IOM

TopWorx engineers are happy to provide technical assistance on GO™ Switch products. However, it is the customer's responsibility to determine the safety and suitability of the product in their application. It is also the customer's responsibility to install the switch using the current electrical codes in their region.

70 Series

GO SWITCH™

Introduction

GO™ Switches operate on the principle of magnetic attraction, reacting to ferrous metal or magnetic targets as they come within the switch's sensing range.

Although switches vary in design according to their intended applications, all GO™ Switches use permanent magnets which, when actuated by the presence of a ferrous or magnetic target, change the state of electrical contacts.

Mounting

- 70 Series GO™ Switches are unaffected by weld fields and RF interference.
- 70 Series GO™ Switches may be mounted adjacent to or surrounded by ferrous metals however the proximity of ferrous metals will affect sensing distance. For the maximum rated sensing distance, avoid mounting near ferrous metals.
- 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 the sensing area. Sensing range will vary according to model number and 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.

- Greater target mass and target movement fully into and out of sensing range will increase contact pressure. This is helpful in low current controls 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. For typical installations: Torque 3/8" threads to 60lbs-in (7 Nm) max. Torque 5/8" threads to 35 lbs.-ft. (47 N-m) max. Consult TopWorx technician for special installations.
- Configure mounting so bracket dissects switch as close to the middle of the body as possible. This eliminates undue stress caused by heavy cables, connectors, etc.
- Two appropriately sized jam nuts are included with switch. Lock washers are recommended where vibration is present.

Specifications - SPDT

Sensing Distance:
71 & 72: .040" (1.02mm) 2,000 PSI
73-77, 7L: .100" (2.54mm) 2,000 PSI
73-77: .072" (1.83mm) 5,000 PSI
73-77: .060" (1.52mm)10,000 PSI

Range with Target Magnet:
Up to .35" (Model 71 & 72 up to .15")

Differential:
Approx. .020" (.5mm)

Thread Options:
71, 72: 3/8-24 UNF; M12 x 1
73-76, 7L: 5/8-18 UNF; M18 x 1

Response time:
8 milliseconds

Temperature Rating:
71-77: 40ºF (-40ºC) to 221ºF (105ºC) Std.*
71-77,7G, 7H: -HiTemp to 400ºF (204ºC)*
7L: -40ºF (-40ºC) to 160ºF (71ºC)*

* Reference certificates for variations to temperature rating.

Contact Material:
Palladium silver with Sawtooth surface configuration

Contacts:
Single Pole, Double Throw, Form C

Electrical Ratings: Resistive
71-77:
4A @ 120VAC/3A @ 24VDC
2A @ 240 VAC/1.25A @ 48VDC

7L:
.25A @ 120VAC/24VDC (approx. 5V drop)

Target Material:
Ferrous metal; optional target magnets

Conduit Outlet:
1/2" -14 NPT
M20 x 1.5

Enclosure Material:
Stainless steel type 303, 316 optional;
7L - 316 stainless steel

Repeatability:
.002" (0.05mm) Under identical operating conditions

Specifications - DPDT

Sensing Distance:
.090" (2.3mm) end sensing (2000 PSI)

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

Differential:
Approx. .020"(.5 mm)

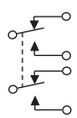
Thread Option:
7G, 7H: 5/8"-18 UNF; M18 x 1
7I: 1"-14 UNF

Response time:
8 milliseconds

Temperature Rating:
-40°F (-40°C) to 221°F (105°C)*
HiTemp option to 400°F (204°C)*
* Reference certificates for variations to temperature rating.

Contact Material:
Palladium silver with Sawtooth surface configuration

Contacts:
Double Pole Double Throw, 2 Form C.



Electrical Ratings: Resistive
3A @ 120VAC/1A @ 24VDC

Target Material:
Ferrous metal; Optional target magnets

Enclosure Materials:
Stainless Steel type 303, 316 optional

Conduit Outlet:
1/2"-14 NPT or 3/4-14 NPT
M20 x 1.5 or M24 x 1.5

Repeatability:
.002" (0.05mm) typical under identical operating conditions

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. The normally closed and normally open contacts change state.

