A Cloud Based Management System

Software Manual

Automation Products Group, Inc.
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APG

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Section 1

INTRODUCTION

1.1 OVERVIEW

The purpose of this Explorer Manual is to provide users with guidance on how to use the features of Explorer.

Key features include:

- Sensor data delivery to user
- Sensor alarm notifications
- Two-way communication between user and sensors
- User controlled sensor and gateway configuration

This introductory section will instruct users on how to register, log in/out, and basic navigation of the website.

The “Using Explorer” section will cover the main features of Explorer and show step-by-step instructions on how to use them.

If a user is having trouble or receiving error messages, the “Troubleshooting & Support section will instruct users on how to best resolve their issues.

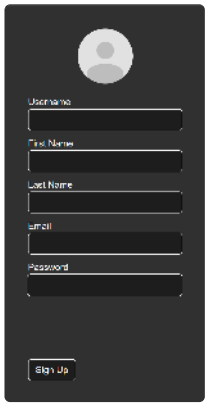
1.2 REGISTRATION

To use Explorer a user must be registered at **explorer.apgsensors.com**.

Sign Up Icon

To get to the Registration page, **click on the "Sign Up"** icon in the top right of the Login page.

Fill in the requested information and click the "Sign Up" button.

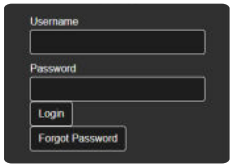


Registration

A verification email will be sent to the provided email address, and once verification has been completed the user will be registered.

1.3 LOG IN

Users will need to input their username and password to log into Explorer.



Log In

If a user has forgotten their password, they can click the "Forgot Password" button to create a new password.

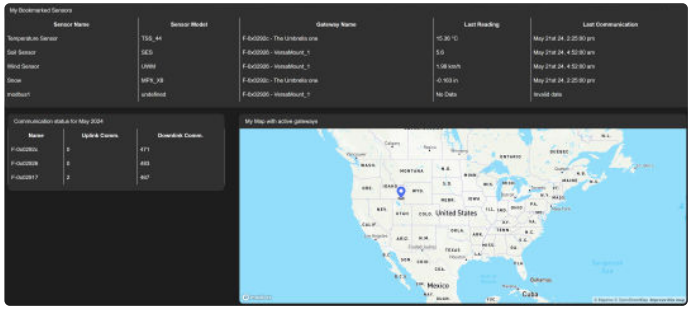
1.4 ORGANIZATION & NAVIGATION

Basic Navigation Icons

From left to right:

- "Home"
- My View
- Dark/Light Mode Toggle
- Profile
- Log Out

1.4.1 HOME PAGE



Home Page

The "Home" page has three displays: most recent communications, monthly communications, and a map of active gateways. It is designed to give users a brief overview of their gateways.

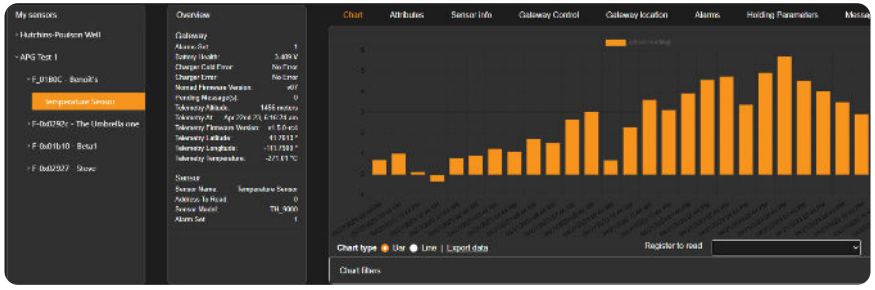
- The most recent communications displays the five most recent communications from the current gateways.
- The monthly communications display keeps track of uplink and downlink communications for the current months for each of the current user's gateways.
- The map of active gateways shows where the gateways are located based on telemetry data. This will only show if the current user has access to the gateway's GPS telemetry.

1.4.2 MY VIEW

The My View page is the principle page for viewing details and changing configurations on the current user's gateways and sensors.

Displayed from left to right:

- "My Sensors" — Controls which information is displayed, and which configurations are to be changed. This is a tree structure with the trunk being groups and leaves are sensors: Group >> Gateway >> Sensor.
- "Overview" — Displays Gateway and Sensor information on device health, telemetry, and current configurations.
- Tabbed Layout — The details of each tab will be covered in **Section 3** of this manual.



