GSMX2200,4400 and 4440

Remote monitor and control system

User Guide

Revision 1.0

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Introduction

The GSMX family of products are designed to provide reliable monitoring of equipment attached to the system at remote locations in addition to providing remote control of equipment connected to system by mobile phone commands. The system operates on both GSM and Next-G/3G mobile phone networks.

System options include

- Solar Power Supply

⇒ Sends text alert up to 5 mobile phones
⇒ Mains Loss/Restore function
⇒ Low Battery/Restore function
⇒ IP67 waterproof/dustproof enclosure
⇒ 12/24V DC operation
⇒ Low power suits solar power supply

- Battery backup with trickle charger

⇒ Control outputs from any mobile phone
⇒ Obtain system status any time using mobile phone
⇒ Indoor or outdoor use
⇒ 3 years warranty
⇒ Full technical support from manufacturer
⇒ Supplied with convenient setup software

Figure 1. System Overview Diagram

How it works

Overview:

GSMX™ is supplied with Windows© based software called “EzGSM”. The software enables up to 5 mobile phone numbers to be defined, a description for the site, a description for each input and output and High/Low limit settings for alarms.

The system requires a user-supplied SIM card. The SIM card is available from mobile phone vendors. It is recommended the SIM is not “Pre-Paid” as the GSMX™ system has no way of determining when the card’s credit expires. The SIM card should also have the PIN number removed before using with GSMX™. This can be done by the provider or by placing the SIM card into a mobile phone and disabling the SIM PIN feature using the phone’s setup function.

The standard GSMX™ system requires 12V or 24V DC to operate. The system can be provided with optional Mains Plug-Pack, 230VAC supply or Solar power supply.

Sensors Available:

The GSMX™ devices can accept a variety of digital and analogue inputs. The most typical being

⇒ Switches

⇒ Relay contacts

⇒ PLC inputs and outputs

⇒ 4-20mA temperature, humidity, pressure probes

⇒ Push buttons

⇒ Solenoid valves

Orbit Communications Pty Ltd can supply a range of sensors that can be used in conjunction with the GSMX™ system.

These include

⇒ Pressure sensors

⇒ Temperature sensors (4-20mA) can be attached by cable up to 300m long

⇒ Float switches

⇒ Humidity sensors

⇒ Digital temperature probe, Cable length limited to 5m from enclosure

Alert Messages

GSMX™ can send several types of text message to the mobile phone numbers setup using the EzGSM software.

When the system is powered up, a “Power Up” system message will be sent to notify that the system has been switched on.

If the 230VAC mains supply or Mains plug-pack option is fitted, the system will send a “Mains Loss” alert if the mains power supply is lost at any time. A “Mains Restore” message will be sent when power is restored after a mains loss occurs.

The system also monitors the Battery voltage (if solar power supply or battery backup is fitted). In event the battery voltage drops below 10.5V a “Low Battery” alert message will be sent. Once the battery level is restored (rises above 11.5V) a “Battery Restore” message will be sent.

The Analogue input alert warnings will be sent when the inputs rises above the HIGH trip-point set up using EzGSM software (if High alarm enabled) and/or the fall below the LOW trip-point (if enables). Once the input value is restored for either alarm case, an “OK” message will be sent.

Sending commands to GSMX™ from mobile phone

The current input states and values, output states and Battery voltage can be obtained at any time using any mobile phone. The user sends a user defined password followed by the word “status” to the GSMX™ unit. The unit will then send back the current Input status and Battery voltage to the mobile phone that sent the request.

The digital outputs can be controlled by mobile phone by sending a command to switch either output ON or OFF. This is typically useful for activating a cooling fan or other device in event of over or under temperature situation.

The GSMX™ unit can be supplied pre-fitted with a 230VAC/10A rated relay contact for each output. *This option needs to be requested at time of ordering the system.*

Installation

Locating the unit:

The GSMX™ Unit should be located close to the points being monitored. Where 4-20mA sensors and digital devices are being attached the length of cable to these sensors can typically be a couple of hundred metres or more from the unit. If the Orbit Digital temperature sensor is being used, the probe must be located with the 5m maximum length of the cable.

