WTS Inclinometer

All-weather radio telemetry Inclinometer system

Features

- Advanced MEMS inclinometer design for ultra-reliability and performance
- Distortion free digital 2 way radio system for data integrity
- Very low power consumption for long battery life
- Worldwide licence exempt 2.4 GHz radio
- Remote power on/off (sleep/wake)
- 100 metre (328 feet) range
- Rechargeable or Alkaline Battery Options
- Stainless Steel sealed construction for all-weather use

WTS Wireless Inclinometer

The WTS Wireless Inclinometer is a flexible, all-weather radio telemetry system designed to provide high accuracy remote angle measurement data. The WTS enables surveyors, geotechnical specialists and structural engineers to record and log data remotely without the cost and impracticality of traditional wired methods.

The WTS Wireless Tilt System operates on licence free, worldwide 2.4GHz and although other equipment uses this frequency, the WTS uses a proprietary protocol based on an 804.15.4 chip. This allows the WTS to co-exist with Bluetooth, Zigbee and WiFi devices without conflict.

The heart of the system is the WTS Wireless Inclinometer; a high-accuracy robust instrument utilising advanced MEMS sensor technology to ensure maximum reliability. A variety of complementary base stations and either PC or handheld data acquisition modules is offered to allow a complete measurement system to be configured to suit any particular application. Backed by Sherborne Sensors' comprehensive 2-year warranty the WTS Wireless Tilt System may be specified and used with confidence throughout the world.

Dimensions
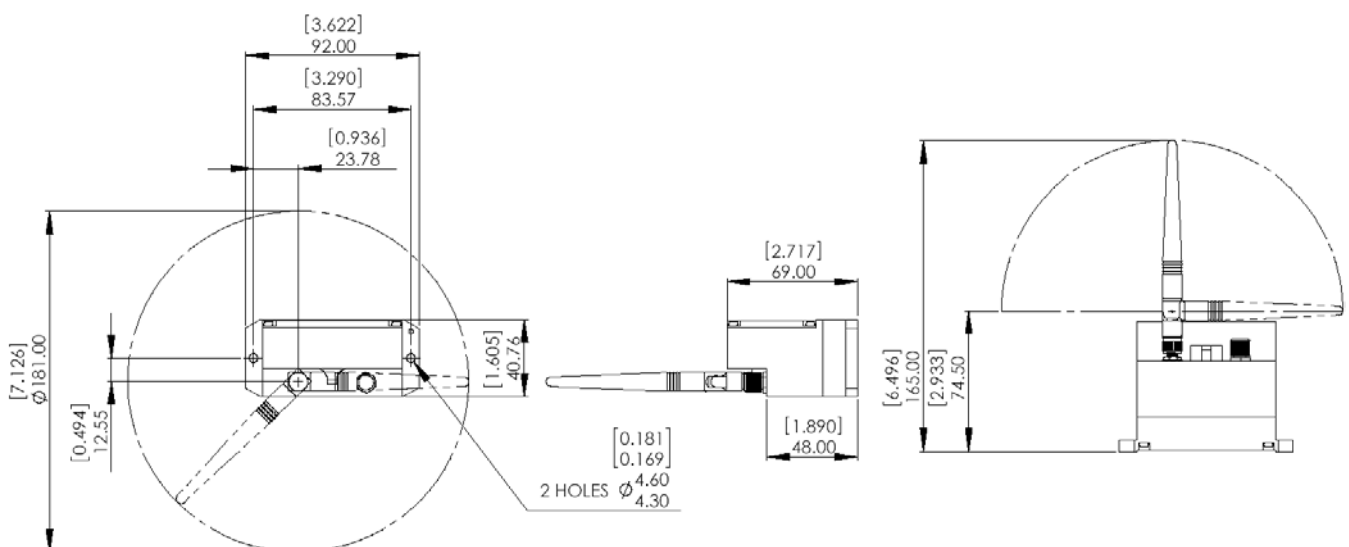
Sherborne Sensors, a Nova Metrix company

System Specification

					Units
Full Range	±5°	±15°	±30°	±60°	Degrees
Deviation from True Angle	0.03	0.04	0.06	0.35	% Full Range (max)
Resolution	0.003°	0.003°	0.004°	0.006°	Degrees
Thermal Zero Shift	±0.007°				Degrees (max)
Thermal Sensitivity Shift	±70				ppm/°C (max)
Zero Offset	±0.05°				Degrees (max)
-3db Frequency	5				Hertz
Internal Resolution	24				Bits
Data Format					Degrees
Warm Up Time	< 5				Seconds (to 99.9% of final value)

General Radio

	Min	Typical	Max	Units
Licence		Licence Exempt		
Modulation method		MS (QPSK)		
Radio type		Transceiver (2 way)		
Data rate		250		kbits/sec
Radio Frequency	2.4000		2.4835	GHz
Power		1		mw
Range			100 (328)	Metres (feet) *
Channels (DSSS)		16		

- Typical range achieved in open field site with WTS at a height of 1 metre (3 feet) above ground and handheld display held at chest height pointing towards the WTS.

