typically must stock both "npn" and "pnp" models
- Voltage sensitive – typically must stock both AC and DC models
- "Contact" sensitive – typically must stock both "Normally Open" and "Normally Closed" models
- Susceptible to moisture ingression

Leverless Limit Switches

Leverless limit switches use a unique, hybrid technology to detect the position of a ferrous target via an electro-magnetic field.

ADVANTAGES
The advantages of leverless limit switches:
- No physical contact is required
- Do not require power
- Only one moving part, with no metal-to-metal contact making it move – with nothing to jam, bend, break or wear out
- Can handle high current loads
- By far the widest operating temperature range
- Immune to electrical noise
- Immune to radio frequency interference
- No leakage current
- No voltage drops
- Simple "Normally Open" or "Normally Closed"
- Not polarity or voltage sensitive
- Can be wired in series or parallel
- Inherently intrinsically safe
- Large selection of shapes and sizes for a variety of applications
- Not affected by dust and dirt
- Not affected by moisture
- Not affected by physical contact
- Not affected by most caustics or chemicals
- Many explosion-proof options
- Water-proof and sub sea options
- Extended sensing ranges up to 4"

GO Switch Leverless Limit Switches

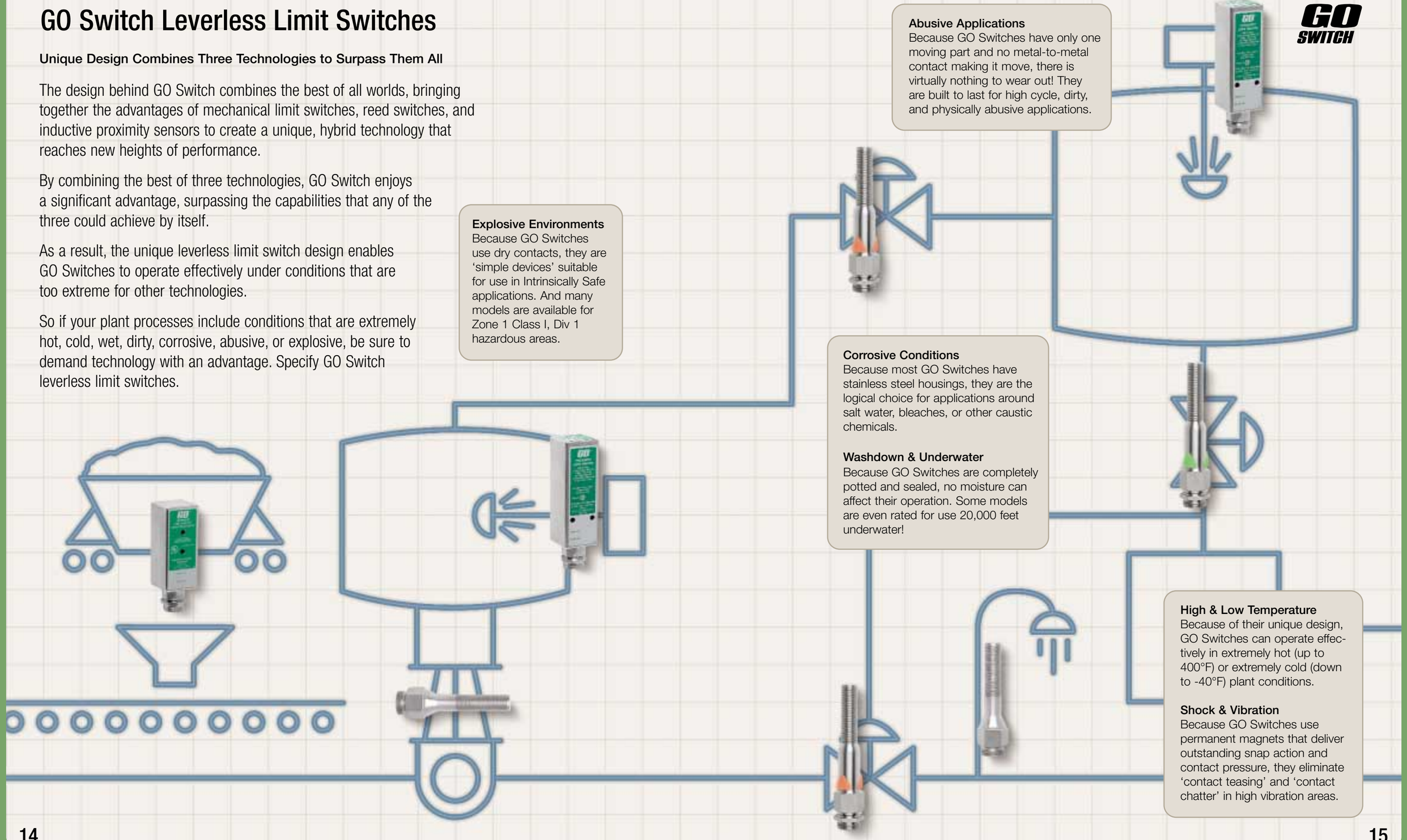
Unique Design Combines Three Technologies to Surpass Them All

The design behind GO Switch combines the best of all worlds, bringing together the advantages of mechanical limit switches, reed switches, and inductive proximity sensors to create a unique, hybrid technology that reaches new heights of performance.

By combining the best of three technologies, GO Switch enjoys a significant advantage, surpassing the capabilities that any of the three could achieve by itself.

As a result, the unique leverless limit switch design enables GO Switches to operate effectively under conditions that are too extreme for other technologies.

So if your plant processes include conditions that are extremely hot, cold, wet, dirty, corrosive, abusive, or explosive, be sure to demand technology with an advantage. Specify GO Switch leverless limit switches.



Abusive Applications
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Explosive Environments
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Corrosive Conditions
Because most GO Switches have stainless steel housings, they are the logical choice for applications around salt water, bleaches, or other caustic chemicals.

Washdown & Underwater
Because GO Switches are completely potted and sealed, no moisture can affect their operation. Some models are even rated for use 20,000 feet underwater!

High & Low Temperature
Because of their unique design, GO Switches can operate effectively in extremely hot (up to 400°F) or extremely cold (down to -40°F) plant conditions.

Shock & Vibration
Because GO Switches use permanent magnets that deliver outstanding snap action and contact pressure, they eliminate 'contact teasing' and 'contact chatter' in high vibration areas.

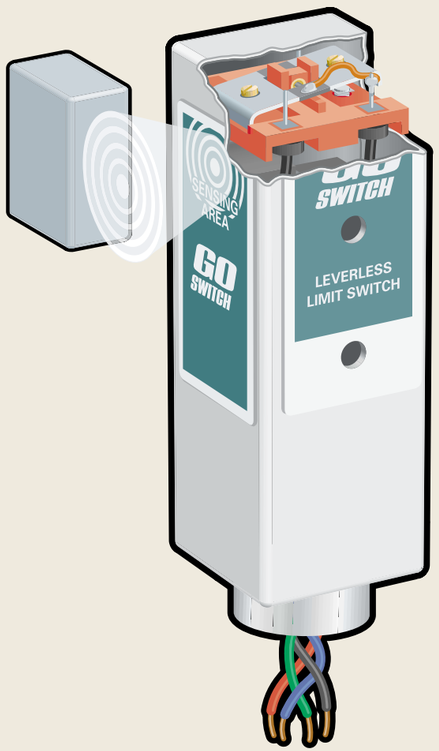
Square Sensors

TECHNOLOGY IN ACTION

10 - 20 Series

LEVERLESS LIMIT SWITCH

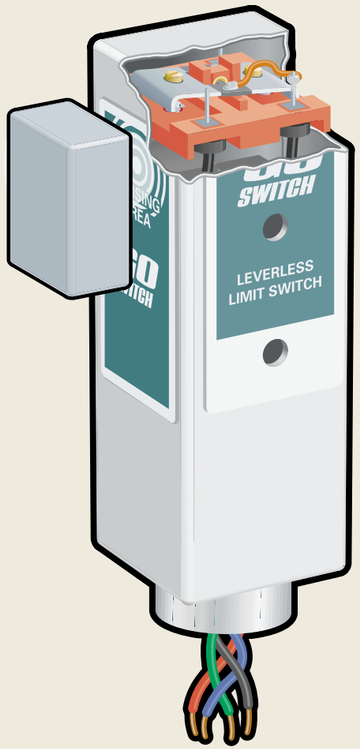
GO Switch 10 and 20 Series side sensing switches use two permanent magnets and a ferrous armature to control a set of dry contacts.



Unoperated

On the sensing side of the switch, one magnet is positioned closer to the armature, creating a dominant magnetic flux field which draws the armature down to its unoperated position, closing a contact circuit.

Shown: Model 11

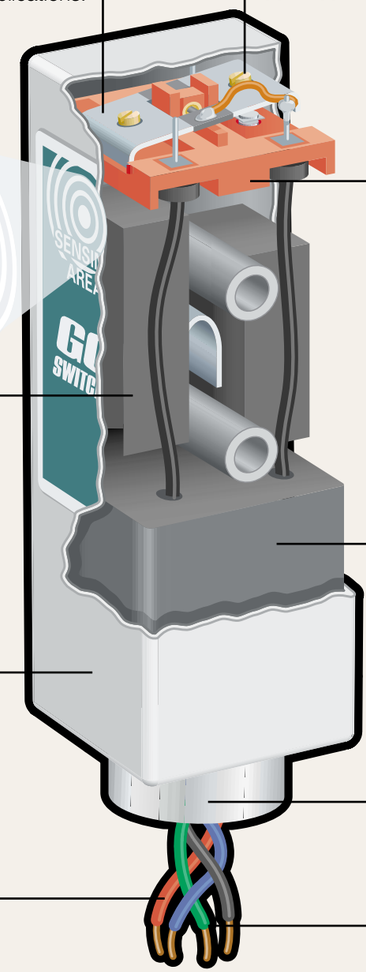


Operated

When a ferrous target enters the sensing area of the switch, it diverts flux lines from the armature to create a magnetic dominance on the opposite side. As a result, the armature snaps to its operated position, closing the other contact circuit.

When the target is removed the armature snaps back to its original, unoperated position.

A LOOK INSIDE - MODEL 11



Seesaw armature provides **snap action** and solid contact pressure, eliminating 'contact teasing' and 'contact chatter' in high vibration applications.

Versatile gold flashed contacts are suitable for high and low electrical loads, and can be wired **AC or DC, N/O or N/C.**

Sealed contact chamber **prevents moisture or dust** from reaching the contacts.

Side sensing range can be extended to **nearly 4"** using external target magnets.

Permanent magnets never lose their strength, even when mounted on ferrous metal.

Potting fills the entire switch cavity, forming a **barrier against moisture.**

Rugged brass or stainless steel housing **withstands physical abuse, moisture, and corrosives.**

Conduit hub can be located in any of 5 positions for **versatile installation.**

Multiple wiring options:
- Terminal Block
- Lead Wires
- Cable
- Quick Disconnects

Consumes no power to operate and has no current leakage or voltage drop.

Options Available

- Explosion Proof
- Extended Sensing
- HiTemp™ to 350°F
- SubSea™ Submersible
- Latching

Key Benefits

GO Switches are simple and built to last.

With only one moving part and no metal-to-metal contact forcing it to move, there is nothing to wear out!

Models 11 and 21

GO Switch Models 11 and 21 are the world's original leverless limit switches.

Their simple design, rugged enclosures, long sensing ranges, and global approvals make these switches the ideal choice wherever reliable position sensing is needed.

Features:
- SPDT 10A contacts
- Side Sensing
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- -40⁰ to 350⁰F high temperature
- Quick disconnect connector
- Underwater capabilities

FAST TRACK DELIVERY

11-11110-00 **21-11110-00**
CSA Class I Div 2
Side Terminal Block

11-12110-00
CSA Class I Div 2
Extended Sensing

11-12510-00 **21-11510-00**
CSA Class I Div 2
Bottom Terminal Block

11-12518-A2 **21-11516-A2**
UL/CSA General Purpose
3 ft. leads

21-11524-A2
CSA Class I Div 1; 3 ft. leads

Need Accessories?

See pp. 92-103 for:

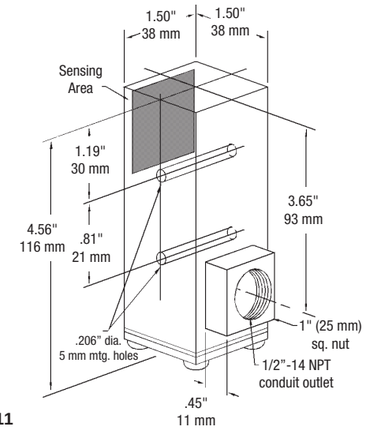
Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

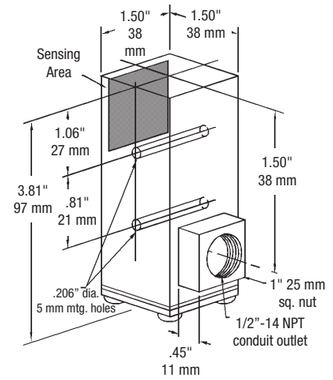
Fill in the boxes to create your 'ordering number.'

Leverless Limit Switches

Dimensions



Model 11



Model 21

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 5/16" (8 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰ to 105⁰C). HiTemp™ option to 350⁰F) (176⁰C)

- **11** Size: 1 1/2" (38 mm) square x 4 9/16" (116 mm) overall. Add 1/2" (13 mm) for bottom conduit outlet
- **21** Size: 1 1/2" (38 mm) square x 3 13/16" (97 mm) overall. Add 1/2" (13 mm) for bottom conduit outlet

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Forms: SPDT, DMDB

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	125	0.5
		250	0.5

- **1** Single Pole Double Throw (Form C)
- **3** Single Pole Double Throw (Form C) Latching (maintained contact) (Outlet position must be 2, 4 or 5)
- **5** Double Make Double Break, two-circuit, Form Z*
- **6** Double Make Double Break, two circuit, Form Z Latching* (maintained contact) (Outlet position must be 2, 4 or 5)

*CSA and SAA certification for Double Make Double Break require potted-in leads or cable.

Form C - SPDT

Form Z - SPDT-DB

Sensing Range

Target Material: Ferrous steel

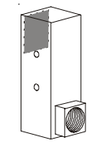
Sensing Range: Approx. 3/8" (10mm) standard; 9/16" (14mm) extended sensing (Model 11)

Sensing Range with Target Magnet: up to 3 3/4" (95 mm) (max)

- **1** Standard sensing - approx. 3/8" (10 mm) side sensing
- **2** Extended sensing - approx. 9/16" (14 mm) side sensing (Contact Form must be 1 or 3) (Model 11)
- **7** Precision sensing - approx. 1/4" (6 mm) side sensing (minimal differential)

Outlet Position

Contact Outlet: 1/2" NPT



- **1** Behind sensing area
- **2** Left of sensing area
- **3** Right of sensing area
- **4** Same side as sensing area
- **5** Bottom of enclosure

Enclosure Material

Material: Brass or Stainless Steel

- **1** Brass - coated with flat black lacquer
- **2** Stainless steel**
- **3** Brass - corrosion resistant coating (polyurethane)
- **4** Stainless steel - corrosion resistant coating (polyurethane)**

**All-welded stainless steel switches are recommended for wet or harsh environments.

Approvals

- **2** High temperature to 350⁰F (176⁰C) with Teflon™ insulated leads (Model 11) (Contact form must be 1 or 3) (Sensing must be 1) (Enclosure must be 2) (Wiring must be F) UL General Purpose
- **3** UL listed explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III (Enclosure must be 2 or 4) (Lead seal req'd within 18")
- **4** CSA / FM certified explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III. (Enclosure must be 2 or 4)
- **5** Mine Safety Health Administration (MSHA) approved "Explosion Proof", File #X / P-1504-1, X / P-1504-2; 6 ft. (1.829m) potted-in SO cable only (Enclosure must be 2) (Wiring must be B3)
- **6** CSA / FM certified explosion proof for Cl I, Div 2; Grps A,B,C,D; Cl II, Div 2, Grps E-G; Cl III
- **7** CSA certified General Purpose
- **8** UL listed General Purpose
- **0** CSA / FM certified Cl I, Div 2, Grps A,B,C,D; Cl II, Div 2, Grps F & G; Cl III Terminal block. (Contact form must be 1 or 3) (Wiring must be 00)
- **A** SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be A or 00) (Metric hub available)
- **B** SAA: High Temp 350⁰F (176⁰C): EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be F) (Metric hub available)
- **C** SAA: Ex e IIC T6 IP65; Cl I Zone 1 (Rated to 275 VAC) (Wiring must be 00) (Metric hub available)

Wiring Options

Terminal Block
- **00** Terminal block only (not recommended for underwater use) (Approval must be 0, 7 or 8)

Lead Wires 18 Gauge (.110" dia.) potted-in PVC insulated AWM / TEW stranded lead wires rated at 221⁰F (105⁰C) 600V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.450" dia.) potted-in SO rubber covered cable rated at 194⁰F (90⁰C) 600V UL / CSA listed
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approval must be 7 or 8) Refer to pp. 92-103 for mating cable assemblies and Aura Light Adapters.

	Mini-change®		Micro-change®
DCA	3 - pin Mini-change® type	**DBA**	3 - pin Micro-change® type
DCD	4 - pin Mini-change® type	**DBD**	4 - pin Micro-change® type
DCG	5 - pin Mini-change® type	**DBG**	5 - pin Micro-change® type

SubSea™ Underwater Connector (Enclosure must be 2 or 4) (Approval 7 or 8)
- **3DD** 3 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **4DD** 4 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **3DE** 3 pin right-angle, certified not to leak underwater (Enclosure must be 2 or 4)
- **4DE** 4 pin right-angle, certified not to leak underwater (Enclosure must be 2 or 4)

HiTemp Wire 18 gauge (.070") dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Model	-	Contact Form	Sensing Range	Outlet Position	Enclosure Material	Approvals	-	Wiring Options

Extended Sensing with External Target Magnets

AMP3 Target Magnet

		10 Series			20 Series	
Contact Form		**1 Standard**	**2 Extended**	7 Precision	**1 Standard**	7 Precision
SPDT	**Sensing Differential**	**1" (25mm) 1/2" (13mm)**	**1-1/4" (32mm) 5/8" (16mm)**	11/16" (17mm) 7/16" (11 mm)	1" (25 mm) 3/4" (19 mm)	3/4" (19 mm) 7/16" (11 mm)
SPDT Latching	Sensing Differential	15/16" (24mm) N/A	1-1/4" (32mm) N/A	3/4" (19mm) N/A	1" (25 mm) N/A	13/16" (21 mm) N/A
DMDB	Sensing Differential	1" (25mm) 11/16" (17mm)	N/A	9/16" (14mm) 7/16" (11mm)	1" (25 mm) 1" (25 mm)	3/4" (19 mm) 11/16" (17 mm)
DMDB Latching	Sensing Differential	1" (25mm) N/A	N/A	N/A	1-1/4" (32 mm) N/A	N/A

AMS4 Target Magnet

		10 Series			20 Series	
Contact Form		**1 Standard**	**2 Extended**	7 Precision	**1 Standard**	7 Precision
SPDT	**Sensing Differential**	**1-1/4" (32mm) 11-16" (17mm)**	**1-9/16" (40mm) 11/16" (17mm)**	7/8" (22mm) 1/2" (13 mm)	1-3/8" (35 mm) 7/8" (22 mm)	1" (25 mm) 7/16" (11 mm)
SPDT Latching	Sensing Differential	1-3/16" (30mm) N/A	1-5/8" (40mm) N/A	1" (25 mm) N/A	1-7/16" (37mm) N/A	1" (25 mm) N/A
DMDB	Sensing Differential	1-1/4" (32 mm) 7/8" (22 mm)	N/A	13/16" (21mm) 1/2" (13mm)	1-15/16" (37mm) 9/16" (14 mm)	1" (25 mm) 3/4" (19 mm)
DMDB Latching	Sensing Differential	1-11-32" (34 mm) N/A	N/A	N/A	1-9/16" (40mm) N/A	N/A

AMC5 Target Magnet

		10 Series			20 Series	
Contact Form		**1 Standard**	**2 Extended**	7 Precision	**1 Standard**	7 Precision
SPDT	**Sensing Differential**	**3-3/8" (86mm) 1-1/2" (38mm)**	**3-3/4" (95mm) 1-1/2" (38mm)**	2-3/8" (60mm) 1" (25mm)	3-3/8" (86mm) 1-3/4" (44mm)	2-5/8" (86mm) 1" (25mm)
SPDT Latching	Sensing Differential	3-3/32" (79mm) N/A	3-7/8" (98mm) N/A	2-11/16" (68mm) N/A	3-7/16" (87mm) N/A	2-13/16" (71mm) N/A
DMDB	Sensing Differential	3-7/16" (87mm) 1-13/16"(46mm)	N/A	2-7/32" (56mm) 1" (25mm)	3-3/8" (86mm) 2" (51mm)	2-5/8" (67mm) 1-3/8" (35mm)
DMDB Latching	Sensing Differential	3-3/8" (86mm) N/A	N/A	N/A	3-7/8" (98mm) N/A	N/A

AMF6 Target Magnet

		10 Series			20 Series	
Contact Form		**1 Standard**	**2 Extended**	7 Precision	**1 Standard**	7 Precision
SPDT	**Sensing Differential**	**2-7/16" (62mm) 1-1/2" (38mm)**	**3" (76mm) 1-11/16"(38mm)**	1-15/16" (33mm) 1-3-32" (28mm)	**2-7/16"(62mm) 1-15/16"(49mm)**	1-9/16" (40mm) 7/8" (22mm)
SPDT Latching	Sensing Differential	2-5/32" (55mm) N/A	3-3/16"(81 mm) N/A	1-9/16" (40mm) N/A	2-1/2" (64mm) N/A	1-13/16"(46mm) N/A
DMDB	Sensing Differential	2-1/4" (57mm) 1-13/16" (46mm)	N/A	1-1/8" (29mm) 1-3/32" (28mm)	2-3/8" (60mm) 2-13/16"(71mm)	1-1/2" (38mm) 1-1/2" (38mm)
DMDB Latching	Sensing Differential	2-7/16" (62mm) N/A	N/A	N/A	3" (76mm) N/A	N/A

Agency Approvals

Approvals	(3) UL Class 1 Div 1	(4) CSA/FM Class 1 Div 1	(5) MSHA	(6) CSA/FM Class 1 Div 2	(7) CSA General Purpose	(8) UL General Purpose	(0) CSA/FM Class 1 Div 2	(A) SAA Exs IIc T6 IP65	(C) SAA Exe IIc IP65
Termination Options									
00 - Terminal Block					X	X	X	X	X
A - Potted PVC Leads	X	X		X	X	X		X	
B - Potted SO Cable	X	X	X	X	X	X			
D - Quick Disconnect					X	X			
D - SubSea™ Connector					X	X			
F - Potted HiTemp™ Leads	X	X		X	X	X			

X = Approvals Available

NEMA Ratings

	Non-Hazardous				Hazardous	
NEMA CLASSES	**4**	**4X**	**6**	**6P**	**7**	**9**
00 - Terminal Block	X					
A - Potted PVC Leads	X	SS	X	SS	SS	SS
B - Potted SO Cable	X	SS	X	SS	SS	SS
D - Quick Disconnect	X	SS	X	SS		
D - SubSea™ Connector	X	SS	X	SS		
F - Potted HiTemp™ Leads	X	SS	X	SS	SS	SS

SS = Stainless steel
X = Designed to meet respective NEMA specifications

Wiring Diagrams (male view)

4 Wire PVC & HiTemp Leads	
N/C	Red
N/O	Blue
COM	Black
GND	Green

Terminations A & F

SO Cable	
N/C	Red
N/O	White
COM	Black
GND	Green

Termination B

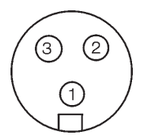
DMDB Form Z	PVC Leads
N/C 1 & 2	Red & Red/White Stripe
N/O 1 & 2	Blue & Blue/White Stripe

Termination A

DMDB Form Z Mini-Change QDC - 4 Pin	
Pin 1	N/O 2
Pin 2	N/C 2
Pin 3	N/C 1
Pin 4	N/O 1

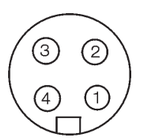
Termination DCD

Mini-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O



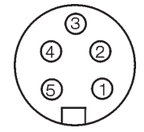
Termination DCA

Mini-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



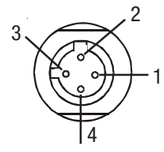
Termination DCD

Mini-Change QDC - 5 Pin	
Pin 1	N/O
Pin 2	N/C
Pin 3	GND
Pin 4	Inactive
Pin 5	COM



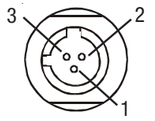
Termination DCG

Micro-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



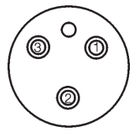
Termination DBD

Micro-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O



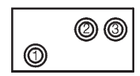
Termination DBA

SubSea - 3 Pin - Lock Sleeve	
Pin 1	N/C
Pin 2	COM
Pin 3	N/O



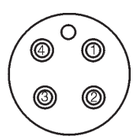
Termination 3DD

SubSea - 3 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C



Termination 3DE

SubSea - 4 Pin - Lock Sleeve	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



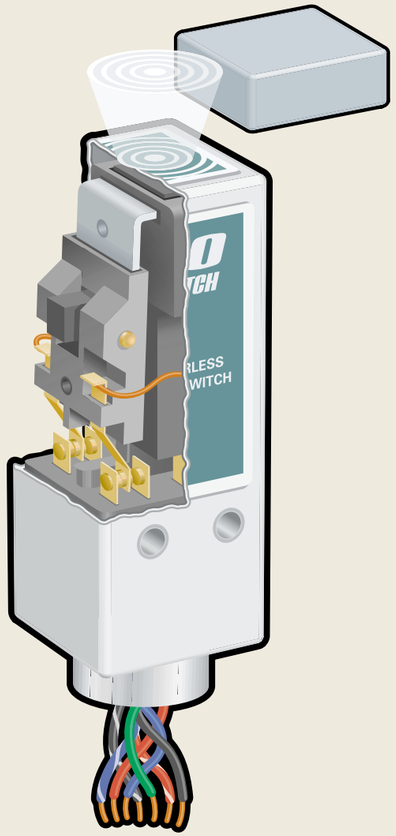
Termination 4DD

TECHNOLOGY IN ACTION

30 - 80 Series

LEVERLESS LIMIT SWITCH

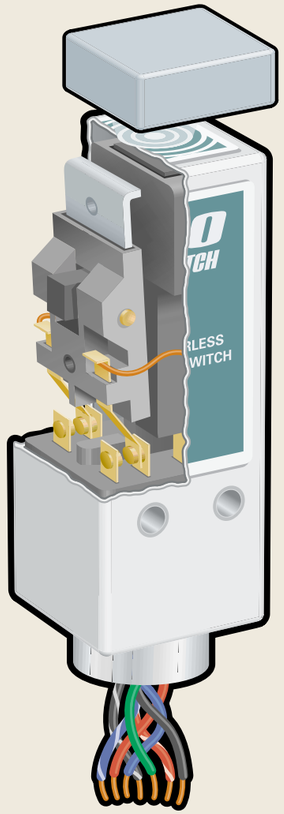
GO Switch 30 and 80 Series end sensing switches use one permanent magnet and a ferrous armature to control a set of dry contacts.



Unoperated

The armature is positioned off-center of the magnet, creating a dominant magnetic flux field on the sensing end of the switch which draws the armature down to its unoperated position, closing a contact circuit.

Shown: Model 81

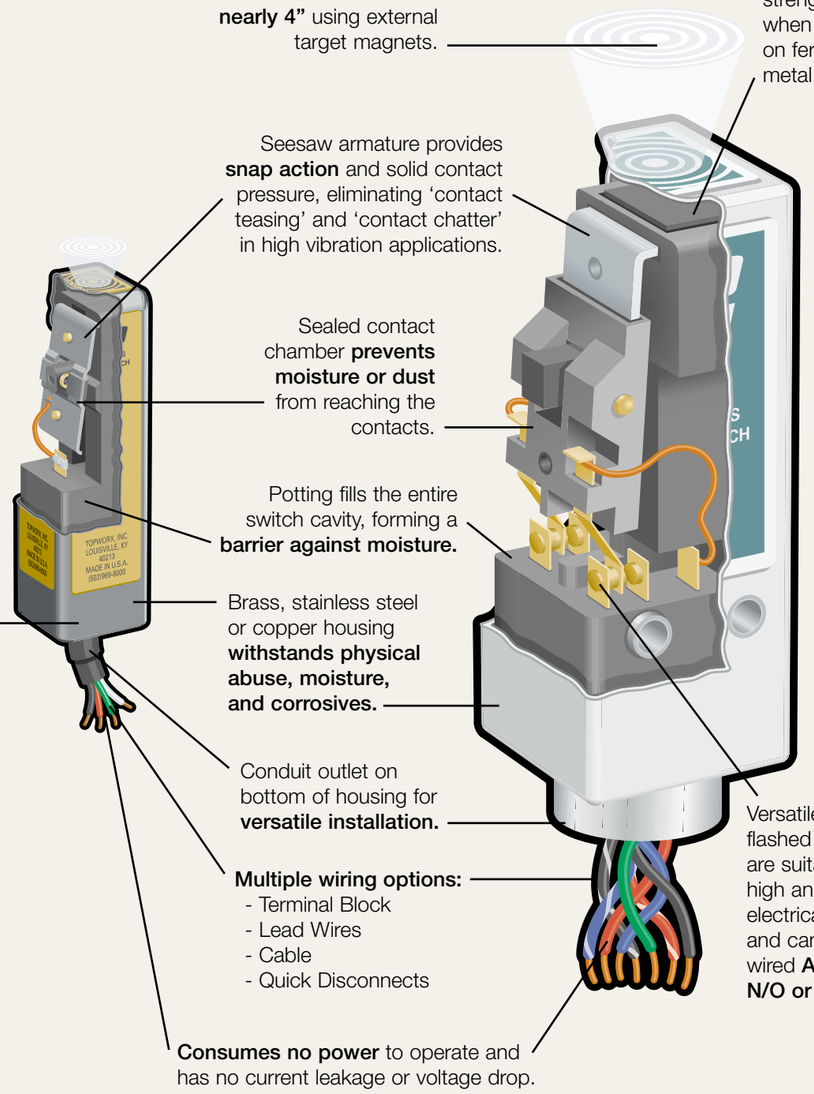


Operated

When a ferrous target enters the sensing area of the switch, it diverts flux lines from the armature to create a magnetic dominance on the opposite side. As a result, the armature snaps to its operated position, closing the other contact circuit.

When the target is removed the armature snaps back to its original, unoperated position.

A LOOK INSIDE - MODELS 35 & 81



Options Available

- Explosion Proof
- SPDT or DPDT
- HiTemp™ to 350°
- SubSea™ Submersible
- Hermetically Sealed

Key Benefits

GO Switches are simple and built to last.

With only one moving part and no metal-to-metal contact forcing it to move, there is nothing to wear out!

Models 31, 32, and 33

GO Switch Models 31, 32, and 33 offer end sensing in compact stainless steel enclosures.

Features:
- SPDT 6A contacts
- End Sensing
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- Quick disconnect connector

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 1/4" (6 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰ to 105⁰C)

31 Size: 1" (25 mm) square x 3 1/4" (81 mm) overall

32 Size: 1" (25 mm) square x 2 1/4" (57 mm) overall (includes mounting bracket)

33 Size: 1" (25 mm) square x 4 1/4" (108 mm) overall

Need Accessories?

