

A perfect solution for both OEM and single-piece user, this string pot provides an economically priced CANopen sensor for 80-inch and 120-inch stroke range applications. This sensor is constructed with a rugged polycarbonate enclosure, a stainless steel mounting bracket and universally accepted M12 connector for operation in both outdoor or factory dry environments. For the OEM, customized options are available.

## Ordering Information:

### w/o terminating resistor

|  |   |   |
|--|---|---|
|  | Part No.<br><b>SGH-80-4</b><br>80-inch stroke range,<br>no terminating resistor,<br>5-pin M12 mating plug,<br>mounting bracket included | Part No.<br><b>SGH-120-4</b><br>120-inch stroke range,<br>no terminating resistor,<br>5-pin M12 mating plug,<br>mounting bracket included |
|--|---|---|

### w/ terminating resistor

|  |  |  |
|--|--|--|
|  | Part No.<br><b>SGH-80-4-TR</b><br>80-inch stroke range,<br>with terminating resistor,<br>5-pin M12 mating plug,<br>mounting bracket. | Part No.<br><b>SGH-120-4-TR</b><br>120-inch stroke range,<br>with terminating resistor,<br>5-pin M12 mating plug,<br>mounting bracket. |
|--|--|--|

|  |  |                                 |
|--|--|---------------------------------|
|  | <b>Optional Cordset</b><br>for short-run connections, a convenient optional 16-ft. cordset with a 5-pin M12 connector. | Part No.<br><b>9036810-0030</b> |
|--|--|---------------------------------|

|  |  |                                 |
|--|--|---------------------------------|
|  | <b>Field Installable Connector</b><br>While every SGJ ships with a field installable 5-pin M12 mating plug, additional connectors are available. | Part No.<br><b>9036810-0032</b> |
|--|--|---------------------------------|

# SGH

## Cable Actuated Sensor Industrial • CANOpen

Two Available Stroke Ranges: 0-80 in & 0-120 in.

Rugged Polycarbonate Enclosure • Simple Installation

Compact Design • Built for IP67 environments

**IN STOCK FOR QUICK DELIVERY!**

### Specifications

|  |   |
|--|---|
| Stroke Range Options                     | 80 in. (2032 mm), 120 in. (3048 mm)         |
| Accuracy                                 | .5% FS.                                     |
| Repeatability                            | .05% FS.                                    |
| Resolution                               | 12-bit                                      |
| Input Voltage                            | 10-36 VDC                                   |
| Input Current                            | 100 mA, max.                                |
| Measuring Cable                          | .019-inch dia. nylon-coated stainless steel |
| Measuring Cable Tension, 80-inch         | 14 oz. (3.9 N) ±30%                         |
| Measuring Cable Tension, 120-inch        | 9 oz. (2.5 N) ±30%                          |
| Maximum Acceleration                     | 10 g  |
| Sensor                                   | plastic-hybrid precision potentiometer      |
| Cycle Life                               | ≥ 250,000                                   |
| Electrical Connection                    | M12 connector (mating plug included)        |
| Enclosure                                | glass-filled polycarbonate                  |
| Environmental                            | IP 67                                       |
| Operating Temperature                    | -40° to 185° F (-40° to 85°C)               |
| Weight, 80-inch (not including bracket)  | .6 lbs (272 g)                              |
| Weight, 120-inch (not including bracket) | 1 lb. (454 g)                               |

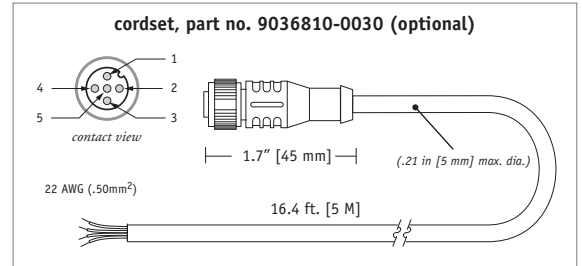
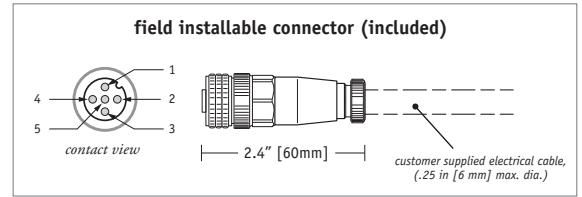
### CANopen Specifications

