HDPM6000

Protocol Guide

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www.se.com

Legal Information

Safety Information

Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

Notice is used to address practices not related to physical injury.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Submetering equipment shall not be mounted within 50.8 mm (2 in.) of any live parts including primary conductors, primary terminals, primary lugs. This requirement excludes insulated cables.
- Submeters attached to the enclosure shall not contact the panel interior insulation.
- Mounting provisions shall not be attached to any live part.
- Voltage sensing and power supply connections to the primary voltage shall have overcurrent protection.
- Do not install submetering equipment in any area where breaker arc venting exhaust gasses could be re-directed as a result of submetering equipment installation.
- This product must be installed inside a suitable fire and electrical enclosure.
- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Do not use this device for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Do not install this product in hazardous or classified locations.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Product may use multiple voltage/power sources. Disconnect all sources before servicing.
- Use a properly rated voltage sensing device to confirm that power is off.
- Do not use data from this device to confirm power is off.
- Replace all doors, covers and protective devices before powering the equipment.
- Do not exceed the product's ratings or maximum limits.
- Treat communications and I/O wiring connected to multiple devices as hazardous live until determined otherwise.

Failure to follow these instructions will result in death or serious injury.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired.

The installer is responsible for conformance to all applicable codes.

The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

Note: See IEC 60950-1:2005, Annex W for more information on communications and I/O wiring connected to multiple devices.

Protective bonding: electrical connection of accessible conductive parts or protective screening to provide electrical continuity to the means for connection of an external protective conductor.

Safety Precautions (cont.)

ATTENTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

⚠ CAUTION

PRODUCT DAMAGE DUE TO ELECTROSTATIC DISCHARGE

Circuit boards and components can be damaged by static electricity or electro-static discharge (ESD). Observe the following electrostatic precautions when handling the product, and cables and components connected to the product:

- Keep static-producing material such as plastic, upholstery, carpeting, etc. out of the immediate work area.
- Store the product in ESD-protective packaging when it is not installed in the panel.
- When handling the product, or a conductive cable / an ESD-sensitive component connected to the product, wear a conductive wrist strap connected to the Ground through a minimum of 1 MΩ resistance.
- Avoid touching exposed conductors and component leads with skin or clothing.

Failure to follow these instructions can result in equipment damage.

⚠ WARNING

UNINTENDED OPERATION

- Do not use this device for critical control or protection of persons, animals, property or equipment.

Failure to follow these instructions can result in death, serious injury or equipment damage.

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Section 2. Modbus

Section 1. Introduction

This document describes the data available through protocols from the HDPM6000. Modbus is supported on Ethernet as Modbus TCP/IP and as Modbus RTU through the RS-485 port. BACnet IP and SNMP v2 are available only through Ethernet. In general, the read only meter data is available via all three protocols and the Web interface (not described here). Writable configuration is done only through Modbus or the Web interface. See the Head Unit Installation Guide Z208128 for information on how to access the Web interface and configure the data ports.

Section 2. Modbus

Modbus READ Registers

The Modbus interface consists of a number of 16-bit registers to read.

The registers (starting at 1) are mapped to addresses from 0. Each Modbus read of registers is via function codes 03 (Read Holding Registers) or 04 (Read Input Registers) allowing access to up to 120 consecutive registers in one transaction.

The implementation does not support exceptions, returning undefined data at invalid addresses.

For simplicity, this document only deals with Modbus addresses using 0-based numbering. Modbus terminology puts register 1 is at address 0.

Processor Board Configuration

Register	Value
0	Number of channels on attached bus modules (TAPs)
1	System firmware version decimal (10234 = v1.23.4) (deprecated)
2	Serial number CPU card
3	System firmware version
4	3-phase meter firmware version
5	
6	
7	Product type 4 – Busway meter(s) (HDPM6000B) 7 – Strip module(s) (HDPM6000S or HDPM6000S24) 11 – Retrofit module(s) (HDPM6000R)
8	Supply type – (1) 120/208, (0) 120/240 split phase mode, (2) 120/208 delta
9	Energy Scale. Accumulated energy in Watt hours will be divided by this value. Value may be -1000 (0.001Wh resolution), -100 (0.01Wh), -10 (0.1Wh), 1 (1Wh), 10 (10Wh), 100 (100Wh), 1000 (1000Wh), 10000 (10000Wh). Also applies to VA and VAR.

Per Circuit Registers

C = (channel number * 10) – where the channel number ranges from 1 to 192.

Register	Value
C + 0	VRMS in 0.1V steps (other steps maybe configured in regs 4498-4501)
C + 1	Circuit number (for creating single, two, three or four phase circuits)
C + 2	IRMS in 10mA steps (other steps maybe configured in regs 4498-4501)
C + 3	CT Type
C + 4	Pfactor * 1000 (signed)
C + 5	Watts in 1W steps (other steps maybe configured in regs 4498-4501)
C + 6	CT Factor * 1000
C + 7	iTHD
C + 8	Phase (1, 2 or 3) - 0 is disconnected
C + 9	Expected phase (1, 2 or 3) – as programmed during setup

Examples:

- VRMS for circuit 1 would be address 10 (1 * 10) + 0
- Power factor for circuit 9 would be address 94 (9 * 10) + 4

C + 0 VRMS
Instantaneous VRMS reading. Value is in 0.1V steps (other steps maybe configured in regs 4498-4501). For L-N circuits this is the L-N voltage, for L-L circuits it is the L-L voltage.

C + 1 Circuit number
This number is used to indicate whether channels should be grouped together as two phase or three phase circuits – or left as a single phase circuit.

Examples:

- Channels that have a unique circuit number will be treated as single phase circuits.
- If channels 3 and 5 have the same circuit number, e.g. 3, these will be treated as a two phase circuit
- If channels 7, 9 and 11 have the same circuit number, e.g. 7, these will be treated as a three phase circuit
- If the top bit of a three phase circuit is set, e.g. hexadecimal 8007 (32775 in decimal), then it is treated as being connected to a delta load.

C + 2 IRMS in 10mA steps
Instantaneous RMS current reading (IRMS) in 10mA steps

Note: Other steps maybe configured in regs 4498-4501.

C + 3 CT Type
This is a number to identify a CT.

If bit 14 is clear this is the max current of the CT. (e.g. 75A, 300A, 400A)

If bit 14 is set then bits 0-13 identify which CT from the system's internal CT types table. These indices and tables may vary between boards and depend not only on which CT types have been uploaded but also the order the uploads took place.

A CT type of 0 indicates the channel is unused. It will not be displayed in the web interface and will not contribute to any totals or averaging calculations.

When reading, if bit 15 is set then the system believes the CT has been installed backwards, i.e. the channel appears to be providing power rather than consuming it.

C + 4 Pfactor * 1000
Power factor * 1000. This value ranges from -999 to 1000 (Power factors of -0.999 to 1.000).

C + 5 Watts
The instantaneous power reading. The units are Watts.

Note: Other steps maybe configured in regs 4498-4501.

C + 6 CT Factor * 1000
The CT Factor is a variable that sets a channel's current magnitude based on the CT's primary rating and secondary output. For most CT's, the CT Factor can be set automatically by choosing the CT model from the **"CT Type"** dropdown on the Channel Cfg tab of the meter's web interface.

If the CT is not available in the **CT Type** dropdown, it can be manually entered in the Modbus register here, or a CT can be created in the web interface (see the HDPM6000 installation guide). For v1 hardware (TrendPoint branded), the CT Factor must be obtained from customer support. For v2 hardware (Schneider Electric HDPM6000 branded), the CT Factor can either be acquired by contacting Schneider Electric customer support or by manually calculating the value.

The CT Factor for 0.25V output CTs may be calculated using the following equation:

CT Factor = CT Primary Rating / 83.75

Note: This method only applies to Schneider Electric HDPM6000 branded hardware (v2).

Enter the value in this register multiplied by 1000 (e.g. for a CT factor of 1.834, enter 1834).

C + 7 iTHD
The total harmonic distortion of the channel current in 0.1% (a value of 27 = 0.27% iTHD).

C + 8 Phase (Read Only)
Indication of the voltage phase assignment of the branch channel. May be 1, 2, or 3 or 4 (neutral). 0 indicates disconnected (channel is not associated with any bus module).

C + 9 Expected Phase (1, 2, 3 or 4 (Neutral))
The voltage phase assignment for a specific branch channel ('Exp. Phase' on web page). For retrofit and strip modules, set this value based on the physical location of the channel in the panel. For busway modules this value is fixed in alignment with the markings on the CT connector.

Circuit	VRMS	Circuit Number	IRMS	CT Type	Power Factor (Signed)	Watts	CT Factor	iTHD	Phase	Expected Phase
Channel 1	10	11	12	13	14	15	16	17	18	19
Channel 2	20	21	22	23	24	25	26	27	28	29
Channel 3	30	31	32	33	34	35	36	37	38	39
…										
Channel 83	830	831	832	833	834	835	836	837	838	839
Channel 84	840	841	842	843	844	845	846	847	848	849
…										
Channel 191	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Channel 192	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929

Accumulated Energy Registers (kWh)

Register Value = Accumulated Energy in Watt hours / Energy

By default, the Accumulated Energy registers read accumulated energy in Watt-Hours, but may be affected by the Energy Scale register setting (address 9).

These registers are non-volatile registers which do not clear each time they are read and are preserved across restarts. Two 16-bit registers are combined to provide each channel a 32-bit unsigned number representing long term accumulation of energy.

Channel 1 starts at addresses 8002 / 8003. Please see the chart that follows as a reference for the appropriate registers for each channel. The ordering is low/high for each channel. (Ex: 8002 is low word and 8003 is high word for channel 1.)

The registers will accumulate energy until they are reset with the Modbus command. The time until rollover (32-bit unsigned integer overflows to 0) will be determined by the maximum power of the channel or circuit and the Energy Scale register. To avoid rollovers when large CTs are used, the energy resolution can be decreased (larger value of Energy Scale) if desired

Resetting Accumulated Energy Values:
To reset an individual channel write value 1234 to the low word register. (e.g. to reset channel 23, write 1234 to offset 8046).

To perform a global reset write 1234 to offset 8000.

Channel	Offset
1	(low word) 8002
	(high word) 8003
2	8004
	8005
…	…
87	8174
	8175
88	8176
	8177
89	8178
	8179
…	…
191	8382
	8383
192	8384
	8385

READ Register Summary

General Channel Setup Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
0	Number channels	Firmware revision (deprecated)	CPU serial number	System firmware version	3 PhM firmware version			Prod code (4 or 7)	Supply type	Energy Scale
10	Ch 1 VRMS	Ch 1 circuit	Ch 1 IRMS	Ch 1 CT	Ch 1 PFactor (signed)	Ch 1 WATTS	Ch 1 CT Factor	Ch 1 iTHD	Ch 1 Phase	Ch 1 Exp Phase
20	Ch 2 VRMS	Ch 2 circuit	Ch 2 IRMS	Ch 2 CT	Ch 2 PFactor (signed)	Ch 2 WATTS	Ch 2 CT Factor	Ch 2 iTHD	Ch 2 Phase	Ch 2 Exp Phase
...	…	…	…	…	…					
880	Ch 88 VRMS	Ch 88 circuit	Ch 88 IRMS	Ch 88 CT	Ch 88 PFactor (signed)	Ch 88 WATTS	Ch 88 CT Factor	Ch 88 iTHD	Ch 88 Phase	Ch 88 Exp Phase
...	…	…	…	…	…					
1920	Ch 192 VRMS	Ch 192 circuit	Ch 192 IRMS	Ch 192 CT	Ch 192 PFactor (signed)	Ch 192 WATTS	Ch 192 CT Factor	Ch 192 iTHD	Ch 192 Phase	Ch 192 Exp Phase

Module (TAP) Summary Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4090										Large TAP address mode Bits 8-11: Nr of large Taps, Bits 0-7: Nr of Channels per Tap
4100	Nr channels on TAP 1	Nr channels on TAP 2	Nr channels on TAP 3	Nr channels on TAP 4	Nr channels on TAP 5	Nr channels on TAP 6	Nr channels on TAP 7	Nr channels on TAP 8	Nr channels on TAP 9	Nr channels on TAP 10
4110	Nr channels on TAP 11	Nr channels on TAP 12	Nr channels on TAP 13	Nr channels on TAP 14	Nr channels on TAP 15	Nr channels on TAP 16	Nr channels on TAP 17	Nr channels on TAP 18	Nr channels on TAP 19	Nr channels on TAP 20
4120	Nr channels on TAP 21	Nr channels on TAP 22	Nr channels on TAP 23	Nr channels on TAP 24	Nr channels on TAP 25	Nr channels on TAP 26	Nr channels on TAP 27	Nr channels on TAP 28	Nr channels on TAP 29	Nr channels on TAP 30
4130	TAP 1 f/w version	TAP 2 f/w version	TAP 3 f/w version	TAP 4 f/w version	TAP 5 f/w version	TAP 6 f/w version	TAP 7 f/w version	TAP 8 f/w version	TAP 9 f/w version	TAP 10 f/w version
4140	TAP 11 f/w version	TAP 12 f/w version	TAP 13 f/w version	TAP 14 f/w version	TAP 15 f/w version	TAP 16 f/w version	TAP 17 f/w version	TAP 18 f/w version	TAP 19 f/w version	TAP 20 f/w version
4150	TAP 21 f/w version	TAP 22 f/w version	TAP 23 f/w version	TAP 24 f/w version	TAP 25 f/w version	TAP 26 f/w version	TAP 27 f/w version	TAP 28 f/w version	TAP 29 f/w version	TAP 30 f/w version
4160	TAP 1 FPGA timestamp low	TAP 1 FPGA timestamp hi	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
4210	…	…	…	…	…	…	…	…	TAP 30 FPGA timestamp low	TAP 30 FPGA timestamp hi
4220	TAP 1 serial number	…	…	…	…	…	…	…	…	…
4230	…	…	…	…	…	…	…	…	…	…
4240	…	…	…	…	…	…	…	…	…	TAP 30 serial number
4250	TAP 1 full serial number 1/2	TAP 1 full serial number 3/4	TAP 1 full serial number 5/6	TAP 1 full serial number 7/8	TAP 1 full serial number 9/10	TAP 1 full serial number 11/12	TAP 2 full serial number 1/2	TAP 2 full serial number 3/4	TAP 2 full serial number 5/6	TAP 2 full serial number 7/8
4260	TAP 2 full serial number 9/10	TAP 2 full serial number 11/12	TAP 3 full serial number 1/2	TAP 3 full serial number 3/4	TAP 3 full serial number 5/6	TAP 3 full serial number 7/8	TAP 3 full serial number 9/10	TAP 3 full serial number 11/12	TAP 4 full serial number 1/2	TAP 4 full serial number 3/4
4270-4410	…	…	…	…	…	…	…	…	…	…
4420	TAP 29 full serial number 5/6	TAP 29 full serial number 7/8	TAP 29 full serial number 9/10	TAP 29 full serial number 11/12	TAP 30 full serial number 1/2	TAP 30 full serial number 3/4	TAP 30 full serial number 5/6	TAP 30 full serial number 7/8	TAP 30 full serial number 9/10	TAP 30 full serial number 11/12

Special Function Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4430										Link local IPv6 addr 1
4440	Link local IPv6 addr 2	Link local IPv6 addr 3	Link local IPv6 addr 4	Link local IPv6 addr 5	Link local IPv6 addr 6	Link local IPv6 addr 7	Link local IPv6 addr 8	Manual IPv6 addr 1	Manual IPv6 addr 2	Manual IPv6 addr 3
4450	Manual IPv6 addr 4	Manual IPv6 addr 5	Manual IPv6 addr 6	Manual IPv6 addr 7	Manual IPv6 addr 8	Manual IPv6 subnet mask	IPv6 Default Router Addr 1	IPv6 Default Router Addr 2	IPv6 Default Router Addr 3	IPv6 Default Router Addr 4
4460	IPv6 Default Router Addr 5	IPv6 Default Router Addr 6	IPv6 Default Router Addr 7	IPv6 Default Router Addr 8	NTP server IPv6 addr 1	NTP server IPv6 addr 2	NTP server IPv6 addr 3	NTP server IPv6 addr 4	NTP server IPv6 addr 5	NTP server IPv6 addr 6
4470	NTP server IPv6 addr 7	NTP server IPv6 addr 8	NTP enable	NTP interval	NTP server IPv4 addr 1	NTP server IPv4 addr 2	NTP server IPv4 addr 3	NTP server IPv4 addr 4	Time zone	Daylight saving
4480	Cur IPv4 addr 1	Cur IPv4 addr 2	Cur IPv4 addr 3	Cur IPv4 addr 4	Manual IPv4 addr 1	Manual IPv4 addr 2	Manual IPv4 addr 3	Manual IPv4 addr 4	IPv4 Subnet mask 1	IPv4 Subnet mask 2
4490	IPv4 Subnet mask 3	IPv4 Subnet mask 4	IPv4 Gateway 1	IPv4 Gateway 2	IPv4 Gateway 3	IPv4 Gateway 4	DHCP	Protocol flags Bit 0 - IPv4 Enabled Bit 1 - IPv6 Enabled Bit 2 - SNMP Enabled Bit 3 - BACnet Enabled Bit 4 - Modbus Write Protect Enabled Bit 12 - IPv6 SLAAC disabled	V scale 16 bit registers: 1 = 0.1 V 10 = 1 V 100 = 10 V 1000 = 100 V 10000 = 1000 V	I resolution 16 bit registers: 1 = 0.01 Amps 10 = 0.1 Amps 100 = 1 Amps 1000 = 10 Amps 10000 = 100 Amps
4500	W resolution 16 bit registers: 1 = 1 W 10 = 10 W 100 = 100 W 1000 = 1000 W 10000 = 10000 W	High power mode 0 = default 1 = on 2 = custom		External PT Ratio (x1000)	Phase orientation 0 = clockwise 1 =anti-clockwise	Watchdogs Bit 0 – network activity Bit 1 – Phase V	RS485 port speed 1 = 9600* 2 = 19200 3 = 38400 4 = 57600 5= 115200		Nr 21/8/4 TAPS (deprecated)	
4510	HU Serial Characters 1 & 2	HU Serial Characters 3 & 4	HU Serial Characters 5 & 6	HU Serial Characters 7 & 8	HU Serial Characters 9 & 10	HU Serial Characters 11 & 12	ETH0 MAC Address Octet 1	ETH0 MAC Address Octet 2	ETH0 MAC Address Octet 3	ETH0 MAC Address Octet 4
4520	ETH0 MAC Address Octet 5	ETH0 MAC Address Octet 6	ETH1 MAC Address Octet 1	ETH1 MAC Address Octet 2	ETH1 MAC Address Octet 3	ETH1 MAC Address Octet 4	ETH1 MAC Address Octet 5	ETH1 MAC Address Octet 6		
…	…	…	…	…	…	…	…	…	…	…
4570		Voltage ZXTO disabled	Nr captured waveforms	Last captured waveform	3 Phase meter current wave cap I mode 0 – over current 1 – tripped breaker	3 phase meter current wave cap timer (ms)	3 phase meter current wave cap threshold (Amps)	TAP current wave cap I mode 0 – over current 1 – tripped breaker	TAP current wave cap timer (ms)	TAP current wave cap threshold (Amps)
4580	RTC1	RTC2	RTC3	RTC4	SD card size (GB)	Enviro sensor order Unlocked = 0 Locked = 1		Harmonic Calculation Nominal Voltage	Refresh Mode 0 - Comprehensive 1 - Fast 2 - Adaptive 3 - Adaptive with 200ms Head Unit Instantaneous	kWh blink 0 – circuits 1 – 3phm

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4590	SD card status	Wave cap nr channels All = 0 Trigger channel only = 1	Wave cap V sag	Wave cap V over	Busway current	Busway state Good = 0 Detected Fault = 1	Phase Summary Source Circuits = 0 3 Phase Meter = 1 Split Circuits = 2	Modbus address	Channel order ANSI = 0 IEC = 1 All ANSI = 2	

4508 - NrTAPs (Deprecated)
Deprecated, use the TAP summary block at 4099.

Number of 21, 8 and 4 port TAPs in the decimal format XYYZZ where X is the number of 21 port TAPs, YY is the number of 8 port TAPs and ZZ is the number of 4 port TAPs.

4598 - Channel Order
This register selects the channel numbering to be used for retrofit, strip and HDPM6000S24 boards. 4 and 8 channel busway meters always use IEC numbering.

0 – ANSI channel numbering for all channels except the 24 circuit retrofit module in a 108 channel system. The 24 circuit module, set to address 9 on the physical address switch (or 22 in soft-addressing) will be numbered continuous (IEC) from 85-108 (see HDPM6000R installation guide).

1 – IEC channel numbering

2 – ANSI channel numbering for all modules, including the 24 circuit retrofit module in a 108 channel system.

A 24 circuit retrofit module in a 192 channel system is numbered in ANSI mode regardless of whether register 4598 is set to 0 or 2.

Module Detail Register

These registers provide information about the capabilities and configuration of a selected module attached to the HDPM6000 bus. Before reading the registers, first select the module by writing to register 4608.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4600									Selected Busway Device Address	
4680	Number of Installed channels on selected board	Busway protocol version (302 = 3.02)	Serial Number of selected board	Config 0 – top/ bottom feed 1 – Waveform disabled 2 – 42 to 30 channel 3 – top/ bottom feed (strip 2)	Features 0 – Harmonics 1 – Full serial nr 2 – Waveform 3 – Fast alarms 4 – Burdenless 11 – Top/ Bottom feed	Firmware version		Product type of selected board 9 = HU 3phm 11 = 24/42 ch retrofit 12 = I/O Module 13 = 4/8 ch Busway 14 = EIM 2.0 17 = 21 ch right strip 18 = 21 ch left strip 20 = HDPM6000S24		

4608 Select a target device on the HDPM6000 bus

Writing a value of '0x0tnn' in hex to this register selects the target module on the HDPM6000 bus, where t is the device type (0 = branch metering module, 1 = 3phm, 2 = I/O module, 3 = Digital Input module) and nn is the device number (1-48 for branch metering modules, 1 for 3phm, 1-8 for I/O modules, 1-10 for digital input modules).

Summary Registers

Totals and averages across all active phases.

The Data source for these registers is controlled by the "Phase Summary Source" setting (register 4596).

If Phase Summary Source is set to '3 Phase Meter' (1) values from the head unit's mains CTs will be used.

If Phase Summary Source is set to 'Circuits' (0) totals for all attached branch circuits will be used.

If Phase Summary Source is set to 'Split Circuits' (2) the totals for each module (up to 4 modules) are available, the first module at the indicated register address, and the 2nd through 4th at the register addresses indicated in parentheses.

Registers that have a high and low word should only be read using Modbus multi-register read instructions.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4690 (4740) (4790) (4840)									Amps avg (low word) * 1000	Amps avg (hi word) * 100 All Phases
4700 (4750) (4800) (4850)	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low word) * 1000 Phase 1	Amps tot (hi word) * 1000 Phase 1	Amps tot (low word) * 1000 Phase 2	Amps tot (hi word) * 1000 Phase 2	Amps tot (low word) * 1000 Phase 3	Amps tot (hi word) * 1000 Phase 3	PF Avg Phase 1 (signed)

4710 (4760) (4810) (4860)	PF AvgPhase 2 (signed)	PF AvgPhase 3 (signed)	Watts total (low word) Phase 1 (signed)	Watts total (hi word) Phase 1 (signed)	Watts total (low word) Phase 2 (signed)	Watts total (hi word) Phase 2 (signed)	Watts total (low word) Phase 3 (signed)	Watts total (hi word) Phase 3 (signed)	KWH total (low word) Phase 1	KWH total (hi word) Phase 1
4720 (4770) (4820) (4870)	KWH total (low word) Phase 2	KWH total (hi word) Phase 2	KWH total (low word) Phase 3	KWH total (hi word) Phase 3	VrmsAll Phases	Amps tot (low word) * 1000All Phases	Amps tot (hi word) * 1000All Phases	PF AvgAll Phases (signed)	Watts total (low word) All Phases (signed)	Watts total (hi word) All Phases (signed)
4730 (4780) (4830) (4880)	KWH total (low word)All Phases	KWH total (hi word)All Phases	Amps tot (low word) * 1000 Phase N	Amps tot (hi word) * 1000 Phase N						

In a delta configuration the voltage registers (4700-4703 & 4724 and corresponding equivalents in 4750, 4800 and 4850 blocks) report L-L values. Phase 1 is 1-2, 2 is 2-3 and 3 is 3-1. In other modes the voltages are L-N.

