Encoders

magnetic Encoder, digital outputs, 3 channels,
16 - 4096 lines per revolution, Line Driver

For combination with
Brushless DC-Motors

Series IEF3-4096 L

IEF3	-16 L	-32 L	-64 L	-128 L	-256 L	-512 L	-1024 L	-2048 L	-4096 L	
Lines per revolution	N	16	32	64	128	256	512	1 024	2 048	4 096	
Frequency range, up to[1]	f	5	10	20	40	80	160	320	640	875	kHz
Signal output, square wave		2+1 Index and complementary outputs									Channels
Supply voltage	U_{DD}	4,5 ... 5,5									V
Current consumption, typical[2]	I_{DD}	typ. 25, max. 40									mA
Index Pulse width[3]	P_0	90 ± 45						90 ± 65	90 ± 75		°e
Phase shift, channel A to B	Φ	90 ± 45						90 ± 65	90 ± 75		°e
Inertia of sensor magnet	J	1,57									gcm²
Operating temperature range		-40 ... +100									°C
Accuracy, typ.		0,5									°m
Repeatability, typ.		0,08									°m
Hysteresis		0,02									°m
Edge spacing, min.		225									ns
Mass, typ.		16,8									g

[1] Velocity (min⁻¹) = f (Hz) x 60/N
[2] U_{DD} = 5 V: with unloaded outputs
[3] At 5 000 min⁻¹

Note: The output signals are TIA-422 compatible.
Examples of Line Driver Receivers: ST26C32AB (STM), AM26C32 (TI).

For combination with Motor

Dimensional drawing A	**<L1 [mm]**
2214 ... BXT H	21,3

Dimensional drawing B	**<L1 [mm]**
3216 ... BXT H	23,3

Dimensional drawing C	**<L1 [mm]**
4221 ... BXT H	28,3

Characteristics

These incremental encoders with 3 output channels, in combination with the FAULHABER Brushless DC-Motors, are used for the indication and control of both shaft velocity and direction of rotation as well as for positioning.

The encoder is integrated in the Brushless DC-Motors BXT H-Series and extends the overall length by only 6,2 mm.

A segmented magnetic disc provides a magnetic field which is detected and further processed by an angle sensor.

At the encoder outputs, two 90° phase-shifted square wave signals are available with up to 4096 impulses and an index impulse per motor revolution.

The Line Driver version has differential signal outputs (TIA-422). Differential signals reduce ambient interference and are suitable for applications with high ambient interference.

The Line Driver amplifies the encoder signal which means that long cables can be used without signal degradation.
Differential signal outputs must be decoded by the appropriate receiver module. In addition, a suitable line termination resistance (100 ohm) is possibly useful.

The supply voltage for the encoder and the output signals are interfaced through a ribbon cable, optional with connector.

Details for the Brushless DC-Motors and suitable reduction gearheads are on separate catalogue pages.

To view our large range of accessory parts, please refer to the "Accessories" chapter.

Circuit diagram / Output signals

Output circuit

- A
- Ā
- B
- B̄
- I
- Ī
- U$_{DD}$
- GND
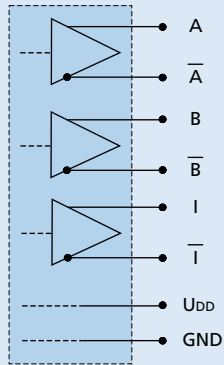
Output signals
with clockwise rotation as seen from the shaft end

Amplitude

- A
- Ā
- B
- B̄
- I
- Ī

Angle
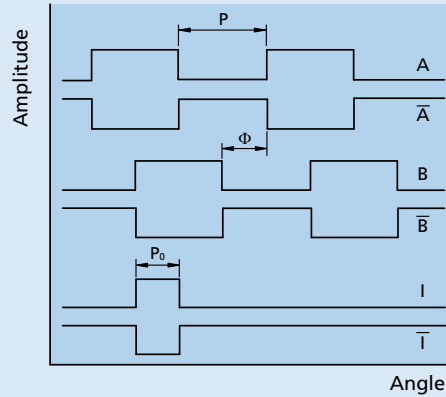
Connector information / Variants

Example product designation: **2214S012BXTH IEF3-4096L**

Option	Type	Description
3806	Connector	for combination with Brushless DC-Flat Motors series BXT H. Connector variants AWG 28 / PVC ribbon cable with connector EN 60603-13 / DIN-41651.
3589	Connector	for combination with Brushless DC-Flat Motors series BXT H. Connector variants AWG 28 / PVC ribbon cable with connector EN 60603-13 / DIN-41651. Inclusive motor connector 3830