Battery Life in Low Power Mode Generating Results at 3Hz	Usage	Typical Battery Life
2 x AA Alkaline cells	Constantly on	25 Hours
2 x AA Alkaline cells	3 sessions per day of 5 minutes	100 Days
Rechargeable Li-Ion Pack	Constantly on	45 Hours
Rechargeable Li-Ion Pack	3 sessions per day of 5 minutes	180 Days

| Environmental	Min	Max	Units
Operating temperature range	-20	+60	°C
Storage temperature	-20	+85	°C
Humidity	95		%RH
Shock Survival	1000g, 0.5msec, ½ sine		
Vibration Endurance	20g rms, 20 Hz to 2000 Hz sinusoidal		
Sealing	IP67 / NEMA 6		
EMC	Complies with EMC directive. 2004/108/E, The Radio Equipment and Telecommunications Terminal Equipment (R&TTE) Directive, 1999/5/EC		

Ordering Information

WTS-H-NR+Range   Horizontally mounted WTS Wireless Inclinometer (Non-Rechargeable).
WTS-V-NR+Range   Vertically mounted WTS Wireless Inclinometer (Non-Rechargeable).
WTS-H-R+Range   Horizontally mounted WTS Wireless Inclinometer (Rechargeable).
WTS-V-R+Range   Vertically mounted WTS Wireless Inclinometer (Rechargeable).
WTS-HS   Handheld display for connection to a single WTS Wireless Inclinometer.
WTS-HA   Handheld display for connection up to 12 x WTS Wireless Inclinometers.
WTS-HR   Handheld display for roaming connections to unlimited numbers of WTS Wireless Inclinometers
WTS-BSU   USB base station to interface with PC to use WTS software.
WTS-BSI   USB, RS232 and RS485 base station to interface with PC to use WTS software.
WTS-Viewer   PC Software to view and log output of one inclinometer at a time.
WTS-Log24   PC Software to view and log output of up to 24 inclinometers at a time.

WTS-H-xx-xx & WTS-V-xx-xx Options

WTS-H-xx-xx version is mounted with its 0° position horizontally. Angle of inclination is measured from the horizontal.

WTS-V-xx-xx version is mounted with its 0° position vertically. Angle of inclination is measured from the vertical.
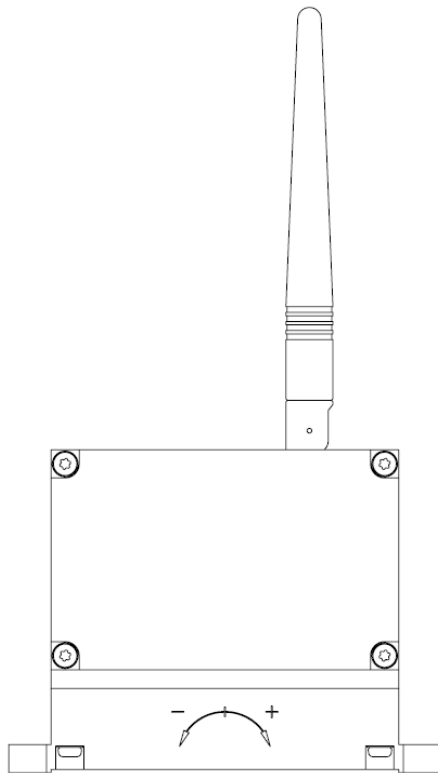
WTS-H-xx-xx
SHOWN AT 0° POSITION
ROTATE CLOCKWISE FOR POSITIVE OUTPUT
ROTATE COUNTER-CLOCKWISE FOR NEGATIVE OUTPUT
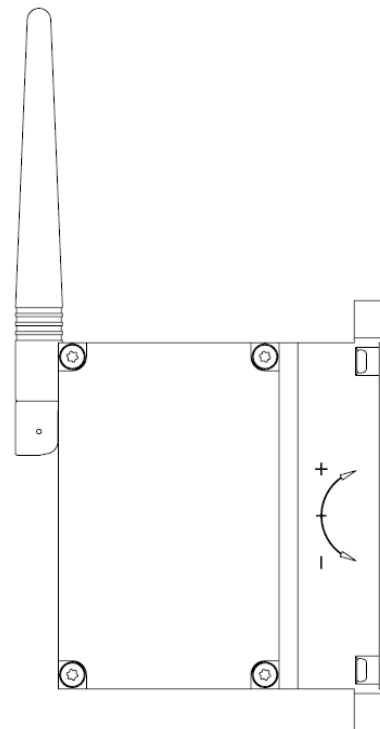
WTS-V-xx-xx
SHOWN AT 0° POSITION
ROTATE CLOCKWISE FOR POSITIVE OUTPUT
ROTATE COUNTER-CLOCKWISE FOR NEGATIVE OUTPUT

