



# Cycle-Indicator Proximity Switches

## DESCRIPTION

Graco's Trabon Cycle Proximity Switches are used for providing a signal to a Monitor, Controller or Programmable Logic Controller (PLC) to indicate the number of cycles and cycle rate of a Series-Progressive (SP) divider valve; this signal is transmitted via a feedback loop to the Controller, providing the status of the lubrication cycle it is programmed to monitor and record.

Graco offers three types of proximity switches for use on Series-Progressive divider valves: Reed-Type (Reed) Proximity Switch, Field Sensing Magnetic (FSM) Proximity Switch, and Field Sensing Mechanical (FS<sub>mech</sub>) Proximity Switch. All are magnetically operated, single-throw switches that sense the movement of the divider valve's piston when it is cycling.

**The Reed-Type proximity switch** is available as an unattached version (magnetically attached to piston) for oil-only applications using MSP, MH or MGO divider valve assemblies.

**The Field-Sensitive Magnetic proximity switch** is a dry contact, ceramic magnet operated switch. It can be used in either grease or oil applications and is available in three sizes compatible with MSP, MH, MX/MXP, and MGO assemblies and its use is not limited by valve section size. This switch is also available in an explosion-proof design with a six-foot long cable for use in MS/MH divider valves.

**The FS<sub>mech</sub> proximity switch** is designed to provide a greater reliability of operation when used with the very low signal power conditions common to DC-powered PLC's. It is a magnetically activated proximity switch that contains a miniature snap-action switch, activated by the attraction of its internal magnet to the divider valve's moving piston. The 24 volt DC-only version of this switch is available with integral light-emitting diodes (LED) for local verification of power and cycling activity. Similar designs without LED's are suitable for either AC or DC power operation; there is also an explosion-proof version with six foot long pigtail leads. FS<sub>mech</sub> proximity switches are available for MSP, MH, and MX/MXP divider valve assemblies.

Each type of Graco Proximity Switch is available with a variety of customer-required options to fulfill each of their application's particular specifications: 24 VDC or 115 VAC power, LED cycle

indicator lights for DC applications, and various types of electrical connection options: Brad Harrison or Crouse Hinds cables with either 3,4, or 5 pin connectors, 6 ft., 3-wires (for explosion-proof versions), 1/2" NPT conduit (Reed Switch types only), or M12x1 Micro 4-pin connection.

A complete list of the cycle and proximity switches with their available options appears on Page 2.

## OPERATION

Proximity Switches are installed in place of an o-ring seal piston enclosure plug in one of the working sections of a Series-Progressive divider valve assembly. They are actuated by movements of the lube-dispensing piston inside the section and thereby send a signal to the Controller indicating the rate and amount of activity of the proportioning divider as lubricant is pumped through it.

Reed type switches utilize a pin attached magnetically to a piston to cause the switch contacts to close. Field sensing magnetic type of switches sense the proximity of the pistons' mass to cause contact closure. When the piston moves in the opposite direction away from the switch, the Reed switch is deactivated by the withdrawal of the actuating pin and opens its contacts. Similarly, the FSM Proximity Switch's sensing of the piston is lost and its contacts open. The two contact transitions (open-to-closed and closed-to-open) are detected by the Monitor/Controller, which has been programmed to interpret such a signal as one complete cycle of the divider section, and therefore one complete cycle of the entire SP divider valve assembly.

Depending upon the individual lubrication system's design and lubrication requirements, the Controller or PLC programming then uses the feedback signals from the Proximity Switch in each lubrication zone to start and stop the lubrication cycle periodically as required by the system design specifications. If the Controller or PLC does not receive the expected signal within a time period specified in the lubrication system's design, and programmed into the PLC as the "Monitor Time", the PLC can initiate various responses as specified by the user. These responses can include triggering a local audible and/or visual warning or sending an electronic notification to a remote computer terminal.

