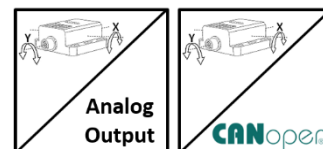




### GENERAL FEATURES

- Angle measurement up to 360°
- 4-20 mA, 0-5V, 0-10V or CANopen signal output option
- Redundant output option
- Compensated axis sensitivity
- High Sensitivity :  $\pm 0.1^\circ$
- Ability to specify 0° point
- Easy installation
- IP67 protection class
- Small and robust housing
- Compact structure



INC 210 series angle 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  $\pm 0.1^\circ$  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

<b>Supply Voltage</b>	4-20 mA & CANopen: 12...24 VDC 0-10 VDC & 0-5 VDC: 15...24 VDC	<b>Protection Class</b>	IP67
<b>*Measurement Range</b>	0° ... 360°	<b>Operating Temperature</b>	- 30°C ... +70°C
<b>*Output Signals</b>	Analog 4-20 mA, 0-5VDC, 0-10 VDC CANopen Opsiyonel Redundant Output	<b>Relative Humidity</b>	%10 ... %90
<b>Response Frequency</b>	10Hz	<b>Weight</b>	~250 gr
<b>Resolution</b>	For analog models: 12 bit For CANopen models: 0.05°	<b>Body Material</b>	Aluminium
<b>Accuracy</b>	$\pm 0,1^\circ$	<b>*Electrical Connection</b>	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

<b>Communication profile</b>	CiA 301
<b>Response Rate</b>	10 Hz.
<b>Device Type</b>	CANopen, CiA DS410
<b>Node ID</b>	Between 1 and 127, it can be adjusted with LSS or SDO
<b>Baud Rate</b>	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
<b>PDO Data Rate</b>	100 ms
<b>Error Control</b>	Heartbeat, Emergency Message
<b>PDO</b>	1 Tx PDO
<b>PDO Modes</b>	Event/Time triggered, Synch/Asynch
<b>SDO</b>	1 server
<b>Position Information</b>	Object Dictionary 6004
<b>Termination Resistance</b>	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 5 seconds 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.

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

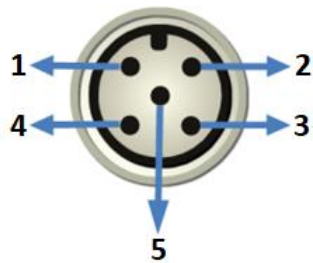
**CANopen**

Sinyal	M12 Soket	Kablo
CAN_SHIELD	Pin 1	Örgü
V+	Pin 2	Kırmızı
GND (0V)	Pin 3	Siyah
CAN_H	Pin 4	Sarı
CAN_L	Pin 5	Yeşil

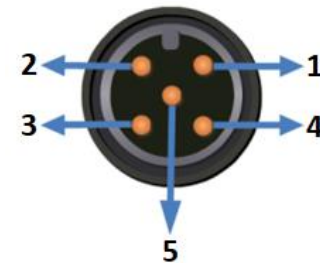
\* CANopen models have 2 outputs. 1 pcs M12 5 pin male and 1 pcs M12 5 pin female sockets are used as standard.

\* Different socket models can be requested optionally.

**M12 5 Pin Female Socket**



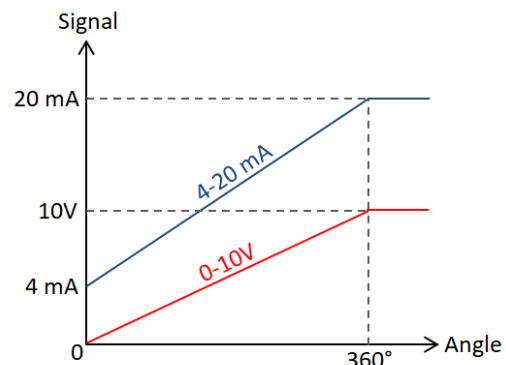
**M12 5 Pin Male Socket**



**MEASUREMENT AXIS AND SIGNAL OUTPUT DIAGRAM**

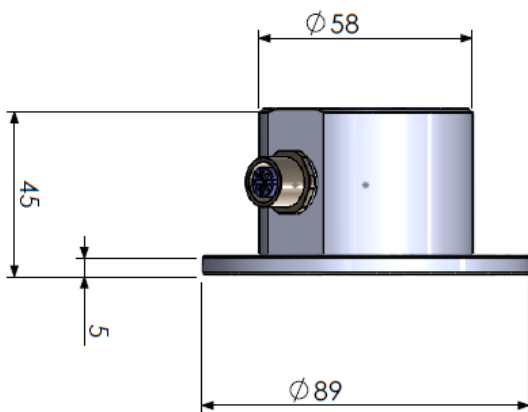
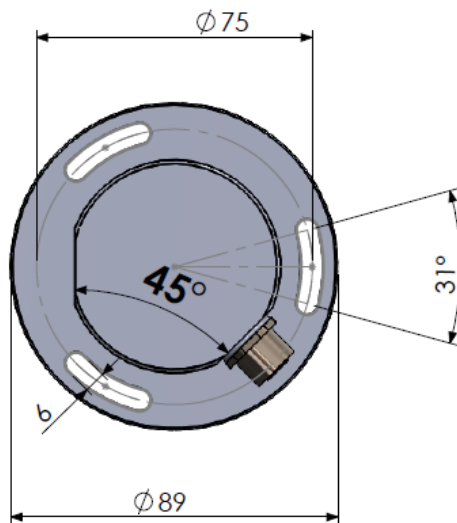
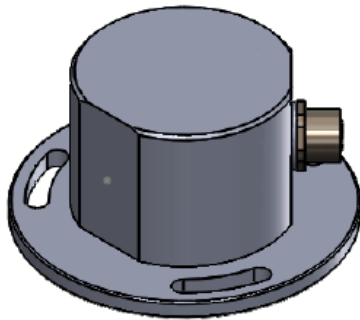


