

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	<i>N</i>	1000	2000	4000	1024	2048	4096	1700	3400	6800	2500	5000	10000	
Frequency range, up to ¹⁾	<i>f</i>	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	<i>U_{DD}</i>	4,5 ... 5,5												V
Current consumption ²⁾	<i>I_{DD}</i>	typ. 27, max. 50												mA
Index Pulse width	<i>P₀</i>	90 ± 15												°e
Phase shift, channel A to B	<i>Φ</i>	90 ± 20												°e
Inertia of code disc	<i>J</i>	typ. 0,14												gcm ²
Operating temperature range		- 20 ... + 85												°C
Accuracy		typ. 0,3			typ. 0,3			typ. 0,2			typ. 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}* = 5V: with unloaded outputs

Note: The output signals are TIA-422 compatible. Examples of Line Driver Receivers: ST26C32ABD (STM), ST26C32IP16 (EXAR), DS26C32AT (NSC).

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]		Motor, <L1 [mm]		Motor, <L1 [mm]		Drawing
2237 ... CXR		52,5		52,5		-		-		-		-		A
3274 ... BP4		90,5		90,5		-		-		-		-		A
2342 ... CR		60,5		60,5		-		-		-		-		B
2642 ... CXR		60,5		60,5		-		-		-		-		B
2642 ... CR		60,5		60,5		-		-		-		-		B
2657 ... CXR		75,5		75,5		-		-		-		-		B
2657 ... CR		75,5		75,5		-		-		-		-		B
2668 ... CR		86,5		86,5		-		-		-		-		B
3242 ... CR		60,5		60,5		-		-		-		-		B
3257 ... CR		75,5		75,5		-		-		-		-		B
3272 ... CR		90,5		90,5		-		-		-		-		B
3863 ... CR - 2016		82,6		82,6		-		-		-		-		C
3890 ... CR - 2016		108,6		108,6		-		-		-		-		C
2232 ... BX4S		50,2		50,2		50,2		-		-		-		D
2232 ... BX4		50,2		50,2		50,2		-		-		-		D
2250 ... BX4S		68,2		68,2		68,2		-		-		-		D
2250 ... BX4		68,2		68,2		68,2		-		-		-		D
3242 ... BX4		60,0		60,0		60,0		60,0		60,0		60,0		E
3268 ... BX4		86,0		86,0		86,0		86,0		86,0		86,0		E

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 quadrature signal 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.

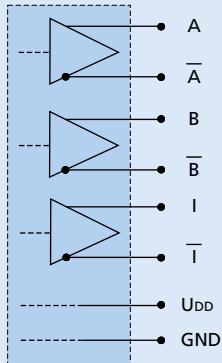
The Line Driver version has differential signal outputs (TIA-422). Differential signals reduce ambient interference and are suitable for applications with high ambient interference.

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 eventually useful.

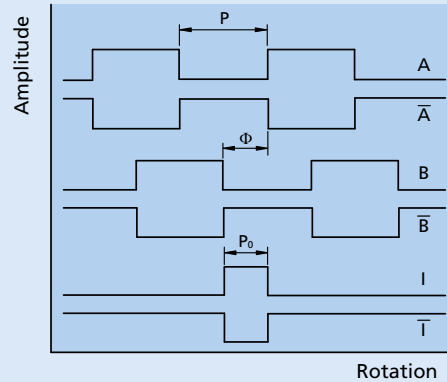
The encoder is connected via a ribbon cable. The pins are compatible to the FAULHABER Encoder IE3 L.

Circuit diagram / Output signals

Output circuit



Output signals with clockwise rotation as seen from the shaft end



Admissible deviation of phase shift:

$$\Delta\Phi = \left| 90^\circ - \frac{\Phi}{P} * 180^\circ \right| \leq 20^\circ$$

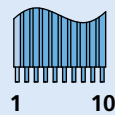
Admissible deviation of Index pulse:

$$\Delta P_0 = \left| 90^\circ - \frac{P_0}{P} * 180^\circ \right| \leq 15^\circ$$

Connector information / Variants

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

Connection Encoder



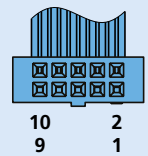
Cable
PVC-ribbon cable
10-AWG 28, 1,27 mm

Option

Connector variants AWG 28 / PVC ribbon cable with connector Pancon DIN-41651, 050-010-435A, recommended mating connector Berg 71918-010.

Option no.: 3806 for combination with DC-Motors series CR, CXR and with Brushless DC-Motor series 3274...BP4.

Option no.: 3589 for combination with Brushless DC-Motors series BX4.
Note: inclusive motor connector 3830.

