



## 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. (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 **
<b>Frequency Response:</b>	200 kHz max. **
<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

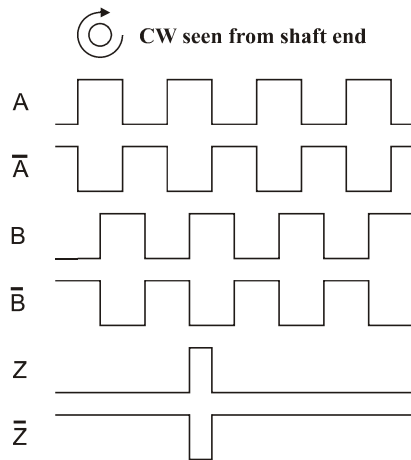
<b>Operating Temp.:</b>	-40° to +85° C
<b>Storage Temp.:</b>	-40° to +85° C
<b>Shock:</b>	100 G / 11 ms
<b>Vibration:</b>	10-2000 Hz / 10 G
<b>Bump:</b>	10 G / 16 ms (1000 x 3 axis)
<b>Humidity:</b>	98 % RH without condensation
<b>IP Rating:</b>	IP 64 / Nema 4 (approx.) IP 50 / Nema 5 (approx.) – flat 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>	M9 5-pin M9 8-pin
<b>Flat Cable:</b>	10 lead flat cable with IDC connector

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

## Output waveform



Channel tolerance  $180\text{ e}^\circ \pm 36\text{ e}^\circ$   
 Phase difference tolerance  $90\text{ e}^\circ \pm 18\text{ e}^\circ$   
 Z channel tolerance  $90\text{ e}^\circ \pm 18\text{ e}^\circ$

## Disk Resolutions (pulses per revolution)

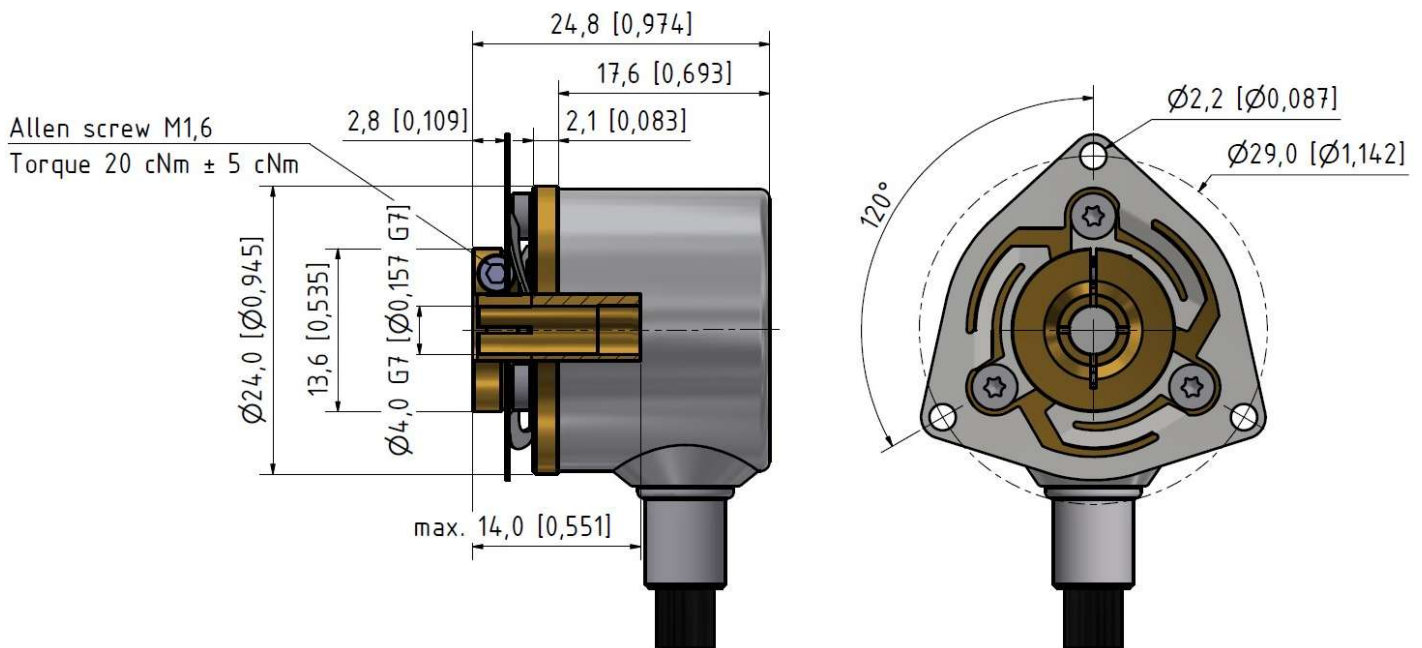
1	36	150	512	3000
4	50	180	600	3600
10	60	200	1000	5000
11	64	250	1024	7500*
12	75	256	1250	
15	90	300	1800	
20	100	360	2000	
25	125	400	2048	
30	128	500	2500	

