

PredictPulse Product Documentation (TD161004EN), Rev. 3.1, Jan. 15. 2018

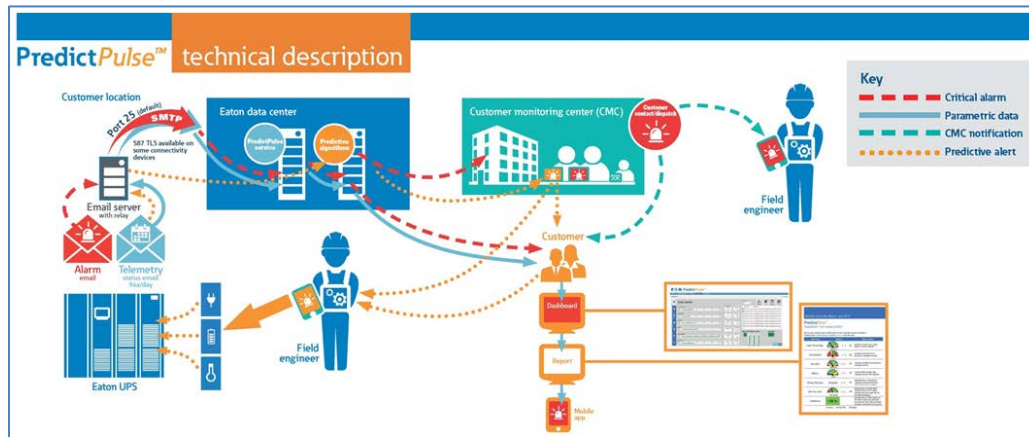
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Welcome



PredictPulse Product Documentation

Everything you need to know about Eaton's PredictPulse predictive remote monitoring for infrastructure management

PredictPulse is a cloud-based monitoring and management service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf.

PredictPulse provides you with a 24x7 critical alarm managed service, dashboard, mobile application and monthly report detailing data on the ongoing health and efficiency of your Eaton UPS. This data delivers information on your unit's alarms, voltages, loads, energy savings, service level and external factors such as temperature and humidity, depending on the model. Additionally, the data provides information about the attached batteries and system availability. All of these factors contribute to the Relative Performance Index (RPI) score that allows you to compare your unit's health relative to Eaton's optimum UPS operating levels.

PredictPulse informs you when events are experienced. Our 24x7 Customer Monitoring Center (CMC) support team will call or notify you of any Critical alarm events to provide proactive monitoring, expedited response and faster repair times.

Going a step further, **PredictPulse Insight** also monitors the likelihood of component failures based on sensor data so Eaton can proactively remedy issues. If an anomaly is detected, a support specialist analyzes the data for failure risks and a verification visit is arranged so a field technician can inspect and replace critical parts before failure.

Finally, **PredictPulse Insight Plus** adds proactive replacement coverage for capacitors and fans so parts are replaced prior to failure without any extra costs (battery replacement coverage can be added separately).

- *PredictPulse uses one-way only SMTP emails to communicate with Eaton's cloud servers*
- *PredictPulse relies on the built-in device firmware and standard Eaton connectivity cards (no wiring or software needed)*
- *PredictPulse is subscription SaaS (Software as a Service) offering*
- *This managed service can complement existing monitoring tools, reducing downtime risk*

Overview

PredictPulse infrastructure monitoring uses automated and expert human processes to continuously monitor the health of an organization's power infrastructure. Power monitoring proactively notifies network administrators (via smartphone apps, web portal dashboards, email, or phone calls) with actionable data that enables them to pre-empt outages and performance degradation.

Questions? Call 800/843-9433 option 5, then 2, or email predictpulsesupport@eaton.com.

The latest documentation, tools, tutorial videos and links to PredictPulse can be found at www.eaton.com/predictpulse.

The screenshot shows the Eaton PredictPulse website. At the top, there is a navigation bar with links for "My Account | Logout?", "Customer Support", "USA | Worldwide Sites | www.eaton.com", and a search bar. Below this is a secondary navigation bar with links for "Welcome Arthur", "What's New", "Sales Tools", "Partner Marketing Resources", and "Extranet Sites". The main content area features a large graphic with an eye and the text "Have eyes on your power infrastructure 24/7". Below the graphic, there is a section titled "PredictPulse predictive remote monitoring for infrastructure management" with a brief description and a "Contact me about this service" button. At the bottom, there are six colored buttons: "View product videos and tutorials", "Learn how it works", "Get documentation and insights", "Download Wizard Tool", "Access your PredictPulse dashboard", and "Which version do I need?". The footer contains a "View Mobile Site" link and several columns of links for "Products & Services", "Solutions", "Knowledge Center", "Customer Support", "Subscribe", and "Site Map".

PredictPulse comparison (Table 1)

Feature	PredictPulse™	PredictPulse™ Insight	PredictPulse™ Insight Plus
Increased power reliability	X	X	X
Installation in minutes	X	X	X
24x7 monitoring and management by Eaton	X	X	X
Remote diagnosis of issues and alarms by Eaton	X	X	X
Expedited repairs	X	X	X
Access to real-time device and alarm data	X	X	X
Performance and device health insights	X	X	X
Secure data transfer	X	X	X
Predictive analytics to identify component failure		X	X
Predictive parts: VRLA batteries, capacitors, fans, filters, power modules		X	X
Verification visit before proactive component replacement		X	X
Reduced downtime from part failures by 75%		X	X
Baseline health inspection and firmware updates		X	X
Cost of proactive component replacement included (except batteries)			X

Key features of PredictPulse

- Remote monitoring by Eaton to monitor and initiate service for critical alarms and manage alerts for most Eaton single- and three-phase UPS's 24x7
- Real-time status information on UPS health, alarms, trended data
- Insights provided via web portal dashboards (My.eaton.com), mobile app and reports
- Easy to deploy and manage with self-installation via Wizard installer, no special hardware needed (SaaS)
- Security built into the solution and use of standard industry protocols
- Telemetry: 96 data transmissions per day of up to 300 sensor data points using one-way outbound email via SMTP, Office 365 or cellular modem
- Integration with service database for contract details, fleet data and site field activity history

Key benefits of PredictPulse

- Increase efficiency by remotely monitoring your power devices, managing scheduled and emergency services, and delivering proactive service recommendations
- Reduces risk of component failures (PredictPulse Insight) and downtime
- Optimizes battery or capacitor replacement cycle using sensor data, reducing total cost of ownership
- Expedites repairs and reduces repair times by real time data analysis
- Proven, global platform built on best-in-class solution

Set up and get started

Set up PredictPulse on a device

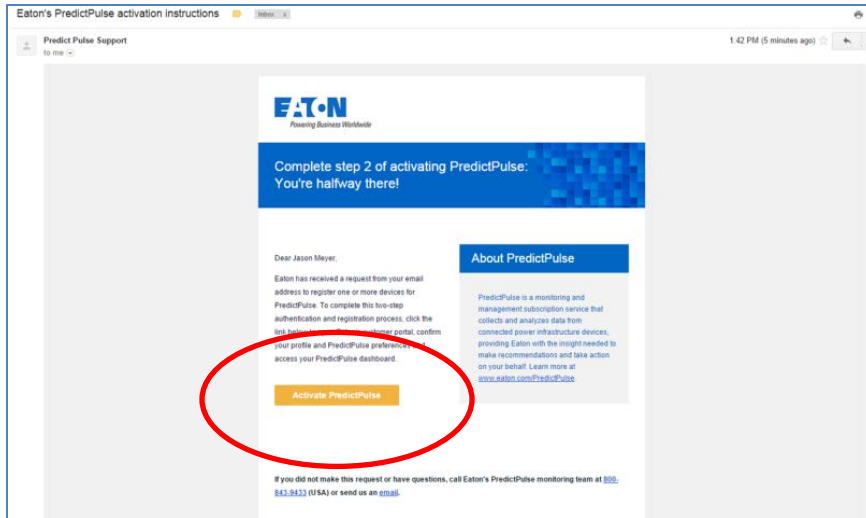
The installation and activation process has several key steps:

1. Possess an Eaton UPS with a Eaton connectivity card (and EMP)

Eaton connectivity parts (Table 2)

Connectivity parts	Part number
PredictPulse PXGMS Connectivity Kit	P-103001920
PredictPulse PXGX-UPS Connectivity Kit	P-103001921
PredictPulse Network-MS Connectivity Kit	P-103001922
Power Xpert Gateway Mini Slot (PXGMS)	P-116000035
Power Xpert Gateway UPS (PXGXUPS)	103007974-5591
Network Card-MS (Network-MS)	Network-MS
Environmental Monitoring Probe	116750224-001

2. Have the connectivity card setup, with an IP address, to allow your SMTP mail server to transmit emails to PredictPulse.
3. Download and run the PredictPulse Wizard tool (from www.eaton.com/predictpulse).
4. After the installer has sent off your activation request you'll receive an email with a link.



5. Click on the “Activate PredictPulse” link provided to navigate to the MyEaton portal. **Tip: You may want to bookmark the MyEaton landing page, since this is where you’ll always go to log into PredictPulse.**
6. Create your unique password. Combined with your email as your username, this is how you will access your PredictPulse dashboard.
7. Download the mobile app for your iOS or Android smartphone or tablet. Use the same email address and password created in the online portal to log in and access alarms from anywhere you are, at any time.

Eaton UPS models compatible with PredictPulse

Eaton PredictPulse UPS model compatibility chart (Table 3)

Eaton UPS Model	PredictPulse Compatible	PredictPulse Insight Compatible	Connectivity Card
5125	Yes	No	Power Xpert Gateway UPS (PXGXUPS)
5P, 5PX	Yes	No	Network Card-MS (Network-MS)
9120, 9170+	Yes	No	ConnectUPS-BD (116750222-001)
9130	Yes	No	Network Card-MS (Network-MS)
9125	Yes	No	Power Xpert Gateway UPS (PXGXUPS)
9155	Yes	Yes	Power Xpert Gateway UPS (PXGXUPS)
9140	Yes	No	Power Xpert Gateway UPS (PXGXUPS)
Evolution, Evolution S, EX, MX, EX RT	Yes	No	Network Card-MS (Network-MS)
9P, 9PX	Yes	No	Network Card-MS (Network-MS)
9315	Yes	Yes	Power Xpert Gateway UPS (PXGXUPS)
9315 SBM	Yes	TBD	Power Xpert Gateway UPS (PXGXUPS)
9330	Yes	No	Power Xpert Gateway UPS (PXGXUPS)
9355	Yes	Yes	Power Xpert Gateway UPS (PXGXUPS)
9390	Yes	Yes	Power Xpert Gateway UPS (PXGXUPS)
Power Xpert 9395, 9395HP	Yes	Yes	Power Xpert Gateway UPS (PXGXUPS)
93E (9E)	Yes	No	Network Card-MS (Network-MS)
93PM	Yes	June 2018	Power Xpert Gateway Mini Slot (PXGMS)
BladeUPS	Yes	No	Power Xpert Gateway UPS (PXGXUPS)

Note: all PredictPulse compatible devices require an Environmental Monitoring Probe (EMP) p/n 116750224-001

Connectivity card pre-installation requirements

Minimum requirements for PredictPulse on an Eaton UPS:

1. Connectivity card connected and configured on the end user's LAN/WAN to mail server
 - a. IP address
 - b. Subnet mask
 - c. Gateway
 - d. Mail server address (mail server name requires DNS)
2. Environmental monitoring probe (EMP) plugged into connectivity card to provide temperature and humidity data near battery (or UPS)
3. Simple Mail Transport Protocol (SMTP)-compatible mail server capable of relaying SMTP messages
4. Network Ethernet connection to connectivity drop
5. SMTP relay/open relay
6. Port 25 (default) or port 587 (TLS) based on connectivity card
7. Complete activation via PredictPulse wizard installer or connectivity card

PredictPulse Wizard installer

The Wizard installer can be downloaded from www.eaton.com/predictpulse (download wizard). A tutorial on how to use the installer can be viewed from the tutorial link at the same web link above.

Refer to the “Minimum requirements for PredictPulse on an Eaton UPS” in the prior Connectivity card pre-installation requirements chapter and the Quick Start Guide prior to running the PredictPulse Wizard installer.

Eaton PredictPulse™

Activating Devices for your PredictPulse™ Subscription

EATON PredictPulse™ PredictPulse is a monitoring and management subscription service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf. Questions? Call 800-843-9433 (USA) or www.eaton.com/predictpulse

Let us locate the serial number of your PredictPulse™ device

IP Address: . . .

Serial Number:

Enter the following contact information

First Name Last Name

Contact: Contact Email:

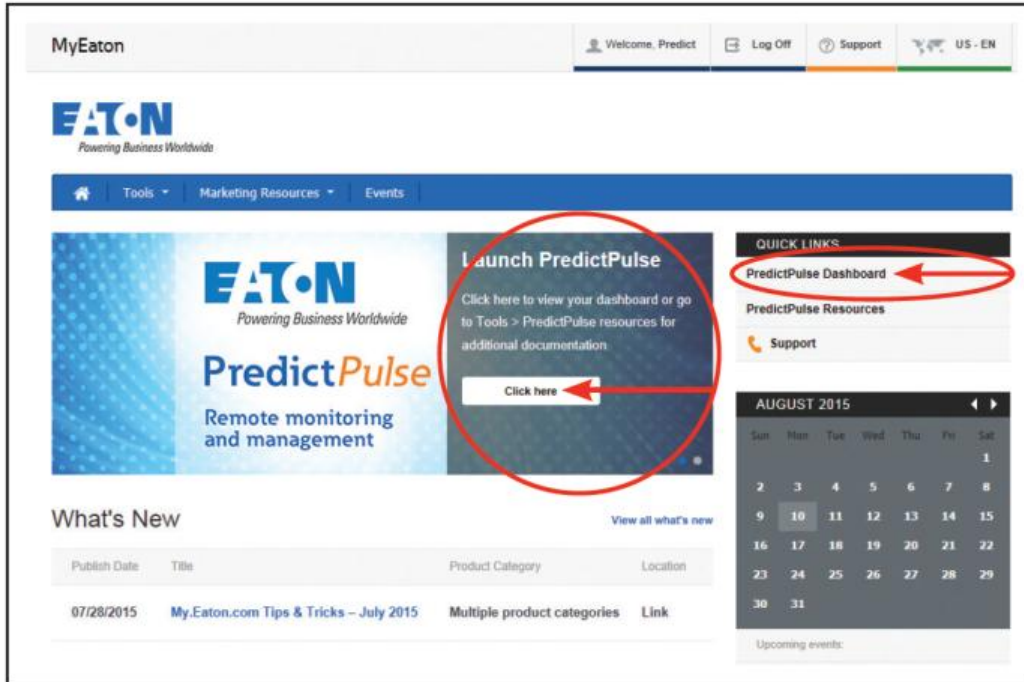
Country: Confirm Email:

v2.0 © 2015 Eaton Corporation. All Rights Reserved.

My.Eaton.com portal and opening your dashboard

How to use the MyEaton portal

The MyEaton portal (www.My.Eaton.com) is where you confirm device activations and access your PredictPulse dashboard. It also includes support information, links to download the mobile app and other relevant resources.



MyEaton portal landing page with multiple ways to launch the PredictPulse dashboard.

Request Access

Note: If someone within your organization administers access for MyEaton, please contact them directly to request an account.

Step 1 - My Personal & Company Details

Required*

First Name*

Last Name*

Email*

Confirm Email*

Country*

Which Eaton business group do you do business with today?*

Aerospace

Hydraulics

Electrical

Vehicle

Filtration

My Role

What type of user are you?*

My Business Contact Details

Company Name*

Address*

City*

State/Province*

Zip or Postal Code*

Business Phone*

Business Fax

Cancel

Continue

MyEaton registration page

Quick start guide

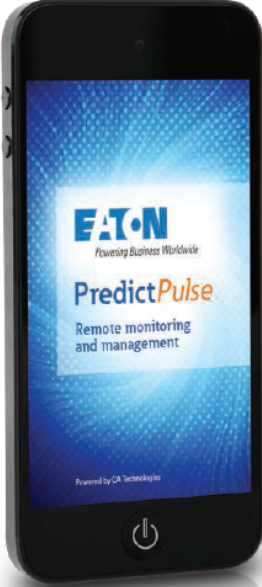
The PredictPulse Quick Start Guide can be downloaded from www.eaton.com/predictpulse (documentation).

IL161006EN: PredictPulse Quick Start Guide

Quick start guide
Eaton® PredictPulse

Effective August 2015

PredictPulse™ Quick start guide



Welcome to Eaton's PredictPulse monitoring and management service. This guide goes over what's included, explains how this service works and helps you set it up. You'll be up and running in no time!

For additional information about PredictPulse, visit Eaton.com/PredictPulse. If you have specific questions, call Eaton (in the US) at **800.843.9433** or send an email to predictpulsesupport@eaton.com.

What do I need to get started with PredictPulse?

- Eaton UPS with connectivity support that's started and on-line
- Eaton connectivity card and environmental monitoring probe installed and connected to your network
- Network access and an IP address for each device to be activated

What's included with PredictPulse?

- Remote monitoring of all your subscribed devices by Eaton 24x7
- Real-time access to your alarms and performance via a dashboard and mobile app
- Summary report emailed to you each month
- Remote diagnosis and response to critical alarms
- Expedited response by Eaton during critical events, resulting in faster resolutions. Eaton also keeps you informed from alarm alert to resolution.¹

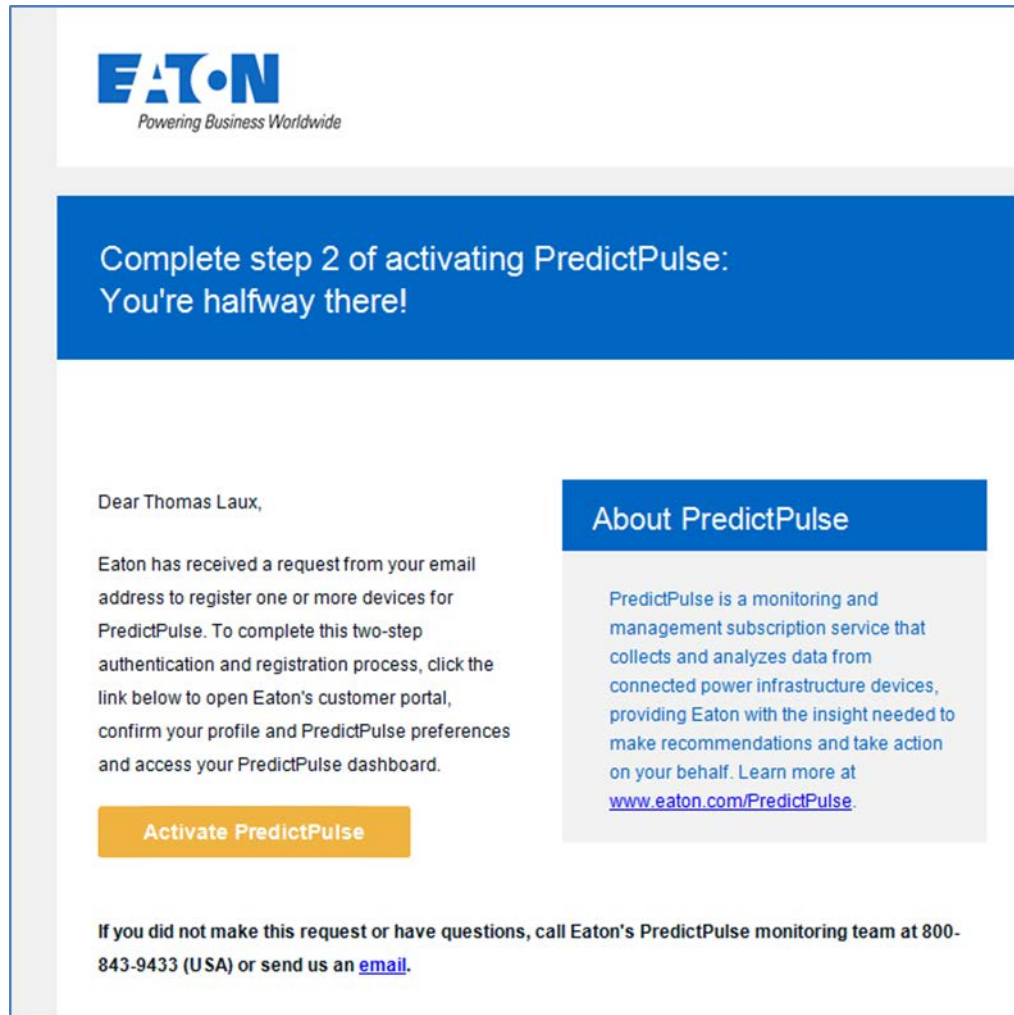
How does PredictPulse work?

