Industrial Interface Wireless Solutions

Martin Sime

Martin Sime

Industrial Interface Systems Ltd

End-to-end Industrial IoT Solutions

Sensors

Temperature
Pressure
Flow
Inclination
Humidity
Force
Position

Conversion of analogue or digital signals to wireless

Sensor protocols

Short Range:
Bluetooth Low Energy

Bluetooth

Long Range:
IEEE 802.15.4 2.4 GHz (MiWi Pro)

IEEE

LoRa in development

LoRa

Gateways

Full Gateway with IoT modem

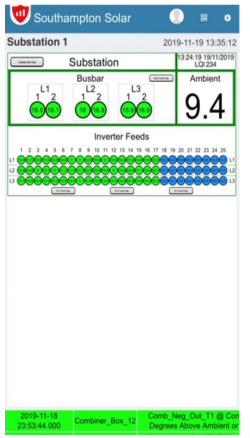
Modbus RTU or TCP/IP communications output over RS232/485 or Ethernet

Management Protocols

MQTT.ORG

android

Cloud (Back end)



amazon web services

Azure

On premises

From Sensors to Knowledge Complete Solutions

Wireless Transmitters and Receivers

Wireless Sensors

Pressure
Temperature
Strain Gauge/Load Cell
4-20mA or Voltage Input
Flow & Level switches
AC Current Transformer
Any standard 4-20mA transmitter
Inclinometers
OEM Custom Wireless sensors

Complete Cable replacement systems

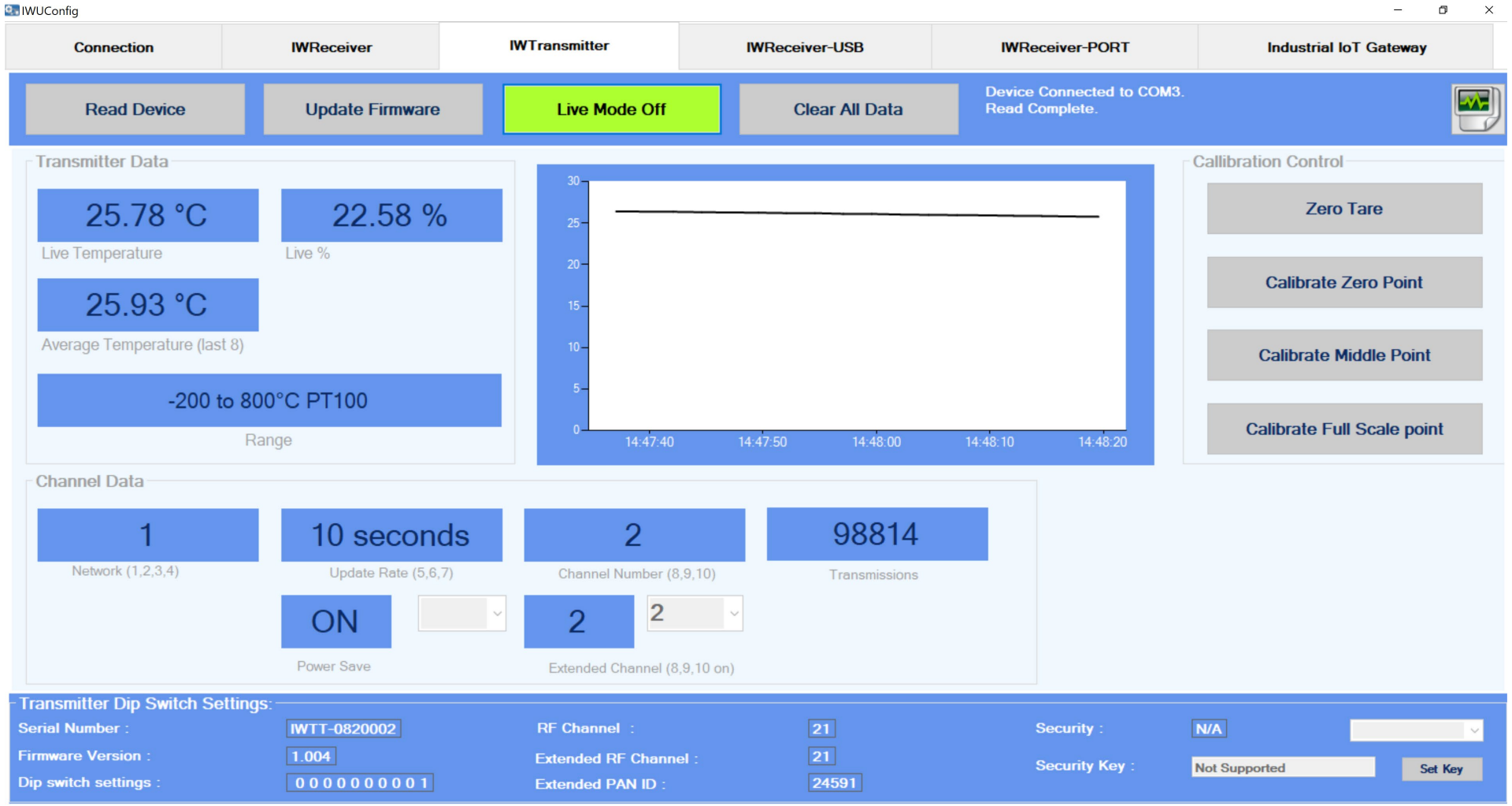
Sensata Proprietary Information. Strictly Private.

IWT Part Numbers Types

IWPT	Pressure Sensor Range
IWTT	Temperature Sensor Range
IWDigT	Switch input Sensor
IWmAT	mA input Sensor
IWVT	Voltage input Sensor
IWCTT	Current Transformer (DC mV) sensor
IWTRhT	Temperature & Relative Humidity
IWTxT	mA input with Transmitter Supply
IWLoadT	Load Cell input
IWTiltT	Biaxial Inclinometer
IWPulsT	Pulse Input (Flow meter etc)

Sensata Proprietary Information. Strictly Private.

IWU Config Transmitter Configuration and Monitoring Tool



Sensata Proprietary Information. Strictly Private.

