

PQvision Universal

User Guide



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1.0 Safety

Safety Instructions Overview

This section provides the safety instructions, which must be followed when installing, operating, and servicing the PQconnect or PQconnect-equipped Harmonic or Sinewave Filter. If neglected, physical injury or death may follow, or damage may occur to the filter or equipment connected to the filter. The material in this chapter must be read and understood before attempting any work on or with the product.

Warnings and Cautions

This manual provides two types of safety instructions. Warnings are used to call attention to instructions, which describe steps, which must be taken to avoid conditions, which can lead to a serious fault condition, physical injury, or death.

Cautions are used to call attention to instructions that describe steps that must be taken to avoid conditions that can lead to a malfunction and possible equipment damage.

Warnings

Readers are informed of situations that can result in serious physical injury and/or serious damage to equipment with warning statements marked with the following symbols:

<p>Warning</p> 	<p>Dangerous Voltage Warning: warns of situations in which a high voltage can cause physical injury and/or damage equipment. The text next to this symbol describes ways to avoid the danger.</p>
<p>Warning</p> 	<p>General Warning: warns of situations that can cause physical injury and/or damage equipment by means other than electrical. The text next to this symbol describes ways to avoid the danger.</p>
<p>Warning</p> 	<p>Many electronic components located within the filter are sensitive to static electricity. Voltages imperceptible to human touch can reduce the life, and affect performance, or destroy sensitive electronic devices. Use proper electrostatic discharge (ESD) procedures when servicing the filter and its circuit boards.</p>

Cautions

Readers are informed of situations that can lead to a malfunction and possible equipment damage with caution statements:

<p>Caution</p> 	<p>General Caution: Identifies situations that can lead to a malfunction and possible equipment damage. The text describes ways to avoid the situation.</p>
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General Safety Instructions

These safety instructions are intended for all work on the filter. Additional safety instructions are provided at appropriate points in other sections of this manual.

<p>Warning</p> 	<p>Be sure to read, understand, and follow all safety instructions.</p>
<p>Warning</p> 	<p>Only qualified electricians should carry out all electrical installation and maintenance work on the filter.</p>
<p>Warning</p> 	<p>All wiring must be in accordance with the National Electrical Code (NEC) and/or any other codes that apply to the installation site.</p>
<p>Warning</p> 	<p>Disconnect all power before working on the equipment. Do not attempt any work on a powered filter.</p>
<p>Warning</p> 	<p>The filter and other connected equipment must be properly grounded.</p>
<p>Warning</p> 	<p>The filter may receive power from two or more sources. 3-phase power is connected to the main input terminals of the filter. All these sources of power must be disconnected before working on the filter.</p>
<p>Warning</p> 	<p>After switching off the power, always allow 5 minutes for the capacitors in the filter and connected equipment to discharge before working on the filter, associated equipment, or the connecting wiring. It is good practice to check with a Voltmeter to make sure that all sources of power have been disconnected and that all capacitors have discharged before beginning work.</p>

2.0 General Information

Intended Audience

This manual is intended for use by all personnel responsible for the installation, operation, and maintenance of the *HarmonicGuard*[®] Active filter and or *MotorGuard*[®] Sinewave Filter. Such personnel are expected to have knowledge of electrical wiring practices, electronic components, and electrical schematic symbols.

General Terminology

Throughout this manual, many different terms are used. A list of some typical terms can be found below. These are provided to assist with the overall understanding of the manual. For clarification on terminology and the *HarmonicGuard*[®] Active filter please refer to the [HarmonicGuard[®] Active Filter Manual](#). If there are any other questions regarding any portion of this manual, please feel free to contact TCI directly.

HarmonicGuard[®] Active Filter (HGA) – TCI's brand name for a real time filter that mitigates harmonics while also maintaining near unity power factor. An Active Harmonic Filter is any piece of equipment that actively monitors and changes the incoming AC line current.

Active Harmonic Filter - An active harmonic filter is a piece of equipment that reads the incoming voltage and current and injects current waveforms that cancel distortion. This term is commonly used in place of the entire brand name of *HarmonicGuard*[®] Active filter.

Bus-Applied Filter – A shunt device connected in parallel to the load. This is an active filter designed to mitigate the harmonics associated with multiple loads. The filter is directly connected to a main bus as can be found in a typical Motor Control Center. The filter is sized for corrective current needed to be injected to cancel the offending harmonics. A Digital Signal Processor (DSP) pulse width modulated controller is used for switching Insulated Gate Bipolar Transistor (IGBT) to cancel the harmonics.

Power Converter - The power converter is the digital filter module of the *HarmonicGuard*[®] Active filter.

Non-Linear Load Input Line Inductor – The 3-phase line reactor connected at the input of an adjustable frequency drive or other non-linear load.

Converter Inductor – The 3-phase inductor is designed to have highly consistent and predictable inductance. These inductors are connected to the inverter, which buffers the inverter output from the analog portion of the filter, the source, and connected equipment.

Current Transformer (CT) – The device that monitors the incoming AC current waveform typically sized to handle the total connected load.

MotorGuard[®] Sinewave Filter (KMG) – TCI's brand name for a High-Performance Output Filters.

Active Filter Overview

The HarmonicGuard® Active filter is an active harmonic filter designed and developed by Allient TCI to relieve the power distribution system of the issues associated with harmonic currents that flow within the power distribution network caused by non-linear loads such as variable frequency motor drives (VFDs).

Sinewave Filter Overview

The MotorGuard is a low-pass sine wave filter designed and developed by Allient TCI to deliver conditioned power to motor loads driven by PWM drives across a wide range of lead lengths. It is available for both 460/480-volt and 575/600-volt systems.

The MotorGuard is a passive, series-connected filter installed between the output terminals of the variable frequency drive (VFD) and the motor. Its purpose is to remove carrier-frequency distortion from the VFD output voltage waveform. By using a low-pass L-R-C network, the MotorGuard produces a nearly pure sine-wave voltage profile. This design helps mitigate the reflected-wave phenomenon (dv/dt) and reduces risks such as motor or transformer insulation damage, premature cable failure, and stresses on VFD output wiring.

In addition, the MotorGuard reduces stray high-frequency harmonic currents, which in turn minimizes VFD ground-fault issues and decreases noise interference in transducer and control-signal wiring. All MotorGuard are suitable for applications with lead lengths up to **15,000 feet**.

The MotorGuard is available in an Industrial configuration. The Industrial filter is available as a stand-alone device in its own enclosure for mounting adjacent to the VFD, or as an open-panel design for installation inside an enclosure supplied with the VFD or other equipment,

The MotorGuard includes the following standard features and components:

- **R-L-C power filter circuit**, consisting of:
 - A TCI-designed 3-phase reactor
 - Power resistors
 - High-endurance, harmonic-rated capacitors
- **Bleeder resistors** for safe capacitor discharge during shutdown
- **Compression terminals** for secure, reliable power wiring
- **Cooling fans** to maintain safe operating temperatures
- **PQconnect** monitoring and communications (optional)

3.0 PQvision Universal

Description

PQVision Universal is our software that allows users to control parameters and other setting on either the Active or Sinewave filters. PQVision provides real-time power quality analysis locally via Bluetooth technology and/or serial communications with a SCADA system. The PQvision allows the end user, installer, or specifier the ability to validate system performance to ensure specification compliance (IEEE-519 2022) and best operating practices. PQvision provides preventative maintenance and troubleshooting benefits to ensure smooth and long-term functionality.

Wiring and Configuration

Active Filter

PQvision Universal is available for all Type 3R Active Harmonic Filter and operates as a Modbus RTU Master/Slave device supporting standard two-wire RS-485/RS-232 signal levels. Contact TCI-Tech Support for utilizing PQvision Universal for Filters with Open Panel's and other types of Enclosures. A Detailed wiring block diagrams of the Interface Module components are available in the [HGA 5% Active Harmonic Filter](#).

Note:

The PQvision Active Type 3R Wire Harness (33262-1) is required to communicate to the Type 3R filter via PC. This 10ft harness is included with every purchase of a Type 3R Active Filter.

Active Harmonic Filters communications via PQvision Universal use the following default Modbus RTU settings:

Table 1: Active Filter Modbus RTU Settings

Parameter	Default Value	Units
Baud Rate	38400	Bps
Data Bits	8	Bits
Stop Bits	1	Bits
Parity	Even	-
Slave ID	1	-

To use **PQvision-Universal** on Type-3R filters, perform the following steps:

1. Safely Power down the Active Filter
2. Locate the Diagnostic Remote Access Port (Same Port used for Remote HMI's)

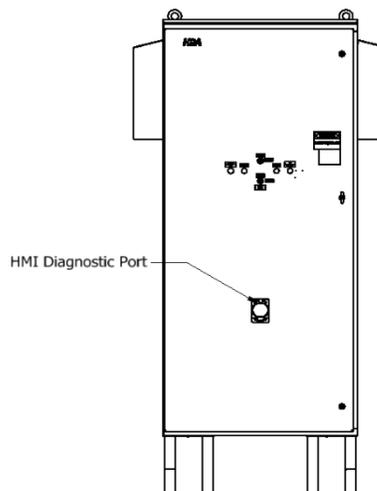


Figure 1: HMI diagnostic Port on an Active filter

3. Locate the PQvision Active Type 3R Wire Harness, 33262-1. This 10ft harness is included with every purchase of a Type 3R Active Filter.
4. Connect the custom Write Harness to the DB-9 header on the Remote Access Port.
5. Connect the appropriate modbus converter adapter to the stranded wires of the of custom wire harness.

Note: Driver’s installation will be required for the modbus converter adapter.

- a. If your Type 3R Active Filter is a Gen 2 30/50A Filter, use a “[B&B SmartWorx, Inc Model: USPTL4](#)” model RS-422/485 converter.
- b. All other Type 3R Active Filter, use a [USB to RS232/485 Serial Converter](#).
 - i. Driver Installation - [USB TO RS232/485 - Waveshare Wiki](#)

Table 2: Active Filter USB Converter Connections

33262-1 Wire Harness – Pinout	Signal Type	Pin Out on B&B Converter USPTL4	Pin Out on Waveshare USB TO RS232/485
White – Tx	RS-485 D+ (non-inverting) RS-232 Tx	TDB (+)	TX_A
Black – GND	RS-485 GND RS-232 GND	GND	GND
Red - Rx	RS-485 D- (Inverting) RS-232 Rx	TDA (-)	RX_B

Sinewave Filter

The Sinewave Filter implements a Modbus RTU Master/Slave device, which supports two-wire RS-485 signal levels through its PQconnect board. The PQconnect communication port used for the Modbus RTU interface is connected directly to the PCB. The communication port is located on the side of the PQconnect board.

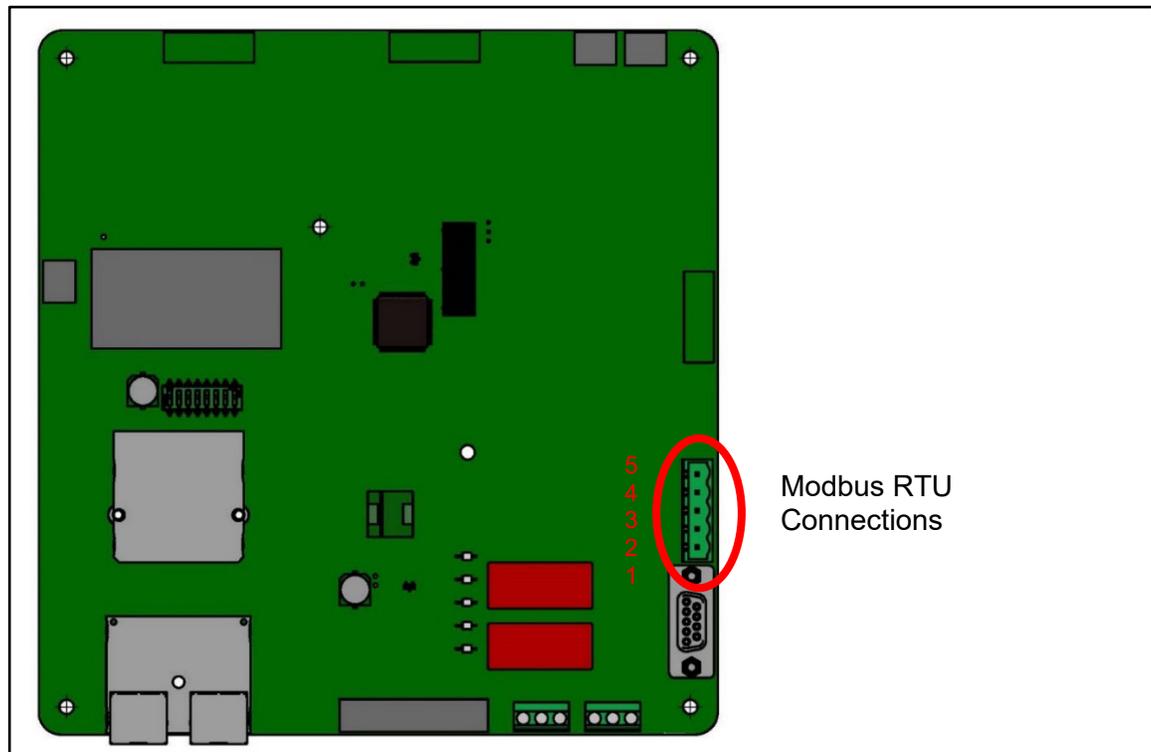


Figure 2: PQconnect Modbus RTU Connection

A standard RS485 to USB converter can be used with your sine wave filter with PQconnect. To run the PQvision software the converter will need to be connected to terminal J5 on the PQconnect PCB with pin orientation as described in the table below, the USB connector will need to be run to laptop or PC.

Table 3: Modbus Connector Pin Definitions

J5 Header Pinout	Signal Name	Signal Type
1	No connect	-
2	D+	RS-485 B (non-inverting)
3	GND	RS-485 SC/G
4	D-	RS-485 A (inverting)
5	No connect	-

Table 4: Modbus RTU Protocol Settings

Parameter	Default Value	Units
Baud Rate	38400	Bd
Data Bits	8	Bits
Stop Bits	1	Bits
Parity	Even	-
Slave ID	10	-

Defaulting/Changing Modbus RTU Settings

Modbus RTU Settings can be defaulted by removing the jumper pin located on **J20** on the PQconnect board. This is helpful if communication to the board has been lost, or the board has unknown Modbus RTU Settings.

The Modbus settings can also be modified via PQvision. A Tech level access password is required to change these parameters. Refer to the *Table 11 & 12* for more information.

Bus Configuration Options

The PQconnect board supports multiple RS-485 bus topologies, configurable through the **SW1** DIP switch located next to connector **J5** on the PCB. **SW1** has two positions on (**On/Up**) and (**Off/Down**) position. Refer to the figure below

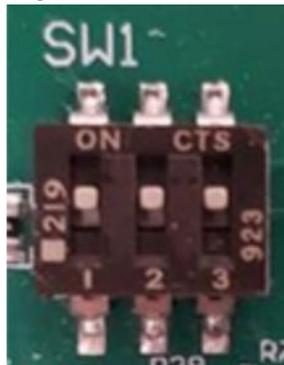


Figure 3: PQConnect SW1 Image

The two most common configurations are:

1. **Single-Filter Bus** (one filter connected)
2. **Multi-Filter Bus** (multiple filters daisy-chained on the same RS-485 bus)

Refer to Table 5 below for configuration details for Single-Filter Bus and Multi-Filter Bus.

In a multi-filter bus configuration, all Sinewave Filters—each equipped with a PQconnect board—are **daisy-chained together on the same Bus**. To ensure proper RS-485 termination, the **last PQconnect board on the bus** must have **SW1-2 configured to ON**, enabling the termination resistor. All other PQconnect boards on the bus must have **SW1 set to OFF**, disabling termination.

Table 5: Bus Configuration Table

SW1 Poles	Single-Filter Bus	Multi-Filter Bus
SW1-1	Switch OFF	Switch OFF
SW1-2	Switch ON	Switch ON for last PQconnect on bus Switch OFF for all other PQconnect's on bus
SW1-3	Switch OFF	Switch OFF

To use **PQvision-Universal** on sinewave filters, perform the following steps:

1. Safely Power down the Sinewave Filter
2. Locate the PQconnect Port and its J5 Terminal block
3. Utilizes a shielded, 3 stranded cable and connect your cable based on Table 16: Modbus Connector Pin Definitions
4. Connect the appropriate modbus converter adapter to the other end of the stranded wires.
Note: Driver's installation will be required for the modbus converter adapter.

a. use a "[B&B SmartWorx, Inc Model: USPTL4](#)" model RS-422/485 converter.

Table 6 : USPTL4 to J5 Header Connections

J5 Header Pinout	B&B Converter USPTL4Pin Out	Signal Name	Signal Type
1	-	No connect	-
2	TDB(+)	D+	RS-485 B (non-inverting)
3	GND	GND	RS-485 SC/G
4	TDA(-)	D-	RS-485 A (inverting)
5	-	No connect	-

Installing PQvision Universal

PQvision Universal is a free software desktop app that provides real-time filter line voltage, current metering values, visual voltage and current waveforms, and spectrum data.

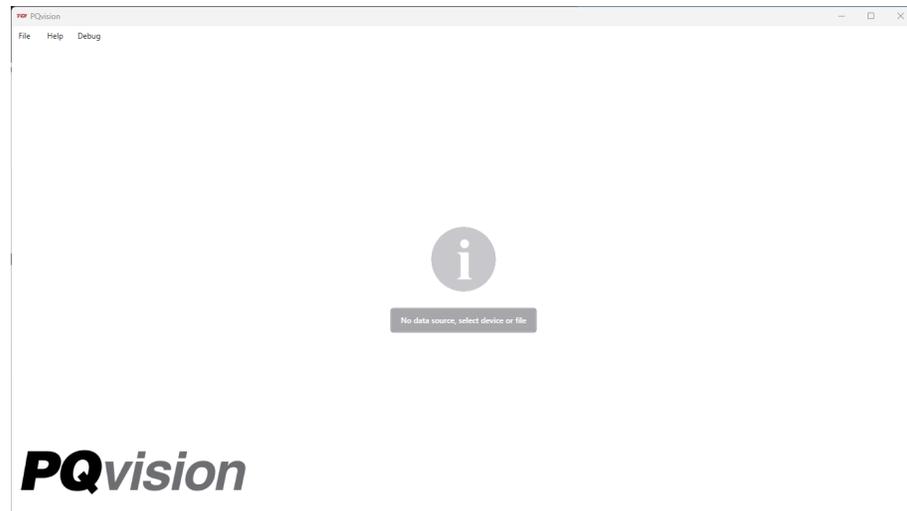


Figure 4 : PQvision Universal Desktop Software

The latest version of PQvision Universal can be downloaded here:

<https://www.transcoil.com/wp-content/uploads/software/pqvision.appinstaller> and is only available on Windows.

The downloaded windows package consists of a setup program that needs to be launched. If asked to grant administrative rights to that application, please accept. To uninstall, simply use window's "Add/Remove programs" wizard.

General Interface

PQvision Universal interface is designed to be simple and intuitive. All main features are accessible from the main window. Familiarizing yourself with the interface layout will help you easily navigate and operate the software.

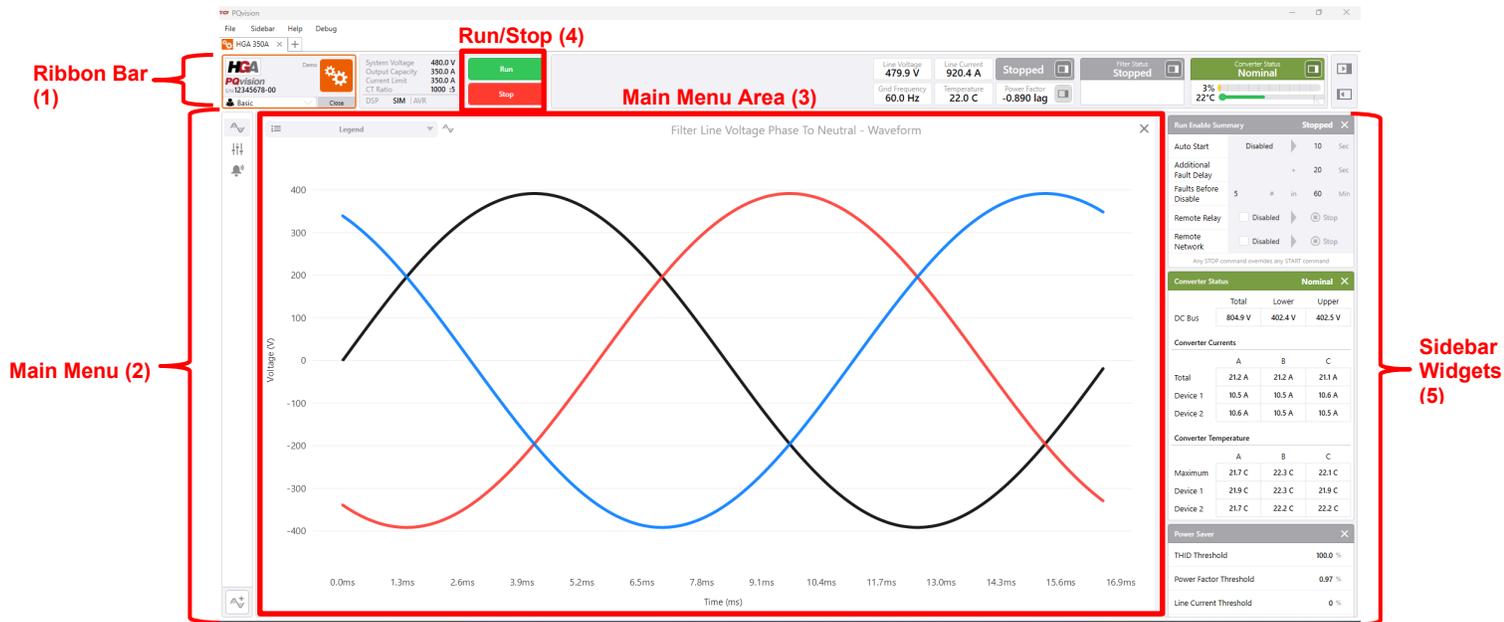


Figure 5 : PQvision Universal User Interface (E.g. - Active Filter)

Interface Zones

1. **Ribbon Bar** – One of the most important components of the interface. Displays key summary information about the filter and its operational status, which always remains visible.
2. **Main Menu** – The Main Menu allows you to change the view in the Main Menu Area - such as displaying waveforms, parameter lists, or alarm status.
3. **Main Menu Area** – Display the content corresponding to the selected Main Menu Item.
4. **Run/Stop (Active Filter Only)** – Provides quick access to start or stop the Active Filter.
5. **Sidebar Widgets** – Displays real-time filter information through easy-to-read widgets. These allow the user to configure, control, and monitor additional system parameters.

Creating Connection Instance

A Connection Instance defines how PQvision communicates with a filter. It includes configuration details such as the communication protocol (e.g., Modbus RTU, EtherNet/IP) and connection parameters.

