

ANGLE / TILT SENSOR

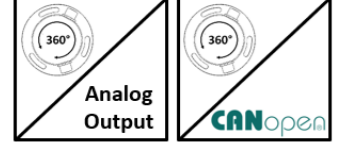
“Analog or CANopen Output”

INC 210



GENERAL FEATURES

- Angle/tilt measurement up to 360°
- 4-20 mA, 0-5V, 0-10V or CANopen signal output option
- Redundant output option
- Compensated axis sensitivity
- High accuracy : $\pm 0.2^\circ$
- Ability to specify 0° point
- Easy installation
- IP67 protection class
- Small and robust housing
- Compact structure



INC 210 series angle/tilt sensors are the sensors that show the angle of rotation of objects standing perpendicular to the earth. Angle measurement information between 0°-360° can be taken from these sensors. These sensors with 0-5VDC or 0-10VDC voltage output, 4-20mA current output or CANopen signal output option, can take measurement with $\pm 0.2^\circ$ accuracy.

These sensors, especially used in machine and crane industries, can operate in outdoor environments with their high IP protection classes. Optionally, sensors with redundant output can be produced.

TECHNICAL SPECIFICATIONS

Supply Voltage	4-20 mA & CANopen: 12...24 VDC 0-10 VDC & 0-5 VDC: 15...24 VDC	Protection Class	IP67
*Measurement Range	0° ... 360°	Operating Temperature	- 30°C ... +70°C
*Output Signals	Analog 4-20 mA, 0-5VDC, 0-10 VDC CANopen Opsiyonel Redundant Output	Relative Humidity	%10 ... %90
Response Frequency	10Hz	Weight	~250 gr
Resolution	For analog models: 12 bit For CANopen models: 0.05°	Body Material	Aluminium
Accuracy	$\pm 0,2^\circ$	*Electrical Connection	Analog models: M12 5 pin (male) socket or cable output CANopen models: M12 5 pin (male) and M12 5 pin (female) socket

Note: The specifications specified by (*) vary depending on the model selected. The detailed code table for product selection is shown on page 4.

CANopen SPECIFICATIONS

Communication profile	CiA 301
Response Rate	10 Hz.
Device Type	CANopen, CiA DS410
Node ID	Between 1 and 127, it can be adjusted with LSS or SDO
Baud Rate	10 kBit/s, 20 kBit/s, 50 kBit/s, 100 kBit/s, 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 Mbit/s
PDO Data Rate	100 ms
Error Control	Heartbeat, Emergency Message
PDO	1 Tx PDO
PDO Modes	Event/Time triggered, Synch/Asynch
SDO	1 server
Position Information	Object Dictionary 6004
Termination Resistance	Optional, specify at the order stage.

ELECTRICAL CONNECTION

Analog

Signal	M12 Socket	Cable
V+	Pin 1	Red
Output1 (Analog current/voltage) (X axis)	Pin 2	Yellow
GND (0V)	Pin 3	Black
Output2 (Analog current/voltage) (Y axis)	Pin 4	Green
Reset	Pin 5	Pink

* Output 2 is only used on two-axis models. On single-axis models, Pin 4 (green cable) is empty.

* On single output models, 1 pcs M12 5 pin male socket is used as standard.

* Redundant models have two outputs. 1 pcs M12 5 pin male ve 1 pcs M12 5 pin female socket is used as standard.

* Different socket models can be requested optionally.

DETERMINING THE 0° POINT OF SENSOR

Pin 5 (pink cable) and pin 3 (black cable) are short-circuited for about 1 second and then disconnected. Thus, the sensor recognizes that the position is 0°. If the same operation is repeated a second time, the sensor is reset to the factory settings.

The reset pin (pin5/pink cable) should not be left idle. After the adjustment process is completed, it must be connected to the supply pin (pin1/red cable).

During the operations, the sensor position should be kept constant for approximately 4 seconds.