IWR-1 & IWR-5 Receivers

- 1 or 5 off Analogue Outputs
- 4-20mA or 1-5Vdc
- 1 off Relay alarm output – LED Indication
- DC Power Supply
- LED Indication of Received data
- Fail-safe mode if transmissions aren’t received

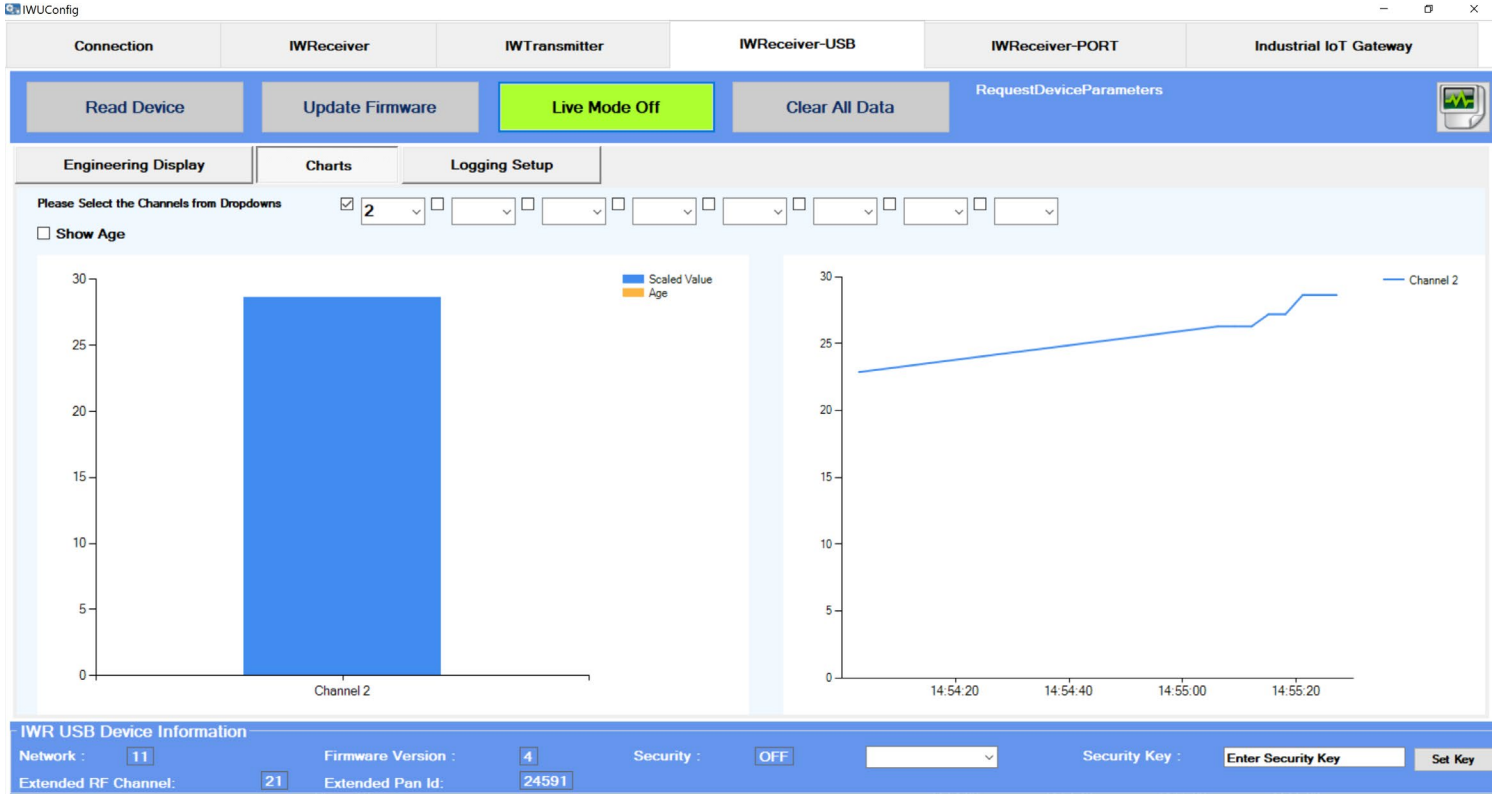
Sensata Proprietary Information. Strictly Private.

IWR-SET – PC Configuration Software for Wireless Receivers

Sensata Proprietary Information. Strictly Private.

IWR-USB Receiver – Ideal for Data Logging

Plugs into standard USB PC socket
Receives Data from up to 128 IWT Wireless Sensors
Packaged software allows all parameters to be displayed
Logs data to Excel compatible .csv file



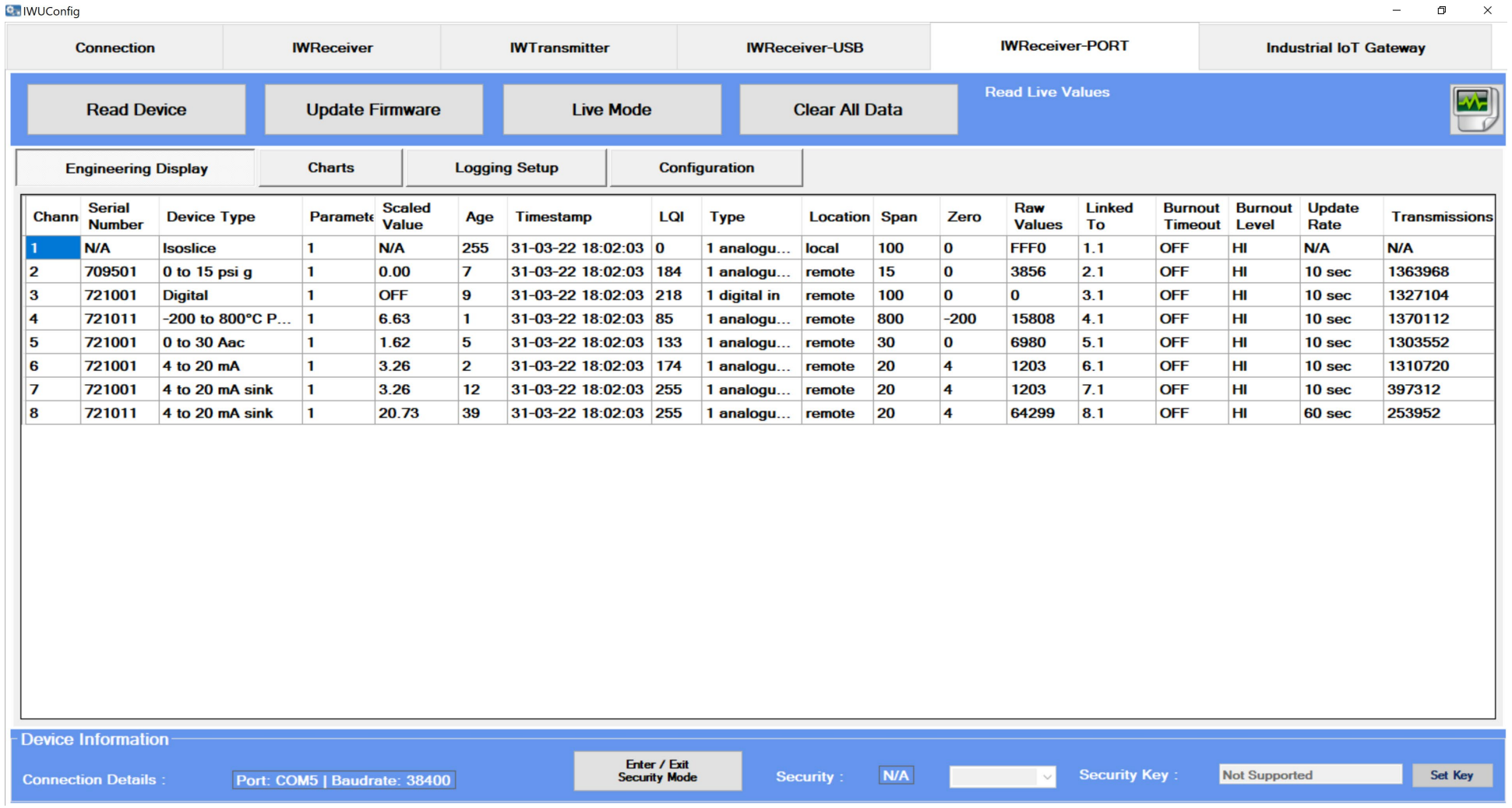
Sensata Proprietary Information. Strictly Private.

