RS232 Data Communication
Ranges: 0-105º to 0-240º
Industrial Grade

IT9232

CE

Specification Summary:

GENERAL

Full Stroke Ranges ..... 0-105 to 0-240 degrees
Electrical Interface RS232
Format ..... HEX
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 ..... 5 lbs. (10 lbs.), max.
**–when plane of pendulum motion parallel to plane of rotation within ± 3°*

ELECTRICAL

Input Voltage ..... 9...22 VDC
Input Current ..... 40 mA, max.
Baud Rate ..... 9600 (programmable to 38.4K)
Update Rate ..... 32 msec

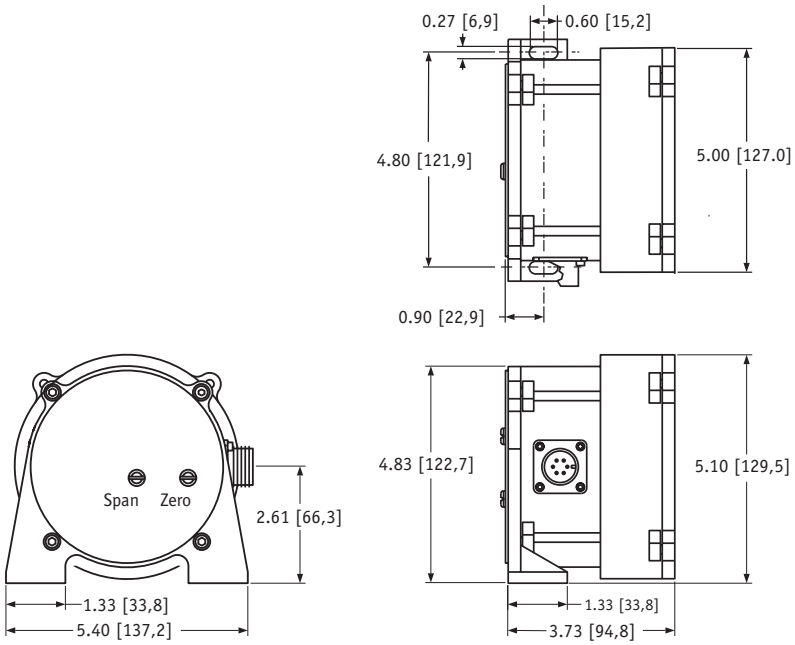
ENVIRONMENTAL

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

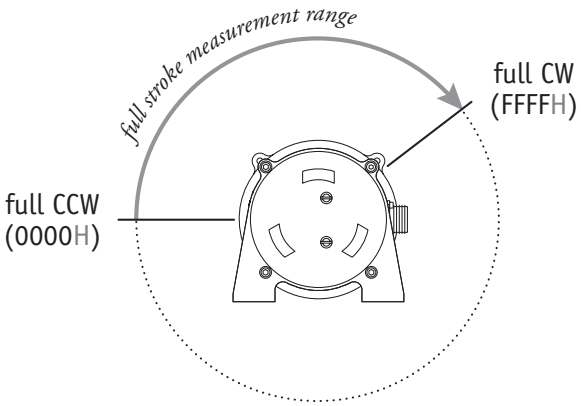
The IT9232 delivers incline position feedback via RS232 serial communication to your data acquisition or controller system. The heart of this inclinometer is a magnetically-damped pendulum coupled to a conductive plastic precision potentiometer.

The IT9232 sends real time data that can be configured to produce engineering units or a raw 16-bit count from 0000H to FFFFH. Additionally this device can be set to continuously send data or send data only when polled.

Outline Drawing



Output Signal



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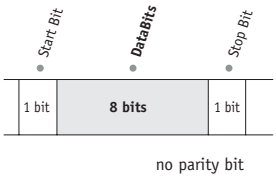
I/O Format:

Data Format



Data Frame

6 byte Hex string:

	STX	CMD	B_0	B_1	B_2	ETX	

STX = 0x02 **CMD** = Command Code* B_0 - B_2 = Data Field* **ETX** = 0x03

** –see below*

Important! All communications to/from the transducer are in **HEX**!

User Commands:

	User Command				*Sensor Response*			
Description	**<CMD>**	**<B_0>**	**<B_1>**	**<B_2>**	**<CMD>**	**<B_0>**	**<B_1>**	**<B_2>**
Get Sensor Info	0x05	0x00	0x00	0x00	0x05	*version*(4)	*date*(5)	*date*(5)
Get Serial Number	0x15	0x00	0x00	0x00	0x15	*serial number*(3)		
Start Continuous Data	0x25	0x00	0x00	0x00	0x25	0x00	0x00	0x00
Stop Continuous Data	0x35	0x00	0x00	0x00	0x35	0x00	0x00	0x00
Get Position Data	0x45	0x00	0x00	0x00	0x45	*CMC*(1)	*CMC*(1)	*status*(2)

(1)CMC - Current Measurement Count (Position)

The **C**urrent **M**easurement **C**ount (**CMC**) is the output data that indicates the present position of the measuring cable.

