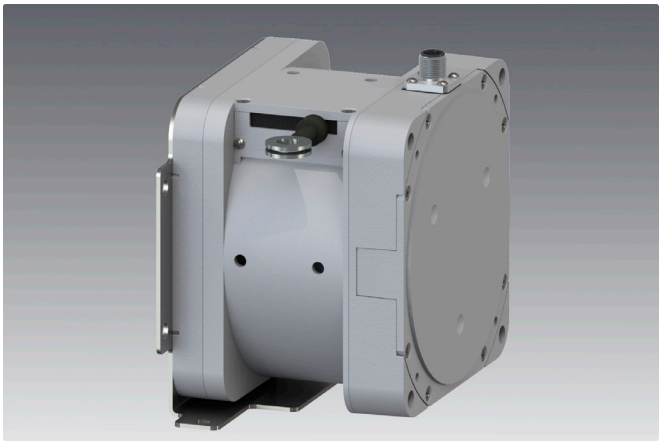
SKJ

J1939 CANBus Output Signal

Linear Position to 400 inches (10 m)
Compact Design • Simple To Install
User Adjustable Measuring Cable Orientation

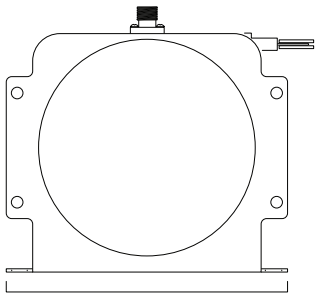


SPECIFICATIONS

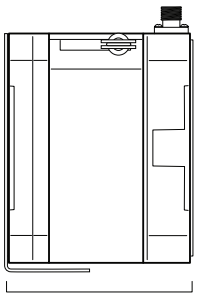
Stroke Range Options	250 inches (6.4 m), 400 inches (10.2 m)
Accuracy	.35% FS.
Repeatability	.05% FS.
Resolution	12-bit
Input Voltage	10-36 VDC
Input Current	100 mA, max.
Measuring Cable	.031-inch dia. bare stainless steel
Maximum Cable Velocity	60 inches per second
Maximum Cable Acceleration	5 g
Measuring Cable Tension	23 oz. (6,4 N) ±40%
Sensor	plastic-hybrid precision potentiometer
Cycle Life	≥ 250,000
Electrical Connection	M12 connector, mating plug included
Enclosure	glass-filled polycarbonate
Environmental	IP67
Operating Temperature	-40˚ to 185˚ F (-40˚ to 85˚ C)

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
Data Rate Options	5ms (default), 20ms, 50ms, 100ms



6.4" [164 mm]

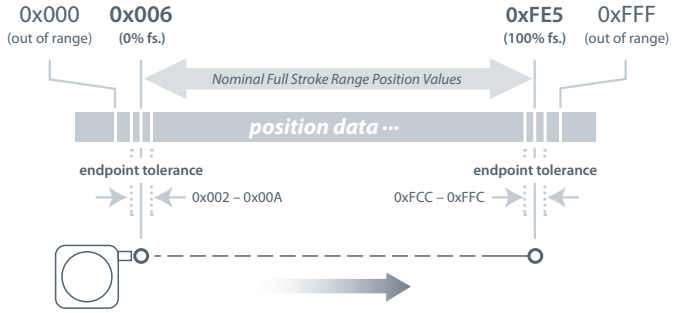


4.3" [109 mm]

The SKJ is the perfect off-the-shelf linear position sensor for applications ranging from outrigger position on a mobile crane to tracking the height of a hydraulic lift table in a factory and anything else in between. Available in both 250 and 400-inch stroke ranges, this model offers the ultimate ease-of-use, compact design and user flexibility. Need to mount it upside down? Simply rotate it's stainless mounting bracket to where you want it. Need the electrical connector to point in a different direction? Just rotate the rear cover to point the connector to the desired direction.

It's compact design, ease of use and the utmost in flexibility makes this model the perfect economically priced solution for both the single piece user to the higher volume OEM.