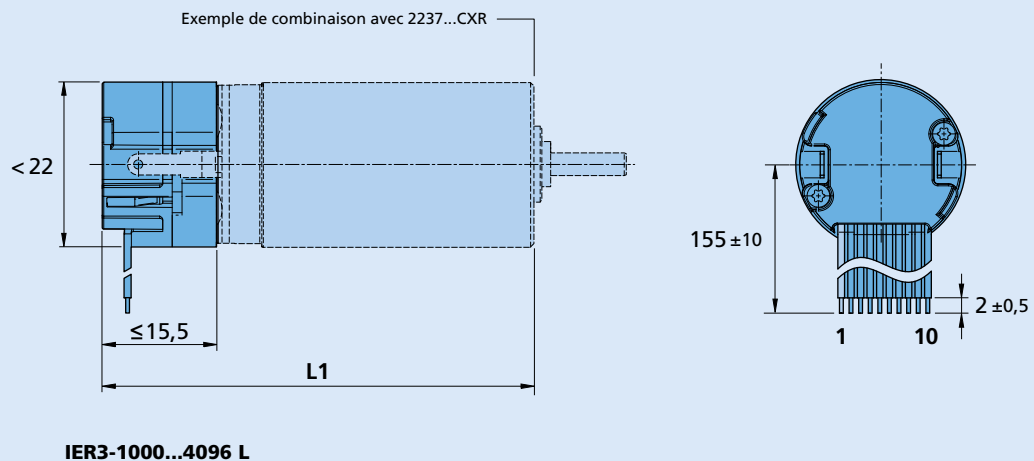


Caution:
Incorrect lead connection will damage the motor electronics!

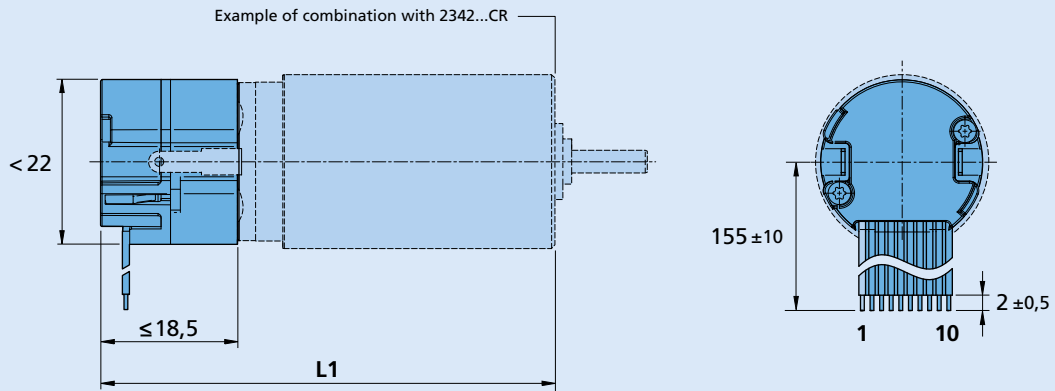
Full product description

- Example:
2237S012CXR IER3-1024L
2232S024BX4 IER3-6800L 3589

Dimensional drawing A

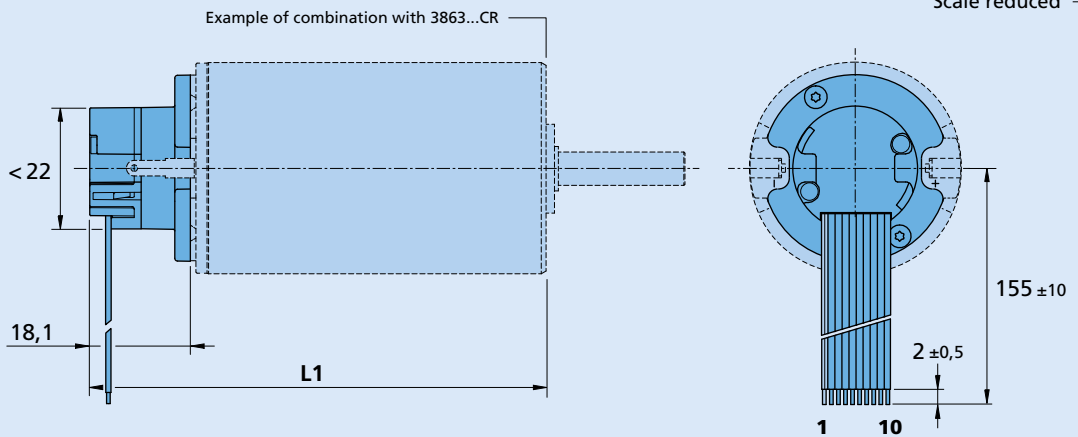


Dimensional drawing B



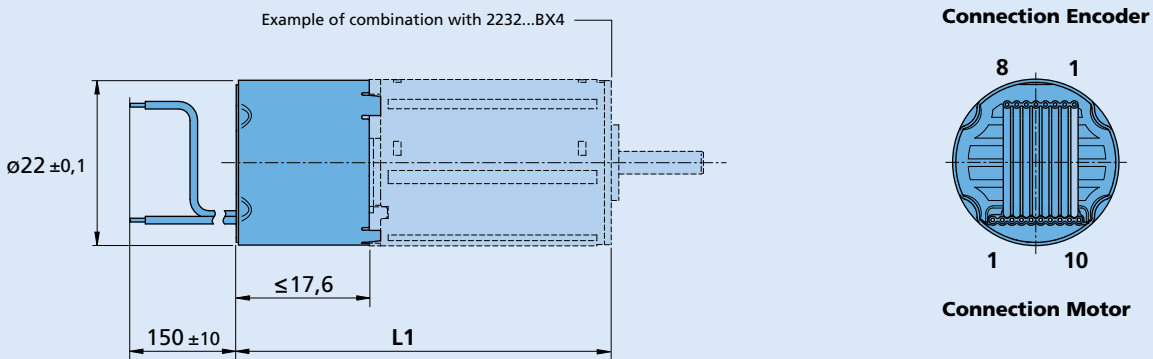
IER3-1000...4096 L

Dimensional drawing C



IER3-1000...4096 L

Dimensional drawing D



IER3-1000...6800 L

Dimensional drawing E

