sensata |IoT-Gateway-00 12-24V DC POWERED IoT-Gateway

Sensata
Technologies

|IoT-Gateway-00 12-24V DC POWERED IoT-Gateway
User Manual

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Information for users
This equipment has been tested and found to comply with the limits for a Class B device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Caution: To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance operation at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. No other antenna may be used with this equipment other than the PCB antenna supplied with this equipment.

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INTRODUCTION

1.1 Safety Information

This manual contains information that must be observed in the interest of your own safety and to avoid damage to assets. Please read this manual before installing and commissioning the device and keep the manual in an accessible location for all users.

Contains FCC ID: W70MRF24J40MDME
& FCC ID:
Caution: To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance operation at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. No other antenna may be used with this equipment other than the PCB antenna supplied with this equipment.
Please see the Certifications section for more information on RF Exposure Compliance

1.2 Hardware Features

The IoT-Gateway-00 receives data from IWT Wireless sensors and other wired inputs and sends the data it receives to a remote server using the in-built IoT cellular modem. The unit also features a 6-line LCD display which can display the latest readings from connected sensors together with the current IoT Gateway configuration information.

By using the two pushbuttons on the front panel the user can cycle through the data received and also view or change the configuration settings of the IoT-Gateway.
The sensors the IoT-Gateway-00 can receive data from as standard are as follows:

- Up to 128 off IWT single parameter wireless sensors
- Up to 4 off 4-20mA or 0-10V wired sensors
- Up to 8 off switch volt-free contact inputs

Please enquire about OEM versions that also allow data to be read from other equipment with RS485 or Ethernet communications.
The IoT-Gateway-00 also features 4 off relay outputs which can act as high/low alarm relays for any of the received data, whether from wireless or wired sensors.
The unit is powered from a 12-24 Vdc supply and is housed on an IP67 wall-mounted enclosure.

UNPACKING

The instrument should be carefully inspected for signs of damage that may have occurred in transit. In the unlikely case that damage has been sustained, DO NOT use the instrument, but please retain all packaging for our inspection and contact your supplier immediately.

QUICK START GUIDE

There are a number of different applications for the IoT-Gateway-00, here are two ‘Quick Start’ examples that explain how two typical applications are realized.

3.1 Application One

The IoT-Gateway-00 receives readings from 8 IWTT thermocouple wireless transmitters and transmits this information to remote cloud-based storage for viewing, alarming, and logging on the Sensata WebScada platform.
The IWTT transmitters are first configured to be channels 1 to 8 using the in-built DIP switches, please refer to the IWTT user manual for exact details of how this is done.
The IoT-Gateway WebScada instance must be set up using the Web Contact form, details and a QR code of the address of this form are on the IoT-Gateway-00 label. When an email has been received indicating that your personnel WebScada site has been provisioned simply switch the power on to the IoT-Gateway-00 and the IWTT

transmitters. The green led LED 4 on the front panel should flash when data from the wireless sensors are being received from the IWTT sensor and LED 1 will indicate that this data has been transmitted to the remote WebScada server.
The latest data from the IWTT sensors can be viewed on the front panel display. This data includes:

- The channel number and Link Quality Index (LQI) of each IWTT transmitter
- The current reading with the appropriate Engineering Units
- The Time and Date stamp of the latest reading received from the IWTT transmitter
- The Serial number and Number of Transmissions made by that transmitter
- The Temperature Range and Type of that sensor
- The Update rate and Software Version of that IWTT transmitter

Using the Up and Down pushbuttons the above information can be read from each IWTT sensor in turn.
Navigating to your personal WebScada address, details will be in your registration confirmation email, which will allow these values to be displayed on any internet-enabled device such as a PC or Smartphone. Using WebScada allows alarm levels, alarm emails, etc.
to be set up and historical data can be viewed in graphical form or downloaded in an Excel-compatible file format.

