



# EMERSON Go Switch Proximity Sensor Instruction Manual

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**EMERSON Go Switch Proximity Sensor**



TopWorx engineers are happy to provide technical assistance on GOTM 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.

#### Caution- Switch Damage

- Switch must be installed according to local electrical codes.
- Wiring connections must be properly secured.
- For two-circuit switches, contacts must be connected to the same polarity in order to minimize the possibility of a line-to-line short.
- In damp environments, use a certified cable gland or a similar moisture barrier to prevent water/condensation from entering conduit hub.

#### Danger- Improper Use

All switches must be installed per the certification requirements.

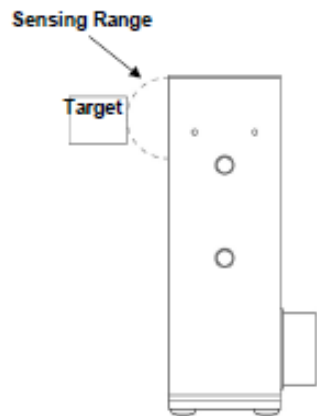
Mounting tips for standard and latching switch

- Determine the desired operating point.
- Determine location of the sensing area on the GO™ Switch.

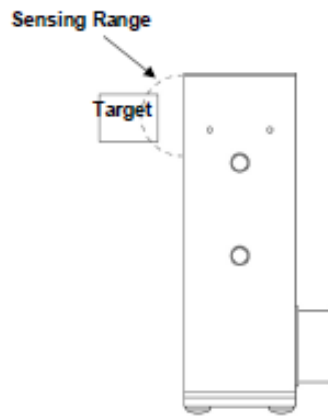


- Position the switch and target in a position that ensures the target comes within the switches sensing area.

In **Figure 1**, the target has been positioned to stop on the outside edge of the sensing envelope. This is a marginal condition for long-term reliable operation.



**Figure 1**

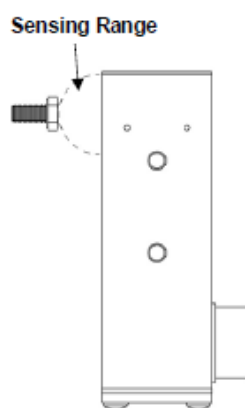


**Figure 2**

In **Figure 2**, the target has been positioned to stop well within the sensing envelope which will assure long reliable operation.

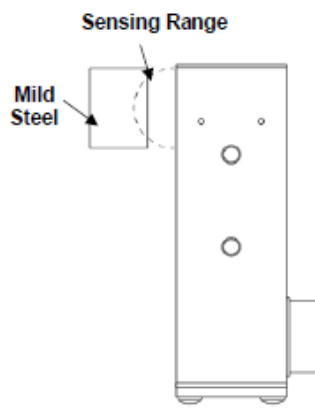
Ferrous target needs to be at least one cubic inch in size. If the target is less than one cubic inch in size, it may significantly reduce operational effectiveness or the target might not be detected by the switch.

**Incorrect**



**Figure 3**

**Correct**

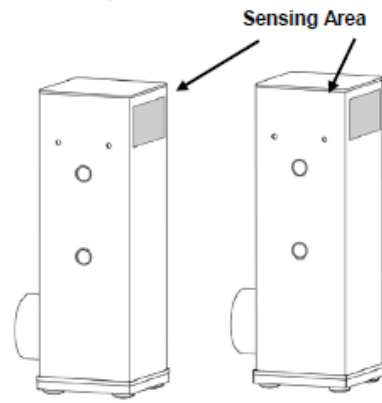


**Figure 4**

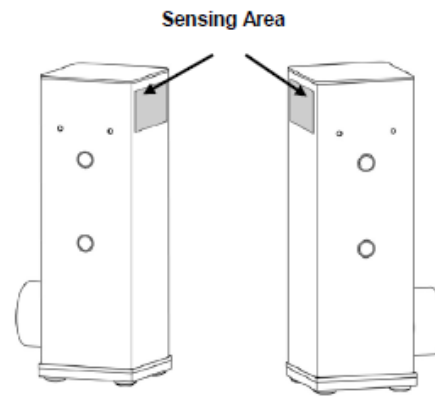
In **Figure 3**, the ferrous target is too small to be detected reliably over the long term.

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

- Switch may be mounted in any position.  
Side by side on non-ferrous bracket (Figure 5 and 6).