|                       |   |
|-----------------------|---|
| Communication Profile | CiA 301 V 4.0.2, CANopen Slave                            |
| Device Type           | CiA 406 V3.2, Encoder                                     |
| Vendor ID             | Company x0002E0, Dept x00                                 |
| Node ID               | 1-127 (Adjustable via dipswitch or LSS, default set to 1) |
| Baud Rate Options     | 125K (default), 250K, 500K, 1M                            |
| Data Rate             | 50ms (default)  |
| Error Control         | Heartbeat, Emergency Message                              |
| PDO                   | 2 TxPDO, 0 RxPDO, no linking, static mapping              |
| PDO Modes             | Event / Time triggered, Synch / Async                     |
| SDO                   | 1 server, 0 client  |
| Position Data         | Object Dictionary 6004                                    |
| Cam Switches          | Not Supported   |
| Termination Resistor  | See Ordering Information                                  |

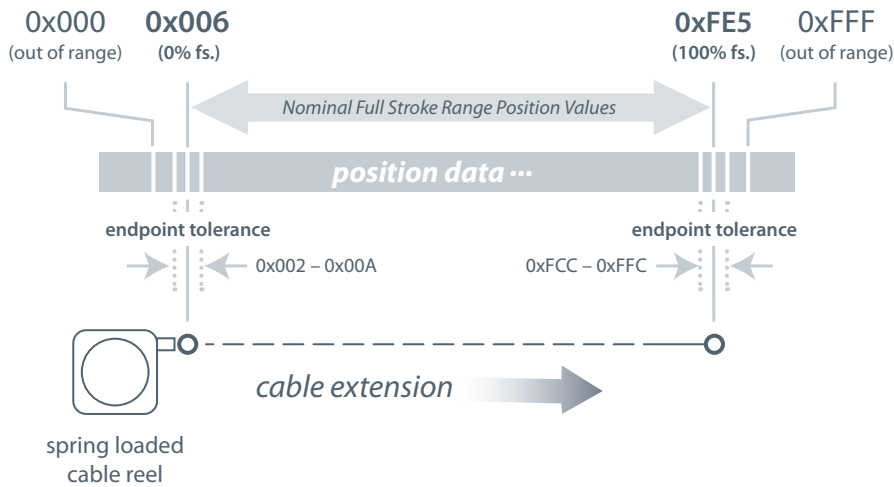
**Electrical Connection:**



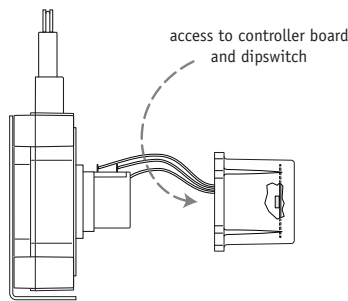
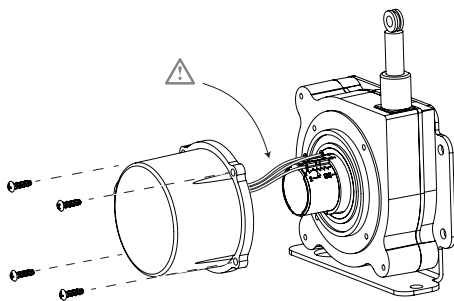
| signal      | pin | pin-colorcode    |
|-------------|-----|------------------|
| n/c         | 1   | 1 - brown        |
| 10...36 Vdc | 2   | 2 - white        |
| common      | 3   | 3 - blue         |
| CAN high    | 4   | 4 - black        |
| CAN low     | 5   | 5 - green/yellow |



**Position Data Overview:**



**Internal Controller Board**



Status LED - Indicates Operating Condition of the Potentiometer

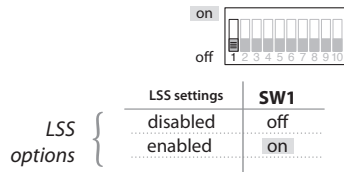
| green | red                            |
|-------|--------------------------------|
| on    | flash emergency message (high) |
| off   | flash buffer (high)            |
| on    | off normal operating range     |
| flash | off buffer (low)               |
| flash | on emergency message (low)     |

