EXAGATE POWERGUARD IP PDU

User Guide
Version 2.0

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i.   Safety Instructions

1. This product should be mounted and installed by a technical person who has experience in electrical equipment.
2. The location must be dry and clean.
3. The product shouldn't be moved or mounted in a rack cabinet unless the product is not electrically powered.
4. Connect the product to an AC power source whose voltage is in the specified range of the product.
5. The power unit (voltage equipment) should be checked by using a voltmeter, before the product is powered. The ground, neutral and phase(s) should be wired in the correct order.
6. Be sure that the power unit contains a suitable fuse.
7. Do not disassemble the product. Only authorized services are allowed disassembling, servicing. Exagate is not responsible from any injuries or death due to electric shock.

Risk of electric shock.

The product is approved by CE Certificate.

The electronic and electrical components used in this product are free of hazardous components according to the Restriction of Hazardous Components Directive.

The product should be recycled according to Waste Electrical and Electronic Equipment Directive.

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Introduction

Overview & Copyright

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Applicable Models

This Manual explains how to install, configure and use Exagate PowerGuard IP PDU Models.

Applicable Zero U Models are given at TableX. The integer "X" indicates a variable for the model series. PWG-9332-318-96-TIP is an example for PWG-93XX.

Model Series	Inlet Measurement	Outlet Measurement	Dimensions (Rack Unit)
PWG-91XX	*yes*	no	0 RU
PWG-93XX	yes	*yes*	0 RU

Table 1: Applicable Models

The applicable models provide the following features:

- Monitoring through a Web browser, SNMP user interface of an integrated monitoring and management software. Exagate offers **SmartPack** DCIM Monitoring and Management Software for a central monitoring and management.
- Local monitoring
- E-mail and SMS notification for the events
- Optional environment monitoring via **SysGuard 2050** an external monitoring device and compatible sensors.

Package Contents

For all models, the product package contains a complete, ready to mount product.

A 1800mmx56mmx56mm body of IP PDU; a 3000mm AC Power cable is connected to the PDU and a IEC 60309 AC Power Socket. The PDU weight is 6kg including the power cable.
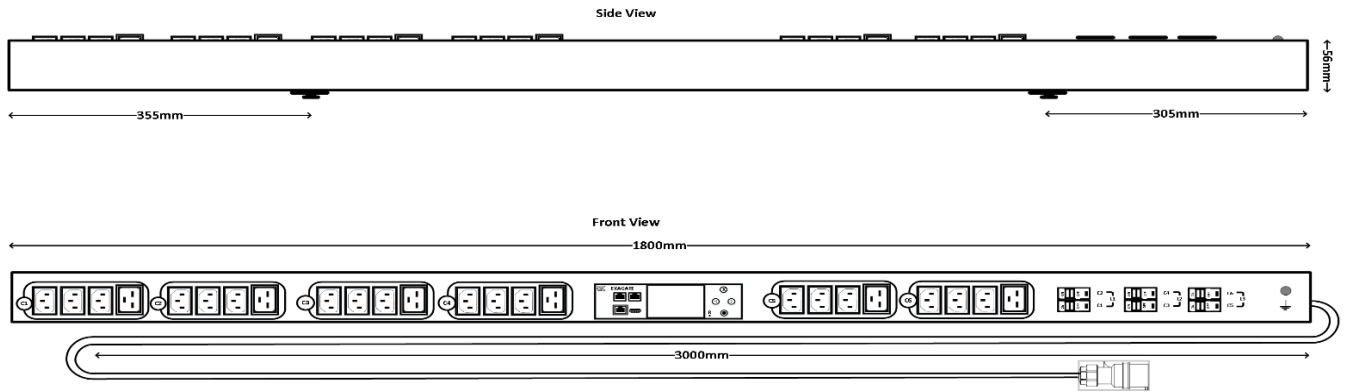
Figure 1: Exagate PowerGuard IP PDU Package Contents

Product Description

Intelligent PDU is a product that is used for distributing, monitoring and measuring energy, especially for the IT equipment in the rack cabinets within the server rooms and data centers.

PDU hardware is designed including multiple power sockets and measuring circuits those provide distributing electric energy and measuring related values. PDU software is designed to monitor, manage and report these values.

Exagate Powerguard IP PDU is an intelligent PDU that is designed and produced by Exagate Corporate. Users are guided how to use the product in this document. Please see the *Applicable Models* section to see if your product model is included.

System Definition

PDU Unit: PDU hardware is composed of Inlet and Outlet Sockets, LCD Display and Circuit Breakers. Please see the section PDU Main Parts for detailed explanations.

WebPack User Interface: The standard web interface, built in xPDU. WebPack enables limited monitoring and managing abilities to the user.

SmartPack Software: Smartpack is an optional Data Center Infrastructure Management (DCIM) software. Smartpack is integrable with intelligent PDUs which are developed by other corporates as well.

Installation

Before you Begin

Before beginning the installation of the product,

- Be sure the environment matches the conditions to the environmental specifications. Please see *Environmental Specifications* section.
- Be sure the package is not damaged.
- Be sure that none of the parts of the product is missing and is not harmed. If any part of the product is missing or damaged, please contact the authorized services.
- Be sure that all circuit breakers are at ON position.

Environmental Specifications

Be sure that the cabinet for rack mounting of the product must be dry and clean. Besides, the location must provide the Environmental Specifications at *Table 2: Environmental Specifications for Installation*.

Feature	Limitations
Operating Temperature	0°C – 65°C
Relative Humidity	5 – 85%
Operating Altitude	Up to 3000m above sea level

Table 2: Environmental Specifications for Installation

Preparing the Installation Site

- The installation area should be clean and free of extreme temperatures and humidity. (Please check the Environmental Specifications section)
- The installation should allow enough space for cabling, outlet connections and air flow.

Connecting the PDU to a Power Source

- Be sure that all circuit breakers are at ON position.
- Empower the PDU and wait for about 50 seconds.
- Check if the LCD Display is switched on.

Configuring the PDU

- After the PDU is empowered, push Escape (**X**) button to see the INFO Page.
- Connect the PDU to a TCP/IP network that supports DHCP, and use the IP address and web browser to configure.
- IP address, gateway and netmask addresses are given at *Table 3: Exagate IP PDU Network Information*. The values should be entered in standard dot notation. The same information is also displayed on LCD Display Info page.

| Network	Address
IP	192.168.1.151
Netmask	255.255.255.0
Gateway	192.168.1.1

Table 3: Exagate IP PDU Network Information

- To connect the PDU to a computer, a CAT5 cable is required.
- Insert the CAT5 cable into LAN port.
- To reach the PDU software, the computer requires a fixed IP.
- Change your Network Settings as shown at *Picture 1: Exagate IP PDU Network Information*.
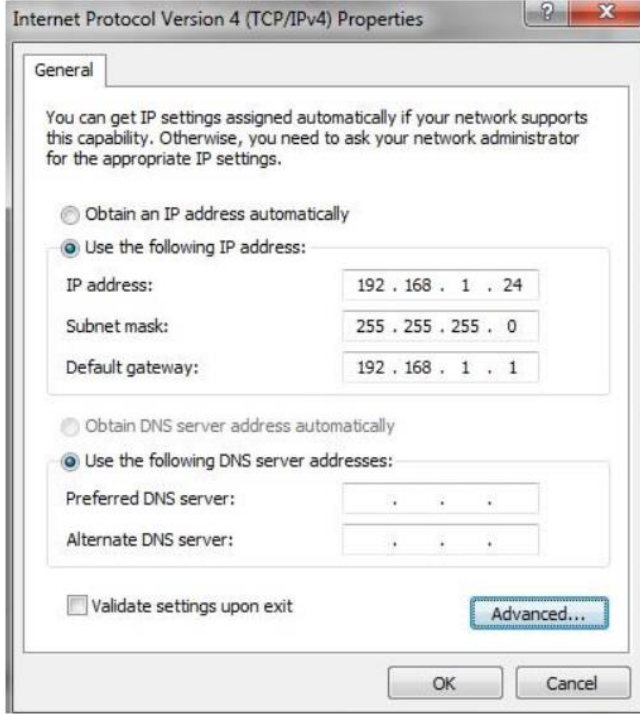
Picture 1: Exagate IP PDU Network Information

- Type the IP adress on your web browser's address bar.
- User name and password will be required. The default username is "admin" and the password is "123456".
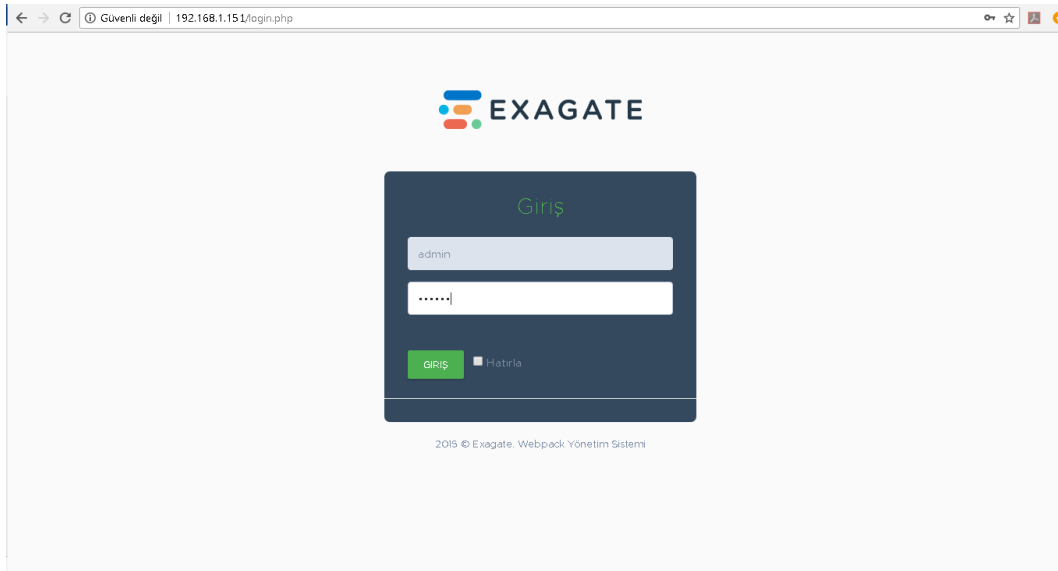
Picture 2: Exagate IP PDU Login Page

PDU Features

Exagate Powerguard IP PDU is a member of the intelligent PDU product group. The product group included in this document is designed and produced by Exagate for power distribution; energy monitoring and measuring.

PDU Physical Features and The PDU Parts

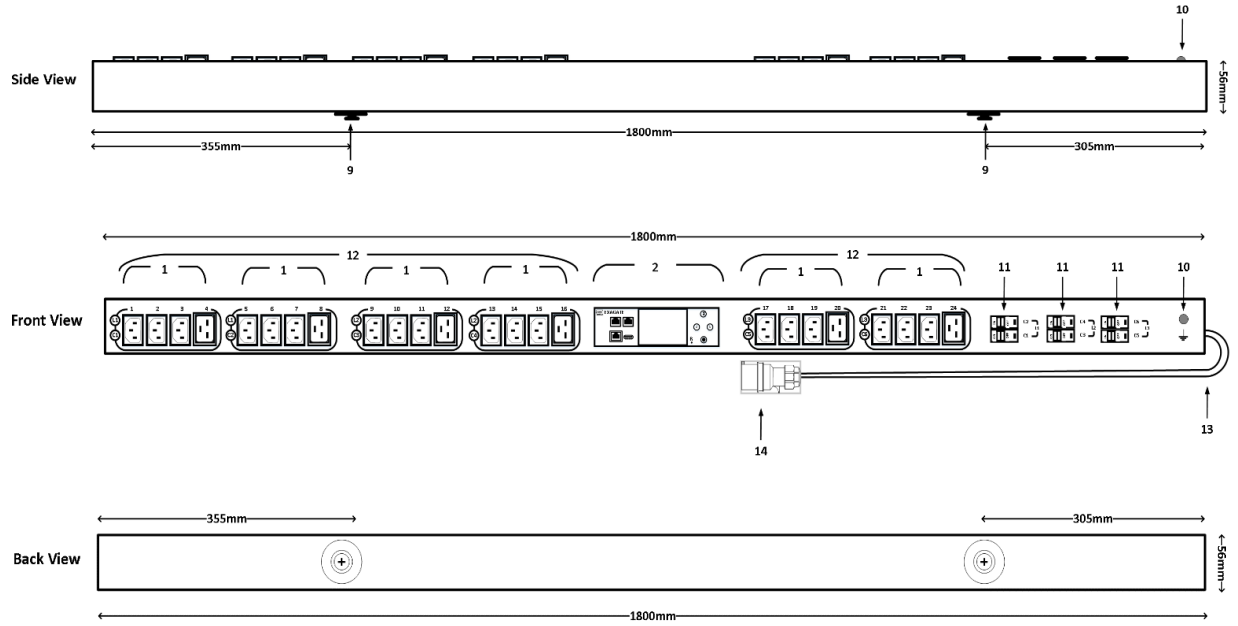**Figure 2: Side, Front and Back View of Exagate IP PDU**
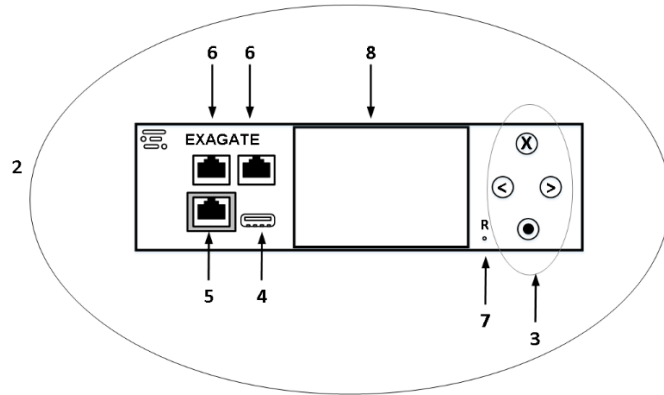
Figure 3: Exagate IP PDU Control Unit

Item Number	Item Name	Explanation
1	Branch Circuit	Depending on the model, one or a few C13 and C19 groups compose a branch circuit.
2	Control Unit	Hot swap CU is made of LCD Display, LCD Control Buttons and Connection Ports.

