

Rotational Position Transducer

CANbus • SAE J1939

Ranges: 0-45° to 0-200 Turns

Industrial Grade

RT8CN

Specification Summary:

GENERAL

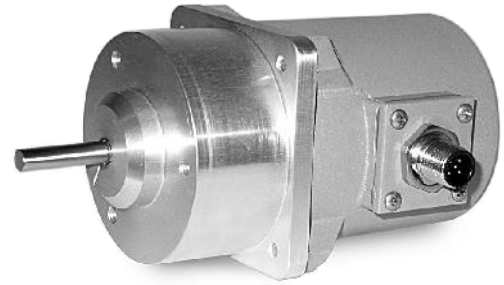
Full Stroke Ranges 0-0.125 to 0-200 turns
 Electrical Interface CANbus SAE J1939
 Protocol Proprietary B
 Accuracy *see ordering information*
 Repeatability $\pm 0.02\%$ full stroke
 Resolution $\pm 0.003\%$ full stroke
 Enclosure Material powder-painted aluminum or stainless steel
 Sensor plastic-hybrid precision potentiometer
 Shaft Loading up to 10 lbs. radial and 5 lbs. axial
 Starting Torque (25°C) 2.0 in-oz., max
 Weight, Aluminum (Stainless Steel) Enclosure 3 lbs. (6 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
 Update Rate 10 ms. (20 ms. available—*contact factory*)

ENVIRONMENTAL

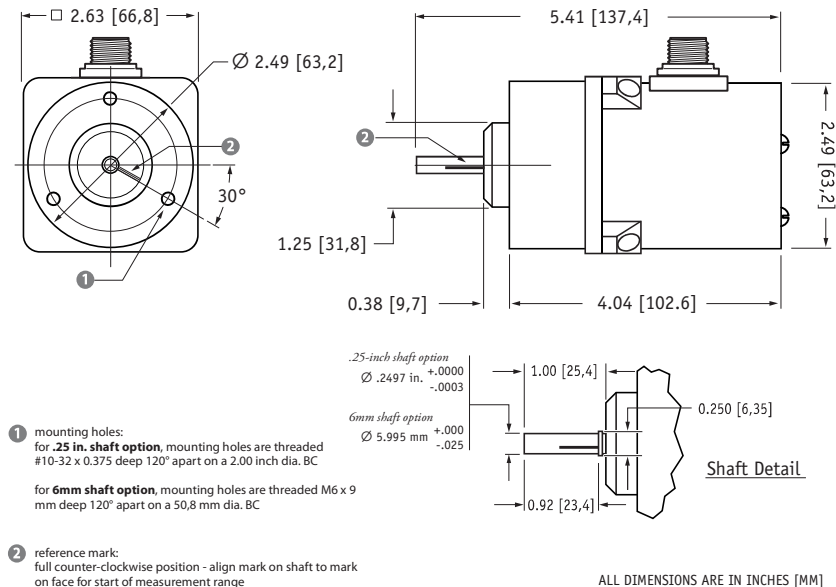
Environmental Suitability NEMA 4/4X/6, IP67/68
 Operating Temperature -40° to 185°F
 Vibration up to 10 G's to 2000 Hz maximum



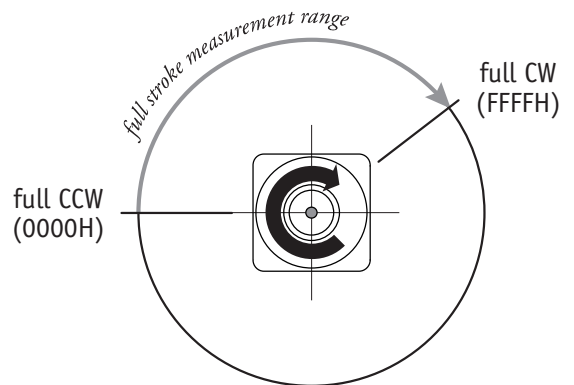
Celesco's model RT8CN communicates rotational position feedback to your PLC via the CANbus SAE J1939 interface. The heart of this sensor is a precision plastic-hybrid position potentiometer which provides a "absolute" position and does not ever have to be reset to a "home" position after a power loss 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 1/8 to 200 turns.

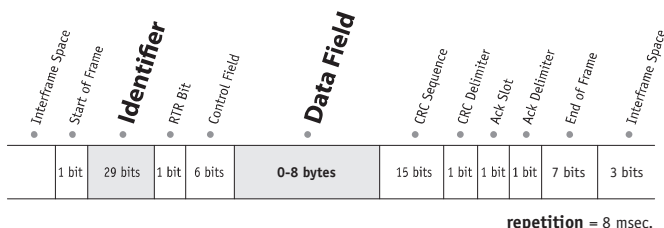
Outline Drawing



Output Signal



I/O Format and Settings



• 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	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	0	0	1	1	1	1	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	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.

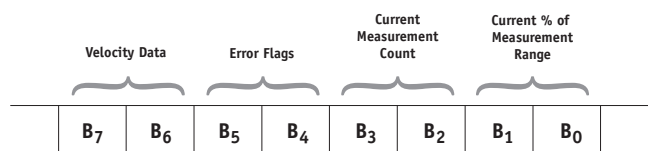
• Data Field

B₀ = LSB current % of measurement range byte
B₁ = MSB current % of measurement range byte

B₂ = LSB current measurement count byte
B₃ = MSB current measurement count byte

B₄ = error flag
B₅ = error flag

B₆ = LSB velocity data byte
B₇ = MSB velocity data byte



B ₇	B ₆	B ₅	B ₄	B ₃	B ₂	B ₁	B ₀
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Current Measurement Count

The **Current Measurement Count (CMC)** is the output data that indicates the present position of the measuring cable. The CMC is a 16-bit value that occupies bytes **B₂** and **B₃** of the data field. **B₂** is the **LSB** (least significant byte) and **B₃** is the **MSB** (most significant byte).

The **CMC** starts at **0x0000** with the shaft in the full counter-clockwise position (at reference mark) and continues upward to the end of the stroke range stopping at **0xFFFF**. This holds true for all ranges.

Converting CMC to Degrees

If required, the CMC can easily be converted a rotary measurement expressed in degrees instead of simply 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 **0x0FF2 (4082 Decimal)** then,

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

B ₇	B ₆	B ₅	B ₄	B ₃	B ₂	B ₁	B ₀
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

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 **0x0000** at the beginning of the stroke and ends at **0x03E8**.

Example:

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

B ₇	B ₆	B ₅	B ₄	B ₃	B ₂	B ₁	B ₀
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

Error Flags

0x55 (yellow LED on controller board) indicates that the sensor has begun to travel beyond the calibrated range of the internal position potentiometer.

0xAA (red LED on controller board) indicates that the sensor has moved well beyond the calibrated range of the internal position potentiometer.

If either error flag occurs within the full stroke range of the sensor, the unit should be returned to the factory for repair and recalibration.

B ₇	B ₆	B ₅	B ₄	B ₃	B ₂	B ₁	B ₀
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

Velocity

Data in bytes **B₇** - **B₆** is the change and direction of the **CMC** (current measurement count) over a 100 msec time period. This data can then be used to calculate velocity and direction in a post processing operation.