**LSS, Baud Rate and Node ID settings:**

LSS, Baud Rate and Node ID settings are set via dip switch found on the internal controller board. To gain access to the controller board, remove the 4 cover attaching screws and carefully separate the sensor cover from the main body. Be careful not to damage the small gage wires that connect the potentiometer to the controller board mounted directly to the rear cover.

Follow the instructions below for desired settings and reinstall sensor cover.

**Settings (cont.):**

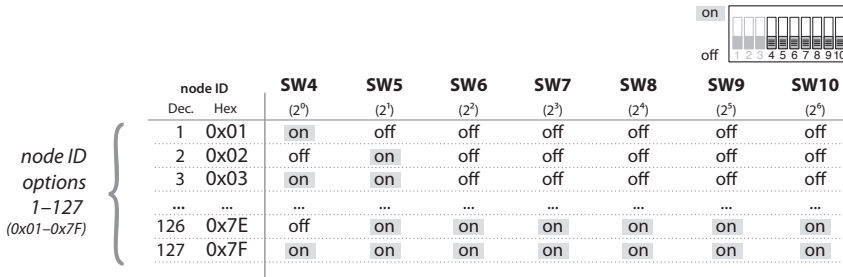
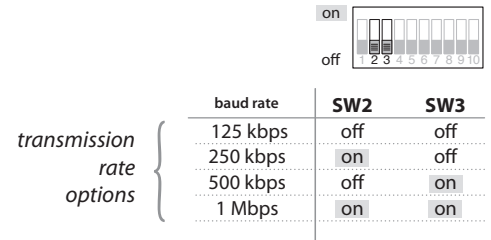


**LSS Settings:**

IF DIP Switch 1 is set to “on” position, then LSS will be functional and uses the contents of EEPROM including Node ID and Baud Rate. If DIP Switch 1 is set to “off” position, then DIP switches will override information in EEPROM including the Node ID and Baud Rate.

**BAUD Rate:**

If DIP Switch 1 is set to “off” then BAUD rate is set via DIP switch 2 and 3 as shown :



**Node ID:**

If DIP Switch 1 is set to “off” then the Node ID is set via DIP switches 4 – 10 as shown below. The DIP switch settings are binary starting with switch number 4 (=2<sup>0</sup>) and ending with switch number 10 (=2<sup>6</sup>).

The Node ID is equal to the binary setting.

**Manufacturer Objects:**

| Index | Sub-Index | Name                      | Default | Comment   |
|-------|-----------|---------------------------|---------|---|
| 2000  |           | Raw Position Value        |         | This is the averaged, non-scaled value from the encoder.  |
| 2001  |           | Emergency Buffer Distance | 0.1     | Emergency Message is sent when the output of the sensing potentiometer is outside it’s calibrated range by more than .1% of the sensors full measurement range (Emergency Buffer). This allows for non-repeatability of sensor and customers application. This object allows user ability to change buffer size along with transmission of Emergency Message, Manufacturer specific bit in error register set, and error added to error list. |

**Device Profile Area:**

| Index | Sub-Index | Name                      | Default | Comment  |
|-------|-----------|---------------------------|---------|--|
| 6000  |           | Operating Parameters      | 0X0000  |  |
| 6004  |           | Position Value            | 0       | Counts proportional to measuring cable extension. Nominal values are 0x006 with cable fully retracted and 0xFE5 with cable fully extended. Format of data in CAN message is little endian – least significant byte pair first. Therefore 0x008 would be shown as “08 00” and 0xFE5 would be shown as “E5 0F” |
| 6400  |           | Area State Register       |         | SubNumber= 2 (indicates underflow or overflow per CiA406)  |
|       | 0         | Highest Subindex          | 0x01    |  |
|       | 1         | Work Area State Channel 1 | 0       |  |