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3	LCD Control Buttons	Up, Down, Select and Escape buttons. Helps to control the information shown on the LCD Display.
4	USB Port	Only used by authorized service.
5	Ethernet Port (LAN)	Intended for Ethernet connection.
6	X1, X2 (Sensor Ports)	Intended for external device connection and cascading. NOT Intended for Ethernet connection.
7	Reset Button	Restarts the Control Unit.
8	LCD Display	320x240 pixels, TFT color LCD Display.
9	Detachable Mounting Brackets	Two pear-shaped brackets at 35.5cm and 149.5 cm behind for Zero-U models.
10	Grounding Chassis	Intended for ground connection.
11	Circuit Breaker	16A Hydraulic Magnetic Circuit Breaker. Must be at ON position for installation.
12	AC Power Receptacles	IEC C13 and IEC C19 variations with 220V-240V or 380V-415V AC output voltage, depending on the model.
13	AC Power Cable	220V-240V or 380V-415V AC input voltage, depending on the model.
14	Power Input Socket	IEC 60309 IP44 1-Phase or 3-Phase, depending on the model.

Table 4: Exagate IP PDU Items and Explanations

PDU Main Parts

Exagate IP PDU can be examined in 3 groups: Control Unit, Outputs and Inputs.

Control Unit

Control Unit is the main unit that carries the software programme. A Linux distribution with 2.6 core runs on the control unit.

Control Unit includes the LCD Display where the instant measured and calculated values are displayed. One can display the details by navigating between pages, using the LCD Display Control Buttons. (Please see the section *LCD* Display, for futher information)

Outputs

IEC-320-C13 and IEC-320-C19:

IEC-320-C13 provides 10A each output current. Number of C13 sockets depend on the model.

IEC-320-C19 provides 16A each output current. Number of C13 sockets depend on the model.

Please remember that each circuit is protected by 16A hydraulic magnetic circuit breaker. The loading rate is maximum 80% and for one branch circuit maximum 12.8A current load is recommended.

Inputs

Input voltage 220V-240V is provided via IEC 60309 IP44 3-phase or 1-phase power sockets. Type of the socket depends on the PDU model. Please see the Applicable Models section to identify the type of the socket of your PDU.

PDU Parts and The Details

Control Unit

- LCD Display: Colored, 320x240 pixel TFT LCD Display

- LCD Control Buttons: There are four control buttons.

LCD Control Buttons		
Button	Function	Description
x	Escape	Return to the prior screen, finally the info page
0	Select	Confirm the selection
^	Up	Move up or go to the previous page
v	Down	Move down or go to the following page

Table 5: LCD Control Buttons

- Reset Button: Restarts the Control Unit.

- Ethernet: Network connection via CAT5 cable.

- USB: For the use of authorized service. Do NOT plug any devices!

- X1: External Exagate SYSGuard device connection or cascading PDU.

- X2: External Exagate SYSGuard device connection or cascading PDU.
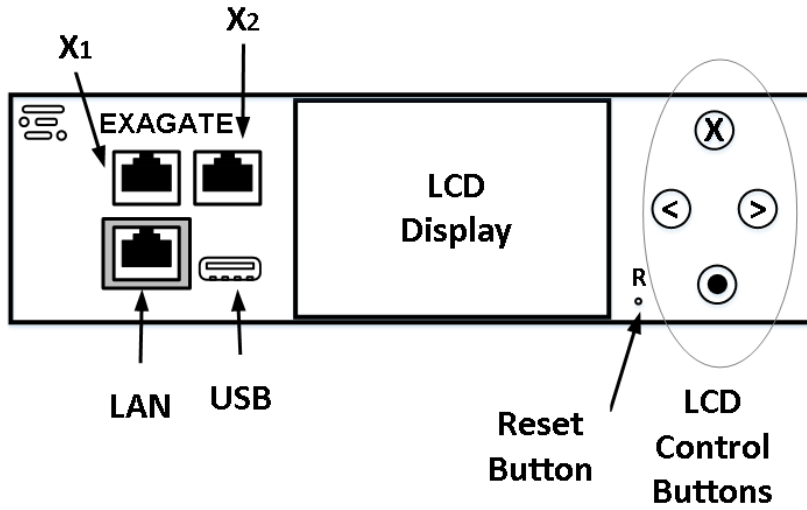
Figure 4: Exagate IP PDU Control Unit Detail

Connection Ports

LAN

Ethernet connection. Use RJ-45 patch-cable to connect through LAN socket, to the local network.

USB

Only for Authorized Service use.

X1

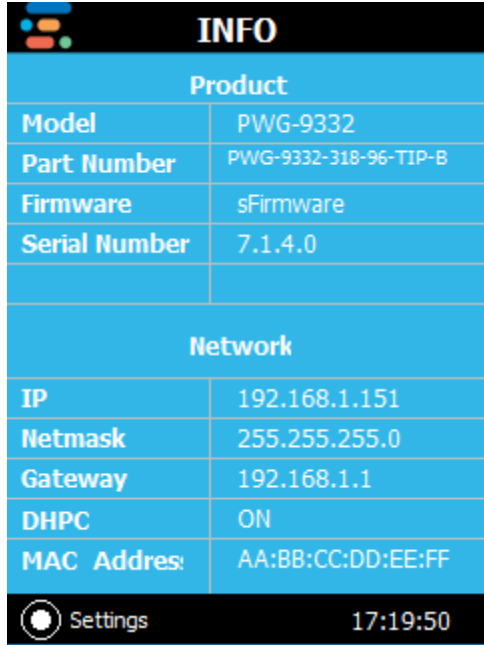For the connection of external devices and cascading.

X2

For the connection of external devices and cascading.

LCD Display

LCD Display is a part of Exagate IP PDU, that enables to display information about your product; monitor the measured and calculated electrical values.

Info

Picture 3: "Info" Page on LCD Display

Info page consists~~is~~ of 2 parts, informing about the device.

Under Info page, you can display:
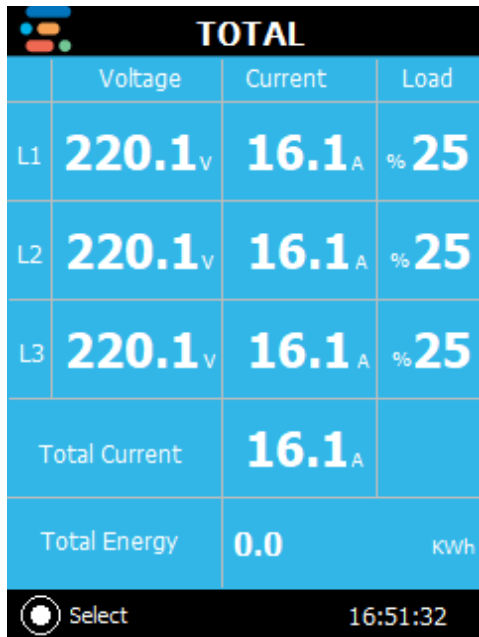
The Product information

1. **Model:** Exagate Powerguard IP PDU model name is in the following format: PWG-9xxx.
2. **Part Number:** Part Number includes all basic information about the device; i.e., whether 1-Phase or 3-Phase, the input current, number of outputs, color.
3. **Firmware:** The last software version is diplayed in this part.
4. **Serial Number:** Since the serial number includes the order date; it is important for the warranty validation period. Each serial number matches a MAC address. The serial number displayed on the LCD Display, must match the colored label on the device.

The Network information

5. **IP:** Master device's IP address is displayed
6. **Netmask**
7. **Gateway**
8. **DHCP:** DHCP is active if dynamic IP is preferred
9. **Mac Address:** MAC address is a physical address that matches with a serial number of the product. The MAC address displayed on the LCD Display, must match the colored label on the device.

Total

Picture 4: "Total" page on LCD Display

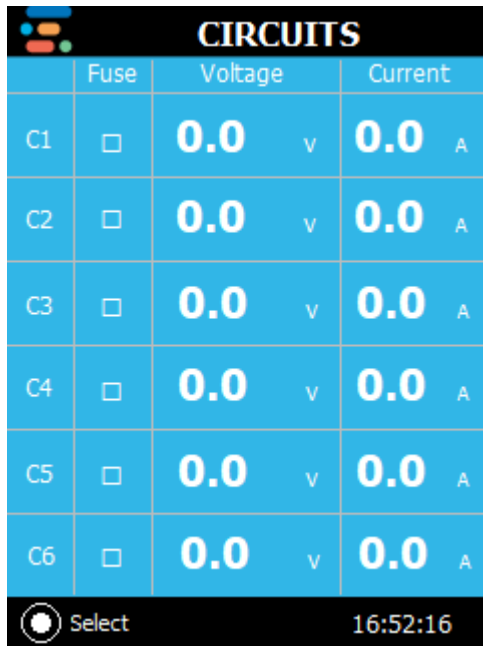On *Total* page, the following information is displayed for all phases (L):

1. **Voltage (V)**: Measured value of Voltage
2. **Current (A)**: Measured value of Current
3. **Load (%):** Percentage of the charge load is displayed. "100%" corresponds to the maximum load; i.e., 32A (7.0kVA) for a phase.
4. **Total Current (A):** Sum of the measured current is calculated and displayed.
5. **Total Energy (kWh):** Total active power is multiplied by the total number of hours that the loaded PDU functions. Total electric energy by the rack equipment is the key value for billing.

Select a phase (L) to display the following detailed information for the phase:

1. **Voltage (V)**
2. **Current (A)**
3. **Active Power (kW)**
4. **Apparent Power (kVA)**
5. **Reactive Power (kVAR)**
6. **Power Factor**
7. **Frequency (Hz)**
8. **Energy (kWh)**

Circuits

Picture 5: "Circuits" Page on LCD Display

On *Circuits* page, the following information is displayed for all branch circuits:

1. **Fuse:** Fuse indicates the Circuit Breaker belonging to the related circuit. The ON of OFF position can be displayed.
2. **Voltage (V)**
3. **Current (A)**

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Select a Circuit (C) to display the following detailed information for the Circuit:

1. **Voltage (V)**
2. **Current (A)**
3. **Active Power (kW)**
4. **Apparent Power (kVA)**
5. **Reactive Power (kVAR)**
6. **Power Factor**
7. **Frequency (f)**
8. **Energy (E)**

Measured and Calculated Values:

Voltage (V): Measured electric potential difference is displayed in terms of Volts. Instant voltage per Outlet, per Circuit and per Phase are displayed in three ways: 1. On LCD Display: Total, Circuits, Outlet pages. 2. On the WebPack. Monitoring->Total Energy, to display voltage per phase and per circuit. Monitoring->Ports, to display voltage per outlet. 3.Smartpack highly customizable web interface that can monitor several PDU's at a time and show reports corresponding to the state of PDU such as alarm status

Current (C): Measured AC current is displayed in terms of unit Amper. Instant current per Outlet, per Circuit and per Phase are displayed in three ways: 1. On LCD Display: Total, Circuits pages. To display current values per Outlet, go to Outlet page, select the outlet. 2. On the WebPack. Monitoring->Total Energy, to display total current per phase and per circuit. Monitoring->Ports, to display the current per outlet. 3.Smartpack where all the current either can be shown as per outlet or total going through the IP PDU.

Load (L): Calculated load percentage is displayed. Instant load per Phase is displayed in three ways: 1. On LCD Display: Total page. 2. On the WebPack. Monitoring->Total Energy, to display load per phase. 3.Smartpack where load is calculated per IP PDU.