WTS Wireless Tilt System

All-weather radio telemetry Inclinometer system

Introduction

The WTS Wireless Tilt System is a flexible, all-weather radio telemetry system designed to provide high accuracy remote angle measurement data. The WTS enables surveyors, geotechnical specialists and structural engineers to record and log data remotely without the cost and impracticality of traditional wired methods.

The heart of the system is the WTS Wireless Inclinometer; a high-accuracy robust instrument utilising advanced MEMS sensor technology to ensure maximum reliability. A variety of complementary base stations and either PC or handheld data acquisition modules is offered to allow a complete measurement system to be configured to suit any particular application.

Highway agencies, bridge and civil structure owners spend large revenues assessing structural health by visual or other types of consuming inspection methods of bolted and welded joints, together with other vital structural elements. Obtaining multiple readings to monitoring the entire structure can be costly and labour intensive. Using the WTS Wireless Tilt System, a single structure can be fitted with low power WTS Inclinometers at strategic points, thus helping to determine where weak points may be and when maintenance is required.

Additionally, the WTS Wireless Tilt System may be used in the verification of design calculations when new structures are manufactured providing valuable data to refine computer models of structural behaviour.

Why Choose WTS?

The WTS system offers up to 328ft (100m) wireless range, up to 18-bit resolution, exceptional battery life (up to 5 years).

Distortion free data reliability is ensured by the digital nature of the WTS system and many devices can operate on the same radio channel depending on the sample rate of the acquisition modules present in the system. There are 16 channels available with each one capable of supporting up to 200 data packets per second.

The WTS Wireless Tilt System operates on licence free, worldwide 2.4GHz and although other equipment uses this frequency, the WTS uses a proprietary protocol based on a 804.15.4 chip. This allows the WTS to co-exist with Bluetooth, Zigbee and WiFi devices without conflict.

Backed by Sherborne Sensors' comprehensive 2-year warranty the WTS Wireless Tilt System may be specified and used with confidence throughout the world.
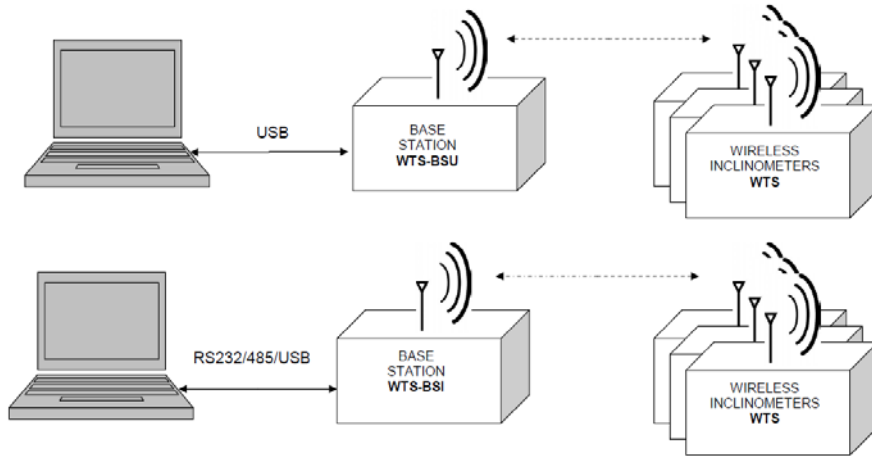
Features

- Advanced MEMS inclinometer design for ultra-reliability and performance
- Distortion free digital 2 way radio system for data integrity
- Very low power consumption for long battery life
- Worldwide licence exempt 2.4 GHz radio
- Option of hand held remote display or PC interface for data capture
- Remote power on/off (sleep/wake)
- > 100 metre (328 feet) range
- Multi-channel operation
- Backed by Sherborne Sensors' comprehensive 2-year warranty the WTS Wireless Tilt System may be specified and used with confidence throughout the world.

