CANbus • SAE J1939
Ranges: 0-90º to 0-50 Turns
Industrial Grade

RT9CN

Specification Summary:

GENERAL

Full Stroke Ranges	0-0.25 to 0-50 turns
Electrical Interface	CANbus SAE J1939
Protocol	Proprietary B
Accuracy	± 0.15 to ± 0.30% full stroke, see ordering information
Repeatability	± 0.02% full stroke
Resolution	± 0.003% full stroke
Enclosure Material	powder-painted aluminum or stainless steel
Sensor	plastic-hybrid precision potentiometer
Shaft Loading	up to 35 lbs. radial and 5 lbs. axial
Weight, Aluminum (Stainless Steel) Enclosure	5 lbs. (10 lbs.), max.

ELECTRICAL

Input Voltage	7 - 18 VDC
Input Current	60 mA max.
Address Setting (Node ID)	0..63 set via DIP Switches
Baud Rate	125K, 250K or 500K set via DIP Switches
EDS file	available @ http://www.celesco.com/download

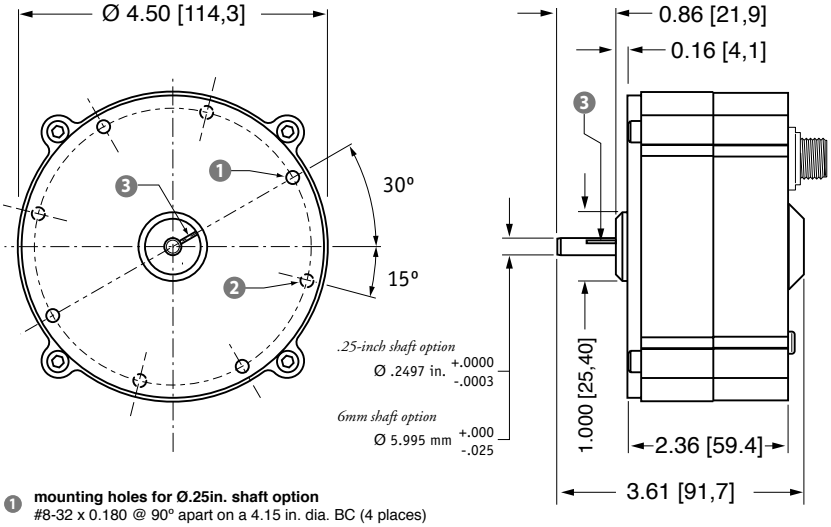
ENVIRONMENTAL

Environmental Suitability	NEMA 4/4X/6, IP 67/68
Operating Temperature	-40º to 185ºF
Vibration	up to 10 G's to 2000 Hz maximu

Celesco's model RT9CN communicates rotational position feedback to your PLC via the CANbus SAE J1939 interface. The heart of this sensor is a precision plastic-hybrid position potentiometer which provides a "absolute" position and does not ever have to be reset to a "home" position after a power loss or planned shutdown.

This innovative sensor from Celesco, designed to meet tough NEMA-4 and IP67 environmental standards, is available in full-stroke measurement ranges of 1/4 to 50 turns.

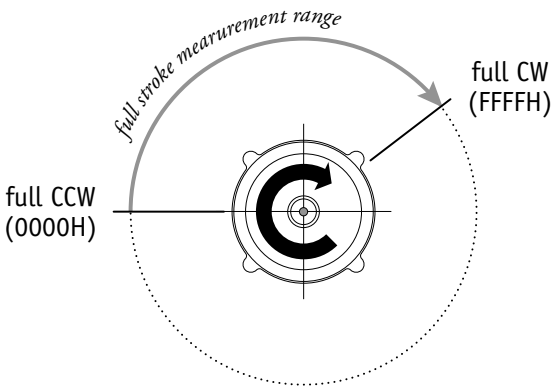
Outline Drawing



1. **mounting holes for Ø.25in. shaft option**
   #8-32 x 0.180 @ 90º apart on a 4.15 in. dia. BC (4 places)
2. **mounting holes for Ø 6mm shaft option**
   M4 x 4.5mm @ 90º apart on a 105.4 mm dia. BC (4 places)
3. **reference mark**
   full counter-clockwise position - align mark on shaft to mark on face for start of measurement range