Energy (E): Consumed electric energy by the rack equipments is calculated and displayed in terms of kWh. Total metered energy, energy per Circuit and Outlet are displayed in three ways: 1. On LCD Display: Total page, total consumed energy measured and calculated by the PDU. To display consumed energy per Outlet, Ports- Outlet page, select the outlet. 2. On the WebPack. Monitoring->Total Energy, to display the total energy. Monitoring->Ports, to display the energy per outlet. 3.Smartpack, Energy value is shown in a table along with other parameters.

Frequency (f): Frequency of the AC circuit is displayed in terms of Hertz. Outlet pages include the frequency information. 1. On LCD Display. To display frequency per Phase, Circuit and Port, select the Outlet. 2. On the WebPack. Monitoring->Total Energy, to display the frequency per phase and per circuit. Monitoring-

>Ports, to display the current per outlet. 3.Smartpack, frequency value is shown in a table along with other important parameters.

Power Factor (PF): Power factor is calculated and displayed 1. On LCD Display. To display power factor per Phase, Circuit and Port, select the Outlet. 2. On the WebPack. Monitoring->Total Energy, to display total Power Factor per phase and per circuit. Monitoring->Ports, to display the Power Factor per outlet. 3.Smartpack**,** where power factor can be monitored through customized dashboard.

Active (Real) Power (P) kW: Active Power is measured and displayed in terms of kW 1. On LCD Display. To display Active Power per Phase, Circuit and Port, select the Outlet. 2. On the WebPack. Monitoring->Total Energy, to display total Active Power per phase and per circuit. Monitoring->Ports, to display the current per outlet. 3.Smartpack can calculate the power and can be shown on a dashboard.

Apparent Power (S) kVA: Apparent Power is measure and displayed in terms of kVA 1. On LCD Display. To display Apparent Power per Phase, Circuit and Port, select the Outlet. 2. On the WebPack. Monitoring->Total Energy, to display total Apparent Power per phase and per circuit. Monitoring>Ports, to display the current per outlet. 3.Smartpack, can be shown on a smart dashboard screen.

Reactive Power (Q) kVAR: Reactive Power is measure and displayed in terms of kVAR 1. On LCD Display. To display Reactive Power per Phase, Circuit and Port, select the Outlet. 2. On the WebPack. Monitoring->Total Energy, to display total Reactive Power per phase and per circuit. Monitoring>Ports, to display the current per outlet. 3.Smartpack can be shown in a smart dashboard screen.

Sleep Mode

In sleep mode, the screensaver is displayed, which includes a dynamic logo. In this mode, the logo must be dynamic and the backlight must be off. Otherwise, please inform the Authorized Service.

Operation Theory of the System

Redundancy

Redundancy is a must to reach the energy uptime in a datacenter. This principle is valid for rack cabinet units, i.e. PDUs, too.

A rack cabinet requires two PDUs to provide the maximum uptime. One PDU is redundant to the other. Therefore, two PDUs functioning in a cabinet provides the maximum energy uptime. To provide the maximum uptime, the PDUs are suggested to be loaded according to Maximum Loading steps (see section *Maximum Loading*)

Loading the PDU

Maximum Loading

Please see the *Applicable Models -*section, for the valid models. The setup guide is explained below, are based on an example model. Please be aware of your PDU model specifications while applying the suggested setup steps.

An example: PWG-9332-318-96-TIP

For a model with input voltage 220V and input current 32A (7kVA), each circuit is protected by a 16A (3.5kVA) hydraulic magnetic circuit breaker, 6 circuits and three phases in total. Suggested maximum loading rate is 80% which corresponds to 12.8A (2.8kVA) for a 16A (3.5kVA) circuit.   It is suggested to share the 80% load to the two PDU's in the cabinet as 40%+40%. This provides the advantage of not losing the power feeding due to any circuit failure.

If the IT Equipments in the racks require 6x2.8kVA, the load should be shared to 12 circuits in total (6 circuits of the main PDU and 6 circuits of the redundant PDU). Final loading will be measured as 1.4kVA each circuit (see *Figure 6: A Maximum Loading and Load Balancing Example for an Exagate IP PDU Model*).
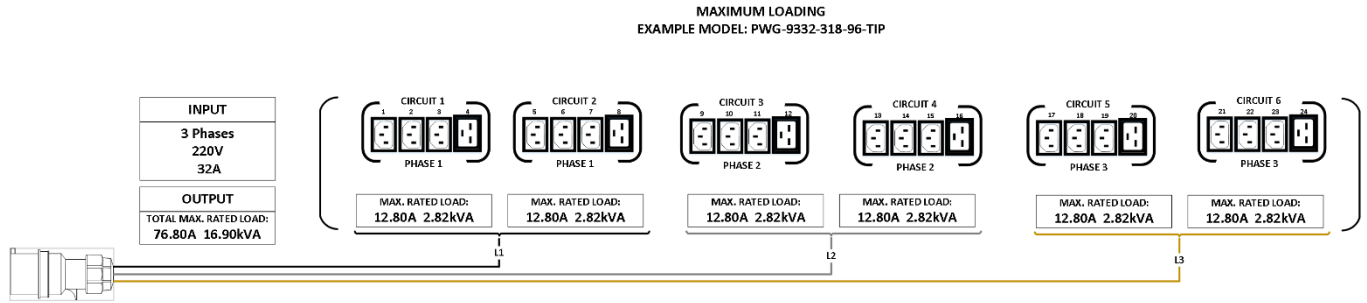
Figure 5: A Maximum Loading Example for an Exagate IP PDU Model
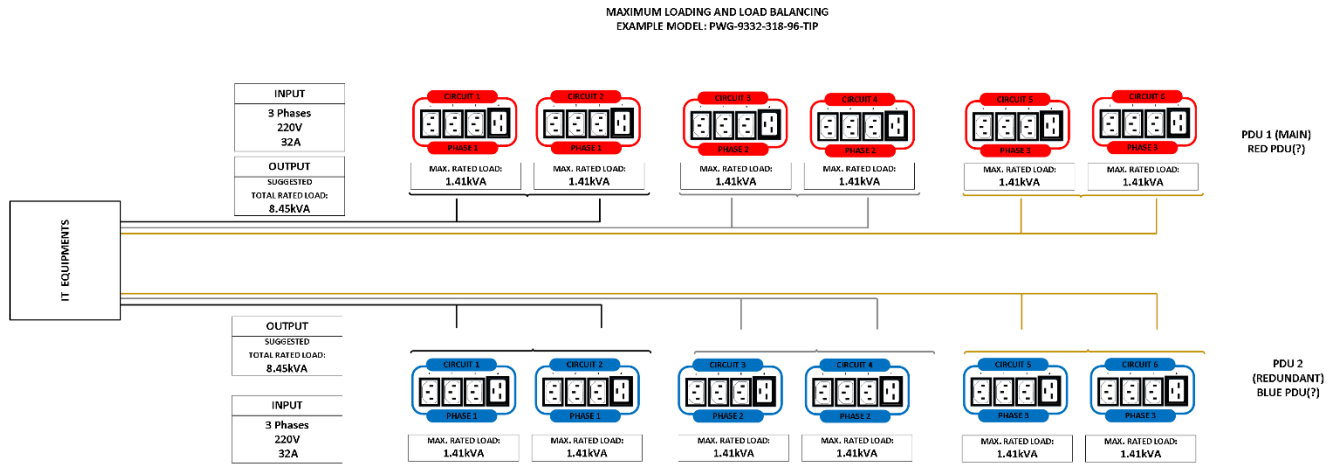

Figure 6: A Maximum Loading and Load Balancing Example for an Exagate IP PDU Model

Load Balancing

The PDUs in the cabinet should be loaded according to Load Balancing instructions:

- The total power requirement of the IT Equipment is calculated. For example, 12kVA
- It is divided to the total number of circuits. For example, 12kVA:6=2kVA
- The circuits are started to be loaded 1kVA each respectively, from C1 to C6 for each PDU; i.e. red PDU and blue PDU. You can accept one of the two PDUs as main and redundant PDU.
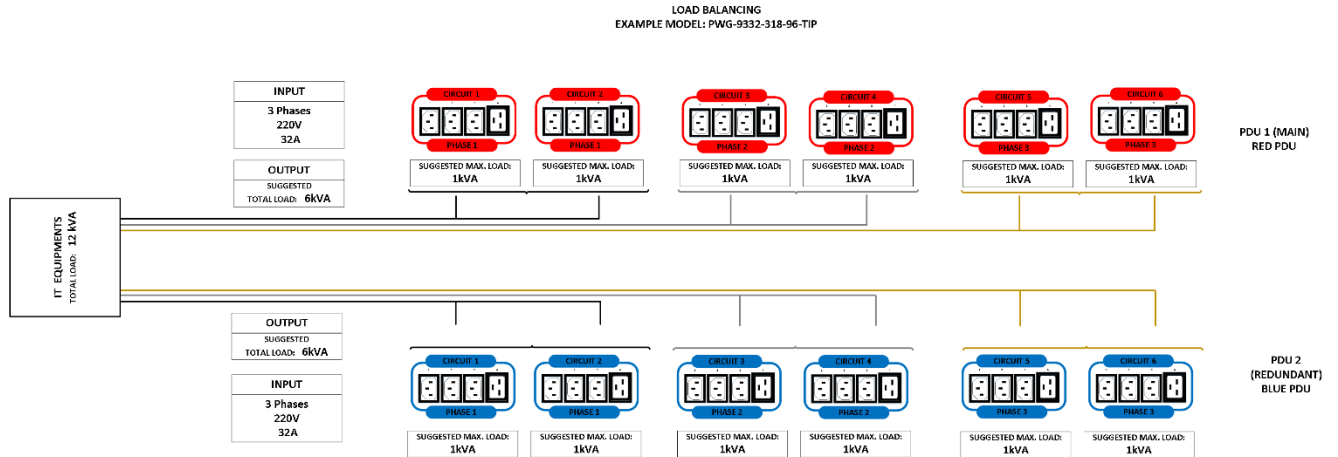
Figure 7: A Loading Balancing Example for an Exagate IP PDU Model

Cascading IP PDUs via X_1 and X_2 Ports

Cascading up to 8 PDUs is possible. At maximum, 1 Master and 7 Slave products are in the daisy chain. The first PDU is the master and the subsequent 7 PDUs are the slaves.

To cascade the Exagate IP PDUs,

- The master device must have Ethernet [connection](#).
- The slave devices cannot have Ethernet connectivity.
- The devices are connected to each other via CAT5 or CAT6 cable.

1. Start with the master device that has ethernet connectivity.
2. Connect the X1 port of the master device to X2 port of the slave device.
3. To add a second slave, connect the first slave's X1 to the second slave's X2.
4. Up to 7 seven slaves can be connected to the master device, via X1-X2 connection, repeating the 3rd step.

Setting Cascading Mode

5. To set the Cascading Mode, log in the master device web interface.
6. To be completed in the next version.
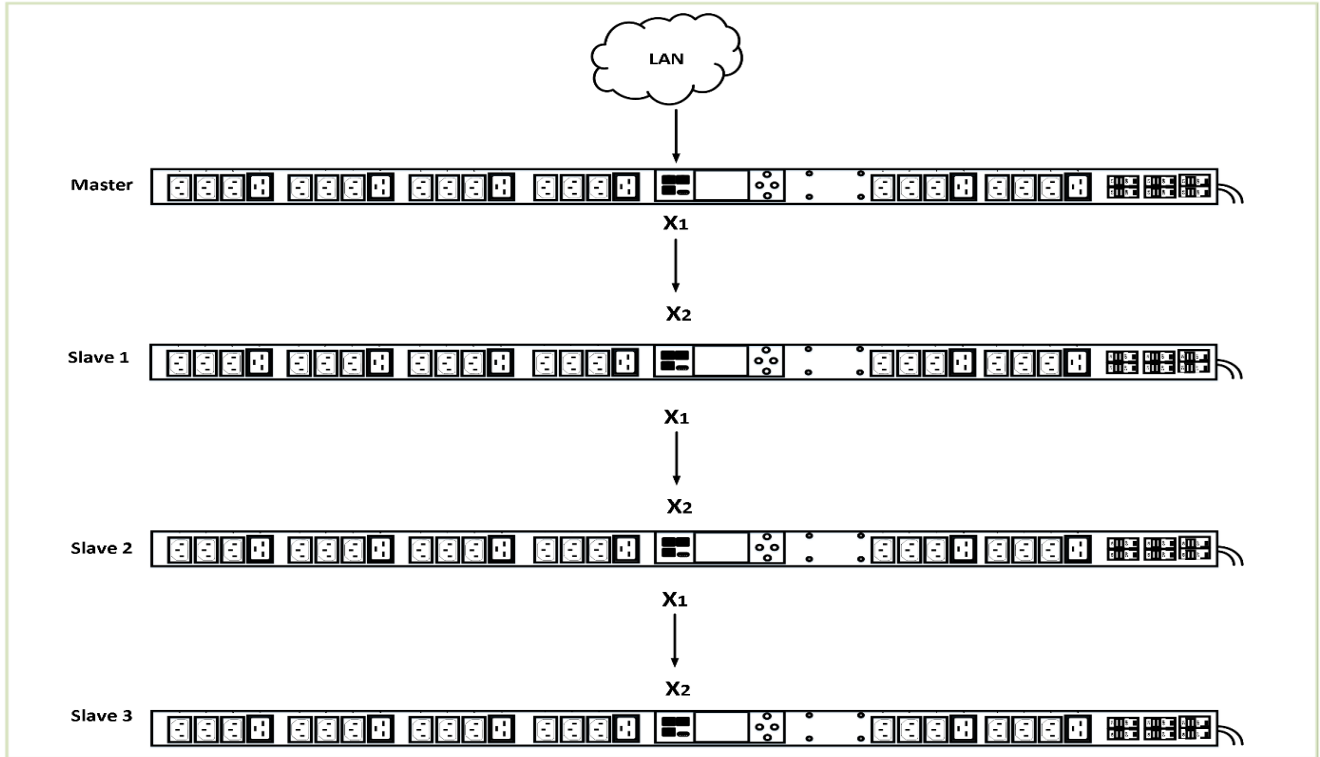
Figure 8: Cascading Exagate IP PDUs

Configuration

PDU Software Components

Linux:

A Linux distribution with 2.6 core runs on the control unit.