System Configurations – PC based

System Configurations – Hand Held

Sherborne Sensors
.... the first choice in precision

VISA   MasterCard   AMERICAN EXPRESS

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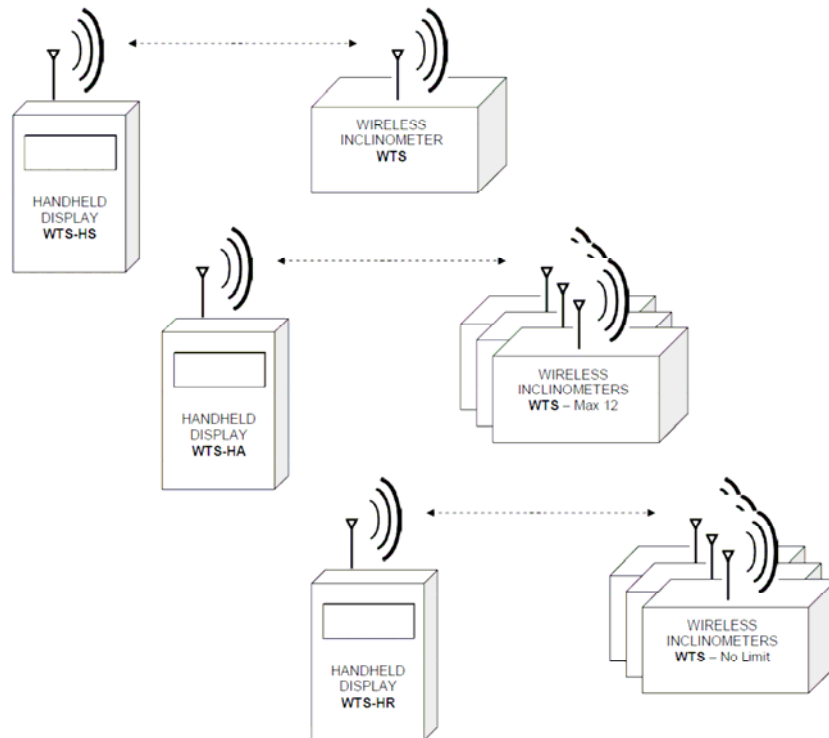
WTS Wireless Inclinometer

The WTS Wireless Inclinometer offers precision measurement with high performance two-way telemetry. See separate datasheet for more details.

Handheld Displays

- Simple wireless display of output from WTS Wireless Inclinometer(s).
- Auto 'power on' and 'power off' of remote WTS Wireless Inclinometer(s).
- Powered by two standard alkaline 'AA' batteries.
- Waterproof to IP65 NEMA 4.

WTS-HS

- Handheld display for connection to a single WTS Wireless Inclinometer.
- This handheld display provides an 6 digit LCD reading from a single 'matched' WTS Wireless Inclinometer.
- Status indicators inform the user if the remote WTS Wireless Inclinometer has a low battery or low signal error.

WTS-HA

- Handheld display for connection up to 12 x WTS Wireless Inclinometers.
- This handheld display provides an 6 digit LCD reading from up to 12 WTS Wireless Inclinometers.
- Allows the user to select which WTS Wireless Inclinometers output to display.
- Status indicators inform the user if the remote WTS Wireless Inclinometer has a low battery or low signal error.

WTS-HR

- Handheld display for roaming connections to unlimited numbers of WTS Wireless Inclinometers.
- Displays ID of 'live' sensor.
- This handheld display provides an 6 digit LCD reading from an unlimited number of WTS Wireless Inclinometers.
- A simple search button is pushed when in the proximity of any WTS Wireless Inclinometer. The module with the highest signal strength, and nearest to the handheld, will initially be selected and displayed. The data tag or 'ID' of the WTS Wireless Inclinometer being read is displayed prior to the output reading, allowing identification of the data's origin. Other WTS Wireless Inclinometers can be displayed by scrolling.
- Ideal for systems where manual reading of WTS Wireless Inclinometers is required but the number is unknown or may be variable.
- Status indicators inform the user if the remote WTS Wireless Inclinometer has a low battery or low signal error.
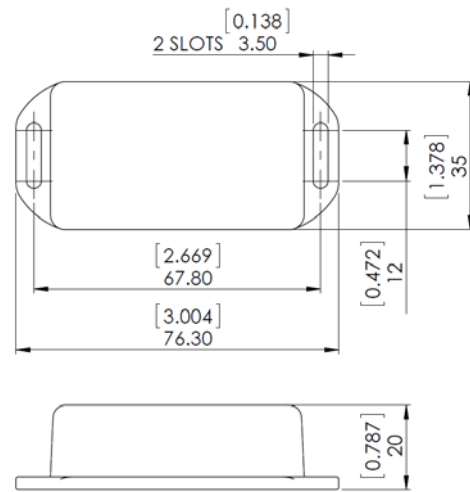
PC based Solution

