

Wi-Corr Clamp: Wireless Corrosion Transmitter

Features

Quick, non-invasive installation on live plant

Low profile sensor can be installed under insulation

Separate wireless and sensing modules provide flexibility in locating transmitter to maximise RF range and minimise repeaters

Automatic reporting and analysis

Self-organising mesh network

High measurement resolution

Intrinsically safe system (Zone 1)

High reliability ensured by continuous on-board diagnostics

Applications

Corrosion and erosion monitoring of difficult-to-reach locations.

Rapid detection of accelerated corrosion.

General Description

The patented Wi-Corr Clamp wireless corrosion transmitter is comprised of a battery powered wireless communication unit (Wi-Corr WU-Clamp) which connects to an ultrasonic sensor (Wi-Corr US201) and optionally, a temperature sensor (Wi-Corr TMP201-Clamp). The wireless unit is housed in a lightweight, rugged enclosure and automatically forms part of a self-organising radio network when deployed. Wi-Corr's robust, installation fixtures ensure that the sensors are reliably clamped to the pipework in minutes with no welding is required.



This non-invasive, proven process is compatible with straight pipes and elbows.

General Specifications:

Wireless Unit: WU101_Clamp

Enclosure: Glass-Reinforced Polyester.

Ingress Protection: IP65

Dimensions: 130mm x 135mm x 90mm

Weight: 1.5kg

Operating Temperature: -40°C to +70°C

Storage Temperature: -40°C to +85°C

Humidity Limits: 0-100% relative humidity

Ultrasonic Sensor: US201

Housing: Stainless steel 304

Straps / Mounting System: Stainless steel 316

Ingress Protection: Certified to IP66/68

Dimension: <50mm total deployed height

Cable length: 1.5 metres (standard).

Extension cables available

Total Weight (transducer, mount, straps): 1.0-1.4kg

Min and max continuous operating temperature of pipework: -40°C to +380°C. Variations are available for temperatures up to 550°C

Humidity Limits: 0-100% relative humidity

Measurement Specifications:

Technique: Ultrasonic Pulse-Echo

Standard Measurement Range:

3.3mm – 20mm.

Contact 3-Sci if a wider measurement range is required.

Resolution: 0.01mm (0.4 mil)

Repeatability: 0.01mm (0.4 mil)

Compatible Pipe Diameters: 3" to 16"

User Data: Metal thickness

Rate of Metal Loss

Ultrasonic A-Scan

Units: Imperial or metric

Additional Measurement Options:

Pipe temperature. Implementation of this additional measurement parameter yields automatic temperature compensation of ultrasonic velocity and improved measurement resolution.

Temperature Sensor Specifications:

Recommended temperature sensor:

Wi-Corr TMP201-Clamp

Sensor Type: Platinum RTD

Range: -40°C to +380°C

Resolution: 0.1°C

Repeatability: 1°C

Accuracy: 1°C

Lifetime: 7+ year power module life based on reference conditions: 1 measurement per day (>1800 measurements), 25°C, routing data for up to three additional wireless devices.

Power supply: 3 x user-replaceable, commercially available, Tadiran SL2770 Lithium Thionyl Chloride C cells. Certified for replacement in hazardous zones.

Wireless Specifications:

Protocol and Channel:

2.4GHz self-organising mesh network enabling coexistence with IEC 62591 (WirelessHART).

Range: >100 metres (line of sight)

Modulation: Direct Sequence Spread Spectrum (DSSS)

Wireless units per gateway: 1 - 250

Gateways per user interface: Up to 4

Transmit Rate: On-command at any time or automated transmissions via the user interface with a selectable periodicity of every hour to once per year.

Diagnostics:

Calibration & verification: Continuous diagnostics are conducted on ultrasonic parameters and system performance, to detect:

Low battery

Temperature sensor installed

Temperature sensor malfunction

Internal timing error

Ultrasonic sensor malfunction

High and low pipe temperature

High and low ambient temperature

Thickness under range (<3.3mm)

Thickness over range (>20mm)

Measured thickness approaching limit

Problem with clamped installation

If a problem is detected, the user interface will describe the problem and recommend a course of action.

Product Approvals
Hazardous Locations

The Ultrasonic Sensor and the Wireless Unit are covered by separate certificates. Connection of the two systems is covered using the terminal parameters stated in the two individual certificates. Both units may be installed in the following hazardous zones: Zone 1 or Zone 2.

