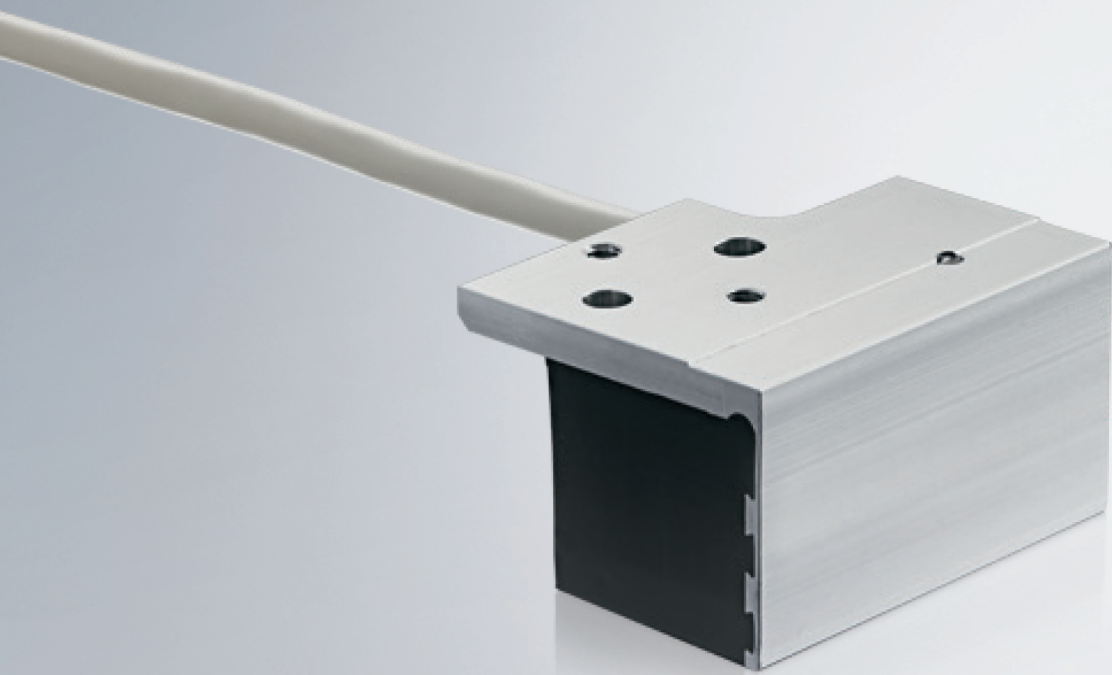


Operating instructions | EN

# AL2200

Magnetic Encoder System MES





# Table of content

<b>1 Foreword</b> .....	<b>5</b>
1.1 Intended use .....	5
<b>2 Guidelines and Standards</b> .....	<b>6</b>
<b>3 Product overview</b> .....	<b>7</b>
3.1 Scope of supply .....	7
3.2 Type key .....	7
<b>4 Properties</b> .....	<b>8</b>
4.1 Assignment plan .....	9
<b>5 Dimensions</b> .....	<b>10</b>
<b>6 Mounting</b> .....	<b>11</b>
<b>7 Support and Service</b> .....	<b>12</b>



# 1 Foreword

## 1.1 Intended use

The Magnetic Encoder System (MES) provides the feedback signal for linear motors from the AL2xxx series and is to be operated exclusively on a servo drive.

Linear feedback systems are required for the commutation and the detection of the velocity and position of brushless linear motors. Such feedback systems consist of a reader head and a graduated rule installed parallel to the travel path. The AL2200 works directly on the magnetic plates of the linear motor, eliminating the need for an additional graduated rule. It detects the magnetic field of the permanent magnets of the magnetic plates and supplies the encoder signals to the servo drive. Since the MES is a semi-absolute feedback system, no wake & shake is required in order to determine the commutation angle at machine start-up. The MES supplies one sine oscillation per logical motor revolution. A logical motor revolution is equivalent to the distance between two homopolar magnets, i.e. between two north poles, for example. The attainable accuracy of  $\pm 0.1$  mm is sufficient for simple positioning tasks and depends to a large extent on the mechanical accuracy and position of the magnets along the travel path. Since no graduated rule has to be installed, the MES is an inexpensive feedback solution for linear motors.

## 2 Guidelines and Standards

### CAUTION

#### **Danger for persons, the environment or equipment**

The Magnetic Encoder System (MES) is **not** a product within the meaning of the EC Machinery Directive. Operation of MES in machines or systems is only permitted once the machine or system manufacturers has provided evidence of CE conformity of the complete machine or system.

## 3 Product overview

### 3.1 Scope of supply

Check the completeness of the delivery against your delivery note.

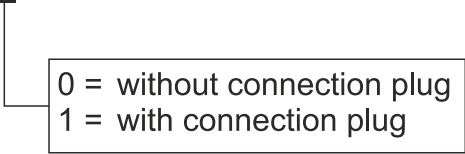
Missing parts or damage should be recorded immediately and reported to the carrier, the insurance and / or Beckhoff Automation GmbH & Co. KG.

