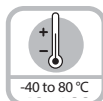


Rotary Position Technology

Incremental Encoders

Large Bore Type RI-43 (Hollow Shaft)



Temperature



Shock/vibration resistant



Short-circuit protected



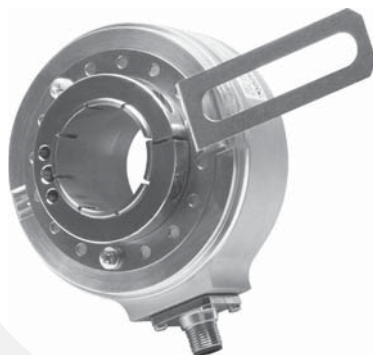
Reverse polarity protection



High rotational speed

Rugged

- Balanced, stainless-steel clamping rings, special bearing-shaft connection increases stability and vibration resistance.
- Optional plastic isolating inserts protect against damage from shaft currents.
- New type of mechanical construction, ideal for handling tough mechanical stresses and strains.



Economical

- Alternative to traditional heavy duty encoders that are often over-engineered and expensive.

Versatile

- Very compact. Optional isolating inserts protect against damage from shaft currents, e.g. with AC vector motors.
- Only 49 mm clearance needed.
- Hollow shaft diameter up to Ø 42 mm.
- RS422, push-pull or SIN/COS outputs.
- Extended speed range up to 6,000 RPM.
- High-quality construction, balanced, stainless steel ensures quiet vibration-free running.

Mechanical Characteristics:

Speed:	max. 6,000 RPM at 158 °F (70 °C) ¹⁾ max. 3,500 RPM at 176 °F (80 °C) ¹⁾
Rotor moment of inertia:	< 12 oz-in ² (< 220 x 10 ⁻⁶ kgm ²) ²⁾
Starting torque with sealing:	< 28.3 oz-in (< 0.2 Nm)
Weight:	approx. 1.8 lbs (0.8 kg)
Protection acc. to EN 60 529:	IP65
Working temperature:	-40 to +176 °F (-40 to +80 °C) ³⁾
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27	200 g (2,000 m/s ²), 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	10 g (100 m/s ²), 10-2,000 Hz

¹⁾ During the run-in-phase of approx. 2 hours, reduce the limits for working temperature max or speed max by 1/3

²⁾ Dependent on the shaft diameter

³⁾ With connectors, -40 °C, cable securely installed; -30 °C, cable flexibly installed; -20 °C

Electrical Characteristics Sine Wave Output:

Output circuit [Key Code]:	Sine [AB] U = 1 Vpp (±20%)	Sine [AA] U = 1 Vpp (±20%)
Supply voltage:	5 VDC (±5%)	10-30 VDC
Current consumption (no load) with inverted signal:	typ. 65 mA / max. 110 mA	typ. 65 mA / max. 110 mA
-3 dB frequency:	< 180 kHz	< 180 kHz
Signal level channels A/B:	1 Vpp (±20%)	1 Vpp (±20%)
Signal level channel 0:	0.1-1.2 V	0.1-1.2 V
Short-circuit protected ¹⁾	yes	yes
Reverse polarity protection:	no	yes
RoHS compliant acc. to EU guideline 2011/65/EU		

¹⁾ If supply voltage correctly applied

Large Bore Type RI-43 (Hollow Shaft)

Electrical Characteristics RS422 or Push-Pull Output:

Output circuit [Key Code]:	RS 422 [4A/4C] (TTL compatible)	Push-Pull [2B]	Push-Pull [2F] (7272) ³⁾
Supply voltage:	5 VDC (±5 %) or 10-30 VDC	10-30 VDC	5-30 VDC
Power consumption (no load) without inverted signal:	-	typ. 55 mA / max. 125 mA	-
Power consumption (no load) with inverted signal:	typ. 40 mA / max. 90 mA	typ. 80 mA / max. 150 mA	typ. 50 mA / max. 100 mA
Permissible load/channel:	max. ±20 mA	max. ±30 mA	max. ±20 mA
Pulse frequency:	max. 300 kHz	max. 300 kHz	max. 300 kHz
Signal level high:	min. 2.5 V	min. +V -3 V	min. +V -2.0 V
Signal level low:	max. 0.5 V	max. 2.5 V	max. 0.5 V
Rise time t _r :	max. 200 ns	max. 1 μs	max. 1 μs
Fall time t _f :	max. 200 ns	max. 1 μs	max. 1 μs
Short-circuit protected ¹⁾ :	yes	yes	yes
Reverse polarity protection:	5 VDC: no, 10-30 VDC: yes	yes	no

¹⁾ If supply voltage correctly applied

²⁾ Only one channel allowed to be shorted-out:

(If +V = 5 VDC, short-circuit to channel, 0 V, or +V is permitted) (If +V = 5-30 VDC, short-circuit to channel or 0 V is permitted)

³⁾ Max. recommended cable length 30 m

Standard Wiring:

Connection Type	Case Ground	Common (0 V)	+V	A	\bar{A}	B	\bar{B}	Z	\bar{Z}	-	-	OV Sensor	+V Sensor
M23 <i>multifast</i> [®]	Coupling Nut	10	12	5	6	8	1	3	4	-	-	11	2
MS 10-pin	J	F	D	A	G	B	H	C	I	-	-		
M12 <i>euromast</i> [®]	Coupling Nut	1	2	3	4	5	6	7	8	-	-		
Cable	Shield/Drain	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU

Individually isolate unused outputs before initial start up.