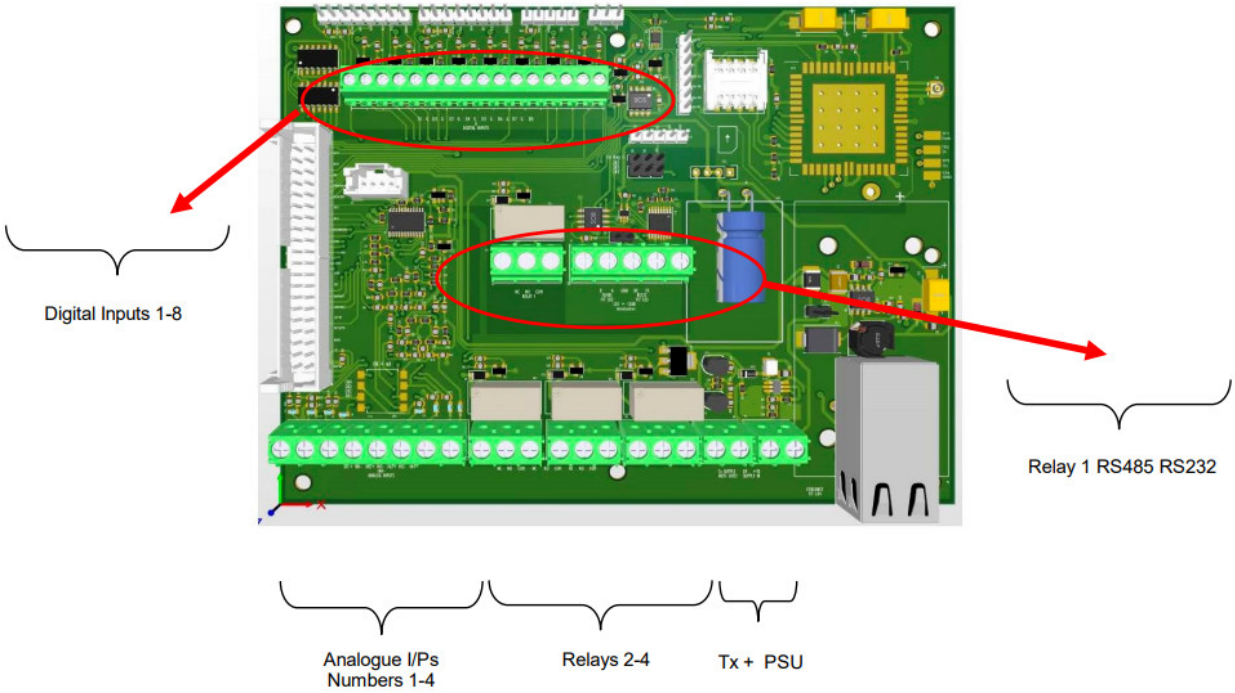
3.2 Application Two
A single IWTP provides wireless transmission of a 0-10 Barg pressure level in a water pipe and the IoT-Gateway-00 sends this data to the remote WebScada address. The IoT- Gateway-00 activates a relay alarm output if the IWPT reports in pressure over 7.5 Barg

The IWTP transmitter is configured to be channel 1 and the IWPT transmitter and IoTGateway are switched on after confirming the provisioning of the unique WebScada instance as in Application One above.
The IWT System Software suite must be downloaded from the Sensata website and a connection made to the micro USB connector on the front panel mounted PCB using a standard USB to the micro USB data cable.
Using this configuration software connect to the IoT- Gateway and assign Relay O/P 1 to IWT wireless sensor channel 1. (Full details are in the WebScada and IWTSoftware manual which is available as a free download). Set the alarm relay to be a high alarm and the setpoint to be 7.5 Barg. The standard hysteresis is 1% of the full range of the IWPT sensor, in this case, 0-10 Barg. Set the burn-out relay condition, again using the options in the software.
The IoT-Gateway will now receive the readings from the IWPT sensor, display the latest readings on its' display and send the data to the remote server-based WebScada instance. Additionally, the IoT-Gateway will switch Relay 1 when the reading from the IWPT sensor exceeds 7.5 Barg or when the burnout (no reading received) condition is met.

