TrendPoint Enkapsis Protocol Guide

(System Firmware v0.41.8+, 3-Phase Firmware v1.26.4+, Tap Firmware v8.60+, and BCPM 2.0 Firmware v1.15.0+)

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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 Modbus function code 4 (F04) 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

Offset	Value
0	Number of circuits
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 – BUS processor (4/8 port TAPs) 6 – BUS calibration processor 7 – iBPCM (21 port TAPs) 9 – Master/slave 3 phase meter 11 – BPCM (42 port TAPs)
8	Supply type – (1) 120/208, (0) 120/240 split phase mode, (2) 120/208 delta
9	KWH scale. Value may be 1, 10, 100

Per circuit registers

C = (circuit number * 10) – *where the circuit number ranges from 1 to 120*.

Offset	Value
C + 0	VRMS in 0.1v steps
C + 1	Circuit group (for creating single, two, three or four phase groups)
C + 2	IRMS in 10mA steps
C + 3	CT Type
C + 4	Pfactor * 1000 (signed)
C + 5	WATTS
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 — 0 + (1 * 10) + 0
- Power factor for circuit 9 would be address 94 — 0 + (9 * 10) + 4

C + 0 VRMS
Instantaneous VRMS reading. Value is in 0.1V steps. For L-N circuits this is the L-N voltage, for L-L circuits it is the L-L voltage.

C + 1 Circuit group

This number is used to indicate whether circuits should be grouped together as two phase or three phase – or left as single phase.

Examples

- Circuits that have a unique group number will be treated as single phase circuits.
- If circuits 3 and 5 have the same group number, 3, these will be treated as a two phase circuit.
- If circuits 7, 9 and 11 have the same group number, e.g. 7, these will be treated as a three phase circuit.
- If the top bit of a three phase group 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: This register is divided by 10 when in high power mode (see address 4501)

C + 3 CT Type

CT type. This is a number to identify a CT, and is the max current of the CT. (EX: 75, 300, 400)

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: This register is divided by 100 when in high power mode (see address 4501)

C + 6 CT Factor * 1000

This factor will be quoted with each CT to be used with the data gathering modules

Examples of given CT's and CT factors are:

75 (Black CT, for older models contact TrendPoint support)	1834 (For Modbus, 1.834 if entered in web i/f)
150	3751 (3.751)
300	4698 (4.698)
400	5308 (5.308)

C + 7 iTHD

The total harmonic distortion of the current channel.

C + 8 Phase (1, 2 or 3) - 0 is disconnected, 4 is neutral

The phase connection maybe fixed, programmed via the Expect Phase register or derived from the board by the jumper setting. For 4/8/21 circuit TAPs if the expected phase is not set to 4 (neutral) the TAP measures the selected phase relative to its first circuit's actual phase and inserts a phase offset from its first circuit's configured expected phase. (value 1, 2 or 3 – value 0 is used to indicate that it is not connected or single phase in a delta configuration, 4 if expected phase is 4).

C + 9 Expected Phase (1, 2, 3 or 4 (neutral))

This is the phase that the board expects to be connected. If the board has been set correctly, C+8 and C+9 should contain the same value.

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

Long-term Accumulated Power Registers

KWH * 1000 * KWH scale (non-resetting counters)

By default, the KWH register reads accumulated power in Watt Hours, but may be affected by the KWHScale register setting (address 9).

These registers do not clear each time they are read and are preserved across restarts. To avoid the potential for data to overflow the register, each circuit has two 16bit unsigned counters that are combined to provide each circuit a 32bit unsigned number representing long term accumulation of KWH.

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

These registers are non-volatile registers. They will accumulate energy values until they are reset with the Modbus command. The registers have a lifetime of 10 years before rolling over the kWh values.

Resetting kWh values:

To reset an individual circuit write value 1234 to the low word register.

(Ex: to reset circuit 23 write 1234 to offset 8046)

To perform a global reset write 1234 to offset 8000.

Circuit	Offset
1	(low word) 8002
	(high word) 8003
2	8004
	8005
…	…
87	8174
	8175
88	8176
	8177
89	8178
	8179
…	…
119	8238
	8239
120	8240
	8241

READ register summary

General circuit setup registers

Ccts above 88 BusPro only

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
0	Number Ccts	Firmware revision (deprecated)	CPU serial number	System firmware version	3 PhM firmware version			Prod code (4 or 7)	Supply type	KWH scale
10	Cct 1 VRMS	Cct 1 Group	Cct 1 IRMS	Cct 1 CT	Cct 1 PFactor (signed)	Cct 1 WATTS	Cct 1 CT Factor	Cct 1 iTHD	Cct 1 Phase	Cct 1 Exp Phase
20	Cct 2 VRMS	Cct 2 Group	Cct 2 IRMS	Cct 2 CT	Cct 2 PFactor (signed)	Cct 2 WATTS	Cct 2 CT Factor	Cct 2 iTHD	Cct 2 Phase	Cct 2 Exp Phase
...	…	…	…	…	…					
880	Cct88 VRMS	Cct 88 Group	Cct 88 IRMS	Cct 88 CT	Cct 88 PFactor (signed)	Cct 88 WATTS	Cct 88 CT Factor	Cct 88 iTHD	Cct 88 Phase	Cct 88 Exp Phase
...	…	…	…	…	…					
1920	Cct 192 VRMS	Cct 192 Group	Cct 192 IRMS	Cct 192 CT	Cct 192 PFactor (signed)	Cct 192 WATTS	Cct 192 CT Factor	Cct 192 iTHD	Cct 192 Phase	Cct 192 Exp Phase

Copy of alarm registers (2000-3400)

TAP summary registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4090										Large TAP address mode Bottom 4 bits – nr ccts on connect large TAPs Top 4 bits – nr large TAPs connected
4100	Nr ccts on TAP 1	Nr ccts on TAP 2	Nr ccts on TAP 3	Nr ccts on TAP 4	Nr ccts on TAP 5	Nr ccts on TAP 6	Nr ccts on TAP 7	Nr ccts on TAP 8	Nr ccts on TAP 9	Nr ccts on TAP 10
4110	Nr ccts on TAP 11	Nr ccts on TAP 12	Nr ccts on TAP 13	Nr ccts on TAP 14	Nr ccts on TAP 15	Nr ccts on TAP 16	Nr ccts on TAP 17	Nr ccts on TAP 18	Nr ccts on TAP 19	Nr ccts on TAP 20
4120	Nr ccts on TAP 21	Nr ccts on TAP 22	Nr ccts on TAP 23	Nr ccts on TAP 24	Nr ccts on TAP 25	Nr ccts on TAP 26	Nr ccts on TAP 27	Nr ccts on TAP 28	Nr ccts on TAP 29	Nr ccts 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 lo	TAP 1 FPGA timestamp hi	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
4210	…	…	…	…	…	…	…	…	TAP 30 FPGA timestamp lo	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 Gateway 1	IPv6 Gateway 2	IPv6 Gateway 3	IPv6 Gateway 4
4460	IPv6 Gateway 5	IPv6 Gateway 6	IPv6 Gateway 7	IPv6 Gateway 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			
4500		High power mode 0 = default 1 = ON			Phase orientation 0 = clockwise 1= anti-clockwise		Get RS485 port speed 1 = 9600* 2 = 19200 3 = 38400 4 = 57600 5= 115200		Nr 21/8/4 TAPS (deprecated)	
…	…	…	…	…	…	…	…	…	…	…
4570				Last captured waveform	3 Phase meter current wave cap l 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 l 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				
4590	SD card status	Wave cap nr channels All = 0 Fault = 1	Wave cap V sag	Wave cap V over	Busway current	Busway state Good = 0 Fault = 1	Phase summary source Ccts = 0 3ph TAP = 1 split ccts = 2	ModBus address	Cct order ANSI = 0 IEC = 1	

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.

