Inclinometer

RS232/485 Data Communication
Ranges: 0-45 to 0-240º
Rugged Industrial Applications

IT9232

Specification Summary:

GENERAL

Full Stroke Ranges ..... 0-45 to 0-240 degrees
Electrical Interface ..... RS232 or RS485
Format ..... ASCII
Accuracy* ..... ± 1% full stroke
Accuracy option ..... ± 0.5 % full stroke—please consult factory
Resolution ..... ± 0.003% full stroke
Enclosure Material ..... powder-painted aluminum or stainless steel
Sensor ..... plastic-hybrid precision potentiometer
Weight, Aluminum (Stainless Steel) Enclosure ..... 8 lbs. (16 lbs.), max.

**–when plane of pendulum motion parallel to plane of rotation within ± 3°*

ELECTRICAL

Input Voltage ..... 10...30 VDC
Input Current ..... 100 mA, max.
Baud Rate ..... 9600 (programmable to 19.2K)
Configuration Software ..... available @ http://www.celesco.com/download

ENVIRONMENTAL

Environmental Suitability ..... NEMA 4/4X/6, IP 67
Operating Temperature ..... 32º to 176ºF (0º to 80ºC)
Vibration ..... up to 10 G's to 2000 Hz maximum

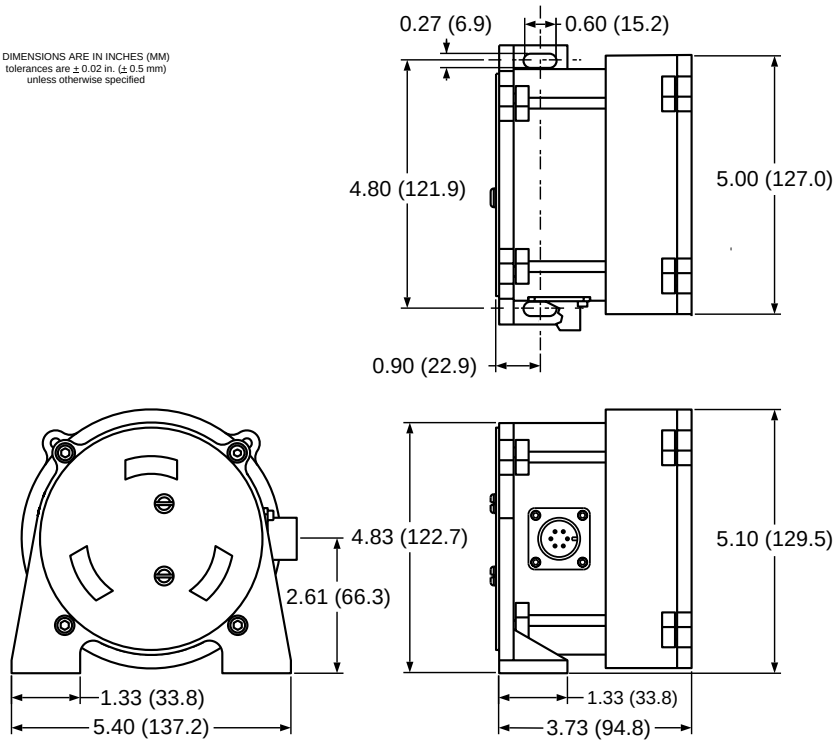
The IT9232 delivers incline position feedback via RS232 or RS485 serial communication to your data acquisition or controller system. The heart of this inclinometer is a magnetically-damped pendulum coupled to a conductive plastic precision potentiometer.

The IT9232 sends real time data that can be configured to produce engineering units or a raw 16-bit count. Additionally this device can be set to continuously send data or send data only when polled.

Software for Win95/98/NT/2000 is available that allows user to access all programmable features including zero-set, address and baudrate settings.

Outline Drawing

DIMENSIONS ARE IN INCHES (MM)
tolerances are ± 0.02 in. (± 0.5 mm)
unless otherwise specified



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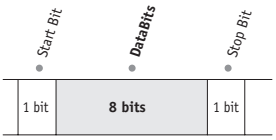
I/O Format

Data Format



no parity bit

Position Output String

8 byte ASCII string:

	D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7	CR

D_0 = sign (space = positive, "-" = negative) D_1 - D_7 = angular position **CR** = return

Sensor Communication:

All communications to/from the transducer are in ASCII. All transmissions are in ASCII.

Command Structure:

Attention Asterisk	Unit Drop Number(1)	Command Code(2)	Space	Return
* <ascii 42>	1 thru V	see below	space <ascii 32>	CR <ascii 13>

(1) Unit Drop Number:

The number of devices is restricted to 32. This is the way to differentiate between multiple units on a single drop. This convention also holds true for a single drop.

