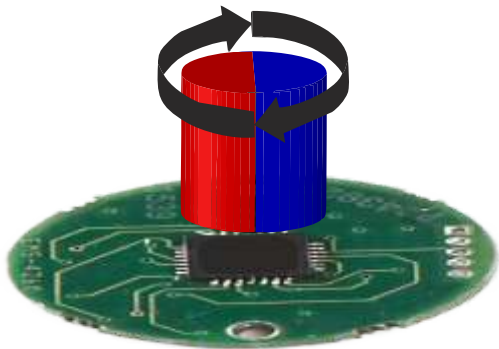


## MDM22 - Magnetic shaft encoder









Based on Dipole Magnet and Hall Sensors



MDM22 magnetic encoder module consists of an encoder body and a magnet holder. The magnet holder is fitted on the rotating shaft and the encoder body in front of the magnet holder. The sensor inside the body will sense the rotating magnet and gives the Absolute as well as incremental outputs up to 14 bits per rotation.

**This gives a very high speed, IP68 robust, bearing less encoder design ideally suitable for applications in harsh environments .**

### Salient Features:

-  **22mm modular encoder with magnet holder 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 Absolute and Incremental outputs**
-  **Accuracy +/- 0.5 deg**
-  **High Speed operation up to 20000 rpm at 12bit 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

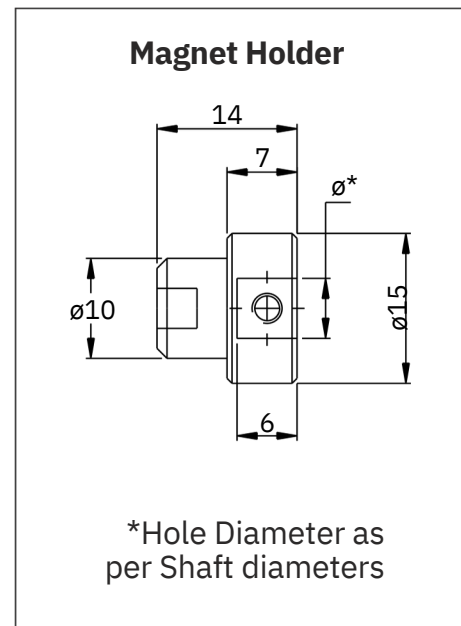
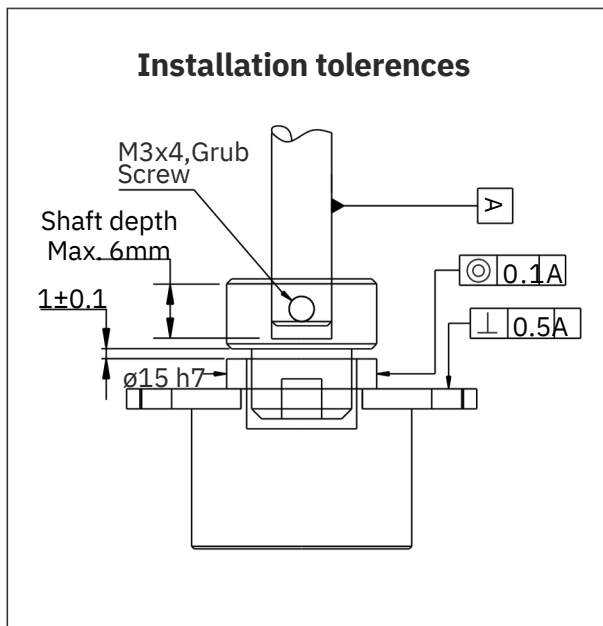
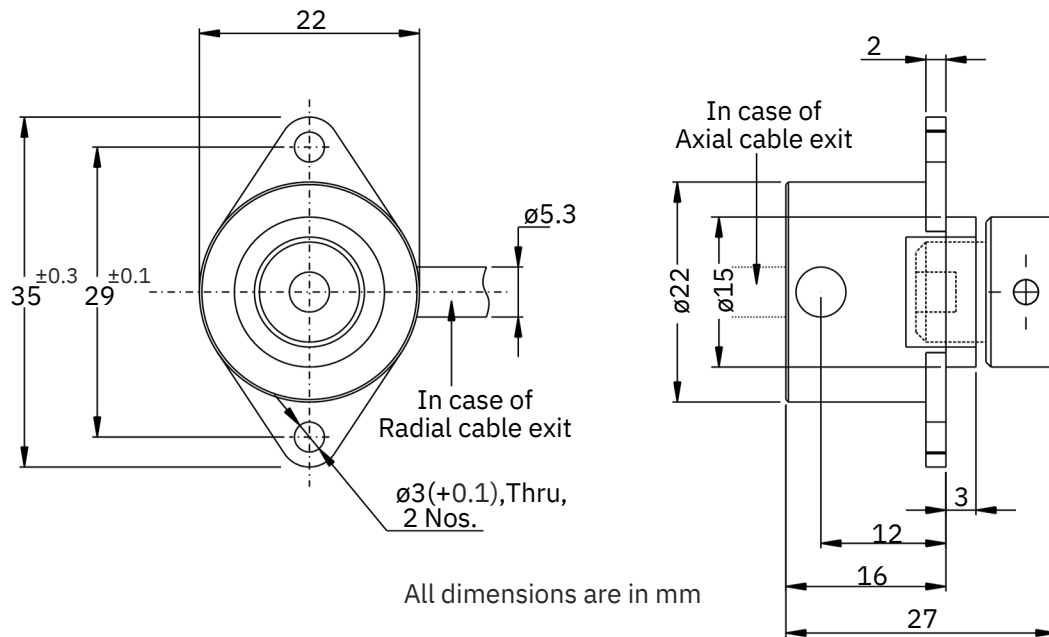
**CE**



