

## Encoders

magnetic Encoder, digital outputs,  
3 channels, 32 - 1024 lines per revolution

For combination with  
DC-Micromotors  
Brushless DC-Motors

### Series IE3-1024

		IE3-32	IE3-64	IE3-128	IE3-256	IE3-512	IE3-1024	
Lines per revolution	$N$	32	64	128	256	512	1 024	
Frequency range, up to <sup>1)</sup>	$f$	15	30	60	120	240	430	kHz
Signal output, square wave		2+1 Index						Channels
Supply voltage	$U_{DD}$	4,5 ... 5,5						V
Current consumption, typical <sup>2)</sup>	$I_{DD}$	typ. 16, max. 23						mA
Output current, max. <sup>3)</sup>	$I_{OUT}$	4						mA
Index Pulse width <sup>4)</sup>	$P_0$	90 ± 45				90 ± 75		°e
Phase shift, channel A to B <sup>4)</sup>	$\Phi$	90 ± 45				90 ± 75		°e
Signal rise/fall time, max. ( $C_{LOAD} = 50$ pF)	$tr/tf$	0,1 / 0,1						µs
Inertia of code disc	$J$	0,08						gcm <sup>2</sup>
Operating temperature range		-40 ... +100						°C

<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>  $U_{DD} = 5$  V: low logic level < 0,4 V, high logic level > 4,5 V: CMOS- and TTL compatible

<sup>4)</sup> At 5 000 min<sup>-1</sup>

#### For combination with Motor

Dimensional drawing A	<L1 [mm]	3257 ... CR	75,5	2232 ... BX4 S	50,2
2237 ... CXR	52,5	3272 ... CR	90,5	2250 ... BX4	68,2
3274 ... BP4	90,8			2250 ... BX4 S	68,2
Dimensional drawing B	<L1 [mm]	Dimensional drawing C	<L1 [mm]	Dimensional drawing E	<L1 [mm]
2342 ... CR	60,5	2444 ... B - K1838	55,3	3242 ... BX4	60,0
2642 ... CXR	60,5	3056 ... B - K1838	67,3	3268 ... BX4	86,0
2642 ... CR	60,5	3564 ... B - K1838	75,3		
2657 ... CXR	75,5	4490 ... B - K1838	100,3		
2657 ... CR	75,5	4490 ... BS - K1838	100,3	Dimensional drawing F	<L1 [mm]
2668 ... CXR	86,5			3863 ... CR - 2016	82,6
2668 ... CR	86,5	Dimensional drawing D	<L1 [mm]	3890 ... CR - 2016	108,6
3242 ... CR	60,5	2232 ... BX4	50,2		

#### Characteristics

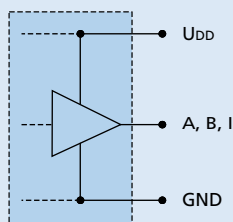
These incremental encoders have 3 output channels, in combination with the Faulhaber Motors are used for the indication and control of both shaft velocity and direction of rotation as well as for positioning.

The encoder is available in a variety of different resolutions. Motor and encoder are connected via a common flexboard.

A permanent magnet on the shaft creates a moving magnetic field which is captured using a single-chip angular sensor and further processed. At the encoder outputs, two 90° phase-shifted rectangular signals are available with up to 1024 impulses and an index impulse per motor revolution.

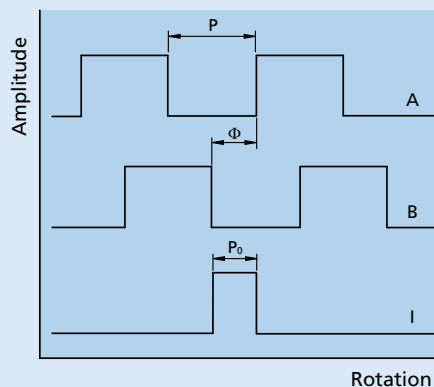
#### Circuit diagram / Output signals

##### Output circuit



##### Output signals

with clockwise rotation as seen from the shaft end



Admissible deviation of phase shift:

$$\Delta\Phi = \left| 90^\circ - \frac{\Phi}{P} * 180^\circ \right| \leq 75^\circ$$

Admissible deviation of Index pulse:

$$\Delta P_0 = \left| 90^\circ - \frac{P_0}{P} * 180^\circ \right| \leq 75^\circ$$

### Connector information / Variants

No.	Function
1	N.C.
2	Channel I
3	GND
4	U <sub>DD</sub>
5	Channel B
6	Channel A

#### Connection Encoder



**Cable**  
PVC-ribbon cable  
6-AWG 28, 1,27 mm

#### Option

Connector variants AWG 28 / PVC ribbon cable with connector MOLEX Picoblade 51021-0600, recommended mating connector 53047-0610.

