

FrostAlert™

Early Warning System



User Guide

Revision 1.0

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Introduction

FrostAlert™ GSM has been designed to provide reliable early warning for impending frost conditions. The temperature alarm trip-point is user-programmable and typically set a couple of degrees above freezing point. The system consists of a Remote sensing unit that is located in the field (up to several km range) and a Master Control Unit located at the house. The Master unit shows current temperature on a screen, has a built-in audible and visual alarm and optional SMS Text alert functions. All settings can be modified using the built-in display and keypad. This option enables the base unit to be located several kilometres away from the unit/s in the field. There is also no ongoing charges for SMS messages being sent. Power for remote sensor unit provided by Solar energy.

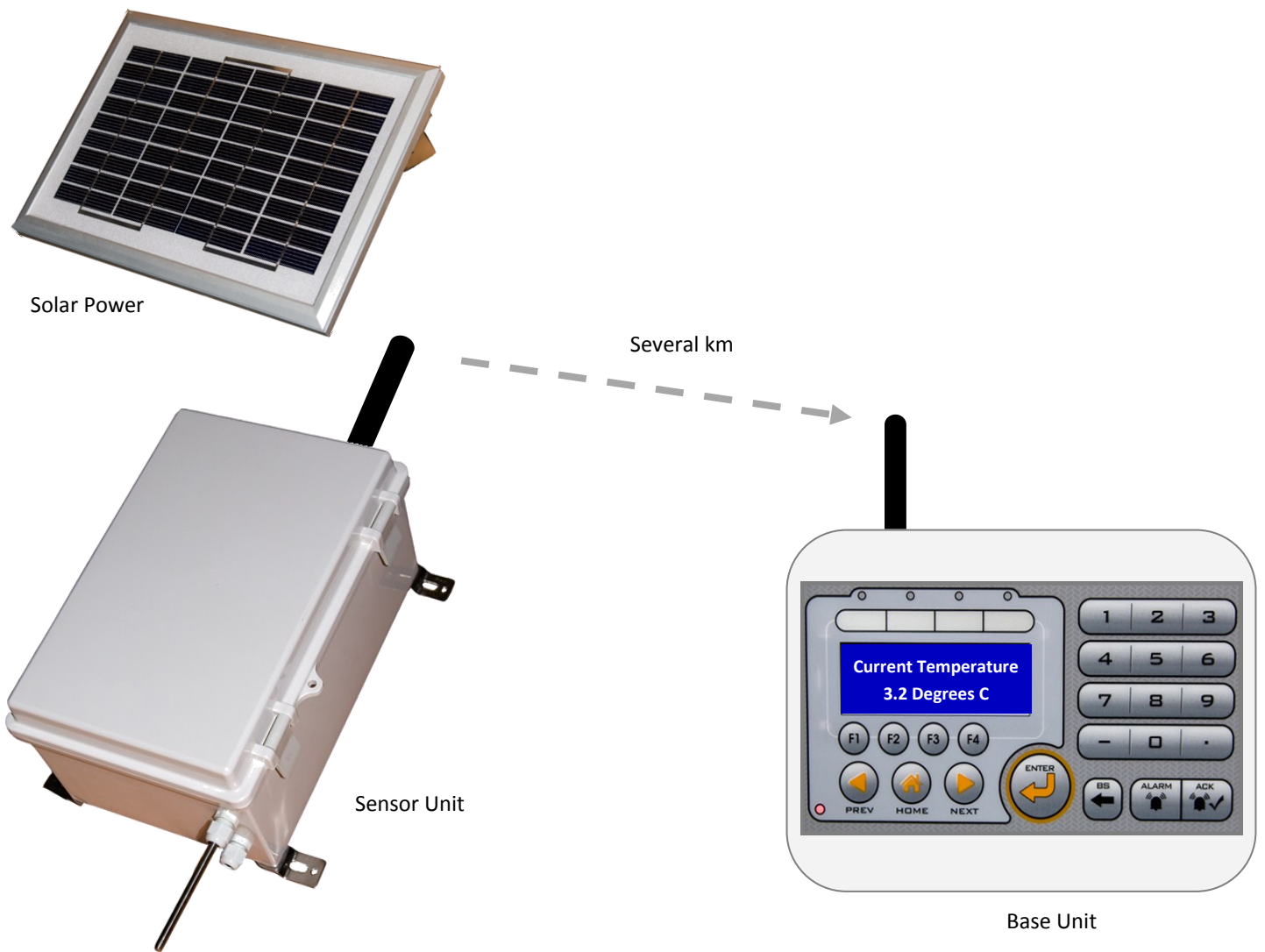


Figure 2. Wireless link to Base Station option

How it works

The Frost Alert system consists of one or more remote sensor units that are installed at locations near the crops or resources to be protected.. The remote sensing unit is typically powered by a solar energy and sends information to the base unit that is normally located inside a shed or house.

