

Rotational Position Transducer

CANbus • SAE J1939

Ranges: 0-90° 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
 Update Rate..... 10 ms. (20 ms. available—*contact factory*)

ENVIRONMENTAL

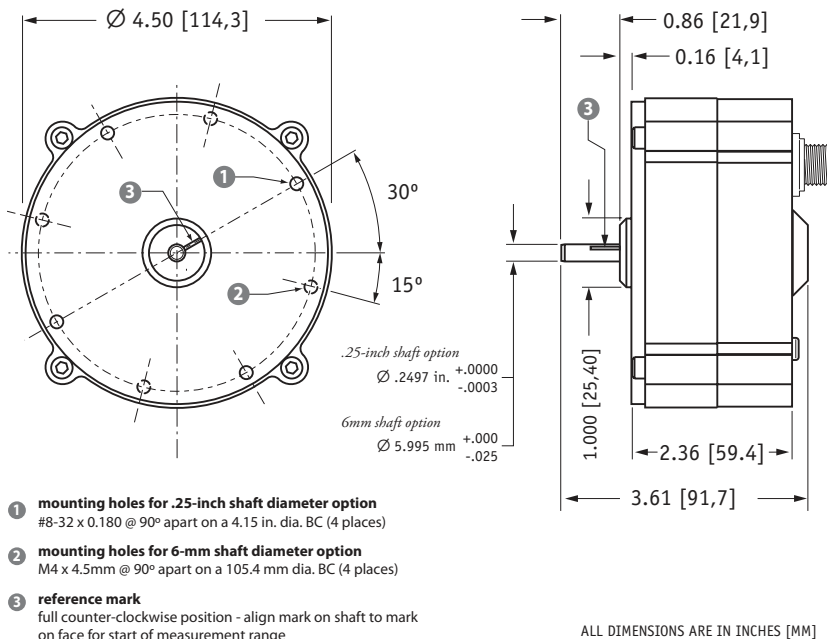
Environmental Suitability..... NEMA 4/4X/6, IP 67/68
 Operating Temperature..... -40° to 185°F
 Vibration..... up to 10 G's to 2000 Hz maximum



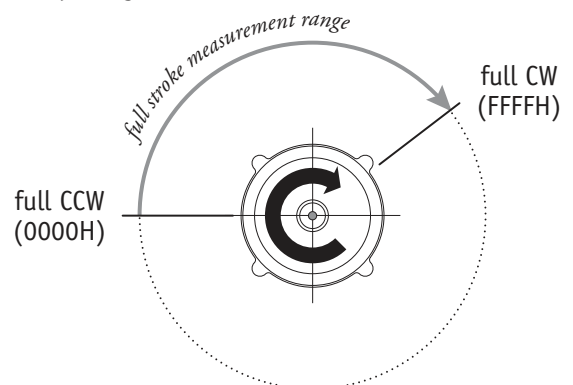
Celesco's model RT9CN communicates rotational position feedback to your PLC via the CANbus SAE J1939 interface. The heart of this sensor is a precision plastic-hybrid position potentiometer which provides a "absolute" position and does not ever have to be reset to a "home" position after a power loss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

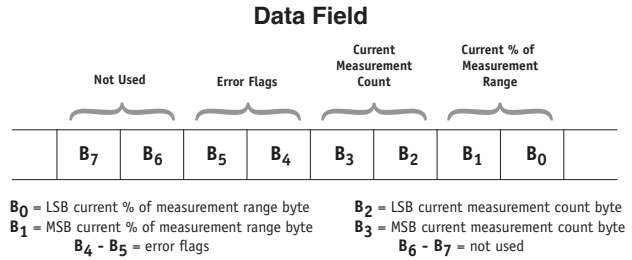
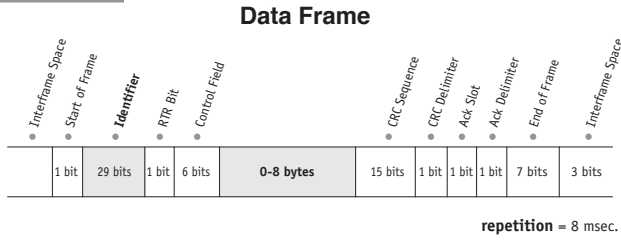
Outline Drawing



Output Signal



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	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	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.

Setting the Address (Node ID) and Baud Rate

Address Setting (Node ID)

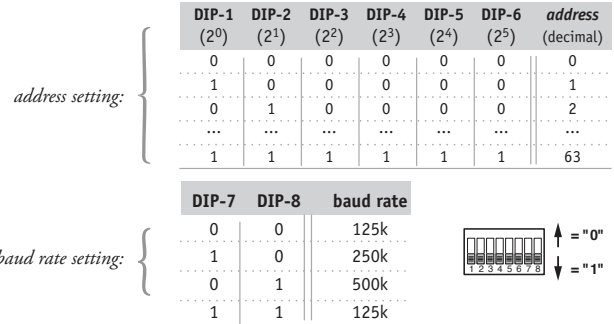
The Address Setting (Node ID) is set via 6 switches located on the 8-pole DIP switch found on the DeviceNET controller board located inside the transducer.