B ₇ - B ₆ HEX (Decimal)	"reverse" velocity	"forward" velocity	Velocity (cts./100 msec.)
0x0000 (0)			- 32767 counts
0x7FFF (32767)			"0" counts (no change)
0xFFFF (65535)			32767 counts

Velocity Calculation

$$\left(\frac{\text{count change} - 32767}{.1 \text{ sec. time period}} \right) \times \left(\frac{\text{full stroke range}}{65,535} \right)$$

Sample Calculations

Clockwise Shaft Rotation (positive direction):

B₇-B₆ = 0x89C6 (43462 Dec.), full stroke = 1 Turn

$$\left(\frac{35270 - 32767}{.1 \text{ sec}} \right) \times \left(\frac{1 \text{ Turn}}{65,535} \right) = .38 \text{ turns/sec.}$$

Counter-Clockwise Shaft Rotation (negative direction):

B₇-B₆ = 0x61A8 (25000 Dec.), full stroke = 1 Turn

$$\left(\frac{25000 - 32767}{.1 \text{ sec}} \right) \times \left(\frac{1 \text{ Turn}}{65,535} \right) = -1.2 \text{ turns/sec.}$$

RT8CN • Rotational Transducer: CANBus SAE J1939

Setting the Address (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** (= 2⁰) and ending with switch number **6** (= 2⁵).

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

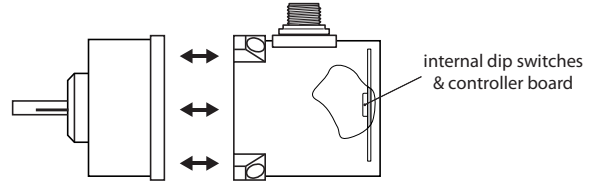
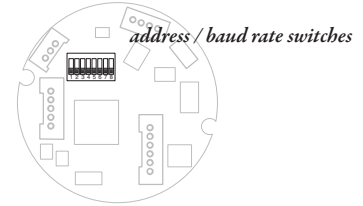
The transmission baud rate may be either factory preset at the time of order or set manually at the time of installation.

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



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

Ordering Information:

Model Number:

RT8CN - **R** - **A** - **B** - **C** - **J** - **D** - **E** - **F** - **G**
order code: R A B C D E F G

Sample Model Number:

RT8CN - 100 - AL - 25 - FL - J - 500 - 32 - SC!

- R** range: 100 turns
- A** enclosure: powder-painted aluminum
- B** shaft: .25-in diameter
- C** mounting style: flange
- D** interface: CANbus SAE J1939
- E** baud rate: 500 k bits/sec.
- F** node ID: 32
- G** electrical connection: 5-meter cordset with straight plug

Full Stroke Range:

R order code:	R125	R25	R50	1	2	3	5	10	20
clockwise shaft rotations, min:	0.125	0.25	0.50	1	2	3	5	10	20
accuracy (% of f.s.):	1.25%	1.25%	0.5%	0.5%	0.5%	0.2%	0.2%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	5 x 10 ⁵	5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵

R order code:	30	40	50	80	100	120	140	180	200
clockwise shaft rotations, min:	30	40	50	80	100	120	140	180	200
accuracy (% of f.s.):	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 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:

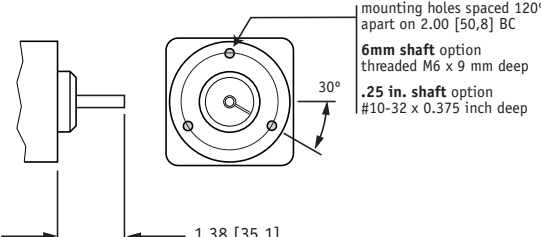
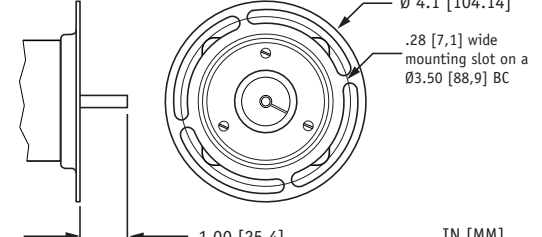
A order code:	AL	SS
	powder-painted aluminum	303 stainless steel

Ordering Information:

Shaft Diameter:

B order code:	25	6	25F	6F
	0.25-in. diameter	6 mm diameter	0.25-in. dia. w/flats	6 mm dia. w/flats
				
	.2497 in. (+.0000 -0.003)	5.995 mm (+.000 -0.025)	0.33 in. ← 0.025 in.	8.4 mm ← 0.64 mm

Mounting Style:

G order code:	FA	FM
	face mount	flange mount
		
	mounting holes spaced 120° apart on 2.00 [50,8] BC 6mm shaft option threaded M6 x 9 mm deep .25 in. shaft option #10-32 x 0.375 inch deep	Ø 4.1 [104.14] .28 [7,1] wide mounting slot on a Ø3.50 [88,9] BC
	1.38 [35,1]	1.00 [25,4]
		IN [MM]

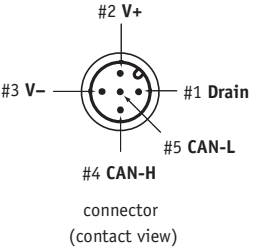
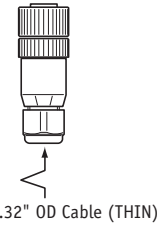
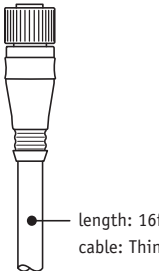
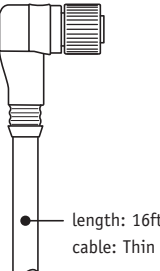
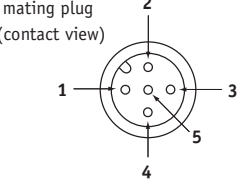
Baud Rate:

E order code:	125	250	500
	125 kbaud	250 kbaud	500 kbaud

Node ID:

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

Electrical Connection:

G 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																		
																						
		0.16" - 0.32" OD Cable (THIN)	length: 16ft [5M] cable: Thin	length: 16ft [5M] cable: Thin																		
																						
			<table border="1"> <thead> <tr> <th>pin</th> <th>signal</th> <th>wire color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>drain</td> <td>brown</td> </tr> <tr> <td>2</td> <td>V+</td> <td>white</td> </tr> <tr> <td>3</td> <td>V-</td> <td>blue</td> </tr> <tr> <td>4</td> <td>Can-H</td> <td>black</td> </tr> <tr> <td>5</td> <td>Can-L</td> <td>grey</td> </tr> </tbody> </table>	pin	signal	wire color	1	drain	brown	2	V+	white	3	V-	blue	4	Can-H	black	5	Can-L	grey	
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3	V-	blue																				
4	Can-H	black																				
5	Can-L	grey																				

version: 9.1 last updated: December 7, 2010

Rotational Position Transducer

DeviceNET®

Ranges: 0-45° to 0-200 Turns

Industrial Grade

RT8DN

Specification Summary:

GENERAL

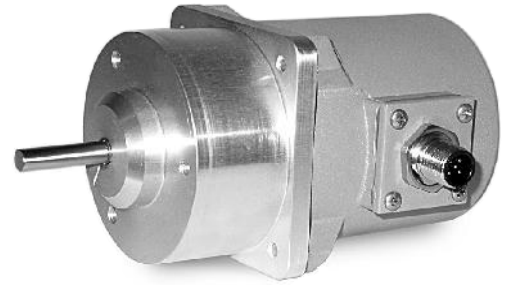
Full Stroke Ranges 0-0.125 to 0-200 turns
 Electrical Interface CANbus ISO 11898
 Protocol DeviceNet Version 2.0
 Accuracy *see ordering information*
 Repeatability $\pm 0.02\%$ full stroke
 Resolution $\pm 0.003\%$ full stroke
 Enclosure Material powder-painted aluminum or stainless steel
 Sensor plastic-hybrid precision potentiometer
 Shaft Loading up to 10 lbs. radial and 5 lbs. axial
 Starting Torque (25°C) 2.0 in.-oz., max
 Weight, Aluminum (Stainless Steel) Enclosure 3 lbs. (6 lbs.), max.