IWR-Port Receiver with Communications

- Accepts inputs from up to 128 IWT wireless sensors
- RS232, RS485 or Ethernet Communication Ports
- All data available as Modbus registers
- Data includes: Latest valid reading received
  - Link Quality
  - Seconds since last reading
- Local display of Sensor values, LQI and Seconds since last receipt
- Can add Isoslice I/O units to combine wireless & wired inputs

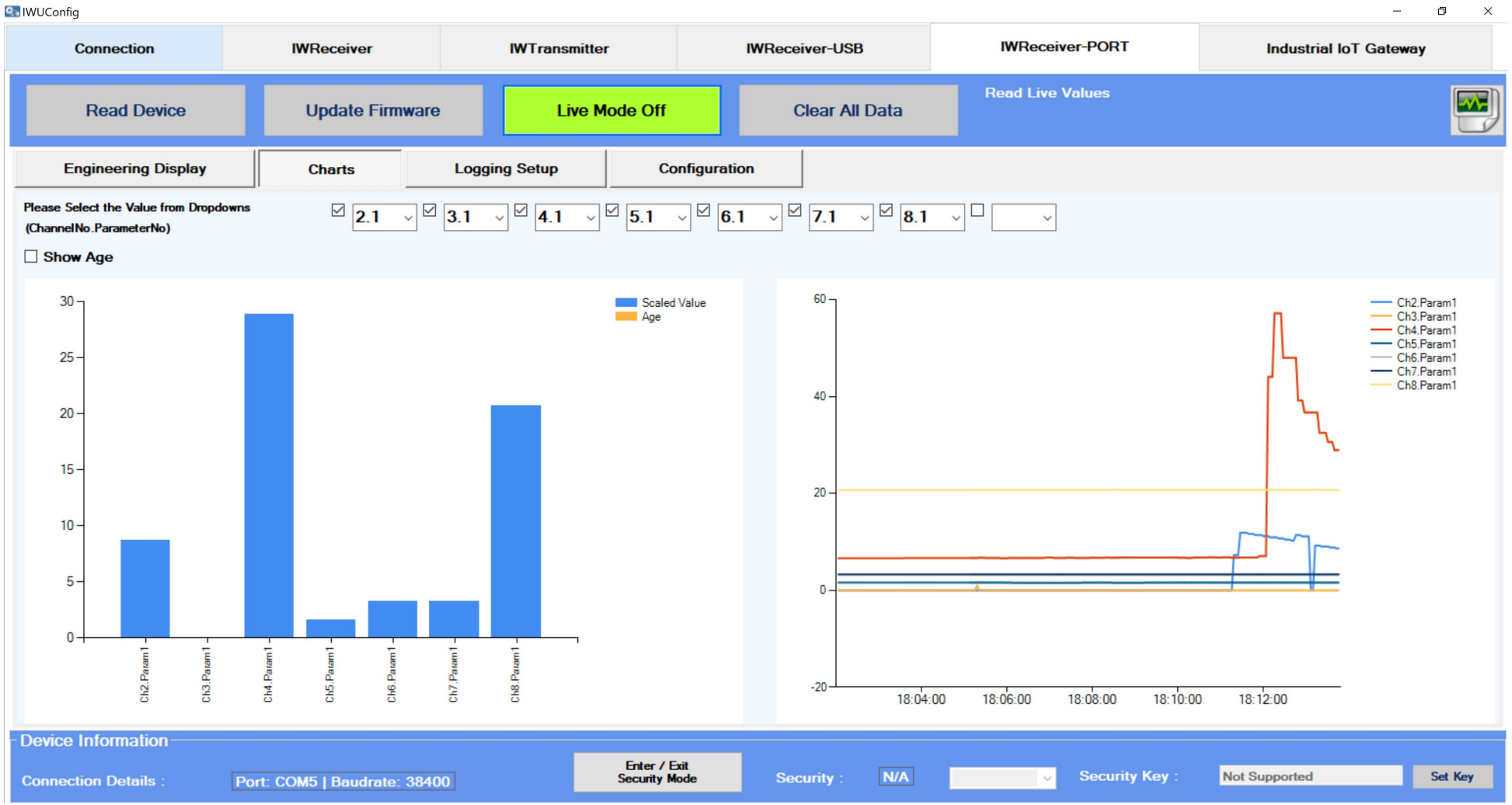
Sensata Proprietary Information. Strictly Private.