**Device Profile Area (cont.):**

|      |   |                                |        |   |
|------|---|--------------------------------|--------|---|
| 6401 |   | Work Area Low Limit            |        | The averaged, non-scaled (raw) encoder data below which the encoder is out of range.  |
|      | 0 | Highest Subindex               | 0x01   |   |
|      | 1 | Work Area Low Limit Channel1   | 0x024  |   |
| 6402 |   | Work Area High Limit           |        | The averaged, non-scaled (raw) encoder data above which the encoder is out of range.  |
|      | 0 | Highest Subindex               | 0x01   |   |
|      | 1 | Work Area High Limit Channel 1 | 0xF4E  |   |
| 6500 |   | Operating Status               | 0x0000 |   |
| 6501 |   | Measuring Step                 | 1      | Position Measuring Step. Can be set by user to convert Position Value (Object 6004) to measurement units (inches, mm). Default is set to 1. |

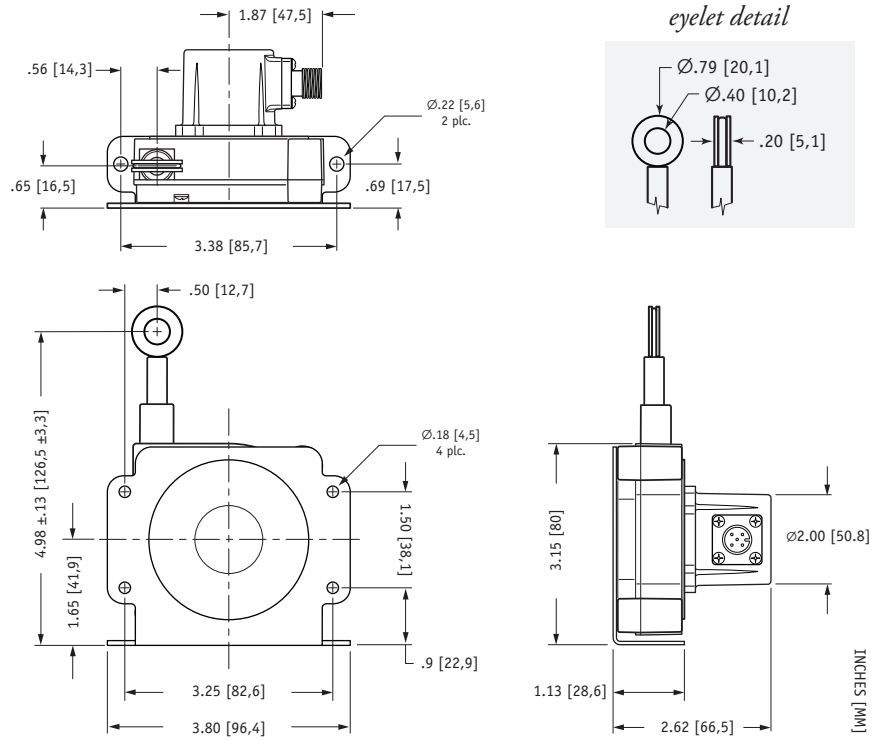
**Communication Area Profile:**

| Index | Sub-Index | Name                    | Default         | Comment   |
|-------|-----------|-------------------------|-----------------|---|
| 1000  |           | Device Type             | 0X00080196      | Device Profile 406  |
| 1001  |           | Error Register          | 0               | Manufacturer Specific Error bit 7 is set when sensor is outside of calibrated range and cleared when back in range.   |
| 1003  |           | Pre-Defined Error Field |                 | SubNumber= 9 (lists last eight Emergency Messages)  |
|       | 0         | Number of Errors        | 0               |   |
|       | 1         | Standard Error Field 1  |                 |   |
|       | 2         | Standard Error Field 2  |                 |   |
|       | 3         | Standard Error Field 3  |                 |   |
|       | 4         | Standard Error Field 4  |                 |   |
|       | 5         | Standard Error Field 5  |                 |   |
|       | 6         | Standard Error Field 6  |                 |   |
|       | 7         | Standard Error Field 7  |                 |   |
|       | 8         | Standard Error Field 8  |                 |   |
| 1005  |           | SYNC COB-ID             | 0x80            |   |
| 1010  |           | Store Parameters        |                 | SubNumber=2   |
| 1010  | 0         | Highest Subindex        | 0x01            | Only "Save All Parameters" feature supported  |
|       | 1         | Save All Parameters     |                 | Write "save" or "evsa" to save parameters to EEPROM. They are automatically loaded on power up/reset. Saves the value of all R/W object dictionary entries. |
| 1014  |           | Emergency COB-ID        | \$NodeID + 0x80 | COB-ID Emergency Message  |
| 1015  |           | Emergency Inhibit Time  | 0               | Multiple of 100us. Minimum time between transmissions of emergency messages.  |
| 1017  |           | Producer Heartbeat Time | 0               | Multiples of 1ms. Time between transmission of heartbeat messages. 0 = disabled   |