Wi-Corr Wireless Unit
ATEX and IECEx:
Certificate Numbers:

Baseefa15ATEX0116X
IECEX BAS 15.0083X

Wi-Corr Clamp Ultrasonic Sensor

Manufactured by Ionix Advanced Technologies under the equipment name "Hotsense Ultrasonic Thickness transducer HS0310-25-113912".

ATEX and IECEx:
Certificate Numbers:

ExVeritas 18 ATEX 0333X
IECEX EXV 18.0009X

European Union Directives

Meets all relevant requirements of the Radio and Telecommunications Terminal Equipment Directive (R&TTE).

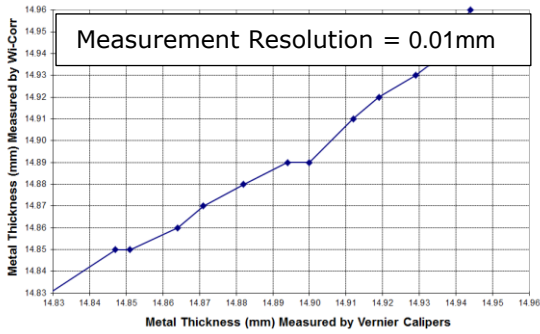

Relevant Approvals:

EN 301 489-1 V1.9.2
EN 301 489-17 V2.2.1
EN 61326-1:2013
EN 61326-2-3:2013
BS EN ISO/IEC 80079-34:2011
BS EN ISO/ IEC 60079-11:2012
BS EN 60079-0:2012 +A11:2013

Typical Performance Characteristics

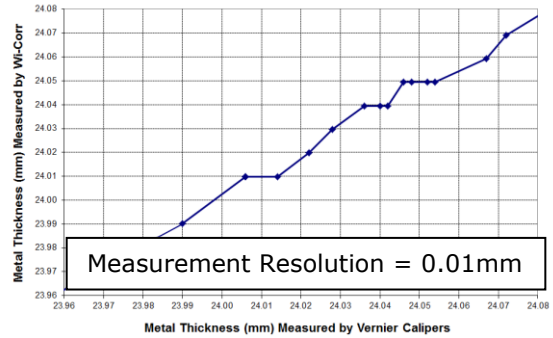
Resolution

Test: Metal removal with milling machine
15mm mild steel sample @ 20°C



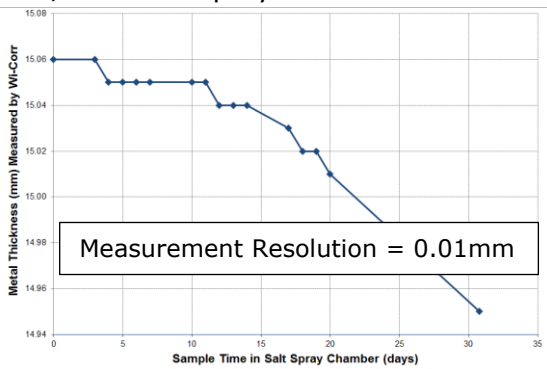
Resolution

Test: Metal removal with milling machine
24mm mild steel sample @ 20°C



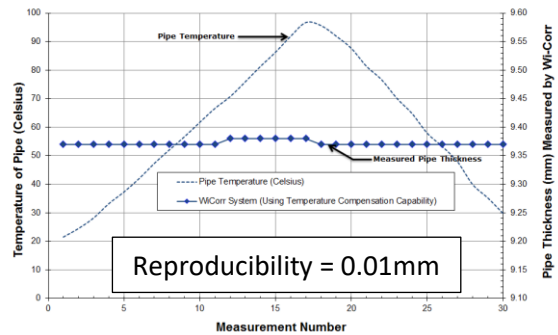
Resolution

Test: Accelerated Corrosion. Metal removal of mild steel sample in a Q-Fog CCT/1100 salt spray corrosion cabinet.