The drop number is defined as a single alpha-numeric character starting at 1 and ending at V. The range of available characters are numbers 1...9 and capital letters A...V. The number zero is not supported.

(2) Command Codes

Command	Description
BAUD 1	*set baud rate to 2400 bps*
BAUD 2	*set baud rate to 4800 bps*
BAUD 3	*set baud rate to 9600 bps*
BAUD 4	*set baud rate to 14400 bps*
BAUD 5	*set baud rate to 19200 bps*
UNIT ***n***	***n*** *= actual distance from xx.xxx to xxxxx.x*
RV	*reverse direction of travel scaling*
DROP ***n***	*set unit drop number,* ***n*** *= 1...9 and A...V*
SPAN	*sets the span at present position*
ZERO	*sets the zero to present position*
B1	*sends back the present position in scaled units*
?	*sends back the actual number of the A/D reading (±0...65535, uncalibrated)*
GS/N	*sends back unit serial number*
GFS	*sends back full scale setting in counts (A/D)*
GZERO	*sends back zero scale setting in counts (A/D)*
GRV	*sends back if reversed or not (0 = normal, 1 = reversed)*
VER	*sends back Celesco software version*
GUNIT	*sends back the units of measurement scaled to*
SC	*set to constant send mode (factory preset)*

Ordering Information

IT9232 - _____ - _____ - ____ ____ ____ ____

order code: CW CCW Ⓐ Ⓑ Ⓒ Ⓓ

Sample Model Number:

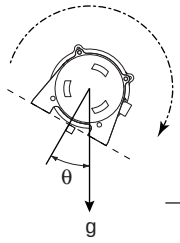
IT9232 - 60 - 120 - AL - D - 232 - M6

CW	clockwise rotation:	60˚	} total rotation = 180˚
CCW	counter-clockwise rotation:	120˚	
Ⓐ	enclosure	aluminum	
Ⓑ	magnetic dampening:	yes	
Ⓒ	data communication:	rs232	
Ⓓ	electrical connection:	6-pin plastic connector	

Ordering Information *(cont.)*

Full Clockwise Rotation:

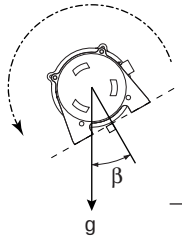
CW *order code:*	**0**	**15**	**30**	**45**	**60**	**75**	**90**	**105**	**120**
θ (clockwise rotation) :	0°	15°	30°	45°	60°	75°	90°	105°	120°



Important--the sum of the Clockwise and Counter-Clockwise Rotations must be in the range of 45° to 240°.

Full Counter-Clockwise Rotation:

CCW *order code:*	**0**	**15**	**30**	**45**	**60**	**75**	**90**	**105**	**120**
β (counter-clockwise rotation) :	0°	15°	30°	45°	60°	75°	90°	105°	120°



Important--the sum of the Clockwise and Counter-Clockwise Rotations must be in the range of 45° to 240°.

Enclosure Material:

Ⓐ *order code:*	**AL**	**SS**
	powder-painted aluminum	303 stainless

Magnetic Dampening:

Ⓑ *order code:*	**D**	**ND**
	magnetic dampening	without magnetic dampening

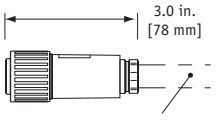
Data Communication:

Ⓒ *order code:*	**232**	**485**
	RS232	RS485

Electrical Connection:

Ⓓ *order code:*	**M6**	**C25**
	6-pin plastic connector with mating plug	25-ft. instrumentation cable 24 AWG, shielded

IP 67, NEMA 6

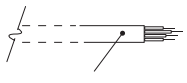


1/2 - 5/16" [14 - 8 mm] cable dia.
16 AWG max conductor size

contact view

pin	RS232	RS485
A	10...30 VDC	10...30 VDC
B	common	common
C	–	Transmitted Data [+]
D	Transmitted Data	Transmitted Data [–]
E	Received Data	Received Data [+]
F	common	Received Data [–]

IP 67, NEMA 6



25 ft. x 0.2-in. dia.
[7,5 M x 5 mm dia.]
24 AWG, shielded

color code	RS232	RS485
Red	10...30 VDC	10...30 VDC
Black	common	common
White	–	Transmitted Data [+]
Green	Transmitted Data	Transmitted Data [–]
Blue	Received Data	Received Data [+]
Brown	common	Received Data [–]