



User Manual for Network Based 3-Channel 4-20 mA Current Sensor Model FAC0420-22

Description – Initialization – Technical Information

Sensor Technical Information

General	
Model	FAC0420-22
Dimension	Length × Height × Depth 14 cm × 2.4 cm × 9.4 cm
Weight	500 g
Working Temperature	-10 to 80 °C
Storage Temperature	-20 to 80 °C
Working Humidity	0 – 60%
Working Voltage	24 - 100 Volts
Mounting Brackets	2 holes at the top to be fixed on the wall
Guaranty	2 Years
Input/ Output	
Type of Input	4 – 20 mA current
Number of inputs	3
Output	Network

Security Considerations

- (Before using this product, please read the precautions)
- Please carefully read this manual before using the product and pay full attention to the mentioned points to use the product correctly.
- In this manual, safety measures are classified into two levels: “Warning ⚠ ” and “Caution ⚠ ”.

Warning ⚠	Improper handling may lead to dangerous conditions and cause death or serious injury.
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Caution ⚠	Improper handling may lead to dangerous conditions and cause minor or moderate injury to persons or damage to property.
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Follow the safety measures of both levels as they are very important for personal and system safety. Ensure that users read this manual and then keep it in a safe place for future reference.

Design Precautions

Warning ⚠

- Paying attention to the details of cabling and proper connection is one of the most important parts of installing sensors, which directly affects the performance and efficiency of the network.
- Always use a consistent standard (T568A or T568B) at both ends of the cable to prevent connection issues.
- Mistakes in wiring during socket installation can lead to hardware damage to the Sensor or improper network performance.
- After installing the sockets, connect the cable to the Sensor. If the Sensor is not recognized or does not function properly, check the following:
 - Complete connection of the socket to the cable
 - Correct wiring arrangement
 - Use a network tester to identify potential cabling errors
 - If the above points are confirmed, test the relevant sensor with a tested network cable at the sensor installation site to ensure the sensor’s proper functioning.
- Avoid excessive bending or sudden pulling of cables while working with them, as this can damage the internal wires and reduce signal quality.

Caution 

- Do not bundle the RJ45 cable with the main circuit and power cables, and do not install them close to each other. Maintain a minimum distance of 100 mm (3.94 inches) between them. Failure to maintain this distance may cause interference due to noise.

Installation Precautions

Warning 

- Before installing the sensor, ensure the quality of the cable being used. The manufacturer recommends using RJ45 with CAT6 specification. Failure to follow this guideline may result in damage to the device.
- To maintain signal integrity, it is essential to connect the shield of the RJ45 cable to properly shielded sockets.
- Avoid installing the sensor in environments with extremely high or low temperatures or humidity levels that exceed the sensor's operating range. Such conditions may lead to malfunction or incorrect performance.
- Use the 4–20 mA current sensor strictly for its intended purposes. Do not connect it to incompatible devices, as this may cause errors or permanent damage.

Caution 

- Use the 4-20 mA 3-Channel sensor in an environment that complies with the general specifications in this manual. Using this sensor in any other operational environment may cause electric shock, fire, malfunction, or damage and reduce the quality of the module.
- Never directly touch the conductive part or electronic component of the 4-20 mA 3-channel sensor. Doing so may cause malfunction or damage to the data logger.
- When installing the 4-20 mA 3-Channel sensor on the wall, carefully tighten the wall screws. Loose screws may cause the sensor to fall and create a short circuit.
- Prevent external materials such as dust or wire fragments from entering the Sensor. These external materials may cause fire, malfunction, or damage.

Wiring Precautions

Warning

- Before wiring, ensure the health and quality of all input and output cables. Failure to do so may cause product damage.
-

Caution

- Before connecting the RJ45 cable, ensure that the type of connector to be connected is correct. Connecting an incorrect connector or incorrect wiring will cause Sensor damage.
- When wall-mounting the sensor, tighten the mounting bracket screws securely. Loose screws can cause the sensor to fall and short circuit.
- Securely connect the RJ45 cable to the sensor. Failure to do so may cause cable damage and improper device operation.
- Ensure that all incoming data cables connected to the Sensor are routed through a cable channel or secured with a cable tie. Failure to do so may result in accidental cable pulling, which can damage the Sensor and cables or cause module malfunction due to loosen connections.
- Handle RJ45 cables with care when disconnecting them from the Sensor. Pulling on the cables can lead to device malfunctions or damage to the Sensor or cable.

Startup and maintenance precautions

Warning

- Do not touch the conductive or electronic part of the sensor while it is activated. Doing so may cause an electric shock or damage the sensor.
-

Caution

- Sensor Installation and setup must only be done by qualified and expert repair personnel familiar with the knowledge related to protection against electric shock.
- Avoid resetting the sensor unnecessarily. Doing so will cause all changes made on the sensor's web page will be returned to factory settings.

Operational safety measures

Warning

- Do not touch any conductive parts or electronic components of the data logger while the Sensor is transmitting data. Doing so may cause the Sensor to malfunction or fail.
-

Caution

- To avoid noise interference, keep all radio communication devices, including mobile phones, at least 25 centimeters away from the Sensor in all directions.
-

Waste disposal precautions

Caution

- Dispose the Sensor as an industrial waste.
- Ensure Sensors are segregated from other waste in accordance with local regulations. Dispose of Sensors correctly at your local waste collection/recycling facility.

Contents of the box

Please verify that the box contents match the packing list. The following items should be included:

- A 3-Channel 20-4 mA current network-based Sensor, model FAC0420-22 ¹
- 48-volt adaptor²
- SD Card
- OTG cable
- A user manual.

