Encoders

magnetic Encoder, digital outputs, 3 channels,
1 - 1024 lines per revolution, Line Driver

For combination with
Brushless DC-Motors
DC-Micromotors

Series IE3-1024 L

		IE3-32 L	IE3-64 L	IE3-128 L	IE3-256 L	IE3-512 L	IE3-1024 L	
Lines per revolution	N	32	64	128	256	512	1 024	
Frequency range, up to[1]	f	15	30	60	120	240	430	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. 20, max. 30						mA
Index Pulse width[3]	P_0	90 ± 45						°e
Phase shift, channel A to B[3]	Φ	90 ± 45						°e
Inertia of sensor magnet	J	0,08						gcm²
Operating temperature range		-40 ... +100						°C
Accuracy, typ.		0,5						°m
Repeatability, typ.		0,1						°m
Hysteresis		0,17						°m
Edge spacing, min.		421						ns
Mass, typ.		13,5						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]	Dimensional drawing D	<L1 [mm]
2214 ... BXT H	26,8	2444 ... B - K1838	55,3
3216 ... BXT H	28,7	3056 ... B - K1838	67,3
4221 ... BXT H	34,0	3564 ... B - K1838	75,3
		4490 ... B - K1838	100,3
Dimensional drawing B	**<L1 [mm]**	4490 ... BS - K1838	100,3
2237 ... CXR	52,5		
2264 ... BP4	79,1	**Dimensional drawing E**	**<L1 [mm]**
3274 ... BP4	90,8	2232 ... BX4	50,2
		2250 ... BX4	68,2
Dimensional drawing C	**<L1 [mm]**	2250 ... BX4 S	68,2
2342 ... CR	60,5		
2642 ... CXR	60,5	**Dimensional drawing F**	**<L1 [mm]**
2642 ... CR	60,5	3242 ... BX4	60,0
2657 ... CXR	75,5	3268 ... BX4	86,0
2657 ... CR	75,5		
2668 ... CR	86,5	**Dimensional drawing G**	**<L1 [mm]**
3242 ... CR	60,5	3863 ... CR - 2016	82,6
3257 ... CR	75,5	3890 ... CR - 2016	108,6
3272 ... CR	90,5		

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.

A permanent magnet on the shaft creates a moving magnetic field which is captured using an angular sensor and further processed. At the encoder outputs, two 90° phase-shifted square wave signals are available with up to 1 024 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 encoder is available in a variety of different resolutions.
The encoder is connected with a ribbon cable.

To view our large range of accessory parts, please refer to the "Accessories" chapter.
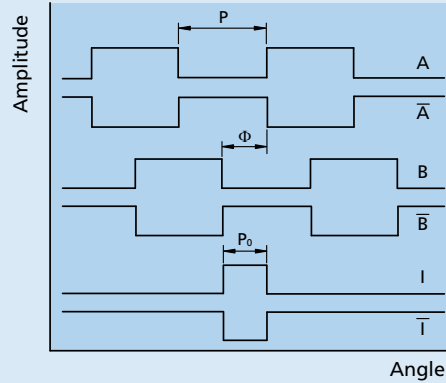
Circuit diagram / Output signals
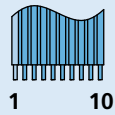
Output circuit
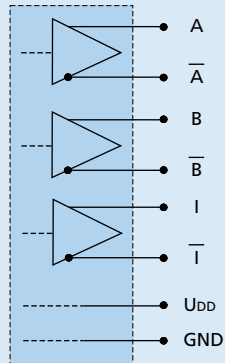
Output signals
with clockwise rotation as seen from the shaft end

Connector information / Variants

No.	Function
1	N.C.
2	U_{DD}
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

Connection Encoder

1   10

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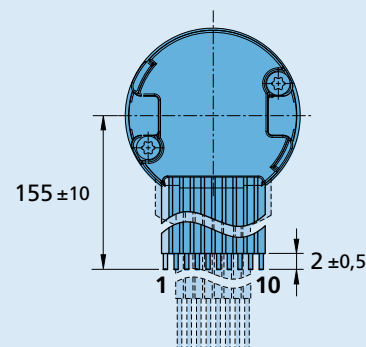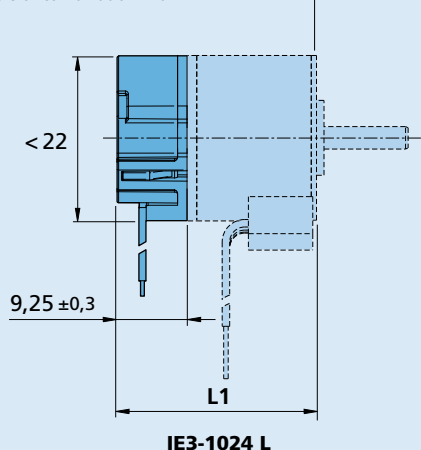10-AWG 28, 1,27 mm

