

# Encoders

## Magnetic Encoders

**Features:**  
 1 to 16 Lines per revolution  
 2 Channels  
 Digital output

### Series HEM

		Encoder Ø 10 ... 12 mm	Encoder Ø 16 ... 17 mm	
Lines per resolution	N	10 ... 12	1 ... 16	
Signal output, square wave		2	2	channels
Supply voltage	V	3,0 ... 15,0	3,0 ... 15,0	V DC
Current consumption, typical ( $V_{cc} = 5$ V DC)	$I_{cc}$	5	5 <sup>1)</sup>	mA
Pulse width	P	180 ± 45	180 ± 45	°e
Phase shift, channel A to B	$\Phi$	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 up to	f	7,2	7,2	khz
Inertia of code disc	J	0,019	0,040	gcm <sup>2</sup>
Operating temperature range		-20 ... +85	-20 ... +85	°C

<sup>1)</sup> current consumption for 1 ppr encoder = 11mA (typical at  $V_{cc} = 5$  V DC) HEM-Q

### Ordering information

Encoder type	number of channels	lines per revolution Ø 10 ... 12 mm	lines per revolution Ø 16 ... 17 mm	in combination with DC-Micromotors
HEM-10	2	10		} series 0816...S series 1016...G, 1024...S series 1219...G, 1224...S
HEM-12	2	12		
HEM-Q <sup>2)</sup>	2		1 <sup>1)</sup>	
HEM-10 <sup>2)</sup>	2		10	} series 1319...S, 1331...S, 1336...C series 1516...S, 1524...S series 1616...S, 1624...S series 1717...S, 1724...S, 1727...C series 2230...S, 2233...S series 3557...C, 3557...CR, 3557...CS
HEM-12 <sup>2)</sup>	2		12	
HEM-15 <sup>2)</sup>	2		15	
HEM-16 <sup>2)</sup>	2		16	

<sup>2)</sup> channel B leads channel A

### 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.

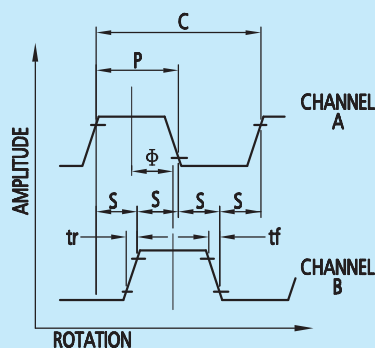
Solid state Hall sensors and a low inertia magnetic disc provide two channels with 90° phase shift.

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 connector on motors ≤ 22mm in diameter for motors ≥ 23mm in diameter the motor voltage is supplied separately.

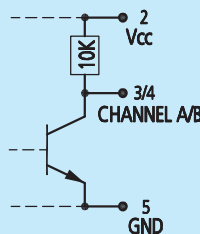
Details for the DC-Micromotors and suitable reduction gearheads are on separate catalog pages.

Please note: Velocity (rpm) = f (Hz) x 60/N

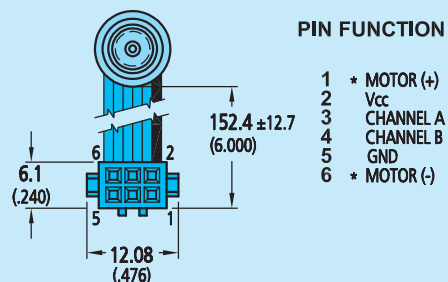
### Output signals / Circuit diagram / Connector information



