Ranger900 Manual

The Ranger900 is an integrated assembly that allows a local 900MHz radio network to communicate with the SignalFire Cloud over an LTE-M1 cellular network.

- DIN Gateway v2 and Ranger-Modbus integrated into a single enclosure
- Solar panel, rechargeable battery, and power management system included
- Configurable from the SignalFire Cloud website signal-fire.cloud
- SignalFire Cloud allows for data visualization, trending and alarming
- Supports MQTT Sparkplug B communication protocol for connection to other servers
- Compact and simple to install and maintain
- Local configuration and diagnostics available using the SignalFire ToolKit and SignalFire Ranger ToolKit
- Internal backlog of a minimum of 200 datapoints in the event of loss of signal. Backlog will be automatically sent when the Ranger reconnects

Specifications

Enclosure	UL/NEMA 4X (IP66/68) rated Polycarbonate. 14.1" tall × 9.8" wide × 7.0" deep
Power Source	10W solar panel, 12A-hr rechargeable SLA battery backup, 4.5A battery management system. 5V DC-DC converter for Ranger.
Temperature Rating	-40°C to +85°C
SIM Slot	Nano SIM card (LTE Cat M SIM and data plan required)
Local config port	Micro-USB (Ranger), DB-9 (Gateway)
Analog Input	1 active (13/18V selectable power out) analog input, 4-20mA/1-5V. 3 passive analog inputs, 1-5V or 4-20mA with precision 250Ω resistor
Digital Inputs	4 digital inputs. Dry Contact or 30 Volts Max (push-pull), 2kHz max
Relay Output	Latching Relay. 2A @ 30VDC, 0.3A @ 110VDC, 0.5A @ 125VAC
Sensor Power Output	Selectable 13V/18V. 60mA max power output
Compliance	• Contains FCC ID: 2ANPO00NRF9160 and IC ID: 24529-NRF9160 • Verizon, AT&T Network Certified

Model Numbers

RANGER900			RANGER LTE M1 Combo with 900mhz Gateway
	-Solar/ExtAnt		Integrated rechargeable battery with solar panel. External LTE & 900mhz antenna
		-Modbus	Expansion Module with RS485 Modbus Serial port
		-NoSIM	No SIM Card. No SignalFire Cloud. User provides LTE CAT M1 SIM Card
		-SIM/VZ	VERIZON LTE CAT M1 SIM - 1 Year Data Plan, SignalFire Cloud Connectivity
		-SFCloud	No SIM Card. 1 year SignalFire Cloud. User provides LTE CAT M1 SIM Card

Table of Contents

The Ranger-900 is not Hazardous Location certified and is for general purpose areas only.

⚠ **WARNING: EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE COMPONENTS UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS FREE OF IGNITIBLE CONCENTRATIONS.** AVERTISSEMENT : RISQUE D'EXPLOSION . NE PAS RETIRER OU REMPLACER LES COMPOSANTS QUE L'ALIMENTATION EST DÉBRANCHÉ OU ZONE EST LIBRE DE CONCENTRATIONS IGNITIBLE.

⚠ **WARNING – EXPLOSION HAZARD Do not disconnect while circuit is live unless area is known to be nonhazardous** AVERTISSEMENT - RISQUE D'EXPLOSION. Ne débranchez pas lorsque le circuit est en direct , sauf si la zone est connue pour être nonhazardous

⚠ **WARNING – All wiring methods must be in accordance with the NEC** *AVERTISSEMENT - Toutes les méthodes de Essorez doivent être en conformité avec la NEC*

⚠ **WARNING - EXPLOSION HAZARD. Do no remove or replace while circuit is live unless the area is free of ignitable concentrations.** AVERTISSEMENT - RISQUE D'EXPLOSION. Ne pas enlever ou remplacer pendant que le circuit est vivant à moins que la zone soit exempt de concentrations ignitibles.

⚠ **WARNING – EXPLOSION HAZARD. Do not remove or replace lamps, fuses or plug-in modules (as applicable) unless power has been disconnected or the area is free of ignitable concentrations.** AVERTISSEMENT - RISQUE D'EXPLOSION. Ne retirez ni ne remplacez les lampes, les fusibles ou les modules enfichables (le cas échéant) à moins que l'alimentation ait été coupée ou que la zone soit exempte de concentrations inflammables.

Overview

The Ranger900 provides a convenient way to bring data from SignalFire's 900MHz nodes into the SFCloud, creating a hybrid system of radio and cellular technology, local and remote. The Ranger-900 is a standalone enclosure that consists of a DIN Gateway v2 and Ranger with Modbus card, powered by an integrated solar system.

