

POSITAL

FRABA

ACCELENS INCLINOMETER RS232 - VOLTAGE



Main Features

- Dual axis inclinometer +/- 80°
- Configured for one axis measurements 0-360°
- High Resolution 0.01°
- Accuracy: 0.1°
- Active linearization and temperature compensation
- Digital interface: RS232, Code ASCII
- Analog interface: Voltage 0,5..4,5V
- High Protection Class: IP69k

Programmable Parameters

Resolution
Preset
Software Filters

Electrical Features

- Highly integrated circuit in SMD-technology
- Polarity inversion protection
- Over-voltage-peak protection

Applications

- Measurement of inclinations and rotational movements
- Construction machines
- Cranes
- Medical Systems

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ACCELENS INCLINOMETER RS232 - VOLTAGE

Technical Data

Electrical Data

Model	ACS 080	ACS 360
Measuring range	+/- 80°	360°
Number of axes	2	1
Resolution	0,01°	0,01°
Accuracy (T = -10 °C .. +40 °C) *	0.1°	0.1°
Sensor Response Time	10 ms (without filter)	
Recommended Measurement Rate	Up to 10 Hz	
Digital Interface	RS232 format ASCII	
Baud rate	Max. 57600 bit/s (programmable)	
Analog interface	0,5...4,5V , 0° = 2.5V; 1mA	
Supply voltage**	10-30 V DC (absolute maximum ratings)	
Current Consumption	max. 100 mA with 10 V DC, max. 80 mA with 24 V DC	
EMC	Emitted interference: EN 61000-6-4	
	Noise immunity: EN 61000-6-2	
Connection	Connector Output M12 8 pin	

* Further data available on request

** Inclinometers should be connected only to subsequent electronics whose power supplies comply with EN 50178 (protective low voltage)

Mechanical Data

Housing	Plastic (Thermelt 869)
Shock (EN 60068-2-27)	≤ 100 g (half sine, 6 ms))
Vibration (EN 60068-2-6)	≤ 10 g (10 Hz ... 1,000 Hz))
Weight	100 g

Environmental Conditions

Operating temperature	-40°C.....+85°C
Humidity	98 % (without liquid state)
Protection class	IP 69k (connected) (EN 60529)

MTBF Data

Failure Rate [FIT]	759
MTBF [Hours]	1317822
MTBF [Years]	150

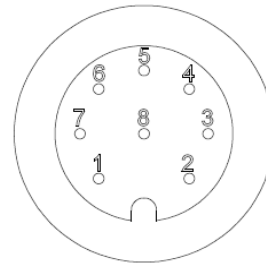
Installation

Electrical Connection

The inclinometer is connected via an 8 pin round connector
(Standard M12, Male side at sensor, Female at connector counterpart or connection cable).

Connector Assignment

Pin	Description ACS 080	Description ACS 360
1	+UB Supply voltage	+UB Supply voltage
2	RxD	RxD
3	TxD	TxD
4	Ground	Ground
5	X-axis* output analog	Output Analog
6	Not used**	Not used**
7	Y-axis* output analog	Not used**
8	Not used**	Not used**



Connector inclinometer

* See drawing on next page

** Should not be connected

Instructions to mechanically install



Do not connect inclinometer under power!