Head Unit Mains Meter (3-Phase Meter)
Registers that have a high and low word should only be read using Modbus multi register read instructions.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
5190									Amps avg (low word) * 1000 All Phases	Amps avg (hi word) * 1000 All Phases
5200	Vrms Phase 1L-N	Vrms Phase 2L-N	Vrms Phase 3L-N	Amps (low word) * 1000 Phase 1	Amps (hi word) * 1000 Phase 1	Amps (low word) * 1000 Phase 2	Amps (hi word) * 1000 Phase 2	Amps (low word) * 1000 Phase 3	Amps (hi word) * 1000 Phase 3	PF Phase 1 (signed)
5210	PF Phase 2 (signed)	PF Phase 3 (signed)	Watts (low word) Phase 1 (signed)	Watts (hi word) Phase 1 (signed)	Watts (low word) Phase 2 (signed)	Watts (hi word) Phase 2 (signed)	Watts (low word) Phase 3 (signed)	Watts (hi word) Phase 3 (signed)	KWH (low word) Phase 1	KWH (hi word) Phase 1
5220	KWH (low word) Phase 2	KWH (hi word) Phase 2	KWH (low word) Phase 3	KWH (hi word) Phase 3	Vrms avg All Phases L-N	Amps tot (low word) * 1000 All Phases	Amps tot (hi word) * 1000 All Phases	PF Avg All Phases (signed)	Watts total (low word) All Phases (signed)	Watts total (hi word) All Phases (signed)
5230	KWH total (low word) All Phases	KWH total (hi word) All Phases	Amps (low word) * 1000 Phase N	Amps (hi word) * 1000 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg	VAR (low word) Phase 1 (signed)	VAR (hi word) Phase 1 (signed)
5240	VAR (low word) Phase 2 (signed)	VAR (hi word) Phase 2 (signed)	VAR (low word) Phase 3 (signed)	VAR (hi word) Phase 3 (signed)	VAR (low word) All Phase (signed)	VAR (hi word) All Phases (signed)	VA (low word) Phase 1	VA (hi word) Phase 1	VA (low word) Phase 2	VA (hi word) Phase 2
5250	VA (low word) Phase 3	VA (hi word) Phase 3	VA (low word) All Phases	VA (hi word) All Phases	VTHD Phase 1	VTHD Phase 2	VTHD Phase 3	VTHD total	VTHD avg	ITHD Phase 1
5260	ITHD Phase 2	ITHD Phase 3	ITHD Phase N (when in 120/240)	ITHD total	ITHD avg	kWh export (low word) Phase 1	kWh export (hi word) Phase 1	kWh export (low word) Phase 2	kWh export (hi word) Phase 2	kWh export (low word) Phase 3
5270	kWh export (hi word) Phase 3	kWh export (low word) Total	kWh export (hi word) Total	kWh import (low word) Phase 1	kWh import (hi word) Phase 1	kWh import (low word) Phase 2	kWh import (hi word) Phase 2	kWh import (low word) Phase 3	kWh import (hi word) Phase 3	kWh import (low word) Total
5280	kWh import (hi word) Total	kVARh (low word) Phase 1 (signed)	kVARh (hi word) Phase 1 (signed)	kVARh (low word) Phase 2 (signed)	kVARh (hi word) Phase 2 (signed)	kVARh (low word) Phase 3 (signed)	kVARh (hi word) Phase 3 (signed)	kVARh (low word) All Phases (signed)	kVARh (hi word) All Phases (signed)	kVARh export (low word) Phase 1
5290	kVARh export (hi word) Phase 1	kVARh export (low word) Phase 2	kVARh export (hi word) Phase 2	kVARh export (low word) Phase 3	kVARh export (hi word) Phase 3	kVARh export (low word) Total	kVARh export (hi word) Total	kVARh import (low word) Phase 1	kVARh import (hi word) Phase 1	kVARh import (low word) Phase 2
5300	kVARh import (hi word) Phase 2	kVARh import (low word) Phase 3	kVARh import (hi word) Phase 3	kVARh import (low word) Total	kVARh import (hi word) Total	Frequency Phase 1	Frequency Phase 2	Frequency Phase 3	Frequency avg	Max Watts (low word) Phase 1

5310	Max Watts (hi word) Phase 1	Max Watts (low word) Phase 2	Max Watts (hi word) Phase 2	Max Watts (low word) Phase 3	Max Watts (hi word) Phase 3	Max total Watts (low word) All phases	Max total Watts (hi word) All phases	Max Watts time 1 Phase 1	Max Watts time 2 Phase 1	Max Watts time 3 Phase 1
5320	Max Watts time 4 Phase 1	Max Watts time 1 Phase 2	Max Watts time 2 Phase 2	Max Watts time 3 Phase 2	Max Watts time 4 Phase 2	Max Watts time 1 Phase 3	Max Watts time 2 Phase 3	Max Watts time 3 Phase 3	Max Watts time 4 Phase 3	Max total Watts time 1 All phases
5330	Max total Watts time 2 All phases	Max total Watts time 3 All phases	Max total Watts time 4 All phases	kVAh (low word) Phase 1 (signed)	kVAh (hi word) Phase 1 (signed)	kVAh (low word) Phase 2 (signed)	kVAh (hi word) Phase 2 (signed)	kVAh (low word) Phase 3 (signed)	kVAh (hi word) Phase 3 (signed)	kVAh total (low word) (signed)
5340	kVAh (hi word) (signed)	kVAh export (low word) Phase 1	kVAh export (hi word) Phase 1	kVAh export (low word) Phase 2	kVAh export (hi word) Phase 2	kVAh export (low word) Phase 3	kVAh export (hi word) Phase 3	kVAh export (low word) Total	kVAh export (hi word) Total	kVAh import (low word) Phase 1
5350	kVAh import (hi word) Phase 1	kVAh import (low word) Phase 2	kVAh import (hi word) Phase 2	kVAh import (low word) Phase 3	kVAh import (hi word) Phase 3	kVAh import (low word) All Phases	kVAh import (hi word) All Phases	Current Imbalance	Voltage Imbalance	Current Total Demand Distortion
5360	Displacement Power Factor (DPF) Phase 1	Displacement Power Factor (DPF) Phase 2	Displacement Power Factor (DPF) Phase 3							

Head Unit Voltage Harmonic Magnitudes

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
5400	Ph 1 harmonic 1	Ph 1 harmonic 3	Ph 1 harmonic 5	Ph 1 harmonic 7	Ph 1 harmonic 9	Ph 1 harmonic 11	Ph 1 harmonic 13	Ph 1 harmonic 15	Ph 1 harmonic 17	Ph 1 harmonic 19
5410	Ph 1 harmonic 21	Ph 1 harmonic 23	Ph 1 harmonic 25	Ph 1 harmonic 27	Ph 1 harmonic 29	Ph 1 harmonic 31	Ph 1 harmonic 33	Ph 1 harmonic 35	Ph 1 harmonic 37	Ph 1 harmonic 39
5420	Ph 1 harmonic 41	Ph 1 harmonic 43	Ph 1 harmonic 45	Ph 1 harmonic 47	Ph 1 harmonic 49	Ph 1 harmonic 51	Ph 1 harmonic 53	Ph 1 harmonic 55	Ph 1 harmonic 57	Ph 1 harmonic 59
5430	Ph 1 harmonic 61	Ph 1 harmonic 63	Ph 2 harmonic 1	Ph 2 harmonic 3	Ph 2 harmonic 5	Ph 2 harmonic 7	Ph 2 harmonic 9	Ph 2 harmonic 11	Ph 2 harmonic 13	Ph 2 harmonic 15
…	…	…	…	…	…	…	…	…	…	…
5490	Ph 3 harmonic 53	Ph 3 harmonic 55	Ph 3 harmonic 57	Ph 3 harmonic 59	Ph 3 harmonic 61	Ph 3 harmonic 63				

Head Unit Current Harmonic Magnitudes

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
5500	Ph 1 harmonic 1	Ph 1 harmonic 3	Ph 1 harmonic 5	Ph 1 harmonic 7	Ph 1 harmonic 9	Ph 1 harmonic 11	Ph 1 harmonic 13	Ph 1 harmonic 15	Ph 1 harmonic 17	Ph 1 harmonic 19
5510	Ph 1 harmonic 21	Ph 1 harmonic 23	Ph 1 harmonic 25	Ph 1 harmonic 27	Ph 1 harmonic 29	Ph 1 harmonic 31	Ph 1 harmonic 33	Ph 1 harmonic 35	Ph 1 harmonic 37	Ph 1 harmonic 39
5520	Ph 1 harmonic 41	Ph 1 harmonic 43	Ph 1 harmonic 45	Ph 1 harmonic 47	Ph 1 harmonic 49	Ph 1 harmonic 51	Ph 1 harmonic 53	Ph 1 harmonic 55	Ph 1 harmonic 57	Ph 1 harmonic 59
5530	Ph 1 harmonic 61	Ph 1 harmonic 63	Ph 2 harmonic 1	Ph 2 harmonic 3	Ph 2 harmonic 5	Ph 2 harmonic 7	Ph 2 harmonic 9	Ph 2 harmonic 11	Ph 2 harmonic 13	Ph 2 harmonic 15
…	…	…	…	…	…	…	…	…	…	…
5590	Ph 3/N harmonic 53	Ph 3/N harmonic 55	Ph 3/N harmonic 57	Ph 3/N harmonic 59	Ph 3/N harmonic 61	Ph 3/N harmonic 63				

Branch Channel Current Harmonic Magnitudes

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6400	Selected harmonics channel	Harmonic 1	Harmonic 3	Harmonic 5	Harmonic 7	Harmonic 9	Harmonic 11	Harmonic 13	Harmonic 15	Harmonic 17
6410	Harmonic 19	Harmonic 21	Harmonic 23	Harmonic 25	Harmonic 27	Harmonic 29	Harmonic 31	Harmonic 33	Harmonic 35	Harmonic 37
6420	Harmonic 39	Harmonic 41	Harmonic 43	Harmonic 45	Harmonic 47	Harmonic 49	Harmonic 51	Harmonic 53	Harmonic 55	Harmonic 57
6430	Harmonic 59	Harmonic 61	Harmonic 63							

Branch Channel Reactive Power (VAR) Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6500	Ch 1 VAR	Ch 2 VAR	Ch 3 VAR	Ch 4 VAR	Ch 5 VAR	Ch 6 VAR	Ch 7 VAR	Ch 8 VAR	Ch 9 VAR	Ch 10 VAR
6510	Ch 11 VAR	Ch 12 VAR	Ch 13 VAR	Ch 14 VAR	Ch 15 VAR	Ch 16 VAR	Ch 17 VAR	Ch 18 VAR	Ch 19 VAR	Ch 20 VAR
…	…	…	…	…	…	…	…	…	…	…
6680	Ch 181 VAR	Ch 182 VAR	Ch 183 VAR	Ch 184 VAR	Ch 185 VAR	Ch 186 VAR	Ch 187 VAR	Ch 188 VAR	Ch 189 VAR	Ch 190 VAR
6690	Ch 191 VAR	Ch 192 VAR								

Miscellaneous Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6800	Internal errors	SMS device ID	Unit ID low	Unit ID hi			Primary : Secondary PDU Ratio			

Logging Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6850	Log nr to configure		Configuration Count	Mode	Max entries	Interval Low	Interval Hi	Offset Low	Offset Hi	Register list length
6860	Register 1	Register 2	Register 3	Register 4	Register 5	Register 6	Register 7	Register 8	Register 9	Register 10
…	…	…	...	...	…	…	…	…	…	…
6980	Register 121									
7000 Event log	Most recently updated record	Valid records in log	Configuration count	Mode	Max entries					
7010 Log 1	Most recently updated record	Valid records in log	Configuration count	Mode	Max entries	Interval Low	Interval Hi	Offset Low	Offset Hi	Register list length
7020 Log 2	Most recently updated record	Valid records in log	Configuration count	Mode	Max entries	Interval Low	Interval Hi	Offset Low	Offset Hi	Register list length
…	…	…	…	…	…	…	…	…	…	…
7200 Log 20	Most recently updated record	Valid records in log	Configuration count	Mode	Max entries	Interval Low	Interval Hi	Offset Low	Offset Hi	Register list length

Environmental Registers (16 Sensors, Legacy Layout)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
7500	Sensor 1 ID1	Sensor 1 ID2	Sensor 1 ID3	Sensor 1 ID4	Sensor 1 Temperature (signed)	Sensor 1 Humidity	Sensor 1 Ext Temp A (signed)	Sensor 1 Ext Temp B (signed)	Sensor 2 ID1	Sensor 2 ID2
7510	Sensor 2 ID3	Sensor 2 ID4	Sensor 2 Temperature (signed)	Sensor 2 Humidity	Sensor 2 Ext Temp A (signed)	Sensor 2 Ext Temp B (signed)	Sensor 3 ID1	Sensor 3 ID2	Sensor 3 ID3	Sensor 3 ID4
…	…	…	…	…	…	…	…	…	…	…
7620	Sensor 16 ID1	Sensor 16 ID2	Sensor 16 ID3	Sensor 16 ID4	Sensor 16 Temperature (signed)	Sensor 16 Humidity	Sensor 16 Ext Temp A (signed)	Sensor 16 Ext Temp B (signed)		

Digital Input Module (EIM) registers (10 x 24 inputs)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
7750	Card 1 full serial number 1/2	Card 1 full serial number 3/4	Card 1 full serial number 5/6	Card 1 full serial number 7/8	Card 1 full serial number 9/10	Card 1 full serial number 11/12	Card 2 full serial number 1/2	Card 2 full serial number 3/4	Card 2 full serial number 5/6	Card 2 full serial number 7/8
…	…	…	…	…	…	…	…	…	…	…
7800	Card 9 full serial number 5/6	Card 9 full serial number 7/8	Card 9 full serial number 9/10	Card 9 full serial number 11/12	Card 10 full serial number 1/2	Card 10 full serial number 3/4	Card 10 full serial number 5/6	Card 10 full serial number 7/8	Card 10 full serial number 9/10	Card 10 full serial number 11/12
7810	Card 1 inputs 1-16	Card 1 inputs 17-24	Card 2 inputs 1-16	Card 2 inputs 17-24	Card 3 inputs 1-16	Card 3 inputs 17-24	Card 4 inputs 1-16	Card 4 inputs 17-24	Card 5 inputs 1-16	Card 5 inputs 17-24
7820	Card 6 inputs 1-16	Card 6 inputs 17-24	Card 7 inputs 1-16	Card 7 inputs 17-24	Card 8 inputs 1-16	Card 8 inputs 17-24	Card 9 inputs 1-16	Card 9 inputs 17-24	Card 10 inputs 1-16	Card 10 inputs 17-24
7830	Card 1 f/w version	Card2 f/w version	Card 3 f/w version	Card 4 f/w version	Card 5 f/w version	Card 6 f/w version	Card 7 f/w version	Card 8 f/w version	Card 9 f/w version	Card10 f/w version
7840	Digital Input cards present bitmask	Digital Input cards configured bitmask	Slot of auto-detected ('Single') module							

Digital inputs are available as a bitmap where input 1 is represented by bit 0 of the first register, input 2 by bit 1, etc. For inputs 17-24, input 17 is represented by bit 0 of the second register, input 18 by bit 1, etc.

I/O Module (Dry Contact) Registers (Up to 16 Sensors)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
7850	Card 1 full serial number 1/2	Card 1 full serial number 3/4	Card 1 full serial number 5/6	Card 1 full serial number 7/8	Card 1 full serial number 9/10	Card 1 full serial number 11/12	Card 2 full serial number 1/2	Card 2 full serial number 3/4	Card 2 full serial number 5/6	Card 2 full serial number 7/8
7860-7880	…	…	…	…	…	…	…	…	…	…
7890	Card 7 full serial number 9/10	Card 7 full serial number 11/12	Card 8 full serial number 1/2	Card 8 full serial number 3/4	Card 8 full serial number 5/6	Card 8 full serial number 7/8	Card 8 full serial number 9/10	Card 8 full serial number 11/12		
7900	Dry contact cards bitmask	Dig In bitfield	Dig Out 1	Dig Out 2	Dig Out 3	Dig Out 4	Dig Out 5	Dig Out 6	Dig Out 7	Dig Out 8
7910	Voltage 1	Voltage 2	Voltage 3	Voltage 4	Voltage 5	Voltage 6	Voltage 7	Voltage 8		
7920	Current 1	Current 2	Current 3	Current 4	Current 5	Current 6	Current 7	Current 8		
7930	CT Type 1	CT Type 2	CT Type 3	CT Type 4	CT Type 5	CT Type 6	CT Type 7	CT Type 8		
7940	CT Factor 1	CT Factor 2	CT Factor 3	CT Factor 4	CT Factor 5	CT Factor 6	CT Factor 7	CT Factor 8		
7950	Card 1 f/w version	Card2 f/w version	Card 3 f/w version	Card 4 f/w version	Card 5 f/w version	Card 6 f/w version	Card 7 f/w version	Card 8 f/w version		
7960	Card 1 serial number	Card 2 serial number	Card 3 serial number	Card 4 serial number	Card 5 serial number	Card 6 serial number	Card 7 serial number	Card 8 serial number		

Branch Channel Accumulated Real Energy Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
8000			Ch 1 Low	Ch 1 Hi	Ch 2 Low	Ch 2 Hi	Ch 3 Low	Ch 3 Hi	Ch 4 Low	Ch 4 Hi
8010	Ch 5 Low	Ch 5 Hi	Ch 6 Low	Ch 6 Hi	Ch 7 Low	Ch 7 Hi	Ch 8 Low	Ch 8 Hi	Ch 9 Low	Ch 9 Hi
…	…	…	…	…	…	…	…	…	…	…
8380	Ch 190 Low	Ch 190 Hi	Ch 191 Low	Ch 191 Hi	Ch 192 Low	Ch 192 Hi				

Branch Channel Max Power Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
8400	Max Watts reset time 1	Max Watts reset time 2	Max Watts reset time 3	Max Watts reset time 4	Ch 1 max Watts	Ch 2 max Watts	Ch 3 max Watts	Ch 4 max Watts	Ch 5 max Watts	Ch 6 max Watts
8410	Ch 7 max Watts	Ch 8 max Watts	Ch 9 max Watts	Ch 10 max Watts	Ch 11 max Watts	Ch 12 max Watts	Ch 13 max Watts	Ch 14 max Watts	Ch 15 max Watts	Ch 16 max Watts
…	…	…	…	…	…	…	…	…	…	…
8580	Ch 177 max Watts	Ch 178 max Watts	Ch 179 max Watts	Ch 180 max Watts	Ch 181 max Watts	Ch 182 max Watts	Ch 183 max Watts	Ch 184 max Watts	Ch 185 max Watts	Ch 186 max Watts
8590	Ch 187 max Watts	Ch 188 max Watts	Ch 189 max Watts	Ch 190 max Watts	Ch 191 max Watts	Ch 192 max Watts				

Load Types Registers

Load Types (also called virtual meters) provide aggregated real power for channels/circuits assigned to the type. Load types are defined by their Load Type Index (1-20). Registers 8740-8749 define alphanumeric names (up to 18 characters) to load types using indirect addressing by index. To read the name for load type 1, enter ‘1’ into the circuit name index (8740), and that load type’s name will populate into 8741 through 8749. The odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than 20, the maximum number of Load Types).

Load type assignment for each channel can be read in registers 8750-8940 (e.g. a value of 5 in register 8750 means channel 1 is assigned to load type index 5)

Power for each load type is available in registers 8700-8739 by index (type 1, type 2, etc.).

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
8700	Watts total (low word) type 1	Watts total (hi word) type 1	Watts total (low word) type 2	Watts total (hi word) type 2	Watts total (low word) type 3	Watts total (hi word) type 3	Watts total (low word) type 4	Watts total (hi word) type 4	Watts total (low word) type 5	Watts total (hi word) type 5
8710	Watts total (low word) type 6	Watts total (hi word) type 6	Watts total (low word) type 7	Watts total (hi word) type 7	Watts total (low word) type 8	Watts total (hi word) type 8	Watts total (low word) type 9	Watts total (hi word) type 9	Watts total (low word) type 10	Watts total (hi word) type 10
8720	Watts total (low word) type 11	Watts total (hi word) type 11	Watts total (low word) type 12	Watts total (hi word) type 12	Watts total (low word) type 13	Watts total (hi word) type 13	Watts total (low word) type 14	Watts total (hi word) type 14	Watts total (low word) type 15	Watts total (hi word) type 15
8730	Watts total (low word) type 16	Watts total (hi word) type 16	Watts total (low word) type 17	Watts total (hi word) type 17	Watts total (low word) type 18	Watts total (hi word) type 18	Watts total (low word) type 19	Watts total (hi word) type 19	Watts total (low word) type 20	Watts total (hi word) type 20
8740	Load Type Index	Load Type Name character 1 + 2	Load Type Name character 3 + 4	Load Type Name character 5 + 6	Load Type Name character 7 + 8	Load Type Name character 9 + 10	Load Type Name character 11 + 12	Load Type Name character 13 + 14	Load Type Name character 15 + 16	Load Type Name character 17 + 18
8750	Ch 1 load type	Ch 2 load type	Ch 3 load type	Ch 4 load type	Ch 5 load type	Ch 6 load type	Ch 7 load type	Ch 8 load type	Ch 9 load type	Ch 10 load type
8760	Ch 11 load type	Ch 12 load type	Ch 13 load type	Ch 14 load type	Ch 15 load type	Ch 16 load type	Ch 17 load type	Ch 18 load type	Ch 19 load type	Ch 20 load type
…	…	…	…	…	…	…	…	…	…	…
8930	Ch 181 load type	Ch 182 load type	Ch 183 load type	Ch 184 load type	Ch 185 load type	Ch 186 load type	Ch 187 load type	Ch 188 load type	Ch 189 load type	Ch 190 load type
8940	Ch 191 load type	Ch 192 load type								

Alarm Registers

Address	+ 0	+ 1	+ 2	…	+ 191	…	+ 196	+ 197	+ 198	+ 199
9000 – 9199	Ch 1 current	Ch 2 current	Ch 3 current	…	Ch 192	…	Ph 1 current	Ph 2 current	Ph 3 current	Ph N current
9200 – 9399	Ch 1 breaker size	Ch 2 breaker size	Ch 3 breaker size	…	Ch 192 breaker size	…	Ph 1 breaker size	Ph 2 breaker size	Ph 3 breaker size	Ph N breaker size
9400 – 9599	Ch 1 warning threshold	Ch 2 warning threshold	Ch 3 warning threshold	…	Ch 192 warning threshold	…	Ph 1 warning threshold	Ph 2 warning threshold	Ph 3 warning threshold	Ph N warning threshold
9600 – 9799	Ch 1 alarm threshold	Ch 2 alarm threshold	Ch 3 alarm threshold	…	Ch 192 alarm threshold	…	Ph 1 alarm threshold	Ph 2 alarm threshold	Ph 3 alarm threshold	Ph N alarm threshold
9800 – 9999	Ch 1 warning timedelay	Ch 2 warning timedelay	Ch 3 warning timedelay	…	Ch 192 warning timedelay	…	Ph 1 warning timedelay	Ph 2 warning timedelay	Ph 3 warning timedelay	Ph N warning timedelay
10000 – 10199	Ch 1 alarm timedelay	Ch 2 alarm timedelay	Ch 3 alarm timedelay	…	Ch 192 alarm timedelay	…	Ph 1 alarm timedelay	Ph 2 alarm timedelay	Ph 3 alarm timedelay	Ph N alarm timedelay

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
10200									Vlo threshold phase 1	Vlo threshold phase 2
10210	Vlo threshold phase 3	Vhi threshold phase 1	Vhi threshold phase 2	Vhi threshold phase 3	Voltage timedelay	Tripped breaker current	Tripped breaker timeframe	Neutral current mismatch threshold		
10220	Warning 1-16	Warning 17-32	Warning 33-48	Warning 49-64	Warning 65-80	Warning 81-96	Warning 97-112	Warning 113-120		Warning Ph 1-N Bits 12-15
10230	Alarm 1-16	Alarm 17-32	Alarm 33-48	Alarm 49-64	Alarm 65-80	Alarm 81-96	Alarm 97-112	Alarm 113-120		Alarm Ph 1-N Bits 12-15
10240	Tripped breaker 1-16	Tripped breaker 17-32	Tripped breaker 33-48	Tripped breaker 49-64	Tripped breaker 65-80	Tripped breaker 81-96	Tripped breaker 97-112	Tripped breaker 113-120		Tripped breaker Ph 1-N Bits 12-15
10250	Warning 1-16 latched	Warning 17-32 latched	Warning 33-48 latched	Warning 49-64 latched	Warning 65-80 latched	Warning 81-96 latched	Warning 97-112 latched	Warning 113-120 latched		Warning Ph 1-N Bits 12-15 latched
10260	Alarm 1-16 latched	Alarm 17-32 latched	Alarm 33-48 latched	Alarm 49-64 latched	Alarm 65-80 latched	Alarm 81-96 latched	Alarm 97-112 latched	Alarm 113-120 latched		Alarm Ph 1-N Bits 12-15 latched
10270	Tripped breaker 1-16 latched	Tripped breaker 17-32 latched	Tripped breaker 33-48 latched	Tripped breaker 49-64 latched	Tripped breaker 65-80 latched	Tripped breaker 81-96 latched	Tripped breaker 97-112 latched	Tripped breaker 113-120 latched		Tripped breaker Ph 1-N Bits 12-15 latched
10280	Global warning	Global alarm	Global tripped breaker	Global warning latched	Global alarm latched	Global tripped breaker latched	Vlo flag	Vhi flag	Vlo flag latched	Vhi flag latched
10290	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 3 phase meter	
10300	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 123N circuit 1	
10310	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 123N circuit 2	
10320	…	…	…	…	…	…	…	…	← 123N circuit 3	
…	…	…	…	…	…	…	…	…	← 123N circuit …	

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
10770	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 123N circuit 48	
10780										
10790										
10800										
10810	Global power flags 1	Global power flags 2	Global power flags 3	Global power flags 4						
10820	Warning 1-16	Warning 17-32	Warning 33-48	Warning 49-64	Warning 65-80	Warning 81-96	Warning 97-112	Warning 113-128	Warning 127-144	Warning 145-160
10830	Warning 161-176	Warning 177-192	Warning Ph 1-N Bits 12-15	Alarm 1-16	Alarm 17-32	Alarm 33-48	Alarm 49-64	Alarm 65-80	Alarm 81-96	Alarm 97-112
10840	Alarm 113-128	Alarm 127-144	Alarm 145-160	Alarm 161-176	Alarm 177-192	Alarm Ph 1-N Bits 12-15	Tripped breaker 1-16	Tripped breaker 17-32	Tripped breaker 33-48	Tripped breaker 49-64
10850	Tripped breaker 65-80	Tripped breaker 81-96	Tripped breaker 97-112	Tripped breaker 113-128	Tripped breaker 127-144	Tripped breaker 145-160	Tripped breaker 161-176	Tripped breaker 177-192	Tripped breaker Ph 1-N Bits 12-15	Warning 1-16 latched
18060	Warning 17-32 latched	Warning 33-48 latched	Warning 49-64 latched	Warning 65-80 latched	Warning 81-96 latched	Warning 97-112 latched	Warning 113-128 latched	Warning 127-144 latched	Warning 145-160 latched	Warning 161-176 latched
10870	Warning 177-192 latched	Warning Ph 1-N Bits 12-15 latched	Alarm 1-16 latched	Alarm 17-32 latched	Alarm 33-48 latched	Alarm 49-64 latched	Alarm 65-80 latched	Alarm 81-96 latched	Alarm 97-112 latched	Alarm 113-128 latched
10880	Alarm 127-144 latched	Alarm 145-160 latched	Alarm 161-176 latched	Alarm 177-192 latched	Alarm Ph 1-N Bits 12-15 latched	Tripped breaker 1-16 latched	Tripped breaker 17-32 latched	Tripped breaker 33-48 latched	Tripped breaker 49-64 latched	Tripped breaker 65-80 latched
10890	Tripped breaker 81-96 latched	Tripped breaker 97-112 latched	Tripped breaker 113-128 latched	Tripped breaker 127-144 latched	Tripped breaker 145-160 latched	Tripped breaker 161-176 latched	Tripped breaker 177-192 latched	Tripped breaker Ph 1-N Bits 12-15 latched		

Averaging Registers for Up to 120 Channels

The ROR (reset-on-read) averaging registers are intended for use by the logging feature. If logs are using these registers, any other access may upset the values stored in the log. Other users wishing to take an average should use the accumulator and counter registers. These are all rolling values. Perform an unsigned subtraction to obtain the values over the period.