My View Page

1.5 LOG OUT

Log Out

Clicking on the Log Out icon will immediately log out the current user and direct the current user to the Log In page.

Section 2

USING EXPLORER

The following sub-sections provide detailed, step-by-step instructions on how to use the various functions or features of Explorer.

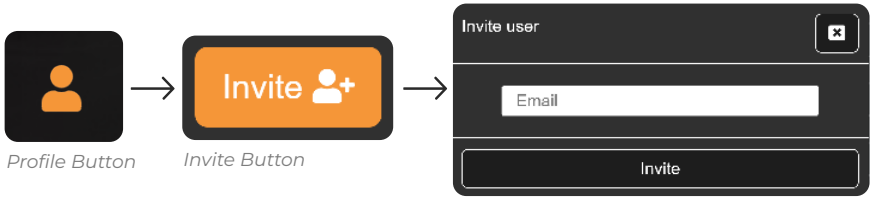
2.1 INVITATIONS & PHANTOM USERS

Invitations can be sent to email addresses from the Profile page.

Once an invitation has been sent, a "Phantom" user is created with the inviter's current configuration and access attributes. These Phantom users can then be added to groups and have access attributes modified. When the invitee registers, the Phantom user becomes a regular user.

2.1.1 HOW TO INVITE OTHER USERS

- Step 1 — Click the Profile Button in the upper right-hand corner.
- Step 2 — Click the Invite Button.
- Step 3 — Input the invitee's email address, click "Invite".



Profile Button *Invite Button* *Invite Input*

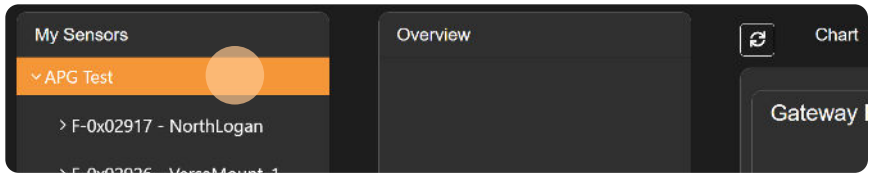
2.2 GATEWAYS

Gateways are a piece of the Nomad system that communicates between the sensors and the website. All users can control the communication frequencies as well as the request register readings from the “Gateway Control” tab:

Step 1 Click “My View”.

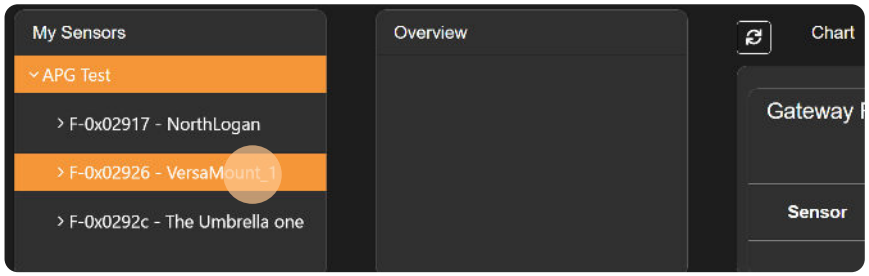
My View Button

Step 2 Select the group the gateway is a member of.



Gateway Group

Step 3 Select the gateway.



Gateway

2.2.1 GATEWAY READING CONTROL (GRC)

Gateway Reading Control allows the user to determine how a Nomad device communicates with its sensors.

Sensor	Address To Read	Length	Power Line	Function	Fct. Desc.	
1	1	1	1	03	Request to Nomad to read modbus holding reg (MD F3)	X

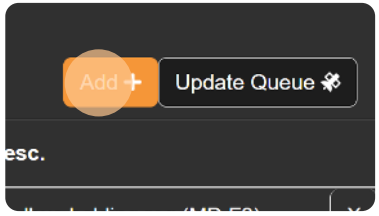
Gateway Reading Control

Displayed from left to right

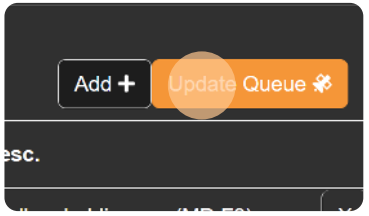
- **Sensors** Modbus Sensor ID.
- **Address To Read** The register address to read.
- **Length** The length of the read starting at “Address To Read” Value.
- **Power Line** The power line associated with the selected sensor.
- **Function** The function to apply to the read.
- **Fct. Desc.** Description of the selected function.

