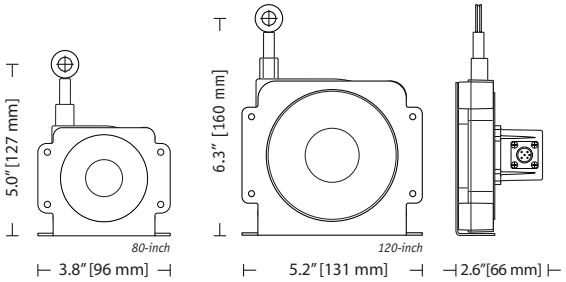


SGJ

Cable Actuated Sensor
Industrial • CANBus J1939

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

Rugged Polycarbonate Enclosure • Simple Installation

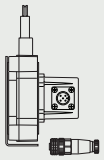
Compact Design • Built for IP67 environments

IN STOCK FOR QUICK DELIVERY!

The economically priced SGJ provides linear position sensing over J1939 CANbus for OEM, mobile equipment and factory automation applications. Designed to withstand IP67 environments, the SGJ is constructed with a rugged polycarbonate body, an extremely durable spring-loaded stainless steel measuring cable and a stainless steel mounting bracket. For the OEM, customized options are available.

Ordering Information:

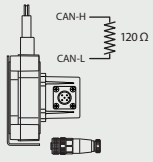
w/o terminating resistor



Part No. **SGJ-80-4**
80-inch stroke range, no terminating resistor, 5-pin M12 mating plug, mounting bracket included

Part No. **SGJ-120-4**
120-inch stroke range, no terminating resistor, 5-pin M12 mating plug, mounting bracket included

w/ terminating resistor



Part No. **SGJ-80-4-TR**
80-inch stroke range, with terminating resistor, 5-pin M12 mating plug, mounting bracket.

Part No. **SGJ-120-4-TR**
80-inch stroke range, with terminating resistor, 5-pin M12 mating plug, mounting bracket.

Optional Cordset Part No. **9036810-0030**
for short-run connections, a convenient optional 16-ft. cordset with a 5-pin M12 connector.

Field Installable Connector Part No. **9036810-0032**
While every SGJ ships with a field installable 5-pin M12 mating plug, additional connectors are available.

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)

CANbus SPECIFICATIONS

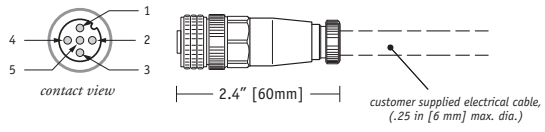
Communication Profile	CANbus SAE J1939
Protocol	Proprietary B
Node ID	Adjustable via dipswitch (0-63), default set to 0
Baud Rate Options	125K (default), 250K, 500K, 1M
Data Rate Options	5ms (default), 20ms, 50ms, 100ms
Termination Resistor	See Ordering Information

Electrical Connection:

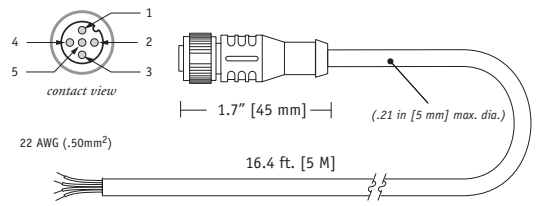
connector cordset

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

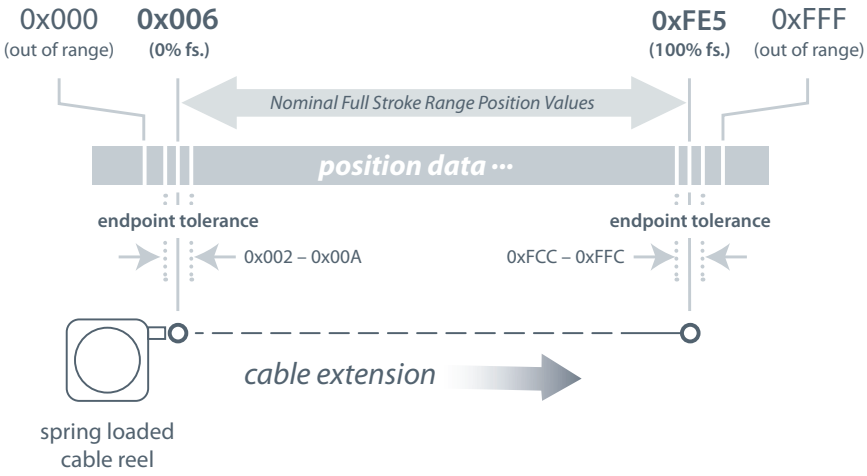
field installable connector (included)



cordset, part no. 9036810-0030 (optional)