IWR-Port – Engineering Display



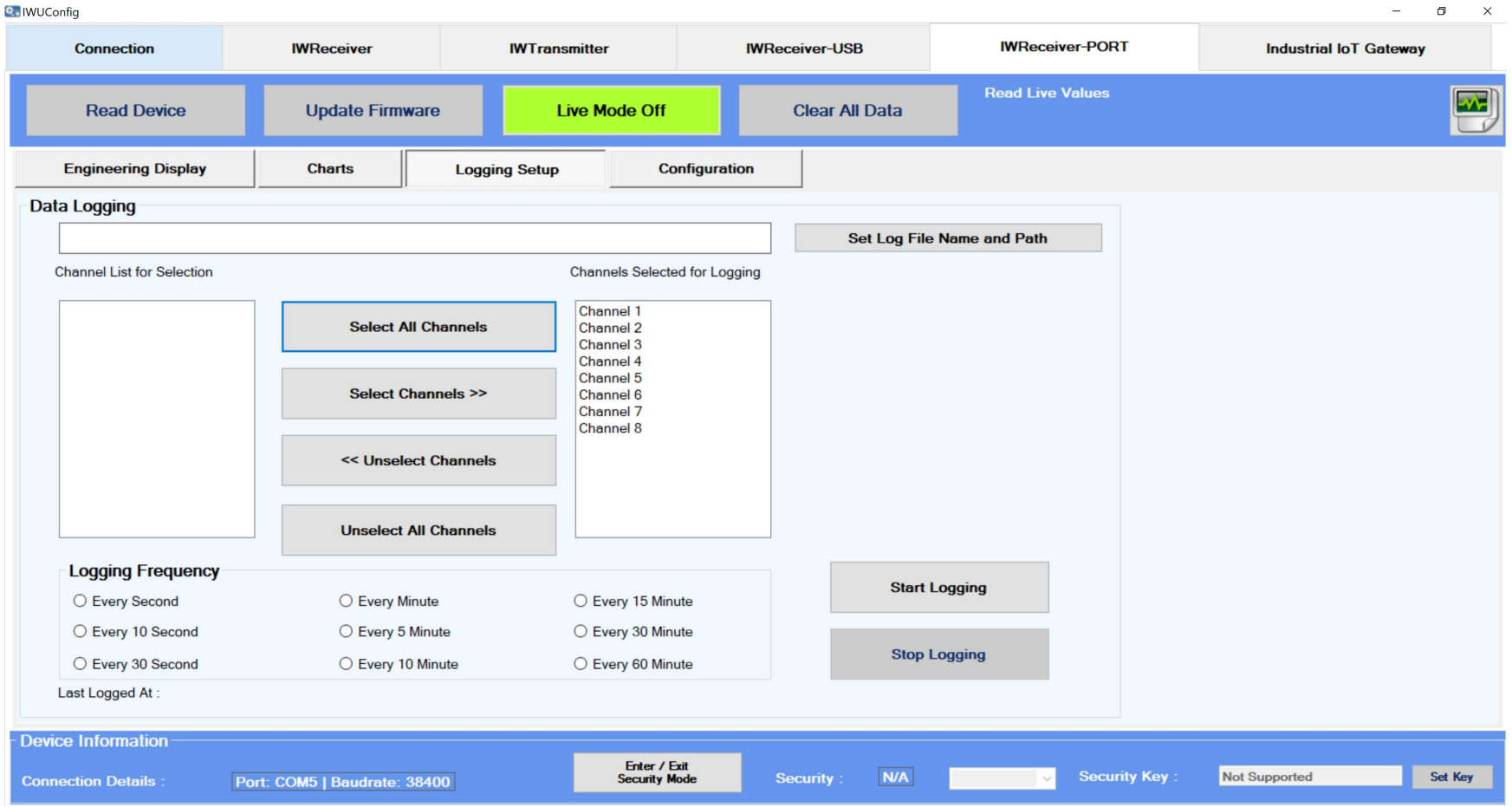
Sensata Proprietary Information. Strictly Private.

IWR-Port – Chart Display



Sensata Proprietary Information. Strictly Private.

IWR-Port – Logging Set-up Display



Sensata Proprietary Information. Strictly Private.

IIoT Gateway

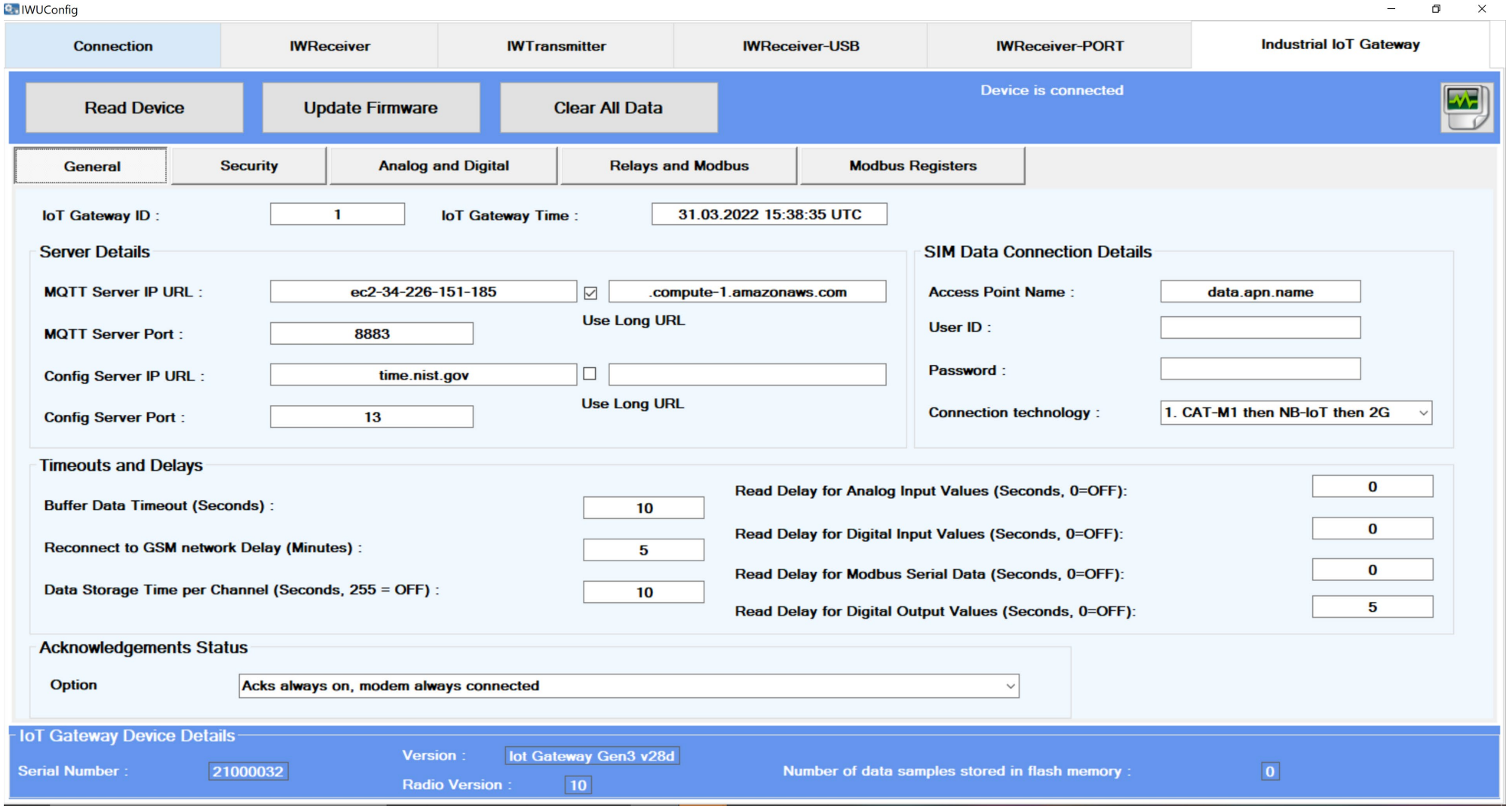
IIoT Gateway Features a wide range of inputs Including:

- Up to 128 IWT Wireless Sensors
- Analogue & Digital Inputs/Outputs
- RS232/485 or Ethernet Comms Ports
- I2C and SPI Interfaces
- In-built optional GPS and Display
- Battery or 12/24vdc Powered
- Sends secure MQTT messages to server
- has 4 off Relay Control/Alaram Outputs

The IoT Gateway Logs Data and periodically uploads it to Cloud-based Servers

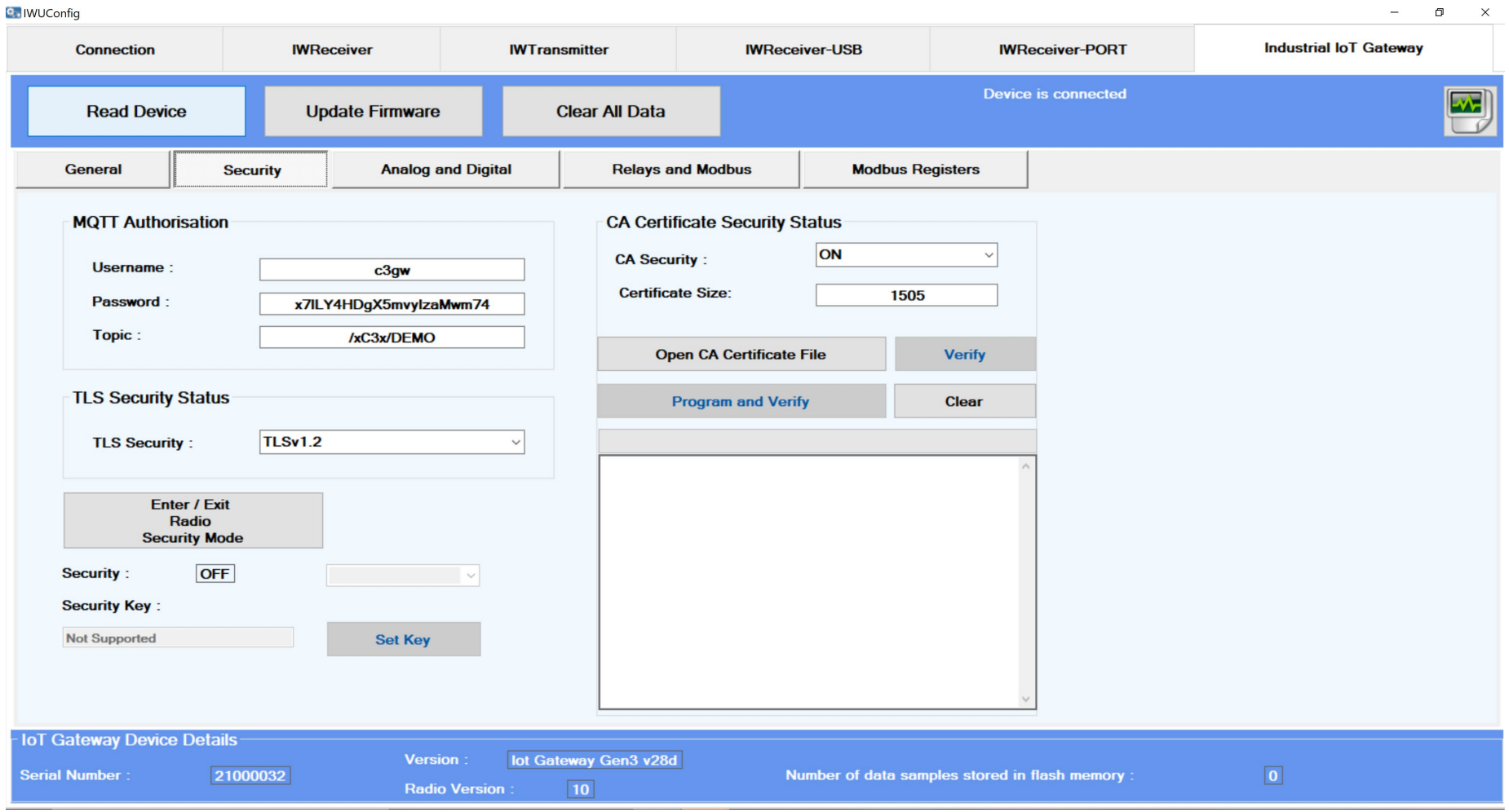
Sensata Proprietary Information. Strictly Private.