See pp. 92-103 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	6	24	2
240	3	48	*
480	*	125	*
		250	0.25

1 Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. 1/4" (6 mm)

Sensing Range with Target Magnet: up to 2 5/8" (66 mm) (max)

7 Precision sensing - approx. 1/4" (6 mm) side sensing (minimal differential)

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Models 31 and 32

Magnet	Sensing	Differential
AMP3	3/4"	1-1/4"
AMS4	1"	1-1/2"
AMC5	2-5/8"	3-1/2"
AMF6	1-5/8"	4-1/4"

Outlet Position

Conduit Outlet: 1/2 NPT, bottom. (Model 31 and 33)

3 No conduit hub (Model 32) (includes mounting bracket)

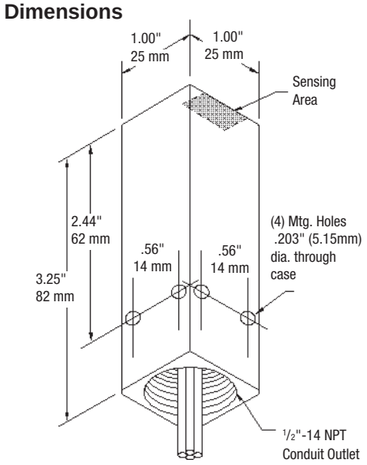
5 Conduit hub on bottom of enclosure with mounting holes (Model 31 and 33)

Ordering Guide

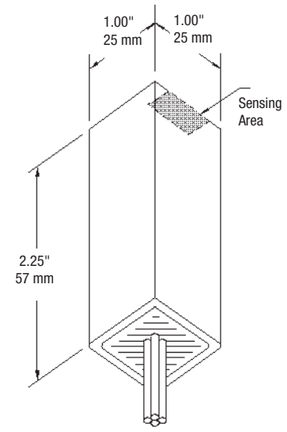
Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position
	-	1		7		

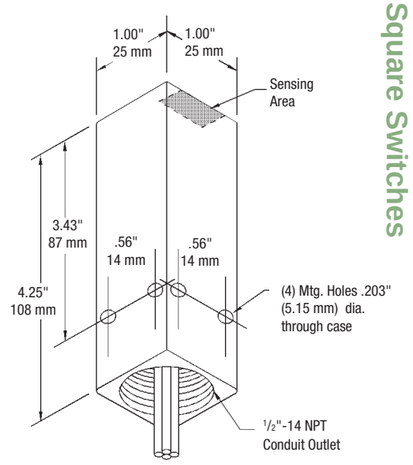
Dimensions



Model 31



Model 32



Model 33

Enclosure Material

2 Stainless steel

4 Stainless steel - corrosion resistant coating (polyurethane)

Approvals

4 CSA / FM certified explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III. (Model 31)

6 CSA / FM certified explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III. (Model 31) (Wiring must be F)

7 CSA certified General Purpose (Wiring must be A, B, or D)

8 UL listed General Purpose

A SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Model 31 and 33) (Wiring must be A)

Wiring Options

Lead Wires 18 Gauge (.110" dia.) potted-in PVC insulated AWM / TEW stranded lead wires rated at 221⁰F (105⁰C) 600V UL / CSA listed

A2 36" (914 mm)
A3 72" (1829 mm)
A4 144" (3658 mm)
A_ _ _ Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.250" dia.) potted-in PVC rubber covered cable rated at 194⁰F (90⁰C) 600V UL / CSA listed

B2 36" (914 mm)
B3 72" (1829 mm)
B4 144" (3658 mm)
B_ _ _ Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approval must be 7 or 8) (Model 31 only and 33) Refer to pp. 92-103 for mating cable assemblies and Aura Light Adapters.

Mini-change®		Micro-change®	
DCA	3 - pin Mini-change® type	**DBA**	3 - pin Micro-change® type
DCD	4 - pin Mini-change® type	**DBD**	4 - pin Micro-change® type
DCG	5 - pin Mini-change® type	**DBG**	5 - pin Micro-change® type

HiTemp Wire 18 gauge (.070") dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed

F2 36" (914 mm)
F3 72" (1829 mm)
F4 144" (3658 mm)
F_ _ _ Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Enclosure Material		Approvals		Wiring Options
	-			

Model 35

The GO Switch Model 35 leverless limit switch has set the standard for reliable performance in valve position monitors.

With its hermetically sealed contacts, low hysteresis, and superior resistance to vibration, moisture, contaminants, abuse, and temperature extremes, the GO Switch 35 clearly out performs any other sensor on the planet.

When ordering valve position monitors and switchboxes, be sure to specify "GO Switch inside."

GO SWITCH Inside

FAST TRACK DELIVERY

35-13319-A2
Hermetic Seal

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 5/32" (4 mm)

Operating Temperature: -40° to 221°F (-40° to 105°C)

35 Size: 3/4" (19 mm) square x 2 1/2" (64 mm) overall

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Forms: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1
480	*	125	0.5
		250	*

Model 35

1 Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. 1/10" (2.5 mm)

Sensing Range with Target Magnet: up to 3 5/8" (92mm) (max)

3 Approx. 1/10" (2.5 mm) end sensing

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	1-5/32"	15/16"
AMS4	1-1/2"	1-3/4"
AMC5	3-5/8"	1-3/4"
AMF6	2-9/16"	2-5/8"

Outlet Position

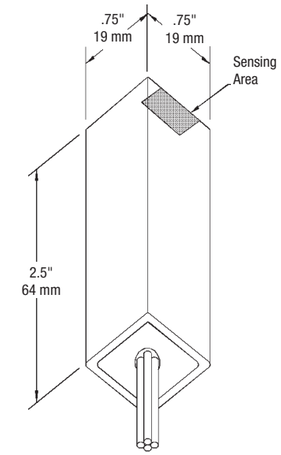
3 No conduit hub

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position
35	-	1		3		3

Dimensions



Model 35

Enclosure Material

1 Copper - coated with flat black lacquer

Approvals

7 CSA certified General Purpose (Wiring must be A or B)

8 UL listed General Purpose

9 Hermetic seal; UL listed General Purpose

Wiring Options

Lead Wires 18 Gauge (.110" dia.) potted-in PVC insulated AWM / TEW stranded lead wires rated at 221°F (105°C) 600V UL / CSA listed

- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.250" dia.) potted-in PVC rubber covered cable rated at 194°F (90°C) 600V UL / CSA listed

- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Need Accessories?

See pp. 92-103 for:

Range Extending Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material		Approvals	Wiring Options
1	-		

Agency Approvals

Approvals / Termination Options	(4) CSA/FM Class 1 Div 1	(6) CSA/FM Class 1 Div 2	(7) CSA General Purpose	(8) UL General Purpose	(9) Hermetic Seal Model 35	(A) SAA Exs IIc T6 IP65
A - Potted PVC Leads			X	X	X	X
B - Potted PVC Cable			X	X	X	
D - Quick Disconnect			X	X		
F - Potted HiTemp™ Leads	X	X		X		

X = Approvals Available

NEMA Ratings

	Non-Hazardous				Hazardous	
NEMA CLASSES	4	4X	6	6P	7	9
A - Potted PVC Leads	X	X				
B - Potted PVC Cable	X	X				
D - Quick Disconnect	X	X	X	X		
F - Potted HiTemp™ Leads	X	X	X	X	X	X
35 Series Hermetic seal w/ potting	X	X	X	X		

X = Designed to meet respective NEMA specifications

Wiring Diagrams (male view)

PVC & Teflon Leads - UL	
N/C	Red
N/O	Blue
COM	Black

Termination A & F

PVC & Teflon Leads - CSA	
N/C	Red
N/O	Blue
COM	Black
GND	Green

Termination A & F

PVC Cable - UL	
N/C	Red
N/O	White
COM	Black

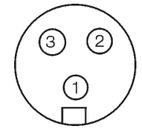
Termination B

PVC Cable - CSA	
N/C	Red
N/O	White
COM	Black
GND	Green

Termination B

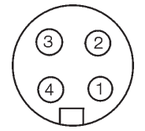
Mini-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O

Termination DCA



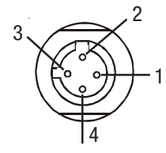
Mini-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination DCD



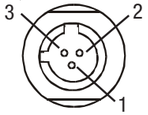
Micro-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination DBD



Micro-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O

Termination DBA



Model 81

The GO Switch Model 81 offers end sensing and an optional Double Pole Double Throw contact arrangement. With its brass or stainless steel housings and global certifications, it is a popular choice around the world.

Features:
- SPDT or DPDT 10A contacts
- End Sensing
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- -40⁰ to 350⁰F high temperature
- Quick disconnect connector
- Underwater capabilities

FAST TRACK DELIVERY

81-20516-A2
CSA Class I Div 2
DPDT Brass, 3 ft. leads

81-20518-A2
UL General Purpose
DPDT Brass, 3 ft. leads

81-20524-A2
CSA Class I Div 1
DPDT Stainless, 3 ft. leads

Need Accessories?

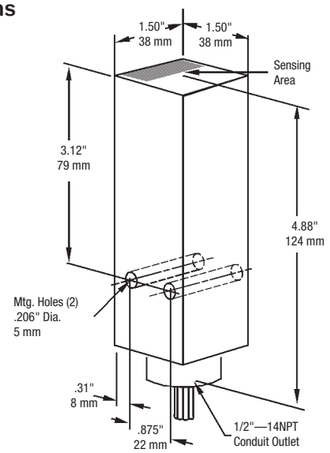
See pp. 92-103 for:

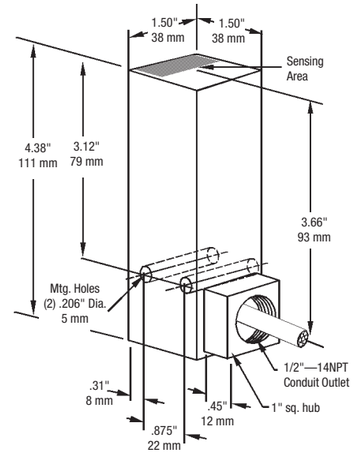
Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Dimensions





Model 81

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 1/4" (6 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰C to 105⁰C). HiTemp™ option to 350⁰F) (176⁰C)

81 Size: 1 1/2" (38 mm) square x 4 3/8" (111 mm) overall. Subtract 1/2" (13 mm) from length for side conduit

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Forms: DPDT, Form CC; SPDT, Form C Electrically isolated

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	120	0.5
		250	0.5

1 Single Pole Double Throw (Form C)

2 Double Pole Double Throw (Form CC)


Form C - SPDT


Form CC - DPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. 1/4" (6 mm)

Sensing Range with Target Magnet: up to 3 7/8" (98 mm) (max)

0 Approx. 1/4" (6 mm) end sensing

Extended Sensing with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	15/16"	3/4"
AMS4	1-3/8"	1-1/8"
AMC5	3-7/8"	2-1/8"
AMF6	2-3/4"	1-5/8"

Outlet Position

Conduit Outlet: 1/2 NPT
Two locations

1 Side outlet

5 Bottom of enclosure

Enclosure Material

Material: Brass or Stainless Steel

1 Brass - coated with flat black lacquer

2 Stainless steel

3 Brass - corrosion resistant coating (polyurethane)

4 Stainless steel - corrosion resistant coating (polyurethane)

Approvals

1 No Approvals (Wiring must be 00)

2 High temperature to 350⁰F (176⁰C) with Teflon™ insulated leads

3 UL listed explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III (Enclosure must be 2 or 4) (Lead seal req'd within 18") (DPDT, leads only)

4 CSA / FM certified explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III. (Enclosure must be 2 or 4)

6 CSA / FM certified explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III

7 CSA certified General Purpose

8 UL listed General Purpose

A SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be A or 00)

B SAA: High Temp EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be F)

Wiring Options

Terminal Block
00 Terminal block only (SPDT only, Approvals must be 1)

Lead Wires 18 Gauge (.110" dia.) potted-in PVC insulated AWM / TEW stranded lead wires rated at 221⁰F (105⁰C) 600V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.450" dia.) potted-in SO rubber covered cable rated at 194⁰F (90⁰C) 600V UL / CSA listed (Contact Form must be 1)
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approval must be 7 or 8) Refer to pp. 92-103 for mating cable assemblies and Aura Light Adapters.

Mini-change®
- **DCA** 3 - pin Mini-change® type
- **DCD** 4 - pin Mini-change® type
- **DCG** 5 - pin Mini-change® type

SubSea™ Underwater Connector (Enclosure must be 2 or 4)
- **3DD** 3 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **4DD** 4 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **8DD** 8 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **3DE** 3 pin right-angle, certified not to leak underwater (Enclosure must be 2 or 4)
- **4DE** 4 pin right-angle, certified not to leak underwater (Enclosure must be 2 or 4)

HiTemp Wire 18 gauge (.070") dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Model	Contact Form	Sensing Range	Outlet Position	Enclosure Material	Approvals	Wiring Options
81		0				

Agency Approvals

Termination Options	(1) No Approvals	(3) UL Class 1 Div 1	(4) CSA/FM Class 1 Div 1	(6) CSA/FM Class 1 Div 2	(7) CSA General Purpose	(8) UL General Purpose	(A) SAA Exs IIc T6 IP65
00 - Terminal Block	X						
A - Potted PVC Leads		X	X	X	X	X	X
B - Potted SO Cable		X	X	X	X	X	
D - Quick Disconnect					X	X	
D - SubSea™ Connector					X	X	
F - Potted HiTemp™ Leads		X	X	X	X	X	

X = Approvals Available

NEMA Ratings

NEMA CLASSES	Non-Hazardous				Hazardous	
	4	4X	6	6P	7	9
00 - Terminal Block	X					
A - Potted PVC Leads	X	SS	X	SS	SS	SS
B - Potted SO Cable	X	SS	X	SS	SS	SS
D - Quick Disconnect	X	SS	X	SS		
D - SubSea™ Connector	X	SS	X	SS		
F - Potted HiTemp™ Leads	X	SS	X	SS	SS	SS

SS = Stainless steel
X = Designed to meet respective NEMA specifications

Wiring Diagrams (male view)

4 Wire PVC & HiTemp Leads	
N/C	Red
N/O	Blue
COM	Black
GND	Green

Terminations A & F

SO Cable	
N/C	Red
N/O	White
COM	Black
GND	Green

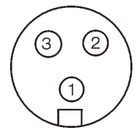
Termination B

PVC Leads, Cable & Teflon Leads	
N/C1 - Red	N/C2 - Red/White Stripe
N/O1 - Blue	N/O2 - Blue/White Stripe
COM1 - Black	COM2 - Black/White Stripe
	GND - Green

Termination A & F

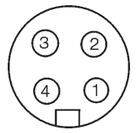
Mini-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O

Termination DCA



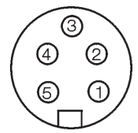
Mini-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination DCD



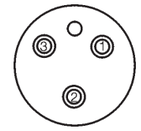
Mini-Change QDC - 5 Pin	
Pin 1	N/O
Pin 2	N/C
Pin 3	GND
Pin 4	Inactive
Pin 5	COM

Termination DCG



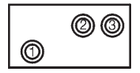
SubSea - 3 Pin - Lock Sleeve	
Pin 1	N/C
Pin 2	COM
Pin 3	N/O

Termination 3DD



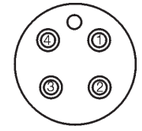
SubSea - 3 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C

Termination 3DE



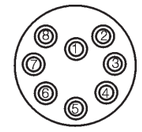
SubSea - 4 Pin - Lock Sleeve	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination 4DD



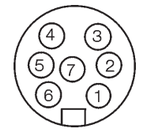
SubSea - 8 Pin - Lock Sleeve	
Pin 1	COM_1
Pin 2	N/O1
Pin 3	N/C_1
Pin 4	GND
Pin 5	N/C_2
Pin 6	N/O_2
Pin 7	COM_2
Pin 8	Inactive

Termination 8DD



Mini-Change QDC - 7 Pin	
Pin 1	N/O_2
Pin 2	COM_1
Pin 3	N/C_2
Pin 4	N/C_1
Pin 5	COM_2
Pin 6	N/O_1
Pin 7	GND

Termination DCH



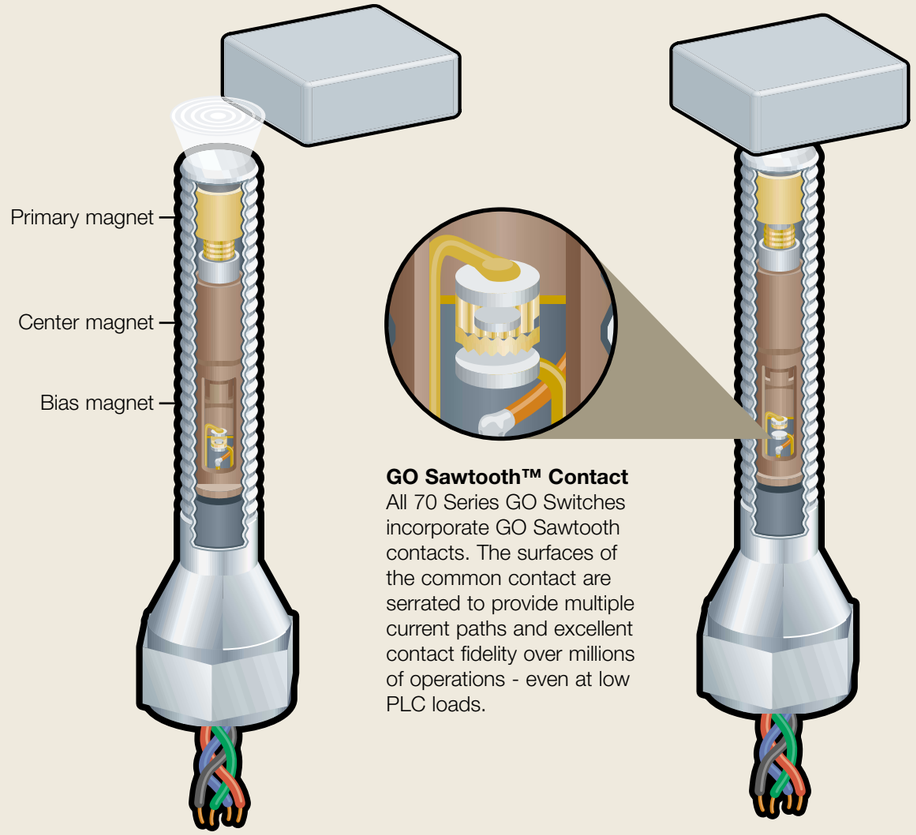
Round Sensors

TECHNOLOGY IN ACTION

70 Series

LEVERLESS LIMIT SWITCH

GO Switch 70 Series end sensing switches use three permanent magnets and push-pull plunger assembly to control a set of dry contacts.



GO Sawtooth™ Contact
All 70 Series GO Switches incorporate GO Sawtooth contacts. The surfaces of the common contact are serrated to provide multiple current paths and excellent contact fidelity over millions of operations - even at low PLC loads.

Unoperated

The center magnet simultaneously attracts the primary magnet and repels the bias magnet, pushing the connecting rod backward. As a result, the common contact rests in its unoperated position, closing a contact circuit.

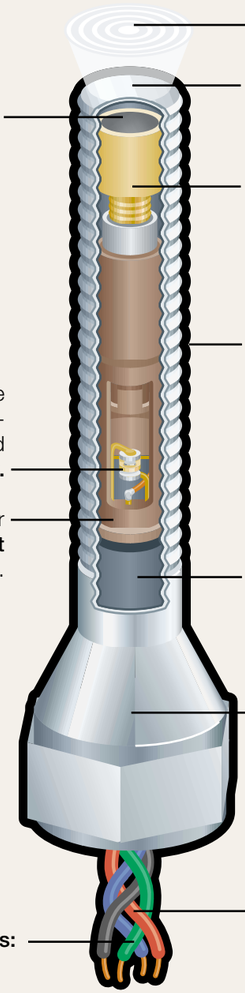
Operated

When a ferrous target enters the sensing area of the switch, it attracts the primary magnet, which pulls the connecting rod forward. As a result, the common contact snaps to its operated position, closing the other contact circuit.

When the target is removed the common contact snaps back to its original, unoperated position.

Shown: Model 73

A LOOK INSIDE - MODEL 73



End sensing range can be extended using external target magnets.

Permanent magnets never lose their strength, even when threaded into ferrous metal.

Sensing face is stainless steel rather than plastic, preventing damage due to incidental physical contact.

Three magnets provide **snap action** and solid contact pressure, eliminating 'contact teasing' and 'contact chatter' in high vibration applications.

English or metric threads available.

Unique sawtooth contacts are suitable for high and low electrical loads, and can be wired **AC or DC, N/O or N/C.**

Sealed contact chamber **prevents moisture or dust** from reaching the contacts.

Potting fills the entire switch cavity, forming a **barrier against moisture.**

One-piece stainless steel construction makes this **the most durable proximity sensor in the world.**

Consumes no power to operate and has no current leakage or voltage drop.

Multiple wiring options:
- Lead Wires
- Cable
- Quick Disconnects

Options Available

- Explosion Proof
- SPDT or DPDT
- HiTemp™ to 400°F
- SubSea™ Submersible
- Hermetically Sealed
- High Pressure to 10,000 psi
- English or metric threads

Key Benefits

GO Switches are simple and built to last.

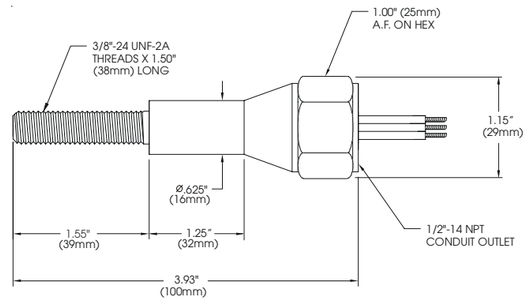
With only one moving part and no metal-to-metal contact forcing it to move, there is nothing to wear out!

Models 71 and 72

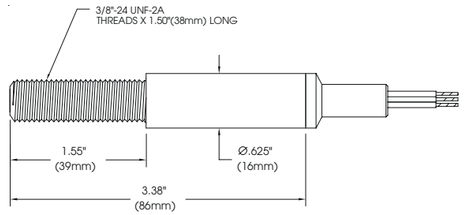
GO Switch Models 71 and 72 have the smallest diameters of any round leverless limit switch, and are used extensively in factory automation applications.

Features:
- SPDT 4A contacts
- Intrinsically Safe
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- -40⁰ to 400⁰F high temperature
- Quick disconnect connector
- English or Metric threads



Model 71



Model 72

Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. 020" (.51 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰ to 105⁰C). HiTemp option to 400⁰F (204⁰C)

71 Model 71
3/8" (10 mm) dia. x 3 15/16" (100 mm) long, with 3/8"-24 UNF x 1 1/2" (38 mm) threads and 1/2" NPT conduit hub

71M Model 71
M12 x 1 external metric thread

72 Model 72
3/8" (10 mm) dia. x 3 3/8" (86 mm) long, with 3/8"-24 UNF x 1 1/2" (38 mm) threads. No conduit hub

72M Model 72
M12 x 1 external metric thread

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1.25
480	*	125	0.5
		250	0.5

1 Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. .040" (1 mm) end sensing

Sensing Range with Target Magnet: up to .15" (4 mm)

6 Standard sensing - approx. .040" (1 mm) end sensing

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.12"	.07"
AMS4	.15"	.10"
AMS7	.13"	.045"

Outlet Position

Conduit Outlet: 1/2" NPT

2 Side entry (Model 72) (Approval must be 8) (Wiring must be F)

5 Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material

2 303 stainless steel (rated 2,000 PSI)

6 316 stainless steel (rated 2,000 PSI)

Approvals

UL CSA SAA

2 High temperature to 400⁰F (204⁰C) with Teflon™ insulated leads (Wiring must be F)

3 UL listed explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III (Model 71) (Lead seal req'd within 18")

4 CSA certified explosion proof for Cl I, Div 1; Grps A,B,C,D; Cl II, Div 1; Grps E-G; Cl III (Model 71) (Lead seal req'd within 18")

6 CSA certified Cl I, Div 2; Grps A,B,C,D; Cl II, Div 2; Grps E-G; Cl III (Model 71) (Wiring must be A, B, or F) (Lead seal req'd within 18")

7 CSA certified General Purpose

8 UL listed General Purpose

A SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be A) (Model 71)

B SAA: High Temp EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be F) (Model 71)

Wiring Options

Lead Wires 18 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221⁰F (105⁰C) 600V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.250" dia.) potted-in PVC cable, rated at 176⁰F (80⁰C) 300V, UL / CSA listed
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Water Resistant 18 Gauge (.250" dia) PVC cable rated at 176⁰F (80⁰C) 300V with water-resistant squeeze connector. (Model 72) UL/CSA listed
- **C2** 36" (914 mm)
- **C3** 72" (1829 mm)
- **C4** 144" (3658 mm)
- **C_ _ _** Lengths greater than 144" (Specify length in feet (e.g. C150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approval must be 7 or 8) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change®		Micro-change®	
DCA	3 pin Mini-change® type	**DBA**	3 pin Micro-change® type
DCD	4 pin Mini-change® type	**DBD**	4 pin Micro-change® type
DCG	5 pin Mini-change® type	**DBG**	5 pin Micro-change® type

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C)) 600V UL / CSA listed (Approval must be 2, 3, 4, 6, 7, 8, or B)
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position		Enclosure Material		Approvals		Wiring Options
71	-	1		6							-	

Models 73 and 74

The GO Switch Model 73 is our most popular leverless limit switch. Its solid stainless steel construction and global certifications make it the ideal choice for a variety of applications. Model 74 is the same, less the conduit hub.

Features:
- SPDT 4A contacts
- Intrinsically Safe
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- -40⁰ to 400⁰F high temperature
- Quick disconnect connector
- Underwater capabilities
- English or Metric threads

FAST TRACK DELIVERY

73-13523-A2
Class I Div 1, 3 ft. leads

73-13524-A2
Class I Div 1, 3 ft. leads

73-13526-A2
Class I Div 2, 3 ft. leads

73-13528-A2
General Purpose 3 ft. leads

73-13528-DCA
General Purpose, Mini Connector

74-13528-B2
General Purpose, 3 ft. cable

74-13528-DBA
General Purpose, Micro Connector

Model

Repeatability: .002" (.05mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰ to 105⁰C). HiTemp to 400⁰F (204⁰C)

- **73** Model 73 5/8" (16 mm) dia. x 3 5/8" (92 mm) long with 5/8"-18 UNF x 1 7/8" (48 mm) threads and 1/2" NPT conduit hub
- **73M** Model 73 M18 x 1.5 external metric thread
- **74** Model 74 5/8" (16 mm) dia. x 2 3/4" (70 mm) long with 5/8"-18 UNF x 1 7/8" (48 mm) threads. No conduit hub
- **74M** Model 74 M18 x 1.5 external metric thread

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1.25
480	*	125	0.5
		250	0.5

- **1** Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx.
.100" (2.5 mm) end sensing (2,000 PSI)
.072" (1.8 mm) end sensing (5,000 PSI)
.060" (1.5 mm) end sensing (10,000 PSI)

Sensing Range with Target Magnet: up to .35" (9 mm)

- **3** Standard sensing - approx. .100" (3 mm) end sensing (Enclosure must be 2 or 6)
- **4** HiPressure sensing - approx. .072" (2 mm) end sensing (Enclosure must be 3 and Approvals must be 2, 7, 8, or 9)
- **5** HiPressure sensing - approx. .060" (2 mm) end sensing (Enclosure must be 4 and Approvals must be 2, 7, or 8)

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.20"	.25"
AMS4	.35"	.15"
AMS7	.20"	.05"

Outlet Position

Conduit Outlet: 1/2" NPT

- **2** Side entry with Teflon insulated leads (Model 74) (Approval must be 8) (Wiring must be F)
- **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

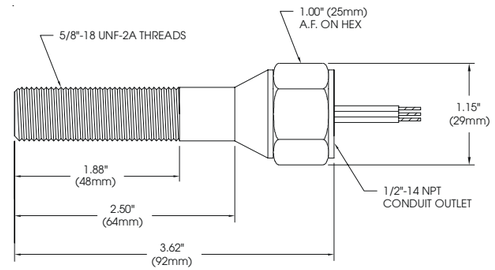
Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

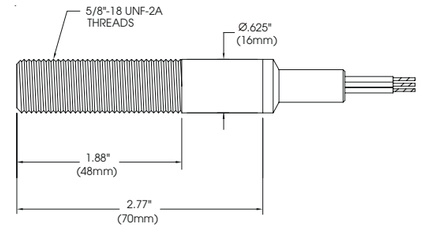
Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position
	-	1				

Dimensions



Model 73



Model 74

Enclosure Material

- **2** 303 stainless steel (rated 2,000 PSI) (Sensing must be 3)
- **3** HiPressure - 303 stainless steel (rated 5,000 PSI) (Sensing must be 4) (Approval must be 2, 7, 8, or 9)
- **4** HiPressure - 303 stainless steel (rated 10,000 PSI) (Sensing must be 5) (Approval must be 2, 7, 8, or 9)
- **6** 316 stainless steel (rated 2,000 PSI)

Approvals

SAA

- **2** High temperature to 400⁰F (204⁰C) with Teflon™ insulated leads (Wiring must be F)
- **3** UL listed explosion proof for Cl I, Div1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III (Model 73) (Lead seal req'd within 18")
- **4** CSA certified explosion proof for Cl I, Div 1; Grps A,B,C,D; Cl II, Div 1; Grps E-G; Cl III (Model 73) (Lead seal req'd within 18")
- **6** CSA certified Cl I, Div 2; Grps A,B,C,D; Cl II, Div 2; Grps E-G; Cl III (Model 73) (Wiring must be A, B, or F) (Lead seal req'd within 18")
- **7** CSA certified General Purpose
- **8** UL listed General Purpose
- **9** CENELEC: EExdIIC T6 Zone 1. (EN 50 014 & EN 50 018, BASEEFA Certificate Ex89C1233X) (Model 73) (Wiring must be A or B)
- **A** SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be A)
- **B** SAA: High Temp 350⁰F (176⁰C): EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be F)

Wiring Options

Lead Wires 18 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221⁰F (105⁰C) 600V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.250" dia.) potted-in PVC cable, rated at 176⁰F (80⁰C) 300V, UL / CSA listed
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Water Resistant 18 Gauge (3 cond .250" dia; 4 cond .450" dia) PVC cable rated at 176⁰F (80⁰C) 300V with water-resistant squeeze connector. (Model 74)
- **C2** 36" (914 mm)
- **C3** 72" (1829 mm)
- **C4** 144" (3658 mm)
- **C_ _ _** Lengths greater than 144" (Specify length in feet (e.g. C150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approvals must be 7 or 8) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change®		Micro-change®	
DCA	3 - pin Mini-change® type	**DBA**	3 - pin Micro-change® type
DCD	4 - pin Mini-change® type	**DBD**	4 - pin Micro-change® type
DCG	5 - pin Mini-change® type	**DBG**	5 - pin Micro-change® type

SubSea Underwater Connector (Model 73)
- **3DD** 3 pin, certified not to leak underwater
- **4DD** 4 pin, certified not to leak underwater
- **3DE** 3 pin right-angle, certified not to leak underwater
- **4DE** 4 pin right-angle, certified not to leak underwater

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed (Approval must be 2, 3, 4, 6, 7, 8 or B)
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Enclosure Material		Approvals		Wiring Options
	-		-	

Models 75, 76 & 77

GO Switch Models 75 and 76 are the same as models 73 and 74, only slightly longer with more thread surface and therefore more adjustability. Model 77 is the longest and largest option in the 70 series family.

