



**TURCK**  
*works*

Industrial  
Automation

## **A02H Encoder for Vector Motor Application**

**Kübler**  
*by* **TURCK**



- NEMA C-Face Accessories
- Robust Bearing Design
- Long Life BTR Lip Seals
- 6000 RPM Continuous Duty
- M12 *eufofast*® Connector



[www.turck.com](http://www.turck.com)



The A02H **Kübler by TURCK** 3.5 inch incremental hollowshaft encoder was specifically designed for use on AC Vector motors, with features that increase operation lifetime and reliability.

In a typical vector motor application, isolation between the encoder and motor chassis must be maintained to reduce the effects of temperature, noise and current. Optional isolation inserts are offered with the A02H to act as both a thermal barrier, reducing the amount of heat that the encoder encounters from the motor shaft, and an electrical barrier, reducing the impact of induced noise and current on the encoder. The inserts for the A02H come in a variety of sizes and can accommodate bores up to 32 millimeters in diameter. However, if the insert is not required, the encoder can accommodate bores up to 42 millimeters in diameter.

The **Kübler by TURCK** line offers two types of tethers to facilitate mounting the A02H encoder to the rear of a motor. The first type is a "C-face" tether designed to fit onto a 4.5 inch C-face bolt pattern, and the other is a universal slotted style that can fit up to an 8 inch pitch diameter. The universal tether can also be used to attach the encoder to a motor fan cover.

One of the most common reasons for mechanical failure of an encoder is bearing failure. The A02H encoder uses dual bearings that are preloaded and locked in place. This feature prevents disk table movement, increases bearing life and prevents failures. The A02H encoder also stands apart from the competition with an extremely high shock rating of 250 g's that allows it to continue functioning where other encoders lose counts or fail entirely.

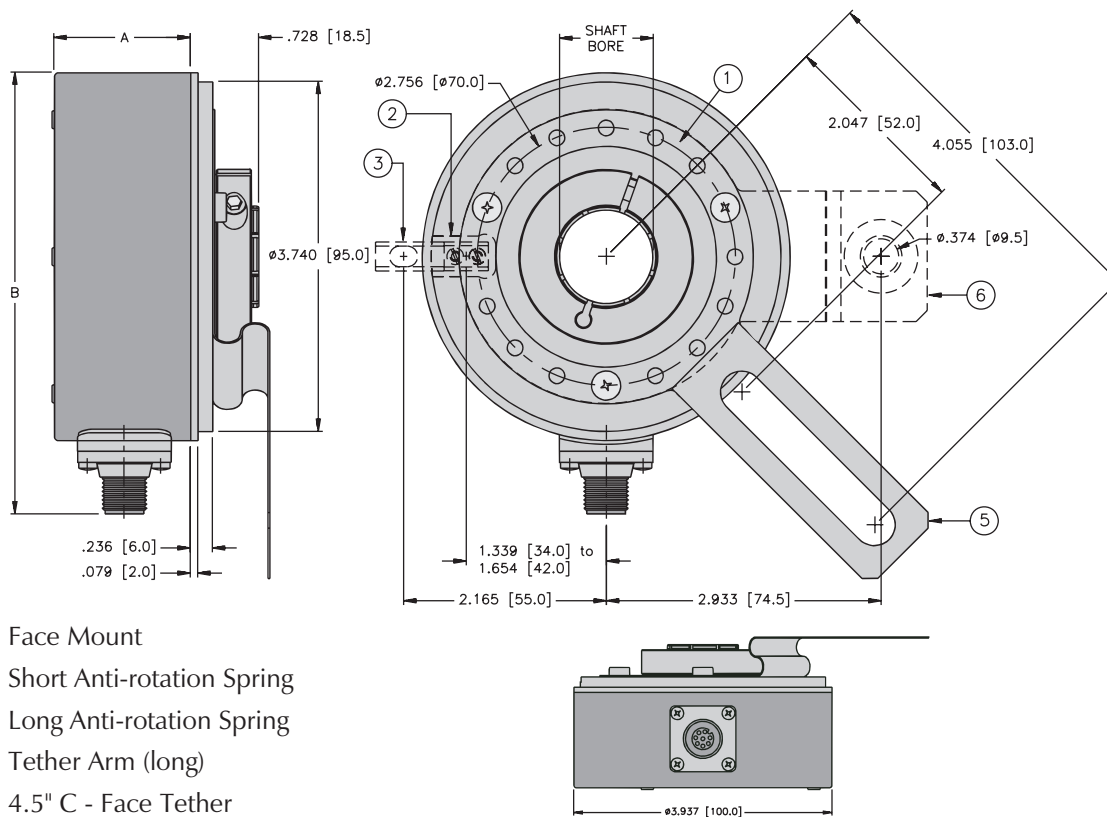
The A02H has an extended speed range of 6000 RPM for continuous duty cycles, and an optional M12 **euromat**® quick disconnect that eliminates the need to assemble complicated MS style connectors (E-RKC-8T-PX3-264-\*). A02H encoders are available with a variety of output circuits, bore sizes and connection types to provide you with the ideal encoder for elevator shaft, converting, conveyor, and other AC motor applications.