The power factor ROR registers for up to 192 channels are located at 26800-26991. Note, registers 13600-13710 and 26800-26919 are aliases for each other; a read from a register in one block will reset the corresponding register in the other as well as itself.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
11000	Ch 1 VRMS accumulator Low	Ch 1 VRMS accumulator Hi	Ch 1 VRMS averaging counter	Ch 2 VRMS accumulator Low	Ch 2 VRMS accumulator Hi	Ch 2 VRMS averaging counter	Ch 3 VRMS accumulator Low	Ch 3 VRMS accumulator Hi	Ch 3 VRMS averaging counter	Ch 4 VRMS accumulator Low
11010	Ch 4 VRMS accumulator Hi	Ch 4 VRMS averaging counter	Ch 5 VRMS accumulator Low	Ch 5 VRMS accumulator Hi	Ch 5 VRMS averaging counter	Ch 6 VRMS accumulator Low	Ch 6 VRMS accumulator Hi	Ch 6 VRMS averaging counter	Ch 7 VRMS accumulator Low	Ch 7 VRMS accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
11350	Ch 117 VRMS averaging counter	Ch 118 VRMS accumulator Low	Ch 118 VRMS accumulator Hi	Ch 118 VRMS averaging counter	Ch 119 VRMS accumulator Low	Ch 119 VRMS accumulator Hi	Ch 119 VRMS averaging counter	Ch 120 VRMS accumulator Low	Ch 120 VRMS accumulator Hi	Ch 120 VRMS averaging counter
11360-90										
11400	Ch 1 IRMS accumulator Low	Ch 1 IRMS accumulator Hi	Ch 1 IRMS averaging counter	Ch 2 IRMS accumulator Low	Ch 2 IRMS accumulator Hi	Ch 2 IRMS averaging counter	Ch 3 IRMS accumulator Low	Ch 3 IRMS accumulator Hi	Ch 3 IRMS averaging counter	Ch 4 IRMS accumulator Low
11410	Ch 4 IRMS accumulator Hi	Ch 4 IRMS averaging counter	Ch 5 IRMS accumulator Low	Ch 5 IRMS accumulator Hi	Ch 5 IRMS averaging counter	Ch 6 IRMS accumulator Low	Ch 6 IRMS accumulator Hi	Ch 6 IRMS averaging counter	Ch 7 IRMS accumulator Low	Ch 7 IRMS accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
11750	Ch 117 IRMS averaging counter	Ch 118 IRMS accumulator Low	Ch 118 IRMS accumulator Hi	Ch 118 IRMS averaging counter	Ch 119 IRMS accumulator Low	Ch 119 IRMS accumulator Hi	Ch 119 IRMS averaging counter	Ch 120 IRMS accumulator Low	Ch 120 IRMS accumulator Hi	Ch 120 IRMS averaging counter
11760-90										
11800	Ch 1 Watts accumulator Low	Ch 1 Watts accumulator Hi	Ch 1 Watts averaging counter	Ch 2 Watts accumulator Low	Ch 2 Watts accumulator Hi	Ch 2 Watts averaging counter	Ch 3 Watts accumulator Low	Ch 3 Watts accumulator Hi	Ch 3 Watts averaging counter	Ch 4 Watts accumulator Low
11810	Ch 4 Watts accumulator Hi	Ch 4 Watts averaging counter	Ch 5 Watts accumulator Low	Ch 5 Watts accumulator Hi	Ch 5 Watts averaging counter	Ch 6 Watts accumulator Low	Ch 6 Watts accumulator Hi	Ch 6 Watts averaging counter	Ch 7 Watts accumulator Low	Ch 7 Watts accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
12150	Ch 117 Watts averaging counter	Ch 118 Watts accumulator Low	Ch 118 Watts accumulator Hi	Ch 118 Watts averaging counter	Ch 119 Watts accumulator Low	Ch 119 Watts accumulator Hi	Ch 119 Watts averaging counter	Ch 120 Watts accumulator Low	Ch 120 Watts accumulator Hi	Ch 120 Watts averaging counter
12160-90										
12200	Ch 1 PF accumulator Low	Ch 1 PF accumulator Hi	Ch 1 PF averaging counter	Ch 2 PF accumulator Low	Ch 2 PF accumulator Hi	Ch 2 PF averaging counter	Ch 3 PF accumulator Low	Ch 3 PF accumulator Hi	Ch 3 PF averaging counter	Ch 4 PF accumulator Low
12210	Ch 4 PF accumulator Hi	Ch 4 PF averaging counter	Ch 5 PF accumulator Low	Ch 5 PF accumulator Hi	Ch 5 PF averaging counter	Ch 6 PF accumulator Low	Ch 6 PF accumulator Hi	Ch 6 PF averaging counter	Ch 7 PF accumulator Low	Ch 7 PF accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
12550	Ch 117 PF averaging counter	Ch 118 PF accumulator Low	Ch 118 PF accumulator Hi	Ch 118 PF averaging counter	Ch 119 PF accumulator Low	Ch 119 PF accumulator Hi	Ch 119 PF averaging counter	Ch 120 PF accumulator Low	Ch 120 PF accumulator Hi	Ch 120 PF averaging counter
12560-70										
12580			All ph avg VRMS accumulator Low	All ph avg VRMS accumulator Hi	All ph avg VRMS averaging counter	All ph avg IRMS accumulator Low	All ph avg IRMS accumulator Mid	All ph avg IRMS accumulator Hi	All ph avg IRMS averaging counter	Total Watts accumulator Low

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
12590	Total Watts accumulator Mid	Total Watts accumulator Hi	Total Watts averaging counter	All ph PF accumulator Low	All ph PF accumulator Hi	All ph PF averaging counter	Neutral IRMS accumulator Low	Neutral IRMS accumulator Mid	Neutral IRMS accumulator Hi	Neutral IRMS averaging counter
12600	Ph 1 VRMS accumulator Low	Ph 1 VRMS accumulator Hi	Ph 1 VRMS averaging counter	Ph 2 VRMS accumulator Low	Ph 2 VRMS accumulator Hi	Ph 2 VRMS averaging counter	Ph 3 VRMS accumulator Low	Ph 3 VRMS accumulator Hi	Ph 3 VRMS averaging counter	Ph 1 IRMS accumulator Low
12610	Ph 1 IRMS accumulator Mid	Ph 1 IRMS accumulator Hi	Ph 1 IRMS averaging counter	Ph 2 IRMS accumulator Low	Ph 2 IRMS accumulator Mid	Ph 2 IRMS accumulator Hi	Ph 2 IRMS averaging counter	Ph 3 IRMS accumulator Low	Ph 3 IRMS accumulator Mid	Ph 3 IRMS accumulator Hi
12620	Ph 3 IRMS averaging counter	Ph 1 Watts accumulator Low	Ph 1 Watts accumulator Mid	Ph 1 Watts accumulator Hi	Ph 1 Watts averaging counter	Ph 2 Watts accumulator Low	Ph 2 Watts accumulator Mid	Ph 2 Watts accumulator Hi	Ph 2 Watts averaging counter	Ph 3 Watts accumulator Low
12630	Ph 3 Watts accumulator Mid	Ph 3 Watts accumulator Hi	Ph 3 Watts averaging counter	Ph 1 PF accumulator Low	Ph 1 PF accumulator Hi	Ph 1 PF averaging counter	Ph 2 PF accumulator Low	Ph 2 PF accumulator Hi	Ph 2 PF averaging counter	Ph 3 PF accumulator Low
12640	Ph 3 PF accumulator Hi	Ph 3 PF averaging counter			12640 only →		All ph avg IRMS ROR average Low	All ph avg IRMS ROR average Hi	All ph total Watts ROR average Low	All ph total Watts ROR average Hi
12650	Ph 1 VRMS ROR average	Ph 2 VRMS ROR average	Ph 3 VRMS ROR average	Ph 1 IRMS ROR average Low	Ph 1 IRMS ROR average Hi	Ph 2 IRMS ROR average Low	Ph 2 IRMS ROR average Hi	Ph 3 IRMS ROR average Low	Ph 3 IRMS ROR average Hi	Ph 1 Watts ROR average Low
12660	Ph 1 Watts ROR average Hi	Ph 2 Watts ROR average Low	Ph 2 Watts ROR average Hi	Ph 3 Watts ROR average Low	Ph 3 Watts ROR average Hi	Ph 1 PF ROR average	Ph 2 PF ROR average	Ph 3 PF ROR average	All Ph PF ROR average	
12670	Ph 1 VRMS ROR average	Ph 2 VRMS ROR average	Ph 3 VRMS ROR average	Ph 1 IRMS ROR average Low	Ph 1 IRMS ROR average Hi	Ph 2 IRMS ROR average Low	Ph 2 IRMS ROR average Hi	Ph 3 IRMS ROR average Low	Ph 3 IRMS ROR average Hi	Ph 1 Watts ROR average Low
12680	Ph 1 Watts ROR average Hi	Ph 2 Watts ROR average Low	Ph 2 Watts ROR average Hi	Ph 3 Watts ROR average Low	Ph 3 Watts ROR average Hi	Ph 1 PF ROR average	Ph 2 PF ROR average	Ph 3 PF ROR average	All Ph PF ROR average	All ph avg IRMS ROR average Low
12690	All ph avg IRMS ROR average Hi	All ph total Watts ROR average Low	All ph total Watts ROR average Hi							
12760-12990										
13000	Ch 1 VRMS ROR average	Ch 2 VRMS ROR average	Ch 3 VRMS ROR average	Ch 4 VRMS ROR average	Ch 5 VRMS ROR average	Ch 6 VRMS ROR average	Ch 7 VRMS ROR average	Ch 8 VRMS ROR average	Ch 9 VRMS ROR average	Ch 10 VRMS ROR average
13010	Ch 11 VRMS ROR average	Ch 12 VRMS ROR average	Ch 13 VRMS ROR average	Ch 14 VRMS ROR average	Ch 15 VRMS ROR average	Ch 16 VRMS ROR average	Ch 17 VRMS ROR average	Ch 18 VRMS ROR average	Ch 19 VRMS ROR average	Ch 20 VRMS ROR average
…	…	…	...	...	…	…	…	…	…	…
13180	Ch 181 VRMS ROR average	Ch 182 VRMS ROR average	Ch 183 VRMS ROR average	Ch 184 VRMS ROR average	Ch 185 VRMS ROR average	Ch 186 VRMS ROR average	Ch 187 VRMS ROR average	Ch 188 VRMS ROR average	Ch 189 VRMS ROR average	Ch 190 VRMS ROR average
13190	Ch 191 VRMS ROR average	Ch 192 VRMS ROR average								
13200	Ch 1 IRMS ROR average	Ch 2 IRMS ROR average	Ch 3 IRMS ROR average	Ch 4 IRMS ROR average	Ch 5 IRMS ROR average	Ch 6 IRMS ROR average	Ch 7 IRMS ROR average	Ch 8 IRMS ROR average	Ch 9 IRMS ROR average	Ch 10 IRMS ROR average
13210	Ch 11 IRMS ROR average	Ch 12 IRMS ROR average	Ch 13 IRMS ROR average	Ch 14 IRMS ROR average	Ch 15 IRMS ROR average	Ch 16 IRMS ROR average	Ch 17 IRMS ROR average	Ch 18 IRMS ROR average	Ch 19 IRMS ROR average	Ch 20 IRMS ROR average
…	…	…	...	...	…	…	…	…	…	…
13380	Ch 181 IRMS ROR average	Ch 182 IRMS ROR average	Ch 183 IRMS ROR average	Ch 184 IRMS ROR average	Ch 185 IRMS ROR average	Ch 186 IRMS ROR average	Ch 187 IRMS ROR average	Ch 188 IRMS ROR average	Ch 189 IRMS ROR average	Ch 190 IRMS ROR average
13390	Ch 191 IRMS ROR average	Ch 192 IRMS ROR average								
13400	Ch 1 Watts ROR average	Ch 2 Watts ROR average	Ch 3 Watts ROR average	Ch 4 Watts ROR average	Ch 5 Watts ROR average	Ch 6 Watts ROR average	Ch 7 Watts ROR average	Ch 8 Watts ROR average	Ch 9 Watts ROR average	Ch 10 Watts ROR average
13410	Ch 11 Watts ROR average	Ch 12 Watts ROR average	Ch 13 Watts ROR average	Ch 14 Watts ROR average	Ch 15 Watts ROR average	Ch 16 Watts ROR average	Ch 17 Watts ROR average	Ch 18 Watts ROR average	Ch 19 Watts ROR average	Ch 20 Watts ROR average
…	…	…	...	...	…	…	…	…	…	…
13580	Ch 181 Watts ROR average	Ch 182 Watts ROR average	Ch 183 Watts ROR average	Ch 184 Watts ROR average	Ch 185 Watts ROR average	Ch 186 Watts ROR average	Ch 187 Watts ROR average	Ch 188 Watts ROR average	Ch 189 Watts ROR average	Ch 190 Watts ROR average

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
13590	Ch 191 Watts ROR average	Ch 192 Watts ROR average								
13600	Ch 1 PF ROR average	Ch 2 PF ROR average	Ch 3 PF ROR average	Ch 4 PF ROR average	Ch 5 PF ROR average	Ch 6 PF ROR average	Ch 7 PF ROR average	Ch 8 PF ROR average	Ch 9 PF ROR average	Ch 10 PF ROR average
13610	Ch 11 PF ROR average	Ch 12 PF ROR average	Ch 13 PF ROR average	Ch 14 PF ROR average	Ch 15 PF ROR average	Ch 16 PF ROR average	Ch 17 PF ROR average	Ch 18 PF ROR average	Ch 19 PF ROR average	Ch 20 PF ROR average
…	…	…	...	...	…	…	…	…	…	…
13710	Ch 111 PF ROR average	Ch 112 PF ROR average	Ch 113 PF ROR average	Ch 114 PF ROR average	Ch 115 PF ROR average	Ch 116 PF ROR average	Ch 117 PF ROR average	Ch 118 PF ROR average	Ch 119 PF ROR average	Ch 120 PF ROR average

Alarm Digital Outputs

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
20000	Ph 1 Under V alarm	Ph 1 Over V alarm	Ph 1 Under V latching alarm	Ph 1 Over V latching alarm	Ph 2 Under V alarm	Ph 2 Over V alarm	Ph 2 Under V latching alarm	Ph 2 Over V latching alarm	Ph 3 Under V alarm	Ph 3 Over V alarm
20010	Ph 3 Under V latching alarm	Ph 3 Over V latching alarm	3phm total power warning	3phm total power alarm	3phm total power warning latching	3phm total power alarm latching	Ch 1 current warning	Ch 1 current alarm	Ch 1 tripped breaker	Ch 1 current warning latching
20020	Ch 1 current alarm latching	Ch 1 tripped breaker latching	Ch 2 current warning	Ch 2 current alarm	Ch 2 tripped breaker	Ch 2 current warning latching	Ch 2 current alarm latching	Ch 2 tripped breaker latching	Ch 3 current warning	Ch 3 current alarm
…	…	…	…	…	…	…	…	…	…	…
21160	Ch 191 current alarm latching	Ch 191 tripped breaker latching	Ch 192 current warning	Ch 192 current alarm	Ch 192 tripped breaker	Ch 192 current warning latching	Ch 192 current alarm latching	Ch 192 tripped breaker latching	Ph 1 current warning	Ph 1 current alarm
21170	Ph 1 tripped breaker	Ph 1 current warning latching	Ph 1 current alarm latching	Ph 1 tripped breaker latching	Ph 2 current warning	Ph 2 current alarm	Ph 2 tripped breaker	Ph 2 current warning latching	Ph 2 current alarm latching	Ph 2 tripped breaker latching
21180	Ph 3 current warning	Ph 3 current alarm	Ph 3 tripped breaker	Ph 3 current warning latching	Ph 3 current alarm latching	Ph 3 tripped breaker latching	Ph N current warning	Ph N current alarm	Ph N tripped breaker	Ph N current warning latching
21190	Ph N current alarm latching	Ph N tripped breaker latching								
…	…	…	…	…	…	…	…	…	…	…
21240	123N circuit 1 Under V alarm	123N circuit 1 Over V alarm	123N circuit 1 Under V latching alarm	123N circuit 1 Over V latching alarm	123N circuit 1 neutral current mismatch	123N circuit 1 neutral current mismatch latching	123N circuit 2 Under V alarm	123N circuit 2 Over V alarm	123N circuit 2 Under V latching alarm	123N circuit 2 Over V latching alarm
21250	123N circuit 2 neutral current mismatch	123N circuit 2 neutral current mismatch latching	123N circuit 3 Under V alarm	123N circuit 3 Over V alarm	123N circuit 3 Under V latching alarm	123N circuit 3 Over V latching alarm	123N circuit 3 neutral current mismatch	123N circuit 3 neutral current mismatch latching	123N circuit 4 Under V alarm	123N circuit 4 Over V alarm
…	…	…	…	…	…	…	…	…	…	…
21520	123N circuit 47 neutral current mismatch	123N circuit 47 neutral current mismatch latching	123N circuit 48 Under V alarm	123N circuit 48 Over V alarm	123N circuit 48 Under V latching alarm	123N circuit 48 Over V latching alarm	123N circuit 48 neutral current mismatch	123N circuit 48 neutral current mismatch latching	Ph 1 Under V alarm	Ph 1 Over V alarm
21530	Ph 1 Under V latching alarm	Ph 1 Over V latching alarm	Ph 1 neutral current mismatch	Ph 1 neutral current mismatch latching						

123N Circuit Summaries

If all branch circuits are configured with three phases and a neutral this section provides totals for each circuit. There are 48 of these, repeated in 100 register blocks from 21998 to 26797.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
21990 … 26690									Amps avg (low word) * 1000 All Phases	Amps avg (hi word) * 1000 All Phases
22000 … 26700	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low word) * 1000 Phase 1	Amps tot (hi word) * 1000 Phase 1	Amps tot (low word) * 1000 Phase 2	Amps tot (hi word) * 1000 Phase 2	Amps tot (low word) * 1000 Phase 3	Amps tot (hi word) * 1000 Phase 3	PF Avg Phase 1 (signed)
22010 … 26710	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low word) Phase 1 (signed)	Watts total (hi word) Phase 1 (signed)	Watts total (low word) Phase 2 (signed)	Watts total (hi word) Phase 2 (signed)	Watts total (low word) Phase 3 (signed)	Watts total (hi word) Phase 3 (signed)	KWH total (low word) Phase 1	KWH total (hi word) Phase 1
22020 … 26720	KWH total (low word) Phase 2	KWH total (hi word) Phase 2	KWH total (low word) Phase 3	KWH total(hi word) Phase 3	Vrms All Phases	Amps tot (low word) * 1000 All Phases	Amps tot (hi word) * 1000 All Phases	PF Avg All Phases (signed)	Watts total (low word) All Phases (signed)	Watts total (hi word) All Phases (signed)
22030 … 26730	KWH total (low word) All Phases	KWH total (hi word) All Phases	Amps tot (low word) * 1000 Phase N	Amps tot (hi word) * 1000 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg	VAR total (low word) Phase 1 (signed)	VAR total (hi word) Phase 1 (signed)
22040 … 26740	VAR total (low word) Phase 2 (signed)	VAR total (hi word) Phase 2 (signed)	VAR total (low word) Phase 3 (signed)	VAR total (hi word) Phase 3 (signed)	VAR total (low word) All Phase (signed)	VAR total (hi word) All Phases (signed)	VA total (low word) Phase 1	VA total (hi word) Phase 1	VA total (low word) Phase 2	VA total (hi word) Phase 2
22050 … 26750	VA total (low word) Phase 3	VA total (hi word) Phase 3	VA total (low word) All Phase	VA total (hi word) All Phases						ITHD Phase 1
22060 … 26760	ITHD Phase 2	ITHD Phase 3	ITHD Neutral	ITHD total	ITHD avg	Max Watts (low word) Phase 1	Max Watts (hi word) Phase 1	Max Watts (low word) Phase 2	Max Watts (hi word) Phase 2	Max Watts (low word) Phase 3
22070 … 26770	Max Watts (hi word) Phase 3	Max total Watts (low word) All phases	Max total Watts (hi word) All phases	Max Watts time 1 Phase 1	Max Watts time 2 Phase 1	Max Watts time 3 Phase 1	Max Watts time 4 Phase 1	Max Watts time 1 Phase 2	Max Watts time 2 Phase 2	Max Watts time 3 Phase 2
22080 … 26780	Max Watts time 4 Phase 2	Max Watts time 1 Phase 3	Max Watts time 2 Phase 3	Max Watts time 3 Phase 3	Max Watts time 4 Phase 3	Max total Watts time 1 All phases	Max total Watts time 2 All phases	Max total Watts time 3 All phases	Max total Watts time 4 All phases	
22090 … 26790				Ph 1 channel number	Ph 2 channel number	Ph 3 channel number	Ph N channel number	Number of 123N circuits		

Averaging Registers for Power Factor (up to 192 channels, Reset on Read)

These ROR (reset-on-read) averaging registers are intended for use by the logging feature. If logs are using these registers, any other access may upset the values stored in the log. Other users wishing to take an average should use the accumulator and counter registers. These are all rolling values. Perform an unsigned subtraction to obtain the values over the period.