After you activate one or more Eaton UPS devices and your profile at Eaton's portal (MyEaton), subscribed devices will send health and alarm data to Eaton. Aggregated PredictPulse data will automatically appear on your dashboard. Additionally, alarm data can be viewed using the PredictPulse mobile app.

Device data is sent using one-way outbound email (SMTP) to maximize security; Eaton cannot interrogate or control any devices. Health data is sent either every 15 minutes or daily, based on the connectivity card. Alarm data is sent real-time.

EATON
Powering Business Worldwide

Automated email messages



Successful activation

Scenario: Customer registers new product and gets above email (Complete step 2 of activating PredictPulse: You're halfway there!"

Free trial activation

Scenario: Customer registers product for a free trial and gets this email

Subject: PredictPulse free trial is now active

Body: Your 90-day free trial of PredictPulse is active for serial number X. This trial expires on date-month-year. If you'd like to continue using PredictPulse after this trial expires, fill out this quick form or call Eaton at 800 843 9433, option 2, then 5.

Serial number not found

Scenario: Customer registers product, but it requires manual input from the customer support specialist/contracts team

Subject: Issue with locating serial number to activate PredictPulse

Body: There is an issue with locating serial number X in Eaton's database. We apologize for this delay and are working to resolve this and will send you an update once it's fixed. If you have questions in the meantime, call Eaton at 800-843-9433, option 2, then 5.

Free trial about to expire

Scenario: Customer has already registered their product for a free trial and its expiration date is approaching.

Subject: Your PredictPulse free trial is about to expire

Body: Your free trial is expiring in <X> days for serial number X. If you'd like to continue using PredictPulse, fill out this quick form or call Eaton at 800 843 9433, option 2, then 5.

Free trial expired

Scenario: Customer has already registered their product for a free trial and its expiration date has passed.

Subject: Your PredictPulse free trial has ended

Body: Your free trial for serial number X has expired. If you'd like to continue using PredictPulse, fill out this quick form or call Eaton at 800 843 9433, option 2, then 5.

PredictPulse service expiration

Scenario: Customer has already activated PredictPulse service and a device's Oracle service contract expiration date has passed.

Subject: Your PredictPulse monitoring service has ended

Body: Your Eaton PredictPulse monitoring service for serial number X has expired. If you'd like to continue using PredictPulse, fill out this quick form or call Eaton at 800 843 9433, option 2, then 5.

Sorry: We're experiencing technical difficulties with activating your PredictPulse subscription

Scenario: Customer registers product, but it has already been registered by the same or a different requestor

Subject: Issue with a duplicate PredictPulse registration of the same serial number

Body: There is an issue with a duplicate registration of serial number X in Eaton's database. For security purposes we cannot activate your subscription since Eaton already has this device registered. We will contact you shortly to resolve this issue. We apologize for this delay. If you have questions in the meantime, call Eaton at 800 843 9433, option 2, then 5.

Congratulations on activating another device for your PredictPulse subscription

Scenario: Customer registers another product and it won't send an activation link (by design) since the customer already has an account and portal password, so send a short acknowledgement of successful activation with no link

Subject: A new device was added to your PredictPulse registration subscription

Body: We've processed your additional device activation for serial number X and will add it to your dashboard. It may take up to 30 minutes for this device to appear in your account. To view your PredictPulse dashboard go to www.my.eaton.com. If you have questions in the meantime, call Eaton at 800 843 9433, option 2, then 5.

PredictPulse architecture and security

Overall service architecture

Figure 1 details the entire service architecture of PredictPulse.

1. The connectivity card gathers data from the UPS and Environmental Monitoring Probe (EMP).
2. The EMP provides site's ambient temperature and humidity measurements and two contact closure terminals used to monitor battery temperature.
3. Either 96 times per day or daily, or upon a critical event, the connectivity card sends an email to the remote monitoring servers.
4. Status and event emails may be sent directly to the customer, depending upon the connectivity card configuration.
5. The monitoring email is sent through the customer's corporate email server, Office 365 or a cellular modem, per configuration. Otherwise, it is sent through Eaton's email server.
6. Once the remote monitoring servers receive the email, the data is stored in Eaton's database server.
7. Appropriate notifications are then sent to the customer support specialist and the customer.
8. If a critical alarm event occurs, the customer is notified within 15 minutes, and a field technician or service request process is initiated per the applicable contract coverage.
9. Reports are also generated by the remote monitoring servers and delivered to the customer via email.
10. If PredictPulse Insight is active, the sensor data packet is increased and predictive analytics are run to evaluate the risk of component failure.
11. If a predictive alert is triggered, analysis is run to validate if a verification visit is appropriate and the customer is notified via phone. Service technician will verify and replace parts as needed per the applicable contract coverage.

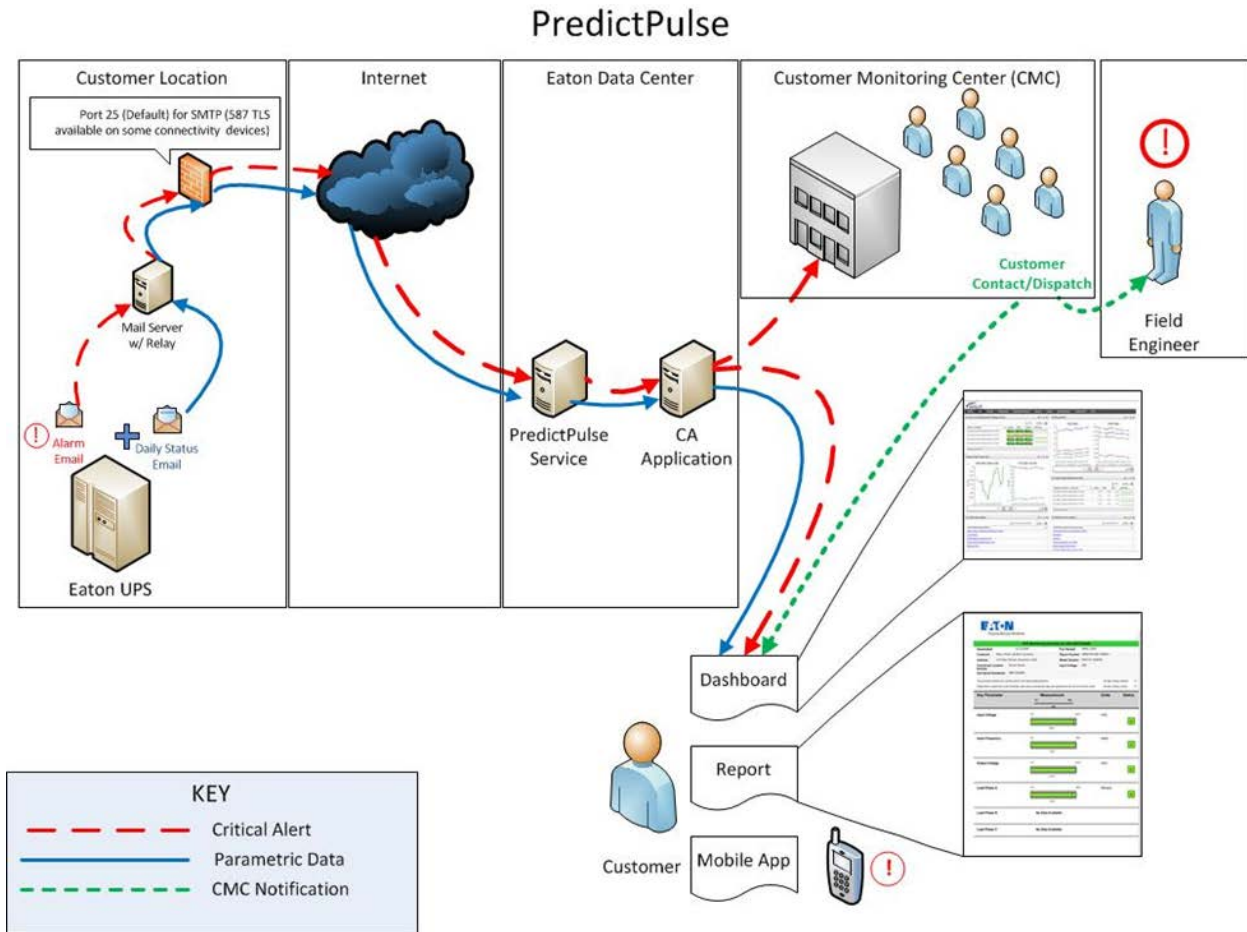


Fig. 1: PredictPulse service architecture

End user architecture

Connectivity card

The connectivity card is attached to the UPS and EMP in order to record and send out parametric (device health) and event data.

Email server

The connectivity card is designed to send the status and event emails through the end user's corporate email server. The connectivity card uses SMTP to communicate with Eaton's remote monitoring servers. This protocol was chosen for three reasons: reliability, pervasiveness and accessibility.

- The email servers and network between them are responsible for delivering the email. The inherent architecture of the internet allows the message to be routed and re-routed, sent and re-sent, as needed until the intended recipient receives the message.

Use of the organizations existing e-mail protocols permits ease of network support and maintenance. E-mail traffic occurs consistent with organization's network design of routing and connectivity.

End user-internal emails

The connectivity card can be configured to send status and event emails directly to any internal email addresses. (The actual number of send-to email addresses allowed depends on the type of card connectivity card.) Two spaces are required for the PredictPulse monitoring service.

PredictPulse process



1. The Eaton connectivity card gathers data from the Eaton UPS and EMP which includes temperature, humidity, and two contact closure terminals.
2. Parametric data is sent from the connectivity card as an email CSV file attachment either every 15 minutes or daily. (The time frame varies based on the type of connectivity card used.)
3. Alarm events are sent immediately through the connectivity card to the remote monitoring server.
4. Status and event emails may be sent directly to authorized end users and other monitoring systems, depending upon the connectivity card configuration.
5. The monitoring email is sent through the organization's email server. Once the Eaton remote monitoring servers process the email, the data is stored in Eaton's database server, and refreshed in the PredictPulse dashboard.
6. Appropriate notifications including alarms are then sent to the customer support specialist and the end user.
7. End users have immediate access to data on their dashboard (via Eaton's portal at www.my.eaton.com) and mobile app (Apple iOS and Android).
8. Reports are also generated by the remote monitoring servers and delivered to the end user via email.

Set up a SMTP server

Common SMTP set up and activation issues

1. Outbound e-mails are failing due to SMTP relay not enabled as default setting on many mail servers.
2. Port not active on the switch
3. Recipient email authorization (e.g., SMTP from address)
4. Connectivity card not configured properly
5. Connectivity card password not available or known to activate PredictPulse
6. Email not working in general

7. Partial activation setup requiring to click the link from email and create a unique password on the MyEaton portal



How to set up a multifunction device or application to send email using Office 365

This article explains how you can send email from devices and business applications when all of your mailboxes are in Office 365. For example:

- You have a scanner, and you want to email scanned documents to yourself or someone else.
- You have a line-of-business (LOB) application that manages appointments, and you want to email reminders to clients of their appointment time.

Authenticate your device or application directly with an Office 365 mailbox, and send mail using SMTP client submission

This option supports most usage scenarios and it's the easiest to set up. Choose this option when:

- You want to send email from a third-party hosted application, service, or device.
- You want to send email to people inside and outside your organization.

To configure your device or application, connect directly to Office 365 using the SMTP client submission endpoint smtp.office365.com.

Each device/application must be able to authenticate with Office 365. It can have its own sender address, or all devices can use one address, such as printer@contoso.com.

How to set up SMTP client submission

Enter the following settings directly on your device or in the application as **their guide instructs** (it might use different terminology than this article). As long as your scenario meets the requirements for SMTP client submission, the following settings will enable you to send email from your device or application.

Device or Application setting	Value
Server/smart host	smtp.office365.com
Port	Port 587 (recommended) or port 25
TLS/ StartTLS	Enabled
Username/email address and password	Enter the sign in credentials of the hosted mailbox being used

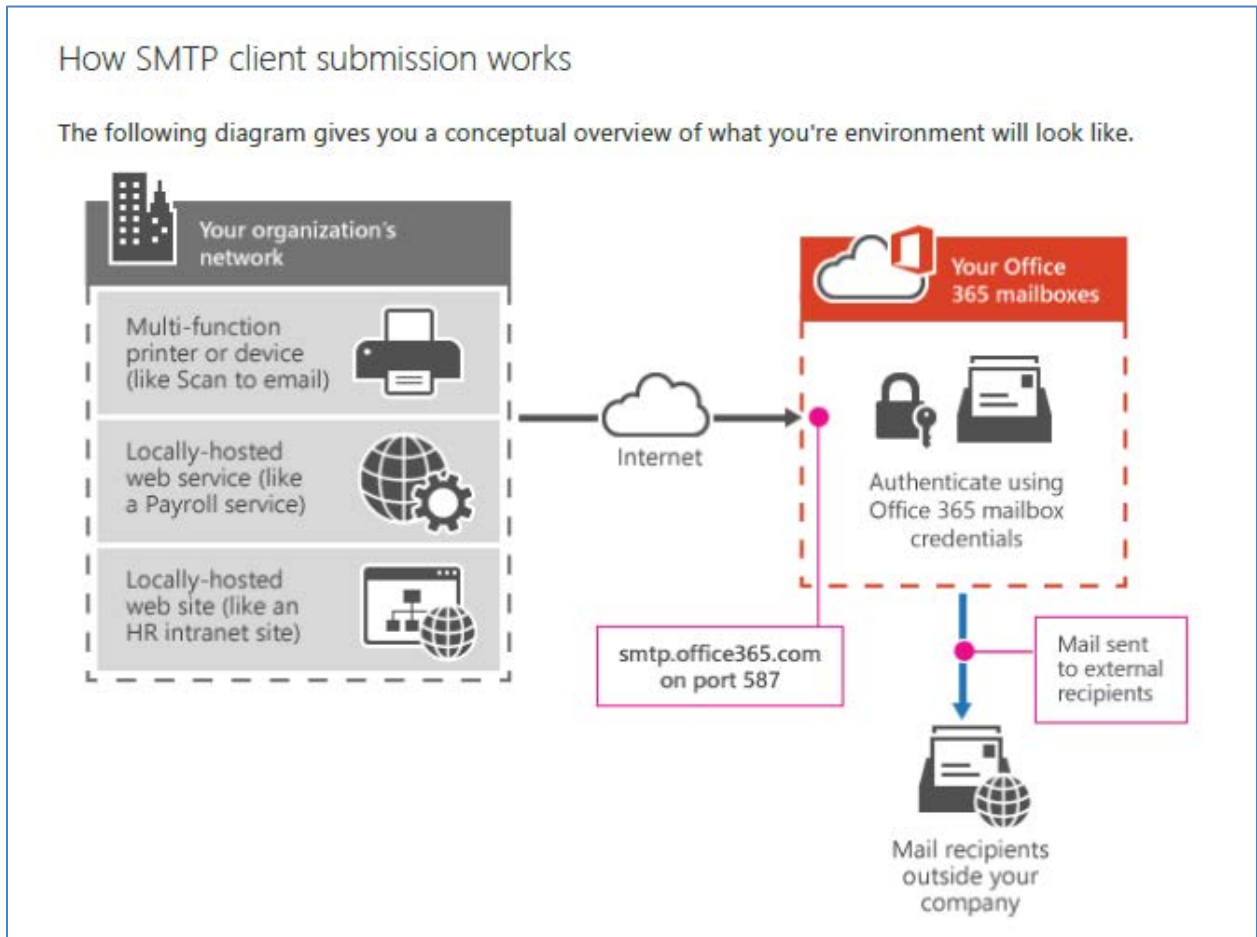
For more information, expand the following sections.

TLS and other encryption options

Determine what version of TLS your device supports by checking the device guide or with the vendor. If your device or application does not support TLS 1.0 or above:

“How to set up a multifunction device or application to send email using Office 365.pdf”


Excerpt from Microsoft Office 365 PDF, "How to set up a multifunction device or application to send email using Office 365.pdf"



Set up a cellular modem

The PredictPulse Wireless Modem Installation Procedure can be downloaded from www.eaton.com/predictpulse (documentation).

P-164000722: Wireless Modem Installation Procedure



Connecting a NetComm Wireless NTC-140W Series Router to an Eaton® Network Card

Part Number: P-164000722
Revision: B0
November 2017

Introduction

This document provides instructions for connecting a NetComm Wireless NTC-140W series wireless router to one of the following Eaton connectivity cards:

- Power Xpert Gateway UPS (PXGX-UPS)
- PXGMS Power Xpert Gateway Minislot UPS (PXGMS)
- Network-MS

Prerequisites

- Eaton UPS with a PXGX-UPS, PXGMS, or Network-MS card
- PuTTY or HyperTerminal software
- USB-to-USB (Type B) cable for PXGX-UPS
- USB-to-USB (MiniTypeB) for PXGMS
- RJ-45 to 9-pin female serial (D shell) for Network-MS
- Serial COM port or USB-to-serial 9-pin male adapter

NTC-140W Series Router Installation Guidelines

Refer to the *Quick Start Guide* provided with the NetComm Wireless NTC-140W Series Router for instructions on mounting the router and connecting power.

Note: The router must be powered by a 120V outlet powered by the UPS. This ensures that the router is protected during a power outage.

Connecting the Router to a PXGX-UPS or PXGMS Card

Connect the NTC-140W Series router and Eaton network card. Use the included Ethernet cable or equivalent.

For a PXGX-UPS card:

- Connect the Ethernet cable from the **LAN** port on the NTC-140W Series router to the **Upstream** port on the card (Figure 1)

For a PXGMS card:

- Connect the Ethernet cable from the **Ethernet** port on the card (Figure 2) to the **LAN** part on the NTC-140W Series router

Route the Ethernet cable into the UPS via the appropriate conduit holes.

Once connected, the LEDs on the active Ethernet port, as well as the green **Power** LED, should light.

Configuring a PXGX-UPS or PXGMS Card

To troubleshoot or set up the PXGX-UPS or PXGMS card, refer to Sections 3–5 of the card's *Quick Start Guide* for instructions on connecting a Windows-based computer to the card's **Setup** port using a USB cable.

For a new installation, the PXGX-UPS or PXGMS card will use default configuration settings. The only steps necessary are to add the SMTP relay information (mail.eaton.com) and to verify that the e-mail recipient (monitor@v2.monitor.com) is properly configured as described below. The router does not require any additional setup steps.

If installing on an existing PXGX-UPS or PXGMS card, reset the card to factory default settings as follows:

- Locate the onboard DIP switch and set switch 6 to ON
- Reboot the card to restore the factory defaults
- Return switch 6 to OFF and reboot the card

For more information on restoring the factory default settings, refer to the *User's Guide* provided with the card.

To configure the PXGX-UPS or PXGMS card, connect to the card's **Setup** port using a USB cable. Once connected, open an internet browser and navigate to <http://192.168.200.101>.

Log in using the default credentials:

Username: admin
Password: admin

From the **Configuration** menu (Figure 3), select **E-mail** to display the **E-mail** tab (Figure 4).

Figure 3. Configuration Menu

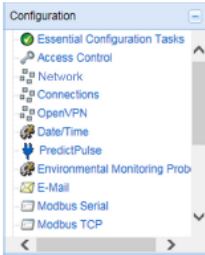
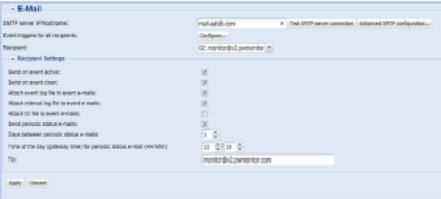


Figure 4. E-Mail Tab



Ensure that the SMTP server/IP hostname is mail.eaton.com and that an e-mail recipient is set up for monitor@v2.pwmonitor.com.

Proceed to the section titled, *Run the PredictPulse Wizard*.

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Eaton PredictPulse Wireless Solution

Eaton's PredictPulse remote monitoring and predictive analytics service is now compatible with a wireless 4G/LTE cellular modem for customers to connect their Eaton UPS using an AT&T broadband data network. Eaton provides an easy to deploy solution along with a data plan tailored for PredictPulse compatible devices. This modem can be used either as a primary or backup transport method instead of, or in addition to, a traditional SMTP relay (or Office 365) network connection.

Eaton's strategic partner, AT&T, has pioneered the ability to support Internet of Thing (IoT) UPS devices via an encrypted 4G/LTE cellular data network and supports PredictPulse using AT&T's Industrial Internet VPN between each subscribing UPS and Eaton's cloud based service.

