

## Encoders

magnetic single-turn absolute Encoder,  
SSI Interface with BISS-C Protocol,  
4096 steps per revolution, Line Driver

For combination with  
Brushless DC-Motors

### Series AES-4096 L

AES-4096 L	
Steps per revolution	4 096
Single-turn resolution	12 Bit
Signal output	SSI Interface with BISS-C Protocol
Supply voltage	$U_{DD}$
Current consumption, typical <sup>1)</sup>	$I_{DD}$
Clock Frequency, max. (CLK and $\overline{CLK}$ )	4,5 ... 5,5 typ. 22, max. 32
Input low level (CLK and $\overline{CLK}$ )	2
Input high level (CLK and $\overline{CLK}$ )	0 ... 0,8
Setup time after power on, max.	2 ... 5
Setup time after power on, max.	$t_{setup}$
Timeout, typ.	20
Inertia of sensor magnet	$J$
Operating temperature range	0,08
Hysteresis	-40 ... +100
Mass, typ.	0
	13,5
	g

<sup>1)</sup>  $U_{DD} = 5$  V: with unloaded outputs

**Note:** The output signals are TIA-422 compatible.  
Examples of Line Driver Receivers: iC-HF, SN65LBC179, SN75179B

For combination with Motor	
Dimensional drawing A	<L1 [mm]
2444 ... B - K3051	55,3
3056 ... B - K3051	67,3
3564 ... B - K3051	75,3
4490 ... B - K3051	100,3
4490 ... BS - K3051	100,3
Dimensional drawing B	<L1 [mm]
2232 ... BX4	50,2
2250 ... BX4	68,2
2250 ... BX4 S	68,2
Dimensional drawing C	<L1 [mm]
3242 ... BX4	60,0
3268 ... BX4	86,0
Dimensional drawing D	<L1 [mm]
2264 ... BP4 - 6356	79,1
3274 ... BP4 - 6356	90,8

#### Characteristics

The absolute encoder with Line Driver in combination with the FAULHABER brushless DC-Servomotors is ideal for commutation, speed and position control. It can also be used to create a sinusoidal commutation signal.

In the AES-4096 L, absolute position information is provided with a resolution of up to 4096 steps per revolution at the signal outputs and communicated via a SSI Interface with BISS-C Protocol. Absolute means, that each shaft position is assigned to an unique angular value within one revolution. This value is already available directly after power-on.

Additional advantages are a higher efficiency of the motor and a reduced torque ripple.

The AES-4096 L 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 the encoder a 120 ohm line termination resistor is integrated between the CLK and  $\overline{CLK}$  inputs. A corresponding resistor is recommended for the DATA and  $\overline{DATA}$  output signals on the controller. Special number 6419 is recommended for operation with FAULHABER Motion Controllers of generation V3.0. With this variant, the resistor for the DATA and  $\overline{DATA}$  output signals is already integrated in the controller.

The supply voltage as well as the output signals for the encoder are interfaced through a ribbon cable, optionally with connector.

For the brushless DC servomotors series BX4, the motor and encoder are connected via two ribbon cables.

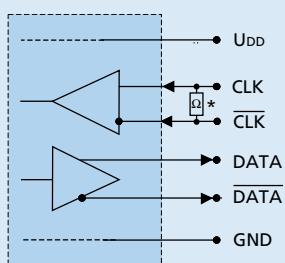
In the series B and BP4 the motors are connected via single wires and the encoders via ribbon cable.

Details for the brushless DC-servomotors and suitable reduction gearheads are on separate catalogue pages.

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

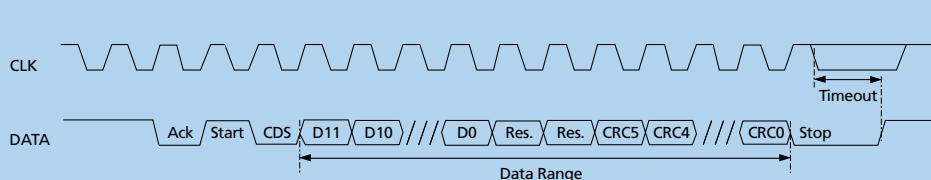
## Circuit diagram / Output signals

### Output circuit



### Interface Protocol BISS-C

Angle position values are ascending for clockwise rotation.  
Clockwise rotation as seen from the shaft end.



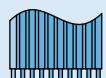
\*Terminating resistor 120  $\Omega$

**Note:** Data and Clock run inverted to the displayed signals Data and Clock.

## Connector information / Variants

No.	Function
1	N.C.
2	UDD
3	GND
4	N.C.
5	Reserved
6	Reserved
7	DATA
8	DATA
9	CLK
10	CLK

### Connection Encoder

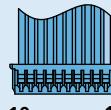


### Cable

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

### Option

■ Connector variants AWG 28 / PVC ribbon cable with connector Molex Picoblade, 51021-1000, recommended mating connector Picoblade 53047-1010.



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Option no.: 5418 for combination with Brushless DC-Motor series BP4 and series B(S).

Option no.: 5419 for combination with Brushless DC-Motors series BX4.  
Note: inclusive motor connector 3830.