Features:
- SPDT 4A contacts
- Intrinsically Safe
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- -40⁰ to 400⁰F high temperature
- Quick disconnect connector
- Underwater capabilities
- English or Metric threads

Model

Repeatability: .002" (.05mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰ to 105⁰C). HiTemp to 400⁰F (204⁰C)

75 Model 75
5/8" (16 mm) dia. x 4 5/16" (110 mm) long with 5/8"-18 UNF x 2 13/16" (71 mm) threads and 1/2" NPT conduit hub

75M Model 75
M18 x 1.5 external metric thread

76 Model 76
5/8" (16 mm) dia. x 3 3/16" (81 mm) long with 5/8"-18 UNF x 2 13/16" (71 mm) threads. No conduit hub

76M Model 76
M18 x 1.5 external metric thread

77 Model 77
3/4" (19 mm) dia. x 5 13/16" (148 mm) long with 3/4"-16 UNF x 2 13/16" (71mm) threads.

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1.25
480	"	125	0.5
		250	0.5

1 Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range:
.100" (2.5 mm) end sensing (2,000 PSI)
.072" (1.8 mm) end sensing (5,000 PSI)
.060" (1.5 mm) end sensing (10,000 PSI)

Sensing Range with Target Magnet: up to .35" (4 mm)

3 Standard sensing - approx. .100" (3 mm) end sensing (must be 2 or 6)

4 HiPressure sensing - approx. .072" (2 mm) end sensing (Enclosure must be 3 and Approvals must be 2, 7, 8, or 9)

5 HiPressure sensing - approx. .060" (2 mm) end sensing (Enclosure must be 4 and Approvals must be 2, 7, or 8)

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.20"	.25"
AMS4	.35"	.15"
AMS7	.20"	.05"

Outlet Position

Conduit Outlet: 1/2" NPT

2 Side entry with Teflon insulated leads (Model 76) (Approval must be 8) (Wiring must be F)

5 Bottom of enclosure

Need Accessories?

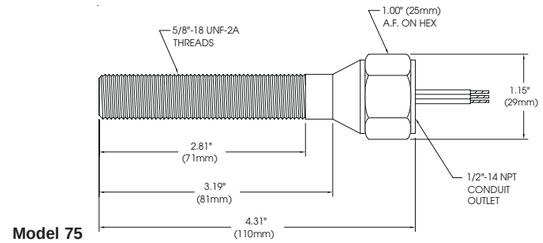
See pp. 93-104 for:

Range Extending Target Magnets
Mounting Brackets
Connectors and more!

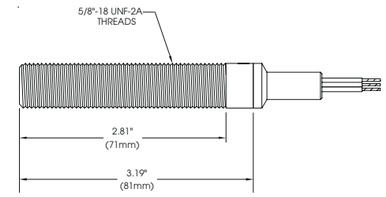
Ordering Guide

Fill in the boxes to create your 'ordering number.'

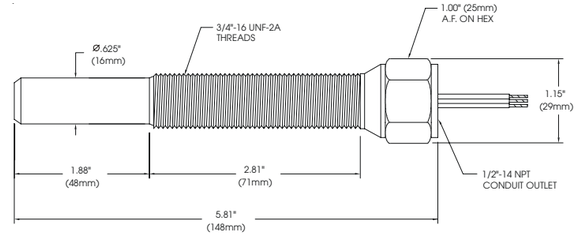
Model	-	Contact Form	Sensing Range	Outlet Position
		1		



Model 75



Model 76



Model 77

Enclosure Material

2 303 stainless steel (rated 2,000 PSI) (Sensing must be 3)

3 HiPressure - 303 stainless steel (rated 5,000 PSI) (Sensing must be 4) (Approval must be 2, 7, 8, or 9)

4 HiPressure - 303 stainless steel (rated 10,000 PSI) (Sensing must be 5) (Approval must be 2, 7, 8, or 9)

6 316 stainless steel (rated 2,000 PSI)

Approvals

2 High temperature to 400⁰F (204⁰C) with Teflon™ insulated leads (Wiring must be F)

3 UL listed explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III (Model 75 & 77) (Lead seal req'd within 18")

4 CSA certified explosion proof for Cl I, Div 1; Grps A,B,C,D; Cl II, Div 1; Grps E-G; Cl III (Model 75) (Lead seal req'd within 18")

6 CSA certified Cl I, Div 2; Grps A,B,C,D; Cl II, Div 2; Grps E-G; Cl III (Model 75 & 77) (Wiring must be A, B, or F) (Lead seal req'd within 18")

7 CSA certified General Purpose

8 UL listed General Purpose

9 CENELEC: EExdIIC T6 Zone 1. (EN 50 014 & EN 50 018, BASEEFA Certificate Ex89C1233X) (Model 75 & 77) (Wiring must be A or B)

A SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be A) (Model 75)

B SAA: High Temp 350⁰F (176⁰C): EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be F) (Model 75)

Wiring Options

Lead Wires 18 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221⁰F (105⁰C) 600V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.250" dia.) potted-in PVC cable, rated at 176⁰F (80⁰C) 300V, UL / CSA listed
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Water Resistant 18 Gauge (.250" dia.) PVC cable rated at 176⁰F (80⁰C) 300V with water-resistant squeeze connector. (Model 76) UL / CSA listed
- **C2** 36" (914 mm)
- **C3** 72" (1829 mm)
- **C4** 144" (3658 mm)
- **C_ _ _** Lengths greater than 144" (Specify length in feet (e.g. C150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approvals must be 7 or 8) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change®		Micro-change®	
DCA	3 - pin Mini-change® type	**DBA**	3 - pin Micro-change® type
DCD	4 - pin Mini-change® type	**DBD**	4 - pin Micro-change® type
DCG	5 - pin Mini-change® type	**DBG**	5 - pin Micro-change® type

SubSea Underwater Connector (Models 75 & 77)
- **3DD** 3 pin, certified not to leak underwater
- **4DD** 4 pin, certified not to leak underwater
- **3DE** 3 pin right-angle, certified not to leak underwater
- **4DE** 4 pin right-angle, certified not to leak underwater

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed (Approval must be 2, 3, 4, 6, 7, 8 or B)
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Enclosure Material	-	Approvals	Wiring Options
2			

Agency Approvals

Termination Options	(2) Hi-Temp	(3) UL Cl. 1, Div. 1	(4) CSA Cl. 1, Div. 1	(6) CSA Cl. 1, Div. 2	(7) CSA General Purpose	(8) UL General Purpose	(9) Cenelec EExdIIC T6 Zone 1	(A) SAA Exs IIc T6 IP65
A - Potted PVC Leads		X	X	X	X	X	X	X
B - Potted PVC Cable		X	X	X	X	X	X	
C - Water squeeze (Models 72, 74 & 76)					X	X		
D - Quick Disconnect					X	X		
D - SubSea™ Connector (Models 73, 75 & 77)					X	X		
F - HiTemp™ Leads	X				X	X		X

NEMA Ratings

Models 71, 73 ,75, 77	Non-Hazardous				Hazardous	
NEMA CLASSES	4	4X	6	6P	7	9
A - Potted PVC leads	X	X	X	X	X	X
B - Potted PVC cable	X	X	X	X	X	X
C - PVC Cable w/ squeeze	X	X				
D - Quick Disconnect	X	X	X	X		
D - SubSea™ Connector	X	X	X	X		
F - HITemp™ Leads	X	X	X	X	X	X

X = Approvals Available

Models 72, 74, 76	Non-Hazardous				Hazardous	
NEMA CLASSES	4	4X	6	6P	7	9
A - Potted PVC leads	X	X				
B - Potted PVC cable	X	X				
C - PVC Cable w/ squeeze	X	X				
D - Quick Disconnect	X	X	X	X		
D - SubSea™ Connector	X	X	X	X		
F - HITemp™ Leads	X	X				

X = Designed to meet respective NEMA specifications

Wiring Diagrams (male view)

3 Wire PVC & HiTemp Leads	
N/C	Red
N/O	Blue
COM	Black

Terminations A & F

3 Conductor PVC Cable	
N/C	Red
N/O	White
COM	Black

Termination B

4 Wire PVC & HiTemp Leads	
N/C	Red
N/O	Blue
COM	Black
GND	Green

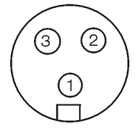
Terminations A & F

4 Conductor PVC Cable	
N/C	Red
N/O	White
COM	Black
GND	Green

Termination B

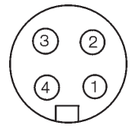
Mini-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O

Termination DCA



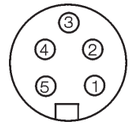
Mini-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination DCD



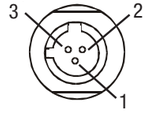
Mini-Change QDC - 5 Pin	
Pin 1	N/O
Pin 2	N/C
Pin 3	GND
Pin 4	Inactive
Pin 5	COM

Termination DCG



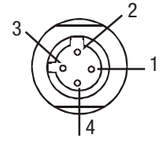
Micro-Change QDC - 3 Pin	
Pin 1	COM
Pin 2	N/C
Pin 3	N/O

Termination DBD



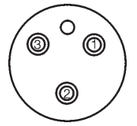
Micro-Change QDC - 4 Pin	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination DBA



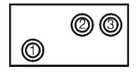
SubSea - 3 Pin - Lock Sleeve	
Pin 1	N/C
Pin 2	COM
Pin 3	N/O

Termination 3DD



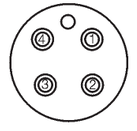
SubSea - 3 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C

Termination 3DE



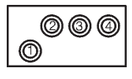
SubSea - 4 Pin - Lock Sleeve	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination 4DD



SubSea - 4 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND

Termination 4DE



Models 7G, 7H & 7I

GO Switch Models 7G, 7H & 7I offer unique options such as hermetically sealed and Double Pole Double Throw contact arrangements in a variety of enclosures.

Features:
- SPDT or DPDT 4A contacts
- Intrinsically Safe
- -40⁰ to 221⁰F operating temperature

Options:
- Suitable for Zone 0, 1, or 2 explosion proof
- DPDT 4A contacts
- -40⁰ to 400⁰F high temperature
- Hermetically sealed contacts

FAST TRACK DELIVERY

7G-23528-A2
DPDT General Purpose
3 ft. leads

7G-23526-A2
DPDT Class I Div 2
3 ft. leads

7G-23523-A2
DPDT Class I Div 1
3 ft. leads

Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40⁰ to 221⁰F (-40⁰ to 105⁰C) (Option to 400⁰F)

- **7G** Model 7G
  5/8" (16 mm) dia. x 4" (101 mm) long with 5/8"-18 UNF x 1 3/4" (44 mm) threads and 1/2" NPT conduit hub
- **7GM** Model 7G
  M18 x 1.5 external metric thread
- **7H** Model 7H
  5/8" (16 mm) dia. x 3 1/4" (83 mm) long with 5/8" - 18 UNF x 1 3/4" threads. No conduit outlet.
- **7HM** Model 7H
  M18 x 1.5 external metric thread
- **7I** Model 7I
  1" (25 mm) dia. x 5 5/8" (148 mm) long with 1" - 14 UNF x 3" (76 mm) threads 1/2" NPT conduit outlet

Ordering Guide
Fill in the boxes to create your 'ordering number.'

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT Form C; DPDT Form CC

Ratings: Resistive

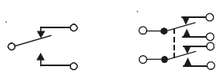
AC		DC	
Volts	Amps	Volts	Amps
120	4	24	1
240	2	48	"
480	"	120	0.5
		250	0.5

SPDT

AC		DC	
Volts	Amps	Volts	Amps
120	3	24	1
240	1.5	48	"
480	"	120	0.5
		250	0.1

DPDT

- **1** Single Pole Double Throw (Form C) Hermetically Sealed (Model 7G & 7I) (Lead seal not required for hazardous locations)
- **2** Double Pole Double Throw (Form CC)



Form C - SPDT

Form CC - DPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range:
.090" (2.3 mm) end sensing (2,000 PSI)

Sensing Range with Target Magnet:
up to .20" (5 mm)

- **3** Standard sensing - approx. .090" (2.3 mm) end sensing

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.15"	.30"
AMS4	.20"	.30"

Outlet Position

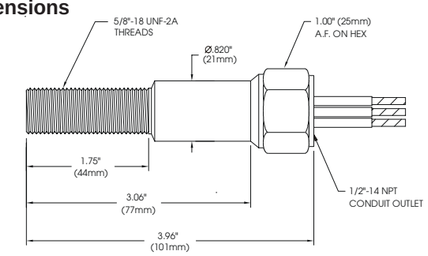
Conduit Outlet: 1/2" NPT

- **5** Bottom of enclosure

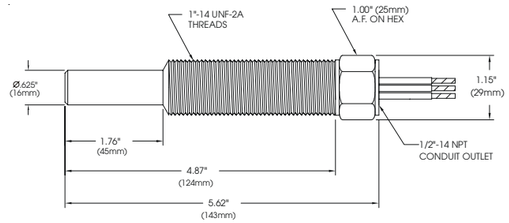
Need Accessories?
See pp. 93-104 for:
Range Extending Target Magnets
Mounting Brackets
Connectors and more!

Model - Contact Form - Sensing Range 3 - Outlet Position 5

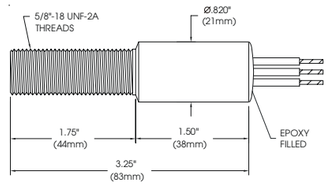
Dimensions



Model 7G



Model 7I



Model 7H

Enclosure Material

Stainless Steel type 303

- **2** 303 stainless steel (rated 2,000 PSI)
- **6** 316 stainless steel (rated 2,000 PSI)

Approvals

SAA

- **2** High temperature to 400⁰F (204⁰C) with Teflon™ insulated leads (Wiring must be F)
- **3** UL listed explosion proof for Cl I, Div 1 & 2; Grps A,B,C,D; Cl II, Div 1 & 2, Grps E-G; Cl III (Model 7G & 7I only) (Lead seal req'd within 18")
- **4** CSA certified explosion proof for Cl I, Div 1; Grps A,B,C,D; Cl II, Div 1; Grps E-G; Cl III (Model 7G & 7I) (Lead seal req'd within 18")
- **6** CSA certified Cl I, Div 2; Grps A,B,C,D; Cl II, Div 2; Grps E-G; Cl III (Model 7G & 7I) (Lead seal req'd within 18")
- **7** CSA certified General Purpose
- **8** UL listed General Purpose
- **9** CENELEC: EExdIIC T6 Zone 1. (EN 50 014 & EN 50 018, BASEEFA Certificate Ex89C1233X) (Model 7G & 7I) (Wiring must be A or B)
- **A** SAA: Ex s IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Model 7G & 7I) (Wiring must be A)

Wiring Options

Lead Wires 20 Gauge (.100" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221⁰F (105⁰C) 300V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 22 Gauge (.215" dia) potted-in PVC cable, rated at 176⁰F (80⁰C) 300V, UL / CSA listed
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approvals must be 7 or 8) (Model 7G and 7I) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change®
- **DCH** 7-pin mini-change type

HiTemp Leads 20 gauge (19 strands at .08") potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed (Approval must be 6, 7, or 8)
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Enclosure Material - Approvals - Wiring Options

Models 7G, 7H & 7I Approvals & Wiring

502.969.8000

Agency Approvals

Approvals / Terminations	(3) UL Explosion Proof	(4) CSA/FM Cl. 1, Div. 1	(6) CSA/FM Cl. 1, Div. 2	(7) CSA General Purpose	(8) UL General Purpose	(9) Cenelec EExdIIC T6 Zone 1	(A) SAA Exs IIc T6 IP65
A - Potted PVC Leads	X	X	X	X	X	X	X
B - Potted PVC Cable	X	X	X	X	X	X	
D - Quick Disconnect				X	X		
F - HiTemp™ Leads			X	X	X		

X = Approvals Available

NEMA Ratings

	NON-HAZARDOUS				HAZARDOUS	
NEMA CLASSES	4	4X	6	6P	7	9
A - Potted PVC leads	X	X	X	X	X	X
B - Potted PVC cable	X	X	X	X	X	X
F - HiTemp™ Leads	X	X	X	X	X	X
7G Hermetic seal	X	X	X	X	X	X

X = Designed to meet respective NEMA specifications

Wiring Diagrams (male view)

SPDT

PVC & Teflon Leads	
N/C	Red
N/O	Blue
COM	Black

Terminations A & F

3 Conductor PVC Cable	
N/C	Red
N/O	White
COM	Black

Termination B

4 Conductor PVC Cable	
N/C	Red
N/O	White
COM	Black
GND	Green

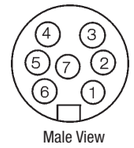
Termination B

DPDT

PVC Leads, Cable & Teflon Leads	
N/C1 - Red	N/C2 - Red/White Stripe
N/O1 - Blue	N/O2 - Blue/White Stripe
COM1 - Black	COM2 - Black/White Stripe
	GND - Green

Mini-Change QDC - 7 Pin	
Pin 1	N/O_2
Pin 2	COM_1
Pin 3	N/C_2
Pin 4	N/C_1
Pin 5	COM_2
Pin 6	N/O_1
Pin 7	GND

Termination DCH



Male View

Model 7L

502.969.8000

New!

Model 7L GO Switch with LEDs

The new GO Switch Model 7L offers the same proven internals as our other 70 Series leverless limit switches, with the addition of Red or Green BriteLite LEDs. The new 7L brings increased plant safety and awareness to the reliability of the 70 Series.

Features:

- 316 stainless steel enclosure
- Red or Green BriteLite LEDs
- Leverless Limit Switch design

GO SWITCH Inside.

FAST TRACK DELIVERY

7LR-13568-A2
General Purpose
Red LEDs, 3 ft. leads

7LG-13568-A2
General Purpose,
Green LED, 3 ft. leads

7LR-1356E-A2
Class I Div 2
Red LED, 3 ft. leads

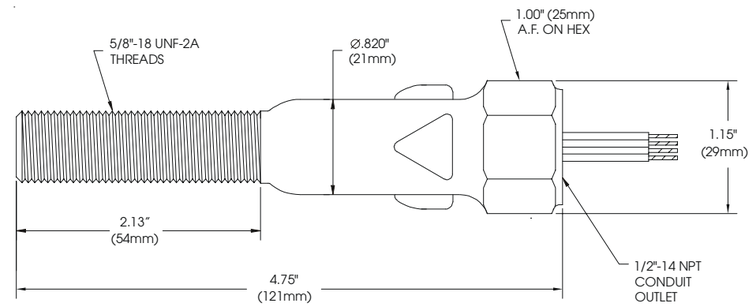
7LG-1356E-A2
Class I Div 2
Green LED, 3 ft. leads

Leverless Limit Switches

GO SWITCH

Round Switches

Dimensions



Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40° to 160°F (-40°C to 71°C).

- **7LG** Model 7LG
  5/8" (16 mm) dia. x 4 3/4" (121 mm) long, with 5/8"-18 UNF x 2.13" (54 mm) threads and 1/2" NPT conduit hub
- **7LR** Model 7LR
  5/8" (16 mm) dia. x 4 3/4" (121 mm) long, with 5/8"-18 UNF x 2.13" (54 mm) threads and 1/2" NPT conduit hub

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: .25A @ 24VDC/120VAC Resistive

- **1** Single Pole Double Throw (Form C)

Sensing Range

Target Material: Ferrous

Sensing Range: 0.100" nominal

- **3** Standard sensing - approx. 0.100" (2.5 mm) end sensing

Outlet Position

Conduit Outlet: 1/2" NPT

- **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material

Stainless Steel type 316

- **6** 316 stainless steel
  (rated 2,000 PSI)

Approvals

c UL us

- **8** C-UL listed General Purpose
- **E** C-UL listed
  Class I, Div 2, All groups
  Class II, Div 1 & 2, All groups
  Class III

Wiring Options

Lead Wires 18 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221°F (105°C) 600V UL / CSA listed

- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (3 cond .250" dia; 4 cond .250" dia.) potted-in PVC cable, rated at 176°F (80°C) 300V, UL / CSA listed

- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (Approval must be 8) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change®		Micro-change®	
DCA	3 - pin Mini-change® type	**DBA**	3 - pin Micro-change® type
DCD	4 - pin Mini-change® type	**DBD**	4 - pin Micro-change® type
DCG	5 - pin Mini-change® type	**DBG**	5 - pin Micro-change® type

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model	-	Contact Form	Sensing Range	Outlet Position	Enclosure Material	Approvals	-	Wiring Options

Model LPS

502.969.8000

LPS: Linear Position Sensor

The Luminator LPS is specifically designed to provide position feedback on linear control valves and knifegate valves. Onboard Green or Red LEDs increase safety and awareness for plant operators.

Features: 316 stainless steel enclosure
Green or Red BriteLite LEDs
Hermetically sealed sensors
Snap-action contacts

FAST TRACK DELIVERY

LPS-DZ2RA2
Class I, Div 2 with
Red BriteLite™

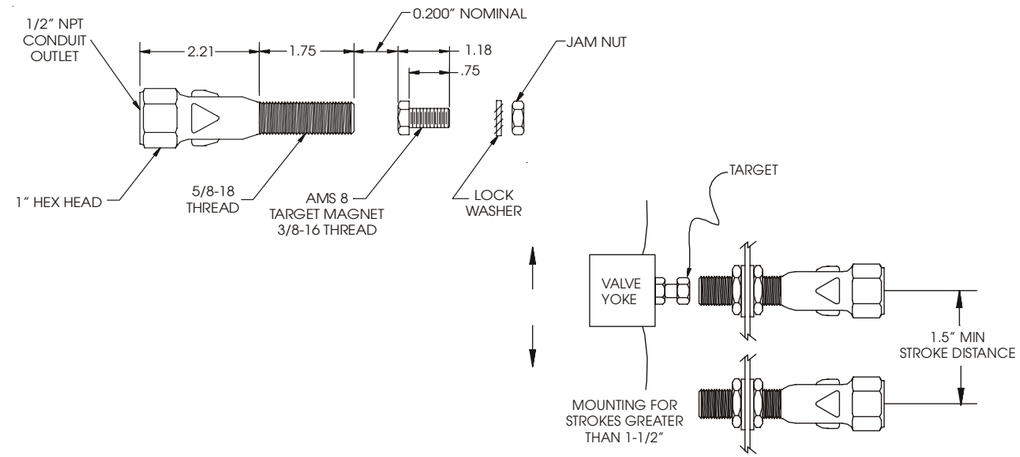
LPS-DZ2GA2
Class I, Div 2 with
Green BriteLite™

Leverless Limit Switches

GO SWITCH

Round Switches

Dimensions



Model

Enclosure: 3.96" x 1", 316 series stainless steel

Target: 1.05" x 0.65", 316 series stainless steel

Conduit Outlet: 1/2" NPT

Operating Temperature: -40° to 160°F (-40°to 71°C)

Environment
Zone 1 (Class I, Div 1): NEMA Type 4, 4X, 7 and 9
Zone 2 (Class I, Div 2): NEMA Type 4, 4X

LPS Luminator Linear Position Sensor

Sensor

D (1) Hermetically sealed SPDT

Without BriteLite: 1A/120VAC; 0.5A/24VDC
With BriteLite: 0.25A/120VAC; 0.25A/24VDC

W (1) Hermetically sealed SPST

Without BriteLite: 3A/120VAC; 2A/24VDC
With BriteLite: 0.25A/120VAC; 0.25/24VDC

Area Classification

Z1 Explosion Proof
Zone 1
Class I, Div 1 & 2, Groups A,B,C,D
Class II, Div 1 & 2, Groups E,F,G
Class III
(Visual Display option must be N)

Z2 Non-Incendive
Zone 2
Class I, Div 2, Groups A,B,C,D
Class II, Div 1 & 2, Groups E,F,G
Class III

May be installed Intrinsically Safe per NEC Article 504.

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Visual Display

BriteLite: Triaxial LEDs

BriteLite Colors: Green or Red

G Green BriteLite 360° triaxial LED visual position indicator (Z0 & Z2 only)

R Red BriteLite 360° triaxial LED visual position indicator (Z0 & Z2 only)

N No visual indication

Wiring

A2 3 ft. 18 gauge potted-in lead wires

A3 6 ft. gauge potted-in lead wires

A4 12 ft. 18 gauge potted-in lead wires

DCA 3-pin mini change quick disconnect
(Z2 only unless installed I.S. per NEC Article 504)
(Sensor option must be W)

DCD 4-pin mini change quick disconnect
(Z2 only unless installed I.S. per NEC Article 504)
(Sensor option must be W)

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model	-	Sensor	Area Classification	Visual Display	Wiring

Model 7A

502.969.8000

Model 7A Pneumatic Proximity Switch

The GO Switch model 7A is a unique pneumatic proximity switch. The 7A uses reliable leverless limit switch technology to operate a 3 way air valve at up to 100 PSI.

The GO Switch 7A is ideal for use as a cylinder position sensor in pneumatic cylinders, on many types of automated equipment, and in any hazardous areas where electrical signals should be avoided.

Features:

- Pneumatic proximity switch
- 3 way air valve
- 1.5 SCFM nominal flow rate
- Up to 100 PSI operation

Model

Repeatability: .002" (.05 mm) typical

Operating Temperature: 0^0 to 350^0F (-20 to 180^0C)

Operating Pressure: 60-100 PSI

- ☑ **7A** Model 7A $^5/_8$" (16 mm) dia. x 3.25" (82 mm) long with $^5/_8$"-18 UNF threads

Port Arrangement

Ports: Three (pneumatic)

- ☑ **7** Supply, Cylinder, and Exhaust

Sensing Range

Target Material: Ferrous steel

Sensing Range: .062" (1.6 mm) end sensing (2,000 PSI)

- ☑ **3** Standard sensing - approx. .062" (1.6mm) end sensing

Port Position

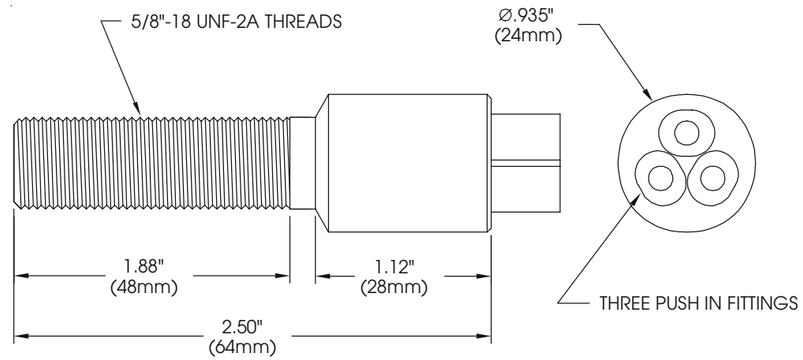
- ☑ **3** Three "push to release" fittings (For 5/32" O.D. tubing)

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Port Arrangement		Sensing Range		Port Position
7A	-	7		3		3

Dimensions



Enclosure Material

- ☑ **2** 303 stainless steel (rated 2,000 PSI)
- **6** Brass base, stainless steel body (rated 2,000 PSI)

Approvals

- ☑ **1** Always a "1"

Wiring Options

- ☑ **00** Straight "push to release" fittings
- **90** Right-angle "push to release" fittings

Enclosure Material		Approvals		Wiring Options
		1	-	

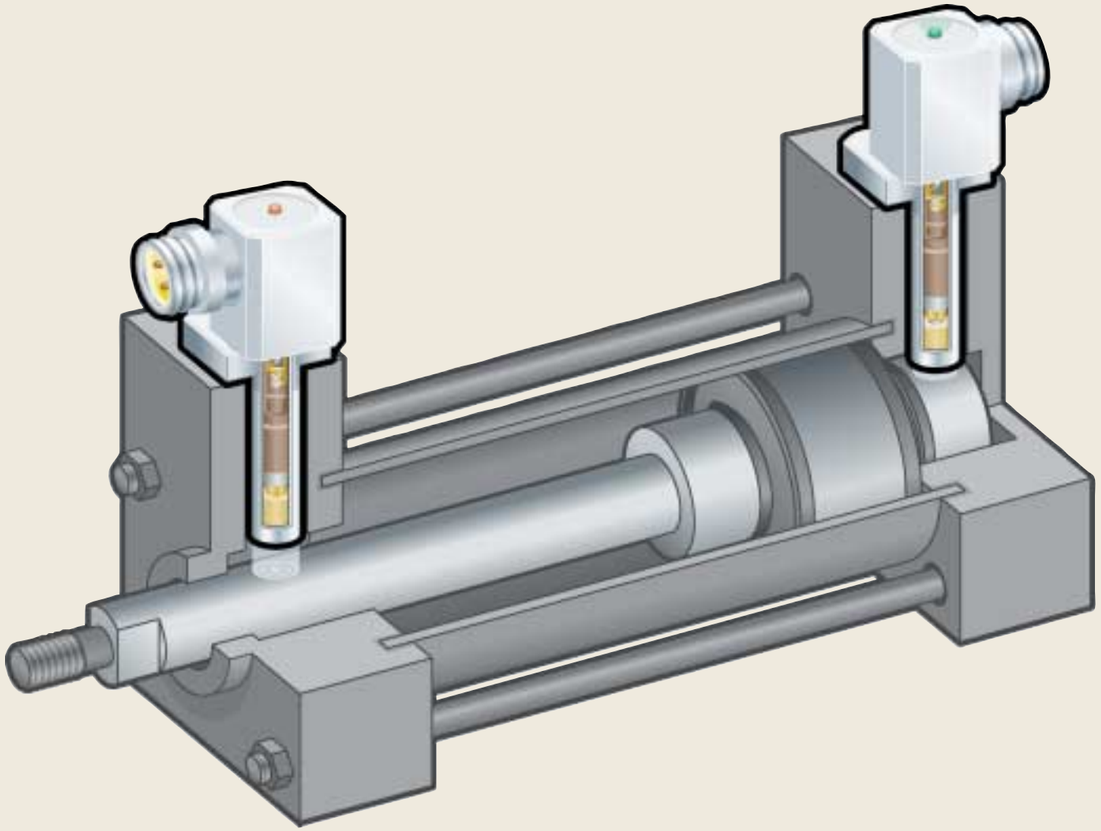
Cylinder Position Sensors

TECHNOLOGY IN ACTION

Stroke-to-GO

LEVERLESS LIMIT SWITCH

GO Switch Stroke-to-GO® cylinder position sensors use three permanent magnets and push-pull plunger assembly to control a set of dry contacts.



Unoperated

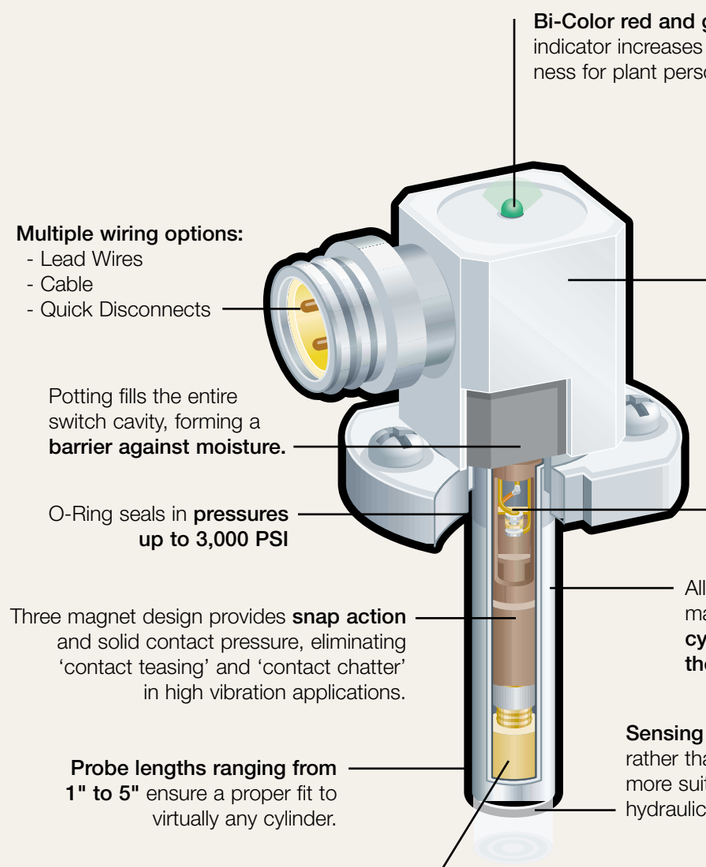
The center magnet simultaneously attracts the primary magnet and repels the bias magnet, pushing the connecting rod backward. As a result, the common contact rests in its unoperated position, closing a contact circuit.