Wireless Requirements

- The wireless modem requires a 120VAC convenience outlet, preferably UPS protected
- Each UPS connecting to a wireless modem requires its own dedicated connectivity card (and EMP for temperature and humidity data)
- Customers are responsible for any inside Ethernet wiring between UPS's and power source
- Each UPS connected to a wireless modem requires a PredictPulse ATT Data Plan (per device/year) added as a service contract item
- A new UPS Accessories Power (UAP) Field Upgrade (available 2018) adds a protected 120VAC convenience outlet to most Eaton 3-phase UPS's to power the modem
- Each UPS device requires its own PredictPulse subscription in addition to the wireless hardware and PredictPulse ATT Data Plan

Key Features

- Easy to install PredictPulse NA IoT Wireless Modem Kit (P-103003239) compliant with all Eaton UPS models and PXGX-UPS, PXGMS, or Network-MS network cards for sites in North America
- Enterprise-grade network security, isolating traffic to decrease the risk of DDoS and other potential Internet-facing threats
- High performance and high availability with less latency, packet loss, jitter and downtime than alternative solutions
- The wireless modem can be attached to one or more Eaton UPS's by use of a customer supplied Ethernet 4-16 port switch and customer provided Ethernet local area network (LAN) Option to self-install or Eaton field technician installed (5x8 labor SW06NXXX-003X, 7x24 labor SW05NXXX-003X), typically mounted on top of the UPS

- Modem includes a DC power supply (requires a 120VAC), installation instructions and PredictPulse/connectivity configuration guide
- PredictPulse AT&T IoT Data Plan (part number AT01NXXX-1) is ordered annually per UPS device to offer customers a easy simple, and comprehensive service solution for PredictPulse devices
- Data connection is encrypted and uses one-way outbound email insuring security of data and device controls; wireless modem uses its own Eaton network connectivity card to isolate the PredictPulse outbound-only data and cellular data from any customer network connection
- AT&T offers custom installation services for customer sites with weak signal coverage or special installation requirements (contact Eaton PredictPulse support team)

Advantages of PredictPulse Wireless Solution

- Enhanced security by delivering alarms and telemetry data through a Multiprotocol Label Switching (MPLS) private network connection. Eaton's PredictPulse uses centralized routing technology that isolates each organization's traffic from other cloud or Internet traffic.
- Increase performance since traffic is routed directly to the cloud services reducing latency, packet loss, and jitter.
- Simplification to achieve operational set-up with Eaton's PredictPulse by providing a solution with a VPN solution integrated within element of the UPS

Added redundancy when used as additional transport method with traditional SMTP relay (or Office 365) network connection.

Set up accounts

Accounts in PredictPulse are typically based on the support contract and devices associated with your organization and their authorized users. PredictPulse requires at least one device already be setup in its install base record to enable any account to initiate device data to flow through PredictPulse and the associated dashboard, mobile app and reports. In situations where a specific device has never been started or registered with Eaton, an error message may be received and an Eaton support specialist will need to assist with your activation.

Accounts may have devices associated with unique support contracts or different organizations requiring Eaton to manually link (or unlink) so you can view specific devices.

Contact Eaton for any requests or changes to your account.

Your PredictPulse User ID is always your email address used when setting up your original account either in the Wizard Installer or if another authorized user added you to your organization's' PredictPulse account.

Since your email address is linked to devices and information associated with your account, should you need to change your email address or add, change or delete devices, you should contact the PredictPulse support team at predictpulsesupport@eaton.com or call 800/843-9433 option 5, then 2.

Your password is defined and only known to you when setting up your dashboard at MyEaton.com (Eaton portal). The same User ID and password is used for the mobile app, and these can be managed and changed through the Eaton portal.

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Your PredictPulse User ID is always your email address used when setting up your original account either in the Wizard Installer or if another authorized user added you to your organization's' PredictPulse account.

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Your password is defined and only known to you when setting up your dashboard at MyEaton.com (Eaton portal). The same User ID and password is used for the mobile app, and these can be managed and changed through the Eaton portal.

Set up a mobile app

How to download and use the PredictPulse mobile app

- 1) Complete your PredictPulse dashboard at MyEaton portal setup with a User ID and password before setting up a mobile app
- 2) Visit the Apple iTunes App Store or Google Play Android Store, search for Eaton “PredictPulse” and download the free app to your device Once the app is opened enter the following credentials on the Login screen
 - a) Server: “predictpulse.eaton.com” (not case sensitive)
 - b) Username: your email address used to register your PredictPulse dashboard at MyEaton portal (not case sensitive)
 - c) Password: your password used to register your PredictPulse dashboard at MyEaton portal (case sensitive)
 - d) HTTPS: click on the checkmark icon so it is on, or illuminated (HTTPS encryption must be on)
 - e) Click Login button (once you log in, the app will store your credentials)



PredictPulse mobile app screens

Eaton will communicate alarm events and alerts via the PredictPulse mobile app after devices are activated and the two-step activation process is complete. (not clear on what alert communication occurs)

The app displays alarm data by device, severity and time. Eaton acknowledges and time stamps all critical alarms, displaying the Eaton owner for each alarm. All alarm types are also displayed by severity (critical, major, minor, warning, informational, and clear) with ability to filter.

This single sign-on for MyEaton and the mobile app ensures security of your device and account data. Should you forget or need to change your password, go to MyEaton to reset your password. Once reset, your new mobile password should be available within 15 minutes.

Push notifications can be enabled so you'll receive alarm/alert event notices whether the PredictPulse app is open or not.

Manage subscriptions and accounts for other users

As long as you already have a PredictPulse account created on the MyEaton portal and have activated one or more devices, you can add new subscribers and modify your communication preferences.

To add a new user, just click on the “PredictPulse – Invite New User” link in the quick links box on the MyEaton home page. Click on “PredictPulse – Update Contact Details” to adjust your communication preferences.

Once you complete the quick form, your information will be sent to a customer support specialist for review and confirmation.

Customer method of procedure change request process (CMOP)

As long as you already have a PredictPulse account created on the MyEaton portal and have activated one or more devices, you can add new subscribers and modify your communication preferences.

The Customer Method of Procedure (CMOP) defines exactly how, who, what and when for PredictPulse's communication to a subscriber. This process can be customized, or, Eaton will call the first contact associated with an account to notify that a critical alarm event has occurred and any appropriate action. If the first contact is not available the support team will continue calling additional contacts. This communication process will be documented with each critical alarm.

Eaton can tailor PredictPulse to support a wide variety of escalation processes. Many organizations have multiple employees, groups, teams, security offices, Network Operating Centers (NOCs) or managers that may be notified during a critical alarm event or predictive alert. Contact the PredictPulse support team at predictpulsesupport@eaton.com or call 800/843-9433 option 5, then 2 to review or update your CMOP preferences.

Add, change or delete devices or account information

Should you need to change your account information or add, change or delete devices, you should contact the PredictPulse support team at predictpulsesupport@eaton.com or call 800/843-9433 option 5, then 2.

PredictPulse Basics

Navigate PredictPulse Dashboards



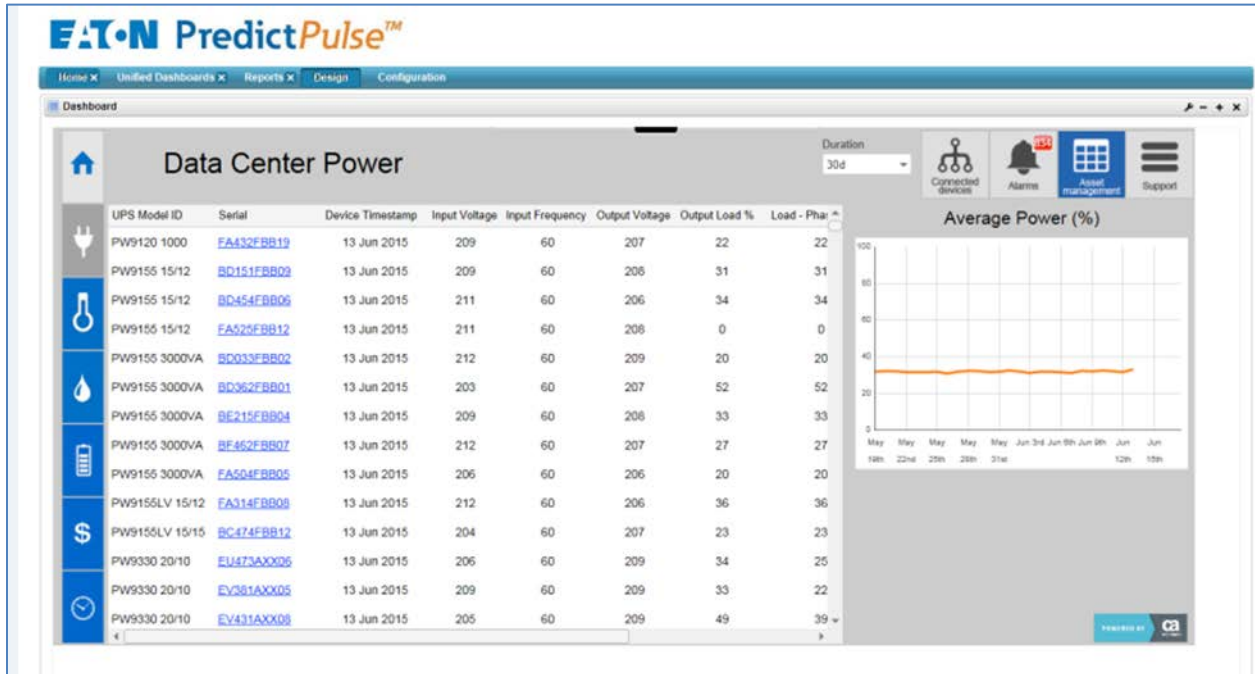
Homepage screen: displays a summary of all subscribing device data and most recent alarms

To view individual device data, select “Connected Devices” or any blue KPI button (left)

- 1) Key performance gauges—shows most current average value of all devices based on duration
- 2) Duration—view information based on the last 24 hours, 7 days or 30 days of data (if available)
- 3) Range and trend—shows minimum, average and maximum values, plus trend rate of change in percentage as green, yellow or red based on duration; this offers insight to positive or negative changes
- 4) Alarm view—shows most current alarms from all devices based on duration; click on links to see alarm detail by device
- 5) Relative Performance Index (RPI)—shows most current overall power equipment health by 30-, 60- and 90-day trends as green, yellow or red; green is positive, yellow is caution and red is negative
- 6) Availability—shows availability of devices to protect loads based on duration (100 percent means all devices were always online)
- 7) Trended data –trend compares the most recent period to the prior period (ex., a 30 day view would compare the most recent 30 days to the prior 30 day period); *note that the first period will always have a null or grey trend arrow since there’s no data to compare*

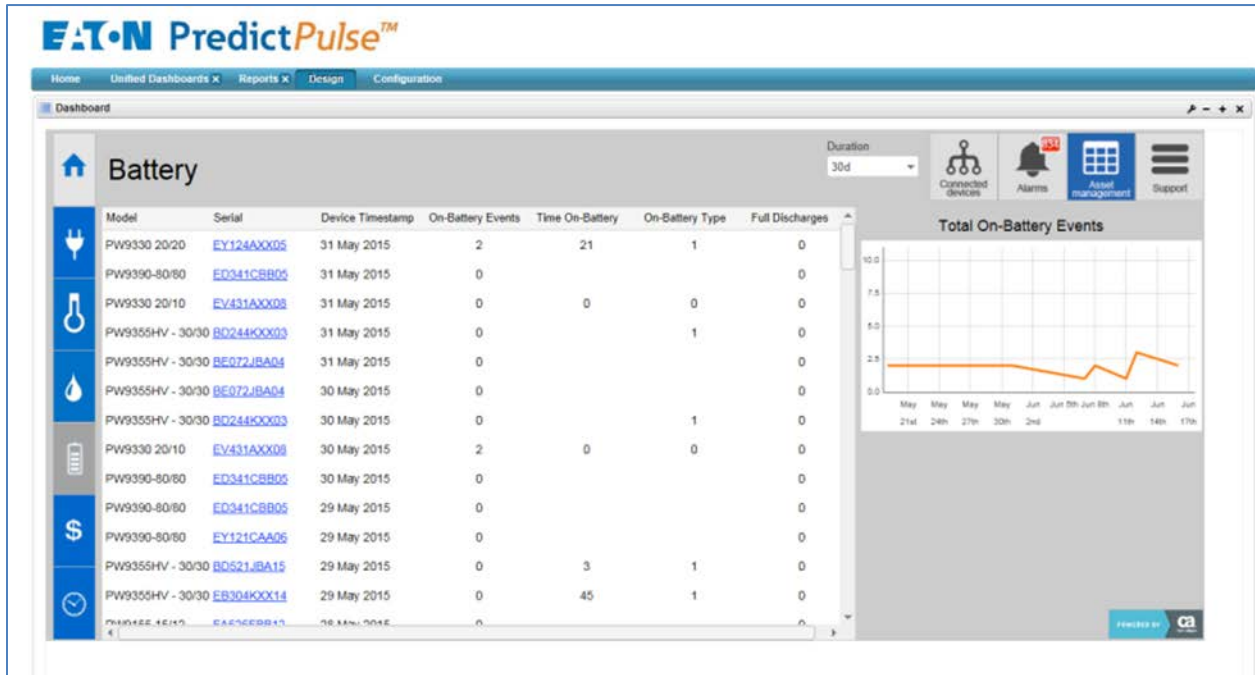
List views—like the one you see under alarms—can be sorted by any column header.

Power dashboard



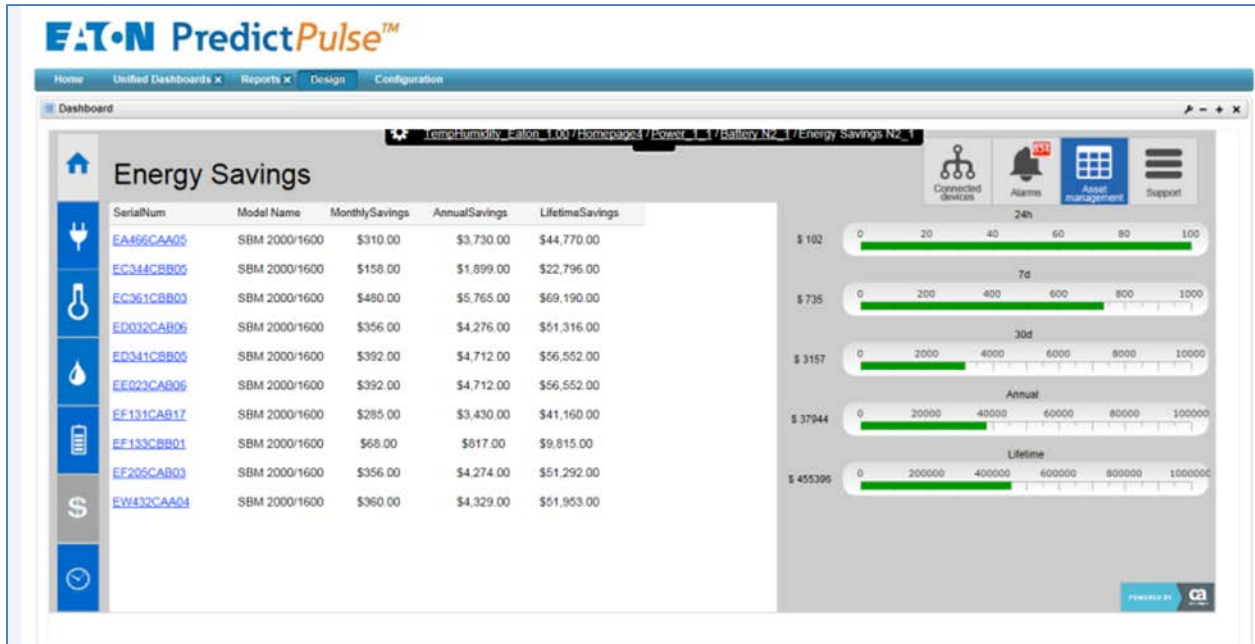
Displays input, output power, load percentage by phase by device; trends load percentage over days

Battery dashboard



Displays battery discharge events over time (30 days default), minutes on battery, battery relative performance index (10= perfect); trends number of on-battery events over days

Energy Savings dashboard



Energy savings uses actual device data for Eaton UPS models with Eaton Energy Savings System (ESS) or High Efficiency feature. It is assumed that a UPS capable of being in ESS mode is actually using it 100% of the time since Eaton's connectivity cards presently do not transmit the ESS status. This does not factor in any UPSs operating in VMMS (Variable Module Management System) mode.

Displays pro forma energy savings at \$0.10 per kW hour based on actual load consumed by month, year and lifetime. Useful to measure actual or potential energy efficiency savings using Eaton Energy Savings System mode and newer UPS models.

Service Level dashboard

Model	Serial Number	Last Event Date	MTTR Performance %	Actual Response Performance %	Service Level %
PW9330 20/20	EV294AXX13		100	100	100
PW9330 20/10	EV381AXX05		100	100	100
PW9330 20/10	EV431AXX08	2015-04-16	400	400	400
9330	EW085AXX02		100	100	100
PW9390-120/120	EX261CAA02		100	100	100
PW9330 20/10	EX423AXX09		100	100	100
PW9390-80/80	EY031CAA02		100	100	100
PW9390-80/80	EY121CAA06		100	100	100
PW9330 20/20	EY124AXX05		100	100	100
PW9155LV 15/12	FA314FBB05		100	100	100
PW9120 1000	FA432FBB19		100	100	100
PW9155 3000VA	FA504FBB05		100	100	100
PW9155 15/12	FA525FBB12		100	100	100

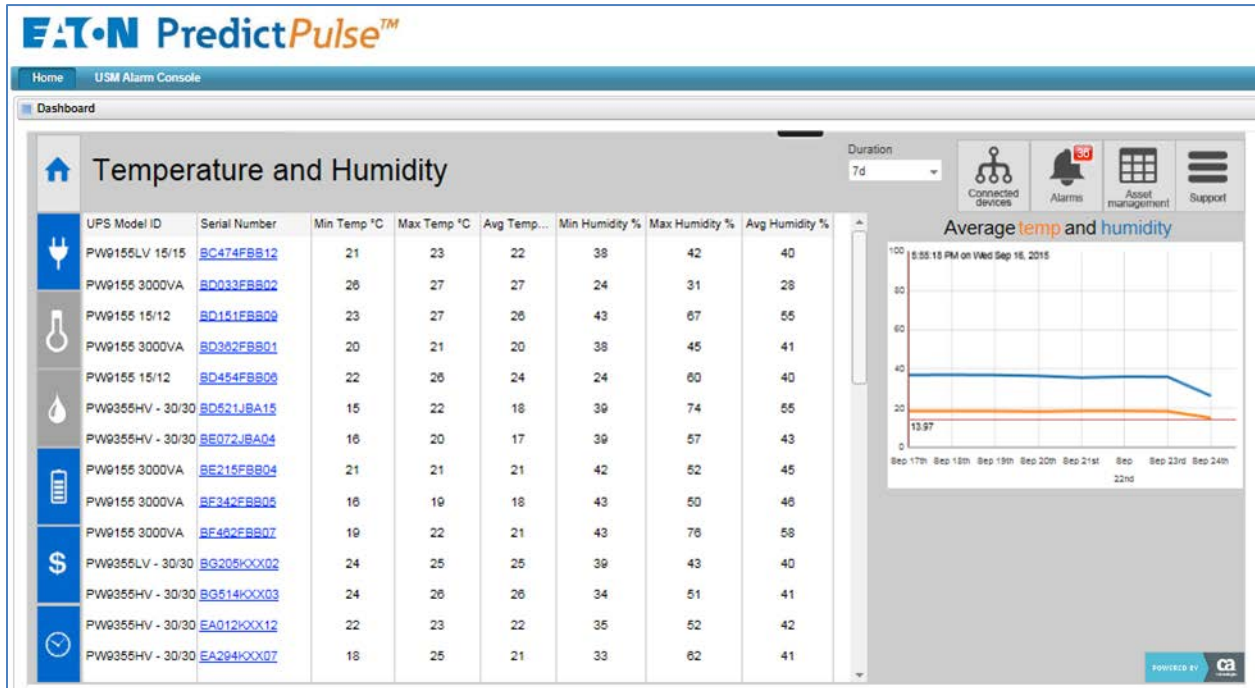
The Service Level key performance indicator uses data from urgent/critical service requests. Source data is from service data input by field technicians. Service level is based on the average of all customer actual emergency contracts or warranty service requests comparing:

- (1) Actual response time to Eaton's contracted response commitment time, and
- (2) Actual total repair time to the national average total repair time

Service level calculations:

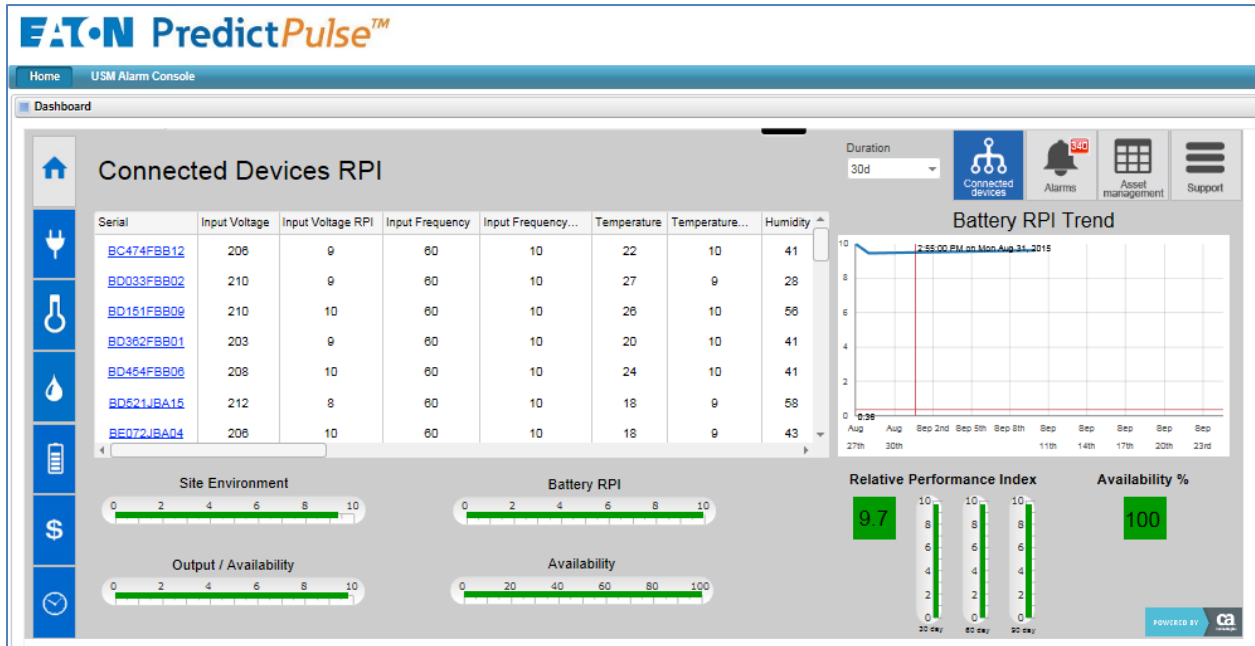
- (1) MTTR
 - (a) Calculate MTTR (median time to repair)
 - (b) Delta between start time and end of tech repair = MTTR
 - (c) Performance = Actual MTTR / national average MTTR (%)
- (2) Response time
 - (a) Response time = start time - tech arrival time (hours, minutes)
 - (b) Performance = contract commitment/response time (%)
- (3) Service level = average of MTTR performance % and response time %
 - (a) Based on your last service event (latched to the last event)
- (4) Dashboard displays when the last event occurred

Temperature and humidity dashboard



Displays temperature (deg. F) and humidity by device, minimum, maximum and average for duration period (days); trends average temperature and humidity by days

Connected Devices dashboard



Displays key performance for all models, overall relative performance and availability of protected load by duration period (days); trends battery health (10= perfect)

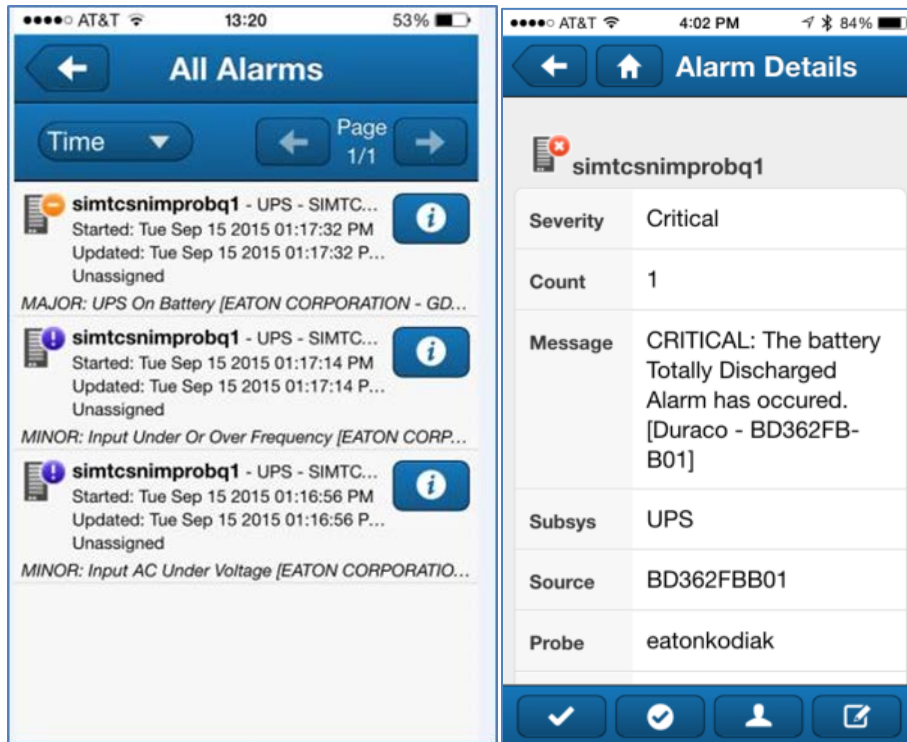
Alarm viewer dashboard

The screenshot displays the Eaton PredictPulse Alarm Viewer dashboard. The main content area is titled "Data Center Alarm Viewer" and contains a table of logged alarms. The table has three columns: "Alarm Date/Time", "Serial Number", and "Event Message". The "Event Message" column contains hyperlinks for each alarm. A "Duration" dropdown menu is open, showing options: "Last 3 months", "Last hour", "Last 4 hours", "Last 8 hours", "Last 24 hours", "Last 7 days", "Last 14 days", "Last 30 days", "Last 12 months", "Yesterday", "Previous week", "Previous month", "Today", "Current week", and "Current month". An "Alarm Details" panel on the right shows fields for "Address", "City", "State", "Installation Date", and "Warranty/Service Contract Expiration", all of which are marked as "Not Available".

Alarm Date/Time	Serial Number	Event Message
06/17/2015 10:27:12	EC344CB805	MINOR: Some Notice condition exists which is not covered by the other traps.
06/17/2015 10:27:12	EC344CB805	MINOR: Some Notice condition exists which is not covered by the other traps.
06/17/2015 10:27:12	EC344CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:12	EC344CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:07	BE215FBR04	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:27:02	ED341CB805	INFORMATIONAL: An alarm not defined in the sups Well Known Alarms has been removed.
06/17/2015 10:26:42	EA343KXX10	CRITICAL: The remote temperature has fallen below the set lower limit, or has risen above the set upper limit.
06/17/2015 10:26:42	EA343KXX10	INFORMATIONAL: A test is in progress, as initiated and indicated by the Battery Test Grc.

Displays all logged alarms by location, device serial number, alarm type. Can be sorted by clicking header. Clicking any hyperlink opens the specific alarm or device detail page.

Mobile app



The mobile app displays alarm/alert events as defined by your UPS device. Refer to alarm chapter for types of alarms, severity, list of critical alarms, and how alarms are managed.

The mobile app displays all events by device, date and time with the device serial number. For more information on the alarm click the "i" button. The mobile app is a convenient alarm viewer and log.

Critical alarms are acknowledged by a support analyst and will display a checkmark. Non-critical alarms are auto acknowledged by PredictPulse. You or another point of contact will receive a notification call on critical alarms (unless you have requested not to be called, or another method of communication).

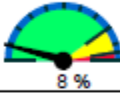

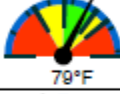

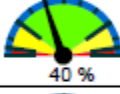

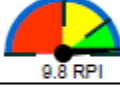


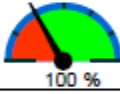
Reports

Monthly Summary Report: September 2017


PredictPulse™

Prepared for: EATON CORPORATION

Here is your monthly recap of performance for all connected devices. Questions? Contact us at: PredictPulseSupport@eaton.com or 800-843-9433.

Attribute	Status	Description
Load Percentage	 8 %	-17.3 %  Amount of power you're using based on overall capacity
Temperature	 79°F	-6.5°F  Average temperature from sensors on managed devices
Humidity	 40 %	-0.1%  Average humidity from sensors on managed devices
Battery	 9.8 RPI	0.0  Current battery health of all managed devices with batteries
Energy Savings	\$ 500 \$ 0 	Estimated sum of savings for managed devices that use the Eaton Energy Saver System
Service Level	 100 %	Measurement of actual Eaton response time to the contract response time and repair time to the national average
Availability	100 %	Measurement of uptime based on the total minutes your managed devices have been offline and total minutes in the duration time period

Devices		
Model	S/N	Location
9305	EB512BAA01	CEC 9305-550 #3 Near SBM 3301 SPRING FOREST RD RALEIGH, NC 27616
9305	EB512BAA02	PredictPulse 3301 SPRING FOREST RD RALEIGH, NC 27616
9305	EC411BAA12	CEC 9305-825 3301 SPRING FOREST RD RALEIGH, NC 27616
9305	EC491BAA04	CEC 9305-550 #2 middle unit 3301 SPRING FOREST RD RALEIGH, NC 27616



View your dashboard

Access PredictPulse resources

Contact support

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Monthly summary report (MSR1) cover page aggregates information from all subscribing devices.

- 1) Key performance gauges—shows most current average value of all devices based on duration
- 2) Duration—prior 30 days of data
- 3) Range and trend—shows minimum, average and maximum values, plus trend rate of change in percentage as green, yellow or red based on duration; this offers insight to positive or negative changes
- 4) Alarm view—shows most current alarms from all devices based on duration; click on links to see alarm detail by device
- 5) Relative Performance Index (RPI)—shows most current overall power equipment health by 30-, 60- and 90-day trends as green, yellow or red; green is positive, yellow is caution and red is negative
- 6) Availability—shows availability of devices to protect loads based on duration (100 percent means all devices were always online)
- 7) Trended data –trend compares the most recent period to the prior period (ex., a 30 day view would compare the most recent 30 days to the prior 30 day period); note that the first period will always have a null or grey trend arrow since there's no data to compare

Monthly Summary Report: September 2017

PredictPulse™

Prepared for: EATON CORPORATION

Here is your monthly recap of performance for all connected devices. Questions? Contact us at: PredictPulseSupport@eaton.com or 800-843-9433.

Devices, cont'd

Model	S/N	Location
9390	EW282CAA02	CEC 9390-80 #1 3301 SPRING FOREST RD RALEIGH, NC 27616
9390	EW512CAA01	PredictPulse 3301 SPRING FOREST RD RALEIGH, NC 27616
93PM	FF524UXX03	CEC 93PM-100 (#3) 3301 SPRING FOREST RD RALEIGH, NC 27616
5PX	G123D13006	PredictPulse 8609 SIX FORKS RD RALEIGH, NC 27615
5PX	G123D13016	PredictPulse 8609 SIX FORKS RD RALEIGH, NC 27615
5PX	G123D13017	PredictPulse 8609 SIX FORKS RD RALEIGH, NC 27615
9130	GJ025A0395	Forum Blackout Monitoring 8609 SIX FORKS RD RALEIGH, NC 27615
9130	GJ145A0366	PredictPulse 8609 SIX FORKS RD RALEIGH, NC 27615
9130	GJ156A1146	Eaton Training Center Lab 8609 SIX FORKS RD RALEIGH, NC 27615
9125	CB453A0107	PredictPulse 8609 SIX FORKS RD RALEIGH, NC 27615
9315	EQ994ZBA07	Electrical Room 11 PLANTATION RD DEBARY, FL 32713
9355	FB363JBA02	9355-15 3720 GREENLEAF AVE ISLAND LAKE, IL 60042
9125	GJ432A0278	PredictPulse 3005 BAYNAM POND DR WAKE FOREST, NC 27587
9130	GJ445A0261	PredictPulse 2400 W COUNTY ROAD D SAINT PAUL, MN 55112
9395	EB312BAA12	Warrendale 9395 130 COMMONWEALTH DR WARRENDALE, PA 15086
9390	ED354CB801	Office 6440 OAK CANYON IRVINE, CA 92618
9390	EC031CBA06	PredictPulse Install Wizard 2.0 8/3/2017 9:00:20 AM 265 BROOKVIEW CENTER WAY KNOXVILLE, TN 37919
9390	EA294CAA09	PredictPulse 10745 WESTSIDE WAY ALPHARETTA, GA 30009
9390	EY121CAA08	PredictPulse 10745 WESTSIDE WAY ALPHARETTA, GA 30009




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All subscribing and connected devices are listed in the monthly report by model, serial number, location code, address, city, and state. The location code is based on a customer provided description and can be updated by contacting PredictPulse support. There is no limit to how many devices can be associated with an account.

Device Detail Report: September 2017



EATON ELECTRICAL | 9395 | S/N EB512BAA02

Location: PredictPulse | 3301 SPRING FOREST RD RALEIGH, NC 27616

Below are key values and an alarm history for this specific device for the above period. RPI is Relative Performance Index where "10" is perfect.

Total Device Alarms	Overall Device RPI	Energy Savings	Contract End Date	Warranty End Date
3	8.67	\$0.00	31 May 2019	31 May 2019

Load

Average Output Voltage	236	Average Output Voltage RPI	4
Average Output Voltage Phase A	236	Average Output Voltage Phase A RPI	4
Average Output Voltage Phase B	235	Average Output Voltage Phase B RPI	4
Average Output Voltage Phase C	236	Average Output Voltage Phase C RPI	4
Average Input Volts	490	Average Input Volts RPI	9
Average Input Volts Phase A	491	Average Input Volts Phase A RPI	9
Average Input Volts Phase B	490	Average Input Volts Phase B RPI	9
Average Input Volts Phase C	489	Average Input Volts Phase C RPI	9
Average Frequency	60.0	Average Frequency RPI	10
Average Load Phase A	0	Average Load Phase A RPI	8
Average Load Phase B	0	Average Load Phase B RPI	8
Average Load Phase C	0	Average Load Phase C RPI	8


MINIMUM LOAD	AVERAGE LOAD	MAXIMUM LOAD
0.00	0.00	0.00

Battery

On-Battery Events	0	On-Battery Count RPI	10
Minutes On-Battery	0	Time On-Battery RPI	10
Full Discharges	0	Battery Discharge RPI	10

Environmental

Minimum Temperature	80.6 °F	Minimum Humidity	27.0
Average Temperature	85.0 °F	Average Humidity	36.8
Maximum Temperature	89.6 °F	Maximum Humidity	43.0
Average Temperature RPI	8.0	Average Humidity RPI	10.0



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[Contact support](#)

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Each monthly report includes a Device Detail page summarizing each subscribing and connected device's alarms, overall relative performance index (RPI), energy savings, contract/warranty end date and parametric device data for the prior month. Data in RED indicates out of normal tolerance, or less than perfect.


Device Detail Report: September 2017



EATON ELECTRICAL | 9395 | S/N EB512BAA02
 Location: PredictPulse | 3301 SPRING FOREST RD RALEIGH, NC 27616

Below are key values and an alarm history for this specific device for the above period. RPI is Relative Performance Index where "10" is perfect.

Alarm Detail		
Severity	Arrival Time	Message
	09/19/2017 11:51:35	CRITICAL: Check Battery Ground (ACTIVE) [EATON CORPORATION - EB512BAA02]
	09/15/2017 12:33:33	MAJOR: System Alarm Active (ACTIVE) [EATON CORPORATION - EB512BAA02]
	09/04/2017 12:34:48	MINOR: System Notice Active (ACTIVE) [EATON CORPORATION - EB512BAA02]



View your dashboard

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Contact support

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Each monthly report includes a complete alarm log by device (alarm log is displayed immediately after the Device Detail page). This is an audit report of every alarm received by PredictPulse by date, time and alarm event description. This information is also displayed on your dashboard and mobile app if these are set-up. Only critical alarms result in a 24x7 Eaton notification call to a customer point of contact.

Alarms and alerts

Alarms and Alerts

Eaton UPS's have four alarm/alert event categories:

- 1. Informational**
- 2. Minor**
- 3. Major**
- 4. Critical**

The purpose of an alarm is to notify Eaton personnel (and possibly your internal staff) of a potentially important event. Of the 283 possible events on any given unit, 81 events are Critical alarms. Eaton publishes all alerts and alarms, but the critical alarms are the focus of PredictPulse. **Only Critical alarm events result in Eaton notifying the customer's point of contact (POC) per the customer pre-defined method of procedure (CMOP).**

- *Predictive alerts, created through PredictPulse Insight, are separate from device alarms and alerts. They are described in a separate section.*

When the event email reaches the Eaton remote monitoring servers, as with the status email, it is first authenticated as being a valid email through the system's various checks. Next the attachments are opened and the data is updated in Eaton's database server.

The email is checked to see if it is a critical email.

Reference the "Critical alarm" section for a list of the alarm events. Not every device will have every alarm, and some critical events will vary (the same event may be a Major alarm, etc.).

When subscribed to PredictPulse, any incoming event that is identified as critical is forwarded to the PredictPulse support team. The information is also saved for future trend analysis and troubleshooting. The customer support specialists will analyze the current and historical parametric and event data. Next, they will check to see if a CSE is currently at your site. If they are on-site, the issue is tracked against the existing service ticket. Otherwise, a new Service Request (issue tracking number) is generated for the critical event. The customer support specialist determines the proper support level and contacts you through the previously established contact list. The information about the critical event is forwarded to a service coordinator and assigned the appropriate personnel to manage the issue until resolution. All alarms are sent to your PredictPulse dashboard and mobile app describing the event, and will be logged on your monthly summary report.

While a single condition may cause a number of alarms to be generated, PredictPulse collects all incoming events for the unit so support specialists can investigate and take the appropriate action.

High temperature

PredictPulse provides 24x7 notifications of critical alarms to the designated point of contact via phone (or the preferred contact method). Alarms are defined by the Eaton UPS device itself and can vary between models. In addition, Eaton network connectivity cards include a user-defined high and low temperature alarm (defaults are 90°F and 40°F, respectively), so email alerts can be sent if appropriate. Eaton has deployed a new high temperature critical alarm for all models and customers, effective June 1, 2017.

The reason for this change is because UPS batteries have adverse performance at high temperatures. Many battery manufacturers rate batteries for optimum life at 77°F, thus exposing them to high temperatures shortens their life. Extreme temperatures can lead to thermal runaways and fires. Since batteries are a common reason why UPSs fail to protect critical loads and can be expensive to replace, managing high temperatures is both a financial and safety consideration. There are exceptions and applications where higher temperatures may be appropriate, and sites where batteries are located apart from the UPS, Eaton offers the flexibility to reset or disable this new feature.

Feature definitions

- The high temperature critical alarm requires an [Environmental Monitoring Probe \(EMP\)](#) be installed into the network connectivity card, and it should be mounted near the battery cabinet or atop the UPS..
- The default high temperature will be 90°F. You can request Eaton to reset this temperature value higher or lower, or disable this new critical alarm. This change can be global or at the device level. You should make these change requests via email to predictpulsesupport@eaton.com, referencing the device serial number(s). Eaton will document change requests in account profiles.
- Any subscribing devices with an EMP reaching 90°F (or your requested high temperature) once or more per day will receive a daily critical alarm notification call (or by the preferred contact method).
- Devices sending telemetry data will receive a critical alarm notification within 15 minutes of Eaton receiving the telemetry. Devices sending a high temperature alarm based on the device alarm definitions will trigger a critical alarm notification within 15 minutes of Eaton receiving the alarm. Eaton will only make one call per day when such conditions occur.
- Low temperatures (under the 40°F default) can be disabled upon written request. In general, low temperature has less impact on battery performance.
- Regardless of the user-defined connectivity high temperature alarm value, Eaton will provide a daily critical alarm notification call (or by the preferred contact method). Since Eaton has no coverage or support for your cooling or environmental equipment, these critical alarm notifications will not result in an Eaton field technician visit. You should take appropriate action upon notification to reduce the high temperature environment.