Special Connector Pin Configuration:

Output Code	Connection Type	Case Ground	Common (0 V)	+V	A	\bar{A}	B	\bar{B}	Z	\bar{Z}	-	-
N41	M12 <i>euromast</i> [®]	Coupling Nut	7	2	1	3	4	5	6	8	-	-
N40	MS 10-pin	G	F	D	A	H	B	I	C	J	-	-

Wiring Diagrams:

Male Encoder View		
M12 <i>euromast</i> [®] Pinout Mating Cordset: E-RKC 8T-930-*	M23 <i>multifast</i> [®] Pinout Mating Cordset: E-CKM 12-931-*	MS Pinout (10-pin) Mating Cordset: E-MK 10-931-*

* Length in meters.

Rotary Position Technology Incremental Encoders

Large Bore Type RI-43 (Hollow Shaft)

Part Number Key: RI-43 Hollow Shaft Version

A	B	C		D	E		F		G/H/I
RI-43H	19	E2	-	1B	50	-	H1181	/	Specials

A	Type
RI-43H	Ø 100 mm, Hollow Shaft, IP65 Shaft Seal

B	Bore
20	Ø 20 mm ¹⁾
25	Ø 25 mm ¹⁾
28	Ø 28 mm
30	Ø 30 mm ¹⁾
32	Ø 32 mm ²⁾
38	Ø 38 mm
40	Ø 40 mm
42	Ø 42 mm
A3	Ø 1/2" ²⁾
A4	Ø 5/8" ¹⁾
A5	Ø 3/4" ²⁾
A6	Ø 1" ¹⁾
A7	Ø 1-1/8" ²⁾
A8	Ø 1-1/4" ¹⁾

¹⁾ Bores Available with Isolation Inserts.
²⁾ Only Available with an Isolation Insert.

C	Flange
E2	4 -1/2" C-Face Tether
S	Face Mount
S4	Long Anti-Rotation Spring
S5	Short Anti-Rotation Spring
S8	Long Tether Arm

D	Voltage Supply and Output Type
1B	10-30 VDC, Push-Pull
2B	10-30 VDC, Push-Pull (w/ Inverted Signals)
2E	5-30 VDC, Push-Pull (w/ Inverted Signals)
2F	5-30 VDC, Line Driver (7272)
4A	5 VDC, RS422 (w/ Inverted Signals)
4B	5-30 VDC, TTL (26C31 w/ Inverted Signals)
4C	10-30 VDC, RS422 (w/ Inverted Signals)
AA	10-30 VDC ³⁾ , SIN/COS, 1 Vpp (w/ Inverted Signals)
AB	5 VDC ³⁾ , SIN/COS, 1 Vpp (w/ Inverted Signals)

³⁾ N24 is the Only Valid Special Output Code for SIN/COS Outputs.

E	Pulse Rate
	50*, 360*, 512*, 600*, 1000*, 1024, 1500, 2000, 2048, 2500, 4096, 5000 (e.g. 360 Pulses => 360)
	Other Pulse Rates Available on Request

* SIN/COS Version not Available with Pulses < 1024

F	Type of Connection
H1181	Radial 8-pin M12 eurofast ® Connector
12M23	Radial 12-pin M23 multifast ® Connector
10MIL	Radial 10-pin MS Connector (MS 3102R18-1P)
C1M	Radial Cable (1 m PVC)