Bussway device registers

Select Bussway address by writing it to 4608 before accessing these registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4600									Selected Busway Device Address	
4680	Number of Installed Circuits 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 cct	Features 0 – Harmonics 1 – Full serial nr 2 – Waveform 3 – Fast alarms	Firmware version		Product type of selected board 3 = TAP		

Summary registers (totals and averages across all active circuits on each actual phase)
Split phase summary 2, 3 and 4 in ()'s
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 wrd) * 100 All Phases	Amps avg (hi wrd) * 100 All Phases
4700 (4750) (4800) (4850)	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low wrd) * 100 Phase 1	Amps tot (hi wrd) * 100 Phase 1	Amps tot (low wrd) * 100 Phase 2	Amps tot (hi wrd) * 100 Phase 2	Amps tot (low wrd) * 100 Phase 3	Amps tot (hi wrd) * 100 Phase 3	PF Avg Phase 1 (signed)
4710 (4760) (4810) (4860)	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low wrd) Phase 1 (signed)	Watts total (hi wrd) Phase 1 (signed)	Watts total (low wrd) Phase 2 (signed)	Watts total (hi wrd) Phase 2 (signed)	Watts total (low wrd) Phase 3 (signed)	Watts total (hi wrd) Phase 3 (signed)	KWH total (low wrd) Phase 1	KWH total (hi wrd) Phase 1
4720 (4770) (4820) (4870)	KWH total (low wrd) Phase 2	KWH total (hi wrd) Phase 2	KWH total (low wrd) Phase 3	KWH total(hi wrd) Phase 3	Vrms All Phases	Amps tot (low wrd) * 100 All Phases	Amps tot (hi wrd) * 100 All Phases	PF Avg All Phases (signed)	Watts total (low wrd) All Phases (signed)	Watts total (hi wrd) All Phases (signed)
4730 (4780) (4830) (4880)	KWH total (low wrd) All Phases	KWH total (hi wrd) All Phases	Amps tot (low wrd) * 100 Phase N	Amps tot (hi wrd) * 100 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.

3-phase TAP registers (measured totals for each phase)

Slave 3-phase TAP registers, if present, in ()'s

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 (5590) (5990)									Amps avg (low wrd) * 100 All Phases	Amps avg (hi wrd) * 100 All Phases
5200 (5600) (6000)	Vrms Phase 1 L-N	Vrms Phase 2 L-N	Vrms Phase 3 L-N	Amps tot (low wrd) * 100 Phase 1	Amps tot (hi wrd) * 100 Phase 1	Amps tot (low wrd) * 100 Phase 2	Amps tot (hi wrd) * 100 Phase 2	Amps tot (low wrd) * 100 Phase 3	Amps tot (hi wrd) * 100 Phase 3	PF Avg Phase 1 (signed)
5210 (5610) (6010)	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low wrd) Phase 1 (signed)	Watts total (hi wrd) Phase 1 (signed)	Watts total (low wrd) Phase 2 (signed)	Watts total (hi wrd) Phase 2 (signed)	Watts total (low wrd) Phase 3 (signed)	Watts total (hi wrd) Phase 3 (signed)	KWH total (low wrd) Phase 1	KWH total (hi wrd) Phase 1
5220 (5620) (6020)	KWH total (low wrd) Phase 2	KWH total (hi wrd) Phase 2	KWH total (low wrd) Phase 3	KWH total(hi wrd) Phase 3	Vrms avg All Phases L-N	Amps tot (low wrd) * 100 All Phases	Amps tot (hi wrd) * 100 All Phases	PF Avg All Phases (signed)	Watts total (low wrd) All Phases (signed)	Watts total (hi wrd) All Phases (signed)
5230 (5630) (6030)	KWH total (low wrd) All Phases	KWH total (hi wrd) All Phases	Amps tot (low wrd) * 100 Phase N	Amps tot (hi wrd) * 100 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg	VAR total (low wrd) Phase 1 (signed)	VAR total (hi wrd) Phase 1 (signed)
5240 (5640) (6040)	VAR total (low wrd) Phase 2 (signed)	VAR total (hi wrd) Phase 2 (signed)	VAR total (low wrd) Phase 3 (signed)	VAR total (hi wrd) Phase 3 (signed)	VAR total (low wrd) All Phase (signed)	VAR total (hi wrd) All Phases (signed)	VA total (low wrd) Phase 1	VA total (hi wrd) Phase 1	VA total (low wrd) Phase 2	VA total (hi wrd) Phase 2
5250 (5650) (6050)	VA total (low wrd) Phase 3	VA total (hi wrd) Phase 3	VA total (low wrd) All Phase	VA total (hi wrd) All Phases	VTHD Phase 1	VTHD Phase 2	VTHD Phase 3	VTHD total	VTHD avg	ITHD Phase 1
5260 (5660) (6060)	ITHD Phase 2	ITHD Phase 3	ITHD Phase N (when in 120/240)	ITHD total	ITHD avg	kWh export (lo word) Phase 1	kWh export (hi word) Phase 1	kWh export (lo word) Phase 2	kWh export (hi word) Phase 2	kWh export (lo word) Phase 3
5270 (5670) (6070)	kWh export (hi word) Phase 3	kWh export (lo word) Total	kWh export (hi word) Total	kWh import (lo word) Phase 1	kWh import (hi word) Phase 1	kWh import (lo word) Phase 2	kWh import (hi word) Phase 2	kWh import (lo word) Phase 3	kWh import (hi word) Phase 3	kWh import (lo word) Total
5280 (5680) (6080)	kWh import (hi word) Total	kVARh total (low wrd) Phase 1 (signed)	kVARh total (hi wrd) Phase 1 (signed)	kVARh total (low wrd) Phase 2 (signed)	kVARh total (hi wrd) Phase 2 (signed)	kVARh total (low wrd) Phase 3 (signed)	kVARh total(hi wrd) Phase 3 (signed)	kVARh total (low wrd) All Phases (signed)	kVARh total (hi wrd) All Phases (signed)	kVARh export (lo word) Phase 1
5290 (5690) (6090)	kVARh export (hi word) Phase 1	kVARh export (lo word) Phase 2	kVARh export (hi word) Phase 2	kVARh export (lo word) Phase 3	kVARh export (hi word) Phase 3	kVARh export (lo word) Total	kVARh export (hi word) Total	kVARh import (lo word) Phase 1	kVARh import (hi word) Phase 1	kVARh import (lo word) Phase 2
5300 (5700) (6100)	kVARh import (hi word) Phase 2	kVARh import (lo word) Phase 3	kVARh import (hi word) Phase 3	kVARh import (lo word) Total	kVARh import (hi word) Total	Frequenc y Phase 1	Frequenc y Phase 2	Frequenc y Phase 3	Frequenc y avg	Max Watts (low wrd) Phase 1
5310 (5710) (6110)	Max Watts (hi wrd) Phase 1	Max Watts (low wrd) Phase 2	Max Watts (hi wrd) Phase 2	Max Watts (low wrd) Phase 3	Max Watts (hi wrd) Phase 3					

3-phase voltage harmonics

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
5400 (5800) (6200)	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 (5810) (6210)	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 (5820) (6220)	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 (5830) (6230)	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 (5890) (6290)	Ph 3 harmonic 53	Ph 3 harmonic 55	Ph 3 harmonic 57	Ph 3 harmonic 59	Ph 3 harmonic 61	Ph 3 harmonic 63				

3-phase current harmonics

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
5500 (5900) (6300)	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 (5910) (6310)	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 (5920) (6320)	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 (5930) (6330)	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 (5990) (6390)	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				

Circuit current harmonics

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

Circuit VAR registers

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

Miscellaneous registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6800	Internal errors	SMS device ID	Unit ID lo	Unit ID hi	Firmware version	Firmware revision				

Logging registers

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

Environmental registers (16 sensors)

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)		