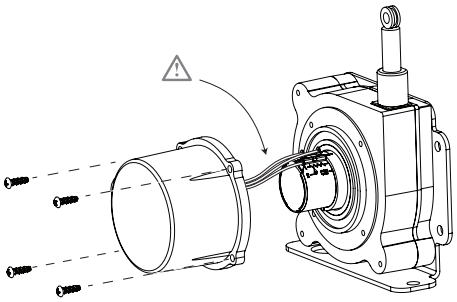
Position Data Overview:

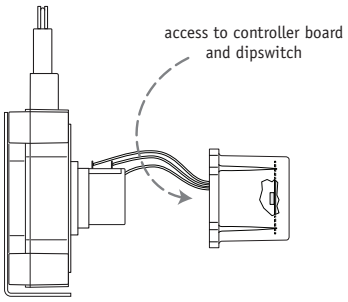


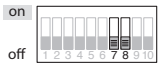
Baud, Node ID and Data Rate:

Baud Rate, Node ID and Data Rate 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.





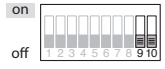


BAUD rate options

baud rate	SW7	SW8
125 kbps	off	off
250 kbps	on	off
500 kbps	off	on

node ID options 0–63 (0x00–0x3F)

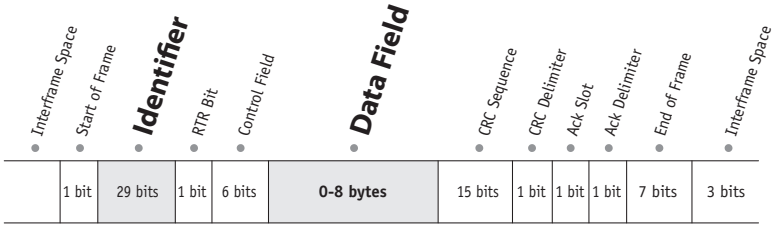
node ID Dec.	node ID Hex	SW1 (2^0)	SW2 (2^1)	SW3 (2^2)	SW4 (2^3)	SW5 (2^4)	SW6 (2^5)
0	0x00	off	off	off	off	off	off
1	0x01	on	off	off	off	off	off
2	0x02	off	on	off	off	off	off
3	0x03	on	on	off	off	off	off
...	...	...	...	...	...	...	...
62	0x3E	off	on	on	on	on	on
63	0x3F	on	on	on	on	on	on



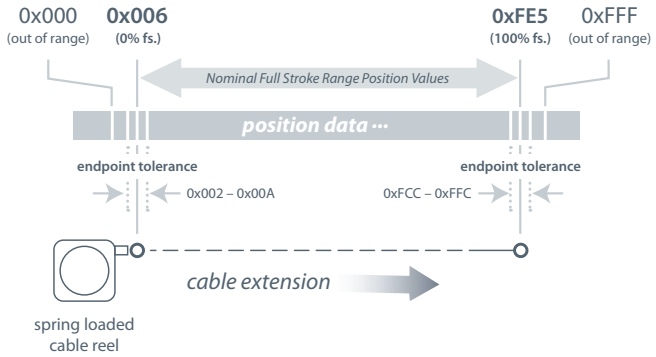
Data Rate options

Data Rate	SW9	SW10
5 ms	off	off
20 ms	on	off
50 ms	off	on
100 ms	on	on

I/O Format:



Position Data Overview



Identifier:

	Message Priority			Future Use		J1939 Reference Proprietary B								Data Field Type*								Not Used		Node ID**					
Example –	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	0	0	1	1	1	1	1	1
Identifier Bit No. –	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Hex Value –		0			F			F			5				3			3				F							

*Sensor field data can be factory set to customer specific value. **Customer defined, set via Dips 1-6. Bit values shown for example only, see **Address Setting** below.

