

# Encoders

## Magnetic Encoders

- Features:**  
 1,10,12,15 or 16 Lines per revolution  
 2 Channels  
 Digital output

### HE See beginning of the Encoder Section for Ordering Information

		10 mm technology	15 mm technology	channels
Signal output, square wave		2	2	
Supply voltage	V <sub>CC</sub>	4.5 ... 15.0	4.5 ... 15.0	V DC
Current consumption, typical (V <sub>CC</sub> = 5 V DC)	I <sub>CC</sub>	5	5	mA
Pulse width	P	180 ± 45	180 ± 45	°e
Phase shift, channel A to B	Φ	90 ± 45	90 ± 45	°e
Logic state width	S	90 ± 45	90 ± 45	°e
Cycle	C	360 ± 30	360 ± 30	°e
Signal rise/fall time, typical	tr/tf	5 / 0.2	5 / 0.2	µs
Frequency range <sup>1)</sup>	f	up to 7.2	up to 7.2	kHz
Inertia of code disc	J	1.3 · 10 <sup>-6</sup>	2.832 · 10 <sup>-6</sup>	oz-in-sec <sup>2</sup>
Operating temperature range		-40 to +85 (-40 to +185)	-40 to +85 (-40 to +185)	°C (°F)

<sup>1)</sup> Velocity (rpm) = f (Hz) x 60/N

Encoder type	number of channels	counts per revolution	in combination with DC-Micromotors and DC-Motor-Tacho units
		Ø 10 technology   Ø 15 technology	
HEM 0816	2	1, 10, 12	series 0816
HEM 1016, 1219, 1224	2	1, 10, 12	series 1016, 1219, 1224
HEM 1319, 1331, 1336	2		series 1319, 1331, 1336
HEM 1516, 1524, 1624, 1841	2	1, 10, 12 15, 16	series 1516, 1524, 1624, 1841
HEM 1717, 1724, 1727	2	1, 10, 12 15, 16	series 1717, 1724, 1727
HEM 2230, 2233, 2251	2	1, 10, 12 15, 16	series 2230, 2233, 2251
HEM 2338, 2342	2	1, 10, 12 15, 16	series 2338, 2342
HEM 2842, 3042	2	1, 10, 12 15, 16	series 2842, 3042
HEM 3557	2	1, 10, 12 15, 16	series 3557

**Phase Relationship (with clockwise motor shaft rotation as seen from the shaft end)**  
 HEM1016 thru HEM12.. with 10 or 12 CPR **Channel A leads channel B**  
 HEM1319 thru HEM35.. with 15 CPR **Channel A leads channel B**  
 HEM1319 thru HEM35.. with 1<sup>(1)</sup>,10,12 or 16 CPR **Channel B leads channel A**

<sup>(1)</sup> 1 pulse encoders are 180° phase shift ± 45°

### Features

These incremental shaft encoders in combination with the FAULHABER® DC-Micromotors are designed for indication and control of both shaft velocity and direction of rotation as well as for positioning.

Solid state Hall sensors and a low inertia magnetic disc provide two channels with 90° phase shift.

The supply voltage for the encoder and the DC-Micromotor as well as the two channel output signals are interfaced with a ribbon cable to a 6-pin or 10-pin connector on motors ≤ 22mm in diameter. Motors ≥ 23mm in diameter the motor voltage is supplied separately.

Details for the DC-Micromotors and suitable reduction gearheads are on separate catalog pages.