Note, registers 13600-13710 and 26800-26919 are aliases for each other; a read from a register in one block will reset the corresponding register in the other as well as itself.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
26800	Ch 1 PF ROR average	Ch 2 PF ROR average	Ch 3 PF ROR average	Ch 4 PF ROR average	Ch 5 PF ROR average	Ch 6 PF ROR average	Ch 7 PF ROR average	Ch 8 PF ROR average	Ch 9 PF ROR average	Ch 10 PF ROR average
26810	Ch 11 PF ROR average	Ch 12 PF ROR average	Ch 13 PF ROR average	Ch 14 PF ROR average	Ch 15 PF ROR average	Ch 16 PF ROR average	Ch 17 PF ROR average	Ch 18 PF ROR average	Ch 19 PF ROR average	Ch 20 PF ROR average
…	…	…	...	...	…	…	…	…	…	…
26980	Ch 181 PF ROR average	Ch 182 PF ROR average	Ch 183 PF ROR average	Ch 184 PF ROR average	Ch 185 PF ROR average	Ch 186 PF ROR average	Ch 187 PF ROR average	Ch 188 PF ROR average	Ch 189 PF ROR average	Ch 190 PF ROR average
26990	Ch 191 PF ROR average	Ch 192 PF ROR average								

Head Unit Reset on Read Averaging Registers

These ROR (reset-on-read) averaging registers are intended for use by the logging feature. If logs are using these registers, any other access may upset the values stored in the log. Other users wishing to take an average should use the accumulator and counter registers at 12582. These are all rolling values. Perform an unsigned subtraction to obtain the values over the period.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
27000	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low word) * 1000 Phase 1	Amps tot (hi word) * 1000 Phase 1	Amps tot (low word) * 1000 Phase 2	Amps tot (hi word) * 1000 Phase 2	Amps tot (low word) * 1000 Phase 3	Amps tot (hi word) * 1000 Phase 3	PF Avg Phase 1 (signed)
27010	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low word) Phase 1 (signed)	Watts total (hi word) Phase 1 (signed)	Watts total (low word) Phase 2 (signed)	Watts total (hi word) Phase 2 (signed)	Watts total (low word) Phase 3 (signed)	Watts total (hi word) Phase 3 (signed)	Vrms All Phases	Amps avg (low word) * 1000 All Phases
27020	Amps avg (hi word) * 1000 All Phases	PF Avg All Phases (signed)	Watts total (low word) All Phases (signed)	Watts total (hi word) All Phases (signed)	Amps tot (low word) * 1000 Phase N	Amps tot (hi word) * 1000 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg
27030	VAR total (low word) Phase 1 (signed)	VAR total (hi word) Phase 1 (signed)	VAR total (low word) Phase 2 (signed)	VAR total (hi word) Phase 2 (signed)	VAR total (low word) Phase 3 (signed)	VAR total (hi word) Phase 3 (signed)	VAR total (low word) All Phase (signed)	VAR total (hi word) All Phases (signed)	VA total (low word) Phase 1	VA total (hi word) Phase 1
27040	VA total (low word) Phase 2	VA total (hi word) Phase 2	VA total (low word) Phase 3	VA total (hi word) Phase 3	VA total (low word) All Phase	VA total (hi word) All Phases	VTHD Phase 1	VTHD Phase 2	VTHD Phase 3	VTHD total
27050	VTHD avg	ITHD Phase 1	ITHD Phase 2	ITHD Phase 3	Reserved	ITHD total	ITHD avg	Frequency Phase 1	Frequency Phase 2	Frequency Phase 3
27060	Frequency avg	% power used	Power remaining							

Branch Channel Max Power Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
28000	Max Watts reset time 1	Max Watts reset time 2	Max Watts reset time 3	Max Watts reset time 4	Ch 1 Max Watts time 1	Ch 1 Max Watts time 2	Ch 1 Max Watts time 3	Ch 1 Max Watts time 4	Ch 1 max Watts	Ch 2 Max Watts time 1
28010	Ch 2 Max Watts time 2	Ch 2 Max Watts time 3	Ch 2 Max Watts time 4	Ch 2 max Watts	Ch 3 Max Watts time 1	Ch 3 Max Watts time 2	Ch 3 Max Watts time 3	Ch 3 Max Watts time 4	Ch 3 max Watts	Ch 4 Max Watts time 1
…	…	…	…	…	…	…	…	…	…	…
28950	Ch 190 Max Watts time 2	Ch 190 Max Watts time 3	Ch 190 Max Watts time 4	Ch 190 max Watts	Ch 191 Max Watts time 1	Ch 191 Max Watts time 2	Ch 191 Max Watts time 3	Ch 191 Max Watts time 4	Ch 191 max Watts	Ch 192 Max Watts time 1
28960	Ch 192 Max Watts time 2	Ch 192 Max Watts time 3	Ch 192 Max Watts time 4	Ch 192 max Watts						

Branch Channel Averaging Registers (up to 192 Channels)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
29000	Ch 1 VRMS accumulator Low	Ch 1 VRMS accumulator Hi	Ch 1 VRMS averaging counter	Ch 2 VRMS accumulator Low	Ch 2 VRMS accumulator Hi	Ch 2 VRMS averaging counter	Ch 3 VRMS accumulator Low	Ch 3 VRMS accumulator Hi	Ch 3 VRMS averaging counter	Ch 4 VRMS accumulator Low
29010	Ch 4 VRMS accumulator Hi	Ch 4 VRMS averaging counter	Ch 5 VRMS accumulator Low	Ch 5 VRMS accumulator Hi	Ch 5 VRMS averaging counter	Ch 6 VRMS accumulator Low	Ch 6 VRMS accumulator Hi	Ch 6 VRMS averaging counter	Ch 7 VRMS accumulator Low	Ch 7 VRMS accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
29570	Ch 191 VRMS accumulator Low	Ch 191 VRMS accumulator Hi	Ch 191 VRMS averaging counter	Ch 192 VRMS accumulator Low	Ch 192 VRMS accumulator Hi	Ch 192 VRMS averaging counter				
29580-90										
29600	Ch 1 IRMS accumulator Low	Ch 1 IRMS accumulator Hi	Ch 1 IRMS averaging counter	Ch 2 IRMS accumulator Low	Ch 2 IRMS accumulator Hi	Ch 2 IRMS averaging counter	Ch 3 IRMS accumulator Low	Ch 3 IRMS accumulator Hi	Ch 3 IRMS averaging counter	Ch 4 IRMS accumulator Low
29610	Ch 4 IRMS accumulator Hi	Ch 4 IRMS averaging counter	Ch 5 IRMS accumulator Low	Ch 5 IRMS accumulator Hi	Ch 5 IRMS averaging counter	Ch 6 IRMS accumulator Low	Ch 6 IRMS accumulator Hi	Ch 6 IRMS averaging counter	Ch 7 IRMS accumulator Low	Ch 7 IRMS accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
30170	Ch 191 IRMS accumulator Low	Ch 191 IRMS accumulator Hi	Ch 191 IRMS averaging counter	Ch 192 IRMS accumulator Low	Ch 192 IRMS accumulator Hi	Ch 192 IRMS averaging counter				
30180-90										
30200	Ch 1 Watts accumulator Low	Ch 1 Watts accumulator Hi	Ch 1 Watts averaging counter	Ch 2 Watts accumulator Low	Ch 2 Watts accumulator Hi	Ch 2 Watts averaging counter	Ch 3 Watts accumulator Low	Ch 3 Watts accumulator Hi	Ch 3 Watts averaging counter	Ch 4 Watts accumulator Low
30210	Ch 4 Watts accumulator Hi	Ch 4 Watts averaging counter	Ch 5 Watts accumulator Low	Ch 5 Watts accumulator Hi	Ch 5 Watts averaging counter	Ch 6 Watts accumulator Low	Ch 6 Watts accumulator Hi	Ch 6 Watts averaging counter	Ch 7 Watts accumulator Low	Ch 7 Watts accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
30770	Ch 191 Watts accumulator Low	Ch 191 Watts accumulator Hi	Ch 191 Watts averaging counter	Ch 192 Watts accumulator Low	Ch 192 Watts accumulator Hi	Ch 192 Watts averaging counter				
12160-90										
30800	Ch 1 PF accumulator Low	Ch 1 PF accumulator Hi	Ch 1 PF averaging counter	Ch 2 PF accumulator Low	Ch 2 PF accumulator Hi	Ch 2 PF averaging counter	Ch 3 PF accumulator Low	Ch 3 PF accumulator Hi	Ch 3 PF averaging counter	Ch 4 PF accumulator Low
30810	Ch 4 PF accumulator Hi	Ch 4 PF averaging counter	Ch 5 PF accumulator Low	Ch 5 PF accumulator Hi	Ch 5 PF averaging counter	Ch 6 PF accumulator Low	Ch 6 PF accumulator Hi	Ch 6 PF averaging counter	Ch 7 PF accumulator Low	Ch 7 PF accumulator Hi
…	…	…	...	...	…	…	…	…	…	…
31370	Ch 191 PF accumulator Low	Ch 191 PF accumulator Hi	Ch 191 PF averaging counter	Ch 192 PF accumulator Low	Ch 192 PF accumulator Hi	Ch 192 PF averaging counter				

Module Summary Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
31420		Large TAP address mode Bottom 4 bits – nr channels on large Modules Top 4 bits – nr large Modules	Nr channels on TAP 1	Nr channels on TAP 2	Nr channels on TAP 3	Nr channels on TAP 4	Nr channels on TAP 5	Nr channels on TAP 6	Nr channels on TAP 7	Nr channels on TAP 8
31430	Nr channels on TAP 9	Nr channels on TAP 10	Nr channels on TAP 11	Nr channels on TAP 12	Nr channels on TAP 13	Nr channels on TAP 14	Nr channels on TAP 15	Nr channels on TAP 16	Nr channels on TAP 17	Nr channels on TAP 18
31440	Nr channels on TAP 19	Nr channels on TAP 20	Nr channels on TAP 21	Nr channels on TAP 22	Nr channels on TAP 23	Nr channels on TAP 24	Nr channels on TAP 25	Nr channels on TAP 26	Nr channels on TAP 27	Nr channels on TAP 28
31450	Nr channels on TAP 29	Nr channels on TAP 30	Nr channels on TAP 31	Nr channels on TAP 32	Nr channels on TAP 33	Nr channels on TAP 34	Nr channels on TAP 35	Nr channels on TAP 36	Nr channels on TAP 37	Nr channels on TAP 38
31460	Nr channels on TAP 39	Nr channels on TAP 40	Nr channels on TAP 41	Nr channels on TAP 42	Nr channels on TAP 43	Nr channels on TAP 44	Nr channels on TAP 45	Nr channels on TAP 46	Nr channels on TAP 47	Nr channels on TAP 48
31470	TAP 1 f/w version	TAP 2 f/w version	TAP 3 f/w version	TAP 4 f/w version	TAP 5 f/w version	TAP 6 f/w version	TAP 7 f/w version	TAP 8 f/w version	TAP 9 f/w version	TAP 10 f/w version
31480	TAP 11 f/w version	TAP 12 f/w version	TAP 13 f/w version	TAP 14 f/w version	TAP 15 f/w version	TAP 16 f/w version	TAP 17 f/w version	TAP 18 f/w version	TAP 19 f/w version	TAP 20 f/w version
31490	TAP 21 f/w version	TAP 22 f/w version	TAP 23 f/w version	TAP 24 f/w version	TAP 25 f/w version	TAP 26 f/w version	TAP 27 f/w version	TAP 28 f/w version	TAP 29 f/w version	TAP 30 f/w version
31500	TAP 31 f/w version	TAP 32 f/w version	TAP 33 f/w version	TAP 34 f/w version	TAP 35 f/w version	TAP 36 f/w version	TAP 37 f/w version	TAP 38 f/w version	TAP 39 f/w version	TAP 40 f/w version
31510	TAP 41 f/w version	TAP 42 f/w version	TAP 43 f/w version	TAP 44 f/w version	TAP 45 f/w version	TAP 46 f/w version	TAP 47 f/w version	TAP 48 f/w version	TAP 1 FPGA timestamp low	TAP 1 FPGA timestamp hi
31520	TAP 2 FPGA timestamp low	TAP 2 FPGA timestamp hi	TAP 3 FPGA timestamp low	TAP 3 FPGA timestamp hi	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
31610	TAP 47 FPGA timestamp low	TAP 47 FPGA timestamp hi	TAP 48 FPGA timestamp low	TAP 48 FPGA timestamp hi	TAP 1 serial number	TAP 2 serial number	TAP 3 serial number	…	…	…
…	…	…	…	…	…	…	…	…	…	…
31660	TAP 47 serial number	TAP 48 serial number	TAP 1 full serial number 1/2	TAP 1 full serial number 3/4	TAP 1 full serial number 5/6	TAP 1 full serial number 7/8	TAP 1 full serial number 9/10	TAP 1 full serial number 11/12	TAP 2 full serial number 1/2	TAP 2 full serial number 3/4
…	…	…	…	…	…	…	…	…	…	…
31940	TAP 47 full serial number 5/6	TAP 47 full serial number 7/8	TAP 47 full serial number 9/10	TAP 47 full serial number 11/12	TAP 48 full serial number 1/2	TAP 48 full serial number 3/4	TAP 48 full serial number 5/6	TAP 48 full serial number 7/8	TAP 48 full serial number 9/10	TAP 48 full serial number 11/12

IP Filtering

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
32000	IP filtering 0 – disabled 1 – enabled	Slot 1 Address type 4 – IPv4 6 – IPv6 0 – empty	Slot 1 IPv4/IPv6 addr 1	Slot 1 IPv4/IPv6 addr 2	Slot 1 IPv4/IPv6 addr 3	Slot 1 IPv4/IPv6 addr 4	Slot 1 IPv6 addr 5	Slot 1 IPv6 addr 6	Slot 1 IPv6 addr 7	Slot 1 IPv6 addr 8
32010		Slot 2 Address type 4 – IPv4 6 – IPv6 0 – empty	Slot 2 IPv4/IPv6 addr 1	Slot 2 IPv4/IPv6 addr 2	Slot 2 IPv4/IPv6 addr 3	Slot 2 IPv4/IPv6 addr 4	Slot 2 IPv6 addr 5	Slot 2 IPv6 addr 6	Slot 2 IPv6 addr 7	Slot 2 IPv6 addr 8
…		…	…	…	…	…	…	…	…	…
32090		Slot 10 Address type 4 – IPv4 6 – IPv6 0 – empty	Slot 10 IPv4/ IPv6 addr 1	Slot 10 IPv4/ IPv6 addr 2	Slot 10 IPv4/ IPv6 addr 3	Slot 10 IPv4/ IPv6 addr 4	Slot 10 IPv6 addr 5	Slot 10 IPv6 addr 6	Slot 10 IPv6 addr 7	Slot 10 IPv6 addr 8

Environmental Registers (16 Sensors)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
32300	Slot 1 host TAP	Slot 1 value cfg 1 & 2	Slot 1 value cfg 3 & 4	Slot 1 value types	Slot 1 value 1	Slot 1 value 2	Slot 1 value 3	Slot 1 value 4	Slot 2 host TAP	Slot 2 value cfg 1 & 2
32310	Slot 2 value cfg 3 & 4	Slot 2 value types	Slot 2 value 1	Slot 2 value 2	Slot 2 value 3	Slot 2 value 4	Slot 3 host TAP	Slot 3 value cfg 1 & 2	Slot 3 value cfg 3 & 4	Slot 3 value types
…	…	…	…	…	…	…	…	…	…	…
32800	Slot 63 value 1	Slot 63 value 2	Slot 63 value 3	Slot 63 value 4	Slot 64 host TAP	Slot 64 value cfg 1 & 2	Slot 64 value cfg 3 & 4	Slot 64 value types	Slot 64 value 1	Slot 64 value 2
32810	Slot 64 value 3	Slot 64 value 4								

Host Module (TAP)
Values 1-48 – TAP nr, 0 – slot unused

Each slot can report 4 environmental sensor readings. The 4 readings must come from sensors connected to the same module. The Host module register selects which module's sensors to use for the slot.

Value cfg

Bits	0-3	value 1 or 3 port
	4-7	value 1 or 3 sensor reading
	8-11	value 2 or 4 port
	12-15	value 2 or 4 sensor reading
Port	0	direct connection to module
	1-8	enviro hub

Note: It is possible to connect a chain of sensor directly to the module. While these will be discovered, and values made available, it is not a supported configuration and the sensor order will be non-deterministic.

Sensor reading Some sensors provide multiple readings (e.g. temperature and humidity). Use this field to select which should be made available in the slot value.

Value Types

Bits	0-3	Type of reading in slot 1
	4-7	Type of reading in slot 2
	8-11	Type of reading in slot 3
	12-15	Type of reading in slot 4
Types	0	None
	1	Temperature
	2	Humidity

Circuit Summaries

This section provides values for each defined circuit. There are 192 of these, repeated in 100 register blocks from 32998 to 52197. Each block corresponds to a channel and contains data for the circuit the channel is assigned to. If channels 1, 3 and 5 are part of circuit 1, registers 32998 (channel 1), 33198 (channel 3), and 33398 (channel 5) will all contain the same average current for circuit 1. The most efficient way to read circuit data is to only read the values for the first channel in each circuit. For example, if channels 1,3,5 are part of circuit 1 and 7,9,11 are part of circuit 2, reading values at 32998 (channel 1) will give circuit 1 data, and reading values at 33598 (channel 7) will give circuit 2 data.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
32990 … 52090									Amps avg (low word) * 1000 All Phases	Amps avg (hi word) * 1000 All Phases
33000 … 52100	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low word) * 1000 Phase 1	Amps tot (hi word) * 1000 Phase 1	Amps tot (low word) * 1000 Phase 2	Amps tot (hi word) * 1000 Phase 2	Amps tot (low word) * 1000 Phase 3	Amps tot (hi word) * 1000 Phase 3	PF Avg Phase 1 (signed)
33010 … 52110	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low word) Phase 1 (signed)	Watts total (hi word) Phase 1 (signed)	Watts total (low word) Phase 2 (signed)	Watts total (hi word) Phase 2 (signed)	Watts total (low word) Phase 3 (signed)	Watts total (hi word) Phase 3 (signed)	KWH total (low word) Phase 1	KWH total (hi word) Phase 1
33020 … 52120	KWH total (low word) Phase 2	KWH total (hi word) Phase 2	KWH total (low word) Phase 3	KWH total (hi word) Phase 3	Vrms All Phases	Amps tot (low word) * 1000 All Phases	Amps tot (hi word) * 1000 All Phases	PF Avg All Phases (signed)	Watts total (low word) All Phases (signed)	Watts total (hi word) All Phases (signed)
33030 … 52130	KWH total (low word) All Phases	KWH total (hi word) All Phases	Amps tot (low word) * 1000 Phase N	Amps tot (hi word) * 1000 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg	VAR total (low word) Phase 1 (signed)	VAR total (hi word) Phase 1 (signed)
33040 … 52140	VAR total (low word) Phase 2 (signed)	VAR total (hi word) Phase 2 (signed)	VAR total (low word) Phase 3 (signed)	VAR total (hi word) Phase 3 (signed)	VAR total (low word) All Phase (signed)	VAR total (hi word) All Phases (signed)	VA total (low word) Phase 1	VA total (hi word) Phase 1	VA total (low word) Phase 2	VA total (hi word) Phase 2
33050 … 52150	VA total (low word) Phase 3	VA total (hi word) Phase 3	VA total (low word) All Phase	VA total (hi word) All Phases						ITHD Phase 1
33060 … 52160	ITHD Phase 2	ITHD Phase 3	ITHD Neutral	ITHD total	ITHD avg	Max Watts (low word) Phase 1	Max Watts (hi word) Phase 1	Max Watts (low word) Phase 2	Max Watts (hi word) Phase 2	Max Watts (low word) Phase 3
33070 … 52170	Max Watts (hi word) Phase 3	Max total Watts (low word) All phases	Max total Watts (hi word) All phases	Max Watts time 1 Phase 1	Max Watts time 2 Phase 1	Max Watts time 3 Phase 1	Max Watts time 4 Phase 1	Max Watts time 1 Phase 2	Max Watts time 2 Phase 2	Max Watts time 3 Phase 2
33080 … 52180	Max Watts time 4 Phase 2	Max Watts time 1 Phase 3	Max Watts time 2 Phase 3	Max Watts time 3 Phase 3	Max Watts time 4 Phase 3	Max total Watts time 1 All phases	Max total Watts time 2 All phases	Max total Watts time 3 All phases	Max total Watts time 4 All phases	Current Imbalance
33090 … 52190				Ph 1 channel number	Ph 2 channel number	Ph 3 channel number	Ph N channel number	Number of channels in circuit		

Circuit Power Alarms

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
52200	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← Circuit 1	
52210	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← Circuit 2	
…	…	…	…	…	…	…	…	…	…	
54110	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← Circuit 192	

Circuit Global Power Alarms

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
54150	Ccts 1-16	Ccts 17-32	Ccts 33-48	Ccts 49-64	Ccts 65-80	Ccts 81-96	Ccts 97-112	Ccts 113-128	Ccts 129-144	Ccts 145-160
54160	Ccts 161-176	Ccts 177-192								

Circuit Power Alarms Digital Outputs

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
54170	Circuit 1 Under V alarm	Circuit 1 Over V alarm	Circuit 1 Under V latching alarm	Circuit 1 Over V latching alarm	Circuit 1 neutral current mismatch	Circuit 1 neutral current mismatch latching	Circuit 2 Under V alarm	Circuit 2 Over V alarm	Circuit 2 Under V latching alarm	Circuit 2 Over V latching alarm
54180	Circuit 2 neutral current mismatch	Circuit 2 neutral current mismatch latching	Circuit 3 Under V alarm	Circuit 3 Over V alarm	Circuit 3 Under V latching alarm	Circuit 3 Over V latching alarm	Circuit 3 neutral current mismatch	Circuit 3 neutral current mismatch latching	Circuit 4 Under V alarm	Circuit 4 Over V alarm
…	…	…	…	…	…	…	…	…	…	…
55310	Circuit 191 Under V alarm	Circuit 191 Over V alarm	Circuit 191 Under V latching alarm	Circuit 191 Over V latching alarm	Circuit 191 neutral current mismatch	Circuit 191 neutral current mismatch latching	Circuit 192 Under V alarm	Circuit 192 Over V alarm	Circuit 192 Under V latching alarm	Circuit 192 Over V latching alarm
55320	Circuit 192 neutral current mismatch	Circuit 192 neutral current mismatch latching								

CT Types

For CT Type Name registers, the odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. Any unused characters at the end of the string should be set to the space character.

CT Type Index starts from 1. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than the maximum number of CT Types).

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
55400 (see note)	CT Type Index	CT Type Name character 1 + 2	CT Type Name character 3 + 4	CT Type Name character 5 + 6	CT Type Name character 7 + 8	CT Type Name character 9 + 10	CT Type Name character 11 + 12	CT Type Name character 13 + 14	CT Type Name character 15 + 16	CT Type Name character 17 + 18
55410	CT Type Name character 19 + 20	CT Type Name character 21 + 22	CT Type Name character 23 + 24	CT Type Name character 25 + 26	CT Type Name character 27 + 28	CT Type Name character 29 + 30	CT Type Name character 31 + 32	CT Type Name character 33 + 34	CT Type Name character 35 + 36	CT Type Name character 37 + 38
55420	CT Type 1 Hardware Version 1 Factor	CT Type 1 Hardware Version 2 Factor	CT Type 1 Hardware Version 1 PHCAL	CT Type 1 Hardware Version 2 PHCAL	CT Type 2 Hardware Version 1 Factor	CT Type 2 Hardware Version 2 Factor	CT Type 2 Hardware Version 1 PHCAL	CT Type 2 Hardware Version 2 PHCAL	CT Type 3 Hardware Version 1 Factor	CT Type 3 Hardware Version 2 Factor
55430	CT Type 3 Hardware Version 1 PHCAL	CT Type 3 Hardware Version 2 PHCAL	CT Type 4 Hardware Version 1 Factor	CT Type 4 Hardware Version 2 Factor	CT Type 4 Hardware Version 1 PHCAL	CT Type 4 Hardware Version 2 PHCAL	CT Type 5 Hardware Version 1 Factor	CT Type 5 Hardware Version 2 Factor	CT Type 5 Hardware Version 1 PHCAL	CT Type 5 Hardware Version 2 PHCAL
…	…	…	…	…	…	…	…	…	…	…
55890	CT Type 118 Hardware Version 1 PHCAL	CT Type 118 Hardware Version 2 PHCAL	CT Type 119 Hardware Version 1 Factor	CT Type 119 Hardware Version 2 Factor	CT Type 119 Hardware Version 1 PHCAL	CT Type 119 Hardware Version 2 PHCAL	CT Type 120 Hardware Version 1 Factor	CT Type 120 Hardware Version 2 Factor	CT Type 120 Hardware Version 1 PHCAL	CT Type 120 Hardware Version 2 PHCAL

Circuit Names and Rack Identifiers

Circuits can be assigned alphanumeric names up to 40 character long. A Rack identifier up to 40 characters long can also be assigned to each circuit. These names are written or read using indirect addressing. To set values for circuit 4, enter ‘4’ into the Circuit Name & Rack Id Index (55900). That circuit’s name will populate into registers 55901 through 55920, and that circuit’s Rack Id will populate into registers 55921 through 55940. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than the maximum number of Circuits).