Power Supply:

GSMX™ requires an operating voltage of 12V or 24V DC with current capacity up to 1.5Amps peak. The system can be powered by 230 VAC/12V Plug-pack, 230VAC fixed-wired supply or backup battery that is connected to a charging unit or Solar panel rated at 10W or higher.
All these options are available from Orbit Communications Pty Ltd.

Antenna:

The antenna supplied with GSMX™ has approximately 5dBi gain. This enables the system to be operated in areas where signal strength may be weaker and provides more reliable connection in higher signal areas. The antenna has 1.5m cable to enable it to be located on top of the unit of close to the unit. The Antenna has a magnetic base for attaching to a metallic surface or Velcro patch can be attached to the underside of the magnetic base to enable it to be attached to almost any surface. The antenna should be mounted vertically.

GSM Dialler

GSMX™ contains a GSM dialler unit that will operate on worldwide GSM and Next-G/3G mobile phone networks. All that is needed to use the GSMX™ unit is an active SIM card. These cards are normally provided through mobile phone vendors. *Note: It is recommended NOT to use a pre-paid SIM card as the system has know means to identify when the card requires topping up.*

GSMX™ has the facility to enable a PIN number to be entered for the SIM card but the SIM card must already be set up with the PIN number before installing in the GSMX™ unit. Typically it is convenient to ensure the PIN number function for the SIM card is disabled. (This can be done by vendor of the SIM or using a standard mobile phone to remove the PIN requirement before installing.

Figure 6. Insert SIM Card into Dialler

Figure 7. Push in until SIM locks in place

Figure 8. RED Status LED

To install the SIM card into the GSM Dialler

1. Switch off the power (Switch on control board should be DOWN)
2. Insert SIM into slot as shown in Fig(6), press SIM fully into slot until it locks into placed as shown in Fig(7). (Gold contacts on SIM are DOWN, Notch on card is on left side as shown).
3. To remove SIM, Press SIM using small flat object and release, the SIM should spring out-ward.
4. Switch on the power (Switch on control board should be UP)

The RED Status LED on the dialler indicates when the dialler is connected to a mobile network. Blink rate 1 second ON and OFF = no connection, 3 seconds ON and 1 second OFF = connected.

Setting up GSMX™

The GSMX™ system is supplied with Windows® software called “EzGSM”. This software is used to set up the system.

Using EzGSM setup software

EzGSM must first be installed onto a desktop or laptop computer. The software is used to program the settings into the GSMX™ unit. Once GSMX has been set up, the cable can be removed and the system will operate as programmed. The settings will remain in the GSMX™ unit even after power down and can only be modified using EzGSM software.

Serial Port

GSMX™ connects to the computer using an RS232 serial link. If the computer has a DB9 serial port (as shown below) then a straight-through RS232 cable can be used to directly connect the computer to the GSMX™ unit. If the computer does not have a DB9 connector then a USB to RS232 convertor can be used to enable the GSMX™ unit to connect to the computer via the USB port instead. The USB to DB9 serial port adaptor is shown below. These can be obtained from most electrical outlets such as Dick Smith Electronics, Tandy, JB-HiFi.