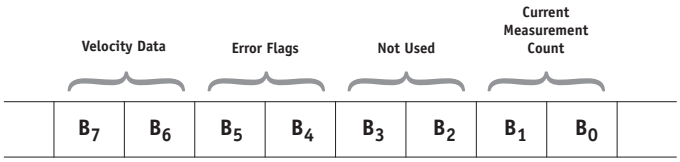
Data Field:

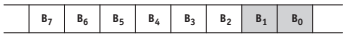
B_0 = LSB current measurement count byte
B_1 = MSB current measurement count byte

B_2 = not used
B_3 = not used

B_4 = error flag
B_5 = error flag

B_6 = LSB velocity data byte
B_7 = MSB velocity data byte

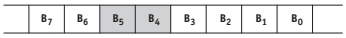




Current Measurement Count

The **C**urrent **M**easurement **C**ount (**CMC**) is the output data that indicates the present position of the measuring cable. The CMC is a 12-bit value that occupies bytes **B_0** and **B_1** of the data field. **B_0** is the **LSB** (least significant byte) and **B_1** is the **MSB** (most significant byte).

The **CMC** starts at **0x006** with the measuring cable fully retracted and continues upward to the end of the stroke range stopping at **0xFE5**. This holds true for all ranges.



Error Flags

RED and GREEN Indicator LEDS (controller board)

0x00 (GREEN - ON, RED - OFF) indicates the sensor is operating within normal calibrated limits.

0x33, 0x55, 0xAA, 0xCC (RED or GREEN - FLASHING) indicates sensor is at or beyond it's calibrated measurment range. Should any of these conditions occur within calibrated range, return unit to factory for evaluation or service.

Converting CMC to Linear Measurement

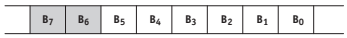
To convert the current measurment count to inches or millimeters, simply divide the count by 4061 (total counts over the range) and then multiply that value by the full stroke range:

$$\left(\frac{\text{CMC} - 6}{4063}\right) \text{ X } \text{full stroke range}$$

Sample Conversion:

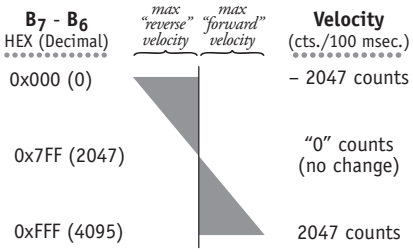
If the full stroke range is **125 inches** and the current position is **0x4FF** (1279 Decimal) then,

$$\left(\frac{1279 - 6}{4061}\right) \text{ X } 125 = 39.2 \text{ inches}$$



Velocity

Data in bytes **B_7 - B_6** is the change in the **CMC** (current measurement count) over a 100 msec time period. This data can then be used to calculate velocity in a post processing operation.



Velocity Calculation

$$\left(\frac{\text{count change} - 2047}{\text{.1 sec. time period}}\right) \text{ X } \left(\frac{\text{full stroke range}}{4063}\right)$$

Sample Calculations

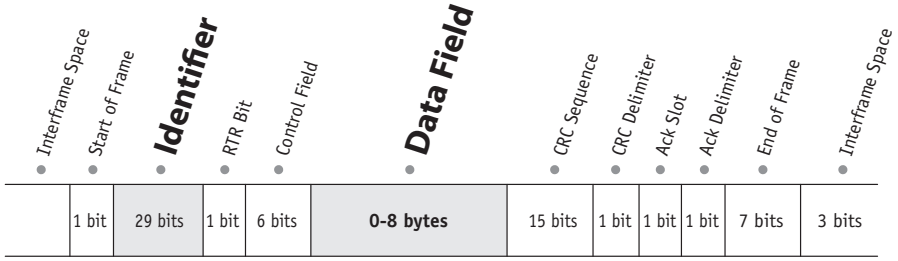
Cable Extension (positive direction):
B_7..B_6 = 0x8D3 (2259Dec), **full stroke = 125 in.**

$$\left(\frac{2259 - 2047}{\text{.1 sec}}\right) \text{ X } \left(\frac{125 \text{ in.}}{4063}\right) = 65.22 \text{ in. / sec.}$$

Cable Retraction (negative direction):
B_7..B_6 = 0x7D0 (2000Dec), **full stroke = 125 in.**

$$\left(\frac{2000 - 2047}{\text{.1 sec}}\right) \text{ X } \left(\frac{125 \text{ in.}}{4063}\right) = -14.46 \text{ in. / sec.}$$

I/O Format:



Identifier:

	Message Priority			Future Use		J1939 Reference Proprietary B								Data Field Type*								Not Used		Node ID**					
Example –	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	0	0	1	1	1	1	1	1
Identifier Bit No. –	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Hex Value –		0				F				F				5				3				3				F			

*Sensor field data can be factory set to customer specific value. **Customer defined, set via Dips 1-6. Bit values shown for example only, see **Address Setting** below.