### Other options on request

Pulses per revolution,  
 min. 1 – max. 7.500

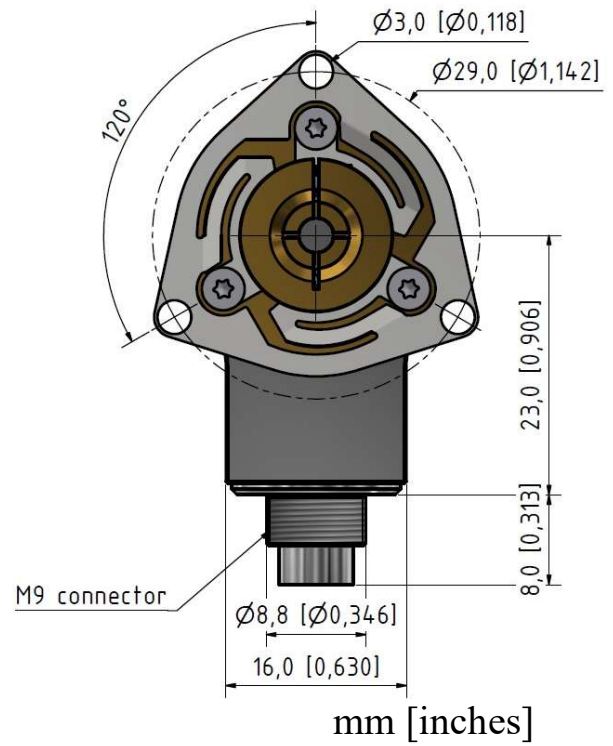
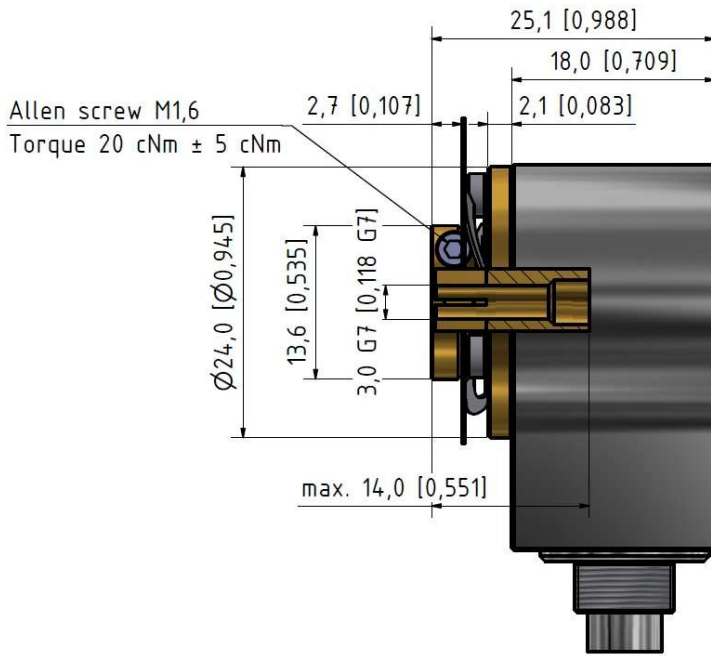
\* Operating temperature:  $-20^\circ\text{C}$  to  $50^\circ\text{C}$

