



## Type 2RMHF

- Hollow Shaft Encoder -  $\varnothing$  24 mm
- Hollow Bore:  $\varnothing$  2 mm to  $\varnothing$  1/4 inch
- Resolution up to 7.500 ppr
- IP 64 rating (*IP 50 for flat cable option*)

### Electrical Specifications

<b>Code:</b>	Incremental
<b>Resolution:</b>	1 to 7.500 ppr (pulses per revolution)
<b>Supply Voltage:</b>	4,5 Vdc min. to 30 Vdc max. <sup>**</sup> (35 mA max. - no load)
<b>Output Voltage:</b>	Low: 500 mV max. at 10 mA High: ( $V_{in} - 0,6$ ) at -10 mA ( $V_{in} - 1,3$ ) at -25 mA
<b>Output Current:</b>	30 mA max. load per output channel <sup>**</sup>
<b>Frequency Response:</b>	200 kHz max. <sup>**</sup>
<b>Output Format:</b>	Two channel (A, B) quadrature with Index (Z) and optional complementary (A-, B-, Z-) outputs
<b>Phase Sense:</b>	A leads B clockwise (CW) from the mounting end of the encoder
<b>Index:</b>	Gated with Channels A and B high
<b>Accuracy:</b>	+/- 26 arc-sec.
<b>Outputs:</b>	ASIC Push pull and Differential OL7272 Push-pull and Differential Line Driver 26C31 Differential Line Driver 5V output (with 5V input)
<b>Electrical Protection:</b>	Reverse polarity and output short circuit protected
<b>Noise Immunity:</b>	Tested to EN61000-6-2 : 2005 (industrial environments) Electromagnetic compatibility (EMC) and EN 61000-6-3 : 2007 (residential, commercial, and light-industrial environments) for Electromagnetic compatibility (EMC)

### Mechanical Specifications

<b>Material:</b>	Housing: Brass Cap: Electroplated Steel Aluminum (flat cable option) Hollow Shaft: Brass
<b>Weight:</b>	Encoder: ~ 35 gr (1,23 oz) Cable: 50 gr / meter (1,76 oz / meter)
<b>Bearing Life:</b>	> 1,9 x 10 <sup>10</sup> revolutions at rated load
<b>Bearing Pre-Load:</b>	1 to 3600 ppr 4 (N) 4000 to 5000 ppr 7 (N) 7500 ppr 10 (N)
<b>Shaft Speed:</b>	12.000 rpm (max.)
<b>Starting Torque:</b>	< 0,005 Nm (0,708 oz-in) at 25° C
<b>Mass Moment of Inertia:</b>	1,0 gcm <sup>2</sup> (1,42 x 10 <sup>-5</sup> oz-in-sec <sup>2</sup> )
<b>Hollow Shaft Loads:</b>	Axial: 20 N (4,5 lbs) max. Radial: 20 N (4,5 lbs) max.

### Environmental Specifications

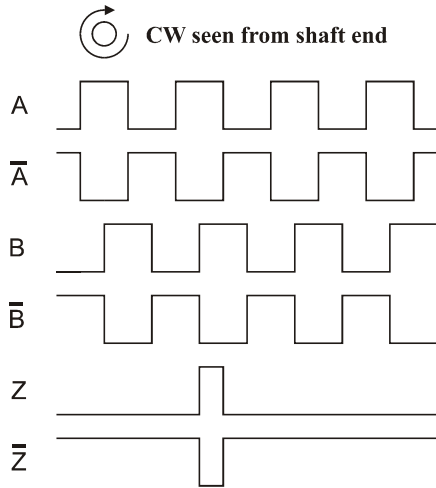
<b>Operating Temp.:</b>	-40° to +85° C
<b>Storage Temp.:</b>	-40° to +85° C
<b>Shock:</b>	100 G / 11 ms
<b>Vibration:</b>	10-2000 Hz / 10 G
<b>Bump:</b>	10 G / 16 ms (1000 x 3 axis)
<b>Humidity:</b>	98 % RH without condensation
<b>IP Rating:</b>	IP 64 / Nema 4 (approx.) IP 50 / Nema 5 (approx.) – flat cable

