FAULHABER

Encoders

Magnetic Encoders

Features:
32 to 1 024 Lines per revolution
3 Channels
Digital output

Series IE3 – 1 024

		IE3 – 32	IE3 – 64	IE3 – 128	IE3 – 256	IE3 – 512	IE3 – 1 024	
Lines per revolution	N	32	64	128	256	512	1 024	
Frequency range [1], up to	f	15	30	60	120	240	430	kHz
Signal output, square wave		2+1 index						channels
Supply voltage	U_{DD}	4,5 … 5,5						V DC
Current consumption, typical [2]	I_{DD}	typ. 16, max. 23						mA
Output current, max. [3]	I_{OUT}	4						mA
Index Pulse width [4]	P_0	90 ± 45				90 ± 75		°e
Phase shift, channel A to B [4]	Φ	90 ± 45				90 ± 75		°e
Signal rise/fall time, max. (C_{LOAD} = 50 pF)	tr/tf	0,1 / 0,1						µs
Inertia of encoder magnet	J	0,08						gcm²
Operating temperature range		– 40 … + 100						°C

[1] speed (rpm) = f (Hz) x 60/N
[2] $U_{DD\,Enc}$ = 5 V: with unloaded outputs
[3] $U_{DD\,Enc}$ = 5 V: low logic level < 0,4 V, high logic level > 4,5 V: CMOS- and TTL compatible
[4] at 5 000 rpm

Ordering information

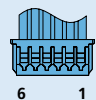| Encoder	number of channels	lines per revolution	in combination with:
IE3 – 32	2+1	32	**DC-Micromotors**
IE3 – 64	2+1	64	**2342 ... CR, 2642 ... CR, 2657 ... CR,**
IE3 – 128	2+1	128	**3242 ... CR, 3257 ... CR,**
IE3 – 256	2+1	256	**2237 ... CXR, 2642 ... CXR, 2657 ... CXR**
IE3 – 512	2+1	512	**3272 ... CR, 3863 ... CR**
IE3 – 1 024	2+1	1 024	
			Brushless DC-Servomotors
			2444 ... B, 3056 ... B, 3564 ... B,
			4490 ... B, 4490 ... BS

Features

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

A permanent magnet on the shaft creates a moving magnetic field which is captured using a single-chip angular sensor and further processed. At the encoder outputs, two 90° phase-shifted rectangular signals are available with up to 1 024 impulses and an index impulse per motor revolution.

The encoder is available in a variety of different resolutions and is suitable for speed control and positioning applications.
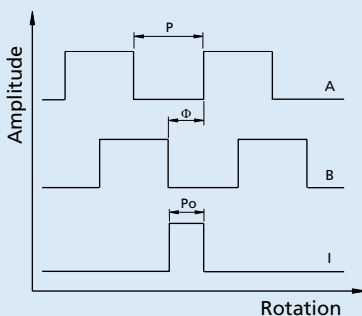The motor and encoder are connected via separate ribbon cables.

Options
- Connector variants (Option no.: 3807) AWG 28 / PVC ribbon cable (6-conductors), with connector PicoBlade (pitch 1,25 mm)
- Resolutions from 1 - 127 lines per revolution are available by request.

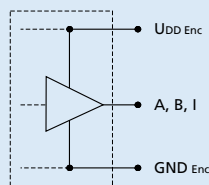### Output signals / Circuit diagram / Connector information

Output signals
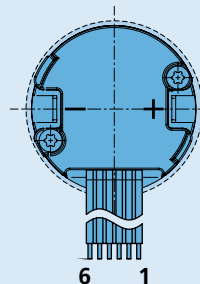with clockwise rotation as seen from the shaft end

