



Micro Detectors

Italian Sensors Technology

M.D. Micro Detectors S.p.A.  
Strada S. Caterina 235  
41122 Modena - Italy

tel. + 39 059 420411  
fax + 39 059 253973  
info@microdetectors.com  
www.microdetectors.com



## INC series

Inclination sensor

### characteristics

- resolution: 0,025°
- working range 0...360°
- bus RS485
- selectable analogue output
- adjustment: OFFSET, minimum angle, maximum angle
- AISI316L stainless steel housing
- mono-axial
- MEMS technology



CE



data sheet  
AP001  
02/2017

**NEW !!!**



Inclination sensor





- EASY TO USE
- HIGH TECHNOLOGY
- INNOVATIVE PRODUCT
- 100% MADE IN ITALY
- QUALITY PRODUCT

- inclinations monitoring
- high resolution
- analogue output proportional to detected angle
- robust housing suitable for mobile applications

- solar panel positioning
- vehicle tail lift position
- measurement of inclination of dumper in logistics applications
- wrapping / unwrapping machine
- lift systems



	INC1/D0-3*
operating voltage	24 Vdc +/- 20%
power consumption	< 1 W
operative range	360°
resolution	0.025° @ RS-485
detection axes	1
frequency range	< 3 ms.
technology	MEMS (Micro Electro-Mechanical Systems)
digital output	RS-485 (addressable) 57600 Baud rate - 1 bit stop - no parity
MEMS digital resolution	14 bit
digital resolution analogue output	12 bit
voltage analogue output	0..5 V / 0..10 V (programmabile)
current analogue output	4..20 mA / 0..20 mA / 0..24 mA (programmabile)
load resistor (voltage)	1k...1M Ohm
load resistor (current)	100...500 Ohm
humidity	< 80 % without freeze
temperature range	-25° C...+ 70°C
storage temperature	-30°...+90°C senza condensa
electrical protections	polarity reversal transient
IP protection degree	IP 67 (EN60529)
housing materials	Grilamid + Inox AISI 316 -L
connections	able 5 poles pig Tail M12 5 poles
dimensions	M18
weight	105 gr. (cable version)

## What is it an inclination sensor?

INC series inclinations sensors allow to monitor the inclination of a mobile part of the machine, replacing angular encoders, with the advantage of having no moving parts and without any need of mechanical constraints.

### What is the technology behind the sensor?

The sensor core is a mono axial MEMS inclinometer.

### Which inclination range can I monitor?

INC series sensors have an angular resolution of  $0.025^\circ$  with a working range from  $0^\circ$  to  $360^\circ$ . By means of the programming software, you can define the offset (to realize the zero point mechanical installation) as well as minimum and maximum angles detection. Outside of the programmed working range, the sensor provides an alarm.

## How I can program the sensor?

The sensor has an RS485 input available through which I can program all of the sensor characteristics. The demonstration program for sensor programming can be downloaded free of charge from M.D. ftp site.

## What are the available outputs?

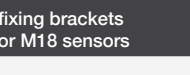
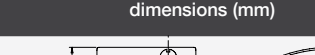
The sensor has an RS485 output that allows you to monitor the inclination on the reference axis (digital resolution of 14bit). An analog output (with a

resolution 12bit) is also available that provides a value proportional to the inclination detected.

**Is the M.D. setup program needed to use the sensor?**


No. The program is provided from the M.D. to facilitate learning and programming the sensor, but it is not necessary for operational use. To use the sensor any program (eg. Telnet) that communicates over RS485 is enough. The sensor is equipped with its own set of commands by means of which it can be programmed and interrogated (for syntax, refer to the User Manual).



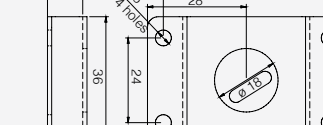
fixing brackets for M18 sensors	ST18-S
	<p data-bbox="359 1861 475 1877">dimensions (mm)</p> 

### ST18-V

fixing brackets  
for M18 sensors



dimensions (mm)



The technical drawing shows the following dimensions (mm):  
 Overall width: 56  
 Overall height: 47  
 Mounting hole diameter:  $\varnothing 4.5$   
 Mounting hole pitch: 17.4  
 Central hole diameter:  $\varnothing 18$   
 Bracket thickness: 1.2  
 Flange thickness: 11.2  
 Flange width: 10  
 Flange height: 36  
 Mounting hole offset from top: 24  
 Mounting hole offset from side: 10  
 Corner radius: R2  
 Cable connector diameter: 9