ELECTRICAL

Input Voltage Bus Powered
 Input Current 40 mA
 Address Setting (Node ID) 0...63 set via DIP Switches—*default setting: 63*
 Baud Rate 125K, 250K or 500K set via DIP Switches
 EDS file available @ <http://www.celesco.com/download>

ENVIRONMENTAL

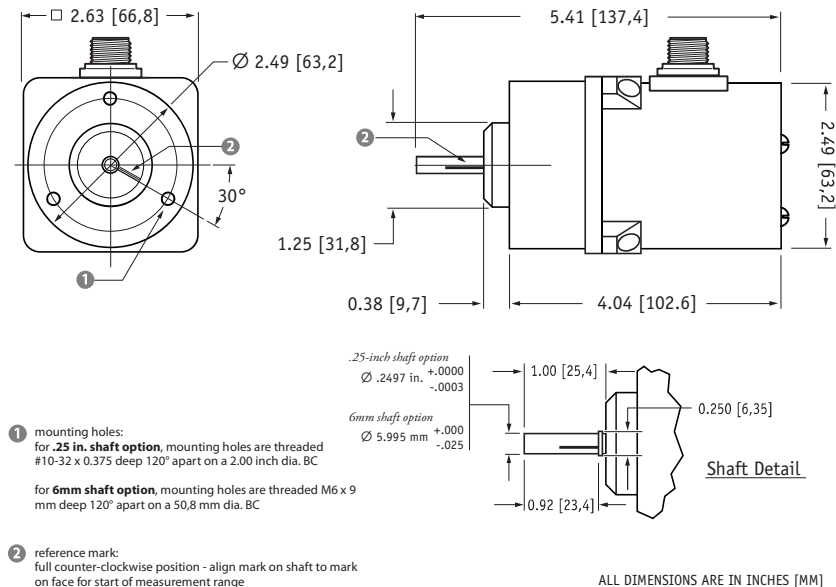
Environmental Suitability NEMA 4/4X/6, IP67/68
 Operating Temperature -40° to 200°F
 Vibration up to 10 G's to 2000 Hz maximum



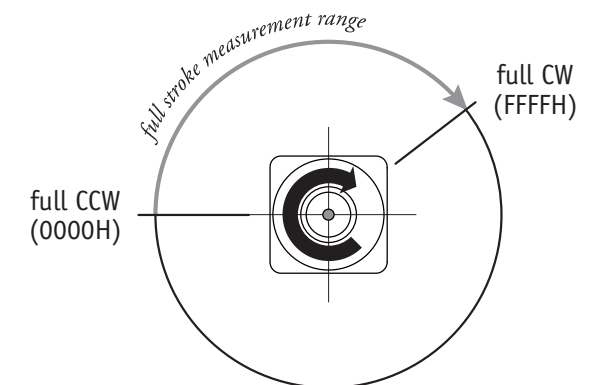
Celesco's model RT8DN communicates rotational position feedback via DeviceNET® to your programmable controller. The heart of this sensor is a precision plastic-hybrid position potentiometer which provides a "absolute" position and does not ever have to be reset to a "home" position after a power loss 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 1/8 to 200 turns.

Outline Drawing



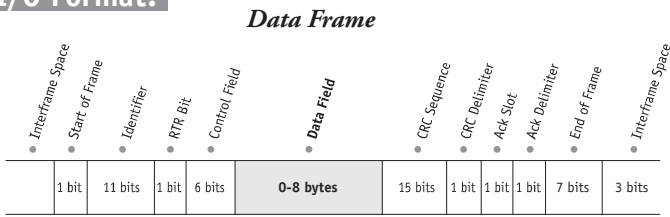
Output Signal



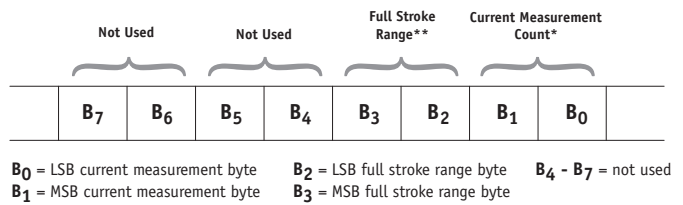
Celesco Transducer Products, Inc.
 20630 Plummer Street • Chatsworth, CA 91311
 tel: 800.423.5483 • +1.818.701.2750 • fax: +1.818.701.2799

celesco
 celesco.com • info@celesco.com

I/O Format:



Data Field



***Current Measurement Count**

The **Current Measurement Count (CMC)** is the output data that indicates the present position of the measuring cable.

The CMC is a 16-bit value that occupies the first two bytes (B₀ and B₁) of the data field. B₀ is the LSB (least significant byte) and B₁ is the MSB (most significant byte).

The CMC starts at 0000H with shaft at the full counter-clockwise position (0° reference mark) and continues in the clockwise direction to the end of the stroke range stopping at FFFFH. This holds true for all ranges.

****Full Stroke Range**

The **Full Stroke Range (FSR)** is a 16-bit value in the data field that expresses the full range of the sensor in degrees. This value can be used to convert the actual count to units of measurement should the application require it.

The full stroke measurement range occupies the second two bytes (B₂ and B₃) of the data field.

B₂ is the LSB (least significant byte) and B₃ is the MSB (most significant byte).

This value is expressed in degrees.

Example:

Hex Value	Decimal Equivalent	Full Stroke Range
0168	360	360 degrees

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 **OFF2 Hex (4082 Decimal)** then,

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

Address Setting (Node ID), Baud Rate and Bus Termination Settings

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 (= 2⁰) and ending with switch number 6 (= 2⁵).

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.

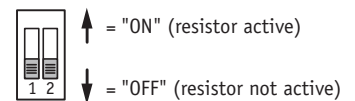
DIP-7	DIP-8	baud rate
0	0	125k
1	0	250k
0	1	500k
1	1	125k



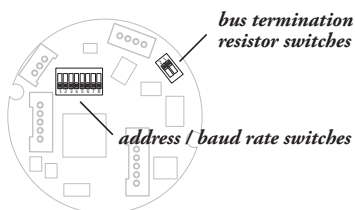
Bus Termination

The setting of the internal bus termination resistor may be specified upon order or manually changed by the end user at the time of installation.

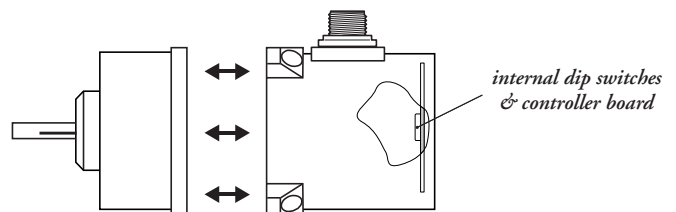
The bus termination resistor is activated setting switches 1 & 2 on the 2-pole DIP switch (located on the internal DeviceNET controller board) to the "ON" position.



DeviceNET 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:



Sample Model Number:

RT8DN - 100 - AL - 25 - FL - 500 - TR - SC5

- R** range: 100 turns
- A** enclosure: powder-painted aluminum
- B** shaft: .25-in diameter
- C** mounting style: flange
- D** baud rate: 500 k bits/sec.
- E** terminating resistor: yes
- F** electrical termination: 5-meter cordset with straight plug

Full Stroke Range:

R <i>order code:</i>	R125	R25	R50	1	2	3	5	10	20
clockwise shaft rotations, min:	0.125	0.25	0.50	1	2	3	5	10	20
accuracy (% of f.s.):	1.25%	1.25%	0.5%	0.5%	0.5%	0.2%	0.2%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	5 x 10 ⁵	5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵

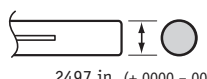
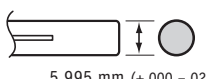
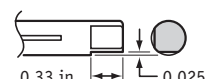
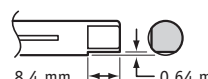
R <i>order code:</i>	30	40	50	80	100	120	140	180	200
clockwise shaft rotations, min:	30	40	50	80	100	120	140	180	200
accuracy (% of f.s.):	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 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.