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.

To apply the 70 Series GO™ Switch and 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 be-tween 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!**

Attachment of Conduit/Field Wiring

- When using long runs of conduit, 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.
- All conduit connected electrical devices, including GO™ Switches, are advised to be sealed against water ingression through the conduit system. See Figures 1 and 2 for best practices.

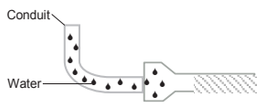


Figure 1. Incorrect

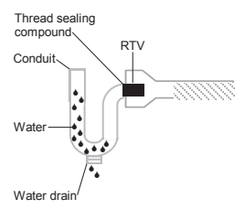


Figure 2. Correct

- Over sheathed or individual conductors must be mechanically protected against damage and appropriately terminated within a terminal or junction facility.
- An external ground connection must be protected via external mounting device, cable connection or conduit.

For hazardous locations/explosive atmospheres install per local Electrical Code. Dry contact devices, such as GO™ Switch, maybe installed intrinsically safe with matched barrier. 70 Series is hermetically sealed and does not require the installation of a separate conduit seal in the conduit connected system (e.g. UL/CSA CL I/II Div1) For Hermetic seal per UL Standard, use 7G-Series

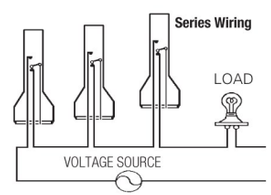
All GO™ Switches are "pure" contact switches, meaning they have no voltage drop when closed, nor do they have any leakage current when open. For multi-unit installation, switches may be wired in series or parallel, as shown below.

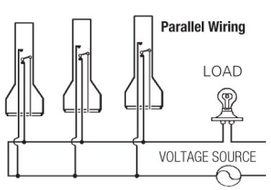
Series Wiring

Any number of GO™ Switches may be wired in series, without voltage drop. By contrast, solid state switches have about two volts drop across the switch when operated. In a 12 volt solid state system with four switches in series, 8 volts is dropped across the switches. Only 4V is left to operate the load. When using GO™ Switches, 12V is still available to operate the load. (Except 7L - approx. 5V drop)

Parallel Wiring

When solid state switches are placed in parallel, there is about 100 micro amps leakage through each switch. If ten solid state switches were wired in parallel, the total leakage current would be 1000 micro-amps or one milliamp - sufficient current to indicate an "ON" condition to a programmable logic controller (PLC). **Any number of GO™ Switches may be wired in parallel, with no current leakage and without drawing operating current.** (Except 7L - approx. 5V drop)





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.

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.

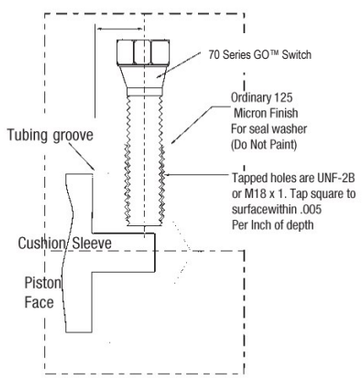
Cylinder Applications Switch Sealing Torque Values

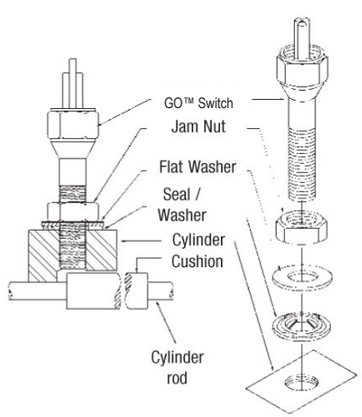
Models 71-72:
3/8" Diam/12mm
Torque Jam Nuts to:
15 lbs-in to achieve seal at 2,000 PSI
30 lbs-in to achieve seal at 5,000 PSI
Do not exceed 60lbs.-in (7N-m)

Models 73-76 & 7L:
5/8" Diam/18mm
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 35lbs.-ft (47 N-m)

FOR ADDITIONAL INFORMATION, SEE BULLETIN S-K037.

