AKS17

Absolute Magnetic Sensing Head

INSTALLATION AND OPERATION INSTRUCTIONS

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Safety Instruction

Read these instructions carefully prior to installation and operation.

This manual is intended for professionals who perform the installation and the setup. The assembly of the system requires knowledge of mechatronics and general health and safety regulations. Follow all warnings and instructions for your own safety and the safety of your system.

These operating instructions apply to the incremental magnetic sensing head AKS16 in connection with a magnetic scale for linear or rotary applications.

Risk of electric shock or short circuit!

Incorrect handling of electrical equipment can be fatal or cause damage to property.

Danger to life!

Unauthorized use of the system can be highly dangerous.

The magnetic position sensing heads must not be used in life-saving systems such as airplanes etc.

Risk of pinching

There is a risk of getting pinched between the sensing head and the magnetic tape. This can lead to injury or mechanical damage. Avoid getting with your limbs and tools near the gap between the head and the tape while the measuring system is in motion!

Dangers that may follow

Malfunctions of the measuring system can lead to further risks to the device or the system in which it is embedded. When there is evidence that the measuring system is not working properly, it must be put out of operation and secured against unauthorized use. The prescribed safety regulations must be observed for the use of position sensing heads. In particular, measures must be taken to prevent dangers to people and property in the event of a failure. This includes the installation of additional safety limit switches, emergency stop switches and the observance of the required environmental conditions

Risk of damage for the magnetic layer

Magnetic tapes and sensing heads can be damaged by magnetic fields!

Apply only demagnetized tools for assembly and maintenance!

Improper storage of magnetic tape rolls can lead to magnetic interaction between the layers and thus to a reduction of the measurement accuracy

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Electromagnetic Compatibility

For the electrical connection it is essential that the electromagnetic compatibility (EMC) is guaranteed.

- System and control cabinet must be connected to the same ground potential.
- Use shielded cables. Connect the cabinet side of the cable shield with protective earth (PE).
- Avoid installing in close proximity to power lines.
- The nominal operating voltage (see datasheet) must be observed even if there is a voltage drop along the supply line!
- Determine the place of installation so that inductive and capacitive interferences cannot affect the sensor. By adequately routing the cable, interferences can be reduced.

Intended Use

The magnetic position sensing heads AKS17 are highly accurate measuring devices consisting of magnetic scales and sensing heads capable of non-contact position detection for linear and rotary applications.

Fields of Deployment

- capital equipment,
- automation,
- medical engineering,
- electrical engineering.

A measurement solution consists of a sensing head and a linear or rotary magnetic scale and can be incorporated into various electronic systems. It can be configured according to the customer's specifications. In combination with a suitable analysis software absolute and relative position and position changes can be measured. In this way it is possible, for instance, to control machine tools, determine torsional forces or detect longitudinal expansions.

Function and Properties

The magnetic position sensing heads AKS17 are suitable for non-contact, absolute and incremental position measuring systems. The measuring function is realized by magnetic scanning.

The system has the following features:

- absolute and incremental encoder
- 21 to 24 bit absolute resolution
- 18 bit incremental resolution
- non-contact, quick position measurement

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- single piece unit
- no wear from usage
- resistant to dust, cooling lubricant emulsion, oil, etc.
- different diameters and length offered
- radial, axial or linear reading.

Mode of Operation

The sensing head with its sensor is mounted on the machine part whose position is to be measured. The measuring magnetic surface is mounted along the measuring distance. On the magnetic tape alternating magnetic north and south poles are positioned with a regular distance. The magnetic hall sensor cells in the sensing head are scanning the magnetic poles on the tape contact-free.

Permissive linear and rotation speed see technical data sheet of the respective type on our website.

Digital Absolute Output

The sensing head with digital absolute output signal converts the analog signals to an absolute information in BISS-C or SSI.

Digital Incremental Output

The sensing head with digital incremental output signal converts the analogue signals into digital A/B and Z pulses and transmits them to the controller. The two digital signals A and B are electrically phase-shifted by 90°. The sign of the phase shift represents the direction of movement of the sensor. Every change of A or B (rise to fall or vice versa) is a count for the period counter (up/down counter). If signal A is preceding signal B, the counter increases. If signal B is preceding signal A, the counter decreases. The Z pulse appears every time when passing the zero point. The controller thus knows at all times the increment position, without having to query the sensing head periodically (real-time capability). Therefore, after an interruption of the power supply the sensing head can still read its correct absolute position on the scale.

Assembly and Installation

During assembly utmost cleanliness is required. Device parts have to be degreased thoroughly before gluing.

During installation the mounting tolerances and the position of the measuring point have to be observed respectively implemented as stated in the datasheet.

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Measurement Options

The AKS17 comes with two measurement options.

- option 1 is a sensing head with parallel orientation of AKS17 chip
- option 2 is a sensing head with perpendicular orientation of AKS17 chip

Delivery Condition

The AKS17 is supplied with a connector Molex 501568-1207 or with a FFC as an alternative for Molex.

Programming Device

Introduction

Each AKS17 requires a calibration process in assembly. It is recommended that the calibration is performed across the whole working range of the sensing solution.

The calibration process consists of an analog calibration where the different sensors in the sensing head will be optimized for best performance and a nonius calibration where the sensing head is optimized over the scale.

With the AKS17 software and hardware the parameters of an AKS17 sensing head can be changed for a successful calibration. The software sets the sensing head parameters for the correct master-nonius periods (128/127/120, 256/255/240, 512/511/496, 1024/1023/992) and the operating measurement systems (linear, rotary radial, rotary axial).

To calibrate the sensing head you need:

Windows PC

cable for programming unit
(USB 2.0 type A connector/ mini-B connector)

AKS17
programming unit

cable (9 pin serial cable/ Molex or FFC)

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System Requirements

The programming device can be connected to a Windows PC with a USB cable and operated with the dedicated software. The software requires Windows Vista or later (32/64 Bit).

Before the programming device (programmer AKS17) can be connected the specific driver must be installed. Copy the software to a local directory on your Windows PC. To install the driver execute the specific program USB_Adapter_00052040_Driver.exe Connecting the device (for calibration setup)

Mount the sensing head correctly per mechanical specifications. It is required to place the sensing head within the allowed mechanical tolerances (maximum displacement), see technical data sheet.

Both status LEDs (green and red) on the AKS17 sensing head will light up now if all devices are mounted correctly. The pictures below show the final stage of all connected cables and the programming device.

Programming Software

Please contact our sales department for software and application notes: sales@bogen-magnetics.com

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