IIoT Gateway –general settings



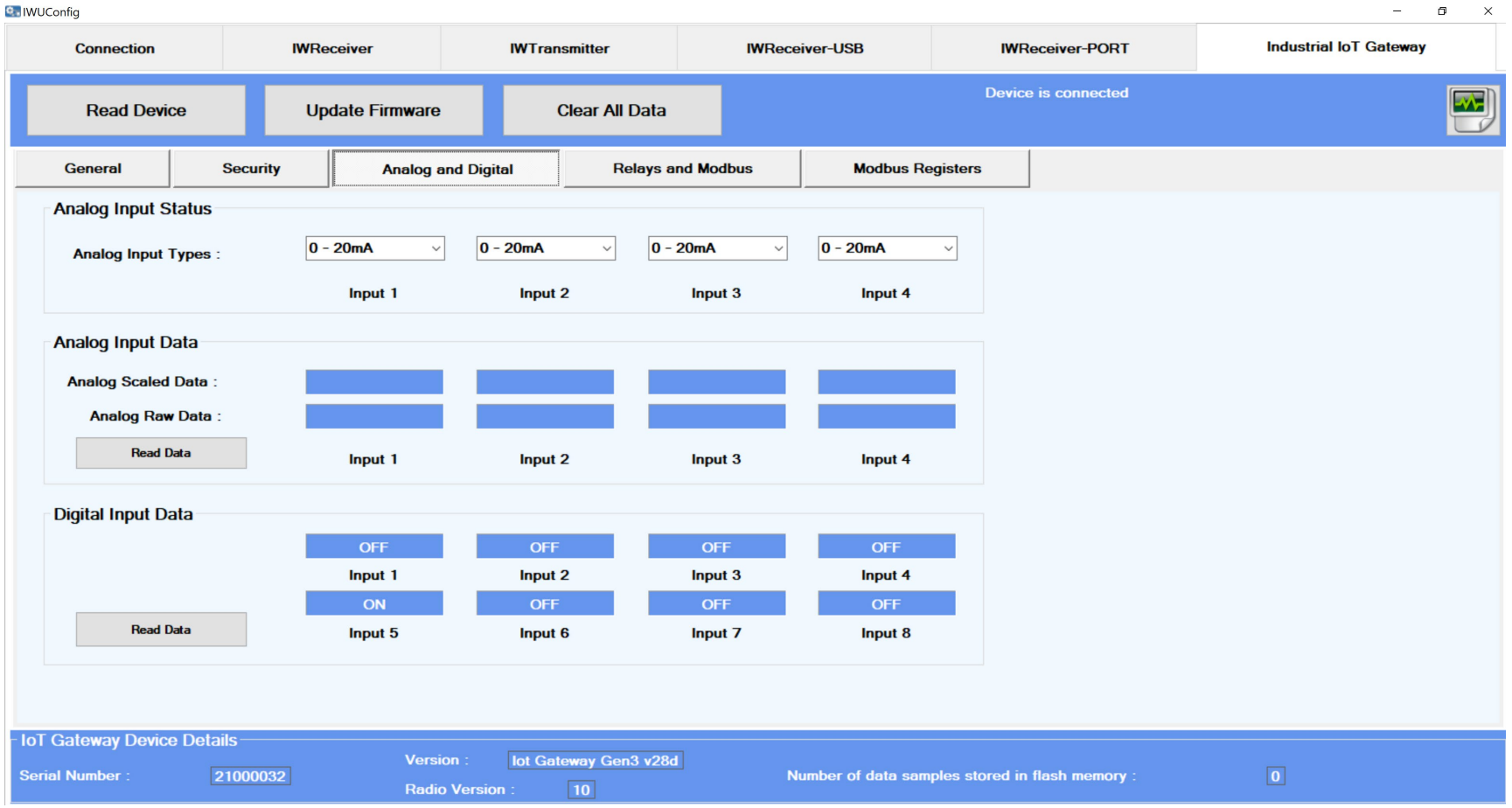
Sensata Proprietary Information. Strictly Private.

IIoT Gateway –security settings



Sensata Proprietary Information. Strictly Private.

IIoT Gateway –Analog & Digital Inputs

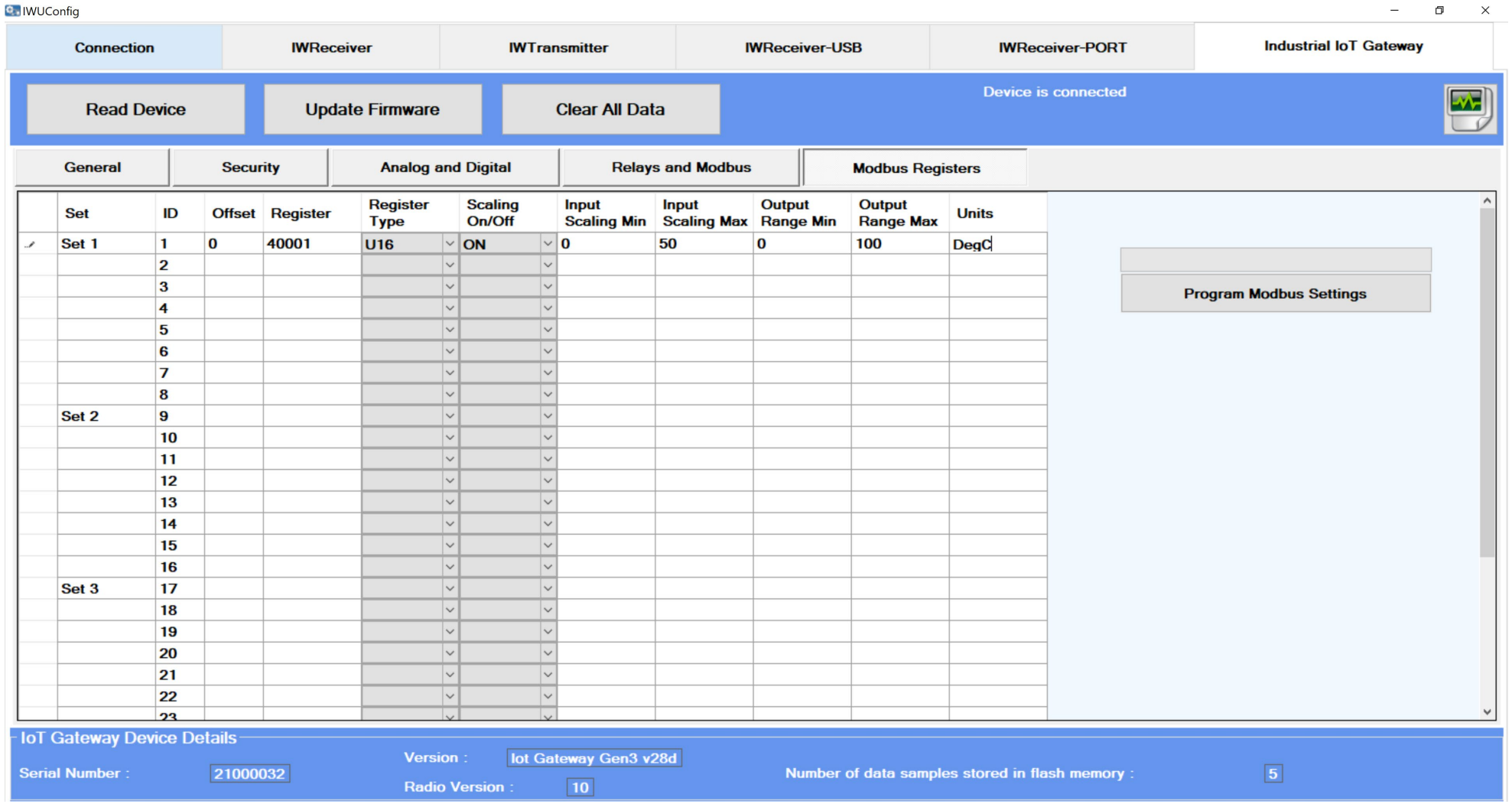


Sensata Proprietary Information. Strictly Private.