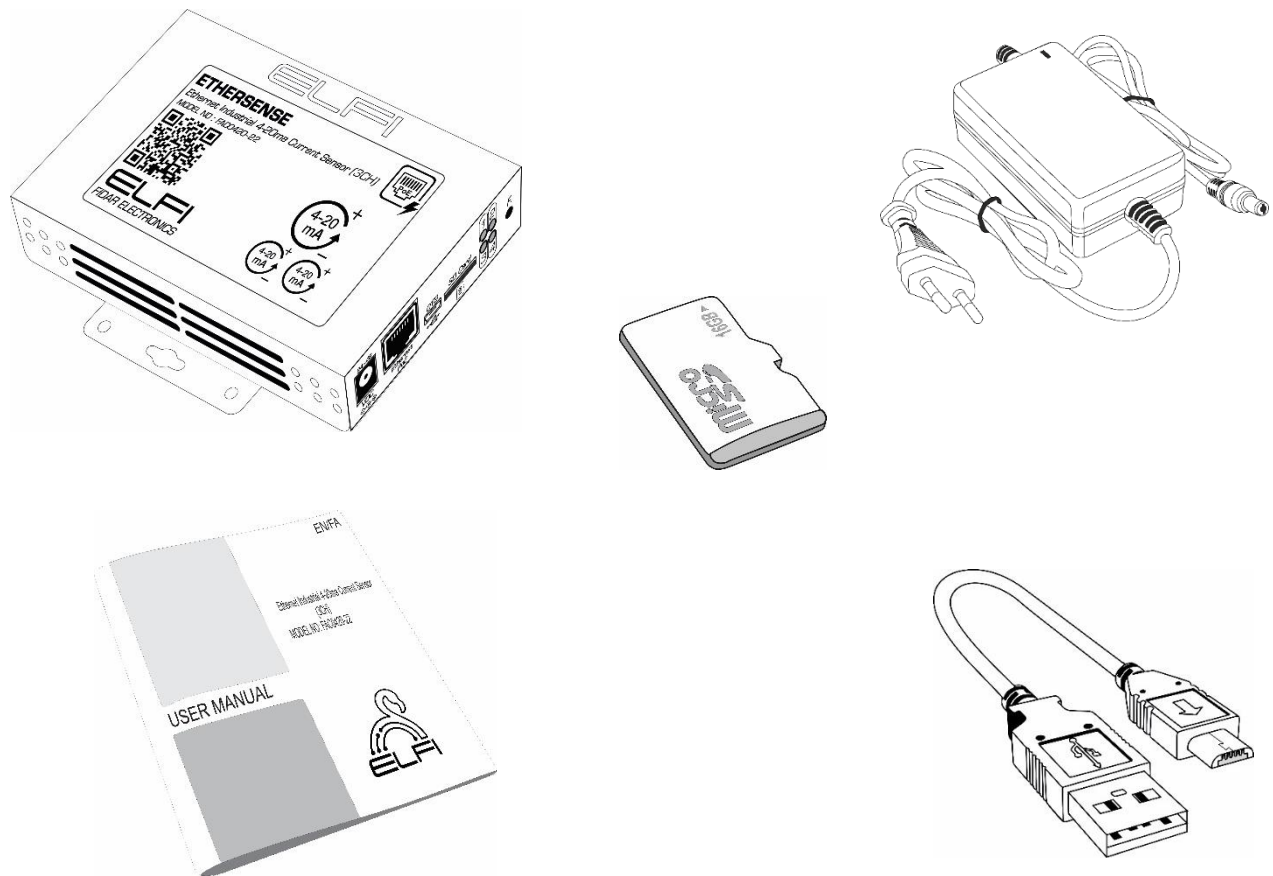


Figure 1: Contents of the box

1. Detailed dimensions of the device can be found on page 27 of the user manual.
2. If requested by the customer

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1. Initialization of the Sensor

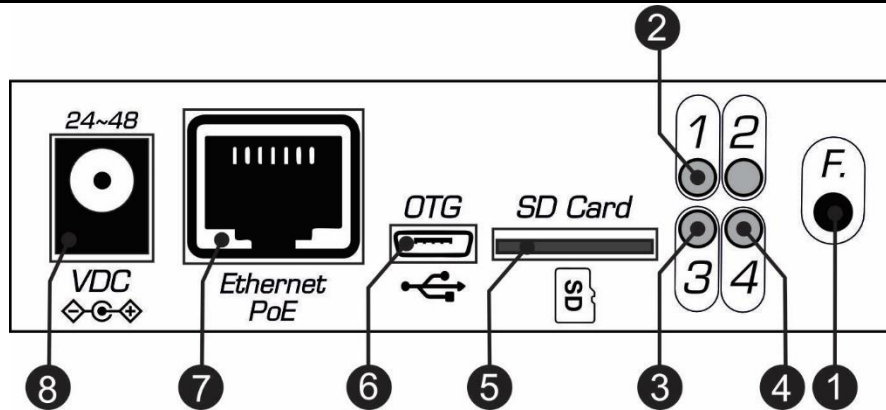


Figure 2: Side view of the sensor

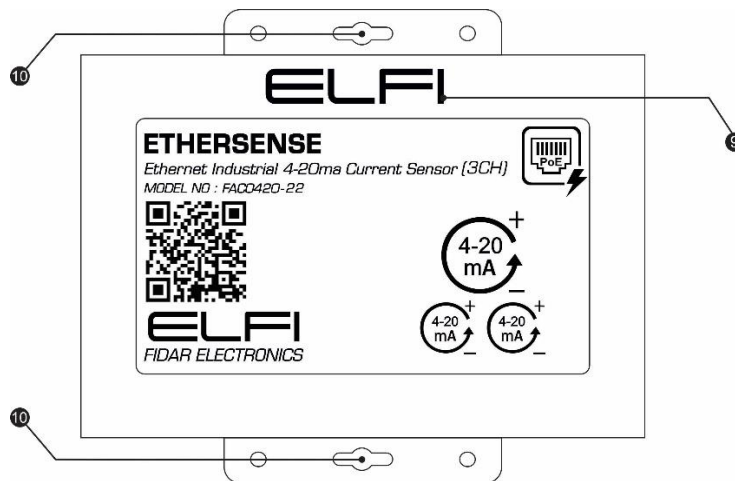


Figure 3: Front view of the sensor

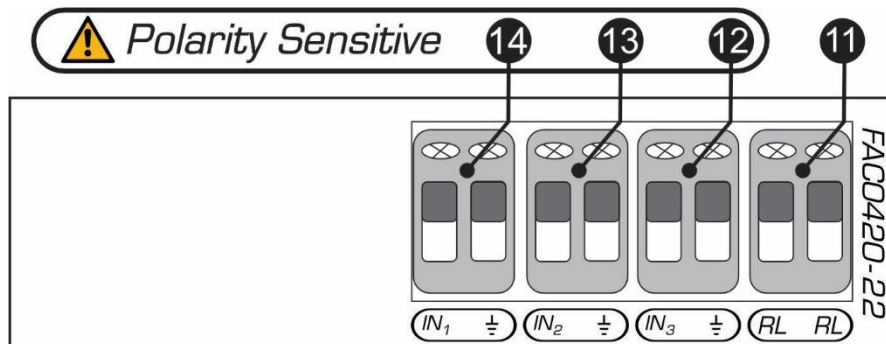



Figure 4: Side view of the sensor

Table 1: Information related to Sensor cover


Number	Name	Description
1	F Key	To perform a calibration and factory reset procedure on the Sensor
2	POWER LED	Indicates Sensor's Power Connection
3	Light which indicates the status related to each channel's calibration.	<ol style="list-style-type: none"> 1. Blinking 1 time per second: channel 1 calibration is ongoing. 2. Blinking 2 times per second: channel 2 calibration is ongoing. 3. Blinking 3 times per second: channel 3 calibration is ongoing
4	Light which indicates the status related to each channel's calibration.	<ol style="list-style-type: none"> 1. Blinking 1 time per second: point zero calibration 2. Blinking 2 times per second: Maximum point calibration
5	SD Card	SD Card input
6	OTG	OTG cable input
7	Ethernet PoE	Ethernet cable input
8	VDC	Adaptor input
9	Sensor Power Connection Display	If the Sensor's power is connected, the  symbol will be displayed in green.
10	Wall Mounting Location	<hr/>
11	RL	To connect sensor to warning equipment (siren, light) or cooling system
12	IN ₃	Sensor 1 st Channel
13	IN ₂	Sensor 2 nd Channel
14	IN ₁	Sensor 3 rd Channel

2. Connecting Sensor to network

To set up the sensor, if you are using a PoE switch, simply connect the sensor to the switch using a cable. Otherwise, use a 48V adapter to set up the sensor and then connect the sensor to your network using a network cable.