3.5" (T8.A02H) Incremental Hollow Shaft Encoder Dimensions

T8.A02H with Flange



- 1 = Face Mount
- 2 = Short Anti-rotation Spring
- 3 = Long Anti-rotation Spring
- 5 = Tether Arm (long)
- 6 = 4.5" C - Face Tether

Mating Shaft Requirements

Type of Flange	Axial End Play	Radial Runout	Angular Offset
Type 2 (Anti-rotational spring short)	max. $\pm 1$ mm	max. $\pm 0.3$ mm	max. $\pm 2^\circ$
Type 3 (Anti-rotational spring long)	max. $\pm 1$ mm	max. $\pm 0.3$ mm	max. $\pm 2^\circ$
Type 5 (Tether arm long)	max. $\pm 0.5$ mm	max. $\pm 0.3$ mm	max. $\pm 2^\circ$
Type 6 (C-face tether)	max. $\pm 0.5$ mm	max. $\pm 0.3$ mm	max. $\pm 2^\circ$

Isolation Inserts

Part Number	Inner Dimension	Outer Dimension
8.0010.4070.0000	15.875 mm (5/8")	38 mm
8.0010.4090.0000	19.05 mm (3/4")	38 mm
8.0010.4050.0000	25.4 mm (1")	38 mm
8.0010.4014.0000	28.58 mm (1-1/8")	38 mm
8.0010.4060.0000	31.75 mm (1-1/4")	38 mm
8.0010.4011.0000	20 mm	38 mm
8.0010.4012.0000	25 mm	38 mm
8.0010.4016.0000	30 mm	38 mm
8.0010.4015.0000	32 mm	38 mm

The A02H 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 hub is provided with the encoder by specifying B0 in the *special insert option* decode. When ordering isolation inserts separately, choose option A0 with a bore diameter of 38 mm.

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

**3.5" (T8.A02H) Vector Motor Incremental Specifications**

**Mechanical:**

<b>Protection Rating</b> . . . . .	IP 64
<b>Speed</b> . . . . .	6000 RPM for continuous duty cycle
<b>Operating Temperature</b> . . . . .	-20°C to +85°C (-4°F to +177°F) to 3600 RPM -20°C to +75°C (-4°F to +167°F) to 6000 RPM
<b>Shock/Vibration</b> . . . . .	2000 m/s <sup>2</sup> , (6 ms) per DIN-IEC 68-2-27 / 100 m/s <sup>2</sup> (10-2000 Hz) per IEC 68-2-6
<b>Humidity</b> . . . . .	98% relative humidity without condensing
<b>Housing/Shaft</b> . . . . .	Aluminum, with epoxy powder coat / 316 stainless
<b>Starting Torque</b> . . . . .	28.32 oz.in. (<0.2 Nm)
<b>Hub Bore Tolerance</b> . . . . .	H7