The DIP switch settings are binary starting with switch number 1 (= 2⁰) and ending with switch number 6 (= 2⁵).

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.



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%

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 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 0x0000 with the measuring cable fully retracted and continues upward to the end of the stroke range stopping at 0xFFFF. This holds true for all ranges.

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.

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:

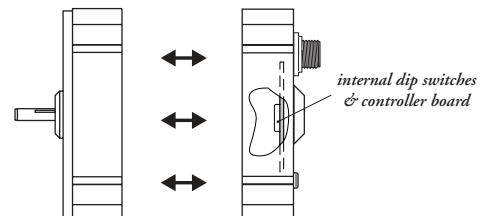
If the full stroke range is 1 turn (360 degrees) and the current position is 0x0FF2 (4082 Decimal) then,

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

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: R A B C D E F

Sample Model Number:

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

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

Full Stroke Range:





R 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:

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

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 - .0003)	5.995 mm (+.000 - .025)	0.33 in. 0.025 in.	8.4 mm 0.64 mm

Baud Rate:

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

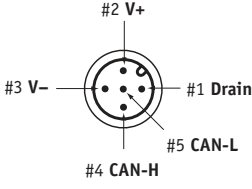


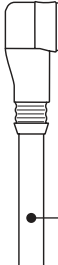
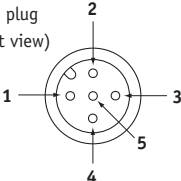
Node ID:

E 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																		
 <p data-bbox="477 638 586 684">connector (contact view)</p>	 <p data-bbox="699 638 932 663">0.16" - 0.32" OD Cable (THIN)</p>	 <p data-bbox="1146 638 1281 705">length: 16ft [5M] cable: Thin</p>	 <p data-bbox="1388 638 1529 705">length: 16ft [5M] cable: Thin</p>																		
	<p data-bbox="769 747 873 800">mating plug (contact view)</p> 	<table border="1"> <thead> <tr> <th data-bbox="1062 768 1089 789">pin</th> <th data-bbox="1146 768 1198 789">signal</th> <th data-bbox="1248 768 1333 789">wire color</th> </tr> </thead> <tbody> <tr> <td data-bbox="1062 789 1073 810">1</td> <td data-bbox="1146 789 1198 810">drain</td> <td data-bbox="1248 789 1333 810">brown</td> </tr> <tr> <td data-bbox="1062 810 1073 831">2</td> <td data-bbox="1146 810 1198 831">V+</td> <td data-bbox="1248 810 1333 831">white</td> </tr> <tr> <td data-bbox="1062 831 1073 852">3</td> <td data-bbox="1146 831 1198 852">V-</td> <td data-bbox="1248 831 1333 852">blue</td> </tr> <tr> <td data-bbox="1062 852 1073 873">4</td> <td data-bbox="1146 852 1198 873">Can-H</td> <td data-bbox="1248 852 1333 873">black</td> </tr> <tr> <td data-bbox="1062 873 1073 894">5</td> <td data-bbox="1146 873 1198 894">Can-L</td> <td data-bbox="1248 873 1333 894">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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Rotational Position Transducer

DeviceNET®

Ranges: 0-90° to 0-50 Turns

Industrial Grade

RT9DN

Specification Summary:

GENERAL

Full Stroke Ranges 0-0.25 to 0-50 turns
 Electrical Interface CANbus ISO 11898
 Protocol DeviceNet Version 2.0
 Accuracy ± 0.30 to 0.15% full stroke
 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 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

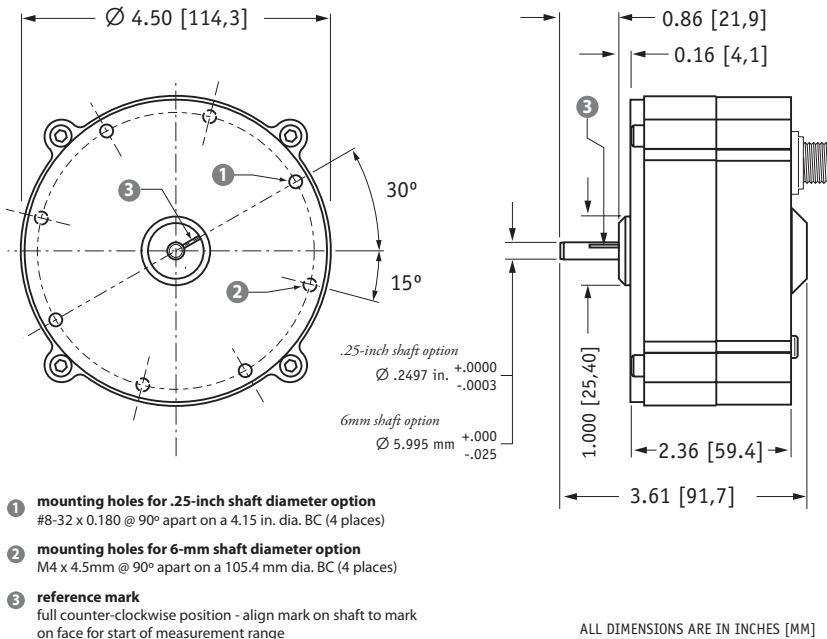
Environmental Suitability NEMA 4/4X/6, IP67/68
 Operating Temperature -40° to 200°F
 Vibration up to 10 G's to 2000 Hz maximum



