

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.

M15

The Timken M15 Modular Magnetic Encoder is an off-axis incremental rotary position sensor that offers high-resolution and excellent reliability at a competitive cost. The M15 uses the Timken MPS160 Encoder ASIC sensor to provide quadrature output at resolutions up to 2048 PPR and an optional once-per-revolution index pulse. Motor commutation signals are available for up to 12 poles. This versatile design is available for imperial and metric shaft sizes ranging from 0.125 inches to 0.5 inches.

DURABILITY

Magnetic encoders operate 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 M15 encoder to sustain shock loads and vibration that would damage more fragile encoders. With this wide gap, the M15 encoder can tolerate more shaft-end play and run-out than competitors, and installation is quick and easy.

TIMKEN DESIGN

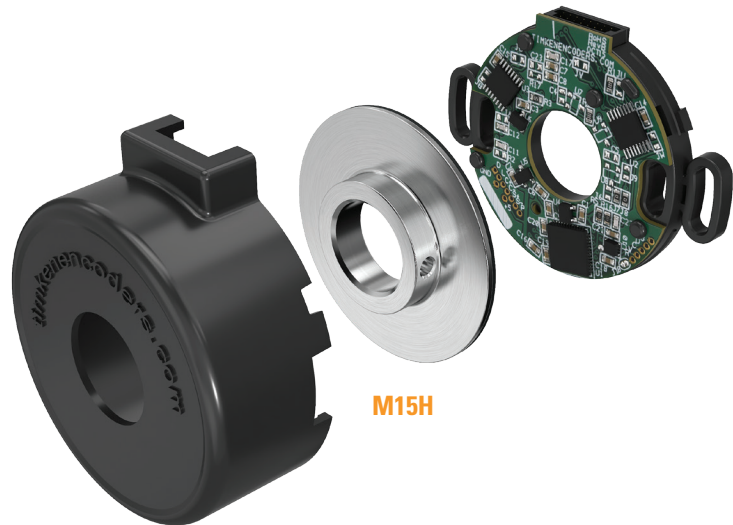
The Timken design combines a direction-sensing Hall Effect encoder with an integrated index pulse and a high-accuracy,

resolution-multiplying circuit. The encoder produces and processes the Hall Effect signals to create high-resolution quadrature output signals that provide zero-speed and direction sensing.

M15H

The Timken M15H High Resolution Modular Magnetic Encoder takes the standard M15 to new heights.

The M15H uses the Timken MPS512 Encoder ASIC sensor to provide resolutions up to 8192 PPR and adds the ability to double the width of the optional once-per-revolution index pulse. Sharing the M15's durability and design features, the M15H is an economical choice for higher resolution applications.



CUSTOMIZED SOLUTIONS

The versatility of Timken's modular encoder technology enables customers to customize a solution for their application. Customers can rely on the expertise and experience of Timken application engineers to tailor the electronic and physical configuration of the encoder to enhance both functionality and performance.

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

- ⊖ Servo motor control using the commutation options
- ⊖ Stepper motor positioning and anti-stall feedback
- ⊖ DC brush-type motor positioning
- ⊖ Brushless DC (BLDC) motor control using the commutation options