Admissible deviation of phase shift:

$$\Delta\Phi = \left| 90° - \frac{\Phi}{P} * 180° \right| \leq 75° \qquad \Delta P_0 = \left| 90° - \frac{P_0}{P} * 180° \right| \leq 75°$$
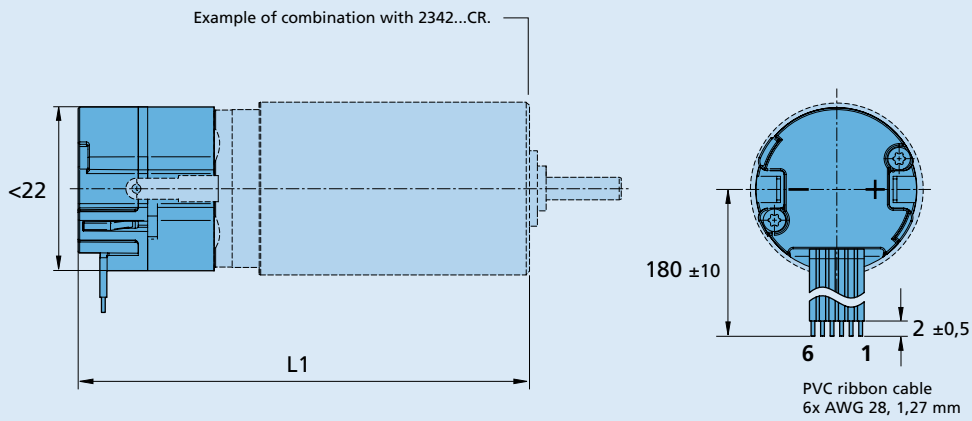
Output circuit

Connection Encoder

No.	Function
1	n.c.
2	Channel I (Index)
3	GND_{Enc}
4	$U_{DD\,Enc}$
5	Channel B
6	Channel A

Caution:
Incorrect lead connection will damage the motor electronics!
When using the encoder at low temperature it is important to keep the cable unmoved.

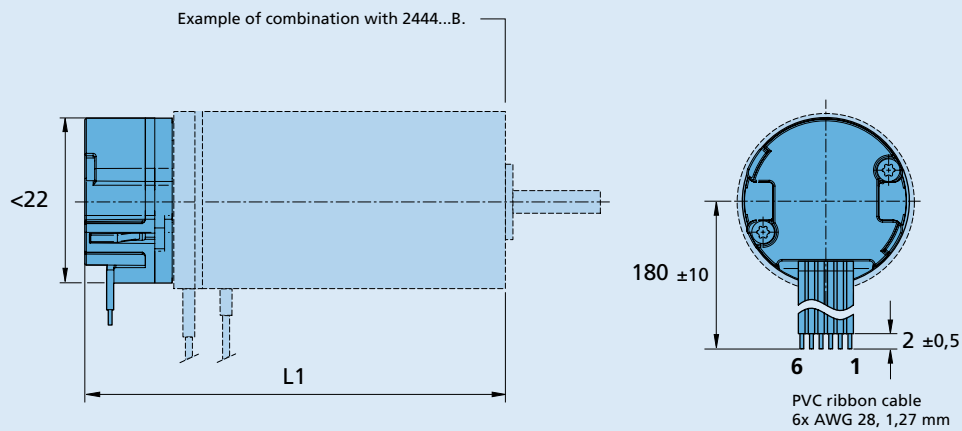**DC-Micromotors 23xx ... CR up to 32xx ... CR and 22xx up to 26xx ... CXR with encoder IE3 – 32 ... 1 024**

M 1:1

Example of combination with 2342...CR.

<22

L1

180 ±10

2 ±0,5

6   1

PVC ribbon cable
6x AWG 28, 1,27 mm

Motor type	< L1
2237	52,5
2342	60,5
2642	60,5
2657	75,5
3242	60,5
3257	75,5

Brushless DC-Servomotors 2444 ... B -K1838, 3056 ... B -K1838, 3564 ... B -K1838 and 4490 ... B/BS -K1838 with encoder IE3 – 32 ... 1 024

M 1:1

Example of combination with 2444...B.

<22

L1

180 ±10

2 ±0,5

6   1

PVC ribbon cable
6x AWG 28, 1,27 mm

Motor type	< L1
2444	55,2
3056	67,2
3564	75,2
4490	100,2

For notes on technical data and lifetime performance
refer to "Technical Information".
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