Dry Contact registers (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		

Accumulated power registers

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

Circuit max Watt 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	Cct 1 max Watts	Cct 2 max Watts	Cct 3 max Watts	Cct 4 max Watts	Cct 5 max Watts	Cct 6 max Watts
8410	Cct 7 max Watts	Cct 8 max Watts	Cct 9 max Watts	Cct 10 max Watts	Cct 11 max Watts	Cct 12 max Watts	Cct 13 max Watts	Cct 14 max Watts	Cct 15 max Watts	Cct 16 max Watts
…	…	…	…	…	…	…	…	…	…	…
8580	Cct 177 max Watts	Cct 178 max Watts	Cct 179 max Watts	Cct 180 max Watts	Cct 181 max Watts	Cct 182 max Watts	Cct 183 max Watts	Cct 184 max Watts	Cct 185 max Watts	Cct 186 max Watts
8590	Cct 187 max Watts	Cct 188 max Watts	Cct 189 max Watts	Cct 190 max Watts	Cct 191 max Watts	Cct 192 max Watts				

Alarm registers

Address	+ 0	+ 1	+ 2	…	+ 191	…	+ 196	+ 197	+ 198	+ 199
9000 – 9119	Cct 1 current	Cct 2 current	Cct 3 current	…	Cct 192	…	Ph 1 current	Ph 2 current	Ph 3 current	Ph N current
9200 – 9319	Cct 1 breaker size	Cct 2 breaker size	Cct 3 breaker size	…	Cct 192 breaker size	…	Ph 1 breaker size	Ph 2 breaker size	Ph 3 breaker size	Ph N breaker size
9400 – 9519	Cct 1 warning threshold	Cct 2 warning threshold	Cct 3 warning threshold	…	Cct 192 warning threshold	…	Ph 1 warning threshold	Ph 2 warning threshold	Ph 3 warning threshold	Ph N warning threshold
9600 – 9719	Cct 1 alarm threshold	Cct 2 alarm threshold	Cct 3 alarm threshold	…	Cct 192 alarm threshold	…	Ph 1 alarm threshold	Ph 2 alarm threshold	Ph 3 alarm threshold	Ph N alarm threshold
9800 – 9919	Cct 1 warning timedela y	Cct 2 warning timedela y	Cct 3 warning timedela y	…	Cct 192 warning timedela y	…	Ph 1 warning timedelay	Ph 2 warning timedela y	Ph 3 warning timedela y	Ph N warning timedela y
10000 – 10119	Cct 1 alarm timedela y	Cct 2 alarm timedela y	Cct 3 alarm timedela y	…	Cct 192 alarm timedela y	…	Ph 1 alarm timedelay	Ph 2 alarm timedela y	Ph 3 alarm timedela y	Ph N alarm timedela y

Alarm registers (Cont.)

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 timedela y	Tripped breaker current	Tripped breaker timefram e	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 remainin g power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 3 phase meter	
10300	Total power limit	Total power used %	Total remainin g power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 123N group 1	

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
10310	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D123N group 2	
10320	…	…	…	…	…	…	…	…	D123N group 3	
…	…	…	…	…	…	…	…	…	D123N group …	
10770	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D123N group 48	
10780	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D3 phase meter 1	
10790	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D3 phase meter 2	
10800	Total power limit	Total power used %	Total remaining power	Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D3 phase meter 3	
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 120 ccts

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
11000	Cct 1 VRMS accumulator Lo	Cct 1 VRMS accumulator Hi	Cct 1 VRMS averaging counter	Cct 2 VRMS accumulator Lo	Cct 2 VRMS accumulator Hi	Cct 2 VRMS averaging counter	Cct 3 VRMS accumulator Lo	Cct 3 VRMS accumulator Hi	Cct 3 VRMS averaging counter	Cct 4 VRMS accumulator Lo
11010	Cct 4 VRMS accumulator Hi	Cct 4 VRMS averaging counter	Cct 5 VRMS accumulator Lo	Cct 5 VRMS accumulator Hi	Cct 5 VRMS averaging counter	Cct 6 VRMS accumulator Lo	Cct 6 VRMS accumulator Hi	Cct 6 VRMS averaging counter	Cct 7 VRMS accumulator Lo	Cct 7 VRMS accumulator Hi
…	…	…	…	…	…	…	…	…	…	…
11350	Cct 117 VRMS averaging counter	Cct 118 VRMS accumulator Lo	Cct 118 VRMS accumulator Hi	Cct 118 VRMS averaging counter	Cct 119 VRMS accumulator Lo	Cct 119 VRMS accumulator Hi	Cct 119 VRMS averaging counter	Cct 120 VRMS accumulator Lo	Cct 120 VRMS accumulator Hi	Cct 120 VRMS averaging counter
11360-90										
11400	Cct 1 IRMS accumulator Lo	Cct 1 IRMS accumulator Hi	Cct 1 IRMS averaging counter	Cct 2 IRMS accumulator Lo	Cct 2 IRMS accumulator Hi	Cct 2 IRMS averaging counter	Cct 3 IRMS accumulator Lo	Cct 3 IRMS accumulator Hi	Cct 3 IRMS averaging counter	Cct 4 IRMS accumulator Lo
11410	Cct 4 IRMS accumulator Hi	Cct 4 IRMS averaging counter	Cct 5 IRMS accumulator Lo	Cct 5 IRMS accumulator Hi	Cct 5 IRMS averaging counter	Cct 6 IRMS accumulator Lo	Cct 6 IRMS accumulator Hi	Cct 6 IRMS averaging counter	Cct 7 IRMS accumulator Lo	Cct 7 IRMS accumulator Hi
…	…	…	…	…	…	…	…	…	…	…
11750	Cct 117 IRMS averaging counter	Cct 118 IRMS accumulator Lo	Cct 118 IRMS accumulator Hi	Cct 118 IRMS averaging counter	Cct 119 IRMS accumulator Lo	Cct 119 IRMS accumulator Hi	Cct 119 IRMS averaging counter	Cct 120 IRMS accumulator Lo	Cct 120 IRMS accumulator Hi	Cct 120 IRMS averaging counter
11760-90										
11800	Cct 1 Watts accumulator Lo	Cct 1 Watts accumulator Hi	Cct 1 Watts averaging counter	Cct 2 Watts accumulator Lo	Cct 2 Watts accumulator Hi	Cct 2 Watts averaging counter	Cct 3 Watts accumulator Lo	Cct 3 Watts accumulator Hi	Cct 3 Watts averaging counter	Cct 4 Watts accumulator Lo
11810	Cct 4 Watts accumulator Hi	Cct 4 Watts averaging counter	Cct 5 Watts accumulator Lo	Cct 5 Watts accumulator Hi	Cct 5 Watts averaging counter	Cct 6 Watts accumulator Lo	Cct 6 Watts accumulator Hi	Cct 6 Watts averaging counter	Cct 7 Watts accumulator Lo	Cct 7 Watts accumulator Hi
…	…	…	…	…	…	…	…	…	…	…
12150	Cct 117 Watts averaging counter	Cct 118 Watts accumulator Lo	Cct 118 Watts accumulator Hi	Cct 118 Watts averaging counter	Cct 119 Watts accumulator Lo	Cct 119 Watts accumulator Hi	Cct 119 Watts averaging counter	Cct 120 Watts accumulator Lo	Cct 120 Watts accumulator Hi	Cct 120 Watts averaging counter
12160-90										
12200	Cct 1 PF accumulator Lo	Cct 1 PF accumulator Hi	Cct 1 PF averaging counter	Cct 2 PF accumulator Lo	Cct 2 PF accumulator Hi	Cct 2 PF averaging counter	Cct 3 PF accumulator Lo	Cct 3 PF accumulator Hi	Cct 3 PF averaging counter	Cct 4 PF accumulator Lo
12210	Cct 4 PF accumulator Hi	Cct 4 PF averaging counter	Cct 5 PF accumulator Lo	Cct 5 PF accumulator Hi	Cct 5 PF averaging counter	Cct 6 PF accumulator Lo	Cct 6 PF accumulator Hi	Cct 6 PF averaging counter	Cct 7 PF accumulator Lo	Cct 7 PF accumulator Hi
…	…	…	…	…	…	…	…	…	…	…
12550	Cct 117 PF averaging counter	Cct 118 PF accumulator Lo	Cct 118 PF accumulator Hi	Cct 118 PF averaging counter	Cct 119 PF accumulator Lo	Cct 119 PF accumulator Hi	Cct 119 PF averaging counter	Cct 120 PF accumulator Lo	Cct 120 PF accumulator Hi	Cct 120 PF averaging counter
12560-70										
12580 (13780) (13840) (13900)			All ph avg VRMS accumulator Lo	All ph avg VRMS accumulator Hi	All ph avg VRMS averaging counter	All ph avg IRMS accumulator Lo	All ph avg IRMS accumulator Mid	All ph avg IRMS accumulator Hi	All ph avg IRMS averaging counter	Total Watts accumulator Lo
12590 (13790) (13850) (13910)	Total Watts accumulator Mid	Total Watts accumulator Hi	Total Watts averaging counter	All ph PF accumulator Lo	All ph PF accumulator Hi	All ph PF averaging counter	Neutral IRMS accumulator Lo	Neutral IRMS accumulator Mid	Neutral IRMS accumulator Hi	Neutral IRMS averaging counter
12600 (13800) (13860) (13920)	Ph 1 VRMS accumulator Lo	Ph 1 VRMS accumulator Hi	Ph 1 VRMS averaging counter	Ph 2 VRMS accumulator Lo	Ph 2 VRMS accumulator Hi	Ph 2 VRMS averaging counter	Ph 3 VRMS accumulator Lo	Ph 3 VRMS accumulator Hi	Ph 3 VRMS averaging counter	Ph 1 IRMS accumulator Lo