Web Interface:

An internal web server runs on the Control Unit. The web server provides the user web pages for monitoring and managing.

Exagate Smartpack:

Exagate Smartpack is an optional DCIM monitoring software. Smartpack provides its users various user friendly interfaces and reports including energy consumption information per PDU, per module, per building, per customer, etc. Please see [Exagate Website](#) Documentation for more information.

Web Interface

WebPack is the web interface of the operating PDU. Monitoring and management processes of the IP PDU are possible using WebPack.

User Authorizations

3 authorization roles are allowed for users to provide the highest security in the system.

Monitoring

The administrator is allowed to create a new user in Monitoring role. To add a user Monitoring role, select the *Monitor* role. The Monitor role can display the following menu on the WebPack:

- Monitoring
- Archive
- Help

The Monitoring role is at the lowest authorization level. The user in this role can monitor actual and archived values but is not authorized to do configuration or change the settings; i.e. adding a user, adding a map, changing sensor settings. For example, Monitoring role is not allowed to assign Internal Sensors' names.

Monitoring and Management

The administrator is allowed to create a new user in Monitoring and Management role. To add a user in Monitoring and Management role, the Administrator should select *Manager* role (please see *Users* section). The Manager role can reach the following items of the menu on the WebPack:

- Monitoring
- Archive
- Help

The Manager role is half authorized compared to Administrator. For example, Manager role is allowed to manage external devices and sensors, output relays connected to the PDU.

Administrator

The administrator is allowed to create a new user in Administrator role. To add a user in Administrator role, select *Admin* role (please see *Users* section)

- Monitoring
- Archive
- Sensor Settings
- Configuration
- Help

The Administrator role is fully authorized to monitor the actual and archived values, do the settings and configuration. Users are recommended not to login as Admin, unless they will do configuration.

Monitoring

Monitoring on LCD Display:

LCD Display ensures that users can monitor measured and calculated values. Please see *LCD Display* section to see detailed information about all values displayed on LCD.

Monitoring on Web Interface:

A web server runs PDU monitoring and management pages, which can be accessed by a web browser, display the instant values of the all sensors and modules connected to the system.

Monitoring on SmartPack:

SmartPack software ensures to connect the PDU control unit and users display the instant values of the sensors and modules.

IP Settings
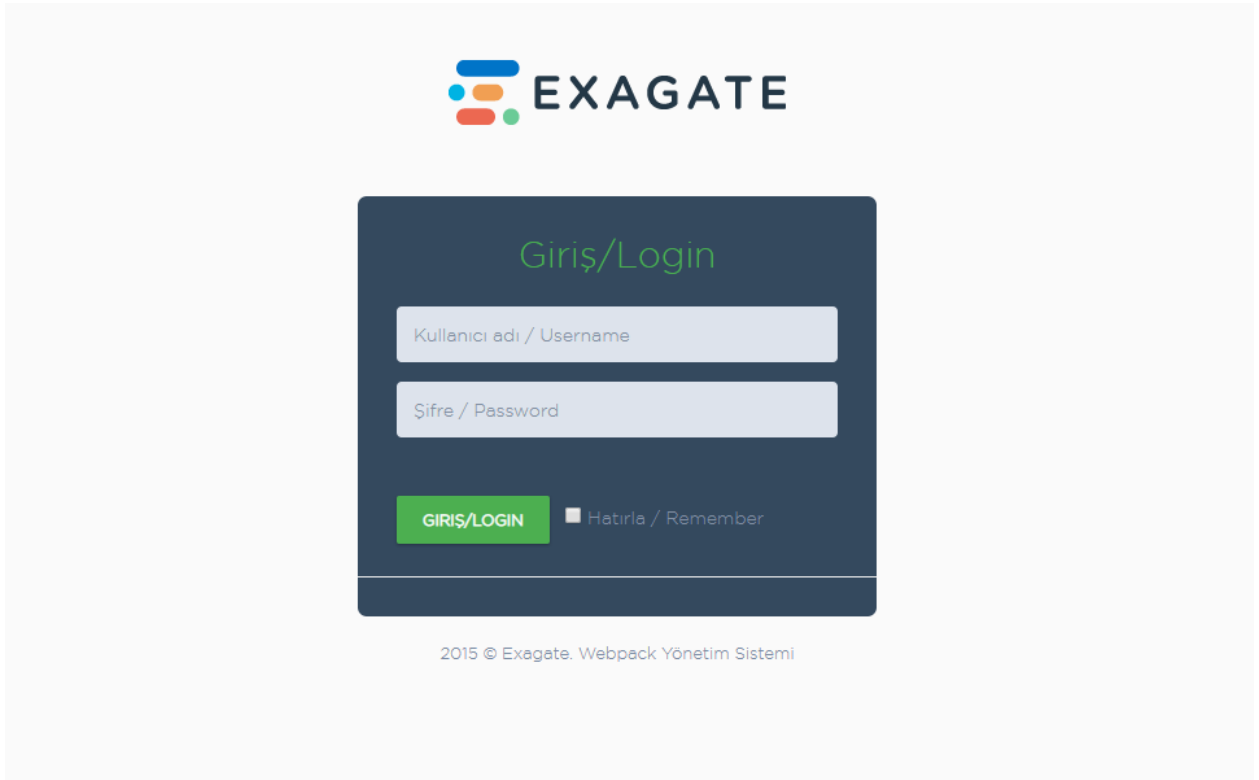
- After the PDU is empowered, push X Escape button to see the INFO Page.

- Connect the PDU to a TCP/IP network that supports DHCP, and use the IP address and web browser to configure.
- IP address, gateway and netmask addresses are given at *Table 3: Exagate IP PDU Network Information*. The same information can be browsed from LCD Display Info page, too. (*Please see Table 3: Exagate IP PDU Network Information*)
- To connect the PDU to a computer, a CAT5 cable is required.
- Insert the CAT5 cable into LAN port.
- The computer requires fixed IP to reach the PDU software.
- Change your Network Settings as shown at *Picture 1: Exagate IP PDU Network Information*.

Login

- Type the IP address on your web browser's address bar.
- User name and password will be required. The default username is "admin" and the password is "123456".

Main Page

When you have successfully logged in to the Web, you will see the main symbols on the right topside. They are the shortest way to handle some main processes and monitor the warnings.
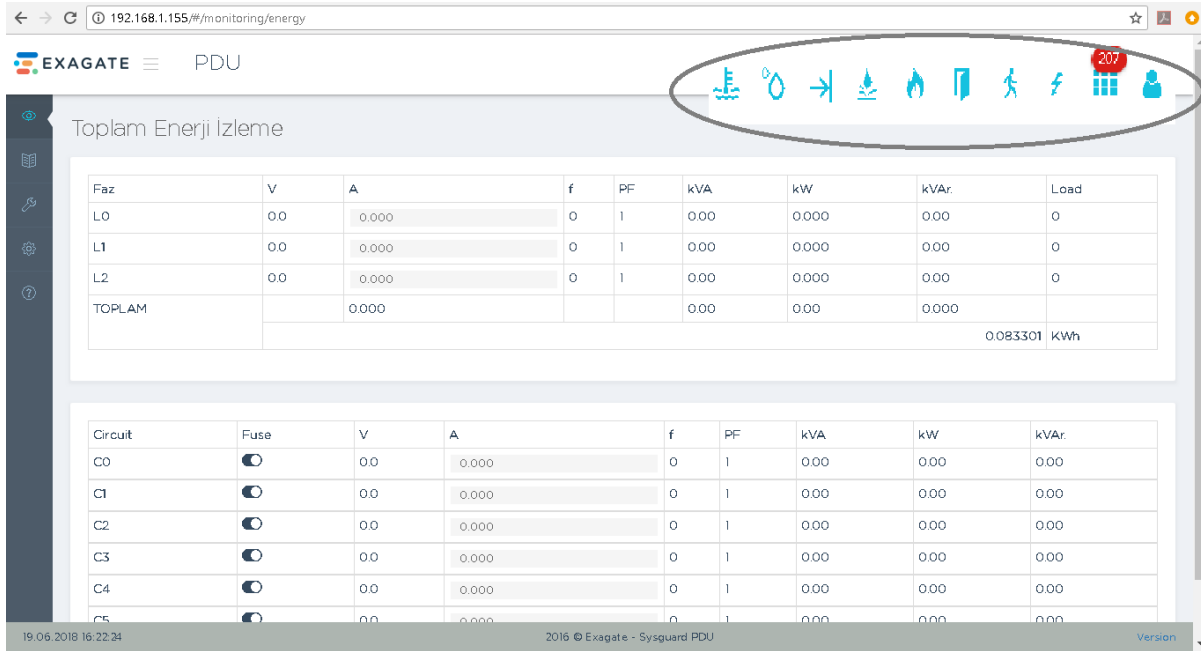
Picture 6: Exagate IP PDU Webpack Main Page

| Symbol	Detector Name	Explanation
	Temperature	Detects the temperature in terms of Centigrade Degrees (°C). Warns/Alerts when the temperature is above or below the critical/alarm values.

	Relative Humidity	Detects the relative humidity in terms of percentage; i.e. Ratio of Actual and saturated vapor densities, in terms of %RH. Warns/Alerts when the RH is above or below the critical/alarm values.
	Dry Contact	Detects the sensor alarms those are connected to the PDU via dry contact module.
	Leak	Detects the leakage. Alerts when there is leakage or flood incident.
	Smoke	Detects the smoke. Alerts when there is smoke due to anything.
	Door	Detects the movement of the door, which the sensor connected. Alerts when the door is opened.
	Movement	Detects the movement.
	Energy	Detects whether the PDU is powered or not. Alerts when there is no energy at master or slave.
	Alarm List	Lists the actual alarms.
	Account	Log Out and Change Password option shortcuts.

Table 6: Exagate IP PDU Webpack Main Page: Detector Symbols, Names and Explanations

Main Menu

Main Menu is on the left side of the WebPack main page. In this section, links listed under the main menu will be explained.
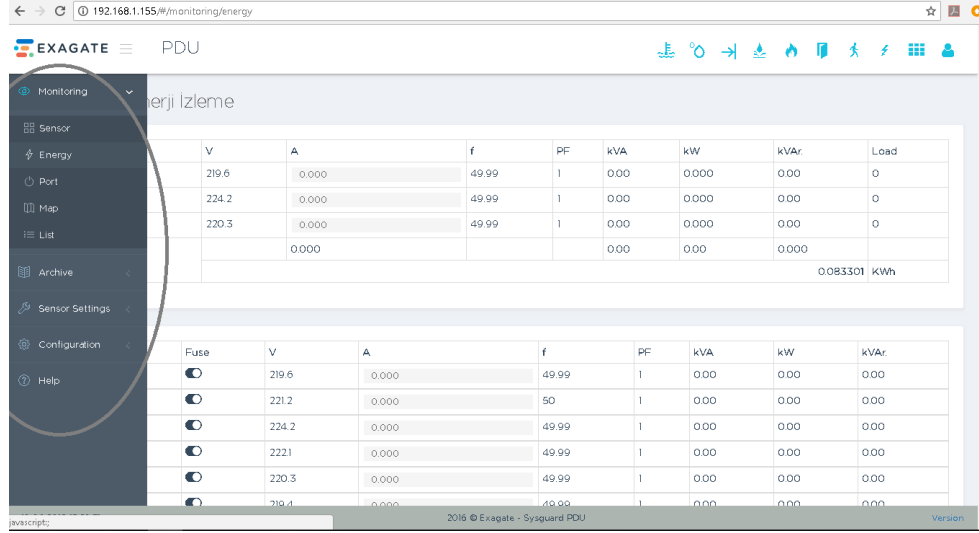
Picture 7: Exagate IP PDU Webpack Main Menu

Monitoring

Sensor

Sensors at critical and alarm values are monitored in this section. Yellow box indicates the sensor alerts below or above the critical limits. Red box indicates the sensor alerts below or above the alarm limits. In this section the following information is given:

Name of the alerted sensor

Value of the alerted sensor

Energy

In this section, two tables of real time values are listed.