Operated

When the ferrous cushion of a cylinder enters the sensing area of the switch, it attracts the primary magnet, which pulls the connecting rod forward. As a result, the common contact snaps to its operated position, closing the other contact circuit.

When the target is removed the common contact automatically returns to its original unoperated position.

A LOOK INSIDE - MODEL 7C



Options Available

- SPST or SPDT
- HiTemp™ to 400°F
- SubSea™ Submersible

Key Benefits

Stroke-to-GO cylinder position sensors are simple and built to last.

With only one moving part and no metal-to-metal contact forcing it to move, there is nothing to wear out!

Models 7C, 7D, 7E & 7F

With their solid stainless steel housings and leverless limit switch design, Stroke to GO switches have set the standard for reliability and durability in cylinder position sensing.

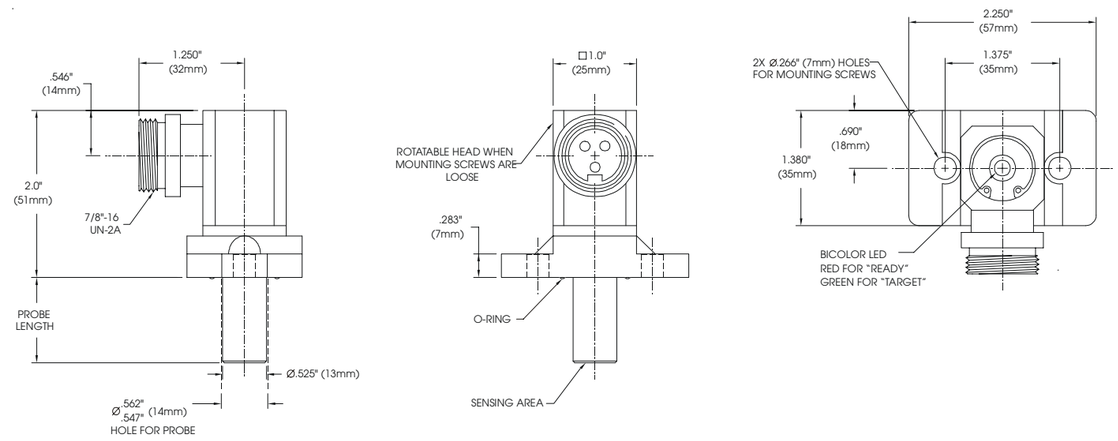
Features:
- SPDT 4A contacts
- Inherently Intrinsically Safe
- -40⁰ to 221⁰F operating temperature

Options:
- -40⁰ to 400⁰F high temperature
- Quick disconnect connector
- Underwater capabilities

FAST TRACK DELIVERY

SPST	SPDT
7C-23658-DCA 1.025" Probe Mini Connector	**7C-43658-DCA** 1.025" Probe Mini Connector
7D-23658-DCA 1.250" probe Mini Connector	**7D-43658-DCA** 1.250" probe Mini Connector
7E-23658-DCA 2.062" probe Mini Connector	**7E-43658-DCA** 2.062" probe Mini Connector

Dimensions



Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40⁰ to 160⁰F (-40⁰ to 71⁰C) with LEDs -40⁰ to 221⁰F (-40⁰ to 105⁰C) without LEDs; HiTemp™ option to 400⁰F) (204⁰C)

- **7C** Model 7C 1.025" (26 mm) probe length
- **7D** Model 7D 1.250"(32 mm) probe length
- **7E** Model 7E 2.062" (52 mm) probe length
- **7F** Custom probe lengths 1.000" (26 mm) - 5.000" (127 mm)*

*Probe lengths shorter than 1.000" require a taller upper switch housing

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C (with or without LED indication) Single Pole, Single Throw (with or without LED indication) Form A or Form B

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	*
480	*	125	0.5
		250	0.5

Without LED's

AC		DC	
Volts	Amps	Volts	Amps
120	0.5	24	0.5
240	0.5	48	0.5
480	*	125	0.5
		250	0.5

With LED's

- **1** Single Pole Double Throw (Form C)
- **2** Single Pole Single Throw (Form A) (N/O output with bi-color LED indication) (Operating voltage: 24 - 120V AC/DC) (Optional voltage: 48 - 240V AC/DC) (Leakage current is 1.0mA)
- **3** Single Pole Single Throw (Form B) (N/C output with bi-color LED indication) (Operating voltage: 24 - 120V AC/DC) (Optional voltage: 48 - 240V AC/DC) (Leakage current is 1.0 mA)
- **4** Single Pole Double Throw (Form C) (without LED) (No leakage)
- **5** Single Pole Double Throw (Form C) (with dual LED's) (Operating voltage: 24 - 240V AC/DC) (No leakage current)
- **7** Single Pole Single Throw (Form A) N/O output w/o LED indication; No leakage
- **8** Single Pole Single Throw (Form B) N/C output w/o LED indication; No leakage

Sensing Range

Target Material: Ferrous steel

Sensing Range: .090" (2.3 mm) end sensing (3,000 PSI) (Recommended air gap .015" - .040")

- **3** Standard sensing - approx. .090" (2.3 mm) end sensing

Outlet Position

- **2** Side entry 360⁰ adjustable (Wiring must be A, B, C, or F) No conduit hub
- **6** Side outlet 360⁰ adjustable with Quick Disconnect (Wiring must be D) (Approval must be 7)
- **7** Side outlet 360⁰ adjustable with ½" NPT conduit hub (Wiring must be A, B, or F)
- **8** Top outlet (Wiring must be SubSea)

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form	Sensing Range	Outlet Position
	-		3	

Enclosure Material

Stainless Steel type 303

- **5** Stainless steel (rated 3,000 PSI operating) (3 to 1 safety factor applies to standard probe lengths)

Approvals

- **2** High temperature to 400⁰F (204⁰C) with Teflon™ insulated leads (Wiring must be F) (Contact form must be 4, 7, or 8)
- **7** CSA certified General Purpose
- **8** UL listed General Purpose

Wiring Options

Lead Wires 18 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221⁰F (105⁰C) 600V UL / CSA listed
- **A2** 36" (914 mm)
- **A3** 72" (1829 mm)
- **A4** 144" (3658 mm)
- **A_ _ _** Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))

Cable 18 Gauge (.250" dia.) potted-in PVC cable, rated at 176⁰F (80⁰C) 300V, UL / CSA listed
- **B2** 36" (914 mm)
- **B3** 72" (1829 mm)
- **B4** 144" (3658 mm)
- **B_ _ _** Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))

Water Resistant 18 Gauge (.250" dia.) PVC cable rated at 176⁰F (80⁰C) 300V with water-resistant squeeze connector.
- **C2** 36" (914 mm)
- **C3** 72" (1829 mm)
- **C4** 144" (3658 mm)
- **C_ _ _** Lengths greater than 144" (Specify length in feet (e.g. C150 = 150 ft. of cable))

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approvals must be 7 or 8) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change®		Micro-change®	
DCA	3 - pin Mini-change® type	**DBA**	3 - pin Micro-change® type
DCD	4 - pin Mini-change® type	**DBD**	4 - pin Micro-change® type
DCG	5 - pin Mini-change® type		

SubSea Underwater Connector (Outlet position must be 8)
- **3DD** 3 pin, certified not to leak underwater
- **4DD** 4 pin, certified not to leak underwater
- **3DE** 3 pin right-angle, certified not to leak underwater
- **4DE** 4 pin right-angle, certified not to leak underwater

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482⁰F (250⁰C) 600V UL / CSA listed (Approval must be 2, 7, or 8)
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Enclosure Material		Approvals	Wiring Options
5	-		

Cylinder Position Sensors

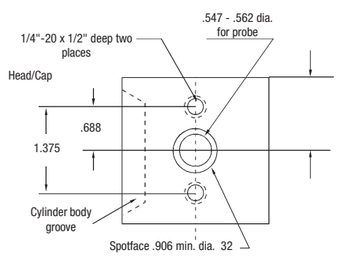
Stroke-To-GO® Switches provide precise end-of-stroke position indication on pneumatic and hydraulic cylinders. Designed to exceed automotive industry standards, the housing is machined from stainless steel bar stock to handle pressures to 3,000 PSI operating (tested to UL's 3X burst requirement) while withstanding the extreme external conditions such as weld slag, coolants, cutting fluids, physical abuse and even high temperatures. Stroke-to-GO® Switches incorporate the same 70 Series GO® Switch mechanism that has been tested to over 200 million mechanical cycles and field proven in the most rigorous applications. This unique design offers the greatest benefits in cylinder indication.

Unique Features

Mechanical life:
>200,000,000 cycles
Leakage current:
Without LEDs - *none*
With LEDs - <1mA (SPST)
Voltage Drop:
Without LEDs - *none*
SPDT w/ LEDs - I.0 volt
With LEDs - 2.8 volts (SPST)
Temperature drift: *none*
Washdown: designed to withstand 1,000 PSI washdown and NEMA 6P with Mini-Change® type connector option
Underwater: rated to 10,000 PSI with deep sea connector option
Weld Field Immune: tested and exceeded General Motors EHS-320 specifications. Testing Agency - Candid Logic
Radio Frequency Interference (RFI): *no affect at any frequency*

Application Considerations

- Cylinder cushion must be ferrous.
- Air gap between switch sensing face and cushion should be .015" to .040" (outside this range please consult factory).
- Largest diameter of target (cushion) should cover at least 75% of probe sensing face.
- Sensing face of Stroke-To-GO® Switch must be at least .125" from piston rod for proper switch reset. This may at times require an air gap distance greater than .040".
- For cushion diameters less than .50", air gap should be .015" to .025".



A two digit code is required for ordering the correct custom probe length. All Application Considerations below must be met. For any discrepancies please consult factory. Please follow these steps:

1. Measure dimension A from both ends of your cylinder or retrieve from specification drawings.
2. Locate the Min/Max range that dimension A falls within on the Custom Probe Length Chart.
3. Locate probe length requirement and Probe Code in the next two Columns to the right.
4. Enter the probe code into the corresponding spaces of the Stroke-To-GO® Part Number.

Application Considerations

- Cylinder cushion must be ferrous.
- Air gap between switch sensing face and cushion should be .015" to .040" (outside this range please consult factory).
- Largest diameter of target (cushion) should cover at least 75% of probe sensing face.
- Sensing face of Stroke-To-GO® Switch must be at least .125" from piston rod for proper switch reset. This may at times require an air gap distance greater than .040".
- For cushion diameters less than .50", air gap should be .015" to .025".
- Mounting hardware is 1/4"-20 grade 8 socket head cap screw (included).

7F- _ _ 23658-DCA
Custom Probe | Probe Code | Standard Catalog Options

EXAMPLE: If "A" = 2.900" then:

"A"		PROBE LENGTH	PROBE CODE
MIN	MAX		
2.890	2.915	2.875	J4

Dimension A is measured from the outside surface of the cylinder block to the Top Dead Center (TDC) of the ferrous cushion. Distance A may differ at each end.

Probe Selection Chart

"A" RANGE MIN	MAX	PROBE LENGTH	PROBE CODE	"A" RANGE MIN	MAX	PROBE LENGTH	PROBE CODE	"A" RANGE MIN	MAX	PROBE LENGTH	PROBE CODE
1.015	1.040	1.000	A1	2.365	2.390	2.350	G1	3.715	3.740	3.700	N1
1.040	1.065	1.025	*	2.390	2.415	2.375	G2	3.740	3.765	3.725	N2
1.065	1.090	1.050	A3	2.415	2.440	2.400	G3	3.765	3.790	3.750	N3
1.090	1.115	1.075	A4	2.440	2.465	2.425	G4	3.790	3.815	3.775	N4
1.115	1.140	1.100	A5	2.465	2.490	2.450	G5	3.815	3.840	3.800	N5
1.140	1.165	1.125	A6	2.490	2.515	2.475	G6	3.840	3.865	3.825	N6
1.165	1.190	1.150	A7	2.515	2.540	2.500	G7	3.865	3.890	3.850	N7
1.190	1.215	1.175	A8	2.540	2.565	2.525	G8	3.890	3.915	3.875	N8
1.215	1.240	1.200	A9	2.565	2.590	2.550	G9	3.915	3.940	3.900	N9
1.240	1.265	1.225	B1	2.590	2.615	2.575	H1	3.940	3.965	3.925	P1
1.265	1.290	1.250	**	2.615	2.640	2.600	H2	3.965	3.990	3.950	P2
1.290	1.315	1.275	B3	2.640	2.665	2.625	H3	3.990	4.015	3.975	P3
1.315	1.340	1.300	B4	2.665	2.690	2.650	H4	4.015	4.040	4.000	P4
1.340	1.365	1.325	B5	2.690	2.715	2.675	H5	4.040	4.065	4.025	P5
1.365	1.390	1.350	B6	2.715	2.740	2.700	H6	4.065	4.090	4.050	P6
1.390	1.415	1.375	B7	2.740	2.765	2.725	H7	4.090	4.115	4.075	P7
1.415	1.440	1.400	B8	2.765	2.790	2.750	H8	4.115	4.140	4.100	P8
1.440	1.465	1.425	B9	2.790	2.815	2.775	H9	4.140	4.165	4.125	P9
1.465	1.490	1.450	C1	2.815	2.840	2.800	J1	4.165	4.190	4.150	R1
1.490	1.515	1.475	C2	2.840	2.865	2.825	J2	4.190	4.215	4.175	R2
1.515	1.540	1.500	C3	2.865	2.890	2.850	J3	4.215	4.240	4.200	R3
1.540	1.565	1.525	C4	2.890	2.915	2.875	J4	4.240	4.265	4.225	R4
1.565	1.590	1.550	C5	2.915	2.940	2.900	J5	4.265	4.290	4.250	R5
1.590	1.615	1.575	C6	2.940	2.965	2.925	J6	4.290	4.315	4.275	R6
1.615	1.640	1.600	C7	2.965	2.990	2.950	J7	4.315	4.340	4.300	R7
1.640	1.665	1.625	C8	2.990	3.015	2.975	J8	4.340	4.365	4.325	R8
1.665	1.690	1.650	C9	3.015	3.040	3.000	J9	4.365	4.390	4.350	R9
1.690	1.715	1.675	D1	3.040	3.065	3.025	K1	4.390	4.415	4.375	S1
1.715	1.740	1.700	D2	3.065	3.090	3.050	K2	4.415	4.440	4.400	S2
1.740	1.765	1.725	D3	3.090	3.115	3.075	K3	4.440	4.465	4.425	S3
1.765	1.790	1.750	D4	3.115	3.140	3.100	K4	4.465	4.490	4.450	S4
1.790	1.815	1.775	D5	3.140	3.165	3.125	K5	4.490	4.515	4.475	S5
1.815	1.840	1.800	D6	3.165	3.190	3.150	K6	4.515	4.540	4.500	S6
1.840	1.865	1.825	D7	3.190	3.215	3.175	K7	4.540	4.565	4.525	S7
1.865	1.890	1.850	D8	3.215	3.240	3.200	K8	4.565	4.590	4.550	S8
1.890	1.915	1.875	D9	3.240	3.265	3.225	K9	4.590	4.615	4.575	S9
1.915	1.940	1.900	E1	3.265	3.290	3.250	L1	4.615	4.640	4.600	T1
1.940	1.965	1.925	E2	3.290	3.315	3.275	L2	4.640	4.665	4.625	T2
1.965	1.990	1.950	E3	3.315	3.340	3.300	L3	4.665	4.690	4.650	T3
1.990	2.015	1.975	E4	3.340	3.365	3.325	L4	4.690	4.715	4.675	T4
2.015	2.040	2.000	E5	3.365	3.390	3.350	L5	4.715	4.740	4.700	T5
2.040	2.065	2.025	E6	3.390	3.415	3.375	L6	4.740	4.765	4.725	T6
2.065	2.090	2.050	E7	3.415	3.440	3.400	L7	4.765	4.790	4.750	T7
2.090	2.115	2.075	E8	3.440	3.465	3.425	L8	4.790	4.815	4.775	T8
2.115	2.140	2.100	E9	3.465	3.490	3.450	L9	4.815	4.840	4.800	T9
2.140	2.165	2.125	F1	3.490	3.515	3.475	M1	4.840	4.865	4.825	V1
2.165	2.190	2.150	F2	3.515	3.540	3.500	M2	4.865	4.890	4.850	V2
2.190	2.215	2.175	F3	3.540	3.565	3.525	M3	4.890	4.915	4.875	V3
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2.290	2.315	2.275	F7	3.640	3.665	3.625	M7	4.990	5.015	4.975	V7
2.315	2.340	2.300	F8	3.665	3.690	3.650	M8	5.015	5.040	5.000	V8
2.340	2.365	2.325	F9	3.690	3.715	3.675	M9				

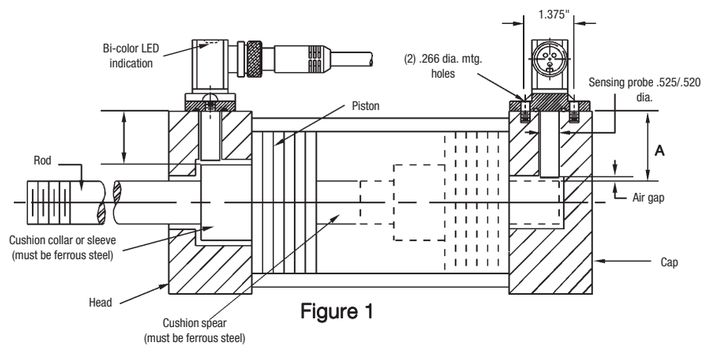


Figure 1

Agency Approvals

Approvals Termination Options	(2) HiTemp	(7) CSA General Purpose	(8) UL General Purpose
A - Potted PVC Leads		X	X
B - Potted PVC Cable		X	X
C - Water squeeze connector		X	X
D - Quick Disconnect		X	X
D - SubSea™ Connector		X	X
F - HiTemp™ Leads	X	X	X

X = Approvals Available

NEMA Ratings

Models 7C, 7D, 7E, 7F	Non-Hazardous				Hazardous	
NEMA CLASSES	4	4X	6	6P	7	9
A - Potted PVC leads	X	X				
B - Potted PVC cable	X	X				
C - PVC Cable w/ squeeze	X	X	X	X		
D - Quick Disconnect	X	X	X	X		
D - SubSea™ Connector	X	X	X	X		
F - HiTemp™ Teflon leads	X	X				

X = Designed to meet respective NEMA specifications

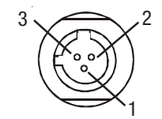
		Leads		Cable		Water-Resistant		HiTemp
CONTACT FORMS		UL	CSA	UL	CSA	UL	CSA	
2 - SPST Form A N/O w/ LED	COM N/O GND	Black Blue Green	Black Blue Green	Black White Red	Black White Red	Black White Red	Black White Red	N/A
3 - SPST Form B N/C w/ LED	COM N/C GND	Black Red Green	Black Red Green	Black Red White	Black Red White	Black Red White	Black Red White	N/A
4 - SPDT Form C No LED	COM N/O N/C GND	Black Blue Red	Black Blue Red Green	Black White Red	Black White Red Green	Black White Red	Black White Red Green	Black Blue Red
5 - SPDT Form C Dual LEDs	COM N/O N/C GND	Black Blue Red	Black Blue Red Green	Black White Red	Black White Red Green	Black White Red	Black White Red Green	N/A
7 - SPST Form A N/O w/o LED	COM N/O GND	Black Blue Green	Black Blue Green	Black White Red	Black White Red	Black White Red	Black White Red	Black Blue Green
8 - SPST Form B N/O w/o LED	COM N/C GND	Black Red Green	Black Red Green	Black Red White	Black Red White	Black Red White	Black Red White	Black Red Green

3 Pin Micro Change with or without LED

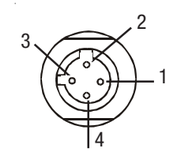
SPST, Form A, N/O	
PIN 1	GND
PIN 2	COM
PIN 3	N/O
SPST, Form B, N/C	
PIN 1	GND
PIN 2	COM
PIN 3	N/C
SPDT, Form C	
PIN 1	COM
PIN 2	N/C
PIN 3	N/O

4 Pin Micro Change with or without LED

SPST, Form A, N/O	
PIN 1	COM
PIN 2	N/O
PIN 3	INACTIVE
PIN 4	GND
SPST, Form B, N/C	
PIN 1	COM
PIN 2	INACTIVE
PIN 3	N/C
PIN 4	GND
SPDT, Form C	
PIN 1	COM
PIN 2	N/O
PIN 3	N/C
PIN 4	GND



Male View



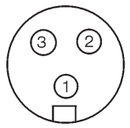
Male View

Stroke to GO Wiring

502.969.8000

3 Pin Mini Change with or without LED

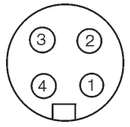
SPST, Form A, N/O	
PIN 1	GND
PIN 2	COM
PIN 3	N/O
SPST, Form B, N/C	
PIN 1	GND
PIN 2	COM
PIN 3	N/C
SPDT, Form C	
PIN 1	COM
PIN 2	N/C
PIN 3	N/O



Male View

4 Pin Mini Change with or without LED

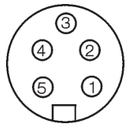
SPST, Form A, N/O	
PIN 1	COM
PIN 2	N/O
PIN 3	INACTIVE
PIN 4	GND
SPST, Form B, N/C	
PIN 1	COM
PIN 2	INACTIVE
PIN 3	N/C
PIN 4	GND
SPDT, Form C	
PIN 1	COM
PIN 2	N/O
PIN 3	N/C
PIN 4	GND



Male View

5 Pin Mini Change with or without LED

SPST, Form A, N/O	
PIN 1	N/O
PIN 2	Inactive
PIN 3	GND
PIN 4	Inactive
PIN 5	COM
SPST, Form B, N/C	
PIN 1	Inactive
PIN 2	N/C
PIN 3	GND
PIN 4	Inactive
PIN 5	COM
SPDT, Form C	
PIN 1	N/O
PIN 2	N/C
PIN 3	GND
PIN 4	Inactive
PIN 5	COM



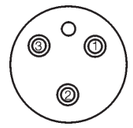
Male View

Leverless Limit Switches

GO SWITCH

3 Pin SubSea without LED

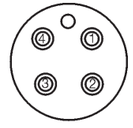
SPST, Form A, N/O	
PIN 1	COM
PIN 2	N/O
PIN 3	GND
SPST, Form B, N/C	
PIN 1	COM
PIN 2	N/C
PIN 3	GND
SPDT, Form C	
PIN 1	N/C
PIN 2	COM
PIN 3	N/O



Male View

4 Pin SubSea without LED

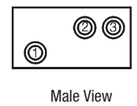
SPST, Form A, N/O	
PIN 1	COM
PIN 2	N/O
PIN 3	INACTIVE
PIN 4	GND
SPST, Form B, N/C	
PIN 1	COM
PIN 2	INACTIVE
PIN 3	N/C
PIN 4	GND
SPDT, Form C	
PIN 1	COM
PIN 2	N/O
PIN 3	N/C
PIN 4	GND



Male View

3 Pin SubSea - Right Angle without LED

SPST, Form A, N/O	
PIN 1	COM
PIN 2	N/O
PIN 3	GND
SPST, Form B, N/C	
PIN 1	COM
PIN 2	N/C
PIN 3	GND
SPDT, Form C	
PIN 1	COM
PIN 2	N/O
PIN 3	N/C



Male View

Specialty Sensors

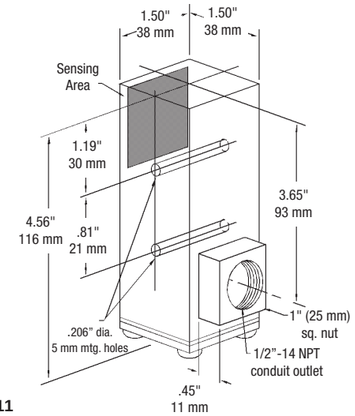
11 HiTemp™ Switch

The GO Switch Model 11 HiTemp™ leverless limit switches are rated for continuous operation at 350°F. With its classic design, the 11 is useful when long sensing ranges are needed, in applications such as automotive paint booths, conveyors, automated driers, and valve position monitoring on steam valves and other high heat applications.

Features:
- SPDT 10A contacts
- Side sensing to 3/8"
- Continuous operation at 350°F

Options:
- Sensing range to 3-3/8" with target magnet
- Mica glass lead wires rated over 842°F

Dimensions



Model 11

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 5/16" (8 mm)

Operating Temperature: -40° to 350°F (-40° to 176°C).

☑ **11** Size: 1 1/2" (38 mm) square x 4 9/16" (116 mm) overall. Add 1/2" (13 mm) for bottom conduit outlet

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Forms: SPDT

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	125	0.5
		250	0.5

☑ **1** Single Pole Double Throw (Form C)

3 Single Pole Double Throw (Form C) Latching (maintained contact) (Outlet position must be 2, 4 or 5)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

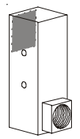
Sensing Range: Approx. 3/8" (10mm) standard

Sensing Range with Target Magnet: up to 3 3/8" (86 mm) (max)

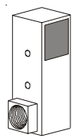
☑ **1** Standard sensing - approx. 3/8" (10 mm) side sensing

Outlet Position

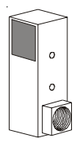
Contact Outlet: 1/2" NPT



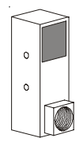
1 Behind sensing area



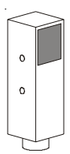
2 Left of sensing area



3 Right of sensing area



4 Same side as sensing area



☑ **5** Bottom of enclosure

Enclosure Material

☑ **2** Stainless steel

Approvals

UL SAA

☑ **2** High temperature to 350°F (176°C) with Teflon™ insulated leads; UL General Purpose

B SAA: High Temp 350°F (176°C): EX S IIC T6 IP65; CI I Zone 1 & 2; EX S IIC T6 IP65; CI I Zone 0; DIP CI II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.) (Wiring must be F)

Wiring Options

HiTemp Wire 18 gauge (.070") dia. potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed

☑ **F2** 36" (914 mm)
F3 72" (1829 mm)
F4 144" (3658 mm)
F_ _ _ Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position		Enclosure Material		Approvals		Wiring Options
11	-			1				2			-	

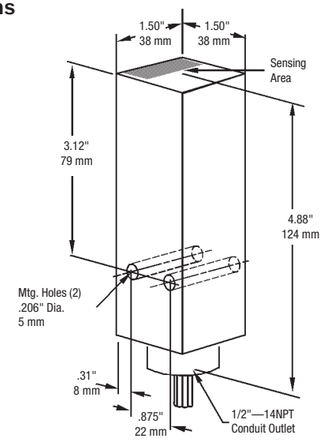
81 HiTemp™ Switch

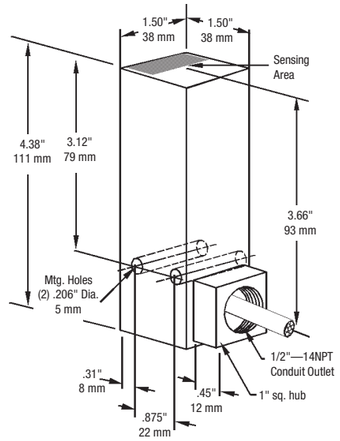
The GO Switch Model 81 HiTemp™ leverless limit switch is rated for continuous operation at 350°F. The 81 offers end sensing and an optional Double Pole Double Throw contact arrangement. The 81 is useful when redundant signals are required in applications such as automotive paint booths, conveyors, automated driers, and valve position monitoring on steam valves and other high heat applications.

Features:
- SPDT or DPDT 10A contacts
- End sensing to 5/16"
- Continuous operation at 350°F

Options:
- Sensing range to 3-7/8" with target magnet
- Mica glass lead wires rated over 842°F

Dimensions





Model 81

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 1/4" (6 mm)

Operating Temperature: -40° to 350°F (-40° to 176°C)

✓ **81** Size: 1 1/2" (38 mm) square x 4 3/8" (111 mm) overall. Subtract 1/2" (13 mm) from length for side conduit

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Forms: DPDT Form CC, SPDT Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	120	0.5
		250	0.5

1 Single Pole Double Throw (Form C)

✓ **2** Double Pole Double Throw (Form CC)

Form C - SPDT

Form CC - DPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. 1/4" (6 mm)

Sensing Range with Target Magnet: up to 3 7/8" (98 mm) (max)

✓ **0** Approx. 1/4" (6 mm) end sensing

Extended Sensing with External Target Magnets Sensing (See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	15/16"	3/4"
AMS4	1-3/8"	1-1/8"
AMC5	3-7/8"	2-1/8"
AMF6	2-3/4"	1-5/8"

Outlet Position

Conduit Outlet: 1/2 NPT. Two locations

1 Side outlet

✓ **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

Range Extending Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material

✓ **2** Stainless steel

Approvals

UL SAA

✓ **2** High temperature to 350°F (176°C) with Teflon™ insulated leads

B SAA: High Temp 350°F (176°C): EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.)

Wiring Options

✓ **HiTemp Wire** 18 gauge (.070") dia. potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position		Enclosure Material		Approvals		Wiring Options
81	-			0				2			-	

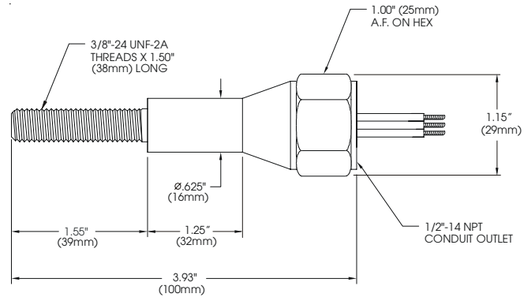
Models 71 and 72

GO Switch Models 71 and 72 have the smallest diameters of any round leverless limit switch, and are used extensively in factory automation applications.

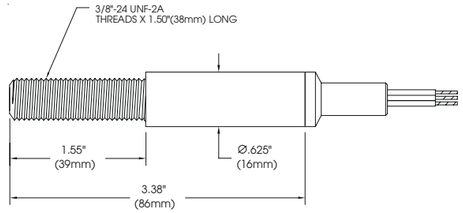
Features:
- SPDT 4A contacts
- Intrinsically Safe
- -40° to 400°F operating temperature

Options:
- English or Metric threads
- Mica glass lead wires rated over 842°F

Dimensions



Model 71



Model 72

Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40° to 400°F (-40° to 204°C)

- ☑ **71** Model 71
  3/8" (10 mm) dia. x 3 15/16" (100 mm) long, with 3/8"-24 UNF x 1 1/2" (38 mm) threads and 1/2"-14 NPT conduit hub
- **71M** Model 71
  M12 x 1 external metric thread
- ☑ **72** Model 72
  3/8" (10 mm) dia. x 3 3/8" (86 mm) long, with 3/8"-24 UNF x 1 1/2" (38 mm) threads. No conduit hub
- **72M** Model 72
  M12 x 1 external metric thread

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1.25
480	*	125	0.5
		250	0.5

- ☑ **1** Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. .040" (1 mm) end sensing

Sensing Range with Target Magnet: up to .15" (4mm)

- ☑ **6** Standard sensing - approx. .040" (1 mm) end sensing

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.12"	.07"
AMS4	.15"	.10"
AMS7	.13"	.045"

Outlet Position

Conduit Outlet: 1/2" NPT

- **2** Side entry (Model 72)
- ☑ **5** Bottom of enclosure

Need Accessories?
See pp. 93-104 for:
Range Extending Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material

- ☑ **2** 303 stainless steel (rated 2,000 PSI)
- **6** 316 stainless steel (rated 2,000 PSI)

Approvals

SAA

- ☑ **2** High temperature to 400°F (204°C) with Teflon™ insulated leads
- **B** SAA: High Temp 350°F (176°C): EX S IIC T6 IP65; Cl I Zone 1 & 2; EX S IIC T6 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.)