Averaging registers 120 ccts (Cont.)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
12610 (13810) (13870) (13930)	Ph 1 IRMS accumulator Mid	Ph 1 IRMS accumulator Hi	Ph 1 IRMS averaging counter	Ph 2 IRMS accumulator Lo	Ph 2 IRMS accumulator Mid	Ph 2 IRMS accumulator Hi	Ph 2 IRMS averaging counter	Ph 3 IRMS accumulator Lo	Ph 3 IRMS accumulator Mid	Ph 3 IRMS accumulator Hi
12620 (13820) (13880) (13940)	Ph 3 IRMS averaging counter	Ph 1 Watts accumulator Lo	Ph 1 Watts accumulator Mid	Ph 1 Watts accumulator Hi	Ph 1 Watts averaging counter	Ph 2 Watts accumulator Lo	Ph 2 Watts accumulator Mid	Ph 2 Watts accumulator Hi	Ph 2 Watts averaging counter	Ph 3 Watts accumulator Lo
12630 (13830) (13890) (13950)	Ph 3 Watts accumulator Mid	Ph 3 Watts accumulator Hi	Ph 3 Watts averaging counter	Ph 1 PF accumulator Lo	Ph 1 PF accumulator Hi	Ph 1 PF averaging counter	Ph 2 PF accumulator Lo	Ph 2 PF accumulator Hi	Ph 2 PF averaging counter	Ph 3 PF accumulator Lo
12640 (13840) (13900) (13960)	Ph 3 PF accumulator Hi	Ph 3 PF averaging counter			12640 only D		All ph avg IRMS ROR average Lo	All ph avg IRMS ROR average Hi	All ph total Watts ROR average Lo	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 Lo	Ph 1 IRMS ROR average Hi	Ph 2 IRMS ROR average Lo	Ph 2 IRMS ROR average Hi	Ph 3 IRMS ROR average Lo	Ph 3 IRMS ROR average Hi	Ph 1 Watts ROR average Lo
12660	Ph 1 Watts ROR average Hi	Ph 2 Watts ROR average Lo	Ph 2 Watts ROR average Hi	Ph 3 Watts ROR average Lo	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 (12700) (12730)	Ph 1 VRMS ROR average	Ph 2 VRMS ROR average	Ph 3 VRMS ROR average	Ph 1 IRMS ROR average Lo	Ph 1 IRMS ROR average Hi	Ph 2 IRMS ROR average Lo	Ph 2 IRMS ROR average Hi	Ph 3 IRMS ROR average Lo	Ph 3 IRMS ROR average Hi	Ph 1 Watts ROR average Lo
12680 (12710) (12740)	Ph 1 Watts ROR average Hi	Ph 2 Watts ROR average Lo	Ph 2 Watts ROR average Hi	Ph 3 Watts ROR average Lo	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 Lo
12690 (12720) (12750)	All ph avg IRMS ROR average Hi	All ph total Watts ROR average Lo	All ph total Watts ROR average Hi							
12760-12990										
13000	Cct 1 VRMS ROR average	Cct 2 VRMS ROR average	Cct 3 VRMS ROR average	Cct 4 VRMS ROR average	Cct 5 VRMS ROR average	Cct 6 VRMS ROR average	Cct 7 VRMS ROR average	Cct 8 VRMS ROR average	Cct 9 VRMS ROR average	Cct 10 VRMS ROR average
13010	Cct 11 VRMS ROR average	Cct 12 VRMS ROR average	Cct 13 VRMS ROR average	Cct 14 VRMS ROR average	Cct 15 VRMS ROR average	Cct 16 VRMS ROR average	Cct 17 VRMS ROR average	Cct 18 VRMS ROR average	Cct 19 VRMS ROR average	Cct 20 VRMS ROR average
…	…	…	…	…	…	…	…	…	…	…
13180	Cct 181 VRMS ROR average	Cct 182 VRMS ROR average	Cct 183 VRMS ROR average	Cct 184 VRMS ROR average	Cct 185 VRMS ROR average	Cct 186 VRMS ROR average	Cct 187 VRMS ROR average	Cct 188 VRMS ROR average	Cct 189 VRMS ROR average	Cct 190 VRMS ROR average
13190	Cct 191 VRMS ROR average	Cct 192 VRMS ROR average								
13200	Cct 1 IRMS ROR average	Cct 2 IRMS ROR average	Cct 3 IRMS ROR average	Cct 4 IRMS ROR average	Cct 5 IRMS ROR average	Cct 6 IRMS ROR average	Cct 7 IRMS ROR average	Cct 8 IRMS ROR average	Cct 9 IRMS ROR average	Cct 10 IRMS ROR average
13210	Cct 11 IRMS ROR average	Cct 12 IRMS ROR average	Cct 13 IRMS ROR average	Cct 14 IRMS ROR average	Cct 15 IRMS ROR average	Cct 16 IRMS ROR average	Cct 17 IRMS ROR average	Cct 18 IRMS ROR average	Cct 19 IRMS ROR average	Cct 20 IRMS ROR average
…	…	…	…	…	…	…	…	…	…	…
13380	Cct 181 IRMS ROR average	Cct 182 IRMS ROR average	Cct 183 IRMS ROR average	Cct 184 IRMS ROR average	Cct 185 IRMS ROR average	Cct 186 IRMS ROR average	Cct 187 IRMS ROR average	Cct 188 IRMS ROR average	Cct 189 IRMS ROR average	Cct 190 IRMS ROR average
13390	Cct 191 IRMS ROR average	Cct 192 IRMS ROR average								
13400	Cct 1 Watts ROR average	Cct 2 Watts ROR average	Cct 3 Watts ROR average	Cct 4 Watts ROR average	Cct 5 Watts ROR average	Cct 6 Watts ROR average	Cct 7 Watts ROR average	Cct 8 Watts ROR average	Cct 9 Watts ROR average	Cct 10 Watts ROR average