In the first table; Voltage (V), Current (Amper) , Frequency (Hz), Power Factor, Apparent Power, Active Power, Reactive Power and Load values per Phase are listed. Total values of the Current and types of voltages, in addition to total energy consumption in kWh are listed.

In the second table; Voltage (V), Current (Ampere) , Frequency (1/s), Power Factor, Apparent Power, Active Power, Reactive Power and Load values per Circuit are listed.
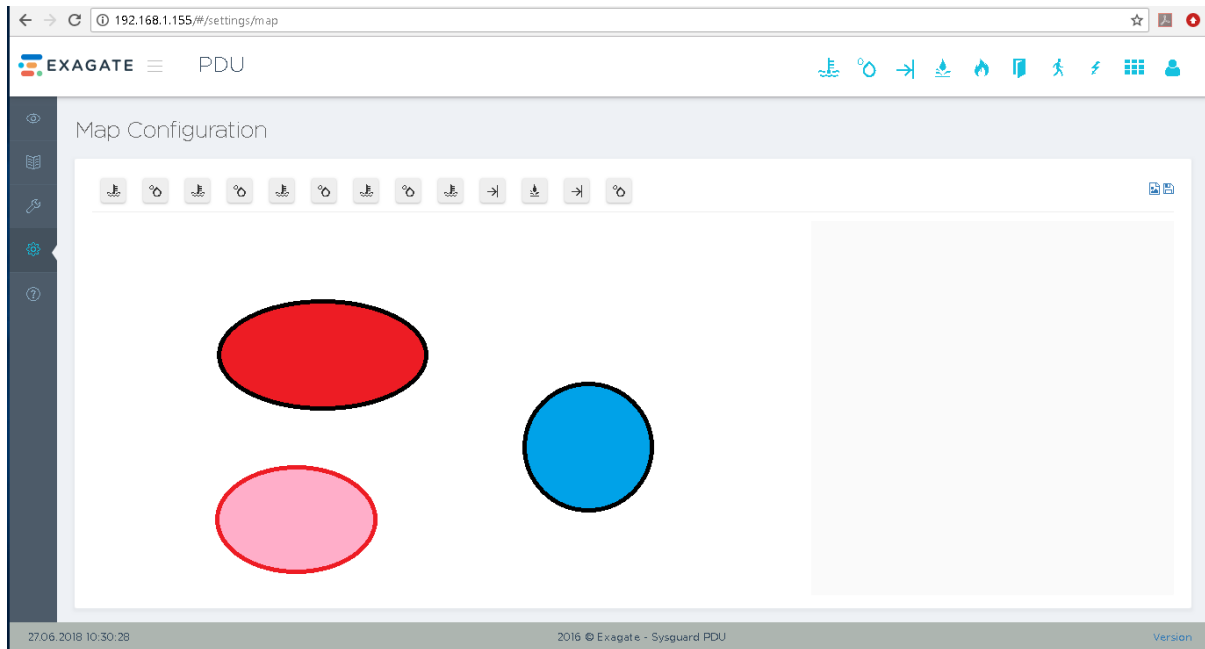
Port

Please see *Applicable Models* if your IP PDU supports this feature.

Voltage, Current, Frequency, Power Factor, Apparent Power, Active Power and Energy Consumption per Port are listed. Besides, Fuse (the circuit breaker to which circuit it belongs to) state is indicated.
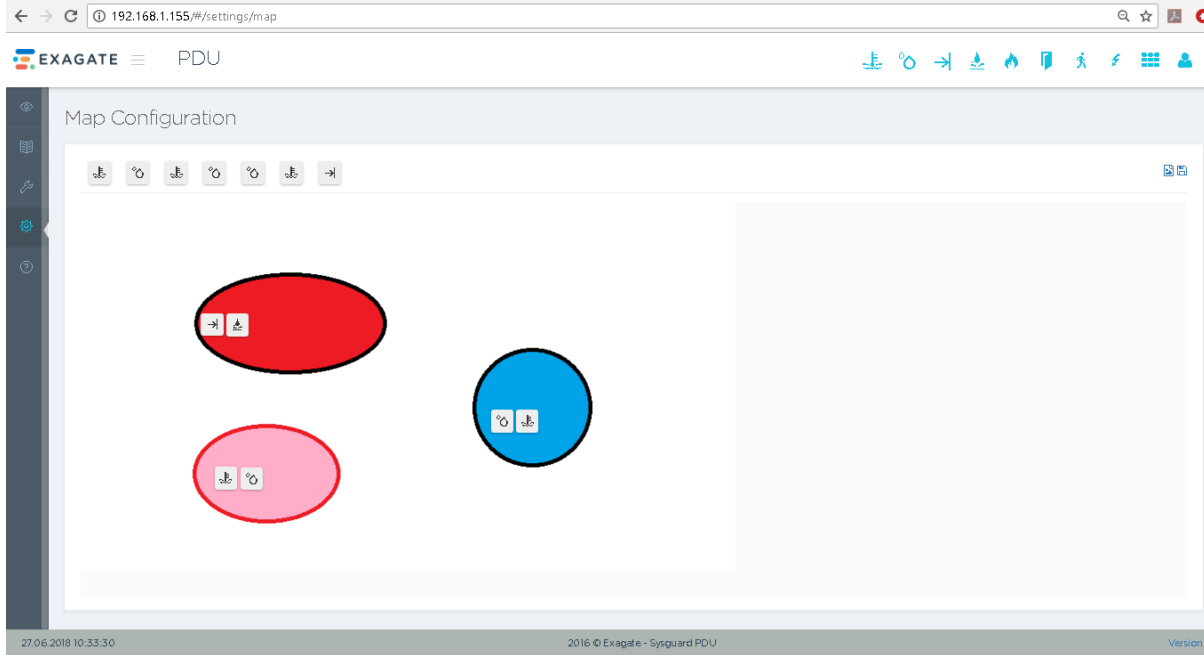
Map

In this section, the map or sketch that was uploaded in Configuration->Map section is monitored. In order to mark the sensor places, drag and drop the sensor icons on the map.

Picture 8: Exagate IP PDU Webpack Map Configuration Page
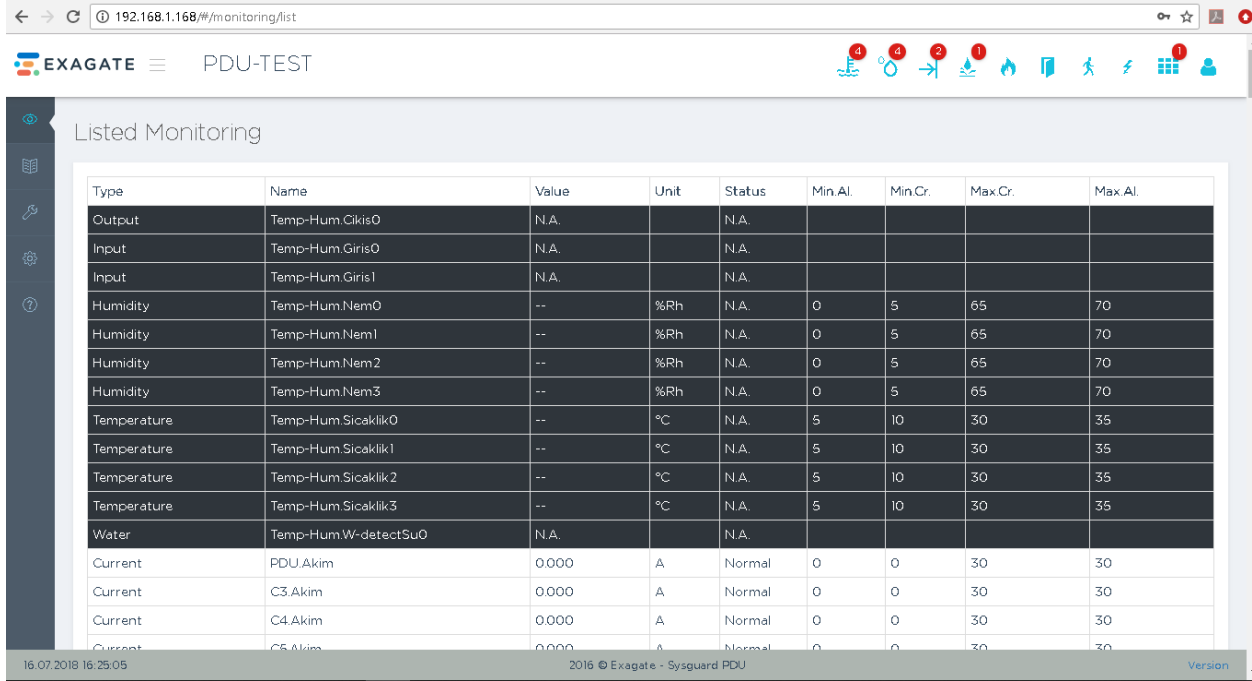
Picture 9: Exagate IP PDU Webpack Map Configuration Page- Sensor Icons are dragged and dropped

List

In this section, Voltage, Current, Frequency, Power Factor, Apparent Power, Active Power and Energy Consumption per Port, per Circuit, per Phase and per PDU are listed. The values, units, status (whether normal or alarmed) of the listed parameters are listed. In other words, you will see the summation of Energy tables of phases, circuits and ports is monitored as a list here. Additional to the mentioned values, Minimum Critical, Maximum Critical, Minimum Alarm and Maximum Alarm values are listed.

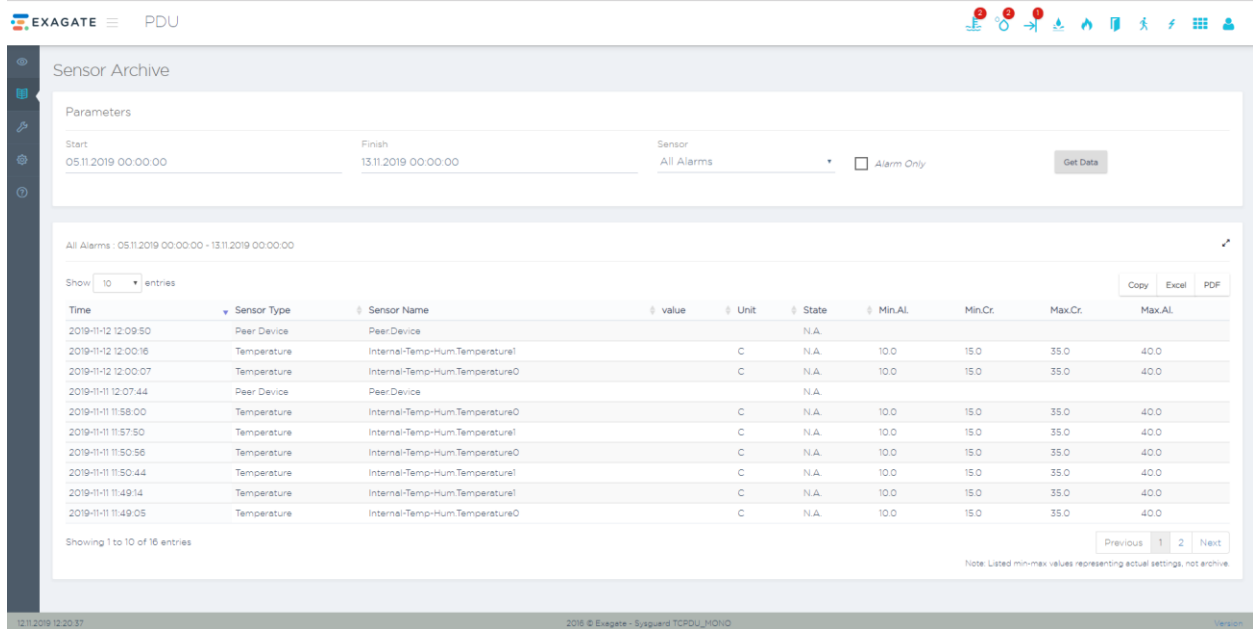The values in alarm status are listed at the beginning of the list.