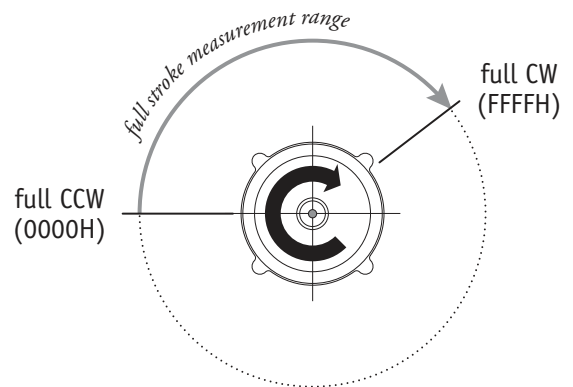
Celesco's model RT9DN communicates rotational position feedback via DeviceNET® to your programmable controller. The heart of this sensor is a precision plastic-hybrid position potentiometer which provides a "absolute" position and does not ever have to be reset to a "home" position after a power loss 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 1/4 to 50 turns.

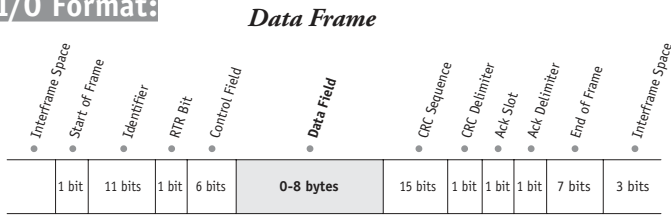
Outline Drawing



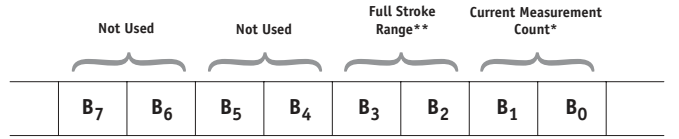
Output Signal



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.

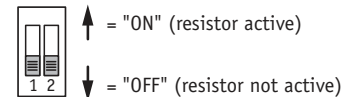
DIP-7	DIP-8	baud rate
0	0	125k
1	0	250k
0	1	500k
1	1	125k



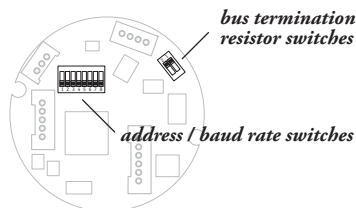
Bus Termination

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.

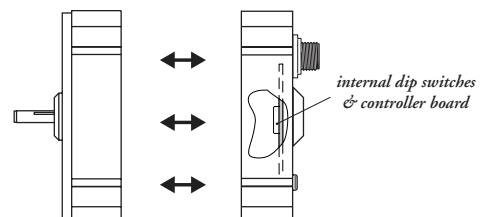
The bus termination resistor is activated setting switches 1 & 2 on the 2-pole DIP switch (located on the internal DeviceNET controller board) to the "ON" position.



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:

RT9DN - - - - - - -
order code: **R** **A** **B** **C** **D** **E**

Sample Model Number:

RT9DN - 30 - AL - 25 - 500 - TR - SC5

- R** range: 30 turns
- A** enclosure: powder-painted aluminum
- B** shaft: .25-in diameter
- C** baud rate: 500 k bits/sec.
- D** terminating resistor: yes
- E** electrical termination: 5-meter cordset with straight plug

Full Stroke Range:





R <i>order code:</i>	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:

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

Baud Rate:

C <i>order code:</i>	125	250	500
	125 kbaud	250 kbaud	500 kbaud

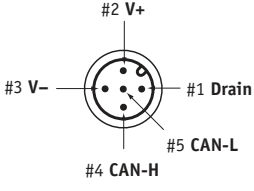


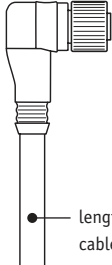
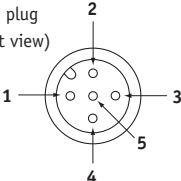
Terminating Resistor:

D <i>order code:</i>	TR	NR
	terminating resistor	no terminating resistor

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																		
 <p data-bbox="475 638 586 684">connector (contact view)</p>	 <p data-bbox="699 638 932 663">0.16" - 0.32" OD Cable (THIN)</p>	 <p data-bbox="1146 638 1279 705">length: 16ft [5M] cable: Thin</p>	 <p data-bbox="1382 638 1528 705">length: 16ft [5M] cable: Thin</p>																		
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1	drain	brown																			
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5	Can-L	grey																			