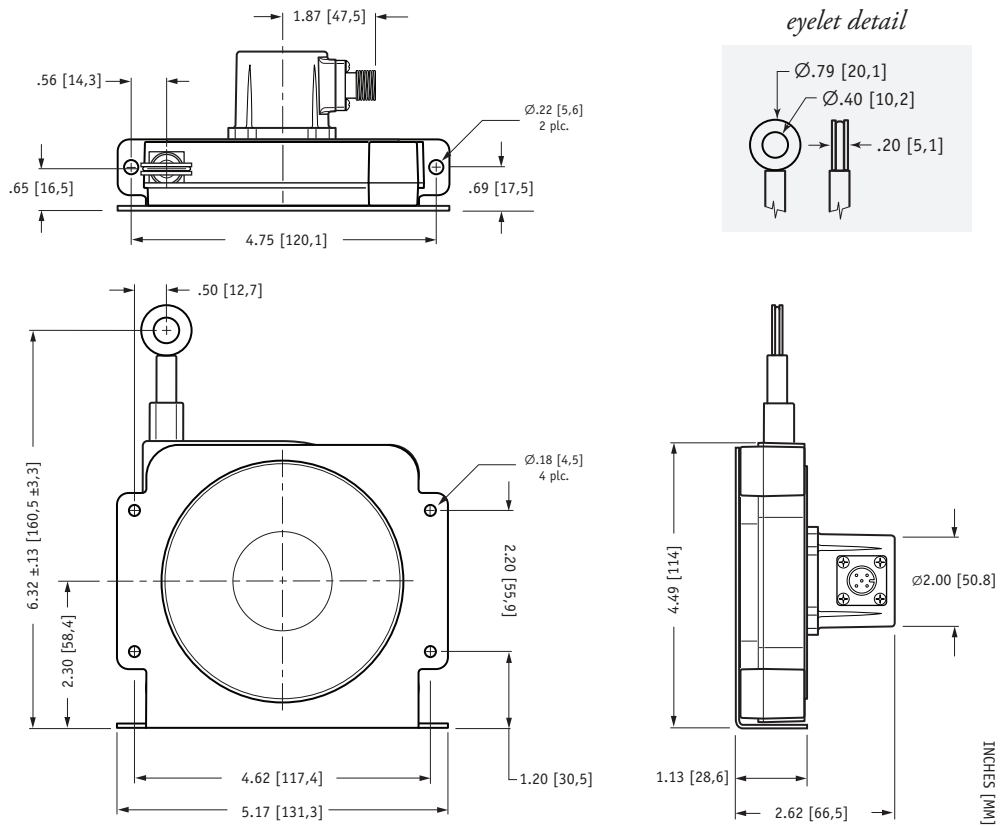
Communication Area Profile (cont.):