### Available models:

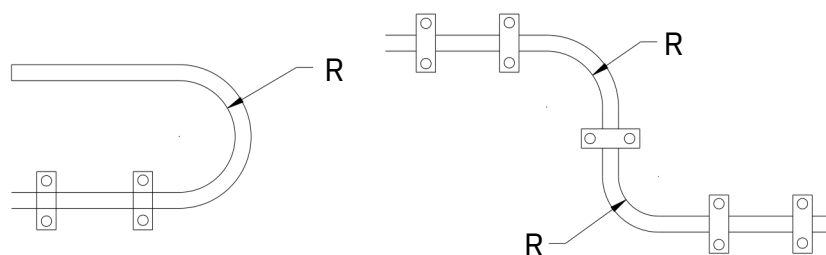
-  **MDM22AS** - Analog single ended Sine Cosine output with a single sine-cosine cycle per rotation
-  **MDM22AC** - Analog complementary Sine Cosine output with a single sine-cosine cycle per rotation
-  **MDM22IR** - Incremental RS422 A, B and Z output with up to 16384 counts per rotation
-  **MDM22SB** - Absolute output on Synchronous Serial interface (SSI) with Binary data up to 13 Bits per rotation
-  **MDM22SG** - Absolute output on Synchronous Serial interface (SSI) with Grey coded data up to 13 Bits per rotation
-  **MDM22BC** - Absolute output on BiSS-C data up to 14 Bits per rotation