The base unit receives periodic temperature information from the remote units and compares the received values with the user-programmable trip temperature (temperature where alarm is activated). Typically the trip temperature may be set to 2 or 3 degrees Celsius in order to give plenty of warning before a frost condition occurs. In event that an alarm is activated, a watering or fog system can be used to help prevent damage by the impending frost conditions.

The alarm will automatically reset when the temperature rises 1 degree Celsius above the programmed trip temperature.

Installation

The remote unit is first installed outside in a region that is prone to frost that is close to the crops that are to be protected. The position of the remote unit should be in an exposed location to enable the solar panel to receive sun all day. The remote unit has a built-in temperature probe that extends from the bottom of the enclosure. The unit should be mounted in such a way that the tip of the sensor is approximately at the height of the crops that are prone to frost damage.

The Antenna should be mounted vertically on a pole as high as possible for best range. If the antenna is mounted on a metal pole then it should be mounted at the top of the pole such that the antenna whip is above the metal and not beside it. The solar panel is provided with a mounting bracket that holds the solar panel at a 45 degree angle to the sun. The mounting bracket can attach to a pole (such as 2" water pipe). The panel should be aimed at a point that is approximately where the sun will be located around mid-day to ensure maximum output.

The base unit should be mounted in a convenient position in a house where the alarm is likely to wake sleeping persons in the event of an approaching frost. Best performance will be achieved if the antenna can be placed outside.

Operation

Once the remote unit has been installed and connected, the base unit can be powered up. When power is first applied, the display will display “---.-” until a valid temperature reading has been received from the remote unit. (The remote unit will send updated temperature information approximately every 5 minutes). Once a valid reading has been received, the current temperature at the remote unit will be displayed on the base unit.

The normal display will show temperature at the remote unit. There are several states that can cause a different reading on the display.

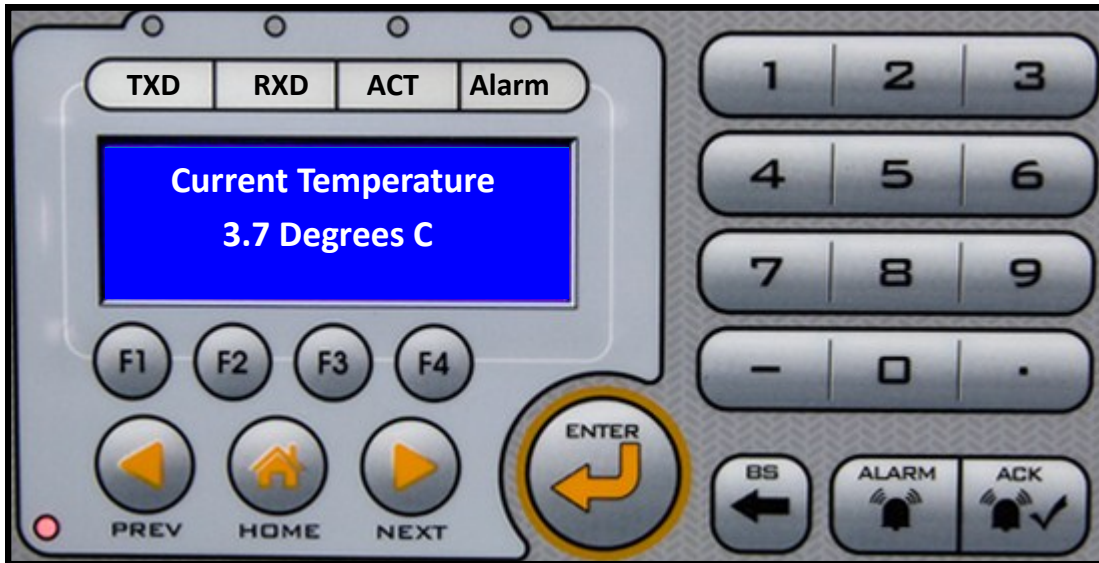
In event of Loss of radio communications for any reason for more than 40 minutes (power failure, broken antenna, lightning hit etc), the base unit display will show “Error”, the buzzer and warning LED will be activated to raise alarm. The alarm will be reset when communication is established with the remote unit or the base unit has power removed and re-applied. (Note: if backup battery system is fitted, the power would need to be removed from the green power terminals on the Control unit PCB inside the base unit enclosure to remove and reapply power).