## Mechanica Dimentions

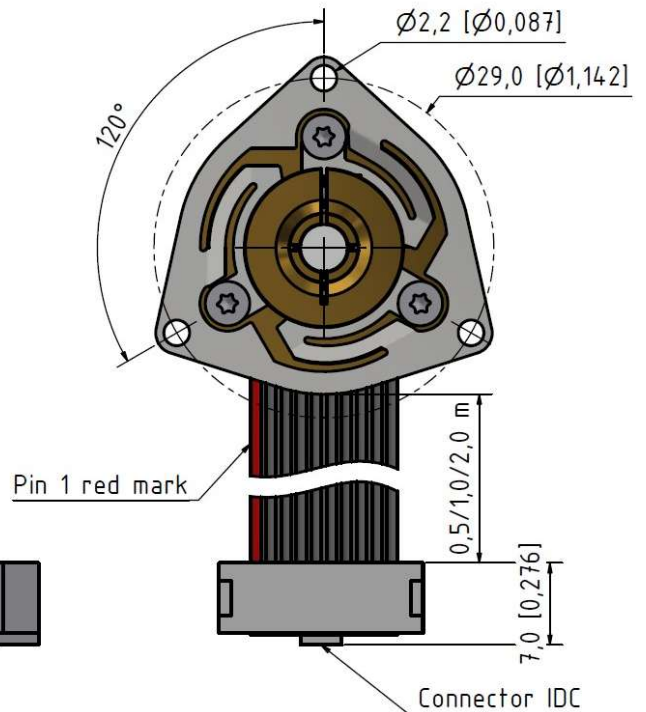
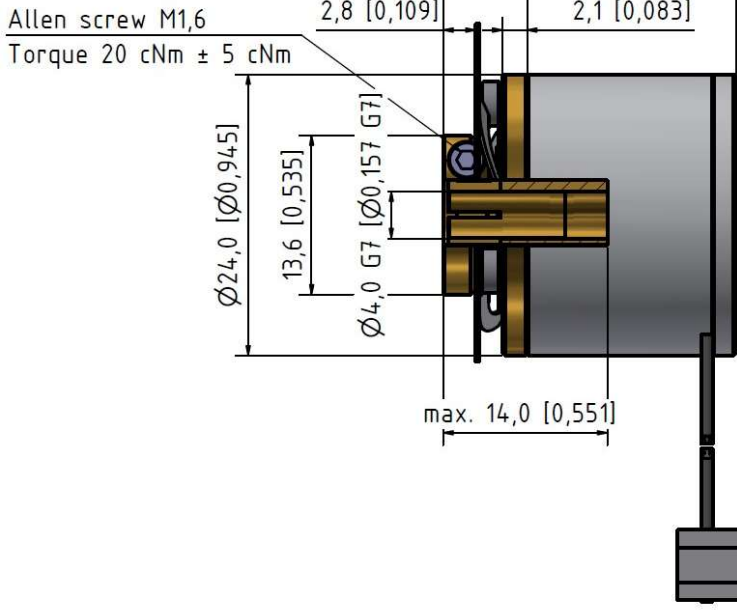


Standard Cable Gland (side or back outlet)

mm [inches]



**M9 Connector**  
25,0 [0,984]



**Flat Ribbon Cable with IDC Connector**

mm [inches]

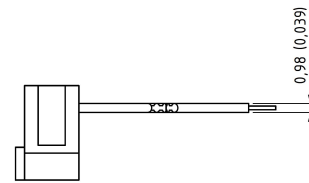
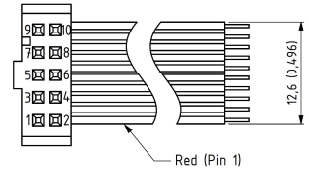
## Output Terminations