Note: For Circuit Name and Rack Id registers, the odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. Any unused characters at the end of the string should be set to the space character.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
55900 (see note)	Circuit Name & Rack Id Index	Circuit Name character 1 + 2	Circuit Name character 3 + 4	Circuit Name character 5 + 6	Circuit Name character 7 + 8	Circuit Name character 9 + 10	Circuit Name character 11 + 12	Circuit Name character 13 + 14	Circuit Name character 15 + 16	Circuit Name character 17 + 18
55910	Circuit Name character 19 + 20	Circuit Name character 21 + 22	Circuit Name character 23 + 24	Circuit Name character 25 + 26	Circuit Name character 27 + 28	Circuit Name character 29 + 30	Circuit Name character 31 + 32	Circuit Name character 33 + 34	Circuit Name character 35 + 36	Circuit Name character 37 + 38
55920	Circuit Name character 39 + 40	Rack Id character 1 + 2	Rack Id character 3 + 4	Rack Id character 5 + 6	Rack Id character 7 + 8	Rack Id character 9 + 10	Rack Id character 11 + 12	Rack Id character 13 + 14	Rack Id character 15 + 16	Rack Id character 17 + 18
55930	Rack Id character 19 + 20	Rack Id character 21 + 22	Rack Id character 23 + 24	Rack Id character 25 + 26	Rack Id character 27 + 28	Rack Id character 29 + 30	Rack Id character 31 + 32	Rack Id character 33 + 34	Rack Id character 35 + 36	Rack Id character 37 + 38
55940	Rack Id character 39 + 40									

Head Unit Interval and Demand Registers
This section combines interval readings (min/max instantaneous) and demand. Interval registers provide the maximum and minimum instantaneous values seen over the last interval (length defined by Block Interval Duration). The arithmetic mean of the value over the last interval is also provided. This value is the demand.

Note: Minimums and maximums in this section are minimum and maximum instantaneous values over the last interval, not minimum and maximum demand.

To set the interval duration, write the time in minutes to register 55994. Register 55996 reports the duration of the last interval (the one the present min/max/demand values are from). The timestamp of the end of the last interval in Unix time is available in register 55998-55999.

Rolling block demand can be configured by setting the number of sub-intervals (register 55995) to greater than 1. After each subinterval length of time (interval divided by number of subintervals), demand will be calculated over the last interval time period. For example, with a 15-minute interval length and 3 subintervals (i.e. 5 minute subintervals), after every 5 minutes (subinterval length) demand will be calculated over the last 15 minutes (full interval length).

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
55990					Block Interval Duration (minutes)	Number of Sub-Intervals	Duration of Last Interval (minutes)	Number of Subintervals defined during last interval period	Last Interval End Timestamp Low	Last Interval End Timestamp High
56000 56100	3PHM Phase 1 Power Demand (low word) (signed)	3PHM Phase 1 Power Demand (hi word) (signed)	3PHM Phase 1 Min Power (low word) (signed)	3PHM Phase 1 Min Power (hi word) (signed)	3PHM Phase 1 Max Power (low word) (signed)	3PHM Phase 1 Max Power (hi word) (signed)	3PHM Phase 1 Apparent Power Demand (low word) (signed)	3PHM Phase 1 Apparent Power Demand (hi word) (signed)	3PHM Phase 1 Min Apparent Power (low word) (signed)	3PHM Phase 1 Min Apparent Power (hi word) (signed)
56010 56110	3PHM Phase 1 Max Apparent Power (low word) (signed)	3PHM Phase 1 Max Apparent Power (hi word) (signed)	3PHM Phase 1 Reactive Power Demand (low word) (signed)	3PHM Phase 1 Reactive Power Demand (hi word) (signed)	3PHM Phase 1 Min Reactive Power (low word) (signed)	3PHM Phase 1 Min Reactive Power (hi word) (signed)	3PHM Phase 1 Max Reactive Power (low word) (signed)	3PHM Phase 1 Max Reactive Power (hi word) (signed)	3PHM Phase 1 Avg Current (low word)	3PHM Phase 1 Avg Current (hi word)
56020 56120	3PHM Phase 1 Min Current (low word)	3PHM Phase 1 Min Current (hi word)	3PHM Phase 1 Max Current (low word)	3PHM Phase 1 Max Current (hi word)	3PHM Phase 2 Power Demand (low word) (signed)	3PHM Phase 2 Power Demand (hi word) (signed)	3PHM Phase 2 Min Power (low word) (signed)	3PHM Phase 2 Min Power (hi word) (signed)	3PHM Phase 2 Max Power (low word) (signed)	3PHM Phase 2 Max Power (hi word) (signed)
56030 56130	3PHM Phase 2 Apparent Power Demand (low word) (signed)	3PHM Phase 2 Apparent Power Demand (hi word) (signed)	3PHM Phase 2 Min Apparent Power (low word) (signed)	3PHM Phase 2 Min Apparent Power (hi word) (signed)	3PHM Phase 2 Max Apparent Power (low word) (signed)	3PHM Phase 2 Max Apparent Power (hi word) (signed)	3PHM Phase 2 Reactive Power Demand (low word) (signed)	3PHM Phase 2 Reactive Power Demand (hi word) (signed)	3PHM Phase 2 Min Reactive Power (low word) (signed)	3PHM Phase 2 Min Reactive Power (hi word) (signed)
56040 56140	3PHM Phase 2 Max Reactive Power (low word) (signed)	3PHM Phase 2 Max Reactive Power (hi word) (signed)	3PHM Phase 2 Avg Current (low word)	3PHM Phase 2 Avg Current (hi word)	3PHM Phase 2 Min Current (low word)	3PHM Phase 2 Min Current (hi word)	3PHM Phase 2 Max Current (low word)	3PHM Phase 2 Max Current (hi word)	3PHM Phase 3 Power Demand (low word) (signed)	3PHM Phase 3 Power Demand (hi word) (signed)
56050 56150	3PHM Phase 3 Min Power (low word) (signed)	3PHM Phase 3 Min Power (hi word) (signed)	3PHM Phase 3 Max Power (low word) (signed)	3PHM Phase 3 Max Power (hi word) (signed)	3PHM Phase 3 Apparent Power Demand (low word) (signed)	3PHM Phase 3 Apparent Power Demand (hi word) (signed)	3PHM Phase 3 Min Apparent Power (low word) (signed)	3PHM Phase 3 Min Apparent Power (hi word) (signed)	3PHM Phase 3 Max Apparent Power (low word) (signed)	3PHM Phase 3 Max Apparent Power (hi word) (signed)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
56060 56160	3PHM Phase 3 Reactive Power Demand (low word) (signed)	3PHM Phase 3 Reactive Power Demand (hi word) (signed)	3PHM Phase 3 Min Reactive Power (low word) (signed)	3PHM Phase 3 Min Reactive Power (hi word) (signed)	3PHM Phase 3 Max Reactive Power (low word) (signed)	3PHM Phase 3 Max Reactive Power (hi word) (signed)	3PHM Phase 3 Avg Current (low word)	3PHM Phase 3 Avg Current (hi word)	3PHM Phase 3 Min Current (low word)	3PHM Phase 3 Min Current (hi word)
56070 56170	3PHM Phase 3 Max Current (low word)	3PHM Phase 3 Max Current (hi word)	3PHM Total Power Demand (low word) (signed)	3PHM Total Power Demand (hi word) (signed)	3PHM Total Min Power (low word) (signed)	3PHM Total Min Power (hi word) (signed)	3PHM Total Max Power (low word) (signed)	3PHM Total Max Power (hi word) (signed)	3PHM Total Apparent Power Demand (low word) (signed)	3PHM Total Apparent Power Demand (hi word) (signed)
56080 56180	3PHM Total Min Apparent Power (low word) (signed)	3PHM Total Min Apparent Power (hi word) (signed)	3PHM Total Max Apparent Power (low word) (signed)	3PHM Total Max Apparent Power (hi word) (signed)	3PHM Total Reactive Power Demand (low word) (signed)	3PHM Total Reactive Power Demand (hi word) (signed)	3PHM Total Min Reactive Power (low word) (signed)	3PHM Total Min Reactive Power (hi word) (signed)	3PHM Total Max Reactive Power (low word) (signed)	3PHM Total Max Reactive Power (hi word) (signed)
56090 56190	3PHM Total Avg Current (low word)	3PHM Total Avg Current (hi word)	3PHM Total Min Current (low word)	3PHM Total Min Current (hi word)	3PHM Total Max Current (low word)	3PHM Total Max Current (hi word)				

Head Unit Peak Demand Registers

This section contains the peak real power demand on the head unit mains (PQM) as both a daily peak and a historical peak. Daily peak demand contains the highest real power demand of any interval during the previous day (updated at midnight local time). Historic peak demand contains the maximum real power demand of any interval since the historic peak was last reset.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
56200 56240	3PHM Phase 1 Power Daily Peak (low word) (signed)	3PHM Phase 1 Power Daily Peak (hi word) (signed)	3PHM Phase 1 Daily Peak Time Stamp (low word)	3PHM Phase 1 Daily Peak Time Stamp (hi word)	3PHM Phase 1 Power Historical Peak (low word) (signed)	3PHM Phase 1 Power Historical Peak (hi word) (signed)	3PHM Phase 1 Historical Peak Time Stamp (low word)	3PHM Phase 1 Historical Peak Time Stamp (hi word)	3PHM Phase 2 Power Daily Peak (low word) (signed)	3PHM Phase 2 Power Daily Peak (hi word) (signed)
56210 56250	3PHM Phase 2 Daily Peak Time Stamp (low word)	3PHM Phase 2 Daily Peak Time Stamp (hi word)	3PHM Phase 2 Power Historical Peak (low word) (signed)	3PHM Phase 2 Power Historical Peak (hi word) (signed)	3PHM Phase 2 Historical Peak Time Stamp (low word)	3PHM Phase 2 Historical Peak Time Stamp (hi word)	3PHM Phase 3 Power Daily Peak (low word) (signed)	3PHM Phase 3 Power Daily Peak (hi word) (signed)	3PHM Phase 3 Daily Peak Time Stamp (low word)	3PHM Phase 3 Daily Peak Time Stamp (hi word)
56220 56260	3PHM Phase 3 Power Historical Peak (low word) (signed)	3PHM Phase 3 Power Historical Peak (hi word) (signed)	3PHM Phase 3 Historical Peak Time Stamp (low word)	3PHM Phase 3 Historical Peak Time Stamp (hi word)	3PHM Total Power Daily Peak (low word) (signed)	3PHM Total Power Daily Peak (hi word) (signed)	3PHM Total Daily Peak Time Stamp (low word)	3PHM Total Daily Peak Time Stamp (hi word)	3PHM Total Power Historical Peak (low word) (signed)	3PHM Total Power Historical Peak (hi word) (signed)
56230 56270	3PHM Total Historical Peak Time Stamp (low word)	3PHM Total Historical Peak Time Stamp (hi word)								

Branch Circuit Demand Registers

This section contains the real power demand on the branch channels over the last demand interval, as well as the daily peak and historic peak.

Each block of 10 registers corresponds to a channel and contains data for the circuit the channel is assigned to. In ANSI mode, if channels 1, 3 and 5 are part of circuit 1, registers 56280 (channel 1), 56300 (channel 3), and 56320 (channel 5) will all contain the same power demand low word for circuit 1. The most efficient way to read circuit data is to only read the values for the first channel in each circuit. For example, if channels 1,3,5 are part of circuit 1 and 7,9,11 are part of circuit 2, reading values at 56280 (channel 1) will give circuit 1 data, and reading values at 56340 (channel 7) will give circuit 2 data.

Daily peak demand contains the highest real power demand of any interval during the previous day (updated at midnight local time). Historic peak demand contains the maximum real power demand of any interval since the historic peak was last reset.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
56280	Circuit 1 Power Demand (low word) (signed)	Circuit 1 Power Demand (hi word) (signed)	Circuit 1 Power Daily Peak (low word) (signed)	Circuit 1 Power Daily Peak (hi word) (signed)	Circuit 1 Daily Peak Time Stamp (low word)	Circuit 1 Daily Peak Time Stamp (hi word)	Circuit 1 Power Historical Peak (low word) (signed)	Circuit 1 Power Historical Peak (hi word) (signed)	Circuit 1 Peak Historical Time Stamp (low word)	Circuit 1 Peak Historical Time Stamp (hi word)
…	…	…	…	…	…	…	…	…	…	…
58190	Circuit 192 Power Demand (low word) (signed)	Circuit 192 Power Demand (hi word) (signed)	Circuit 192 Power Daily Peak (low word) (signed)	Circuit 192 Power Daily Peak (hi word) (signed)	Circuit 192 Daily Peak Time Stamp (low word)	Circuit 192 Daily Peak Time Stamp (hi word)	Circuit 192 Power Historical Peak (low word) (signed)	Circuit 192 Power Historical Peak (hi word) (signed)	Circuit 192 Peak Historical Time Stamp (low word)	Circuit 192 Peak Historical Time Stamp (hi word)

WRITE Registers

Write registers are programmed via Modbus function codes 06 (Write Single Register) or 16 (Write Multiple Registers).

General Circuit Setup Registers

See equivalent read register descriptions.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
0			CPU serial number					Reset processor	Supply type	KWH scale
'1234'	Supply type	Energy Scale		Cct 1 CT Type			Cct 1 CT Factor			Cct 1 Exp Phase
10		Ch 1 circuit		Ch 1 CT Type			Ch 1 CT Factor			Ch 1 Exp Phase
20		Ch 2 circuit		Ch 2 CT Type			Ch 2 CT Factor			Ch 2 Exp Phase
30		…	…	…	…	…	…	…	…	…
…	…	…	…	…	…					
880		Ch 88 circuit		Ch 88 CT Type			Ch 88 CT Factor			Ch 88 Exp Phase
…	…	…	…	…	…					
1200		Ch 120 circuit		Ch 120 CT Type			Ch 120 CT Factor			Ch 120 Exp Phase

Special Function Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4440								Manual IPv6 addr 1	Manual IPv6 addr 2	Manual IPv6 addr 3
4450	Manual IPv6 addr 4	Manual IPv6 addr 5	Manual IPv6 addr 6	Manual IPv6 addr 7	Manual IPv6 addr 8		Default Router Addr 1	Default Router Addr 2	Default Router Addr 3	Default Router Addr 4
4460	Default Router Addr 5	Default Router Addr 6	Default Router Addr 7	Default Router Addr 8	NTP server IPv6 addr 1	NTP server IPv6 addr 2	NTP server IPv6 addr 3	NTP server IPv6 addr 4	NTP server IPv6 addr 5	NTP server IPv6 addr 6
4470	NTP server IPv6 addr 7	NTP server IPv6 addr 8	NTP enable	NTP interval	NTP server IPv4 addr 1	NTP server IPv4 addr 2	NTP server IPv4 addr 3	NTP server IPv4 addr 4	Time zone	Daylight saving
4480					IP addr 1	IP addr 2	IP addr 3	IP addr 4	Subnet mask 1	Subnet mask 2
4490	Subnet mask 3	Subnet mask 4	Gateway 1	Gateway 2	Gateway 3	Gateway 4	DHCP			
4500		High power mode (0= default, 1 = ON)					Set RS485 port speed 1 = 9600* 2 = 19200 3 = 38400 4 = 57600 5= 115200 (next boot)			Restart Board '1234'
…	…	…	…	…	…	…	…	…	…	…
4570					3 Phase meter current wave cap I mode 0 – over current 1 – tripped breaker	3 phase meter current wave cap timer (ms)	3 phase meter current wave cap threshold (Amps)	TAP current wave cap I mode 0 – over current 1 – tripped breaker	TAP current wave cap timer (ms)	TAP current wave cap threshold (Amps)
4580	RTC1	RTC2	RTC3	RTC4		Enviro sensor order Unlocked = 0 Locked = 1				

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4590	1234 - Force wave capture 2345 – TAP NCM check	Wave cap nr channels All = 0 Trigger channel only = 1	Wave cap V sag	Wave cap V over		Reset Busway power	Phase Summary Source Circuits = 0 3-Phase Meter = 1 Split Circuits = 2	Modbus address	Channel order ANSI = 0 IEC = 1	
4580	RTC1	RTC2	RTC3	RTC4		Enviro sensor order Unlocked = 0 Locked = 1		Harmonic Calculations Nominal Voltage		
4590	1234 Force wave capture 2345 – TAP NCM check	Wave cap nr channels All = 0 Trigger channel only = 1	Wave cap V sag	Wave cap V over		Reset Busway power	Phase summary source Ccts = 0 3ph TAP = 1 split ccts = 2	Modbus address	Cct order ANSI = 0 IEC = 1	

4501 High Power Mode
This divides channel current readings by 10 and power readings by 100. Note: The accumulated energy reading (kWh) is NOT affected by this setting. To change energy scaling, adjust the Energy Scale factor at address 9.

4506 Set RS485 Port Speed
Allows the serial port speed to be adjusted from next reboot. Enter the index using the following:

1. 9600 baud (*factory default)
2. 19200 baud
3. 38400 baud
4. 57600 baud
5. 115200 baud

4509 Restart Processor Board
Writing a value of ‘1234’ to this register will restart the processor card, allowing any pending serial port speed changes to take effect.

4580 – 4583 RTC
The RTC is available in TI081 format.

RTC1	bits 0-6	year (0-127) from 2000
RTC2	bits 8-11 bits 0-4	month (1-12) day (1-31)
RTC3	bits 8-12 bits 0-5	hour (0-23) minutes (0-59)
RTC4		milliseconds (0-59999)

When setting the RTC, all four registers must be written in a single multi-register operation.

Module Detail Registers
These registers provide information about the capabilities and configuration of a selected module attached to the HDPM6000 bus. Before writing configuration registers, first select the module by writing to register 4608.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4600									Board selection address	Restart Board '4321'
4680			Serial Number of selected board	Config 0 – top/bottom feed 1 – Waveform disabled						

4608 Select a target device on the HDPM6000 bus

Writing a value of '0x0tnn' in hex to this register selects the target module on the HDPM6000 bus, where t is the device type (0 = branch metering module, 1 = 3phm, 2 = I/O module, 3 = Digital Input module) and nn is the device number (1-48 for branch metering modules, 1 for 3phm, 1-8 for I/O modules, 1-10 for digital input modules).

4609 Restart Processor Board
Writing a value of '4321' to this register will restart the board selected by 4608, allowing any pending serial port speed changes to take effect.

Branch Channel Current Harmonic Magnitudes

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6400	Selected harmonics channel									

Miscellaneous Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6800		SMS device ID	Unit ID low	Unit ID hi						

Logging Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6850	Log nr to configure	Action		Mode	Max entries	Interval Low	Interval Hi	Offset Low	Offset Hi	Register list length
6860	Register 1	Register 2	Register 3	Register 4	Register 5	Register 6	Register 7	Register 8	Register 9	Register 10
…	…	…	...	...	…	…	…	…	…	…
6980	Register 121									

6851 Action
Writing 1 here copies the configuration of the log selected in 6850 to the rest of the logging configuration block (6853-6980).

Writing 1234 sets the configuration of the log selected in 6850.

Writing 4321 sets the configuration of the log selected in 6850 and clears the existing contents of the log regardless of the changes made to the log config.

6853 Mode
Bit 0 – Log is enabled when set

Bit 1 – Full log behavior, rollover when clear, stop when set.

Event Log

To configure the event log, set 6850 to 0 and use 6851 (Action) as for the other logs. When configuring the event log, registers 6855 - 6980 are not used.

I/O Module (Dry Contact) Registers (16 Sensors)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
7930	CT Type 1	CT Type 2	CT Type 3	CT Type 4	CT Type 5	CT Type 6	CT Type 7	CT Type 8		
7940	CT Factor 1	CT Factor 2	CT Factor 3	CT Factor 4	CT Factor 5	CT Factor 6	CT Factor 7	CT Factor 8		

Branch Channel Accumulated Real Energy Registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
8000	Reset all channels	Reset all channels	Ch 1 reset	Ch 1 reset	Ch 2 reset	Ch 2 reset	Ch 3 reset	Ch 3 reset	Ch 4 reset	Ch 4 reset
8010	Ch 5 reset	Ch 5 reset	Ch 6 reset	Ch 6 reset	Ch 7 reset	Ch 7 reset	Ch 8 reset	Ch 8 reset	Ch 9 reset	Ch 9 reset
…	…	…	…	…	…	…	…	…	…	…
8380	Ch 190 reset	Ch 190 reset	Ch 191 reset	Ch 191 reset	Ch 192 reset	Ch 192 reset				

Writing to either Hi or Low parts of the accumulated power registers resets the entire register. All registers may be reset in one operation by writing to 8000 or 8001.

Load Types Registers

Load Types (also called virtual meters) provide aggregated real power for channels/circuits assigned to the type. Load types are defined by their Load Type Index (1-20). Registers 8740-8749 define alphanumeric names (up to 18 characters) to load types using indirect addressing by index. To set the name for load type 1, enter ‘1’ into the load type index (8740), and that load type’s name will populate into 8741 through 8749. The odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. Any unused characters at the end of the string should be set to a space character. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than 20, the maximum number of Load Types).

Channels can be assigned to a load type by entering the desired load type index into registers 8750-8940 (e.g. to add channel 1 to load type 5, enter 5 into register 8750).

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
8740 (see note)	Load Type Index	Load Type Name character 1 + 2	Load Type Name character 3 + 4	Load Type Name character 5 + 6	Load Type Name character 7 + 8	Load Type Name character 9 + 10	Load Type Name character 11 + 12	Load Type Name character 13 + 14	Load Type Name character 15 + 16	Load Type Name character 17 + 18
8750	Ch 1 load type	Ch 2 load type	Ch 3 load type	Ch 4 load type	Ch 5 load type	Ch 6 load type	Ch 7 load type	Ch 8 load type	Ch 9 load type	Ch 10 load type
8760	Ch 11 load type	Ch 12 load type	Ch 13 load type	Ch 14 load type	Ch 15 load type	Ch 16 load type	Ch 17 load type	Ch 18 load type	Ch 19 load type	Ch 20 load type
…	…	…	…	…	…	…	…	…	…	…
8930	Ch 181 load type	Ch 182 load type	Ch 183 load type	Ch 184 load type	Ch 185 load type	Ch 186 load type	Ch 187 load type	Ch 188 load type	Ch 189 load type	Ch 190 load type
8940	Ch 191 load type	Ch 192 load type								

Note: For Load Type Name registers, the odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. Any unused characters at the end of the string should be set to a space character.