**OUTPUT SIGNALS**  
 with clockwise rotation as seen from the shaft end  
 exceptions indicated by note 3



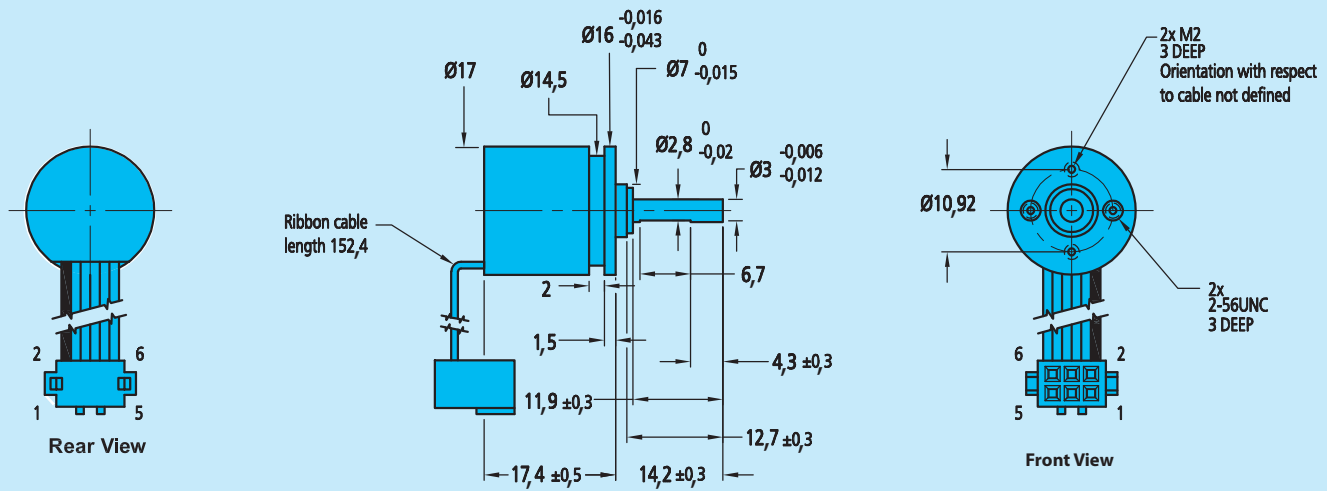
**OUTPUT CIRCUIT**  
 \* Motors 2342 and larger have separate motor connections



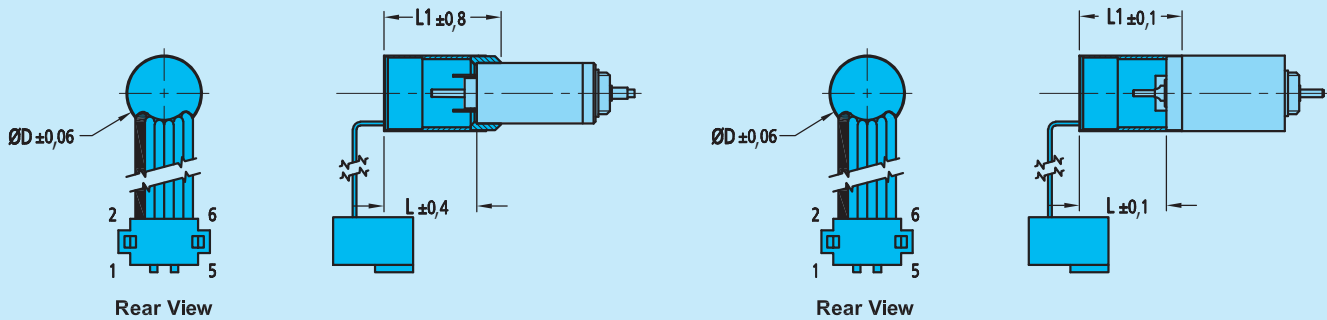
**Shown with optional CONNECTOR (-6P)**  
 (Berg / FCI 71601-106)  
 Polarized  
 .050" Ribbon cable - PVC  
 6 conductors - 28 AWG  
 Mating connector:  
 Header / FCI 75869-131