M15 AND M15H MODULAR MAGNETIC ENCODERS FULL DATA

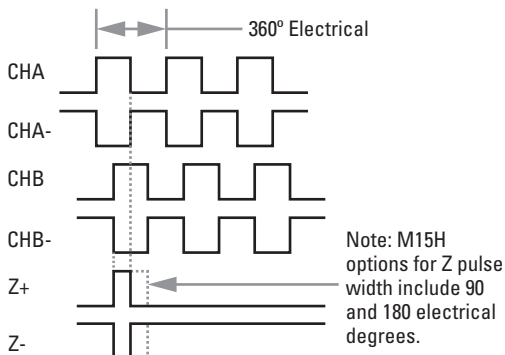
MECHANICAL SPECIFICATIONS	Encoder Wheel Hub Material	400 Series stainless steel/Nickel plated steel
	Encoder Wheel Magnet Material	Nitrile-bonded ferrite
	Maximum RPM	10,000 RPM
	Housing	High-temperature glass-filled nylon
	Weight	28 grams (1.0 oz.)
MECHANICAL INSTALLATION	Encoder Wheel Method of Attachment	Set screw (3 mm) aligned with index pulse (if applicable)
	Mounting Screws	M2.5 or #2-56
	Air Gap	Set with e-z gauge M15: Maximum air gap of between 1.1 mm (0.043 in) and 1.8 mm (0.071 in) for most resolutions up to 1280. Maximum of at least 0.4 mm (0.015 in) for resolutions over 1280. M15H: Maximum air gap of 1.8 mm (0.071 in) for most resolutions up to 3200. Maximum of at least 0.4 mm (0.015 in) for resolutions over 3200.
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	0/4/6/8/10/12 (Other options available)
	Output Terminations	Header Connector: JAE FI-W15P-HFE-E1500 Mating Connector: JAE FI-W15S
	Current Requirements	M15: 39 mA + 15 mA with commutation Halls + output load M15H: 70 mA + 15 mA with commutation Halls + output load
	Resolution	100 PPR to 8192 PPR (400 EPR to 32768 EPR)
	Data Rate	M15: 200 kHz (800 kHz combined) M15H: 2.4 MHz (9.6 MHz combined)
	Output Format	Line driver (26C31) or open collector
	Supply Voltage	5 VDC $\pm$ 10%

*Consult Timken for other electrical options.

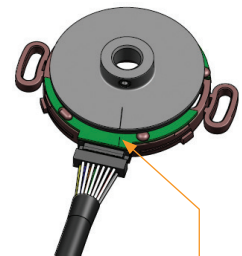
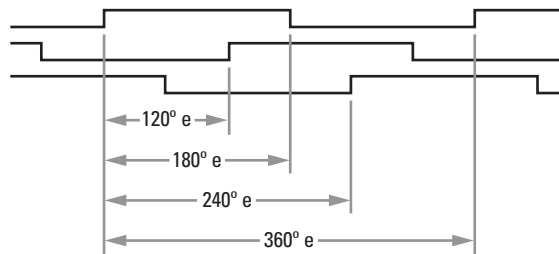
SIGNAL OUTPUTS

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

INCREMENTAL A, B, AND Z



COMMUTATION U, V, W



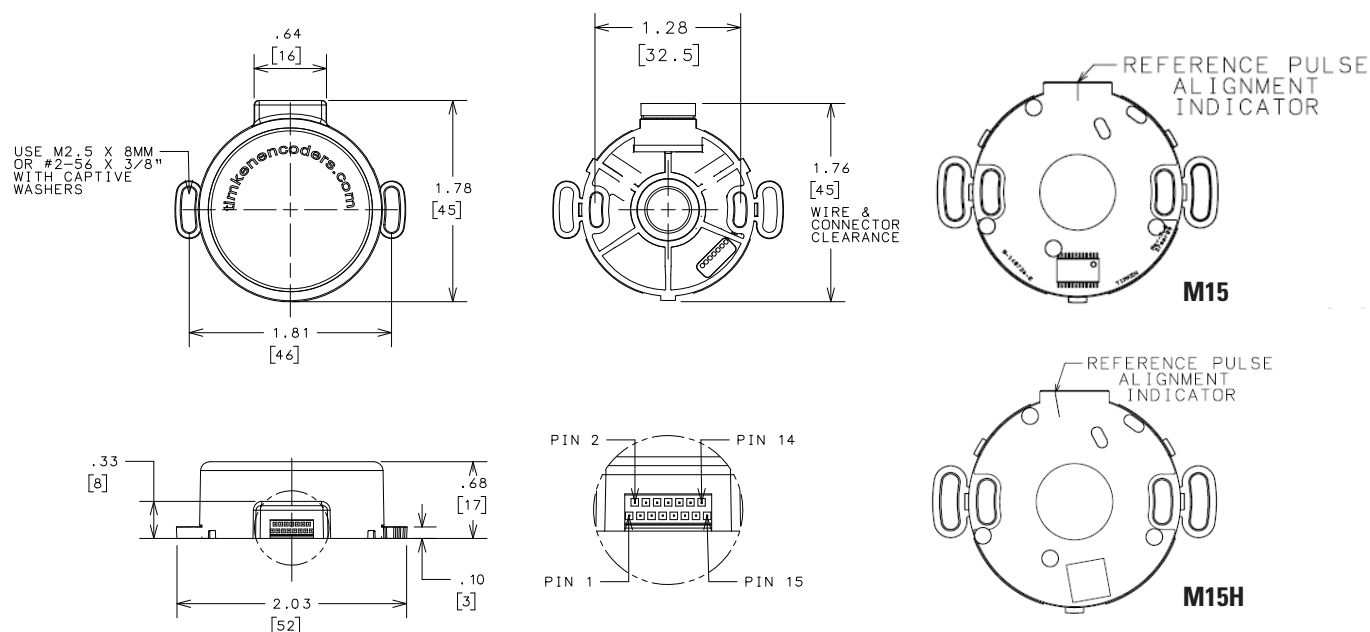
Index pulse released when set screw aligns with mark on silk screen