Wiring Options

- ☑ **HiTemp Leads** 18 gauge (.070" dia.) potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed
  - **F2** 36" (914 mm)
  - **F3** 72" (1829 mm)
  - **F4** 144" (3658 mm)
  - **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position		Enclosure Material		Approvals		Wiring Options
71	-	1		6							-	

73-74-75-76-77 HiTemp™ Switches

GO Switch Models 73, 75, and 77 HiTemp™ leverless limit switches are rated for continuous operation at 400°F, the highest rating of any position sensors on the market. These models are useful when precision sensing is required, in applications such as cylinder position sensing in automated paint booths, driers, and conveyors, and valve position monitoring on steam valves and other high heat applications.

Features:
- SPDT 4 amp contacts
- End sensing to 0.100"
- Continuous operation at 400°F

Options:
- Sensing range to .35" with target magnet
- Mica glass lead wires rated over 842°F

Model

Repeatability: .002" (.05mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40° to 400°F (-40° to 204°C)

- **73** Model 73 5/8" (16 mm) dia. x 3 5/8" (92 mm) long with 5/8"-18 UNF x 1 7/8" (48 mm) threads and 1/2"-14 NPT conduit hub
- **73M** M18 x 1.5 external metric thread
- **74** Model 74 5/8" (16 mm) dia. x 2 3/4" (70 mm) long with 5/8"-18 UNF x 1 7/8" (48 mm) threads. No conduit hub
- **74M** M18 x 1.5 external metric thread
- **75** Model 75 5/8" (16 mm) dia. x 4 5/16" (110 mm) long with 5/8"-18 UNF x 2 13/16" (71 mm) threads and 1/2" NPT conduit hub
- **75M** M18 x 1.5 external metric thread
- **76** Model 76 5/8" (16 mm) dia. x 3 3/16" (81 mm) long with 5/8"-18 UNF x 2 13/16" (71 mm) threads. No conduit hub
- **76M** Model 76 M18 x 1.5 external metric thread

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1.25
480	*	125	0.5
		250	0.5

- **1** Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx.
.100" (2.5 mm) end sensing (2,000 PSI)
.072" (1.8 mm) end sensing (5,000 PSI)
.060" (1.5 mm) end sensing (10,000 PSI)

Sensing Range with Target Magnet: up to .35" (9 mm)

- **3** Standard sensing - approx. .100" (3 mm) end sensing (Enclosure must be 2 or 6)
- **4** HiPressure sensing - approx. .072" (2 mm) end sensing (Enclosure must be 3)
- **5** HiPressure sensing - approx. .060" (2 mm) end sensing (Enclosure must be 4)

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.20"	.25"
AMS4	.35"	.15"
AMS7	.20"	.05"

Outlet Position

Conduit Outlet: 1/2" NPT

- **2** Side entry with Teflon insulated leads (Model 74)
- **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

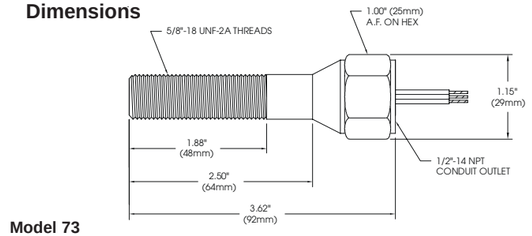
Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

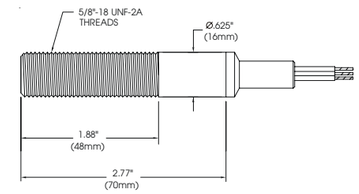
Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range	Outlet Position
	-	1			

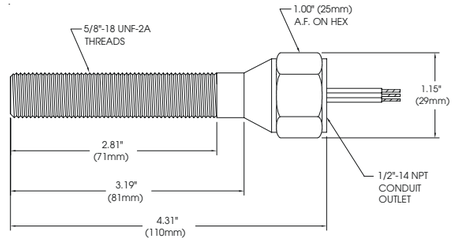
Dimensions



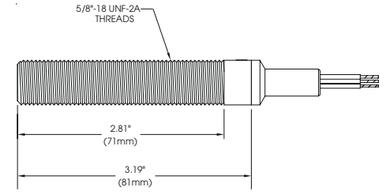
Model 73



Model 74



Model 75



Model 76

Enclosure Material

- **2** 303 stainless steel (rated 2,000 PSI) (Sensing must be 3)
- **3** HiPressure - 303 stainless steel (rated 5,000 PSI) (Sensing must be 4)
- **4** HiPressure - 303 stainless steel (rated 10,000 PSI) (Sensing must be 5)
- **6** 316 stainless steel (rated 2,000 PSI)

Approvals

SAA BASEEFA

- **2** High temperature to 400°F (204°C) with Teflon™ insulated leads (Wiring must be F)
- **4** CSA certified explosion proof for Cl I, Div 1; Grps A,B,C,D; Cl II, Div 1; Grps E-G; Cl III (Model 73) (Wiring must be H) (Rated 298° (148°C)) (Lead seal req'd within 18")
- **9** CENELEC: EExdIIC T3 Zone 1. (EN 50 014 & EN 50 018, BASEEFA Certificate Ex89C1233X).(Model 73 & 75) (Wiring must be H)
- **B** SAA: High Temp 400°F (204°C): EX S IIC T3 IP65; Cl I Zone 1 & 2; EX S IIC T3 IP65; Cl I Zone 0; DIP Cl II (Intrinsically safe with entity approved barrier. Install per NEC Article 501.)

Wiring Options

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed
- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

HiTemp Leads 16 gauge potted-in Peek insulated leads with silver plated copper conductor rated at 500°F (260°C) 600V; UL / CSA listed
- **H2** 36" (914 mm)
- **H3** 72" (1829 mm)
- **H4** 144" (3658 mm)
- **H_ _ _** Lengths greater than 144" (Specify length in feet (e.g. H150 = 150 ft. of leads))

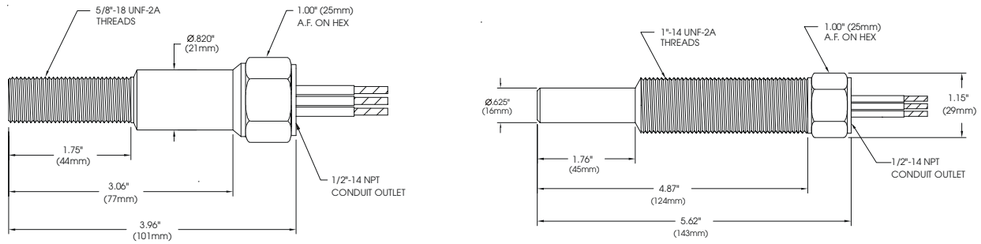
Enclosure Material		Approvals	Wiring Options

7G-7H-7I HiTemp™ Switches

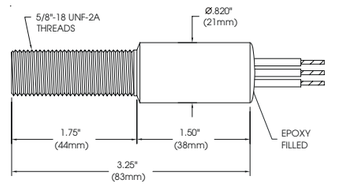
GO Switch Models 7G, 7H, and 7I HiTemp™ leverless limit switches are rated for continuous operation at 400°F, the highest rating of any position sensors on the market. These models offer end sensing and an optional Double pole Double Throw contact arrangement. They are useful when precision sensing and redundant signals are needed, in applications such as cylinder position sensing in automated paint booths, driers, and conveyors, and valve position monitoring on steam valves and other high heat applications.

Features:
- SPDT or DPDT 4A contacts
- End sensing to .090"
- Continuous operation at 400°F

Options:
- Sensing range to .20" with target magnet
- Mica glass lead wires rated over 842°F



Model 7G



Model 7H

Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40° to 221°F (-40° to 105°C) (Option to 400°F)

- **7G** Model 7G 5/8" (16 mm) dia. x 4" (101 mm) long with 5/8"-18 UNF x 1 3/4" (44 mm) threads and 1/2" NPT conduit hub
- **7GM** Model 7G M18 x 1.5 external metric thread
- **7H** Model 7H 5/8" (16 mm) dia. x 3 1/4" (83 mm) long with 5/8" - 18 UNF x 1 3/4" threads. No conduit outlet.
- **7HM** Model 7H M18 x 1.5 external metric thread
- **7I** Model 7I 1" (25 mm) dia. x 5 5/8" (148 mm) long with 1" - 14 UNF x 3" (76 mm) threads 1/2" NPT conduit outlet

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT Form C; DPDT Form CC

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	1
240	2	48	*
480	*	120	0.5
		250	0.5

SPDT

AC		DC	
Volts	Amps	Volts	Amps
120	3	24	1
240	1.5	48	*
480	*	120	0.5
		250	0.1

DPDT

- **1** Single Pole Double Throw (Form C) Hermetically Sealed (Model 7G & 7I) (Lead seal not required for hazardous locations)
- **2** Double Pole Double Throw (Form CC)

Form C - SPDT

Form CC - DPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: .090" (2.3 mm) end sensing (2,000 PSI)

Sensing Range with Target Magnet: up to .20" (5 mm)

- **3** Standard sensing - approx. .090" (2.3 mm) end sensing

Extended Sensing Range with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	.15"	.30"
AMS4	.20"	.30"

Outlet Position

Conduit Outlet: 1/2" NPT

- **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material

Stainless Steel type 303

- **2** 303 stainless steel (rated 2,000 PSI)
- **6** 316 stainless steel (rated 2,000 PSI)

Approvals

- **2** High temperature to 400°F (204°C) with Teflon™ insulated leads

Wiring Options

HiTemp Leads 20 gauge (19 strands at .08") potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed (Approval must be 6, 7, or 8)

- **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model		Contact Form	Sensing Range	Outlet Position	Enclosure Material	Approvals		Wiring Options
	-		3	5			-	

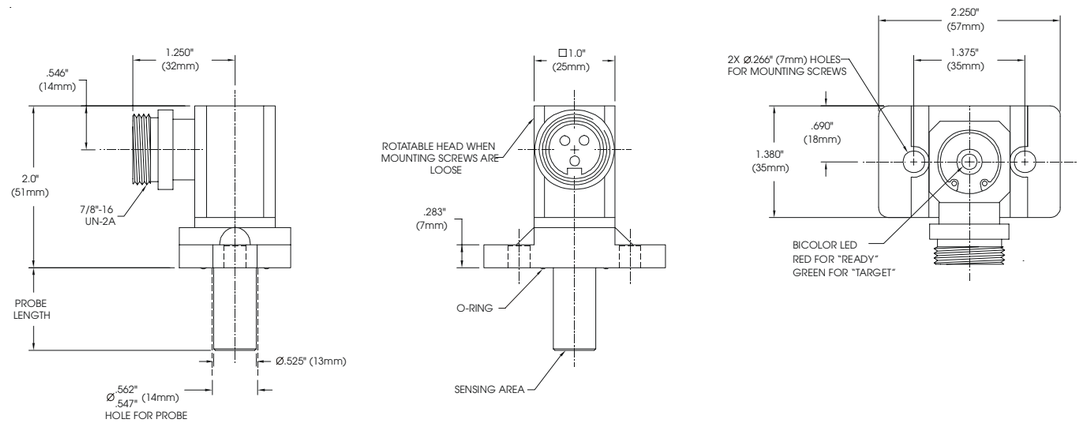
Stroke-to-GO HiTemp™ Switches

Stroke-to-GO Models 7C, 7D, 7E, and 7F HiTemp™ cylinder position sensors are rated for continuous operation at 400°F, the highest rating of any cylinder position sensors on the market. These models are useful in applications such as cylinder position sensing in automated paint booths, driers, and conveyors, and other high heat applications.

Features:
- SPST or SPDT 4A contacts
- Continuous operation at 400°F

Options:
- Custom probe lengths up to 5" long
- Mica glass lead wires rated over 842°F

Dimensions



Model

Repeatability: .002" (.05 mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40° to 400°F (-40° to 204°C) without LEDs

- ☑ **7C** Model 7C 1.025" (26 mm) probe length
- ☑ **7D** Model 7D 1.250" (32 mm) probe length
- ☑ **7E** Model 7E 2.062" (52 mm) probe length
- **7F** Custom probe lengths 1.000" (26 mm) - 5.000" (127 mm)*

*Probe lengths shorter than 1.000" require a taller upper switch housing

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C (with or without LED indication) Single Pole, Single Throw (with or without LED indication) Form A or Form B

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	*
480	*	125	0.5
		250	0.5

Without LED's

- ☑ **4** Single Pole Double Throw (Form C) (without LED) (No leakage)
- **7** Single Pole Single Throw (Form A) (N/O output w/o LED indication) (No leakage)
- **8** Single Pole Single Throw (Form B) (N/C output w/o LED indication) (No leakage)

Sensing Range

Target Material: Ferrous steel

Sensing Range: .090" (2.3 mm) end sensing (3,000 PSI) (Recommended air gap .015" - .040")

- ☑ **3** Standard sensing - approx. .090" (2.3 mm) end sensing

Outlet Position

Conduit Outlet: 1/2" NPT

- ☑ **2** Side entry 360° adjustable No conduit hub
- **7** Side outlet 360° adjustable with ½" NPT conduit hub

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Enclosure Material

Stainless Steel type 303

- ☑ **5** Stainless steel (rated 3,000 PSI operating) (3 to 1 safety factor applies to standard probe lengths)

Approvals

- ☑ **2** High temperature to 400°F (204°C) with Teflon™ insulated leads

Wiring Options

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed

- ☑ **F2** 36" (914 mm)
- **F3** 72" (1829 mm)
- **F4** 144" (3658 mm)
- **F_ _ _** Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Ordering Guide

Fill in the boxes to create your 'ordering number.'

Model	-	Contact Form	Sensing Range	Outlet Position	Enclosure Material	Approvals	-	Wiring Options
			3		5	2		

11/21 SubSea™ Switches

GO Switch Models 11 and 21 SubSea™ leverless limit switches are submersible to 434 feet. With their classic design, the 11 and 21 are useful when long sensing ranges are needed, in applications such as lock and dam gates, military hatch doors, ships and vessels, and offshore oil platforms.

Features:
- SPDT 10A contacts
- Side sensing to 9/16"
- Permanent submersion to 434 feet

Options:
- Sensing range to 3-3/8" (86mm) with target magnet
- Straight or right angle SubSea connector

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 5/16" (8 mm)

Operating Temperature: -40° to 221°F (-40° to 105°C).

11 Size: 1 1/2" (38 mm) square x 4 9/16" (116 mm) overall. Add 1/2" (13 mm) for bottom conduit outlet.

21 Size: 1 1/2" (38 mm) square x 3 13/16" (97 mm) overall. Add 1/2" (13 mm) for bottom conduit outlet.

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

Forms: SPDT, DMDB

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	125	0.5
		250	0.5

1 Single Pole Double Throw (Form C)

3 Single Pole Double Throw (Form C) Latching (maintained contact) (Outlet position must be 2, 4 or 5)

5 Double Make Double Break, two-circuit, Form Z

6 Double Make Double Break, two circuit, Form Z Latching (maintained contact) (Outlet position must be 2, 4 or 5)


Form C - SPDT


Form Z - SPDT-DB

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. 3/8" (10mm) standard; 9/16" (14mm) extended sensing (Model 11)

1 Standard sensing - approx. 3/8" (10 mm) side sensing

2 Extended sensing - approx. 9/16" (14 mm) side sensing (Contact Form must be 1 or 3) (Model 11)

See pg. 20 for Extended Sensing Range with External Target Magnets

Outlet Position

Contact Outlet: 1/2" NPT

1 Behind sensing area

2 Left of sensing area

3 Right of sensing area

5 Bottom of enclosure

Need Accessories?

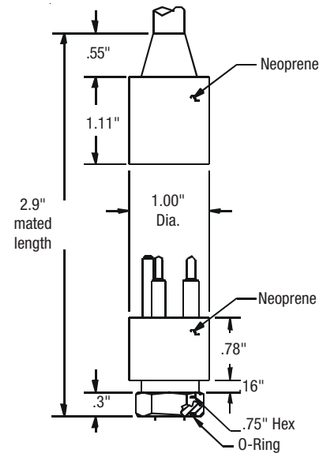
See pp. 93-104 for:

Range Extending Target Magnets
Mounting Brackets
Connectors and more!

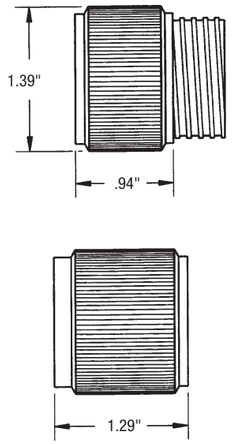
Ordering Guide
Fill in the boxes to create your 'ordering number.'

Model	-	Contact Form	Sensing Range	Outlet Position

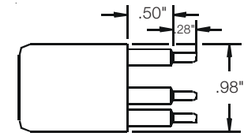
SubSea Connector with Delrin Lock Sleeve



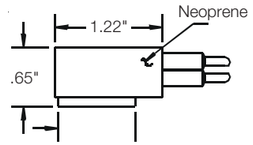
Delrin Lock Sleeves (mating cable sold separately)



SubSea Right Angle Connector No lock sleeve required



Top View



Side View

Enclosure Material

Material: Stainless Steel

Pressure Rating: 200 PSI

2 304 Stainless steel

4 304 Stainless steel - corrosion resistant coating (polyurethane)

Approvals

7 CSA certified General Purpose

8 UL listed General Purpose

Wiring Options

SubSea™ Underwater Connector Refer to pp. 93-104 for mating cable assemblies.

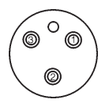
3DD 3 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)

4DD 4 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)

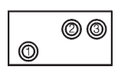
3DE 3 pin right-angle, certified not to leak underwater

4DE 4 pin right-angle, certified not to leak underwater

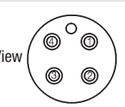
SubSea - 3 Pin - Lock Sleeve	
Pin 1	N/C
Pin 2	COM
Pin 3	N/O


Male View

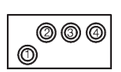
SubSea - 3 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C


Male View

SubSea - 4 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND


Male View

SubSea - 4 Pin - Lock Sleeve	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND


Male View

Enclosure Material	Approvals	-	Wiring Options

81 SubSea™ Switch

The GO Switch Model 81 SubSea™ leverless limit switch is submersible to 434 feet. The 81 offers end sensing and an optional Double Pole Double Throw contact arrangement. The 81 is useful when redundant signals are required in applications such as lock and dam gates, military hatch doors, ships and vessels, and offshore oil platforms.

Features:
- SPDT or DPDT 10 amp contacts
- End sensing to 1/4"
- Permanent submersion to 434 feet

Options:
- Sensing range to 3-7/8" with target magnet
- Straight or right angle SubSea™ connector

Model

Repeatability: .002" (.05 mm)

Response Time: 8 milliseconds

Differential: Approx. 1/4" (6 mm)

Operating Temperature: -40° to 221°F (-40° to 105°C).

✓ **81** Size: 1 1/2" (38 mm) square x 4 3/8" (111 mm) overall. Subtract 1/2" (13 mm) from length for side conduit

Contact Form

Contact Material: Silver cadmium oxide, gold flashed

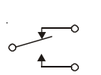
Forms: DPDT Form CC, SPDT Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	10	24	3
240	5	48	1
480	2.5	120	0.5
		250	0.5

1 Single Pole Double Throw (Form C) (Wiring must be 3DD, 4DD, 3DE or 4DE)

✓ **2** Double Pole Double Throw (Form CC) (Wiring must be 8DD)



Form C - SPDT

Form CC - DPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range: Approx. 1/4" (6 mm)

Sensing Range with Target Magnet: up to 3 7/8" (98 mm) (max)

✓ **0** Approx. 1/4" (6 mm) end sensing

Extended Sensing with External Target Magnets
(See Accessories for External Target Magnets)

Magnet	Sensing	Differential
AMP3	15/16"	3/4"
AMS4	1-3/8"	1-1/8"
AMC5	3-7/8"	2-1/8"
AMF6	2-3/4"	1-5/8"

Outlet Position

Conduit Outlet: 1/2" NPT. Two locations.

1 Side outlet

✓ **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

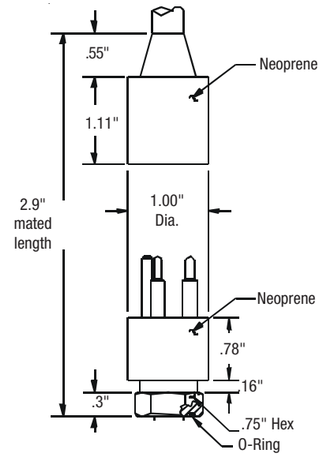
Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

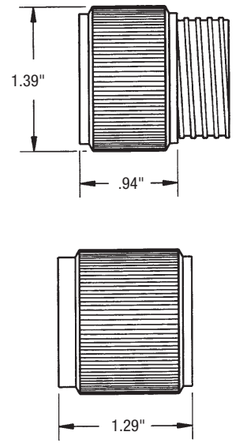
Fill in the boxes to create your 'ordering number.'

Model		Contact Form		Sensing Range		Outlet Position
81	-			0		

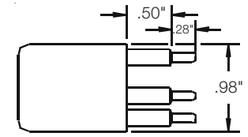
SubSea Connector with Delrin Lock Sleeve



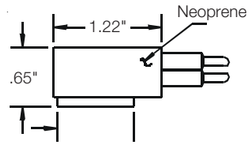
Delrin Lock Sleeves (mating cable sold separately)



SubSea Right Angle Connector No lock sleeve required



Top View



Side View

Enclosure Material

Material: Stainless Steel

✓ **2** Stainless steel

4 Stainless steel - corrosion resistant coating (polyurethane)

Approvals

7 CSA certified General Purpose

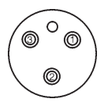
✓ **8** UL listed General Purpose

Wiring Options

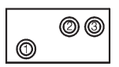
SubSea™ Underwater Connector Refer to pp. 93-104 for mating cable assemblies.

3DD 3 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
4DD 4 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
✓ **8DD** 8 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
3DE 3 pin right-angle, certified not to leak underwater
4DE 4 pin right-angle, certified not to leak underwater

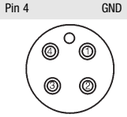
SubSea - 3 Pin - Lock Sleeve	
Pin 1	N/C
Pin 2	COM
Pin 3	N/O



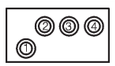
SubSea - 3 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C



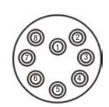
SubSea - 4 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



SubSea - 4 Pin - Lock Sleeve	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



SubSea - 8 Pin - Lock Sleeve	
Pin 1	COM_1
Pin 2	N/O1
Pin 3	N/C_1
Pin 4	GND
Pin 5	N/C_2
Pin 6	N/O_2
Pin 7	COM_2
Pin 8	Inactive



Underwater Switches - 70 Series

502.969.8000

73-75-77 SubSea™ Switches

GO Switch Models 73, 75, and 77 SubSea™ leverless limit switches are submersible to as deep as 23,000 feet. With their solid, one-piece stainless steel housings, there is no means for water to penetrate the contact chamber. These models are useful when precision sensing is required, in applications such as valve position monitoring, pig detection, pin placement detection, and cylinder position sensing on lock and dam gates, military hatch doors, ships and vessels, and offshore oil platforms.

Features:
- SPDT 4 amp contacts
- End sensing to 0.100"

Options:
- Optional submersion depth to 11,500 feet
- Optional submersion depth to 23,000 feet
- Sensing range to .35" with target magnet
- Straight or right angle SubSea connector

Model

Repeatability: .002" (.05mm) typical

Response Time: 8 milliseconds

Differential: Approx. .020" (.51 mm)

Operating Temperature: -40° to 221°F (-40° to 105°C)

- ☑ **73** Model 73 5/8" (16 mm) dia. x 3 5/8" (92 mm) long with 5/8"-18 UNF x 1 7/8" (48 mm) threads and 1/2" NPT conduit hub
- **73M** Model 73 M18 x 1.5 external metric thread
- ☑ **75** Model 75 5/8" (16 mm) dia. x 4 5/16" (110 mm) long with 5/8"-18 UNF x 2 13/16" (71 mm) threads and 1/2" NPT conduit hub
- **75M** Model 75 M18 x 1.5 external metric thread
- **77** Model 77 3/4" (19 mm) dia. x 5 13/16" (148 mm) long with 3/4"-16 UNF x 2 13/16" (71mm) threads

Contact Form

Contact Material: Palladium silver with sawtooth surface configuration

Form: SPDT, Form C

Ratings: Resistive

AC		DC	
Volts	Amps	Volts	Amps
120	4	24	3
240	2	48	1.25
480	*	125	0.5
		250	0.5

- ☑ **1** Single Pole Double Throw (Form C)

Form C - SPDT

Sensing Range

Target Material: Ferrous steel

Sensing Range:
.100" (2.5 mm) end sensing (2,000 PSI)
.072" (1.8 mm) end sensing (5,000 PSI)
.060" (1.5 mm) end sensing (10,000 PSI)

- ☑ **3** Standard sensing - approx. .100" (3 mm) end sensing (Enclosure must be 2 or 6)
- **4** HiPressure sensing - approx. .072" (2 mm) end sensing (Enclosure must be 5)
- **5** HiPressure - approx. .060" (2 mm) end sensing (Enclosure must be 4)

Outlet Position

Conduit Outlet: 1/2-14 NPT

- ☑ **5** Bottom of enclosure

Need Accessories?

See pp. 93-104 for:

Range Extending
Target Magnets
Mounting Brackets
Connectors and more!

Ordering Guide

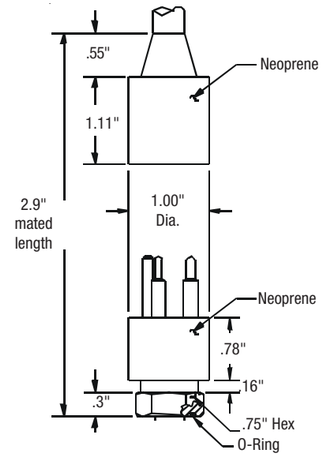
Fill in the boxes to create your 'ordering number.'

Model		Contact Form	Sensing Range	Outlet Position
	-	1		5

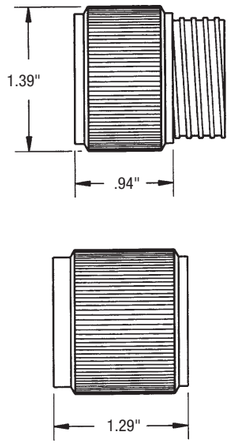
Leverless Limit Switches

GO SWITCH

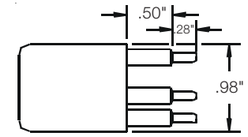
SubSea Connector with Delrin Lock Sleeve



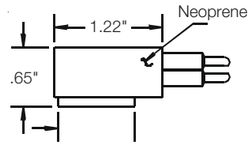
Delrin Lock Sleeves



SubSea Right Angle Connector
No lock sleeve required



Top View



Side View

Enclosure Material

Material: 303 Stainless Steel

- ☑ **2** 303 stainless steel (rated 2,000 PSI) (Sensing must be 3)
- **3** HiPressure - 303 stainless steel (rated 5,000 PSI) (Sensing must be 4)
- **4** HiPressure - 303 stainless steel (rated 10,000 PSI) (Sensing must be 5)
- **6** 316 stainless steel (rated 2,000 PSI)

Approvals

- **7** CSA certified General Purpose
- ☑ **8** UL listed General Purpose

Wiring Options

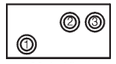
SubSea Underwater Connector Refer to pp. 93-104 for mating cable assemblies.

- **3DD** 3 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **4DD** 4 pin, certified not to leak underwater (includes male/female Delrin™ lock sleeves)
- **3DE** 3 pin right-angle, certified not to leak underwater
- **4DE** 4 pin right-angle, certified not to leak underwater

SubSea - 3 Pin - Lock Sleeve	
Pin 1	N/C
Pin 2	COM
Pin 3	N/O

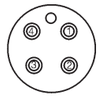
Male View

SubSea - 3 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C



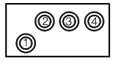
Male View

SubSea - 4 Pin - Right Angle	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



Male View

SubSea - 4 Pin - Lock Sleeve	
Pin 1	COM
Pin 2	N/O
Pin 3	N/C
Pin 4	GND



Male View

Enclosure Material	Approvals	Wiring Options

DEFENDER Turbine Valve Monitoring System

502.969.8000

Defender Turbine Trip Switch

In the power generation industry, reliability is a must. This is especially true when it comes to turbine control valves. But one of the more common difficulties in power plants is the typical limit switch arrangement on throttle, governor, intercept, and reheat stop valves. Conventional limit switches in this application are notorious for failing due to heat and physical abuse, and for falling out of tolerance and requiring readjustment.

TopWorx has solved this problem with the Defender turbine trip switch system. Made especially for turbine valves, the Defender is packed with up to 10 reliable GO Switch leverless limit switches, and is designed as a direct, drop-in replacement for existing OEM limit switches on Westinghouse or General Electric turbines.

FAST TRACK DELIVERY

48-07000-000
Turbine Valve Monitoring System with 7 GO Switches

Model

- ✓ **48** Defender Turbine Valve Monitoring System

  Heavy Duty 11 Gauge Steel 12" x 10" x 5" - ANSI 61 Light Gray

GO Switches

Model 74-LLS: SPDT, environmentally sealed, rated 4A @ 120VAC, 3A @ 24VDC, maximum 240 VAC or 240VDC, with prewired HiTemp™ Teflon lead wires

Choose number of switches (minimum 1, maximum 10)

- **010000** One Leverless Limit Switch
- **020000** Two Leverless Limit Switches
- **030000** Three Leverless Limit Switches
- **040000** Four Leverless Limit Switches
- **050000** Five Leverless Limit Switches
- **060000** Six Leverless Limit Switches
- ✓ **070000** Seven Leverless Limit Switches
- **080000** Eight Leverless Limit Switches
- **090000** Nine Leverless Limit Switches
- **100000** Ten Leverless Limit Switches

Wiring Options

- ✓ **00** Male/Female Mil Spec Quick Disconnect with back shell connection to 1-1/4" flex conduit
- **01** Male/Female Mil Spec Quick Disconnect with 25 ft. of cable
- **02** Male/Female Mil Spec Quick Disconnect with 50 ft. of cable
- **03** Male/90⁰ Female Mil Spec Quick Disconnect with back shell connection to 1-1/4" flex conduit
- **04** Male/90⁰ Female Mil Spec Quick Disconnect with 25 ft. of cable
- **05** Male/90⁰ Female Mil Spec Quick Disconnect with 50 ft. of cable
- **06** Male/45⁰ Female Mil Spec Quick Disconnect with back shell connection to 1-1/4" flex conduit
- **07** Male/45⁰ Female Mil Spec Quick Disconnect with 25 ft. of cable
- **08** Male/45⁰ Female Mil Spec Quick Disconnect with 50 ft. of cable
- **10** Male/90⁰ Female Mil Spec Quick Disconnect with 25 ft. of HiTemp™ cable
- **12** Male/Female Mil Spec Quick Disconnect with 75 ft. of cable
- **13** Male/90⁰ Female Mil Spec Quick Disconnect with 100 ft. of cable
- **16** Male/90⁰ Female Mil Spec Quick Disconnect with 50 ft. of HiTemp™ cable

Accessories

ACP48 DEFENDER Calibration Unit
Only one unit is required to calibrate any quantity of Defender Systems

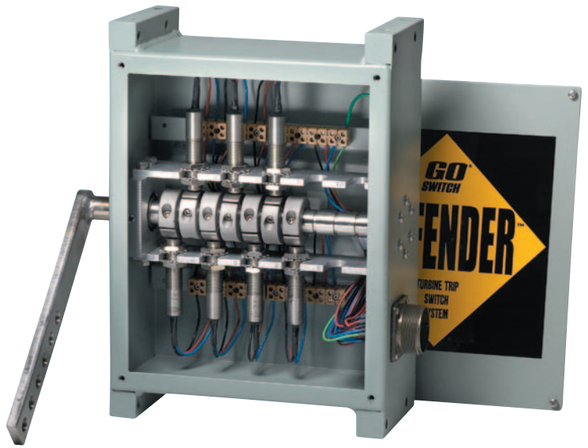
74-LLS Replacement GO Switch and Target Cam Package

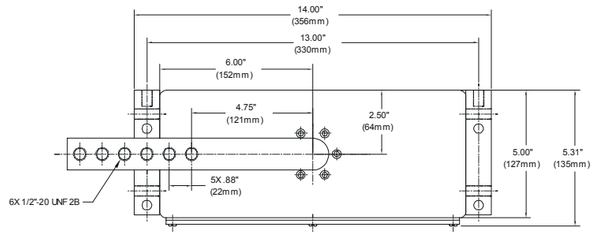
Ordering Guide

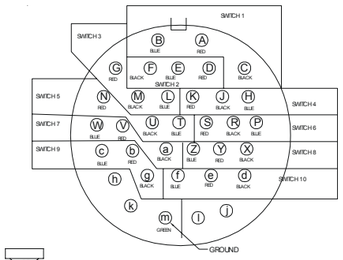
Fill in the boxes to create your 'ordering number.'