To create a new connection instance:

1. Open PQvision
2. Select the “No data, source, select device or file” button.
3. The ‘Select A Datasource’ dialog box will appear. (By default, Modbus RTU is selected)
4. Configure the communication settings

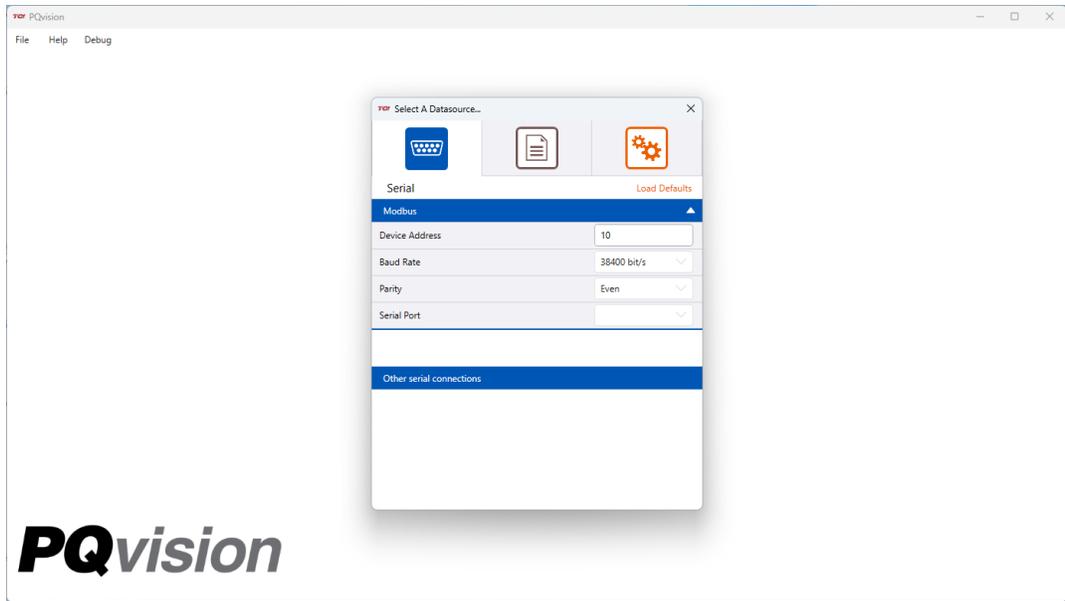


Figure 6 : Creating new connection Instance

Tip:

To simulate a connection without a physical device, select “Demo Mode” by clicking on the Orange Gear Icon of the dialog window.

Demo Mode Operation

In *Demo Mode*, PQvision behaves as if a real Active/Sinewave Filter is connected. When you start or stop the simulated filter, the application generates pseudo realistic line and converter current /voltage waveforms.

Additionally, simulated faults can be triggered to demonstrate how the PQvision responds to different fault conditions.

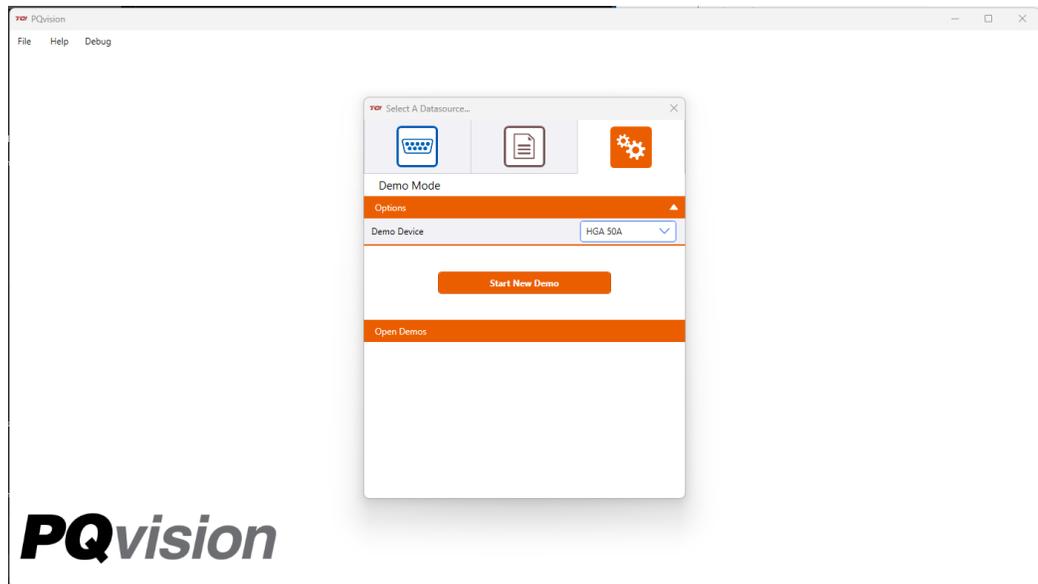


Figure 7 : PQvision Demo Mode Connection

Changing Access Levels

After successfully connecting to the filter, the dashboard is displayed. PQvision supports multiple access levels that define the visibility and configuration options available:

Table 7: Access Level Description Level

Access Level	Description
Basic	Default view with limited control
Tech	Enables technical views and parameter editing
Tech+ (Active Filter Only)	Provides advanced parameter access and widgets
Tech++ (Active Filter Only)	Extends access for detailed diagnostics, Tech and Engineering
Factory	Full access reserved for factory personnel

To change access levels

1. Select the desired Access level through the Ribbon Bar

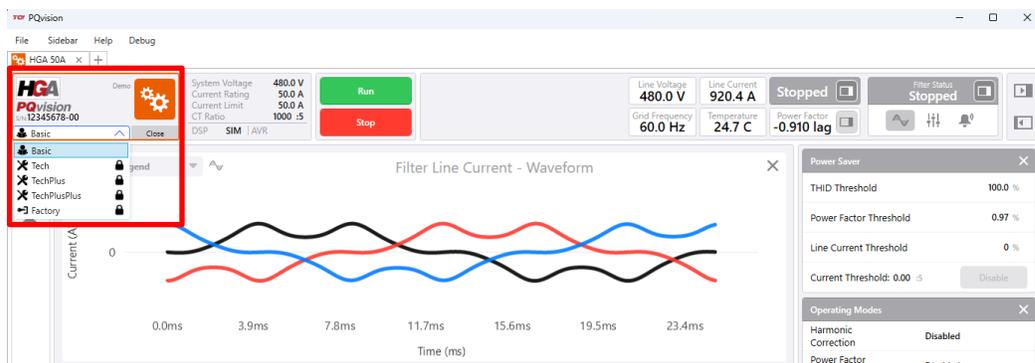


Figure 8 : Access Level Elevation Example

2. When prompted, enter the appropriate password
 - a. Tech Access Password – **08252014**.
 - b. For higher-level access, contact **TCI Technical Support**

Waveform Viewer

Adding Waveform Graph

PQvision allows users to view harmonic filter waveforms in real time while the filter is operating. By default, *no graphs* are shown when first installing PQvision.

To add additional waveforms:

1. Select the Waveform Viewer Icon  from the Main Menu

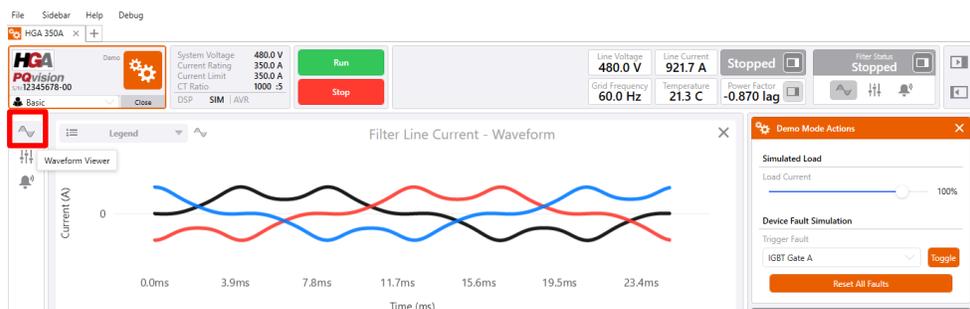


Figure 9: “Waveform Veiv Icon” Location

- Click on “Add Graph” Icon 



Figure 10: “Add Graph” Icon Location

- A small window should pop up, allowing the user to select the additional graph that you would like to add.

Note – If harmonic spectrum is available for your product line, the “With Harmonics” checkbox will be shown.

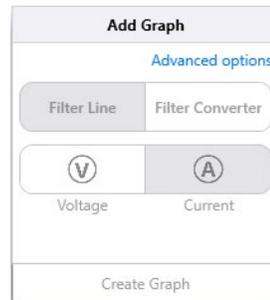


Figure 11: Add Graph Widget Active Filter Example

- The Waveform Editor will update to include the new graph.



Figure 12: Example Result of Adding Waveform Graph

Editing Existing Waveform Graph

PQvision also allows users to modify or update existing waveform graphs directly within the waveform viewer. This feature provides flexibility to adjust which signals or graph types are displayed with real time.

To edit an existing waveform:

1. Select the Waveform Viewer Icon  from the Main Menu
2. Select on the “Waveform Edit” Icon on the graph you want to edit.

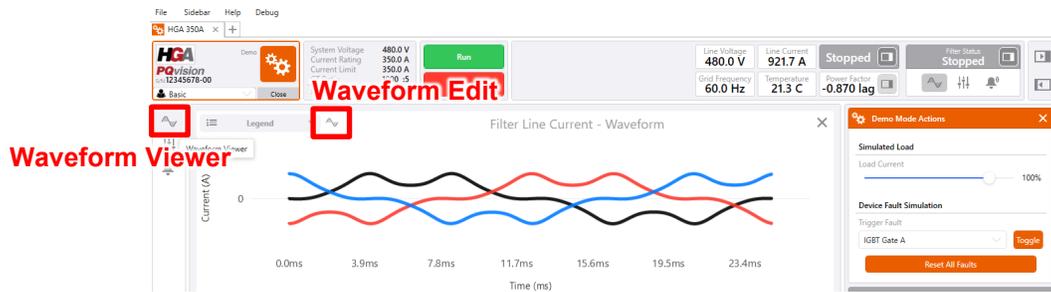


Figure 13: "Waveform Edit" Icon on Filter Line Current

3. In the dialog that appears, choose the new signal outputs you want to display.

Note: Be sure after selection to transfer  the output signals to the current signals section.

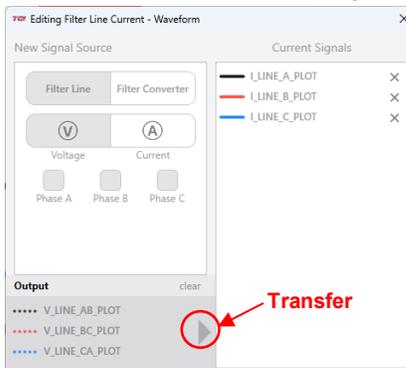


Figure 14: "Waveform Edit" Edit UI For Active Filter

4. Once your selections are made, the waveform graph will update automatically. You may then close the editor dialog window.



Figure 15: Example Editing Waveform Result

Hiding Waveform Signals

PQvision allows users to hide signals on existing waveform graphs directly within the waveform viewer. This feature provides flexibility to adjust signals in real time for debugging purpose. For example, if you want to only view the Filter Line/Voltage of Phase A, you can hide phases B and C.

To hide an existing waveform signal.

1. Select the Waveform Viewer Icon  from the Main Menu
2. Select the Waveform Legend on the graph you want to edit.
3. Click on a signal in the dropdown list to toggle between hidden or visible.

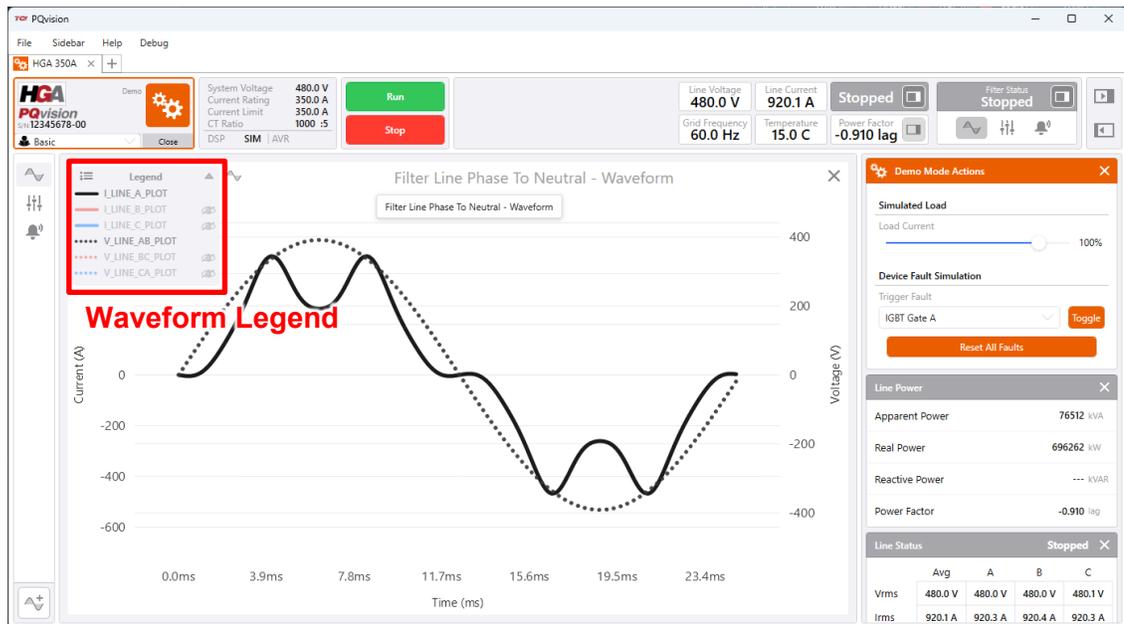


Figure 16: Hiding Phase B & C Example

Parameter Editor

The Parameter Editor allows the user to view and adjust accessible parameters reported by the Filter, depending on their current access level. Parameters provide insight into filter operation, diagnostics, and control settings.

To Open the Parameter Editor:

1. Select the Parameter Editor Icon  from the Main Menu
2. The parameter list will appear, displaying all accessible parameters for the connected filter.

Parameter with similar functions are grouped together under common categories (aliases) such as *Diagnostics*, *Control*, *Calibration*, or *CTs* (Active Filter Grouping Example)

Each group can be expanded or collapsed to make navigation easier and improve readability. Parameters can also be searched using keywords in the main search bar of the editor.

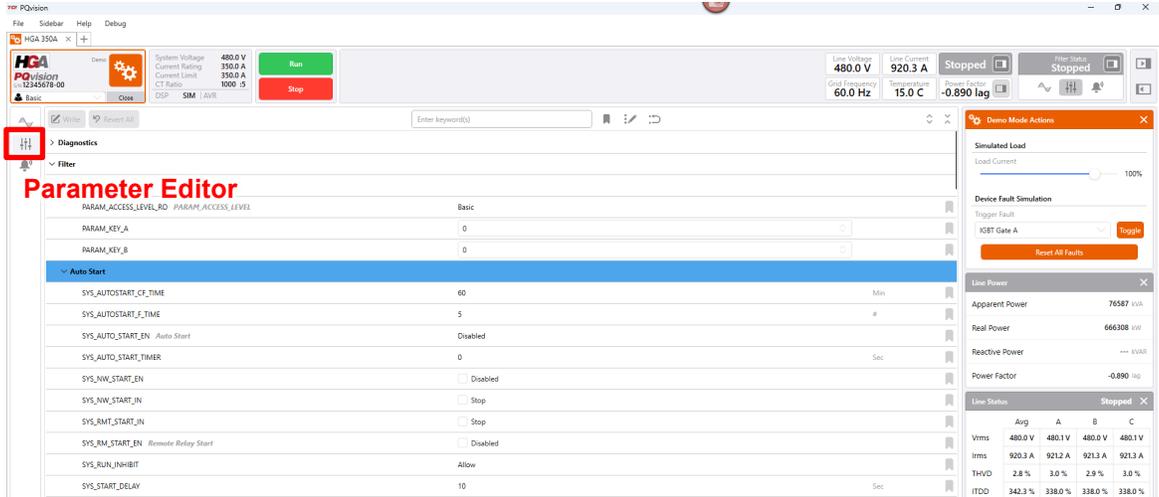


Figure 17: Example of Parameter Grouping

Note: Certain parameters may be read-only or hidden depending on the user's access level

When a parameter is selected the main title of the parameter will become highlighted and the general parameter information will get displayed. The Figure below shows the Parameter Editor displaying the `SYS_AUTO_STAT_EN` parameter expanded. In this, example, the parameter `SYS_AUTO_START_EN` (Auto Start Enable) is highlighted.



Figure 18: Expanded Parameter View of SYS_AUTO_START_EN

- **Parameter Name:** SYS_AUTO_START_EN
- **Description:** Enables automatic startup after power restoration or after a fault restart.
- **Current Value:** Disabled
- **Default:** Disabled
- **ID:** 1092
- **Register Type:** Holding Register
- **Register Address:** 102
- **Value Size:** 16 bits

Bookmarking Parameters

The Parameter Editor  allows user to bookmark frequently used parameters for quick access. This feature is useful for monitoring or adjusting key values without needing to navigate through multiple parameter groups.

To bookmark a parameter:

1. Click on the Bookmark icon  next to the parameter name in Parameter Editor view. Once the bookmarked, the parameter will appear in the Bookmarked Parameters View.
2. To view all bookmarked parameters, select the Bookmark icon  on the Parameter Editor Ribbon bar.

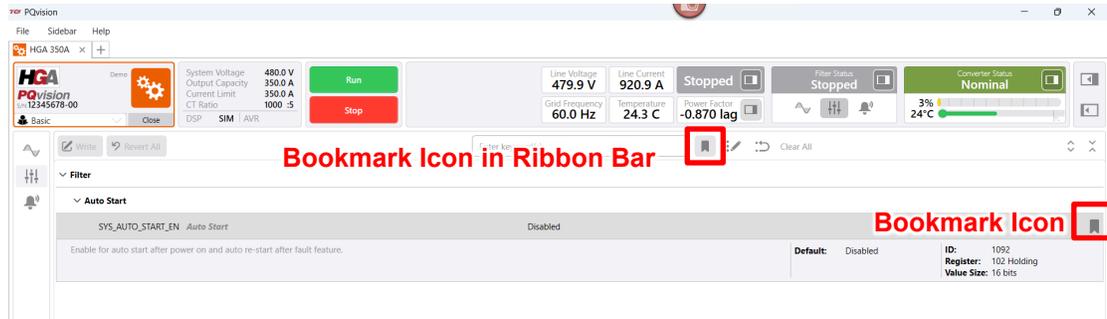


Figure 19: Bookmark Icon Location

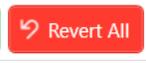
Tip:

Bookmarks are especially helpful for service engineers and technicians who frequently monitor specific diagnostic or control parameters.

Editing/Modifying Parameter

PQvision allows users with sufficient access rights to edit writable parameters directly from the Parameter Editor . Multiple parameters can be written to the Filter at the same time or one by one.

To modify/write a parameter:

1. Select the desired parameter from the Parameter Editor List
2. Click inside the Parameter's value field and enter the new value or select from the available options. (for example, Enabled/Disabled).
3. Once modified, the parameter row will be highlighted in a light blue indicating that the value has been modified but not yet written to the filter.
 - a. Multiple parameters can be selected to be changed if required.
4. To view all modified parameters, select "Edit (Pencil)"  on the toolbar of the editor.
5. After verifying your change, click on "Write"  button on the toolbar to apply the updates to the filter.
6. To discard all pending changes and restore the last saved value, click "Revert All"  button on the toolbar.

Live Event/Alarm Viewer

The Event Viewer in PQvision provides users with real-time visibility into the system’s operational alerts, active faults, and history fault events detected by the Filter.

To open the Event Viewer:

1. Select the Alert/Bell  icon located on the Main Menu Sidebar.
2. The Event Viewer view will display a list of all currently active and recent system faults or alerts.

Each entry includes:

- **Event Name** – The fault or warning identifier (for example, IGBT Gate A)
- **Event Severity** – The fault’s importance level, displayed as a color-coded indicator.
- **Timestamp and Status** – Depending on the system’s configuration, additional information such as fault duration or acknowledgement status may appear.

Alert and Fault Status Indicators

At the top of the PQvision interface, system health indicators display the Filter Status, Converter Status (Active Filter Only), and system condition in real time.

When a fault or alert occurs:

- The Filter Status and System Health Indicators change colors from Nominal to Critical or Faulted.
- The Event viewer automatically logs the condition with the corresponding fault name and severity color.

These status indicators are read-only and reflect the present fault state of the filter. Some faults will automatically clear once the underlying condition resolves, while others require manual troubleshooting or user intervention before the filter can resume normal operation.

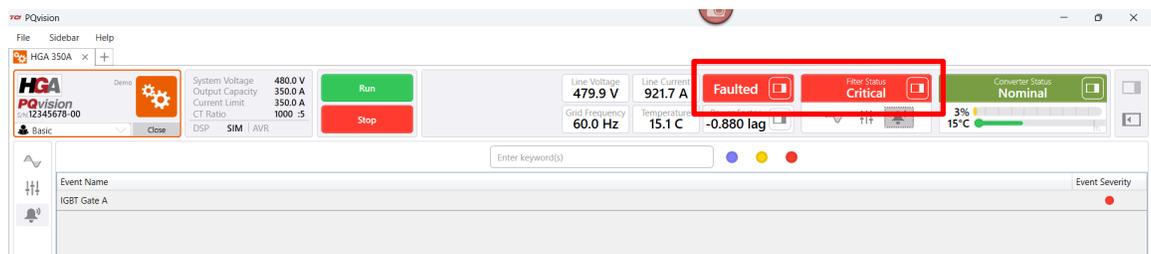


Figure 20: Example of Dashboard and Alert Indicators on Active Filter

Severity Color Schema

The severity of the event is represented through color-coded indicators for easy identification:

Table 8: Severity Table for All Filters

Color	Severity Level	Description
Red	Critical Fault	Indicates a severe condition that requires immediate attention. The filter will enter a faulted or stopped state. Manual reset may be required.
Orange/Yellow	Warning/Non-Critical Fault	Indicates an abnormal but non-critical condition. The filter may continue operate but performance could be affected.
Blue	Informational Event	Denotes normal informational messages or system actions such as communication notifications, or configuration changes.

Understanding Active Filter Fault Codes

For a full list of available fault codes and their definitions for the Active Filter, refer to the table below. This table includes each fault’s severity, reset behavior, and description. The Fault status on the active filter firmware is tied to the FAULT_ACTIVE parameter.