# HEM

Encoder HEF Free standing



## DC-Micromotor 0816 S, 1016 G, 12mm diameter series with HEM encoder



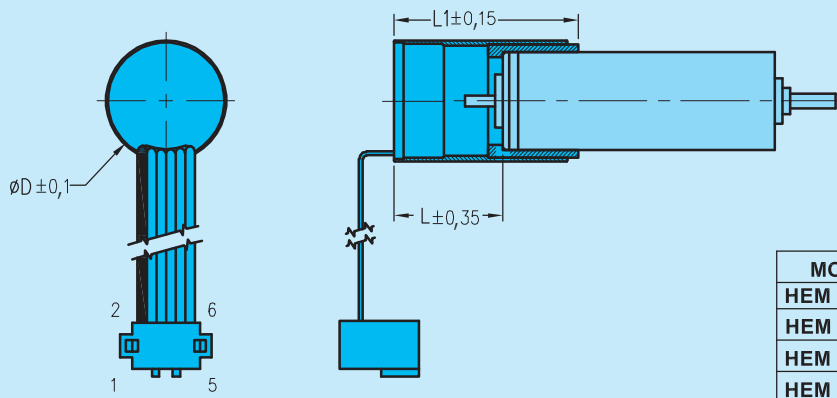
MODEL	ØD	L	L1
HEM 0816	10	12,3	15,5

HEM 0816

MODEL	ØD	L	L1
HEM 1016	10	11,5	13,5
HEM 12..	12	11,5	11,5

HEM 10../12..

## DC-Micromotor 13mm diameter series with HEM encoder



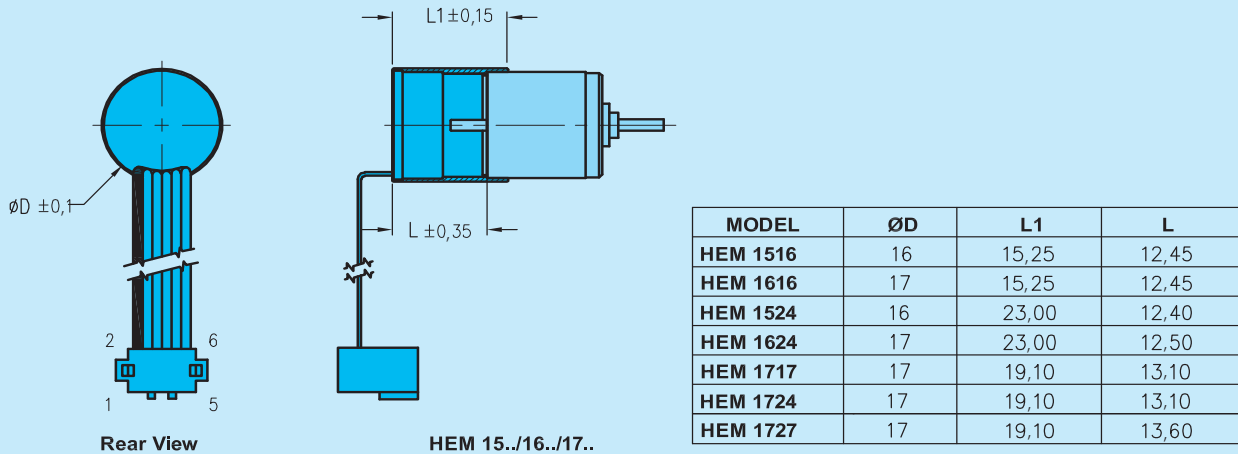
MODEL	ØD	L1	L
HEM 1319	16	20,5	14,4
HEM 1331E	16	32,69	14,5
HEM 1331T	16	23	14,4
HEM 1336	16	23	14,4