### Output signals / Circuit diagram / Connector information

**OUTPUT SIGNALS**  
with clockwise rotation as seen from the shaft end

**OUTPUT CIRCUIT**  
\* Motor types 2842, 3042, 3557 have separate motor connectors

**STANDARD CONNECTOR**  
(Panduit 050-010-455)  
.050" Ribbon cable - PVC  
6 conductors - 28 AWG

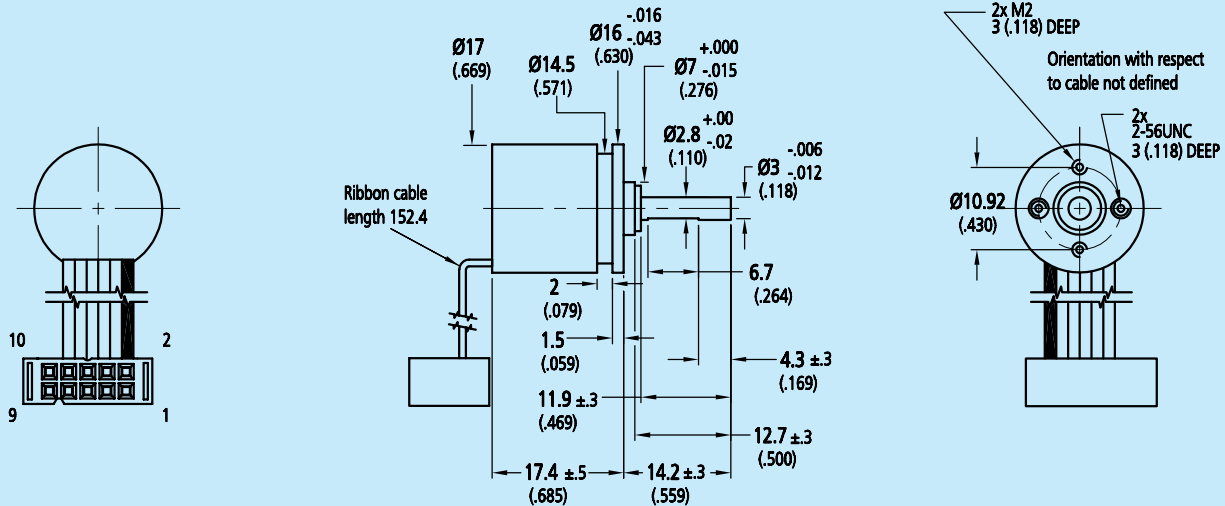
PIN FUNCTION BOTH CONNECTORS	
1	* MOTOR (+)
2	Vcc
3	CHANNEL A
4	CHANNEL B
5	GND
6	* MOTOR (-)
7	N.C.
8	N.C.
9	N.C.
10	N.C.

**OPTIONAL CONNECTOR**  
(Panduit 050-006-455)  
.050" Ribbon cable - PVC  
6 conductors - 28 AWG

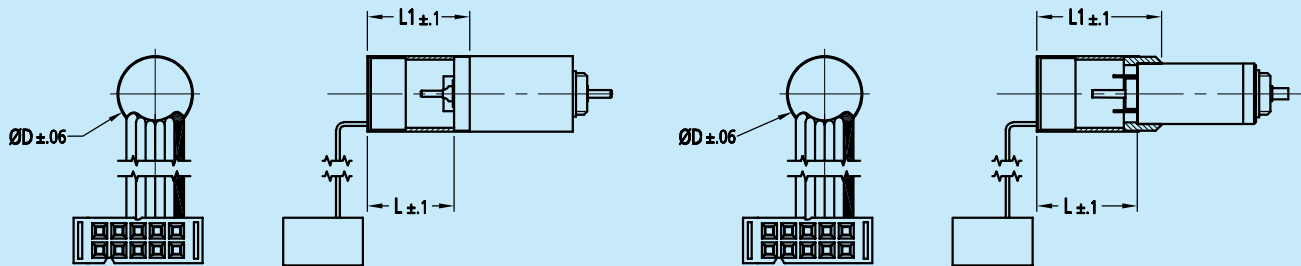
For notes on technical data refer to "Technical Information". Specifications subject to change without notice. MME0701

# HE

## Encoder HEF Free standing



## Encoder HEM 1016 & HEM 12...

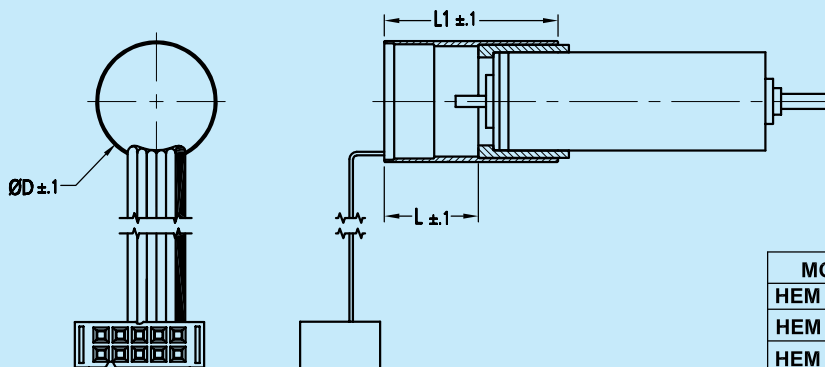


MODEL	ØD	L	L1
HEM 0816	10 (.394)	11.5 (.453)	16.5 (.650)
HEM 1016	10 (.394)	11.5 (.453)	13.5 (.531)
HEM 12..	12 (.472)	11.5 (.453)	11.5 (.453)

HEM 10../12..