CONNECTIONS

The IoT-Gateway-00 is housed in a compact wall-mounting enclosure.
The terminals are accessed by levering the right-hand hinge to the right using a flat-bladed screwdriver. The hinge pops open allowing the front panel to be opened. This reveals the terminals on the bottom PCB and the USB configuration sockets on the top and bottom PCBs.

The diagrams below show the dimensions of the enclosure and the connections to an IoT-Gateway-00. Please note that to maintain the IP67 rating only one cable gland has been pre-fitted for the Power Connection. If other wired connections are to be used please machine extra holes for additional M12 cable glands as required.



CONFIGURING THE IoT-Gateway-00

5.1 Configuring the IoT Gateway using the Built-in display

The built-in LCD display has a menu structure that allows the main settings of the IoTGateway to be displayed and in some cases to be modified. This is convenient for small changes and as a guide during commissioning but for large-scale changes or alphanumeric changes such as cellular network IDs etc. please use the PC Configuration software suite instead. On power up the IoT-Getaway will display the last value received by any IWT wireless sensors. This display includes the following information:

- IWT Channel Number
- LQI (Link Quality Index) of the last reading received
- Parameter Number and latest reading in engineering units
- The Timestamp of the last reading received
- The Serial number of the IWT
- The number of transmissions made by that IWT since a battery change
- The range and type of IWT, the update rate and the software version

The Main Menu of the gateway is accessed by pressing the Lower and Raise buttons at the same time. This allows the following parameters to be viewed and in some cases changed by using the Raise/ Lower front panel pushbuttons.

5.1.1 Modem Messages

This menu option allows you to turn on and off Modem troubleshooting messages. The default setting is off but if a cellular connection is proving difficult turning these messages on is a useful tool. Full information on the messages and their meaning is included in the troubleshooting section of this manual.

5.1.2 Store Data

The is the minimum time in seconds that the IoT Gateway will store data from a particular sensor. This should be set to reflect the update rate of that channel's wireless transmitter. For example, if a wireless sensor is set to update every 60s then the minimum time between stores should also be set for 60s.

5.1.3 Reconnect

This is the time in minutes the IoT Gateway will wait before trying to re-connect to a 2G cellular network if that connection has been lost. The default setting for this is one minute.

5.1.4 Push Data

The Push Data setting is the time between sending successive data messages to the remote server. The default setting for this is 30 seconds.

5.1.5 Read HL

The Read HL setting is the time between reading the four High Level wired analog inputs. This should be set to how often you require data to be stored for these input types. The default setting for this is 0s and this means these inputs are not read when the IoT-Gateway si first powered up.

5.1.6 Read Dig

The Read Dig setting is the time between reading the eight-volt-free wired digital inputs.
This should be set to how often you require data to be read for these input types. The default setting for this is 0s which means these inputs are not read when the IoT Gateway is first powered up.

5.1.7 IoT Technology

This setting selects which types of cellular connection the IoT-Gateway will attempt to connect with. The choices are as follows:

- 1: 2G, Cat-M1 or NB-IoT
- 2: 2G or Cat-M1
- 3: 2G or NB-Iot
- 4: 2G only

5.1.8 About

Using this menu item allows the following information about the IoT-Gateway to be read on the display:

- Serial Number
- Gateway ID number
- Software Version
- Hardware Version
- Current Date/Time
- Number of data values stored

5.1.9 About Modem

Using this menu allows the following information on the Modem within the IoT-Gateway to be displayed:

- IMEI Number
- CCID Number
- Last CSQ value (Cellular signal strength indication)
- Last update time taken in seconds

5.1.10 SIMCARD

When you select this menu item details of the SIM Card contained within the IoTGateway are displayed. This information consists of the following:

- Network APN

- User ID (if required by the network)
- Network Password (if required by the network)

5.1.11 Modem Connection

This menu option gives details of the network connection made in the following format:

- Operator:
- Type:

This can be useful to know so that any known operator outages can be reported

5.1.12 MQTT Server

Under this menu option, you can find the IP or URL address that the modem will connect to when uploading data and also the port used on that connection.