**Figure 5**



**Figure 6**

- Switch mounted on non-magnetic materials

### **Recommended for the best results**

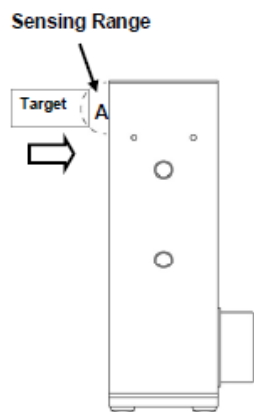
a). Keep all ferrous materials at least 1" from switch.

b). Steel placed outside the switches sensing area will not affect functioning.

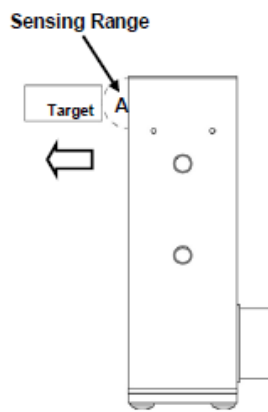
It is not recommended that switches are mounted on ferrous metal, due to the reduction in sensing distance.

### **Activate/Deactivate the switch**

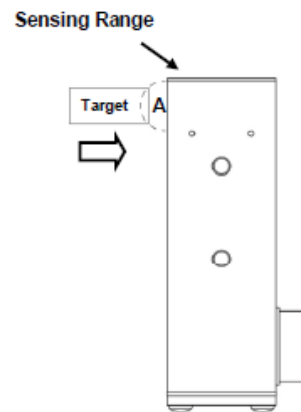
a). Switch with standard contacts – has sensing area on one side of the switch (A). To activate, the ferrous or magnetic target must fully enter the sensing area of the switch (Figure 7). To deactivate the target must move fully outside the sensing area, equal or greater than the reset distance in Table.



**Switch is activated  
Figure 7**



**Switch is deactivated  
Figure 8**



**Switch is activated again  
Figure 9**

To activate the contacts on side A (see Figure 10), the target must fully enter sensing area A of the switch (see sensing ranges in Table x). To deactivate the contacts on side A and activate on side B, the target must move fully outside of sensing area A and another target fully enter sensing area B (Figure 11). To reactivate the contacts on side A, the target must fully exit sensing area B and the target must fully re-enter sensing area A (Figure 13).

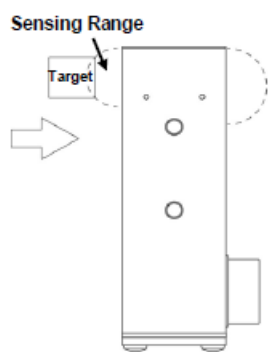


Figure 10

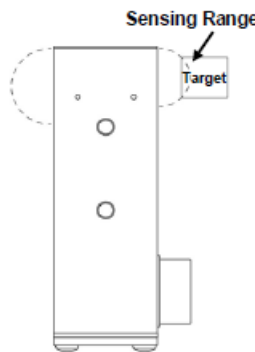


Figure 11

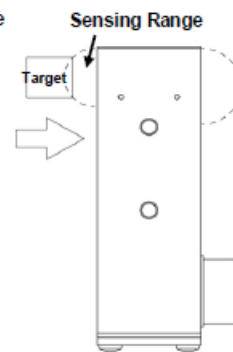


Figure 12

## Sensing Range

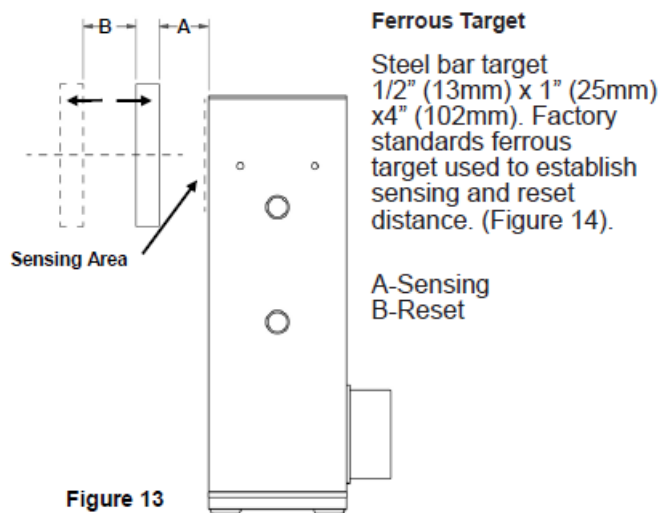


Figure 13

Sensing range includes ferrous target and magnets.