**O-RING SEAL STYLE<sup>(1)</sup> CYCLE-INDICATOR PROXIMITY SWITCHES**

| Modular Divider Type | Proximity Switch Part No. (Old Part No.) | Proximity Switch Type | Operating Voltage    | Cable Electric Connection | LED | Max Cycle Rate Per Min | Max Pressure Rating - psi | Rated Life Cycle |
|----------------------|--|-----------------------|----------------------|---------------------------|-----|------------------------|---------------------------|------------------|
| MGO                  | UL+CSA 563495 (527-007-120)              | FSM                   | 10-32 VDC            | 4-pin CH Mini             | No  | 125                    | 10,000**                  | 50,000,000+      |
| MGO                  | UL+CSA 564402 (527-007-160)              | FSM                   | 115 VAC              | 5-pin BH Mini             | No  | 125                    | 10,000**                  | 50,000,000+      |
| MGO                  | — (570-155-001)                          | Reed                  | 115 VAC              | 1/2 in NPT cond           | No  | 60                     | 7,500                     | 10,000,000+      |
| MGO                  | UL+CSA 563970 (570-999-060)              | FSM                   | 115 VAC              | 3-pin BH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MGO                  | UL+CSA Disc. (570-999-220)               | FSM                   | 115 VAC              | 5-pin BH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MXP/MX/MXO           | UL+CSA 564399 (527-005-190)              | FSM                   | 115 VAC              | 5-pin BH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MXP/MX/MXO           | UL+CSA 563476 (527-005-520)              | FSM                   | 115 VAC              | 3-pin BH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MXP/MX/MXO           | 563486 (527-006-130)                     | FS <sub>mech</sub>    | 20-32 VDC            | 3-pin BH Mini             | Yes | 100                    | 7,500                     | 10,000,000+      |
| MXP/MX/MXO           | 564400 (527-006-140)                     | FS <sub>mech</sub>    | 20-32 VDC            | 5-pin BH Mini             | Yes | 100                    | 7,500                     | 10,000,000+      |
| MXP/MX/MXO           | CSA <sub>NRTL</sub> 564401 (527-006-150) | FS <sub>mech</sub>    | 115 VAC or 10-32 VDC | Explosion-Proof*          | No  | 100                    | 7,500                     | 10,000,000+      |
| MXP/MX/MXO           | UL+CSA 557752 (527-007-110)              | FSM                   | 10-32 VDC            | 4-pin CH Mini             | No  | 125                    | 10,000**                  | 50,000,000+      |
| MXP/MX/MXO           | UL+CSA 558938 (527-007-140)              | FSM                   | 115 VAC              | 5-pin BH Mini             | No  | 125                    | 10,000**                  | 50,000,000+      |
| MXP/MX/MXO           | UL+CSA 564403 (527-007-269)              | FSM                   | 10-32 VDC            | 4-pin Micro               | No  | 125                    | 10,000**                  | 50,000,000+      |
| MSP/MH               | UL+CSA 557741 (527-003-251)              | FSM                   | 115 VAC              | 3-pin BH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MSP/MH               | ⚡ 557745 (527-003-431)                   | FSM                   | 115 VAC              | Explosion-Proof*          | No  | 125                    | 3,500                     | 50,000,000+      |
| MSP/MH               | UL+CSA 557746 (527-004-111)              | FSM                   | 115 VAC              | 5-pin BH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MSP/MH               | UL+CSA 557747 (527-004-112)              | FSM                   | 10-32 VDC            | 4-pin CH Mini             | No  | 125                    | 3,500                     | 50,000,000+      |
| MSP/MH               | 563477 (527-005-670)                     | FS <sub>mech</sub>    | 20-32 VDC            | 5-pin BH Mini             | Yes | 100                    | 7,500                     | 10,000,000+      |
| MSP/MH               | 563478 (527-005-690)                     | FS <sub>mech</sub>    | 20-32 VDC            | 3-pin BH Mini             | Yes | 100                    | 7,500                     | 10,000,000+      |
| MSP/MH               | 563484 (527-006-050)                     | FS <sub>mech</sub>    | 115 VAC or 10-32 VDC | 5-pin BH Mini             | No  | 100                    | 7,500                     | 10,000,000+      |
| MSP/MH               | CSA <sub>NRTL</sub> 563485 (527-006-060) | FS <sub>mech</sub>    | 115 VAC or 10-32 VDC | Explosion-Proof*          | No  | 100                    | 7,500                     | 10,000,000+      |
| MSP/MH               | 563427 (527-001-231)                     | Reed                  | 115 VAC or 10-32 VDC | 1/2 in NPT cond           | No  | 60                     | 7,500                     | 10,000,000+      |
| MSP/MH               | 563501 (527-007-273)                     | FS <sub>mech</sub>    | 20-32 VDC            | 4-pin Micro               | Yes | 100                    | 7,500                     | 10,000,000+      |