Table 9 : Active Filter Fault Codes Table

Fault Code	Critical or Non-critical Fault	Auto or Manual Reset	Fault Description
10	Critical	Manual*	Desaturation - Hardware Phase A
11	Critical	Manual*	Desaturation - Hardware Phase B
12	Critical	Manual*	Desaturation - Hardware Phase C
920	Non-critical	Auto	Internal CPU Fault 1 (CPU Cycle Time)
921	Non-critical	Auto	Internal CPU Fault 2 (CPU Clock Failure)
922	Non-critical	Auto	Internal CPU Fault 3 (CPU Stop)
923	Non-critical	Auto	Internal CPU Fault 4 (CPU Hardware)
950	Non-critical	Auto	Invalid Setpoint Configuration
951	Non-critical	Auto	Internal CPU Fault 5 (CPU Memory)
980	Non-critical	Auto	Test Fault 1 (Run)
981	Non-critical	Auto	Test Fault 2 (PCB)
1000	Non-critical	Auto	DC Bus Overvoltage - Overall
1001	Non-critical	Auto	DC Bus Overvoltage - Lower
1250	Non-critical	Auto	DC Bus Undervoltage - Overall
1251	Non-critical	Auto	DC Bus Overvoltage - Lower
3000	Non-critical	Auto	Overcurrent - Phase A
3010	Non-critical	Auto	Overcurrent - Phase B
3020	Non-critical	Auto	Overcurrent - Phase C
4000	Non-critical	Auto	Over Temperature - Phase A
4010	Non-critical	Auto	Over Temperature - Phase B
4020	Non-critical	Auto	Over Temperature - Phase C
4250	Non-critical	Auto	Under temperature - Phase A
4260	Non-critical	Auto	Under temperature - Phase B
4270	Non-critical	Auto	Under temperature - Phase C
4500	Non-critical	Auto	Exhaust Over Temperature
7000	Non-critical	Auto	Calibration Fault
7010	Non-critical	Auto	Communications Fault
7050	Critical	Manual*	Auto-start Restart Limit Exceeded
Unit N Faulted	Non-critical	Auto	Fault location indication. Fault originated in Unit N where N is in the range 1 to 8. For factory configured parallel systems, the unit numbers are sequential ordered from left to right when looking at the front of the system. Unit 1 is the left most unit in the system.

*Critical faults flagged with a manual reset require an HMI stop button or run/stop switch stop command at the unit to clear.

Understanding Sinewave Filter Fault Codes

For a full list of available fault codes and their definitions for the Sinewave Filter, refer to the table below. This table includes each fault's severity, reset behavior, and description. The Fault status on the Sinewave firmware is tied to the `_DETECTION_STATUS` parameter.

Table 10 : Sinewave Filter Fault Codes Table

Bit Position	Critical or Non-critical Fault	Fault Description
0	Non-critical	Overvoltage – Output Voltage Phase A
1	Non-critical	Overvoltage – Output Voltage Phase B
2	Non-critical	Overvoltage – Output Voltage Phase C
3	Non-critical	High THVD – Output Voltage Phase A
4	Non-critical	High THVD – Output Voltage Phase B
5	Non-critical	High THVD – Output Voltage Phase C
6	Non-critical	Thermal SW – Reactor Thermal SW 1 (J7)
7	Non-critical	Thermal SW – Reactor Thermal SW 2 (J8)
8	Informational	Temp – PCB Under Temperature
9	Informational	Temp – PCB Over Temperature
10	Informational	Phase Loss – Output Voltage Phase A
11	Informational	Phase Loss – Output Voltage Phase B
12	Informational	Phase Loss – Output Voltage Phase C
13	N/A	Unused
14	N/A	Unused
15	Critical	CPU Error

History Log (Status Detection) Viewer

The Event Viewer in PQvision can also provide an historical event for Sinewave filters. This feature is available when the user is Tech and above.

To view History, Log through the Event Viewer:

1. Elevate your Access Level to Tech. Refer to [Changing Access Levels](#)
2. Select the Alert/Bell  icon located on the Main Menu Sidebar.
3. The Event Viewer view will display any resent currently active faults along with a preview of fault history log.

History Log records are chronological listed based on Power Cycle Count and timestamps.

When a History Log record is selected, PQvision will display phase-level measurements such as:

- **THVD Voltage**
- **Average Voltage**
- **Fundamental Frequency**
- **Estimated Carrier Frequency**
- **Event Severity** – The fault’s importance level, displayed as a color-coded indicator.

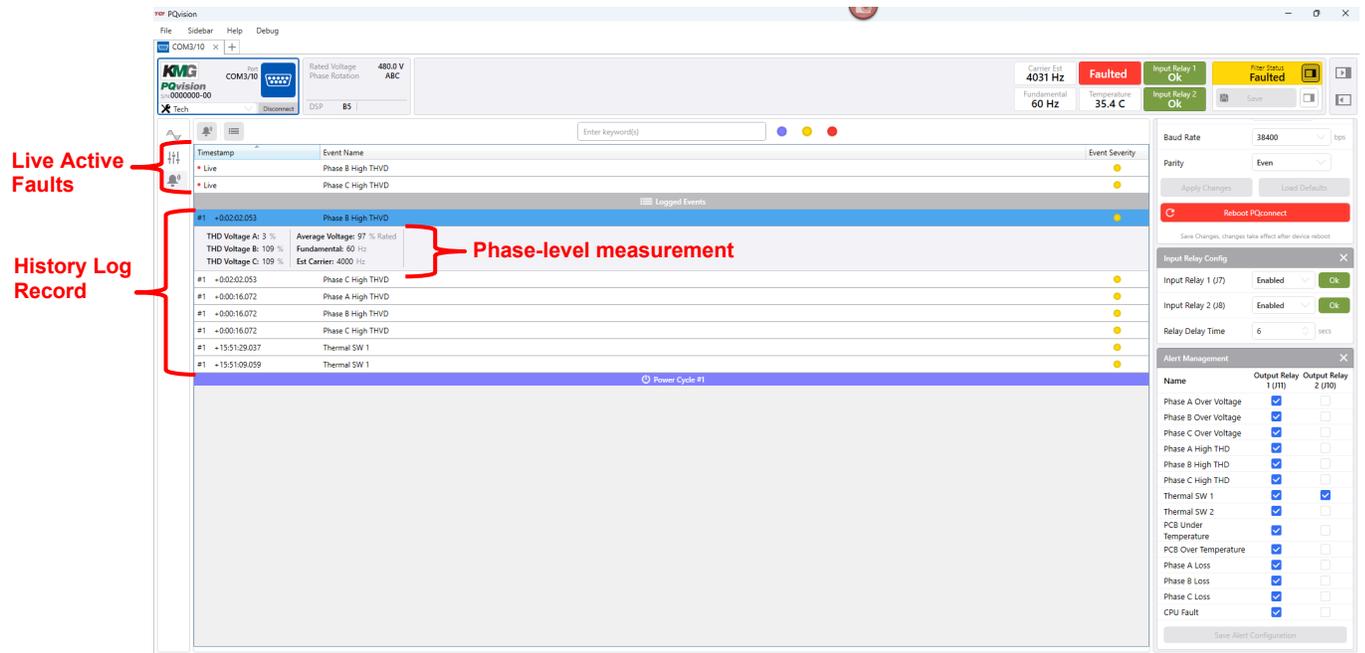


Figure 21: PQvision Universal History Log Breakdown

For more information on breakdown of history log for sinewave refer to [Sinewave Filter – History Log \(Status Detection\) Data](#)

Snapshot Feature

The snapshot feature in PQvision allows user to capture and save a complete set of real-time operating data from the filter at a specific moment. This function is useful for troubleshooting, analysis, and record keeping, as it preserves detailed system parameters and power quality data for later review – even when the system is no longer connected.

When a snapshot is taken, PQvision records all available parameters currently being monitored by the software, including but not limited to unit status, alarm/fault codes, etc. The data is captured in a single custom file that can then be used to view the captured data.

Common Use Cases:

- Troubleshooting: Capture filter data now of a fault or irregular event.
- Field Support: Share a snapshot file with TCI or Engineering teams for remote analysis.
- Performance Verification: Compare before/after snapshots when adjusting settings or replacing components.
- Documentation: Store baseline system performance data after installation or commissioning.

How to take a Snapshot

1. Ensure communication is active. Verify that PQvision is successfully connected, and that live data is being displayed on the screen.
2. Access the Snapshot Menu, from the top menu bar, navigate to **File** → **Export Snapshot**.
3. Save the Snapshot File and follow the prompt instructions.
4. Verify the snapshot export, by attempting to import the recently exported file.

Tip:

Taking a snapshot immediately after a fault or unexpected event can help isolate the cause by preserving the exact system conditions present of when the fault occurred.

How to view a Snapshot

Saved snapshots can be reloaded into PQvision to review previously captured data, even when the Filter is not connected. This allows users to analyze past conditions, compare data across time, or share snapshots for troubleshooting support.

1. Launch PQvision on your PC
2. Load up the main connection instance window and select on the file icon 
3. Select the Snapshot File to load and follow prompt instructions if any.
4. The Application will load the snapshot data and display all recorded values as they were captured at the time of the export.
5. The status bar or title panel will indicate that the data shown is from a snapshot file (not a live connection)

You can open multiple snapshots for side-by-side comparison to analyze by setting up a new connection instance tab. Snapshot files can also be shared with TCI Technical Support for off-site diagnostic review.

Sidebar Widgets

The sidebar widgets in PQvision provides real-time visibility into key parameters of the Filter. These widgets allow users to monitor filter status, performance, and power quality data without having to go through a whole list of parameters through the parameter editor.

Note:

In this document, only the Basic and Tech sidebar widgets are outlined. For detailed information on additional widgets that are available in higher access level, contact TCI Technical Support.

Accessing Sidebar Widgets

1. Launch PQvision and connect to the Filter.
2. Ensure the main dashboard is open.
3. Select **Sidebar** from the top menu bar to toggle visibility.
4. The sidebar widget will then appear on the right-hand side of the application window, displaying grouped widgets based on your current access level, without having to go through a whole list of parameters through the parameter editor.

The widgets available in the sidebar depend on the current access level. Higher level of access provides additional access to more detailed widgets for advance control.

Access Level and Widget Availability

PQvision organizes sidebar widgets by user access level, ensuring each user only views data appropriate to their role. Some widget's ability to write to certain parameters also change based on access level.

If a sidebar widget that you are currently viewing requires a higher access level, and your session of access is **downgraded**, PQvision will automatically remove or close any widgets that are no longer permitted under the new access level.

Active Filter Widget(s)

The table below outlines each widgets name with description and access level required to view.

Table 11: Active Filter Widget Table

Access Level	Widget Name	Widget Description
Basic	Line Status	Displays specific power quality information regarding source voltage, current, power, and Power Factor and THD measurements.
	Line Power	Displays Filter Line Power parameters such as Apparent, Line, Reactor Power and D.P.F.
	Converter Status	Displays present status of Active Filter Power Converter module. Displays present output corrective current that the Active Filter is outputting, Internal DC Link Bus Voltages of the harmonic filter, along Filter's internal power converter heat sink temperature.
	Operating Modes	Allows for selection of operation modes, such as Harmonic Correction, PF Correction, and VAR Output.
	Power Saver	Configuration widget that allows the unit to turn off its internal power converter, if the system line current, THID and/or Power Factor drops below a set threshold.
	Run Enable Summary	Displays the states of all enables that affect the running of the harmonic filter. Any STOP command overrides any STRT command.
Tech	Filter Configuration	Configuration Widget that allows for techs to calibrate filter, change Filter Line CT Ratio's etc.
Tech Plus	Displacement PF Regulator Configuration	Allows for Power factor set point to be selected and the band or range the power factor will operate within. PF measured from +0.5 Leading to -0.5 lagging.
	Installation Voltage Configuration	Allows for Configuration of the Filter line voltage as well as the external transformer and the transformer tap percentage.
	Parameter Tuning	Users can control and configuration the Vlink Voltage, Var Control, and Converter current RSM limit
	Regulator Configuration	Allows user to enable and disable specific harmonic orders the active filter targets
	SD Card Logging	Displays information regarding data acquisition on the SD card or terminal.
	Sensor Error Configuration	A configuration widget that allows users to activate or deactivate sensors and define threshold values for sensors activation point.
	Test Var Command	Allows user to test different Var loads to determine the reactive power
	Wiring Setup	Displays information regarding how the current transformers are installed

Sinewave Filter Widget(s)

The table below outlines each widgets name with description and access level required to view.

Table 12 : Sinewave Filter Widet Table

Access Level	Widget Name	Widget Description
Basic	Filter Status	Displays specific power quality information regarding voltage and THD measurements
	Alert Management	Allows the user to enable and disable the status detection conditions that drive the Output Relay 1 (J11) and Output Relay 2 (J10). Upon power up the relays energize, closing the normally open contacts. This is the nominal status OK state. The output relays stay in this state until one of the configured alerts is detect or board becomes unpowered.
	Input Relay Config	Allows the user to change Input Relay 1 (J7) and Input Relay 2 (J8) Settings of the PQConnect board. Relay 1 is intended to be used with the normally closed thermal switch available on the filter reactor.
	Modbus Configuration	Allows the user to change Modbus Settings of the PQConnect board.
Tech	Save & Load Filter Settings	Configuration Widget that allows for techs to calibrate filter, change Filter Line CT Ratio's etc.
Factory	Calibration Setup	Allows for TCI to calibrate the PQconnect board to the rated KMG Filter. Used only by TCI personal.

Modbus RTU Parameter Appendix

The Modbus RTU Parameter appendix provides detailed information on all Modbus holding registers available within the Active Filter. These registers define the communication interface between PQvision Universal, HMI (Active Filter Only), and external system connected via Modbus RTU.

The **Analog Output Holding Registers** define the Modbus register range used to monitor and control the filter's parameters, such as measured voltage, currents, and calculated power values. Each analog parameter is represented by a single 16-bit Modbus register, unless otherwise denoted. When a value exceeds the 16-bit range, multiple consecutive registers may be used. The Start Address for these parameters is **40000**.

Active Filter - Parameter Register Map

Parameter Name	I/O Register Address Offsets	Type	Range	Description
DSP_SW_VER	1	R: Basic	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*1 => 1.0	Software revision code for power converter processor Two 8bit ASCII Characters 0x3144 = ASCII for "D1"
AVR_SW_VER	2	R: Basic	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*2 => 2.0	Software revision code for communications interface processor Two 8bit ASCII Characters 0x3144 = ASCII for "D1"
HMI_SW_VER	3	R: Basic	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*3 => 3.0	Software revision code for HMI touchscreen processor. Two 8bit ASCII Characters 0x3144 = ASCII for "D1"
V_LINE_AVG_RMS	4	R: Basic	0 ≤ X ≤ 7200 Scalar: 0.1 Equation: 0.1*10 => 1.0 V	Input Line Voltage Average RMS
V_LINE_AB_RMS	5	R: Basic	0 ≤ X ≤ 7200 Scalar: 0.1 Equation: 0.1*11 => 1.1 V	Source Utility Line Phase to Phase Voltage (A-B)
V_LINE_BC_RMS	6	R: Basic	0 ≤ X ≤ 7200 Scalar: 0.1 Equation: 0.1*11 => 1.1 V	Source Utility Line Phase to Phase Voltage (B-C)
V_LINE_CA_RMS	7	R: Basic	0 ≤ X ≤ 7200 Scalar: 0.1 Equation: 0.1*9 => 0.9 V	Source Utility Line Phase to Phase Voltage (C-A)
V_LINE_AVG_THD	8	R: Basic	0 ≤ X ≤ 10000 Scalar: 0.1 Equation: 0.1*1 => 0.1 %	Input Line Voltage Average THD at injection point. In cases of low signal feedback, this value will be zeroed out.
SYS_INT_STATE	9	R: Basic	0 ≤ X ≤ 255	System Interrupt State which is tied to the Active Filter's Converter Status 00 = Idle 01 = Stopped 02 = Initializing Run 03 = Run Ramp Voltage 04 = Run Normal
V_LINE_AB_THD	10	R: Basic	0 ≤ X ≤ 10000 Scalar: 0.1 Equation: 0.1*10 => 1.0 %	Input Line Voltage Phase A THD at injection point. In cases of low signal feedback, this value will be zeroed out.
V_LINE_BC_THD	11	R: Basic	0 ≤ X ≤ 10000 Scalar: 0.1 Equation: 0.1*11 => 1.1 %	Input Line Voltage Phase B THD at injection point. In cases of low signal feedback, this value will be zeroed out.

V_LINE_CA_THD	12	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*12 => 1.2 %	Input Line Voltage Phase C THD at injection point. In cases of low signal feedback, this value will be zeroed out.
I_LINE_AVG_RMS	13	R: Basic	0 <= X <= 20000 Scalar: 0.1 Equation: 0.1*13 => 1.3 A	Input Line Current Average RMS
I_LINE_D_POS	14	R: Tech	-32768 <= X <= 32767 Scalar: 1.0 Equation: 1.0*14 => 1.0 A	Line/Load Current Positive Sequence D Component (Direct-quadrature-zero transformation)
I_LINE_Q_POS	15	R: Tech	0 <= X <= 32767 Scalar: 1.0 Equation: 1.0*15 => 1.0 A	Line/Load Current Positive Sequence Q Component (Direct-quadrature-zero transformation)
I_LINE_AVG_THD	16	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*16 => 1.6 %	Line/Load Current Average THD Line THID for units configured for line side/bus applied control or load THID for units configured for load side control
I_LINE_THD_REF	17	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*17 => 1.7 %	Line/Load Current Reference THD In cases of low signal feedback, this value will be zeroed out.
P_LINE_POWER_FACTOR	18	R: Basic	-999 <= X <= 1000 Scalar: 0.001	Filter Current Line Displacement Power Factor 1,000 = 1.00 Unity PF -950 = 0.95 Lagging PF 950 = 0.95 Leading PF
I_LINE_AVG_TDD	19	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*19 => 1.9 %	Line/Load Current Average TDD
I_LINE_A_THD_REF	20	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*20 => 2.0 %	Line/Load Current Phase A Reference THD In cases of low signal feedback, this value will be zeroed out.
I_LINE_B_THD_REF	21	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*21 => 2.1 %	Line/Load Current Phase B Reference THD In cases of low signal feedback, this value will be zeroed out.
I_LINE_C_THD_REF	22	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*22 => 2.2 %	Line/Load Current Phase C Reference THD In cases of low signal feedback, this value will be zeroed out.
SYS_RUNNING	23	R: Basic	0 <= X <= 1	Indicates if the HGA filter is currently running or in the idle state 00 = Idle 01 = Running
SYS_FAULTED	24	R: Basic	0 <= X <= 1	Indicates if the HGA filter has faulted 00 = Not faulted 01 = Faulted
SYS_IN_I_LIMIT	25	R: Basic	0 <= X <= 1	Indicates if the HGA filter is running at its maximum capacity 00 = Nominal 01 = At Capacity
SYS_IN_T_LIMIT	26	R: Basic	0 <= X <= 1	Indicates if the HGA filter is running at its maximum Thermal Limit Active filter correction current reduced due to power converter heatsink temperature approaching trip level. 00 = Nominal 01 = In Limit
SYS_PWR_SV	27	R: Basic	0 <= X <= 1	Indicator for unit in power save mode where a run command is present but correction demand below turn on threshold 00 = Unit not in power save mode 01 = Unit in power save mode.

LINE_FREQ	28	R: Basic	0 <= X <= 700 Scalar: 0.1 Equation: 0.1*600 => 60 Hz	Configured Utility Grid Frequency
LINE_ROT	29	R: Basic	0 <= X <= 3	Configured Utility Grid Rotation 00 = Null 01 = ABC 02 = ACB 03 = CAB
PLL_LOCK	30	R: Basic	0 <= X <= 1	Filter Utility Grid Synchronous Locked (PLL) 00 = Not Locked 01 = Locked
SYS_CAPACITY	31	R: Basic	0 <= X <= 1000 Scalar: 0.1 Equation: 0.1*301 => 30.1 %	Present Injection Current Capacity of Active Filter in Units of Percent of Max Capacity
V_LINK_TOTAL	32	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*32 => 3.2 V	Converter DC Bus Voltage Total
V_LINK_BOTTOM	33	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*33 => 3.3 V	Converter DC Bus Voltage Bottom Half
FILTER_CONTROL_CMD	34	R: Basic W: Basic	0 <= X <= 1	Command code for unit operation. 00 = Stop/Reset 01 = Run
I_LINE_A_RMS	35	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*35 => 3.5 A	Line/Load Current A Phase RMS Line current if unit is a master/ line side configuration, else it will be Load Current.
I_LINE_B_RMS	36	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*36 => 3.6 A	Line/Load Current B Phase RMS Line current if unit is a master/ line side configuration, else it will be Load Current.
I_LINE_C_RMS	37	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*37 => 3.7 A	Line/Load Current C Phase RMS Line current if unit is a master/ line side configuration, else it will be Load Current.
I_LINE_A_THD	38	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*38 => 3.8 %	Line/Load Current Phase A THD Line THID for units configured for line side/bus applied control or load THID for units configured for load side control
I_LINE_B_THD	39	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*39 => 3.9 %	Line/Load Current Phase B THD Line THID for units configured for line side/bus applied control or load THID for units configured for load side control
I_LINE_C_THD	40	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*40 => 4.0 %	Line/Load Current Phase C THD Line THID for units configured for line side/bus applied control or load THID for units configured for load side control
I_LINE_A_TDD	41	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*41 => 4.1 %	Line/Load Current Phase A TDD
I_LINE_B_TDD	42	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*42 => 4.2 %	Line/Load Current Phase B TDD
I_LINE_C_TDD	43	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*43 => 4.3 %	Line/Load Current Phase C TDD
PCB_TEST_NUM	44	R: Basic W: Tech++	0 <= X <= 65535	Test number of the PCB serial number Parameter contains NNN in the UUUULLLL-NNN serial number format.