|      |   |                          |                  |   |
|------|---|--------------------------|------------------|---|
| 1018 |   | Identity Object          |                  |   |
|      | 0 | Number of Entries        | 4                |   |
|      | 1 | Vendor Id                | 0x2E0            |   |
|      | 2 | Product Code             | 269 (decimal)    | Celesco Reference # 604269  |
|      | 3 | Revision Number          | 1                |   |
|      | 4 | Serial Number            | 0x00000000       |   |
| 1800 |   | Tx PDO Comm. Parameter   |                  | PDO1  |
|      | 0 | Number of Entries        | 5                |   |
|      | 1 | COB-ID                   | \$NodeID + 0x108 | COB-ID used by PDO1   |
|      | 2 | Transmission Type        | 254              | PDO1 Tx Type: 0 = on Sync Message. 254 = Asynchronous Tx                          |
|      | 3 | Inhibit Time             | 0                | Multiple of 100us. Minimum time between transmissions of the PDO                  |
|      | 5 | Event Timer              | 0x32             | If non-zero then transmits the PDO periodically. This value is a multiple of 1ms. |
| 1801 |   | Tx PDO Comm. Parameter   |                  | PDO2  |
|      | 0 | Number of Entries        | 5                |   |
|      | 1 | COB-ID                   | \$NodeID + 0x280 | COB-ID used by PDO2   |
|      | 2 | Transmission Type        | 0                | PDO2 Tx Type: 0 = on Sync Message. 254 = Asynchronous Tx                          |
|      | 3 | Inhibit Time             | 0                | Multiple of 100us. Minimum time between transmissions of the PDO                  |
|      | 5 | Event Timer              | 0                | If non-zero then transmits the PDO periodically. This value is a multiple of 1ms. |
| 1A00 |   | Tx PDO Mapping Parameter |                  | Subnumber = 2   |
|      | 0 | Number of Entries        | 1                |   |
|      | 1 | PDO Mapping Entry        | 0x60040020       | Mapping Parameter   |
| 1A01 |   | Tx PDO Mapping Parameter |                  | Subnumber = 2   |
|      | 0 | Number of Entries        | 1                |   |
|      | 1 | PDO Mapping Entry        | 0x60040020       | Mapping Parameter   |