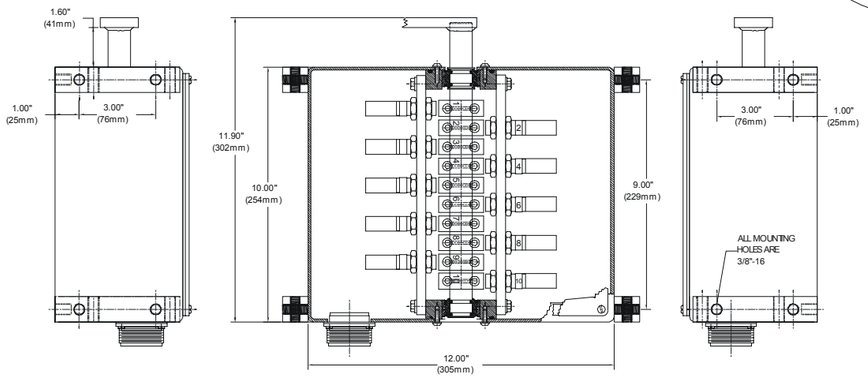
Model		GO Switches		Wiring Options
48	-	_ _0000	-	

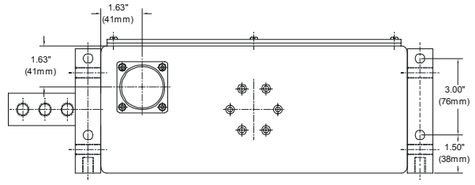
Dimensions











Accessories

Quick Disconnects & Cordsets

502.969.8000

Quality-engineered connectors and cordsets make installation and maintenance a snap.

Standard designs are shown, with custom connectors available on special order.

Refer to the Wiring Options portion of each GO Switch Ordering Guide for detailed information.

Micro Change®
Quick Disconnect
22 gauge (3 pin .23" dia.; 4 pin .25 dia.; 5 pin .26 dia.) molded PVC anodized aluminum shell rated 221ºF (105ºC) 300V

Available on all GO Switches

Mini Change®
Quick Disconnect
16 gauge (3 pin .41" dia.; 4 pin .44" dia.; 5 pin .52" dia.; 7 pin .54 dia.) molded PVC anodized aluminum shell rated 221ºF (105ºC) 600V

Available on all GO Switches

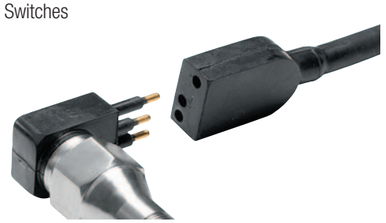
Water Resistant Squeeze Connector
Stainless steel water resistant strain relief.
Approx. 1" (25 mm) in length.

Available on GO Switch Models 72, 74, 76, 7C, 7D, 7E and 7F

High Pressure Right Angle
SubSea Quick Disconnect

Overall length of connector is 2.85" (72 mm) X .65" (17 mm).

Available on 10, 20, 70, and 80 Series GO Switches



High Pressure
SubSea Quick Disconnect
Molded Neoprene™ Quick Disconnect with Delrin™ lock-sleeves. Provides water-tight seal, safety and quick change-out. Overall length of connector is 2.9" (74 mm) X 1.23" (31 mm) dia.

Available on 10, 20, 70, 80 Series and Stroke to GO Switches

New!

Connection Heads by Minco Products, Inc.
TopWorx offers connection heads from Minco Products, Inc. suitable for use with any GO Switch. There are three base models available. A 4, 4X rated aluminum with epoxy coating, a 316 stainless steel version,and an aluminum with epoxy coating certified EEx d IIc Zone 1.

These units are being offered as an accessory to our GO Switch product line, but may also be certified as an assembly under a special quote number.

Consult factory for details.

Mini-Change® Cordsets

A-ECA	3 - Pin, 3 ft. (914 mm)
A-ECA-90	3 - Pin, 3 ft. 90º (914 mm)
A-ECB	3 - Pin, 6 ft. (1829 mm)
A-ECB-90	3 - Pin, 6 ft. 90º (1829 mm)
A-ECC	3 - Pin, 12 ft. (3658 mm)
A-ECC-90	3 - Pin, 12 ft. 90º (3658 mm)
A-ECU	3 - Pin, 20 ft. (6096 mm)
A-ECV	3 - Pin, 30 ft. (9144 mm)
A-ECD	4 - Pin, 3 ft. (914 mm)
A-ECE	4 - Pin, 6 ft. (1829 mm)
A-ECF	4 - Pin, 12 ft. (3658 mm)
A-ECW	4 - Pin, 20 ft. (6096 mm)
A-ECX	4 - Pin, 30 ft. (9144 mm)
A-ECG	5 - Pin, 3 ft. (914 mm)
A-ECT	5 - Pin, 6 ft. (1829 mm)
A-ECL	5 - Pin, 12 ft. (3658 mm)
A-ECY	5 - Pin, 20 ft. (6096 mm)
A-ECZ	5 - Pin, 30 ft. (9144 mm)
A-ECH	7 - Pin, 3 ft. (914 mm)
A-ECJ	7 - Pin, 6 ft. (1829 mm)
A-ECK	7 - Pin, 12 ft. (3658 mm)
A-EFA	7 - Pin, 20 ft. (6096mm)
A-EFB	7 - Pin, 30 ft. (9144mm)

Micro-Change® Cordsets

A-EBB	3 - Pin, 6 ft. (1829 mm)
A-EBC	3 - Pin, 12 ft. (3658 mm)
A-EBU	3 - Pin, 20 ft. (6096 mm)
A-EBV	3 - Pin, 30 ft. (9144 mm)
A-EBE	4 - Pin, 6 ft. (1829 mm)
A-EBF	4 - Pin, 12 ft. (3658 mm)
A-EBW	4 - Pin, 20 ft. (6096 mm)
A-EBX	4 - Pin, 30 ft. (9144 mm)
A-EBT	5 - Pin, 6 ft. (1829 mm)
A-EBL	5 - Pin, 12 ft. (3658 mm)
A-EBY	5 - Pin, 20 ft. (6096 mm)
A-EBZ	5 - Pin, 30 ft. (9144 mm)

Class I Div 2 Quick Disconnect Guard **New!**

NXS-4101 Guard fits all molded mini-change cordsets. Prevents against mechanical separation of male/female connectors and is **suitable for use in Cl I Div 2 applications.**

Watertight Cable Gland **New!**

A-GLD1 3 or 4 conductor SO cable
A-GLD2 3 or 4 conductor PVC cable

Plastic cable gland is easy to install on any stainless steel GO Switch with a 1/2" conduit hub using the "B" cable termination option. It provides a water-tight seal rated to IP 68 - 5 bar (comparable to NEMA 6) and is an excellent way of protecting all GO Switches in wet environments. Not suitable for use with conduit.

SubSea™ Underwater Cordsets

(Specify length of cable (ft.) required.)
(e.g. 3ED20 = 3 pin and 20 ft. of cable)

A-3ED_ _ 3 pin female connector with Delrin™ lock sleeve and minimum 12 ft. (610 mm) of 16 gauge (3 pin .395" dia.) SO cable rated 194ºF (90ºC) 600V (certified not to leak underwater)

A-4ED_ _ 4 pin female connector with Delrin™ lock sleeve and minimum 12 ft. (610 mm) of 16 gauge (4 pin .425" dia.) SO cable rated 194ºF (90ºC) 600V (certified not to leak underwater)

A-8ED_ _ 8 pin female connector with Delrin™ lock sleeve and minimum 12 ft. (610 mm) of 16 gauge (8 pin .645" dia.) SO cable rated 194ºF (90ºC) 600V (certified not to leak underwater)

A-3EE_ _ 3 pin right angle female connector with minimum 12 ft. (610 mm) of 16 gauge (3 pin .395" dia) SO cable rated 194ºF (90ºC) 600V (certified not to leak underwater)

A-4EE_ _ 4 pin right angle female connector with minimum 12 ft. (610 mm) of 16 gauge (4 pin .425" dia) SO cable rated 194ºF (90ºC) 600V (certified not to leak underwater)

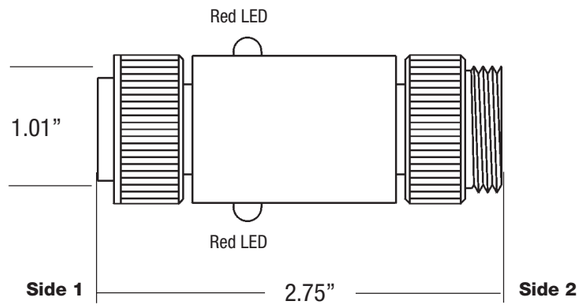
AURA Light Adapter

502.969.8000

Aura™ Light Adapter

The Aura Light Adapter provides LED position confirmation on any N/O GO Switch using a 3, 4, or 5 pin Mini-Change connector.

Dimensions



Ordering Guide

Fill in the boxes to create your ‘ordering number.’

Model

LED Adapter Module

ALA1 Aura Light Adapter for one contact (requires a load)

ALA

Control Arrangement

R (2) Red LEDs for normally open (N/O) output

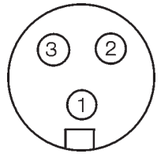
G (2) Green LEDs for normally open (N/O) output

Connector

3 3-pin Mini-Change type connector

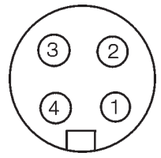
4 4-pin Mini-Change type connector

5 5-pin Mini-Change type connector



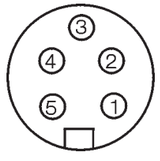
3-Pin

PIN 1 - COM
PIN 2 - NOT USED
PIN 3 - N/O



4-Pin

PIN 1 - COM
PIN 2 - N/O
PIN 3 - NOT USED
PIN 4 - GND



5-Pin

PIN 1 - N/O
PIN 2 - NOT USED
PIN 3 - GND
PIN 4 - NOT USED
PIN 5 - COM

Options

0 None
1 Contact Wash Circuit

Target Magnets
Increase the Sensing Range of GO Switches

AMP3 Magnet/Resin Cover

AMC3 magnet in plastic molded bracket with mounting holes. 7/8" (22 mm) x 2 9/16" (65 mm) x 17/32" (13 mm) thick with 7/32" (6 mm) holes.

For all GO Switches

AMS4 Magnet/Stainless Cover

AMC4 magnet molded into stainless steel cover, with mounting holes. 11/4" (32 mm) x 1 7/16" (37 mm) x 1" (25 mm) thick with 3/16" (5 mm) holes.

For all GO Switches

AMC5 Magnet/ Stainless Cover

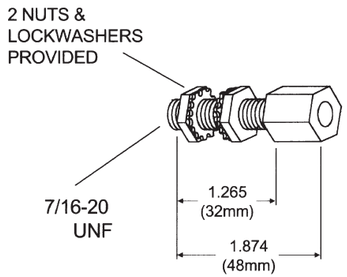
AMC1 magnet molded into stainless cover with mounting holes. 7/8" (22 mm) x 2 9/16" (65 mm) x 17/32" (13 mm) thick with 7/32" (6 mm) holes.

For all square GO Switches

AMS7 Magnet/Stainless

Magnet assembly. 2" (50 mm) x 1/2" (13mm) 7/16-20 UNC threads.

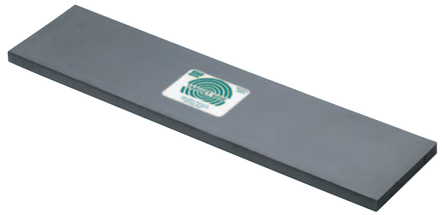
For 70 Series GO Switches



AMF6 Magnet (Machinable)

Flexible sensing amplifier/external magnet. 3" (76 mm) x 12" (305 mm) x 3/8" (10 mm) thick.

For all square GO Switches

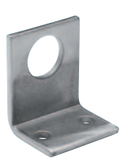


Refer to individual GO Switch models for extended sensing ranges with external target magnets.

Mounting Brackets

502.969.8000

Standard mounting brackets are available to cover most GO Switch installations. They are designed to provide secure installation without interfering with the operation of the switch.

Item	Part Number & Description
Heavy Duty Mounting Bracket Side mount bracket for 10 Series GO Switches 	**ABS2** 3" (76mm) x 3 1/4" (82mm) x 1/8" (3mm) thick stainless steel
Universal Mounting Bracket for 10/20 Series Universal mounting bracket for 10 Series and 20 Series GO Switches 	**ABS3** 6" (152mm) x 1-1/2" (38mm) x 3/16" (5mm) stainless steel
Combination Cover Plate and Mounting Bracket Bottom mount for 10 or 20 Series GO Switches 	**ABB4** 3" (76mm) x 1-1/2" (38mm) x 1/8" (3mm) thick brass **ABS5** 3" (76mm) x 1-1/2" (38mm) x 1/8" (3mm) thick stainless steel
Universal Mounting Bracket for 80 Series Side mount bracket adapts 80 Series GO Switches for rotary valve position indication 	**ABS6** 10 gauge (.134") type 304 stainless steel
Strap Bracket Strap brackets for 30 Series GO Switches 	**ABS7** 1" (25mm) wide x .050" thick stainless steel for Model 31, 32, & 33 GO Switches **ABS11** 3/4" (19mm) x 3/4" (19mm) x .030" thick stainless steel for Model 35 GO Switches
Heavy Duty "L" Mounting Bracket "L" bracket for 70 Series Model 73, 74, 75, 76 & 7G GO Switches 	**ABS9** 1-1/4" (32mm) wide. 11 gauge (.120") thick non-magnetic stainless steel

Item	Part Number & Description
Cover Plates Cover plate for 10 and 20 Series GO Switches. Bottom mount cover plate/conduit for 10 and 20 Series GO Switches. Furnished with gasket and screws 	**AHB1** Brass; 1-1/2" (38mm) x 1-1/2" (38mm) x 1/8" (3mm) **AHS2** Stainless steel; 1-1/2" (38mm) x 1-1/2" (38mm) x 1/8" (3mm) **AHB3** Brass; 1-1/2" (38mm) x 1-1/2" (38mm) x 1/8" (3mm)
Jam Nuts Nickel plated brass jam nuts for 70 Series GO Switches 	**AHS7** (2) 3/8" nickel plated brass for Model 71 and 72 GO Switches **AHS8** (2) 5/8" nickel plated brass for Model 73-76, 7G and 7H GO Switches **AHS18** (2) 5/8" stainless steel for Model 73-76, 7G and 7H GO Switches **AHS9** (2) 3/4" stainless steel for Model 77 GO Switches **AHS16** (2) 1" nickel plated brass for Model 7I GO Switches
Parker Seal Nut and Washer ThredSeal Kits for 70 Series GO Switches. Zinc plated steel with nitrile rubber (standard) or Viton (hi-temp or hydraulic fluids detergent) washer 	**AHS13** 3/8" zinc plated steel for Model 71 and 72 GO Switches **AHS14** 5/8" zinc plated steel for Model 73-76, 7G & 7H GO Switches **AHS19** 5/8" Viton for Model 73-76, 7G & 7H GO Switches **AHS15** 3/4" zinc plated steel for Model 77 GO Switches **AHS20** 3/4" Viton for Model 77 GO Switches **AHS17** 1" zinc plated steel for Model 7I GO Switches
Sealant Tape Grafoil sealant tape for 70 Series GO Switches. Forms a leak-tight temperature-stable joint. Recommended for high pressure and/or high temperature 	**AHF16** .005" x 24"

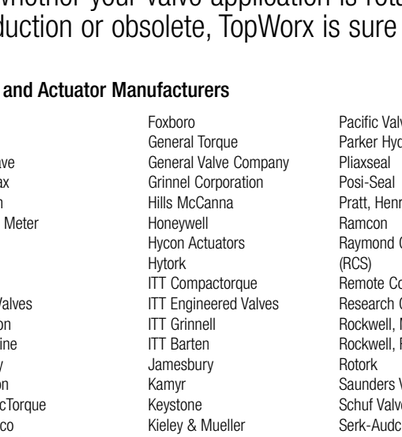
Over the years, customers have asked us to mount our GO Switch leverless limit switches to just about every type and brand of valve and actuator on the planet.

As a result, TopWorx has amassed over 1,200 different mounting kit designs.

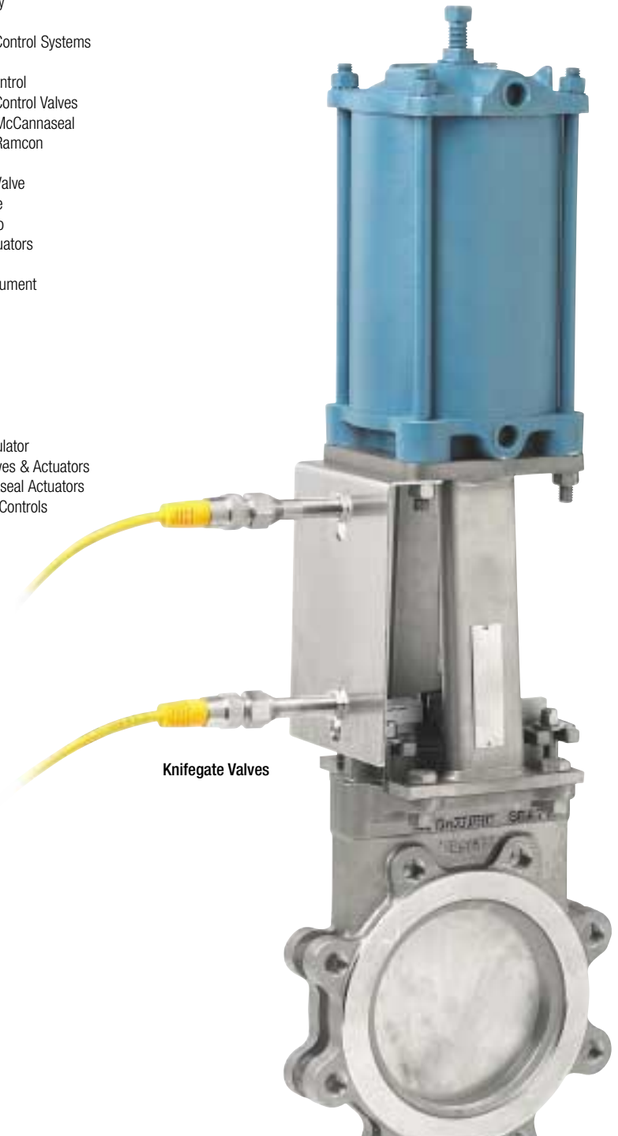
So whether your valve application is rotary or linear, NAMUR or non-NAMUR, in production or obsolete, TopWorx is sure to have a mounting kit that fits your need.

Valve and Actuator Manufacturers

Annin
Apollo
Autoclave
Automax
Axelson
Badger Meter
Bettis
Bray
Brooks
BV&B Valves
Cameron
Centerline
Century
Clarkson
CompacTorque
Conbraco
Contromatics
Cooper Valve
CPV Mfg.
Dahl, G. W.
Demco
DeZurik
Dover
Dresser
Durco
Dynatorque
Elliott, Kenneth
El-O-Matic
Exeeco Gear Operators
Fabri Valve
Fisher Controls
Flexible Valve Company
Foxboro
General Torque
General Valve Company
Grinnel Corporation
Hills McCanna
Honeywell
Hycon Actuators
Hytork
ITT Compactorque
ITT Engineered Valves
ITT Grinnell
ITT Barten
Jamesbury
Kamyr
Keystone
Kieley & Mueller
Kinetrol
KTM-General Torque
LeDeen Actuators
Limitorque
Magnetrol
Marpac
Masoneilan-Dresser
Mastergear Gear Operators
Matryx
McCannaseal
Mercoid Liquid Level Controls
Metrodyne
Morin Actuators
Neles Automation
Orbit Valve
Pacific Valves
Parker Hydropower
Pliaxseal
Posi-Seal
Pratt, Henry
Ramcon
Raymond Control Systems (RCS)
Remote Control
Research Control Valves
Rockwell, McCannaseal
Rockwell, Ramcon
Rotork
Saunders Valve
Schuf Valve
Serk-Audco
Shafer Actuators
SVF
Taylor Instrument
TK Valve
Tork-Pak
Tufline
Unitorq
Valtek
Velan
Walworth
Watts Regulator
Whitey Valves & Actuators
WKM Dynaseal Actuators
Worcester Controls
Xomox



Control Valves



Knifegate Valves

NAMUR Mounting Kits

The vast majority of rack and pinion valve actuators come with an ISO/NAMUR mounting pattern. This worldwide standard provides a consistent bolt pattern and shaft height regardless of the actuator brand. As a result, there is less need for expensive, custom made mounting kits, making it easier and less expensive to mount topworks accessories.

TopWorx offers several cast aluminum and stainless steel mounting kits that make it easy to attach GO Switch 70 Series switches to rack and pinion actuators.

Custom (Non-NAMUR) Mounting Kits

Rotary valve actuators that do not use the ISO/NAMUR standard, such as scotch-yoke or vane actuators, require custom designed mounting kits to attach GO Switches.

This can be a complex procedure that should not be overlooked by the end user. Since there are no standards, it is more difficult to ensure the proper fit and function of brackets, and consequently the automated valve system itself.

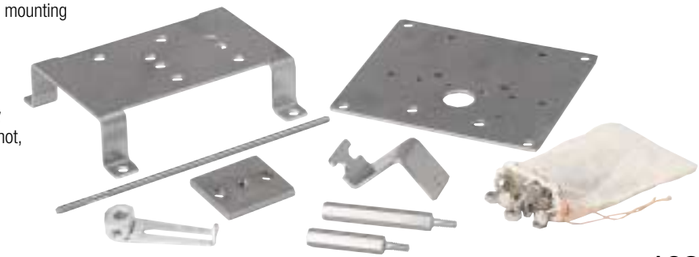
TopWorx has a team of designers experienced at solving this problem, making it easy to mount GO Switch products to scotch-yoke and vane actuators. With an existing library of over 1,200 different designs, there is probably already a design ready for your application.

Note: TopWorx custom mounting kits are always made of heavy-gauge stainless steel, ensuring the proper amount of support in the field.

Linear Valve Mounting Kits

Linear valves, such as control valves, globe valves, knifegate valves, or diaphragm valves, do not conform to any standard mounting patterns. Therefore, custom designed mounting kits are necessary to attach GO Switches.

Since TopWorx has been mounting GO Switch leverless limit switches onto linear valves and actuators for several decades, there is probably already a design ready for your application - if not, we will create one.



Installation

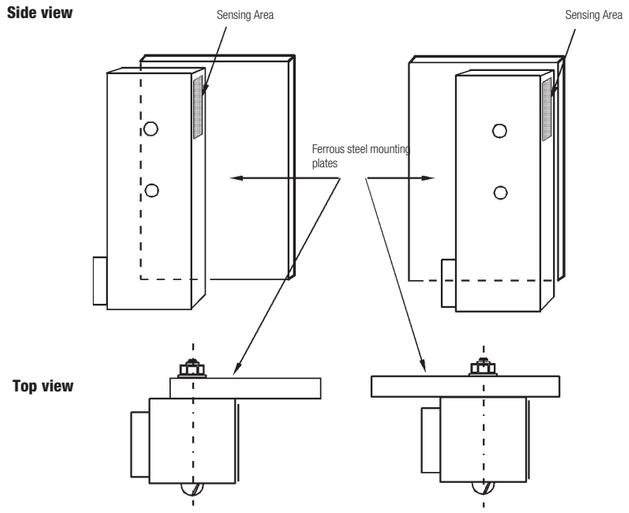
Installation Principle - Square Switches

- Non-ferrous brackets/plates are recommended (stainless steel or aluminum).
- GO Switches may be mounted on ferrous materials but it is not recommended. Loss of sensing range will result.
- It is recommended to mount switches 1" to 1-1/2" away from surrounding ferrous materials when possible.
- If mounting on ferrous material, insure uniform coverage of the switch, biasing the internal magnet(s) equally. (Fig. 2) If magnets are biased unequal, latching may occur. (Fig. 1)
- GO Switches sense ferrous materials such as mild steel, 400 series and 17/4 stainless steel.
- Avoid contact between target and switch. Configure mounting of switch and/or target so that target passes within proximity range of sensing area. Sensing range will vary according to model number and size (mass) of target used.
- Target magnets, available through TopWorx, will increase the sensing range of the switch. Reference sensing ranges in corresponding sections throughout the catalog.
- For optimum performance, provide sufficient mass of target, and choose the appropriate GO Switch model to match the application requirements for operating frequency, type of load, etc.
- The greater mass of target the better for maximum contact pressure, especially in low current applications.
- For heavy or inductive loads, arc suppression devices, or interposing relays are recommended for contact longevity. Contact factory for specifics.
- GO Switches may be mounted in any plane.
- When mounting GO Switches side by side, place 2-1/4" apart edge to edge, not center to center.
- Contact factory for side by side mounting.

See individual switch Ordering Guides for wiring diagrams and information on external target magnets for increased sensing ranges.

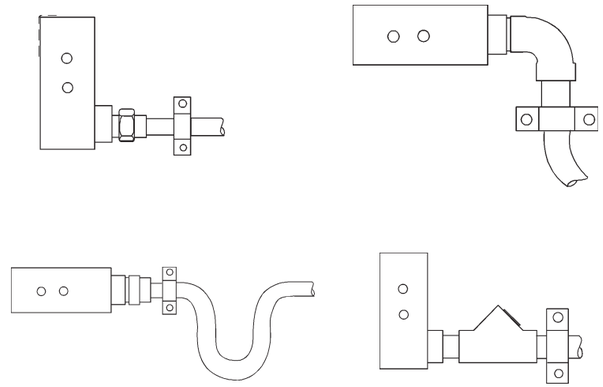
Figure 1
Incorrect

Figure 2
Correct



Attachment of Conduit or Cable

- Attach conduit or cable correctly
  - When using long runs of conduit or cable, place supports close to the switch to avoid pulling switch out of position.
  - If switch is mounted on a moving part, be sure flexible conduit is long enough to allow for movement, and positioned to eliminate binding or pulling.
  - For installation in hazardous locations, check local electrical codes. Switches must be installed according to local electrical codes.
  - In damp environments, use 1/4" thick non-conductive RTV or a similar moisture barrier to prevent water/condensation from entering conduit hub



Satisfy these 3 criteria to reduce possible premature failures

Sealing switches

In figure 1 something common has occurred; the conduit system has filled with water. Over a period of time this may cause the switch to fail prematurely.

In figure 2, the termination of the switch has been filled with 1/4" thick non-conductive RTV to prevent water intrusion and to prevent premature switch failure. A drip loop with provision for water to escape has also been installed.

Incorrect

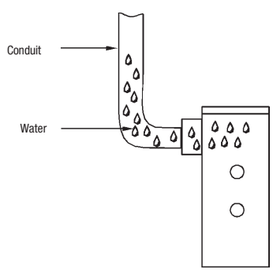


Figure 1

Correct

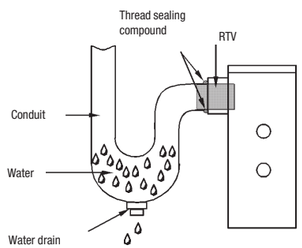


Figure 2

Target size

In figure 3, the ferrous target is too small to be detected reliably.

In figure 4, the target has sufficient size and mass for long term, reliable operation.

Incorrect

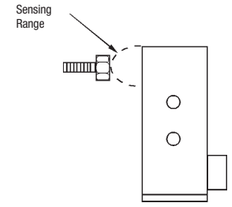


Figure 3

Correct

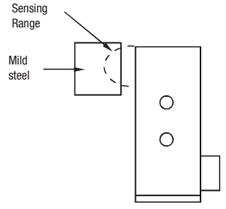


Figure 4

Target location

In figure 5, the target has been positioned to stop on the outside edge of the sensing range. This is a marginal condition for long term reliable operation.

In figure 6, the target has been positioned to stop well within the sensing range which will assure long term reliable operation.

Incorrect

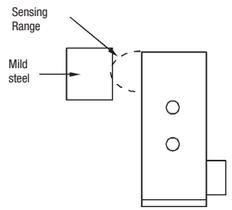


Figure 5

Correct

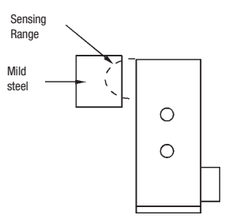


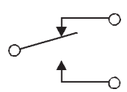
Figure 6

Contact arrangements vary according to type of switch. Refer to sections on each switch series for detailed information. Be sure that electrical load will not exceed rated capacity of the switch.
For two-circuit switches (DMDB), contacts must be connected same polarity only in order to minimize possibility of a line-to-line short.

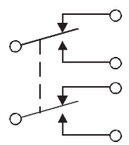
All GO® Switches are "pure"contact switches, meaning that they have **no voltage drop when closed, nor do they have any leakage current when open**. For multi-unit installation, switches may be wired in series or parallel, as shown below.

ATTENTION!

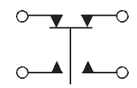
Please refer to individual switch sections for wiring diagrams.