PCB_SERIAL_NUM_0	45	R: Basic W: Tech++	0 <= X <= 65535	Lower 16 bits of the PCB serial number Parameter contains LLLL in the UUUULLLL-NNN serial number format.
PCB_SERIAL_NUM_1	46	R: Basic W: Tech++	0 <= X <= 65535	Upper 16 bits of the PCB serial number Parameter contains UUUU in the UUUULLLL-NNN serial number format.
I_CONV_AVG_RMS	47	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*47 => 4.7 A	Converter Current RMS Average
I_CONV_A_RMS	48	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*48 => 4.8 A	Converter Current Phase A RMS
I_CONV_B_RMS	49	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*49 => 4.9 A	Converter Current Phase B RMS
I_CONV_C_RMS	50	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*50 => 5.0 A	Converter Current Phase C RMS
VAR_SP_DYNAMIC	51	R: Tech	-32768 <= X <= 32767 Scalar: 0.1 Equation: 0.1*51 => 5.1 A	Physical Amp Value of Converter's VAR Setpoint
SYS_POKE_0	52	R: Factory W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Diagnostic poke variable 0 - Used for Unit Testing Set the run timer as per poke zero where time is poke0 cycles of run time (units of cycles).
ISOLATE_DEVICE_ACTIVE	53	R: Basic W: Error	0 <= X <= 1	Identifies whether Isolation of Converters Is Active 00 = Inactive 01 = Active
T_DSP	54	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*54 => 5.4 C	DSP Processor Temperature
T_PHASE_MAX	55	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*55 => 5.5 C	Max Temperature of Converter, specifically at the Heat Sink Location
T_PHASE_A	56	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*56 => 5.6 C	Phase A Temperature of Converter, specifically at the Heat Sink Location
T_PHASE_B	57	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*57 => 5.7 C	Phase B Temperature of Converter, specifically at the Heat Sink Location
T_PHASE_C	58	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*58 => 5.8 C	Phase C Temperature of Converter, specifically at the Heat Sink Location
SYS_E_GAIN_ACTIVE	59	R: Basic	0 <= X <= 16384	E Gain Active Indicator 00 = Nominal 01 = EGain Active
SYS_LIMITS_ACTIVE	60	R: Basic	0 <= X <= 256	Active Status/Flags for Event Logging Sets Control Limits for Thermal, Current, VAR, and THD Limits Bit 00 = Thermal Active Mask Bit 01 = Current Rms Active Mask Bit 02 = THD Active Mask Bit 03 = Inner Current Pole Active Mask Bit 04 = Voltage Pole Active Mask Bit 05 = Voltage Full Bus Active Mask Bit 06= Voltage Half Bus Active Mask

PARAM_PENDING	61	R: Basic	0 <= X <= 1	Parameter Changes Pending 00 = No Changes Pending 01 = Change Pending
PARAM_ACCESS_LEVEL RO	62	R: Basic	0 <= X <= 32	Level of Parameter Access to Read and/or Change Parameter Inputs 00 = Base access 16 = Tech access 20 = Tech+ access 24 = Tech++ access 32 = Factory access
START_UP_WIZARD_ST ATUS	63	R: Basic W: Tech	-3200 <= X <= 3200	Represents the current implementation phase of the Start- Up Wizard feature. This status is used to track the progress of the user during the progress of the wizard.
INHIBIT_ACTIVE	64	R: Basic	0 <= X <= 16	Unit Sensor Wiring check inhibit state 00 = Null 01 = Pending 02 = VLinePLL 03 = VLineUV 04 = VLineOV 05 = VLineRotation 06 = VLineAUV 07 = VLineBUV 08 = VLineCUV 09 = ILineRotation 10 = ILineAUC 11 = ILineBUC 12 = ILineCUC 13 = SLineAPolarity 14 = SLineBPolarity 15 = SLineCPolarity 16 = SLineImbalance
CAL_FAULT_ACTIVE	65	R: Basic	0 <= X <= 255	Location of Calibration Fault - Auto Nulling Offset, occurs when a Channel Offset is too big 00 = No Faults 01 = ISys A 02 = ISys C 03 = IConv A 04 = IConv C 05 = VLine A 06 = VLine C
SD_LOAD_STATUS	66	R: Tech	0 <= X <= 255	SD Card Parameter Load Status 00 = Init 01 = Ok 02 = Run Inhibit Error 03 = File Open Error 04 = File Read Error 05 = Parse Error 06 = Write Error 07 = Write Time Out
SD_LOAD_COUNT	67	R: Tech	0 <= X <= 255 Scalar: 1.0 Equation: 1.0*X => 0.0	SD Card Parameter Load Count
SD_RESULT	68	R: Tech	0 <= X <= 255	SD Memory Command Result 00 = Ok 01 = Disk Error (Hard Error) 02 = Internal Error (Assertion Error) 03 = Not Ready (The physical drive cannot Work) 04 = No File (Could not find the File) 05 = No Path (Could not find the Path) 06 = Invalid Name (File Name is invalid) 07 = Denied (Access Denied prohibited Directory) 08 = Exists 09 = Invalid Object (File Object is Invalid) 10 = Write Protected 11 = Invalid Drive 12 = Not Enabled (The Volume has No Work Area) 13 = No File System 14 = MKFS Aborted 15 = Timeout 16 = Locked 17 = Not Enough Core 18 = Too Many Open Files 19 = Invalid Parameter (Given parameter is invalid)

				System Configuration Feedback - Bitfield Variable bits are mutually bit exclusive Bit 00 = Autotransformer Bit 01 = Line Side Bit 02 = Load Side Bit 03 = 50A Bit 04 = 100A Bit 05 = 150A Bit 06 = 200A Bit 07 = 250A Bit 08 = 300A Bit 09 = 350A Bit 10 = 30A
SYS_UNIT_CONFIG	69	R: Basic	$0 \leq X \leq 32767$	
SYS_MIN_VAR	70	R: Basic	-7000 $\leq X \leq 0$ Scalar: 0.1 Equation: $0.1 * 70 \Rightarrow -7.0$ A	Min Inductive VAR Command in Amps
SYS_MAX_VAR	71	R: Basic	$0 \leq X \leq 7000$ Scalar: 0.1 Equation: $0.1 * 71 \Rightarrow 7.1$ A	Max Capacitive VAR Command in Amps
FAULT_ACTIVE	72	R: Basic	$0 \leq X \leq 65535$	Latched System Fault - Indicates the Fault with the highest Priority is 00 = None 10 = IGBT Gate A Fault 4500 = Exhaust Over Temp 920 = Internal CPU Cycle 1000 = DC Bus OverVoltage 1250 = DC Bus UnderVoltage 3000 = Phase A OverCurrent 3010 = Phase B OverCurrent 3020 = Phase C OverCurrent 3250 = HW Phse A OverCurrent 3260 = HW Phase B OverCurrent 3270 = HW Phase C OverCurrent 4000 = Heat Sink A Over Temp 4250 = Heat Sink A Under Temp 7000 = Unit Cal Fault 7010 = Com Fault 7050 = Restart Limit 11 = IGBT Gate B Fault 12 = IGBT Gate C Fault 1001 = DC Bus OverVoltage Lower 1251 = DC Bus UnderVoltage Lower 4010 = Heat Sink B Over Temp 4020 = Heat Sink C Over Temp 4260 = Heat Sink B Under Temp 4270 = Heat Sink C Under Temp 921 = Internal CPU CLK 922 = Internal CPU Stop 4300 = Internal CPU HW 950 = Setpoint Config 980 = Test Run 981 = Test PCB
SYS_AUTO_START_TIMER	73	R: Basic	$0 \leq X \leq 3600$ Scalar: 1.0 Equation: $1.0 * 73 \Rightarrow 73$ Secs	System Autostart Timer If the Auto Start is enabled and the Unit is at a Stop of Fault State the AutoStart Timer will count down Once the AutoStart Timer reaches zero the Run Command will be set High. Start Time for this parameter is set by PARAM_SYS_START_DELAY parameter.
LOG_CARD_STATUS	74	R: Tech	$0 \leq X \leq 10$	Log memory Card Status 00 = Null 01 = Card Ok 02 = Card Error 03 = Card Full 04 = Card Disabled
LOG_CARD_TOT_SIZE	75	R: Tech	$0 \leq X \leq 32000$ Scalar: 1.0 Equation: $1.0 * 75 \Rightarrow 75.0$ Mb	Log Memory Card Total Size - - Highest Amount is 32GB
LOG_CARD_FREE_SIZE	76	R: Tech	$0 \leq X \leq 32000$ Scalar: 1.0 Equation: $1.0 * 76 \Rightarrow 76.0$ Mb	Log Memory Card Free Size - Highest Amount is 32GB

RTC_SYNC_REQ_DSP	77	R: Basic W: Basic	$0 \leq X \leq 1$	Real time Clock Sync Request from DSP to AVR 00 = Idle 01 = Synch
P_LINE_REAL_TOTAL	78	R: Basic	-3000 $\leq X \leq$ 3000 Scalar: 1.0 Equation: $1.0 \cdot 78 \Rightarrow 78.0$ kW	Total Filter Line Real Power kW
P_LINE_APPARENT_TOTAL	79	R: Basic	-3000 $\leq X \leq$ 3000 Scalar: 1.0 Equation: $1.0 \cdot 79 \Rightarrow 79$ kVA	Line Total Apparent Power kVA
FAULT_LOCATION	80	R: Basic	$0 \leq X \leq 32767$	System fault location indicator bits. Each bit represents whether a fault was detected in a power converter Bit 00= Power Converter 1 Fault, Bit 01 = Power Converter 2 Fault, Bit 02 = Power Converter 3 Fault,
SYS_ACTIVE_DEVICES	81	R: Basic	$0 \leq X \leq 255$	Bit mask of active units in parallel system
FAULT_COM	82	R: Basic	$0 \leq X \leq 15$	Communications Fault Code for Dual Converter Units 00 = No Error 01 = TimeOut Error 02 = Checksum Error 03 = Length Error 04 = Buffer Overflow Error 05 = Parity Error 06 = Frame Error 07 = HW Overflow Error 08 = Command Error 09 = Packet Overflow Error
FAULT_MASK_A	83	R: Basic	$0 \leq X \leq 65535$	Lower 16 bits of fault mask Each bit represents whether the assigned fault was detected. A value of binary 1 indicate the assigned fault was detected and a value of zero indicates the assigned value was not detected. Bit 00 = IGBT Gate A Fault Bit 01 = Exhaust Over Temp Bit 02 = Internal CPU Cycle Bit 03 = DC Bus OverVoltage Bit 04 = DC Bus UnderVoltage Bit 05 = Phase A OverCurrent Bit 06 = Phase B OverCurrent Bit 07 = Phase C OverCurrent Bit 08 = HW Phase A OverCurrent Bit 09 = HW Phase B OverCurrent Bit 10 = HW Phase C OverCurrent Bit 11 = Heat Sink A Over Temp Bit 12 = Heat Sink A Under Temp Bit 13 = Unit Cal Fault Bit 14 = Com Fault Bit 15 = Restart Limit
FAULT_MASK_B	84	R: Basic	$0 \leq X \leq 65535$	Upper 16 bits of fault mask Each bit represents whether the assigned fault was detected. A value of binary 1 indicate the assigned fault was detected and a value of zero indicates the assigned value was not detected. Bit 00 = IGBT Gate B Fault Bit 01 = IGBT Gate C Fault Bit 02 = DC Bus Overvoltage Lower Bit 03 = DC Bus Undervoltage Lower Bit 04 = Heat Sink B Over Temp Bit 05 = Heat Sink C Over Temp Bit 06 = Heat Sink B Under Temp Bit 07 = Heat Sink C Under Temp Bit 08 = Internal CPU CLK Bit 09 = Internal CPU Stop Bit 10 = Internal CPU HW/Cooling System Bit 11 = Setpoint Config Bit 12 = Internal CPU Mem Bit 13 = Test Run Bit 14 = Test PCB
D1_I_CONV_RMS_A	85	R: Basic	$0 \leq X \leq 10000$ Scalar: 0.1 Equation: $0.1 \cdot X \Rightarrow 0.0$ A	Device 1 Phase A Converter Current

D2 I CONV RMS A	86	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*0 => 0.0 A	Device 2 Phase A Converter Current
D1 I CONV RMS B	87	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*0 => 0.0 A	Device 1 Phase B Converter Current
D2 I CONV RMS B	88	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*0 => 0.0 A	Device 2 Phase B Converter Current
D1 I CONV RMS C	89	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*0 => 0.0 A	Device 1 Phase C Converter Current
D2 I CONV RMS C	90	R: Basic	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*0 => 0.0 A	Device 2 Phase C Converter Current
D1 T CONV A	91	R: Basic	-500 <= X <= 1500 Scalar: 0.1 Equation: 0.1*0 => 0.0 C	Device 1 Phase A Converter Temperature
D2 T CONV A	92	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*0 => 0.0 C	Device 2 Phase A Converter Temperature
D1 T CONV B	93	R: Basic	-500 <= X <= 1500 Scalar: 0.1 Equation: 0.1*0 => 0.0 C	Device 1 Phase B Converter Temperature
D2 T CONV B	94	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*0 => 0.0 C	Device 2 Phase B Converter Temperature
D1 T CONV C	95	R: Basic	-500 <= X <= 1500 Scalar: 0.1 Equation: 0.1*0 => 0.0 C	Device 1 Phase C Converter Temperature
D2 T CONV C	96	R: Basic	-500 <= X <= 1550 Scalar: 0.1 Equation: 0.1*0 => 0.0 C	Device 2 Phase C Converter Temperature
ISOLATE_DEVICE	97	R: Tech+ W: Tech+	0 <= X <= 4	Returns ID of Device Selected
RTC_SYNC_REQ_AVR	98	R: Basic W: Basic	0 <= X <= 1	Real Time Clock Sync Request from AVR to HMI 00 = Idle 01 = Synch
HISTORY_LOG_INDEX	99	R: Basic W: Basic	0 <= X <= 99 Scalar: 1.0 Equation: 1.0*0 => 0.0	Specifies the index (or record number) of the historical event you wish to access within the HISTORY_LOG_RECORD buffer. It acts as a pointer or selector when retrieving specific log entries.
PARAM_USER_CMD_REQ	101	R: Basic W: Basic	0 <= X <= 255	Requested User State 00 = Init 09 = Save To Flash 21 = Set User Access 25 = Set Tech Access 30 = Set Factory Access 42 = Reboot 150 = Load From Flash 200 = Restore Non-Cal Defaults 255 = Restore Defaults
SYS_AUTO_START_EN	102	R: Basic W: Tech	0 <= X <= 1	Enable for auto start after power on and auto re-start after fault feature. 00 = Disabled 01 = Enabled

CT_0_CONFIG	103	R: Tech W: Tech+	0 ≤ X ≤ 5	Configures the phase location of the external line/load current sensing CTs. 00 = Phase ABC 01 = Phase CAB 02 = Phase BCA 03 = Phase ACB 04 = Phase BAC 05 = Phase CBA
CT_1_CONFIG	104	R: Tech W: Tech+	0 ≤ X ≤ 3	Configures the polarity of the external line/load current sensing CTs as far as direction of current flow through CT. 00 = Pos/Pos 01 = Neg/Pos 02 = Pos/Neg 03 = Neg/Neg
VLIN_CONFIG	105	R: Tech W: Tech+	0 ≤ X ≤ 5	Configures the incoming utility grid phase order as connected at the input to the unit. 00 = Phase ABC 01 = Phase CAB 02 = Phase BCA 03 = Phase ACB 04 = Phase BAC 05 = Phase CBA
SYS_VAR_OUTPUT_EN	106	R: Basic W: Tech	0 ≤ X ≤ 1	Enable VAR Output 00 = Disabled 01 = Enabled
SYS_H_CORRECT_EN	107	R: Basic W: Tech	0 ≤ X ≤ 1	Enables the harmonic correction feature of the unit. If both harmonic and power factor correction are enabled harmonic correction gets priority. 00 = Disabled 01 = Enabled
SYS_PF_CORRECT_EN	108	R: Basic W: Tech	0 ≤ X ≤ 1	Enables the power factor correction feature of the unit. If both harmonic and power factor correction are enabled harmonic correction gets priority. 00 = Disabled 01 = Enabled
SYS_PWR_SAVE_THRESH	109	R: Basic W: Tech	0 ≤ X ≤ 80 Scalar: 1.0 Equation: 1.0*50 => 50.0 %	Converter Power Save Threshold Sets the current threshold where the unit will go into a standby power save state if the line/load current is low. This value is represented in % multiplied by the primary side rating of the line/load CT ratio.
SYS_CT_FILTER	110	R: Tech W: Tech+	0 ≤ X ≤ 1	Enables extra filtering on the line/load current sensing CT feedback. 00 = Disabled 01 = Enabled
SYS_LIGHT_LOAD	111	R: Tech W: Tech+	0 ≤ X ≤ 1	Turns off some controls features to improve THD performance at light load conditions. 00 = Disabled 01 = Enabled
V_SUPPLY_RMS	112	R: Factory	-3200 ≤ X ≤ 3200 Scalar: 0.1 Equation: 0.1*240 => 240.0 V	This parameter represents the nominal +15V RMS voltage power supply rail used to power critical analog or mixed-signal subsystems. The expected nominal voltage is +15.00V, and it should remain within a tolerance range of ±2% (approximately 14.55V to 15.45V) under normal operating conditions. Deviation outside this range may indicate power instability or degradation that could impact system performance, accuracy, or safety.
SYS_RATED_CURRENT	113	R: Basic W: Tech++	300 ≤ X ≤ 3500 Scalar: 0.1 Equation: 0.1*500 => 50.0 A	Sets the unit rated current for the per unit controls implementation
SYS_RATED_AC_VOLTAGE	114	R: Basic W: Tech++	500 ≤ X ≤ 4800 Scalar: 0.1 Equation: 0.1*4800 => 480 V	Sets the unit rated AC voltage for the per unit controls implementation
SYS_RATED_DC_VOLTAGE	115	R: Basic W: Tech++	1000 ≤ X ≤ 8050 Scalar: 0.1 Equation: 0.1*8050 => 805 V	Sets the unit rated DC voltage for the per unit controls implementation
SYS_CONV_FAN_TIME	116	R: Tech W: Tech+	0 ≤ X ≤ 6000 Scalar: 1.0 Equation: 1.0*600 => 600 Sec	Minimum time the converter cooling fan will run after converter shut down.

SYS_ENC_FAN_ON	117	R: Tech+ W: Tech++	0 ≤ X ≤ 1250 Scalar: 0.1 Equation: 0.1*630 => 63.0 C	The temperature threshold for the enclosure where the enclosure cooling fan will turn on.
SYS_ENC_FAN_OFF	118	R: Tech+ W: Tech++	0 ≤ X ≤ 1200 Scalar: 0.1 Equation: 0.1*580 => 58.0 C	The temperature threshold for the enclosure where the enclosure cooling fan will turn off.
SYS_ENC_FAN_TIME	119	R: Tech W: Tech+	0 ≤ X ≤ 6000 Scalar: 1.0 Equation: 1.0*300 => 300.0 Sec	The minimum time the enclosure cooling fan will run for after fan turn on.
SYS_CONV_FAN_OFF	120	R: Tech W: Tech+	200 ≤ X ≤ 800 Scalar: 0.1 Equation: 0.1*600 => 60.0 C	The minimum temperature threshold of the power converter where the converter cooling fan will turn off and start the fan min run time count down period.
MB_SLAVE_ADDRESS	121	R: Basic W: Basic	1 ≤ X ≤ 247	The Modbus RTU server or slave device address
MB_COM_WD_TIME	122	R: Tech+ W: Tech+	0 ≤ X ≤ 600 Scalar: 1.0 Equation: 1.0*0 => 0.0 Sec	Defines a communications timeout period on the Modbus RTU interface. After this timeout period expires the unit will attempt to re-establish communication by resetting the Modbus RTU communications stack. Max Timer is 60 seconds./ 1 Minute
V_LINK_SP	123	R: Tech W: Tech++	0 ≤ X ≤ 1100 Scalar: 0.001 Equation: 0.001*1000 => 1.0 V	Bus Voltage Setpoint Total The setpoint for the full bus voltage regulator.
V_LINK_CTRL_LIMIT	124	R: Tech W: Tech++	0 ≤ X ≤ 40000 Scalar: 0.001 Equation: 0.001*2000 => 2.0	Bus Voltage Controller Limit Setpoint Total
V_LINK_CTRL_LIMIT_BOTTOM	125	R: Tech W: Tech++	0 ≤ X ≤ 10000 Scalar: 0.001 Equation: 0.001*250 => 0.25	Bus Voltage Controller Limit Setpoint Bottom
V_LINK_UPDATE_T	126	R: Tech W: Tech+	1 ≤ X ≤ 20000 Scalar: 1.0 Equation: 1.0*20 => 20.0 ms	Bus Voltage Controller Update Timer If the Converter is off the lower bus regulator timer is 0 Once the timer expires the lower bus regulator gets checked if it's over voltage or if the regulator is clamping.
VAR_SP	127	R: Tech W: Tech+	-3000 ≤ X ≤ 1000 Scalar: 6.1e-05 Equation: 6.1e-05*-16 => -0.0009765	Static VAR Setpoint (filter cap compensation), Used for Factory Parameter Tuning Value gets multiple by some constant k factor that was found by internal testing based on the Filter's Current Rating 50A = 81.15f 100A = 40.57F 150A = 27.05F 250A = 16.22F 350A = 11.19F
CONV_I_LIMIT_RMS	128	R: Tech W: Tech+	0 ≤ X ≤ 1000 Scalar: 0.001 Equation: 0.001*100 => 0.1 A	Converter Current RMS Limit Setpoint/Converter Current Limit Setpoint The Limit Setpoint to limit in master, current limit for Var Controller in slaves
CONV_I_LIMIT_HARD	129	R: Tech W: Tech+	0 ≤ X ≤ 60000 Scalar: 0.0001 Equation: 0.0001*25000 => 2.5 pU	Converter Synchronous Frame Current Regulator Limit
CONV_I_LIMIT_PEAK	130	R: Tech W: Tech+	0 ≤ X ≤ 6000 Scalar: 0.001 Equation: 0.001*3000 => 3.0 pU	Conv Current Peak Limit

HISTORY_LOG_READY	131	R: Basic	$0 \leq X \leq 1$	Status flag indicating that a complete set of system history log data has been captured and is ready to be retrieved. It is typically used in conjunction with tools or host systems that poll for log availability before performing a read or download operation.
VAR_BYPASS	132	R: Tech W: Tech++	-20000 \leq X \leq 20000 Scalar: 0.01 Equation: $0.01 \cdot -200 \Rightarrow -2.0$	Stationary frame loop VAR bypass gain
VAR_FOLDBACK	133	R: Tech+ W: Tech++	$0 \leq X \leq 10000$ Scalar: 0.0001 Equation: $0.0001 \cdot 7999 \Rightarrow 0.7999$	VAR foldback onset threshold
V_SUPPLY_MIN_RMS	134	R: Factory	-3200 \leq X \leq 3200 Scalar: 0.1 Equation: $0.1 \cdot 0 \Rightarrow 0.0$ V	This parameter represents the nominal minimum +15V RMS voltage power supply rail used to power critical analog or mixed-signal subsystems. The expected nominal voltage is +15.00V, and it should remain within a tolerance range (approximately 14.55V to 15.45V) under normal operating conditions. Deviation outside this range may indicate power instability or degradation that could impact system performance, accuracy, or safety.
H_REG_ANTI_RES_EN	135	R: Tech W: Tech+	$0 \leq X \leq 1$	Anti Resonance feature enables f the Active Filter is in line side parallel mode, the Harmonic Regulator run in low order harmonic synch. 00 = Disabled 01 = Enabled
H_REG_LP_FILT_COEF	136	R: Tech W: Factory	$0 \leq X \leq 65530$ Scalar: 0.01 Equation: $0.01 \cdot 7500 \Rightarrow 75.0$	DQ Transform Low Pass Filter Coefficient
V_LINK_REG_KP	137	R: Tech W: Factory	$0 \leq X \leq 6105$ Scalar: 0.01 Equation: $0.01 \cdot 500 \Rightarrow 5.0$	Bus Voltage Controller P Gain Total
V_LINK_REG_KI	138	R: Tech W: Factory	$0 \leq X \leq 65535$ Scalar: 0.01 Equation: $0.01 \cdot 18000 \Rightarrow 180.0$	Bus Voltage Controller I Gain Total
V_LINK_REG_FLUSH	139	R: Tech W: Tech++	$0 \leq X \leq 1250$ Scalar: 0.001 Equation: $0.001 \cdot 1037 \Rightarrow 1.037\%$	Bus Voltage Integrator Flush Threshold Total
V_LINK_REG_KP_BOTTO M	140	R: Tech W: Factory	$0 \leq X \leq 65535$ Scalar: 0.001 Equation: $0.001 \cdot 4000 \Rightarrow 4.0$	Bus Voltage Controller P Gain Bottom
V_LINK_REG_KI_BOTTO M	141	R: Tech W: Factory	$0 \leq X \leq 65535$ Scalar: 0.01 Equation: $0.01 \cdot 22000 \Rightarrow 220.0$	Bus Voltage Controller I Gain Bottom
V_LINK_REG_FLUSH_BO TTOM	142	R: Tech W: Tech++	$0 \leq X \leq 1250$ Scalar: 0.001 Equation: $0.001 \cdot 1220 \Rightarrow 1.22$	Bus Voltage Integrator Flush Threshold Bottom
I_LOAD_LINE_REG_KP	143	R: Tech W: Factory	-2400 \leq X \leq 0 Scalar: 0.01 Equation: $0.01 \cdot -25 \Rightarrow -0.25$	Load/Line Controller P Gain
I_LOAD_LINE_REG_KI	144	R: Tech W: Factory	-100 \leq X \leq 0 Scalar: 0.01 Equation: $0.01 \cdot -100 \Rightarrow -1.0$	Load/Line Controller I Gain
I_LOAD_LINE_REG_KD	145	R: Tech W: Factory	-100 \leq X \leq 0 Scalar: 0.01 Equation: $0.01 \cdot -10 \Rightarrow -0.1$	Load/Line Controller D Gain