If the voltage level of the battery in the remote unit falls below 10.6V DC, the base unit display will show “BAT” to indicate the remote battery is low. The display will change when the Battery voltage rises above 11.8V DC (by recharging or replacement).

When an alarm has been activated, the buzzer can be silenced by pressing the “ACK” button. The Alarm LED will continue to be activated but the buzzer will be off.

The Trip temperature is selected by pressing the PREV and NEXT buttons on the base unit. To save and apply the new setting, press the SEL button. The temperature is adjustable from -40 to +40 Degrees Celsius in 0.1 Degree increments for each press of the up or down button.

Key functions



Key	Description
F1	Edit Site ID
F2	Edit Probe ID
F3	Edit Trip Point
F4	Edit Mobile Phone Numbers
Prev	Move cursor UP
Next	Move cursor DOWN
Home	Escape back to main screen
Enter	Save Settings
Ack	Silence Alarm buzzer
ALARM	Test Unit—Sends Test Alert message
0-9, -, .	Used for numeric entry

Table 3. Master Key Functions

GSM Dialler Option

FrostAlert™ 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 FrostAlert™ 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 no means to identify when the card requires topping up.*

FrostAlert™ 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 FrostAlert™ 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 place 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 outward.
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.

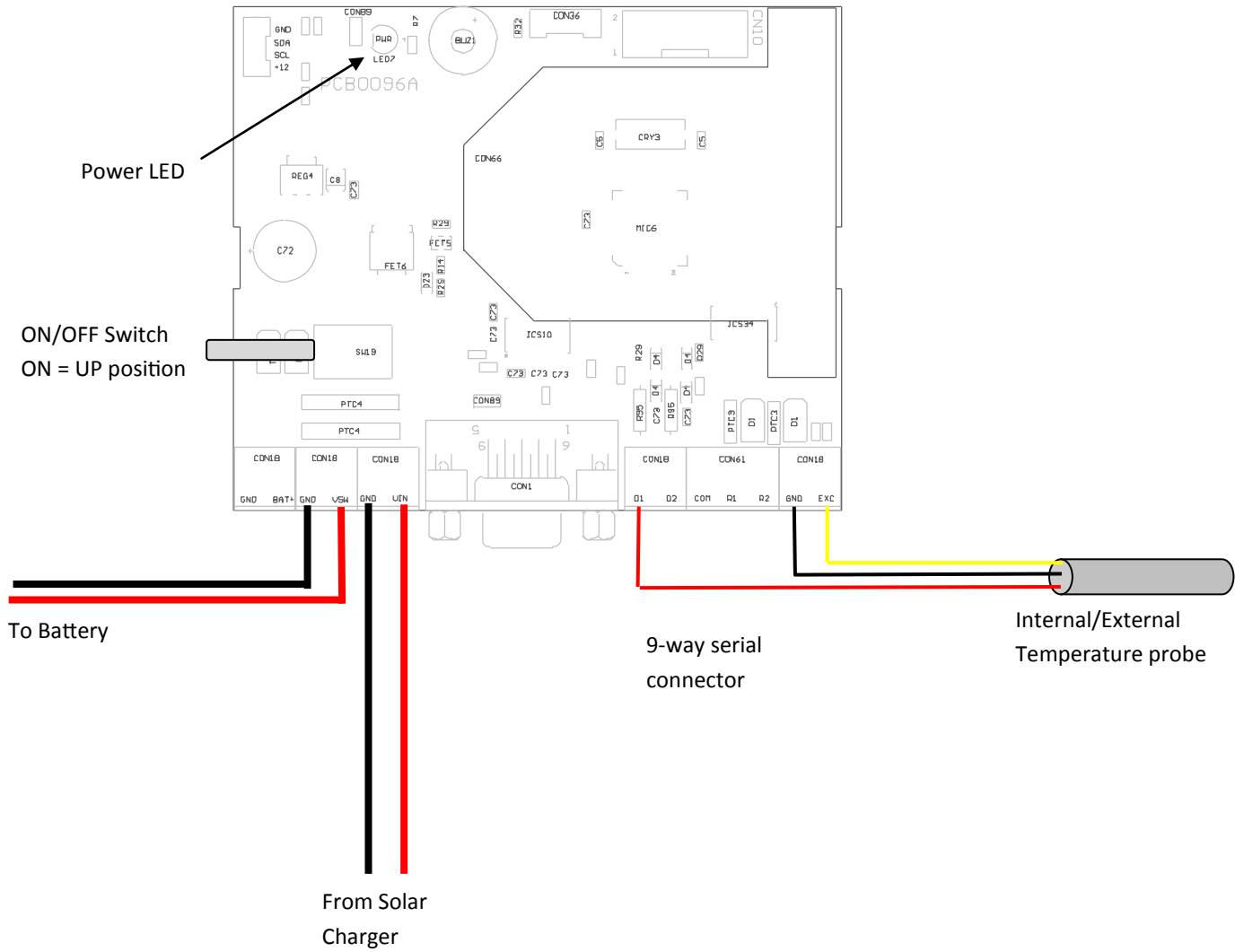
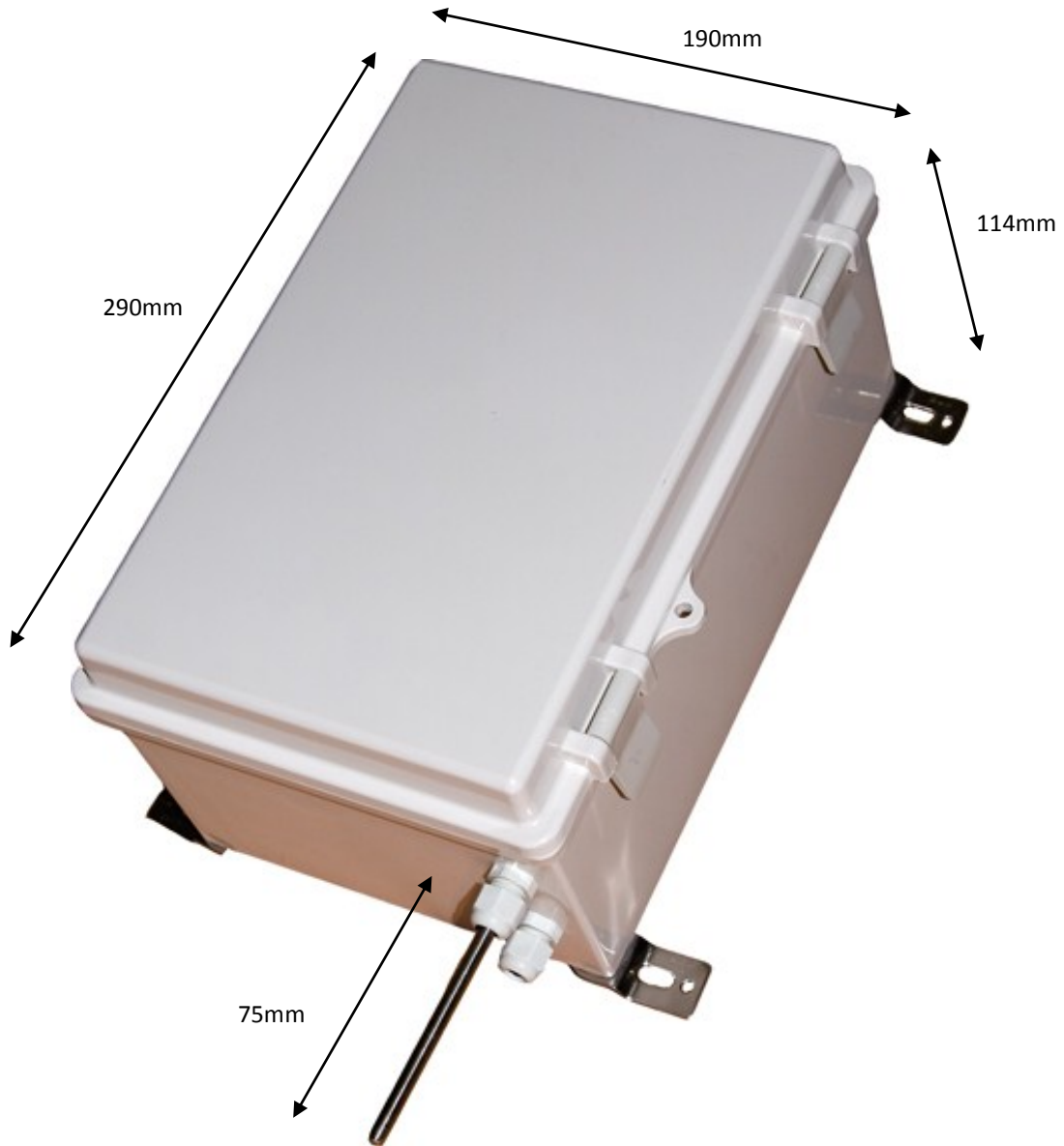


Figure 3. Wiring diagram for FrostAlert

Mechanical Details



Ordering Information

Part Code	Description
FRA0001	Remote sensing unit with Internal probe
FRA0003	Remote sensing unit with External probe
FRA0002	Master control unit with battery backup
SOL0007	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.

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