Encoders

optical Encoder, digital outputs, 3 channels,
1000 - 10000 lines per revolution, Line Driver

For combination with
DC-Micromotors
Brushless DC-Motors

Series IER3-10000 L

	IER3	-1000	-2000	-4000	-1024	-2048	-4096	-1700	-3400	-6800	-2500	-5000	-10000	L
Lines per revolution	*N*	1000	2000	4000	1024	2048	4096	1700	3400	6800	2500	5000	10000	
Frequency range, up to [1]	*f*	250	500	1000	250	500	1000	250	500	1000	250	500	1000	kHz
Signal output, square wave		2+1 Index and complementary outputs												Channels
Supply voltage	U_{DD}	4,5 … 5,5												V
Current consumption [2]	I_{DD}	typ. 27, max. 50												mA
Index Pulse width	P_0	90 ± 15												°e
Phase shift, channel A to B	Φ	90 ± 20												°e
Inertia of code disc, typ.	*J*	0,14												gcm^2
Operating temperature range [3]		– 20 ... + 85												°C
Accuracy, typ.		0,3			0,3			0,2			0,1			°m
Repeatability, typ.		0,05												°m
Hysteresis		< 0,05												°m
Edge spacing, min.		125												ns
Mass, typ.		13,5												g

[1] Velocity (min^{-1}) = *f* (Hz) x 60/*N*
[2] U_{DD} = 5 V: with unloaded outputs
[3] Operating temperature range - 40 ...+ 85 °C available on request

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

Product combination	IER3	-1000 -2000 -4000	-1024 -2048 -4096	-1700 -3400 -6800	-2500 -5000 -10000	L
Series		**Motor, <L1** [mm]	**Motor, <L1** [mm]	**Motor, <L1** [mm]	**Motor, <L1** [mm]	**Drawing**
2214 ... BXT H		26,8	26,8	–	–	A
3216 ... BXT H		28,7	28,7	–	–	A
4221 ... BXT H		34,0	34,0	–	–	A
2264 ... BP4		79,1	79,1	–	–	B
3274 ... BP4		90,8	90,8	–	–	B
2237 ... CXR		52,5	52,5	–	–	B
2642 ... CXR		60,5	60,5	–	–	C
2657 ... CXR		75,5	75,5	–	–	C
2342 ... CR		60,5	60,5	–	–	C
2642 ... CR		60,5	60,5	–	–	C
2657 ... CR		75,5	75,5	–	–	C
2668 ... CR		86,5	86,5	–	–	C
3242 ... CR		60,5	60,5	–	–	C
3257 ... CR		75,5	75,5	–	–	C
3272 ... CR		90,5	90,5	–	–	C
3863 ... CR - 2016		82,6	82,6	–	–	D
3890 ... CR - 2016		108,6	108,6	–	–	D
2232 ... BX4		50,2	50,2	50,2	–	E
2250 ... BX4S		68,2	68,2	68,2	–	E
2250 ... BX4		68,2	68,2	68,2	–	E
3242 ... BX4		60,0	60,0	60,0	60,0	F
3268 ... BX4		86,0	86,0	86,0	86,0	F

Note: Please note that the available pulse numbers depend on the attachment system and therefore not all motors are available with all pulse numbers. The available pulse numbers for each motor are listed under the Combinatorics section.

Characteristics

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

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

The optical measurement principle allows high accuracy and repeatability for positioning applications. The high resolution encoder provides up to 4096 lines per revolution. In combination with the brushless DC-Servomotors BX4 with diameter 22 mm up to 6800 lines per revolution are available.
In combination with the brushless DC-Servomotors BX4 with diameter 32 mm up to 10000 lines per revolution are available.

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

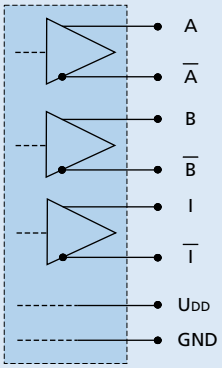
The Line Driver amplifies the encoder signal which means that long cables can be used without signal degradation.
Differential signal outputs must be decoded by the appropriate receiver module. In addition, a suitable line termination resistance (100 ohm) is possibly useful.

The encoder is connected via a ribbon cable. The pins are compatible to the FAULHABER Encoder IE3 L.

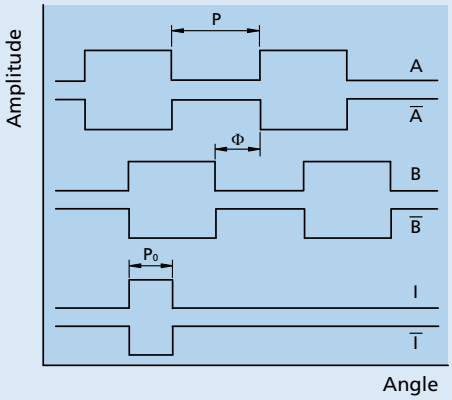
To view our large range of accessory parts, please refer to the "Accessories" chapter.