The CMC is a 16-bit value that occupies the first two bytes (B_0 and B_1) of the data field. B_0 is the MSB (most significant byte) and B_1 is the LSB (least significant byte).

The CMC starts at 0000H with the inclinometer in the full clockwise (**CW**) position and continues counter clockwise to the full counter-clockwise (**CCW**) position stopping at FFFFH. This holds true for all ranges.

(2)Status

The status byte is used as a flag to indicate the validity of the position signal that the internal electronics receives from the potentiometer.

Flags are as follows:
0x00 = GREEN, 0x55 = YELLOW, 0xAA = RED

A "green" flag shows everything OK. A "yellow" or "red" flag indicates that the sensor has either been extended beyond its range or that there is a problem with the potentiometer.

(3)Serial Number

Each sensor has it's own unique serial number. This information can be retrieved by sending the sensor the "Get Serial Number" command.

The serial number is a 3 byte value from which ranges from 0 to 9999999 (decimal).

(4)Version

This is a single byte value (0-255 decimal) which indicates the currently installed firmware version of the sensor.

(5)Date

This is a 2 byte value showing the date of currently installed firmware. This value ranges from 01011 - 12319 (decimal). Format is MMDDY. While the month and day are expressed as two digit numbers the year is expressed in a single digit only.

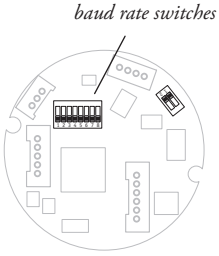
Example: 08054 = August 5, 2004

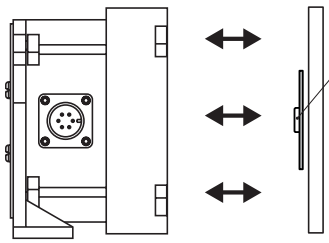
Baud Rate

The baud rate can be set using switches **7** & **8** on the 8-pole DIP switch found on the rs232 controller board located inside the transducer.

DIP-7	DIP-8	baud rate
0	0	9600
1	0	19200
0	1	38400
1	1	9600

RS232 Controller Board and DIP Switch Location





internal dip switches & controller board

to gain access to the controller board, remove four Allen-Head Screws and remove end cover bracket.

Ordering Information:

Model Number:

IT9232 - _____ - _____ - ___ ___ ___
order code: CW CCW Ⓐ Ⓑ Ⓒ

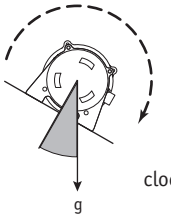
Sample Model Number:

IT9232 - 60 - 120 - AL - D - M6

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

Full Clockwise Rotation:

CW order code:	0	15	30	45	60	75	90	105	120
	0º	15º	30º	45º	60º	75º	90º	105º	120º

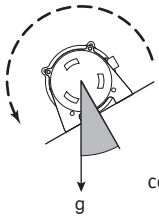


clockwise rotation

Important--
the sum of the Clockwise and Counter-Clockwise Rotations must be in the range of 105º to 240º

Full Counter-Clockwise Rotation:

CCW order code:	0	15	30	45	60	75	90	105	120
	0º	15º	30º	45º	60º	75º	90º	105º	120º



counter-clockwise rotation

Important--
the sum of the Clockwise and Counter-Clockwise Rotations must be in the range of 105º to 240º

Enclosure Material:

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

Dampening Option:

Ⓑ order code:	D	ND
	magnetic dampening	without magnetic dampening

Ordering Information:

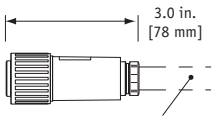
Electrical Connection:

order code:

M6

6-pin plastic connector with mating plug

IP 67, NEMA 6



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

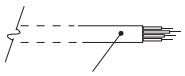
contact view

pin	
A	9...22 VDC
B	common
C	–
D	Transmitted Data
E	Received Data
F	common

C25

25-ft. instrumentation cable 24 AWG, shielded

IP 67, NEMA 6



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

color code	
Red	9...22 VDC
Black	common
White	–
Green	Transmitted Data
Blue	Received Data
Brown	common