MDE16 - Magnetic shaft encoder

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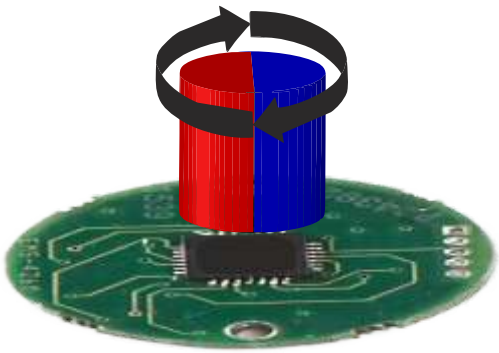
Based on Dipole Magnet and Hall Sensors



MDE16 is a very compact magnetic rotary enclosed encoder with a shaft. It has a precision sensor having an integrated Hall element for scanning a permanent Dipole magnet. The encoder can give Absolute as well as incremental outputs up to 14 bits per rotation.

MDE16 enclosure is designed like a miniature enclosed shaft encoder allowing for very easy and compact installation in applications.
Its IP68 robust design makes it ideal for use in harsh environments.

Salient Features:

- **16mm Circular encoder with Ø4mm Shaft**
- **Operates on 5V power supply**
- **Variety of outputs supported like Analog Sin-Cos output, Incremental RS422, Absolute SSI and BiSS-C protocol**
- **Supports up to 14 bits (16384 positions) per rotation in Absolute and up to 12 bits (4096) in Incremental outputs**
- **Accuracy +/- 0.35 deg**
- **High Speed operation up to 20000 rpm at finest resolution**
- **3600 CPR also available to give angular resolutions easier for mathematical calculations**
- **Suitable for applications like motor control, Medical instrumentation, paper and textile industry, Industrial automation and many more**

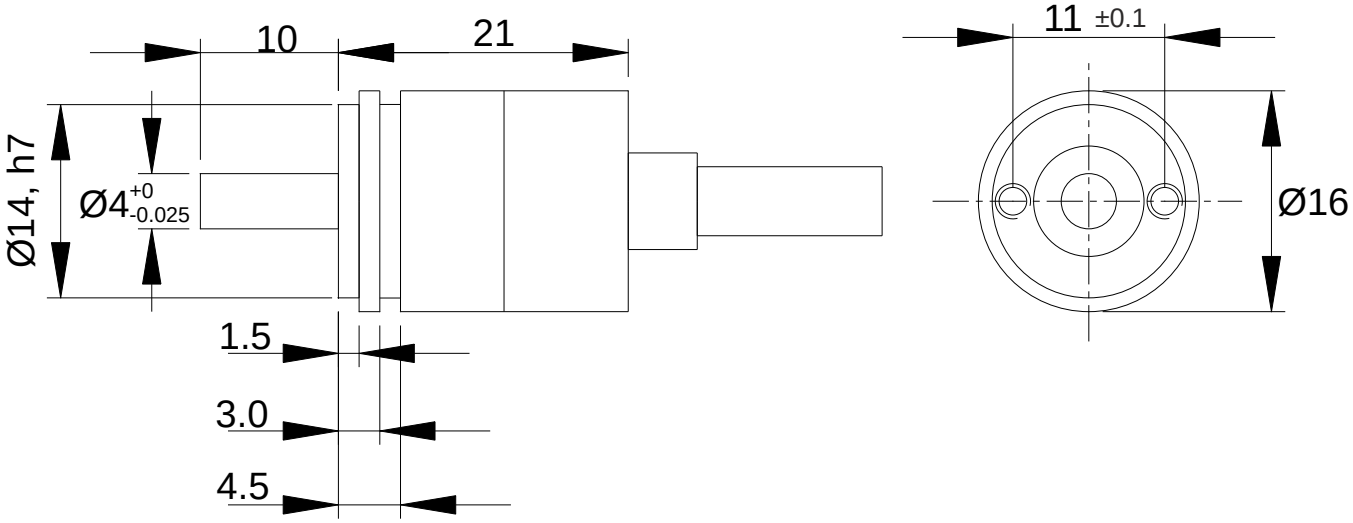
RATED TO IP68 CE RoHS

Available models:

- **MDE16AS -** Analog single ended Sine Cosine output with a single sine-cosine cycle per rotation
- **MDE16AC -** Analog complementary Sine Cosine output with a single sine-cosine cycle per rotation
- **MDE16IR -** Incremental RS422 A, B and Z output with up to 4096 counts per rotation
- **MDE16SB -** Absolute output on Synchronous Serial interface (SSI) with Binary data up to 13 Bits per rotation (Differential Signals)
- **MDE16SG -** Absolute output on Synchronous Serial interface (SSI) with Grey coded data up to 13 Bits per rotation (Differential Signals)
- **MDE16BC -** Absolute output on BiSS-C data up to 14 Bits per rotation (Differential Signals)

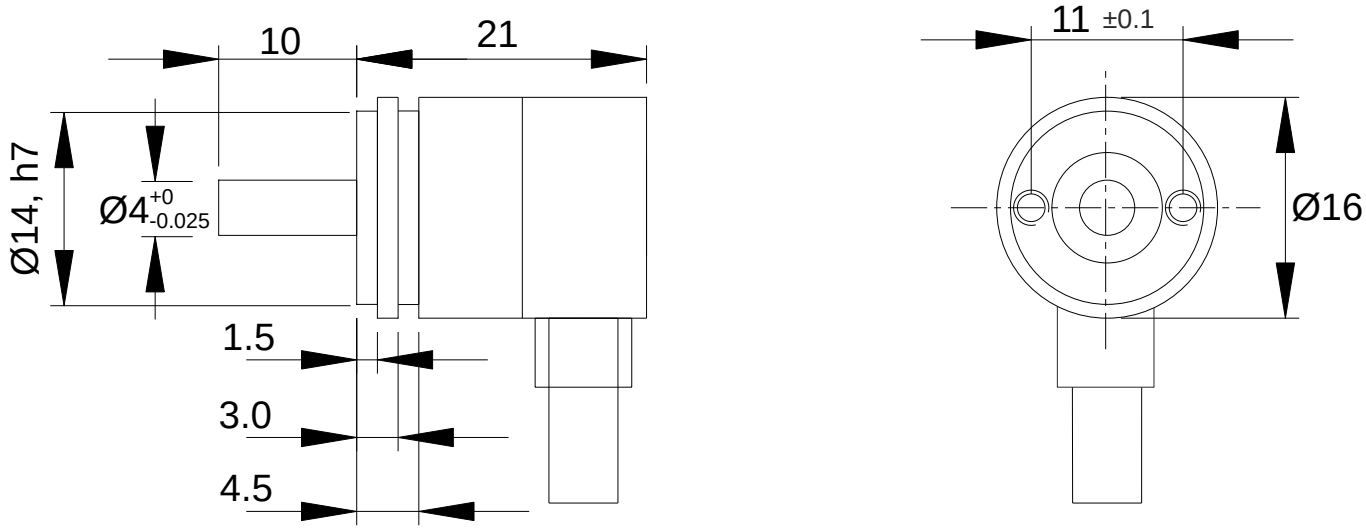
Installation drawings:

Axial type



All dimensions are in mm

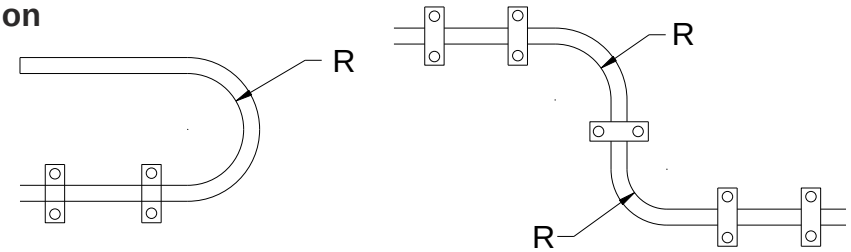
Radial type



All dimensions are in mm

Note: The above drawings for IP53, IP64 model only. Please contact factory for installation drawings for IP68 encoder.