Note: Load Type Index starts from 1. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than the maximum number of Load Types)

Alarm Registers

Address	+ 0	+ 1	+ 2	…	+ 191	…	+ 196	+ 197	+ 198	+ 199
9200 – 9399	Ch 1 breaker size	Ch 2 breaker size	Ch 3 breaker size	…	Ch 192 breaker size	…	Ph 1 breaker size	Ph 2 breaker size	Ph 3 breaker size	Ph N breaker size
9400 – 9599	Ch 1 warning threshold	Ch 2 warning threshold	Ch 3 warning threshold	…	Ch 192 warning threshold	…	Ph 1 warning threshold	Ph 2 warning threshold	Ph 3 warning threshold	Ph N warning threshold
9600 – 9799	Ch 1 alarm threshold	Ch 2 alarm threshold	Ch 3 alarm threshold	…	Ch 192 alarm threshold	…	Ph 1 alarm threshold	Ph 2 alarm threshold	Ph 3 alarm threshold	Ph N alarm threshold
9800 – 9999	Ch 1 warning timedelay	Ch 2 warning timedelay	Ch 3 warning timedelay	…	Ch 192 warning timedelay	…	Ph 1 warning timedelay	Ph 2 warning timedelay	Ph 3 warning timedelay	Ph N warning timedelay
10000 – 10199	Ch 1 alarm timedelay	Ch 2 alarm timedelay	Ch 3 alarm timedelay	…	Ch 192 alarm timedelay	…	Ph 1 alarm timedelay	Ph 2 alarm timedelay	Ph 3 alarm timedelay	Ph N alarm timedelay

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
10200	Global breaker size	Global warning threshold	Global alarm threshold	Global warning timedelay	Global alarm timedelay	Global warning reset	Global alarm reset	Global tripped breaker reset	Vlo threshold phase 1	Vlo threshold phase 2
10210	Vlo threshold phase 3	Vhi threshold phase 1	Vhi threshold phase 2	Vhi threshold phase 3	Voltage timedelay	Tripped breaker current	Tripped breaker timeframe			
10220	Warning 1-16	Warning 17-32	Warning 33-48	Warning 49-64	Warning 65-80	Warning 81-96	Warning 97-112	Warning 113-120		Warning Ph 1-N Bits 13-16
10230	Alarm 1-16	Alarm 17-32	Alarm 33-48	Alarm 49-64	Alarm 65-80	Alarm 81-96	Alarm 97-112	Alarm 113-120		Alarm Ph 1-N Bits 13-16
10240	Tripped breaker 1-16	Tripped breaker 17-32	Tripped breaker 33-48	Tripped breaker 49-64	Tripped breaker 65-80	Tripped breaker 81-96	Tripped breaker 97-112	Tripped breaker 113-120		Tripped breaker Ph 1-N Bits 13-16
10250	Warning 1-16 latched	Warning 17-32 latched	Warning 33-48 latched	Warning 49-64 latched	Warning 65-80 latched	Warning 81-96 latched	Warning 97-112 latched	Warning 113-120 latched		Warning Ph 1-N Bits 13-16 latched
10260	Alarm 1-16 latched	Alarm 17-32 latched	Alarm 33-48 latched	Alarm 49-64 latched	Alarm 65-80 latched	Alarm 81-96 latched	Alarm 97-112 latched	Alarm 113-120 latched		Alarm Ph 1-N Bits 13-16 latched
10270	Tripped breaker 1-16 latched	Tripped breaker 17-32 latched	Tripped breaker 33-48 latched	Tripped breaker 49-64 latched	Tripped breaker 65-80 latched	Tripped breaker 81-96 latched	Tripped breaker 97-112 latched	Tripped breaker 113-120 latched		Tripped breaker Ph 1-N Bits 13-16 latched
10280							Vlo flag	Vhi flag	Vlo flag latched	Vhi flag latched
10290	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 3 phase meter	
10300	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 123N circuit 1	
10310	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 123N circuit 2	
10320	…	…	…	…	…	…	…	…	← 123N circuit 3	
…	…	…	…	…	…	…	…	…	← 123N circuit …	
10770	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	← 123N circuit 48	
10780										
10790										
10800										

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
10810										
10820	Warning 1-16	Warning 17-32	Warning 33-48	Warning 49-64	Warning 65-80	Warning 81-96	Warning 97-112	Warning 113-128	Warning 127-144	Warning 145-160
10830	Warning 161-176	Warning 177-192	Warning Ph 1-N Bits 12-15	Alarm 1-16	Alarm 17-32	Alarm 33-48	Alarm 49-64	Alarm 65-80	Alarm 81-96	Alarm 97-112
10840	Alarm 113-128	Alarm 127-144	Alarm 145-160	Alarm 161-176	Alarm 177-192	Alarm Ph 1-N Bits 12-15	Tripped breaker 1-16	Tripped breaker 17-32	Tripped breaker 33-48	Tripped breaker 49-64
10850	Tripped breaker 65-80	Tripped breaker 81-96	Tripped breaker 97-112	Tripped breaker 113-128	Tripped breaker 127-144	Tripped breaker 145-160	Tripped breaker 161-176	Tripped breaker 177-192	Tripped breaker Ph 1-N Bits 12-15	Warning 1-16 latched
18060	Warning 17-32 latched	Warning 33-48 latched	Warning 49-64 latched	Warning 65-80 latched	Warning 81-96 latched	Warning 97-112 latched	Warning 113-128 latched	Warning 127-144 latched	Warning 145-160 latched	Warning 161-176 latched
10870	Warning 177-192 latched	Warning Ph 1-N Bits 12-15 latched	Alarm 1-16 latched	Alarm 17-32 latched	Alarm 33-48 latched	Alarm 49-64 latched	Alarm 65-80 latched	Alarm 81-96 latched	Alarm 97-112 latched	Alarm 113-128 latched
10880	Alarm 127-144 latched	Alarm 145-160 latched	Alarm 161-176 latched	Alarm 177-192 latched	Alarm Ph 1-N Bits 12-15 latched	Tripped breaker 1-16 latched	Tripped breaker 17-32 latched	Tripped breaker 33-48 latched	Tripped breaker 49-64 latched	Tripped breaker 65-80 latched
10890	Tripped breaker 81-96 latched	Tripped breaker 97-112 latched	Tripped breaker 113-128 latched	Tripped breaker 127-144 latched	Tripped breaker 145-160 latched	Tripped breaker 161-176 latched	Tripped breaker 177-192 latched	Tripped breaker Ph 1-N Bits 12-15 latched		

Alarm Digital Outputs

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
20000	Ph 1 Under V alarm	Ph 1 Over V alarm	Ph 1 Under V latching alarm	Ph 1 Over V latching alarm	Ph 2 Under V alarm	Ph 2 Over V alarm	Ph 2 Under V latching alarm	Ph 2 Over V latching alarm	Ph 3 Under V alarm	Ph 3 Over V alarm
20010	Ph 3 Under V latching alarm	Ph 3 Over V latching alarm	3phm total power warning	3phm total power alarm	3phm total power warning latching	3phm total power alarm latching	Ch 1 current warning	Ch 1 current alarm	Ch 1 tripped breaker	Ch 1 current warning latching
20020	Ch 1 current alarm latching	Ch 1 tripped breaker latching	Ch 2 current warning	Ch 2 current alarm	Ch 2 tripped breaker	Ch 2 current warning latching	Ch 2 current alarm latching	Ch 2 tripped breaker latching	Ch 3 current warning	Ch 3 current alarm
…	…	…	…	…	…	…	…	…	…	…
21160	Ch 191 current alarm latching	Ch 191 tripped breaker latching	Ch 192 current warning	Ch 192 current alarm	Ch 192 tripped breaker	Ch 192 current warning latching	Ch 192 current alarm latching	Ch 192 tripped breaker latching	Ph 1 current warning	Ph 1 current alarm
21170	Ph 1 tripped breaker	Ph 1 current warning latching	Ph 1 current alarm latching	Ph 1 tripped breaker latching	Ph 2 current warning	Ph 2 current alarm	Ph 2 tripped breaker	Ph 2 current warning latching	Ph 2 current alarm latching	Ph 2 tripped breaker latching
21180	Ph 3 current warning	Ph 3 current alarm	Ph 3 tripped breaker	Ph 3 current warning latching	Ph 3 current alarm latching	Ph 3 tripped breaker latching	Ph N current warning	Ph N current alarm	Ph N tripped breaker	Ph N current warning latching
21190	Ph N current alarm latching	Ph N tripped breaker latching								
…	…	…	…	…	…	…	…	…	…	…

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
21240	123N circuit 1 Under V alarm	123N circuit 1 Over V alarm	123N circuit 1 Under V latching alarm	123N circuit 1 Over V latching alarm	123N circuit 1 neutral current mismatch	123N circuit 1 neutral current mismatch latching	123N circuit 2 Under V alarm	123N circuit 2 Over V alarm	123N circuit 2 Under V latching alarm	123N circuit 2 Over V latching alarm
21250	123N circuit 2 neutral current mismatch	123N circuit 2 neutral current mismatch latching	123N circuit 3 Under V alarm	123N circuit 3 Over V alarm	123N circuit 3 Under V latching alarm	123N circuit 3 Over V latching alarm	123N circuit 3 neutral current mismatch	123N circuit 3 neutral current mismatch latching	123N circuit 4 Under V alarm	123N circuit 4 Over V alarm
…	…	…	…	…	…	…	…	…	…	…
21520	123N circuit 47 neutral current mismatch	123N circuit 47 neutral current mismatch latching	123N circuit 48 Under V alarm	123N circuit 48 Over V alarm	123N circuit 48 Under V latching alarm	123N circuit 48 Over V latching alarm	123N circuit 48 neutral current mismatch	123N circuit 48 neutral current mismatch latching	Ph 1 Under V alarm	Ph 1 Over V alarm
21530	Ph 1 Under V latching alarm	Ph 1 Over V latching alarm	Ph 1 neutral current mismatch	Ph 1 neutral current mismatch latching						

CT Types

For CT Type Name registers, the odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. Any unused characters at the end of the string should be set to the space character.

CT Type Index starts from 1. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than the maximum number of CT Types).

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
55400 (see note)	CT Type Index	CT Type Name character 1 + 2	CT Type Name character 3 + 4	CT Type Name character 5 + 6	CT Type Name character 7 + 8	CT Type Name character 9 + 10	CT Type Name character 11 + 12	CT Type Name character 13 + 14	CT Type Name character 15 + 16	CT Type Name character 17 + 18
55410	CT Type Name character 19 + 20	CT Type Name character 21 + 22	CT Type Name character 23 + 24	CT Type Name character 25 + 26	CT Type Name character 27 + 28	CT Type Name character 29 + 30	CT Type Name character 31 + 32	CT Type Name character 33 + 34	CT Type Name character 35 + 36	CT Type Name character 37 + 38
55420	CT Type 1 Hardware Version 1 Factor	CT Type 1 Hardware Version 2 Factor	CT Type 1 Hardware Version 1 PHCAL	CT Type 1 Hardware Version 2 PHCAL	CT Type 2 Hardware Version 1 Factor	CT Type 2 Hardware Version 2 Factor	CT Type 2 Hardware Version 1 PHCAL	CT Type 2 Hardware Version 2 PHCAL	CT Type 3 Hardware Version 1 Factor	CT Type 3 Hardware Version 2 Factor
55430	CT Type 3 Hardware Version 1 PHCAL	CT Type 3 Hardware Version 2 PHCAL	CT Type 4 Hardware Version 1 Factor	CT Type 4 Hardware Version 2 Factor	CT Type 4 Hardware Version 1 PHCAL	CT Type 4 Hardware Version 2 PHCAL	CT Type 5 Hardware Version 1 Factor	CT Type 5 Hardware Version 2 Factor	CT Type 5 Hardware Version 1 PHCAL	CT Type 5 Hardware Version 2 PHCAL
…	…	…	…	…	…	…	…	…	…	…
55890	CT Type 118 Hardware Version 1 PHCAL	CT Type 118 Hardware Version 2 PHCAL	CT Type 119 Hardware Version 1 Factor	CT Type 119 Hardware Version 2 Factor	CT Type 119 Hardware Version 1 PHCAL	CT Type 119 Hardware Version 2 PHCAL	CT Type 120 Hardware Version 1 Factor	CT Type 120 Hardware Version 2 Factor	CT Type 120 Hardware Version 1 PHCAL	CT Type 120 Hardware Version 2 PHCAL

Circuit Names and Rack Identifiers

Circuits can be assigned alphanumeric names up to 40 character long. A Rack identifier up to 40 characters long can also be assigned to each circuit. These names are written or read using indirect addressing. To set values for circuit 4, enter ‘4’ into the Circuit Name & Rack Id Index (55900). That circuit’s name will populate into registers 55901 through 55920, and that circuit’s Rack Id will populate into registers 55921 through 55940. An Illegal Data Value exception is returned for an index out of range (e.g. 0 or greater than the maximum number of Circuits).

Note: For Circuit Name and Rack Id registers, the odd numbered characters are bits 0-7 and the even numbered characters are bits 8-15. Any unused characters at the end of the string should be set to the space character.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
55900 (see note)	Circuit Name & Rack Id Index	Circuit Name character 1 + 2	Circuit Name character 3 + 4	Circuit Name character 5 + 6	Circuit Name character 7 + 8	Circuit Name character 9 + 10	Circuit Name character 11 + 12	Circuit Name character 13 + 14	Circuit Name character 15 + 16	Circuit Name character 17 + 18
55910	Circuit Name character 19 + 20	Circuit Name character 21 + 22	Circuit Name character 23 + 24	Circuit Name character 25 + 26	Circuit Name character 27 + 28	Circuit Name character 29 + 30	Circuit Name character 31 + 32	Circuit Name character 33 + 34	Circuit Name character 35 + 36	Circuit Name character 37 + 38
55920	Circuit Name character 39 + 40	Rack Id character 1 + 2	Rack Id character 3 + 4	Rack Id character 5 + 6	Rack Id character 7 + 8	Rack Id character 9 + 10	Rack Id character 11 + 12	Rack Id character 13 + 14	Rack Id character 15 + 16	Rack Id character 17 + 18
55930	Rack Id character 19 + 20	Rack Id character 21 + 22	Rack Id character 23 + 24	Rack Id character 25 + 26	Rack Id character 27 + 28	Rack Id character 29 + 30	Rack Id character 31 + 32	Rack Id character 33 + 34	Rack Id character 35 + 36	Rack Id character 37 + 38
55940	Rack Id character 39 + 40									

Head Unit Interval and Demand Registers

To set the interval duration, write the interval time in minutes to register 55994.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
55990					Interval Duration (minutes)	Number of Sub-intervals				

Head Unit Peak Demand Registers

Writing ‘0’ to any reset register resets the historical peak, any other value is ignored.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
56200 56240					Reset 3PHM Phase 1 Power Historical Peak	Reset 3PHM Phase 1 Power Historical Peak				
56210 56250			Reset 3PHM Phase 2 Power Historical Peak	Reset 3PHM Phase 2 Power Historical Peak						
56220 56260	Reset 3PHM Phase 3 Power Historical Peak	Reset 3PHM Phase 3 Power Historical Peak							Reset 3PHM Total Power Historical Peak	Reset 3PHM Total Power Historical Peak
56230 56270										

Branch Circuit Demand Registers

Writing ‘0’ to any reset register resets the historical peak, any other value is ignored.

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
56280							Reset Circuit 1 Power Historical Peak	Reset Circuit 1 Power Historical Peak		
…	…	…	…	…	…	…	…	…	…	…
58190							Reset Circuit 192 Power Historical Peak	Reset Circuit 192 Power Historical Peak		

58200	3PHM Phase 1 Min VLN	3PHM Phase 1 Max VLN	3PHM Phase 1 Power VLN	3PHM Phase 1 Min VLL	3PHM Phase 1 Max VLL	3PHM Phase 1 Power VLL	3PHM Phase 2 Min VLN	3PHM Phase 2 Max VLN	3PHM Phase 2 Power VLN	3PHM Phase 2 Min VLL
58210	3PHM Phase 2 Max VLL	3PHM Phase 2 Power VLL	3PHM Phase 3 Min VLN	3PHM Phase 3 Max VLN	3PHM Phase 3 Power VLN	3PHM Phase 3 Min VLL	3PHM Phase 3 Max VLL	3PHM Phase 3 Power VLL		

Modbus ReadFile

The Modbus ReadFile operation is used to download the circuit logs and waveform data.

If it is not possible to retrieve a waveform a Modbus exception is returned.

Circuit Logs
Each log forms a single file, the event log is file 0, the rest 1-20. Each log entry is accessed via a single file record. Use the log's 'Most recently updated record' (7000, 7010, 7020…) register to identify the start/end of the log and the 'Valid records in log' register (7001, 7011, 7021…) for the number of entries in the log.

The first four registers of a record are the timestamp in TI081 format. The remaining registers, up to 121, are as defined in the log configuration (6860-6980 when log is selected in register 6850).

Only one record may be read in a single ReadFile operation.

Captured Waveform Data
Captured waveform data download uses ReadFile files in the range 0x8000-0xffff (32768-65535). The file number of the most recent capture is available in register 4573. The most recent capture number is increment ed by 1 each time a capture is made, so subtract 1 to access the previous capture. If a previous capture number would be less than 0x8000 (32768) then wrap around back up to 0xffff (65535). Over 1000 waveform captures can be stored.

If the most recent capture number is 0 then no waveforms are available.

The first record (number 0) of a waveform capture file contains the metadata

Register	Contents
0-3	Timestamp (TI081 format)
4	Cause: 0 Unknown cause 1 Over current 2 Over voltage 3 Tripped breaker 4 Voltage sag 5 Manual 6 V zero cross timeout
5-16	Bitmap of circuit currents present in capture
17	Bitmap of phase currents present in capture
18	Bitmap of phase voltages present in capture
19	Time zone/DST offset in minutes
20	Channel/phase that triggered capture
21	Trigger threshold (if applicable and available)
22	Samples
23	Trigger point
24	V scale

Subsequent records contain the legacy, 1024 sample, waveform data. Data read from these records return 1024 samples, trigger point at sample 512, 18 records per waveform regardless of those values reported in the capture metadata.

Register	Contents
0	Channel/phase number - bit 15 set indicates phase voltages; bit 14 set indicates phase currents
1	Offset into waveform data of this record
2	Registers remaining after this record
3-118	Waveform data - Signed 32-bit values, big endian

Event Log Format

The event log can contain entries giving details of various circuit and system events. Each type of entry has its own format.

If it is not possible to retrieve a log a Modbus exception is returned.

Register	Contents
0-3	Time (TI081 format)
4	Entry type 0 Circuit alarm 1 Log configuration update 2 Log error 3 Waveform error 4 System start 5 Lost TAP 6 Waveform capture 7 Demand 8 Waveform power quality event end
	Other values are reserved for future expansion
5-120	Optional event data

Channel Alarm

Entry made when a change in one of the non-latching alarm state registers is detected.

Register	Contents
5	Modbus register number
6	New register value
7	Changed bits
8-120	Reserved for future expansion

Log Configuration Update

Entry made when a log configuration is updated.

Register	Contents
5-120	Raw log configuration data

Log Error

Entry made when an error is detected while downloading a log.

Register	Contents
5	Log number
6	SD card status (register 4590)
7-120	Reserved for future expansion

Waveform Error

Entry made when an error is detected while downloading a captured waveform.

Register	Contents
5	Waveform number
6	SD card status (register 4590)
7-120	Reserved for future expansion

System Start
Entry made shortly after system start up. This event entry does not provide additional data.

Register	Contents
5-120	Reserved for future expansion

Lost TAP
Entry made when communications with a TAP are lost.

Register	Contents
5	TAP address
6	TAP variant
7	Number of circuits on TAP
8	Operation when communications with the TAP were lost
7-120	Reserved for future expansion

Waveform Capture
Entry made when a waveform is captured.

Register	Contents
5	Waveform number
6-30	Waveform capture metadata – see first record (number 0) of waveform capture file for details
31-120	Reserved for future expansion

Demand
Entry made when demand configuration changes.

Register	Contents
5	New demand interval value
6	New value of demand subintervals
7-120	Reserved for future expansion

Waveform Power Quality Event End
Entry made when a waveform event ends (i.e. a voltage sag or over-voltage event ends).

Register	Contents
5	Waveform number. From the corresponding Waveform Capture event.
6	Cause of the event that ended (see list in Waveform Data table above)
7-10	Time that the waveform event ended (TI081 format)
11	Trigger threshold at time of event end
12	Phase on which the event ended
13-120	Reserved for future expansion

Section 3. SNMP

The HDPM6000 head unit is capable of communicating over Simple Network Management Protocol (SNMP) version 2. This functionality can be enabled or disabled on the General Settings tab of the HDPM6000 Web Interface. See the HDPM6000 Installation Guide for details.

The HDPM 6000 OID is 1.3.6.1.4.1.3833.1.6000 (iso.org.dod.internet.private.enterprises.schneiderElectric.schneiderEnergy.hdpm)

The MIB file SchneiderElectric_HDPM6000_v0_56_0.mib (or later) may be downloaded from www.se.com. This MIB can be loaded into a MIB browser to explore the full set of product data available. The following table is a small subset of that data.

Taps/Branch Circuits:

Volts:	1.3.6.1.4.1.3833.1.6000.1.3.2.1.22.x	*.1
Amps:	1.3.6.1.4.1.3833.1.6000.1.3.2.1.23.x	*.01
pF:	1.3.6.1.4.1.3833.1.6000.1.3.2.1.24.x	*.001
Watts:	1.3.6.1.4.1.3833.1.6000.1.3.2.1.25.x	
kWh:	1.3.6.1.4.1.3833.1.6000.1.3.2.1.8.x	*.001
Phase:	1.3.6.1.4.1.3833.1.6000.1.3.2.1.6.x	

Example:

Volts for channel #1 = 1.3.6.1.4.1.3833.1.6000.1.3.2.1.22.1
Amps for channel #12 = 1.3.6.1.4.1.3833.1.6000.1.3.2.1.23.12

Head Unit: (* = Designates data from a '2nd' Head Unit Device, not supported at this time)**

seHdpmPhaseVRMS.1	VRMS All Phases	*.1
seHdpmPhaseVRMS.2	VRMS All Phases ***	*.1
seHdpmPhaseIRMS.1	IRMS All Phases	*0.001
seHdpmPhaseIRMS.2	IRMS All Phases ***	*0.001
seHdpmPhasePF.1	PF All Phases	*0.001
seHdpmPhasePF.2	PF All Phases ***	*0.001
seHdpmPhaseWatt.1	kW All Phases	*0.001
seHdpmPhaseWatt.2	kW All Phases ***	*0.001
seHdpmPhaseKwh.1	kVAR All Phases	*0.001
seHdpmPhaseKwh.2	kVAR All Phases ***	*0.001
seHdpmPhaseTHDv.1	VTHD All Phases	*.1
seHdpmPhaseTHDv.2	VTHD All Phases ***	*.1
seHdpmPhaseTHDi.1	ITHD All Phases	*.1
seHdpmPhaseTHDi.2	ITHD All Phases ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.2.1.10.1	kWh All Phases	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.2.1.10.2	kWh All Phases ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.2.1.11.1	kVARh All Phases	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.2.1.11.2	kVARh All Phases ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.2.1.12.1	Freq All Phases	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.2.1.12.2	Freq All Phases ***	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.1	VRMS Phase 1	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.2	VRMS Phase 2	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.3	VRMS Phase 3	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.5	VRMS Phase 1 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.6	VRMS Phase 2 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.7	VRMS Phase 3 ***	*.1

.1.3.6.1.4.1.3833.1.6000.1.4.3.1.2.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.1	IRMS Phase 1	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.2	IRMS Phase 2	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.3	IRMS Phase 3	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.4	IRMS Phase N	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.5	IRMS Phase 1 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.6	IRMS Phase 2 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.7	IRMS Phase 3 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.3.8	IRMS Phase N ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.1	PF Phase 1	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.2	PF Phase 2	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.3	PF Phase 3	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.5	PF Phase 1 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.6	PF Phase 2 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.7	PF Phase 3 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.4.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.1	kW Phase 1	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.2	kW Phase 2	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.3	kW Phase 3	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.5	kW Phase 1 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.6	kW Phase 2 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.7	kW Phase 3 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.5.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.1	kVAR Phase 1	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.2	kVAR Phase 2	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.3	kVAR Phase 3	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.5	kVAR Phase 1 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.6	kVAR Phase 2 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.7	kVAR Phase 3 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.6.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.1	VTHD Phase 1	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.2	VTHD Phase 2	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.3	VTHD Phase 3	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.5	VTHD Phase 1 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.6	VTHD Phase 2 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.7	VTHD Phase 3 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.7.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.1	ITHD Phase 1	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.2	ITHD Phase 2	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.3	ITHD Phase 3	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.5	ITHD Phase 1 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.6	ITHD Phase 2 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.7	ITHD Phase 3 ***	*.1
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.8.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.1	kWh Phase 1	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.2	kWh Phase 2	*0.001

.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.3	kWh Phase 3	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.5	kWh Phase 1 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.6	kWh Phase 2 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.7	kWh Phase 3 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.9.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.1	kVARh Phase 1	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.2	kVARh Phase 2	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.3	kVARh Phase 3	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.5	kVARh Phase 1 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.6	kVARh Phase 2 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.7	kVARh Phase 3 ***	*0.001
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.10.8	N/A ***	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.1	Freq Phase 1	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.2	Freq Phase 2	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.3	Freq Phase 3	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.4	N/A	
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.5	Freq Phase 1 ***	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.6	Freq Phase 2 ***	*.01
.1.3.6.1.4.1.3833.1.6000.1.4.3.1.11.7	Freq Phase 3 ***	

Section 4. BACnet

Date: 2022/02/04
Vendor Name: Schneider Electric
Product Name: PowerLogic HDPM6000
Product Model Number: HDPM6000
Applications Software Version: **Firmware Revision:** 0.60.0
BACnet Protocol Revision: 10

Version	Firmware revision	Change
1	0.53.1	Added Changelog
2	0.53.2	Add Demand feature registers
3	0.53.3	Update with channel and circuit terminology
4	0.54.0	Update Demand
5	0.55.3	Add reactive power and peak to demand Add accumulated kVAh
6	0.55.6	Added circuit rack identifiers
7	0.58.3	Added more harmonic information, DPF, demand VLN & VLL and dry input cards
8	0.60.0	Added extended demand

Electricity power monitor

	BACnet Operator Workstation (B-OWS)
	BACnet Building Controller (B-BC)
	BACnet Advanced Application Controller (B-AAC)
x	BACnet Application Specific Controller (B-ASC)
	BACnet Smart Sensor (B-SS)
	BACnet Smart Actuator (B-SA)

DS-RP-B Read Property DS-WP-B Write Property DS-RPM-B ReadPropertyMultiple DS-WPM-B WritePropertyMultiple DM-DDB-B Dynamic Device Binding DM-DOB-B Dynamic Object Binding DM-DCC-B Device Communication Control DM-UTC-B UTC Time Synchronization

	Send Who-Is, receive I-Am (BIBB DM-DDB-A)
x	Receive Who-Is, send I-Am (BIBB DM-DDB-B)
	Send Who-Has, receive I-Have (BIBB DM-DOB-A)
x	Receive Who-Has, send I-Have (BIBB DM-DOB-B)
	Manual configuration of recipient device's network number and MAC address
	None of the above

Standard Object Types Supported:

Analog Input Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description
Maximum value timestamp - 826 – 828, 1295 – 1414, 3335 – 3478, 4079 – 4150, 12087 – 12662, 13380 – 13382, 13383 – 13385, 13386, 13387, 13580 – 13771 and 13772 – 13963.

