

Instruction Manual

Specification 622031

Inclination Sensor with RS485-Modbus-Interface

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Declaration of Conformity

CE-Conformity

This product has been developed and manufactured in accordance with the current European standards and guidelines.

Note: A Declaration of Conformity can be requested separately.

General

The Inclination Sensor 622031 is an instrument used to control the inclination angle of a reference axis.

The product should be examined for any possible damage that may have occurred during transportation. Should any damage have occurred, please contact the transportation company or 2E mechatronic without delay.

Read the instructions carefully. Familiarize yourself with the device before assembling, installing and operating.

The following assembly and operation instructions have been carefully drafted, however, it is not possible to cover every conceivable eventuality. Therefore, if you have any queries regarding the product or its application we can be contacted at our internet address (www.2E-mechatronic.de) or one of our contact personnel for further information.

The Sensor should be operated and installed in accordance with the instructions given in order to guarantee that the device and the connected systems operate safely.

The safety of operating personnel can only be guaranteed when the device is used for the purpose which it was intended for.

Furthermore the national regulations are to be followed. (e.g. VDE0100) shielded cables to be used for connecting the device.

Safety Instructions

Responsibility for safe planning, assembly, operating and maintenance lies with the equipment user.

The installation and operation of all devices should only be carried out by qualified personnel. Changes or modifications which are not expressly

approved in the operation manual and are made without permission could void the warranty and manufacturer's liability. Should a severe disturbance occur, the device should be taken out of operation immediately and protected against accidental reuse. If such an occurrence should happen the device should be sent to 2E mechatronic for repair.

| Technical Data | |
|----------------------------|--|
| Axis | 1 |
| Positive sense of rotation | Clockwise |
| Measurement range (angle) | 360° |
| Max. resolution | ± 0,01° |
| Dimensions | 79 mm x 28 mm x 21 mm |
| Operating voltage | 9V....32V |
| Measurement rate | < 180 ms |
| Protection class | IP67 |
| Temperature range | -40°C – +85°C |
| Weight | 80g (with cable/connector) |
| Accuracy | +10 – +40°C: <±0,1° - 40 – +10°C: <±0,15° +40 – +85°C: <±0,15° |
| Housing | Aluminium, 2 fixings |
| Interface | Modbus RTU (RS485) |

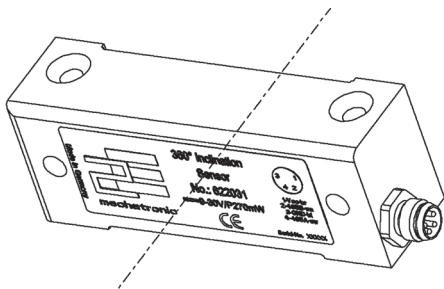
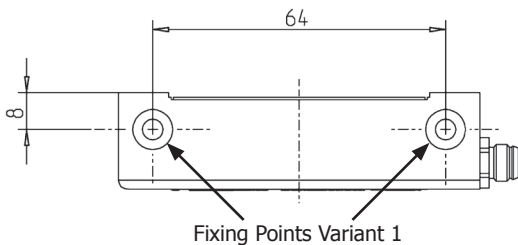
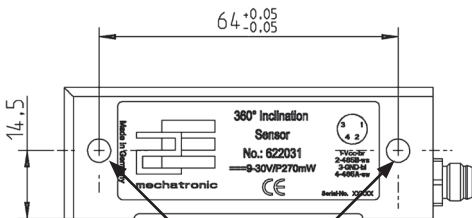
This is a Protection Class IP67 device.

Installation/Assembly

The Sensor can be mounted on the target unit in 2 ways, both perpendicular and parallel to the axis rotation.

Variation 1 (Perpendicular to axis): First, ensure that the surface is clean. Then, mount the Sensor using 2 flat head screws (max. Ø4.5mm thread diameter) to the target unit.

Variation 2 (Parallel to axis) mount the Sensor using 2 head shoulder screws (fitting an inner diameter of Ø5H7).