Cylinder Application Detail



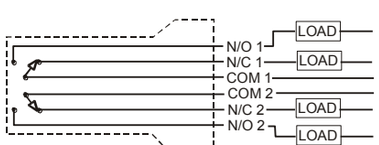


GO™ Switch Hook-Up Diagrams

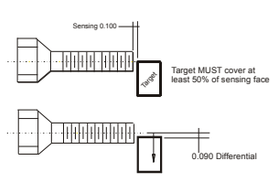
71, 72, 73, 74, 75, 76, 77 & 7G, & I
(Hermetically sealed) Models

SPDT (Form C) Contacts
May be wired from A (N/O) or B (N/C)

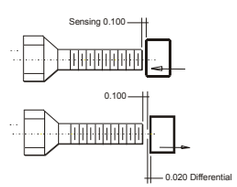
7G, 7H & 7I Models



DPDT (2 Form C) Contacts



Orientation A



Orientation B

⚠ WARNING

To reduce risk of death, serious injury or property damage:

- Personnel installing, maintaining, or operating this equipment must be qualified, must read, understand, and follow these instructions before proceeding.
- This document must be retained for future reference.
- Please contact local Topworx representative for questions, clarifications, or comments.

EU Declaration of Conformity

The products described herein, conform to the provisions of the following Union Directives, including the latest amendments:

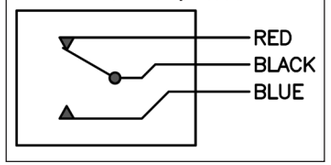
Low Voltage Directive (2014/35/EU)
EMD Directive (2014/30/EU)
UNION Directive (2014/34/EU).
Safety Integrity Level (SIL), Models 73, 74, 75, 76, 77, 7G, 7H, 7I, 7J Highest SIL capability: SIL3 (HFT:1), as per IEC61508-2:2010
Highest SC capability: SC3 (HFT:1), as per Clause 7.4.3
Proof Test Interval: 1 Year

IOM

70 Series

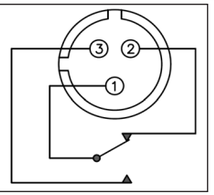
GO SWITCH™

3 Wire PVC & HiTemp Leads

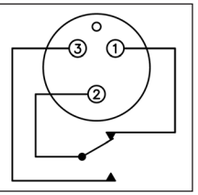


DBA
3 Pin Micro Connector

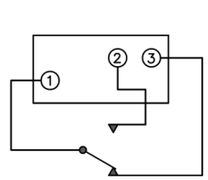
Pin 1 - COM
Pin 2 - N/C
Pin 3 - N/O



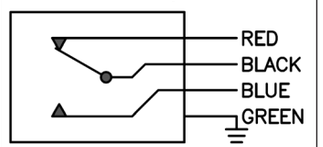
3DD - 3 Pin SUBSEA Connector
Pin 1 - N/C
Pin 2 - COM
Pin 3 - N/O



3DE - 3 Pin SUBSEA Right Angle Connector
Pin 1 - COM
Pin 2 - N/O
Pin 3 - N/C

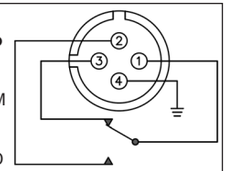


4 Wire PVC & HiTemp Leads

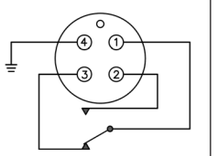


DBD
4 Pin Micro Connector

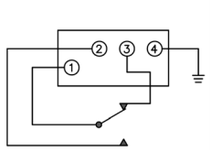
Pin 1 - COM
Pin 2 - N/O
Pin 3 - N/C
Pin 4 - GND



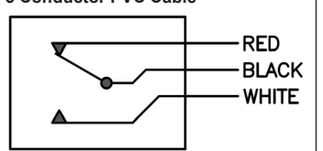
4DD - 4 Pin SUBSEA Connector
Pin 1 - COM
Pin 2 - N/O
Pin 3 - N/C
Pin 4 - GND



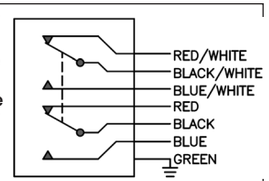
4DE - 4 Pin SUBSEA Right Angle Connector
Pin 1 - COM
Pin 2 - N/O
Pin 3 - N/C
Pin 4 - GND