Output Signal



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measurement SPECIALTIES™

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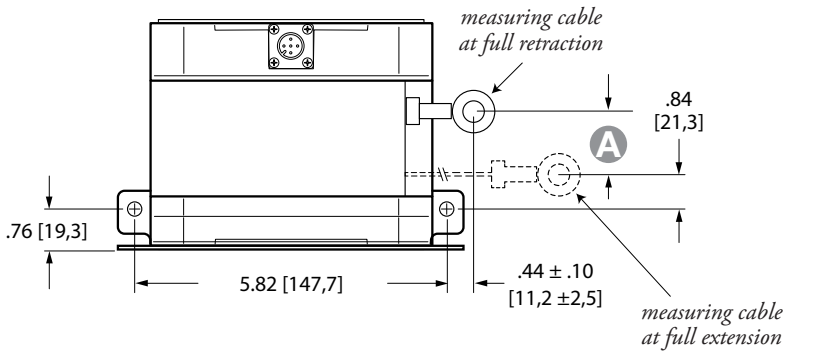
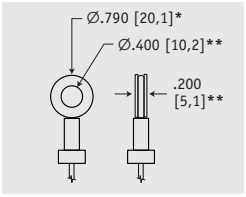
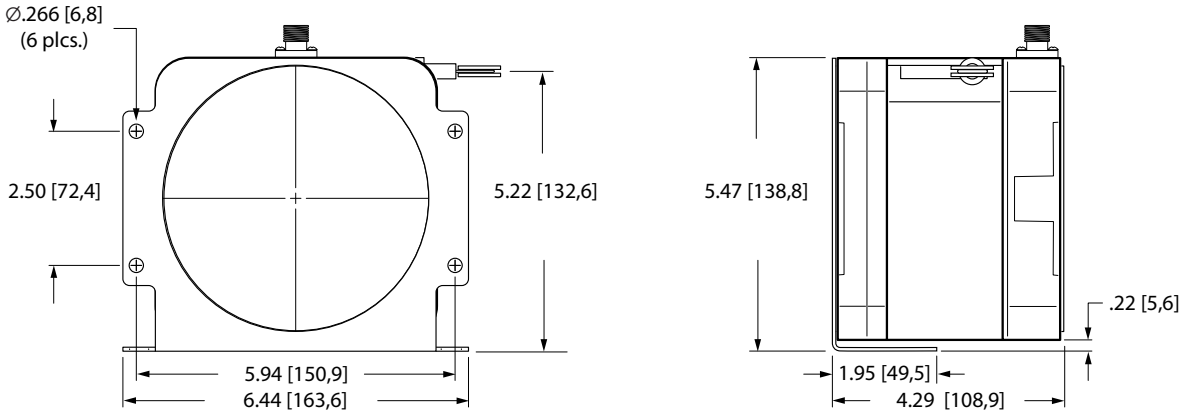
Outline Drawing:





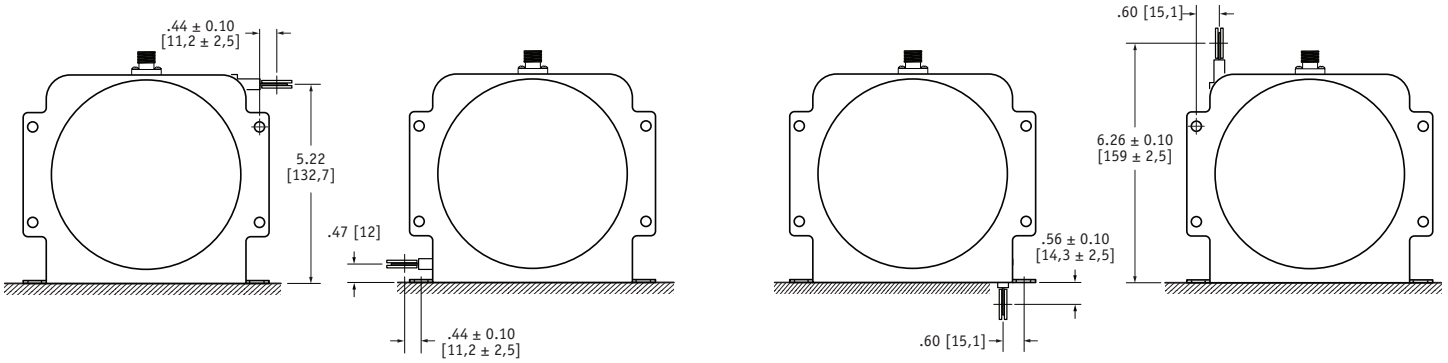
STROKE RANGE	A
250 in.	.62 [16]
400 in.	.99 [25]



DIMENSIONS ARE IN INCHES [MM]
tolerances are 0.04 IN. [1.0 MM] unless otherwise noted.

