

**NEW**

# Encoders

optical Encoder, digital outputs, 3 channels, 512 - 16384 lines per revolution, Line Driver

For combination with Brushless DC-Motors

## Series IERF3-16384 L

	IERF3	-512 L	-1024 L	-2048 L	-4096 L	-8192 L	-16384 L	
Lines per revolution	$N$	512	1 024	2 048	4 096	8 192	16 384	
Frequency range, up to <sup>1)</sup>	$f$	125	250	500	1 000	2 000	2 000	kHz
Signal output, square wave		2+1 Index and complementary outputs						Channels
Supply voltage	$U_{DD}$	4,5 ... 5,5						V
Current consumption, typical <sup>2)</sup>	$I_{DD}$	typ. 45, max. 70						mA
Index Pulse width <sup>3)</sup>	$P_0$	90 ± 20				90 ± 30		°e
Phase shift, channel A to B	$\Phi$	90 ± 20				90 ± 30		°e
Inertia of sensor magnet	$J$	1,33						gcm <sup>2</sup>
Operating temperature range		-40 ... +100						°C
Accuracy, typ.		0,1						°m
Repeatability, typ.		0,007						°m
Hysteresis		< 0,001						°m
Edge spacing, min.		62,5						ns
Mass, typ.		16,8						g

<sup>1)</sup> Velocity (min<sup>-1</sup>) =  $f$  (Hz) x 60/ $N$

<sup>2)</sup>  $U_{DD}$  = 5 V: with unloaded outputs

<sup>3)</sup> At 2 500 min<sup>-1</sup>

**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.

With a reflective code disc two square wave signals with 90° phase shift with up to 16348 lines per revolution and one index impulse per motor revolution are generated.

The optical measurement principle allows high accuracy and repeatability for positioning applications.

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 (120 ohm) is possibly useful.

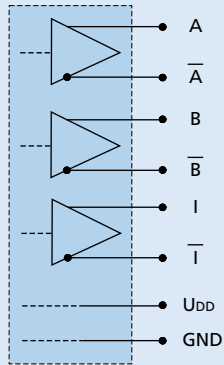
The supply voltage for the encoder and the output signals are interfaced through a ribbon cable, optional with connector.

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

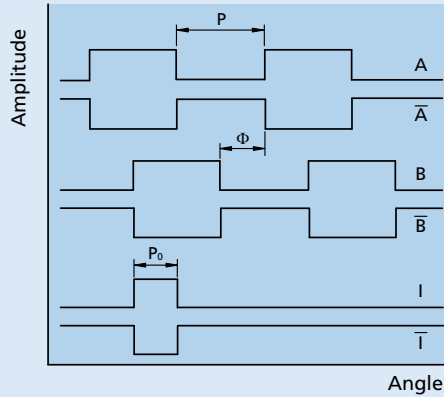
To view our large range of accessory parts, please refer to the "Accessories" chapter.

**Circuit diagram / Output signals**

**Output circuit**



**Output signals**  
with clockwise rotation as seen  
from the shaft end



**Connector information / Variants**

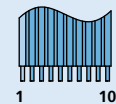
Example product designation: 2214S012BXTH IERF3-4096L

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
	Resolution	Higher resolutions with limited speed range are available on request.

**Connection Encoder**

**No. Function**

- 1 N.C.
- 2 U<sub>DD</sub>
- 3 GND
- 4 N.C.
- 5 Channel  $\bar{A}$
- 6 Channel A
- 7 Channel  $\bar{B}$
- 8 Channel B
- 9 Channel  $\bar{I}$
- 10 Channel I



**Standard cable**

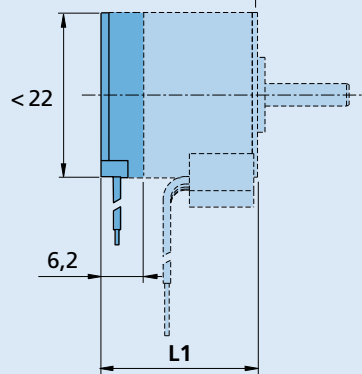
PVC-ribbon cable, 10-AWG 28, 1,27 mm

**Caution:**

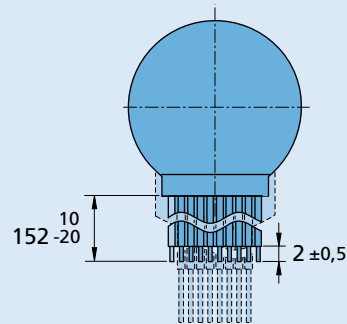
Incorrect lead connection will damage the motor electronics!

**Dimensional drawing A**

Example of combination with 2214...BXTH

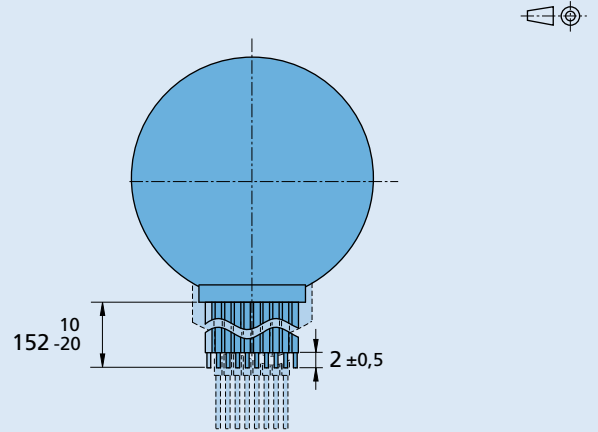
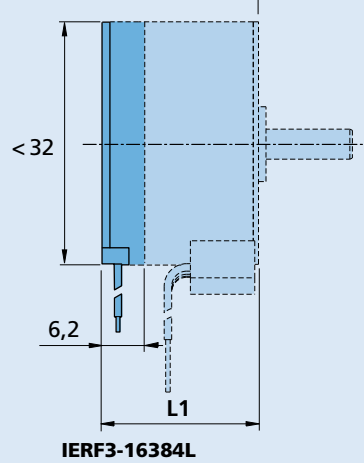


IERF3-16384L



**Dimensional drawing B**

Example of combination with 3216...BXTH



**Dimensional drawing C**

Example of combination with 4221...BXTH