**Electrical:**

<b>Input/Output</b> . . . . .	<b>5 VDC/TTL (26C31)</b> . . . . .	<b>5-30 VDC/Line Driver (7272)</b>
<b>Power Consumption</b> . . . . .	90 mA . . . . .	100 mA
<b>Short-circuit Protection (DIN-IEC 68-2-27)</b> . . . . .	Yes <sup>1)</sup> . . . . .	Yes
<b>Reverse Polarity Protection</b> . . . . .	No . . . . .	Yes
<b>Operating Frequency (max.)</b> . . . . .	300 kHz . . . . .	300 kHz
<b>Permissible Load per Channel</b> . . . . .	±20 mA . . . . .	±20 mA
<b>Signal Level High (min.)</b> . . . . .	2.5 V . . . . .	+V -2 V
<b>Signal Level Low (max.)</b> . . . . .	0.5 V . . . . .	0.5 V

<b>Input/Output</b> . . . . .	<b>5-30 VDC/Open Collector (7273)</b> . . . . .	<b>10-30 VDC/Push-Pull (IC-WE)</b>
<b>Power Consumption</b> . . . . .	150 mA . . . . .	150 mA
<b>Short-circuit Protection (DIN-IEC 68-2-27)</b> . . . . .	Yes . . . . .	Yes
<b>Reverse Polarity Protection</b> . . . . .	No . . . . .	Yes
<b>Operating Frequency (max.)</b> . . . . .	300 kHz . . . . .	300 kHz
<b>Permissible Load per Channel</b> . . . . .	20 mA sink @ 30 VDC . . . . .	±30 mA
<b>Signal Level High (min.)</b> . . . . .	2.5 V . . . . .	+V -3 V
<b>Signal Level Low (max.)</b> . . . . .	0.5 V . . . . .	2.5 V

<b>Input/Output</b> . . . . .	<b>10-30 VDC/TTL (26C31)</b> . . . . .	<b>5 VDC/SIN/COS</b> . . . . .	<b>10-30 VDC/SIN/COS</b>
<b>Power Consumption</b> . . . . .	90 mA . . . . .	110 mA . . . . .	110 mA
<b>Short-circuit Protection (DIN-IEC 68-2-27)</b> . . . . .	Yes <sup>1)</sup> . . . . .	Yes . . . . .	Yes
<b>Reverse Polarity Protection</b> . . . . .	Yes . . . . .	No . . . . .	Yes
<b>Operating Frequency (max.)</b> . . . . .	300 kHz . . . . .	180 kHz . . . . .	180 kHz
<b>Permissible Load per Channel</b> . . . . .	±20 mA . . . . .	N/A . . . . .	N/A
<b>Signal Level High (min.)</b> . . . . .	2.5 V . . . . .	1 Vpp (±20%) . . . . .	1 Vpp (±20%)
<b>Signal Level Low (max.)</b> . . . . .	0.5 V . . . . .	0.1-1.2 V . . . . .	0.1-1.2 V

<sup>1)</sup> Only one channel at a time:  
 (when +V = 5 VDC, short-circuit to common, or +V is permitted)  
 (when +V = 10-30 VDC, short-circuit to common is permitted)

## A02H Encoders Provide

- Stainless steel hub & clamp
- Long life BTR (rubber) lip seals
- Captive, preloaded dual bearing construction
- 6000 RPM continuous duty cycle
- Temperature rating of -20°C to +75°C to 6000 RPM;  
-40°C on request
- Shock & vibration rated to 200g/10g