### Connection Options

<b>Cable:</b>	8 leads (0,05 mm <sup>2</sup> , 30 AWG) - Differential 5 leads (0,14 mm <sup>2</sup> , 26 AWG) - Standard twisted pairs; shielded
<b>Connector:</b>	5-pin M9 8-pin M9
<b>Flat Cable:</b>	10 lead flat cable with IDC connector

<sup>\*\*</sup>= It is recommended user not to combine max. value for all 3 parameters

## Output waveform



**Channel tolerance** 180 e° +/- 36 e°  
**Phase difference tolerance** 90 e° +/- 18 e°  
**Z channel tolerance** 90 e° +/- 18 e°

## Disk Resolutions (pulses per revolution)

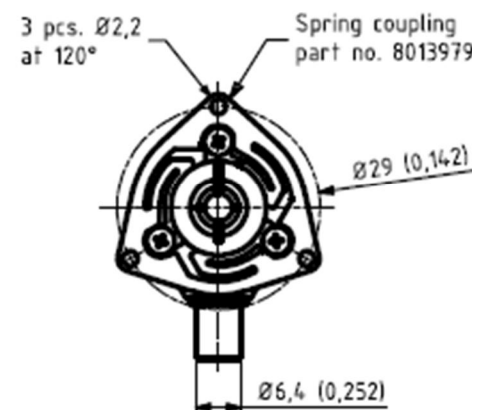
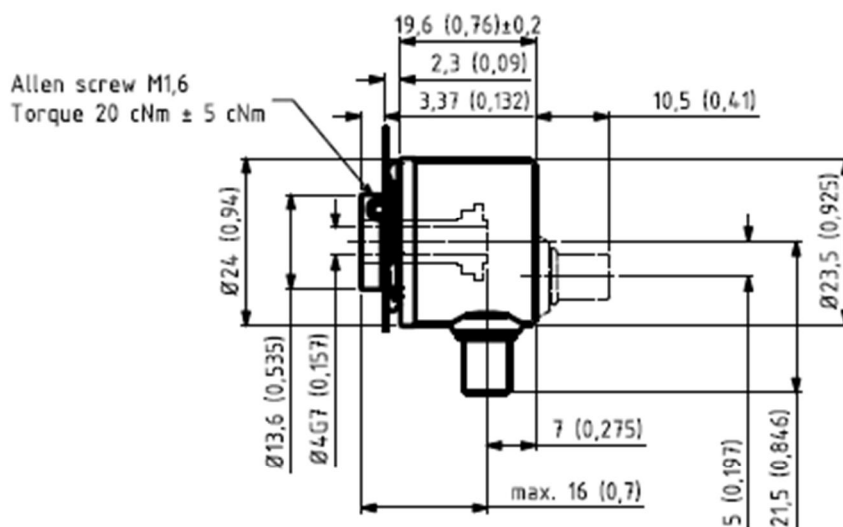
1	36	150	512	3000
4	50	180	600	3600
10	60	200	1000	5000
11	64	250	1024	7500*
12	75	256	1250	
15	90	300	1800	
20	100	360	2000	
25	125	400	2048	
30	128	500	2500	