PLL_REG_KP	146	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.01 Equation: 0.01*50 => 0.5	DQ PLL Controller P Gain
PLL_REG_KI	147	R: Tech W: Factory	0 <= X <= 6555 Scalar: 0.01 Equation: 0.01*50 => 0.5	DQ PLL Coontroller, I Gain
PLL_REG_LOCK_THRES HOLD	148	R: Tech W: Tech++	0 <= X <= 2000 Scalar: 0.001 Equation: 0.001*10 => 0.01	DQ PLL Lock Threshold
PLL_COEF_LP_FILTER	149	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.01 Equation: 0.01*7500 => 75.0	DQ PLL Low Pass Extraction Filter Coefficient
PLL_GRID_MODE	150	R: Tech W: Tech+	0 <= X <= 3	Utility Grid Synchronization Locked Mode 01 = Auto 02 = 60 Hz 03 = 50 Hz
PLL_ANGLE_OFFSET_S CALAR	151	R: Tech+ W: Tech++	0 <= X <= 65535 Scalar: 0.0001 Equation: 0.0001*9899 => 0.9899	DQ based PLL frequency dependent phase offset adjustment
I_LIMIT_REG_THERMAL_ KP	152	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*100 => 0.1	Current Limit Thermal Controller P Gain
I_LIMIT_REG_THERMAL_ KI	153	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.0001 Equation:0.0001*100 => 0.01	Current Limit Thermal Controller I Gain
I_LIMIT_REG_THD_KP	154	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*500 => 0.5	Current Limit THD Controller P Gain
I_LIMIT_REG_THD_KI	155	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.0001 Equation:0.0001*500 => 0.05	Current Limit THD Controller I Gain
I_LIMIT_REG_RMS_KP	156	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*3000 => 3.0	Current Limit RMS Controller P Gain
I_LIMIT_REG_RMS_KI	157	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*3000 => 3.0	Current Limit RMS Controller I Gain
I_LIMIT_REG_VAR_KP	158	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*2000 => 2.0	Current Limit VAR Controller P Gain
I_LIMIT_REG_VAR_KI	159	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*2000 => 2.0	Current Limit VAR Controller I Gain
I_LIMIT_REG_PF_KP	160	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*100 => 0.1	Current Limit PF Controller P Gain
I_LIMIT_REG_PF_KI	161	R: Tech W: Factory	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*50 => 0.05	Current Limit PF Controller I Gain
STATIONARY_KP	162	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*100 => 0.1	Stationary frame harmonic loop Kp

VAR_REG_KP	163	R: Tech W: Factory	-32768 <= X <= 0 Scalar: 0.001 Equation: 0.001*-299 => -0.299	Var Reg P Gain
VAR_REG_KI	164	R: Tech W: Factory	-32768 <= X <= 0 Scalar: 0.001 Equation: 0.001*-3000 => -3.0	Var Reg I Gain
VAR_REG_ERR_LIMIT	165	R: Tech W: Factory	0 <= X <= 4000 Scalar: 0.001 Equation: 0.001*2000 => 2.0	Var regulator error limit
H_REG_A3P_KP	166	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	A3P Harm Reg P Gain
H_REG_A3P_KI	167	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	A3P Harm Reg I Gain
H_REG_A3P_HARMONIC	168	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*3 => 3.0	A3P Harm Reg Harmonic 3rd Harmonic Regulator in the Positive Position
H_REG_A3P_EGAIN_REF	169	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*50 => 0.05	A3P Harm Reg E Gain Ref
H_REG_A3P_ENABLE	170	R: Tech W: Tech+	0 <= X <= 1	A3P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_A3P_PHASE	171	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*200 => 0.2	A3P Harm Inverse Transform Phase Adjust
H_REG_B3N_KP	172	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	B3N Harm Reg P Gain
H_REG_B3N_KI	173	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	B3N Harm Reg I Gain
H_REG_B3N_HARMONIC	174	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-3 => -3.0	B3N Harm Reg Harmonic 3rd Harmonic Regulator in the Negative Position
H_REG_B3N_EGAIN_REF	175	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*50 => 0.05	B3N Harm Reg E Gain Ref
H_REG_B3N_ENABLE	176	R: Tech W: Tech+	0 <= X <= 1	B3N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_B3N_PHASE	177	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*200 => 0.2	B3N Harm Inverse Transform Phase Adjust
H_REG_C5N_KP	178	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	C5N Harm Reg P Gain
H_REG_C5N_KI	179	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-1299 => -129.9	C5N Harm Reg I Gain

H_REG_C5N_HARMONIC	180	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-5 => -5.0	C5N Harm Reg Harmonic 5th Harmonic Regulator in the Negative Position
H_REG_C5N_EGAIN_REF	181	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*960 => 0.96	C5N Harm Reg E Gain Ref
H_REG_C5N_ENABLE	182	R: Tech W: Tech+	0 <= X <= 1	C5N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_C5N_PHASE	183	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*500 => 0.5	C5N Harm Inverse Transform Phase Adjust
H_REG_D7P_KP	184	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	D7P Harm Reg P Gain
H_REG_D7P_KI	185	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-1299 => -129.9	D7P Harm Reg I Gain
H_REG_D7P_HARMONIC	186	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*7 => 7.0	7th Harmonic Regulator in the Positive Position
H_REG_D7P_EGAIN_REF	187	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*659 => 0.659	D7P Harm Reg E Gain Ref
H_REG_D7P_ENABLE	188	R: Tech W: Tech+	0 <= X <= 1	D7P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_D7P_PHASE	189	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*700 => 0.70	D7P Harm Inverse Transform Phase Adjust
H_REG_E11N_KP	190	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	E11N Harm Reg P Gain
H_REG_E11N_KI	191	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-1299 => -129.9	E11N Harm Reg I Gain
H_REG_E11N_HARMONIC	192	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-11 => -11.0	E11N Harm Reg Harmonic 11th Harmonic Regulator in the Negative Position
H_REG_E11N_EGAIN_REF	193	R: Tech W: Factory	0 <= X <= 10000 Scalar: 0.001 Equation: 0.001*420 => 0.42	E11N Harm Reg E Gain Ref
H_REG_E11N_ENABLE	194	R: Tech W: Tech+	0 <= X <= 1	E11N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_E11N_PHASE	195	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*1100 => 1.1	E11N Harm Inverse Transform Phase Adjust
H_REG_F13P_KP	196	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	F13P Harm Reg P Gain

H_REG_F13P_KI	197	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-746 => -74.6	F13P Harm Reg I Gain
H_REG_F13P_HARMONIC	198	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*13 => 13.0	F13P Harm Reg Harmonic 13th Harmonic Regulator in the Positive Position
H_REG_F13P_EGAIN_REF	199	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*200 => 0.2	F13P Harm Reg E Gain Ref
SYS_POWER_ON	200	R: Basic	0 <= X <= 1	Indicates if the HGA filter has input power available 00 = Power Off 01 = Power On
H_REG_F13P_ENABLE	201	R: Tech W: Tech+	0 <= X <= 1	F13P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_F13P_PHASE	202	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*1300 => 1.3	F13P Harm Inverse Transform Phase Adjust
H_REG_G17N_KP	203	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	G17N Harm Reg P Gain
H_REG_G17N_KI	204	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-746 => -74.60	G17N Harm Reg I Gain
H_REG_G17N_HARMONIC	205	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-17 => -17.0	G17N Harm Reg Harmonic 17th Harmonic Regulator in the Negative Position
H_REG_G17N_EGAIN_REF	206	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*130 => 0.13	G17N Harm Reg E Gain Ref
H_REG_G17N_ENABLE	207	R: Tech W: Tech+	0 <= X <= 1	G17N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_G17N_PHASE	208	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*1700 => 1.7	G17N Harm Inverse Transform Phase Adjust
H_REG_H19P_KP	209	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	H19P Harm Reg P Gain
H_REG_H19P_KI	210	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-565 => -56.5	H19P Harm Reg I Gain
H_REG_H19P_HARMONIC	211	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*19 => 19.0	H19P Harm Reg Harmonic 19th Harmonic Regulator in the Positive Position
H_REG_H19P_EGAIN_REF	212	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*100 => 0.1	H19P Harm Reg E Gain Ref
H_REG_H19P_ENABLE	213	R: Tech W: Tech+	0 <= X <= 1	H19P Harm Reg Enable 00 = Disabled 01 = Enabled

H_REG_H19P_PHASE	214	R: Tech W: Factory	0 ≤ X ≤ 6283 Scalar: 0.001 Equation: 0.001*1900 => 1.90	H19P Harm Reg Inverse Transform Phase Adjust
H_REG_I23N_KP	215	R: Tech W: Factory	-10000 ≤ X ≤ 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	I23N Harm Reg P Gain
H_REG_I23N_KI	216	R: Tech W: Factory	-10000 ≤ X ≤ 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	I23N Harm Reg I Gain
H_REG_I23N_HARMONIC	217	R: Tech W: Factory	-50 ≤ X ≤ 50 Scalar: 1.0 Equation: 1.0*-23 => -23.0	I23N Harm Reg Harmonic 23rd Harmonic Regulator in the Negative Position
H_REG_I23N_EGAIN_REF	218	R: Tech W: Factory	0 ≤ X ≤ 1000 Scalar: 0.001 Equation: 0.001*100 => 0.1	I23N Harm Reg E Gain Ref
H_REG_I23N_ENABLE	219	R: Tech W: Tech+	0 ≤ X ≤ 1	I23N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_I23N_PHASE	220	R: Tech W: Factory	0 ≤ X ≤ 6283 Scalar: 0.001 Equation: 0.001*2000 => 2.0	I23N Harm Reg Inverse Transform Phase Adjust
H_REG_J25P_KP	221	R: Tech W: Factory	-10000 ≤ X ≤ 0 Scalar: 0.01 Equation: 0.01*-50 => -0.5	J25P Harm Reg P Gain
H_REG_J25P_KI	222	R: Tech W: Factory	-10000 ≤ X ≤ 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	J25P Harm Reg I Gain
H_REG_J25P_HARMONIC	223	R: Tech W: Factory	-50 ≤ X ≤ 50 Scalar: 1.0 Equation: 1.0*25 => 25.0	J25P Harm Reg Harmonic 25th Harmonic Regulator in the Positive Position
H_REG_J25P_EGAIN_REF	224	R: Tech W: Factory	0 ≤ X ≤ 1000 Scalar: 0.001 Equation: 0.001*100 => 0.1	J25P Harm Reg E Gain Ref
H_REG_J25P_ENABLE	225	R: Tech W: Tech+	0 ≤ X ≤ 1	J25P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_J25P_PHASE	226	R: Tech W: Factory	0 ≤ X ≤ 6283 Scalar: 0.001 Equation: 0.001*2100 => 2.1	J25P Harm Reg Inverse Transform Phase Adjust
H_REG_K29N_KP	227	R: Tech W: Factory	-10000 ≤ X ≤ 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	K29N Harm Reg P Gain
H_REG_K29N_KI	228	R: Tech W: Factory	-10000 ≤ X ≤ 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	K29N Harm Reg I Gain
H_REG_K29N_HARMONIC	229	R: Tech W: Factory	-50 ≤ X ≤ 50 Scalar: 1.0 Equation: 1.0*-29 => -29.0	K29N Harm Reg Harmonic 29th Harmonic Regulator in the Negative Position
H_REG_K29N_EGAIN_REF	230	R: Tech W: Factory	0 ≤ X ≤ 1000 Scalar: 0.001 Equation: 0.001*100 => 0.1	K29N Harm Reg E Gain Ref

H_REG_K29N_ENABLE	231	R: Tech W: Tech+	0 <= X <= 1	K29N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_K29N_PHASE	232	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*2300 => 2.3	K29N Harm Reg Inverse Transform Phase Adjust
H_REG_L31P_KP	233	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	L31P Harm Reg P Gain
H_REG_L31P_KI	234	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	L31P Harm Reg I Gain
H_REG_L31P_HARMONIC	235	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*31 => 31.0	L31P Harm Reg Harmonic 31st Harmonic Regulator in the Positive Position
H_REG_L31P_EGAIN_REF	236	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*80 => 0.08	L31P Harm Reg E Gain Ref
H_REG_L31P_ENABLE	237	R: Tech W: Tech+	0 <= X <= 1	L31P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_L31P_PHASE	238	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*2400 => 2.4	L31P Harm Reg Inverse Transform Phase Adjust
H_REG_M35N_KP	239	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	M35N Harm Reg P Gain
H_REG_M35N_KI	240	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	M35N Harm Reg I Gain
H_REG_M35N_HARMONIC	241	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-35 => -35.0	M35N Harm Reg Harmonic 35th Harmonic Regulator in the Negative Position
H_REG_M35N_EGAIN_REF	242	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*80 => 0.08	M35N Harm Reg E Gain Ref
H_REG_M35N_ENABLE	243	R: Tech W: Tech+	0 <= X <= 1	M35N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_M35N_PHASE	244	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*2100 => 2.1	M35N Harm Reg Inverse Transform Phase Adjust
H_REG_N37P_KP	245	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	N37P Harm Reg P Gain
H_REG_N37P_KI	246	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	N37P Harm Reg I Gain
H_REG_N37P_HARMONIC	247	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*37 => 37.0	N37P Harm Reg Harmonic 37th Harmonic Regulator in the Positive Position

H_REG_N37P_EGAIN_REF	248	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*90 => 0.09	N37P Harm Reg E Gain Ref
H_REG_N37P_ENABLE	249	R: Tech W: Tech+	0 <= X <= 1	N37P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_N37P_PHASE	250	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*2800 => 2.8	N37P Harm Reg Inverse Transform Phase Adjust
H_REG_O41N_KP	251	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	O41N Harm Reg P Gain
H_REG_O41N_KI	252	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	O41N Harm Reg I Gain
H_REG_O41N_HARMONIC_C	253	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-41 => -41.0	O41N Harm Reg Harmonic 41st Harmonic Regulator in the Negative Position
PARAM_STATE	254	R: Basic	0 <= X <= 25	Indicates The Present State of The Parameter State Machine - Read Only Value 0-11 = Initialization, 12 = Parameter Init Finished 13 = Restore Defaults 14 = Restore Non-Cal Defaults 15 = Init Save Current Values 16 = Reboot 17 = Save Single Value 18 = Clear History
SYS_STATE	255	R: Basic	0 <= X <= 255	System State 00 = Init 01 = Init Params 02 = Fault Inhibit 03 = Input Inhibit 04 = Reset 05 = Stop 06 = Precharge 07 = Precharge Closed 08 = Running 09 = Faulted 10 = Calibrating 11 = Power Save 12 = No Communication 13 = Communication Config 14 = Not Calibrated 15 = Test PCB Stop 16 = Test PCB Run 17 = Test PCB Fault
H_REG_O41N_EGAIN_REF	256	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*70 => 0.07	O41N Harm Reg E Gain Ref
H_REG_O41N_ENABLE	257	R: Tech W: Tech+	0 <= X <= 1	O41N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_O41N_PHASE	258	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*3000 => 3.0	O41N Harm Reg Inverse Transform Phase Adjust

H_REG_P43P_KP	259	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	P43P Harm Reg P Gain
H_REG_P43P_KI	260	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	P43P Harm Reg I Gain
H_REG_P43P_HARMONIC	261	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*43 => 43.0	P43P Harm Reg Harmonic 43rd Harmonic Regulator in the Positive Position
H_REG_P43P_EGAIN_REF	262	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*70 => 0.07	P43P Harm Reg E Gain Ref
H_REG_P43P_ENABLE	263	R: Tech W: Tech+	0 <= X <= 1	P43P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_P43P_PHASE	264	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*2600 => 2.6	P43P Harm Reg Inverse Transform Phase Adjust
H_REG_Q47N_KP	265	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	Q47N Harm Reg P Gain
H_REG_Q47N_KI	266	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	Q47N Harm Reg I Gain
H_REG_Q47N_HARMONIC	267	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*-47 => -47.0	Q47N Harm Reg Harmonic 47th Harmonic Regulator in the Negative Position
H_REG_Q47N_EGAIN_REF	268	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*50 => 0.05	Q47N Harm Reg E Gain Ref
H_REG_Q47N_ENABLE	269	R: Tech W: Tech+	0 <= X <= 1	Q47N Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_Q47N_PHASE	270	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*3400 => 3.4	Q47N Harm Reg Inverse Transform Phase Adjust
H_REG_R49P_KP	271	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-40 => -0.4	R49P Harm Reg P Gain
H_REG_R49P_KI	272	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	R49P Harm Reg I Gain
H_REG_R49P_HARMONIC	273	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*49 => 49.0	R49P Harm Reg Harmonic 49th Harmonic Regulator in the Positive Position
H_REG_R49P_EGAIN_REF	274	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*50 => 0.05	R49P Harm Reg E Gain Ref
H_REG_R49P_ENABLE	275	R: Tech W: Tech+	0 <= X <= 1	R49P Harm Reg Enable 00 = Disabled 01 = Enabled

H_REG_R49P_PHASE	276	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*3000 => 3.0	R49P Harm Reg Inverse Transform Phase Adjust
H_REG_S6P_KP	277	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	S6P Harm Reg P Gain
H_REG_S6P_KI	278	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	S6P Harm Reg I Gain
H_REG_S6P_HARMONIC	279	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*6 => 6.0	S6P Harm Reg Harmonic 6th Harmonic Regulator in the Positive Position
H_REG_S6P_EGAIN_REF	280	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*80 => 0.08	S6P Harm Reg E Gain Ref
H_REG_S6P_ENABLE	281	R: Tech W: Tech+	0 <= X <= 1	S6P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_S6P_PHASE	282	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*800 => 0.8	S6P Harm Reg Inverse Transform Phase Adjust
H_REG_T9P_KP	283	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.01 Equation: 0.01*-60 => -0.6	T9P Harm Reg P Gain
H_REG_T9P_KI	284	R: Tech W: Factory	-10000 <= X <= 0 Scalar: 0.1 Equation: 0.1*-260 => -26.0	T9P Harm Reg I Gain
H_REG_T9P_HARMONIC	285	R: Tech W: Factory	-50 <= X <= 50 Scalar: 1.0 Equation: 1.0*9 => 9.0	T9P Harm Reg Harmonic 9th Harmonic Regulator in the Positive Position
H_REG_T9P_EGAIN_REF	286	R: Tech W: Factory	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*80 => 0.08	T9P Harm Reg E Gain Ref
H_REG_T9P_ENABLE	287	R: Tech W: Tech+	0 <= X <= 1	T9P Harm Reg Enable 00 = Disabled 01 = Enabled
H_REG_T9P_PHASE	288	R: Tech W: Factory	0 <= X <= 6283 Scalar: 0.001 Equation: 0.001*1100 => 1.1	T9P Harm Reg Inverse Transform Phase Adjust
E_REG_GLOBAL_KP	289	R: Tech W: Factory	-100 <= X <= 100 Scalar: 6.1e-05 Equation: 6.1e-05*1 => 6.1e-05	Global E Reg P Gain
E_REG_GLOBAL_KI	290	R: Tech W: Factory	-32768 <= X <= 32767 Scalar: 0.001 Equation: 0.001*1848=> 1.848	Global E Reg I Gain

HARMONIC_LOAD_TYPE CMD	291	R: Factory W: Factory	-20 <= X <= 20	Harmonic Load (E-Load) Type Selection- Used by Engineering for selecting what type of E-Load option has been selected. 00 = No Harmonic Load 01 = Composite Harmonic Load -05 = 5th Harmonic Load 07 = 7th Harmonic Load -11 = 11th Harmonic Load 13 = 13th Harmonic Load
VAR_OUTPUT_SETPOINT	292	R: Basic W: Basic	-11541 <= X <= 11541 Scalar: 1.0 Equation: 1.0*0 => 0.0 KVAR	Commanded KVAR value for controller while in VAR Output mode Note: Software bounds to be unit amp rating appropriate A negative setpoint value results in lagging KVAR output Interpretation: KVAR: Value * [0.1164 * (SYS_NUM_DEVICES)] + 0.4582 (SYS_NUM_DEVICES)
VAR_OUTPUT_ROC	293	R: Tech W: Tech++	2 <= X <= 1000 Scalar: 1.0 Equation: 1.0*50 => 50.0	VAR Injection setpoint rate of change limit
VAR_OUTPUT_SCALAR	294	R: Tech+ W: Tech++	0 <= X <= 65535 Scalar: 0.01 Equation: 0.01*100 => 1.0	VAR Injection Scalar (scale setpoint to actual VARs)
V_LINK_SCALAR	295	R: Tech+ W: Tech++	213 <= X <= 500 Scalar: 1e-06 Equation: 1e-06*287 => 0.000287	Converter DC Bus Voltage Scalar Total, gets used in calculated the Bus Voltage RMS and THD.
V_LINK_SCALAR_BOTTOM	296	R: Tech+ W: Tech++	213 <= X <= 500 Scalar: 1e-06 Equation: 1e-06*287 => 0.000287	Converter DC Bus Voltage Scalar Bottom
I_CONV_A_SCALAR	297	R: Tech+ W: Tech++	0 <= X <= 65535 Scalar: 1e-05 Equation: 1e-05*215 => 0.00215	Converter Current A Phase Scalar
I_CONV_C_SCALAR	298	R: Tech+ W: Tech++	0 <= X <= 65535 Scalar: 1e-05 Equation: 1e-05*215 => 0.00215	Converter Current C Phase Scalar
V_LINE_SCALAR_A	299	R: Tech+ W: Tech++	0 <= X <= 65535 Scalar: 1e-05 Equation: 1e-05*131 => 0.00131	Input Line Voltage A Phase Scalar
V_LINE_SCALAR_C	300	R: Tech+ W: Tech++	0 <= X <= 65535 Scalar: 1e-05 Equation: 1e-05*131 => 0.001310	Input Line Voltage C Phase Scalar
HARMONIC_LOAD_PHASE_OFFSET_CMD	301	R: Factory W: Factory	0 <= X <= 3600 Scalar: 0.1	Harmonic Load (E-Load) Phase Cmd - Used by Engineering for phase shift between regulators (0 to 2PI)
I_LINE_SCALAR_A	302	R: Tech+ W: Tech++	-10000 <= X <= 10000 Scalar: 1e-05 Equation: 1e-05*589 => 0.00589	System (Line/Load) current Scalar A
I_LINE_SCALAR_C	303	R: Tech+ W: Tech++	-10000 <= X <= 10000 Scalar: 1e-05 Equation: 1e-05*589 => 0.00589	System (Line/Load) current Scalar C
I_LINE_THD_PWRSV_THRESH	304	R: Basic W: Tech	0 <= X <= 1000 Scalar: 0.1 Equation: 0.1*80 => 8.0 %	Line THID Power Save Threshold
I_LINE_PF_PWRSV_THRESH	305	R: Basic W: Tech	-100 <= X <= 100 Scalar: 0.01 Equation: 0.01*97 => 0.97 %	Line PF Power Save Threshold