Circuit diagram / Output signals

Output circuit

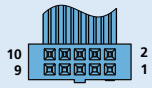
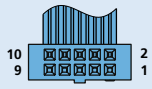


Output signals
with clockwise rotation as seen from the shaft end



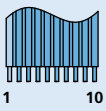
Connector information / Variants

Example product designation: **2232S024BX4 IER3-6800L 3589**

Option	Type	Description
3806	Connector 	for combination with DC-Motors series CR, CXR and with Brushless DC-Motor series BP4 and BXT H. Connector variants AWG 28 / PVC ribbon cable with connector EN 60603-13 / DIN-41651.
3589	Connector 	for combination with Brushless DC-Motors series BX4. Connector variants AWG 28 / PVC ribbon cable with connector EN 60603-13 / DIN-41651.  Inclusive motor connector 3830

Connection Encoder

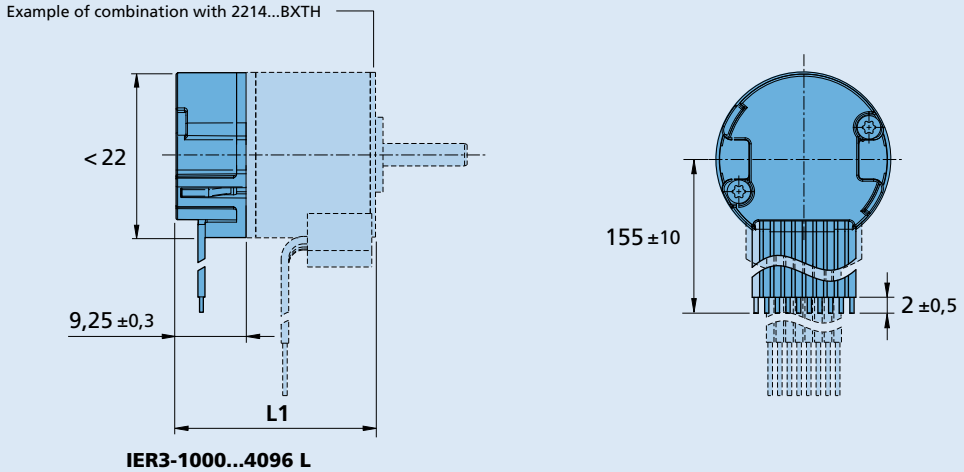
No.	Function
1	N.C.
2	UDD
3	GND
4	N.C.
5	Channel $\overline{A}$
6	Channel A
7	Channel $\overline{B}$
8	Channel B
9	Channel $\overline{I}$
10	Channel I



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

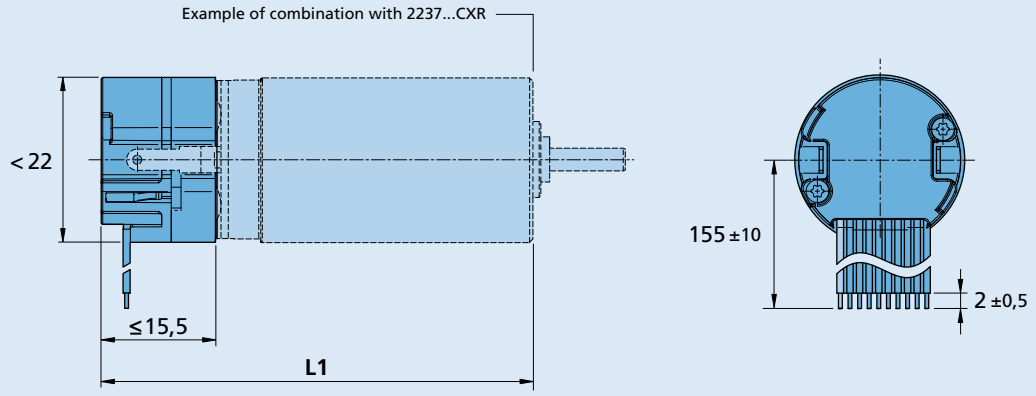
Caution:
Incorrect lead connection will damage the motor electronics!