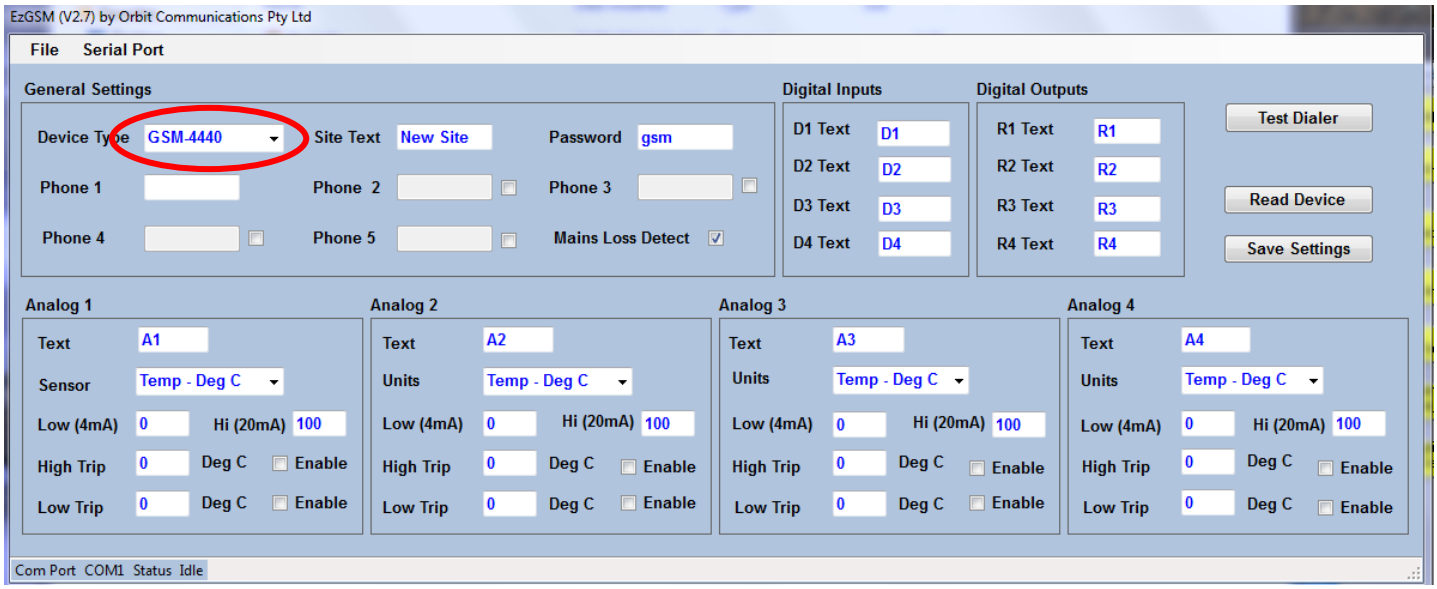
DB9 Connector

USB to DB9 Adaptor

Running the software:

Install EzGSM onto the computer by running the setup file provided on CD ROM that came with the GSMX™ unit. Once EzGSM software is installed, an icon will be placed on the desktop of the computer. Run the software using the desktop icon.

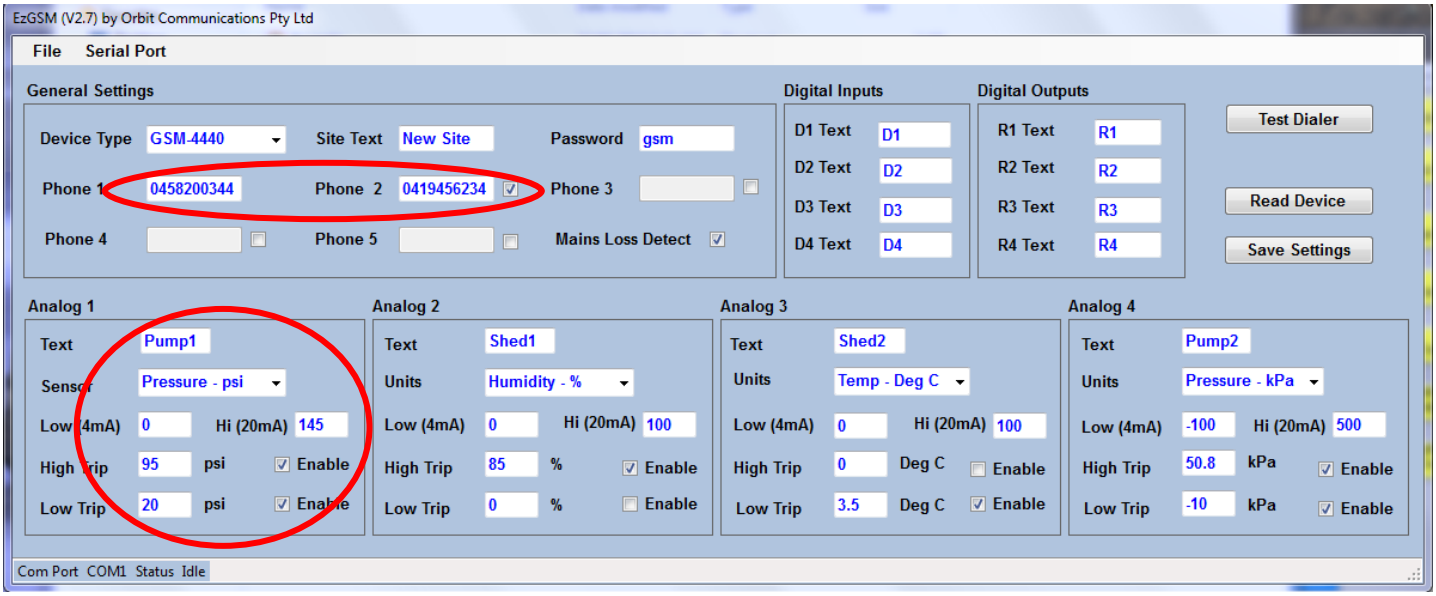
Note: The first time EzGSM is run, the program may prompt for a serial port. Enter the number of the serial port that is to be used to program GSMX™. The appropriate serial port may be selected also by clicking “Serial Port” from the main menu and selecting from list of installed ports.