Critical alarms

The following list details the current set of 81 Critical Alarm events (may vary by UPS or connectivity card):

- Abnormal Output Voltage At Startup
- Battery Totally Discharged
- Battery Voltage High
- Battery Voltage Low
- Check Backfeed Switchgear
- Check Battery Ground
- Check Battery Switchgear
- Check Bypass
- Check Bypass Switchgear
- Check Fuse
- Check Heatsink Temperature Sensor
- Check Input Switchgear
- Check Inverter
- Check Inverter Switchgear
- Check Logic Power Supply
- Check Power Supply
- Check Precharge
- Check Secondary Power Supply
- Check Static Switch
- Configuration Error
- DC Link Over Voltage
- DC/DC Converter Tripped
- Internal Communication Failure
- Inv AC Over Voltage
- Invalid Board ID
- Inverter AC Over Voltage
- Inverter Phase Rotation
- Inverter Startup Failure
- Inverter Tripped
- Inverter Under Or Over Frequency
- Loss Of Sync Bus
- Low Battery Shutdown
- Output Short Circuit
- Program Stack Error
- Rectifier Input Over Current
- Site Wiring Fault
- External Communication Failure
- Ambient Over Temperature
- Ambient Under Temperature
- Bypass Phase Rotation
- Check Battery
- Check Charger
- Check Fan
- Check Inverter Temperature Sensor
- Check Rectifier
- Check Rectifier Temperature Sensor
- Charger Over Temperature
- Inverter Over Temperature
- Inverter Over Temperature Trip
- Rectifier Over Temperature
- Rectifier Over-Temperature Trip
- Selective Trip Of Module
- Static Switch Over Temperature
- Ground Current Overload
- Input Phase Rotation
- Input Phase Rotation Error
- Inverter L1 Current Limit
- Inverter L2 Current Limit
- Inverter L3 Current Limit
- L1 Overload
- L1 Overload (Extreme Level)
- L1 Overload (High Level)
- L2 Overload
- L2 Overload (Extreme Level)
- L2 Overload (High Level)
- L3 Overload
- L3 Overload (Extreme Level)
- L3 Overload (High Level)
- Neutral Fault Alarm
- Neutral Overload
- Neutral Overload Warning
- Non-Volatile Memory Failure
- Output Overload
- Output Watts Overload
- Program Checksum Failure
- Rectifier L1 Current Limit
- Rectifier L2 Current Limit
- Rectifier L3 Current Limit
- Software Incompatibility Detected
- Network Not Responding
- Rectifier Current Over 125%

PredictPulse Insight

In addition to all of the features of PredictPulse, PredictPulse Insight adds predictive analytics capabilities.

Predictive analytics

- PredictPulse Insight combines data, intelligence, proprietary modeling tools, and experience of how UPS parts performance to predict the probability of a component requiring replacement.
- This data inverts the service model from reactive to proactive reducing problematic impact
- Algorithms will improve over time thanks to the data coming in from a fleet of deployed UPSs

Service contract integration

- Customers who subscribe to PredictPulse will see enhanced integration with field service technicians
- Technicians can access and use the service history, fleet service trends, device data and algorithms integrated into PredictPulse
- When emergency repairs are needed, technicians review the impacted device's data and come prepared with the correct parts, saving time and costly downtime expenses

PredictPulse Insight pre and post installation

Unlike PredictPulse, where most customers can self-install and activate a device subscription, PredictPulse Insight requires Eaton technicians to inspect component health, upgrade and test firmware in the UPS and/or connectivity card. They will verify the data is correctly being received by the PredictPulse Insight system.

Pre installation

Eaton PredictPulse specialists will contact you to confirm details regarding your equipment, connectivity hardware, and network as well as answer any questions before arranging for an Eaton technician to visit your location to activate PredictPulse. We will collect information to make the network details for transmission of outbound emails is ready, which may require coordination with your IT specialist.

Installation

Once Eaton and you are ready to proceed your local Eaton field technician will receive a PredictPulse Onboarding service request and will contact you to confirm a convenient date and time for setup. Typically, this service is done during business hours and requires the UPS to be placed in maintenance mode so we can safely complete the firmware upgrades and inspection process.

Post installation

The Eaton technician will explain or assist you with activating your new PredictPulse dashboard, mobile app and answer any questions you have. The technician will activate each UPS for PredictPulse using your email address as your user name. You will receive an email from Eaton linking you to Eaton's portal, my.eaton.com, so you can set up a password and complete the setup and access your dashboard. This process takes less than ten minutes and involves an additional step of getting a temporary password before you create a permanent password.

Your new PredictPulse data will display new parametric data every 15 minutes or any time an alarm is sent. Alarms are sent immediately and will appear in the dashboard or mobile app in less than 2 minutes. Critical alarm events get reviewed by Eaton specialists 7x24 and Eaton will call you within 15 minutes regarding dispatching a technician or next steps. You may request alternative notification methods like email or an escalation list if you have peers added to your PredictPulse service.

PredictPulse Insight warnings, watches, advisories

Eaton has adopted predictive alert classification based on the US National Weather Service. This was done to describe the severity of these special alerts in categories most people recognize, so an “Advisory” is less severe than a “Watch”. A “Warning” is the most severe predictive alert and will typically result in a recommendation for Eaton to immediately dispatch a technician to verify this likely component failure event.

In some cases the predictive alert may be low enough to enable a verification visit combined with a planned preventive maintenance or other scheduled maintenance window. In all cases, except where Eaton has concluded that a predictive alert was due to bad data or a false positive, Eaton will contact a customer’s point of contact to discuss in detail the predictive alert and the planning for a verification visit. Ultimately, the risk of a component failure event and the timing and impact of a maintenance window is a customer decision since in most cases Eaton requires the UPS be placed in bypass (maintenance) mode to safely verify and replace most components.

Battery health predictive alerts

VRLA batteries a leading cause of UPS failures since they must provide the power backup supply and degrade over time. Here are just some of the critical inputs we would want to capture and trend over the life of a battery:

- Battery make and model – define maximum and average life based on UPS rating
- Frequency and depth of battery discharge in minutes and percentage (more frequent and deep discharges exhaust the battery life)
- Temperature
- Age of battery
- Load percentage of UPS
- Battery test results measuring voltage and resistance over time based on battery age
- Operating modes of UPS
- Service history of UPS compared to similar UPS’s with same battery make and model
- UPS logic and battery alarms
- Battery inspection test results
- UPS application

After inspecting and onboarding an Eaton UPS for PredictPulse Insight (or Plus), Eaton will calibrate the algorithms to the specific batteries including their age and condition. Once Eaton has a predictive alert it will arrange a planned battery PM (maintenance inspection) to thoroughly inspect and test each individual battery jar before making a recommendation on replacement.

Cellwatch integration

Cellwatch battery monitoring integration with Eaton PredictPulse Insight

Cellwatch Rel. 4.4 software enables a Cellwatch iBMU to transmit emails of all battery events and logs directly in to PredictPulse Insight using the CW.net email capability.

- CW Rel 4.4 requires an iBMU with 4.0 or higher (if iBMU is older than 4.0, replace the iBMU)
- CW 4.4 is an annual license and includes the CW.net capability
- CW 4.4 enables Eaton to review and analyze the Cellwatch jar level battery data after any battery predictive alert, saving time to identify which and how many batteries need replacing or further attention

Verification visit

When PredictPulse Insight identifies a component at risk of failing an Eaton specialist will validate the predictive alert before communicating with your local Eaton technician to arrange an inspection maintenance window. The PredictPulse Insight Inspection enables a trained technician to verify the component and test its condition prior to making any replacement decision. The primary benefit of PredictPulse Insight is to proactively identify and replace components before they fail saving you time and money.

Replacement of covered and non-covered components

Based on your PredictPulse Insight coverage you may have replacement coverage for the capacitors, fans or batteries. With prepaid replacement coverage Eaton automatically replaces all components where PredictPulse and the technician confirm the components are close to failure or end of useful life. PredictPulse Insight can be purchased without the prepaid replacement coverage, so once your technician confirms the components are close to failure or end of useful life you would be quoted the costs of proactively replacing the parts. In most cases the technician will have the parts, except for batteries, available to complete this proactive replacement immediately or when convenient.

Lost Communication process, notices and reports

PredictPulse’s architecture depends on outbound email between your Eaton UPS transmitting both alarms and heartbeat telemetry between your email servers and Eaton’s cloud servers. The heartbeat emails are sent either every 15 minutes (PredictPulse Insight) or daily (PredictPulse). When Eaton fails to receive two consecutive heartbeat emails we’ll automatically initiate a “lost comm” process so all customer subscribers get timely notice of this issue so we can reconnect the devices.

The screenshot shows an email from Eaton with the subject "PredictPulse Device Lost Communication Notice". The Eaton logo is at the top left. The email body starts with "Dear Fusheng Shao," followed by a list of devices with their last communication times. On the right side, there is a blue header "About PredictPulse" and a text box explaining that PredictPulse is a monitoring and management subscription service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf. A link to www.eaton.com/PredictPulse is provided.

EATON
Powering Business Worldwide

PredictPulse Device Lost Communication Notice

Dear Fusheng Shao,

Eaton is reporting lost PredictPulse connectivity with the following device(s) as of today:

- PW9170 12/12-2 Kirby PD S/N:BD494T0010 Last Communication: 10-30-2017 06:01:00 AM
- PW9170 9/9-2 Live Oak PD S/N:EA525T0045 Last Communication: 10-30-2017 01:11:00 AM
- PW9170 9/9-2 Windcrest PD S/N:EA525T0046 Last Communication: 10-29-2017 06:08:00 AM
- PW9170 9/9-2 Alamo Heights PD S/N:EA531T0018 Last Communication: 10-29-2017 09:12:00 AM
- PW9170 9/9-2 UTSA PD S/N:EB032T0012 Last Communication: 10-29-2017 08:03:00 AM

About PredictPulse

PredictPulse is a monitoring and management subscription service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf. Learn more at www.eaton.com/PredictPulse.

Lost communication notice is sent after two missed heartbeats

Until connectivity is restored, PredictPulse cannot receive or manage alarms or telemetry data.

In many lost communication cases your network has been changed or disrupted, preventing the PredictPulse device from sending emails. There are a few common steps you can easily take to check if your network or SMTP server needs attention, including checking the IP address and device status or contacting your network

administrator. Eaton can provide technical support, but we cannot perform work on your network or mail server. If you believe the issue is with the Eaton UPS or connectivity card you should call or email Eaton to arrange a technical support and/or field technician visit.

Based on customer feedback, Eaton will start automatically sending a “Lost Communication Notice” via email to all customer subscribers as soon as two consecutive heartbeats have not been received by PredictPulse. Once a device is successfully sending data a “Notice of Device Communication Restoration” will be sent and removed from any lost comm notifications. This lost communication status will also be sent weekly until the device has been restored or no longer subscribes to PredictPulse.

To easily identify which of your devices went offline, email notices will include the Model, Location and Serial Number in the email subject line, plus the date and time Eaton last heard from your device creating the lost comm issue.

Once a device is restored and sending data to PredictPulse there may be a data gap in subsequent monthly reports, dashboards and mobile app depending on the lost comm duration and device.

In addition to the automated email lost comm notifications, Eaton will continue to call subscribers to communicate this issue and offer assistance with resolution.

PredictPulse Device Lost Communication Notice

Dear brett Schnelder,

Eaton PredictPulse has lost connectivity with your device(s) listed below.

Until connectivity is restored, PredictPulse cannot receive or manage alarms or telemetry data.

To restore your PredictPulse service please check the IP address or device status, or contact your network administrator to see if your network has been changed preventing outbound emails from reaching Eaton. If everything looks good on your side or you have questions about this notice, please contact Eaton's PredictPulse support team at the phone number or email below. We will send you reminder notices of this lost connectivity until this is resolved.

About PredictPulse

PredictPulse is a monitoring and management subscription service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf. Learn more at www.eaton.com/PredictPulse

Model	Location	Serial Number	Last Communication
PW9170 12/12-2	Kirby PD	BD494T0010	10-30-2017 06:01:00 AM
PW9170 9/9-2	Live Oak PD	EA525T0045	10-30-2017 01:11:00 AM
PW9170 9/9-2	Windcrest PD	EA525T0045	10-29-2017 06:06:00 AM
PW9170 9/9-2	Alamo Heights PD	EA531T0018	10-29-2017 09:12:00 AM
PW9170 9/9-2	UTSA PD	EB032T0012	10-29-2017 08:03:00 AM
PW9170 9/9-2	Converse PD	EB032T0017	10-30-2017 06:01:00 AM
PW9170 12/12-2	Guadalupe Co SO	EB032T0020	10-30-2017 12:39:00 AM
PW9170 12/12-2	New Braunfels PD	EB032T0028	10-30-2017 12:43:00 AM
PW9170 12/12-2	Cornal Co SO	EB032T0029	10-29-2017 11:10:00 PM
PW9170 12/12-2	Schertz PD	EB032T0030	10-29-2017 10:59:00 AM
PW9170 9/9-2	Balcones Heights PD	EB053T0007	10-29-2017 10:13:00 AM
PW9170 9/9-2	Castle Hills PD	EB053T0009	10-30-2017 05:45:00 AM
PW9170 12/12-2	Seguin PD	EB304T0008	10-30-2017 06:01:00 AM

If you have any questions about this notice, call Eaton's PredictPulse monitoring team at 800-843-9433 (USA) or send us an [email](#).

Connect with Eaton: [in](#) [t](#) [v](#)

This email was sent to you by Eaton.
Eaton, 1000 Eaton Boulevard, Cleveland, OH 44122.

[Privacy Policy](#)

Lost communication report is sent weekly summarizing any device with missing heartbeats

Lost communication notices

<Initial email notice sent upon a device losing comm>

Subject: Eaton PredictPulse Loss of Communication Notice [MODEL ID, Location:, S/N:]

PredictPulse Device Lost Communication Notice <Blue banner headline>

Dear FIRSTNAME LASTNAME,

Eaton has lost PredictPulse connectivity with the following device(s) as of today:

MODEL ID, LOCATION, SERIAL NUMBER, DATE/TIME OF LAST HEARTBEAT

Until connectivity is restored, PredictPulse cannot receive or manage alarms or telemetry data.

To restore your PredictPulse service please check the IP address or device status, or contact your network administrator to see if your network has been changed preventing outbound emails from reaching Eaton. If everything looks good on your side or you have questions about this notice, please contact Eaton's PredictPulse support team at the phone number or email below. We will send you reminder notices of this lost connectivity until this is resolved.

<Weekly email notice sent upon a device losing comm>

Subject: Eaton PredictPulse Loss of Communication Report

PredictPulse Device Lost Communication Notice <Blue banner headline>

Dear FIRSTNAME LASTNAME,

Eaton is reporting lost PredictPulse connectivity with the following device(s) as of today:

MODEL ID, LOCATION, SERIAL NUMBER, DATE/TIME OF LAST HEARTBEAT <display as many rows as POC has LC open events>

Until connectivity is restored, PredictPulse cannot receive or manage alarms or telemetry data.

To restore your PredictPulse service please check the IP address or device status, or contact your network administrator to see if your network has been changed preventing outbound emails from reaching Eaton. If everything looks good on your side or you have questions about this notice, please contact Eaton's PredictPulse support team at the phone number or email below. We will send you weekly reminder notices of this lost connectivity until this is resolved.

<Email notice sent upon a device restoring comm>

Subject: Eaton PredictPulse Notice of Device Communication Restoration, MODEL ID, LOCATION, SERIAL NUMBER

PredictPulse Notice of Device Communication Restoration <Blue banner headline>

Dear FIRSTNAME LASTNAME,


Eaton is pleased to report that PredictPulse connectivity has been restored with the following device(s) as of today:

MODEL ID, LOCATION, SERIAL NUMBER, DATE/TIME OF LAST HEARTBEAT <display as many rows as POC has LC open events>

Congratulations on reconnecting with Eaton. Your reports and dashboard may have gaps depending on how long your device was disconnected, but everything going forward is good.

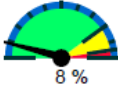

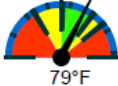



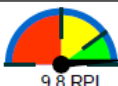


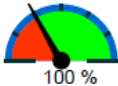
Monthly summary report

Monthly Summary Report: September 2017




Prepared for: EATON CORPORATION

Here is your monthly recap of performance for all connected devices. Questions? Contact us at PredictPulseSupport@eaton.com or 800-843-9433.

Attribute	Status	Description
Load Percentage	 8 % -17.3 % 	Amount of power you're using based on overall capacity
Temperature	 79°F -6.5°F 	Average temperature from sensors on managed devices
Humidity	 40 % -0.1% 	Average humidity from sensors on managed devices
Battery	 9.8 RPI 0.0 	Current battery health of all managed devices with batteries
Energy Savings	\$ 500 \$ 0 	Estimated sum of savings for managed devices that use the Eaton Energy Saver System
Service Level	 100 %	Measurement of actual Eaton response time to the contract response time and repair time to the national average
Availability	<div style="background-color: #00ff00; color: white; padding: 5px; text-align: center; font-weight: bold;">100 %</div>	Measurement of uptime based on the total minutes your managed devices have been offline and total minutes in the duration time period

Devices		
Model	S/N	Location
9395	EB512BAA01	CEC 9395-550 #3 Near SBM 3301 SPRING FOREST RD RALEIGH, NC 27616
9395	EB512BAA02	PredictPulse 3301 SPRING FOREST RD RALEIGH, NC 27616
9395	EC411BAA12	CEC 9395-825 3301 SPRING FOREST RD RALEIGH, NC 27616
9395	EC491BAA04	CEC 9395-550 #2 middle unit 3301 SPRING FOREST RD RALEIGH, NC 27616



View your dashboard

Access PredictPulse resources

Contact support

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Monthly summary page of all subscribing devices (refer to Basics: Report section for details)

Device detail report

Device Detail Report: September 2017

PredictPulse™

EATON ELECTRICAL | 9395 | S/N EB512BAA02

Location: PredictPulse | 3301 SPRING FOREST RD RALEIGH, NC 27616

Below are key values and an alarm history for this specific device for the above period. RPI is Relative Performance Index where "10" is perfect.

Total Device Alarms	Overall Device RPI	Energy Savings	Contract End Date	Warranty End Date
3	8.67	\$0.00	31 May 2019	31 May 2019

Load

Average Output Voltage	236	Average Output Voltage RPI	4
Average Output Voltage Phase A	236	Average Output Voltage Phase A RPI	4
Average Output Voltage Phase B	235	Average Output Voltage Phase B RPI	4
Average Output Voltage Phase C	236	Average Output Voltage Phase C RPI	4
Average Input Volts	490	Average Input Volts RPI	9
Average Input Volts Phase A	491	Average Input Volts Phase A RPI	9
Average Input Volts Phase B	490	Average Input Volts Phase B RPI	9
Average Input Volts Phase C	489	Average Input Volts Phase C RPI	9
Average Frequency	60.0	Average Frequency RPI	10
Average Load Phase A	0	Average Load Phase A RPI	8
Average Load Phase B	0	Average Load Phase B RPI	8
Average Load Phase C	0	Average Load Phase C RPI	8
	MINIMUM LOAD	AVERAGE LOAD	MAXIMUM LOAD
	0.00	0.00	0.00

Battery

On-Battery Events	0	On-Battery Count RPI	10
Minutes On-Battery	0	Time On-Battery RPI	10
Full Discharges	0	Battery Discharge RPI	10

Environmental

Minimum Temperature	80.6 °F	Minimum Humidity	27.0
Average Temperature	85.0 °F	Average Humidity	36.8
Maximum Temperature	89.6 °F	Maximum Humidity	43.0
Average Temperature RPI	8.0	Average Humidity RPI	10.0



View your dashboard

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Privacy policy and Wizard Installer EULA

PLEASE READ THE TERMS AND CONDITIONS IN THIS AGREEMENT CAREFULLY BEFORE INSTALLING AND/OR ENABLING THE PREDICTPULSE™ MONITORING SERVICE (“PredictPulse Service”). THIS AGREEMENT (“AGREEMENT”) IS A LEGAL AGREEMENT BETWEEN YOU AND THE ENTITY YOU REPRESENT (IF ANY) (COLLECTIVELY, “YOU”), AND EATON CORPORATION, CLEVELAND, OH, USA, AND ITS AFFILIATES (“EATON”), STATING THE TERMS AND CONDITIONS THAT GOVERN YOUR USE OF THE PredictPulse Service. BY CLICKING THE “ACCEPT” BUTTON AT THE END OF THIS AGREEMENT, YOU ARE AGREEING TO BE BOUND BY THE TERMS AND CONDITIONS OF EATON AS STATED HEREIN. IF YOU DO NOT ACCEPT THE TERMS AND CONDITIONS IN THIS AGREEMENT, DO NOT CLICK THE “ACCEPT” BUTTON AND DO NOT INSTALL AND/OR ENABLE THE PredictPulse Service.