Averaging registers 120 ccts (Cont.)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
13410	Cct 11 Watts ROR average	Cct 12 Watts ROR average	Cct 13 Watts ROR average	Cct 14 Watts ROR average	Cct 15 Watts ROR average	Cct 16 Watts ROR average	Cct 17 Watts ROR average	Cct 18 Watts ROR average	Cct 19 Watts ROR average	Cct 20 Watts ROR average
…	…	…	…	…	…	…	…	…	…	…
13580	Cct 181 Watts ROR average	Cct 182 Watts ROR average	Cct 183 Watts ROR average	Cct 184 Watts ROR average	Cct 185 Watts ROR average	Cct 186 Watts ROR average	Cct 187 Watts ROR average	Cct 188 Watts ROR average	Cct 189 Watts ROR average	Cct 190 Watts ROR average
13590	Cct 191 Watts ROR average	Cct 192 Watts ROR average								
13600	Cct 1 PF ROR average	Cct 2 PF ROR average	Cct 3 PF ROR average	Cct 4 PF ROR average	Cct 5 PF ROR average	Cct 6 PF ROR average	Cct 7 PF ROR average	Cct 8 PF ROR average	Cct 9 PF ROR average	Cct 10 PF ROR average
13610	Cct 11 PF ROR average	Cct 12 PF ROR average	Cct 13 PF ROR average	Cct 14 PF ROR average	Cct 15 PF ROR average	Cct 16 PF ROR average	Cct 17 PF ROR average	Cct 18 PF ROR average	Cct 19 PF ROR average	Cct 20 PF ROR average
…	…	…	…	…	…	…	…	…	…	…
13710	Cct 111 PF ROR average	Cct 112 PF ROR average	Cct 113 PF ROR average	Cct 114 PF ROR average	Cct 115 PF ROR average	Cct 116 PF ROR average	Cct 117 PF ROR average	Cct 118 PF ROR average	Cct 119 PF ROR average	Cct 120 PF ROR average

The power factor ROR registers for 192 circuits 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.
The ROR (reset-on-read) 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.

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	Cct 1 current warning	Cct 1 current alarm	Cct 1 tripped breaker	Cct 1 current warning latching
20020	Cct 1 current alarm latching	Cct 1 tripped breaker latching	Cct 2 current warning	Cct 2 current alarm	Cct 2 tripped breaker	Cct 2 current warning latching	Cct 2 current alarm latching	Cct 2 tripped breaker latching	Cct 3 current warning	Cct 3 current alarm
…	…	…	…	…	…	…	…	…	…	…
21160	Cct 191 current alarm latching	Cct 191 tripped breaker latching	Cct 192 current warning	Cct 192 current alarm	Cct 192 tripped breaker	Cct 192 current warning latching	Cct 192 current alarm latching	Cct 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 group 1 Under V alarm	123N group 1 Over V alarm	123N group 1 Under V latching alarm	123N group 1 Over V latching alarm	123N group 1 neutral current mismatch	123N group 1 neutral current mismatch latching	123N group 2 Under V alarm	123N group 2 Over V alarm	123N group 2 Under V latching alarm	123N group 2 Over V latching alarm
21250	123N group 2 neutral current mismatch	123N group 2 neutral current mismatch latching	123N group 3 Under V alarm	123N group 3 Over V alarm	123N group 3 Under V latching alarm	123N group 3 Over V latching alarm	123N group 3 neutral current mismatch	123N group 3 neutral current mismatch latching	123N group 4 Under V alarm	123N group 4 Over V alarm
…	…	…	…	…	…	…	…	…	…	…
21520	123N group 47 neutral current mismatch	123N group 47 neutral current mismatch latching	123N group 48 Under V alarm	123N group 48 Over V alarm	123N group 48 Under V latching alarm	123N group 48 Over V latching alarm	123N group 48 neutral current mismatch	123N group 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 group summaries

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									Amps avg (low wrd) * 100 All Phases	Amps avg (hi wrd) * 100 All Phases
22000	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low wrd) * 100 Phase 1	Amps tot (hi wrd) * 100 Phase 1	Amps tot (low wrd) * 100 Phase 2	Amps tot (hi wrd) * 100 Phase 2	Amps tot (low wrd) * 100 Phase 3	Amps tot (hi wrd) * 100 Phase 3	PF Avg Phase 1 (signed)
22010	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low wrd) Phase 1 (signed)	Watts total (hi wrd) Phase 1 (signed)	Watts total (low wrd) Phase 2 (signed)	Watts total (hi wrd) Phase 2 (signed)	Watts total (low wrd) Phase 3 (signed)	Watts total (hi wrd) Phase 3 (signed)	KWH total (low wrd) Phase 1	KWH total (hi wrd) Phase 1
22020	KWH total (low wrd) Phase 2	KWH total (hi wrd) Phase 2	KWH total (low wrd) Phase 3	KWH total(hi wrd) Phase 3	Vrms All Phases	Amps tot (low wrd) * 100 All Phases	Amps tot (hi wrd) * 100 All Phases	PF Avg All Phases (signed)	Watts total (low wrd) All Phases (signed)	Watts total (hi wrd) All Phases (signed)
22030	KWH total (low wrd) All Phases	KWH total (hi wrd) All Phases	Amps tot (low wrd) * 100 Phase N	Amps tot (hi wrd) * 100 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg	VAR total (low wrd) Phase 1 (signed)	VAR total (hi wrd) Phase 1 (signed)
22040	VAR total (low wrd) Phase 2 (signed)	VAR total (hi wrd) Phase 2 (signed)	VAR total (low wrd) Phase 3 (signed)	VAR total (hi wrd) Phase 3 (signed)	VAR total (low wrd) All Phase (signed)	VAR total (hi wrd) All Phases (signed)	VA total (low wrd) Phase 1	VA total (hi wrd) Phase 1	VA total (low wrd) Phase 2	VA total (hi wrd) Phase 2
22050	VA total (low wrd) Phase 3	VA total (hi wrd) Phase 3	VA total (low wrd) All Phase	VA total (hi wrd) All Phases						ITHD Phase 1
22060	ITHD Phase 2	ITHD Phase 3	ITHD Neutral	ITHD total	ITHD avg	Max Watts (low wrd) Phase 1	Max Watts (hi wrd) Phase 1	Max Watts (low wrd) Phase 2	Max Watts (hi wrd) Phase 2	Max Watts (low wrd) Phase 3
22070	Max Watts (hi wrd) Phase 3									
22080										
22090				Ph 1 circuit number	Ph 2 circuit number	Ph 3 circuit number	Ph N circuit number	Number of 123N groups		

Averaging registers (Power Factor, 192 ccts, reset on read)

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

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.

3-phase meter reset on read averaging registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
27000 (27100) (27200)	Vrms Phase 1	Vrms Phase 2	Vrms Phase 3	Amps tot (low wrd) * 100 Phase 1	Amps tot (hi wrd) * 100 Phase 1	Amps tot (low wrd) * 100 Phase 2	Amps tot (hi wrd) * 100 Phase 2	Amps tot (low wrd) * 100 Phase 3	Amps tot (hi wrd) * 100 Phase 3	PF Avg Phase 1 (signed)
27010 (27110) (27210)	PF Avg Phase 2 (signed)	PF Avg Phase 3 (signed)	Watts total (low wrd) Phase 1 (signed)	Watts total (hi wrd) Phase 1 (signed)	Watts total (low wrd) Phase 2 (signed)	Watts total (hi wrd) Phase 2 (signed)	Watts total (low wrd) Phase 3 (signed)	Watts total (hi wrd) Phase 3 (signed)	Vrms All Phases	Amps avg (low wrd) * 100 All Phases
27020 (27120) (27220)	Amps avg (hi wrd) * 100 All Phases	PF Avg All Phases (signed)	Watts total (low wrd) All Phases (signed)	Watts total (hi wrd) All Phases (signed)	Amps tot (low wrd) * 100 Phase N	Amps tot (hi wrd) * 100 Phase N	V 1-2	V 2-3	V 3-1	V L-L avg
27030 (27130) (27230)	VAR total (low wrd) Phase 1 (signed)	VAR total (hi wrd) Phase 1 (signed)	VAR total (low wrd) Phase 2 (signed)	VAR total (hi wrd) Phase 2 (signed)	VAR total (low wrd) Phase 3 (signed)	VAR total (hi wrd) Phase 3 (signed)	VAR total (low wrd) All (signed)	VAR total (hi wrd) All Phases (signed)	VA total (low wrd) Phase 1	VA total (hi wrd) Phase 1
27040 (27140) (27240)	VA total (low wrd) Phase 2	VA total (hi wrd) Phase 2	VA total (low wrd) Phase 3	VA total (hi wrd) Phase 3	VA total (low wrd) All Phase	VA total (hi wrd) All Phases	VTHD Phase 1	VTHD Phase 2	VTHD Phase 3	VTHD total
27050 (27150) (27250)	VTHD avg	ITHD Phase 1	ITHD Phase 2	ITHD Phase 3	Reserve d	ITHD total	ITHD avg	Frequenc y Phase 1	Frequenc y Phase 2	Frequenc y Phase 3
27060 (27160) (27260)	Frequenc y avg	% power used	Power remainin g							