Channel	Standard Cable		Flat Cable w/ IDC Connector	
	Standard Output	Differential Output	Differential Output *	
	Wire Color		Position	Channel
A	Green	Pink	1	NC
A -	NC*	Gray	2	Vsup
B	Yellow	Green	3	GND
B -	NC*	Yellow	4	NC
Z	Gray	White	5	A
Z -	NC*	Brown	6	A -
Vsup	Brown	Red	7	B
GND	White	Blue	8	B -
			9	Z -
			10	Z

GND = Circuit Ground

\* Internally connected as GND

\* Hewlett Packard (HP) compatible

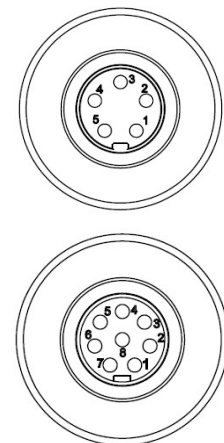


- IP 50 rating
- CE mark not available
- 0,5 m, 1 m, or 2 m cable length only

Cable Tolerances		
	Cable Length	Tolerances
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



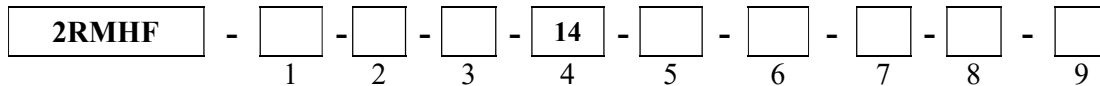
Position	M9 5 - pin	M9 8 - pin
	Standard Output	Differential Output
Channel	Channel	Channel
1	VDD	VDD
2	GND	GND
3	A	A
4	B	A -
5	Z	B
6		B -
7		Z
8		Z -



GND = Circuit Ground

## Ordering Code

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



### 1. Pulses per revolution

See table on page 2

### 2. Output

Standard ..... N  
 Standard (Open collector NPN) ..... **NON**  
 Standard (Open collector PNP) ..... **NOP**  
 Differential ..... **D**  
 26C31 Line Driver (SV IN/OUT) ..... **L**  
 OL 7272 Line Driver ..... **M**  
 Standard (with built-in TSM \*\*) .. **T**  
 \*\*Only without cable

### 3 & 4. Hollow Shaft diameter

2 mm x 14 mm	<b>02</b>	x	<b>14</b>
3 mm x 14 mm	<b>03</b>	x	<b>14</b>
4 mm x 14 mm	<b>04</b>	x	<b>14</b>
5 mm x 14 mm	<b>05</b>	x	<b>14</b>
6 mm x 14 mm	<b>06</b>	x	<b>14</b>
3/16 in x 14 mm	<b>3/16</b>	x	<b>14</b>
1/4 in x 14 mm	<b>1/4</b>	x	<b>14</b>

### 5. IP Rating

IP 50 ..... **50\***  
 IP 64 ..... **64**  
 \*Only flat cable

### 6. Cable Length

Standard cable is 1m ..... **01**  
 Specify length ..... **XX**  
 No cable ..... **00**

### Flat cable w/ IDC

0,5 meters ..... **0,5**  
 1 meters ..... **01**  
 2 meters ..... **02**

### 7. Cable & Connector Takeout

Side radial ..... **S**  
 Back axial ..... **B\***  
 Flat cable radial ..... **SF**  
 \*Only encoders with cable

### 8. Connector

M9 5-pin ..... **M9/5**  
 M9 8-pin ..... **M9/8**  
 No connector ..... **00**

### IDC connector

IDC on flat cable\* ..... **IDC**  
 \*Only IP 50

### 9. Spring coupling

1 hole p/n 70137434 ..... **S1**  
 1 hole p/n 80147180 ..... **S2**  
 2 holes p/n 80149654 ..... **S3**  
 2 holes p/n 80149578 ..... **S4**  
 3 holes p/n 80139791 ..... **S5**  
 3 holes p/n 80131377\* ..... **S6**  
 2 holes p/n 80140700 ..... **S7**  
 3 holes p/n 80141752 ..... **S8**  
 1 hole p/n 80140482 ..... **S9**  
 No spring coupling ..... **00**  
 \*Always used for 7500 pulses