Cable installation



Note: Minimum possible R is 25mm
Tested at 500000 strokes at minimum bending radius

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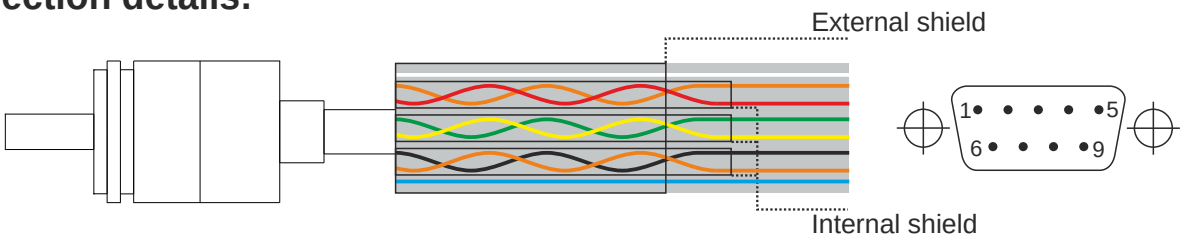
MDE16 Specifications:

	MDE16AS / AC	MDE16IR	MDE16SB / SG	MDE16BC
Power Supply (V_{dd})	+5V DC (±5%)			
Current consumption	50mA maximum		90mA maximum	
Output	AS - 2Vpp each signal AC - 0.5Vpp each signal	RS422		
Maximum RPM	20000 RPM			
Operating Temperature	-40°C to +125°C			
Storage Temperature	-40°C to +125°C			
Storage Humidity	Max. 95% relative humidity (non-condensing)			
Operating Humidity	Max. 80% relative humidity (non-condensing)			
Accuracy	±0.35°			
Clock Frequency	Not Applicable		4MHz maximum	10MHz maximum
Output data format	Not Applicable		SB - Binary data SG - Grey coded data	BiSS-C
SSI Data time out	Not Applicable		16µS	12.5µS to 40µS
Standard Cable length	1 m			
Connector type	9 Pin D Connector Male (Plug), Flying leads			
Maximum Cable length	3 m	50 m		
Driving current	20mA max.			
Cable	Ø5.3mm, double shielded PUR cable, dragchain compatible			
Cable exit	Axial, Radial			
Shaft Size	Ø4 X 10 mm			
Max. Shaft loads	Radial and Axial 10N			
Protection class	IP53, IP64, IP68 (IEC 60529)			
EMI/EMC compliance	EN61326			

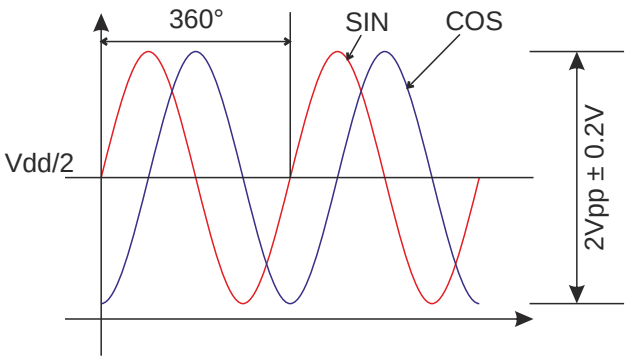
Pin Connection details:



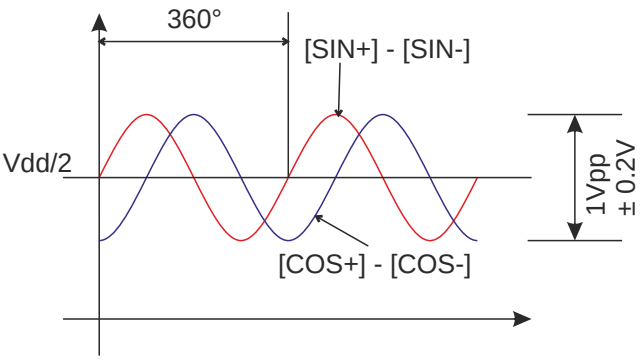
Pin numbers	MDE16AS		MDE16AC		MDE16IR		MDE16SB/SG/BC	
	Signal	Colour	Signal	Colour	Signal	Colour	Signal	Colour
1	Internal Shield		Internal Shield		Internal Shield		Internal Shield	
2	SIN	Red	SIN +	Red	Z +	Brown	CLK +	Red
3	COS	Yellow	COS +	Yellow	B +	Yellow	CLK -	Orange
4	NC	–	NC	–	A +	Red	NC	–
5	Vdd	White	Vdd	White	Vdd	White	Vdd	White
6	NC	–	SIN -	Orange	Z -	Black	Data +	Yellow
7	NC	–	COS -	Green	B -	Green	Data -	Green
8	NC	–	NC	–	A -	Orange	NC	–
9	GND	Blue	GND	Blue	GND	Blue	GND	Blue
Body	External Shield		External Shield		External Shield		External Shield	