Rear View

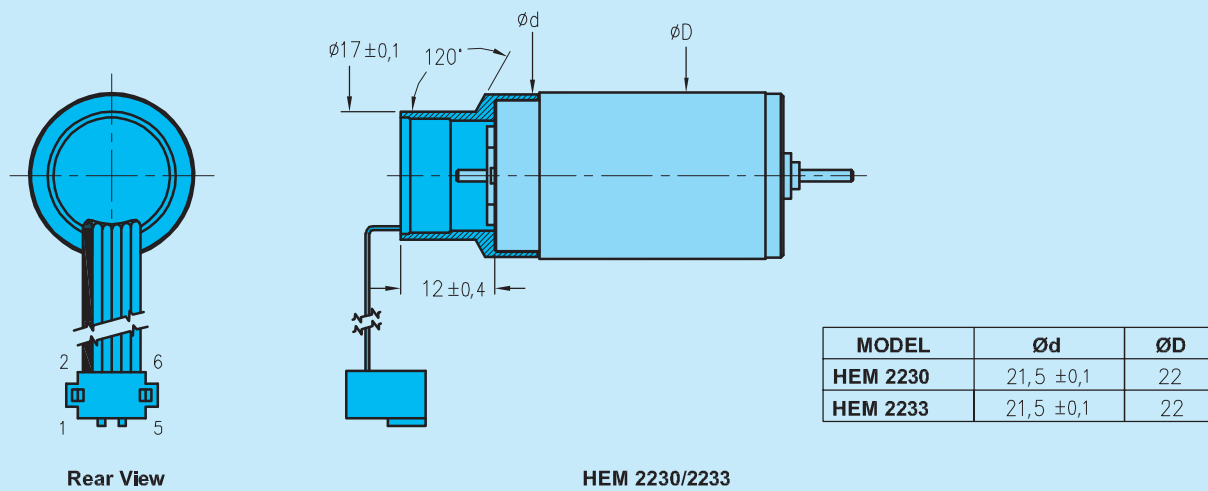
HE 13..

## HEM

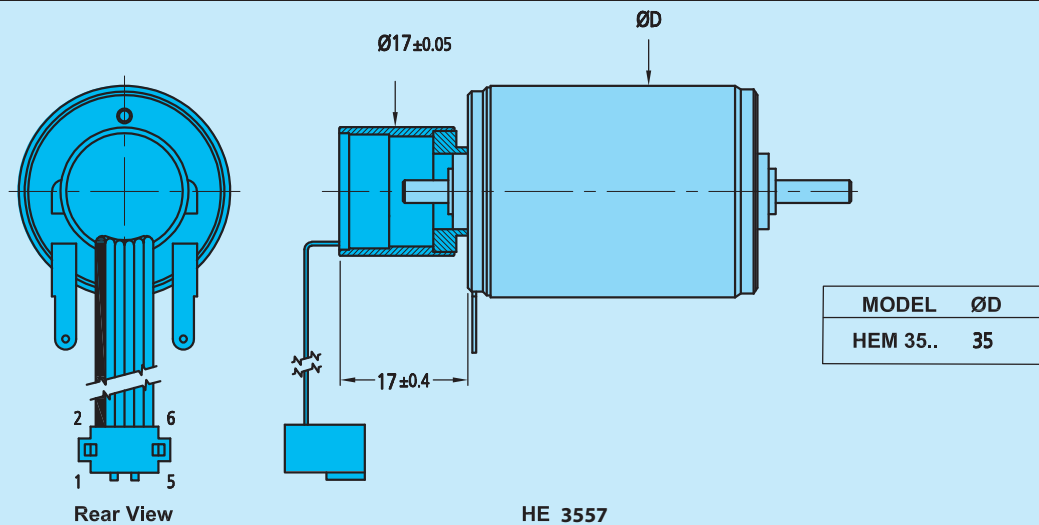
### DC-Micromotor 15, 16, 17mm diameter series with HEM encoder