UL+CSA = Approved

CSA<sub>NRTL</sub> = Approved for hazardous locations: Class I, Groups A, B, C & D - Division 1

⚡ = UL and CSA approved for hazardous locations: Class I, Groups A, B, C & D - Division 1; Class II, Groups E, F & G - Division 1

\*Includes 6ft, 3 conductor cable, shown on page 4

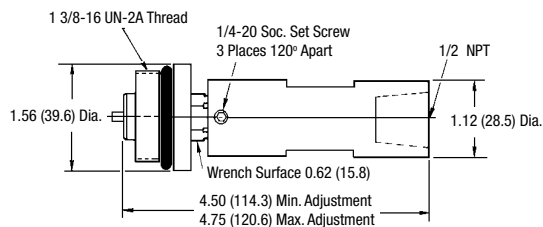
\*\*Specially-developed and recommended for stamping press applications

<sup>(1)</sup>NOTE: Cycle Indicator Proximity Switches shown in this bulletin are for use in divider valves having O-ring sealed piston closure ports only.

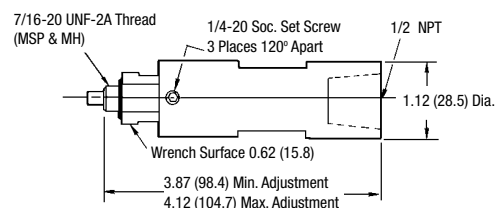
**TRABON® REED-TYPE PROXIMITY SWITCHES**

| SPECIFICATIONS    |  |
|-------------------|--|
| Material          | Aluminum HSG, SS Magnet HSG, Buna-N O-Ring |
| Electrical        | 0.5A @ 50 VDC, 10mA @ 115 VAC, N.O.        |
| Lubricant         | Oil Only                                   |
| Max Cycle Rate    | 60 cpm                                     |
| Temperature Range | -20° F to 180° F (-29° C to 83° C)         |
| Max Pressure      | 7500 psi                                   |