I_LINE_FL A	306	R: Basic W: Tech	0 <= X <= 30000 Scalar: 1.0 Equation: 1.0*0 => 0.0 A	Line/Load Full Load Amps for TDD Calc
I_LINE_THD_DISPLAY_R MS_MIN	307	R: Tech W: Tech++	0 <= X <= 5000 Scalar: 1.0 Equation: 1.0*1000 => 1000 A	Minimum CT current to display Line/Load ITHD metering
I_CONV_RMS_SCALAR	308	R: Tech+ W: Tech++	-32768 <= X <= 32767 Scalar: 0.001 Equation: 0.001*1023 => 1.023	Conv Current RMS Scalar
I_SYS_RMS_SCALAR	309	R: Tech+ W: Tech++	-32768 <= X <= 32767 Scalar: 0.001 Equation: 0.001*1000 => 1.0	System Current RMS Scalar
V_LINK_OFFSET	310	R: Tech W: Tech++	-8192 <= X <= 8192 Scalar: 1.0 Equation: 1.0*0 => 0.0	Bus Voltage Offset Total
V_LINK_OFFSET_BOTTO M	311	R: Tech+ W: Tech++	-8192 <= X <= 8192 Scalar: 1.0 Equation: 1.0*0 => 0.0	Bus Voltage Offset Bottom
I_CONV_A_OFFSET	312	R: Tech+ W: Tech++	0 <= X <= 8192 Scalar: 1.0 Equation: 1.0*2048 => 2048	Converter Current Offset Phase A
I_CONV_C_OFFSET	313	R: Tech+ W: Tech++	0 <= X <= 8192 Scalar: 1.0 Equation: 1.0*2048 => 2048	Converter Current Offset Phase C
T_CONV_OFFSET_A	314	R: Tech+ W: Tech++	-8192 <= X <= 8192 Scalar: 1.0 Equation: 1.0*0 => 0.0 C	Temperature Offset Phase A
T_CONV_OFFSET_B	315	R: Tech+ W: Tech++	-8192 <= X <= 8192 Scalar: 1.0 Equation: 1.0*0 => 0.0 C	Temperature Offset Phase B
T_CONV_OFFSET_C	316	R: Tech+ W: Tech++	-8192 <= X <= 8192 Scalar: 1.0 Equation: 1.0*0 => 0.0 C	Temperature Offset Phase C
I_THD_REF_OFFSET	317	R: Tech+ W: Tech++	-500 <= X <= 500 Scalar: 0.0001 Equation: 0.0001*0 => 0.0	I THD ref display offset
DSP_POWER_CYC_COU NT	318	R: Basic	0 <= X <= 65535 Scalar: 1.0	DSP Power Cycle Count
DSP_UPTIME_COUNT	319	R: Basic	0 <= X <= 65535 Scalar: 1.0	DSP Uptime Count (Seconds)
DSP_RUN_COUNT	320	R: Basic	0 <= X <= 65535 Scalar: 1.0	DSP Runtime Count (Seconds)
SYS_PF_SETPOINT	321	R: Basic W: Tech+	-100 <= X <= 100 Scalar: 0.01 Equation: 0.01*100 => 1.0 D.P. F	Power Factor Setpoint
SYS_THD_SETPOINT	322	R: Tech W: Tech+	0 <= X <= 300 Scalar: 0.1 Equation: 0.1*0 => 0.0 %	Current THD Setpoint

V_LINK_OV_THRESHOLD	323	R: Tech W: Tech++	0 <= X <= 1230 Scalar: 0.001 Equation: 0.001*1050 => 1.05 V	VDC Over Voltage Threshold Total
V_LINK_UV_THRESHOLD	324	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 0.001 Equation: 0 .001*700 => 0.70 V	VDC Under Voltage Threshold Total
V_LINK_OV_THRESHOLD_BOT	325	R: Tech W: Tech++	0 <= X <= 620 Scalar: 0.001 Equation: 0.001*520 => 0.52 V	VDC Over Voltage Threshold Bottom Half
V_LINK_UV_THRESHOLD_BOT	326	R: Tech W: Tech+	0 <= X <= 500 Scalar: 0.001 Equation: 0.001*350 => 0.350 V	VDC Under Voltage Threshold Bottom Half
I_CONV_OC_THRESHOLD	327	R: Tech W: Tech++	0 <= X <= 4000 Scalar: 0.001 Equation: 0.001*2500 => 2.5	Over Current Threshold
T_CONV_OT_THRESHOLD	328	R: Basic W: Tech++	250 <= X <= 2500 Scalar: 0.1 Equation: 0.1*760 => 76.0 C	Over Temperature Threshold
T_CONV_UT_THRESHOLD	329	R: Basic W: Tech++	-450 <= X <= 2500 Scalar: 0.1 Equation: 0.1*-210 => -21.0 C	Under Temperature Threshold
T_CONV_SETPPOINT	330	R: Basic W: Tech++	250 <= X <= 1550 Scalar: 0.1 Equation: 0.1*670 => 67.0 C	Temperature Foldback Onset Temperature
T_CONV_CS_THRESHOLD	331	R: Tech+ W: Tech++	0 <= X <= 100 Scalar: 0.01 Equation: 0.01*75 => 0.75 %	Cooling System Fail Current Limit Threshold
T_CONV_CS_DELAY	332	R: Tech W: Tech+	0 <= X <= 6000 Scalar: 1.0 Equation: 1.0*600 => 600.0 Sec	Cooling System Fail Delay Time
AUTO_NULL_THRESHOLD	333	R: Tech+ W: Tech++	0 <= X <= 2048 Scalar: 1.0 Equation: 1.0*50 => 50.0	Auto offset null fault Threshold
SENSOR_ERROR_ENABLE	334	R: Tech W: Tech+	0 <= X <= 1	Sensor configuration error detection enable 00 = Disabled 01 = Enabled
I_LINE_DETECT_THRESHOLD	335	R: Tech W: Tech+	0 <= X <= 5000 Scalar: 0.001 Equation: 0.001*1000 => 1.0 A	The minimum line or load CT secondary current in Amps to enable sensor error wiring checks.
V_LINE_ROT_ERROR_ENABLE	336	R: Tech W: Tech+	0 <= X <= 1	Enable for voltage phase rotation sensor error 00 = Disabled 01 = Enabled
I_LINE_ROT_ERROR_ENABLE	337	R: Tech W: Tech+	0 <= X <= 1	Enable for current phase rotation sensor error 00 = Disabled 01 = Enabled
EXHAUST_FAULT_ENABLE	338	R: Basic W: Tech+	0 <= X <= 1	Enable for exhaust fault input 00 = Disabled 01 = Enabled
V_LINE_UV_THRESHOLD	339	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*850 => 0.85 V	Threshold for phase under voltage sensor error in per unit

I_LINE_UC_THRESHOLD	340	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*700 => 0.700 A	Threshold for phase under current sensor error in per unit
I_LINE_POLARITY_THRE SHOLD	341	R: Tech W: Tech+	-1000 <= X <= 1000 Scalar: 0.001 Equation: 0.001*700 => -0.05 A	Threshold for phase volt amp sensor polarity error, in per unit
I_LINE_BALANCE_THRE SHOLD	342	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 0.001 Equation: 0.001*700 => 0.700 per Unit Rating	Threshold for phase-to-phase balance sensor error in per unit
GATE_FAULT_AUTO_RE SET	343	R: Tech W: Tech+	0 <= X <= 1	Enables auto reset of gate drive fault 00 = Disabled 01 = Enabled
PLL_DELAY	344	R: Tech W: Tech+	0 <= X <= 65535 Scalar: 0.0001 Equation: 0.0001*59275 => 5.9275	Angle Delay Constant (Filter Compensation)
V_POLE_FF	345	R: Tech+ W: Tech++	0 <= X <= 3600 Scalar: 0.001 Equation: 0.001*1900 => 1.90	Converter Voltage Command Feedforward
V_POLE_DT_COMP	346	R: Tech W: Tech+	-100 <= X <= 100 Scalar: 0.001 Equation: 0.001*60 => 0.06	PWM Deadtime Compensation
V_POLE_3RD	347	R: Tech+ W: Tech++	-1000 <= X <= 1000 Scalar: 0.001 Equation: 0.001*0 => 0.0	Converter voltage 3rd harmonic injection gain
VAR_REG_RAMP_DELAY	348	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 1.0 Equation: 1.0*25 => 25.0	VAR Current Ramp Delay
SYS_FAULT_RESET_DE LAY	349	R: Basic W: Tech	10 <= X <= 3600 Scalar: 1.0 Equation: 1.0*300 => 300.0 Sec	Fault Reset Delay Constant (In Seconds) -Zero Deactivates
VDC_REG_RAMP_DELA Y	350	R: Tech W: Tech+	0 <= X <= 1000 Scalar: 1.0 Equation: 1.0*350 => 350.0	Bus Voltage Ramp Delay (Delay between setpoint changes - in interrupt time)
SYS_START_DELAY	351	R: Basic W: Tech	10 <= X <= 3600 Scalar: 1.0 Equation: 1.0*20 => 20.0 Sec	Start Delay in seconds.
SYS_AUTOSTART_F_TIM E	352	R: Basic W: Tech	1 <= X <= 15 Scalar: 1.0 Equation: 1.0*5 => 5.0 #	Auto start limit fault number of restarts allowed
SYS_AUTOSTART_CF_TI ME	353	R: Basic W: Tech	2 <= X <= 600 Scalar: 1.0 Equation: 1.0*60 => 60.0 Min	Auto start limit fault timespan in minutes
I_CONV_TURN_ON_RAM P_DELAY	354	R: Tech W: Tech+	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*20 => 20.0	Converter current ramp delay during turns on
CAPTURE_ID	355	R: Tech W: Tech+	0 <= X <= 65535	Waveform capture file ID

CAPTURE_TRIG_ENABLE	356	R: Tech W: Tech+	0 ≤ X ≤ 255	Enable bits for waveform capture triggers - trigger enable bit mask 0x00 = Disabled 0x01 = Converter Turned Off 0x02 = Converter Turned On 0x04 = Fault Onset 0x08 = Inhibit Onset 0x10 = Limit 0x20 = Preprocessor Check
SYS_RMT_START_IN	357	R: Basic W: Basic	0 ≤ X ≤ 1	Remote Relay Start Input 00 = Stop 01 = Start
SYS_NW_START_IN	358	R: Basic W: Basic	0 ≤ X ≤ 1	Network Start Input 00 = Stop 01 = Start
SYS_DS_MODE	359	R: Basic	0 ≤ X ≤ 1	Indicates If the Processor is in Data Simulation Mode 00 = Inactive 01 = Active
SYS_RM_START_EN	360	R: Basic W: Basic	0 ≤ X ≤ 1	Remote Relay Start Enable 00 = Disabled 01 = Enabled
SYS_NW_START_EN	361	R: Basic W: Basic	0 ≤ X ≤ 1	Network Start Enable 00 = Disabled 01 = Enabled
SYS_NW_VAR_OUTPUT_EN	362	R: Basic W: Tech	0 ≤ X ≤ 1	Network VAR Output Enable 00 = Disabled 01 = Enabled
SYS_LOCAL_VAR_OUTPUT_EN	363	R: Basic W: Tech	0 ≤ X ≤ 1	Local HMI VAR Output Enable 00 = Disabled 01 = Enabled
SD_CMD	364	R: Tech W: Tech++	0 ≤ X ≤ 10	SD Memory Command 00 = Null/Clear 01 = Idle 02 = Load Param File
SD_ADDR	365	R: Tech W: Tech++	0 ≤ X ≤ 10	SD Memory Command Address
T_AVR	366	R: Basic W: Error	-500 ≤ X ≤ 1550 Scalar: 0.1 Equation: 0.1*10 => 1.0 C	AVR processor temperature
HARMONIC_LOAD_MAG_CMD	367	R: Factory W: Factory	0 ≤ X ≤ 1000 Scalar: 0.1 Equation: 0.1*0 => 0.0 % of rated currnt	Harmonic Load (E-Load) Phase Cmd - Used by Engineering for changing the magnitude of the load.
SYS_DEVICE_ID	368	R: Basic W: Basic	1 ≤ X ≤ 4	Device ID for communication used when using a AVR Board
SYS_PRIMARY_DEVICE_ID	369	R: Basic W: Basic	1 ≤ X ≤ 4	Device ID of primary data source, Filter is the primary if the Primary Device ID is equal to Parameter SYS_Device_ID
SYS_PARALLEL_UNITS	370	R: Basic W: Tech+	0 ≤ X ≤ 10	Specifies the number of active parallel units in the system configuration. This parameter is critical for distributed or parallelized power or filtering systems where multiple hardware units are deployed to share load, increase capacity, or provide redundancy.

SYS POKE 4	371	R: Factory W: Factory	0 <= X <= 65535	<p>Diagnostic poke variable 4 - Used by Engineering Only for Processor Lockups If the firmware is compiled with Test Cmd support ie: DIAG_DATA_TEST_TRAPS enabled. This parameter can be used for processor lockups, math overflows, and illegal instructions Cmd.</p> <p>000 = Cmd Null 101 = Cpu1 Interrupt Lockup 102 = Cpu2 Interrupt Lockup 103 = Cpu1 Background Lockup 104 = Cpu2 Background Lockup 105 = Cpu1 Floating Point Overflow 106 = Cpu2 Floating Point Overflow 107 = Cpu1 Illegal Instruction Trap 108 = Cpu2 Illegal Instruction Trap 109 = Cpu1 Stack Testing Turned On 110 = Cpu2 Stack Testing Turned On</p>
SYS POKE 5	372	R: Factory W: Factory	0 <= X <= 65535	<p>Diagnostic poke variable 5 - Used by Engineering Only for DAC Display Selection Three DAC channels are available on the DCU board for viewing internal DSP feedback, regulator, and status values on an oscilloscope.</p> <p>A High Voltage (HV) diff probe will need to be used to probe these DAC channels because the DCU board is referenced to neg bus on the power converter. The DAC voltage header is J6 just under SD memory card on the DCU board. The recommendation is to solder in probe points to the board if you want to probe the DAC channels.</p> <p>00 = SIN_REF = 0, 01 = VLINE_LN, 02 = VLINE_LL, 03 = ICONV, 04 = ISYS, 05 = VDC, 06 = PLL, 07 = PLL_OFFSET, 08 = PLL_LOCK, 09 = PLL_LOCK_TIMER, 10 = PLL_DQ_FBK, 11 = TSWITCH, 12 = VDCREG, 13 = VDCREG_SIN_REF, 14 = VDCREGLOW, 15 = VARREG, 16 = HARMREG_SYNCH, 17 = HARMREG_BROAD, 18 = HARMREG_TEST, 19 = HARMREG_TOTAL, 20 = LIMITMREG, 21 = ICREG, 22 = MOD, 23 = VFF_CALC, 24 = VFF, 25 = ICCMD, 26 = CPU2, 27 = SCOPE_RANGE, 28 = OVERSAMPLE_CHECK, 29 = SENSOR_POWER, 30 = SENSOR_POWER_INST, 31 = VAR_STATIC_CMD, 32 = VAR_CONTROLLER_CMD, 33 = VAR_DQ_FBK, 34 = SENSOR_POWER_CALC_A, 35 = SENSOR_POWER_CALC_B, 36 = SENSOR_POWER_CALC_C, 37 = RMS_I_SYS_OFFSETS, 38 = TURN_ON_RAMP, 39 = GAIN_DEBUG, 40 = PF_BANDWIDTH,</p>

SYS_POKE_6	373	R: Factory W: Factory	0 <= X <= 65535	<p>Diagnostic poke variable 6 - Used by Engineering Only For Selection of Channel's Usage This parameter is used by Engineering in for task usage channel selection that get written to the usage min, max and average parameters. If this parameter value is not within the task id enumeration, active filter's shared memory cpu wait times are shown, wait times are in units of uS.</p> <p>Usage times are scaled from 0-100%. 00 = NULL = 0, 01 = Cpu1 Interrupt Usage, 02 = Cpu1 Intramission Interrupt Usage, 03 = Cpu2 Intramission Interrupt Usage, 04 = Cpu2 Total Usage, 05 = Background Total Usage, 06 = Background Spin loop Usage, 07 = Background 10ms loop Usage, 08 = Background 1sec loop Usage, 09 = Background timer loop Usage, 10 = Background Asynchronous Stradi loop Usage, 11 = Background EEPROM loop Usage, 12 = Background System StateMachine loop Usage, 13 = Background Usage StateMachine loop Usage, 14 = Background Trace loop Usage, 15 = Background Parameter StateMachine loop Usage, 16 = Background Log StateMachine loop Usage, 17 = Background A2DData StateMachine loop Usage, 18 = Background Thermal StateMachine loop Usage, 19 = Background Control StateMachine loop Usage, 20 = Background Diagnostic Data StateMachine loop Usage, 21 = Background Line Synchronous StateMachine loop Usage, 22 = Background Stradi StateMachine loop Usage, 23 = Background Sensor StateMachine loop Usage, 24 = Background GPIO StateMachine loop Usage, 25 = Background DSP StateMachine loop Usage.</p>
SYS_POKE_7	374	R: Factory W: Factory		<p>Diagnostic poke variable 7 - Used by Engineering Only For Cpu2 Trace Channel Selection This meant to be used for debugging purposes</p>
SYS_POKE_8	375	R: Factory W: Factory	-32768 <= X <= 32767	<p>Diagnostic poke variable 8 - Used by Engineering Only For Cpu2 Trace Regulator Selection This meant to be used for debugging purposes</p> <p>00 = Regulator Init , 01 = Regulator Id 3 Pos, 02 = Regulator Id 3 Neg, 03 = Regulator Id 5 Neg, 04 = Regulator Id 7 Pos, 05 = Regulator Id 11 Neg, 06 = Regulator Id 13 Pos, 07 = Regulator Id 17 Neg, 08 = Regulator Id 19 Pos, 09 = Regulator Id 23 Neg, 10 = Regulator Id 25 Pos, 11 = Regulator Id 29 Neg, 12 = Regulator Id 31 Pos, 13 = Regulator Id 35 Neg, 14 = Regulator Id 37 Pos, 15 = Regulator Id 41 Neg, 16 = Regulator Id 43 Pos, 17 = Regulator Id 47 Neg, 18 = Regulator Id 49 Pos, 19 = Regulator Id 6 Pos, 20 = Regulator Id 9 Pos,</p>
SYS_POKE_9	376	R: Factory W: Factory	-32768 <= X <= 32767	<p>Diagnostic poke variable 9 - Used by Engineering Only For Cpu2 DAC Group Selection This meant to be used for debugging purposes</p> <p>00 = Display Isys , 01 = Display Angle, 02 = Display 5th Sine-Cosine, 03 = Display 5th Alpha-Beta Signal, 04 = Display 5th DQ Signal, 05 = Display 5th DQ Filtered Signal,</p>

				06 = Display 5th DQ Cmd Signal, 07 = Display 5th Alpha-Beta Cmd Signal, 08 = Display 5th ABC Cmd Signal, 09 = Display Test Cmd, 10 = Display Total Cmd, 11 = Display 5th D Cmd Signal, 12 = Display 5th ABC Sig Cmd Signal,
SYS_RUN_INHIBIT	377	R: Basic W: Tech	$0 \leq X \leq 1$	run inhibit - manual Stop Command 00 = Allow 01 = Inhibit
VAR_TEST_CMD	378	R: Tech W: Tech+	-1000 \leq X \leq 1000 Scalar: 1.0 Equation: $1.0 * 0 \Rightarrow 0.0$ kVAR	VAR Test Load Command - can be written to anytime, converter on or off, so no need to make sure the converter is off before updating. Max var command allowed is based on SYS_MAX_VAX parameter
VAR_TEST_CLEAR_DELAY	379	R: Tech W: Tech+	$0 \leq X \leq 6000$ Scalar: 1.0 Equation: $1.0 * 600 \Rightarrow 600$ secs	VAR Test Load Command Auto Clear Timer
PEEK_POKE_PARAM_TO_CHANGE_ID	380	R: Tech++ W: Factory	$0 \leq X \leq 65535$	A temporary internal-use parameter used to specify the target Parameter ID for manual "peek" (read) or "poke" (write) operations. This is typically used for advanced diagnostics, debug access, or system-level overrides where dynamic parameter access is required without hardcoded addresses.
PEEK_POKE_PARAM_TO_CHANGE_VALUE_1	381	R: Tech++ W: Factory	$-32768 \leq X \leq 32767$	This parameter holds the higher 16-bits of the 32-bit data value to be written to the parameter specified by PEEK_POKE_PARAM_TO_CHANGE_ID. It is part of the manual "poke" mechanism used for low-level diagnostics, debug commands, or dynamic parameter manipulation.
PEEK_POKE_PARAM_TO_CHANGE_VALUE_0	382	R: Tech++ W: Factory	$-32768 \leq X \leq 32767$	This parameter holds the lower 16-bits of the 32-bit data value to be written to the parameter specified by PEEK_POKE_PARAM_TO_CHANGE_ID. It is part of the manual "poke" mechanism used for low-level diagnostics, debug commands, or dynamic parameter manipulation.
PEEK_POKE_WRITE	383	R: Tech++ W: Factory	$0 \leq X \leq 1$	PEEK_POKE_WRITE is a control flag used to initiate a manual "poke" operation i.e., a direct write to the parameter specified by PEEK_POKE_PARAM_TO_CHANGE_ID. When set to 1, the system attempts to write the value(s) provided (e.g., PEEK_POKE_PARAM_TO_CHANGE_VALUE_1) to the target parameter. 00 = No Request 01 = Check Write Parameter Request
PEEK_POKE_READ	384	R: Tech++ W: Factory	$0 \leq X \leq 1$	PEEK_POKE_READ is a control flag used to initiate a manual "peek" operation i.e., a direct read from the parameter specified by PEEK_POKE_PARAM_TO_CHANGE_ID. When set to 1, the system retrieves the current value of the selected parameter and stores it in the associated output parameters 00 = No Request 01 = Check Read Parameter Request
PEEK_POKE_DSP_PARAM_VALUE_1	385	R: Tech++ W: Factory	$-32768 \leq X \leq 32767$	This parameter holds the higher 16-bits of the 32-bit data value to be read parameter specified by PEEK_POKE_PARAM_TO_CHANGE_ID. It is part of the manual "peek" mechanism used for low-level diagnostics, debug commands, or dynamic parameter manipulation.
PEEK_POKE_DSP_PARAM_VALUE_0	386	R: Tech++ W: Factory	$-32768 \leq X \leq 32767$	This parameter holds the lower 16-bits of the 32-bit data value to be read parameter specified by PEEK_POKE_PARAM_TO_CHANGE_ID. It is part of the manual "peek" mechanism used for low-level diagnostics, debug commands, or dynamic parameter manipulation.