Electrical Connector

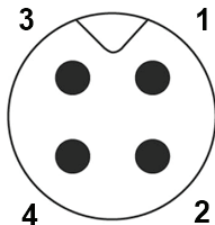
Sensor-/Actor-Panel Connector 4 pol. M8

IEC 61076-2-104

Voltage requirements: 9 – 32 V DC

Power Consumption at 9V DC: 20mA

Power Consumption at 32V DC: 9mA



Description of all input and output ports/terminals

| Variante | Pin 1 | Pin 2 | Pin 3 | Pin 4 |
|------------------------------|------------------|---------------------|-------------|---------------------|
| 622031 kNS Standard RS485 | brown VCC (+) | white 485B/Data- | blue GND | black 485A/Data+ |

Operation

The Sensor comes with an RS485 interface and is connected by Modbus-RTU-Protocol. Additional information can be found at <http://www.modbus.org/specs.php>

The instruction (question) consists of one word 8 bytes long with the following configuration

| Request | Master | Slave ID | Function | Address | Quantity Value | Checksum |
|---------|-----------------|----------|----------|---------|----------------|----------|
| | length (8 byte) | 1 byte | 1 byte | 2 byte | 2 byte | 2 byte |

The answer varies according to the register quantity and is configured as follows

| Answer | Slave | Slave ID | Function | Byte Count | Value | Checksum |
|--------|--------|----------|----------|------------|--------|----------|
| | length | 1 byte | 1 byte | 1 byte | x byte | 2 byte |

Changing a Holding Register

Important: Please note that locating a Sensor by an unintentional modification of the node address is only possible by a ModBus Scanner or manually scanning all possible addresses.

Function Code Read: 03

Function Code Write: 06

Display options (Holding Register)

Register 135: Option Rotating direction sets up, that the sensor has a positive turning direction clock- or counterclockwise.

Register 136: Changing display range sets up, that the sensor shows the inclination in range 0 ... 359,99° (Value „0“) or in range -180,00° to +179,99° (Value „1“)

Register Plan

| Register-No. | read/write | Register-Content | Scale-factor | Meas remer |
|------------------|------------|--|--------------|------------|
| Input register | | | | |
| 0 | r | Inclination | 100 | 1/100 |
| 10 | r | Sensor Temperature | 100 | 1/100 C |
| 17 | r | Inclination with display options, bits 16-23 | 100 | 1/100 |
| 18 | r | Inclination with display options, bits 0-15 | 100 | 1/100 |
| holding register | | | | |
| 133 | r/w | Quantity for averaging | - | - |
| 134 | r/w | Offset | 100 | 1/100 |
| 135 | r/w | Rotating direction | - | - |
| 136 | r/w | Display range | - | - |
| 200 | r/w | ModBus Node-Address | - | - |
| 201 | r/w | MODBUS-Baud Rate | 1/100Bd | - |

| Unit | Initial-value 16-bit | Value Range | Note |
|------|----------------------|--|------|
| | | | |
| ° | 0 | 0...36000 | |
| ° | 0 | | |
| ° | 0 | a) 0 ... 36000 | 4) |
| ° | 0 | b) -18000 ... +17999 | |
| | | | |
| | 1 | 1, ... | |
| ° | 0 | 0...36000 | |
| | 0 | 0 = cw (clockwise) | 4) |
| | 0 | 0 = 0 to +359,99° 1 = -180 bis +179,99° | 4) |
| | 1 | 1...247 | 1)2) |
| | 192 | 96, 192, 384, 576 | 2)3) |

Explanatory Note:

- 1) These values have not been checked against a current range of values
- 2) These values are effective only after a reset (switching on and off the operating voltage)
- 3) An invalid value is corrected up 96 (9600 B)
- 4) Display options:
Rotating direction (cw/ccw) and Changing Display Range

Inclination or Temperature Readout (Input Register)

The inclination can be read either in register „0“ without display options (16bit, display 0 ... 359,99°, rotating direction cw) or in registers „17+18“ (32 bits) with display options. The current sensor temperature can be read in register „10“.

These registers are Input Registers which cannot be written to.

Function Code Read: 04

Value „5555“ in Register 0

If the value „5555“ is shown in the register 0, one of the registers 132, 133 or 134 is set to an invalid value.

Please check these registers for valid data. (s. Register plan)

Service

The Sensor is maintenance free.

Please contact the following if required.

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