Note: Please note that under no circumstances should you use the adapter and network cable at the same time to set up the sensor.

Note: If the sensor is offline, first check the RJ45 or Ethernet cable connection. If the cable is properly connected and the sensor is still not responding, perform a reset as follows:

Disconnect the Ethernet (RJ45) cable from the sensor. Press and hold the F button. While holding the button, reconnect the Ethernet cable. Continue holding the F button until the  indicator light turns on, then release the button.

3. Calibration

To calibrate the current sensor, follow the steps below in order:

Step 1: Entering Calibration Mode

1. Press and hold the F button for 4 seconds.
 - LED 3 will begin to blink (once per second).
 - If the LED does not turn on, try again.

Step 2: Setting the 4 mA Current (Zero Point)

1. Connect the current calibrator to the sensor.
2. Send a 4-mA signal from the calibrator.
 - LED 4 will blink once per second.

Step 3: Setting the 20 mA Current (Maximum Point)

1. Press the F button again.
 - LED 4 will start blinking twice per second.
2. Send a 20-mA signal from the calibrator.

Step 4: Calibrating Additional Channels (Optional)

1. To calibrate the second channel, press the F button once more.
 - LED 3 will blink twice per second.
2. Repeat the same steps using 4 mA and 20 mA signals.

Note: When calibrating the third channel, LED 3 will blink three times per second.

Step 5: Saving the Settings

1. To save the calibration settings, press the F button.

In Case of Errors:

- If the LEDs do not function correctly or calibration is incomplete, restart the process from the beginning.

Note: Calibration always starts from Channel 1 in sequence.

4. Sensor Software Configuration

To access the sensor’s user interface, after powering it on, enter the IP address 192.168.1.7 into a browser on a computer connected to the same network. Enter the username and password ¹ to access the sensor’s web interface (see Figure 5).

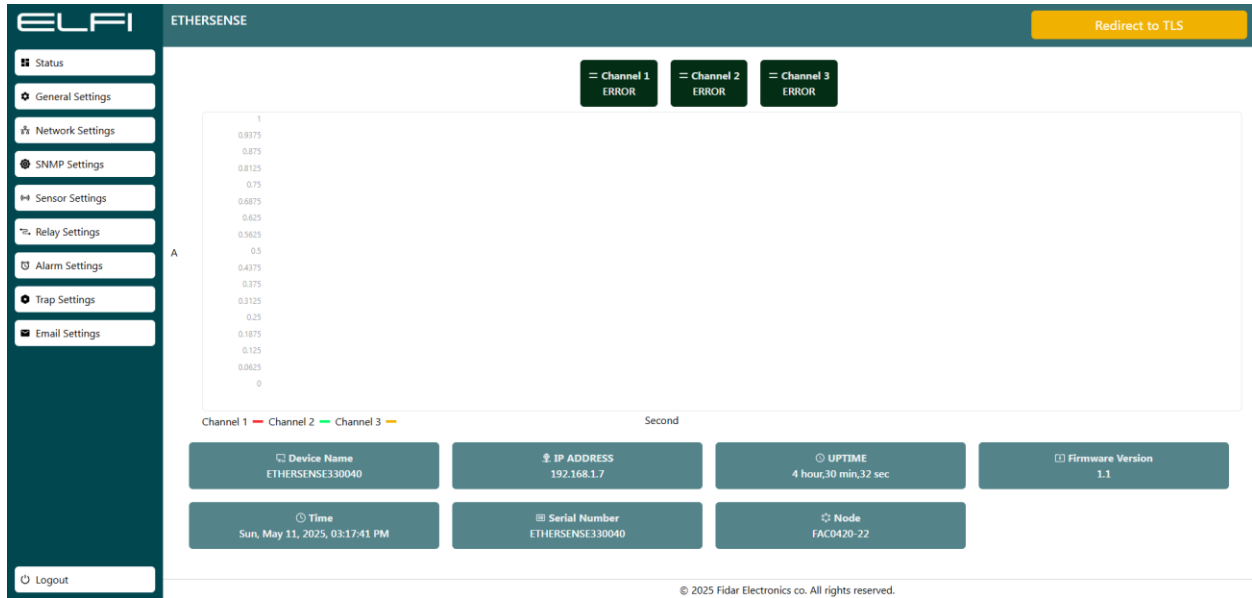


Figure 5: Sensor Web Page

4.1. Status Menu

In devices connected to a 4–20 mA current sensor, the Status page displays real-time and accurate information about the current value and operational state of the sensor. This type of sensor is typically used to measure physical variables such as temperature, pressure, liquid level, or gas flow, and transmits measured values via a standardized current between 4 and 20 mA (see Figure 6).

Current Value Display

- Real-time Current Reading:

The exact current value sent by the sensor (between 4 and 20 mA) is displayed numerically.

- **4 mA:** Represents the minimum value (e.g., empty level or zero pressure).
- **20 mA:** Represents the maximum value (e.g., full level or maximum pressure).

1. The default username and password for this sensor are both “admin”.

- Values between 4 and 20 mA represent intermediate conditions based on the measured variable.
- **Error Conditions:**
 - A current below 4 mA or above 20 mA is identified as a fault, possibly due to sensor or connection issues.

Sensor Information

This section provides technical details about the sensor:

- **Device Name:** Custom name assigned to the sensor for easy identification on the network or in the field.
- **IP Address:** The network address through which the sensor is connected.
- **Uptime:** The total time the sensor has been running continuously since the last startup or reset.
- **Firmware Version:** Indicates the current software version of the sensor, reflecting its features and updates.
- **Time:** The current date and time set on the sensor, essential for event logging and time synchronization.
- **Serial Number:** The unique ID of the sensor used for tracking and documentation.
- **Sensor (Node) part number:** Corresponding to the sensor hardware, identifying its technical specifications.