---

## Other Accessories



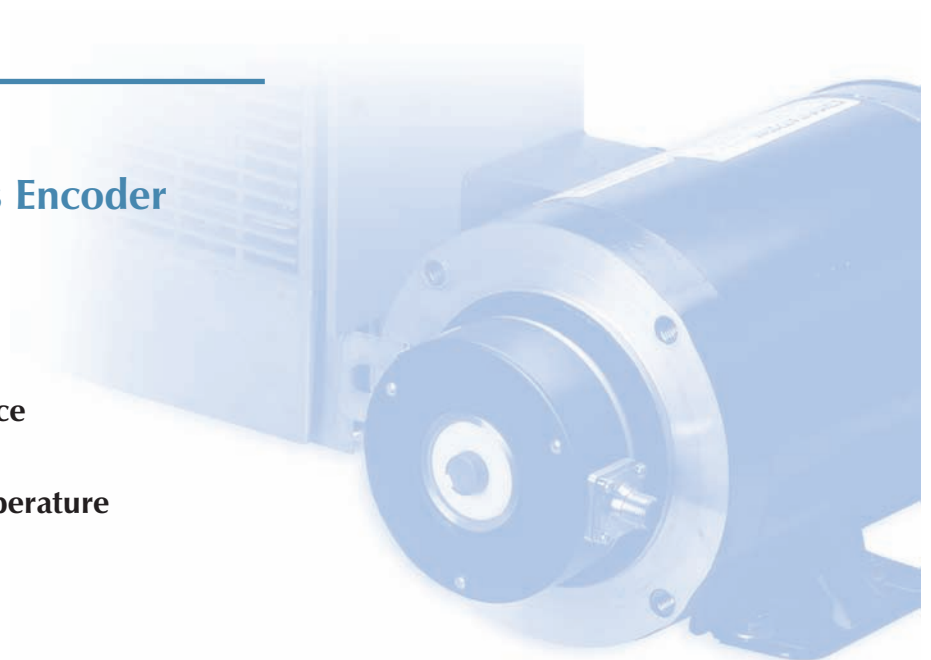
Part Number: Encoder Cover Kit

- Tether for 4.5" C-face
- Protective cover; for 4.5" NEMA C-face
- Phenolic hub inserts
  - Provides electrical and thermal isolation from motor shaft
  - Available sizes: 1/2", 5/8", 3/4", 1", 1-1/4" and metric

---

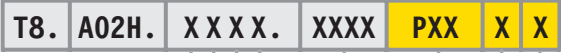
## What the Competition's Encoder Might Provide

- Aluminum/plastic hub
- Paper seals
- Bearings that are glued in place
- 1800 RPM design
- Standard 70°C operating temperature