Circuit max Watt 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	Cct 1 Max Watts time 1	Cct 1 Max Watts time 2	Cct 1 Max Watts time 3	Cct 1 Max Watts time 4	Cct 1 max Watts	Cct 2 Max Watts time 1
28010	Cct 2 Max Watts time 2	Cct 2 Max Watts time 3	Cct 2 Max Watts time 4	Cct 2 max Watts	Cct 3 Max Watts time 1	Cct 3 Max Watts time 2	Cct 3 Max Watts time 3	Cct 3 Max Watts time 4	Cct 3 max Watts	Cct 4 Max Watts time 1
…	…	…	…	…	…	…	…	…	…	…
28950	Cct 190 Max Watts time 2	Cct 190 Max Watts time 3	Cct 190 Max Watts time 4	Cct 190 max Watts	Cct 191 Max Watts time 1	Cct 191 Max Watts time 2	Cct 191 Max Watts time 3	Cct 191 Max Watts time 4	Cct 191 max Watts	Cct 192 Max Watts time 1
28960	Cct 192 Max Watts time 2	Cct 192 Max Watts time 3	Cct 192 Max Watts time 4	Cct 192 max Watts						

Averaging registers 192 ccts

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

WRITE registers

Write registers are programmed using Modbus write single register command (F06).

General circuit setup registers

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

See equivalent read register descriptions

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					
4460					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’
4510										
4520										
…										
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				
4590	1234 - Force wave capture 2345 – TAP NCM check	Wave cap nr channels All = 0 Fault = 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 circuit current readings by 10 and power readings by 100. Note: The accumulated power reading (kWh) is NOT affected by this setting. To change kWh scaling, adjust the scale factor at address 9.

4506 Set RS485 port speed

On compatible products (Enersure) allow serial port speed to be adjusted from next reboot.

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		8-11	month (1-12)
		0-4	day (1-31)
RTC3		8-12	hour (0-23)
		0-5	minutes (0-59)
RTC4			milliseconds (0-59999)

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

BUSSWAY device registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4600									Board selection address	Restart Board '4321'
4610										
4620										
…										
4670										
4680			Serial Number of selected board	Config 0 – top/bottom feed 1 – Waveform disabled						

4608 Select a target device address on the Bussway

Writing a value of '0xmmnn' to this register selects the address on the Bussway for Firmware and 4680 data to be transferred to. Where nn is the Bussway address in hex and mm is the bit inverse of this value

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.

Circuit current harmonics

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

Miscellaneous registers

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
6800		SMS device ID	Unit ID lo	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 Lo	Interval Hi	Offset Lo	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 behaviour, 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.

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		

Accumulated power registers

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

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

Alarm registers

Address	+ 0	+ 1	+ 2	…	+ 119	…	+ 196	+ 197	+ 198	+ 199
9200 – 9319	Cct 1 breaker size	Cct 2 breaker size	Cct 3 breaker size	…	Cct 192 breaker size	…	Ph 1 breaker size	Ph 2 breaker size	Ph 3 breaker size	Ph N breaker size
9400 – 9519	Cct 1 warning threshold	Cct 2 warning threshold	Cct 3 warning threshold	…	Cct 192 warning threshold	…	Ph 1 warning threshold	Ph 2 warning threshold	Ph 3 warning threshold	Ph N warning threshold
9600 – 9719	Cct 1 alarm threshold	Cct 2 alarm threshold	Cct 3 alarm threshold	…	Cct 192 alarm threshold	…	Ph 1 alarm threshold	Ph 2 alarm threshold	Ph 3 alarm threshold	Ph N alarm threshold
9800 – 9919	Cct 1 warning timedelay	Cct 2 warning timedelay	Cct 3 warning timedelay	…	Cct 192 warning timedelay	…	Ph 1 warning timedelay	Ph 2 warning timedelay	Ph 3 warning timedelay	Ph N warning timedelay
10000 – 10119	Cct 1 alarm timedelay	Cct 2 alarm timedelay	Cct 3 alarm timedelay	…	Cct 192 alarm timedelay	…	Ph 1 alarm timedelay	Ph 2 alarm timedelay	Ph 3 alarm timedelay	Ph N alarm timedelay
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

Alarm registers (Cont.)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
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	D 3 phase meter	
10300	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 123N group 1	
10310	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 123N group 2	
10320	…	…	…	…	…	…	…	…	D 123N group 3	
…	…	…	…	…	…	…	…	…	D 123N group …	
10770	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 123N group 48	
10780	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 3 phase meter 1	
10790	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 3 phase meter 2	
10800	Total power limit			Warning threshold	Alarm threshold	Warning delay	Alarm delay	Power flags	D 3 phase meter 3	
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

Alarm registers (Cont.)

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
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	Cct 1 current warning	Cct 1 current alarm	Cct 1 tripped breaker	Cct 1 current warning latching
20020	Cct 1 current alarm latching	Cct 1 tripped breaker latching	Cct 2 current warning	Cct 2 current alarm	Cct 2 tripped breaker	Cct 2 current warning latching	Cct 2 current alarm latching	Cct 2 tripped breaker latching	Cct 3 current warning	Cct 3 current alarm
…	…	…	…	…	…	…	…	…	…	…
21160	Cct 191 current alarm latching	Cct 191 tripped breaker latching	Cct 192 current warning	Cct 192 current alarm	Cct 192 tripped breaker	Cct 192 current warning latching	Cct 192 current alarm latching	Cct 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 group 1 Under V alarm	123N group 1 Over V alarm	123N group 1 Under V latching alarm	123N group 1 Over V latching alarm	123N group 1 neutral current mismatch	123N group 1 neutral current mismatch latching	123N group 2 Under V alarm	123N group 2 Over V alarm	123N group 2 Under V latching alarm	123N group 2 Over V latching alarm
21250	123N group 2 neutral current mismatch	123N group 2 neutral current mismatch latching	123N group 3 Under V alarm	123N group 3 Over V alarm	123N group 3 Under V latching alarm	123N group 3 Over V latching alarm	123N group 3 neutral current mismatch	123N group 3 neutral current mismatch latching	123N group 4 Under V alarm	123N group 4 Over V alarm
…	…	…	…	…	…	…	…	…	…	…
21520	123N group 47 neutral current mismatch	123N group 47 neutral current mismatch latching	123N group 48 Under V alarm	123N group 48 Over V alarm	123N group 48 Under V latching alarm	123N group 48 Over V latching alarm	123N group 48 neutral current mismatch	123N group 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						

Password reset

Address	+ 0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
65500	Reset web password '1234'									

65500 Password reset
Writing '1234' to this register will reset the web password back to 'password'.

MODBUS READFILE

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

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 incremented 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 of a waveform capture file contains the metadata…

Register's	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 ¼ hours

Subsequent records contain the waveform data, 18 records per waveform…

Register's	Contents
0	Circuit/phase number - bit 15 set indicates phase voltage, circuits above 192 are phase currents (phase 2 current is therefore 194)
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.