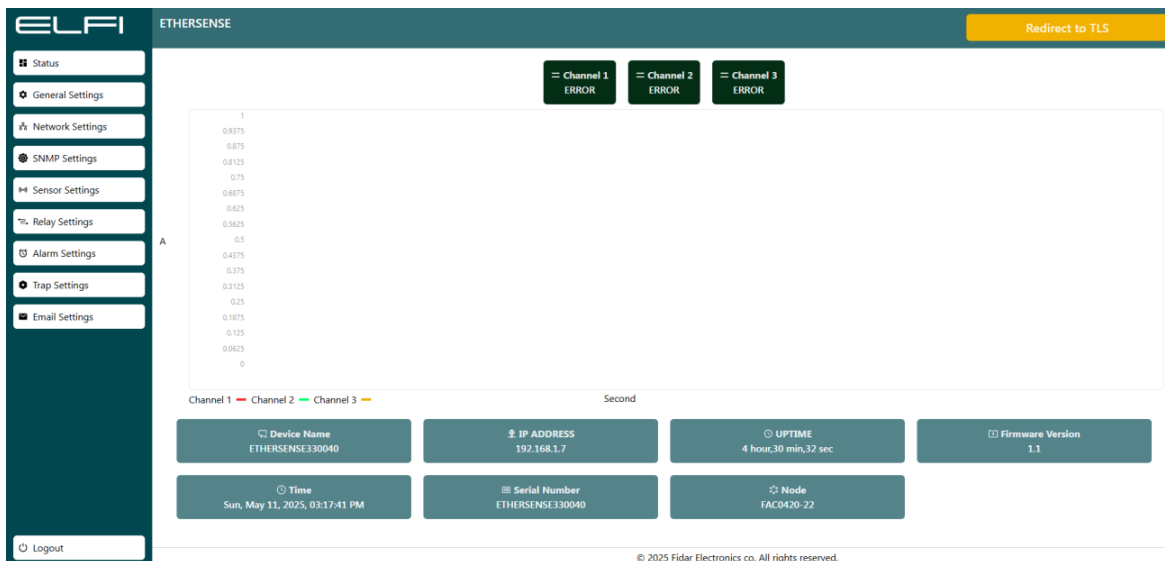


Figure 6: Sensor “Status” Menu

4.2. General Settings Menu

This menu allows for time configuration and password changes (see Figure 7).

- To configure time settings, use the NTP option to automatically synchronize the sensor's clock with internet time servers. If disabled, you can manually adjust the date and time, or sync with your computer's clock.
- For enhanced security, change the default sensor password.

Note: The default Device Name is the sensor's Serial Number. It is recommended to rename the device after setup for easier identification.

Note: After making any changes, first click Save and then select Reboot to apply the settings completely.

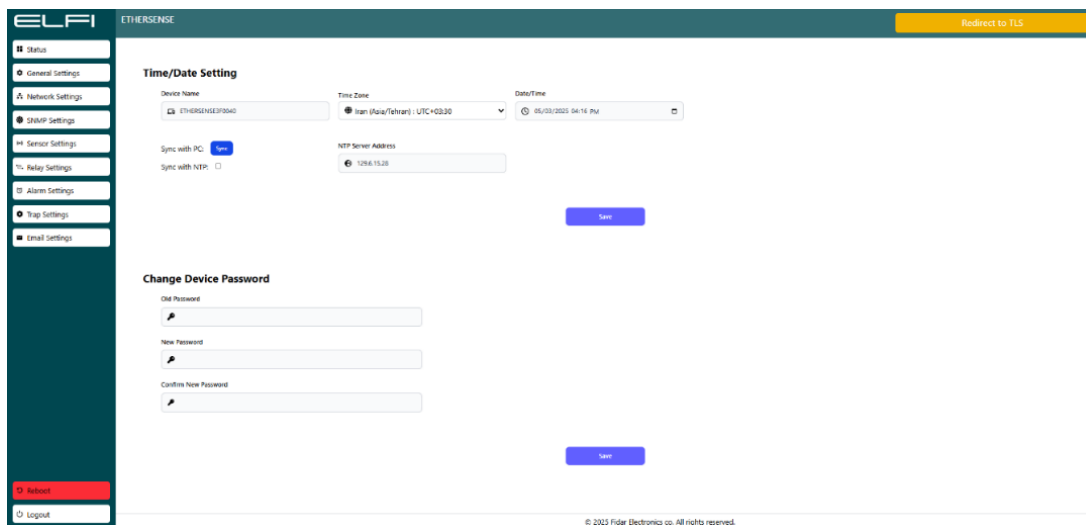


Figure 7: Sensor “General Settings” Menu

4.3. Network Settings Menu

This section helps configure the sensor's network connectivity. Depending on your network requirements, you can use either automatic configuration via DHCP or manual configuration (see Figure 8).

1. When DHCP is enabled, the sensor automatically obtains required network information from the DHCP server. This includes the IP Address, Subnet, Gateway, DNS Server, and other relevant settings.
2. When DHCP is disabled, if you prefer to enter the settings manually, disable the DHCP option. Once disabled, the following fields will become available for manual configuration:
 - **IP Address:** The unique address of the sensor on the network (e.g., 192.168.1.100)
 - **Subnet:** Defines the local network range (e.g., 255.255.255.0)
 - **Gateway:** The default gateway address for connecting to external networks (e.g., 192.168.1.1)
 - **DNS1 & DNS2:** Addresses of DNS servers used to resolve domain names to IP addresses
 - **HTTP Port:** Port used to access the sensor's web interface via HTTP (Default: 80)
 - **HTTPS Port:** Port used to access the sensor's web interface via HTTPS (Default: 443)
 - **Certificate:** A digital file that verifies the sensor's identity for secure HTTPS communication
 - **Private Key:** A component of the certificate used to decrypt data in secure connections

After completing the settings, click Save, then click Reboot to apply the changes.

Important Notes:

Note: The Private Key must remain confidential and must not be shared.

Note: To enhance security, use HTTPS instead of HTTP.

Note: It is recommended to change default ports (e.g., 80 and 443) if possible.

Note: Store the Private Key in a secure location and prevent unauthorized access.

Note: Use encryption for the Private Key file.