4. List of all properties that are writable where not otherwise required by this standard

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

List of non-dynamic object identifiers and their meaning in this device

Object Identifier	Meaning	
Ch *n* Vrms	Where $1 \leq n \leq 120$, instantaneous RMS voltage of the channel	0 – 119
Ch *n* Irms	Where $1 \leq n \leq 120$, instantaneous RMS current of the channel	120 – 239
Ch *n* PFactor	Where $1 \leq n \leq 120$, the power factor of the channel	240 – 359
Ch *n* Watts	Where $1 \leq n \leq 120$, the instantaneous power of the channel	360 – 479
Ch *n* kWh	Where $1 \leq n \leq 120$, total energy measured through the channel	480 – 599
Ch *n* kWh resetting	Where $1 \leq n \leq 120$, no longer available, returns 0	600 – 719
Phase *n* Vrms	Where $1 \leq n \leq 3$, the RMS voltage of the phase	720 – 722
Phase *n* Itot	Where $1 \leq n \leq 3$, the total current of all channels on the phase	723 – 725
Phase *n* PFactor avg	Where $1 \leq n \leq 3$, the average power factor of all channels on the phase	726 – 728
Phase *n* Watts	Where $1 \leq n \leq 3$, the total power of all channels on the phase	729 – 731
Phase *n* kWh	Where $1 \leq n \leq 3$, the total energy measured through all channels on the phase	732 – 734
Dry contact *n* V	Where $1 \leq n \leq 8$, instantaneous DC voltage	735 – 742
Dry contact *n* Irms	Where $1 \leq n \leq 8$, instantaneous RMS current	743 – 750
Phase N Itot	The total current of all neutral channels	751
All Phase average Vrms	Average RMS voltage across all phases	752
All Phase Itot	Total RMS current across all phases	753
All Phase Iavg	Average RMS current across all phases	754
All Phase PFactor avg	The average power factor across all phases	755
All Phase Watts total	The total power across all phases	756
All Phase kWh total	The total energy measured across all phases	757
3phm Phase *n* Vrms	Where $1 \leq n \leq 3$, instantaneous RMS voltage of the phase	758 – 760
3phm Phase *n* Irms	Where $1 \leq n \leq 3$, instantaneous RMS current of the phase	761 – 763
3phm Phase *n* PFactor avg	Where $1 \leq n \leq 3$, the power factor of the phase	764 – 766
3phm Phase *n* Watts	Where $1 \leq n \leq 3$, the instantaneous power of the phase	767 – 769
3phm Phase *n* kWh	Where $1 \leq n \leq 3$, total energy measured through the phase	770 – 772

3phm Phase N Irms	Instantaneous RMS current of the neutral phase	773
3phm All Phase average Vrms	Average RMS voltage across all phases	774
3phm All Phase Itot	Total RMS current across all phases	775
3phm All Phase Iavg	Average RMS current across all phases	776
3phm All Phase PFactor avg	The average power factor across all phases	777
3phm All Phase Watts total	The total power across all phases	778
3phm All Phase kWh total	The total energy measured across all phases	779
3phm 1-2 Vrms	Instantaneous RMS voltage between phases	780
3phm 2-3 Vrms	Instantaneous RMS voltage between phases	781
3phm 3-1 Vrms	Instantaneous RMS voltage between phases	782
3phm L-L avg Vrms	Average instantaneous RMS voltage between phases	783
3phm Phase *n* VAR	Where $1 \leq n \leq 3$, the instantaneous reactive power of the phase	784 – 786
3phm All Phase VAR total	The total reactive power across all phases	787
3phm Phase *n* VA	Where $1 \leq n \leq 3$, the instantaneous apparent power of the phase	788 – 790
3phm All Phase VA total	The total apparent power across all phases	791
3phm Phase *n* VTHD	Where $1 \leq n \leq 3$, total harmonic distortion of the phase voltage	792 – 794
3phm All Phase VTHD total	Total of the phase voltage total harmonic distortions	795
3phm All Phase VTHD avg	Average of the phase voltage total harmonic distortions	796
3phm Phase *n* ITHD	Where $1 \leq n \leq 3$, total harmonic distortion of the phase current	797 – 799
3phm All Phase ITHD total	Total of the phase current total harmonic distortions	800
3phm All Phase ITHD avg	Average of the phase current total harmonic distortions	801
3phm Phase *n* kWh export	Where $1 \leq n \leq 3$, total energy exported through the phase	802 – 804
3phm All Phase kWh export	The total energy exported across all phases	805
3phm Phase *n* kWh import	Where $1 \leq n \leq 3$, total energy imported through the phase	806 – 808
3phm All Phase kWh import	The total energy imported across all phases	809
3phm Phase *n* kVARh total	Where $1 \leq n \leq 3$, total reactive energy measured through the phase	810 – 812
3phm All Phase kVARh total	The total reactive energy measured across all phases	813
3phm Phase *n* kVARh export	Where $1 \leq n \leq 3$, total reactive energy exported through the phase	814 – 816
3phm All Phase kVARh export	The total reactive energy exported across all phases	817
3phm Phase *n* kVARh import	Where $1 \leq n \leq 3$, total reactive energy imported through the phase	818 – 820
3phm All Phase kVARh import	The total reactive energy imported across all phases	821
3phm Phase *n* frequency	Where $1 \leq n \leq 3$, the instantaneous frequency of the phase	822 – 824

3phm All Phase frequency average	Average frequency across all phases	825
3phm Phase *n* Watts max	Where $1 \le n \le 3$, maximum phase power recorded	826 – 828
3phm total power used	Percentage of supply's power capacity in use	829
3phm total power remaining	Power supply's remaining capacity	830
3phm Phase *n* V harmonic *h*	Where $1 \le n \le 3$ and $1 \le h \le 63$ (odds only), odd numbered harmonics 1 to 63 of the phase voltage	831 – 926
3phm Phase *n* I harmonic *h*	Where $1 \le n \le 3$ and $1 \le h \le 63$ (odds only), odd numbered harmonics 1 to 63 of the phase current	927 – 1022
Selected channel I harmonic *h*	Where $1 \le h \le 63$ (odds only), odd numbered harmonics 1 to 63 of the selected channel	1023 – 1054
Ch *n* ITHD	Where $1 \le n \le 120$, total harmonic distortion of the channel current	1055 – 1174
Ch *n* VAR	Where $1 \le n \le 120$, the instantaneous reactive power of the channel	1175 – 1294
Ch *n* Watts max	Where $1 \le n \le 120$, maximum channel power recorded	1295 – 1414
123N circuit *c* Phase *n* Vrms	Where $1 \le c \le 48$ and $1 \le n \le 3$, instantaneous RMS voltage of the circuit phase	1415 – 1558
123N circuit *c* Phase *n* Irms	Where $1 \le c \le 48$ and $1 \le n \le 3$, instantaneous RMS current of the circuit phase	1559 – 1702
123N circuit *c* Phase *n* PFactor avg	Where $1 \le c \le 48$ and $1 \le n \le 3$, the power factor of the circuit phase	1703 – 1846
123N circuit *c* Phase *n* Watts	Where $1 \le c \le 48$ and $1 \le n \le 3$, the instantaneous power of the circuit phase	1847 – 1990
123N circuit *c* Phase *n* kWh	Where $1 \le c \le 48$ and $1 \le n \le 3$, total energy measured through the circuit phase	1991 – 2134
123N circuit *c* Phase N Irms	Where $1 \le c \le 48$, Instantaneous RMS current of the circuit neutral phase	2135 – 2182
123N circuit *c* All Phase average Vrms	Where $1 \le c \le 48$, Average RMS voltage across all circuit phases	2183 – 2230
123N circuit *c* All Phase Itot	Where $1 \le c \le 48$, Total RMS current across all circuit phases	2231 – 2278
123N circuit *c* All Phase Iavg	Where $1 \le c \le 48$, Average RMS current across all circuit phases	2279 – 2326
123N circuit *c* All Phase PFactor avg	Where $1 \le c \le 48$, The average power factor across all circuit phases	2327 – 2374
123N circuit *c* All Phase Watts total	Where $1 \le c \le 48$, The total power across all circuit phases	2375 – 2422
123N circuit *c* All Phase kWh total	Where $1 \le c \le 48$, The total energy measured across all circuit phases	2423 – 2470
123N circuit *c* 1-2 Vrms	Where $1 \le c \le 48$, Instantaneous RMS voltage between circuit phases	2471 – 2518
123N circuit *c* 2-3 Vrms	Where $1 \le c \le 48$, Instantaneous RMS voltage between circuit phases	2519 – 2566
123N circuit *c* 3-1 Vrms	Where $1 \le c \le 48$, Instantaneous RMS voltage between circuit phases	2567 – 2614
123N circuit *c* L-L avg Vrms	Where $1 \le c \le 48$, Average instantaneous RMS voltage between circuit phases	2615 – 2662
123N circuit *c* Phase *n* VAR	Where $1 \le c \le 48$ and $1 \le n \le 3$, the instantaneous reactive power of the circuit phase	2663 – 2806
123N circuit *c* All Phase VAR total	Where $1 \le c \le 48$, The total reactive power across all circuit phases	2807 – 2854
123N circuit *c* Phase *n* VA	Where $1 \le c \le 48$ and $1 \le n \le 3$, the instantaneous apparent power of the circuit phase	2855 – 2998

123N circuit *c* All Phase VA total	Where $1 \le c \le 48$, The total apparent power across all circuit phases	2999 – 3046
123N circuit *c* Phase *n* ITHD	Where $1 \le c \le 48$ and $1 \le n \le 3$, total harmonic distortion of the circuit phase current	3047 – 3190
123N circuit *c* Phase N ITHD	Where $1 \le c \le 48$, total harmonic distortion of the circuit neutral phase current	3191 – 3238
123N circuit *c* All Phase ITHD total	Where $1 \le c \le 48$, Total of the circuit phase current total harmonic distortions	3239 – 3286
123N circuit *c* All Phase ITHD avg	Where $1 \le c \le 48$, Average of the circuit phase current total harmonic distortions	3287 – 3334
123N circuit *c* Phase *n* Watts max	Where $1 \le c \le 48$ and $1 \le n \le 3$, maximum circuit phase power recorded	3335 – 3478
123N circuit *c* total power used	Where $1 \le c \le 48$, percentage of circuit's power capacity in use	3479 – 3526
123N circuit *c* total power remaining	Where $1 \le c \le 48$, circuit's remaining power capacity	3527 - 3574
Ch *n* Vrms	Where $121 \le n \le 192$, instantaneous RMS voltage of the channel	3575 – 3646
Ch *n* Irms	Where $121 \le n \le 192$, instantaneous RMS current of the channel	3647 – 3718
Ch *n* PFactor	Where $121 \le n \le 192$, the power factor of the channel	3719 – 3790
Ch *n* Watts	Where $121 \le n \le 192$, the instantaneous power of the channel	3791 – 3862
Ch *n* kWh	Where $121 \le n \le 192$, total energy measured through the channel	3863 – 3934
Ch *n* ITHD	Where $121 \le n \le 192$, total harmonic distortion of the channel current	3935 – 4006
Ch *n* VAR	Where $121 \le n \le 192$, the instantaneous reactive power of the channel	4007 – 4078
Ch *n* Watts max	Where $121 \le n \le 192$, maximum channel power recorded	4079 – 4150
Environmental sensor *n*, [3phm | TAP] *t*, port *p*, value *v*	Where $1 \le t \le 48$, $1 \le p \le 8$ and $1 \le v \le 10$, environmental sensor reading from device with ID *n*	4151 – 4406
Circuit *c* Phase *n* Vrms	Where $1 \le c \le 192$ and $1 \le n \le 3$, instantaneous RMS voltage of the circuit phase	4407 – 4982
Circuit *c* Phase *n* Irms	Where $1 \le c \le 192$ and $1 \le n \le 3$, instantaneous RMS current of the circuit phase	4983 – 5558
Circuit *c* Phase *n* PFactor avg	Where $1 \le c \le 192$ and $1 \le n \le 3$, the power factor of the circuit phase	5559 – 6134
Circuit *c* Phase *n* Watts	Where $1 \le c \le 192$ and $1 \le n \le 3$, the instantaneous power of the circuit phase	6135 – 6710
Circuit *c* Phase *n* kWh	Where $1 \le c \le 192$ and $1 \le n \le 3$, total energy measured through the circuit phase	6711 – 7286
Circuit *c* Phase N Irms	Where $1 \le c \le 192$, Instantaneous RMS current of the circuit neutral phase	7287 – 7478
Circuit *c* All Phase average Vrms	Where $1 \le c \le 192$, Average RMS voltage across all circuit phases	7479 – 7670
Circuit *c* All Phase Itot	Where $1 \le c \le 192$, Total RMS current across all circuit phases	7671 – 7862
Circuit *c* All Phase Iavg	Where $1 \le c \le 192$, Average RMS current across all circuit phases	7863 – 8054
Circuit *c* All Phase PFactor avg	Where $1 \le c \le 192$, The average power factor across all circuit phases	8055 – 8246
Circuit *c* All Phase Watts total	Where $1 \le c \le 192$, The total power across all circuit phases	8247 – 8438
Circuit *c* All Phase kWh total	Where $1 \le c \le 192$, The total energy measured across all circuit phases	8439 – 8630
Circuit *c* 1-2 Vrms	Where $1 \le c \le 192$, Instantaneous RMS voltage between circuit phases	8631 – 8822
Circuit *c* 2-3 Vrms	Where $1 \le c \le 192$, Instantaneous RMS voltage between circuit phases	8823 – 9014
Circuit *c* 3-1 Vrms	Where $1 \le c \le 192$, Instantaneous RMS voltage between circuit phases	9015 – 9206
Circuit *c* L-L avg Vrms	Where $1 \le c \le 192$, Average instantaneous RMS voltage between circuit phases	9207 – 9398

Circuit *c* Phase *n* VAR	Where $1 \leq c \leq 192$ and $1 \leq n \leq 3$, the instantaneous reactive power of the circuit phase	9399 – 9974
Circuit *c* All Phase VAR total	Where $1 \leq c \leq 192$, The total reactive power across all circuit phases	9975 – 10166
Circuit *c* Phase *n* VA	Where $1 \leq c \leq 192$ and $1 \leq n \leq 3$, the instantaneous apparent power of the circuit phase	10167 – 10742
Circuit *c* All Phase VA total	Where $1 \leq c \leq 192$, The total apparent power across all circuit phases	10743 – 10934
Circuit *c* Phase *n* ITHD	Where $1 \leq c \leq 192$ and $1 \leq n \leq 3$, total harmonic distortion of the circuit phase current	10935 – 11510
Circuit *c* Phase N ITHD	Where $1 \leq c \leq 192$, total harmonic distortion of the circuit neutral phase current	11511 – 11702
Circuit *c* All Phase ITHD total	Where $1 \leq c \leq 192$, Total of the circuit phase current total harmonic distortions	11703 – 11894
Circuit *c* All Phase ITHD avg	Where $1 \leq c \leq 192$, Average of the circuit phase current total harmonic distortions	11895 – 12086
Circuit *c* Phase *n* Watts max	Where $1 \leq c \leq 192$ and $1 \leq n \leq 3$, maximum circuit phase power recorded	12087 – 12662
Circuit *c* total power used	Where $1 \leq c \leq 192$, percentage of circuit's power capacity in use	12663 – 12854
Circuit *c* total power remaining	Where $1 \leq c \leq 192$, circuit's remaining power capacity	12855 – 13046
3 phase meter 2 Phase *n* Vrms	Where $1 \leq n \leq 3$, 3 phase meter 2 Vrms	13047 – 13049
3 phase meter 2 Phase *n* Irms	Where $1 \leq n \leq 3$, 3 phase meter 2 Irms	13050 – 13052
3 phase meter 2 Phase *n* PFactor avg	Where $1 \leq n \leq 3$, 3 phase meter 2 PFactor avg	13053 – 13055
3 phase meter 2 Phase *n* Watts	Where $1 \leq n \leq 3$, 3 phase meter 2 Watts	13056 – 13058
3 phase meter 2 Phase *n* kWh	Where $1 \leq n \leq 3$, 3 phase meter 2 kWh	13059 – 13061
3 phase meter 2 Phase N Irms	3 phase meter 2 Phase N Irms	13062
3 phase meter 2 All Phase average Vrms	3 phase meter 2 All Phase average Vrms	13063
3 phase meter 2 All Phase Itot	3 phase meter 2 All Phase Itot	13064
3 phase meter 2 All Phase Iavg	3 phase meter 2 All Phase Iavg	13065
3 phase meter 2 All Phase PFactor avg	3 phase meter 2 All Phase PFactor avg	13066
3 phase meter 2 All Phase Watts total	3 phase meter 2 All Phase Watts total	13067
3 phase meter 2 All Phase kWh total	3 phase meter 2 All Phase kWh	13068
3 phase meter 2 1-2 Vrms	3 phase meter 2 1-2 Vrms	13069
3 phase meter 2 2-3 Vrms	3 phase meter 2 2-3 Vrms	13070
3 phase meter 2 3-1 Vrms	3 phase meter 2 3-1 Vrms	13071
3 phase meter 2 L-L avg Vrms	3 phase meter 2 L-L avg Vrms	13072
3 phase meter 2 Phase	Where $1 \leq n \leq 3$, 3 phase meter 2 VAR	13073 – 13075

n VAR		
3 phase meter 2 All Phase VAR total	3 phase meter 2 All Phase VAR total	13076
3 phase meter 2 Phase *n* VA	Where $1 \leq n \leq 3$, 3 phase meter 2 VA	13077 – 13079
3 phase meter 2 All Phase VA total	3 phase meter 2 All Phase VA total	13080
3 phase meter 2 Phase *n* VTHD	Where $1 \leq n \leq 3$, 3 phase meter 2 VTHD	13081 – 13083
3 phase meter 2 All Phase VTHD total	3 phase meter 2 All Phase VTHD total	13084
3 phase meter 2 All Phase VTHD avg	3 phase meter 2 All Phase VTHD avg	13085
3 phase meter 2 Phase *n* ITHD	Where $1 \leq n \leq 3$, 3 phase meter 2 ITHD	13086 – 13088
3 phase meter 2 All Phase ITHD total	3 phase meter 2 All Phase ITHD total	13089
3 phase meter 2 All Phase ITHD avg	3 phase meter 2 All Phase ITHD avg	13090
3 phase meter 2 Phase *n* kWh export	Where $1 \leq n \leq 3$, 3 phase meter 2 kWh export	13091 – 13093
3 phase meter 2 All Phase kWh export	3 phase meter 2 All Phase kWh export	13094
3 phase meter 2 Phase *n* kWh import	Where $1 \leq n \leq 3$, 3 phase meter 2 kWh import	13095 – 13097
3 phase meter 2 All Phase kWh import	3 phase meter 2 All Phase kWh import	13098
3 phase meter 2 Phase *n* kVARh total	Where $1 \leq n \leq 3$, 3 phase meter 2 kVARh total	13099 – 13101
3 phase meter 2 All Phase kVARh total	3 phase meter 2 All Phase kVARh total	13102
3 phase meter 2 Phase *n* kVARh export	Where $1 \leq n \leq 3$, 3 phase meter 2 kVARh export	13103 – 13105
3 phase meter 2 All Phase kVARh export	3 phase meter 2 All Phase kVARh export	13106
3 phase meter 2 Phase *n* kVARh import	Where $1 \leq n \leq 3$, 3 phase meter 2 kVARh import	13107 – 13109
3 phase meter 2 All Phase kVARh import	3 phase meter 2 All Phase kVARh import	13110
3 phase meter 2 Phase *n* frequency	Where $1 \leq n \leq 3$, 3 phase meter 2 frequency	13111 – 13113
3 phase meter 2 All Phase frequency average	3 phase meter 2 All Phase frequency average	13114
3 phase meter 2 Phase *n* Watts max	Where $1 \leq n \leq 3$, 3 phase meter 2 Watts max	13115 – 13117
3 phase meter 2 total power used	3 phase meter 2 total power used	13118
3 phase meter 2 total power remaining	3 phase meter 2 total power remaining	13119
3 phase meter 2 Phase 1 V harmonic *n*	Where $1 \leq n \leq 63$ (odds only), odd numbered harmonics 1 to 63 of the phase voltage	13120 – 13151
3 phase meter 2 Phase 2 V harmonic *n*	Where $1 \leq n \leq 63$ (odds only), odd numbered harmonics 1 to 63 of the phase voltage	13152 – 13183
3 phase meter 2 Phase	Where $1 \leq n \leq 63$ (odds only), odd numbered harmonics 1 to 63 of the phase	13184 – 13215

3 V harmonic *n*	voltage	
3 phase meter 2 Phase 1 I harmonic *n*	Where $1 \leq n \leq 63$ (odds only), odd numbered harmonics 1 to 63 of the phase current	13216 – 13247
3 phase meter 2 Phase 2 I harmonic *n*	Where $1 \leq n \leq 63$ (odds only), odd numbered harmonics 1 to 63 of the phase current	13248 – 13279
3 phase meter 2 Phase 3 I harmonic *n*	Where $1 \leq n \leq 63$ (odds only), odd numbered harmonics 1 to 63 of the phase current	13280 – 13311
Load Type *n* Total Watts	Where $1 \leq n \leq 20$, Load Type Total Watts	13312 – 13331
3 phase meter Ch *n* Demand Avg Power	Where $1 \leq n \leq 3$, Average power for demand period for channel	13332 – 13334
3 phase meter Ch *n* Demand Min Power	Where $1 \leq n \leq 3$, Minimum power in demand period for channel	13335 – 13337
3 phase meter Ch *n* Demand Max Power	Where $1 \leq n \leq 3$, Maximum power in demand period for channel	13338 – 13340
3 phase meter Ch *n* Demand Avg Apparent Power	Where $1 \leq n \leq 3$, Average apparent power for demand period for channel	13341 – 13343
3 phase meter Ch *n* Demand Min Apparent Power	Where $1 \leq n \leq 3$, Minimum apparent power in demand period for channel	13344 – 13346
3 phase meter Ch *n* Demand Max Apparent Power	Where $1 \leq n \leq 3$, Maximum apparent power in demand period for channel	13347 – 13349
3 phase meter Ch *n* Demand Avg Reactive Power	Where $1 \leq n \leq 3$, Average reactive power for demand period for channel	13350 – 13352
3 phase meter Ch *n* Demand Min Reactive Power	Where $1 \leq n \leq 3$, Minimum reactive power in demand period for channel	13353 – 13355
3 phase meter Ch *n* Demand Max Reactive Power	Where $1 \leq n \leq 3$, Maximum reactive power in demand period for channel	13356 – 13358
3 phase meter Ch *n* Demand Avg Current	Where $1 \leq n \leq 3$, Average current for demand period for channel	13359 – 13361
3 phase meter Ch *n* Demand Min Current	Where $1 \leq n \leq 3$, Minimum current in demand period for channel	13362 – 13364
3 phase meter Ch *n* Demand Max Current	Where $1 \leq n \leq 3$, Maximum current in demand period for channel	13365 – 13367
3phase meter Total Demand Avg Power	Average power for demand period for circuit	13368
3phase meter Total Demand Min Power	Minimum power in demand period for circuit	13369
3phase meter Total Demand Max Power	Maximum power in demand period for circuit	13370
3phase meter Total Demand Avg Apparent Power	Average apparent power for demand period for circuit	13371
3phase meter Total Demand Min Apparent Power	Minimum apparent power in demand period for circuit	13372
3phase meter Total Demand Max Apparent Power	Maximum apparent power in demand period for circuit	13373
3phase meter Total	Average reactive power for demand period for circuit	13374