G	Special Output Signal Formats
	See N21 thru N33 on Page E34

H	Special Insert Options
N42	Isolation Insert Included ⁴⁾

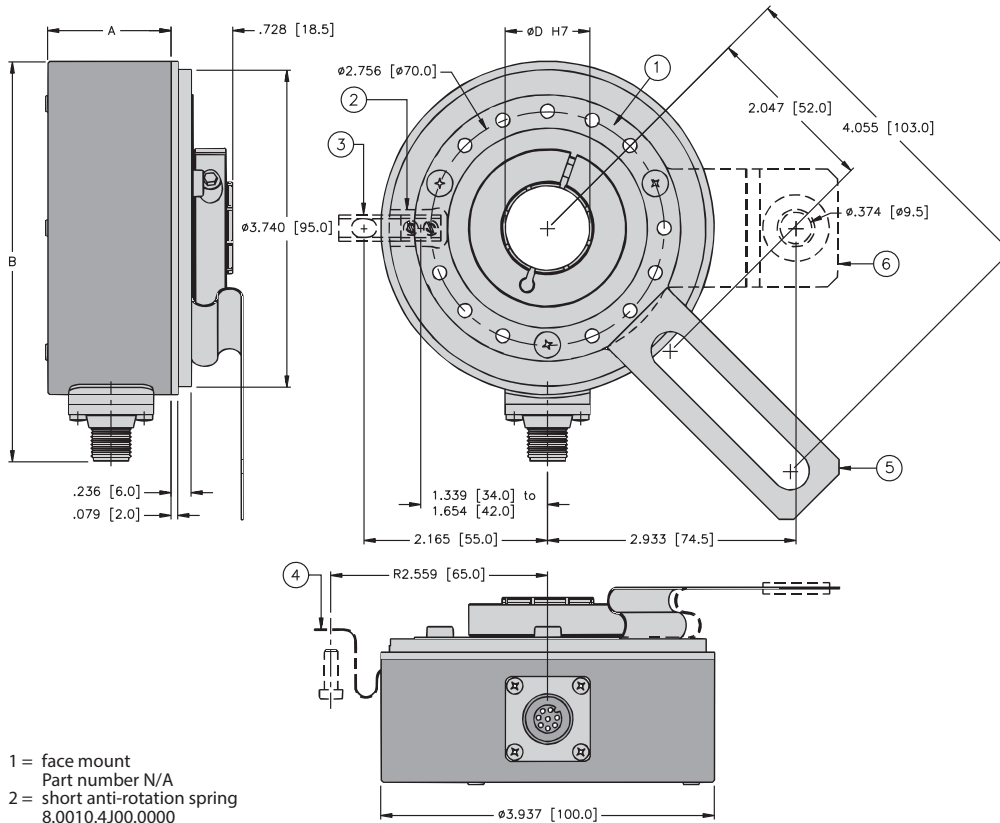
⁴⁾ Includes Plastic Hollow Shaft Inserts for Electrical Isolation.

I	Special Connector Pin Configuration
	See N40 or N41 on Page E23

Large Bore Type RI-43 (Hollow Shaft)

Dimensions: RI-43 Hollow Shaft Version

RI-43 Flange S8/E2
Connection H1181



- 1 = face mount
Part number N/A
- 2 = short anti-rotation spring
8.0010.4J00.0000
- 3 = long anti-rotation spring
8.0010.4K00.0000
- 4= tether arm (short)
8.0010.4G00.0000
- 5 = tether arm (long)
8.0010.4E00.0000
- 6 = 4 1/2" C-face tether
8.0010.4T00.0000

Incremental Encoders

Dimensions for Radial Connector - in [mm]

DIM	Connection Style			
	Cable	M12	M23	MS (10-pin)
A	1.181 [30.0]	1.181 [30.0]	1.181 [30.0]	1.457 [37.0]
B	-	4.705 [119.5]	4.961 [126.0]	5.394 [137.0]

Rotary Position Technology

Incremental Encoders

Large Bore Type RI-43 (Hollow Shaft)

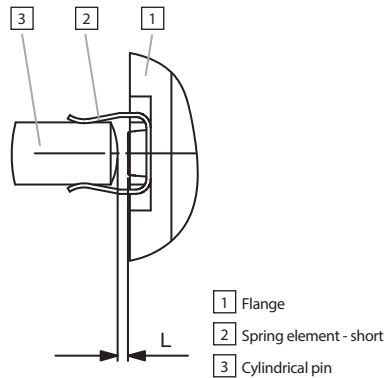
Mating Shaft Requirements:

Type of Flange	Axial End Play	Radial Runout	Angular Offset
S5 (anti-rotational spring short)	max. ± 1 mm	max. ± 0.3 mm	max. $\pm 2^\circ$
S4 (anti-rotational spring long)	max. ± 1 mm	max. ± 0.3 mm	max. $\pm 2^\circ$
S8 (tether arm long)	max. ± 0.5 mm	max. ± 0.3 mm	max. $\pm 2^\circ$
E2 (C-face tether)	max. ± 0.5 mm	max. ± 0.3 mm	max. $\pm 2^\circ$

Mounting:

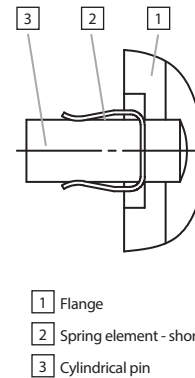
Mounting using the spring element - short:

When mounting the encoder, ensure that dimension **L** is larger than the maximum axial play of the drive in the direction of the arrow.



Mounting using the spring element - long:

Cylindrical pin fed through the bore of the spring.