Part No. (570-155-001) – Used on MGO Divider Valves

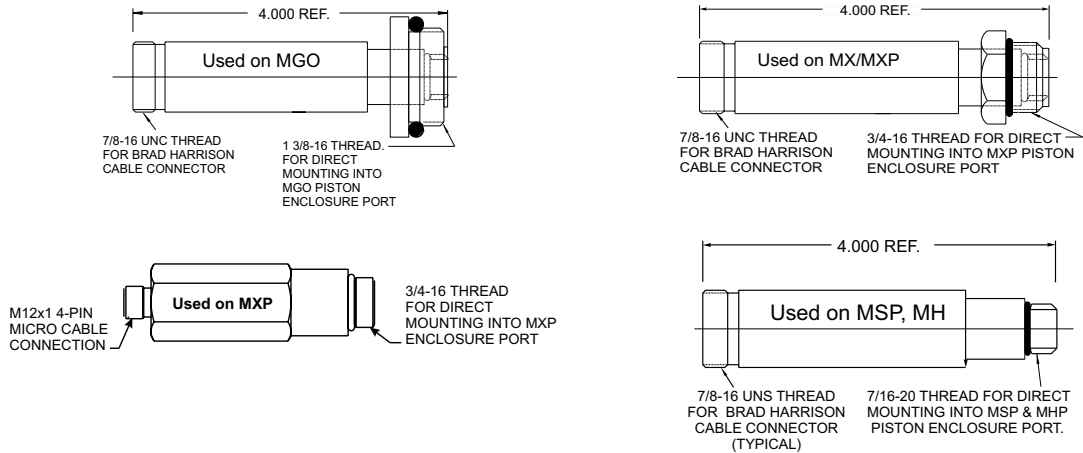


Part No. 563427 (527-001-231) – Used on MH, MSP Divider Valves



**TRABON® FSM-TYPE PROXIMITY SWITCHES – 3 PIN, 4 PIN, 5 PIN, EXPLOSION-PROOF**

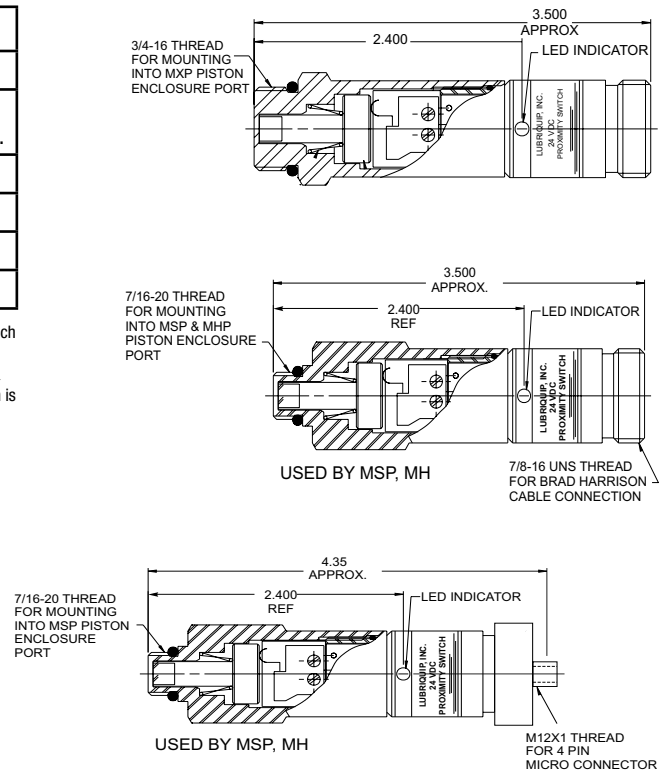
| SPECIFICATIONS    |  |
|-------------------|--|
| Material          | Type 303 SS Housing, Buna-N O-Ring       |
| Electrical        | 2A @ 120/240 VAC, 1A @ 12-32 VDC, N.O.   |
| Lubricant         | Oil or Grease                            |
| Max Cycle Rate    | 200 cpm (See rated life cycles in table) |
| Temperature Range | -22° F to 250° F (-30° C to 121° C)      |
| Max Pressure      | (See Table)                              |



**TRABON® FS<sub>MECH</sub>-TYPE PROXIMITY SWITCHES – 3 PIN, 4 PIN, 5 PIN, EXPLOSION-PROOF**

| SPECIFICATIONS    |  |
|-------------------|--|
| Material          | Type 303 SS Housing, Viton O-Ring  |
| Electrical†       | With LEDs 25mA @ 24 VDC, N.O.;<br>Without LEDs 1.2 VA @ 24 VDC, 5A @ 115/230 VAC, N.O. |
| Lubricant         | Oil or Grease  |
| Max Cycle Rate    | 150 cpm (See rated life cycles in table)   |
| Temperature Range | -58° F to 167° F (-50° C to 75° C)   |
| Max Pressure      | 7500 psi   |

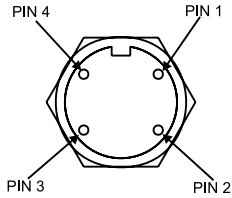
† The FS<sub>mech</sub> illuminated Proximity Switches (i.e. 527-005-670) are designed to work with controllers and PLCs which have a typical input impedance of 1500 ohms or less. Using the switch on devices which have an input impedance about 3000 ohms or larger may cause the input to not recognize a change of state to the closed position. If using a high impedance input, it is suggested that a 527-006-050 non illuminated FS<sub>mech</sub> switch be used. If state indication is required, a connecting cable with LEDs should be used.



## ACCESSORIES – CABLES

Graco offers a variety of connecting cables for use with its proximity switches. Cables are available with either straight or right-angle Mini, or Micro connectors; with or without indicator lights and in lengths from three to twelve feet as listed in the tables below. (Pin call outs shown below are from connecting cable).

DC PROX. SWITCH CABLES - 4 PIN  
(MINI CONNECTOR 7/8-16 TH'D)

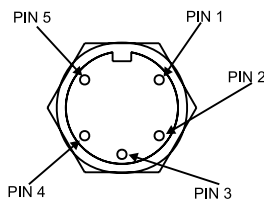


| 4-PIN CABLE OPTIONS<br>For DC-Powered Applications with LED Power/<br>Operational Indicators |          |                         |              |
|--|----------|-------------------------|--------------|
| Connector  | Polarity | Part No. (Old)          | Cable Length |
| Straight   | NPN      | 558968<br>(570-999-937) | 12 ft        |
| 90°  | NPN      | —<br>(570-999-938)      | 12 ft        |
| Straight   | PNP      | 558025<br>(570-999-953) | 12 ft        |
| 90°  | PNP      | 558026<br>(570-999-954) | 12 ft        |

| EURO CABLE<br>WIRES COLOR<br>CODE | DC CABLE PIN ASSIGNMENTS                           |   |
|-----------------------------------|--|---|
|                                   | PNP Cable*<br>(with LED Operational<br>Indicators) | NPN Cable**<br>(with LED Operational<br>Indicators) |
| Black                             | Pin 1 - N.O.                                       | Pin 1 - N.O.  |
| Blue                              | Pin 3 - Common                                     | Pin 2 - Common                                      |
| White                             | Pin 4 - Ground                                     | Pin 4 - Ground                                      |
| Brown                             | Pin 2 - Power                                      | Pin 3 - Power                                       |