HEM 0816

## Encoder HEM 13...



MODEL	ØD	L1	L
HEM 1319	16 (.630)	23.0 (.906)	14.5 (.571)
HEM 1331E	16 (.630)	32.7 (1.287)	14.5 (.571)
HEM 1331T	16 (.630)	24.5 (.965)	14.5 (.571)
HEM 1336	16 (.630)	24.5 (.965)	14.5 (.571)

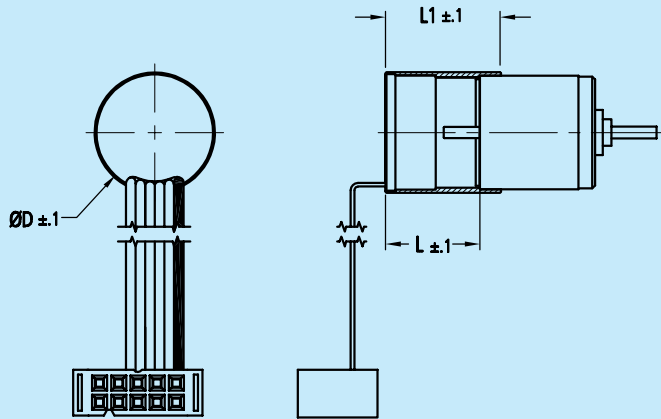
Rear View

HEM 13..

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# HE

## Encoder HEM 15... & HEM 16... & HEM 17...

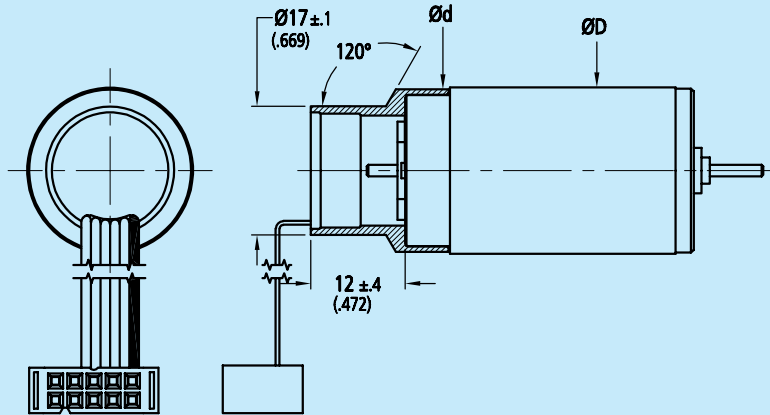


MODEL	$\varnothing D$	L1	L
HEM 1516	16 (.630)	15.3 (.602)	12.5 (.492)
HEM 1616	17 (.669)	15.3 (.602)	12.5 (.492)
HEM 1524	16 (.630)	23.0 (.906)	12.5 (.492)
HEM 1624	17 (.669)	23.0 (.906)	12.5 (.492)
HEM 1717	17 (.669)	18.4 (.724)	12.5 (.492)
HEM 1724	17 (.669)	18.4 (.724)	12.5 (.492)
HEM 1727	17 (.669)	19.1 (.752)	12.5 (.492)

Rear View

HEM 15../16../17..

## Encoder HEM 22... & HEM 2338

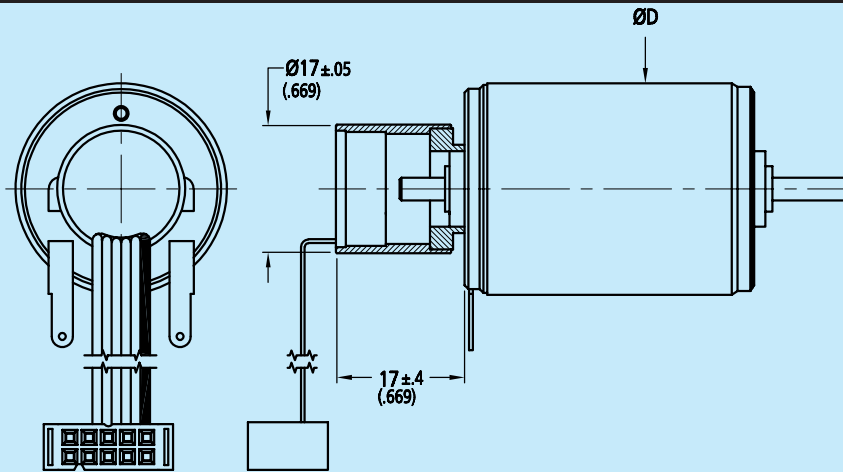


MODEL	$\varnothing d$	$\varnothing D$
HEM 22..	21.5 $\pm$ 1 (.846)	22 (.866)
HEM 2338	22 $\begin{smallmatrix} +.00 \\ -.12 \end{smallmatrix}$ (.866)	23 (.906)

Rear View

HEM 22../2338

## Encoder HEM 2342 & HEM 28... & HEM 30... & HEM 35...



MODEL	$\varnothing D$
HEM 2342	23 (.906)
HEM 28..	28 (1.102)
HEM 30..	30 (1.181)
HEM 35..	35 (1.378)

Rear View

HEM 2342/28../30../35..

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