Select “GSMX” as the Device Type using the pull-down list.

The description of the site (Site Text) is set as “New Site” by default. This can be changed to any meaningful text that describes or helps identify the site where the GSMX™ unit is to be installed. This text is sent with every message to identify which site the message has been sent from.

Enter a password up to 5 characters long in the “Password” box. This is the word that MUST be sent before each command. It can be set to blank and therefore no password needs to be sent with commands to the unit but it is recommended a password be used for security purposes.



Enter at least 1 mobile phone number that alert messages can be sent to. (2 shown in example above). GSMX can sent alert messages up to 5 phone numbers. The small tick box next to each number must be ticked to enable another number to be added.

Enter a description of the object each input being monitored
(eg. “Pump1” ,”Shed1”,”Shed2”,”Pump2”).

Select the type of sensor attached to each channel (Temp Deg C, Pressure psi etc).

Enter the scaling factors for the output of the 4-20mA sensors. (eg. Pump1 defines that when the sensor produces 4mA, it will be reading 0 psi and when the output is full scale at 20mA, the read pressure will be 145). This information is obtained from the sensor specifications.

The High and Low limits can be programmed individually for each input. One or both types of alarms and values for alarm can be set as desired. The “Enable” box must be ticked for an alarm to be active. (eg. Pump1 has BOTH High and Low alarms set and enabled).

Click “Save Settings” button to store the values into the GSMX™ unit.

Click the “Test Dialler” button to send a test message to the phone number entered. Typical delivery time on Next-G/3G network is around 5 seconds. This may vary between various network providers and network usage at the time.

The GSMX™ unit is programmed and ready for use. Whenever the input value rises above the level set for a HIGH Trip, a High alert message will be sent and visa-versa when the level drops below the LOW Trip value (if Enabled).

Digital Inputs generate an alarm condition when they are switched LOW (to ground)

Text Message commands

The format for commands sent to the GSMX device...

[Password] [Single Space] [Command]

The password is selected using EzGSM software provided. Note: The text is NOT case sensitive but there must be only a SINGLE SPACE between password and command.

Example: Send a command to switch ON R1 Output. Assume the password was set to **site3**

Create a text message on the mobile phone using the phone number set using the supplied configuration software and then enter the following text as the message and Send...

"Site3 R1ON"

GSMX™ will send an acknowledgement message back to the mobile phone to indicate the required action has been performed.