Output waveforms:

MDE16AS

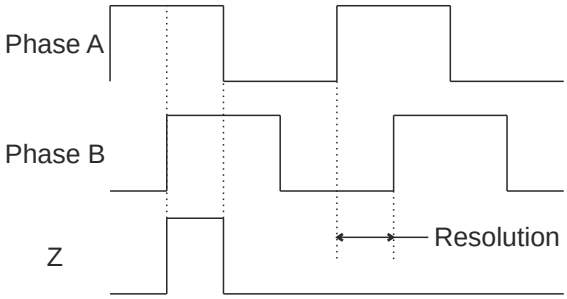


MDE16AC



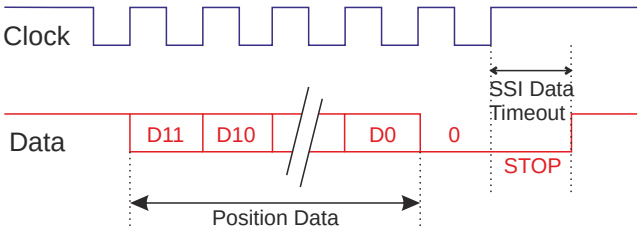
MDE16IR

(Differential signals are not shown)

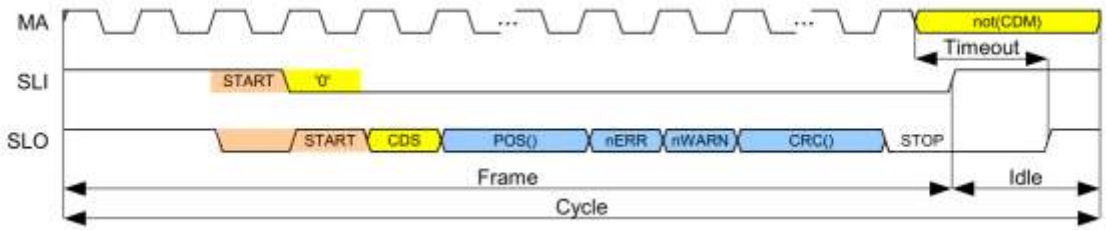


MDE16SB / SG

(Differential signals are not shown)



MDE16BC



Output Resolutions:

MDE16IR

CPR	Hysteresis	Max. RPM
4 to 256*	0.7°	20000
260 to 512*	0.35°	20000
516 to 4096*	0.17°	20000

MDE16SB /SG

No of Bits	Hysteresis
9	0.35°
10 to 13	0.17°

MDE16BC

No of Bits	Hysteresis
9	0.35°
10 to 14	0.17°

* - In increments of 4. Eg 4, 8, 12, till 4096 etc

Note: Counts per Rotation (CPR) can be calculated as pulse per rotation (PPR) X 4

Ordering Information:

MDE16 □□ □□□□□ □□ □ □ □□ □ □□

Series name
16mm Circular
rotary shaft encoder

Model name
AS - Single ended SIN COS output
AC - Complementary SIN COS output
IR - Incremental RS422 output
SB - SSI with binary data output
SG - SSI with grey coded data output
BC - BiSS-C with binary data output

Resolution in PPR
For **AS** and **AC**
0000
For **IR**
0004 to 4096
For **SB** (no of bits)
0512(9)**, 1024**(10)**, 2048**(11)**, 4096**(12), **8192**(13)
For **BC** (no of bits)
0512(9)**, 1024**(10)**, 2048**(11)**,**
4096(12)**, 8192**(13)**, 16384**(14)

Cable Length
10 - 1m standard

Connector type
A - Flying leads
B - 9 pin male (plug)
D connector

Cable exit type
A - Axial
R - Radial

Shaft size
04 - Ø4mm Std.
F4 - Ø4mm Flat

IP Rating
A - IP53
B - IP64
C - IP68

00 - Standard
RoHS assembly
01 - Standard
non-RoHS assembly

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