WTS-BSU Base Station

The WTS-BSU is a simple USB device. It draws power from the USB bus and therefore no further components are required to control remote devices from a PC.

WTS-BSI Base Station

The WTS-BSI is the industrial base station, housed in an IP65 standard enclosure. This device offers far more interface options for a user. The WTS-BSI can be powered and controlled using a single USB interface; however the WTS-BSI also has serial RS232 and RS485 interfaces at baud rates of 9600-460800. When using either of the serial interfaces the device must be powered externally.
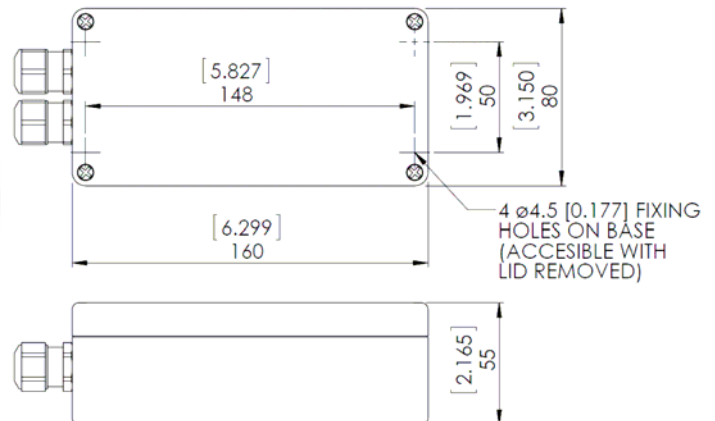
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WTS-Viewer PC Software
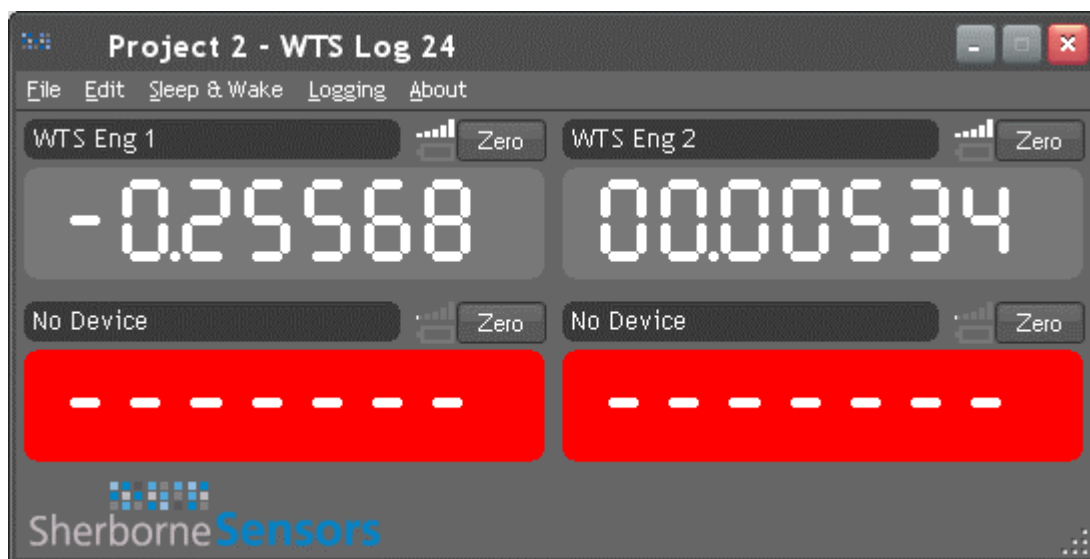
With this software you can:
- Select a required device.
- View the value on a simulated LCD display.
- Log the data to a CSV file.

WTS-Log-24 PC Software

With this software you can:
- View up to 24 displays of data gathered from WTS Wireless Inclinometers.
- Configure the number of channels, log interval, display resolution etc.
- Log data to CSV file for easy viewing in MS Excel.