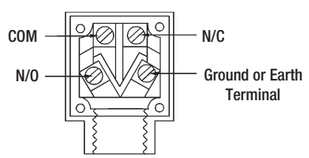
SPDT
Form C



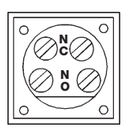
DPDT
2 Form C



DMDB
Form Z



Bottom view



Bottom view
Two circuit (DMDB)
Same polarity only

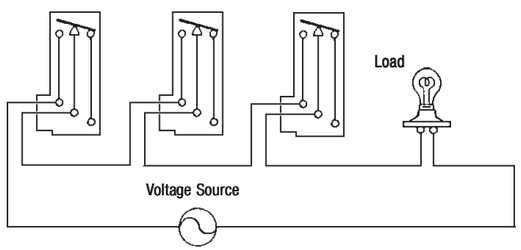
Series and Parallel Wiring

Series Wiring

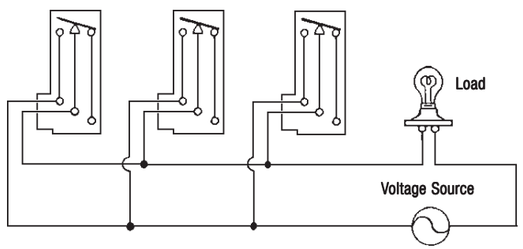
Any number of GO® Switches may be wired in series, without voltage drop. By contrast, conventional solid state switches have about two volts drop across the switch when operated. With a system of 12 volts and four switches in series, 8 volts is dropped across the switches and only 4V is left to operate the load. When using GO® Switches, 12V is still available to operate the load.

Parallel Wiring

Any number of GO® Switches may be wired in parallel, with no current leakage and without drawing operating current.
When conventional solid state switches are wired in parallel, there is about 100 microamps leakage through each switch. If ten switches were wired in parallel, the total leakage current would be 1000 microamps or one milliamp -sufficient current to indicate an "ON" condition to a programmable logic controller (PLC).



No Voltage Drop with GO® Switches



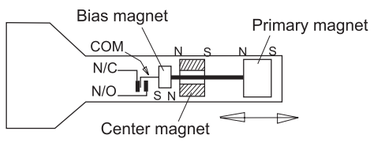
No Current Leakage with GO® Switches

Setting Up A 70 Series GO®Switch For Optimum Performance

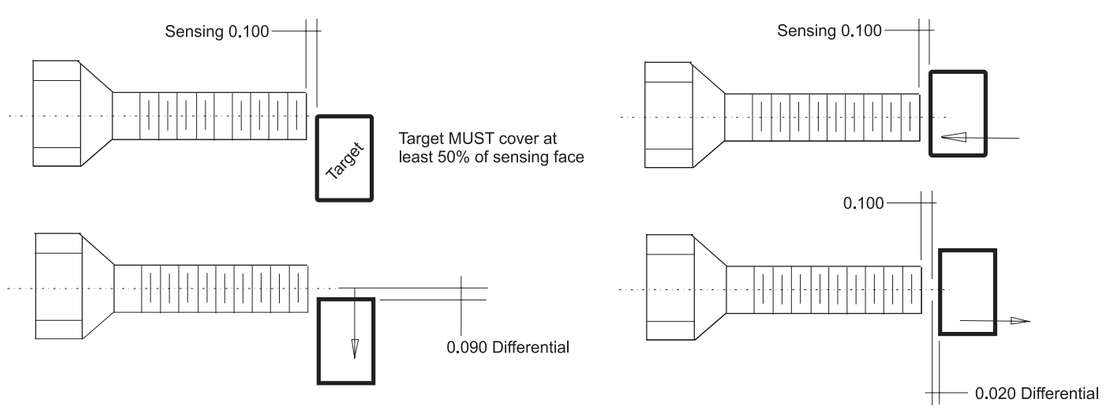
GO Switch 70 Series end sensing switches use three permanent magnets and a push-pull plunger to control a set of mechanical contacts. The center magnet simultaneously attracts the primary magnet and repels the bias magnet, pushing the connecting rod and common contact into the normally closed position, closing a contact circuit. When a ferrous or magnetic target enters the sensing area of the switch, it attracts the primary magnet, which pulls the connecting rod and common contact into the normally open position, closing the other contact circuit.

The **sensing distance** is the maximum distance between the switch and target when the switch first operates; the trip point. The **differential,** also known as deadband or hysteresis, is the distance that the target must move from the sensing area in order to allow the switch to reset.

The internal mechanism is shown here:



To apply the 70 Series GO Switch to obtain the least differential, the direction the target approaches the switch must be considered. Below are two possible orientations that illustrate the differences in target movement and the affects on switch differential.



The measurements shown are nominal and can vary as much as .030-.050" depending on the material and size of target used in the application. As you can see, the best scenario for least differential is to orient the switch and target as shown in **Orientation B**. However, in this application, the possibility of getting debris between the switch and target must also be considered.

When trying to determine differential of an application, it is directly proportional to the distance the target will travel in the application. For example: a linear valve stroke is 1". A switch is applied to indicate the closed position of the valve. Using **Orientation A,** the differential is 0.090 ". The 'deadband' is therefore 9% of travel. If the switch were re-oriented, as shown in the **Orientation B**, the deadband would be only 2% of the total valve travel.

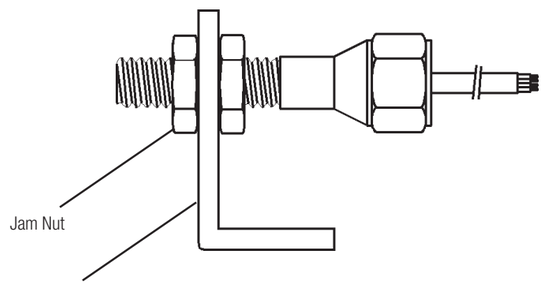
Remember, there is no exact science to use when applying a GO Switch. However, once the switch is set, and the target travels to the same position every time (within .002"), the GO Switch will maintain calibration for life. **Set it and forget it!**

Installation Principle - Round Switches

- 70 Series GO Switches are inherently shielded, and are **unaffected by surrounding ferrous material, weld fields and RF interference.**
- GO Switches sense ferrous materials such as mild steel, 400 series and 17/4 stainless steel.
- Sensing and differential of switch may vary depending on target travel direction.
- Avoid contact between target and switch. Configure mounting of switch and/or target so that target passes within proximity range of sensing area. Sensing range will vary according to model number and size (mass) of target used.
- Target magnets, available through TopWorx, will increase the sensing range of the switch. Reference sensing ranges in corresponding sections through out the catalog.
- For optimum performance, provide sufficient mass of target, and choose the appropriate GO Switch model to match the application requirements for operating frequency, type of load, etc.
- The greater mass of target the better for maximum contact pressure, especially in low current applications.
- For heavy or inductive loads, arc suppression devices, or interposing relays are recommended for contact longevity. Contact factory for specifics.
- Do not use excessive force on external threads when installing. (36 in/lbs. max)
- Configure mounting so bracket dissects switch as close to the middle of the length of body as possible (Fig. 1). This eliminates undue stress caused by heavy cables, connectors, etc.
- Two appropriately sized jam nuts are included with switch. Lock washers are recommended in high vibration applications.

See individual switch Ordering Guides for wiring diagrams and information on external target magnets for increased sensing ranges.

For cylinder applications, see pg. 65 for set up recommendations.

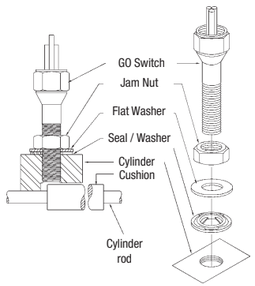


ABS9
Mounting Bracket

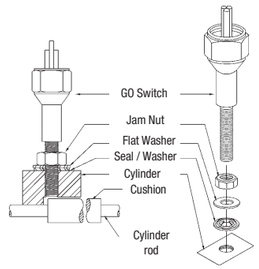
Figure 1
Mount as close to mid-point of length of switch

Pressure Sealing Methods

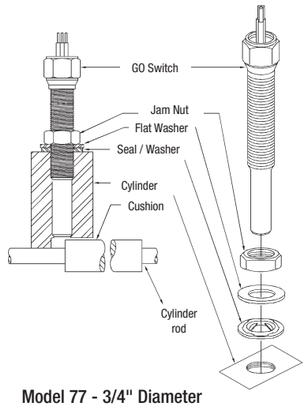
GO Switch recommends the use of our Parker ThredSeal® Washer Kits in lieu of other commercially available sealing hardware. Provided with the Parker ThredSeal® Washer Kit are torque values for specific pressure ratings as well as the maximum torque values.



Models 73-76 - 5/8" Diameter
Torque Jam Nuts to:
15 lbs-ft to achieve seal at 2,000 PSI
25 lbs-ft to achieve seal at 5,000 PSI
Do not exceed 30 lbs-ft



Models 71 & 72 - 3/8" Diameter
Torque Jam Nuts to:
15 lbs-in to achieve seal at 2,000 PSI
30 lbs-in to achieve seal at 5,000 PSI
Do not exceed 45 lbs-in



Model 77 - 3/4" Diameter
Torque Jam Nuts to:
20 lbs-ft to achieve seal at 2,000 PSI
65 lbs-ft to achieve seal at 5,000 PSI
Do not exceed 75 lbs-ft

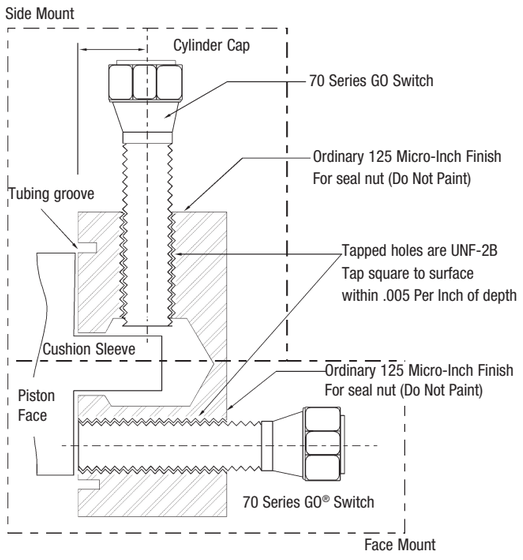
Air and Hydraulic Cylinders

A ferrous cylinder cushion or piston will actuate the switch.

To determine the correct thread length, measure the distance from the head cap surface to the cushion and add 1/2" for seal nut. 70 Series are rated 2,000 PSI operating pressure; 5,000 PSI operating and 10,000 PSI non-shock optional on models 73 through 77.

Thread seal nut onto switch. Screw switch into cylinder by hand until switch touches cushion. Back out 1/4 to 1/2 turn. Tighten seal nut.

- 70 Series GO® Switches areunaffected by surrounding ferrous steel.



Factors Affecting Contact Life

GO Switches are designed to provide optimum performance over a long period. Their premium grade components and inherently durable design keeps them working, trouble-free, year after year. Some of the conditions that can decrease contact life are:

Contact Erosion

There are two types of contact erosion, mechanical and electrical. Electrical contact erosion is caused by heavy electrical loads. The contacts may overheat and become molten if there isn't sufficient off time to allow cooling between cycles. Mechanical erosion occurs as a result of friction between contacts cycling at high speeds with little or no electrical load. Mechanical wear can also occur due to operating a switch at a frequency higher than its design capability. The high operating speed of GO Switches make them ideal for almost any application. For those with unusually high-frequency switching demands, please consult factory.

Electrical wear caused by arcing, can be eliminated by utilizing high quality contact materials, such as the gold-flashed silver cadmium oxide used in GO Switches, and by operating the switches within the voltage parameters for which they are designed. The use of arc suppressors such as resistor-capacitor combinations or blowout coils can also serve to prevent arcing, a consideration which is particularly important in certain hazardous operating environments.

Contact Transfer

When switches are operated above rated voltage or at high speeds, contact material can transfer from one contact to the other. For this reason, it is important to observe the input voltage specifications supplied for each GO Switch.

Welding or Sticking

The GO Switch design virtually eliminates welding or sticking due to mechanical armature hang-ups. Excessive voltage and the resultant arcing, however, can cause overheating of the contacts and welding or sticking. By operating the GO Switch within its specified parameters, this problem can be eliminated.

NEC 500-4 Protection Techniques for Hazardous Locations
- 500-4(a) Explosionproof Apparatus
- 500-4(e) Intrisically Safe Systems
- 500-4(f)(2) Nonincendive Equipment
- 500-4(h) Hermetically Sealed

NEC 500-5(a) Class I Group Classifications
NEC 500-5(b) Class II Group Classifications
NEC 500-7 Class I Locations Definitions
- 500-7(a) Class, I, Division 1.
- 500-7(b) Class I, Division 2

NEC 500-8 Class II Locations Definitions
- 500-8(a) Class II, Division 1
- 500-8(b) Class II, Division 2

NEC 500-9 Class III Locations Definitions
- 500-9(a) Class III, Division 1
- 500-9(b) Class III, Division 2

NEC 501-4 Wiring Methods
- 501-4(a) Class I, Division 1
- 501-4(b) Class I, Division 2

NEC 501-5 Sealing and Drainage
- 501-5(a) Conduit Seals, Class I, Division 1 (Conduit Seal Locations)
- 501-5(b) Conduit Seals, Class I, Division 2 (Conduit Seal Locations)
- 501-5(c) Class I, Divisions 1 and 2 (Seal Fitting Compliance)
- 501-5(d) Cable Seals, Class I, Division 1
- 501-5(e) Cable Seals, Class I, Division 2
  - Table 5.1 Conduit and Cable Seal Requirements for Hazardous Locations

NEC 501-6 Switches, Circuit Breakers, Motor Controllers and Fuses.
- 501-6(a) Class I, Division 1
- 501-6(b) Class I, Division 2
  - 501-6(1) Type Required
    - 501-6(1)(a) Hermetic seal
    - 501-6(1)(b) Factory seal
    - 501-6(1)(d) Solid state switch

NEC 501-7 Control Transformers and Resistors (Solenoids)
NEC 501-12 Receptacles and Attachment Plugs, Class I, Divisions 1 & 2 (Disconnect Plugs)
NEC 501-16 Grounding, Class I, Divisions 1 & 2

NEC 502-4 Wiring Methods
- 502-4(a) Class II, Division 1
- 502-4(b) Class II, Division 2

NEC 502-5 Sealing, Class II, Divisions 1 & 2
NEC 502-6 Switches, Circuit Breakers, Motor Controllers and Fuses
- 502-6(a) Class II, Division 1
  - 502-6(a)(1) Type required
  - 502-6(a)(2) Isolating Switches
  - 502-6(a)(3) Metal dusts
- 502-6(b) Class II, Division 2

NEC 502-7 Control Transformers and Resistors (Solenoids)
- 502-7(a) Class II, Division 1

502-7(b) Class II, Division 2

NEC 504 Intrinsically Safe Systems
504-2 Definitions
- Associated apparatus
- Control drawing
- Intrinsically safe apparatus
- Simple apparatus

504-4 Equipment Approval
504-10 Equipment Installation
- 504-10(a) Control drawing
- 504-10(b) Location

504-20 Wiring Methods

505 Class I, Zone 0, 1 and 2 Locations
505-3 Location and General Requirements
- 505-3(a) Classification of locations

505-4 Protection Techniques
- 505-4(a) Flameproof “d”
- 505-4(c) Intrinsically safe
- 505-4(d) Type of protection “n”
- 505-4(f) Increased safety “e”
- 505-4(g) Encapsulation “m”

505-5 Reference Standards
505-7 Grouping and Classification
- 505-7(a) Group IIC
- 505-7(b) Group IIB
- 505-7(c) Group IIA

505-9 Zone Classification
- 505-9(a) Class I, Zone 0
- 505-9(b) Class I, Zone 1
- 505-9(c) Class I, Zone 2

505-10 Listing, Marking and Documentation
- 505-10(a) Listing
- 505-10(b) Marking
- 505-10(c) Documentation

505-15 Wiring Methods
- 505-15(a) Zone 0
- 505-15(b) Zone 1
- 505-15(c) Zone 2

505-20 Equipment
- 505-15(a) Zone 0
- 505-15(b) Zone 1
- 505-15(c) Zone 2

Definitions as referenced by NEC Article 100

Ampacity
The current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating.

Approved
Acceptable to the authority having jurisdiction.

Bonding
The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed.

Bonding jumper
A reliable conductor to ensure the required electrical conductivity between metal parts required to be electrically connected.

Device
A unit of an electrical system that is intended to carry but not utilize electric energy.

Disconnecting
A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

Dustproof
Constructed or protected so that dust will not interfere with its successful operation.

Dusttight
Constructed so that dust will not enter the enclosing case under specified test conditions.

Enclosure
The case or housing of apparatus…to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.

Explosionproof apparatus
Apparatus enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosions of gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited thereby.

Ground
A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of the earth.

Grounded
Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current carrying capacity to prevent the buildup of voltages that may result in undue hazards to connected equipment or to persons.

Labeled
Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Listed
Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or services meets identified standards or has been tested and found suitable for a specified purpose.

Live parts
Electric conductors, buses, terminals, or components that are uninsulated or exposed and a shock hazard exists.

Nonincendive circuit
A circuit, other than field wiring, in which any arc or thermal effect produced under intended operating conditions of the equipment, is not capable, under specified test conditions, or igniting the flammable gas, vapor, or dust-air mixture. See Section 500-4(f) for details regarding this protection method allowable in Class I and II, Division 2 classified areas.

Qualified person
One familiar with the construction and operation of the equipment and the hazards involved.

Rainproof
Constructed, protected, or treated so as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions.

Raintight
Constructed or protected so that exposure to a beating rainwill not result in the entrance of water under specified test conditions.

Watertight
Constructed so that moisture will not enter the enclosure under specified test conditions.

Weatherproof
Constructed or protected so that exposure to the weather will not interfere with successful operation.

Applications

Applications

502.969.8000

AUTOMOTIVE
- Chemical washdown areas
- Conveyors
- Cylinder end-of-stroke indication
- Eye wash stations
- Marmac position sensing
- Paint incineration damper indication
- Paint mixing valves
- Paint spray areas
- Part present indication
- Pneumatic and hydraulic clamping and welding fixtures
- Positioning and indexing
- Powerhouse (see Power Generation)
- Safety showers
- Speed control on conveyors

CEMENT PLANTS
- Bagging
- Chutes
- Conveyors
- Crushers
- Hopper doors
- Kilns
- Loaders
- Machinery
- Packaging
- Valve position indication

CHEMICAL PROCESSING
- Emergency showers
- Eye wash stations
- Filters
- Hose Couplings
- Transfer panels
- Valve position indication

CONSTRUCTION
- Concrete block mfg.
- Concrete ready mix trucks (counting revolutions of drum)
- Cranes

ELEVATORS/ESCALATORS
- Leveling switch in mining elevators

EQUIPMENT
- On all equipment where the value of the switch is judged by its performance and long life

FLUID POWER
- Cylinders
- Valves

FOOD PROCESSING
- Canning/bottling equipment
- Conveyors
- Cylinder indication
- Freezers
- Labelers
- Material handling
- Mixers
- Ovens
- Packaging equipment
- Scales
- Showers and eyewash stations
- Valve position indication

FOUNDRIES
- Conveyors
- Crane
- Dampers
- Ladle positioning
- Mold positioning
- Shakers
- Showers and eyewash stations

GLASS
- Conveyors
- Limits in all high heat areas
- Mixers

LUMBER AND WOOD PRODUCTS
- Conveyors
- Eyewash stations
- Sawdust bins
- Saws
- Ventilation equipment

MACHINERY
- Car wash
- Commercial laundry
- Compacting
- Engraving
- Freezing
- Gluing
- Heavy Equipment (Komatsu, John Deere, Hyundia, etc.)
- Lubricators
- Mixing
- Printing
- Other machinery dealing with abrasive, explosive, corrosive or otherwise "hard to handle" environments
- Rock crushing

MATERIAL HANDLING
- Baggers/Balers
- Bulk loading/unloading equipment
- Conveyors
- Crating equipment
- Labelers
- Lifts
- Packaging machines

MILITARY/MARINE
- Ballast transfer pumps
- Davits
- Elevators
- Elevator speed control
- Hatch interlock
- Safety interlocks
- Shipboard cranes
- Valve position indication

MINING
- Any limit application
- Conveyors
- Cylinders
- Dump bed up indication
- Longwall equipment
- Shower and eyewash stations
- Track signal

GAS TRANSMISSION/ DISTRIBUTION
- Door security
- Valve position indication

NUCLEAR POWER PLANTS
- Fuel transfer systems
- Valve position indication

OFF ROAD EQUIPMENT
- Boom alignment
- Cranes
- Cylinders
- Dump truck bed indication
- Ore/coal pile reclaimers

OIL/GAS EXPLORATION
- Off-shore sites
- Sub-sea applications
- Valve position indication

PETROLEUM REFINING
- Interlocks
- Motor phase monitoring
- Shower and eyewash stations
- Valve position indication

POWER GENERATION
- Air preheaters
- Air preheater blowers
- Ash bins
- Ash handling valves
- Bag houses
- Barge unloaders
- Blow down valves
- Boiler feed pump recirculation valve
- Boiler oil injectors
- Bottom ash valves
- Burner valves
- Coal car dumpers
- Coal feeders
- Coal handling apparatus
- Coal pulverizing swing valves
- Coal samplers
- Coal transport conveyors
- Conveyors
- Dampers
- Damper valves
- Economizers
- Feedwater heater level detection
- Fly ash valves
- Hopper gates
- Igniters
- Louvered dampers
- Master trip valves
- Pyrite gates
- Pulverizer and pulverizer valves
- Scrubber valves
- Showers and eyewash stations
- Soot blowers
- Steam valves
- Stokers
- Stop control valves
- Turbine control valves
- Ventilator valves
- Wallblowers
- Water de-mineralization valves

PULP AND PAPER
- Agitators
- Conveyors
- Mixers
- Shower and eyewash stations
- Speed monitors
- Valve position indication

RAILROADS
- Bridges (draw and swing)
- Car Maintenance Eqpt.
- Couplers
- Cranes
- Crossing gates
- Track maintenance vehicles & machinery
- Track manipulation equipment (Railway Technologies)

SOLID WASTE DISPOSAL/ CO-GENERATION
- Conveyors
- Cranes
- Dampers
- Valve position indication
- Ventilation equipment

STEEL MILLS
- Bullwheels
- Cold rolling units
- Conveyors
- Cranes
- Dampers
- Draw benches
- Fans
- Hot mill applications
- Shower and eyewash stations
- Track monitors
- Valve position indication

TIRE AND RUBBER
- Any machinery handling carbon black
- Conveyors
- Curing presses
- Cylinder end-of-stroke indication
- Shower and eyewash stations
- Tire mold closure inter locks
- Tire scrivers

TOOL & DIE
- Plastic injection molding
- Aluminum die-casting
- Rubber molding
- High temperature applications

TRANSPORTATION EQUIPMENT
- Airport fuel transfer equipment
- Davits
- Hangar doors
- Hatch interlocks
- K-Loaders
- Passenger jetways
- Scissor lifts
- Shipboard cranes
- Valve position indication
- Vehicle interlocks

WASTE WATER TREATMENT
- Agitators
- Clarifiers
- Clutches
- Shower and eyewash stations
- Sluice gates
- Valves

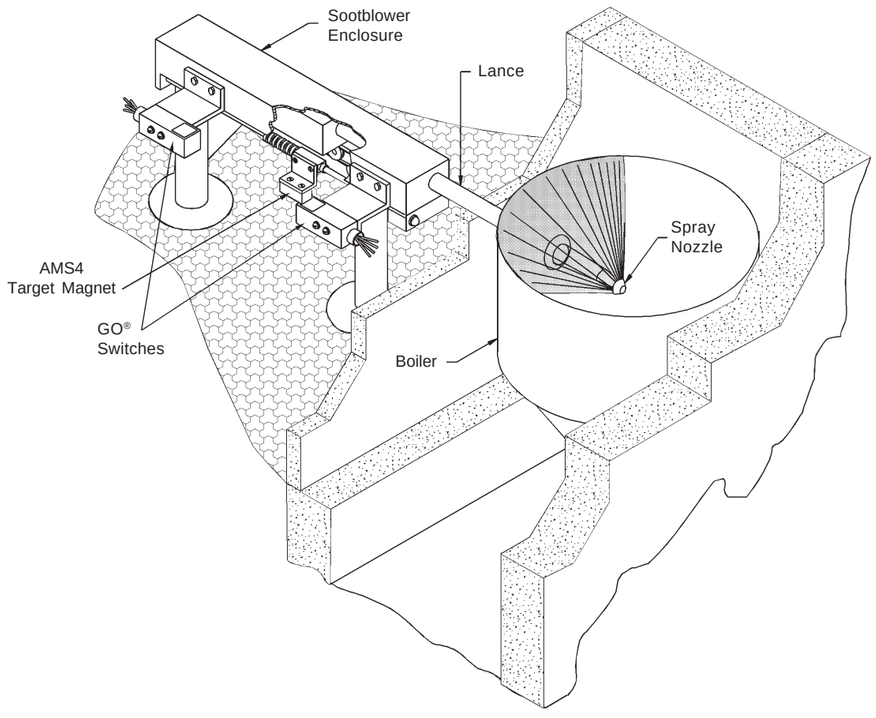
SOOT BLOWER POSITION INDICATION

Wherever power is generated, whether it is at a power generation station or a pulp and paper facility, soot blowers are used to eliminate slag buildup from the inside wall of a boiler. The lance of the soot blower penetrates the side of the boiler wall and extends inside. As it enters the boiler, the lance rotates in a clockwise motion spraying high pressure steam from the end of the lance back toward the boiler wall. This high pressure spray removes the slag in a circular pattern that enlarges as the lance extends further into the boiler. After the lance is fully extended, it retracts and rotates counter-clockwise to its original inactive state until a predetermined time when the process starts again. Depending on the size of the boiler, there can be as many as 60 soot blowers to service one boiler!

As you might imagine, the area in which the soot blowers operate is a demanding environment. High temperature and physical abuse make mechanical limit switches a constant maintenance headache. If a soot blower is out of service, the boiler wall is not being cleaned and as a result, power is not being generated efficiently. Translation: downtime, maintenance costs and lost revenue.

Fortunately, GO Switch has the solution. Each soot blower can be retrofitted using two Double Pole, Double Throw 80 Series GO Switches and one (1) AMS4 target magnet. As the soot blower lance extends and retracts into the boiler, the target magnet travels to the sensing area of each GO Switch, providing maintenance-free, fit and forget position indication.

The GO Switch is wired like a mechanical switch so existing wiring can be used for easy installation. Since the GO Switch does not depend on lever arms or internal moving parts, maintenance is immediately eliminated. This has been field tested and proven in thousands of applications already.



AUTOMOTIVE SKID CONVEYOR INDICATION

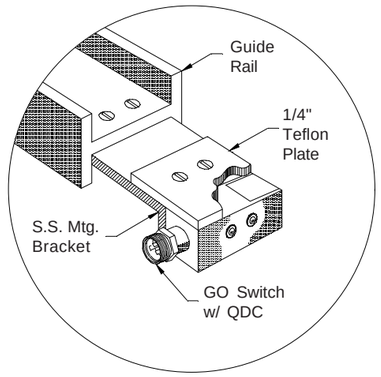
Automotive manufacturers need reliable position indication of body skids along the skid conveyor system. The critical areas are at the entrance, exit, and even inside of the paint-drying ovens where temperatures can reach close to 400ºF. Mechanical limit switches and inductive proximity switches cannot withstand the heat or the physical abuse of this application. Fortunately...

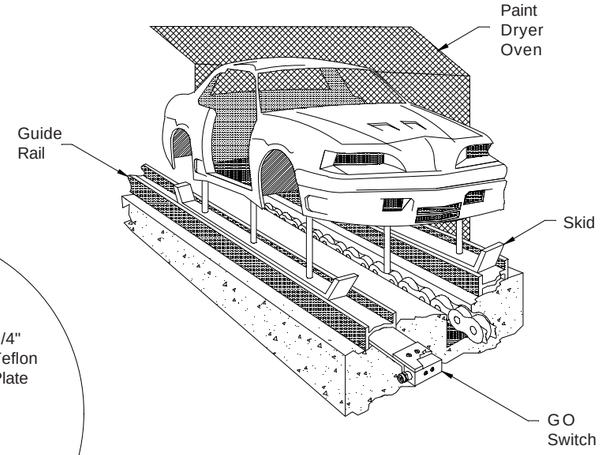
GO Switch has the answer.

We recommend our stainless steel high temperature 10 Series GO Switch with extended sensing, and a 400ºF continuous temperature rating.

The GO Switch will provide reliable maintenance-free position indication in this tough application.

Contact the paint shop supervisor, electrical engineers, and/or maintenance people responsible for the paint booth. They will be glad you called!





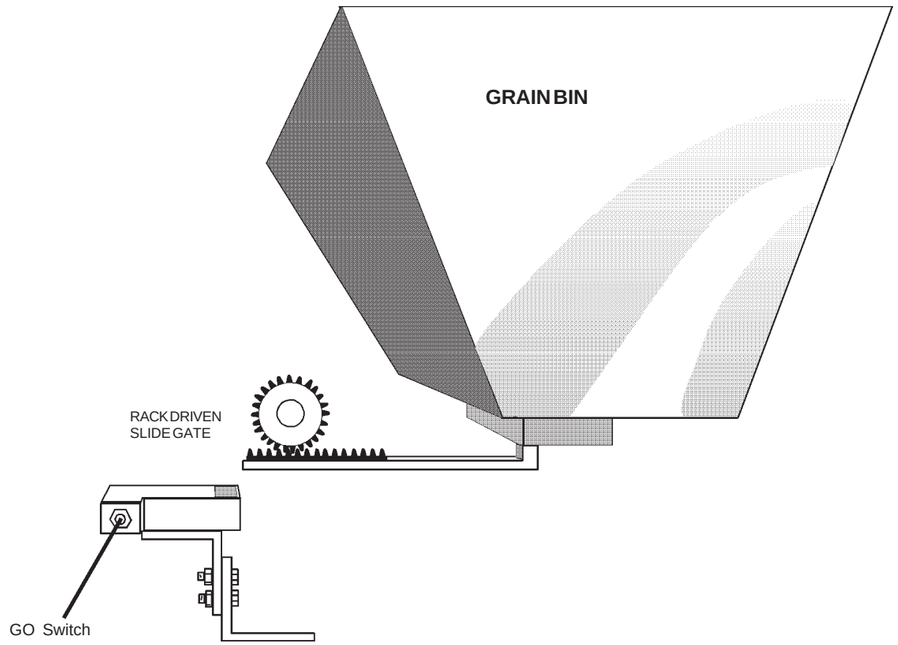
GRAIN BIN OPEN/CLOSED GATE POSITION

Grain elevators need an explosion-proof sensing device to signal when the slide gate of a grain bin is fully closed. This permits grain to be fed into the bin without waste.

The switch not only had to be explosion-proof, but also had to withstand dirty and dusty conditions.

A GO Switch was mounted on a stainless steel bracket, 1/4" below the moving rack drive. This allows 1/8" of play in the drive movement, while providing accurate sensing of the position of the bin gate.

The dependable GO Switch costs less than other explosion-proof limit switches.



BAR SCREEN TRASH RAKES FOR WATER TREATMENT

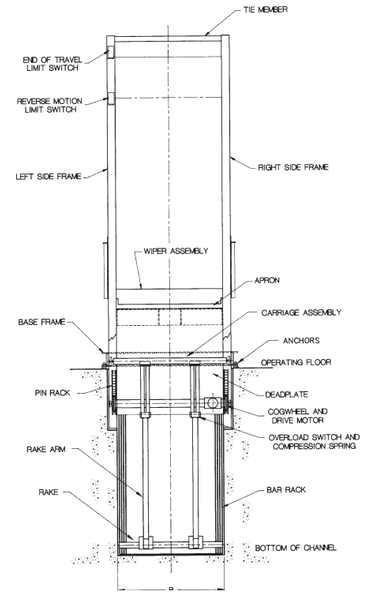
Bar screens are typically used in the intake channels of water treatment plants to remove solid debris from the water to prevent damage of subsequent equipment. When debris has accumulated on the screen, cleaning is required. It is done with a trash rake that is usually mounted in front of the screen on a support frame. Some of these trash rakes are manually operated and most are motor propelled so an operator only has to push a button to activate the rake. Some are activated by a timer. The rake goes through a cycle descending in front of the screen to the bottom moving towards the screen and then moving upward transporting the accumulated debris to a discharge chute where a container or a conveyor takes it away.