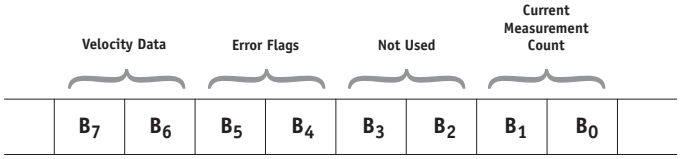
Data Field:

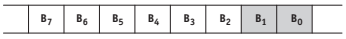
B_0 = LSB current measurement count byte
B_1 = MSB current measurement count byte

B_2 = not used
B_3 = not used

B_4 = error flag
B_5 = error flag

B_6 = LSB velocity data byte
B_7 = MSB velocity data byte





Current Measurement Count

The **C**urrent **M**easurement **C**ount (**CMC**) is the output data that indicates the present position of the measuring cable. The CMC is a 12-bit value that occupies bytes **B_0** and **B_1** of the data field. **B_0** is the **LSB** (least significant byte) and **B_1** is the **MSB** (most significant byte).

The **CMC** starts at **0x008** with the measuring cable fully retracted and continues upward to the end of the stroke range stopping at **0xFE5**. This holds true for all ranges.

Converting CMC to Linear Measurement

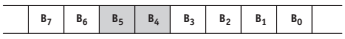
To convert the current measurment count to inches or millimeters, simply divide the count by 4061 (total counts over the range) and then multiply that value by the full stroke range:

$$\left(\frac{\text{current measurement count}}{4061}\right) \text{ X } \text{full stroke range}$$

Sample Conversion:

If the full stroke range is **80 inches** and the current position is **0x4FF** (1279 Decimal) then,

$$\left(\frac{1279}{4061}\right) \text{ X } 80.00 \text{ inches} = 25.2 \text{ inches}$$

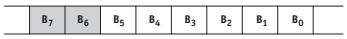


Error Flags

RED and GREEN Indicator LEDS (controller board)

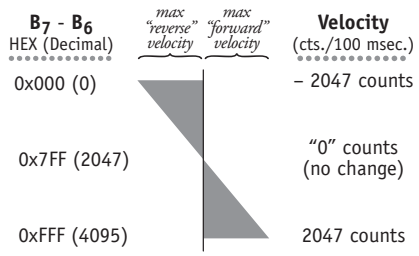
0x00 (GREEN - ON, RED - OFF) indicates the sensor is operating within normal calibrated limits.

0x33, 0x55, 0xAA, 0xCC (RED or GREEN - FLASHING) indicates sensor is at or beyond it's calibrated measurment range. Should any of these conditions occur within calibrated range, return unit to factory for evaluation or service.



Velocity

Data in bytes **B_7** - **B_6** is the change in the **CMC** (current measurement count) over a 100 msec time period. This data can then be used to calculate velocity in a post processing operation.



Velocity Calculation

$$\left(\frac{\text{count change} - 2047}{.1 \text{ sec. time period}}\right) \text{ X } \left(\frac{\text{full stroke range}}{4061}\right)$$

Sample Calculations

Cable Extension (positive direction):