Rotational Position Transducer

Precision Potentiometric Output
Ranges: 0-90° to 0-50 Turns
Industrial Grade



RT9101

Specification Summary:

GENERAL

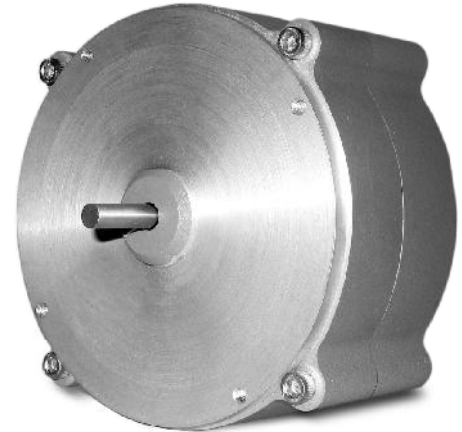
Full Stroke Range Options 0-0.25 to 0-50 turns
 Output Signal Options..... voltage divider (potentiometer)
 Accuracy $\pm 0.30\%$ to $\pm 0.15\%$ full stroke *see ordering information*
 Repeatability..... $\pm 0.02\%$ full stroke
 Resolution essentially infinite
 Enclosure Material Options powder-painted aluminum or stainless steel
 Sensor plastic-hybrid precision potentiometer
 Potentiometer Cycle Life *see ordering information*
 Shaft Loading up to 35 lbs. radial and 5 lbs. axial
 Weight, Aluminum (Stainless Steel) Enclosure 5 lbs. (10 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% $\pm 4\%$ of input voltage

ENVIRONMENTAL

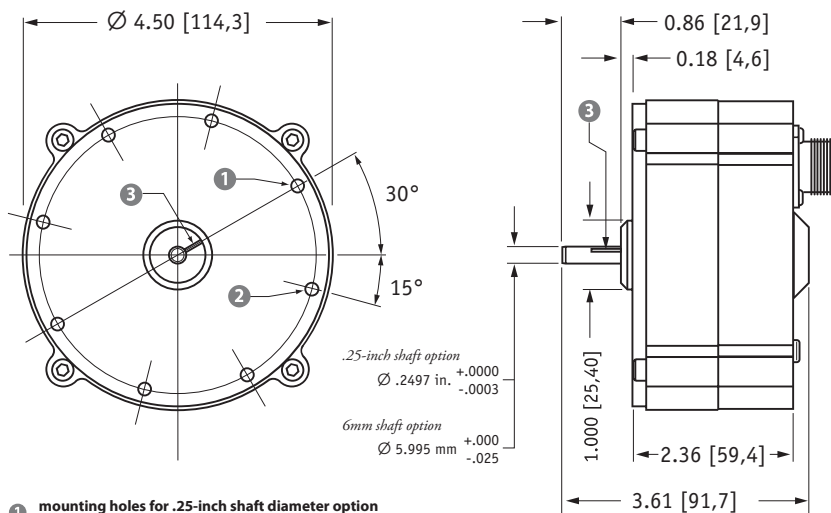
Enclosure NEMA 4/4X/6, IP 67/68
 Operating Temperature -40° to 200°F (-40° to 90°C)
 Vibration..... up to 10 G's to 2000 Hz maximum



Celesco's model RT9101 provides a voltage feedback signal for rotational position. The sensing element of this device is a precision plastic-hybrid potentiometer which provided superb linearity and resolution.

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. Because the sensor is potentiometric, the RT9101 is absolute and will maintain position information even after a loss of power.

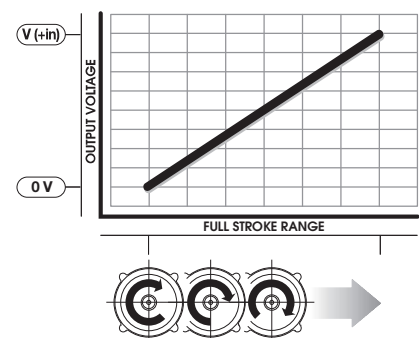
Outline Drawing



- 1 mounting holes for .25-inch shaft diameter option
#8-32 x 0.180 @ 90° apart on a 4.15 in. dia. BC (4 places)
- 2 mounting holes for 6-mm shaft diameter option
M4 x 4,5 mm @ 90° 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



RT9101 • Rotational Transducer: Precision Potentiometric Output

Ordering Information:

Model Number:

RT9101- -

order code: R A B C D E F G

Sample Model Number:

RT9101 - 0005 - 111 - 1110

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

Full Stroke Range:





R order code:	0R25	0R50	0001	0002	0003	0005	0010	0020	0030	0050
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:

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

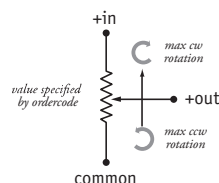
Shaft Diameter:

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 -0.0003)	5.995 mm (+.000 -0.025)	0.33 in. \leftarrow 0.025 in.	8.4 mm \leftarrow 0.64 mm

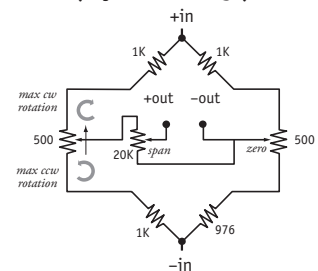
Output Signals:

D order code:	1	2	3	4	5
	500 ohm*	1000 ohm*	5000 ohm*	10,000 ohm*	adjustable bridge (0...30 mV/V)
				*tolerance = $\pm 10\%$	

circuit options: 1, 2, 3, 4



circuit option: 5 (adjustable bridge)

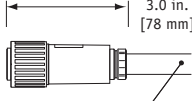
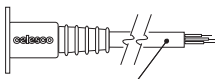
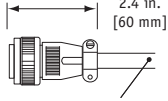

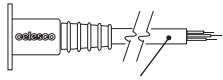
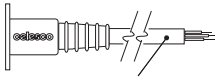
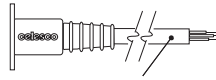
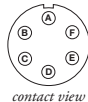


full scale output: adjustable from 0 to 30mV/V
zero adjust: to 50% of full stroke

RT9101 • Rotational Transducer: Precision Potentiometric Output

Ordering Information:

Electrical Connection:

1			2			3			4		
order code: 6-pin plastic connector w/mating plug IP 67, NEMA 4X**, 6  3.0 in. [78 mm]			10-ft. [3 M] waterproof cable IP 67, NEMA 4X**, 6  10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW			6-pin metal connector w/mating plug IP 65, NEMA 4  2.4 in. [60 mm]			25-ft. [7.5 M] instrumentation cable IP 67, NEMA 6  25 ft. x 0.2-in. dia. [7,5 M x 5 mm dia.] 24 AWG, shielded		
1/2 - 5/16" [14 - 8 mm] cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S						3/8-in. [9 mm] max cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S					
5			6			7					
order code: 100-ft. [30 M] waterproof cable IP 67, NEMA 4X**, 6  100 ft. x 0.4-in. dia. [30 M x 10 mm dia.] 18 AWG, type SJTW			10-ft. [3 M] pressure tested* waterproof cable IP 68, NEMA 4X**, 6P  10 ft. x 0.4-in. dia. [3 M x 10 mm dia.] 18 AWG, type SJTW			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					
6-pin Mating Plug			 contact view			Waterproof Cable			Instrumentation Cable		
pin	standard	bridge	color code	standard	bridge	color code	standard	bridge	color code	standard	bridge
A	+ in	+ in	WHITE	+ in	n/a	RED	+ in	+ in	RED	+ in	+ in
B	common	- in	BLACK	common	n/a	BLACK	common	- in	BLACK	common	- in
C	+ out	- out	GREEN	+ out	n/a	GREEN	+ out	+ out	GREEN	+ out	+ out
D	-	+ out				WHITE	-	- out	WHITE	-	- out

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

version: 3.0 last updated: June 01, 2011

Rotational Position Transducer

0/4...20 mA Output • Hazardous Area Certification
Ranges: 0-90° to 0-50 Turns
Industrial Grade

RT9420



Specification Summary:

GENERAL

Full Stroke Range Options 0-0.125 to 0-50 turns
 Output Signal Options 4...20 mA (2-wire) and 0...20 mA (3-wire)
 Accuracy $\pm 0.30\%$ to $\pm 0.15\%$ full stroke *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 35 lbs. radial and 5 lbs. axial
 Weight, Aluminum (Stainless Steel) Enclosure 5 lbs. (10 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
 Hazardous Area Certification *see ordering information*
 Operating Temperature -40° to 200°F (-40° to 90°C)
 Vibration up to 10 G's to 2000 Hz maximum

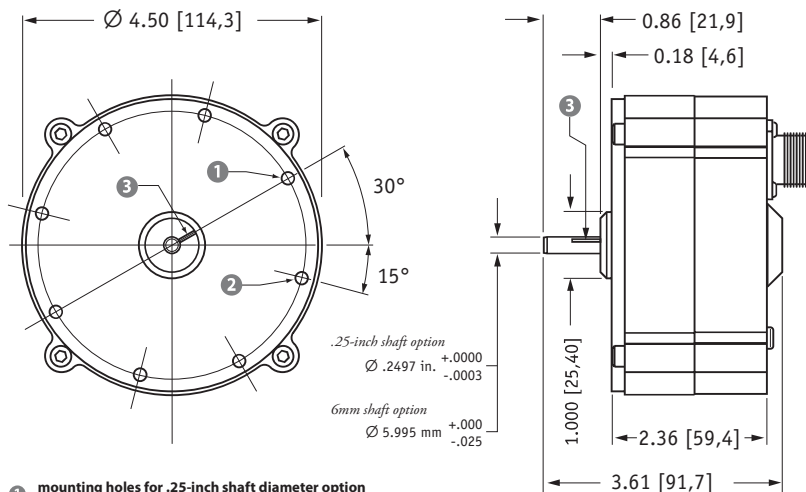
EMC COMPLIANCE PER DIRECTIVE 89/336/EEC

Emission/Immunity EN50081-2/EN50082-2



The RT9420 provides rotational position feedback via 4...20 mA current loop signal. This device combines the superb linearity and resolution of a plastic-hybrid potentiometer and the durability of Celesco's 4...20mA circuit to provide an accurate and reliable electrical signal. Additionally the zero and span settings are adjustable through access holes in the housing.