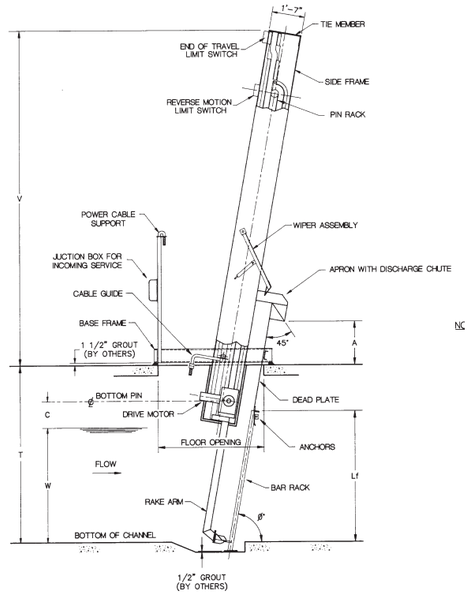
The motor operated trash rakes usually have two limit switches on them mounted to the support frame well above the water level. The end-of-travel limit switch defines the exact position at which the assembly will stop at the end of the cycle. The overload protection switch is activated when the rake comes in contact with an obstruction in the screen too large for it to remove.

Stainless steel 10 series or 80 series are the best limit switches for these applications. The harsh and moist environments in water treatment plants are too much for mechanical or solid state switches. Often the switches must be explosion proof and magnets must be used as targets because of the variation in the traveling rake position.

Water treatment plants are in a number of facilities including:

—Electrical generating stations
—Chemical processing plants
—Plastics manufacturing plants
—Food processing plants
—Industrial plants
—Pulp and paper mills
—Irrigation projects
—Oil refineries
—Sewage treatment plants
—Fish conservation projects
—Flood control pumping stations





REFUSE TRUCKS

Refuse trucks have as few as three switches and as many as ten switches per truck. The most common competitive switches used are mechanical lever-arm and push-button limit switches. Some trucks incorporate electronic proximity sensors.

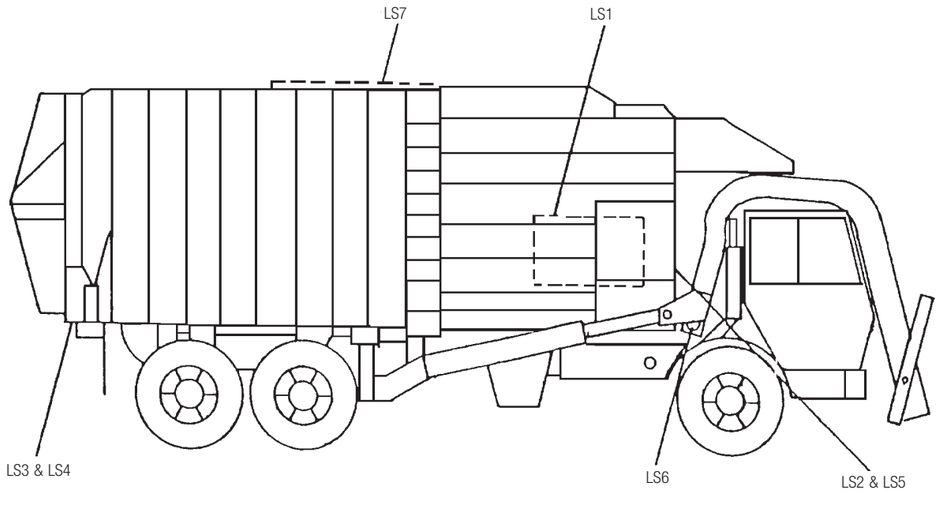
Limit switch/sensor failures are prevalent in the refuse collection business. These switch/sensor failures are attributed to mechanical wear and tear, moisture-ingression, corrosion and temperature extremes.

Vehicles out of service for any period of time cause lost revenue.

GO Leverless Limit Switches will prevent these failures and downtime while reducing maintenance costs.

Visit the refuse collection companies in your area. They will be glad you called!

LS1 = Normally open: held closed when side door is closed and latched.
LS2 = (7 & 8 normally closed) (1 & 2 normally open): switches at end of packer stroke.
LS3 = Normally closed: opens when tailgate is latched.
LS4 = Normally closed: opens when tailgate is latched.
LS5 = Normally closed: opens when packer is fully retracted.
LS6 = Normally open: (1 & 2 normally open) (5 & 6 normally open): closes when arms are above cab.
LS7 = Normally closed: opens when top door opens.



SAFETY SHOWERS AND EYEWASH STATIONS

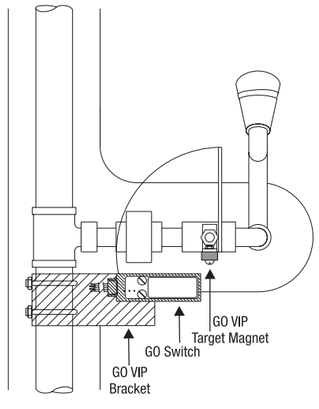
In an emergency first-aid is crucial and according to the OSHA Plant Safety regulations; Subpart G-Occupational Health and Environmental Control; Section 1910.94, Paragraph (d) (9) (vii):

(vii) Near each tank containing a liquid which may burn, irritate, or otherwise be harmful to the skin if splashed upon the worker's body, there shall be a supply of clean cold water. The water pipe (carrying a pressure not exceeding 25 pounds) shall be provided with a quick opening valve and at least 48 inches of hose not smaller than three-fourths inch, so that no time may be lost in washing off liquids from the skin or clothing. Alternatively, deluge showers and eye flushes shall be provided in cases where harmful chemicals may be splashed on the body.

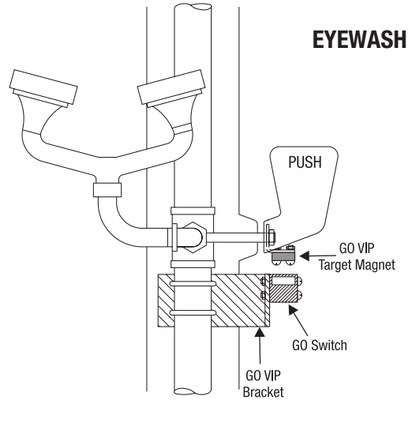
Deluge Showers and eye flushes are plentiful in chemical processing facilities How are the proper personnel notified should an emergency occur? Flow switches are used, but have corrosion and freezing problems.

GO Switch has the answer.

The GO Switch VIP for deluge showers and eye flushes can be mounted on any new or existing unit. Using the GO DPDT 80 Series switch allows for flexibility in signalling the proper personnel. For example, when the shower or eye flush valve is opened the GO Switch can signal the central control room and first-aid personnel simultaneously, or signal the control room and sound an alarm. When personal injury occurs time is of the essence.



EYEWASH



Reference Material

Type 1	General Purpose	indoor	accidential contact (cage or skeleton) will not rust
Type 2	Drip-proof	indoor	limited amounts of falling water and dirt (not dust-tight) will not rust
Type 3	Dust-tight, rain-tight	outdoor	windblown dust, rain, sleet, and undamaged by external ice formation
Type 3R	Dust-tight, rain-tight	outdoor	same as type 3 above, plus diverts water from live parts, provision for drainage, will not rust
Type 3S	Dust-tight, rain-tight	outdoor	same as type 3 above, operation of external mechanism when ice laden, will not rust
Type 4	Water-tight/dust-tight	indoor/ outdoor	windblown dust and rain, splashing water, and hose directed water, undamanged by ice formation, will not rust
Type 5	Dust-tight	indoor	dust and falling direct, will not rust
Type 6	Water-tight, dust-tight	indoor/ outdoor	temporary entry of water during limited submersion (6 ft. for 30 min), undamaged by formation of ice, will not rust
Type 6P	Water-tight/dust-tight	indoor/ outdoor	same as type 6 above plus prolonged submersion at 6 psig, will not rust
Type 7	Explosion proof Cl I, Gps A, B, C, D	indoor	Hazardous locations: protection against corrosive effects of liquids and gases
Type 8	Explosion proof Cl I, Gps A, B, C, D	indoor/ outdoor	Hazardous locations: protection against corrosive effects of liquids and gases; contacts or connections immersed in oil
Type 9	Explosion proof Cl II, Gps E or G	indoor	Hazardous locations: dust-tight, hazardous dust
Type 10	Hazardous Locations	indoor	(MSHA) Mine Safety and Health Adm. per 30 C.F.R., Part 18
Type 11	Oil-tight/Corrosion	indoor	protection from corrosive effects of gases and liquid dripping, seepage and external condensation of corrosives, oil immersion
Type 12	Oil-tight/Dust-tight	indoor	fibers, lint, dust and light splashing, seeage, and dripping condensation of non-corrosive liquids
Type 12K	Oil-tight/Dust-tigh	indoor	same as type 12 above, enclosure has knockouts
Type 13	Oil-tight/Dust-tight	indoor	dust, spraying of water, oil and corrosive coolant, oil resistant gaskets

Approval Agencies

This group defines the options or approvals which may be required for a particular application. Safety requirements, the demands of the machinery on which the switch will be used, or the type of environment will all play a role in determining the type of approval needed.

Underwriters Laboratories (UL) **DEMCO** (Subsidiary of UL)	Our file number is E79070 for hazardous location switches and E81878 for general purpose switches.
Mine Safety and Health Administration (MSHA)	Our file number is X/P-1504-1 November 20, 1984.
Factory Mutual (FM)	Factory Mutual approved switches are listed in the Factory Mutual Approved Guide.
Canadian Standard Association (CSA)	Our file number is LR-24226, (CSA) which includes most GO® Switches except special models.
Standards Association of Australia (SAA) Ex109.	Our file number is EL/29:78062/M90
British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA) (Cenelec)	Our file number is Ex 89C1233X for use in Zone 1 Hazardous areas.

UL Hazardous Locations

Class I
Flammable Gases, Vapors or Liquids
Class I Area Classification

Division 1:
Where ignitable concentrations of flammable gases, vapors, or liquids can exist all of the time or some of the time under normal operating conditions.

Zone 0:
Where ignitable concentrations of flammable gases, vapors or liquids can exist all of the time or long periods of time under normal operating conditions.

Zone 1:
Where ignitable concentrations of flammable gases, vapors or liquids can exist some of the time under normal operating conditions.

Division 2:
Where ignitable concentrations of flammable gases, vapors or liquids are not likely to exist under normal operating conditions.

Zone 2:
Where ignitable concentrations of flammable gases, vapors, or liquids are not likely to exist under normal operating conditions.

Class I Groups

Division 1 & 2	Zone 0, 1 & 2
A (acetylene)	IIC (acetylene & hydrogen)
B (hydrogen)	
C (ethylene)	IIB (ethylene)
D (propane)	IIA (propane)

Class I Temperature Codes

Division 1 & 2	Zone 0, 1 & 2
T1 (≤450°C)	T1 (≤450°C)
T2 (≤300°C)	T2 (≤300°C)
T2A, T2B, T2C, T2D (≤280°C, ≤260°C, ≤230°C, ≤215°C)	
T3 (≤200°C)	T3 (≤200°C)
T3A, T3B, T3C (≤180°C, ≤165°C, ≤160°C)	
T4 (≤135°C)	T4 (≤135°C)
T4A (≤120°C)	
T5 (≤100°C)	T5 (≤100°C)
T6 (≤85°C)	T6 (≤85°C)

Class II
Combustible Dusts
Class II Area Classification

Division 1:
Where ignitable concentrations of combustible dusts can exist all of the time or some of the time under normal operating conditions.

Division 2:
Where ignitable concentrations of combustible dusts are not likely to exist under normal operating conditions.

Class II Groups

Division 1 & 2
E (metals - Div. 1 only)
F (coal)
G (grain)

Class II Temperature Codes

Division 1 & 2
T1 (≤450°C)
T2 (≤300°C)
T2A, T2B, T2C, T2D (≤280°C, ≤260°C, ≤230°C, ≤215°C)
T3 (≤200°C)
T3A, T3B, T3C (≤180°C, ≤165°C, ≤160°C)
T4 (≤135°C)
T4A (≤120°C)
T5 (≤100°C)
T6 (≤85°C)

Class III
Ignitable Fibers & Flyings
Class III Area Classification

Division 1:
Where easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used.

Division 2:
Where easily ignitable fibers are stored or handled.

Class III Groups

Division 1 & 2
None.

Class III Temperature Codes

Division 1 & 2
T3B, T3C (≤165°C, ≤160°C)
T4 (≤135°C)
T4A (≤120°C)
T5 (≤100°C)
T6 (≤85°C)

Note: Article 503 of the NEC limits the maximum temperature codes for Class III equipment to 165°C for equipment not subject to overloading and to 120°C for equipment that may be overloaded.

UL Hazardous Locations

Class I, Division 1 & 2 Protection Methods

Area	Protection	Applicable Certification Documents U.S.	Canada
Division 1	Explosion proof	UL 1203	CSA-30
	Intrinsically safe (2 fault)	UL 913	CSA-157
	Purged/pressurized (Type X or Y)	NFPA 496	NFPA 496
Division 2	Non-incendive	UL 1604	CSA-213
	Non-sparking device	UL 1604	CSA-213
	Purged/pressurized (Type Z)	NFPA 496	NFPA 496
	Hermetically sealed	UL 1604	CSA 213
	Any Class I, Div. 1 method	---	---
	Any Class I, Zone 1 or 2 method	---	---

Class I, Zone 0, 1 & 2 Protection Methods

Area	Protection	Applicable Certification Documents U.S.	Canada	IEC	Europe
Zone 0	Intrinsically safe, 'ia' (2 fault)	UL 2279, Pt. 11	CSA-E79-11	IEC 60079-11	EN50020
	Class I, Div. 2 Intrinsically safe, (2 fault) method	UL 913	CSA-157	---	---
Zone 1	Encapsulation, 'm'	UL 2279, Pt. 18	CSA-E79-18	IEC 60079-18	EN 50028
	Flameproof, 'd'	UL 2279, Pt. 1	CSA-E79-1	IEC 60079-1	EN 50018
	Increased safety, 'e'	UL 2279, Pt. 7	CSA-E79-7	IEC 60079-7	EN 50019
	Intrinsically safe, 'ib' (1 fault)	UL 2279, Pt. 11	CSA-E79-11	IEC 60079-11	EN 50020
	Oil immersion, 'o'	UL 2279, Pt. 6	CSA-E79-6	IEC 60079-6	EN 50015
	Powder filling, 'q'	UL 2279, Pt. 5	CSA-E79-5	IEC 60079-5	EN 50017
	Purged/pressurized, 'p'	---	CSA-E79-2	IEC 60079-2	EN 50016
	Any Class I, Zone 0 method	---	---	---	---
	Any Class I, Div. 1 method	---	---	---	---
Zone 2	Non-incendive, 'nC'	UL 2279, Pt. 15	CSA-E79-15	IEC 60079-15	prEN 50021
	Non-sparking device, 'nA'	UL 2279, Pt. 15	CSA-E79-15	IEC 60079-15	prEN 50021
	Restricted breathing, 'nR'	UL 2279, Pt. 15	CSA-E79-15	IEC 60079-15	prEN 50021
	Hermetically Sealed, 'nC'	UL 2279, Pt. 15	CSA-E79-15	IEC 60079-15	prEN 50021
	Any Class I, Zone 0 or 1 method	---	---	---	---
	Any Class I, Div. 1 or 2 method	---	---	---	---

UL Hazardous Locations

Class II, Division 1 & 2 Protection Methods

		Applicable Certification Documents	
Area	**Protection**	**U.S.**	**Canada**
Division 1	Dust-ignition proof	UL 1203	CSA-25 or CSA-E-1241-1-1
	Intrinsically safe	UL 913	CSA-157
	Pressurized	NFPA 496	NFPA 496
Division 2	Dust-tight	UL 1604	CSA-157 or CSA-E-1241-1-1
	Non-incendive	UL 1604	---
	Non-sparking	UL 1604	---
	Pressurized	NFPA 496	NFPA 496
	Any Class II, Div. 1 method	---	---

Hazardous Locations Markings

Class I, II & III, Division 1 & 2 (U.S. & Canada) -- This marking would include:
Class(es), Division(s), Gas/Dust Group(s), Temperature Code. *Example:* Class I, Division 1, Groups C & D, T4A.

Class I, Zone 0, 1 & 2 (U.S. & Canada) -- This marking would include:
Method A: For Zone Listings based on UL 2279 or the CSA-E79 Series Class, Zone(s), Ex, Protection Method(s), Gas Group, Temporary Code. *Example*: Class I, Zone 1, Ex de IIB T4.

Method B: For Zone Listings based on UL or CSA Division Certification Documents Class, Zone(s), Gas Group, Temperature Code. *Example*: Class I, Zone 1, Group IIB T4.

Note: For U.S. Zone Listings based on UL 2279, Article 505 of the 1999 NEC requires that the "Ex" element of the marking string shall read "AEx."

Note: For Canadian Zone Listings based on the CSA-E79 Series, the "Class" and "Zone" elements of the marking string are optional.

Zone 0, 1 & 2 (IEC only) -- This marking would include:
Ex, Protection Method(s), Gas Group, Temperature Code. *Example*: Ex de IIB T4.

Zone 0, 1 & 2 (Europe only) -- This marking would include:
EEX, Protection Method(s), Gas Group, Temperature Code. *Example*: EEX de IIB T4.

UL Hazardous Locations

Class III, Division 1 & 2 Protection Methods

		Applicable Certification Documents	
Area	**Protection**	**U.S.**	**Canada**
Division 1	Dust-tight	UL 1604	CSA-157
	Intrinsically safe	UL 913	CSA-157
Division 2	Dust-tight	UL 1604	CSA-157
	Intrinsically safe	UL 913	CSA-157

UL's Hazardous Locations Standards

ANSI/UL 674	Electric motors and generators for use in Division 1 hazardous (classified) locations.
ANSI/UL 698	Industrial control equipment for use in hazardous (classified) locations.
ANSI/UL 781	Portable electric lighting units for use in hazardous (classified) locations.
ANSI/UL 783	Electric flashlights and lanterns for use in hazardous (classified) locations.
ANSI/UL 823	Electric heaters for use in hazardous (classified) locations.
ANSI/UL 844	Electric lighting fixtures for use in hazardous (classified) locations.
ANSI/UL 877	Circuit breakers and circuit-breaker enclosures for use in hazardous (classified) locations.
ANSI/UL 886	Outlet boxes and fittings for use in hazardous (classified) locations.
ANSI/UL 894	Switches for use in hazardous (classified) locations.
ANSI/UL 913	Intrinsically safe apparatus and associated apparatus for use in Class I, II and III, Division I, hazardous (classified) locations.
ANSI/UL 1002	Electrically operated valves for use in hazardous (classified) locations.
ANSI/UL 1010	Receptacle-plug combinations for use in hazardous (classified) locations.
ANSI/UL 1067	Electrically conductive equipment and materials for use in flammable anesthetizing locations.
ANSI/UL 1203	Explosion-proof and dust-ignition-proof electrical equipment for use in hazardous (classified) locations.
ANSI/UL 1207	Sewage pumps for use in hazardous (classified) locations.
UL 1604	Electrical equipment for use in Class I and II, Division 2, and Class III hazardous (classified) locations.
UL 2208	Solvent distillation units.
UL 2225	Metal-clad cables and cable-sealing fittings for use in hazardous (classified) locations.
ANSI/UL 2279	Electrical equipment for use in Class I, Zone 0, 1 and 2 hazardous (classified) locations.

Ambient Temperature
The temperature for a medium, such as gas or liquid, surrounding an object.

Analog Signal
A signal in which the data is represented or transmitted in continuously varying quantities, as opposed to a digital signal.

ANSI
Abbreviation for American National Standards Institute.

AWG
Abbreviation for American Wire Gauge; based on circular mil system.

AWM
Appliance Wiring Material.

Axial Motion
A motion of the target along the reference axis.

BASEEFA
Abbreviation for British Approvals Service for Electrical Equipment in Flammable Atmospheres.

CEE
Abbreviation for the International Commission on Rules for the approval of Electrical Equipment.

CE Mark
A trademark that allows a manufacturer trade privileges with the European Union. The CE Mark, by responsibility of the manufacturer, insures that certain directives have been met through testing and documentation.

CENELEC
European Committee for Electrotechnical Standardization.

C-UL
Products bearing this mark are a UL listed device, and tested to CSA standards.

Contact Bounce
A condition that can occur with switching circuits in which the movable contacts close against the stationary contacts with enough energy to "bounce" and reopen the contacts. This may occur several times, very rapidly, during a contact closure.

Contact Pressure
The amount of force holding the movable and stationary contacts together.

CSA
Abbreviation for Canadian Standards Association.

DEMCO
A subsidiary of Underwriter's Laboratories.

Differential (Hysteresis) (Reset)
The distance which a target must move from the sensing point in order to allow the switch to reset.

Differential Travel
A distance between the operating and release points.

Digital Signal
A signal in which the data is transmitted or represented by a series of discrete pulses or steps of constant amplitude.

Dry Circuit
A circuit in which the open circuit voltage is 0.03V or less and the current is 200 mA or less. At such low levels, the current is not able to break through the film of oxides, sulfides or other films which may build up on the contact surfaces.

Environmental Seal
A seal created by gaskets, seals, potting or other means, designed to keep out contamination which might reduce performance. An environmental seal is sometimes referred to as a "factory seal."

Explosion Proof
The property of being able to contain an explosion within the sensor or housing.

Frequency
The number of cycles completed by an alternating current in one second. The newest term Hertz, abbreviated “Hz,” is equivalent to “cycles per second.”

Hermetic seal
A permanent seal created by fusion, soldering, welding, brazing or other means, to prevent the transmission of gases. A hermetic seal is also referred to as "helium tight," "leak tight," or "vacuum tight." For most applications, a hermetic seal is one where the leakage rate is less than 1 x 10^{-8} cubic centimeters per second of helium, at a differential of one atmosphere.

Hi-Pot
A device used to place a high voltage across an insulator, to test its insulating properties. The typical Hi-Potential Breakdown Test specified by CSA and UL requires that the voltage be twice the rated voltage, plus 1000 volts, plus 20% of that total. For example, a 600v switch would be tested at [(600 x 2) + 1000] x 1.2=2640 volts. This voltage is placed across the insulator for 1 second, If the insulator doesn't break down, it is considered acceptable.

Hysteresis (Differential) (Reset)
The distance which a target must move from the sensing point in order to allow the switch to reset.

IEC
Abbreviation for the international Electrical and Electronics Engineers.

(IS) Intrinsically Safe
Intrinsic safety may be attained through integral circuitry or an appropriately sized barrier, both of which are current limiting devices. The on-board circuitry, or barrier, is designed for the area classification which the monitoring device is to be used. The basis of intrinsic safety is to limit the amount of current through a device, so that if there is exposure to the surrounding atmosphere there is not sufficient heat generated to ignite that atmosphere.

ISO
Abbreviation for the International Standards Organization.

Latching Condition
A condition where the switch will not reset to its unoperated mode. It must be operated, then reset, in two separate operations.

Lateral Motion
A motion of the target perpendicular to the reference axis.

Leakage Current
Minute amounts of current which flow through a switch even in the unoperated state. Leakage current occurs with electronic switches since they require an external power supply. GO® Switches do not require a power supply and, therefore have no leakage current.

MSHA
Abbreviation for Mine Safety Heath Administration

NEMA
Abbreviation for the National Electrical Manufacturers Association.

NEC
National Electric Code.

Non-incendive
Non-incendive equipment contain components that do not allow arcs or sparks to ignite concentrations of flammable gases. One method of producing a non-incendive switch is by sealing off the contact chamber with a hermetic seal so that a flammable gas cannot enter into the arcing / sparking area of the switch.

Normally Closed Circuit
Circuit which passes current when the GO Switch is not actuated. Symbolized by N/C.

Normally Open Circuit
Circuit which passes current when the GO Switch is actuated. Symbolized by N/O.

Operating Distance
A distance at which the target under its axial or lateral approaching causes the switch to operate. An axial operating distance is a distance between an operating point and the sensing face; a lateral operating distance is a distance between an operating point and the reference axis.

(PPM) Pulses Per Minute
Refers to applications, particularly in motion control circuits on rotary applications, where several operations of a switch take place with each revolution of the actuator device. If the actuator turns at "X" revolutions per minute and there are "Y" operations per revolution, the pulses per minute rate would be "X" x "Y" PPM.

PSI
Pounds per square inch. A unit of measure for pressure on a given surface.

PVC
Polyvinyl chloride.

Proximity Switch
A position switch which is operated without mechanical contact with a moving target.

Rated Temperature
Maximum temperature at which an electric component can operate for extended periods without breaking down due to heat.

Rated Voltage
Maximum voltage at which an electric component can operate for extended periods without undue degradation or safety hazard.

Reference Axis
An axis perpendicular to the sensing face and passing through its center.

Release Point
A position of the target at its axial or lateral moving away from the switch when it returns to non-operating state.

Repeatability
Ability to perform the same task operating parameters, consistently, time after time.

Reset (Differential) (Hysteresis)
The distance which a target must move from the sensing point in order to allow the switch to reset.

Response Time
The amount of time required for the switch to move from N/C position to N/O position, or vice versa.

RTV
Abbreviation for Room Temperature Vulcanizing.

SAA
Abbreviation for Standards Association of Australia.

SAE
Abbreviation for Society of Automotive Engineers.

Same Polarity Only
On DMDB switches the like terminals must be wired with the same voltage polarity.

Sensing Area
That location marked on a GO® Switch that is most sensitive to a ferrous or magnetic target.

Sensing Distance Range
Maximum gap between switch and target when the switch first operates; the trip point.

Sensing Face
A surface of the switch through which the magnetic field interact with a moving target and causes the switch operate.

SO Cable
A cable designed for industrial use that has the PVC insulated lead wires protected by a rubber (usually neoprene) jacket.

Standard Target
A specified object used for making comparative measurements of the operating and differential distances.

TEW
Thermoplastic Equipment Wire.

Temperature Rating
Maximum and minimum temperature at which an insulating material can be used in continuous operation without loss of basic properties.

UL
Abbreviation for Underwriter's Laboratories.

Voltage Drop
The amount of voltage across a pair of closed contacts. In GO Switches, this voltage drop is extremely low, compared to solid state switches.

Voltage Rating
The highest voltage that may be continuously applied to an electrical device in conformance with standards or specifications.

Conversion Factors

PSI x 27.71 = in. H_2O
PSI x 2.036 = in. Hg
PSI x 703.1 = mm H_2O
PSI x 51.75 = mm Hg
PSI x .0703 = kg/cm²
PSI x .0689 = bar
PSI x 68.95 = mbar
PSI x 6895 = Pa
PSI x 6.895 = kPa

Note: conversion factors are rounded.

Pressure*			
BAR	ATM.	Kg cm2	P.S.I.
1	1	1	15
2	2	2	30
3	3	3	45
5	5	5	75
10	10	10	150
20	20	20	300
30	30	30	450
50	50	50	750
100	100	100	1500
200	200	200	3000
300	300	300	4500
500	500	500	7500
1000	1000	1000	15000

Pressure
Standard Atmosphere Pressure is 15 psi (14.7)
15 Pounds = 1 Atmosphere
Square Inch

Bar is a Unit of Pressure Equal to 1 Atmosphere or Approx. 15 Pounds
Square Inch

*Conversions are approximate for convenience of users.

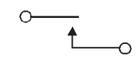
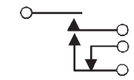
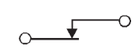
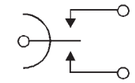
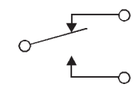
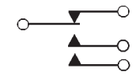
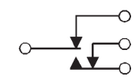
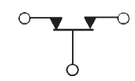
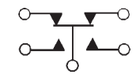
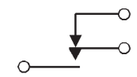
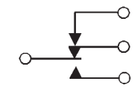
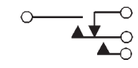
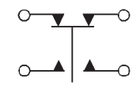
Fraction/Decimal/Millimeter Conversion Chart					
Inches	Decimals	Millimeters	inches	Decimals	Millimeters
1/64	0.0157	0.40	33/64	0.5156	13.10
1/32	0.0313	0.80	17/32	0.5312	13.49
3/64	0.0469	1.19	35/64	0.5469	13.89
1/16	0.0625	1.59	9/16	0.5625	14.29
5/64	0.0781	1.98	37/64	0.5781	14.68
3/32	0.0938	2.38	19/32	0.5938	15.08
7/64	0.1094	2.78	39/64	0.6094	15.48
1/8	0.125	3.18	5/8	0.6250	15.88
9/64	0.1406	3.57	41/64	0.6406	16.27
5/32	0.1563	3.97	21/32	0.6563	16.67
11/64	0.1719	4.37	43/64	0.6719	17.07
3/16	0.1875	4.76	11/16	0.6875	17.46
13/64	0.2031	5.52	45/64	0.7031	17.86
7/32	0.2188	5.56	23/32	0.7188	18.26
15/64	0.2344	5.95	47/64	0.7344	18.65
1/4	0.2500	6.35	3/4	0.7500	19.05
17/64	0.2656	6.75	49/64	0.7656	19.45
9/32	0.2813	7.14	25/32	0.7813	19.84
19/64	0.2969	7.54	51/64	0.7969	20.24
5/16	0.3125	7.94	13/16	0.8125	20.64
21/64	0.3281	8.33	53/64	0.8281	21.03
11/32	0.3438	8.73	27/32	0.8348	21.43
23/64	0.3594	9.13	55/64	0.8594	21.83
3/8	0.3750	9.53	7/8	0.8750	22.23
25/64	0.3906	9.92	57/64	0.8906	22.62
13/32	0.4063	10.32	29/32	0.9063	23.02
27/64	0.4219	10.72	59/64	0.9219	23.42
7/16	0.4375	11.11	15/16	0.9375	23.81
29/64	0.4531	11.51	61/64	0.9531	24.21
15/32	0.4688	11.91	31/32	0.9688	24.61
31/64	0.4844	12.30	63/64	0.9844	25.00
1/2	0.5000	12.70	1	1	25.40

1 mm = .040" .001" = .0254 mm

Temperature Conversion	
Fahrenheit	Centigrade
F	C
-40	-40.00
-30	-34.44
-20	-28.89
-10	-23.33
0	-17.78
10	-12.22
20	-6.67
30	-1.11
40	4.44
50	10.00
60	15.56
70	21.11
80	26.67
90	32.22
100	37.78
110	43.33
120	48.89
130	54.44
140	60.00
150	65.56
160	71.11
170	76.67
180	82.22
190	87.78
200	93.33
250	121.11
275	135.00
300	148.89
325	162.78
350	176.67
375	190.55
400	204.44
425	218.33
450	232.22
475	246.11
500	260.00

Temperature conversion formula

$C = \frac{5}{9}(F-32)$ $F = \frac{9}{5}C + 32$

Basic Contact Forms	
A **Make** **SPST-NO** 	**J** Make, Make, Break 
B Break SPST-NC 	**K** Center off SPDT 
C **Break, Make** **Transfer** **SPDT** 	**L** Break, Make, Make 
D Make, Break (Continuity Transfer) 	**U** Double make Contact on arm 
E Break, Make, Break 	**V** Double break Contact on arm 
F Make, Make 	**W** Double break, Double make, Contact on arm 
G Break, Make 	**X** Double make 
H Break, Break, Make 	**Y** Double break 
I Make, Break, Make 	**Z** **Double make** **Double break** **SPDT-DB** 

Notes

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