Dimensional drawing A



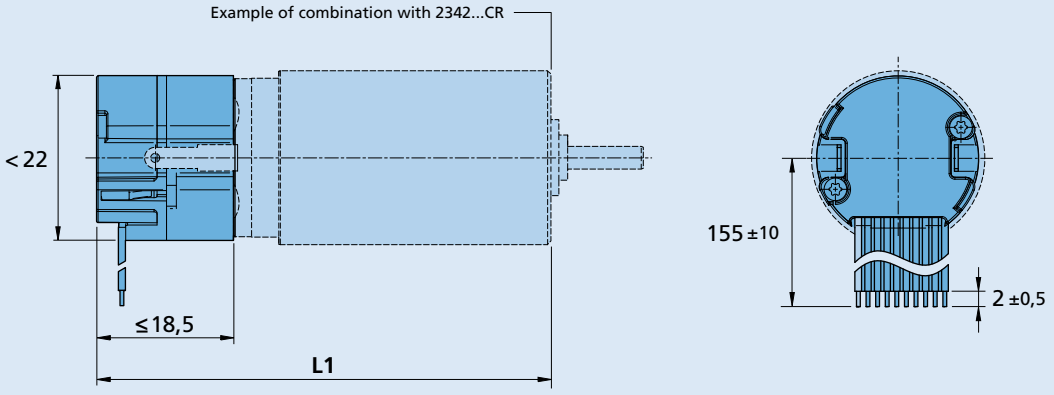
IER3-1000...4096 L

Dimensional drawing B



IER3-1000...4096 L

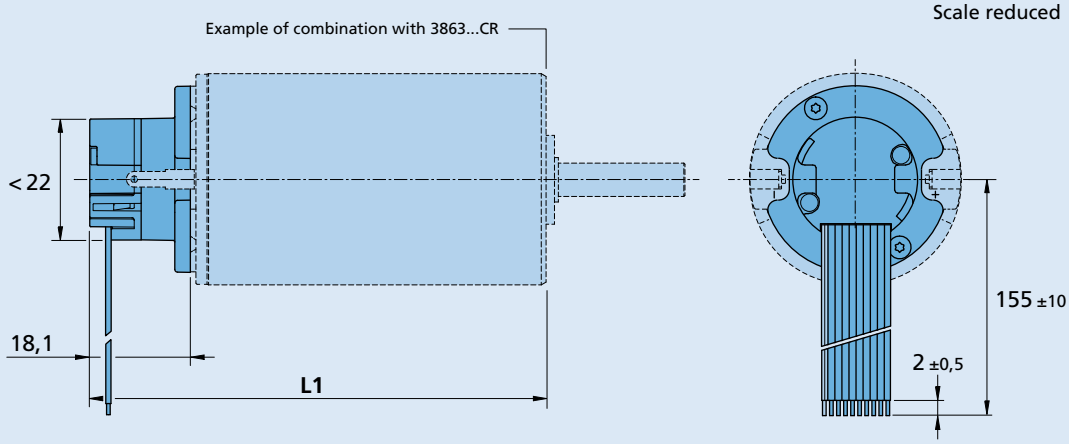
Dimensional drawing C



IER3-1000...4096 L

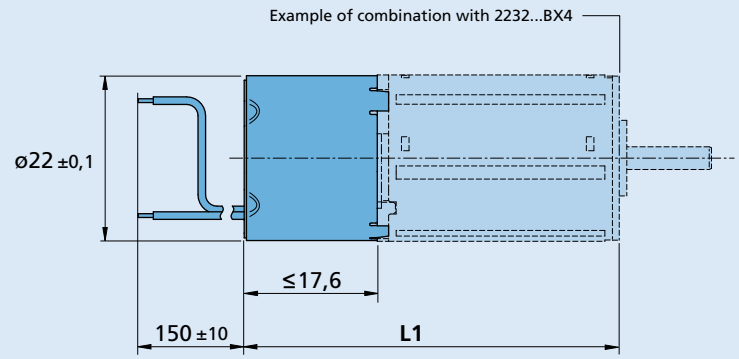
Dimensional drawing D

Scale reduced



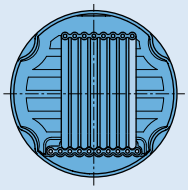
IER3-1000...4096 L

Dimensional drawing E



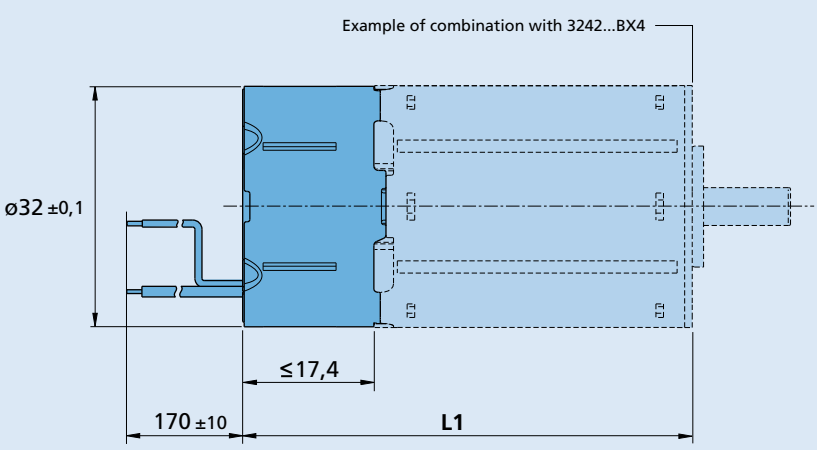
IER3-1000...6800 L

Connection Motor



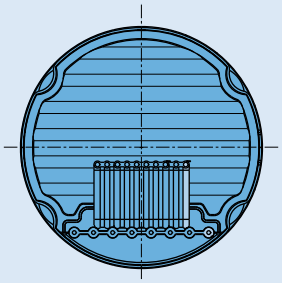
Connection Encoder

Dimensional drawing F



IER3-1000...10000 L

Connection Encoder



Connection Motor