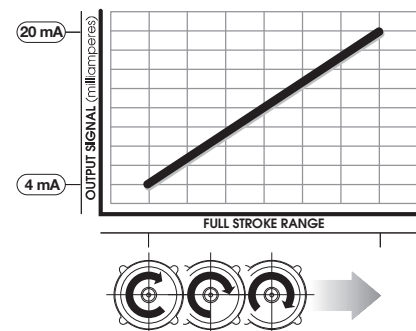
This innovative sensor from Celesco, designed to meet NEMA-4 and IP67 standards, is available in full stroke ranges of 1/4 to 50 turns.



- 1 mounting holes for .25-inch shaft diameter option
#8-32 x 0.180 @ 90° apart on a 4.15 in. dia. BC (4 places)
- 2 mounting holes for 6-mm shaft diameter option
M4 x 4.5 mm @ 90° 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



celesco

celesco.com • info@celesco.com

Celesco Transducer Products, Inc.

20630 Plummer Street • Chatsworth, CA 91311

tel: 800.423.5483 • +1.818.701.2750 • fax: +1.818.701.2799

RT9420 • Rotational Transducer: 0/4...20 mA Output

Ordering Information:

Model Number:

RT9420- _____ - _____ **1** - **1** _____ **0**
order code: R A B C D E F G

Sample Model Number:

RT9420 - 0005 - 111 - 1110

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

Full Stroke Range:

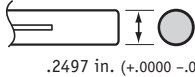
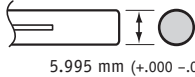
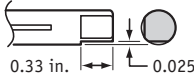
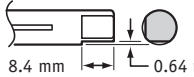
R order code:	R125	0R25	0R50	0001	0002	0003	0005	0010	0020	0030	0050
clockwise shaft rotations, min:	0.125	0.25	0.50	1	2	3	5	10	20	30	50
accuracy (% of f.s.):	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.2%	0.15%	0.15%	0.15%	0.15%
potentiometer cycle life*:	2.5×10^6	2.5×10^6	2.5×10^6	2.5×10^6	2.5×10^6	2.5×10^6	5×10^5	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.



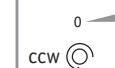

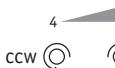
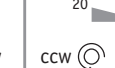












Enclosure Material:

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 -0.0003)	 5.995 mm (+.000 -0.025)	 0.33 in. 0.025 in.	 8.4 mm 0.64 mm

Output Signals:



F order code:	1	2	3	4	5*	6*
output signal options:	4...20 mA 	20...4 mA 	0...20 mA 	20...0 mA 	4...20 mA 	20...4 mA 
	ccw  cw 	ccw  cw 	ccw  cw 	ccw  cw 	ccw  cw 	ccw  cw 
sensitivity:	16 mA/full stroke $\pm 0.25\%$		20 mA/full stroke $\pm 0.25\%$		16 mA/full stroke $\pm 0.25\%$	
wiring configuration:	2 - wire		3 - wire		2 - wire	
input voltage:	8 - 34 vdc		14 - 29 vdc		14 - 32 vdc	
hazardous area certification:	not certified		not certified		CSA • Cenelec	

Example:

ordercode = **1** = 4...20 mA

max ccw  = 4 mA
max cw  = 20 mA

Hazardous Area Certifications:

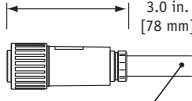
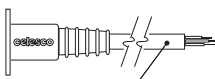
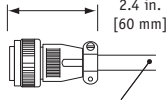

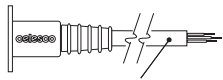
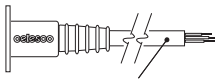
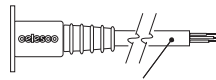
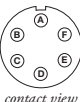
-  CSA Standard 22.2 Class 1 Groups A, B, C and D
-  Cenelec LCIE EEx ia IIc T4

***IMPORTANT:** intrinsically safe when powered from a CSA certified zener barrier rated 28 VDC max, 110 mA max per installation drawing#677984

RT9420 • Rotational Transducer: 0/4...20 mA Output

Ordering Information:

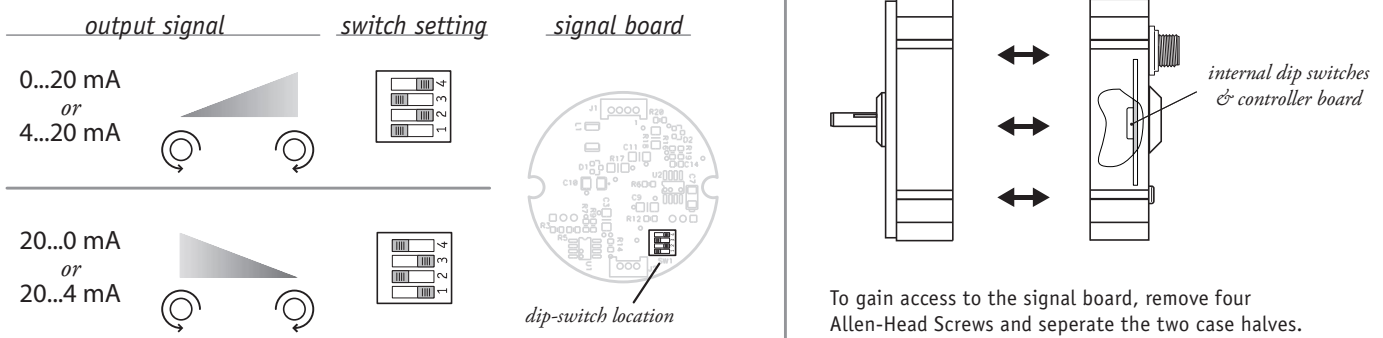
Electrical Connection:

1		2		3		4		
order code: 6-pin plastic connector w/mating plug IP 67, NEMA 4X**, 6		order code: 10-ft. [3 M] waterproof cable IP 67, NEMA 4X**, 6		order code: 6-pin metal connector w/mating plug IP 65, NEMA 4		order code: 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		order code: 10-ft. [3 M] pressure tested* waterproof cable IP 68, NEMA 4X**, 6P		order code: 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				Waterproof Cable		Instrumentation Cable		
pin	2-wire	3-wire	 contact view	color code	2-wire	3-wire	color code	
A	8...34 vdc***	14...29 vdc common		WHITE	8...34 vdc***	14...29 vdc common	RED	8...34 vdc***
B	4...20 mA out	-		BLACK	4...20 mA out	-	BLACK	4...20 mA out
C	-	0...20 mA out		GREEN	case ground	0...20 mA out	WHITE	n/a
D	case ground	-				GREEN	case ground	

Notes: { * -Test pressure: 100 feet [30 meters] H₂O (40 PSID); Test Medium: Air; Duration: 2 hours.
 ** -NEMA 4X applies to stainless steel enclosure only.
 *** -14-32 VDC for hazardous area option.

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.



version: 6.0 last updated: May 21, 2013

Rotational Position Transducer

0...5, 0...10 VDC Output
Ranges: 0-90° to 0-50 Turns
Industrial Grade



RT9510

Specification Summary:

GENERAL

Full Stroke Range Options 0-0.125 to 0-50 turns
 Output Signal Options..... 0...5, 0...10 VDC
 Accuracy $\pm 0.30\%$ to $\pm 0.15\%$ full stroke *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 35 lbs. radial and 5 lbs. axial
 Weight, Aluminum (Stainless Steel) Enclosure 5 lbs. (10 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

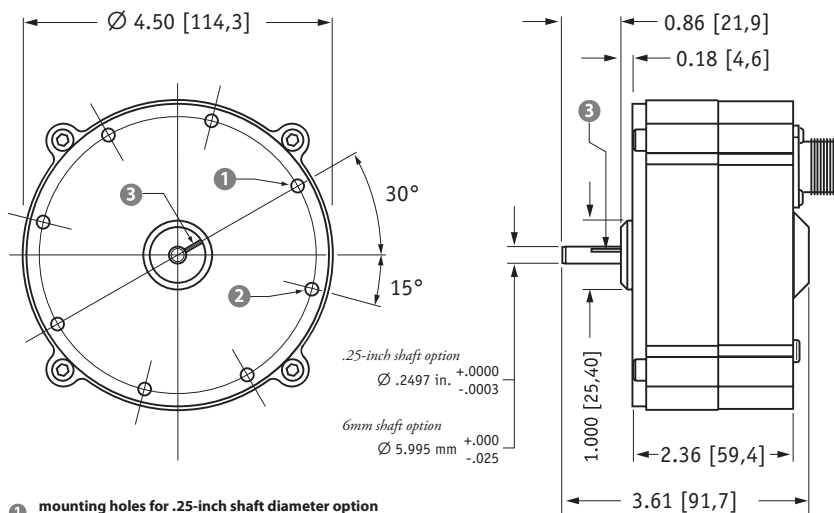
ENVIRONMENTAL

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



- 1 mounting holes for .25-inch shaft diameter option
#8-32 x 0.180 @ 90° apart on a 4.15 in. dia. BC (4 places)
- 2 mounting holes for 6-mm shaft diameter option
M4 x 4,5 mm @ 90° 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

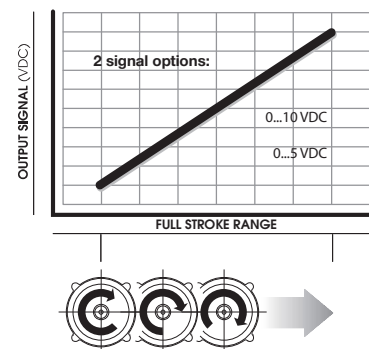
ALL DIMENSIONS ARE IN INCHES [MM]



The RT9510 is an incredibly simple device which provides a regulated 0...10VDC rotational-position feedback signal with a 14.5...40 VDC unregulated input voltage.