B_7..B_6 = 0x8D3 (2259Dec), **full stroke = 80 in.**

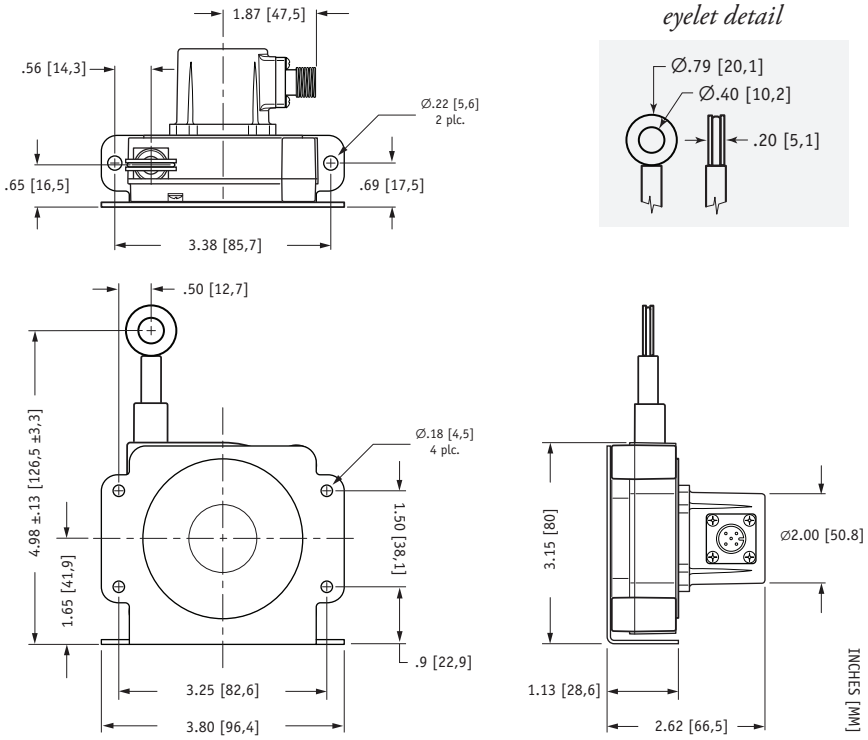
$$\left(\frac{2259 - 2047}{.1 \text{ sec}}\right) \text{ X } \left(\frac{80 \text{ in.}}{4061}\right) = 41.76 \text{ in. / sec.}$$

Cable Retraction (negative direction):

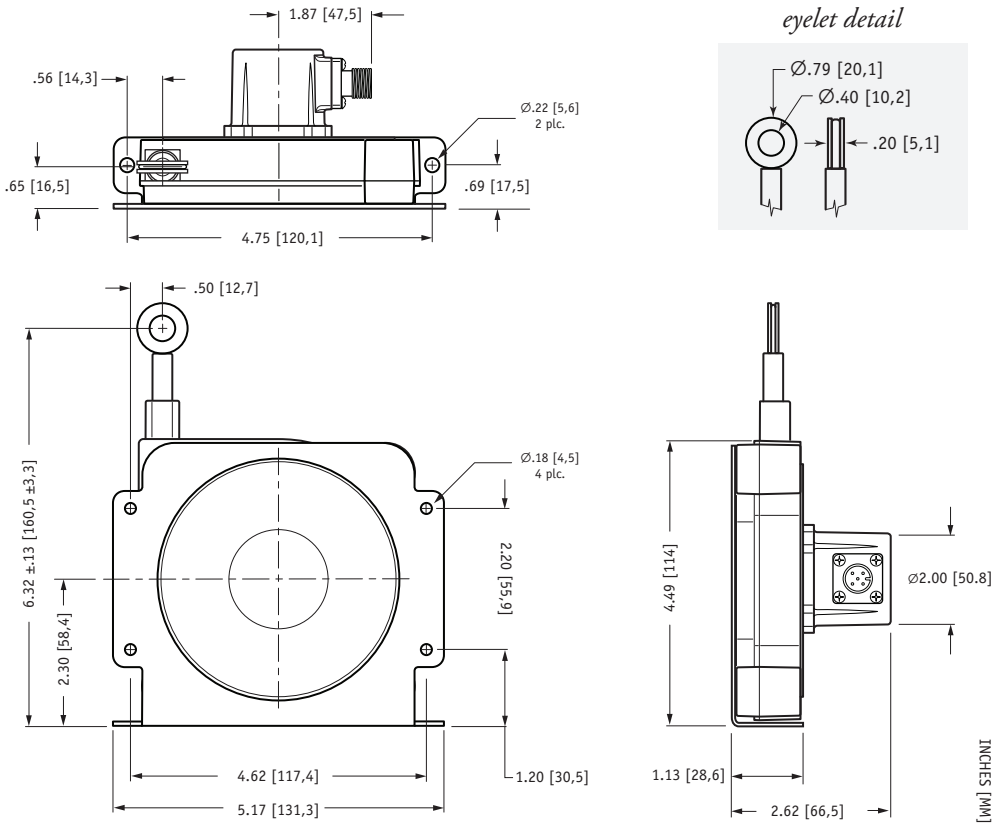
B_7..B_6 = 0x7D0 (2000Dec), **full stroke = 80 in.**

$$\left(\frac{2000 - 2047}{.1 \text{ sec}}\right) \text{ X } \left(\frac{80 \text{ in.}}{4061}\right) = -9.26 \text{ in. / sec.}$$