## Installation drawings:



All dimensions are in mm

## Cable installation

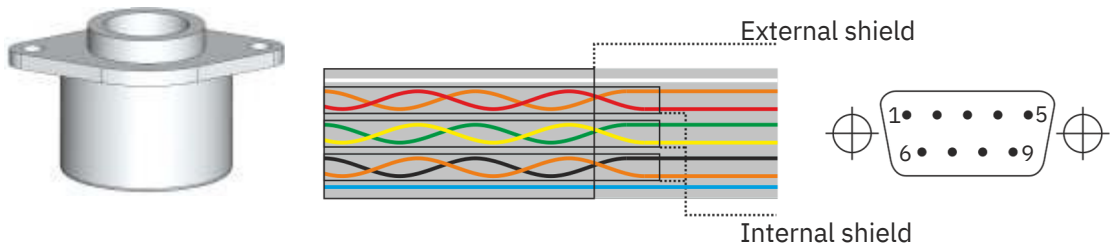


**Note:** Minimum possible R is 25mm  
Tested at 500000 strokes at minimum bending radius

## MDM22 Specifications:

	MDM22A S / AC	MD M22IR	MDM22S B / SG	MDM22BC
Power Supply (Vdd)	+5V DC (±5%)			
Current consumption	50mA maximum		90mA maximum	
Output	AS - 2Vpp each signal AC - 0.5Vpp each signal	RS422		
Maximum RPM	120000 RPM	2500 RPM to 120000 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	±0.5°			
Clock Frequency	Not	4MHz maximum		10MHz maximum
Output data format	Applicable	SB - Binary data SG - Grey coded data		BiSS-C
SSI Data time out	Not	16µS		12.5µS to 40µS
Standard Cable length	Applicable 1 m			
Connector type	9 Pin D Connector Male (Plug), Flying leads			
Maximum Cable length	3 m	Not	50 m	
Driving current	Applicable		20mA max.	
Cable	Ø5.3mm, double shielded PUR cable, dragchain compatible			
Cable exit	Axial, Radial			
Protection class	IP68 (IEC 60529)			
EMI/EMC compliance	EN61326			

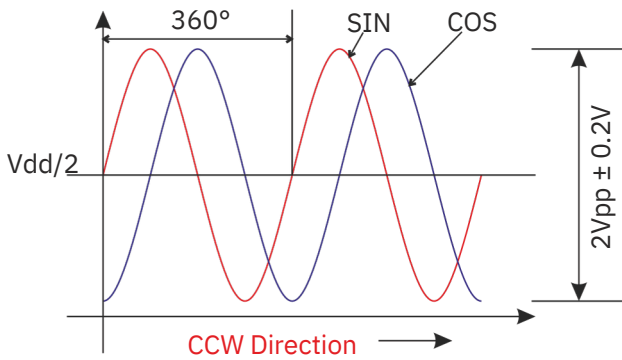
## Pin Connection details:



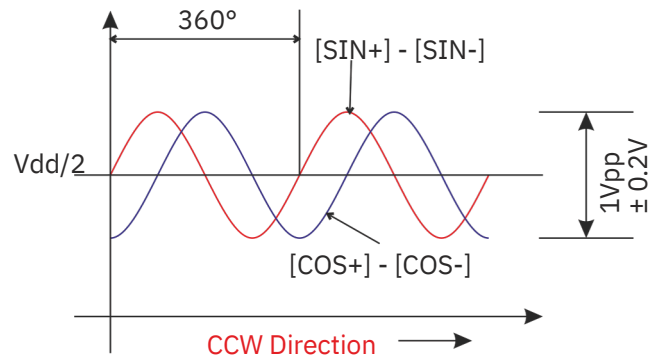
Pin numbers	MDM22AS		MDM22AC		MDM22IR		MDM22SB/SG/BC	
	Signal	Colour	Signal	Colour	Signal	Colour	Signal	Colour
1	Internal Shield		Internal Shield		Internal Shield		Internal Shield	
2	SIN	Red	SIN +	Red	Z +	Brown	CLK +	Red
3	COS	Yellow	COS +	Yellow	B +	Yellow	CLK -	Orange
4	NC	-	NC	-	A +	Red	NC	-
5	Vdd	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	Blue	NC	-	A -	Orange	NC	-
9	GND		GND	Blue	GND	Blue	GND	Blue
Body	External Shield		External Shield		External Shield		External Shield	