IIoT Gateway –Relay Outputs & Modbus Registers

Sensata Proprietary Information. Strictly Private.

IIoT Gateway –Modbus Registers

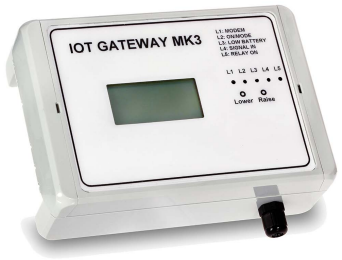


Sensata Proprietary Information. Strictly Private.

Industrial IoT Schematic Diagram

Wireless sensors

Wired sensors including
mA, V, Dig, I²C, SPI, GPS



mosquitto

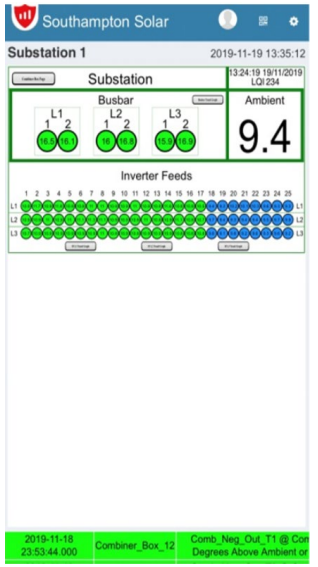
MQTT

MQTT Broker

Sensata
Technologies

Sensata Webscada
SQL Database
Enterprise APIs

Web browser

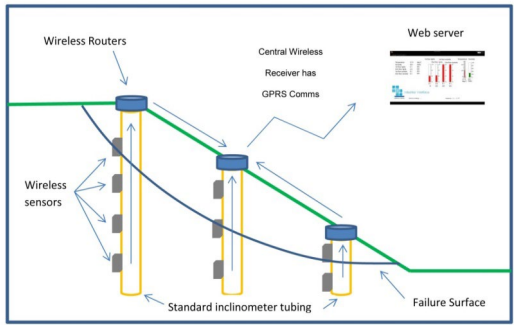


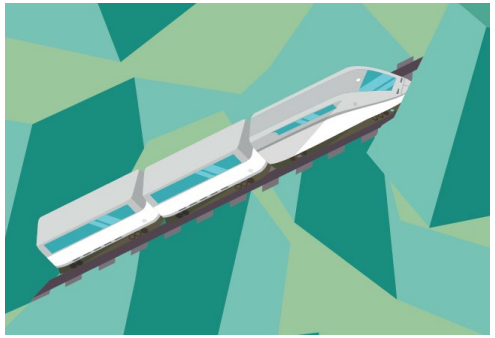
E-mail, SMS, Alarms

Our Wireless Sensors Enable a Clean and Connected Environment

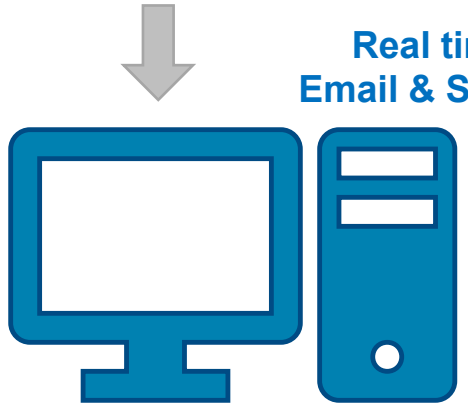
How our Sensors Contribute to a Smart World