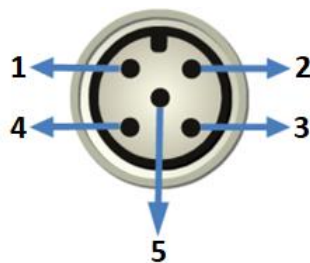
CANopen

Signal	M12 Socket	Cable
CAN_SHIELD	Pin 1	Shield
V+	Pin 2	Red
GND (0V)	Pin 3	Black
CAN_H	Pin 4	Yellow
CAN_L	Pin 5	Green

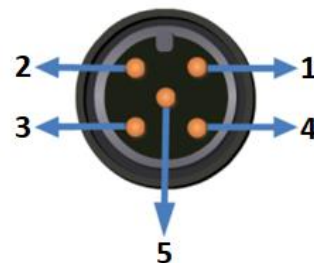
* CANopen models have 2 outputs. 1 pcs M12 5 pin male and 1 pcs M12 5 pin female sockets are used as standard.

* Different socket models can be requested optionally.

M12 5 Pin Female Socket



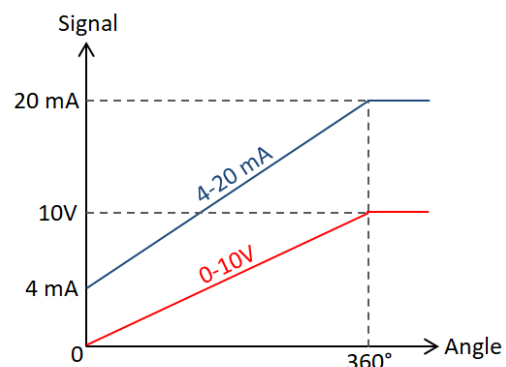
M12 5 Pin Male Socket



MEASUREMENT AXIS AND SIGNAL OUTPUT DIAGRAM

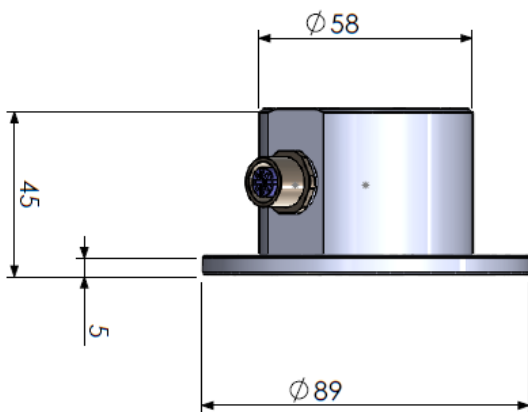
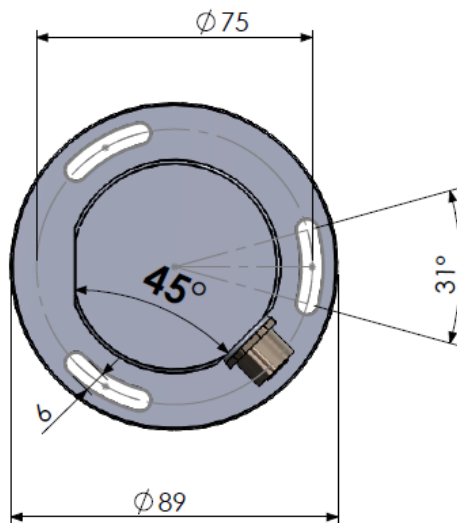
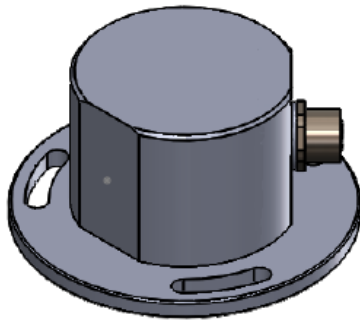