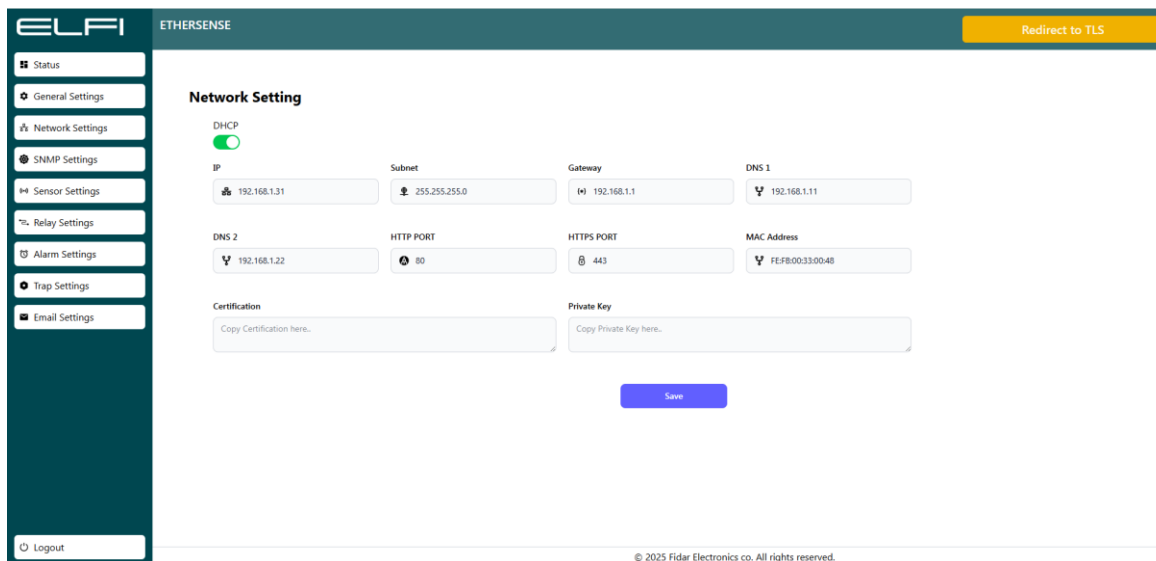


Figure 8: Sensor “Network Settings” Menu

4.4. SNMP Settings Menu

SNMP (Simple Network Management Protocol) enables communication between the network administrator and devices such as sensors, switches, and routers. This section includes options for protocol version, Community settings, OIDs, and Traps (see Figure 9).

- **Current Version:** Indicates the SNMP version supported by the sensor. Typically, versions 1 and 2 are supported.
- **Community:** Acts as a simple password controlling access to sensor information.

Default: public, which allows general access to public sensor data.

Note: Change the default public value to a secure and unique name.

Note: Avoid using easy-to-guess names like "public" or "private".

Note: In the SNMP OID and Trap OID sections, review available identifiers.

Note: Configure Trap OIDs based on your monitoring needs to avoid unnecessary notifications.

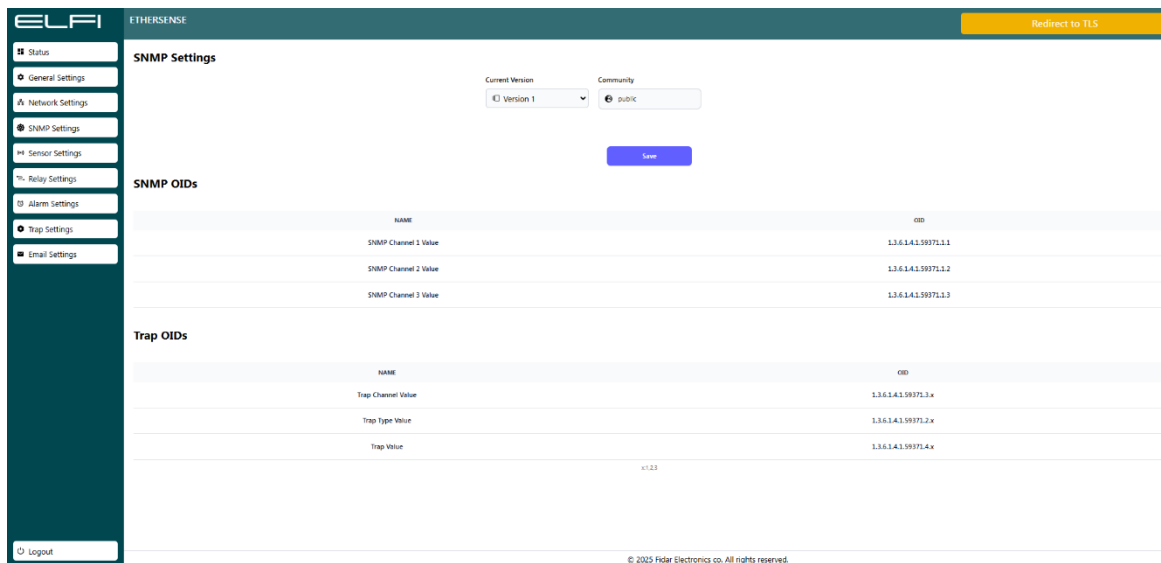


Figure 9: Sensor “SNMP Settings” Menu

4.5. Sensor Settings Menu

In this section, you can enter Ref Low Value and Ref High Value for each channel to define the calibration range. These values determine how the sensor maps the physical measurement (e.g., temperature, pressure, or level) to a 4–20 mA output signal (see Figure 10).

To access these settings, go to the Sensor Settings menu in the device interface.

Ref Low Value:

- Represents the zero point (minimum physical measurement).
- Examples:
 - For a temperature sensor: If the minimum is 0°C, enter 0.
 - For a pressure sensor: If the minimum is 0 bar, enter 0.
- The entered value should reflect the real conditions of the system.

Ref High Value:

- Represents the maximum point (highest measurable value).
- Examples:
 - For a temperature sensor: If the maximum is 100°C, enter 100.
 - For a pressure sensor: If the maximum is 10 bar, enter 10.

Confirm Settings:

- After entering both Ref Low and Ref High values, click Save, then Reboot to apply the settings.

The screenshot displays the 'Sensor Setting' configuration page in the ELFI ETHERSENSE web interface. On the left is a dark teal sidebar with navigation options: Status, General Settings, Network Settings, SNMP Settings, Sensor Settings (highlighted), Relay Settings, Alarm Settings, Trap Settings, and Email Settings. At the bottom of the sidebar is a 'Logout' button. The main content area has a dark teal header with the 'ELFI ETHERSENSE' logo and a 'Redirect to TLS' button. Below the header, the 'Sensor Setting' section is titled. It contains three channels, each with two input fields: 'Ref Value Low' and 'Ref Value High'. All three channels have '4' entered in the 'Ref Value Low' field and '20' in the 'Ref Value High' field. A blue 'Save' button is centered at the bottom of the form area. At the very bottom of the page, there is a small copyright notice: '© 2025 Fidar Electronics co. All rights reserved.'