## Output waveforms:

### MDM22AS

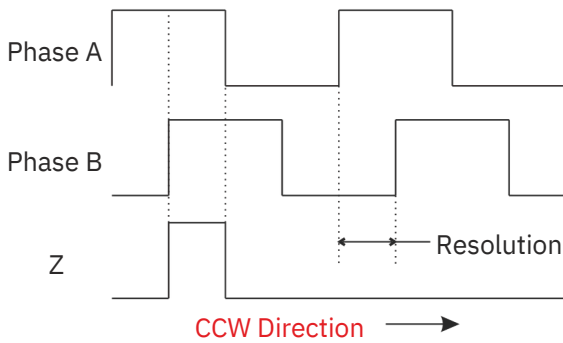


### MDM22AC



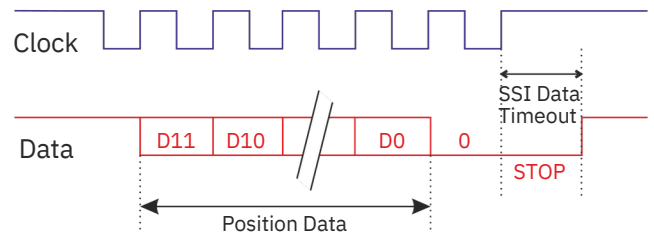
### MDM22IR

(Differential signals are not shown)



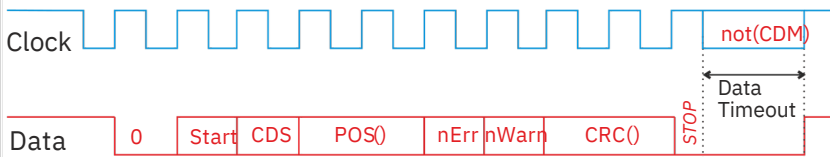
### MDM22SB / SG

(Differential signals are not shown)

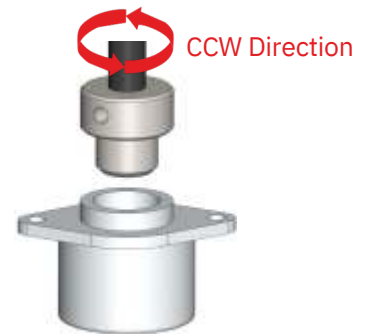


Position data is 13bit for all resolutions up to 13bits with trailing zeros. Position data increments in CCW direction

### MDM22BC



POS() is 12bit data for Res up to 12bits and 16bit data for Resolutions above 12bit with trailing zeros. Position data increments in CCW direction



## Output Resolutions:

### MDM22IR

CPR	Hysteresis	Max. RPM
4 to 256*	0.7°	20000
260 to 512*	0.35°	20000
516 to 4096*	0.17°	20000
8192	0.17°	5000
16384	0.17°	2500

### MDM22SB / MDM22SG

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

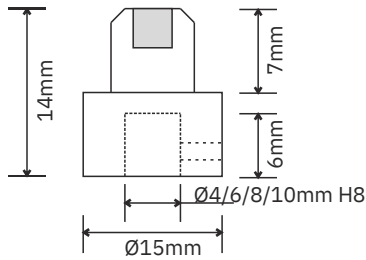
### MDM22BC

No of Bits	Hysteresis
8	0.7°
9	0.35°
10 to 14	0.17°

\* - In increments of 4. Eg 4, 8, 12, till 256 etc

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

## Magnet with Holder:



Order code - MDH04 / 06 / 08 / 10

**Note:** M3 Grub screw is provided on the holder for fixing on to Shaft

## Ordering Information:

MDM22

**Series name**  
22mm Circular rotary modular 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 CPR**  
 For **AS** and **AC**  
**00000**  
 For **IR**  
**00004 to 04096, 08192, 16384**  
 For **SB** and **SG** (no of bits)  
**00512(9), 01024(10), 02048(11), 04096 (12), 08192 (13)**  
 For **BC** (no of bits)  
**00256(8), 00512(9), 01024(10), 02048 (11), 04096(12), 08192(13), 16384(14)**

**Cable Length**  
**10** - 1m standard

**00** - for Standard

**IP Rating**  
**C** - IP68

**Cable exit type**  
**A** - Axial  
**R** - Radial

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