Picture 10: Exagate IP PDU Webpack Monitoring List Page – The list begins with the values in alarm status

Archive

Sensor

In this section, Sensor Archive is monitored. Normal, critical and alarm states of the sensors in a certain time interval can be listed.

Picture 11: Exagate IP PDU Webpack Sensor Archive Page – Parameters can be set by the user and the requested values are listed

Parameters

You can set the *Start* and *Finish* date and time by selecting from the calendar and time table.

Select or Unselect *Alarm Only* to display Critic and Alarm or only Alarm values.

Select a certain alarm or All Alarms from the box. According to your selection, all notifications belonging to certain sensors or all sensors will be displayed in the Archive Table. Archive Table has 10 columns.

Select number of entries you want to display, via *Show (number of) Entries* button.
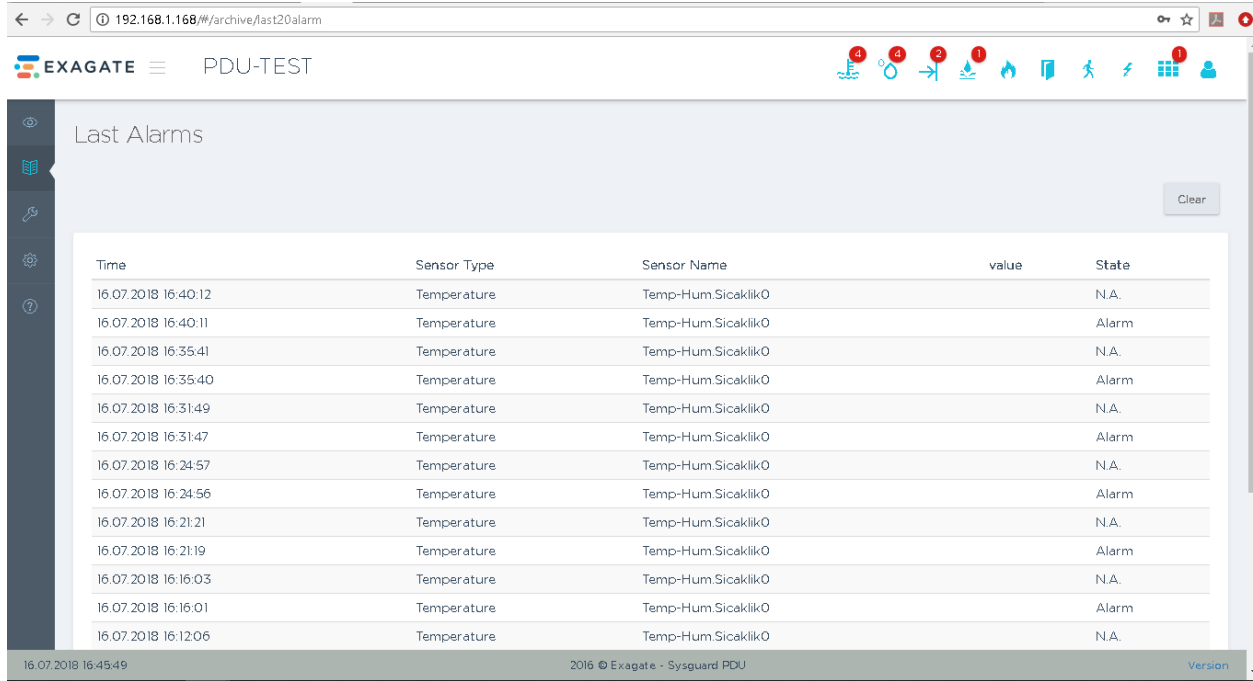
In the first 6 columns; Sensor Type, Sensor Name, the Value at alarm level, Unit (i.e.; V, A), State (critic or alarm) are displayed. From 7th to 10th column; Minimum Alarm, Maximum Alarm, Minimum Critic and Maximum Critic values are displayed. These values are set by the user and displays the actual information.

The user is allowed to copy The Archive Table to paste on a page, or download the table as an Excel or a PDF file.

Last Alarms

In this section, last alarms of the sensors are displayed. In a 5-column table, alarm *Time*, alarm *Sensor Type*, *Sensor Name*, the alarm *Value* and the *State* of the alarm are listed.

Picture 12: Exagate IP PDU Webpack Last Alarms Page

Sensor Settings

Internal Sensors

Picture 13: Exagate IP PDU Webpack Internal Sensor Settings Page

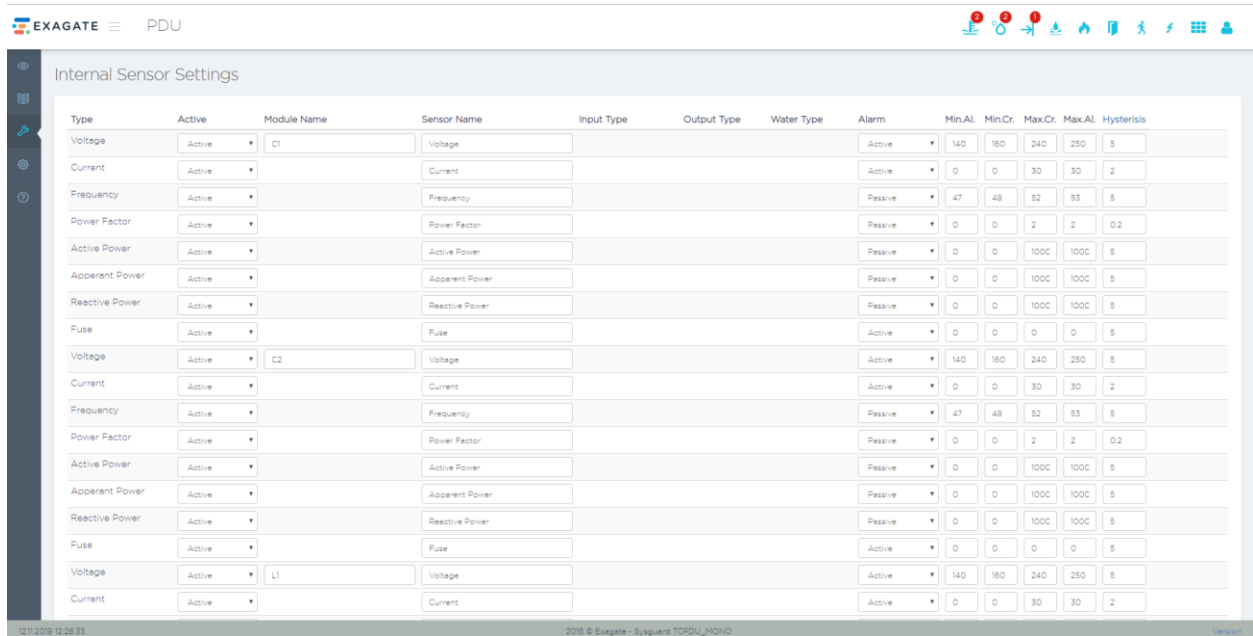Internal sensors are the default sensors. All measured values are displayed as internal sensors; i.e., active, reactive, apparent powers; current, circuit breaker, frequency, voltage, load, power factor; temperature, humidity, leak detectors.

When the Ethernet connection of the PDU is done, internal sensors are displayed. Number of internal sensors depend on the device model. For example, model PWG-9332-318-96-TIP has 283 default sensors.

The information about Internal Sensors are displayed in 12 columns.

Column 1: **Type** of the sensor includes the outlet name and the measured value, *e.g.*, C3 (Active Power).

Column 2: **Status** of the sensor is selected in this column. You can select *Active* or *Passive* status.

Column 3: **Name** of the sensor is given in this column. You can change the name of the internal sensor, here.

Column 4: **Input Type** of the sensor is given in this column. This is available only for inputs. You can select one of the following input:

- Normally Open
- Normally Closed
- Smoke
- Door
- Movement

Column 5: **Output Type** of the sensor is given in this column. You can select the one of the following input:

- Normally Open
- Normally Closed

Column 6: **Water Type**: This section is not supported by your IP PDU model.

Column 7: **Alarm** status is displayed in this column. Select the status of the alarm as Active or Passive.

Column 8: **Minimum Alarm** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

Column 9: **Minimum Critical** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

Column 10: **Maximum Critical** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

Column 11: **Maximum Alarm** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

Column 12: **Hysteresis** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

How to assign the Values?

In this section, the theory of assigning alarm and critical values is explained.

Important: Not all sensor types include assignable values.

- Max. Value determining the normal operational range: max.

- Min. Value determining the normal operational range: min.

- Hysteresis value: his.

- Value measured by the sensor: Value

- Precondition for generating alarm: Value≥max.+his. or Value≤min.-his.

- Precondition for eliminating alarms: Value≤max.-his. or Value≥min.+his.

Hysteresis value helps to determine the values that generates the alarm or eliminates the alarm, together with the defined maximum and minimum values. Here is the formula of alarm generation and elimination:

Conditions required to generate maximum alarm is as follows:

Measured value > Defined Maximum Value + Hysteresis

Condition required to eliminate alarm when maximum alarm is generated, is as follows:

Measured value < Defined Maximum Value – Hysteresis

Conditions required to generate minimum alarm is as follows:

Measured value > Defined Minimum Value – Hysteresis
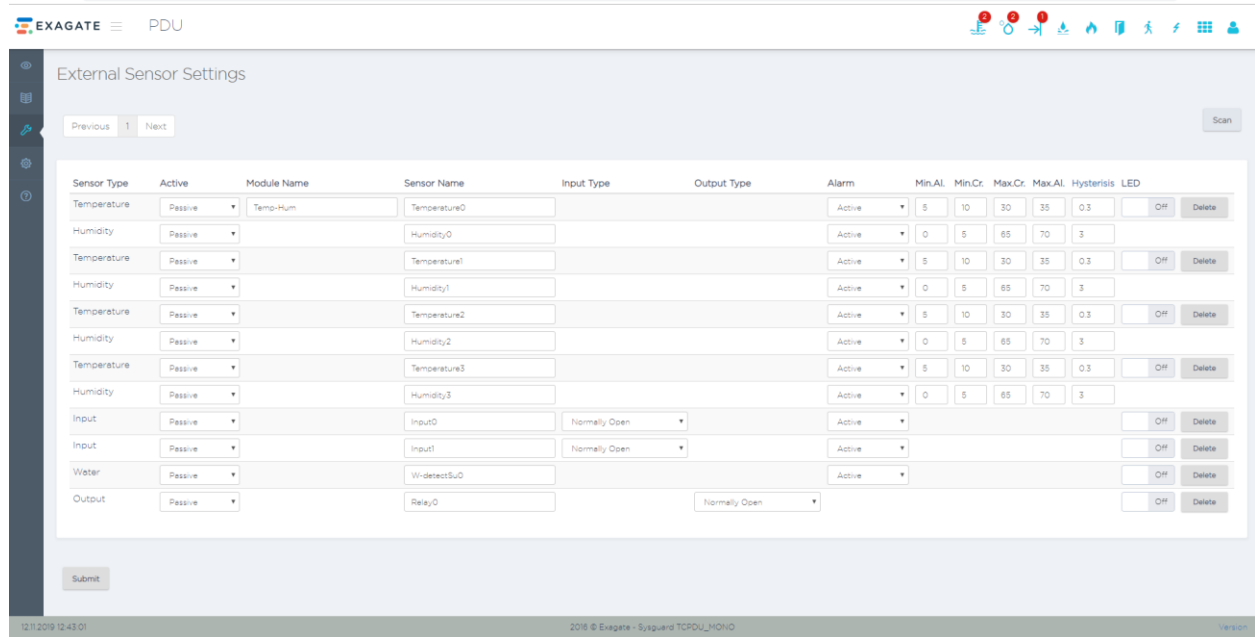
Condition required to eliminate alarm when maximum alarm is generated, is as follows:

Measured value < Defined Minimum Value + Hysteresis

Enter max. and min. values with only 1 decimal in relative humidity percent for the Humidity Type Sensor and in °C with 1 decimal for Temperature Type Sensor on Sensor Assignment Page. Then save your changes by clicking on Save button on the same page.

External Sensors

External sensors are optional sensors that can be connected to the PDU via Ethernet cables. These compatible sensors are temperature, humidity, water leak, dry contact, smoke, air flow, air quality, vibration sensor and more can be attached up to 4 in total to the target PDU. The values measured on external sensors are sent to PDU's web interface and shown in picture above.

When the Ethernet connection of the PDU is done, external sensors are displayed. Number of internal sensors depend on the device model.

The information about External Sensors are displayed in 13 columns.

Column 1: **Type** of the sensor includes the outlet name and the measured value, *e.g.*, Temperature, Humidity.

Column 2: **Status** of the sensor is selected in this column. You can select *Active* or *Passive* status.