Figure 10: Sensor “Sensor Settings” Menu

4.6. Relay Settings Menu

Relay settings can be configured in two modes:

- **Time-Based Mode:** When this mode is enabled and a time value is set (e.g., 10 seconds), the relay will activate connected devices—such as sirens, cooling systems, etc.—for the specified time duration (10 seconds in this example) as soon as the relay is triggered, and will then automatically turn off.
- **Continuous mode:** If Continuous mode is selected, once the relay is triggered, connected devices—such as alarms, cooling systems, etc.—will remain active until the sensor exits the alarm state. Additionally, in Continuous mode, if the option “Reset relay status when alarm ends” is enabled, the relay will automatically return to its previous state when the alarm condition ends (e.g., the alarm will be turned off). (See Figure 11)

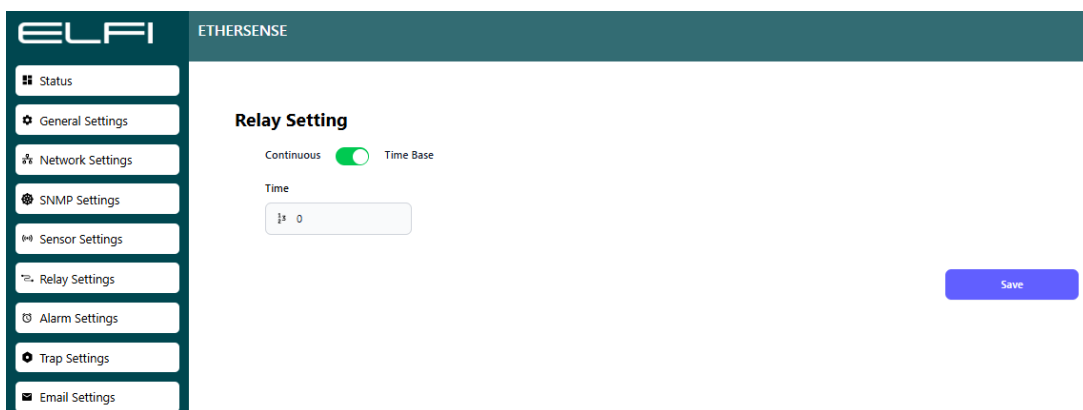
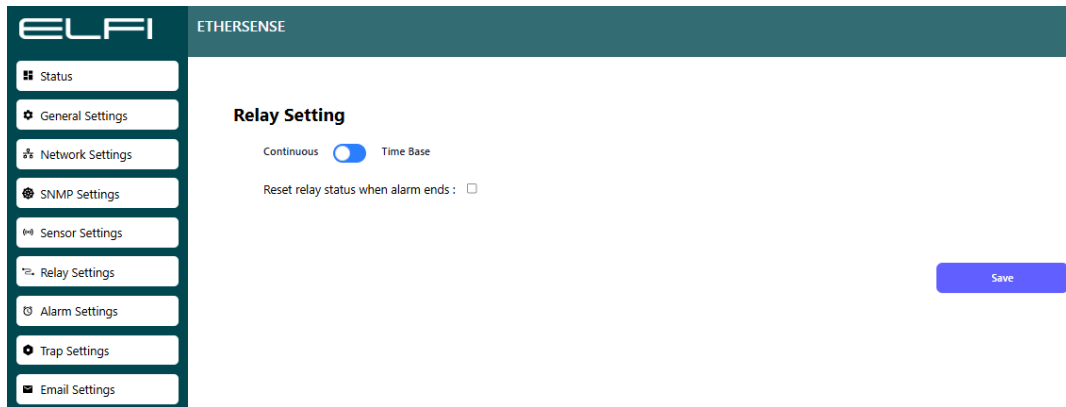


Figure 11: Sensor “Relay Settings” Menu

4.7. Alarm Settings Menu

This section allows you to define alarm thresholds so that the device issues alerts when measured values exceed safe limits or sensor errors occur. These settings include: Low Alarm, High Alarm, Low Pre-Alarm, and High Pre-Alarm thresholds. You can also enable alerts in case of sensor error. (See Figure 12)

1. Accessing Alarm Settings:

- Navigate to the device menu and select Alarm Settings or Sensor Alarm.

2. Low Alarm:

- This value tells the sensor to issue an alert if the measured value drops below the specified threshold.
- Examples:

- For a temperature sensor: if the temperature should not fall below 10°C, enter 10.
- For a pressure sensor: if the pressure should not fall below 1 bar, enter 1.

3. High Alarm:

- This value sets the upper threshold for alerts when the measurement exceeds the specified value.
- Examples:
 - For a temperature sensor: if the temperature must not exceed 80°C, enter 80.
 - For a pressure sensor: if the pressure must not exceed 8 bar, enter 8.

4. Low Pre-Alarm:

- This value alerts the user before reaching the low alarm threshold.
- Example:
 - If the Low Alarm for temperature is 10°C, you can set the Pre-Alarm to 15°C.

5. High Pre-Alarm:

- Similar to the low pre-alarm, this triggers a warning before the high alarm limit is reached.
- Example:
 - If the High Alarm is set to 80°C, you can set the Pre-Alarm to 75°C.

6. Sensor Error Alarm:

- In this mode, the device automatically detects sensor faults such as disconnection, failure, or signals outside the 4–20 mA range, and issues an alert.
- To enable:
 - Turn on the Sensor Error Alarm option.
 - Ensure the sensor is properly calibrated.

7. Saving the Settings:

- After entering the values, click Save, then click Reboot to apply the settings.

Important Notes:

- **Alarm vs. Pre-Alarm:**

- Pre-alarms are designed for early warnings and preventive action.
- Alarms are triggered only when values exceed safe limits.

- **Sensitivity of Settings:**

- Set the pre-alarm values reasonably distant from the alarm thresholds to allow time for intervention.

- **Sensor Error:**
 - If the sensor provides signals outside the 4–20 mA range, the device should alert immediately.

Potential Errors and Troubleshooting:

- **Alarm Not Triggering:**
 - Verify that alarm thresholds are correctly entered.
- **Frequent Alarms:**
 - Review and adjust alarm and pre-alarm values to avoid over-sensitivity.
- **Sensor Error:**
 - Check the sensor's connection and verify calibration settings.

These configurations help you accurately monitor system performance and respond promptly to any issues.

Alarm Notification Options:

1. Email Notification:

- When an alarm is triggered, the sensor can send an alert email to predefined addresses.
- The email will contain details such as the sensor ID and type of alarm.
- To use this feature, SMTP settings must be properly configured in the email settings section.

2. SNMP Trap:

- The sensor can send a Trap to the network administrator indicating an alarm condition.
- Ideal for centralized monitoring systems in managed networks.
- Ensure proper SNMP and Trap OID configuration in the SNMP Settings menu.

3. Relay Activation:

- The sensor can activate a relay to respond physically to an alarm event.
- This may include turning on a warning light, sounding an alarm, or controlling an external device.
- Useful for environments requiring immediate mechanical response.

After configuring your desired alarm responses, click **Save** and then **Reboot** to ensure the changes take effect.

Note: If you are using email notifications for alarms, make sure to verify the recipient addresses and configure the SMTP settings correctly.

Note: In environments that require immediate physical response (such as sirens or warning lights), it is recommended to enable the relay activation feature.