Connection Encoder

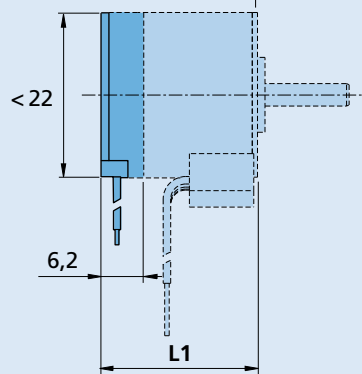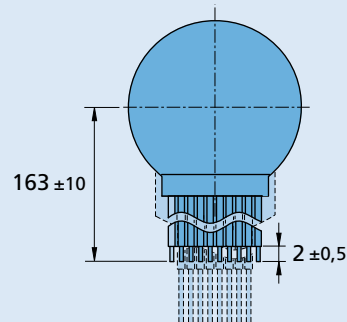| No.	Function
1	N.C.
2	U$_{DD}$
3	GND
4	N.C.
5	Channel Ā
6	Channel A
7	Channel B̄
8	Channel B
9	Channel Ī
10	Channel I
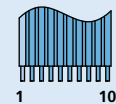
Standard cable
PVC-ribbon cable, 10-AWG 28, 1,27 mm

Caution:
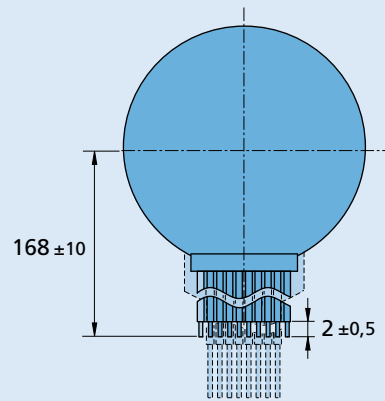Incorrect lead connection will damage the motor electronics!

Dimensional drawing A

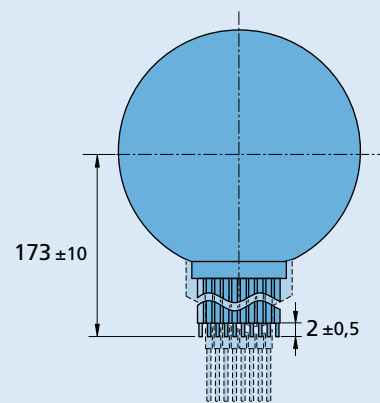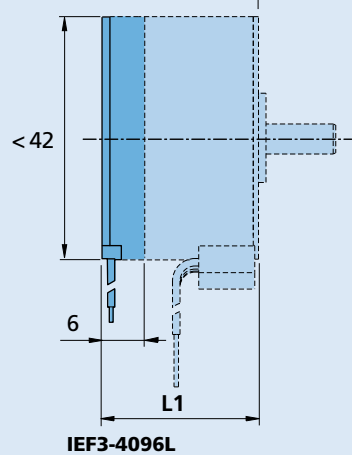Example of combination with 2214...BXTH

< 22

6,2

L1

IEF3-4096L

163 ±10

2 ±0,5

Dimensional drawing B

Example of combination with 3216...BXTH

< 32

6,2

L1

IEF3-4096L

168 ±10

2 ±0,5
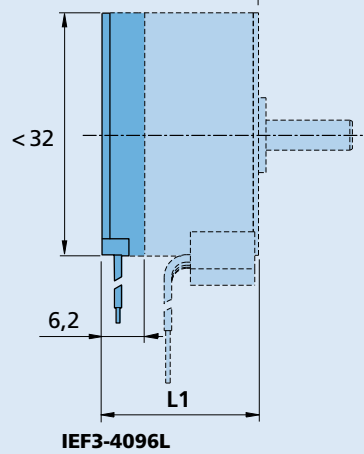
Dimensional drawing C

Example of combination with 4221...BXTH

Scale reduced

< 42

6

L1

IEF3-4096L

173 ±10

2 ±0,5

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