2.2.2 HOW TO CREATE A NEW GATEWAY READING CONTROL

- **Step 1** Click “Add”.
- **Step 2** Click “Update Queue”.



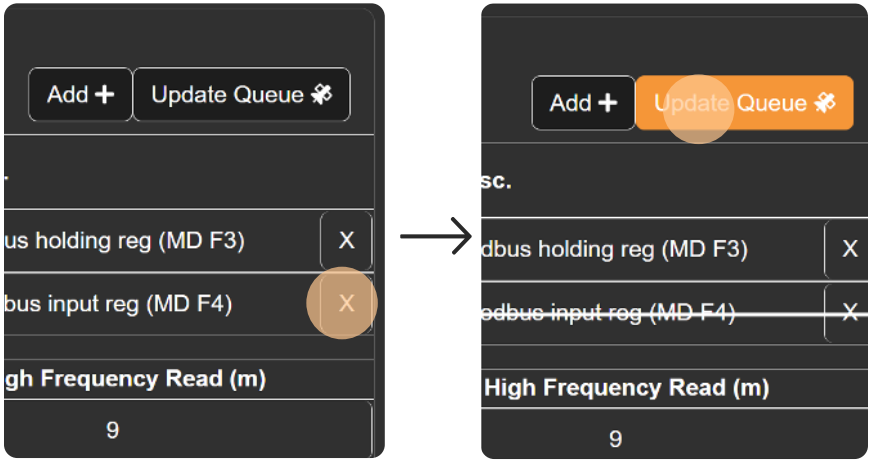
GRC Add Button



GRC Update Queue Button

2.2.3 HOW TO DELETE A GATEWAY READING CONTROL

- Step 1 Click “X”.
- Step 2 Click “Update Queue”.



GRC X Button *GRC Update Queue Button*

2.2.4 GATEWAY COMMUNICATION & READING SETTINGS

My View Gateway Configuration

Users can adjust gateway sensor reading and communication settings according to their need. **See Section 2.2.1 for a description of the configuration settings.**

Step 1 Click “Gateway Control”.

Gateway Control Menu Options

Step 2 Adjust communications settings.

Communication Settings Adjustment

Step 3 Select “Update Queue”.

Gateway Control Update Queue

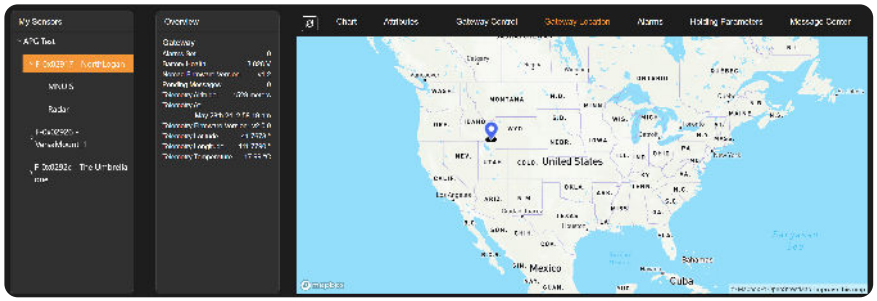
Table 1. Gateway Configuration

Setting	Description	Default
High Frequency Read (minutes)	How often the gateway will read sensor values without sending (used for alarm detection).	10
Send Comm. Every (minutes)	How often the gateway will read and send sensor values.	60
Boot-up Timeout (seconds)	The time between gateway boot-up and sensor reading.	10

2.2.5 GATEWAY LOCATION

If a user has access to GPS data, then they will see a "Gateway Location" tab in My View that shows the gateway's recorded location.