The system supports our line of 900MHz nodes such as the C1D1 Sentinel or Pressure Scout, which connect to the DIN Gateway v2. While normally this information would then be read from the Gateway over Modbus into a PLC/SCADA system, the Ranger-900 can transmit this information to the SFCloud. With this flexibility, users don't have to split their data between local systems and the SFCloud where they see other Ranger data.

Power

The Ranger900 is powered by a 10W solar panel, with a rechargeable 12A-hr SLA backup battery. A fully charged battery can provide power for over 16 days.

Software Configuration

The Ranger can be configured locally through its micro-USB port using the SignalFire Ranger ToolKit. The DIN Gateway v2 can be configured locally through its DB-9 port using the SignalFire ToolKit. Both pieces of software can be downloaded from our website, signal-fire.com, with registration of a free account.

Sensor Connections

The Ranger and DIN Gateway v2 both support a variety of integrated I/O. Wires can be brought in through the cable glands on the enclosure's underside. For more information on their I/O capabilities, please refer to their respective manuals.
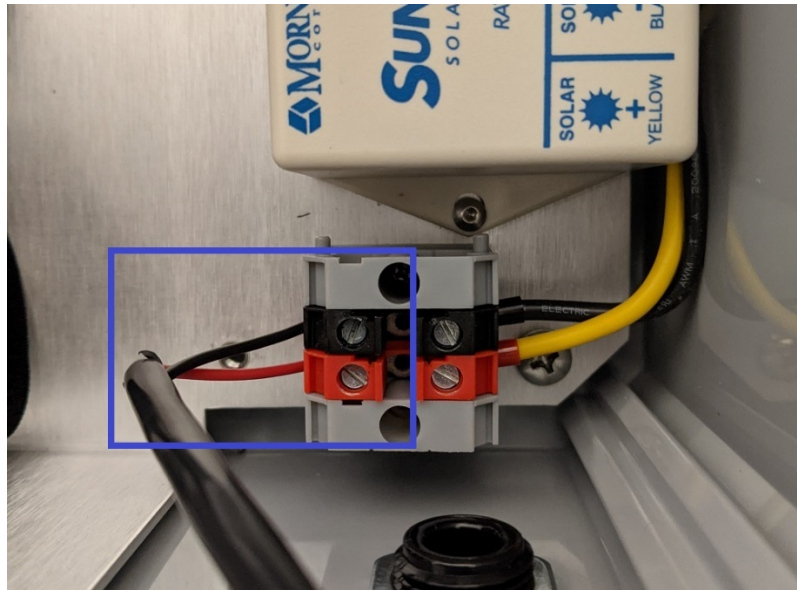
The Ranger's expansion module slot is occupied by an RS-485 card in order to read registers from the Gateway, therefore no other daughter cards can be used. Using the Ranger's active analog input will impact battery life and is generally not recommended for use in this configuration. Contact SignalFire or your local vendor for applications where the Ranger's analog input will need to be use.

Setup

Power

The solar panel and battery will be packed separately and need to be assembled with the enclosure. Please follow the step-by-step instructions below to get power to the system.
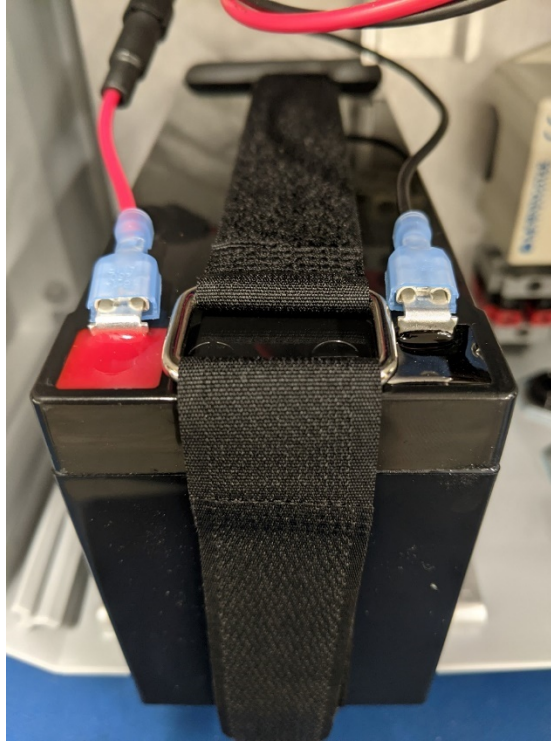
1. Unlock the enclosure and open the door.
2. Pull the solar panel's wire in through the cable gland on the underside of the enclosure and land them on the terminals as shown below, such that red goes to red and black goes to black.

3. Tighten the cable gland until the solar panel cable is secure.
4. Install the battery by inserting it into the enclosure on the strap as shown below. Pull the Velcro strap through the buckle and secure tightly.