### DC-Micromotor 22mm diameter series with Emcoder HEM

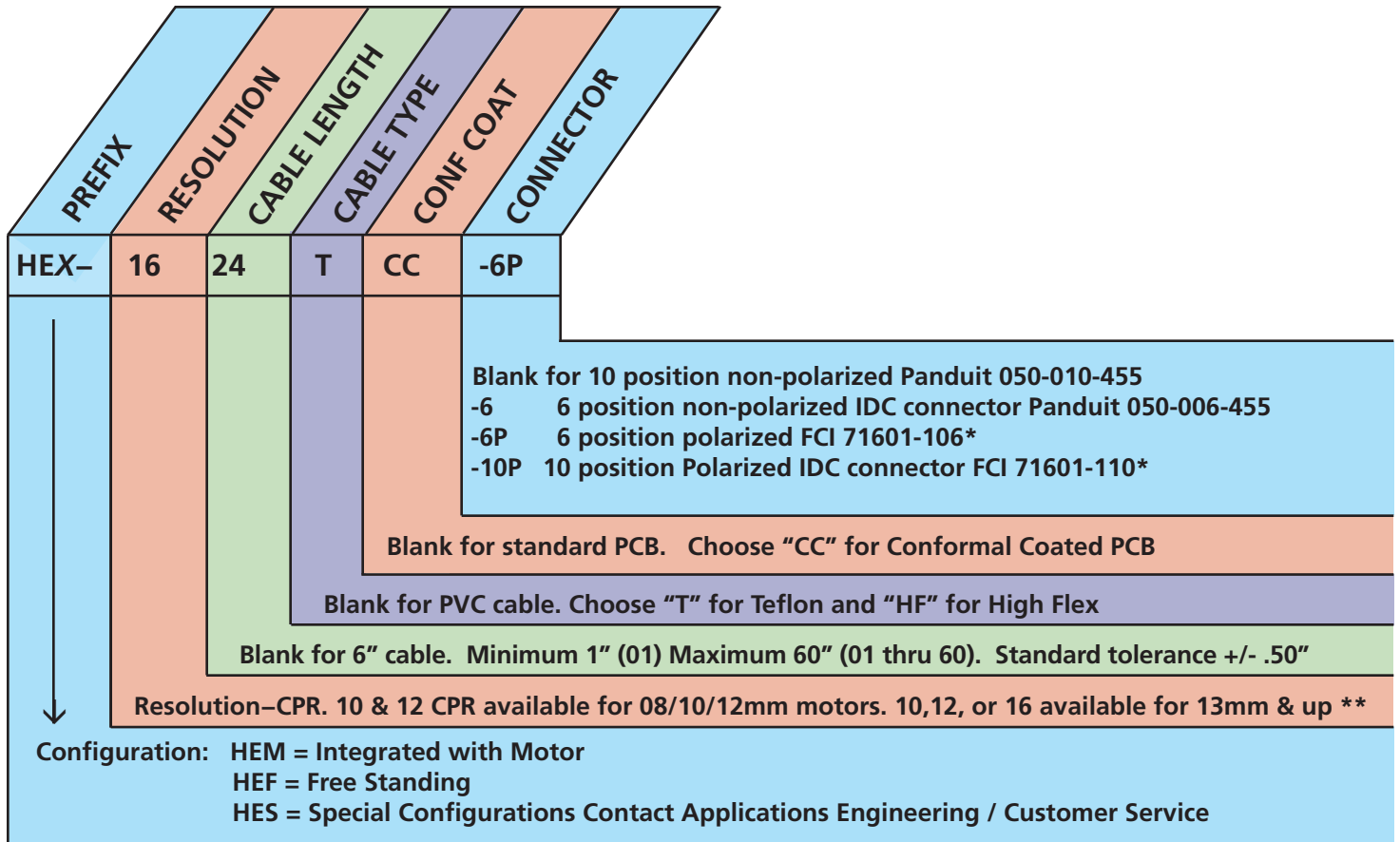


### DC-Micromotor 3557 series with Emcoder HEM



# HEM ORDERING GUIDE

Encoder Magnetic  
Ordering information



\* Mating connectors available for Polarized Receptacles

\*\* A "Q" in this position indicates 1 ppr quadrature technology