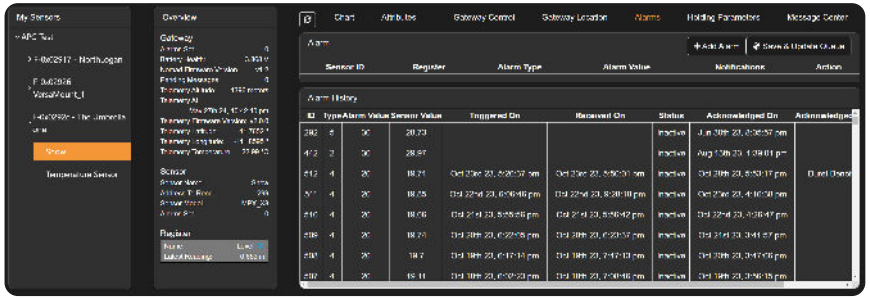
This feature requires gateway telemetry data that may not always be available.



Gateway Location

2.3 ALARMS

Alarms are handled at the gateway level but are defined at the sensor level. When a user selects the Alarm tab in My View they will see all sensors' set alarms and alarm history for the gateway.



My View Alarms

2.3.1 ALARM TYPES

Table 2. Gateway Configuration

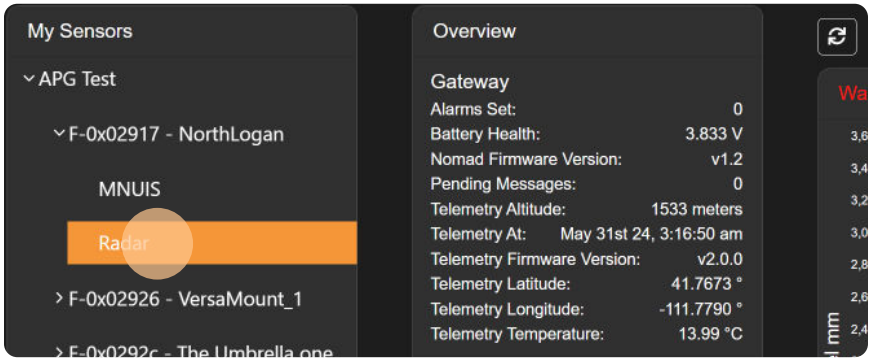
Type ID	Type	Alarm Triggers
1	Under	Sensor reading goes below the set value.
2	Over	Sensor reading goes above the set value.
3	Abrupt	The absolute difference between two consecutive sensor readings is larger than the set value.
4	Hysteresis Near	If the value of the sensor, for the specified register, is under the set-point, turn on the alarm. To turn off the alarm, the value of the sensor needs to be out of the hysteresis window.
5	Hysteresis Far	If the value of the sensor, for the specified register, is over the set-point, turn on the alarm To turn off the alarm, the value of the sensor needs to be out of the hysteresis window.

Table 3. Gateway Configuration

Action ID	Action	Description
1	Turn P1 ON	Gateway will turn Digital Output 1 **ON**
2	Turn P1 OFF	Gateway will turn Digital Output **1 OFF**
3	Turn P2 ON	Gateway will turn Digital Output **2 ON**
4	Turn P2 OFF	Gateway will turn Digital Output **2 OFF**
5	Nothing	Gateway will **do nothing** (Alarm notifications will be sent out)

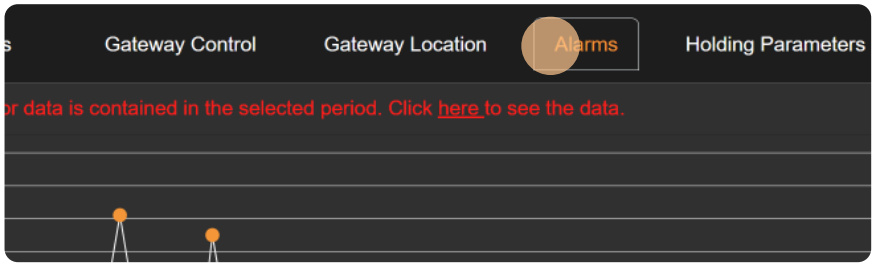
2.3.2 HOW TO ADD AN ALARM

Step 1 Select sensor.