You represent that you have the authority to bind the entity that you represent to the terms and conditions in this Agreement.

You represent that you will protect the privacy of the username and password that allow you to access the PredictPulse Service and will not share your username or password with any individual or entity or allow any individual or entity to gain access to the PredictPulse Service using your username or password. If, at any time, your status with the entity that you represent changes, you shall immediately notify EATON and discontinue all access and use of the PredictPulse Service and any information you may have obtained from the PredictPulse Service.

Except for personally identifiable information, the use and disclosure of which is addressed in the Privacy Notice below, EATON may use or disclose any and all information provided by you to EATON, regardless of whether the information is marked or otherwise identified as confidential or proprietary.

PRIVACY NOTICE

EATON collects the following personally identifiable information from individuals that register to use, use, or otherwise access the PredictPulse Service for the purpose of allowing EATON to provide the PredictPulse Service to you: name; title; employer; address(es) (residential and/or business); telephone number(s) (personal and/or business); and email address(es) (personal and/or business) (collectively, “Personal Information”). EATON does not sell Personal Information disclosed to it through the PredictPulse Service, but it may transfer such Personal Information outside of the United States and share the Personal Information with third parties that EATON retains to provide services on its behalf and to EATON’s sales representatives, which include third parties. In addition, EATON may disclose Personal Information it collects as required by law, an arbitral body, a court of competent jurisdiction, a law enforcement agency, or any other government agency, and may disclose Personal Information it collects when it believes it is appropriate to prevent physical or financial loss or in connection with an investigation of suspected or actual illegal activity. If you desire to withdraw your consent to EATON’s use of your Personal Information in connection with the PredictPulse Service, you can submit a request to EATON to remove your Personal Information from the PredictPulse Service at the following email address: jam@eaton.com or auto link <mailto:jam@eaton.com>, specifying removal of your Personal Information from the PredictPulse Service. Following receipt of such request, EATON will remove all of your Personal Information from the PredictPulse Service. If you withdraw your consent to EATON’s use of your Personal Information as described in this Agreement, EATON may terminate your access to the PredictPulse Service. To the extent that you input or otherwise provide in the

PredictPulse Service the Personal Information of another individual (“Other Individual”), you represent that you have obtained such Other Individual’s prior written consent to: 1) allow you to input such Other Individual’s Personal Information into the PredictPulse Service and 2) the foregoing Personal Information privacy terms. You shall have sole responsibility for any violation of privacy laws as a result of your failure to obtain the Other Individual’s prior written consent as described in the preceding sentence.

Any sale of the PredictPulse Service by EATON shall be governed solely by EATON’s standard selling policy T-0 Service Agreement – Terms and Conditions and Scope of Work, Attachment R-32 (“Service Agreement”), or solely by the standard terms and conditions of EATON’s applicable affiliate, unless otherwise agreed to in writing. EATON hereby expressly rejects any and all additional or different terms, irrespective of where contained, and no such different or additional terms shall form part of this contract or be binding on EATON. In case of any conflict between this Agreement and the Service Agreement, the terms and conditions of the Service Agreement shall control.

These terms and conditions shall be governed by the laws of the State of Ohio, USA.

End user license agreement

PredictPulse™ Application End User License Agreement

THIS END USER LICENSE AGREEMENT (“AGREEMENT”) IS A LEGAL AGREEMENT BETWEEN YOU AND THE ENTITY YOU REPRESENT (IF ANY) (COLLECTIVELY, “YOU”), AND EATON CORPORATION (“EATON”) STATING THE TERMS AND CONDITIONS THAT GOVERN YOUR USE OF THE “PredictPulse™” APPLICATION FOR MOBILE DEVICES AND TABLETS (“LICENSED APPLICATION”). PLEASE READ THIS AGREEMENT CAREFULLY AS THESE PROVISIONS AFFECT YOUR RIGHTS AND LIABILITIES UNDER THE LAW AND SET OUT THE TERMS UNDER WHICH EATON MAKES THE LICENSED APPLICATION TO YOU. BY PURCHASING, DOWNLOADING, INSTALLING AND/OR USING THE LICENSED APPLICATION, YOU ARE INDICATING THAT YOU AGREE TO BE BOUND BY AND COMPLY WITH THE TERMS AND CONDITIONS SET FORTH IN THIS AGREEMENT. IF YOU DO NOT AGREE TO THESE TERMS AND CONDITIONS, DO NOT PURCHASE, DOWNLOAD, INSTALL AND/OR USE THE LICENSED APPLICATION.

1. Scope of License. Subject to the terms and conditions of this Agreement, Eaton hereby grants to you a limited, non-transferable, non-sublicensable, non-assignable and revocable license to install and use the Licensed Application solely for your own use on a mobile device or tablet that you own or control. You acknowledge and agree that this Agreement is between you and Eaton, and the mobile device or tablet manufacturer and its subsidiaries are not a party to this Agreement and are not responsible for the Licensed Application. For the avoidance of doubt, the Licensed Application is licensed, not sold, to you by Eaton pursuant to and subject to the terms and conditions of this Agreement and any other applicable terms and conditions promulgated by the mobile device or tablet manufacturer. You shall only use the Licensed Application in connection with the PredictPulse™ monitoring service, which is governed by separate terms and conditions. Eaton reserves all rights not expressly granted to you herein.

2. Restrictions. This Agreement does not allow you to use the Licensed Application on any mobile device or tablet that you do not own or control, and you may not distribute or make the Licensed Application available over a network where it could be used by multiple devices at the same time. You shall not rent, lease, lend, sell, redistribute or sublicense the Licensed Application. You shall not copy, decompile, reverse engineer, disassemble, attempt to derive the source code of, modify, or create derivative works of the Licensed Application, or any updates or upgrades, or any part thereof. Any attempt to do so is a violation of the rights of Eaton. If you breach these restrictions, you may be subject to prosecution and damages.

3. Proprietary Rights. All title and copyrights in and to the Licensed Application (including but not limited to any graphics, images, photographs, animations, video, audio, text, and “applets,” incorporated into the Licensed Application), the accompanying printed materials, and any copies of the Licensed Application, are owned by Eaton or its licensors. Except for the limited license granted to you herein, nothing in this Agreement shall be construed to restrict, transfer, convey, encumber, alter, impair or otherwise adversely affect Eaton’s ownership or proprietary rights therein or any other of Eaton’s information, processes, methodologies, products, goods, services, or materials, tangible or intangible, in any form and in any medium. The Licensed Application may utilize or include third party software that is subject to open source license terms (“Open Source Software”). You acknowledge and agree that your right to use such Open Source Software as part of the Licensed Application is subject to and governed by the terms and conditions of any applicable open source license, including, without limitation, any applicable acknowledgements, license terms and disclaimers contained therein (collectively, the

“Open Source License Terms”). In the event of a conflict between the terms of this License and the Open Source License Terms, the Open Source License Terms shall control.

4. Consent to Use of Data. You agree that Eaton may collect and use technical data and related information, including but not limited to technical information about your mobile device or tablet, system and application software, and peripherals, that is gathered periodically to facilitate the provision of software updates, product support and other services to you (if any) related to the Licensed Application. Eaton may use this information, as long as it is in a form that does not personally identify you, to improve its products or to provide services or technologies to you.

5. No Warranty. YOU EXPRESSLY ACKNOWLEDGE AND AGREE THAT USE OF THE LICENSED APPLICATION IS AT YOUR SOLE RISK AND THAT THE ENTIRE RISK AS TO SATISFACTORY QUALITY, PERFORMANCE, ACCURACY AND EFFORT OF THE LICENSED APPLICATION IS WITH YOU. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THE LICENSED APPLICATION AND ANY SERVICES PERFORMED OR PROVIDED BY THE LICENSED APPLICATION ("SERVICES") ARE PROVIDED "AS IS" AND "AS AVAILABLE", WITH ALL FAULTS AND WITHOUT WARRANTY OF ANY KIND, AND EATON HEREBY DISCLAIMS ALL WARRANTIES AND CONDITIONS WITH RESPECT TO THE LICENSED APPLICATION AND ANY SERVICES, EITHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES AND/OR CONDITIONS OF MERCHANTABILITY, OF SATISFACTORY QUALITY, OF FITNESS FOR A PARTICULAR PURPOSE, OF ACCURACY, OF QUIET ENJOYMENT, AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS. EATON DOES NOT WARRANT AGAINST INTERFERENCE WITH YOUR ENJOYMENT OF THE LICENSED APPLICATION, THAT THE FUNCTIONS CONTAINED IN, OR SERVICES PERFORMED OR PROVIDED BY, THE LICENSED APPLICATION WILL MEET YOUR REQUIREMENTS, THAT THE OPERATION OF THE LICENSED APPLICATION OR SERVICES WILL BE UNINTERRUPTED OR ERROR-FREE, OR THAT DEFECTS IN THE LICENSED APPLICATION OR SERVICES WILL BE CORRECTED. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY EATON OR ITS AUTHORIZED REPRESENTATIVE SHALL CREATE A WARRANTY. SHOULD THE LICENSED APPLICATION OR SERVICES PROVE DEFECTIVE, YOU ASSUME THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR LIMITATIONS ON APPLICABLE STATUTORY RIGHTS OF A CONSUMER, SO THE ABOVE EXCLUSION AND LIMITATIONS MAY NOT APPLY TO YOU.

6. Limitation of Liability. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT SHALL EATON OR ITS AFFILIATES BE LIABLE FOR ANY LOSS OR DAMAGE OF ANY KIND, WHETHER DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL, INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, LOSS OF DATA, BUSINESS INTERRUPTION OR ANY OTHER COMMERCIAL DAMAGES OR LOSSES, ARISING OUT OF OR RELATED TO YOUR USE OR INABILITY TO USE THE LICENSED APPLICATION, HOWEVER CAUSED, REGARDLESS OF THE THEORY OF LIABILITY (CONTRACT, TORT OR OTHERWISE) AND EVEN IF EATON OR ITS AFFILIATES HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. Indemnification. You agree to indemnify, defend, and hold Eaton, its affiliates, and respective successors and assigns, officers, directors, employees, agents, licensors, representatives, advertisers, service providers, and suppliers harmless against any and all claims, demands, actions, losses, damages, costs and expenses (including reasonable attorneys' fees), arising out of or relating to your (a) breach or violation of this Agreement, (b) infringement, misappropriation or any violation of the rights of any other party, (c) violation or non-compliance with any applicable law, rule or regulation, and (d) use, alteration or export of the Licensed Application (or any component thereof) in violation of this Agreement. Eaton and its affiliates reserve the right to assume the exclusive defense and control of any claims or actions subject to indemnification by you and all negotiations for its settlement or compromise, and you agree to fully cooperate with Eaton and its affiliates upon request by Eaton.

8. Privacy Notice. Eaton collects the following personal information from individuals that install and use the Licensed Application: name and email address (personal and/or business) (“Personal Information”). Eaton does not sell Personal Information, but it may transfer Personal Information outside of the United States and share Personal Information with third parties that Eaton retains to provide services on its behalf and to Eaton’s sales representatives, which include third parties. In addition, Eaton may disclose Personal Information as required by law, an arbitral body, a court of competent jurisdiction, a law enforcement agency, or any other government agency, and may disclose Personal Information it collects when it believes it is appropriate to prevent physical or financial loss or in connection with an investigation of suspected or actual illegal activity. If you desire to withdraw your consent to Eaton’s use of your Personal Information as described in this Agreement, please submit your request to Eaton at the following email address: iam@eaton.com, referencing the Licensed Application. Following receipt of your request, Eaton will remove all of your Personal Information from the Licensed Application. If you withdraw your consent to Eaton’s use of your personal information as described in this Agreement, Eaton may terminate your access to the Licensed Application.

9. Updates. Eaton may offer automatic or manual updates or upgrades to the Licensed Application at any time without notice to you. Certain functions of the Licensed Application may be modified or discontinued as a result of any such updates or upgrades, or may not be available if you have not installed all updates and upgrades made available by Eaton or otherwise. If Eaton elects to provide maintenance or support of any kind, Eaton may terminate that maintenance or support at any time without notice to you. The terms and conditions of this Agreement shall govern any upgrades or updates provided by Eaton that replace and/or supplement the original Licensed Application, unless such upgrade is accompanied by, or references, a separate license agreement in which case the terms of that license agreement shall govern.

10. Amendments. Eaton may amend any of the terms and conditions of this Agreement at its sole discretion through an update of the Licensed Application. Using the Licensed Application after such amendments are made to the Agreement is evidence that you agree to be bound by and comply with such changes, and Eaton shall treat your use as acceptance of the amendments.

11. No Guarantee of Continued Use or Availability. Eaton and its affiliates reserve the right to modify, update supplement, limit, discontinue, remove or disable access to the Licensed Application without notice to you and neither Eaton, nor its affiliates, shall be liable to you or any third party should it exercise such rights.

12. Cellular Charges. You acknowledge that cellular voice, data and messaging rates may apply when you use the Licensed Application, including domestic and international roaming charges, if applicable. You agree that you are solely responsible for any such cellular usage charges you incur by using the Licensed Application.

13. Export Restrictions. You may not use or otherwise export or re-export the Licensed Application except as authorized by United States law and the laws of the jurisdiction in which the Licensed Application was obtained. In particular, but without limitation, the Licensed Application may not be exported or re-exported (a) into any U.S. embargoed countries or (b) to anyone on the U.S. Treasury Department's list of Specially Designated Nationals or the U.S. Department of Commerce Denied Person’s List or Entity List. By using the Licensed Application, you represent and warrant that you are not located in any such country or on any such list. You also agree that you will not use these products for any purposes prohibited by United States law, including, without limitation, the development, design, manufacture or production of nuclear, missiles, or chemical or biological weapons.

14. Termination. This Agreement is effective for an unlimited duration unless and until terminated as set forth herein. Your rights under the license granted shall terminate automatically without notice from Eaton if you fail to

comply with any terms or conditions of this Agreement. Upon termination of this Agreement, you shall cease all use of the Licensed Application, and destroy all copies, full or partial, thereof. Any provision of this Agreement which by its nature must survive the termination of this Agreement in order to give effect to its meaning shall survive such termination.

15. Severability. If any provision hereof becomes or is declared by a court of competent jurisdiction to be illegal, unenforceable, or void, this Agreement will continue in full force and effect without said provision.

16. Governing Law and Interpretation. To the extent not prohibited by law, you agree that this Agreement and all disputes, claims, actions, suits or other proceedings arising hereunder shall be governed by, and construed in accordance with, the substantive law of the State of Ohio applicable to contracts wholly made and to be performed within the State of Ohio, and to irrevocably submit to the sole and exclusive jurisdiction of the courts of Ohio or the Federal courts of the Northern District of Ohio, and to irrevocably consent to the exercise of personal jurisdiction by such courts and waive any right to plead, claim or allege that Ohio is an inconvenient forum. No failure or delay by Eaton or its affiliates to exercise any right or enforce any obligation shall impair or be construed as a waiver or ongoing waiver of that or any other right or power.

17. Section Titles. The section titles in this Agreement are for convenience only and have no legal or contractual effect.

18. Non-Waiver. Eaton or its affiliates' failure to exercise or enforce any right or provision of this Agreement shall not operate as a waiver of such right or provision.

19. Agreement. This Agreement constitutes the entire agreement between you and Eaton regarding the use of the Licensed Application and supersedes any prior or contemporaneous understandings and agreements between you and Eaton related to its subject matter.

If you have any questions regarding this Agreement, you may contact Eaton at:

Eaton Corporation

IP Law Group

1000 Eaton Blvd.

Cleveland, OH 44122

PredictPulse SOW R-32

Eaton PredictPulse™ Remote Monitoring Service Scope of Work (SOW) Attachment R-32

The terms and conditions in this SOW are in addition to and are incorporated by reference into the T-O Service Agreement – Terms and Conditions (“Service Agreement”). Terms that are capitalized in this SOW shall have the same meaning ascribed to them in the Service Agreement, unless stated otherwise in this SOW. In case of any conflict between this SOW and the Service Agreement, the terms and conditions of this SOW shall control.

DEFINITIONS. The following terms shall have the following meanings whenever used in this SOW:

“PredictPulse Service” means Contractor’s PredictPulse™ remote monitoring service, which includes the collection of status, alarm, and performance information and data from network-connected Covered Equipment, and the analysis and monitoring of such information and data to provide alarm notifications and reports to Customer and/or its Users.

“Equipment Data” means all Covered Equipment status, alarm, and performance information and data that is collected, analyzed, generated, displayed, and reported in connection with the PredictPulse Service and all information and data about Customer’s and/or its Users’ use of, and interaction with, the PredictPulse Service. For avoidance of doubt, Equipment Data does not include any Personal Data or any information or data relating to the identity of Customer, which would specifically link or associate Customer with such Covered Equipment status, alarm, and performance data or such use and interaction data.

“Customer Equipment Data” means Equipment Data combined with any information or data that is inputted into the PredictPulse Service by a User relating to the identity of Customer, which specifically links or associates Customer with the Equipment Data.

“Personal Data” means all personally identifiable information and data relating to employees or agents of Customer, Users, or other individuals, including without limitation, the name, title, employer, address(es) (residential and/or business), email address(es) (personal and/or business), and phone number(s) (personal and/or business) of such employees, Users, and other individuals, which is inputted into the PredictPulse Service by Users.

“User” means any individual who uses or accesses the PredictPulse Service on Customer’s behalf or through Customer’s account or passwords, whether authorized or not.

1. PredictPulse Service Description and Customer Requirements

1.1 Contractor will provide the PredictPulse Service on subscribed Covered Equipment. The PredictPulse Service shall include alarm notifications via a dashboard, mobile application, and monthly report summarizing alarms and Equipment Data.

- a. Access to the PredictPulse Service shall be from Contractor’s web portal and include Covered Equipment status, alarms, reports and service history.
- b. Contractor’s obligation shall be to enable enrollment in the PredictPulse Service by Customer, validation of the PredictPulse Service, and to notify Customer contact when a critical alarm occurs.
- c. Contractor will remotely diagnose critical alarms and if appropriate, resolve emergency events as if Customer has requested Covered Equipment Service, enabling Contractor to arrive at the location of the Covered Equipment per the contracted CPM hours. If subscribed Covered Equipment has no contracted Covered Equipment Service coverage other than the PredictPulse Service, Contractor’s obligation will solely be to notify Customer contact when a critical alarm occurs.
- d. Display and availability Equipment Data will vary and depend on the Covered Equipment, connectivity equipment and access to Customer provided network.

1.2 The PredictPulse Service will only be available if Customer provides and supports a CAT5 LAN/Ethernet cable connected to Customer’s email server or equivalent network (along with necessary network configuration information (including IP addresses) to facilitate connectivity).

1.3 Covered Equipment will continue to transmit Customer Equipment Data to Contractor until Customer disconnects or disables the network connection. Upon termination of the PredictPulse Service, Customer is responsible for disconnecting or disabling any Covered Equipment from Customer’s network connection. Contractor will not be responsible for notifying or reminding Customer that it must disconnect or disable any Covered Equipment from Customer’s network connection after termination of the PredictPulse Service. Contractor will continue to own the Equipment Data and not incur any liability as a result of Customer’s failure to disconnect or disable any Covered Equipment from the network connection.

1.4 Customer shall register at www.my.eaton.com with a valid email address, self-maintain a complex password, and contact information in order to access the PredictPulse Service.

1.5 Connectivity Equipment Excluded – Customer shall be responsible for purchasing and/or upgrading compatible connectivity equipment required to support the PredictPulse Service.

1.6 Parts and labor coverage for all Covered Equipment is separate from the PredictPulse Service.

2. Data

2.1. Unless it receives Customer's prior written consent, Contractor: (a) shall not disclose to third parties or publish Customer Equipment Data and (b) shall not intentionally grant any third party access to Customer Equipment Data. Notwithstanding the foregoing, Contractor may disclose Customer Equipment Data as required by applicable law or by proper legal or governmental authority. Contractor shall give Customer prompt notice of any such legal or governmental demand and reasonably cooperate with Customer in any effort to seek a protective order or otherwise to contest such required disclosure, at Customer's expense.