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. Because the sensor is potentiometric, the RT9510 is absolute and will maintain position information even after a loss of power.

Output Signal



celesco

celesco.com • info@celesco.com

Celesco Transducer Products, Inc.

20630 Plummer Street • Chatsworth, CA 91311

tel: 800.423.5483 • +1.818.701.2750 • fax: +1.818.701.2799

RT9510 • Rotational Transducer: 0...5, 0...10 VDC Output

Ordering Information:

Model Number:

RT9510- _____ **-** _____ **1** **-** **1** _____ **0**
order code: R A B C D E F G

Sample Model Number:

RT9510 - 0005 - 111 - 1110

- R** range: 5 turns (clockwise shaft rotations)
- A** enclosure: aluminum
- B** shaft diameter: .25 inches
- E** output signal: 0...10 VDC 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	0030	0050
clockwise shaft rotations, min:	0.125	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%	0.3%	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	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:

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

Output Signals:

E 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	

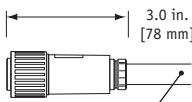
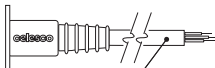
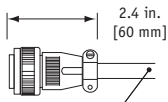

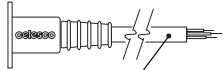
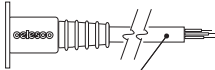
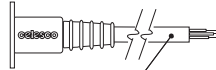

Example:

ordercode = **1** = 0...10 VDC { = 0 VDC = 10 VDC

RT9510 • Rotational Transducer: 0...5, 0...10 VDC Output

Ordering Information:

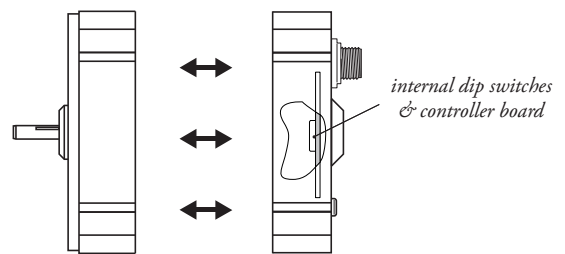
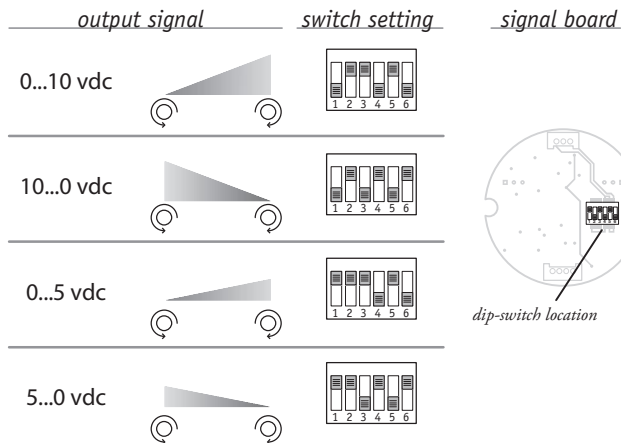
Electrical Connection:

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																											
																															
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6-pin Mating Plug <table border="0"> <tr> <td>pin</td> <td>signal</td> </tr> <tr> <td>A</td> <td>input voltage</td> </tr> <tr> <td>B</td> <td>output signal</td> </tr> <tr> <td>C</td> <td>common</td> </tr> </table>		pin	signal	A	input voltage	B	output signal	C	common	 contact view		Waterproof Cable <table border="0"> <tr> <td>color code</td> <td>signal</td> </tr> <tr> <td>WHITE</td> <td>input voltage</td> </tr> <tr> <td>GREEN</td> <td>output signal</td> </tr> <tr> <td>BLACK</td> <td>common</td> </tr> </table>		color code	signal	WHITE	input voltage	GREEN	output signal	BLACK	common	Instrumentation Cable <table border="0"> <tr> <td>color code</td> <td>signal</td> </tr> <tr> <td>RED</td> <td>input voltage</td> </tr> <tr> <td>GREEN</td> <td>output signal</td> </tr> <tr> <td>BLACK</td> <td>common</td> </tr> </table>		color code	signal	RED	input voltage	GREEN	output signal	BLACK	common
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*-Test pressure: 100 feet [30 meters] H₂O (40 PSID); Test Medium: Air; Duration: 2 hours. **-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.

version: 3.0 last updated: July 14, 2008