Caution:
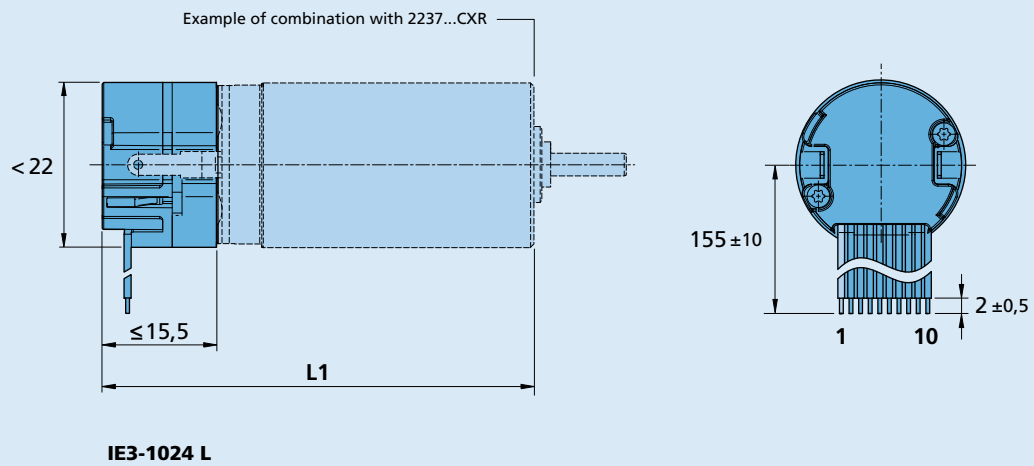Incorrect lead connection will damage the motor electronics!

In combination with the BX4 brushless DC-servomotors with digital Hall sensors, the sensor supply connections of encoder and motor are connected to each other.
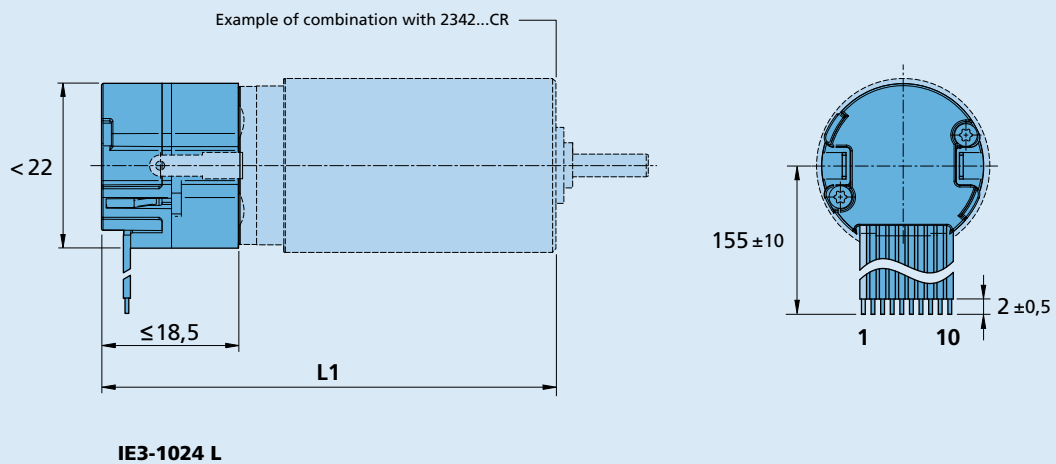
Option
■ Connector variants AWG 28 / PVC ribbon cable with connector EN 60603-13 / DIN-41651.

   Option no.: 3806 for combination with DC-Motors series CR, CXR and with Brushless DC-Motor series B(S), BP4 and BXT H.
   Option no.: 3589 for combination with Brushless DC-Motors series BX4.
   Note: inclusive motor connector 3830.

■ Resolutions from 1 - 1024 lines per revolution are available by request.

Full product description
■ Example:
   2444S024B-K1838 IE3-1024L
   2232S024BX4 IE3-256L