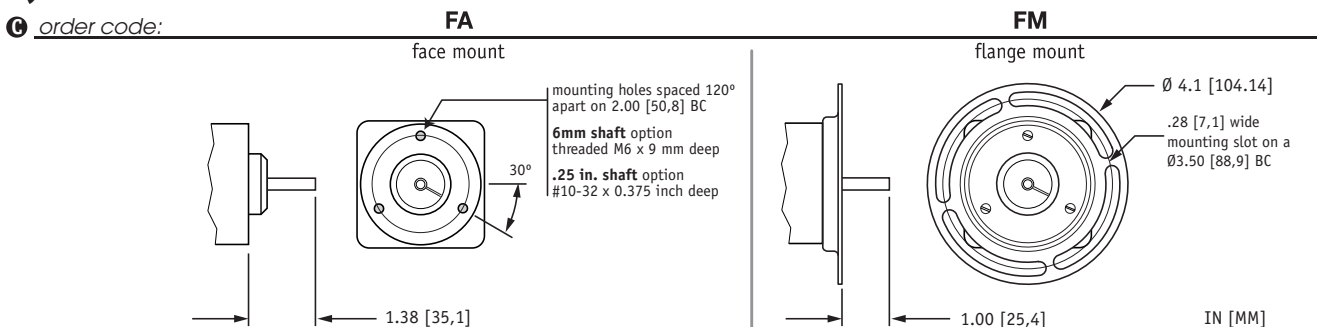
Enclosure Material:

A <i>order code:</i>	AL	SS
	powder-painted aluminum	303 stainless steel

Shaft Diameter:

B <i>order code:</i>	25	6	25F	6F
	0.25-in. diameter	6 mm diameter	0.25-in. dia. w/flats	6 mm dia. w/flats
	 .2497 in. (+.0000 -.0003)	 5.995 mm (+.000 -.025)	 0.33 in. 0.025 in.	 8.4 mm 0.64 mm

Mounting Style:



Ordering Information:

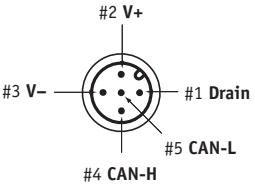


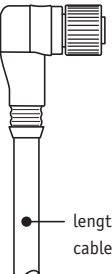
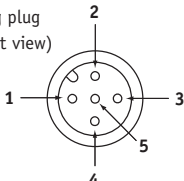
Baud Rate:

order code:	125	250	500
	125 kbaud	250 kbaud	500 kbaud

Terminating Resistor:

order code:	TR	NR
	terminating resistor	no terminating resistor

Electrical Connection:

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																		
 <p>#2 V+ #3 V- #1 Drain #5 CAN-L #4 CAN-H connector (contact view)</p>	 <p>0.16" - 0.32" OD Cable (THIN)</p>	 <p>length: 16ft [5M] cable: Thin</p>	 <p>length: 16ft [5M] cable: Thin</p>																		
	 <p>mating plug (contact view)</p>																				
		<table border="1"> <thead> <tr> <th>pin</th> <th>signal</th> <th>wire color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>drain</td> <td>brown</td> </tr> <tr> <td>2</td> <td>V+</td> <td>white</td> </tr> <tr> <td>3</td> <td>V-</td> <td>blue</td> </tr> <tr> <td>4</td> <td>Can-H</td> <td>black</td> </tr> <tr> <td>5</td> <td>Can-L</td> <td>grey</td> </tr> </tbody> </table>	pin	signal	wire color	1	drain	brown	2	V+	white	3	V-	blue	4	Can-H	black	5	Can-L	grey	
pin	signal	wire color																			
1	drain	brown																			
2	V+	white																			
3	V-	blue																			
4	Can-H	black																			
5	Can-L	grey																			

version: 5.0 last updated: July 20, 2010

Rotational Position Transducer

Precision Potentiometric Output
Ranges: 0-45° to 0-200 Turns
Industrial Grade



RT8101

Specification Summary:

GENERAL

Full Stroke Range Options 0-0.125 to 0-200 turns
 Output Signal Options..... voltage divider (potentiometer)
 Accuracy *see ordering information*
 Repeatability..... ± 0.02% full stroke
 Resolution essentially infinite
 Enclosure Material Options powder-painted aluminum or stainless steel
 Sensor plastic-hybrid precision potentiometer
 Potentiometer Cycle Life *see ordering information*
 Shaft Loading up to 10 lbs. radial and 5 lbs. axial
 Starting Torque (25°C) 2.0 in-oz., max.
 Weight, Aluminum (Stainless Steel) Enclosure 3 lbs. (6 lbs.) max.

ELECTRICAL

Input Resistance Options 500, 1K, 5K, 10K or bridge, *see ordering information*
 Power Rating, Watt 2.0 at 70°F derated to 0 at 250°
 Recommended Maximum Input Voltage 30 V (AC/DC)
 Output Signal Change Over Full Stroke Range 94% ±4% of input voltage

ENVIRONMENTAL

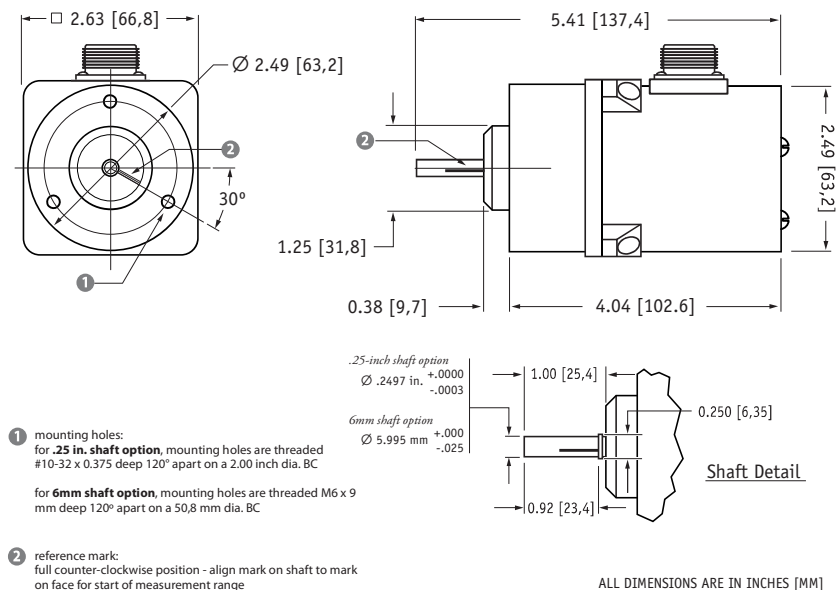
Enclosure NEMA 4/4X/6, IP 67/68
 Operating Temperature -40° to 200°F (-40° to 90°C)
 Vibration..... up to 10 G's to 2000 Hz maximum



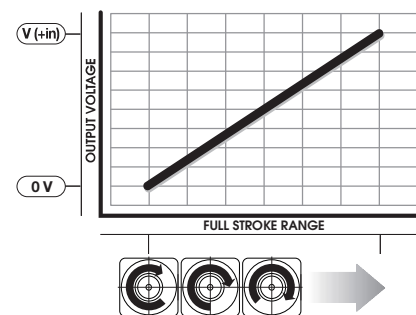
Celesco's model RT8101 provides a voltage feedback signal for rotational position. The sensing element of this device is a precision plastic-hybrid potentiometer which provides superb linearity and resolution.