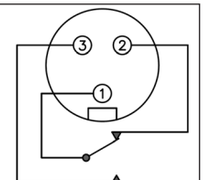
3 Conductor PVC Cable



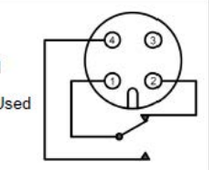
DPDT PVC Cable & 7 Wire DPDT



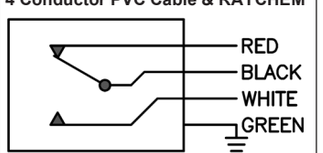
DCA
3 Pin Mini Connector
Pin 1 - COM
Pin 2 - N/C
Pin 3 - N/O



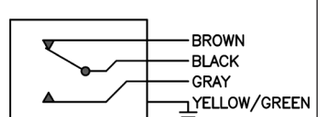
DMD
4 Pin M12 Connector
Pin 1 - COM
Pin 2 - N/C
Pin 3 - Not Used
Pin 4 - N/O



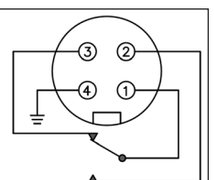
4 Conductor PVC Cable & RAYCHEM



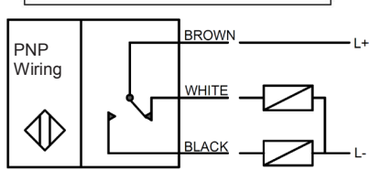
Silicone Cable
4 Wire



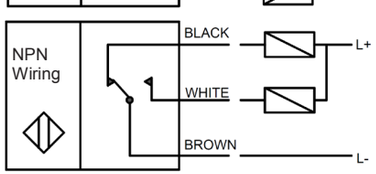
DCD
4 Pin Mini Connector
Pin 1 - COM
Pin 2 - N/O
Pin 3 - N/C
Pin 4 - GND



PNP Wiring

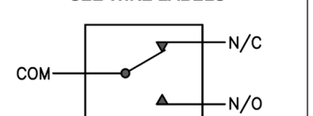


NPN Wiring

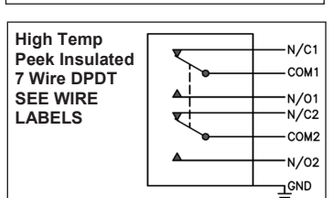


High Temp Peek Insulated 3 wire

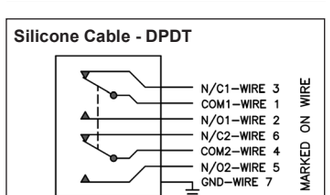
SEE WIRE LABELS



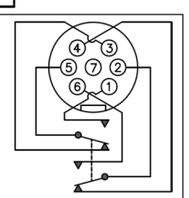
High Temp Peek Insulated 7 Wire DPDT SEE WIRE LABELS



Silicone Cable - DPDT



DCH 7 Pin Mini Connector
Pin 1 - N/O 2
Pin 2 - COM 1
Pin 3 - N/C 2
Pin 4 - N/C1
Pin 5 - COM 2
Pin 6 - N/O1
Pin 7 - GND



- The switch must be supplied from a Certified Ex ia IIC intrinsically safe source

- The flying leads must be terminated in a manner suitable for the zone of installation.

- An external ground connection must be protected by an external mounting device and / or cable connections /conduits.

- For 74 Series switch, operating and certified ambient temperatures are marked T6 / T85 °C (-20 °C ≤ Ta ≤ +50 °C).