2.2. Contractor shall own all Equipment Data and all results from processing such data, including without limitation, compilations and derivative works of such data. Contractor may use such Equipment Data for any purpose, including without limitation, for data mining, analysis and trending purposes, and may disclose Equipment Data to third parties without Customer's consent for any purpose, including without limitation, for comparison and reliability reporting.

2.3. Contractor collects Personal Data from Users of the PredictPulse Service for the purpose of allowing Eaton to provide the PredictPulse Service to Customer. Contractor does not sell Personal Data disclosed to it through the PredictPulse Service, but it may transfer such Personal Data outside of the United States and share the information with third parties that Contractor retains to provide services on its behalf and to Contractor's sales representatives, which include third parties. In addition, Contractor may disclose Personal Data it collects as required by law, an arbitral body, a court of competent jurisdiction, a law enforcement agency, or any other government agency, and may disclose personal information it collects when it believes it is appropriate to prevent physical or financial loss or in connection with an investigation of suspected or actual illegal activity. If a User desires to withdraw its consent to Contractor's use of his/her Personal Data in connection with the PredictPulse Service, such User can submit a request to Contractor to remove his/her Personal Data from the PredictPulse Service at the following email address: iam@eaton.com or auto link <mailto:iam@eaton.com>, specifying removal of your Personal Data from the PredictPulse Service. Following receipt of such request, Contractor will remove all of such User's Personal Data from the PredictPulse Service. If a User withdraws his/her consent to Contractor's use of Customer's Personal Data as described in this Agreement, Contractor may terminate such User's Customer's access to the PredictPulse Service. To the extent that a User inputs or otherwise provides in the PredictPulse Service the Personal Data of another individual, whether or not an employee of Customer or whether or not such individual is another User of the System ("Other Individual"), Customer represents that it has obtained such Other Individual's prior written consent to: 1) allow such User to input such Other Individual's Personal Information into the PredictPulse Service and 2) the foregoing Personal Data privacy terms. Customer shall have sole responsibility for any violation of privacy laws as a result of its failure to obtain the Other Individual's prior written consent as described in the preceding sentence.

2.4. Contractor makes no warranty regarding, and has no obligation with respect to, the accuracy, completeness, or omissions of any Customer Equipment Data or any report, alarm, notification, or recommendation generated or not generated by the PredictPulse Service based on the Customer Equipment Data.

Customer must use reasonable judgment in interpreting this data and information, and contact his or her local Eaton sales representative or Contractor Technical Support with any questions.

2.5. Customer recognizes and agrees that hosting data online involves risks of unauthorized disclosure or exposure and that, in accessing and using the PredictPulse Service, Customer assumes such risks. To the extent permitted by law, Contractor offers no representation, warranty, or guarantee that Customer Equipment Data and/or Personal Data will not be exposed or disclosed through errors or the actions of third parties.

3. Customer Restrictions

3.1. Customer shall not: (a) use the PredictPulse Service for any purpose other than for its intended purpose or otherwise misuse the PredictPulse Service; (b) provide PredictPulse Service passwords or other log-in information to any third party; (c) share non-public PredictPulse Service features or content with any third party; (d) access the PredictPulse Service in order to build a competitive product or service, to build a product using similar ideas, features, functions or graphics of the PredictPulse Service, or to copy any ideas, features, functions or graphics of the PredictPulse Service; (e) attempt to penetrate or disable any security system, or intentionally distribute a computer virus, launch a denial of service attack, or in any other way attempt to interfere with the functioning of the PredictPulse Service, including without limitation any computer, communications system, or website associated therewith; or (f) attempt to access or otherwise interfere with the accounts of other users of the PredictPulse Service. In the event that it suspects any breach of the requirements of this Section 3.1, including without limitation by Users, Contractor may suspend Customer's use of the PredictPulse Service without advanced notice, in addition to such other remedies as Contractor may have. This Agreement does not require Contractor to take any action against Customer or any User or other third party for violating this Section 3.1 or this Agreement, but Contractor is free to take any such action it sees fit.

PredictPulse and Eaton are trademarks of Eaton Corporation.

PredictPulse Insight SOW R-36

Eaton PredictPulse™ Insight Remote Monitoring Service Scope of Work (SOW) Attachment R-36

The terms and conditions in this SOW are in addition to and are incorporated by reference into the T-O Service Agreement – Terms and Conditions (“Service Agreement”). Terms that are capitalized in this SOW shall have the same meaning ascribed to them in the Service Agreement, unless stated otherwise in this SOW. In case of any conflict between this SOW and the Service Agreement, the terms and conditions of this SOW shall control.

DEFINITIONS. The following terms shall have the following meanings whenever used in this SOW:

“PredictPulse Service” means Contractor’s PredictPulse™ remote monitoring service, which includes the collection of status, alarm, and performance information and data from network-connected Covered Equipment, and the analysis and monitoring of such information and data to provide alarm notifications and reports to Customer and/or its Users.

“PredictPulse Insight Service” means Contractor’s PredictPulse™ remote monitoring service with the addition of predictive analytic methods to identify component failures prior to a planned replacement event and schedule an onsite inspection to validate if a component needs to be replaced proactively.

“Equipment Data” means all Covered Equipment status, alarm, and performance information and data that is collected, analyzed, generated, displayed, and reported in connection with the PredictPulse Service and all information and data about Customer’s and/or its Users’ use of, and interaction with, the PredictPulse Service. For avoidance of doubt, Equipment Data does not include any Personal Data or any information or data relating to the identity of Customer, which would specifically link or associate Customer with such Covered Equipment status, alarm, and performance data or such use and interaction data.

“Customer Equipment Data” means Equipment Data combined with any information or data that is inputted into the PredictPulse Service by a User relating to the identity of Customer, which specifically links or associates Customer with the Equipment Data.

“Personal Data” means all personally identifiable information and data relating to employees or agents of Customer, Users, or other individuals, including without limitation, the name, title, employer, address(es) (residential and/or business), email address(es) (personal and/or business), and phone number(s) (personal and/or business) of such employees, Users, and other individuals, which is inputted into the PredictPulse Service by Users.

“User” means any individual who uses or accesses the PredictPulse Service on Customer’s behalf or through Customer’s account or passwords, whether authorized or not.

1. PredictPulse Insight Service Description and Customer Requirements

1.1 Contractor will provide the PredictPulse Service on subscribed Covered Equipment. The PredictPulse Service shall include alarm notifications via a dashboard, mobile application, and monthly report summarizing alarms and Equipment Data.

- a. Access to the PredictPulse Service shall be from Contractor’s web portal and include Covered Equipment status, alarms, reports and service history.
- b. Contractor’s obligation shall be to enable enrollment in the PredictPulse Insight Service by Customer, validation of the PredictPulse Insight Service, to notify Customer contact when a critical alarm occurs and communicate and schedule planned onsite inspections of Covered Components. Contractor shall use a combination of predictive analytics and other data processing methods to identify component failures prior to a planned replacement event. Customer acknowledges the inherent nature of predicting failures as imperfect and shall release Contractor of all liability in the event of missed component failures.
- c. Contractor will remotely diagnose critical alarms and if appropriate, resolve emergency events as if Customer has requested Covered Equipment Service, enabling Contractor to arrive at the location of the Covered Equipment per the contracted CPM hours.
- d. Display and availability Equipment Data will vary and depend on the Covered Equipment, connectivity equipment and access to Customer provided network.

1.2 The PredictPulse Service will only be available if Customer provides and supports a CAT5 LAN/Ethernet cable connected to Customer’s email server or equivalent network (along with necessary network configuration information (including IP addresses) to facilitate connectivity).

1.3 Covered Equipment will continue to transmit Customer Equipment Data to Contractor until Customer disconnects or disables the network connection. Upon termination of the PredictPulse Service, Customer is responsible for disconnecting or disabling any Covered Equipment from Customer’s network connection. Contractor will not be responsible for notifying or reminding Customer that it must disconnect or disable any Covered Equipment from Customer’s network connection after termination of the PredictPulse Service. Contractor will continue to own the Equipment Data and not incur any liability as a result of Customer’s failure to disconnect or disable any Covered Equipment from the network connection.

1.4 Customer shall register at www.my.eaton.com with a valid email address, self-maintain a complex password, and contact information in order to access the PredictPulse Service.

1.5 Connectivity Equipment Excluded – Customer shall be responsible for purchasing and/or upgrading compatible connectivity equipment required to support the PredictPulse Service.

1.6 Parts and labor coverage for all Covered Equipment is separate from the PredictPulse Service.

2. Data

2.1. Unless it receives Customer's prior written consent, Contractor: (a) shall not disclose to third parties or publish Customer Equipment Data and (b) shall not intentionally grant any third party access to Customer Equipment Data. Notwithstanding the foregoing, Contractor may disclose Customer Equipment Data as required by applicable law or by proper legal or governmental authority. Contractor shall give Customer prompt notice of any such legal or governmental demand and reasonably cooperate with Customer in any effort to seek a protective order or otherwise to contest such required disclosure, at Customer's expense.

2.2. Contractor shall own all Equipment Data and all results from processing such data, including without limitation, compilations and derivative works of such data. Contractor may use such Equipment Data for any purpose, including without limitation, for data mining, analysis and trending purposes, and may disclose Equipment Data to third parties without Customer's consent for any purpose, including without limitation, for comparison and reliability reporting.

2.3. Contractor collects Personal Data from Users of the PredictPulse Service for the purpose of allowing Eaton to provide the PredictPulse Service to Customer. Contractor does not sell Personal Data disclosed to it through the PredictPulse Service, but it may transfer such Personal Data outside of the United States and share the information with third parties that Contractor retains to provide services on its behalf and to Contractor's sales representatives, which include third parties. In addition, Contractor may disclose Personal Data it collects as required by law, an arbitral body, a court of competent jurisdiction, a law enforcement agency, or any other government agency, and may disclose personal information it collects when it believes it is appropriate to prevent physical or financial loss or in connection with an investigation of suspected or actual illegal activity. If a User desires to withdraw its consent to Contractor's use of his/her Personal Data in connection with the PredictPulse Service, such User can submit a request to Contractor to remove his/her Personal Data from the PredictPulse Service at the following email address: iam@eaton.com or auto link <mailto:iam@eaton.com>, specifying removal of your Personal Data from the PredictPulse Service. Following receipt of such request, Contractor will remove all of such User's Personal Data from the PredictPulse Service. If a User withdraws his/her consent to Contractor's use of Customer's Personal Data as described in this Agreement, Contractor may terminate such User's Customer's access to the PredictPulse Service. To the extent that a User inputs or otherwise provides in the PredictPulse Service the Personal Data of another individual, whether or not an employee of Customer or whether or not such individual is another User of the System ("Other Individual"), Customer represents that it has obtained such Other Individual's prior written consent to: 1) allow such User to input such Other Individual's Personal Information into

the PredictPulse Service and 2) the foregoing Personal Data privacy terms. Customer shall have sole responsibility for any violation of privacy laws as a result of its failure to obtain the Other Individual's prior written consent as described in the preceding sentence.

2.4. Contractor makes no warranty regarding, and has no obligation with respect to, the accuracy, completeness, or omissions of any Customer Equipment Data or any report, alarm, notification, or recommendation generated or not generated by the PredictPulse Service based on the Customer Equipment Data. Customer must use reasonable judgment in interpreting this data and information, and contact his or her local Eaton sales representative or Contractor Technical Support with any questions.

2.5. Customer recognizes and agrees that hosting data online involves risks of unauthorized disclosure or exposure and that, in accessing and using the PredictPulse Service, Customer assumes such risks. To the extent permitted by law, Contractor offers no representation, warranty, or guarantee that Customer Equipment Data and/or Personal Data will not be exposed or disclosed through errors or the actions of third parties.

3. Customer Restrictions

3.1. Customer shall not: (a) use the PredictPulse Service for any purpose other than for its intended purpose or otherwise misuse the PredictPulse Service; (b) provide PredictPulse Service passwords or other log-in information to any third party; (c) share non-public PredictPulse Service features or content with any third party; (d) access the PredictPulse Service in order to build a competitive product or service, to build a product using similar ideas, features, functions or graphics of the PredictPulse Service, or to copy any ideas, features, functions or graphics of the PredictPulse Service; (e) attempt to penetrate or disable any security system, or intentionally distribute a computer virus, launch a denial of service attack, or in any other way attempt to interfere with the functioning of the PredictPulse Service, including without limitation any computer, communications system, or website associated therewith; or (f) attempt to access or otherwise interfere with the accounts of other users of the PredictPulse Service. In the event that it suspects any breach of the requirements of this Section 3.1, including without limitation by Users, Contractor may suspend Customer's use of the PredictPulse Service without advanced notice, in addition to such other remedies as Contractor may have. This Agreement does not require Contractor to take any action against Customer or any User or other third party for violating this Section 3.1 or this Agreement, but Contractor is free to take any such action it sees fit.

PredictPulse and Eaton are trademarks of Eaton Corporation.

PredictPulse Insight Plus SOW R-37

Eaton PredictPulse™ Insight Plus Remote Monitoring Service Scope of Work (SOW) Attachment R-37

The terms and conditions in this SOW are in addition to and are incorporated by reference into the T-O Service Agreement – Terms and Conditions (“Service Agreement”). Terms that are capitalized in this SOW shall have the same meaning ascribed to them in the Service Agreement, unless stated otherwise in this SOW. In case of any conflict between this SOW and the Service Agreement, the terms and conditions of this SOW shall control.

DEFINITIONS. The following terms shall have the following meanings whenever used in this SOW:

“PredictPulse Service” means Contractor’s PredictPulse™ remote monitoring service, which includes the collection of status, alarm, and performance information and data from network-connected Covered Equipment, and the analysis and monitoring of such information and data to provide alarm notifications and reports to Customer and/or its Users.

“PredictPulse Insight Plus Service” means Contractor’s PredictPulse™ remote monitoring service with the addition of predictive analytic methods to identify component failures prior to a planned replacement event and schedule an onsite inspection to validate and proactively replace components as needed.

“Equipment Data” means all Covered Equipment status, alarm, and performance information and data that is collected, analyzed, generated, displayed, and reported in connection with the PredictPulse Service and all information and data about Customer’s and/or its Users’ use of, and interaction with, the PredictPulse Service. For avoidance of doubt, Equipment Data does not include any Personal Data or any information or data relating to the identity of Customer, which would specifically link or associate Customer with such Covered Equipment status, alarm, and performance data or such use and interaction data.

“Customer Equipment Data” means Equipment Data combined with any information or data that is inputted into the PredictPulse Service by a User relating to the identity of Customer, which specifically links or associates Customer with the Equipment Data.

“Personal Data” means all personally identifiable information and data relating to employees or agents of Customer, Users, or other individuals, including without limitation, the name, title, employer, address(es) (residential and/or business), email address(es) (personal and/or business), and phone number(s) (personal and/or business) of such employees, Users, and other individuals, which is inputted into the PredictPulse Service by Users.

“User” means any individual who uses or accesses the PredictPulse Service on Customer’s behalf or through Customer’s account or passwords, whether authorized or not.

1. PredictPulse Insight Service Description and Customer Requirements

1.1 Contractor will provide the PredictPulse Service on subscribed Covered Equipment. The PredictPulse Service shall include alarm notifications via a dashboard, mobile application, and monthly report summarizing alarms and Equipment Data.

- a. Access to the PredictPulse Service shall be from Contractor’s web portal and include Covered Equipment status, alarms, reports and service history.
- b. Contractor’s obligation shall be to enable enrollment in the PredictPulse Insight Service by Customer, validation of the PredictPulse Insight Service, to notify Customer contact when a critical alarm occurs and communicate and schedule planned onsite inspections of Covered Components. Contractor shall use a combination of predictive analytics and other data processing methods to identify component failures prior to a planned replacement event. Customer acknowledges the inherent nature of predicting failures as imperfect and shall release Contractor of all liability in the event of missed component failures.
- c. Covered Components for replacement coverage include electronic power modules, capacitors, fans, and air filters (if applicable to the Covered Equipment). Batteries may be a Covered or Excluded Component for replacement coverage but will be eligible for predictive analytics and component failure identification prior to a planned replacement event.
- d. Contractor will remotely diagnose critical alarms and if appropriate, resolve emergency events as if Customer has requested Covered Equipment Service, enabling Contractor to arrive at the location of the Covered Equipment per the contracted CPM hours.
- e. Display and availability Equipment Data will vary and depend on the Covered Equipment, connectivity equipment and access to Customer provided network.

1.2 The PredictPulse Service will only be available if Customer provides and supports a CAT5 LAN/Ethernet cable connected to Customer’s email server or equivalent network (along with necessary network configuration information (including IP addresses) to facilitate connectivity).

1.3 Covered Equipment will continue to transmit Customer Equipment Data to Contractor until Customer disconnects or disables the network connection. Upon termination of the PredictPulse Service, Customer is responsible for disconnecting or disabling any Covered Equipment from Customer's network connection. Contractor will not be responsible for notifying or reminding Customer that it must disconnect or disable any Covered Equipment from Customer's network connection after termination of the PredictPulse Service. Contractor will continue to own the Equipment Data and not incur any liability as a result of Customer's failure to disconnect or disable any Covered Equipment from the network connection.

1.4 Customer shall register at www.my.eaton.com with a valid email address, self-maintain a complex password, and contact information in order to access the PredictPulse Service.

1.5 Connectivity Equipment Excluded – Customer shall be responsible for purchasing and/or upgrading compatible connectivity equipment required to support the PredictPulse Service.

1.6 Parts and labor coverage for all Covered Equipment is separate from the PredictPulse Service.

2. Data

2.1. Unless it receives Customer's prior written consent, Contractor: (a) shall not disclose to third parties or publish Customer Equipment Data and (b) shall not intentionally grant any third party access to Customer Equipment Data. Notwithstanding the foregoing, Contractor may disclose Customer Equipment Data as required by applicable law or by proper legal or governmental authority. Contractor shall give Customer prompt notice of any such legal or governmental demand and reasonably cooperate with Customer in any effort to seek a protective order or otherwise to contest such required disclosure, at Customer's expense.

2.2. Contractor shall own all Equipment Data and all results from processing such data, including without limitation, compilations and derivative works of such data. Contractor may use such Equipment Data for any purpose, including without limitation, for data mining, analysis and trending purposes, and may disclose Equipment Data to third parties without Customer's consent for any purpose, including without limitation, for comparison and reliability reporting.

2.3. Contractor collects Personal Data from Users of the PredictPulse Service for the purpose of allowing Eaton to provide the PredictPulse Service to Customer. Contractor does not sell Personal Data disclosed to it through the PredictPulse Service, but it may transfer such Personal Data outside of the United States and share the information with third parties that Contractor retains to provide services on its behalf and to Contractor's sales representatives, which include third parties. In addition, Contractor may disclose Personal Data it collects as required by law, an arbitral body, a court of competent jurisdiction, a law enforcement agency, or any other government agency, and may disclose personal information it collects when it believes it is appropriate to prevent physical or financial loss or in connection with an investigation of suspected or actual illegal activity. If a User desires to withdraw its consent to Contractor's use of his/her Personal Data in connection with the PredictPulse Service, such User can submit a request to Contractor to remove his/her Personal Data from the PredictPulse Service at the following email address: iam@eaton.com or auto link <mailto:iam@eaton.com>, specifying removal of

your Personal Data from the PredictPulse Service. Following receipt of such request, Contractor will remove all of such User's Personal Data from the PredictPulse Service. If a User withdraws his/her consent to Contractor's use of Customer's Personal Data as described in this Agreement, Contractor may terminate such User's Customer's access to the PredictPulse Service. To the extent that a User inputs or otherwise provides in the PredictPulse Service the Personal Data of another individual, whether or not an employee of Customer or whether or not such individual is another User of the System ("Other Individual"), Customer represents that it has obtained such Other Individual's prior written consent to: 1) allow such User to input such Other Individual's Personal Information into the PredictPulse Service and 2) the foregoing Personal Data privacy terms. Customer shall have sole responsibility for any violation of privacy laws as a result of its failure to obtain the Other Individual's prior written consent as described in the preceding sentence.

2.4. Contractor makes no warranty regarding, and has no obligation with respect to, the accuracy, completeness, or omissions of any Customer Equipment Data or any report, alarm, notification, or recommendation generated or not generated by the PredictPulse Service based on the Customer Equipment Data. Customer must use reasonable judgment in interpreting this data and information, and contact his or her local Eaton sales representative or Contractor Technical Support with any questions.

2.5. Customer recognizes and agrees that hosting data online involves risks of unauthorized disclosure or exposure and that, in accessing and using the PredictPulse Service, Customer assumes such risks. To the extent permitted by law, Contractor offers no representation, warranty, or guarantee that Customer Equipment Data and/or Personal Data will not be exposed or disclosed through errors or the actions of third parties.