5.1.13 Config Server

This menu option gives details of the IP or URL address for the configuration server together with the port used. The IoT-Gateway uses this connection to ensure its internal time and date are accurate and can also be used to update settings on the IoT-Gateway.

5.1.14 Wired Inputs

The Wired Inputs menu item displays the current values of the four analogs and eight digital wired inputs. The analog values are displayed as 0-100% and the digital inputs are displayed as either ON or OFF.

5.1.15 Wired Outputs

This menu displays the current value of the four relay outputs, these are displayed as either ON or OFF.

5.1.16 Delete xx Values

This menu option allows you to delete the current values stored in the IoT-Gateway. This is useful where the values have been obtained during commissioning tests, for example, and you don't want them to be uploaded to the IoT- platform.

5.1.17 Read Aux xxx Sec

The IoT Gateway has the ability to be factory set up to read auxiliary inputs using its optionally built-in RS232/RS485 or Ethernet serial ports. If this option has been requested this setting is used to configure how often the values are read from the equipment connected to these auxiliary inputs.

5.2 Configuring the IoT Gateway using the PC configuration Software

In addition to the parameters listed above which can be changed using the front panel LCD display, the PC Configuration software allows you to display and modify the following settings and parameters.
5.2.1 List of Settings and Parameters which can be viewed using the PC Configuration Software

- Read the latest data stored in the IoT Gateway
- Erase all the data stored in the IoT Gateway
- Read the following settings:
    - Software Version
    - IoT Gateway Serial Number
    - IoT Gateway ID (useful for multi-gateway projects)
    - Current Time and Date
    - IP or Url and Port for MQTT Data

- IP or URL and Port for Config Server
- Network Connection Information
- Data upload times for all input types
- Number of Readings currently stored in the IoT-Gateway
- Network APN and Password of cellular connection
- Type of Cellular connection to be made: 2G, CAT-M1, NB-IoT
- Data buffering time before upload
- Reset the IoT-Gateway
- Reconnection time after a 2G network drop-out

This software application is a very useful tool for more advanced applications.

OPERATING & TROUBLE SHOOTING GUIDE

When the unit is shipped the IoT-Gateway-00 is designed to work out of the box with minimal user intervention. The following features allow the user to determine how the IoTGateway is working and give insights into any potential problems.

6.1 LED Indicators

The green LED indicators on the front panel are designed to help ascertain the operation of the IoT-Gateway. In particular, the LEDs indicate the following:

LED 1: Modem Operation: Flash every 1s: Joining network Flash every 3s: Joined network LED 4: Wireless Receiver: Flashes when data is received

6.2 Front Panel LCD Display

A number of troubleshooting menus are available from the front panel LCD display and these are itemized in detail in Section 5.2 above. In particular trouble-shooting messages from the Modem are available under Menu option 1.0