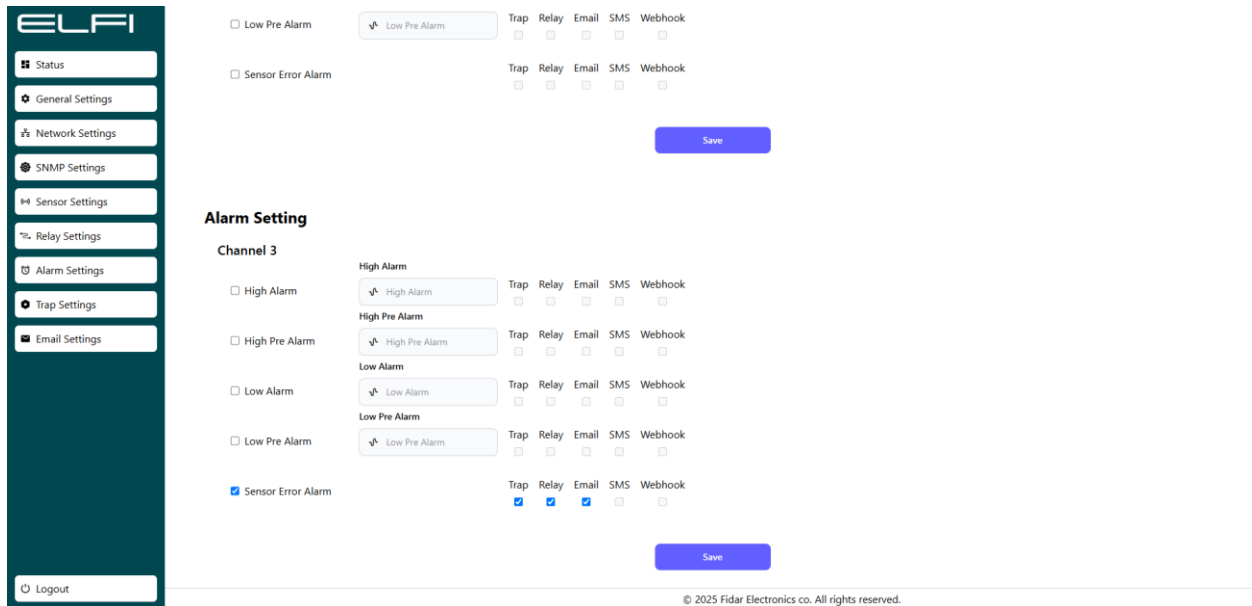


Figure 12: Sensor “Alarm Settings” Menu

4.8. Trap Settings Menu

A Trap is an asynchronous alert message sent by the sensor to the SNMP server, providing information about specific events (such as alarms or status changes). These messages are automatically transmitted by the sensor without any polling request from the server. (See Figure 13). To configure Trap Settings:

1. Go to the Trap Settings section.
2. Fill in the following fields:
 - 2.1. **Trap Destination IP:** The IP address of the network management server.
 - 2.2. **Trap Port:** The appropriate port number (default: 162).
 - 2.3. **Trap Community:** A community string used for SNMP access. (It is recommended to change the default value for improved security.)

Within the Trap Settings page, you will find the Send Delay Config option. This defines a delay before Trap messages are sent to the network management server. It is useful for optimizing network performance and reducing server load, especially in environments with frequent events.

Importance of Send Delay:

- **Network Traffic Management:** Prevents flooding the network with multiple Trap messages in a short time.
- **Reducing Server Load:** Allows the SNMP server enough time to process previous messages before receiving new ones.
- **Avoiding Redundant Alerts:** Temporary sensor fluctuations won't immediately trigger a Trap, preventing unnecessary alerts.

How Send Delay Config Works:

- Set Delay Time (in seconds):
- Default: 0 (no delay)
- Example: 10 means the Trap will be delayed for 10 seconds after the event occurs.
- Trap messages are only sent after the delay, even if multiple events happen.

Using Delay in Repeated Traps:

- If several events occur within the delay period, only the latest status is sent.
- This helps reduce traffic and prevents repetitive messages.

Note: Choose a delay that does not risk missing critical events.

Note: For time-sensitive networks, set a very low or zero delay.

Note: After configuration, verify the Trap functionality to ensure messages are delivered properly.

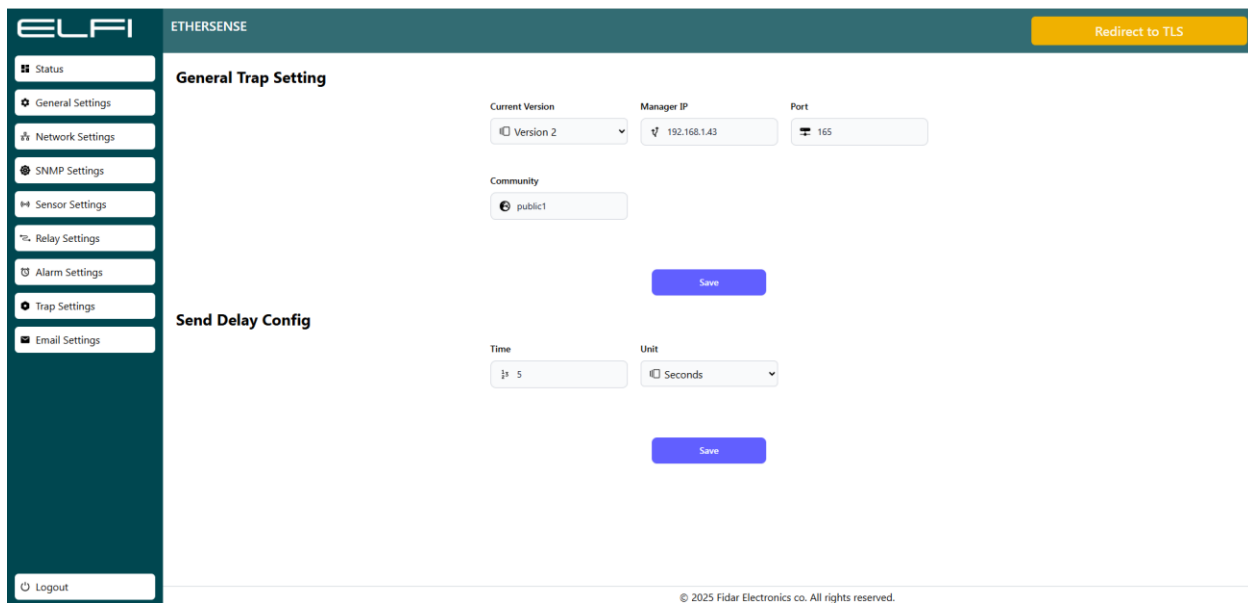


Figure 13: Sensor “Trap Settings” Menu

4.9. Email Settings Menu

This section allows you to configure settings for sending emails via the SMTP (Simple Mail Transfer Protocol). It is used for sending alerts, notifications, or reports to designated email addresses. (See Figure 14)

Available Fields:

- **SMTP Sender Email Address:** The email address shown as the sender in the message. This must be valid and usually matches the credentials of the SMTP server. (Example: example@yourdomain.com)
- **SMTP Receiver Email Address:** The destination email address where alerts will be sent. (Example: example@yourdomain.com)
- **SMTP Server Address:** The address of the SMTP server used to send emails. (Depends on your email provider.)
- **Server IP:** If using a local SMTP server, enter its IP address here.
- **SMTP Port:** Port number used for communication with the SMTP server.
Common values:
 - 25: No encryption (legacy, rarely used today)
 - 465: Secure connection using SSL/TLS
 - 587: Secure connection using STARTTLS

- **SMTP Username:** Username for authentication, typically the same as the sender's email address.
- **SMTP Password:** Password for the specified SMTP username (used for authentication).
- **Time:** Time interval (in seconds) for sending emails or scheduling automated messages.
- **Test Email Address:** An email address used for testing the configuration. Use the “Send Test Email” option to verify that the settings are correct.