The RT8101 provides extended rotational position feedback from as little as 1/8 of a turn f.s. all the way up to 200 turns f.s. Because the sensor is potentiometric, the RT8101 is absolute and will maintain position information even after a loss of power.

Outline Drawing



Output Signal



RT8101 • Rotational Transducer: Precision Potentiometric Output

Ordering Information:

Model Number:

RT8101- _____ - _____ - _____ - _____ - **1** - **0**
order code: **R** **A** **B** **C** **D** **E** **F** **G**

Sample Model Number:

RT8101 - 0005 - 111 - 1110

- R** range: 5 turns (clockwise shaft rotations)
- A** enclosure: aluminum
- B** shaft diameter: .25 inches
- C** mounting style: face mount
- D** output signal: 500 ohm potentiometer
- F** electrical connection: 6-pin plastic connector

Full Stroke Range:

R <i>order code:</i>	R125	0R25	0R50	0001	0002	0003	0005	0010	0020
clockwise shaft rotations, min:	0.125	0.25	0.50	1	2	3	5	10	20
accuracy (% of f.s.):	1.25%	1.25%	0.5%	0.5%	0.5%	0.2%	0.2%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	5 x 10 ⁵	5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵





R <i>order code:</i>	0030	0040	0050	0080	0100	0120	0140	0180	0200
clockwise shaft rotations, min:	30	40	50	80	100	120	140	180	200
accuracy (% of f.s.):	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 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.

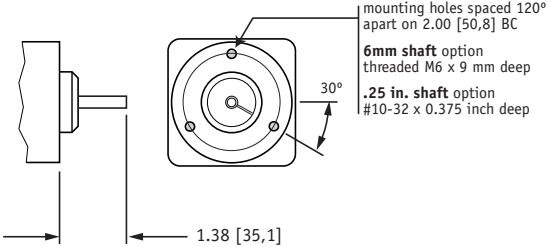
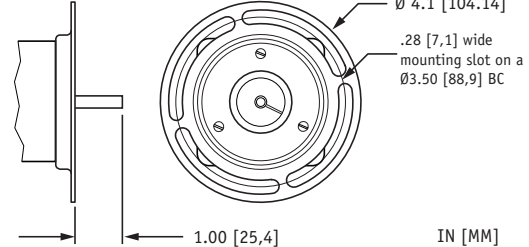
Enclosure Material:

A <i>order code:</i>	1	2
	powder-painted aluminum	303 stainless steel

Shaft Diameter:

B <i>order code:</i>	1	2	3	4
	0.25-in. diameter	6 mm diameter	0.25-in. dia. w/flats	6 mm dia. w/flats
	 .2497 in. (+.0000 - .0003)	 5.995 mm (+.000 - .025)	 0.33 in. 0.025 in.	 8.4 mm 0.64 mm

Mounting Style:

C <i>order code:</i>	1	2
	face mount	flange mount
	 mounting holes spaced 120° apart on 2.00 [50,8] BC 6mm shaft option threaded M6 x 9 mm deep .25 in. shaft option #10-32 x 0.375 inch deep 30° 1.38 [35,1]	 Ø 4.1 [104,14] .28 [7,1] wide mounting slot on a Ø3.50 [88,9] BC 1.00 [25,4] IN [MM]

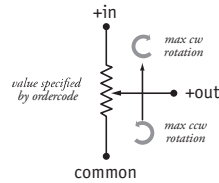
RT8101 • Rotational Transducer: Precision Potentiometric Output

Ordering Information:

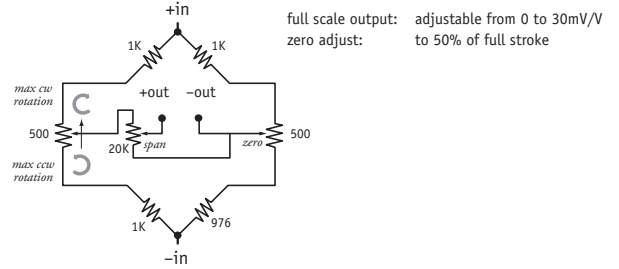
Output Signals:

order code:	1	2	3	4	5
available ranges:	500 ohm*	1000 ohm*	5000 ohm*	10,000 ohm*	adjustable bridge (0...30 mV/V)
	all ranges	not available for .125-turn (R125) and .25-turn (OR25) range options			
					*tolerance = ±10%

circuit options: 1, 2, 3, 4



circuit option: 5 (adjustable bridge)



Electrical Connection:

order code:	1	2	3	4																																												
	6-pin plastic connector w/mating plug IP 67, NEMA 4X** , 6	10-ft. [3 M] waterproof cable IP 67, NEMA 4X** , 6	6-pin metal connector w/mating plug IP 65, NEMA 4	25-ft. [7.5 M] instrumentation cable IP 67, NEMA 6																																												
	 1/2 - 5/16" [14 - 8 mm] cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S	 10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW	 3/8-in. [9 mm] max cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S	 25 ft. x 0.2-in. dia. [7.5 M x 5 mm dia.] 24 AWG, shielded																																												
order code:	5	6	7																																													
	100-ft. [30 M] waterproof cable IP 67, NEMA 4X** , 6	10-ft. [3 M] pressure tested* waterproof cable IP 68, NEMA 4X** , 6P	100-ft. [30 M] pressure tested* waterproof cable IP 68, NEMA 4X** , 6P																																													
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	6-pin Mating Plug <table border="1"> <thead> <tr> <th>pin</th> <th>standard</th> <th>bridge</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>+ in</td> <td>+ in</td> </tr> <tr> <td>B</td> <td>common</td> <td>- in</td> </tr> <tr> <td>C</td> <td>+ out</td> <td>- out</td> </tr> <tr> <td>D</td> <td>-</td> <td>+ out</td> </tr> </tbody> </table> contact view		pin	standard	bridge	A	+ in	+ in	B	common	- in	C	+ out	- out	D	-	+ out	Waterproof Cable <table border="1"> <thead> <tr> <th>color code</th> <th>standard</th> <th>bridge</th> </tr> </thead> <tbody> <tr> <td>WHITE</td> <td>+ in</td> <td>n/a</td> </tr> <tr> <td>BLACK</td> <td>common</td> <td>n/a</td> </tr> <tr> <td>GREEN</td> <td>+ out</td> <td>n/a</td> </tr> </tbody> </table>		color code	standard	bridge	WHITE	+ in	n/a	BLACK	common	n/a	GREEN	+ out	n/a	Instrumentation Cable <table border="1"> <thead> <tr> <th>color code</th> <th>standard</th> <th>bridge</th> </tr> </thead> <tbody> <tr> <td>RED</td> <td>+ in</td> <td>+ in</td> </tr> <tr> <td>BLACK</td> <td>common</td> <td>- in</td> </tr> <tr> <td>GREEN</td> <td>+ out</td> <td>+ out</td> </tr> <tr> <td>WHITE</td> <td>-</td> <td>- out</td> </tr> </tbody> </table>		color code	standard	bridge	RED	+ in	+ in	BLACK	common	- in	GREEN	+ out	+ out	WHITE	-	- out
pin	standard	bridge																																														
A	+ in	+ in																																														
B	common	- in																																														
C	+ out	- out																																														
D	-	+ out																																														
color code	standard	bridge																																														
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BLACK	common	n/a																																														
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RED	+ in	+ in																																														
BLACK	common	- in																																														
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WHITE	-	- out																																														