**80-inch SGH-80-4 w/ Mounting Bracket:**



**120-inch SGH-120-4 w/ Mounting Bracket:**



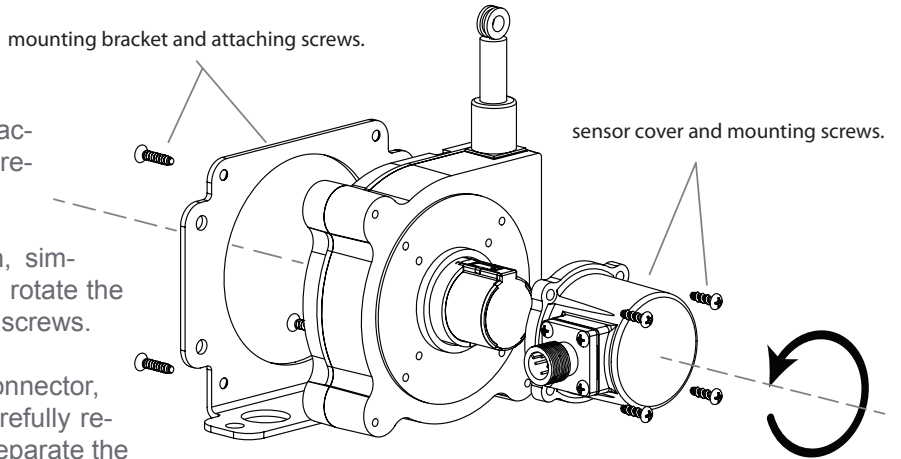
**Mounting Options:**

**Changing Measuring Cable Exit and Electrical Connector Direction:**

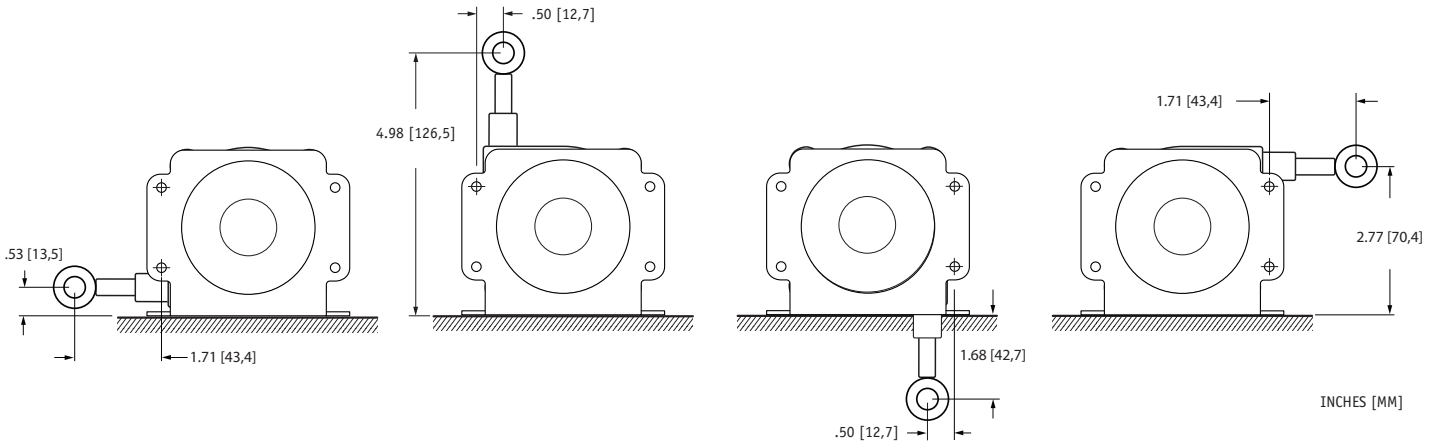
For the ultimate in flexibility, the measuring cable exit direction and the direction of the electrical connector can be rotated around in 90° increments to accommodate just about any installation requirement.

To change measuring cable exit direction, simply remove the 4 mounting bracket screws, rotate the bracket to desired position and replace the screws.

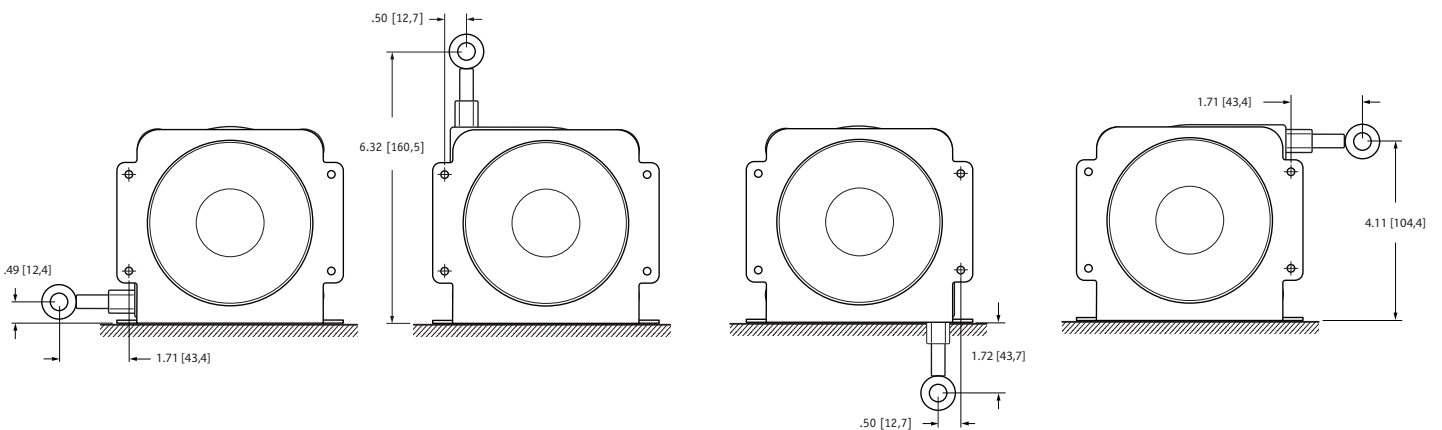
To change the direction of the electrical connector, remove the 4 sensor cover screws and carefully remove the sensor cover just far enough to separate the cover from the main body. Be careful of the three small gage wires that attach the internal controller board to the potentiometer.



**Mounting Option Mounting Dimensions • 80-inch (SGH-80-4):**



**Mounting Option Mounting Option Dimensions • 120-inch (SGH-120-4):**



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