5. Insert the disconnects on to the battery's tabs, red to red, black to black. The system will then be fully powered on.

Cloud

Ranger900's purchased with the SignalFire Cloud service come with a pre-installed SIM card. Customers will require a login to access the SignalFire Cloud server (signal-fire.cloud). Fill out the request form here: https://signal-fire.com/lte-m1-cellular-products/cloudregister/ to setup your company site. Once your account is created, follow the steps below:

1. Login to the SignalFire Could with the account login/password provided
2. From the Home page click "Add Device"
3. Enter either the Ranger serial number or IMEI number and click "Send Request". The serial number and IMEI number are located on inside of the enclosure door. The serial number will have a format of "RA" followed by 6 numbers.
4. A message will be sent to the Ranger to "claim" it to the customer site, and a wait screen with appear.
5. Within approximately one minute the device will connect to your account, and you will be automatically redirected to the device status page
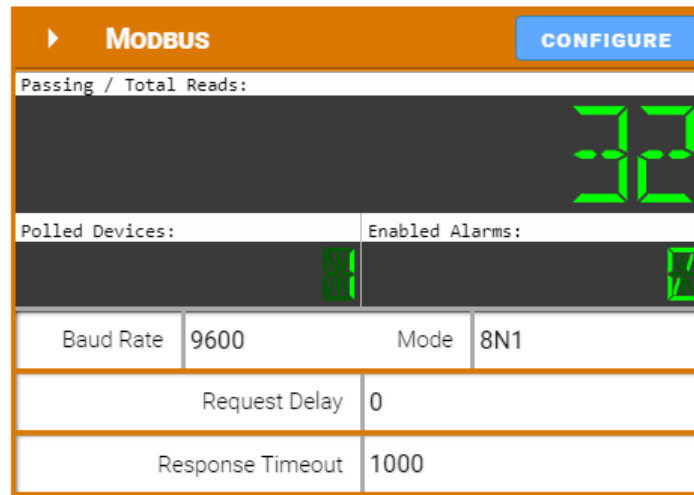
Gateway

The Gateway and its nodes should be configured as normal. Connect to the Gateway through the DB-9 port with the SignalFire ToolKit and set the Network, Network Group, and Encryption Key parameters as needed. To

add a node to its network, simply configure it to have the same Network, Network Group, and Encryption Key along with a unique Slave ID. For more information, please refer to the DIN Gateway v2 manual.

8

Ranger

The Ranger can be programmed to pull individual registers from the Gateway from the various nodes. To do so, click on the "Configure" button on the Modbus tile.

The Ranger can read up to 32 datapoints from up to 8 connected devices. To add a new register read, click on the '+' button. Each line needs to be specified with a Tag Name, and point to a Modbus Slave ID, register address, register data type, and read/write access. The register can also be tagged with units if needed. Click Apply to send the changes to the Ranger.

To select lines for deletion, click on the trash can icon at the end of each line, and then click on the "Delete Rows" button to delete all the rows selected.

Once the registers have been set up as desired, click "Exit" to return to the Ranger's main page. The registers and their values will appear in a table below, where they can be organized in ascending or descending order by clicking on each header. The Modbus register configuration can also be done locally using the Ranger ToolKit.

Because the Ranger's Modbus capability is limited to reading 32 registers from 8 devices, SignalFire recommends using register remapping on the Gateway. That way, all 32 registers can be read off one device (the Gateway's Slave ID).

MODBUS SETTINGS					APPLY		EXIT

Current Settings on Node

Baud	9600 ▼	Serial Mode	8N1 (8 Data Bits, No ... ▼	Byte Order	ABCD (High word, Hi... ▼
Request Delay	0	Response Timeout	1,000		

▶ REGISTERS: 6						DELETE ROWS	APPLY

	Tag Name	ID	Address	Type		Unit	Access	+
0.	3000 Voltage	1	3000	HOLDI... ▼	UINT16 ▼	mV	Read/W... ▼	🗑
1.	3001 PSI int	1	3001	HOLDI... ▼	UINT16 ▼		Read/W... ▼	🗑
2.	3006 Span	1	3006	HOLDI... ▼	UINT16 ▼		Read/W... ▼	🗑
3.	3008 PSI float	1	3008	HOLDI... ▼	FLOAT ▼	PSI	Read/W... ▼	🗑
4.	3010 Scaled	1	3010	HOLDI... ▼	FLOAT ▼		Read/W... ▼	🗑
5.	Solar Battery	247	2025	HOLDI... ▼	UINT16 ▼	mV	Read/W... ▼	🗑

In the example above, the Ranger is transmitting information from a Pressure Scout as well as the Gateway's supply voltage.