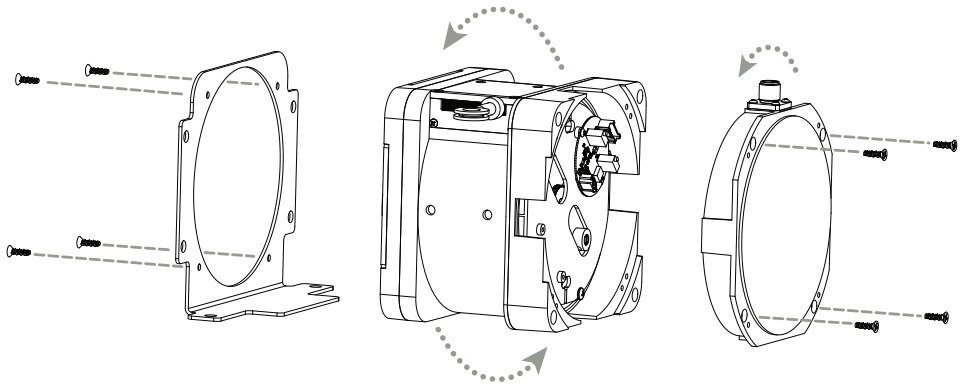
* tolerance = +.005 –.001 [+0,1 –0,0]
** tolerance = +.005 –.005 [+0.1 –0.1]

Mounting Options:

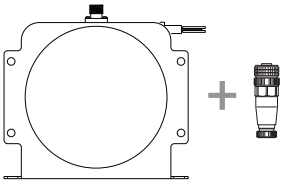


To change cable exit direction: simply remove the 4 bracket mounting screws and rotate sensor body to desired direction.

To change electrical connector orientation: remove the 4 rear screws and carefully remove the rear cover and rotate cover.

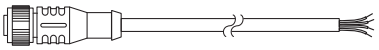
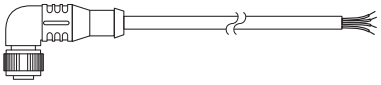


Ordering Information:

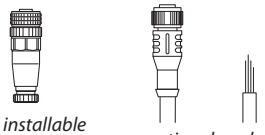


Part Number	full stroke range	accuracy	max. acceleration	measuring cable tension (± 40%)
SKJ-250-4	250 in (6.4 m)	.35%	5 g	23 oz. (6,4 N)
SKJ-400-4	400 in (10.2 m)	.35%	5 g	23 oz. (6,4N)

includes mounting bracket & mating connector.

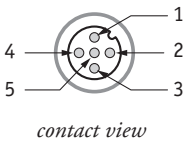
Optional Cordsets	Part Number	length	wire size	connector
	**9036810-0030**	13 ft (4 m)	22 AWG (.34mm²)	straight 5-pin M12
	**9036810-0031**	13 ft (4 m)	22 AWG (.34mm²)	90° 5-pin M12

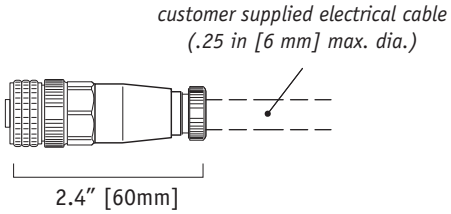
Electrical Connection:



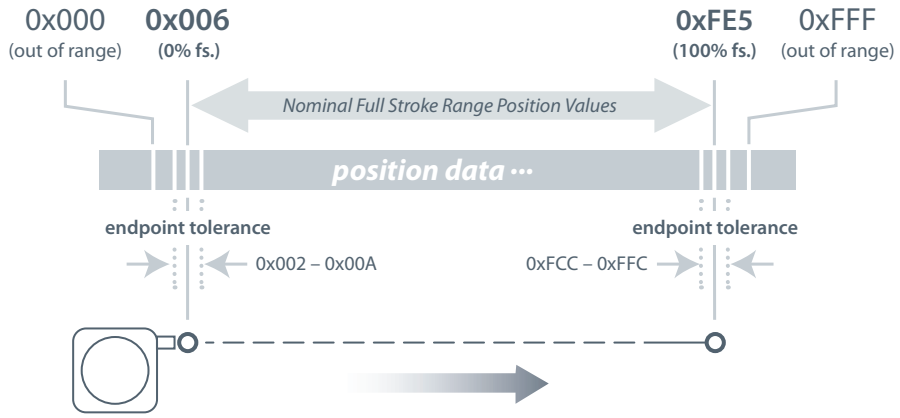
Output Signal •	pin	pin - color
drain	1	1 - brown
10..36 Vdc	2	2 - white
common	3	3 - blue
CAN - High	4	4 - black
CAN - Low	5	5 - green/yellow