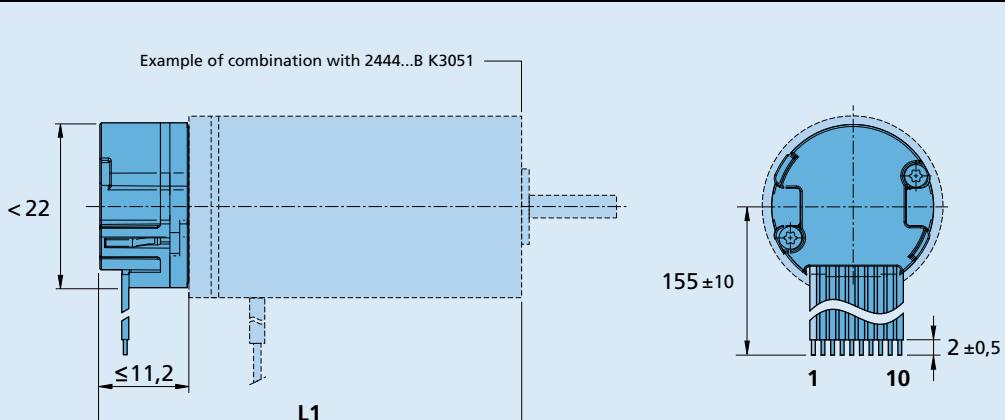
### Caution:

Incorrect lead connection will damage the motor electronics!

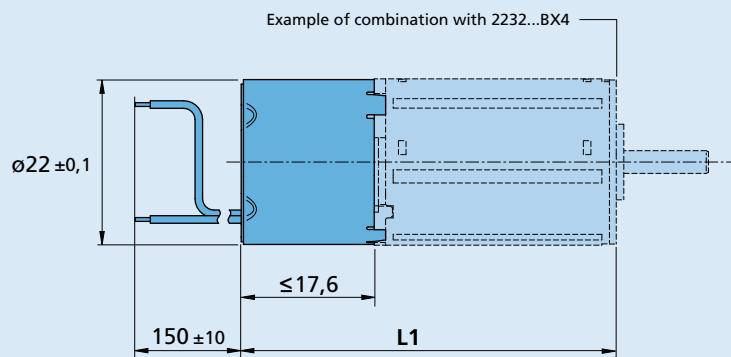
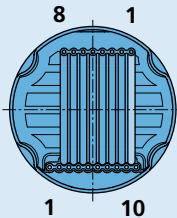
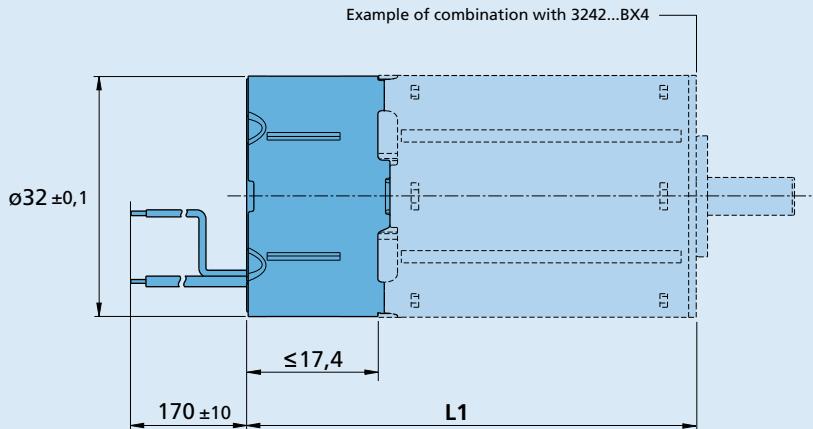
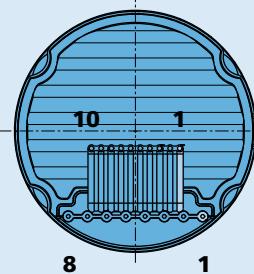
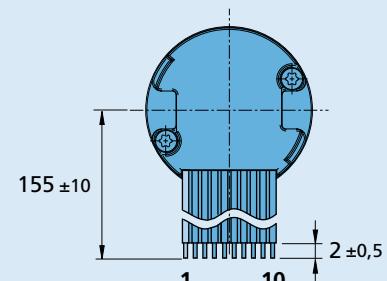
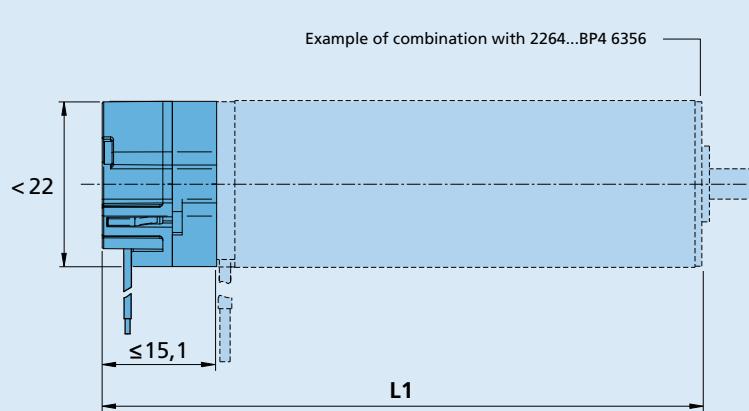
### Full product description

■ Example:  
3242G024BX4 AES-4096 L

## Dimensional drawing A



AES-4096 L

**Dimensional drawing B**

**Connection Motor**

**Connection Encoder**
**AES-4096 L**
**Dimensional drawing C**

**Connection Encoder**

**Connection Motor**
**AES-4096 L**
**Dimensional drawing D**

**AES-4096 L**