Available Commands (number of outputs depends on specific GSMX model

Command	Description
R1ON	Sets R1 Output ON
R1OFF	Sets R1 Output OFF
R2ON	Sets R2 Output ON
R2OFF	Sets R2 Output OFF
R3ON	Sets R3 Output ON
R3OFF	Sets R3 Output OFF
R4ON	Sets R4 Output ON
R4OFF	Sets R4 Output OFF
STATUS	Returns input values, Battery Voltage and IO state

Most mobile phones have a facility to save text "Templates". This provides a convenient method of sending the commands without needing to re-type them each time. First set up an entry into the mobiles Phone Book that has the phone number of the GSMX device then create a template for each of the commands shown in the table above. To send a command you then select to send a message to the GSMX (select from the phone book) and then "insert" the appropriate text template and finally "Send".

Text Alert messages

The following messages are sent from GSMX™ (x is dependant on model of GSMX used)

Message	Description
Ain (x) Over	Enabled High Trip point exceeded for chan (x)
Ain (x) Under	Enabled Low Trip point exceeded for chan (x)
Ain (x) OK	Analog chan (x) value OK
Din (x) Alarm	Digital Input chan (x) alarm
Din (X) OK	Digital Input chan (x) OK
Mains Loss	Detected loss of mains power
Mains Restore	Mains power has been restored
Low Battery	Backup Battery below 10.5V
Battery OK	Backup Battery OK
Power Up	System has been powered up
Status	Returns Input values, Battery and IO Status

Example of sent text alert

“New Site: Pump1 Over Limit 95.5 psi”