Standard & Latching

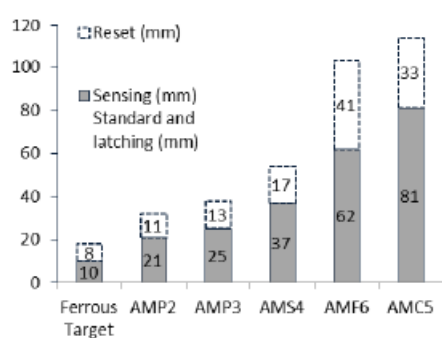


Table 1

Extended Sensing (available only for 10)

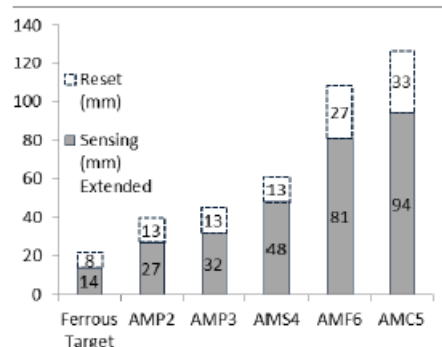
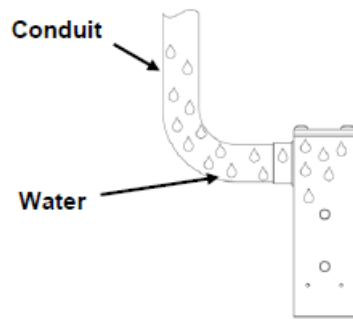


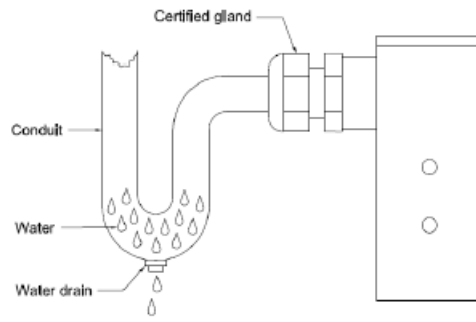
Table 2

All conduit-connected electrical devices, including GO™ Switches, must be sealed against water ingress through the conduit system. See Figures 14 and 15 for best practices.

## Sealing Switches



**Figure 14**



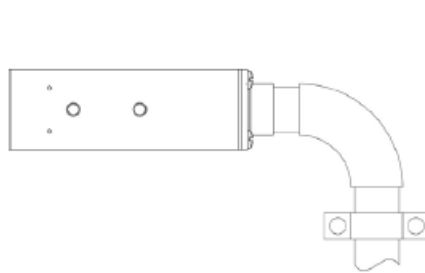
**Figure 15**

In **Figure 14**, the conduit system is filled with water and is leaking inside the switch. Over a period of time, this may cause the switch to fail prematurely.

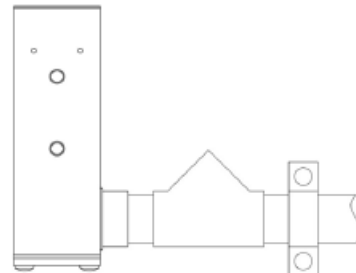
In **Figure 15**, the termination of the switch may be fitted with a certified thread-ed cable entry device (user supplied) in accordance with the manufacturer's instructions to prevent water intrusion resulting in premature switch failure. A drip loop with provision for water to escape has also been installed.

### Attachment of Conduit or Cable

#### Attachment of Conduit or Cable



**Figure 16**



**Figure 17**

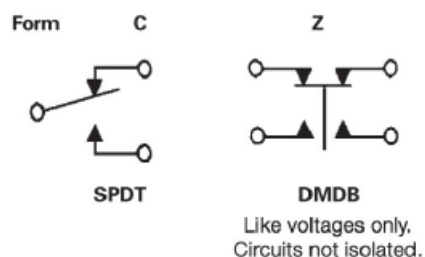
If the switch is mounted on a moving part, be sure that the flexible conduit is long enough to allow for movement, and positioned to eliminate binding or pulling. (Figure 16). In damp applications, use a certified cable gland or a similar moisture barrier to prevent water/condensation from entering the conduit hub. (Figure 17).