10   2
9   1

Dimensional drawing A

Example of combination with 2214...BXTH

< 22

9,25 ±0,3

L1

IE3-1024 L

155 ±10

2 ±0,5

1   10

Dimensional drawing B

Example of combination with 2237...CXR

< 22

≤ 15,5

L1

155 ±10

2 ±0,5

1   10

IE3-1024 L

Dimensional drawing C

Example of combination with 2342...CR

< 22

≤ 18,5

L1

155 ±10

2 ±0,5

1   10

IE3-1024 L

Dimensional drawing D

Example of combination with 2444...B

< 22

≤ 11,2

L1

155 ±10

2 ±0,5

1   10

IE3-1024 L

FAULHABER

Dimensional drawing E

Example of combination with 2232...BX4

ø22 ±0,1

≤17,6

150 ±10

L1
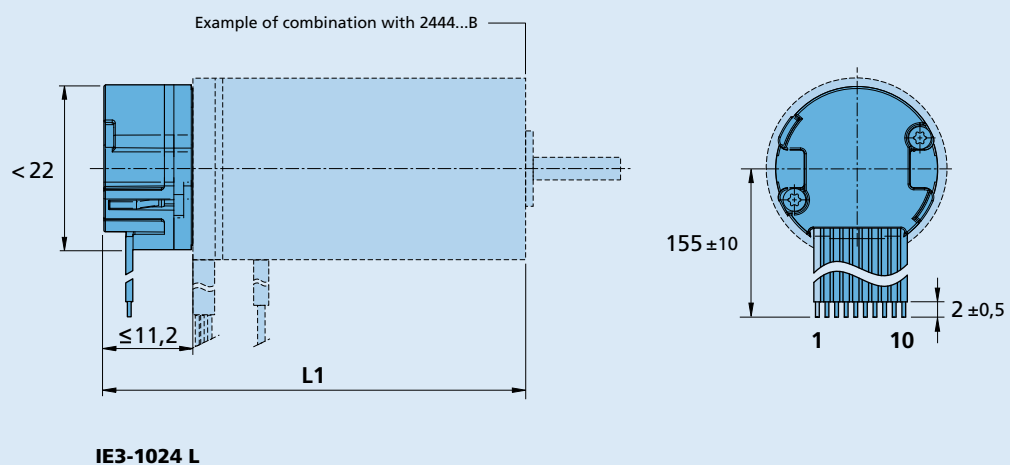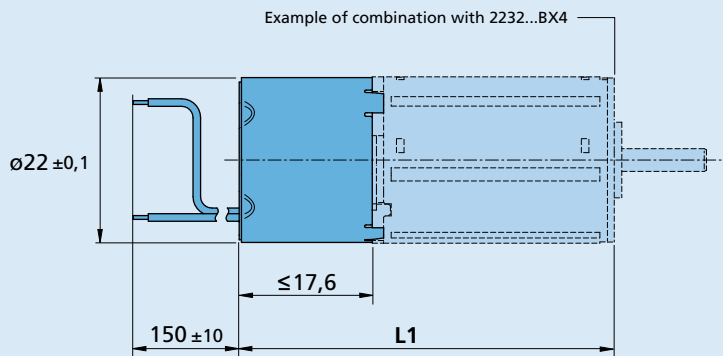
IE3-1024 L

Connection Motor

8   1

1   10
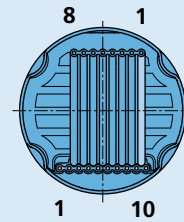
Connection Encoder

Dimensional drawing F

Example of combination with 3242...BX4

ø32 ±0,1

≤17,4

170 ±10

L1
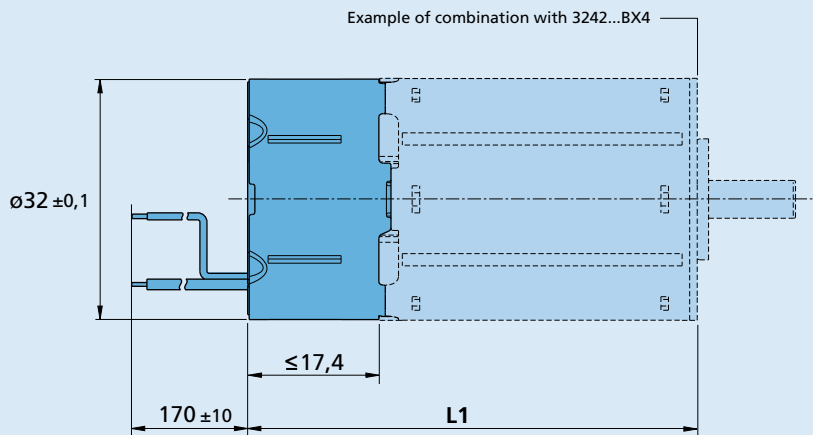
IE3-1024 L

Connection Encoder

10   1

8   1
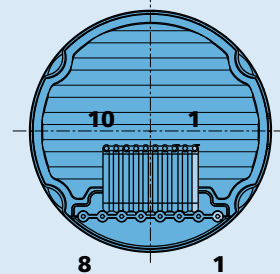
Connection Motor

Dimensional drawing G

Example of combination with 3863...CR

Scale reduced

< 22

18,1

L1

155 ±10

2 ±0,5

1   10

IE3-1024 L