Clicking on "Show In Trend" will add that register to the historical data view at the bottom of the page. Clicking on "Modify" will bring a pop-up to configure alarms, or to do a register write to set a Modbus value in a register. Every register can be individually set up with Low and High alarm thresholds. Click "Apply" to save alarm settings for each register.
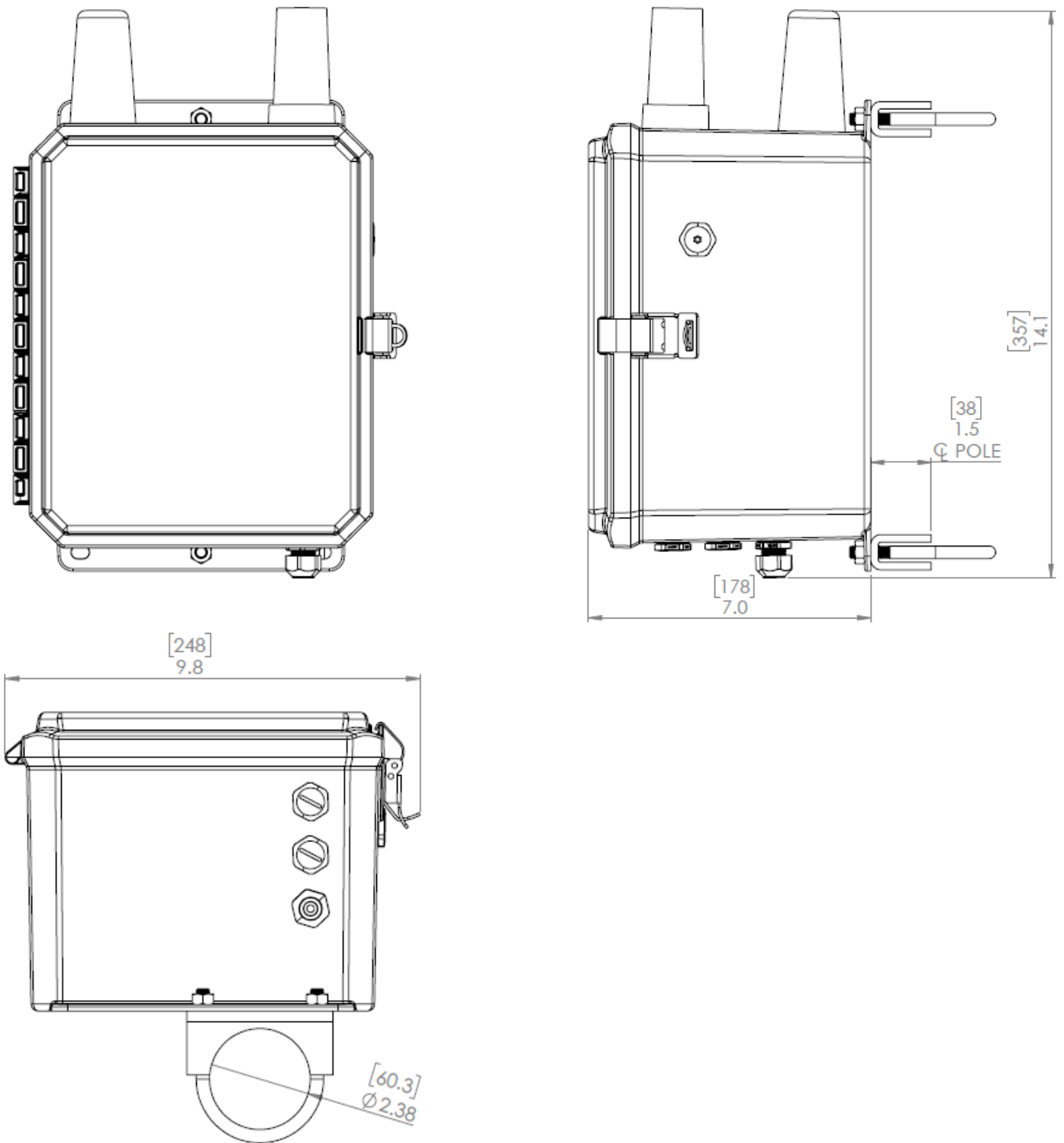
▶ FLOAT 1		APPLY

Current Settings on Node

Register Value	700.553100

▶ ALARMS		APPLY

Current Settings on Cloud

Low Alarm Threshold	0	Disabled ▼
High Alarm Threshold	0	Disabled ▼

Mechanical Dimensions

[248]
9.8

[357]
14.1

[38]
1.5
℄ POLE

[178]
7.0

[60.3]
Ø 2.38

Technical Support and Contact Information

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Revision History

Revision	Date	Changes/Updates
1.0	05/14/21	Initial release