Large Bore Type RI-43 (Hollow Shaft) Accessories

Isolation Insert



The RI-43 encoder is used for AC vector motor and general industrial applications. For AC vector motor applications, the encoder should be electrically isolated from the motor chassis to minimize encoder bearing currents and ground noise. An isolation insert for the hollow shaft is provided with the encoder by specifying N42 in the "special insert option" decode. **When ordering isolation inserts separately, choose option 38 with a bore diameter of 38 mm.**

Part Number:	Inner Dimensions
8.0010.4013.0000	12.7 mm (1/2")
8.0010.4070.0000	15.875 mm (5/8")
8.0010.4019.0000	16 mm
8.0010.4080.0000	18 mm
8.0010.4090.0000	19.05 mm (3/4")
8.0010.4011.0000	20 mm
8.0010.4012.0000	25 mm
8.0010.4050.0000	25.4 mm (1")
8.0010.4014.0000	28.58 mm (1-1/8")
8.0010.4016.0000	30 mm
8.0010.4060.0000	31.75 mm (1-1/4")
8.0010.4015.0000	32 mm

For general industrial applications, isolation is not required and the decode for "special insert options" can be left blank.

Isolation insert for hollow shaft $\varnothing 42$ mm:

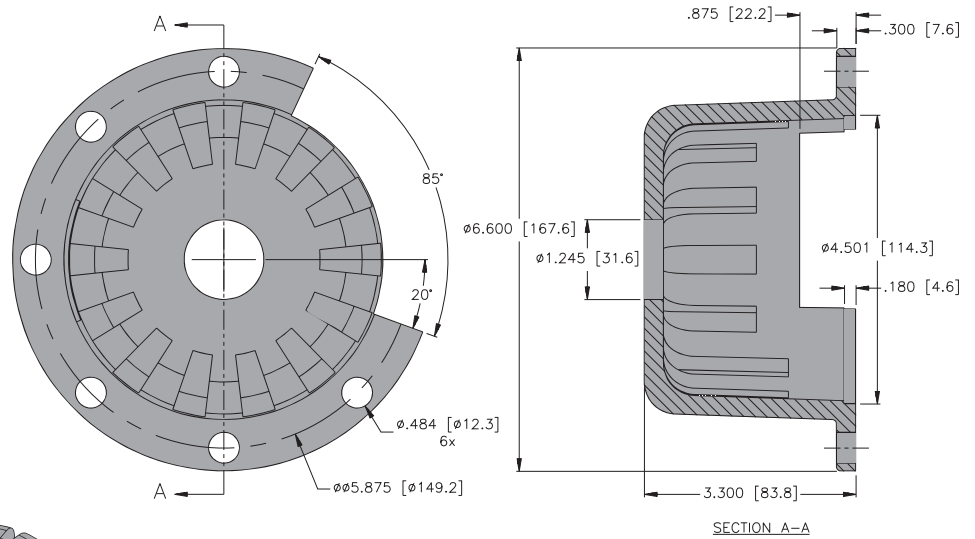
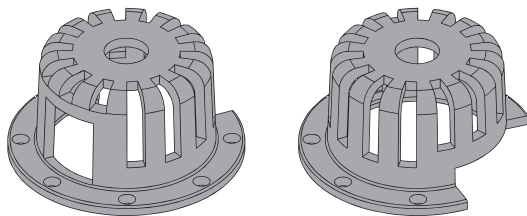
External diameter 42 mm
Internal diameter 38 H7 in accordance with ISO 286-2
Order Number: 8.0010.4017.0000

Large Bore Type RI-43 (Hollow Shaft) Accessories

Part Number:
 ENCODER COVER KIT

Description:
 Cover kit for 4.5" C-face motors

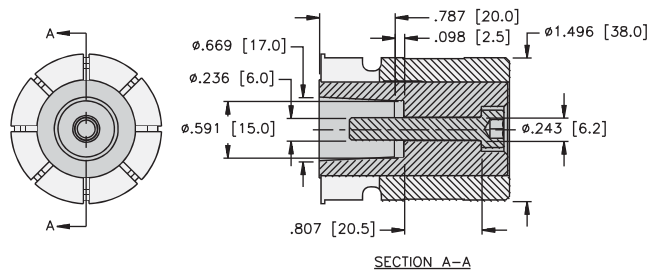
Included: (3) 3/8 x 16 x 3/4 bolts, (3) washers



Part Number:
 8.0010.4028.0000

Description:
 Mounting kit adapts the RI-43 hollow shaft encoder for mounting onto a tapered shaft. Tapered shafts are used for high-precision direct coupling to direct devices. An isolating insert is also included in the mounting kit; this reliably protects the encoder from shaft currents.

Included: Insert for cone blind hole, cone 1:10, 17 mm length, insulation insert, allen screw for tightening



Incremental Encoders