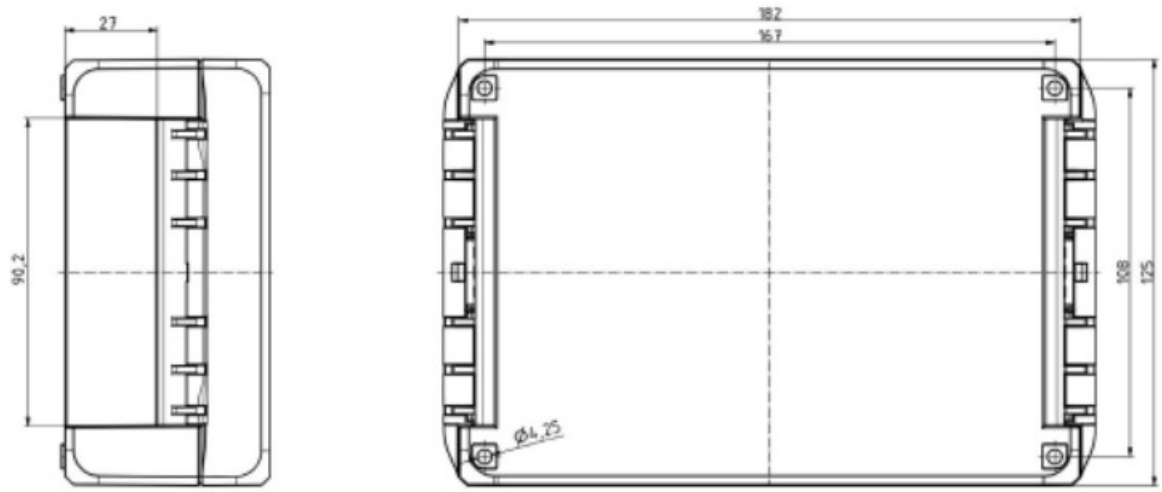
6.3 PC Configuration Software

The PC configuration and display software can be used with a standard USB data cable to display and configure all the settings of the IoT-Gateway.

INSTALLATION

The IoT-Gateway is designed to be either wall or surface-mounted.

The front panel of the gateway is where the IWT wireless receiver is mounted with the Cellular modem antenna being located on the top side of the enclosure above the front panel label. When choosing a mounting position for the unit please bear these antenna locations in mind to get the best possible reception and transmission of data.



CERTIFICATIONS

United States FCC

This equipment has been tested and found to comply with the limits for a Class B device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Warning: Changes or modifications not expressly approved by Cynergy3 could void the user's authority to operate the equipment.
RF Exposure
Contains FCC ID: W70MRF24J40MDME
In this equipment, the antenna supplied is a PCB antenna and an alternative antenna must not be used.
Caution: To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance operation at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. No other antenna may be used with this equipment other than the PCB antenna supplied with this equipment.

Canada (IC)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of the type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Europe

The MRF24J40MD/ME wireless module used in this equipment has been tested to R&TTE Directive 1995/5/EC Essential Requirements for Health and Safety (Article 3.1(a)), Electromagnetic Compatibility (EMC) Article 3.1(b)) and Radio (Article 3.2) and are summarized in the table below. A Notified Body Opinion has also been issued for this module.

Certification	Standards	Article
Safety	EN60950-2006+A11+A1:2010	(3.1(a))
Health	EN50371:2002-03	(3.1(a))
EMC	EN301 489-1 V1..8.1 (2008-04_	(3.1(b))
EMC	EN301-489-17 V2.1.1(2009-05)	(3.1(b))
Radio	EN 300 328 V1.7.1(2006-10)	(3.)

SPECIFICATIONS (@ 25°C)

Operating Temperature	-10 to +55 °C
Operating Altitude	Sea Level to 2000m
Humidity	0-90% RH
Power Requirements DC Supply	12 to 24Vdc
Transmit Bands	2G, CAT-M1, NB-IoT
Transmission Protocol MQTT	
Current Consumption	120 mA @ 12Vdc
Transmitter Power Supply	24V @ up to 24mA Dependant on the supply voltage and load
Analog Inputs	4 off 4-20mA or 0-10Vdc
Digital Inputs	8 off volt-free switch contacts
Dimensions	190mm x 125mm x 60mm (W x H x D)
Mounting	Wall or Surface mounting
Connections	Screw Clamp with pressure plate
Conductor Size	0.5 to 4.0 mm
Insulation Stripping	12 mm
Maximum Terminal Torque	0.4 Nm
Weight	Approx. 190g
EMC Emissions/Immunity	TBC
RF Certifications	TBC

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Documents / Resources

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References

- Home \| Cynergy3
- Sensata Technologies: Sensing is What We Do

Manuals+,