**3.5" (T8.A02H) Vector Motor Incremental Hollow Shaft Encoder Part Number Key**



<p><b>Flange</b></p> <p>1 = Face mount 2 = Short anti-rotational spring 3 = Long anti-rotational spring 5 = Tether arm (long) 6 = 4.5 inch C-face tether</p> <p><b>Bore Dimension</b></p> <table border="0"> <tr><td>1 = Ø42 mm</td><td>A = Ø30 mm<sup>†</sup></td></tr> <tr><td>2 = Ø38 mm</td><td>B = Ø40 mm</td></tr> <tr><td>3 = Ø28 mm</td><td>C = Ø20 mm<sup>†</sup></td></tr> <tr><td>4 = Ø1.0"<sup>†</sup></td><td>D = Ø1/2"</td></tr> <tr><td>5 = Ø25 mm<sup>†</sup></td><td>E = Ø5/8"<sup>†</sup></td></tr> <tr><td>6 = Ø24 mm</td><td>F = Ø3/4"<sup>†</sup></td></tr> <tr><td></td><td>G = Ø1-1/8"<sup>†</sup></td></tr> <tr><td></td><td>N = Ø1-1/4"<sup>†</sup></td></tr> <tr><td></td><td>P = 32 mm-***</td></tr> </table> <p><b>Input / Output Circuit</b></p> <p>1 = 5 VDC / TTL (26C31) 3 = 10-30 VDC / Push-Pull (IC-WE) 4 = 10-30 VDC / TTL (26C31) 8 = 5 VDC / 1 Vpp Sine Wave 9 = 10-30 VDC / 1 Vpp Sine Wave A = 5-30 VDC / Line Driver (7272) B = 5-30 VDC / Open Collector (7273) D = 5-30 VDC / TTL (26C31) E = 5-30 VDC / TTL Line Driver (7272)</p>	1 = Ø42 mm	A = Ø30 mm <sup>†</sup>	2 = Ø38 mm	B = Ø40 mm	3 = Ø28 mm	C = Ø20 mm <sup>†</sup>	4 = Ø1.0" <sup>†</sup>	D = Ø1/2"	5 = Ø25 mm <sup>†</sup>	E = Ø5/8" <sup>†</sup>	6 = Ø24 mm	F = Ø3/4" <sup>†</sup>		G = Ø1-1/8" <sup>†</sup>		N = Ø1-1/4" <sup>†</sup>		P = 32 mm-***	<p><b>Special Connector Wiring Format</b></p> <p>0 = Standard wiring Other = See page F5</p> <p><b>Special Insert Options</b></p> <p>B = Isolation insert included** A = Isolation insert not included</p> <p><b>Special Output Signal Formats</b></p> <p>See page A7</p> <p><b>Pulse Rate (PPR)</b></p> <p>See below</p> <p><b>Connection Type</b></p> <p>1 = Radial cable (PVC, 1 meter) 2 = Radial 12-pin, M23 (<i>multifast</i>®) D = Radial MS, 10-pin (MS 3102R18-1P) E = Radial 8-pin, M12 (<i>eurofast</i>®) K = Radial MS, 7-pin (MS 3102R165-1P)</p>
1 = Ø42 mm	A = Ø30 mm <sup>†</sup>																		
2 = Ø38 mm	B = Ø40 mm																		
3 = Ø28 mm	C = Ø20 mm <sup>†</sup>																		
4 = Ø1.0" <sup>†</sup>	D = Ø1/2"																		
5 = Ø25 mm <sup>†</sup>	E = Ø5/8" <sup>†</sup>																		
6 = Ø24 mm	F = Ø3/4" <sup>†</sup>																		
	G = Ø1-1/8" <sup>†</sup>																		
	N = Ø1-1/4" <sup>†</sup>																		
	P = 32 mm-***																		

\* Length in meters.  
\*\* Includes plastic hub inserts for electrical isolation.  
\*\*\* This bore size only available as an isolation insert.  
† Bores available with isolation inserts.

**Pulse Rates (PPR):**  
50, 100, 360, 512, 600, 1000, 1024, 1500, 2000, 2048, 2500, 4096, 5000

**Mating Connectors Available:**  
Standard E-RKC-8T-264-\*  
LED E-WKC-8T-PX3-930-\*  
Field Wireable CMB-8181-0

**TURCK USA**  
TURCK Inc.  
3000 Campus Drive  
Minneapolis, MN 55441  
Phone: (763) 553-7300  
Fax: (763) 553-0708  
Application Support:  
1-800-544-7769

**TURCK Mexico**  
TURCK Mexico S. de R.L. de C.V.  
Carr Saltillo-Sacatecas km 4.5 s/n  
Parque Industrial La Angostura  
Saltillo, COAH. CP. 25070  
Phone: 011 +52 (844) 411-6647/46  
Fax: 011 +52 (844) 482-6926  
Toll Free: 01-800-01-TURCK (Mexico only)  
(01-800-01-88725)  
email: ventasmexico@turck.com

**TURCK Canada**  
CHARTWELL  
ELECTRONICS, INC.  
140 Duffield Drive  
Markham, Ontario  
Canada, L6G 1B5  
Phone: (905) 513-7100  
Fax: (905) 513-7101  
Toll Free: 1-877-513-779

**TURCK World Headquarters**  
Hans TURCK GmbH & Co. KG  
Witzlebenstrasse 7  
D-45472 Muelheim der Ruhr  
Federal Republic Of Germany  
Phone: (+49) 208-49 52-0  
Fax: (+49) 208-49 52 264

....Sense It!....Connect It!....Bus It!