ALL DIMENSIONS ARE IN INCHES [MM]

Output Signal



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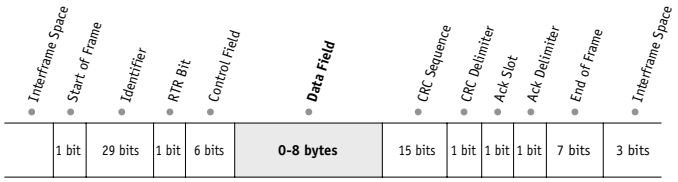
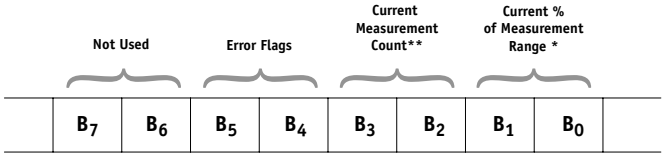
I/O Format:

Data Frame



repetition = 8 msec.

Data Field



B_0 = LSB current % of measurement range byte
B_1 = MSB current % of measurement range byte
B_4 - B_5 = error flags
B_2 = LSB current measurement count byte
B_3 = MSB current measurement count byte
B_6 - B_7 = not used

***Current % of Measurement Range**

The Current % of Measurement Range is a 2-byte value that expresses the current linear position as a percentage of the entire full stroke range. Resolution is **.1 %** of the full stroke measurement range.

This value starts at **0000H** at the beginning of the stroke and ends at **03E8H**.

Example:

Hex	Decimal	Percent
0000	0000	0.0%
0001	0001	0.1%
0002	0002	0.2%
...	...	...
03E8	1000	100.0%

****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 16-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 **0000H** with the measuring cable fully retracted and continues upward to the end of the stroke range stopping at **FFFFH**. This holds true for all ranges.

Converting CMC to Degrees

If required, the CMC can easily be converted to a rotational measurement expressed in degrees instead of counts.

This is accomplished by first dividing the CMC by 65,535 (total counts over the range) and then multiplying that value by the FSR:

$$\left(\frac{\text{CMC}}{65{,}535}\right) \times \text{FSR}$$

Example:

If the full stroke range is **1 turn (360 degrees)** and the current position is **0FF2 Hex** (4082 Decimal) then,

$$\left(\frac{4082}{65{,}535}\right) \times 360 \text{ deg.} = 22.4 \text{ degrees}$$

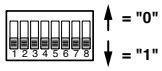
Setting the Address Setting (Node ID) and Baud Rate

Address Setting (Node ID)

The Address Setting (Node ID) is set via 6 switches located on the 8-pole DIP switch found on the DeviceNET controller board located inside the transducer.

The DIP switch settings are binary starting with switch number **1** (= 2^0) and ending with switch number **6** (= 2^5).

DIP-1 (2^0)	DIP-2 (2^1)	DIP-3 (2^2)	DIP-4 (2^3)	DIP-5 (2^4)	DIP-6 (2^5)	*address* (decimal)
0	0	0	0	0	0	0
1	0	0	0	0	0	1
0	1	0	0	0	0	2
...	...	...	...	...	...	...
1	1	1	1	1	1	63



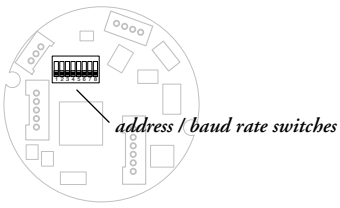
Baud Rate

The transmission baud rate may be either factory preset at the time of order or set manually at the time of installation.

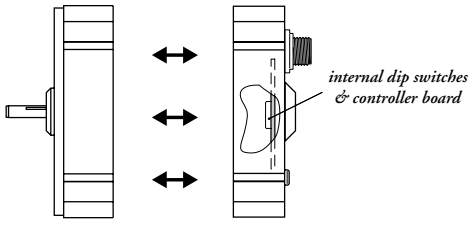
The baud rate can be set using switches **7** & **8** on the 8-pole DIP switch found on the DeviceNET controller board located inside the transducer.