**Analog Signal Output**

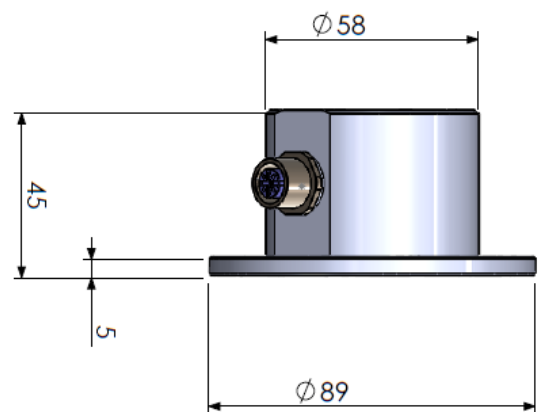
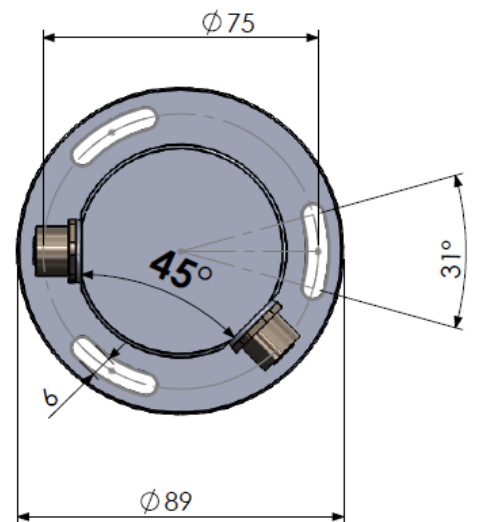
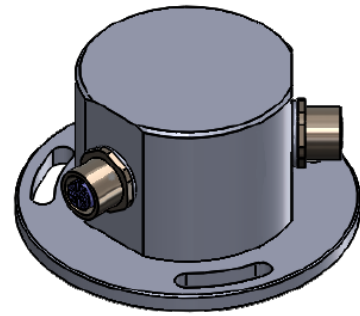


MECHANICAL DIMENSIONS (in mm)

Analog

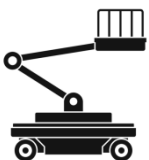


CANopen

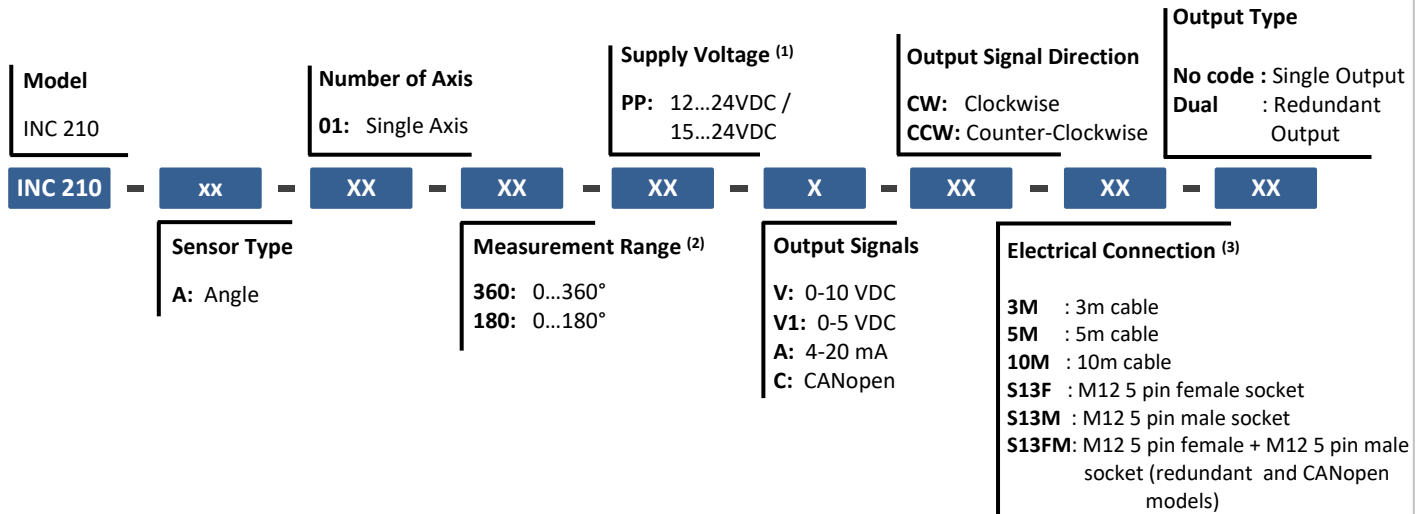


SAMPLE APPLICATION AREAS

- 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



- (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  $\pm 90^\circ$  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, 2 pcs M12 5 pin male socket

## OPTIONAL PRODUCTS

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