Demand Avg Reactive Power		
3phase meter Total Demand Min Reactive Power	Minimum reactive power in demand period for circuit	13375
3phase meter Total Demand Max Reactive Power	Maximum reactive power in demand period for circuit	13376
3phase meter Total Demand Avg Current	Average current for demand period for circuit	13377
3phase meter Total Demand Min Current	Minimum current in demand period for circuit	13378
3phase meter Total Demand Max Current	Maximum current in demand period for circuit	13379
3 phase meter Phase *n* Demand Daily Peak Power	Where $1 \leq n \leq 3$, Peak power of phase from previous day	13380 – 13382
3 phase meter Phase *n* Demand Peak Power	Where $1 \leq n \leq 3$, Peak power of phase since last reset	13383 – 13385
3 phase meter All Phase Demand Daily Peak Power	Peak total power of supply from previous day	13386
3 phase meter All Phase Demand Peak Power	Peak total power of supply since last reset	13387
Cct *n* Demand Avg Power	Where $1 \leq n \leq 192$, Average power of circuit for demand period	13388 – 13579
Cct *n* Demand Daily Peak Power	Where $1 \leq n \leq 192$, Peak power of circuit from previous day	13580 – 13771
Cct *n* Demand Peak Power	Where $1 \leq n \leq 192$, Peak power of circuit since last reset	13772 – 13963
3 phase meter Phase *n* kVAh total	Where $1 \leq n \leq 3$, total apparent energy measured through the phase	13964 – 13966
3 phase meter All Phase kVAh total	The total apparent energy measured across all phases	13967
3 phase meter Phase *n* kVAh export	Where $1 \leq n \leq 3$, total apparent energy exported through the phase	13968 – 13970
3 phase meter All Phase kVAh export	The total apparent energy exported across all phases	13971
3 phase meter Phase *n* kVAh import	Where $1 \leq n \leq 3$, total apparent energy imported through the phase	13972 – 13984
3 phase meter All Phase kVAh import	The total apparent energy imported across all phases	13975
3 phase meter I imbalance	I imbalance for 3 phase meter	13976
3 phase meter V imbalance	V imbalance for 3 phase meter	13977
3 phase meter I total demand distortion	I total demand distortion for 3 phase meter	13978
3 phase meter 2 I imbalance	I imbalance for second 3 phase meter	13979
3 phase meter 2 V imbalance	V imbalance for second 3 phase meter	13980
3 phase meter 2 I total demand distortion	I total demand distortion for second 3 phase meter	13981

Phase *n* DPF	Where 1 ≤ n ≤ 3, Displacement Power Factor for phase	13982-13984
3 phase meter Ch *n* Demand Min VLN	Where 1 ≤ n ≤ 3, Minimum Line to Neutral Voltage in demand period for channel	13985-13987
3 phase meter Ch *n* Demand Max VLN	Where 1 ≤ n ≤ 3, Maximum Line to Neutral Voltage in demand period for channel	13988-13990
3 phase meter Ch *n* Demand Avg VLN	Where 1 ≤ n ≤ 3, Average Line to Neutral Voltage in demand period for channel	13991-13993
3 phase meter Ch *n* Demand Min VLL	Where 1 ≤ n ≤ 3, Minimum Line to Line Voltage in demand period for channel	13994-13996
3 phase meter Ch *n* Demand Max VLL	Where 1 ≤ n ≤ 3, Maximum Line to Line Voltage in demand period for channel	13997-13999
3 phase meter Ch *n* Demand Avg VLL	Where 1 ≤ n ≤ 3, Average Line to Line Voltage in demand period for channel	14000-14002
3 phase meter 2 Ch *n* Demand Avg Power	Where 1 ≤ *n* ≤ 3, Average power for demand period for channel	14003 – 14005
3 phase meter 2 Ch *n* Demand Min Power	Where 1 ≤ *n* ≤ 3, Minimum power in demand period for channel	14006 – 14008
3 phase meter 2 Ch *n* Demand Max Power	Where 1 ≤ *n* ≤ 3, Maximum power in demand period for channel	14009 – 14011
3 phase meter 2 Ch *n* Demand Avg Apparent Power	Where 1 ≤ *n* ≤ 3, Average apparent power for demand period for channel	14012 – 14014
3 phase meter 2 Ch *n* Demand Min Apparent Power	Where 1 ≤ *n* ≤ 3, Minimum apparent power in demand period for channel	14015 – 14017
3 phase meter 2 Ch *n* Demand Max Apparent Power	Where 1 ≤ *n* ≤ 3, Maximum apparent power in demand period for channel	14018 – 14020
3 phase meter 2 Ch *n* Demand Avg Reactive Power	Where 1 ≤ *n* ≤ 3, Average reactive power for demand period for channel	14021 – 14023
3 phase meter 2 Ch *n* Demand Min Reactive Power	Where 1 ≤ *n* ≤ 3, Minimum reactive power in demand period for channel	14024 – 14026
3 phase meter 2 Ch *n* Demand Max Reactive Power	Where 1 ≤ *n* ≤ 3, Maximum reactive power in demand period for channel	14027 – 14029
3 phase meter 2 Ch *n* Demand Avg Current	Where 1 ≤ *n* ≤ 3, Average current for demand period for channel	14030 – 14032
3 phase meter 2 Ch *n* Demand Min Current	Where 1 ≤ *n* ≤ 3, Minimum current in demand period for channel	14033 – 14035
3 phase meter 2 Ch *n* Demand Max Current	Where 1 ≤ *n* ≤ 3, Maximum current in demand period for channel	14036 – 14038
3phase meter 2 Total Demand Avg Power	Average power for demand period for circuit	14039
3phase meter 2 Total Demand Min Power	Minimum power in demand period for circuit	14040
3phase meter 2 Total Demand Max Power	Maximum power in demand period for circuit	14041
3phase meter 2 Total Demand Avg Apparent Power	Average apparent power for demand period for circuit	14042
3phase meter 2 Total Demand Min Apparent Power	Minimum apparent power in demand period for circuit	14043

3phase meter 2 Total Demand Max Apparent Power	Maximum apparent power in demand period for circuit	14044
3phase meter 2 Total Demand Avg Reactive Power	Average reactive power for demand period for circuit	14045
3phase meter 2 Total Demand Min Reactive Power	Minimum reactive power in demand period for circuit	14046
3phase meter 2 Total Demand Max Reactive Power	Maximum reactive power in demand period for circuit	14047
3phase meter 2 Total Demand Avg Current	Average current for demand period for circuit	14048
3phase meter 2 Total Demand Min Current	Minimum current in demand period for circuit	14049
3phase meter 2 Total Demand Max Current	Maximum current in demand period for circuit	14050
3 phase meter 3 Ch *n* Demand Avg Power	Where $1 \leq n \leq 3$, Average power for demand period for channel	14051 – 14053
3 phase meter 3 Ch *n* Demand Min Power	Where $1 \leq n \leq 3$, Minimum power in demand period for channel	14054 – 14056
3 phase meter 3 Ch *n* Demand Max Power	Where $1 \leq n \leq 3$, Maximum power in demand period for channel	14057 – 14059
3 phase meter 3 Ch *n* Demand Avg Apparent Power	Where $1 \leq n \leq 3$, Average apparent power for demand period for channel	14060 – 14062
3 phase meter 3 Ch *n* Demand Min Apparent Power	Where $1 \leq n \leq 3$, Minimum apparent power in demand period for channel	14063 – 14065
3 phase meter 3 Ch *n* Demand Max Apparent Power	Where $1 \leq n \leq 3$, Maximum apparent power in demand period for channel	14066 – 14068
3 phase meter 3 Ch *n* Demand Avg Reactive Power	Where $1 \leq n \leq 3$, Average reactive power for demand period for channel	14069 – 14071
3 phase meter 3 Ch *n* Demand Min Reactive Power	Where $1 \leq n \leq 3$, Minimum reactive power in demand period for channel	14072 – 17074
3 phase meter 3 Ch *n* Demand Max Reactive Power	Where $1 \leq n \leq 3$, Maximum reactive power in demand period for channel	17075 – 17077
3 phase meter 3 Ch *n* Demand Avg Current	Where $1 \leq n \leq 3$, Average current for demand period for channel	17078 – 14080
3 phase meter 3 Ch *n* Demand Min Current	Where $1 \leq n \leq 3$, Minimum current in demand period for channel	14081 – 14083
3 phase meter 3 Ch *n* Demand Max Current	Where $1 \leq n \leq 3$, Maximum current in demand period for channel	14084 – 14086
3phase meter 3 Total Demand Avg Power	Average power for demand period for circuit	14087
3phase meter 3 Total Demand Min Power	Minimum power in demand period for circuit	14088
3phase meter 3 Total Demand Max Power	Maximum power in demand period for circuit	14089
3phase meter 3 Total	Average apparent power for demand period for circuit	14090

Demand Avg Apparent Power		
3phase meter 3 Total Demand Min Apparent Power	Minimum apparent power in demand period for circuit	14091
3phase meter 3 Total Demand Max Apparent Power	Maximum apparent power in demand period for circuit	14092
3phase meter 3 Total Demand Avg Reactive Power	Average reactive power for demand period for circuit	14093
3phase meter 3 Total Demand Min Reactive Power	Minimum reactive power in demand period for circuit	14094
3phase meter 3 Total Demand Max Reactive Power	Maximum reactive power in demand period for circuit	14095
3phase meter 3 Total Demand Avg Current	Average current for demand period for circuit	14096
3phase meter 3 Total Demand Min Current	Minimum current in demand period for circuit	14097
3phase meter 3 Total Demand Max Current	Maximum current in demand period for circuit	14098
Circuit c Current Imbalance	Where $1 \leq c \leq 192$, Imbalance between phase current magnitudes in a three phase circuit	14099 - 14290

Analog Value Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description

4. List of all properties that are writable where not otherwise required by this standard

Present_Value

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

List of non-dynamic object identifiers and their meaning in this device

Object Identifier	Meaning	
Ch *n* CT factor	Where $1 \leq n \leq 120$, this factor will be quoted with each CT to be used with the data gathering modules.	0 – 119
Ch *n* alarm breaker size	Where $1 \leq n \leq 120$, current scale against which warning and alarm thresholds are measured.	120 – 239
Phase *n* Vlo threshold	Where $1 \leq n \leq 3$, threshold for triggering the Vlo alarm	240 – 242
Phase *n* Vhi threshold	Where $1 \leq n \leq 3$, threshold for triggering the Vhi alarm	243 – 245
Tripped breaker current	Current at which the tripped breaker alarm becomes active	246
3phm SAGV	3 phase meter wave capture sag voltage threshold	247
3phm OV	3 phase meter wave capture over voltage threshold	248
3phm OI	3 phase meter current wave capture threshold	249
3phm OI hold-off	3 phase meter current wave capture hold-off	250
TAPs TB hold-off	TAPs current wave capture hold-off	251
TAPs TB trigger level	TAPs current wave capture threshold	252
123N circuit *n* total power limit	Where $1 \leq n \leq 48$, 123N circuit total power limit	253-300
3phm total power limit	3 phase meter total power limit	301
Ch *n* CT factor	Where $121 \leq n \leq 192$, this factor will be quoted with each CT to be used with the data gathering modules.	302 – 373
Ch *n* alarm breaker size	Where $121 \leq n \leq 192$, current scale against which warning and alarm thresholds are measured.	374 – 445
Circuit *c* total power limit	Where $1 \leq c \leq 192$, circuit total power limit	446 – 637
3 phase meter 2 total power limit	3 phase meter 2 total power limit	638
CT Type *n* Hardware Version 1 Factor	Where $1 \leq n \leq 120$, CT Type's factor for Hardware Version 1	639-758
CT Type *n* Hardware Version 2 Factor	Where $1 \leq n \leq 120$, CT Type's factor for Hardware Version 2	759-878

Positive Integer Value Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description

4. List of all properties that are writable where not otherwise required by this standard

Present_Value

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

List of non-dynamic object identifiers and their meaning in this device

Object Identifier	Meaning	
Ch *n* circuit	Where $1 \leq n \leq 120$, this number is used to indicate whether channels should be circuited together as two phase or three phase – or left as single phase.	0 – 119
Ch *n* CT	Where $1 \leq n \leq 120$, this is a number to identify a CT, and is the max current of the CT.	120 – 239
Ch *n* phase	Where $1 \leq n \leq 120$, the phase connection is derived from the board by the jumper setting.	240 – 359
Ch *n* Exp phase	Where $1 \leq n \leq 120$, this is the phase that the board expects to be connected.	360 – 479
Ch *n* warning threshold	Where $1 \leq n \leq 120$, channel's warning level.	480 – 599
Ch *n* alarm threshold	Where $1 \leq n \leq 120$, channel's alarm level.	600 – 719
Ch *n* warning delay	Where $1 \leq n \leq 120$, time over warning level before warning is triggered.	720 – 839
Ch *n* alarm delay	Where $1 \leq n \leq 120$, time over alarm level before alarm is triggered.	840 – 959
Log *n* configuration count	Where $0 \leq n \leq 9$, version of the log configuration.	960 – 969
Log *n* mode	Where $0 \leq n \leq 9$, rollover or stop logging when full.	970 – 979
Log *n* max entries	Where $0 \leq n \leq 9$, maximum number of entries in log (≤ 65535).	980 – 989
Log *n* interval	Where $0 \leq n \leq 9$, how often log entry is made.	990 – 999
Log *n* offset	Where $0 \leq n \leq 9$, offset from day/hour/minute to make log entry.	1000 – 1009
Log *n* register list length	Where $0 \leq n \leq 9$, number of registers in log entry.	1010 – 1019
Voltage alarm delay	Time under or over threshold before alarm is triggered.	1020
Tripped breaker timeframe	Time over tripped breaker current before tripped breaker alarm becomes active.	1021
Nr channels	Number of physical channels.	1022
kWh scale	Multiplier for kWh readings.	1023
High power mode	Readings over high or low power range.	1024
CPU serial nr	CPU's serial number.	1025
ANSI/IEC channel numbering	ANSI/IEC channel numbering	1026
Nr channels on TAP *n*	Where $1 \leq n \leq 30$, Number of channels on TAP	1027-1056

Supply type	Supply type	1057
3 phase meter current wave capture mode	3 phase meter current wave capture mode	1058
TAPs current wave capture mode	TAPs current wave capture mode	1059
Channel selected for I harmonics	Channel selected for I harmonics	1060
123N circuit *n* warning threshold	Where $1 \leq n \leq 48$, 123N circuit warning threshold	1061-1108
123N circuit *n* alarm threshold	Where $1 \leq n \leq 48$, 123N circuit alarm threshold	1109-1156
123N circuit *n* warning delay	Where $1 \leq n \leq 48$, 123N circuit warning delay	1157-1204
123N circuit *n* alarm delay	Where $1 \leq n \leq 48$, 123N circuit alarm delay	1205-1252
3 phase meter warning threshold	3 phase meter warning threshold	1253
3 phase meter alarm threshold	3 phase meter alarm threshold	1254
3 phase meter warning delay	3 phase meter warning delay	1255
3 phase meter alarm delay	3 phase meter alarm delay	1256
Ch *n* circuit	Where $121 \leq n \leq 192$, this number is used to indicate whether channels should be circuited together as two phase or three phase – or left as single phase.	1257 – 1328
Ch *n* CT	Where $121 \leq n \leq 192$, this is a number to identify a CT, and is the max current of the CT.	1329 – 1400
Ch *n* phase	Where $121 \leq n \leq 192$, the phase connection is derived from the board by the jumper setting.	1401 – 1472
Ch *n* Exp phase	Where $121 \leq n \leq 192$, this is the phase that the board expects to be connected.	1473 – 1544
Ch *n* warning threshold	Where $121 \leq n \leq 192$, channel's warning level.	1545 – 1616
Ch *n* alarm threshold	Where $121 \leq n \leq 192$, channel's alarm level.	1617 – 1689
Ch *n* warning delay	Where $121 \leq n \leq 192$, time over warning level before warning is triggered.	1689 – 1760
Ch *n* alarm delay	Where $121 \leq n \leq 192$, time over alarm level before alarm is triggered.	1761 – 1832
Log *n* configuration count	Where $10 \leq n \leq 20$, version of the log configuration.	1833 – 1843
Log *n* mode	Where $10 \leq n \leq 20$, rollover or stop logging when full.	1844 – 1854
Log *n* max entries	Where $10 \leq n \leq 20$, maximum number of entries in log (≤ 65535).	1855 – 1865
Log *n* interval	Where $10 \leq n \leq 20$, how often log entry is made.	1866 – 1876
Log *n* offset	Where $10 \leq n \leq 20$, offset from day/hour/minute to make log entry.	1877 – 1887
Log *n* register list length	Where $10 \leq n \leq 20$, number of registers in log entry.	1888 – 1898
Circuit *c* warning threshold	Where $1 \leq c \leq 192$, Circuit warning threshold	1899 – 2090
Circuit *c* alarm threshold	Where $1 \leq c \leq 192$, Circuit alarm threshold	2091 – 2282
Circuit *c* warning delay	Where $1 \leq c \leq 192$, Circuit warning delay	2283 – 2474
Circuit *c* alarm delay	Where $1 \leq c \leq 192$, Circuit alarm delay	2475 – 2666
3 phase meter 2 warning threshold	3 phase meter 2 warning threshold	2667
3 phase meter 2 alarm threshold	3 phase meter 2 alarm threshold	2668
3 phase meter 2 warning delay	3 phase meter 2 warning delay	2669
3 phase meter 2 alarm delay	3 phase meter 2 alarm delay	2670
Ch *n* Load Type	Where $1 \leq n \leq 192$, channel's load type	2671-2862
CT Type *n* Hardware Version 1 PHCAL	Where $1 \leq n \leq 120$, CT Type's PHCAL for Hardware Version 1	2863-2982
CT Type *n* Hardware Version 2 PHCAL	Where $1 \leq n \leq 120$, CT Type's PHCAL for Hardware Version 2	2983-3102
Demand Interval	Demand Interval	3103
Demand Subinterval	Demand Subinterval	3104

Last Demand Interval	Interval of last demand period	3105
Last Demand Subinterval	Subinterval of last demand period	3106
Last Demand Timestamp	Time the last demand period was ended	3107

BitString Value Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description

4. List of all properties that are writable where not otherwise required by this standard

Present value

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

List of non-dynamic object identifiers and their meaning in this device

Object Identifier	Meaning	
Warnings	Channel warning states.	0
Alarms	Channel alarm states.	1
Tripped breakers	Channel tripped breaker states.	2
Warnings latched	Channel latched warning states.	3
Alarms latched	Channel latched alarm states.	4
Tripped breakers latched	Channel latched tripped breaker states.	5
Voltage low alarms	Voltage low alarm states.	6
Voltage high alarms	Voltage high alarm states.	7
Voltage low alarms latched	Voltage low latched alarm states.	8
Voltage high alarms latched	Voltage high latched alarm states.	9
Dry contact inputs	Dry contact inputs	10
123N circuit *n* power alarms	Where $1 \leq n \leq 48$, 123N circuit power alarms	11 – 58
3 phase meter power alarms	3 phase meter power alarms	59
Circuit *c* power alarms	Where $1 \leq c \leq 192$, Circuit power alarms	60 – 251
3 phase meter 2 power alarms	3 phase meter 2 power alarms	252
Card *c* dry inputs	Where $1 \leq c \leq 10$, dry input states	253-262

CharString Value Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description

4. List of all properties that are writable where not otherwise required by this standard

Present value

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

List of non-dynamic object identifiers and their meaning in this device

Object Identifier	Meaning	
CT Type *n* Name	Where $1 \leq n \leq 120$, CT type names	0-119
Load Type *n* Name	Where $1 \leq n \leq 20$, Load type names	120-139
Circuit *n* Name	Where $1 \leq n \leq 192$, Circuit names	140-331
Circuit n Identifier	Where $1 \leq n \leq 192$, Circuit rack identifier	332-523

File Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description Record count

4. List of all properties that are writable where not otherwise required by this standard

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

Device Object Type

1. Dynamically creatable using BACnet's CreateObject service? No
2. Dynamically deletable using BACnet's DeleteObject service? No
3. List of optional properties supported:

Description Local time Local date UTC offset Daylight savings status

4. List of all properties that are writable where not otherwise required by this standard

Object identifier Number of APDU retries APDU timeout

5. List of proprietary properties:

Property Identifier	Property Datatype	Meaning

6. List of any property value range restrictions:

Property Identifier	Restrictions

Data Link Layer Options (check all that are supported):

X	BACnet IP, (Annex J)	
	BACnet IP, (Annex J), Foreign Device	
	ISO 8802-3, Ethernet (Clause 7)	
	ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)	
	ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s):	
	MS/TP master (Clause 9), baud rate(s):	
	MS/TP slave (Clause 9), baud rate(s):	
	Point-To-Point, EIA 232 (Clause 10), baud rate(s):	
	Point-To-Point, modem, (Clause 10), baud rate(s):	
	LonTalk, (Clause 11), medium:	
	Other:	

Networking Options (check all that are supported):

	Router, Clause 6 - List all routing configurations (e.g. ARCNET-Ethernet, Ethernet-MS/TP, etc.):
	Annex H.3, BACnet Tunneling Router over UDP/IP
	BACnet/IP Broadcast Management Device (BBMD)
	BBMD supports registrations by Foreign Devices

Segmentation Capability (check all that apply):

		Window Size
	Segmented requests supported	
	Segmented responses supported	

Character Sets Supported (check all that apply):
Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

x	ANSI X3.4
	IBM /Microsoft DBCS
	ISO 8859-1
	ISO 10646 (UCS-2)
	ISO 10646 (ICS-4)
	JIS C 6226

If this product is a communication gateway, describe the non-BACnet equipment/network(s) that the gateway supports:

N/A

Include any addition information about the product's BACnet capabilities relevant to interoperability:

Appendix A. Logging Access

Use the web interface to download the recorded logs. The web interface can be accessed by entering the device IP address into a web browser such as Chrome or Firefox.

To access the logs without using the web interface, use the standard Modbus read file record.

Note: Accessing the logs through Modbus only yields the most recent log.

Data Log

Data logs from the web interface consist of a first row that displays all registers being read. Each register will populate down the column. The first four registers are the RTC registers that provide the date and time (in UTC) that the log was taken.

Each register after the RTC registers are the registers defined in the log that are to be recorded. The default log setup will record volts, amps, watts, PF, kWh (two logs), and the Circuit Group registers. Logs 8 and 9 are blank by default.

Event Log

The Event Log format is similar to the Data Log format, although no register list is defined. Each entry has an entry type value in the fifth column (log from web interface).

Register Offset	Register Name	Comments
0-3	Timestamp	Format as defined above
4	Event Type	0 – Threshold alarm 1 – Log configuration change
5-*n*	Entry (see below)	
0	Register Address	Address of real time alarm register in Modbus map
1	Current Value	Current value of alarm register
2	Transition Mask	For each alarm bit in the register: 0 – Alarm status did not change 1 – Alarm status changed e.g. If the original value of the alarm register was 0x0011, and it changed to 0x0101, the Transition Mask would be 0x0110.

Appendix B. Waveform Access

Use the web interface to download the waveform capture data. The web interface can be accessed by entering the device IP address into a web browser such as Chrome and Firefox.

To access the waveform data without using the web interface, use the standard Modbus read file record and the following information.

Obtain the file number

Register 4573 holds the last captured waveform number. If this is '0' then there are no captures, otherwise this will be a value with bit 15 set, 0x8000.

Use the last capture number in reg 4573 as the file number for the latest capture. Subtract 1 for the previous capture. If you get down to 0x8000 then wrap around back up to '0xffff'.

Data

The first record of each waveform file provides the metadata.

Register	Contents
1-4	Timestamp
5	Cause (same as for CSV download: 0 – ‘Unknown Cause’ 1 – ‘Over Current’ 2 – ‘Over Voltage’ 3 – ‘Tripped Breaker’ 4 – ‘Voltage Sag’ 5 – ‘Manual’ 6 – ‘V Zero Cross Timeout’)
6-17	Bit field of circuit current waveforms are present in capture - Circuit 0 is register 5 bit 0 - Circuit 192 is register 16 bit 15
18	Bit field of phase current waveforms are present in capture - Phase 1 is register 17 bit 0 - Phase N is register 17 bit 4
19	Bit field of phase voltage waveforms are present in capture - Phase 1 is register 18 bit 0 - Phase 3 is register 18 bit 3
20	Timezone/DST offset in ¼ hours

Subsequent records contain the waveform data, 18 records per waveform. The first three registers of each record are:

Register	Contents
1	Circuit/Phase number (bit 15 set indicates phase voltage, circuits above 192 are phase currents)
2	Offset into waveform data of this record
3	Registers remaining after this record
4-120	The waveform data – signed 32-bit values, big endian

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