Option no.: 3807 for combination with DC-Motors series CR, CXR and with Brushless DC-Motor series BP4.

Option no.: 3592 for combination with Brushless DC-Motors series BX4.  
Note: inclusive motor connector 3830.

Resolutions from 1 - 127 lines per revolution are available by request.

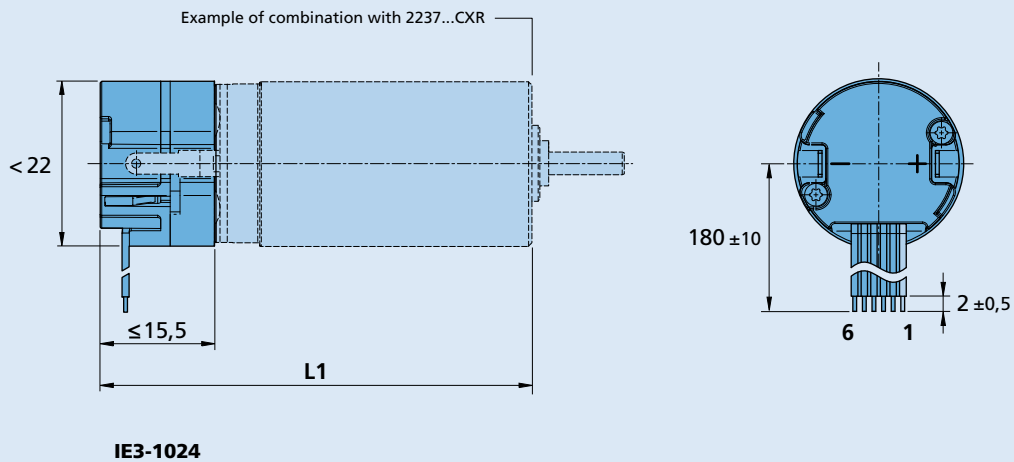
#### Full product description

Example:  
2444S024B K1838 IE3-1024  
2232S024BX4 IE3-256

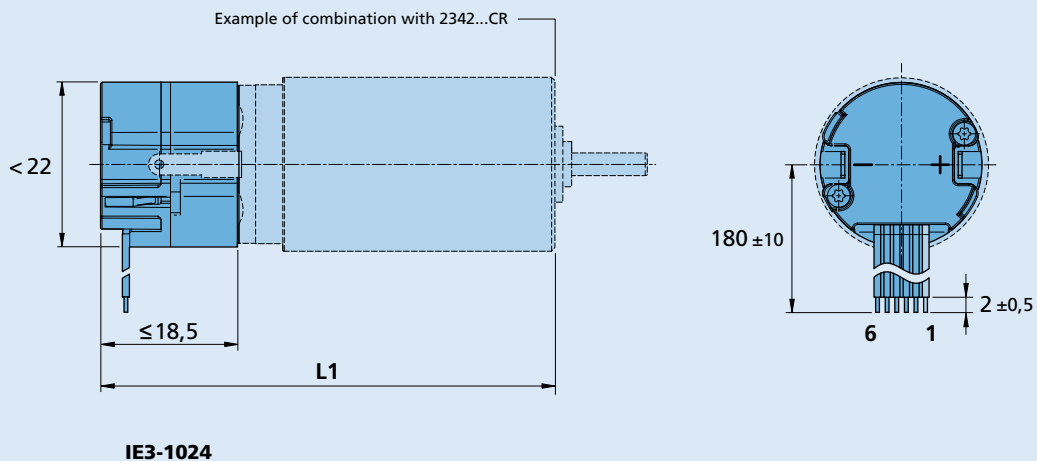


**Caution:**  
Incorrect lead connection will damage the motor electronics!

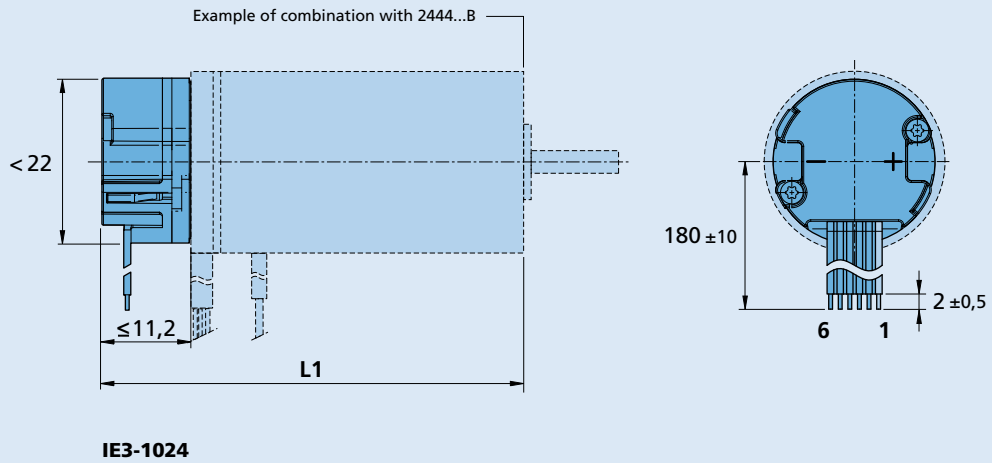
