

Timken[®] magnetic encoder technology offers clear operational and cost benefits over other commonly used technologies. Our superior sensing products provide reliable speed and position data even in harsh operating environments.

The Timken M11 Modular Magnetic Encoder is a miniature off-axis incremental rotary position sensor. It provides a robust high-resolution position-sensing solution with consistent performance, reliable operation in tough conditions, long life, and easy installation.

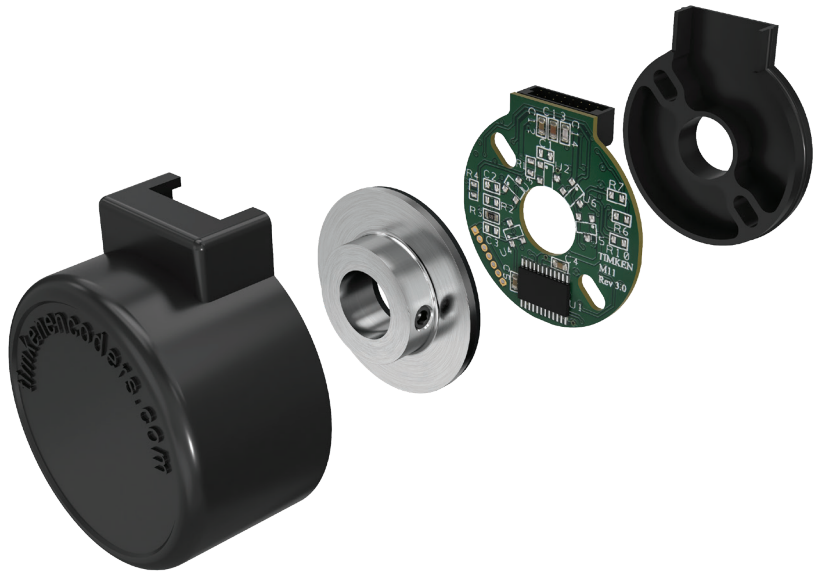
DURABLE

Magnetic encoders perform reliably in environments filled with dirt, dust, oil, humidity, or other contaminants. Timken's patented differential magnetic sensor circuit design also protects from interference by external magnetic fields. This innovative technology allows for a large sensor air gap which enables the M11 to sustain intense shock loads and vibration. With this wide gap, the M11 can tolerate more shaft-end play and run-out than competitors, and installation is quick and easy.

DESIGN

The M11 uses the Timken MPS160 Encoder ASIC sensor to provide quadrature output at resolutions up to 1024 PPR and an optional once-per-revolution index pulse. Motor commutation signals are available for up to 6 poles.

One of the smallest commutating encoders available, the M11 is the most accurate magnetic encoder in its class. The M11 is designed to fit NEMA 11 motors and is available for imperial and metric shaft sizes ranging from 4 mm to 8 mm.



The M11 is ideal for small brushless DC motors, servo motors, and small stepper motors.

Off-axis technology provides accuracy not available from on-axis magnetic encoders. The magnetic target is marked for shaft-positioning alignment.

CUSTOMIZED SOLUTIONS

Customers interested in a customized solution can rely on Timken application engineers to provide expertise and experience. They can help customers tailor the electronic aspects and physical configuration of the encoder to enhance both function and performance for end users.

WHY MAGNETIC ENCODERS?

- ⊖ Highly resistant to liquid or solid particulate in the gap between sensor and target
- ⊖ Non-contact design resists damage from shock or vibration
- ⊖ Features a polymer-bonded multi-pole magnet target containing no rare earth materials
- ⊖ High accuracy performance – better than 20 arc minutes
- ⊖ Compact, low-cost, rugged design
- ⊖ Can be used as a replacement part or configured to fit new designs

APPLICATIONS

- ⊖ Small brushless DC motors
- ⊖ Servo motors
- ⊖ Microstepping small stepper motors

M11 MODULAR MAGNETIC ENCODERS FULL DATA

MECHANICAL SPECIFICATIONS	Encoder Wheel Hub Material	400 Series stainless steel/Nickel plated steel
	Encoder Wheel Magnet Material	Nitrile-bonded ferrite
	Maximum RPM	12,000 RPM
	Housing	High-temperature glass-filled nylon
	Weight	12.5g

MECHANICAL INSTALLATION	Encoder Wheel Method of Attachment	Set screw (3 mm) aligned with index pulse (if applicable)
	Mounting Screws	M2.5 wafer head
	Air Gap	Set with e-z gauge M11: Maximum air gap of 0.755 mm (0.030 in) to 1.8 mm (0.073 in) for resolutions up to 1000. Maximum of at least 0.6 mm (0.024 in) for resolutions over 1000.