LOGGING_LEVEL	387	R: Tech W: Tech+	0 ≤ X ≤ 6	Verboseness level of logging 00 = Disabled 01 = Processor Fatal Error 02 = Error 03 = Warning 04 = Info 05 = Debug 06 = All
LOGGING_ENABLE	388	R: Tech W: Tech+	0 ≤ X ≤ 3	Enable bits for logging devices 00 = All Logging Disabled 01 = SD Card Logging Enabled 02 = Terminal Logging Enabled 03 = SD Card and Terminal Logging Enabled
RTC_SYNC_RDY	389	R: Tech W: Factory	0 ≤ X ≤ 1	Real time clock data ready from AVR to DSP 00 = Not ready 01 = Ready
RTC_SEC	390	R: Basic W: Basic	-1 ≤ X ≤ 59 Scalar: 1.0 Equation: 1.0*-1 => -1.0 sec	Real time clock seconds time field
RTC_MIN	391	R: Basic W: Basic	-1 ≤ X ≤ 59 Scalar: 1.0 Equation: 1.0*-1 => -1.0 min	Real time clock minutes time field
RTC_HOUR	392	R: Basic W: Basic	-1 ≤ X ≤ 23 Scalar: 1.0 Equation: 1.0*-1 => -1.0 hr	Real time clock hour time field
RTC_DAY	393	R: Basic W: Basic	-1 ≤ X ≤ 31 Scalar: 1.0 Equation: 1.0*-1 => -1.0	Real time clock daytime field
RTC_MONTH	394	R: Basic W: Basic	-1 ≤ X ≤ 12 Scalar: 1.0 Equation: 1.0*-1 => -1.0	Real time clock month time field
RTC_YEAR	395	R: Basic W: Basic	-1 ≤ X ≤ 3000 Scalar: 1.0 Equation: 1.0*-1 => -1.0	Real time clock year time field
SYS_XFMR_TAP	396	R: Basic W: Tech+	-10 ≤ X ≤ 10 Scalar: 1.0 Equation: 1.0*0 => 0.0 %	Autotransformer tap setting
SYS_NUM_DEVICES	397	R: Basic W: Basic	1 ≤ X ≤ 4	Number of converters in unit
SYS_ADDR_CMD	398	R: Basic W: Basic	0 ≤ X ≤ 10	Serial Com bus configuration command - Only gets used for Active Filters that Utilize an AVR Board 00 = Null, 01 = Cmd Write, 02 = Cmd Cancel, 03 = Cmd RollCall, 04 = Cmd Manual, 05 = Cmd Auto,
SYS_NULL_STAT	399	R: Basic	0 ≤ X ≤ 1	System Calibration Status Read-only 00 = Not Calibrated 01 = Calibrated
SYS_FACT_PASS	400	R: Tech W: Tech+	0 ≤ X ≤ 32767	Initiates a pre-defined load of test parameters used for low voltage testing or parallel unit configuration.
SYS_INT_HB	401	R: Basic	0 ≤ X ≤ 65535	System Interrupt Heartbeat Counter Counts and rolls over to zero used to verify Processor Clock
SYS_BG_HB	402	R: Basic	0 ≤ X ≤ 65535	System Background Heartbeat Counter Counts and rolls over to zero used to verify processor clock operation

TRACE_TRIG_RESET	404	R: Basic W: Basic	0 <= X <= 1	Trace trigger reset/arm 00 = Idle 01 = Reset
TRACE_DELAY	405	R: Basic W: Basic	0 <= X <= 255	Trace sample delay
PLL_ANGLE_OFFSET	406	R: Tech W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	DQ based PLL frequency dependent phase offset adjustment
TRACE_TRIG_FORCE	407	R: Basic W: Basic	0 <= X <= 1	Trace force trigger 00 = Idle 01 = Trigger
TRACE_PRE_TRIG	408	R: Basic W: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Trace pre trigger sample count, if value is greater than the Trace Buffer Size -1 it will set the Pre Trigger to 0.
TRACE_MODE	409	R: Basic W: Basic	0 <= X <= 20	Trace Channel Selection Mode 00 = VLine 01 = ILine 02 = IConv 03 = VLine & ILine 04 = Debug Waveform
TRACE_TRIG_MODE	410	R: Basic W: Basic	0 <= X <= 1	Trace Trigger Mode 00 = Manual 01 = Num
TRACE_SCALE_SELECT	415	R: Basic W: Basic	0 <= X <= 1	Select whether trace reads out over Modbus should be scaled to the Delta HMI screen or sent raw to the PQ Vision app. 0 = No Scaling 1 = HMI Scaling (Normalized to 16-bit range @ given rated current/voltage)
SYS_V_RATING_XFMR	419	R: Basic W: Tech+	500 <= X <= 6900 Scalar: 0.1 Equation: 0.1*4800 => 480 V	Facility Source Voltage on H-Side of Active Filter Transformer
SYS_I_RATING	420	R: Basic W: Tech++	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*10 => 1.0 A	Unit Max Amp Rating (no derating applied)
SYS_I_LIMIT	421	R: Basic W: Factory	0 <= X <= 10000 Scalar: 0.1 Equation: 0.1*20 => 2.0 A	Unit Max Amp Rating with derating applied
TRACE_STATUS	424	R: Basic W: Basic	0 <= X <= 100 Scalar: 1.0 Equation: 1.0*0 => 0.0 %	Trace Status Indication, current progress of the Trace Buffer
SYS_USAGE_MIN	449	R: Tech	0 <= X <= 2000 Scalar: 0.1 Equation: 0.1*0 => 0.0 %	Processor Min Cycle Usage
SYS_USAGE_MAX	450	R: Tech	0 <= X <= 2000 Scalar: 0.1 Equation: 0.1*0 => 0.0 %	Processor Max Cycle Usage
SYS_USAGE_AVG	451	R: Tech	0 <= X <= 2000 Scalar: 0.1 Equation: 0.1*0 => 0.0 %	Processor Avg Cycle Usage
SYS_PEEK_0	452	R: Tech++	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Returns the Value Pointed at by the Corresponding Peek Address in PARAM_SYS_PEEK_ADDR_0
SYS_PEEK_1	453	R: Tech++	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Returns the Value Pointed at by the Corresponding Peek Address in PARAM_SYS_PEEK_ADDR_1

SYS_PEEK_2	454	R: Tech++	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Returns the Value Pointed at by the Corresponding Peek Address in PARAM_SYS_PEEK_ADDR_2
SYS_PEEK_3	455	R: Tech++	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Returns the Value Pointed at by the Corresponding Peek Address in PARAM_SYS_PEEK_ADDR_3
PARAM_KEY_A	502	R: Basic W: Basic	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Read/write parameters keys
PARAM_KEY_B	503	R: Basic W: Basic	0 ≤ X ≤ 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Read/write parameters keys
CT_RATIO	504	R: Basic W: Tech	0 ≤ X ≤ 6000 Scalar: 1.0 Equation: 1.0*100 => 100 :5	Current Transformer CT ratio primary Amps relative to five Amp secondary XXXX:5 where XXXX is the primary turns count of the CT
MB_BAUD_RATE	600	R: Basic W: Basic	240 ≤ X ≤ 11520 Scalar: 1.0 Equation: 1.0*3840 => 3840	The bits per second rate of the Modbus RTU interface.
MB_PARITY	601	R: Basic W: Basic	0 ≤ X ≤ 2	Parity bit setting for the ModbusRTU interface serial link. 00 = None 01 = Odd 02 = Even
V_LINE_RMS_SCALAR	749	R: Tech+ W: Tech++	-32768 ≤ X ≤ 32767 Scalar: 0.001 Equation: 0.001*1000 => 1.0	Line Voltage RMS Scalar
V_THD_OFFSET	803	R: Tech+ W: Tech++	-500 ≤ X ≤ 500 Scalar: 0.0001 Equation: 0.0001*0 => 0.0	THVD display offset
I_THD_OFFSET	804	R: Tech+ W: Tech++	-500 ≤ X ≤ 500 Scalar: 0.0001 Equation: 0.0001*0 => 0.0	THID display offset
SYS_NULL_EN	819	R: Basic W: Tech	0 ≤ X ≤ 1	Enabled the auto DC nulling calibration of the unit AC current and voltage feedback signals. 00 = Disabled 01 = Enabled
V_LINE_A_OFFSET	829	R: Tech+ W: Tech++	0 ≤ X ≤ 4096 Scalar: 1.0 Equation: 1.0*2048 => 2048	Voltage Offset Phase A
V_LINE_C_OFFSET	831	R: Tech+ W: Tech++	0 ≤ X ≤ 4096 Scalar: 1.0 Equation: 1.0*2048 => 2048	Voltage Offset Phase C
I_LINE_A_OFFSET	842	R: Tech+ W: Tech++	0 ≤ X ≤ 32760 Scalar: 1.0 Equation: 1.0*2048 => 2048	System (Line/Load) Current Offset A
I_LINE_C_OFFSET	843	R: Tech+ W: Tech++	0 ≤ X ≤ 32760 Scalar: 1.0 Equation: 1.0*2048 => 2048	System (Line/Load) Current Offset C
SYS_CPU_THRESHOLD	900	R: Tech+ W: Tech++	0 ≤ X ≤ 32768 Scalar: 0.001 Equation: 0.001*950 => 0.95	Processor CPU fault Threshold

				Debug trace group selection parameter 00 = VLineRaw 01 = ILineRaw 02 = IConvRaw 03 = VLineFiltered 04 = VBusFiltered 05 = TSwitchFiltered 06 = VLineRms 07 = ILineRms 08 = IConvRms 09 = FilterCtrlSine 10 = FilterCtrlVarSine 11 = FilterThermalLimit 12 = FilterCtrlRmsLimit 13 = FilterCtrlVarLimit 14 = FilterCtrlThdLimit 15 = FilterCtrlPFLimit 16 = FilterCtrlAmpLimit 17 = FilterCtrlHarmonicCmdStats 18 = FilterCtrlSineReference 19 = FilterCtrlHarmonicCmdSync 20 = FilterCtrlIcReference 21 = FilterVdcSetpoint 22 = VdcRegFullOutput 23 = VdcRegFullIntegral 24 = VdcRegHalfOutput 25 = VdcRegHalfIntegral 26 = VarSPROC 27 = VarSigDQ 28 = VarSigDQFiltered 29 = VarRegData 30 = VarRegCmdDQ 31 = VarRegCmdAC 32 = VarStaticCmd 33 = VarTotalCmd 34 = IcRegResults 35 = FilterCtrlPoleVoltageCmd 36 = SMemTracesBuffer 37 = PLL_DQ_REG 38 = PLL_DQ_SIG 39 = PLL_DQ_Angle1 40 = PLL_DQ_Angle2 41 = UsageStats 42 = SystemState1 43 = SystemState2 44 = ParamState
TRACE_DEBUG_SELECT	949	R: Basic W: Factory	0 <= X <= 32767	
SYS_POKE_1	950	R: Factory W: Factory	0 <= X <= 65535	Diagnostic poke variable 1 - Used by Engineering Only for IGBT Pulse Test Used for tuning IGBT gate drive fault and soft off values to change its Pulse Switch Length Time. Running this build in production hardware IS POTENTIALLY DESTRUCTIVE!
SYS_POKE_2	951	R: Factory W: Factory	0 <= X <= 65535	Diagnostic poke variable 2 - Used by Engineering Only for IGBT Pulse Test Used for tuning IGBT gate drive fault and soft off values to change its Pulse Switch Options. Running this build in production hardware IS POTENTIALLY DESTRUCTIVE! 00 = Upper Switch Type 01 = Lower Switch Type
SYS_POKE_3	952	R: Factory W: Factory	0 <= X <= 65535	Diagnostic poke variable 3 - Used by Engineering Only for IGBT Pulse Test Used for tuning IGBT gate drive fault and soft off values to change its Pulse Switch Request, a value of 2 starts the process.
SYS_PEEK_ADDR_0	953	R: Tech++ W: Factory	0 <= X <= 65535	Diagnostic peek address 0 - Used for viewing Tracing Address or Raw DSP Memory Trace IDS: 0 -121 Raw DSP Memory 122-65535

SYS_PEEK_ADDR_1	954	R: Tech++ W: Factory	0 <= X <= 65535	Diagnostic peek address 1 - Used for viewing Tracing Address or Raw DSP Memory Trace IDS: 0 -121 Raw DSP Memory 122-65535
SYS_PEEK_ADDR_2	955	R: Tech++ W: Factory	0 <= X <= 65535	Diagnostic peek address 2 - Used for viewing Tracing Address or Raw DSP Memory Trace IDS: 0 -121 Raw DSP Memory 122-65535
SYS_PEEK_ADDR_3	956	R: Tech++ W: Factory	0 <= X <= 65535	Diagnostic peek address 3 - Used for viewing Tracing Address or Raw DSP Memory Trace IDS: 0 -121 Raw DSP Memory 122-65535
SYS_PF_BANDWIDTH	1024	R: Basic W: Tech	0 <= X <= 80 Scalar: 0.01 Equation: 0.01*5 => 0.05	Power Factor Band
SYS_PF_REACTIVE_FILTER_CAP	1029	R: Basic W: Tech	0 <= X <= 65535 Scalar: 0.001 Equation: 0.001*15 => 0.015	Filter's PF Regulator Capacitor Hardcoded Value
LOCAL_STOP_CMD_INHIBIT	1030	R: Basic W: Basic	0 <= X <= 1	Local Stop button enable inhibit
PARAM_MODEL_ID	5000	R: Basic	0 <= X <= 65535	Production Model ID Value for Current supported Parameters for PQvision. 00 = Universal 01 = Passive 02 = Active 03 = Sinewave
PARAM_MODEL_VERSION	5001	R: Basic	0 <= X <= 65535	Production Model Version Value for Current supported Parameters for PQvision.
PRODUCT_MAJOR_ID	5002	R: Basic W: Error	0 <= X <= 65535	Production Line ID 01 = HGP 02 = HGL 03 = HSD 04 = HSL 05 = HSE 07 = HGA 08 = KMG 09 = MSD
PRODUCT_MINOR_ID	5003	R: Basic W: Error	0 <= X <= 65535	Production Line Minor ID - Details specific HP or Amp Rating Configuration 00 = NA Active Filters 100 = 3L_LINE_30A 101 = 2L_LOAD_30A 102 = 2L_LINE_50A 103 = 3L_LINE_50A

				104 = 2L_LOAD_50A 105 = 2L_LINE_100A 106 = 3L_LINE_100A 107 = 2L_LOAD_100A 108 = 2L_LINE_150A 109 = 3L_LINE_150A 110 = 2L_LOAD_150A 111 = 2L_LINE_200A 112 = 3L_LINE_200A 113 = 2L_LOAD_200A 114 = 2L_LINE_250A 115 = 3L_LINE_250A 116 = 2L_LOAD_250A 117 = 2L_LINE_300A 118 = 3L_LINE_300A 119 = 2L_LOAD_300A 120 = 2L_LINE_350A 121 = 3L_LINE_350A 122 = 2L_LOAD_350A 999 = 2L_PCB, 3L_PCB
SERIAL_JOB_NO_LSB	5004	R: Basic W: Tech++	0 ≤ X ≤ 65535	Unit serial number section - lower 16 bits of 32-bit unit job number Parameter contains LLLL in the UUUULLLL-NN serial number format
SERIAL_JOB_NO_MSB	5005	R: Basic W: Tech++	0 ≤ X ≤ 65535	Unit serial number section - Upper 16 bits of 32-bit unit job number Parameter contains UUUU in the UUUULLLL-NN serial number format
SERIAL_LINE_NO	5006	R: Basic W: Tech++	0 ≤ X ≤ 65535	Unit serial number section - two-digit unit number Parameter contains NN in the UUUULLLL- NN serial number format

Active Filter - Waveform Data

The waveform data displayed by the Filter is available in the Modbus read analog input register data space. Use function code 4 for reading inputs.

Table 13: Waveform Data

Waveform	Address	Length
Filter Line to Neutral Voltage Phase A	0	128
Filter Line to Neutral Voltage Phase B	128	128
Filter Line to Neutral Voltage Phase C	256	128
Filter Line Current Phase A	384	128
Filter Line Current Phase B	512	128
Filter Line Current Phase C	640	128
Filter Converter Current Phase A	768	128
Filter Converter Current Phase B	896	128
Filter Converter Current Phase C	1024	128

Sinewave Filter - Parameter Register Map

Note: For metering data including Output Voltage, THVD, Peak Voltage to RMS voltage ratio, Fundamental Frequency, and Carrier Frequency, if data is not available, the PQconnect will report a value of 63353 (or 0xFFFF in hex format) to indicate no data is available. The no data available condition is usually triggered by the filter output voltage being below the minimum fundamental frequency tracking voltage threshold

Parameter Name	I/O Register Address Offsets	Type	Range	Description
DSP_SW_VER	12	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*12=> 12.0	Software revision code for DSP Two 8bit ASCII Characters 0x3144 = ASCII for "D1"
HMS_SW_VER	14	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*14 => 14.0	Ethernet Module Model Number - Major. Minor
DSP_MCU_NUM	15	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*15 => 15.0	Main Processor MCU Number MCU Type number for 2809 or 28044
BGM_SW_VER	16	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*16 => 16.0	Software Revision Code for Bluetooth Processor Two 8bit ASCII characters 0x4234 = ASCII for "4B"
BGM_MODEL_NUM_RO	17	R: Basic	0 <= X <= 3	Module Revision Code for Bluetooth Processor 00 = Null 01 = BGM111 02 = BGM210 03 = BGM220
HMS_MODEL_NUM_RO	20	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*20 => 20.0	Ethernet Hardware Version Number Notifies the user what type of Module is connected.
V_LOAD_AB_RMS	50	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*4878 => 487.8 V	Filter Output Phase to Phase Voltage (A-B)
V_LOAD_BC_RMS	51	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*4879 => 487.9 V	Filter Output Phase to Phase Voltage (B-C)
V_LOAD_CA_RMS	52	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*4877 => 487.7 V	Filter Output Phase to Phase Voltage (C-A)
V_LOAD_AB_THD	53	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*309 => 30.9 %	Filter Output Phase to Phase Voltage THD (A-B)
V_LOAD_BC_THD	54	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*310 => 31.0 %	Filter Output Phase to Phase Voltage THD (B-C)
V_LOAD_CA_THD	55	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*308 => 30.8 %	Filter Output Phase to Phase Voltage THD (C-A)
V_LOAD_AB_PEAK_RMS_RATIO	60	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*756 => 75.6 %	Filter Output Peak Voltage to RMS Ratio AB
V_LOAD_BC_PEAK_RMS_RATIO	61	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*759 => 75.9 %	Filter Output Peak Voltage to RMS Ratio BC
V_LOAD_CA_PEAK_RMS_RATIO	62	R: Basic	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*753 => 75.3 %	Filter Output Peak Voltage to RMS Ratio CA
LINE_FREQ	100	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*60 => 60.0 Hz	Filter output voltage fundamental frequency
V_IN_CARRIER_HZ	101	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*4000 => 4 kHz	Filter input voltage carrier frequency
LINE_ROT	102	R: Basic	0 <= X <= 2	Filter Output Grid Rotation 00 = Null 01 = ABC 02 = ACB

T AMBIENT	103	R: Basic	-950 <= X <= 950 Scalar: 0.1 Equation: 0.1*103 => 10.3 C	Filter Controls Temperature Board will give a status conditions : overtemp if it exceeds 75C or under-temp if the temperature descends past -40C
SYS POWER ON	201	R: Basic	0 <= X <= 1	Filter Powered On - Indicates if the filter has input power available 00 = Power Off 01 = Power On
CAP DEGREDDATION WARNING	205	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*205 => 205.0	Filter capacitor degradation warning 00 = No Warning Nonzero value = warning
DETECTION STATUS	210	R: Basic	0 <= X <= 65535	Relay output combined detection status 16 bitmask (for each 1 = detection active, 0 = detection clear) bit 00 = Phase A Over Voltage bit 01 = Phase B Over Voltage bit 02 = Phase C Over Voltage bit 03 = Phase A High THVD bit 04 = Phase B High THVD bit 05 = Phase C High THVD bit 06 = Thermal SW 1 bit 07 = Thermal SW 2 bit 08 = PCB Under Temperature bit 09 = PCB Over Temperature bit 10 = Phase A Loss bit 11 = Phase B Loss bit 12 = Phase C Loss bit 15 = CPU Fault
TRACE DELAY	250	R: Basic	0 <= X <= 3	Waveform capture interval between recording (higher = more cycles and lower resolution) 00 = Full Resolution 01 = Half Resolution 02 = 1/3 Resolution 03 = 1/4 Resolution
PARAM ACCESS LEVEL RO	254	R: Basic	0 <= X <= 32	Level of Parameter Access to Read and/or Change Parameter Inputs 00 = Base access 16 = Tech access 32 = Factory access
PARAM STATE	255	R: Basic	0 <= X <= 17	Indicates The Present State of The Parameter State Machine - Read Only Value 00 = Init 01 = Init E2 Chip 02 = Init Delay 03 = Init Read 04 = Write Flash Test 05 = Setup Flash 06 = Setup Non Cal Flash 07 = Save Current Values 08 = Stamp EE 09 = Init From Defaults 10 = Init From Flash 11 = Execute Param Functions 12 = Init Finish 13 = Restore Defaults 14 = Restore Non Cal Defaults 15 = Init Save Current Values 16 = Save Single Value 17 = Reboot
SYS STATE	256	R: Basic	0 <= X <= 9	System state machine state 00 = Init 01 = Init Params 02 = Calibrate Offsets 03 = Calibrate Check 04 = Run 09 = Faulted

RELAY_INPUT_STATUS	320	R: Basic	0 <= X <= 3	Relay input status 00 = "Relay 1 - Okay, Relay 2 - Okay" 01 = "Relay 1 - Hot, Relay 2 - Okay" 02 = "Relay 1 - Okay, Relay 2 - Hot" 03 = "Relay 1 - Hot, Relay 2 - Hot"
SYS_DS_MODE	360	R: Basic	0 <= X <= 1	Indicates If the Processor is in Data Simulation Mode 00 = Inactive 01 = data simulation active
BGM_PASSKEY_A	375	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*375 => 375.0	Wireless password high bytes
BGM_PASSKEY_B	376	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*376 => 376.0	Wireless password set low bytes
BGM_MODULE_STATUS	380	R: Basic	0 <= X <= 5	Status of the BGM (Bluetooth LE module) 00 = Idle 01 = Advertising 02 = Connected 03 = Not Responding 04 = Radio Disabled 05 = Firmware Mismatch
FIELDBUS_STATUS_A	381	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*381 => 381.0	Ethernet Module Status Register A Notifies the User of the status of the EtherNet/IP Module.
FIELDBUS_STATUS_B	382	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*382 => 382.0	Ethernet Module Status Register B Notifies the User of the status of the EtherNet/IP Module.
ETH_IP_ADDR_A	383	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*383 => 383.0	ParameterDatabase Only, Used to Read EtherNet/IP IP Address
ETH_IP_ADDR_B	384	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*384 => 384.0	ParameterDatabase Only, Used to Read EtherNet/IP IP Address
ETH_SUB_NET_A	385	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*385 => 385.0	EtherNet/IP Subnet Upper 16 Bits
ETH_SUB_NET_B	386	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*386 => 386.0	EtherNet/IP Subnet Lower 16 Bits
ETH_DEF_GATEWAY_A	387	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*387 => 387.0	EtherNet/IP Gateway Upper 16 Bits
ETH_DEF_GATEWAY_B	388	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*388 => 388.0	EtherNet/IP Gateway Lower 16 Bits
FB_CONFIG	389	R: Basic	0 <= X <= 1	Fieldbus Configuration Status 00 = DHCP Disabled 01 = DHCP Enabled
FB_LED	390	R: Basic	0 <= X <= 65535	Fieldbus Debug LED's two bits per each of the 8 LEDs with
ETH_MAC_ADDR_A	391	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*391 => 391.0	EtherNet/IP MAC Address Upper 16 Bits
ETH_MAC_ADDR_B	392	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*392 => 392.0	EtherNet/IP MAC Address Middle 16 Bits
ETH_MAC_ADDR_C	393	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*391 => 393.0	EtherNet/IP MAC Address Lower 16 Bits