The general event log entry format is…

Register's	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
	Other values are reserved for future expansion	
5-120	Optional event data	

Circuit alarm

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

Register's	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's	Contents
5-120	Raw log configuration data

Log error

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

Register's	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 whilst downloading a captured waveform.

Register's	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's	Contents
5-120	Reserved for future expansion

Lost TAP

Entry made when communications with a TAP are lost.

Register's	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

Section 2:

SNMP

Note: *x* denotes the circuit number (1-88 for EnerSure BCPM and 1-120 for EnerSure Bus).

Example:

Volts for Circuit #1= 1.3.6.1.4.1.10381.1.3.1.3.2.1.22.1

Amps for circuit #12= 1.3.6.1.4.1.10381.1.3.1.3.2.1.23.12

Taps/Branch Circuits:

Volts: 1.3.6.1.4.1.10381.1.3.1.3.2.1.22.x *.1

Amps: 1.3.6.1.4.1.10381.1.3.1.3.2.1.23.x *.01

pF: 1.3.6.1.4.1.10381.1.3.1.3.2.1.24.x *.001

Watts: 1.3.6.1.4.1.10381.1.3.1.3.2.1.25.x

kWh: 1.3.6.1.4.1.10381.1.3.1.3.2.1.8.x *.001

Phase: 1.3.6.1.4.1.10381.1.3.1.3.2.1.6.x

Enkapsis: (* = Designates data from 'Slave' Enkapsis Device)**

tpEsPhaseVRMS.1	VRMS All Phases	*.1
tpEsPhaseVRMS.2	VRMS All Phases ***	*.1
tpEsPhaseIRMS.1	IRMS All Phases	*0.001
tpEsPhaseIRMS.2	IRMS All Phases ***	*0.001
tpEsPhasePF.1	PF All Phases	*0.001
tpEsPhasePF.2	PF All Phases ***	*0.001
tpEsPhaseWatt.1	kW All Phases	*0.001
tpEsPhaseWatt.2	kW All Phases ***	*0.001
tpEsPhaseKwh.1	kVAR All Phases	*0.001

tpEsPhaseKwh.2	kVAR All Phases ***	*0.001
tpEsPhaseTHDv.1	VTHD All Phases	*.1
tpEsPhaseTHDv.2	VTHD All Phases ***	*.1
tpEsPhaseTHDi.1	ITHD All Phases	*.1
tpEsPhaseTHDi.2	ITHD All Phases ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.2.1.10.1	kWh All Phases	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.2.1.10.2	kWh All Phases ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.2.1.11.1	kVARh All Phases	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.2.1.11.2	kVARh All Phases ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.2.1.12.1	Freq All Phases	*.01
.1.3.6.1.4.1.10381.1.3.1.4.2.1.12.2	Freq All Phases ***	*.01
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.1	VRMS Phase 1	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.2	VRMS Phase 2	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.3	VRMS Phase 3	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.5	VRMS Phase 1 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.6	VRMS Phase 2 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.7	VRMS Phase 3 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.2.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.1	IRMS Phase 1	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.2	IRMS Phase 2	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.3	IRMS Phase 3	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.4	IRMS Phase N	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.5	IRMS Phase 1 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.6	IRMS Phase 2 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.7	IRMS Phase 3 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.3.8	IRMS Phase N ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.1	PF Phase 1	*0.001

.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.2	PF Phase 2	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.3	PF Phase 3	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.5	PF Phase 1 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.6	PF Phase 2 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.7	PF Phase 3 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.4.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.1	kW Phase 1	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.2	kW Phase 2	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.3	kW Phase 3	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.5	kW Phase 1 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.6	kW Phase 2 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.7	kW Phase 3 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.5.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.1	kVAR Phase 1	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.2	kVAR Phase 2	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.3	kVAR Phase 3	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.5	kVAR Phase 1 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.6	kVAR Phase 2 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.7	kVAR Phase 3 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.6.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.1	VTHD Phase 1	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.2	VTHD Phase 2	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.3	VTHD Phase 3	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.5	VTHD Phase 1 ***	*.1

.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.6	VTHD Phase 2 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.7	VTHD Phase 3 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.7.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.1	ITHD Phase 1	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.2	ITHD Phase 2	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.3	ITHD Phase 3	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.5	ITHD Phase 1 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.6	ITHD Phase 2 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.7	ITHD Phase 3 ***	*.1
.1.3.6.1.4.1.10381.1.3.1.4.3.1.8.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.1	kWh Phase 1	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.2	kWh Phase 2	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.3	kWh Phase 3	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.5	kWh Phase 1 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.6	kWh Phase 2 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.7	kWh Phase 3 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.9.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.1	kVARh Phase 1	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.2	kVARh Phase 2	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.3	kVARh Phase 3	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.5	kVARh Phase 1 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.6	kVARh Phase 2 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.7	kVARh Phase 3 ***	*0.001
.1.3.6.1.4.1.10381.1.3.1.4.3.1.10.8	N/A ***	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.1	Freq Phase 1	*.01

.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.2	Freq Phase 2	*.01
.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.3	Freq Phase 3	*.01
.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.4	N/A	
.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.5	Freq Phase 1 ***	*.01
.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.6	Freq Phase 2 ***	*.01
.1.3.6.1.4.1.10381.1.3.1.4.3.1.11.7	Freq Phase 3 ***	*.01

Section 3:

BACnet

Date: 17/03/16
Vendor Name: Trendpoint
Product Name: Enkapsis
Product Model Number: 14TPT622
Applications Software Version: **Firmware Revision:** 0.28.0
BACnet Protocol Revision: 10

Product Description:

Electricity power monitor

BACnet Standardized Device Profile (Annex L)

	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)

List all BACnet Interoperability Building Blocks supported (see Annex K in BACnet Addendum 135d):

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

Which of the following device binding methods does the product support? (check one or more)

	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 and 1295 – 1414

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	
Cct *n* Vrms	Where 1 ≤ *n* ≤ 120, instantaneous RMS voltage of the circuit	0 – 119
Cct *n* Irms	Where 1 ≤ *n* ≤ 120, instantaneous RMS current of the circuit	120 – 239
Cct *n* PFactor	Where 1 ≤ *n* ≤ 120, the power factor of the circuit	240 – 359
Cct *n* Watts	Where 1 ≤ *n* ≤ 120, the instantaneous power of the circuit	360 – 479
Cct *n* kWh	Where 1 ≤ *n* ≤ 120, total energy measured through the circuit	480 – 599
Cct *n* kWh resetting	Where 1 ≤ *n* ≤ 120, no longer available, returns 0	600 – 719
Phase *n* Vrms	Where 1 ≤ *n* ≤ 3, the RMS voltage of the phase	720 – 722
Phase *n* Itot	Where 1 ≤ *n* ≤ 3, the total current of all circuits on the phase	723 – 725
Phase *n* PFactor avg	Where 1 ≤ *n* ≤ 3, the average power factor of all circuits on the phase	726 – 728
Phase *n* Watts	Where 1 ≤ *n* ≤ 3, the total power of all circuits on the phase	729 – 731
Phase *n* kWh	Where 1 ≤ *n* ≤ 3, the total energy measured through all circuits on the phase	732 – 734
Dry contact *n* V	Where 1 ≤ n ≤ 8, instantaneous DC voltage	735 – 742
Dry contact *n* Irms	Where 1 ≤ n ≤ 8, instantaneous RMS current	743 – 750
Phase N Itot	The total current of all neutral circuits	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 ≤ n ≤ 3, instantaneous RMS voltage of the phase	758 – 760
3phm Phase *n* Irms	Where 1 ≤ n ≤ 3, instantaneous RMS current of the phase	761 – 763
3phm Phase *n* PFactor avg	Where 1 ≤ n ≤ 3, the power factor of the phase	764 – 766
3phm Phase *n* Watts	Where 1 ≤ n ≤ 3, the instantaneous power of the phase	767 – 769
3phm Phase *n* KWh	Where 1 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 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 ≤ n ≤ 3, the instantaneous frequency of the phase	822 – 824