After completing the configuration, click Save, then Reboot to ensure all settings are applied correctly.

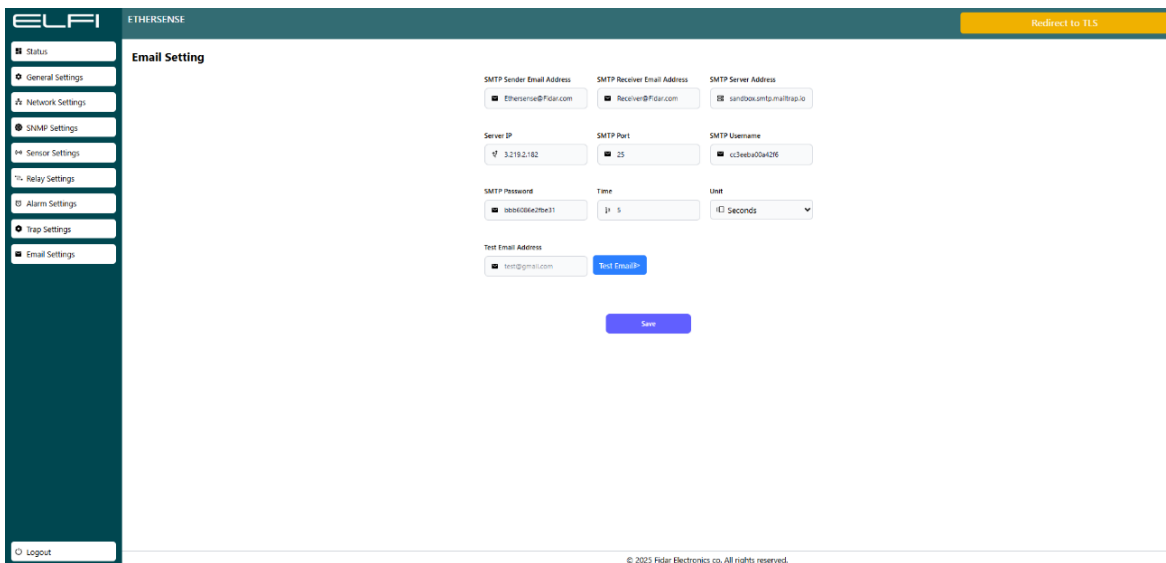
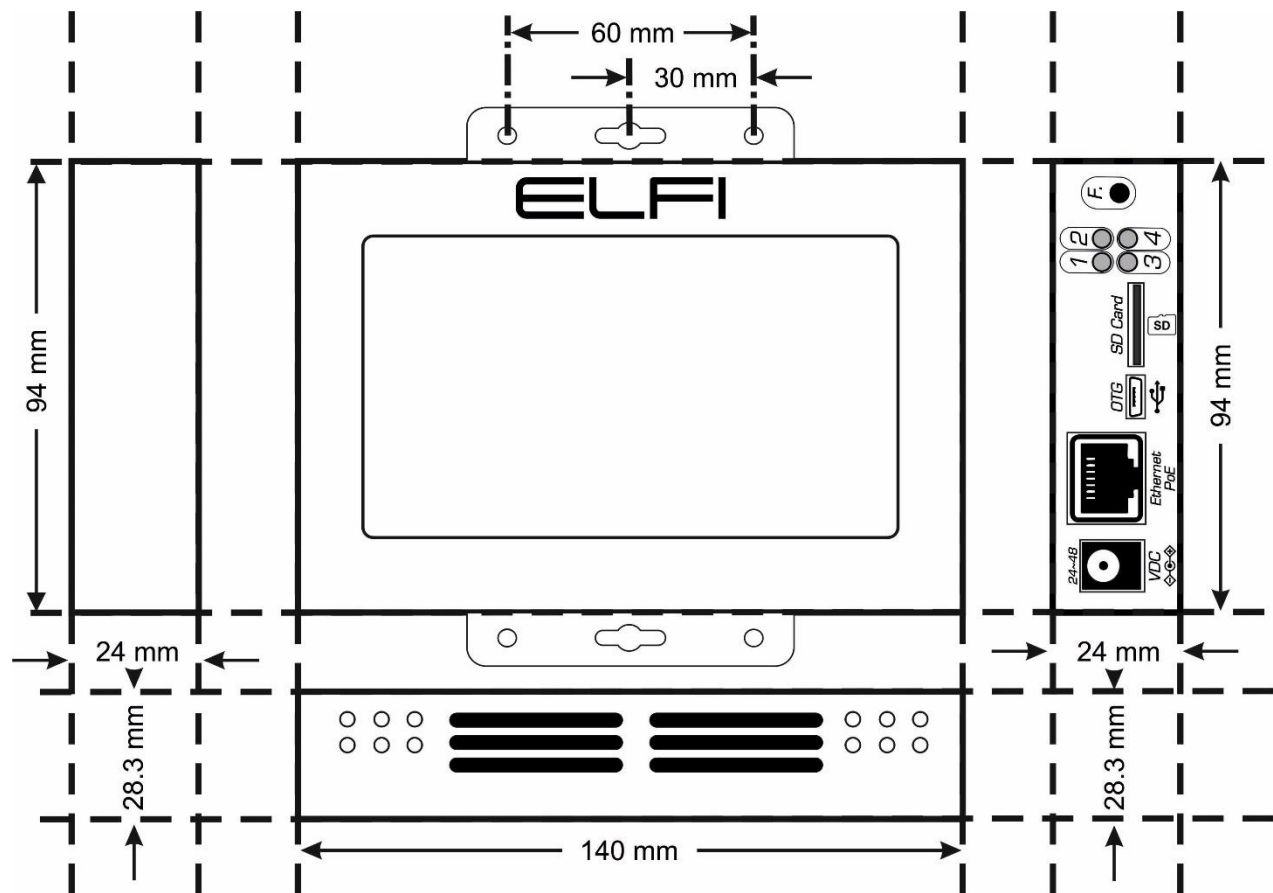


Figure 14: Sensor “Email Settings” Menu

5. Sensor Dimensions



Contact Info

Behineh Farayand Electronic Fidar Company

Telephone: 021-91308515

Address: West Azerbaijan Province, Urmia, 10th KM Sero Road, Science and Technology Park

Email: info@fidarelectronics.com

Website: www.fidarelectronics.com