Field Installable Connector:

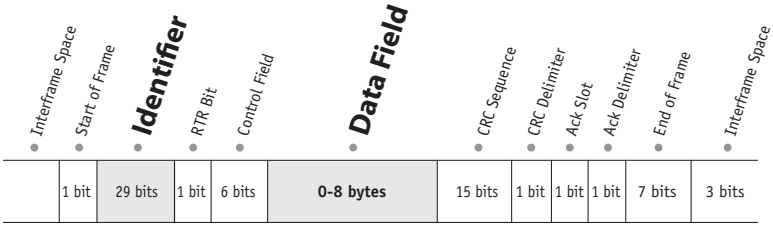




Position Data Overview:



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.

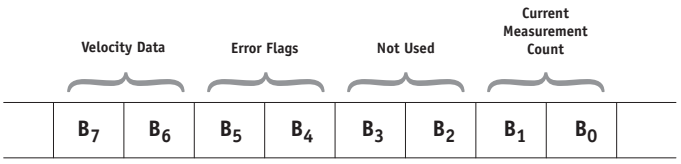
Data Field:

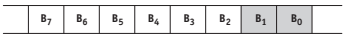
B_0 = LSB current measurement count byte
B_1 = MSB current measurement count byte

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 **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.

Converting CMC to Linear Measurement

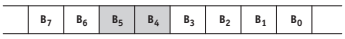
To convert the current measurment count to inches or millimeters, simply divide the count by 4061 (total counts over the range) and then multiply that value by the full stroke range:

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

Sample Conversion:

If the full stroke range is **250 inches** and the current position is **0x4FF** (1279 Decimal) then,

$$\left(\frac{1279 - 6}{4061}\right) \text{X } 250 = 78.8 \text{ inches}$$

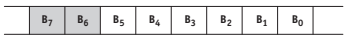


Error Flags

RED and GREEN Indicator LEDS (controller board)

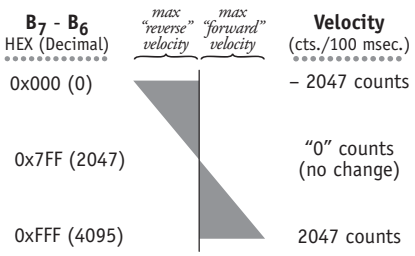
0x00 (GREEN - ON, RED - OFF) indicates the sensor is operating within normal calibrated limits.

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

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

Sample Calculations

Cable Extension (positive direction):
B_7..B_6 = 0x8D3 (2259Dec), **full stroke = 250 in.**

$$\left(\frac{2259 - 2047}{\text{.1 sec}}\right) \text{X} \left(\frac{250 \text{ in.}}{4063}\right) = 130.45 \text{ in./ sec.}$$

Cable Retraction (negative direction):
B_7..B_6 = 0x7D0 (2000Dec), **full stroke = 250 in.**

$$\left(\frac{2000 - 2047}{\text{.1 sec}}\right) \text{X} \left(\frac{250 \text{ in.}}{4063}\right) = -28.92 \text{ in./ sec.}$$

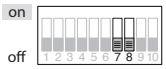
Baud, Node ID and Data Rate:

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 controller board to the connector mounted directly to the rear cover.

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

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

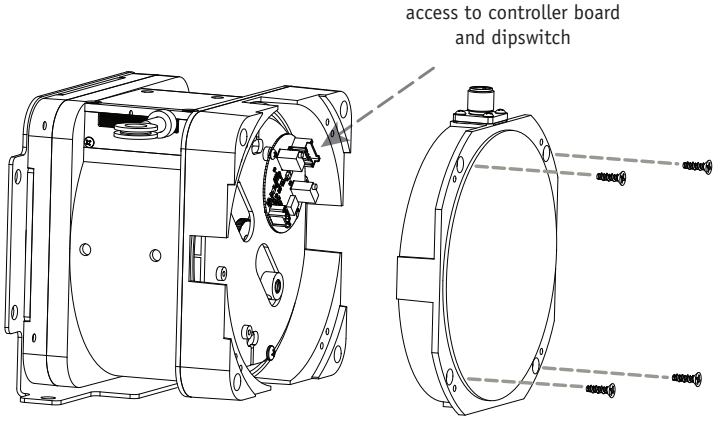


BAUD rate options

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

Data Rate options

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



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