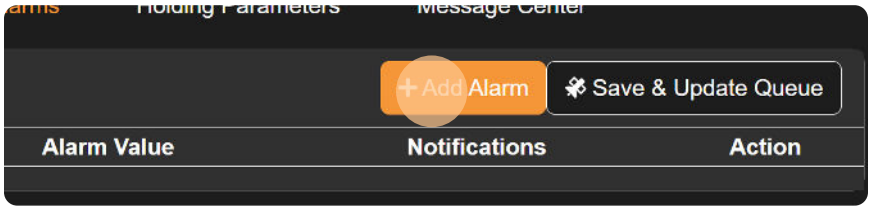
Sensor Selection

Step 2 Click “Alarms”.



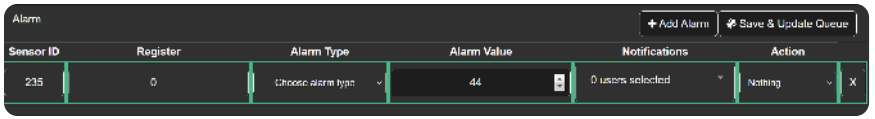
Alarm Menu Options

Step 3 Click “Add Alarms”.



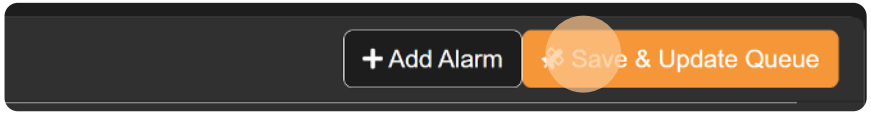
Add Alarm

Step 4 Set the alarm configuration.



Alarm Configuration

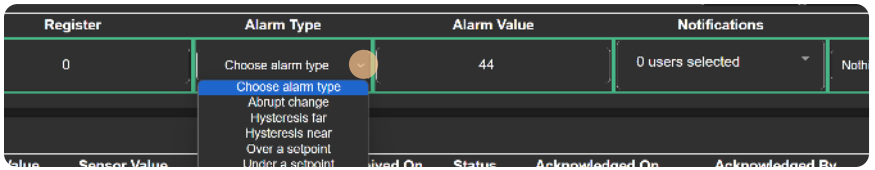
Step 5 Click “Save & Update Queue”.



Save & Update Queue Button

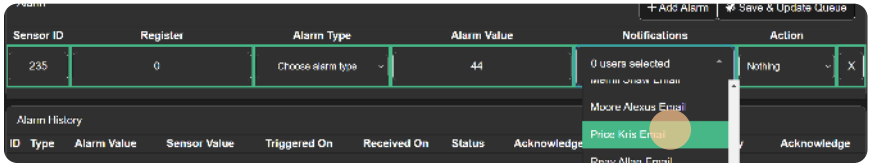
2.3.3 HOW TO EDIT AN ALARM

Step 1 Configure alarm type.



Alarm Type Selection

Step 2 Configure alarm notification.



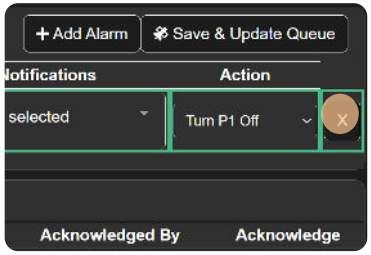
Alarm Notification Selection

Step 3 Click “Save & Update Queue”.

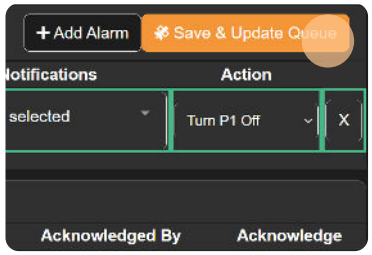
Save & Update Queue Button

2.3.4 HOW TO DELETE AN ALARM

- **Step 1** Click “X”.
- **Step 2** Click “Save & Update Queue”.