DIP-7	DIP-8	baud rate
0	0	125k
1	0	250k
0	1	500k
1	1	125k

CANBus Controller Board and DIP Switch Location



to gain access to the controller board, remove four Allen-Head Screws and separate case halves



Ordering Information:

Model Number:

RT9CN - ____ Ⓡ - ___ Ⓐ - ___ Ⓑ - **J** Ⓒ - ___ Ⓓ - ___ Ⓔ - ___ Ⓕ
order code:

Sample Model Number:

RT9CN - 30 - AL - 25 - J - 500 - 32 - SC5

Ⓡ	range:	30 turns
Ⓐ	enclosure:	powder-painted aluminum
Ⓑ	shaft:	.25-in diameter
Ⓒ	interface:	CANbus SAE J1939
Ⓓ	baud rate:	500 k bits/sec.
Ⓔ	node ID:	32
Ⓕ	electrical connection:	5-meter cordset with straight plug

Full Stroke Range:

Ⓡ *order code:*	R25	R50	1	2	3	5	10	20	30	50
clockwise shaft rotations, min:	0.25	0.50	1	2	3	5	10	20	30	50
accuracy (% of f.s.):	0.3%	0.3%	0.3%	0.3%	0.3%	0.2%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5×10^6	2.5×10^6	2.5×10^6	2.5×10^6	2.5×10^6	5×10^5	2.5×10^5	2.5×10^5	2.5×10^5	2.5×10^5

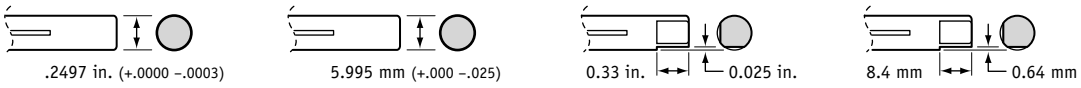
**–number of times the sensor shaft can be cycled back and forth from beginning to end and back to the beginning before any measurable signal degradation may occur.*

Enclosure Material:

Ⓐ *order code:*	AL	SS
	powder-painted aluminum	303 stainless steel

Shaft Diameter:

Ⓑ *order code:*	25	6	25F	6F
	0.25-in. diameter	6 mm diameter	0.25-in. dia. w/flats	6 mm dia. w/flats



Baud Rate:

Ⓓ *order code:*	125	250	500
	125 kbaud	250 kbaud	500 kbaud

Node ID:

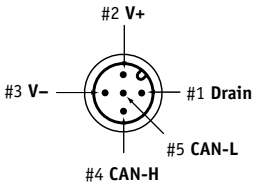
Ⓔ *order code:*	0	1	2	...	62	63
	select address (0 - 63 Decimal)					

Ordering Information:

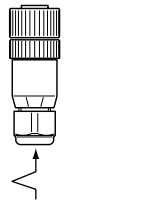
Electrical Connection:

order code:

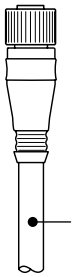
blank	MC5	SC5	NC5
5-pin micro-connector *(no mating plug supplied)*	5-pin micro-connector w/ mating plug	5-pin micro-connector and 5 meter length cordset w/straight mating plug	5-pin micro-connector and 5 meter length cordset w/90° mating plug



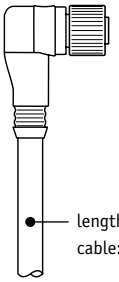
connector
(contact view)



0.16" - 0.32" OD Cable (THIN)

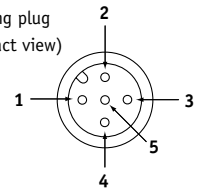


length: 16ft [5M]
cable: Thin



length: 16ft [5M]
cable: Thin

mating plug
(contact view)



pin	signal	wire color
1	drain	brown
2	V+	white
3	V-	blue
4	Can-H	black
5	Can-L	grey