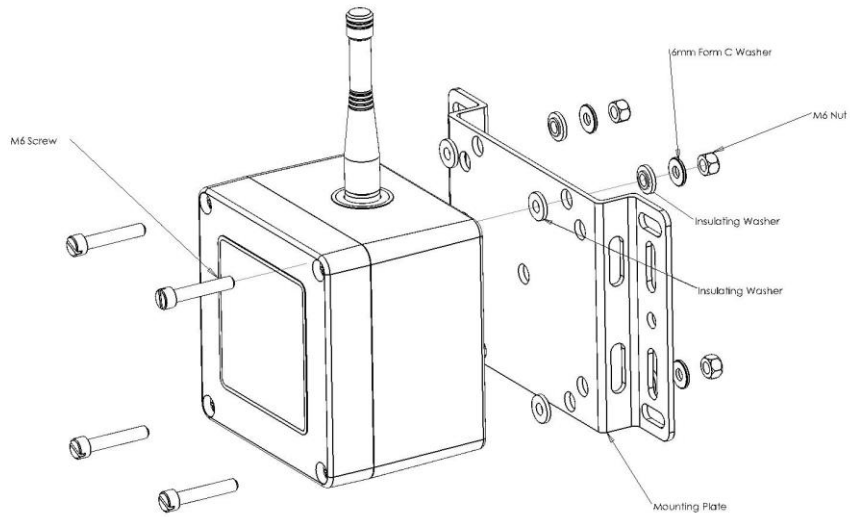
Temperature Compensation

Test: Reproducibility. Temperature cycle of a 5" diameter pipe with light internal and external corrosion.

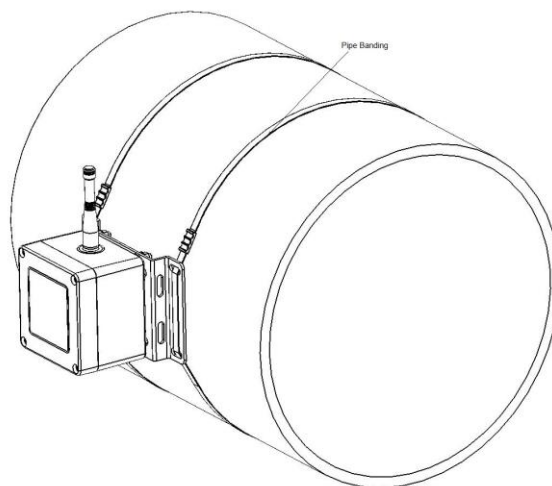
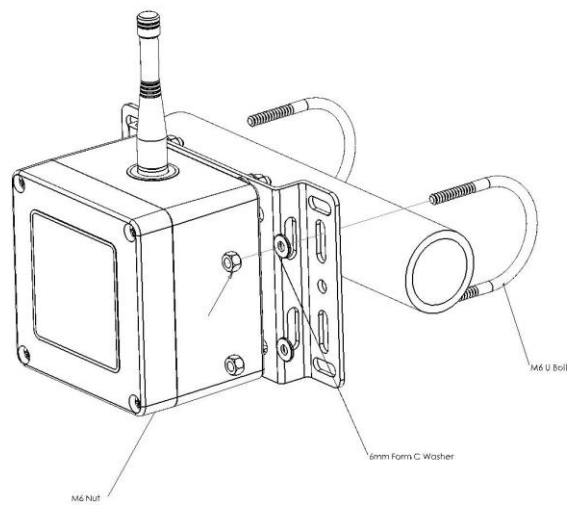


Installation Details: Wi-Corr WU Wireless Transmitter

Wi-Corr Mounting Bracket (Part Number: MK01)