### Wiring Information

**Ratings**

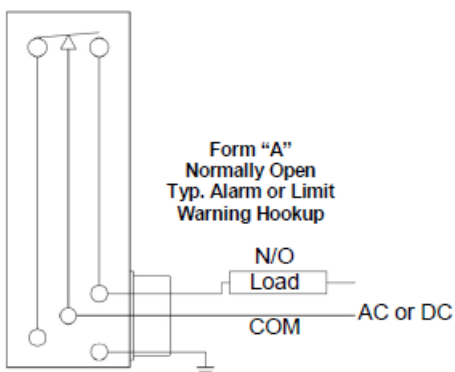
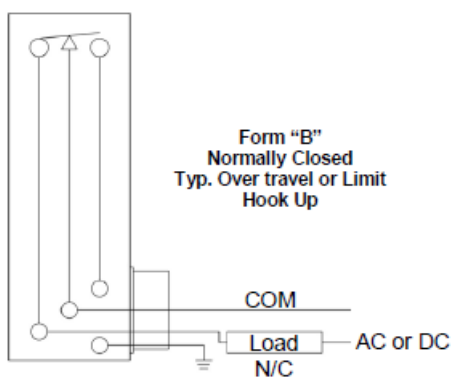
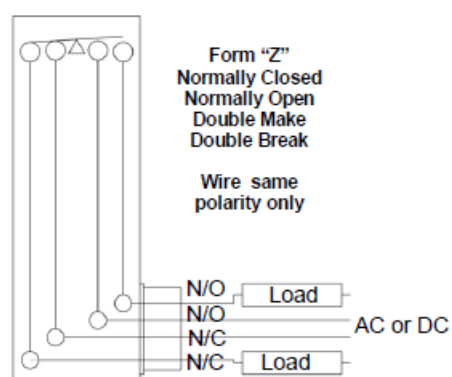
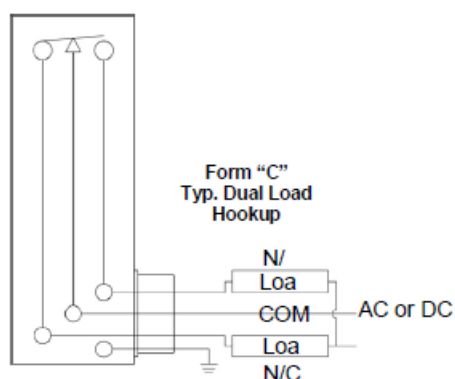
<b>AC</b>	<b>Volts</b>	<b>120</b>	<b>240</b>	<b>480</b>
	<b>Amps</b>	<b>10</b>	<b>5</b>	<b>2.5</b>
<b>DC</b>	<b>Volts</b>	<b>24</b>	<b>48</b>	<b>120</b>
	<b>Amps</b>	<b>3</b>	<b>1</b>	<b>0.5</b>

**Table 3**



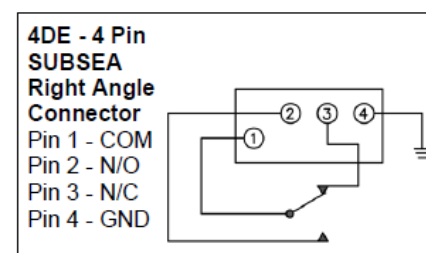
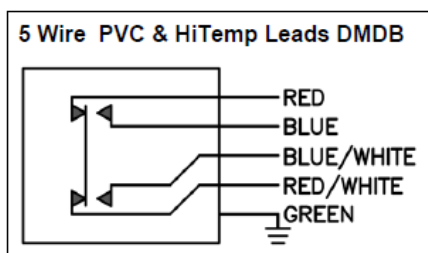
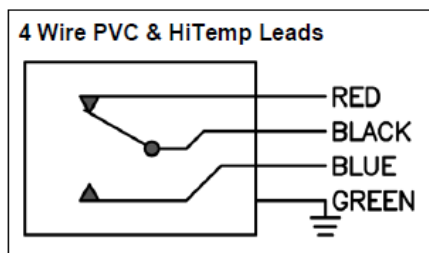
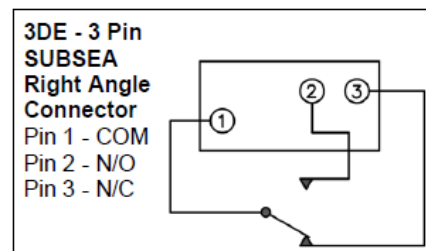
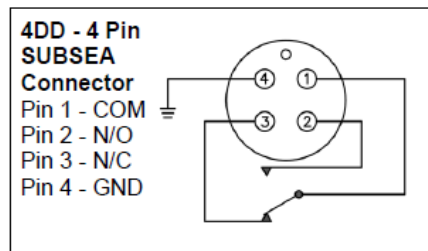
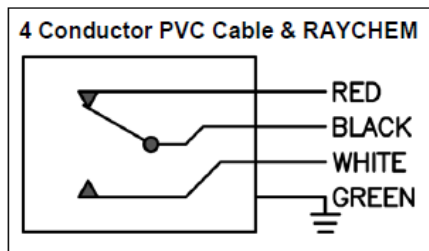
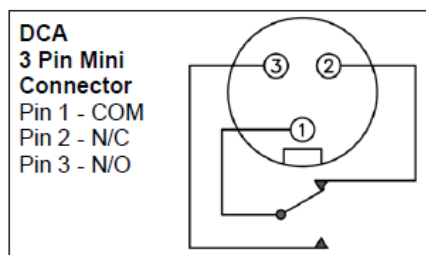
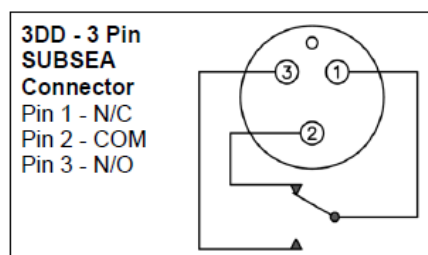
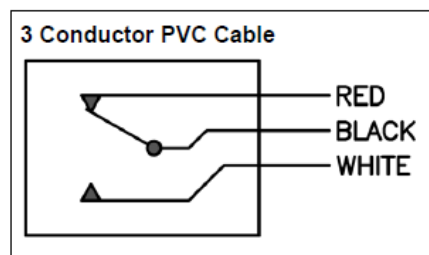
All GO Switches are dry contact switches, meaning that they have no voltage drop when closed, nor do they have any leakage current when open. For multi-unit installation, switches may be wired in series or in parallel.