DMD 4 Pin M12 Connector

External ground must be used with 120VAC and voltages greater then 60VDC when using the DMD connector

The GO Switch can be wired as PNP or NPN depending on the desired application

CE 0518 Ex II 2GD

Ex db IIC T* Gb; Ex tb IIIC T* Db; IP66
With PVC leads/cables: T6/T85°C, Tamb: -40°C to +50°C
With TEFLON leads: T4/135°C, Tamb: -40°C to +100°C
With PEEK leads: T3/T200°C, Tamb: -40°C to 150°C
Model 72, 74, 76 with RAYCHEM cable: T6/85°C; T4/135°C; T3/200°C, Tamb: -55°C to +55°C/100°C/100°C
Model 74 with NILTOX cable: T6/85°C, Tamb: -20°C to +50°C
Baseefa 08ATEX0360X
IECEx BAS 08.0122X
120VAC/4A and 24VDC/3A for SPDT switches
120VAC/3A and 24VDC/1A for DPDT switches

CE INMETRO Ex NEPSI EAC

Ex d IIC T* Gb; Ex tb IIIC T* Db; IP66
With PVC leads/cables: T6/T85°C, Tamb: -40°C to +50°C
With TEFLON leads: T4/135°C, Tamb: -40°C to +100°C
With PEEK leads: T3/T200°C, Tamb: -40°C to 150°C
Model 72, 74, 76 with RAYCHEM cable: T6/85°C; T4/135°C; T3/200°C, Tamb: -55°C to +55°C/100°C/100°C
Model 74 with NILTOX cable: T6/85°C, Tamb: -20°C to +50°C
UL-BR 18.0097X
TC RU C-US.ГШ02.B.00063
GYJ16.1507X
120VAC/4A and 24VDC/3A for SPDT switches
120VAC/3A and 24VDC/1A for DPDT switches

CE 0518 Ex II 1GD EAC

Ex ia IIC T6 Ga, Ex ia IIIC T85°C Da (Tamb = -40°C to +50°C)
Ex ia IIC T4 Ga, Ex ia IIIC T135°C Da (Tamb = -40°C to +100°C)
Ex ia IIC T3 Ga, Ex ia IIIC T200°C Da (Tamb = -40°C to +150°C)
Baseefa 09ATEX0173X
IECEx BAS 09.0080X
TC RU C-US.ГШ02.B.00061
Ui = 30V and Ii = 250mA

Reference Baseefa Certificate for special conditions.
All area classifications are dictated by the model number. Reference GO™ Switch brochure for complete listing.

For 7L Series with "E" approval the following statements apply:
-This equipment is suitable for use in Class I, Division 2, Groups A,B,C & D, Class II, Division 2, Groups F&G and Class III or non-hazardous locations only.

-**Warning-Explosion Hazard-** Substitution of components may impair suitability for Class 1, Division 2.
-**Warning-Explosion Hazard** - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Special Conditions for Safe Use and Possible Misuse

-The over sheathed or individual conductors must be suitably protected against mechanical damage and terminated within a terminal or junction facility suitable for the conditions of use.
-Three wire/three pin devices are not provided with an external connection facility for the earthing or bonding conductor. It is the user's responsibility to ensure adequate earth continuity via the mounting arrangements.
-Both contacts of the Double Throw and the separate poles of the Double Pole switch, within one proximity switch must form part of the same intrinsically safe circuit.
-The proximity switches do not require a connection to earth for safety purposes, but an earth connection is provided which is directly connected to the metallic enclosure. Normally an intrinsically safe circuit may be earthed at one point only. If the earth connection is used, the implications of this must be fully considered in any installation. i.e. by the use of a galvanically isolated interface.

有毒或有害物質 (Hazardous Substance)						
零件名称 (Part Name)	铅 (Lead) (Pb)	汞 (Mercury) (Hg)	镉 (Cadmium) (Cd)	六价铬 (Hexavalent Chromium) (Cr+6)	多溴联苯 (Polybrominated biphenyls) (PBB)	多溴二苯醚 (Polybrominated diphenyl ethers) (PBDE)
接触组件 (Contact Assembly)	X	O	O	O	O	O
磁铁 (Magnets)	O	O	O	O	O	O
壳体 (Enclosure)	O	O	O	O	O	O
塑料 (Plastic)	O	O	O	O	O	O
接线 (Wiring)	X	O	O	O	X	X

○：表示该有毒有害物质在该部件所有物质材料中的含量均低于GB/T26572规定的限量要求以下
×：表示该有毒有害物质至少在该部件的某一物质材料中的含量超出GB/T26572规定的限量

EMERSON

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