Notes: { * -Test pressure: 100 feet [30 meters] H₂O (40 PSID); Test Medium: Air; Duration: 2 hours.
** -NEMA 4X applies to stainless steel enclosure only.

version: 7.0 last updated: June 01, 2011

Rotational Position Transducer



10-11 Colorado Court, Hallam
 Victoria 3803, Australia
 Telephone: 61 3 9708 6885
 Facsimile: 61 3 9708 6770
 Email: idm@idminstruments.com.au
 Web: www.idminstruments.com.au

0/4...20 mA Output
Ranges: 0-45° to 0-200 Turns
Industrial Grade



RT8420

Specification Summary:

GENERAL

Full Stroke Range Options 0-0.125 to 0-200 turns
 Output Signal Options 4...20 mA (2-wire) and 0...20 mA (3-wire)
 Accuracy *see ordering information*
 Repeatability $\pm 0.05\%$ full stroke
 Resolution essentially infinite
 Enclosure Material Options powder-painted aluminum or stainless steel
 Sensor plastic-hybrid precision potentiometer
 Potentiometer Cycle Life *see ordering information*
 Shaft Loading up to 10 lbs. radial and 5 lbs. axial
 Starting Torque (25°C) 2.0 in.-oz., max.
 Weight, Aluminum (Stainless Steel) Enclosure 3 lbs. (6 lbs.) max.

ELECTRICAL

Input Voltage *see ordering information*
 Input Current 20 mA max.
 Maximum Loop Resistance (Load) (loop supply voltage - 8)/0.020
 Circuit Protection 38 mA max.
 Impedance 100M ohms@100 VDC, min.
 Output Signal Adjustment
 Zero Adjustment from factory set zero to 50% of full stroke range
 Span Adjustment to 50% of factory set span
 Thermal Effects
 Zero 0.01% f.s./°F, max.
 Span 0.01% f.s./°F, max.

ENVIRONMENTAL

Enclosure NEMA 4/4X/6, IP 67/68
 Operating Temperature -40° to 200°F (-40° to 90°C)
 Vibration up to 10 G's to 2000 Hz maximum

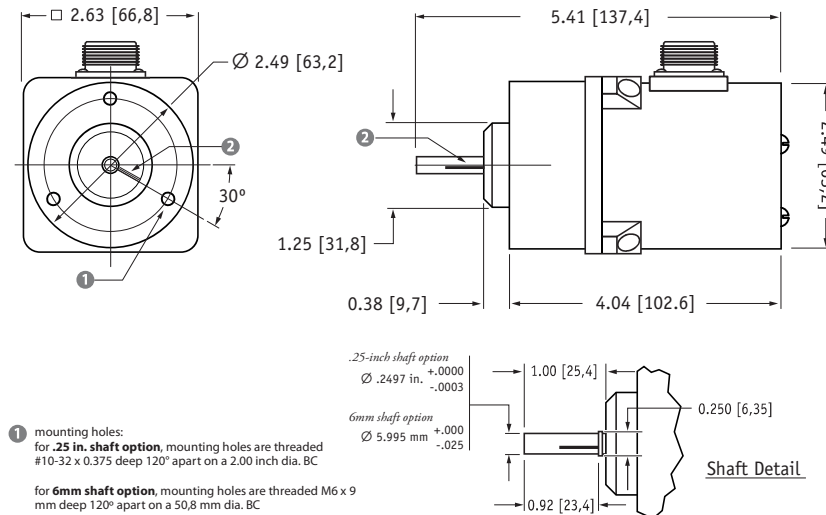
EMC COMPLIANCE PER DIRECTIVE 89/336/EEC

Emission/Immunity EN50081-2/EN50082-2



Celeco's model RT8420 provides extended rotational position feedback from as little as 1/8 of a turn f.s. all the way up to 200 turns f.s. The RT8420 combines the superb linearity and resolution of a plastic-hybrid potentiometer with the durability of Celeco's 4...20 mA circuit to provide an accurate and reliable electrical signal over all ranges.

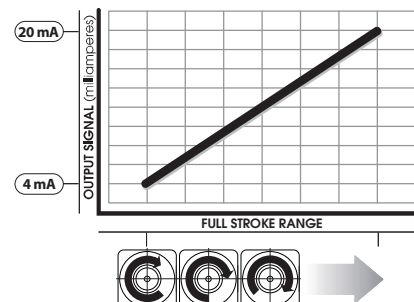
Additionally, the RT8420 has fully accessible zero and span settings allowing precise matching of the output signal to the required measurement.



- mounting holes:
 for .25 in. shaft option, mounting holes are threaded #10-32 x 0.375 deep 120° apart on a 2.00 inch dia. BC
 for 6mm shaft option, mounting holes are threaded M6 x 9 mm deep 120° apart on a 50.8 mm dia. BC
- 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



10-11 Colrado Court, Hallam
 Victoria 3803, Australia
 Telephone: 61 3 9708 6885
 Facsimile: 61 3 9708 6770
 Email: idm@idminstruments.com.au
 Web: www.idminstruments.com.au

Ordering Information:

Model Number:

RT8420- - - - - - - **0**
order code: R A B C D E F G

Sample Model Number:
RT8420 - 0005 - 111 - 1110

- R** range: 5 turns (clockwise shaft rotations)
- A** enclosure: aluminum
- B** shaft diameter: .25 inches
- C** mounting style: face mount
- E** output signal: 4...20 mA signal increasing clockwise
- F** electrical connection: 6-pin plastic connector

Full Stroke Range:

R order code:	R125	0R25	0R50	0001	0002	0003	0005	0010	0020
clockwise shaft rotations, min:	0.125	0.25	0.50	1	2	3	5	10	20
accuracy (% of f.s.):	1.25%	1.25%	0.5%	0.5%	0.5%	0.2%	0.2%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	2.5 x 10 ⁶	5 x 10 ⁵	5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵





R order code:	0030	0040	0050	0080	0100	0120	0140	0180	0200
clockwise shaft rotations, min:	30	40	50	80	100	120	140	180	200
accuracy (% of f.s.):	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 10 ⁵	2.5 x 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.

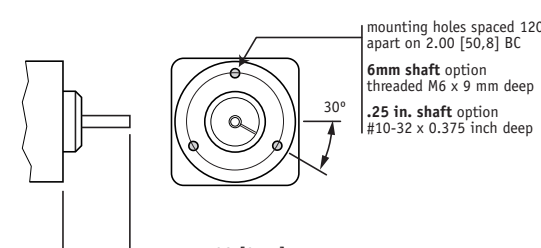
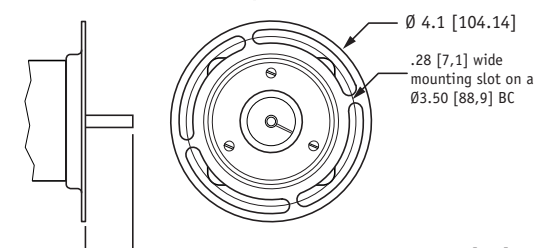
Enclosure Material:

A order code:	1	2
	powder-painted aluminum	303 stainless steel

Shaft Diameter:

B order code:	1	2	3	4
	0.25-in. diameter	6 mm diameter	0.25-in. dia. w/flats	6 mm dia. w/flats
	 <small>.2497 in. (+.0000 -0.0003)</small>	 <small>5.995 mm (+.000 -0.025)</small>	 <small>0.33 in. 0.025 in.</small>	 <small>8.4 mm 0.64 mm</small>

Mounting Style:

C order code:	1	2
	face mount	flange mount
	 <small>mounting holes spaced 120° apart on 2.00 [50,8] BC 6mm shaft option threaded M6 x 9 mm deep .25 in. shaft option #10-32 x 0.375 inch deep 1.38 [35,1]</small>	 <small>Ø 4.1 [104.14] .28 [7,1] wide mounting slot on a Ø3.50 [88,9] BC 1.00 [25,4]</small>

IN [MM]

10-11 Colrado Court, Hallam
 Victoria 3803, Australia
 Telephone: 61 3 9708 6885
 Facsimile: 61 3 9708 6770
 Email: idm@idminstruments.com.au
 Web: www.idminstruments.com.au

Ordering Information:

Output Signals:

	1	2	3	4
output signal options:	4...20 mA	20...4 mA	0...20 mA	20...0 mA
sensitivity:	16 mA/full stroke ±0.25%		20 mA/full stroke ±0.25%	
wiring configuration:	2 - wire		3 - wire	
input voltage:	8 - 34 vdc		14 - 29 vdc	

Example:



Electrical Connection:

	1	2	3	4
order code:	6-pin plastic connector w/mating plug IP 67, NEMA 4X** , 6	10-ft. [3 M] waterproof cable IP 67, NEMA 4X** , 6	6-pin metal connector w/mating plug IP 65, NEMA 4	25-ft. [7.5 M] instrumentation cable IP 67, NEMA 6
	1/2 - 5/16" [14 - 8 mm] cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S	10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW	3/8-in. [9 mm] max cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S	25 ft. x 0.2-in. dia. [7.5 M x 5 mm dia.] 24 AWG, shielded

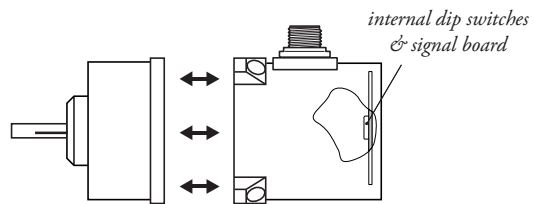
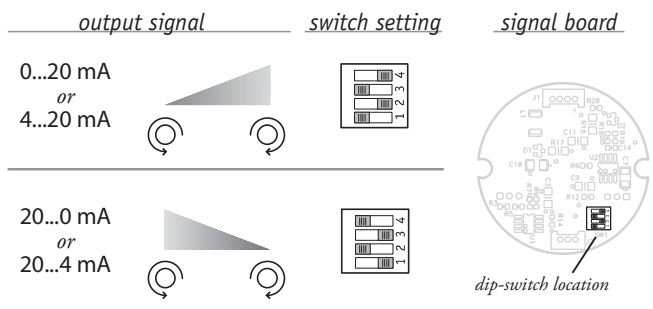
	5	6	7
order code:	100-ft. [30 M] waterproof cable IP 67, NEMA 4X** , 6	10-ft. [3 M] pressure tested* waterproof cable IP 68, NEMA 4X** , 6P	100-ft. [30 M] pressure tested* waterproof cable IP 68, NEMA 4X** , 6P
	100 ft. x 0.4-in. dia. [30 M x 10 mm dia.] 18 AWG, type SJTW	10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW	100 ft. x 0.4-in. dia. [30 M x 10 mm dia.] 18 AWG, type SJTW

pin	6-pin Mating Plug		Waterproof Cable	Instrumentation Cable		
A	2-wire	3-wire	color code	2-wire	3-wire	color code
B	8...34 vdc	14...29 vdc	WHITE	8...34 vdc	14...29 vdc	RED
C	4...20 mA out	common	BLACK	4...20 mA out	common	BLACK
D	-	0...20 mA out	GREEN	-	-	WHITE
	case ground	-		case ground	0...20 mA out	GREEN

Notes: { * -Test pressure: 100 feet [30 meters] H₂O (40 PSID); Test Medium: Air; Duration: 2 hours.
 ** -NEMA 4X applies to stainless steel enclosure only.

Output Signal Selection:

The output signal direction can be reversed at any time by simply changing the dip-switch settings found on the internal signal board. After the settings have been changed, adjustment of the Zero and Span trim pots will be required to precisely match signal values to the beginning and end points of the stroke.



To gain access to the signal board, remove four Allen-Head Screws and separate the two case halves.

Rotational Position Transducer

0...5, 0...10 VDC Output
Ranges: 0-45° to 0-200 Turns
Industrial Grade



RT8510

Specification Summary:

GENERAL

Full Stroke Range Options 0-0.125 to 0-200 turns
 Output Signal Options 0...5, 0...10 VDC
 Accuracy *see ordering information*
 Repeatability $\pm 0.05\%$ full stroke
 Resolution essentially infinite
 Enclosure Material powder-painted aluminum or stainless steel
 Sensor plastic-hybrid precision potentiometer
 Potentiometer Cycle Life *see ordering information*
 Shaft Loading up to 10 lbs. radial and 5 lbs. axial
 Starting Torque (25°C) 2.0 in-oz., max.
 Weight, Aluminum (Stainless Steel) Enclosure 3 lbs. (6 lbs.) max.

ELECTRICAL

Input 14.5-40 VDC (10.5-40 VDC for 0...5 volt output)
 Input Current 10 mA maximum
 Output Impedance 1000 ohms
 Maximum Load 5000 ohms
 Zero Adjustment from factory set zero to 50% of full stroke range
 Span Adjustment to 50% of factory set span

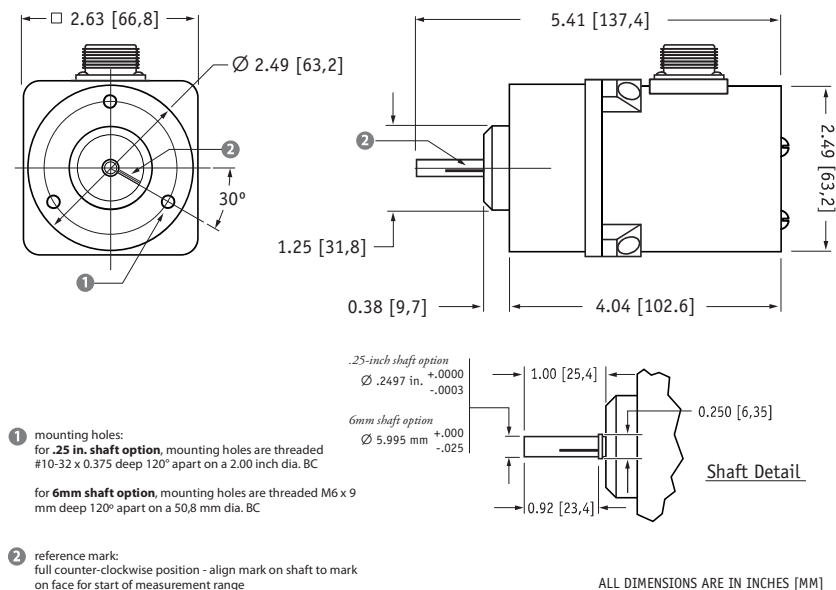
ENVIRONMENTAL

Enclosure NEMA 4/4X/6, IP 67/68
 Operating Temperature -40° to 200°F (-40° to 90°C)
 Vibration up to 10 G's to 2000 Hz maximum

EMC COMPLIANCE PER DIRECTIVE 89/336/EEC

Emission/Immunity EN50081-2 / EN50082-2

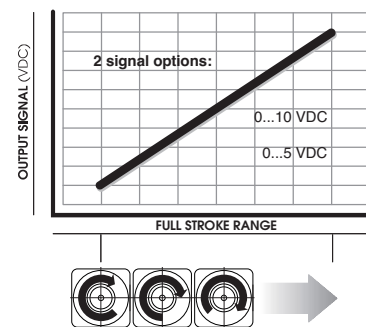
Outline Drawing



The RT8510 can operate from an unregulated 14.5 to 40 VDC power supply while providing a regulated output signal over it's full range from 1/8 of a turn up to 200 turns. It provides a 0 - 10 VDC position feedback signal proportional to the rotational position of the shaft

As a member of Celesco's innovative family of NEMA-4/ IP67 rotational transducers, the RT8510 offers numerous benefits including a zero and span adjust and a potentiometric sensor which provides an "absolute" feedback signal that is unaffected by power loss.