80-inch SGJ-80-4 w/ Mounting Bracket:



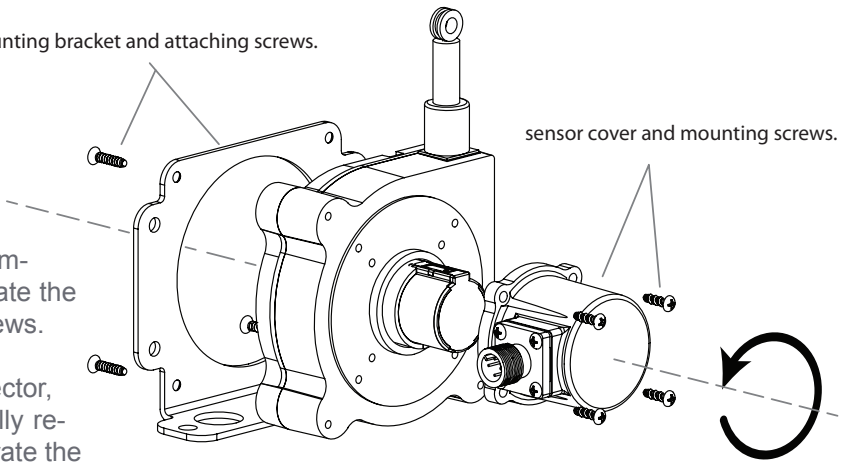
120-inch SGJ-120-4 w/ Mounting Bracket:



Mounting Options:

Changing Measuring Cable Exit and Electrical Connector Direction:

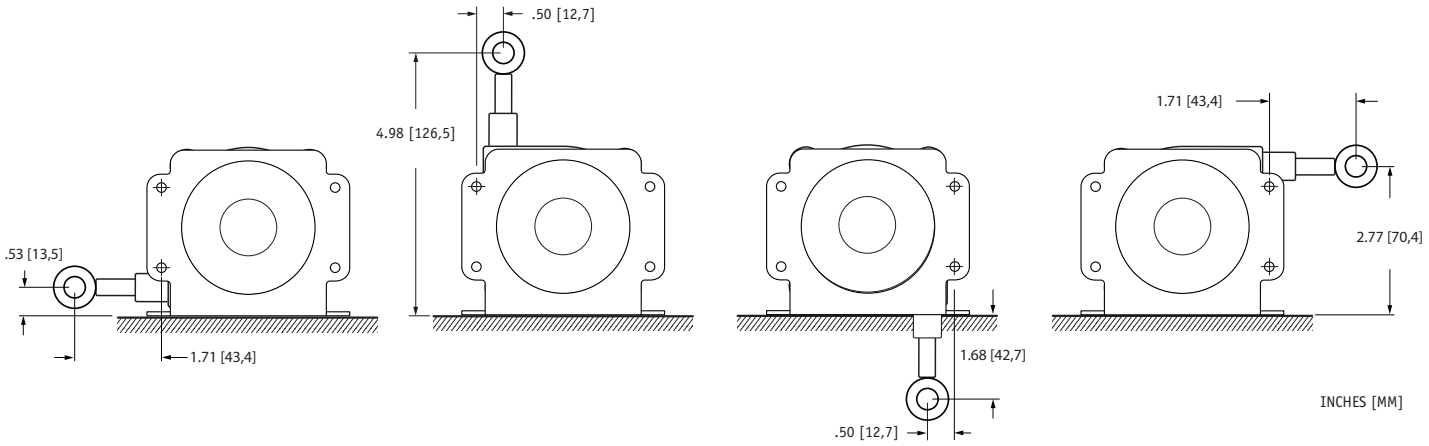
For the ultimate in flexibility, the measuring cable exit direction and the direction of the electrical connector can be rotated around in 90° increments to accommodate just about any installation requirement.



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 (SGJ-80-4):



Mounting Option Mounting Option Dimensions • 120-inch (SGJ-120-4):