Column 3: **Module Name** of the sensor is given in this column. You can change the name of the external sensor, here e.g., Temp-Hum Sensor

Column 4: **Sensor Name** of the sensor is given in this column. This is the sub for the connected sensor. You can name the module e.g., TempHumSensor01, TempHumSensor02

Column 5: **Input Type** of the sensor is given in this column. This is available only for inputs. You can select one of the following input:

- Normally Open

- Normally Closed
- Smoke
- Door
- Movement

Column 6: **Output Type** of the sensor is given in this column. You can select the one of the following input:

- Normally Open
- Normally Closed

Column 8: **Alarm** status is displayed in this column. Select the status of the alarm as Active or Passive.

Column 9: **Minimum Alarm** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

Column 10: **Minimum Critical** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical

Column 11: **Maximum Alarm** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

Column 12: **Hysteresis** value is assigned in this column. Please see *How to assign the Values?* for more information about how to assign the alarm, critical and hysteresis values.

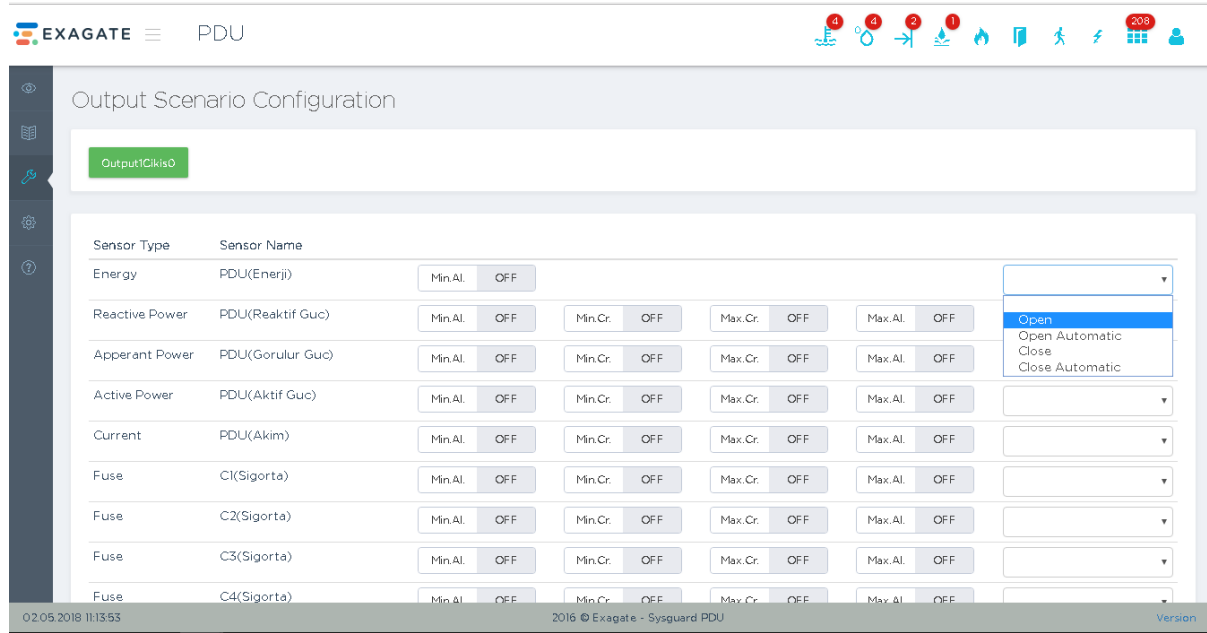Column 13: **LED** is a toggle column which helps finding the connected sensor in crowded spaces where there are too many sensors coupled together.

Assigning values for sensors are similar to assigning them on internal sensors, check for more details.

Output Scenario

Picture 14: Exagate IP PDU Webpack Output Scenario Configuration Page

If sensors generating alarms and some output type sensors are available in your system, you can configure any alarms to be generated by any sensor to intervene the required output.

For this configuration, click on "Configure" button in the required Output Type Sensor line on Output Sensor Settings Page.

Sensor Assignment Page For Output, where all sensors are listed. On this page you can make required configuration sensors, by ticking boxes in "Alarm/Max.", "Min." columns and selecting either "Turn on" "Automatically Turn on", "Turn Off", "Automatically Turn off" options in "Intervention" column. Definitions of the terms used on this page are as follows:
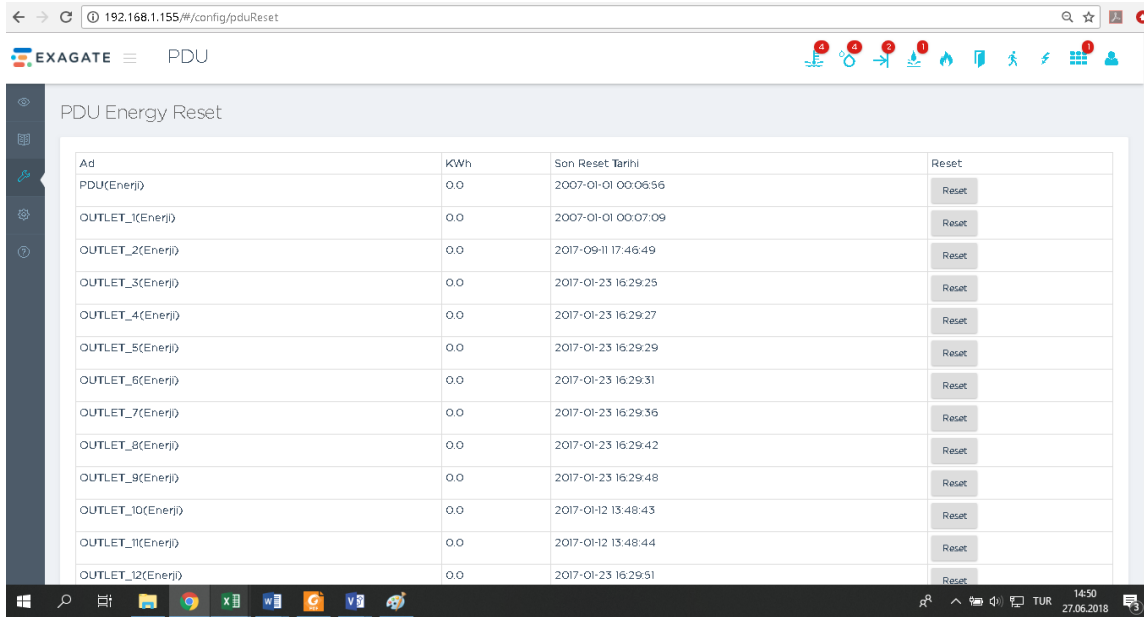
- Ticking "Alarm/Max." box ensures the intervention when sensor generates alarm upon exceeding the maximum value.

- Ticking "Min." box ensures the intervention when sensor generates alarm while the received value is under min. one.

- "Intervention" column defines the possible intervention type. Intervention types are as follows:

  o If "Turn On" is ticked, device connected to the said output is turned on in case of alarm event and device continues to be on when the alarm is eliminated.

o   If "Automatically Turn On" is selected, device connected to the said output is turned on in case of alarm event and device would be off when the alarm is eliminated.

o   If "Turn Off" is ticked, device connected to the said output is turned off in case of alarm event and device continues to be off when the alarm is eliminated.

o   If "Automatically Turn Off" is selected, device connected to the said output is turned off in case of alarm event and device would be on when the alarm is eliminated.

Then click on "Save" button. Configuration will be saved and the page is closed.

PDU Energy Reset

Picture 15: Exagate IP PDU Webpack PDU Energy Reset Page

In this page, you can view and reset the displayed value of Total Energy (kWh) per PDU and per outlet. Additionally, the last Reset date is displayed in the page.

Configuration

System

System Configuration page enables to configure some basics like the system language, notification time, backup and restoring the system, uploading update files. Below each option is explained.
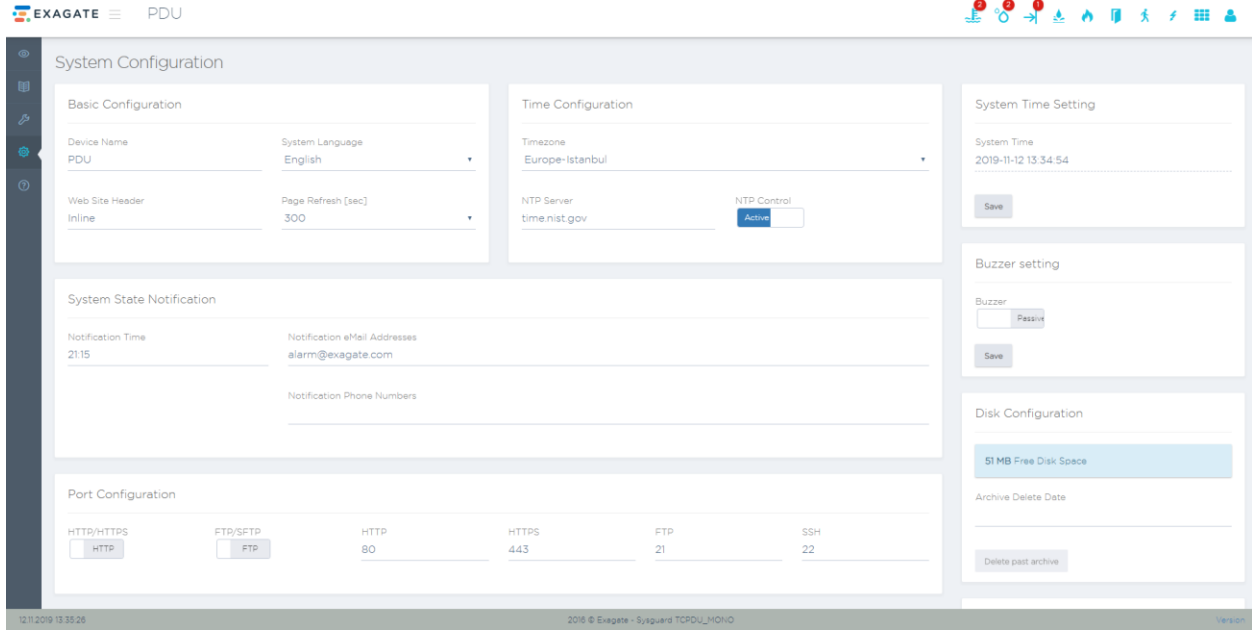
Picture 16: Exagate IP PDU Webpack System Congfiguration Page

Basic Configuration

Device Name

Assign a name for your PDU. Click Save button.

System Language

Select the language of the web interface. Click Save button.

Web Site Header

Type a name for your web site heading. Click Save button.

Page Refresh

Select an interval of the page refreshing of monitoring and management pages at the web interface. Define a refreshing time interval within 1sec-300sec. Click Save button.

Time Configuration

Timezone

Select your timezone according to your location (Continent-City). Click Save button.

NTP Server

Type a valid Network Time Protocol server address if you will use NTP server. Save button.

NTP Control

Select *Passive* to leave the timezone selection. It will be chosen automatically if you are online.

Select *Active* if you have entered a valid address at *NTP Server* part. Click Save button.

System Time Setting

Actual date and time are selectable when *NTP Control* is at *Passive* position. Select the time and date. Click Save button.

System State Notification

Notification Time

Assign a notification time, at which the system will send a daily alarm notification. Click Save button.

 Notification Address

Assign a notification address, to which the system will send a daily alarm notification. Click Save button.

Disk Configuration

Available capacity of the archive disk is shown in this section. You can delete archive information partly or totally. Select Archive Delete Date to start the cleaning of the archive files up to this date. Then click *"Delete Past Archive" (Clear up to This Date).*

Port Configuration

Select whether you want to use HTTP (Hypertext Transfer Protocol) or HTTPS (Secure Hypertext Transfer Protocol).

Select whether you want to use FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol).

Assign the port numbers of HTTP, HTTPS, FTP and SSH.

Click Save button.

Backup and Restore

This section is useful when the PDU requires an update and the user assignments like sensor names, alarm and critical values.

To create and download a system backup, click *Create System Backup and Download*.

To create and download an archive backup, click *Create Archive Backup and Download*.

To restore the device, browse a restore file via *Select Restore File* button or *Restore from Backup*.

Software Update

Currently you can update the software through web interface:

1. Browse an update file via *Select Update File* button.
2. Before updating the software, you must create a backup of the current version system.
3. Press *Install Update* to setup the selected version.