### Dimensional drawing A



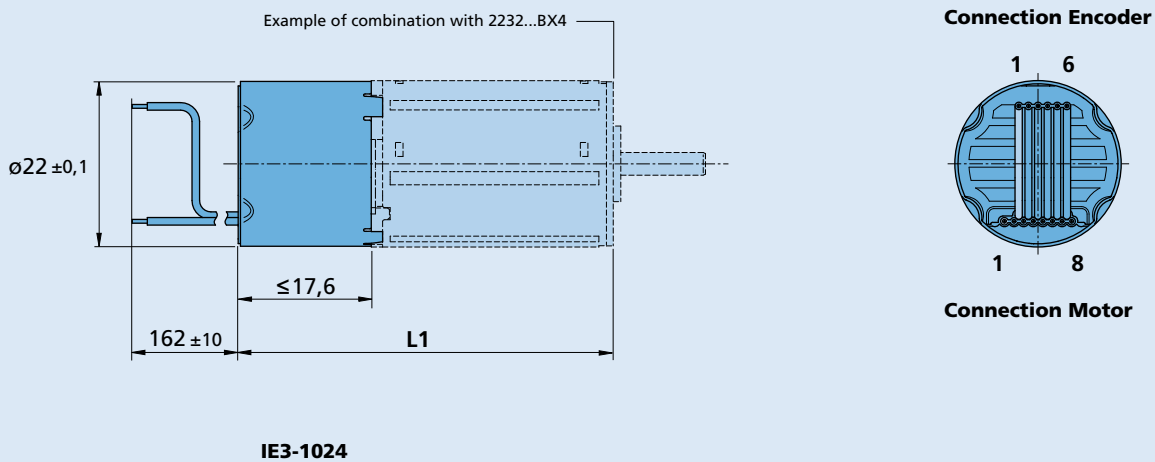
### Dimensional drawing B



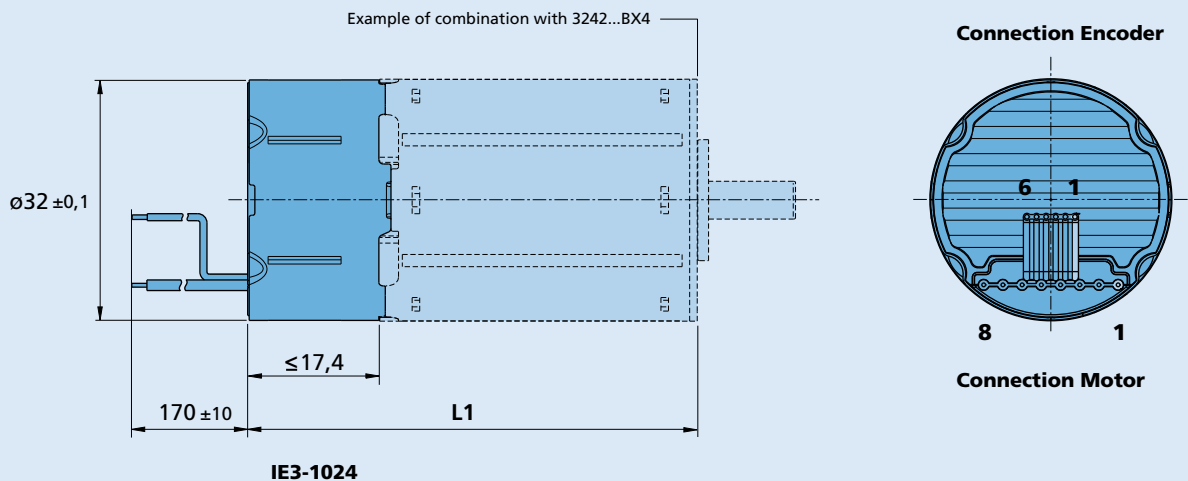
**Dimensional drawing C**



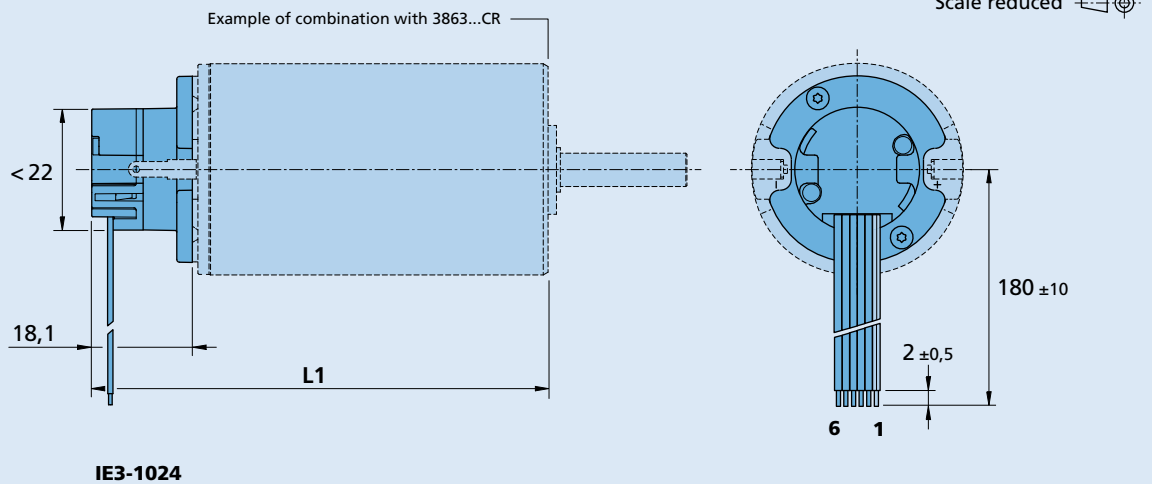
**Dimensional drawing D**



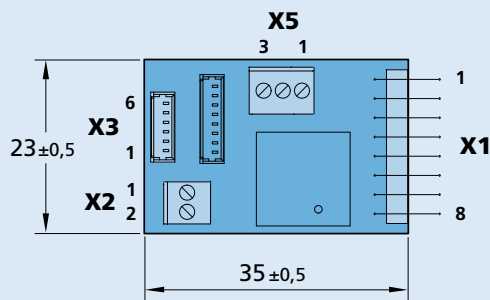
**Dimensional drawing E**



### Dimensional drawing F



### Adapter board

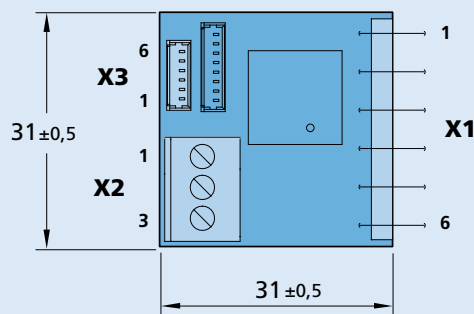


**Interface Board IE3-1024**  
for Motion Controller MCDC 3002 S  
Part. No.: 6501.00193

#### Connection

Pin	Connection X1	Pin	Connection X3
1	4. In	1	N.C.
2	Channel A	2	Channel I
3	Channel B	3	SGND
4	$U_{DD} = 5V$	4	$U_{DD} = 5V$
5	SGND	5	Channel B
6	Motor +	6	Channel A
7	Motor -		
8	5. In	Pin	Connection X5
		1	4. In
Pin	Connection X2	2	5. In
1	Motor +	3	Channel I
2	Motor -		

### Adapter board



**Interface Board IE3-1024**  
for Motion Controller MCDC 3006 S  
Part. No.: 6501.00194

#### Connection

Pin	Connection X1	Pin	Connection X3
1	Channel A	1	N.C.
2	Channel B	2	Channel I
3	$U_{DD} = 5V$	3	SGND
4	SGND	4	$U_{DD} = 5V$
5	Motor +	5	Channel B
6	Motor -	6	Channel A
Pin	Connection X2		
1	Channel I		
2	Motor +		
3	Motor -		