### Other options on request

Pulses per revolution,  
 min. 1 – max. 7.500

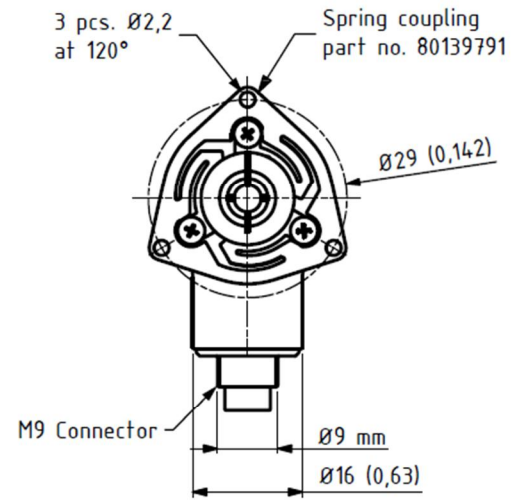
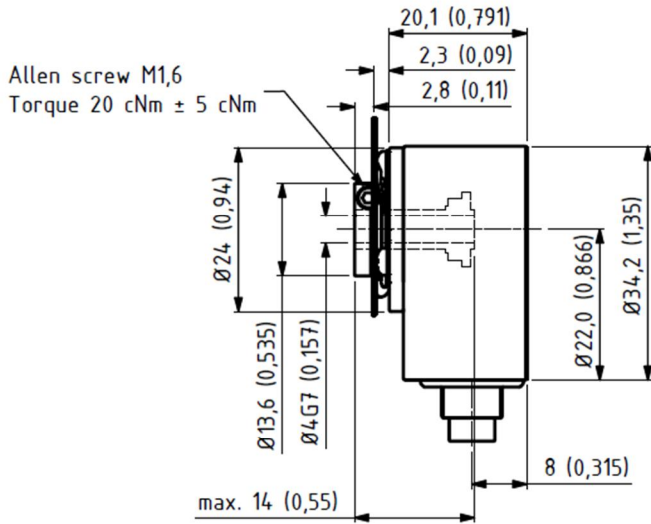
\* Operating temperature: -20° C to 50° C

## Mechanical Dimensions



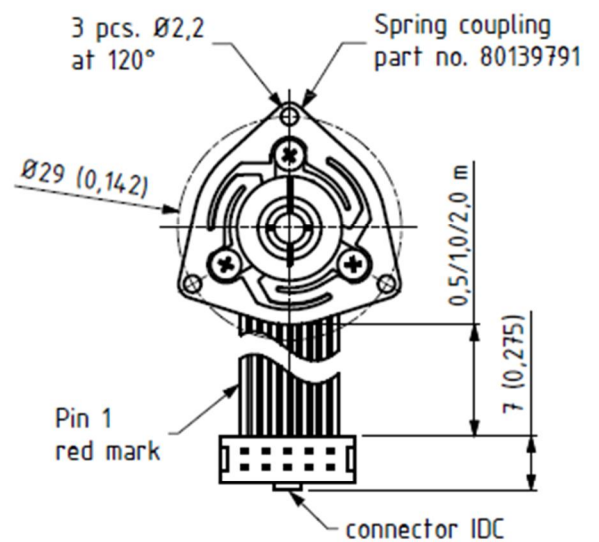
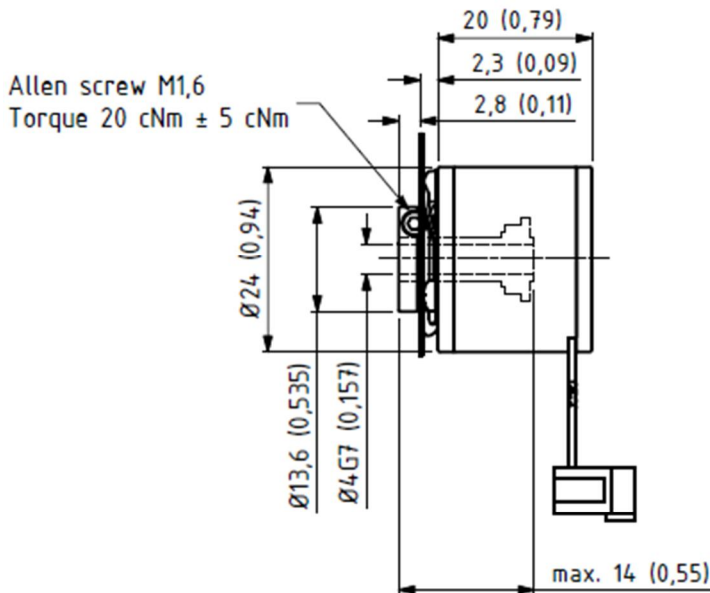
Standard Cable Gland  
 Side (S) or Back (B)

mm (inches)