Monitoring High resistance Joints on Solar Farms





Slope Monitoring on Rail and Highway Embankments



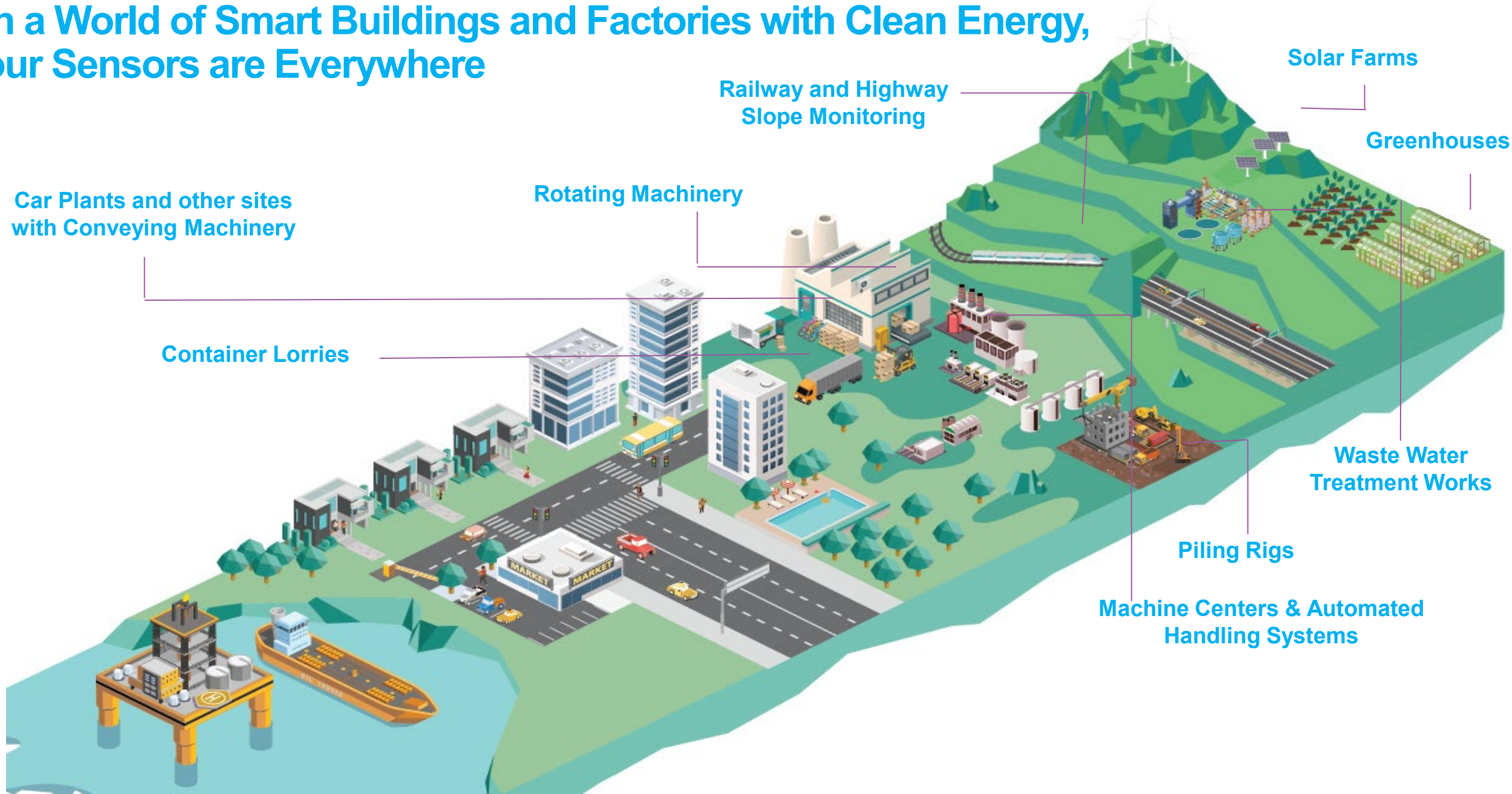
Real time data Email & SMS alarms

Motor & key equipment monitoring at UK Car Assembly Plant

Fixture Monitoring System for Major Aerospace Company

Wireless Sensors for a Smart Monitoring of your Application

In a World of Smart Buildings and Factories with Clean Energy, our Sensors are Everywhere



Other example completed applications

Application	Description	End User	Project Status
Irrigation Rig monitoring	Monitors the current taken by motors driving large scale irrigation rigs. Used to check for overloaded motors, sometimes due to flat tyres on the wheels fitted to them	Heartland, USA	Trial system
Railway Embankment Monitoring	Using buried MEMs inclinometers to monitor movement in embankments	Network Rail	2 x Trial Sites
Monitoring of Fixtures in CNC Machines	Using wireless transmitters embedded into fixtures to monitor hydraulic clamping pressure and alarm if changes are detected	Rolls Royce Aerospace	Completed, on-going orders
Solar Farm High Terminal Monitoring	Uses digital temperature ICs to check for high resistance joints in solar farm DC combiner boxes and substations	Mycena	Trial Site
Motor Condition Monitoring	Monitoring of 500+ production motors for HRJs, phase imbalance and increased load conditions	Jaguar LandRover	
Load Weighing on Log Loader	Uses Pressure to weight the quantity of logs loaded onto low loader	LateHose	On-going sales
Rotating Oven Temperature Measurement	Uses wireless thermocouple transmitters to replace inherently unreliable slip rings	Premier Foods	On-going sales
Wireless Vibration monitoring	Monitors raw vibration data from industrial accelerometers in Iron Ore and Coal mines in Western Australia	BHP Billiton, Rio Tinto, FMG etc.	On-going sales
Sludge Depth Monitoring at WTW	Sends the Sludge Depth signal wireless to receiver to eliminate the requirement for slip rings	South West Water +	Complete
Tamper monitoring of Sculptures	System monitors sculptures for movement & vibration to send an SMS alarm if a sculpture is being attacked or stolen	Pangolin	Complete
Concrete Pressure Monitoring on Piling Rigs	Monitors the pressure of the concrete at swan neck at the top of the piling rig to detect when the concrete is backing up	ND Tech	On-going sales
Water Pressure Monitoring	Monitoring of under-body and over-body spray water pressure	Jaguar LandRover	Complete
Office Temperature & RH Monitoring	Monitors the temperature and RH in commercial offices during HVAC installation acceptance period		Complete
Fire Temperature Monitoring	1-2m long wireless thermocouple transmitters used to monitor the internal temperature of buildings used during fire testing	PICS, Belgium	Complete

Sensata Proprietary Information. Strictly Private.

Other example completed applications

Wine Fermenting Temperature monitoring	**Used to measure the temperature of wine in fermenting vats in wineries in Australia**	**Precision Electrical**	**Complete**
Well head pressure monitoring system	Used by Weatherford plc to measure well head pressure levels	Weatherford	On-going sales
Excavation Monitoring	Monitors the level and force on struts supporting large scale excavations	Mabey Hire	Complete
Borehole Water Usage in Quarry	Transmits water meter pulses wirelessly across a quarry to a central location	Hansen Quarry	Complete
Temperature measurement in Grain Silos	Long temperature probes inserted into grain silos to check for rises in temperature which may indicate that fermentation is commencing		Complete
Level measurement in Grain Silos	Bottom mounted level sensors wired to antennas at the top of each silo. Wireless network was effectively in the air above the silos which overcame the problem of getting a wireless signal around lots of metal silos in a small area.	Process Instrument Sales	Complete
Cement Mixer Weight monitor	Wireless pressure sensors mounted to the hydraulic drive circuit on cement mixers. The hydraulic pressure was used to indicate how much force was needed to rotate the drum on the vehicle, this in turn indicated how full the mixer was. Used in central filling station	European Cement	Complete
Signal transfer across reservoir	IWT-128 used as a cable replacement system to transfer analogue and digital signals across reservoirs	Scottish Water +	Complete
Wireless pH signal transfer	Picked up the output from a pH meter and wirelessly transferred this to a central dosing control system	Clippertech	Complete
Wireless Borehole Level monitoring	Monitored water levels in multiple boreholes so that the central controller could decide which to pump water out of	St Philips, Bahamas vis Grundfos	Complete
Overhead trolley wear monitoring	Monitors the force on motor drive stations using load cells embedded into trolley blocks. If the force reduces the rack drive starts to slip and the line may stop	Jaguar LandRover	Complete
Wireless Tailgate opening system	Automatically opens the tailgate on vehicles on the production line when operators require access to the rear of the vehicles	Jaguar LandRover	Complete

Sensata Proprietary Information. Strictly Private.

Thank you for listening, any questions?

Martin Sime
martin@industrialinterface.co.uk