### GO™ Switch Wiring Diagrams



### Grounding

Depending on certification requirements, GO Switches may be supplied with or without an integral ground wire. If supplied without a ground wire, installer must ensure proper ground connection to the enclosure.



## Special Conditions for Intrinsic Safety

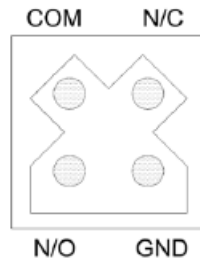
- Both contacts of the Double Throw and the separate poles of the Double Pole switch, within one switch must form part of the same intrinsically safe circuit.
- The proximity switches do not require a connection to earth for safety purposes, but an earth connection is provided which is directly connected to the metallic enclosure. Normally an intrinsically safe circuit may be earthed at one point only. If the earth connection is used, the implication of this must be fully considered in any installation. I.e. by use of a galvanically isolated interface.

The terminal block variants of the equipment are fitted with a non-metallic cover that constitutes a potential electrostatic hazard and must only be cleaned with a damp cloth.

- 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.

## Terminal Block Wiring For Flameproof And Increased Safety

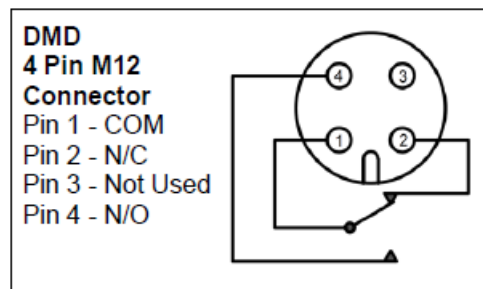
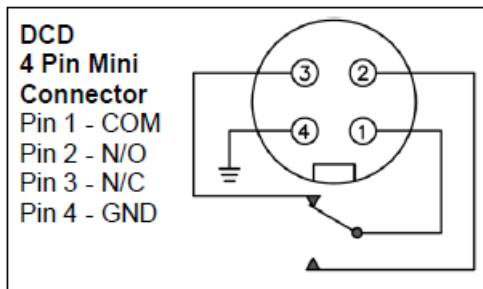
- External earth bonding can be achieved via the mounting fixings. These fixings should be in stainless steel or an alternative non-ferrous metal in order to minimize both corrosion and magnetic interference of the switch function. The connection shall made in such a manner as to prevent loosening and twisting (e.g. with shaped lugs/nuts and locking washers).
- Suitably certified cable entry devices shall be installed in accordance with IEC60079-14 and must maintain the ingress protection (IP) rating of the enclosure. The cable entry device thread shall not protrude within the enclosure body (i.e. shall maintain the clearance to the terminals).
- Only one single or multiple strand conductor of size 16 to 18 AWG (1.3 to 0.8mm<sup>2</sup>) is to be accommodated in each terminal. The insulation of each conductor shall extend to within 1 mm of the terminal clamping plate. Connection lugs and/or ferrules are not permitted.