Alarm Delete Button



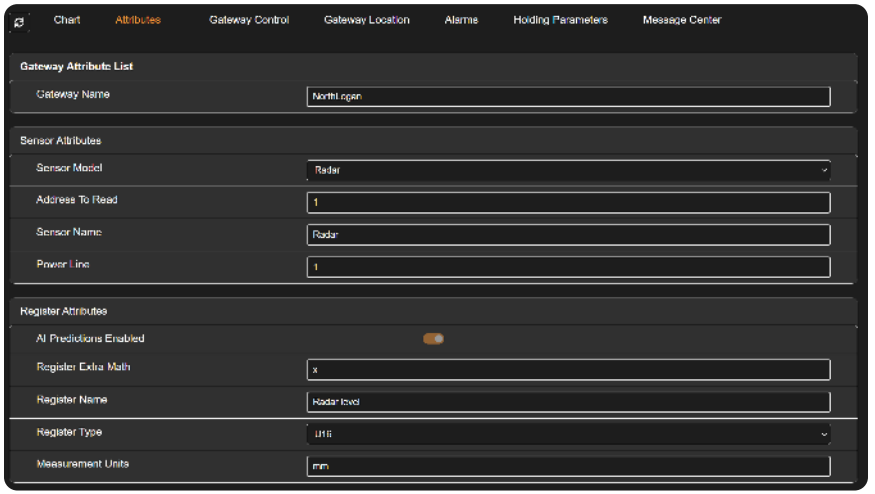
Save & Update Queue Button

2.3.5 ALARM HISTORY

The “Alarm History” table will show all previously triggered alarms as well as all actively triggered alarms. Nomad will clear its own alarms if the sensor value returns to a ‘safe’ reading.

NOTE: *Using satellite communications can cause some messages to become unordered. It is possible for Explorer to receive an alarm cleared message before receiving an alarm triggered message. To better inform the user, the Alarm History table includes the “Triggered On”, “Received On”, and “Acknowledged On” timestamp columns.*

2.4 ATTRIBUTES



Attributes Page

2.4.1 SENSOR ATTRIBUTES

The user can configure the sensor configuration by changing the values in the **Sensor Attributes list**. Any changes to these values will automatically be saved to the database.

Table 4. Sensor Attributes

Name	Action
Sensor Model	The model of the sensor.
Address to Read	The address of the register holding the sensor value.
Sensor Name	User defined alias for the sensor.
Power Line	Which power line the sensor is using.

2.4.2 REGISTER ATTRIBUTES

The register attributes let Explorer know how to format the register values for display to the user.

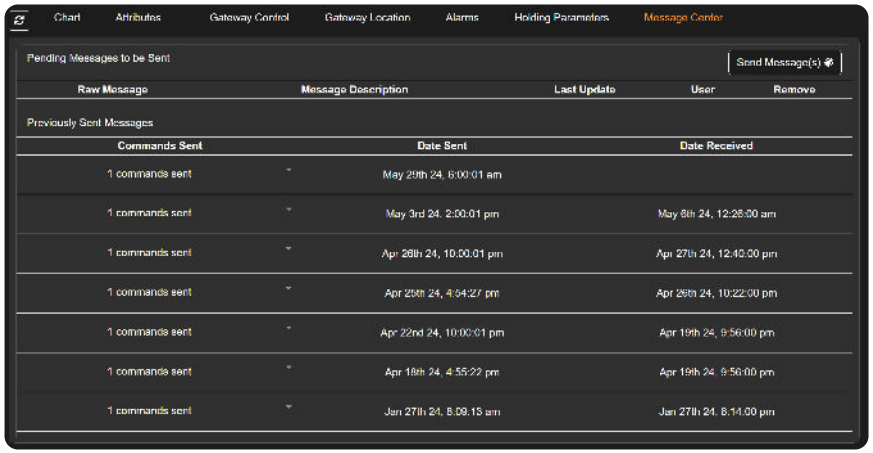
Table 5. Register Attributes

Name	Description
Register Extra Math	Equation used to convert this register's values.
Register Type	The data type stored by this register.

NOTE: *Explorer converts to and from the register, meaning this equation must be bijective and should be kept simple.*

2.5 MESSAGE CENTER

The "Message Center" is where outgoing messages are queued and sent to Nomad devices.



Message Center Page

2.5.1 SENDING MESSAGES

Configuration changes to a gateway or a sensor are encoded into hexadecimal messages and assembled in the Message Center. Users will see a notification if any pending messages are waiting to be sent.

To send the messages simply click the "Send Message(s)" button.