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

SIGNAL OUTPUTS continued

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/ Wht	Blu	Blu/ Wht	Orn	Orn/ Wht	Grn	Grn/ Wht	Brn	Brn/ Wht	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.



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

M15 CONFIGURATION EXAMPLE: M15 – 100 – 0 – 0 – 1 – 1 – 1 – 0

Encoder	Resolution (PPR)		Commutation	Index, Z	Hub	Electrical	Termination	Cover
M15	100	500	0 = none	0 = none	1 = 1/8 in.	1 = open collector	1 = 15 pin on-board header connector	0 = none
	125	512	4 = 4 pole	1 = yes, 90°	2 = 3/16 in.	2 = line driver 26C31		1 = cover
	128	640	6 = 6 pole		3 = 5 mm			2 = cover with center hole
	160	800	8 = 8 pole		4 = 6 mm			
	200	1000	10 = 10 pole		5 = 1/4 in.			
	250	1024	12 = 12 pole		6 = 5/16 in.			
	256	1280			7 = 8 mm			
	320	2000			8 = 3/8 in.			
	360	2048			9 = 10 mm			
	400				10 = 1/2 in.			

*2 pole communication available with the following resolutions: 1000, 800, 500, 400, 250, 200, 120, 100

M15H CONFIGURATION EXAMPLE: M15H – 1250 – 0 – 0 – 1 – 1 – 1 – 0

Encoder	Resolution (PPR)	Commutation	Index, Z	Hub	Electrical	Termination	Cover
M15H	1250	0 = none	0 = none	1 = 1/8 in.	1 = open collector	1 = 15 pin on-board header connector	0 = none
	2000	4 = 4 pole	1 = yes, 90°	2 = 3/16 in.	2 = line driver 26C31		1 = cover
	2048	6 = 6 pole	2 = yes, 180°	3 = 5 mm			2 = cover with center hole
	2500	8 = 8 pole		4 = 6 mm			
	3200	10 = 10 pole		5 = 1/4 in.			
	3600	12 = 12 pole		6 = 5/16 in.			
	4000			7 = 8 mm			
	4096			8 = 3/8 in.			
	5000			9 = 10 mm			
	8192			10 = 1/2 in.			

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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M15



M15H



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TIMKEN

The Timken team applies their know-how to improve the reliability and performance of machinery in diverse markets worldwide. The company designs, makes and markets bearings, gear drives, automated lubrication systems, belts, brakes, clutches, chain, couplings, linear motion products and related industrial motion rebuild and repair services.

Stronger. By Design.

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