Network

Network configuration can be done for protocols TCP/IP v4 and TCP/IP v6.
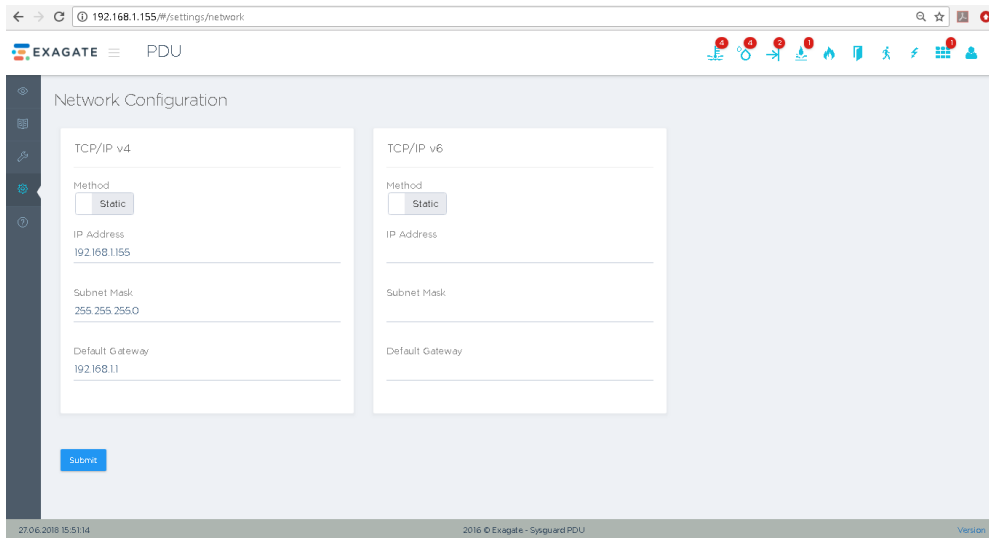
Picture 17: Exagate IP PDU Webpack Network Configuration Page

Select *DHCP Method* to assign an automatic IP Address, a Subnet Mask and a Default Gateway.

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Select Static Method to assign a static IP Address, a Subnet Mask and a Default Gateway as given at *Table 3: Exagate IP PDU Network Information*.

Users

User information is listed in this section. The user name, role of the user and last login time is observable.

To add a user;

Assign a User Name, type the password 123456.

Select one Role of the user from Manager, Monitor, Admin options; type the password 123456 again. Click Save button.

To delete a user;

Click the Delete button of the user you want to delete.

Map

Positions of the PDUs and connected sensors can be recorded on your area map/location/sketch. To replace your map/sketch on the background, upload your image via *Select and Upload Background Image* at the up right corner of the screen. Click *Save Sensors Positions*.

Email

Email Configuration

Sending e-mail is a method to warn related personnel in case of alarm events. In parallel to system configuration, e-mail stating the alarm event will be automatically sent. It is required to configure the e-mail server settings accurately for sending the e-mails. It is explained in related articles how to make this configuration. You can select the related personnel to send the e-mails in case of alarm events as well as you can determine what kind of e-mails stating which sensor is generating alarms are to be sent these personnel.

Head Office
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T: +90 212 275 73 22 F: +90 212 275 73 66
E: info@exagate.com

Support
support@exagate.com
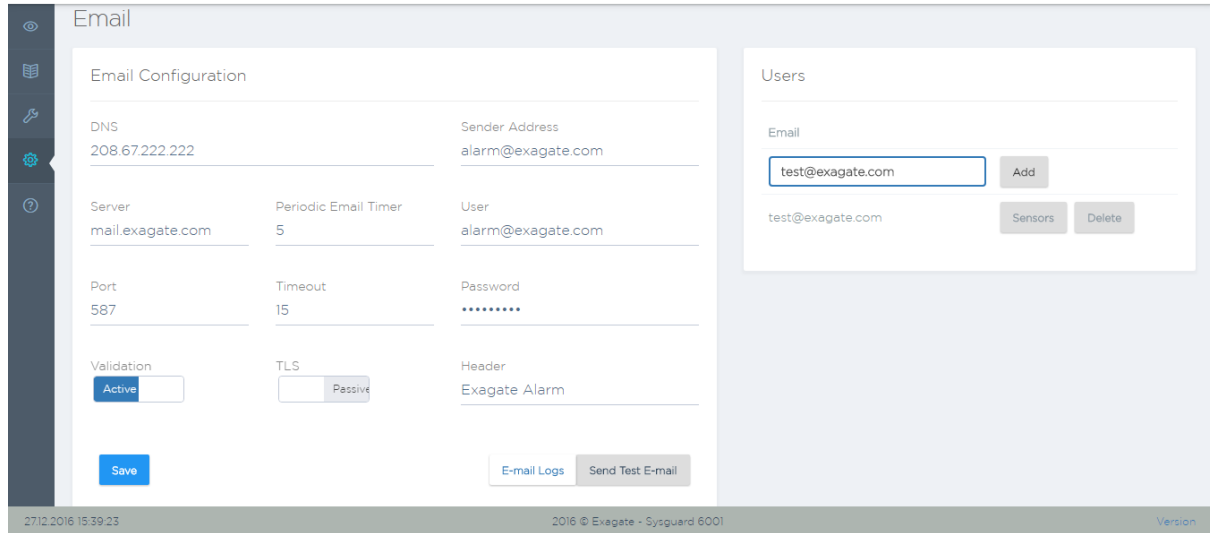
Picture 18: Exagate IP PDU Webpack Email Configuration Page

DNS

Enter your DNS address.

Server

Enter your server address. Example: smtp.gmail.com

Periodic Email

Assign an interval of alarm notification in terms of minutes. When the device generates alarm, the information will be sent as an email to the assigned email address periodically.

Port

Assign your port number.

Timeout

Assign a timeout duration for email sending, in terms of seconds.

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Head Office
A: Yeşilce Mh. Doğa Sk. Kökten Plaza No:6 Kat:2 34418 Kağıthane- Istanbul
T: +90 212 275 73 22 F: +90 212 275 73 66
E: info@exagate.com

Support
support@exagate.com

Sender Address

Assign a sender address.

User

Assign a user address.

Password

Enter the password, 123456.

Header

Assign a header for the alarm.

Validation

Select Active or Passive option.

TLS

Select Active or Passive option.

Users

To add a user, type an email and click Add button.

When you click *Sensors* button, you can open or close the alarm value, critical value or N.A. notifications by selecting ON or OFF positions. You may choose all Alarm events, all Critical events, all N.A. events and getting Periodic Emails for all events or certain sensors.

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E: info@exagate.com

Support
support@exagate.com
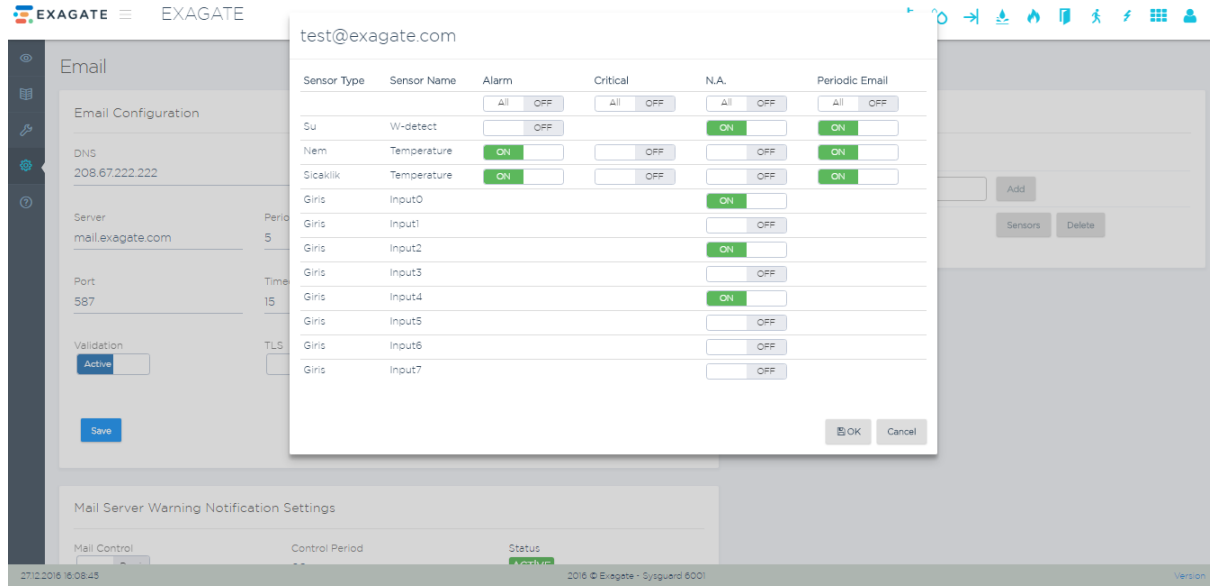
Picture 19: Exagate IP PDU Webpack Email Configuration – Sensors Page

SMS Configuration

Sending an SMS is a method to warn related personnel in case of alarm events. It is required to configure the SMS settings accurately for sending the SMSs. It is explained in related articles how to make this configuration.

Gsm Module

Choose GSM Modem or Virtual Modem.

Working Hours

Assign your work day start time. When the working and after working hours are identified, you are able to choose whether the alarm SMS will be sent in or after working hours.

After Working Hours

Assign your work day end time. When the working and after working hours are identified, you are able to choose whether the alarm SMS will be sent in or after working hours.

Notification E-mail Address

Assign an email address for notification. An email will be sent to this address.

User Name

Assign a user name.

Password

Assign a password.

Company

Type the name of your company.

Periodic SMS

Assign an interval of alarm notification in terms of minutes.

Users

Add a user name and a mobile phone number. You can select whether to send the SMS in or out of the workhours.

SNMP

Smartpack

Exagate DCIM Smartpack or any integrated DCIM software is activated in this section.

Server 1

Select *Active* option, if you prefer Server 1 for SNMP Trap.

Select *Passive* option, if you do not prefer Server 1 in Smartpack but Server 2 OR if you prefer SNMP v1/v2 or SNMP v3.

Trap Port 1

Enter the Port number, belonging to Server 1.

IP Address 1

Enter the IP Address of Server 1.

Server 2

Select *Active* option, if you prefer to use Server 2 for SNMP Trap.

Select *Passive* option, if you do not prefer Server 2 in Smartpack but Server 1 OR if you prefer SNMP v1/v2 or SNMP v3.

Trap Port 2

Enter the Port number, belonging to Server 2.

IP Address 2

Enter the IP Address of Server 2.

SNMP Port

Enter the SNMP Port number of your server.

Heartbeat

Assign the frequency of the SNMP Trap in terms of seconds.

SNMP v1/v2

System Configuration

Select *Active* option, if you prefer SNMP version 1 or version 2.

Read Community

Type v1read.

This is a default keyword in SNMP communication. It enables reading.

Write Community

Type v2write.

This is a default keyword in SNMP communication. It enables writing.

SNMP v3

Exagate IP PDU allows SNMP v1/v2 and SNMP v3 protocols. You may prefer SNMP v3 if your system supports and compatible with the following SNMP v3 options.

State

Select *Active* option, if you prefer SNMP version 3.

Read Authorization

Type roauthpass.

Write Authorization

Type rwauthpass

Security Level

NoAuthNoPriv: This option indicates no security level; Read Community users can *read* and Write Community users can *write.*

AuthNoPriv: In this option, there is Authentication Password but no Privacy password.

User can read with the following options:

- Roauthpass – MD5
- V3read

    OR

- Rwauthpass – MD5
- V3read

AuthPriv: In this option, there are both Authentication Password and Privacy password.

User can read with the following options:

- Roauthpass- MD5
- v3read
- roprivacypass - DES

User can read and write with the following options:

- Rwauthpass – MD5
- V3write
- Rwprivacypass-DES

Authentication

MD5: Select if you prefer MD5 hashing algorithm.

SHA1: Select if you prefer SHA hashing algorithm.

Privacy

DES: Select if you prefer DES security algorithm.

AES: Select if you prefer AES security algorithm.

Read Community

Type v3read.

This is a default keyword in SNMP communication. It enables reading.

Write Community

Type v3write.

This is a default keyword in SNMP communication. It enables writing.

Read Priv.

Type roprivacypass which enables reading.

Write Priv.

Type rwprivacypass which enables writing.

Help

Help button directs you to the online Exagate PowerGuard IP PDU User Manual. Please have a contact via info@exagate.com if you need further help.

Using SNMP

By default, SNMP v1/v2 is enabled on Powerguard IP PDU so that PDU can communicate with an SNMP manager.

From the web interface or SmartPack, you can activate either SNMP v1/v2 or SNMP v3. Please see section SNMP for SNMP Configuration via web interface WebPack.

MIB File

Download the SNMP MIB to use with your SNMP manager.

Downloading the MIB file

1. Contact our support for MIB file.
2. Select a location for the file.
3. Load the selected file.

The MIB can then be loaded into the SNMP client.

Appendices

Troubleshooting

Problem: One of the phases has a very high value than the mains voltage.

Check: Please check the mains voltage with the help of a voltmeter. Are the relative values (phase-neutral, phase-grounding, phase-phase) in the expected values?

Problem: A circuit breaker trips when I load the circuit.

Check: Have you installed your PDU according to the "Installation" instructions? If yes, please check the mains voltage with the help of a voltmeter. Are the relative values (phase-neutral, phase-grounding, phase-phase) in the expected values?