M9 Connector

mm (inches)



Flat Ribbon Cable with IDC connector

mm (inches)

## Output Terminations

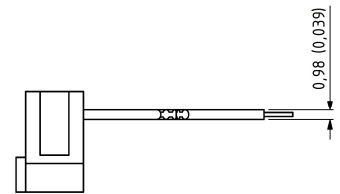
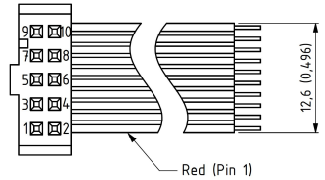
Channel	Standard Cable	
	Standard Output	Differential Output
	Wire Color	
A	Green	Pink
A -	NC*	Gray
B	Yellow	Green
B -	NC*	Yellow
Z	Gray	White
Z -	NC*	Brown
Vsup	Brown	Red
GND	White	Blue

GND = Circuit Ground

\* Internally connected as GND

Flat Cable w/ IDC Connector	
Differential Output *	
Position	Channel
1	NC
2	Vsup
3	GND
4	NC
5	A
6	A -
7	B
8	B -
9	Z -
10	Z

\* Hewlett Packard (HP) compatible



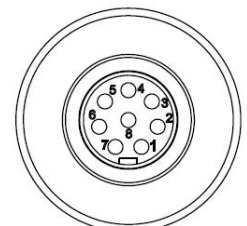
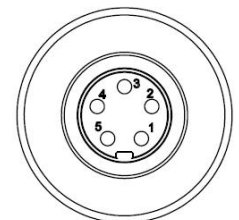
- IP 50 rating
- CE mark not available
- 0,5 m, 1 m, or 2 m cable length only

### Cable Tolerances

	Cable Length		Tolerances
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Flat Cable	0,5 (= 0,5 m)	+/- 10 mm	
	01 (= 1 m)	+/- 15 mm	
	02 (= 2 m)	+/- 20 mm	
Round Cable	01 (= 1 m)	Min. XX - 15 mm	
	XX (specified length)		
	XX ≤ 500 mm w/ connector	Min. XX - 10 mm	
	500 ≤ XX ≤ 1000 mm w/ connector	Min. XX - 15 mm	
	XX > 1000 mm w/ connector	Min. XX - 20 mm	



Position	M9 5 - pin	M9 8 - pin
	Standard Output	Differential Output
	Channel	Channel
1	VDD	VDD
2	GND	GND
3	A	A
4	B	A -
5	Z	B
6		B -
7		Z
8		Z -



GND = Circuit Ground

## Ordering Code

Example: 2RMHF – 1024 – D – 04 – 14 – 64 – 01 – S – 00 – S5

<b>2RMHF</b>	-	-	-	<b>14</b>	-	-	-	-	-																														
<b>Pulses per Revolution</b>		<b>Output</b>	<b>Hollow Shaft Dia.</b>	<b>Hollow Shaft Length</b>	<b>IP Rating</b>	<b>Cable Length</b>	<b>Cable Takeout</b>	<b>Connector</b>	<b>Spring Coupling</b>																														
See table					<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>IP 50</td><td><b>50*</b></td></tr> <tr><td>IP 64</td><td><b>64</b></td></tr> </table> <p style="text-align: center; font-size: small;">* = Only flat cable</p>	IP 50	<b>50*</b>	IP 64	<b>64</b>																														
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