Output Signal



RT8510 • Rotational Transducer: 0...5, 0...10 VDC Output Signal

Ordering Information:

Model Number:

RT8510- order code: **R** - **A** - **B** - **C** - **1** - **D** - **E** - **F** - **0**

Sample Model Number:

RT8510 - 0005 - 111 - 1110

R range: 5 turns (clockwise shaft rotations)
A enclosure: aluminum
B shaft diameter: .25 inches
C mounting style: face mount
D output signal: 0...10 VDC signal increasing clockwise
E electrical connection: 6-pin plastic connector

Full Stroke Range:

R order code:	R125	0R25	0R50	0001	0002	0003	0005	0010	0020
clockwise shaft rotations, min:	0.125	0.25	0.50	1	2	3	5	10	20
accuracy (% of f.s.):	1.25%	1.25%	0.5%	0.5%	0.5%	0.2%	0.2%	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	5×10^5	2.5×10^5	2.5×10^5





R order code:	0030	0040	0050	0080	0100	0120	0140	0180	0200
clockwise shaft rotations, min:	30	40	50	80	100	120	140	180	200
accuracy (% of f.s.):	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5×10^5	2.5×10^5	2.5×10^5	2.5×10^5	2.5×10^5	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.

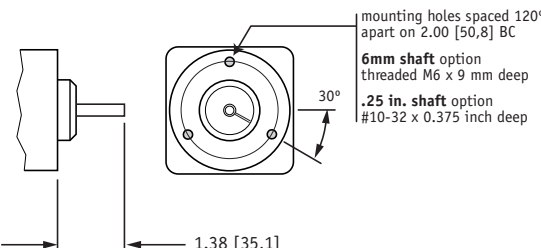
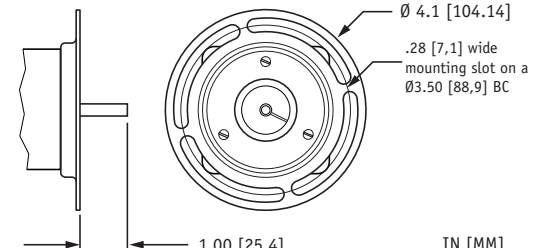
Enclosure Material:

A order code:	1	2
	powder-painted aluminum	303 stainless steel

Shaft Diameter:

B order code:	1	2	3	4
	0.25-in. diameter	6 mm diameter	0.25-in. dia. w/flats	6 mm dia. w/flats
	 .2497 in. (+.0000 - .0003)	 5.995 mm (+.000 - .025)	 0.33 in. \leftarrow \leftarrow \leftarrow 0.025 in.	 8.4 mm \leftarrow \leftarrow \leftarrow 0.64 mm

Mounting Style:

C order code:	1	2
	face mount	flange mount
	 mounting holes spaced 120° apart on 2.00 [50,8] BC 6mm shaft option threaded M6 x 9 mm deep .25 in. shaft option #10-32 x 0.375 inch deep 30° 1.38 [35,1]	 Ø 4.1 [104,14] .28 [7,1] wide mounting slot on a Ø3.50 [88,9] BC 1.00 [25,4] IN [MM]

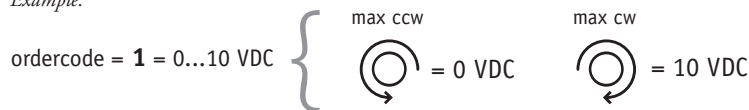
RT8510 • Rotational Transducer: 0...5, 0...10 VDC Output Signal

Ordering Information:

Output Signals:

order code:	1	2	3	4
output signal options:	0...10 VDC 	10...0 VDC 	0...5 VDC 	5...0 VDC
input voltage:	14.5...40 VDC		10.5...40 VDC	

Example:



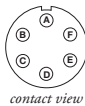
Electrical Connection:

order code:	1	2	3	4
	6-pin plastic connector w/mating plug IP 67, NEMA 4X** , 6	10-ft. [3 M] waterproof cable IP 67, NEMA 4X** , 6	6-pin metal connector w/mating plug IP 65, NEMA 4	25-ft. [7.5 M] instrumentation cable IP 67, NEMA 6
	 1/2 - 5/16" [14 - 8 mm] cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S	 10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW	 3/8-in. [9 mm] max cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S	 25 ft. x 0.2-in. dia. [7.5 M x 5 mm dia.] 24 AWG, shielded

order code:	5	6	7
	100-ft. [30 M] waterproof cable IP 67, NEMA 4X** , 6	10-ft. [3 M] pressure tested* waterproof cable IP 68, NEMA 4X** , 6P	100-ft. [30 M] pressure tested* waterproof cable IP 68, NEMA 4X** , 6P
	 100 ft. x 0.4-in. dia. [30 M x 10 mm dia.] 18 AWG, type SJTW	 10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW	 100 ft. x 0.4-in. dia. [30 M x 10 mm dia.] 18 AWG, type SJTW

6-pin Mating Plug

pin	signal
A	input voltage
B	output signal
C	common



Waterproof Cable

color code	signal
WHITE	input voltage
GREEN	output signal
BLACK	common

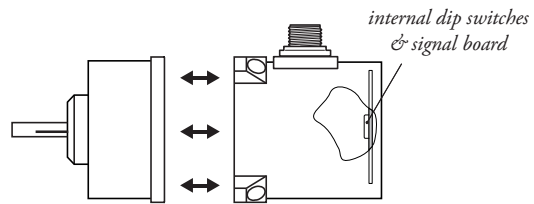
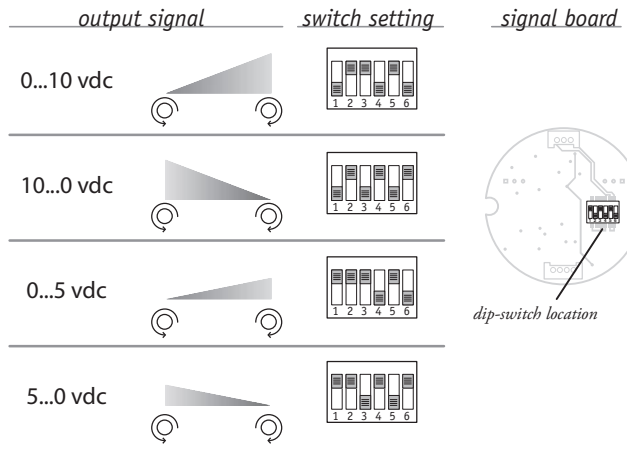
Instrumentation Cable

color code	signal
RED	input voltage
GREEN	output signal
BLACK	common

Notes: { * -Test pressure: 100 feet [30 meters] H₂O (40 PSID); Test Medium: Air; Duration: 2 hours.
 ** -NEMA 4X applies to stainless steel enclosure only.

Output Signal Selection:

The output signal direction can be reversed at any time by simply changing the dip-switch settings found on the internal signal board. After the settings have been changed, adjustment of the Zero and Span trimpots will be required to precisely match signal values to the beginning and end points of the stroke.



To gain access to the signal board, remove four Allen-Head Screws and separate the two case halves.