Wiring must be 16 to 18 gauge and rated for the electrical load marked on the switch with a service temperature of at least 80°C.

Wire terminal screws, (4) #8-32X5/16" stainless with annular ring, must be tightened down to 2.8 N-m [25 lb-in].

Cover plate must be tightened down to terminal block to a value of 1.7 N-m [15 lb-in].



The GO Switch can be wired as PNP or NPN depending on the desired application DMD 4 Pin M12 Connector.

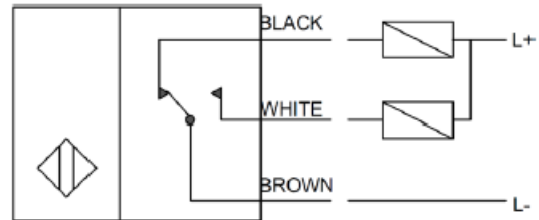
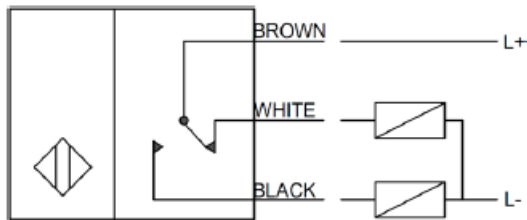


Table 2: FMEA Summary for the 10 & 20 Series GO magnetic proximity switches in single mode (1oo1)

<u>Safety Functions:</u>		1. To close a normally open contact or 2. To open a normally closed contact	
<b>Summary of IEC 61508-2 Clauses 7.4.2 and 7.4.4</b>		1. To close a normally open contact	2. To open a normally closed contact
Architectural constraints & Type of product A/B		<b>HFT = 0</b> <b>Type A</b>	<b>HFT = 0</b> <b>Type A</b>
Safe Failure Fraction (SFF)		<b>29.59%</b>	<b>62.60%</b>
Random hardware failures [h-1]	$\lambda_{DD} \lambda_{DU}$	<b>0</b> <b>6.40E-07</b>	<b>0</b> <b>3.4E-07</b>
Random hardware failures [h-1]	$\lambda_{DD} \lambda_{DU}$	<b>0</b> <b>2.69E-7</b>	<b>0</b> <b>5.59E-7</b>
Diagnostic coverage (DC)		<b>0.0%</b>	<b>0.0%</b>
PFD @ PTI = 8760 Hrs. MTTR = 24 Hrs.		<b>2.82E-03</b>	<b>2.82E-03</b>
Probability of Dangerous failure (High Demand – PFH) [h-1]		<b>6.40E-07</b>	<b>6.40E-07</b>
Hardware safety integrity compliance		Route 1H	Route 1H
Systematic safety integrity compliance		Route 1S See report R56A24114B	Route 1S See report R56A24114B
Systematic Capability		SC 3	SC 3
Hardware safety integrity achieved		<b>SIL 1</b>	<b>SIL 2</b>

#### DMD 4 Pin M12 Connector

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

#### 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) ATEX Directive (2014/34/EU).

#### Safety Integrity Level (SIL)

Highest SIL Capability: SIL2 (HFT:0)

Highest SC Capability: SC3

(HFT:0) 1 Year Full Proof Test Interval.

Ex ia IIC T\*Ga; Ex ia IIIC T\*C Da

Ambient temperature as low as – 40°C up to 150°C available for certain products.

Baseefa 12ATEX0187X

Ex de IIC T\* Gb; Ex tb IIIC T\*C Db

Ambient temperatures as low as – 40°C up to 60°C available for certain products.

Baseefa 12ATEX0160X

IECEX BAS 12.0098X 30V AC/DC @ 0.25 FOR SPDT SWITCHES

Visit [www.topworx.com](http://www.topworx.com) for comprehensive information on our company, capabilities, and products – including model numbers, data sheets, specifications, dimensions, and certifications.

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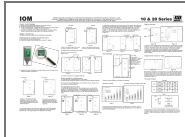
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## Documents / Resources



[EMERSON Go Switch Proximity Sensor](#) [pdf] Instruction Manual  
Go Switch Proximity Sensor, Proximity Sensor, Go Switch, Sensor

## References

- [TopWorx | Emerson US](#)