SYS_NULL_STAT	400	R: Basic	0 <= X <= 1	System Calibration Status Read-only 00 = Not Calibrated 01 = Calibrated
SYS_NULL_TMR	401	R: Basic	0 <= X <= 65535 Scalar: 0.01 Equation: 0.01*3000 => 30.0 secs	System null timer - Indicates whether the unit is calibrating.
SYS_INT_HB	402	R: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*402 => 402.0	System Interrupt Heartbeat Counter Counts and rolls over to zero used to verify Processor Clock
SYS_BG_HB	403	R: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*403 => 403.0	System Background Heartbeat Counter Counts and rolls over to zero used to verify processor clock operation
SYS_USAGE_MIN	450	R: Factory	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*789 => 78.9 %	Processor Min Cycle Usage
SYS_USAGE_MAX	451	R: Factory	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*801 => 80.1 %	Processor Max Cycle Usage
SYS_USAGE_AVG	452	R: Factory	0 <= X <= 65535 Scalar: 0.1 Equation: 0.1*791 => 79.1 %	Processor Avg Cycle Usage
SYS_PEEK_0	453	R: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*453 => 453.0	Returns the Value Pointed at by the Corresponding Poke Address
SYS_PEEK_1	454	R: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*453 => 453.0	Returns the Value Pointed at by the Corresponding Poke Address
SYS_PEEK_2	455	R: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*453 => 453.0	Returns the Value Pointed at by the Corresponding Poke Address
SYS_PEEK_3	456	R: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*453 => 453.0	Returns the Value Pointed at by the Corresponding Poke Address
HISTORY_LOG_STATUS	464	R: Basic	0 <= X <= 3	Indicates the present Status of the History Log (Read Only Internal States) 00 = Initializing History Log 01 = Successfully Reading/Storing History 02 = Out of Bounds history registers 03 = EEPROM is busy, Try Again Later
SYS_COM_ACTIVE	465	R: Basic	0 <= X <= 65535	System Communication Status, bit 0 = Modbus RTU active, bit 1 = Bluetooth active, bit 2 = EtherNet/IP active,
PARAM_USER_CMD_REQ	500	R: Basic W: Basic	0 <= X <= 255	Requested User State 00 = Init 01 = Stop 09 = Save To Flash 21 = Set User Access 25 = Set Tech Access 30 = Set Factory Access 42 = Reboot 100 = Clear History 150 = Load From Flash 200 = Restore Non-Cal Defaults 255 = Restore Defaults
TRACE_TRIG_FORCE	501	R: Basic W: Basic	0 <= X <= 1	Waveform Capture Trig Command 00 = Capture Done 01 = Trigger Capture
PARAM_KEY_A	503	R: Basic W: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*503 => 503.0	Read/write parameters keys
PARAM_KEY_B	504	R: Basic W: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*504 => 504.0	Read/write parameters keys

RELAY_MIN_ON_TIME	505	R: Basic W: Tech	1 <= X <= 3600 Scalar: 1.0 Equation: 1.0*10 => 10.0 secs	Relay Minimum on Time
TRACE_RESOLUTION_RANGE_HYST	508	R: Basic W: Tech	0 <= X <= 500 Scalar: 1.0 Equation: 1.0*5 => 5.0 %	Waveform resolution range hysteresis (higher value means res changes more readily)
RATED_VOLTAGE	521	R: Basic W: Tech	1200 <= X <= 6900 Scalar: 0.1 Equation: 0.1*4800 => 480.0 V	Unit Rated RMS Line to Line Voltage
OUTPUT_RELAY_1_ENABLE	540	R: Basic W: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*32888 => 32888.0	Relay output 1 status detection enable bit mask If a status is active and the bit corresponding to that status in this mask is set, the relay will be activated. 0 = Disabled 65535 = All enabled bit 00 = Phase A Over Voltage bit 01 = Phase B Over Voltage bit 02 = Phase C Over Voltage bit 03 = Phase A High THVD bit 04 = Phase B High THVD bit 05 = Phase C High THVD bit 06 = Thermal SW 1 bit 07 = Thermal SW 2 bit 08 = PCB Under Temperature bit 09 = PCB Over Temperature bit 10 = Phase A Loss bit 11 = Phase B Loss bit 12 = Phase C Loss bit 15 = CPU Fault
OUTPUT_RELAY_2_ENABLE	550	R: Basic W: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*64 => 64.0	Relay output 2 status detection enable bit mask If a status is active and the bit corresponding to that status in this mask is set, the relay will be activated. 0 = Disabled 65535 = All enabled bit 00 = Phase A Over Voltage bit 01 = Phase B Over Voltage bit 02 = Phase C Over Voltage bit 03 = Phase A High THVD bit 04 = Phase B High THVD bit 05 = Phase C High THVD bit 06 = Thermal SW 1 bit 07 = Thermal SW 2 bit 08 = PCB Under Temperature bit 09 = PCB Over Temperature bit 10 = Phase A Loss bit 11 = Phase B Loss bit 12 = Phase C Loss bit 15 = CPU Fault
MB_SLAVE_ADDRESS	600	R: Basic W: Tech	1 <= X <= 247 Scalar: 1.0 Equation: 1.0*10 => 10.0	The ModbusRTU server or slave device address
MB_BAUD_RATE	601	R: Basic W: Tech	0 <= X <= 11520 Scalar: 1.0 Equation: 1.0*3840 => 3840.0 bps	The bits per second rate of the Modbus RTU interface.
MB_PARITY	602	R: Basic W: Tech	0 <= X <= 2	Parity bit setting for the ModbusRTU interface serial link. 00 = None 01 = Odd 02 = Even
MB_SAVE_SET_FLAG	603	R: Basic W: Tech	0 <= X <= 2	Modbus Flag Save Settings 00 = Idle 01 = Saving Settings 02 = Save Completed

BOOTLOADER START	604	R: Tech W: Tech	$0 \leq X \leq 2$	Used to navigate to bootloader, which launches the main program 00 = No Action 01 = Start Bootloader 02 = Start Recovery
RELAY INPUT 1 CONFIG	610	R: Basic W: Tech	$0 \leq X \leq 1$	External Control Relay Input 1: J7 of the PCB 00 = Disabled 01 = Enabled
RELAY INPUT 2 CONFIG	611	R: Basic W: Tech	$0 \leq X \leq 1$	External Control Relay Input 2: J8 of the PCB 00 = Disabled 01 = Enabled
STATUS OVERVOLTAGE ONSET	620	R: Tech W: Tech	$100 \leq X \leq 500$ Scalar: 1.0 Equation: $1.0 * 130 \Rightarrow 130.0$ [%V]	Filter output voltage peak overvoltage onset threshold
STATUS OVERVOLTAGE CLEAR	621	R: Tech W: Tech	$100 \leq X \leq 500$ Scalar: 1.0 Equation: $1.0 * 125 \Rightarrow 125.0$ [%V]	Filter output voltage peak overvoltage clear threshold
STATUS OVERVOLTAGE DELAY	622	R: Tech W: Tech	$1 \leq X \leq 3600$ Scalar: 1.0 Equation: $1.0 * 6 \Rightarrow 6.0$ secs	Filter output voltage peak overvoltage delay
STATUS HIGH THD ONSET	630	R: Tech W: Tech	$1 \leq X \leq 100$ Scalar: 1.0 Equation: $1.0 * 16 \Rightarrow 16.0$ %	Filter output voltage high THD onset threshold
STATUS HIGH THD CLEAR	631	R: Tech W: Tech	$1 \leq X \leq 100$ Scalar: 1.0 Equation: $1.0 * 15 \Rightarrow 15.0$ %	Filter output voltage high THD clear threshold
STATUS HIGH THD DELAY	632	R: Tech W: Tech	$1 \leq X \leq 3600$ Scalar: 1.0 Equation: $1.0 * 6 \Rightarrow 6.0$ secs	Filter output voltage high THD delay time
STATUS REACTOR SWITCH DELAY	635	R: Basic W: Tech	$1 \leq X \leq 3600$ Scalar: 1.0 Equation: $1.0 * 6 \Rightarrow 6.0$ secs	Relay input/reactor thermal switch delay time
STATUS T AMBIENT UT ONSET	640	R: Tech W: Tech	$-500 \leq X \leq 0$ Scalar: 0.1 Equation: $0.1 * -400 \Rightarrow -40.0$ deg C	PCB under temperature onset threshold
STATUS T AMBIENT UT CLEAR	641	R: Tech W: Tech	$-500 \leq X \leq 0$ Scalar: 0.1 Equation: $0.1 * -350 \Rightarrow -35.0$ deg C	PCB under temperature clear threshold
STATUS T AMBIENT UT DELAY	642	R: Tech W: Tech	$1 \leq X \leq 3600$ Scalar: 1.0 Equation: $1.0 * 6 \Rightarrow 6.0$ secs	PCB under temperature delay
STATUS T AMBIENT OT ONSET	645	R: Tech W: Tech	$100 \leq X \leq 850$ Scalar: 0.1 Equation: $0.1 * 750 \Rightarrow 75.0$ deg C	PCB overtemperature onset threshold
STATUS T AMBIENT OT CLEAR	646	R: Tech W: Tech	$100 \leq X \leq 800$ Scalar: 0.1 Equation: $0.1 * 700 \Rightarrow 70.0$ deg C	PCB overtemperature clear threshold
STATUS T AMBIENT OT DELAY	647	R: Tech W: Tech	$1 \leq X \leq 3600$ Scalar: 1.0 Equation: $1.0 * 6 \Rightarrow 6.0$ secs	PCB overtemperature delay
STATUS PHASE LOSS ONSET	650	R: Tech W: Tech	$1 \leq X \leq 100$ Scalar: 1.0 Equation: $1.0 * 60 \Rightarrow 60.0$ % of avg phase RMS	Filter output voltage phase loss onset threshold

STATUS_PHASE_LOSS_CLEAR	651	R: Tech W: Tech	1 <= X <= 100 Scalar: 1.0 Equation: 1.0*65 => 65.0 % of avg phase RMS	Filter output voltage phase loss clear threshold
STATUS_PHASE_LOSS_DELAY	652	R: Tech W: Tech	1 <= X <= 3600 Scalar: 1.0 Equation: 1.0*6 => 6.0 secs	Filter output voltage phase loss delay
STATUS_CPU_ERROR_DELAY	655	R: Tech W: Tech	1 <= X <= 3600 Scalar: 1.0 Equation: 1.0*6 => 6.0 secs	Main processor CPU error delay
STATUS_HIGH_THD_WARNING_ONSET	660	R: Tech W: Tech	1 <= X <= 100 Scalar: 1.0 Equation: 1.0*12 => 12.0 %	Filter output voltage high THD onset threshold for warning only indicator
STATUS_HIGH_THD_WARNING_CLEAR	661	R: Tech W: Tech	1 <= X <= 100 Scalar: 1.0 Equation: 1.0*11 => 11.0 %	Filter output voltage high THD clear threshold for warning only indicator
STATUS_HIGH_THD_WARNING_DELAY	662	R: Tech W: Tech	1 <= X <= 3600 Scalar: 1.0 Equation: 1.0*6 => 6.0 secs	Filter output voltage high THD delay time for warning only indicator
STATUS_MIN_DETECTION_VOLTAGE	670	R: Tech W: Tech	1 <= X <= 100 Scalar: 1.0 Equation: 1.0*5 => 5.0 [%V]	Minimum voltage to enable status detections
FUND_MIN_TRACKING_VOLTAGE	680	R: Basic W: Tech	1 <= X <= 100 Scalar: 1.0 Equation: 1.0*5 => 5.0 [%V]	Minimum voltage to enable output voltage frequency tracking
FUND_TRACKING_MODE	681	R: Basic W: Tech	0 <= X <= 3	Fundamental frequency tracking mode 00 = Min - Max Tracking Only 01 = Min - Max Zero Combo 02 = Zero Tracking Only 03 = Fixed Tracking
FUND_TRACKING_FILTER_GAIN	682	R: Tech W: Tech	1 <= X <= 16 Scalar: 1.0 Equation: 1.0*13 => 13.0	Fundamental frequency reference filter gain for example of filter gain, shift of 15 is fs/2^ shift, 30.7kHz/2^15 = 0.9375Hz
V_OUT_SCALAR_A	703	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 1.0 Equation: 1.0*9639 => 9639.0	Filter Output Voltage Scalar AB Value Set by Factory
V_OUT_SCALAR_B	704	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 1.0 Equation: 1.0*9639 => 9639.0	Filter Output Voltage Scalar BC Value Set by Factory
V_OUT_SCALAR_C	705	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 1.0 Equation: 1.0*9639 => 9639.0	Filter Output Voltage Scalar CA Value Set by Factory
V_OUT_A_OFFSET	708	R: Tech W: Tech	0 <= X <= 4096 Scalar: 1.0 Equation: 1.0*2048 => 2048.0	Filter Output Voltage Offset AB Value Set by Factory
V_OUT_B_OFFSET	709	R: Tech W: Tech	0 <= X <= 4096 Scalar: 1.0 Equation: 1.0*2048 => 2048.0	Filter Output Voltage Offset BC Value Set by Factory
V_OUT_C_OFFSET	710	R: Tech W: Tech	0 <= X <= 4096 Scalar: 1.0 Equation: 1.0*2048 => 2048.0	Filter Output Voltage Offset CA Value Set by Factory
T_AMBIENT_SCALAR	741	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 6.103e-05 Equation: 6.103e-05*12000 => 0.732	Magnitude Scalar for controls temperature Value set by Factory
T_AMBIENT_OFFSET	745	R: Tech W: Tech	-8192 <= X <= 8192 Scalar: 6.103e-05 Equation: 6.103e-05*683 => 0.0416	Offset for Controls Temperature Value set by Factory

V_LOAD_RMS_SCALAR	751	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 6.103e-05 Equation: 6.103e-05*437 => 0.02667	Filter output voltage RMS scalar Value set by Factory
V_THD_SCALAR	802	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 6.103e-05 Equation: 6.103e-05*16384 => 1.0	Filter output voltage THD gain adjustment factor
V_THD_OFFSET	804	R: Tech W: Tech	-32768 <= X <= 32767 Scalar: 1.0 Equation: 1.0*804 => 804.0	Filter output voltage THD offset adjustment factor Value Configured in Production
SYS_NULL_EN	820	R: Basic W: Tech	0 <= X <= 1	Enabled the System calibration of the unit voltage feedback signals. 00 = Idle 01 = Start Calibration
POWER_CYC_COUNT	840	R: Basic W: Factory	0 <= X <= 255 Scalar: 1.0 Equation: 1.0*10 => 10.0 # of Power Cycles	PQconnect Power cycle count
BGM_ENABLE	900	R: Basic W: Tech	0 <= X <= 1	Set to Enable BGM 00 = Disabled 01 = Enabled
SYS_CPU_THRESHOLD	901	R: Tech W: Factory	0 <= X <= 30000 Scalar: 1.0 Equation: 1.0*12369 => 12369.0	Main Processor CPU fault Threshold
PCB_SERIAL_NUM_1	906	R: Basic W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Upper 16 bits of the PCB serial number Parameter contains UUUU in the UUUULLLL-NNN serial number format.
PCB_SERIAL_NUM_0	907	R: Basic W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Lower 16 bits of the PCB serial number Parameter contains LLLL in the UUUULLLL-NNN serial number format.
PCB_TEST_NUM	908	R: Basic W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*0 => 0.0	Test number of the PCB serial number Parameter contains NNN in the UUUULLLL-NNN serial number format.
TRACE_DEBUG_SELECT	949	R: Factory W: Factory	0 <= X <= 3	Debug trace group selection parameter Debug trace group selection parameter 00 = Voltage Output 01 = PLL Phase A 02 = PLL Phase B 03 = THD
SYS_POKE_0	950	R: Factory W: Factory	0 <= X <= 3	Diagnostic poke variable 0 - Used by Engineering Only
SYS_POKE_1	951	R: Factory W: Factory	0 <= X <= 65535	Diagnostic poke variable 1 - Not Used
SYS_POKE_2	952	R: Factory W: Factory	0 <= X <= 3	Diagnostic poke variable 2 - Used in Datasim build configuration Sets the amount of randomness to the data simulator build 00 = Low Random 01 = Non-Random 02 = High Random
SYS_POKE_3	953	R: Factory W: Factory	0 <= X <= 32767	Diagnostic poke variable 3 - Not Used

BGM_STATIC_PASSKEY_A	970	R: Basic W: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*970 => 970.0	Upper 16 bits of wireless password
BGM_STATIC_PASSKEY_B	971	R: Basic W: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*971 => 971.0	Lower 16 bits of wireless password
BGM_SECURITY_LEVEL	972	R: Basic W: Tech	0 <= X <= 1	BGM Security level. High Security mode blocks new pairing requests. Passkey changes each time a connection is attempted. 00 = Low Security 01 = High Security
BGM_NUMERIC_ID	973	R: Basic W: Tech	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*10 => 10.0	Wireless numeric identifier
BGM_PAIRING_MODE	974	R: Basic W: Tech	0 <= X <= 65535 Scalar: 1.0	Wireless pairing mode request 00 = No active request 01 = Active request
BGM_COMMAND	975	R: Basic W: Tech	0 <= X <= 2	Wireless command input User command written to the BGM device 00 = Run 01 = Delete Bonding Info 02 = Disconnect
FIELD_BUS_COMMAND	976	R: Basic W: Tech	0 <= X <= 3	Field Bus Command Input 00 = No Command 03 = Reset 05 = Shutdown
HISTORY_LOG_REQUEST	989	R: Basic W: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*10 => 10.0	Status detection history record request command
PROC_DATA_CMD_EN	990	R: Basic W: Basic	0 <= X <= 1	Enable or Disables Implicit Setpoint Writes. If 0, any implicit IO Setpoint writes will be disabled. If 1, all Implicit IO Setpoint writes will be allowed.
PARAM_MODEL_ID	5000	R: Basic	0 <= X <= 3	Production Model ID Value for Current supported Parameters for PQvision. 00 = Universal 01 = Passive 02 = Active 03 = Sinewave
PARAM_MODEL_VERSION	5001	R: Basic	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*1 => 1.0	Production Model Version Value for Current supported Parameters for PQvision.

PRODUCT MAJOR ID	5002	R: Basic	0 <= X <= 14	Production Line ID 00 = NA 01 = HGP 02 = HGL 03 = HSD 04 = HSL 05 = HSE 06 = HGA 07 = KMG 08 = MSD 09 = MSL 10 = V1K 11 = KDR 12 = KLR 13 = PFG 14 = KRF
PRODUCT_MINOR_ID	5003	R: Basic	0 <= X <= 303	Production Line Minor ID - Details specific HP or Amp Rating Configuration 00 = NA Sinewave Filters 300 = SWF-KIT 301 = SWF-KMG 302 = SWF-MSD 303 = SWF-DATASIM
SERIAL_JOB_NO_LSB	5004	R: Basic W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*50 => 50.0	Unit serial number section - lower 16 bits of 32-bit unit job number Parameter contains LLLL in the UUUULLLL-NN serial number format
SERIAL_JOB_NO_MSB	5005	R: Basic W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*51 => 51.0	Unit serial number section - Upper 16 bits of 32-bit unit job number Parameter contains UUUU in the UUUULLLL-NN serial number format
SERIAL_LINE_NO	5006	R: Basic W: Factory	0 <= X <= 65535 Scalar: 1.0 Equation: 1.0*52 => 52.0	Unit serial number section - two-digit unit number Parameter contains NN in the UUUULLLL-NN serial number format

Sinewave Filter - Waveform Data

The waveform data displayed by the Filter is available in the Modbus read analog input register data space. Use function code 4 for reading inputs. Waveform data will be scaled in units of tenths of Volts. (E, g. A Value of 6787 is 678.7 Volts)

Table 14: Waveform Data

Waveform	Address	Length
Filter Output Voltage Phase A	0	512
Filter Output Voltage Phase B	512	512
Filter Output Voltage Phase C	1024	512

Sinewave Filter – History Log (Status Detection) Data

The Status Detection History data displayed by the PQconnect is available in the Modbus Read Analog Input Register data space (function code 4) at the following addresses:

Table 15: History Log (Status Detection) Address Location

Waveform Phase	History Record Start Address	History Record Length
History Record 0	1536	16
History Record 1	1552	16
History Record 2	1668	16
...
History Record 99	3136	16

The history record is circular buffer of 100 records from index 0 to 99. When the history buffer fills up the oldest record is overwritten. The newest entry in the history record is at index 0 and the oldest entry is at index 99.

A history record is logged each time the status detection parameter 210 value changes. Each history record is a collection of 16 bytes with the following format:

Table 16: History Log Record Breakdown

Byte	Value	Format
0	Timestamp Seconds (4 bytes)	Seconds value of timestamp. Timestamp seconds: milliseconds value is the time since power on of the event.
1		
2		
3		
4	Timestamp Power Cycle Count	Range 0 to 255. Indicates the number times the PQconnect has been reset / power cycled.
5	Timestamp Milliseconds	Millisecond value of timestamp in units of 10s of milliseconds.
6	Detection Status	For format see Parameter 210 Detection Status
7		
8	Filter Output THVD Phase A	Filter Output Voltage THD at the time of the event in units of percent THD (100 = 100%)
9	Filter Output THVD Phase B	
10	Filter Output THVD Phase C	
11	Filter Output Average RMS Voltage	Filter output average RMS voltage in units of percent rated voltage (100=100% or nominal voltage).
12	Filter Output Voltage Fundamental	Fundamental Frequency divided by 2 in Hz. For example, a value of 30 would equate to $30 \times 2 = 60\text{Hz}$ Fundamental Frequency. The factor of two is used to compress the 0 to 500Hz fundamental frequency value to fit in an 8-bit value.
13	Estimated Carrier Frequency	VFD Carrier frequency in units of 100Hz. For example, a value of 20 would equate to a carrier frequency of $20 \times 100 = 2000\text{Hz}$. The factor 100 is used to compress the data to fit in an 8-bit value.
14	16 Bit, Two's Compliment Checksum	History Record Checksum. When this 16-bit value is added together with the rest of the history records as 16 bit values the result should be zero if no data errors exist in the packet.
15		



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