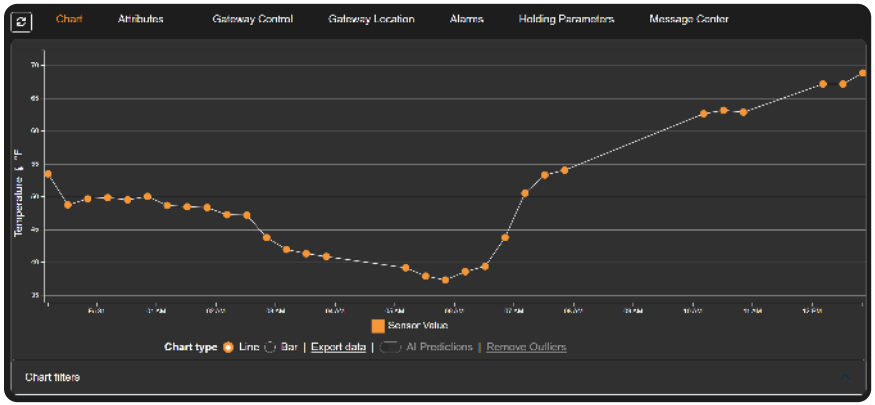
2.5.2 MESSAGE HISTORY

Messages that have been sent are saved and can be viewed in the Message Center. Messages that have been received and acknowledged by the device have a "Date Received" timestamp.

Message History

2.6 CHART

The Chat tab will visualize a sensor's register values over time.



Sensor Value Chart

2.6.1 CHART FILTERS

The number of readings can be changed to common choices:

- Last 30 readings
- Last 24 hours
- Last 30 days
- Last 7 days

If none of these options suffice, the user can input a custom date range to visualize.

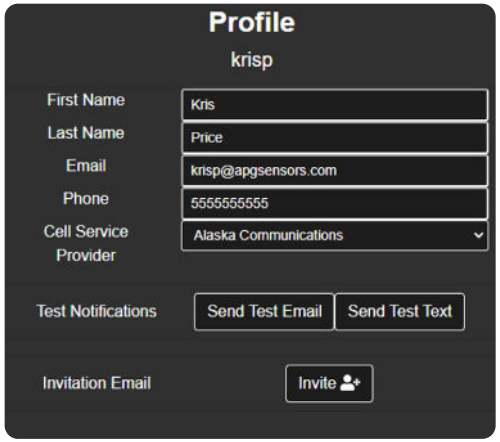
2.6.2 EXPORT DATA

Users can download a CSV file that contains the current chart visualization data. The column headers of this downloaded data are:

- sensor_id
- sensor_type_id
- address
- lastupdate_ts
- last_update_user_id
- sensor_data_id
- sensor_data_value
- receive_date_time
- sensor_address

2.7 PROFILE

The Profile page is for users to add or change basic user information, test notifications, and invite other users.



Profile Page

2.7.1 USER CONTACT INFORMATION

The user's contact information is used almost exclusively for alarm notifications. Users should keep this information updated and use the test notification to ensure that alarm notifications are delivered.

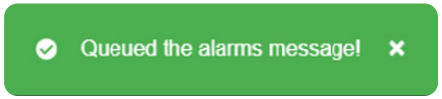
Section 3

TROUBLESHOOTING & SUPPORT

3.1 ERROR MESSAGES

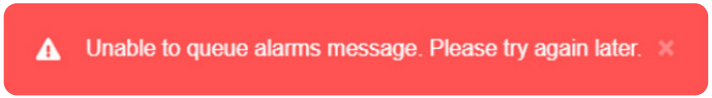
The result of Explorer saving information to the database is displayed to the user using pop up notifications (examples below). These notifications will be shown at the bottom right of the website.

When data was saved successfully the user will see a green notification along with a brief description:



Example of a Successful Database Interaction

However, whenever there is a problem saving data, the user will see a red notification.



Example of an Unsuccessful Database Interaction

NOTE: *If an error message appears, any changes the user was attempting to make will NOT be saved until the error has been corrected.*

3.2 TROUBLESHOOTING

The most common reason for a user to run into problems with Explorer is disruption of their Internet connection.

Step 1 The first step of troubleshooting should always be to check that the user's device has a connection to the Internet.

The second most likely reason a user will experience problems is if Explorer's website host is down. Once the user has ensured that they are connected to the Internet, the second step is to wait. This will give the hosting service time to get back online.

Step 2 Wait one hour before resuming work on Explorer.

If user still has problems after these two steps, please see **Section 3.3** about getting support.

3.3 SUPPORT

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