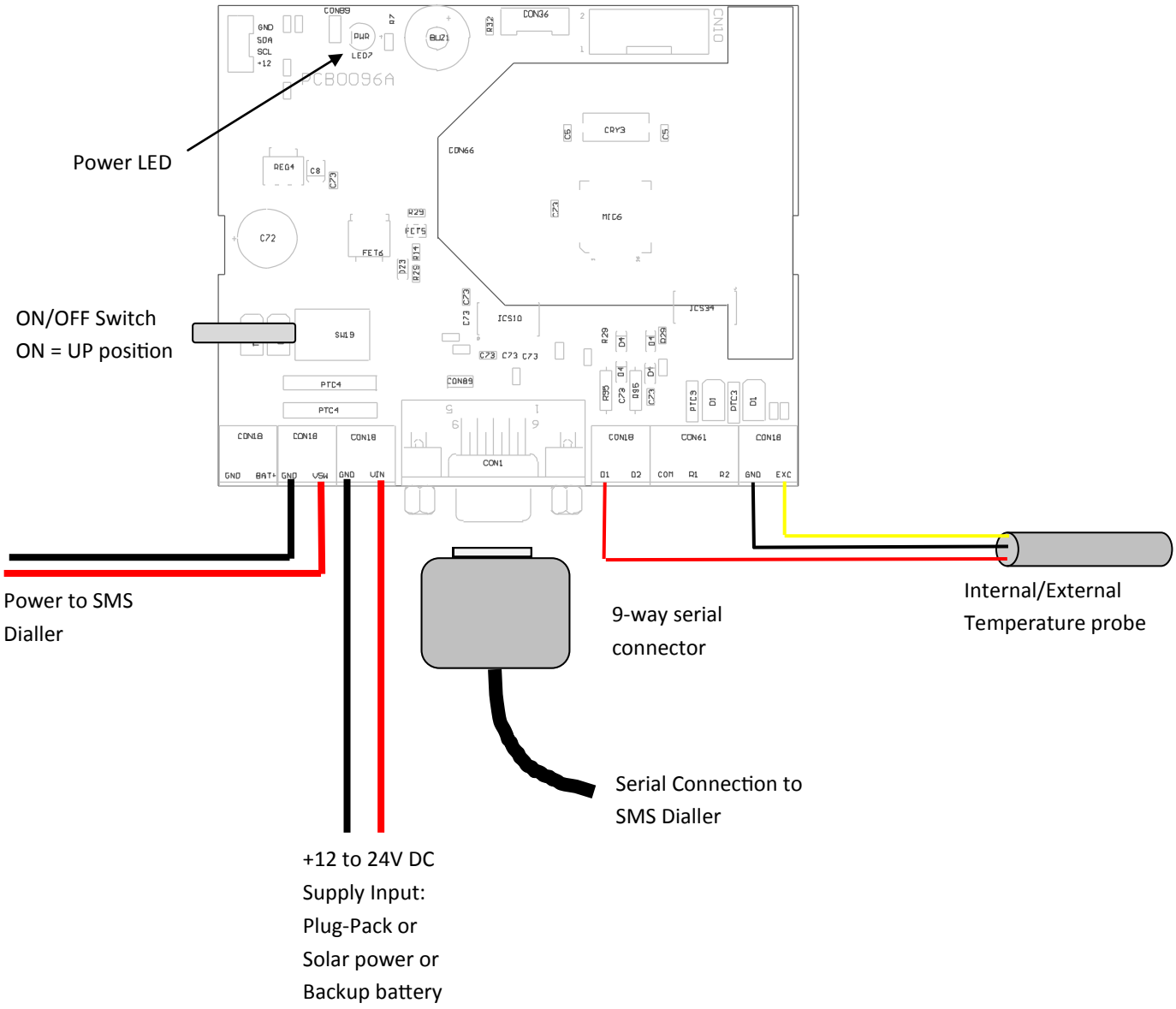
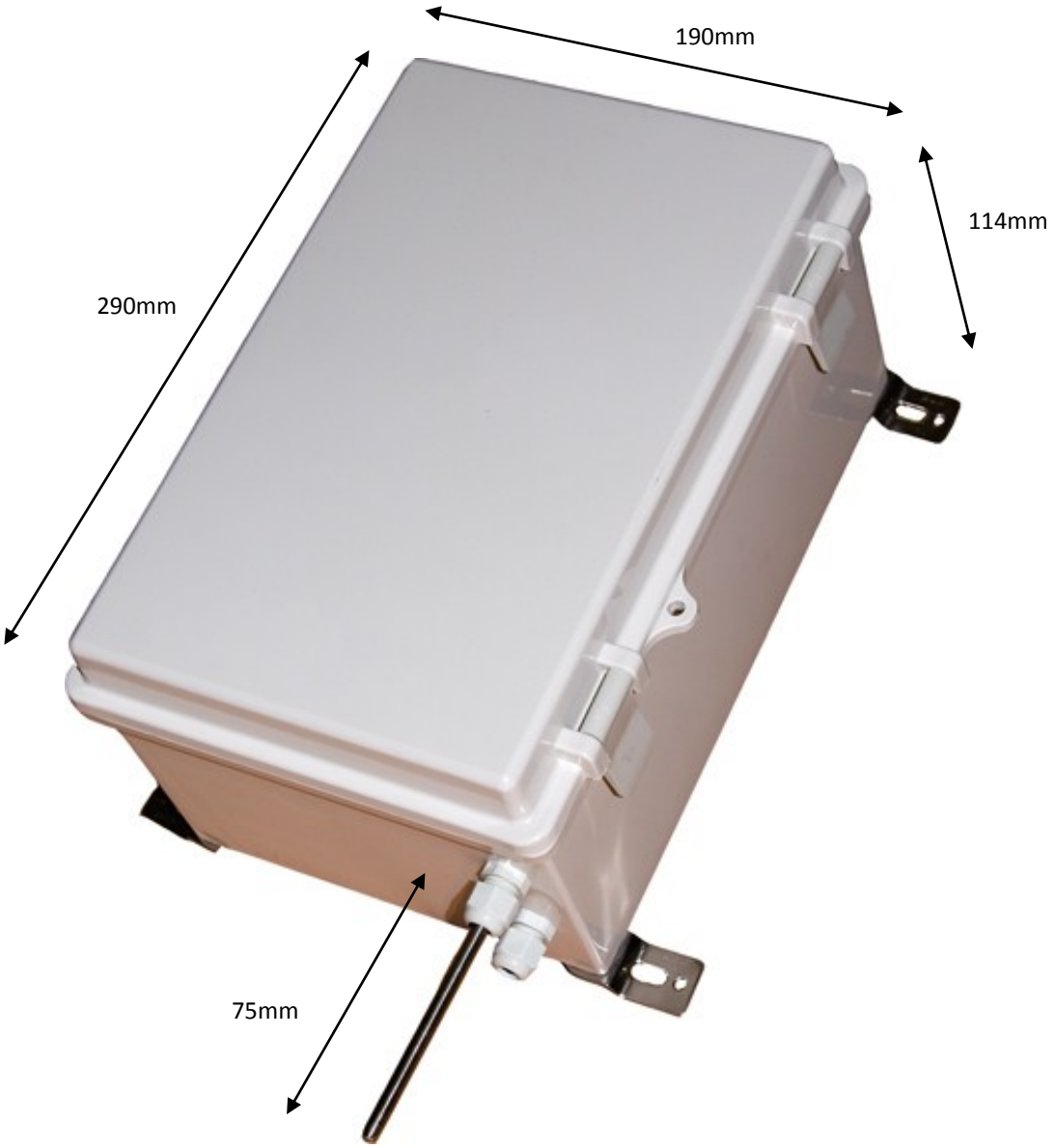