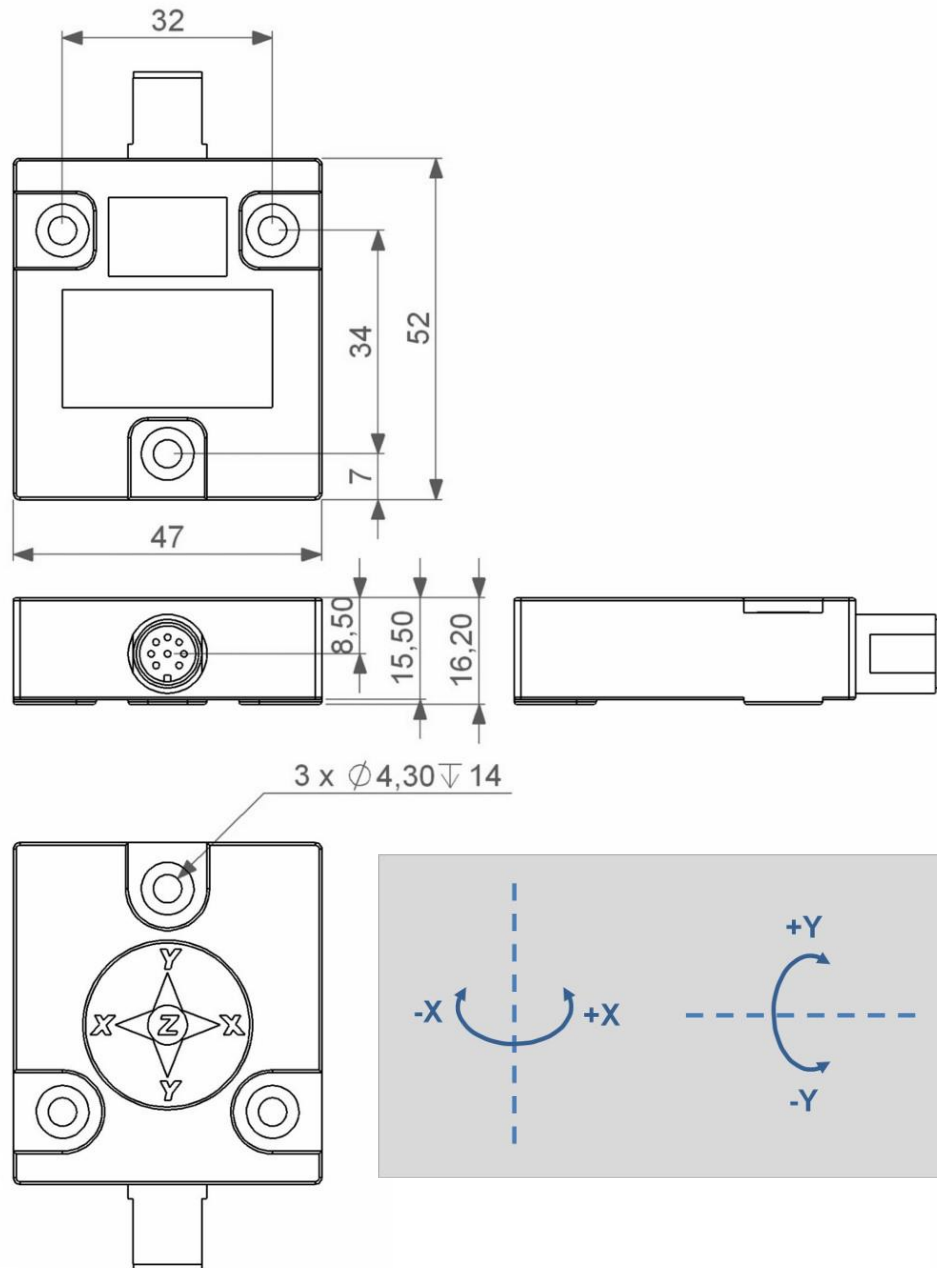


Do not stand on the inclinometer!



Avoid mechanical load!

Plastic Housing



Serial Interface RS 232

Communication with the sensor is done through a standardized RS-232 interface. Data transmission is effected in duplex mode. The baud rate is fixed by 9600 baud. After Power On the sensor is sending continuous the angle values in degrees (°). In the setup level several settings can be permanently modified. If the continuous mode was permanently changed to the polling mode, the sensor will send after

"Power On" a start information with actual parameters. On error no angle values are sending and after "Power On" a error message was add to the start information.

Programming Instructions

Basic Settings

After Power On, the sensor is in the user level. In factory setting (==Free running mode) every 100ms the current angle values are continuously supplied with a baud rate of 9600 bd. In the Setup-level several settings can be changed permanent like query or free running mode, output rate, baud rate and angle offset. If query mode instead of free running mode is ser, the sensor will send start information with the current settings after Power On. In case of errors no angle values will be provided and after Power On an error message will be added to the start information.