**The standard scope of supply includes:**

Magnetic encoder system (MES)

### 3.2 Type key

AL2200-000 x



0 = without connection plug  
1 = with connection plug

## 4 Properties

The Magnetic Encoder System (MES) consists of a reader head with integrated analog Hall sensors. The Hall sensors evaluate the magnetic field of the magnetic plates and convert the signal into an analog output signal.

Name	Value / property
Signal period	Pole pair spacing 24 mm
Output signal	Analog signal 1 V <sub>ss</sub> , sine-cosine
Termination resistor	R = 120 Ω
Accuracy	< 100 μm The prerequisite is the precise installation of the magnetic plates with an accuracy of ± 20 μm and offset, phase and amplitude compensation.
Repeatability	< 50 μm
Resolution	5 – 10 μm
Power supply	5 V <sub>DC</sub>
Connection cable	<ul style="list-style-type: none"> <li>• 8-core</li> <li>• with twisted pairs</li> <li>• material PUR</li> <li>• UL-certified</li> <li>• diameter 3.2 mm</li> <li>• length 3 m</li> </ul>

Assignment (color code)	
green	SIN +
yellow	SIN -
blue	COS +
red	COS -
brown	+ 5 V <sub>DC</sub>
white	GND
pink	+ 5 V sense
grey	GND sense
Shield	PE / GND

### Pin assignment for AX2000 / AX2500 and AX5000

MES	MES – without connector	MES D-Sub (15-pin)	AX2000 / AX2500	AX5000 (X11 / X21)
Signal	Color	Pin	Pin	Pin
SIN +	green	8	11	1
SIN -	yellow	15	3	9
COS +	blue	6	9	3
COS -	red	13	1	11
+ 5 V <sub>DC</sub>	brown	5	4 <sup>*1</sup>	4 <sup>*1</sup>
+ 5 V sense	pink	12	12 <sup>*1</sup>	12 <sup>*1</sup>
GND	white	7	2 <sup>*1</sup>	2 <sup>*1</sup>
GND sense	grey	14	10 <sup>*1</sup>	10 <sup>*1</sup>

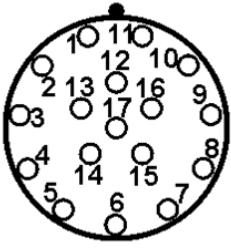
\*1) Pins 4 and 12 as well as 2 and 10 are bridged!

The appropriate signal coupling has the order number ZS4000-2051 (Service Pack). The AM2000/AM3000 encoder cables can then be used.

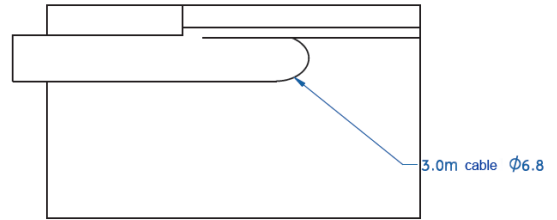
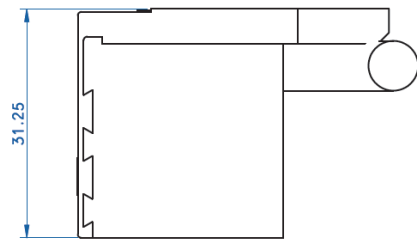
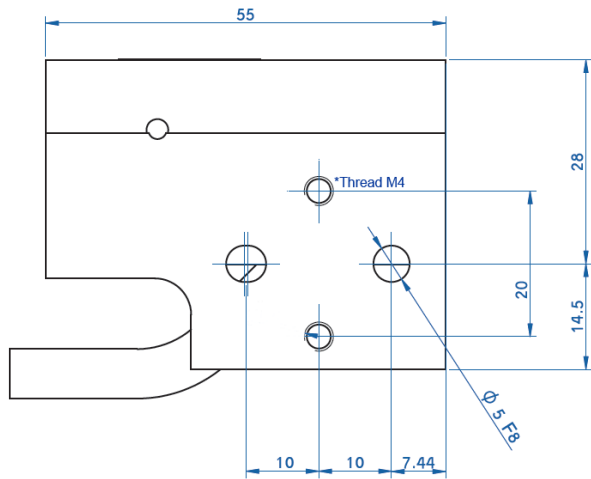
The feedback cable is connected to X1 on the AX2000 and to X2 on the AX2500.