3. Customer Restrictions

3.1. Customer shall not: (a) use the PredictPulse Service for any purpose other than for its intended purpose or otherwise misuse the PredictPulse Service; (b) provide PredictPulse Service passwords or other log-in information to any third party; (c) share non-public PredictPulse Service features or content with any third party; (d) access the PredictPulse Service in order to build a competitive product or service, to build a product using similar ideas, features, functions or graphics of the PredictPulse Service, or to copy any ideas, features, functions or graphics of the PredictPulse Service; (e) attempt to penetrate or disable any security system, or intentionally distribute a computer virus, launch a denial of service attack, or in any other way attempt to interfere with the functioning of the PredictPulse Service, including without limitation any computer, communications system, or website associated therewith; or (f) attempt to access or otherwise interfere with the accounts of other users of the PredictPulse Service. In the event that it suspects any breach of the requirements of this Section 3.1, including without limitation by Users, Contractor may suspend Customer's use of the PredictPulse Service without advanced notice, in addition to such other remedies as Contractor may have. This Agreement does not require Contractor to take any action against Customer or any User or other third party for violating this Section 3.1 or this Agreement, but Contractor is free to take any such action it sees fit.

PredictPulse and Eaton are trademarks of Eaton Corporation.

Frequently asked questions (FAQ) and common issues

Based on customer feedback, below are some situations you may have seen or still be encountering, and what we can do to resolve any missing devices or bad data.

- **Missing devices due to expired service:** PredictPulse is a subscription service and can be added to any service contract. In addition, PredictPulse is included for free in the U.S. with every Eaton three-phase UPS device during the first warranty year, and can be activated as a free 90-day trial. Once the subscription or service contract expires, the service is disconnected and an email notice is sent to that effect.
- **Missing devices due to lost communications:** A common issue is the SMTP mail server or device IP address gets changed and devices stop transmitting data. Eaton contacts customers after two or more missed telemetry emails (after either 48 hours or 45 minutes).
- **Missing devices due to other causes:** After basic troubleshooting over the phone, an Eaton field technician may be dispatched to verify the device and connectivity performance. In the event a customer network or IT issue is involved, you'll need to resolve network issues.
- **Incorrect device data in PredictPulse:** Typically, the data displayed on the Eaton UPS device is "true," so data displayed in PredictPulse should always match the device data. There are multiple causes of data discrepancies, and there may be timing delays, but the key metrics like load percentage and alarms should align. Contact Eaton to report data issues so this can be corrected; in many cases, the UPS or connectivity card firmware may require updating.
- **Incorrect customer or asset data in PredictPulse:** PredictPulse integrates data from the field technician's prior visits, along with service history and contract data from our service database. Whether it's an incorrect battery installation date, a misspelled name or missing location code, contact Eaton to have incomplete or incorrect information changed.

Key Feature: Location Code. Many customers have special names for their UPS equipment, like "Third Floor Data Center" or "Store 125." Contact Eaton to add or update the Location Code on the dashboard, reports and mobile app (available mid-2017).

FAQ

1. Does the connectivity card support one-way or two-way external communication?

The connectivity card only supports one-way external communication. This is accomplished through the connectivity card sending the email to the remote monitoring servers. Eaton has no way of externally communicating to your connectivity card or unit.

2. Can anyone breach my firewall or disrupt my UPS?

Access to the connectivity card is controlled through two means—your network configuration and the security settings on the card itself. The connectivity card has settings for SSL and SSH secure communications as well as the ability to change the port the web-based application runs over. Additionally, the web-based application can be configured to require a username and password to access the application. Your network configuration also plays an important part in the security of the connectivity card. If you allow external access to the connectivity card's IP address, unwanted users may be able to access the card. It is important to mention however, that Eaton has no inherent way of externally accessing the connectivity card.

3. How do I change who receives the status and event emails?

The web-based application that is included in the connectivity card allows you to configure who receives the emails. Currently the connectivity card can hold a total of four email addresses. The first two are used to send the status and event emails to the remote monitoring servers. You are able to set the remaining two emails to whatever email address you choose, including a ListServ address that can send the emails to multiple individuals.

4. How do I change who receives the critical event notifications and reports?

You can update who receives the critical events notifications and the reports from the MyEaton portal or by contacting Eaton through the contact methods listed below. You can have the reports and the notifications sent to two different sets of contacts.

5. What happens if my email server fails (loses power, etc.)?

If your email server fails, there are two scenarios that could occur. First, if an email was already sent from the connectivity card to the server but the server has not had a chance to forward it, the email will be queued to send the email once the server is back online. This is one of the benefits of using SMTP as the communication protocol. The second scenario is that the connectivity card cannot connect to the email server for some reason. In this situation, the connectivity card will queue up the emails and send them once the connectivity has been restored.

6. Will I get called if a critical alarm occurs?

When a critical alarm is received, a customer support specialist will contact you or your designated contacts, by the method and in the order you specify the MyEaton portal, or by contacting Eaton through the contact methods listed below.

7. How quickly will I get notified of a critical alarm?

A critical alarm notification will be emailed to your designated contact immediately after the event is recognized by the remote monitoring servers. Upon receiving an initial critical event email, the Remote Monitoring servers wait

for a short period of time until any other event emails come in. Once the traffic has subsided, the critical event notification is sent to your contact and to the CMC. This reduces the number of notifications that are sent for the same issue.

8. Will the Eaton CSE have my alarm information if they need to make an on-site repair?

The Eaton CSE will have access to a customer support specialist who can access your alarm information. Additionally, the customer support specialist will have an in-depth analysis of the particular alarm along with numerous resources with which to assist the CSE in correcting the issue.

9. How do I go about obtaining a past report?

Past reports can be obtained by contacting the Eaton CMC via the contact information listed below. Although it is not required, including the report number in your request would be helpful in locating the correct report.

10. How often do I get reports?

The monthly summary report is currently generated within the first five business days of each month against the previous month's data.

11. If I have a question, whom do I call?

Installation, configuration, and/or ongoing performance issues, along with informational and service changes should be directed to the Eaton CMC at 1-800-843-9433, option 2, then 5. Additionally, you can contact the CMC via email at predictpulsesupport@eaton.com.

12. What is the maximum installation distance of the environmental monitoring probe (EMP)?

Twenty (20) meters / sixty (60) feet.

13. When is PredictPulse available and how do I get it on my Eaton UPS?

PredictPulse will be available in October 2015. You subscribe to PredictPulse through a self-installation process. Eaton UPSs can be activated from a PredictPulse installation wizard or Power Xpert connectivity card. Eaton field technicians can also activate PredictPulse for you during startup or any scheduled maintenance at no additional cost as long as connectivity hardware and network access are present.

14. How does PredictPulse work?

Currently, PredictPulse only works with Eaton UPSs in the U.S. and does not function on any non-Eaton power devices or in other countries. Eaton UPSs use a connectivity card, sending out update emails to Eaton every 15 minutes on the health and status of connected equipment. Health and alarm data are collected at Eaton's data center and pushed to your dashboard and mobile app. If there is a critical alarm, the software will email it immediately to Eaton and notify your designated contacts. Eaton analysts communicate with Eaton field technicians and your contacts to remedy critical events, and, if you have a service agreement with parts and labor coverage, Eaton will expedite the on-site service to resolve any issues.

15. How does PredictPulse connect with my equipment? How do I know that connection is secure?

PredictPulse uses SMTP port 25 for one-way, outbound-only traffic via your mail server to send emails to Eaton. Using industry-standard security protocols and methods, and implementing rigorous IT security architecture and methods, Eaton built PredictPulse with your security and privacy in mind. The architecture is built around multi-tenancy, two-step authentication, complex passwords and similar authentication of subscribers to prevent unauthorized access. In other words, Eaton cannot get inside your data center or control any connected UPS equipment. Eaton only receives data from connected equipment, and can never interrogate, or come through your firewall. This provides a completely secure solution.

16. How do I access my PredictPulse dashboard?

The MyEaton portal (www.my.eaton.com) is where you confirm device activations and access your PredictPulse dashboard. It also includes support information, links to download the mobile app and other relevant resources.

17. What data can I view in PredictPulse?

Eaton aggregates all subscribing devices onto the same dashboard, eliminating the need to visit a different website for each UPS that also displays information from Eaton's service ERP system, Oracle. In addition to the device's parametric health data and alarms, you can view details such as when the device was installed, configuration and ancillary devices, warranty and service contract expiration, battery type and date codes, firmware revisions, capacitor date codes and last/next scheduled service dates. Service-level data also shows how Eaton field technicians performed during any recent emergency events. While many devices will not display all possible data, PredictPulse's overall goal is to present a comprehensive blend of trended performance, real-time status, alarms, asset management and key performance indicators to provide the insight needed to ensure increased power reliability.

You'll also receive a monthly report via email that aggregates all device performance data, trends and alarms. Similar to the dashboard, green, yellow and red colors offer at-a-glance insight into the operating status of your power equipment.

18. Does Eaton include PredictPulse with any of its UPS hardware?

Yes. In the U.S., new Eaton three-phase UPS models include a complimentary one-year PredictPulse subscription for the first warranty year. In some models, Eaton even includes a complimentary PredictPulse connectivity kit with the required hardware (connectivity card, environmental monitoring probe and quick start summary). While PredictPulse does not come with a full service contract, many full service agreements include PredictPulse. Remember, PredictPulse can also be added to any contract type or purchased standalone at any time.

19. What is included in a PredictPulse subscription and do I need a service contract to subscribe?

PredictPulse includes 24x7 monitoring, technical support, activation tools, dashboard access, mobile app alarm data, expedited response to critical alarm events and a monthly summary report. PredictPulse is a subscription service generally sold by the device based on a period of time, ranging from one day to five years. PredictPulse uses Eaton's standard terms and conditions and a scope of work (SOW) as part of its subscription. It may be purchased in addition to, or as part of an existing service agreement or as a standalone service.

20. Can Eaton enable me to control the remote access to allow two-way communication for advanced remote diagnostics, remote service delivery, etc.?

No. There is no remote access capability.

21. Can I connect existing service ticket tools (i.e., Remedy) to PredictPulse to link in with work-flows?

Not at this time. API's are in development to enable this capability; contact PredictPulse support if you have a specific need or interest in this future capability.

23. Are there any legacy Eaton products or connectivity cards PredictPulse does not work with?

Legacy Eaton devices lacking network connectivity support are not compatible with PredictPulse. This mostly includes products built before 1996.

24. Do you need a special MIB to access PredictPulse?

No.

25. Can PredictPulse communicate with other monitoring software or protocols, or other IT hardware?

No. While the Eaton connectivity cards support many protocols and can be shared with many applications, PredictPulse does not integrate with other tools. PredictPulse is also unable to connect with IT hardware such as servers, storage or communications.

26. Is PredictPulse a cloud-based application, or is there any software I need to install?

PredictPulse is a cloud-based application hosted by Eaton at its U.S. data center. There is no software to be installed for PredictPulse, and PredictPulse is compatible with most web browsers.

27. How often does PredictPulse get data from the power devices (UPSs) and what type of data is it sending?

PredictPulse collects two types of data from the power device: parametric health data and alarm data. Parametric health data is transmitted either daily or every 15 minutes (96 times per day) and includes input voltage, output voltage, and load capacity by phase, temperature and humidity by the battery, and battery state plus length of discharge. Alarm data is sent real-time and includes the alarm type, description, date and time code and other relevant alarm data based on the device.

28. PredictPulse uses SMTP Relay with a static IP address. Is this the only communication choice?

PredictPulse can be used with Office 365, Gmail and a static network configuration or can also support DHCP. You cannot use TLS for communication through SMTP at this time.

29. What if I use a non-Microsoft server or email application? Will I be able to access email attachments sent using Microsoft Exchange and Outlook?

PredictPulse email attachments are CSV files and are typically less than 100 KB per email. Outlook is the default email application for initial registration, but there are directions available within the PredictPulse wizard on a manual process to send emails using another email application.

30. Can I edit my dashboard or mobile app based on my needs?

No. There are no options for editing what alarms are displayed or for redefining the severity levels of alarms. You can, however, sort the alarm data by time duration (up to one year), alarm severity or device.

31. How fast are the alarms coming from my equipment to PredictPulse and my dashboard/mobile app?

One advantage of using email, or SMTP, is its resiliency and speed. In general, all email alarms are real-time and are displayed within seconds of the device transmission, unless unusual Internet or mail server traffic is occurring. PredictPulse dashboards may take as long as 15 minutes to refresh parametric health data based on the system design and device type (or as long as one day for legacy connectivity cards).

32. What happens if the connection is lost between my device and Eaton?

PredictPulse is designed to detect and alarm for lost connectivity. Depending on the connectivity card and its default parametric health transmission frequency, Eaton will alarm for lost connectivity after two missed transmissions, either after 45 minutes or two days, depending on the card type. Eaton will contact your designated contact to investigate and remedy any lost communications. The Lost Communication notices are sent in a HTML email format upon loss of two or more telemetry (heartbeat) emails and weekly until a device's connectivity is restored.

33. How do I add coworkers or peers to my PredictPulse account, change my contact information and add/remove devices?

The MyEaton online portal is where you can make these types of changes to your PredictPulse account. It has a checkbox to add or invite authorized peers to enroll to receive alarm updates at no additional charge. You can email or call Eaton to add, change or delete other subscribers for the same account as well. Through MyEaton, you can also select options for setting up escalation lists so certain people are notified of alarms ahead of others.

34. What can Eaton diagnose on my power devices?

Eaton can diagnose electronic, battery and overall system health, critical components, site, environmental and related conditions that can impact future performance, as well as actual alarms.

35. What happens during a critical alarm event and how fast can Eaton respond?

The system generates an email alert and updates your alarm panel and mobile app with the critical alarm. Eaton will acknowledge critical alarms and indicate the analyst or technician resolving the events. If you have requested a call notification, Eaton will follow-up with a call to a business or mobile phone based on the data on file. Eaton typically responds to critical alarm events within 15 minutes, or less.

36. What happens to the other alerts and non-critical alarms?

These are communicated to your alarm panel and mobile app. Eaton uses these alarms and alerts to monitor overall system health and may take action proactively even if a critical event has not occurred.

37. Will my Eaton field technician see the same data from my dashboard or mobile app that I do?

Yes, but in a different form. Analysts see all of your data and transmit appropriate alarms, event logs and key device history. They also troubleshoot probable cause solutions to the field technicians to expedite repairs and ensure recommended parts are available to increase first-time fix outcomes.

38. How much does PredictPulse cost per year?

PredictPulse subscriptions start at less than \$300 per year and vary based on device size, number of devices, and location and activation point relative to the Eaton product's warranty. Contact Eaton or your Eaton sales representative for pricing details.

39. How does the PredictPulse 90-day free trial work? Is connectivity included?

You subscribe to the PredictPulse free trial through a self-installation process. Eaton UPSs can be activated from a PredictPulse installation wizard or Power Xpert connectivity cards, and activation tools can be found at Eaton.com/PredictPulse. As the trial period progresses, you will receive emails alerting you of the upcoming expiration and purchase offers. After 90 days, the trial will be terminated unless a purchase is made. No connectivity hardware is included with the free trial, but Eaton may offer special incentives for a PredictPulse connectivity kit. Many customers already have the required connectivity in place for PredictPulse.

40. Who do I contact with questions about PredictPulse?

Email predictpulsesupport@eaton.com or call Eaton in the U.S. at 800-843-9433. You should call or email Eaton to correct any data errors or omissions with your PredictPulse service as well.

41. Where do I purchase PredictPulse? Do I need a license or contract to buy?

To purchase PredictPulse, contact an Eaton sales representative, email eatoninsideservicesales@eaton.com or call Eaton in the U.S. at 800-843-9433. PredictPulse uses Eaton's standard terms and conditions and a scope of work (SOW) as a part of its subscription. PredictPulse may be purchased in addition to or as part of an existing service agreement or as a standalone service. The PredictPulse mobile app has an End User License Agreement (EULA) when downloading from the Apple or Android app stores.

Glossary of terms

Anomaly detection: A check in the PredictPulse process where the parametric data is checked for incoming status emails and the event data is checked for incoming event emails. The data is checked against a set of rules that are looking for various anomalies over a certain period of time.

CMC: Customer Monitoring Center – Eaton product support group that responds to critical events and anomalies. They also manage your contact and report setting information within the PredictPulse offering.

Connectivity card: Eaton cards that plug into Eaton UPSs to transmit data via protocols like SMTP, MODBUS, SNMP, etc.

CSE: Customer Service Engineer – an Eaton employee who installs and configures your UPS and connectivity card. Additionally, they troubleshoot, repair, and maintain your unit.

CSS: Customer support specialists – team of analysts that support PredictPulse pre and post-sale requests, critical alarm diagnostics and notification, and overall monitoring support

EMP: Environmental monitoring probe to collect temperature and humidity data.

Event email: The email that is sent to the remote monitoring servers when the connectivity card detects that a specific event has occurred. The email contains attachments of the connectivity card's parametric data and event data logs. A critical event email will generate a critical event notification to the CMC and to your company contacts.

LAN/WAN: A local area network (LAN) is a computer network that connects computers within a limited area, such as a residence, school, laboratory or office building. A wide area network (WAN) covers a larger geographic distance and may involve leased telecommunication circuits. The media for LANs are locally managed.

Mail server (SMTP compatible): Mail submission agent

MPLS: Multi-Protocol Layer System

MSA: Mail submission agent or mail server

MTA: Mail transfer agent

MUA: Mail user agent

MX: Mail eXchange

Parametric data: Minute-by-minute data collected by the connectivity card that measures such items as voltages, frequency, temperature, and humidity. The data is stored in the connectivity card's data log before being attached to a status or event email.

Port 25: SMTP by default uses TCP port 25.

Port 587 (TLS): The protocol for mail submission is the same, but uses port 587.

RPI: Relative Performance Index – a measurement of the health of your UPS, measured on a scale of 0 to 10, with 10 being the best. This score is calculated by using weighted averages of parametric data and recorded events and is reported to you through your monthly summary report.

SBM: System Bypass Module –provides bypass capability for paralleled UPS systems to be serviced without taking the critical load off of protected power.

SME: Subject Matter Expert – someone thoroughly knowledgeable in the Eaton product line on information such as features, operation, and maintenance. The SMEs have provided such items as the rules for anomaly detection, the list of critical events, and the lists of “alarm statements” and “next steps” that are included in the critical emails you receive.

SMTP: Simple Mail Transfer Protocol is an internet standard for email transmission. It’s a connection-oriented, text-based protocol in which a mail sender communicates with a mail receiver by issuing command strings and supplying necessary data over a reliable ordered data stream channel—typically a Transmission Control Protocol (TCP) connection. SMTP works best when the sending and receiving machines are connected to the network all the time, using a store and forward mechanism (push technology).

SMTP relay: Although email servers and other mail transfer agents use SMTP to send and receive mail messages, user-level client mail applications typically use SMTP only for sending messages to a mail server for relaying.

The initiating host, the SMTP client, can be an end user's email client, functionally identified as a mail user agent (MUA), or a relay server's mail transfer agent (MTA), an SMTP server acting as an SMTP client in the relevant session, to relay mail. Fully capable SMTP servers maintain queues of messages for retrying message transmissions that resulted in transient failures.

A MUA knows the outgoing mail SMTP server from its configuration. An SMTP server acting as the client, i.e., relaying, typically determines which SMTP server to connect to by looking up the MX (Mail eXchange) DNS resource record for each recipient's domain name. Conformant MTAs (not all) fall back to a simple A record in case no MX record can be found. Relaying servers can also be configured to use a smart host.

An SMTP server acting as a client initiates a TCP connection to the server on the "well-known port" designated for SMTP—port 25. MUAs should use port 587 to connect to an MSA. The main difference between an MTA and an MSA is that SMTP authentication is mandatory for the latter only.

SSH: Secure Shell – a protocol that allows you to encrypt all data traveling from your computer to your server or other computer using different types of encryption algorithms.

SSL: Secure Sockets Layer – a protocol that transmits your communications over the Internet in an encrypted form. SSL ensures that the information is sent, unchanged, only to the server you intended to send it to.

Status Email: The email that is sent to the remote monitoring servers on a daily basis. It contains attachments of the parametric and event data logs. If a status email is not received by the Remote Monitoring servers within a set timeframe, you will repeatedly receive a lost communication until either five such reports are sent or a status email is received.

TLS: Transport layer security

Wizard installer: Eaton-provided proprietary software tool created to easily enable self-configured installations