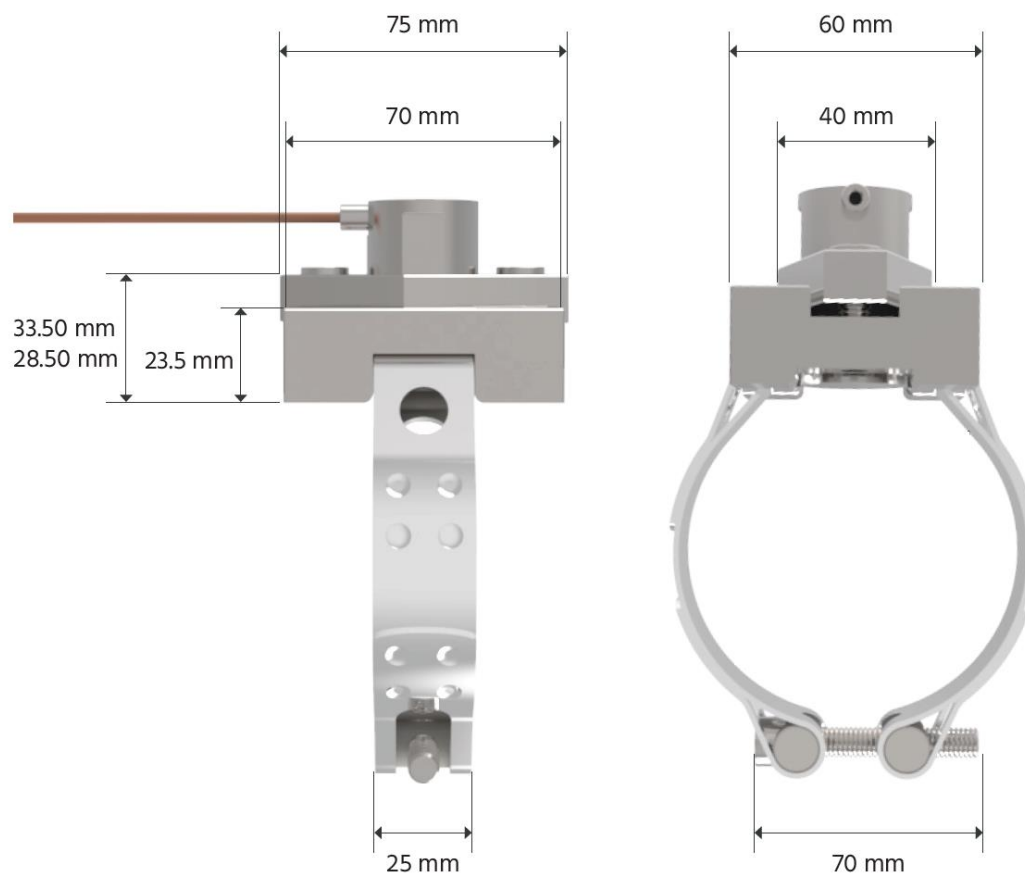


MK01 Mounting Options



Dimensional Details: Wi-Corr Clamp Ultrasonic Sensor

With 3-Sci's recommended installation procedures, the Wi-Corr Clamp Ultrasonic Sensor can be quickly installed on live plant in minutes and relied upon to remain operational for many years. An ultrasonic test set with A-scan capability can be used to confirm the ultrasonic coupling to the pipe before connection to the wireless unit, if desired. Dimensions of the US201, Wi-Corr Clamp Ultrasonic Sensor inclusive of mounting system is shown below:



Recommended pipe surface preparation: Cleaned back to base metal (SSPC SP-10)

Ordering Information: Wi-Corr Clamp 1 System

Ultrasonic Sensor for Clamped Applications

Wi-Corr Clamp US201 sensors can be supplied with mounting hardware for all common ANSI pipe diameters. Other sizes are available via special request. The sensors are supplied with a 1.5 metre cable length. If a longer cable length is required, use of the cable extension accessory CBE-1.5 is recommended. See the following Ordering Information for more details regarding part numbers.

Wi-Corr US201 – XX – S

Part Number incorporates: the sensor type, pipe diameter and cable length.

Standard pipe diameter:

03	4" ANSI Pipe Diameter
04	5" ANSI Pipe Diameter
06	6" ANSI Pipe Diameter
08	8" ANSI Pipe Diameter
10	10" ANSI Pipe Diameter
12	12" ANSI Pipe Diameter
14	14" ANSI Pipe Diameter
16	16" ANSI Pipe Diameter

Cable Length:

S	1.5 metre cable length (standard)
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Longer cable lengths can be accommodated through the use of the cable extension accessory (CBE-1.5)

Ordering Information: Wi-Corr Clamp 1 System

Accessories:

Part Number	Description
TMP201_Clamp	Temperature Sensor
WU101_Clamp	Wireless Unit
MK01	Universal High Temperature Steel Mounting Bracket for WU101
MK02	Nylon Mounting Bracket for WU101 (for long term deployment on pipes at temperatures < 80°C)
GW101	Low Cost Wireless Gateway (includes mains power adaptor). Must be located in a non-explosive zone.
GW_ANT_EX	Gateway antenna compatible with explosive zones for use with GW101. Antenna is rated for Zone 1 / Zone 2 Hazardous Area Environments and is supplied with a 5-metre cable and mounting brackets, as standard. IECEX markings: IECEX Ex e IIC T6 Gb Ex t IIIC T85°C Db
GW_ANT_OUT	Non-ATEX Gateway Antenna (for outdoor use). Supplied with mounting brackets.
GW_ANT_IN	Non-ATEX Gateway Antenna (for indoor use only)
GW_EX	Wireless Gateway for use in Explosive Zones. Gateway is mounted within a flameproof enclosure. IECEX markings: Ex d [ia IIC Ga] IIB+H2 T5 Gb Ex tb [ia Da] IIIC T100°C Db -40°C or -20°C ≤ Tamb ≤ 60°C
MS01	USB memory stick containing PC based Wi-Corr Trend user interface software and manuals
D01	Licence dongle for Wi-Corr Trend User Interface Software
Cable Extenders	
CBE-1.5	Additional, 1.5 metre cable extensions for the ultrasonic sensor and temperature sensor.