Analog Signal Output

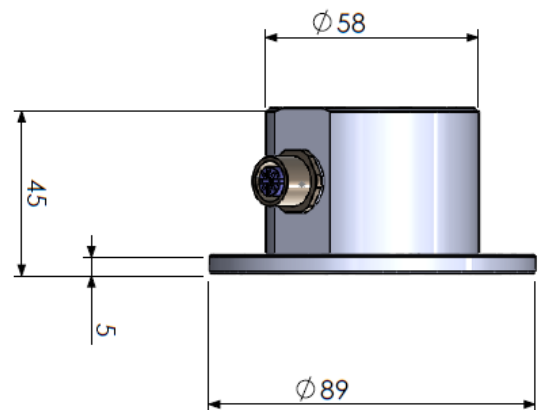
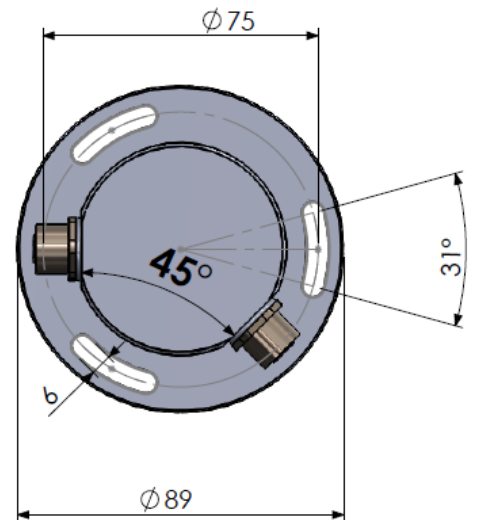
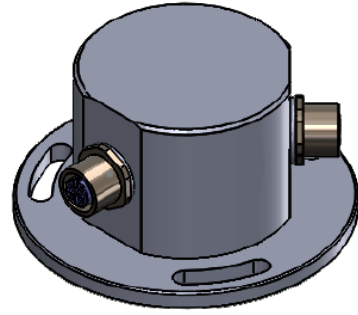


MECHANICAL DIMENSIONS (in mm)

Analog



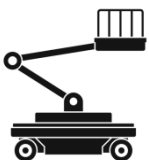
CANopen



SAMPLE APPLICATION AREAS

- Agricultural and forestry machinery
- Construction machinery and special-purpose vehicles
- Solar thermal energy and photovoltaics

- Automated guided systems
- Crane and lifting technology
- Wind power plant



ORDER CODE

Model	Number of Axis	Supply Voltage ⁽¹⁾	Output Signal Direction	Output Type
INC 210	01: Single Axis	PP: 12...24VDC / 15...24VDC	CW: Clockwise CCW: Counter-Clockwise	No code : Single Output Dual : Redundant Output
INC 210	XX	XX	XX	XX
Sensor Type	Measurement Range ⁽²⁾	Output Signals	Electrical Connection ⁽³⁾	
A: Angle	360: 0...360° 180: 0...180°	V: 0-10 VDC V1: 0-5 VDC A: 4-20 mA C: CANopen	3M : 3m cable 5M : 5m cable 10M : 10m cable S13F : M12 5 pin female socket S13M : M12 5 pin male socket S13FM: M12 5 pin female + M12 5 pin male socket (redundant and CANopen models)	

- (1) The supply voltage is 12...24VDC for CANopen and 4-20 mA output models, and 15...24VDC for 0-10 VDC and 0-5 VDC output models.
- (2) Optionally, different measurement values between 0...360 ° can be requested. You should specify your non-standard measurement value at the order stage.
- (3) The product can be requested with cable or socket.
As standard;
For single output models, 1 pcs M12 5 pin male socket (S13M) is used.
For redundant and CANopen output models, 1 pcs M12 5 pin female + 1 pcs M12 5 pin male socket (S13FM) is used.
However, different socket combinations may be requested as in the examples below.
Please contact us for any other socket model other than M12.

Sample Code 1: INC210- 01-360-PP-A-CW-S13F

INC 210 series, single axis, measurement between 0...360°, 12-24VDC supply, clockwise, 1 pcs M12 5 pin female socket, single output

Sample Code 2: INC210- 01-180-PP-C-CCW-S13FM-DUAL

INC 210 series, single axis, measurement between 0...180°, 12-24VDC supply, CANopen output, counter-clockwise, 1 pcs M12 5 pin female + 1 pcs M12 5 pin male socket, redundant output

Sample Code 3: INC210- 01-180-PP-C-CCW-S13M

INC 210 series, single axis, measurement between 0...180°, 12-24VDC supply, CANopen output, counter-clockwise, 1 pcs M12 5 pin male socket

OPTIONAL PRODUCTS

Product	Code	Description
	CB5 5M / S13F	5 meters 5x0,14 mm ² extension cable + M12/5 pin female connector (IP67)

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