ENVIRONMENTAL SPECIFICATIONS	Enclosure Rating	NEMA 1/IP40 for models with cover
	Operating Temperature	-40° to 125° C (-40° to 255° F) open collector, -40° to 85° C (-40 to 185° F) for line driver
	Storage Temperature	-55° to 150° C (-67° to 302° F)
	Humidity	98% relative humidity without condensation
	RoHS Compliant	

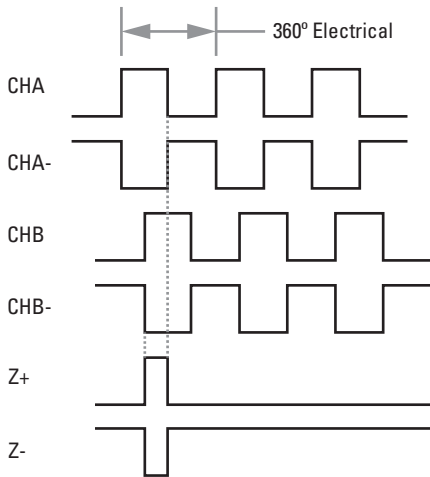
ELECTRICAL SPECIFICATIONS*	Output	Two channels in quadrature with gated index and optional commutation
	Commutation	0/2/4/6 poles
	Output Terminations	Header Connector: JAE FI-W15P-HFE-E1500 Mating Connector: JAE FI-W15S
	Current Requirements	39 mA + 15 mA with commutation Halls + output load
	Resolution	100 PPR to 1280 PPR (400 EPR to 5120 EPR)
	Data Rate	200 kHz (800 kHz combined)
	Output Format	Line driver (26C31) or open collector
	Supply Voltage	5 VDC ±10%

*Consult Timken for other electrical options.

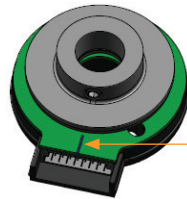
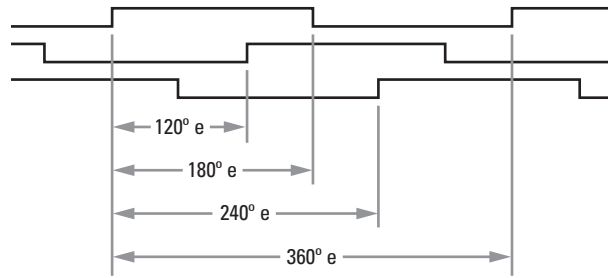
SIGNAL OUTPUTS

As observed when magnetic target rotates clockwise, viewed from target side of the system.

INCREMENTAL A, B, AND Z



COMMUTATION U, V, W

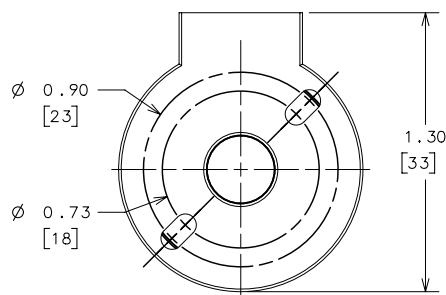
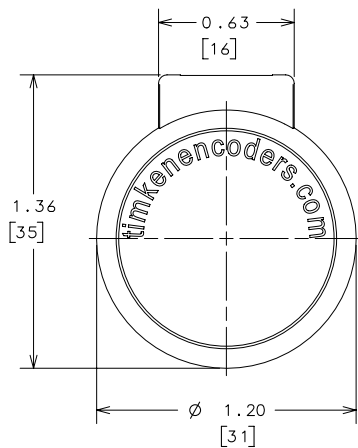


Index pulse released when set screw aligns with mark on silk screen

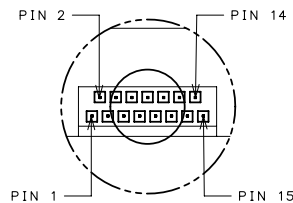
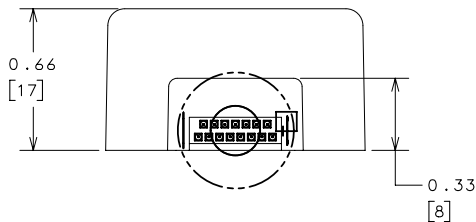
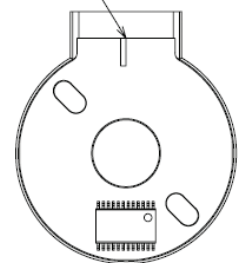
Alignment of index pulse and rising edge of "U" commutation signal

Pin #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Function†	A+	A-	B+	B-	Z+	Z-	U+	U-	V+	V-	W+	W-	VCC	GND	N/C
Color	Yel	Yel/Wh	Blu	Blu/Wh	Orn	Orn/Wh	Grn	Grn/Wh	Brn	Brn/Wh	Wht	Wht/Gry	Red	Blk	Gry

†Output on pins 2, 4, 6, 8, 10, 12 available with line driver option. Output on pins 7-12 available with commutation signals.



REFERENCE PULSE ALIGNMENT INDICATOR



3D MODELS AVAILABLE
TO DOWNLOAD AT
WWW.TIMKENENCODERS.COM

CONFIGURATION EXAMPLE: M11 – 100 – 0 – 1 – 11 – 1 – 1 – 2

Encoder	Resolution (PPR)		Commutation	Index Pulse*	Shaft/Bore Size	Output	Termination	Cover
M11	90	400	0 = none	1 = yes	11 = 4 mm	1 = open collector	1 = 15 pin on-board header connector	1 = cover
	100	500	2 = 2 pole		3 = 5 mm	2 = line driver		2 = cover with center hole
	125	512	4 = 4 pole		4 = 6 mm			
	128	720	6 = 6 pole		5 = 1/4 in.			
	180	800			7 = 8 mm			
	250	1000						
	256	1024						
	360							

*Other configurations available upon request

CABLES SOLD SEPARATELY

Cable Part Numbers	Description
MISC-K165024	17.5" CABLE, MATING CONNECTOR ON ONE END
MISC-K164473	36" CABLE, MATING CONENCTOR ON BOTH ENDS
MISC-20	20' CABLE, MATING CONNECTOR ON ONE END

More details regarding specifications, installation, and instructions are available at www.timkenencoders.com.

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