## 4.1 Assignment plan

Plug Assignment ZS4000-2051		
Plug	Contact	Function
	1	COS -
	2	GND
	3	SIN -
	4	+5 VDC
	9	COS +
	10	GND sense
	11	SIN +
	12	+5 V sense
	Housing	Shield

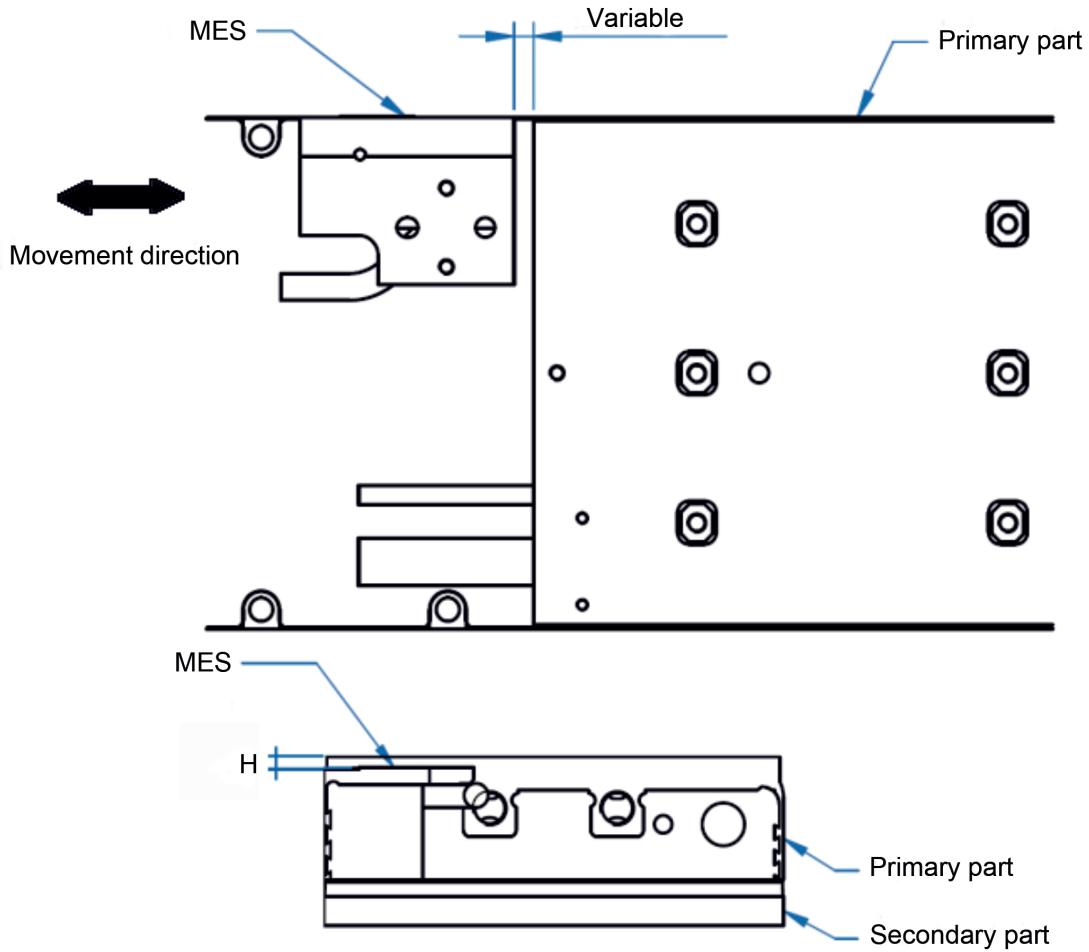
# 5 Dimensions



\*Please be aware that the depth of the threaded hole is 4.5 mm!  
Too long screws can cause damage to the MES!

# 6 Mounting

The MES is installed behind or in front of the primary part, so that it moves with the primary part over the secondary part.



	Distance to the top side of the primary part.	Rotation with respect to the movement direction	Distance to the outside edge of the primary part	Screws	Locating pins
	H in mm	deg	mm		
AL20xx	0	0.5	+/- 1	M4	Ø 5 F8
AL24xx	0				
AL28xx-0	1				
AL28xx-1	3				

## 7 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

### Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for [local support and service](#) on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages:

<http://www.beckhoff.com>

You will also find further [documentation](#) for Beckhoff components there.

### Beckhoff Headquarters

Beckhoff Automation GmbH & Co. KG

Huelshorstweg 20  
33415 Verl  
Germany

Phone:	+49(0)5246/963-0
Fax:	+49(0)5246/963-198
e-mail:	<a href="mailto:info@beckhoff.com">info@beckhoff.com</a>

### Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

Hotline:	+49(0)5246/963-157
Fax:	+49(0)5246/963-9157
e-mail:	<a href="mailto:support@beckhoff.com">support@beckhoff.com</a>

### Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

Hotline:	+49(0)5246/963-460
Fax:	+49(0)5246/963-479
e-mail:	<a href="mailto:service@beckhoff.com">service@beckhoff.com</a>



More Information:  
**[www.beckhoff.de](http://www.beckhoff.de)**

Beckhoff Automation GmbH & Co. KG  
Hülshorstweg 20  
33415 Verl  
Germany  
Phone: +49 5246 9630  
[info@beckhoff.com](mailto:info@beckhoff.com)  
[www.beckhoff.com](http://www.beckhoff.com)