Interface parameter: 9600 Baud , 8 data bits, parity even, 1 stop bit,

The baud rate can be adjusted to different values in the Setup-level

Structure:

Baud rate: 9600 Baud (factory setting, changes in Setup-Mode possible)

Format: ASCII, 8 data bits, 1 stop bit, parity even

Length: 22 byte

Display: <D0 ... D21>

D0 ... D10 = "X=±xx.xxx", <CR>, <LF>
with D2 = sign (+ or -)
with D5 = point

D11 ... D21 = "Y=±xx.xxx", <CR>, <LF>
with D13 = sign (+ or -)
with D16 = point

Display example:

```
...  
X=+00.430  
Y=-00.084  
...
```

Commands in use

Table 1: instructions at user level

instruction	to the sensor	response sensor	explanation
Activate temporary polling mode (1) (2)	"f"	"f"	the continuous sending of angle values are stopped, instructions can send to the sensor
Activate temporary continuous mode (1) (2)	"F"	„X=±xx.xxx“, CR, LF, "Y=±xx.xxx“, CR, LF, "X= . . .	X angle in ° Y angle in ° with „±“ = „+“ or „-“, one string contains x and y value
Read angle values at one-time (3)	"R"	"X=±xx.xxx“, CR, LF, "Y=±xx.xxx“, CR, LF,	X angle in ° Y angle in ° with „±“ = „+“ or „-“
Switch to the setup level (3) (4)	"prog"	"P"	Sensor is at setup level

- (1) In free running mode measurement data is continuously displayed. In query mode measurement and display is only once on command.
- (2) After reset or new Power On after an interruption of power supply, the sensor will be in user-level again with the original setup or with the setup changed in the setup level.
- (3) Only possible in query mode (=free running mode deactivated).
- (4) The Input of „prog“ must take place within 20 sec.

Setup Level

The Setup level is active until "Power On" or Reset. All settings taken in the setup level are stored in the EEPROM and permanent available also after Power down.

Table 2: instructions at setup level

Instruction	To the sensor	Response sensor	Explanation
Activate permanent polling mode (1)	“f“	“f“	the continuous sending of angle values are permanent stopped, instructions can send to the sensor
Activate permanent continuous mode (1)	“F“	„X=±xx.xxx“, CR, LF, ”Y=±xx.xxx“, CR, LF, ”X= . . .	continuous sending of X angle in ° Y angle in ° with „±“ = „+“ or „-“
Set rate of data transmission for continuous mode (2) (3)	“O“ <Code transmission rate>	“O“ <Code transmission rate>	Echo, Code transmission rate or „E“ for Error, if the code is outside defined values
Read angle values at one-time (2)	“R“		same as at user level
Reset offset adjust (2) (3)	“N“	“N“	the offset adjust was reset to the original value
Set Baud rate (2) (3) (4)	“B“ <Code Baud rate>	“B“ <Code Baud rate>	Echo, Code Baud rate or „E“ for Error, if the code is outside defined values
Deactivate Filter	„M0“	„M0“	all filters are deactivated
Moving Average Filter (5)	„MP“	„N=“	Filter: Moving Average Filter is activated
Reset (2)	“Q“	“Q“	Software-Reset will be executed

- (1) in the continuous mode the sensor is sending continuous angle values, in the polling mode the sensor is sending one answer after an instruction
- (2) only possible at polling mode.
- (3) for activating a reset or power fail restart is necessary
- (4) Attention! A reset of the baud rate to a default value is not possible. If the user forgets the adjusted baud rate, the new value must be detected by testing.
- (5) Filter Configuration:
Possible values: N = 002 to 100, with N = 000 is moving average filter deactivated:
Output value = Average over last N values.
Factory settings: Activated with N = 20

Models/Ordering Description

Description	Type key
Accelens	ACS
Range	360° (1 axis) 360 +/-80° (2 axis) 080
Number of axis	One ("ACS360-...") 1 Two ("ACS080-...") 2
Interface	RS232+Voltage SV
Version	00
Mounting	Horizontal for +/-80° Version H Vertical for 360° Version V
Housing Material	Plastic P
Inclinometer Series	ACSII 2
Connection	Connector M12 8-pin PM

Accessories

Article No	Article	Description
34500800	P8F	Counter Connector for ACSXXX-XSV-...-P8M
34500801	P8F-STK8.2	Counter Connector for ACSXXX-XSV-...-P8M with 2m PUR cable
34500802	P8F-STK8.5	Counter Connector for ACSXXX-XSV-...-P8M with 5m PUR cable

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