\*Sourcing \*\*Sinking

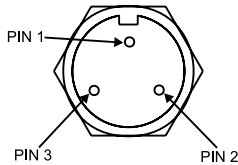
AC & DC PROX. SWITCH CABLES - 5 PIN  
(MINI CONNECTOR 7/8-16 TH'D)



| 5-PIN CABLE OPTIONS<br>for AC or DC-Powered Applications (No Operational Indicators in Cables) |                         |              |
|--|-------------------------|--------------|
| Connector  | Part No. (Old)          | Cable Length |
| Straight   | —<br>(570-999-180)      | 3 ft         |
| Straight   | 558023<br>(570-999-160) | 6 ft         |
| Straight   | 558024<br>(570-999-170) | 12 ft        |
| 90°  | 558965<br>(570-999-390) | 6 ft         |

| USA COLOR CODES | AC CABLE PIN ASSIGNMENTS |
|-----------------|--------------------------|
| White           | Pin 1 - N.O.             |
| Red             | Pin 2 - Not Used         |
| Green           | Pin 3 - Ground           |
| Orange          | Pin 4 - Not Used         |
| Black           | Pin 5 - Common           |

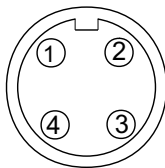
AC & DC PROX. SWITCH CABLES - 3 PIN  
(MINI CONNECTOR 7/8-16 TH'D)



| 3-PIN CABLE OPTIONS<br>for AC or DC-Powered Applications (No Operational Indicators in Cables) |                         |              |
|--|-------------------------|--------------|
| Connector  | Part No. (Old)          | Cable Length |
| Straight   | Disc.<br>(570-999-070)  | 3 ft         |
| Straight   | 558021<br>(570-999-080) | 6 ft         |
| Straight   | 558022<br>(570-999-090) | 12 ft        |
| 90°  | Disc.<br>(570-999-350)  | 6 ft         |

| USA COLOR CODES | AC CABLE PIN ASSIGNMENTS |
|-----------------|--------------------------|
| Green           | Pin 1 - Ground           |
| Black           | Pin 2 - Common           |
| White           | Pin 3 - N.O.             |

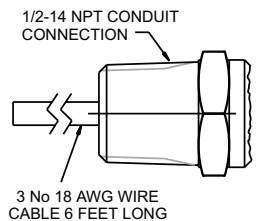
DC PROX. SWITCH CABLES - 4 PIN  
(MICRO CONNECTOR M12 X 1 THREAD)



| COLOR CODES | DC CABLE PIN ASSIGNMENT |
|-------------|-------------------------|
| Brown       | Pin 1 - Common (Power)  |
| White       | Pin 2 - Not Used        |
| Blue        | Pin 3 - Ground          |
| Black       | Pin 4 - N.O.            |

| 4-PIN CABLE OPTIONS<br>for DC-Powered Applications |                        |              |
|--|------------------------|--------------|
| Connector  | Part No. (Old)         | Cable Length |
| Straight   | —<br>(570-999-590)     | 6.6 ft       |
| 90°  | Disc.<br>(570-999-600) | 6.6 ft       |

### EXPLOSION-PROOF PROXIMITY SWITCHES



| Part No. (Old)          | Wire Color For               |                               |        |
|-------------------------|------------------------------|-------------------------------|--------|
|                         | Common                       | Normally Open                 | Ground |
| 557745<br>(527-003-431) | Black                        | White                         | Red    |
| 563485<br>(527-006-060) | Black or Red w/Black Stripes | White or Red w/ White Stripes | Green  |
| 564401<br>(527-006-150) | Black or Red w/Black Stripes | White or Red w/ White Stripes | Green  |

Contact us today!

To receive product information or talk with a Graco representative,  
call 800-533-9655 or visit us online at [www.graco.com](http://www.graco.com).