Figure 9. Internal wiring diagram for GSMX™ 2200

Note: Refer to hardware manual for wiring details of specific GSMX models

Mechanical Details



Ordering Information

Part Code	Description
GSM0006	GSMX-4440-OD
GSM0023	GSMX-4400-OD
GSMX0026	GSMX-2200-OD
SOL0004	10W Solar power supply

Safety Precautions

The following safety precautions must be observed whenever the Orbit wireless device system is in operation or in service. Failure to comply with these precautions violates the safety standards of the design, manufacture and intended use of the product

- The system is not to be used:

  In hospitals or places where medical equipment may be in use.

  In an aircraft (whether on the ground or in the air)

  Refuelling points

  Explosive areas

- Restricted use of the Orbit wireless device

  Near any chemical plant

  Near any Fuel depot

The Orbit wireless device system receives and transmits radio frequency energy while switched on, therefore interference can occur if the Orbit wireless device is located near TVs, radios, PCs or any inadequately shielded equipment.

WEEE directive 2002/96/EC, disposal of old electronic equipment

This product shall not be treated as household waste. It must be placed at an appropriate collection point for the recycling of electrical and electronic equipment. By ensuring the correct disposal of this equipment, it will help the environment and human's health. The recycling will help to conserve the natural resources.

Important

Due to the nature of wireless systems, transmission and reception of data can never be guaranteed. Data may be corrupted (i.e. Have errors) or be totally lost at certain times due to the environment, other machinery or malfunction of electronic components. Although significant loss of data are rare when wireless devices such as the Orbit wireless device system are used in a normal manner, Orbit's wireless device system should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death or loss of property. Orbit Communications Pty Ltd accepts no responsibility for damages of any kind resulting from errors in data transmitted or received using Orbit's Orbit wireless device systems, or for the failure of the Orbit wireless device system to transmit or receive such data.

Do not operate the Orbit wireless device system in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference, in such areas, Orbit's wireless device system must be powered OFF.

Do not operate Orbit wireless device system in any aircraft, whether the aircraft is on the ground or in flight. In an aircraft the Orbit wireless device system must be powered OFF.

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Warranty

All products manufactured by Orbit Communications Pty Ltd are warranted to be free from defects in materials and workmanship under normal use and service for 36 months from the date of shipment unless otherwise specified. Orbit Communications' obligation under this warranty is limited to repairing or replacing (at Orbit's discretion) defective products. The customer shall assume all costs of removing, reinstalling and shipping defective products to Orbit Communications. Orbit Communications will return such products by surface carrier prepaid. This warranty shall not apply to any Orbit product that has been subject to modification, misuse, neglect, accidents of nature or shipping damage. This warranty is in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose. Orbit Communications is not liable for special, indirect, accidental, or consequential damages.
Products may not be returned to Orbit Communications without prior authorization. To obtain a Returned Product Authorization (RPA), contact Orbit Communications by phone, fax or email. An RPA number will be issued after our staff determines the nature of the problem. Please write the RPA number on the outside of the shipping container. Any non-warranty products returned for repair should be accompanied by a purchase order to cover the cost of the repairs.