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

123N group *g* All Phase VA total	Where 1 ≤ g ≤ 48, The total apparent power across all group phases	2999 – 3046
123N group *g* Phase *n* ITHD	Where 1 ≤ g ≤ 48 and 1 ≤ n ≤ 3, total harmonic distortion of the group phase current	3047 – 3190
123N group *g* Phase N ITHD	Where 1 ≤ g ≤ 48, total harmonic distortion of the group neutral phase current	3191 – 3238
123N group *g* All Phase ITHD total	Where 1 ≤ g ≤ 48, Total of the group phase current total harmonic distortions	3239 – 3286
123N group *g* All Phase ITHD avg	Where 1 ≤ g ≤ 48,	3287 – 3334
123N group *g* Phase *n* Watts max	Where 1 ≤ g ≤ 48 and 1 ≤ n ≤ 3,	3335 – 3478
123N group *g* total power used	Where 1 ≤ g ≤ 48,	3479 – 3526
123N group *g* total power remaining	Where 1 ≤ g ≤ 48,	3527 - 3574

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	
Cct *n* CT factor	Where 1 ≤ *n* ≤ 120, this factor will be quoted with each CT to be used with the data gathering modules.	0 – 119
Cct *n* alarm breaker size	Where 1 ≤ *n* ≤ 120, current scale against which warning and alarm thresholds are measured.	120 – 239
Phase *n* Vlo threshold	Where 1 ≤ *n* ≤ 3, threshold for triggering the Vlo alarm	240 – 242
Phase *n* Vhi threshold	Where 1 ≤ *n* ≤ 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 group *n* total power limit	Where 1 ≤ n ≤ 48, 123N group total power limit	253-300
3phm total power limit	3 phase meter total power limit	301

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	
Nr circuits	Physical number of circuits.	
Cct *n* group	Where 1 ≤ *n* ≤ 120, this number is used to indicate whether circuits should be grouped together as two phase or three phase – or left as single phase.	0 – 119
Cct *n* CT	Where 1 ≤ *n* ≤ 120, this is a number to identify a CT, and is the max current of the CT.	120 – 239
Cct *n* phase	Where 1 ≤ *n* ≤ 120, the phase connection is derived from the board by the jumper setting.	240 – 359
Cct *n* Exp phase	Where 1 ≤ *n* ≤ 120, this is the phase that the board expects to be connected.	360 – 479
Cct *n* warning threshold	Where 1 ≤ *n* ≤ 120, circuit's warning level.	480 – 599
Cct *n* alarm threshold	Where 1 ≤ *n* ≤ 120, circuit's alarm level.	600 – 719
Cct *n* warning delay	Where 1 ≤ *n* ≤ 120, time over warning level before warning is triggered.	720 – 839
Cct *n* alarm delay	Where 1 ≤ *n* ≤ 120, time over alarm level before alarm is triggered.	840 – 959
Log *n* configuration count	Where 0 ≤ *n* ≤ 9, version of the log configuration.	960 – 969
Log *n* mode	Where 0 ≤ *n* ≤ 9, rollover or stop logging when full.	970 – 979
Log *n* max entries	Where 0 ≤ *n* ≤ 9, maximum number of entries in log (≤ 65535).	980 – 989
Log *n* interval	Where 0 ≤ *n* ≤ 9, how often log entry is made.	990 – 999
Log *n* offset	Where 0 ≤ *n* ≤ 9, offset from day/hour/minute to make log entry.	1000 – 1009
Log *n* register list length	Where 0 ≤ *n* ≤ 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 circuits	Number of physical circuits.	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 circuit numbering	ANSI/IEC circuit numbering	1026

Nr circuits on TAP *n*	Where 1 ≤ n ≤ 30, Number of circuits 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
Circuit selected for I harmonics	Circuit selected for I harmonics	1060
123N group *n* warning threshold	Where 1 ≤ n ≤ 48, 123N group warning threshold	1061-1108
123N group *n* alarm threshold	Where 1 ≤ n ≤ 48, 123N group alarm threshold	1109-1156
123N group *n* warning delay	Where 1 ≤ n ≤ 48, 123N group warning delay	1157-1204
123N group *n* alarm delay	Where 1 ≤ n ≤ 48, 123N group alarm delay	1205-1252
3 phase meter warning threshold	3 phase meter warning threshold	1253
3 phase meter alarm	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

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	Circuit warning states.	0
Alarms	Circuit alarm states.	1
Tripped breakers	Circuit tripped breaker states.	2
Warnings latched	Circuit latched warning states.	3
Alarms latched	Circuit latched alarm states.	4
Tripped breakers latched	Circuit 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 group *n* power alarms	Where 1 ≤ n ≤ 48, 123N group power alarms	11 – 58
3 phase meter power alarms	3 phase meter power alarms	59

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

There are two ways to identify the type of processor being used.

To physically check a board, look at the RJ45 communications port opposite the ribbon cable connector. If the RJ45 port has a label that says “Digi” on top and has a “–C” on the side (shown below), then the processor is a C-type. If there is no label on the RJ45 then the processor is an xD processor.

Figure: C-Type processor card

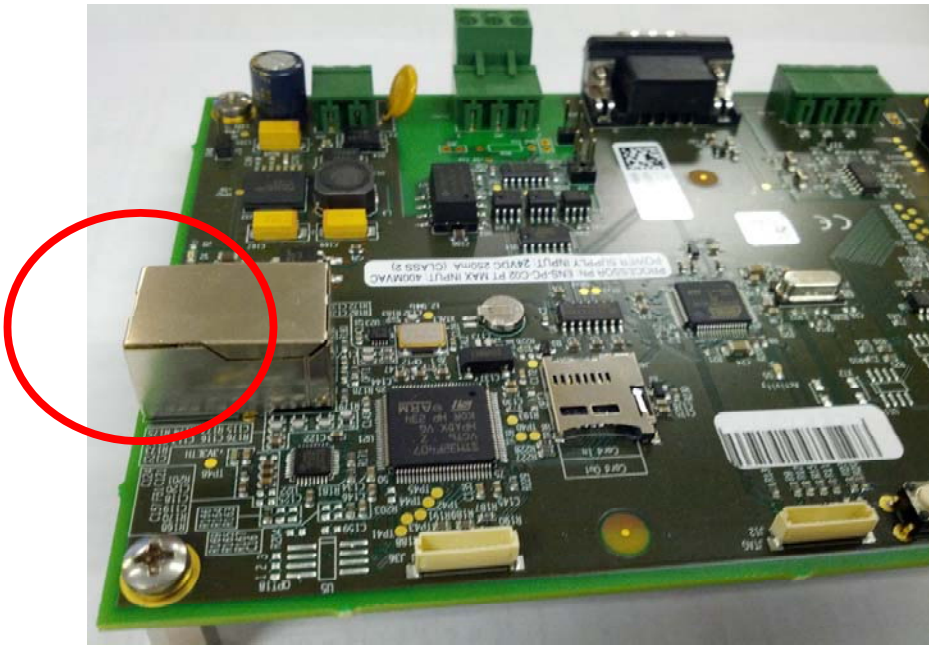

Figure: xD Processor

To check the processor type without physically looking at the board you need to be able to connect to the board through your network. Type the IP address of the board into a web browser. If prompted by a pop-up for a Username and Password then it is a C-type processor. If not prompted by a pop-up, but instead brought to a page, shown below, that says TrendPoint on it, then it is an xD processor.

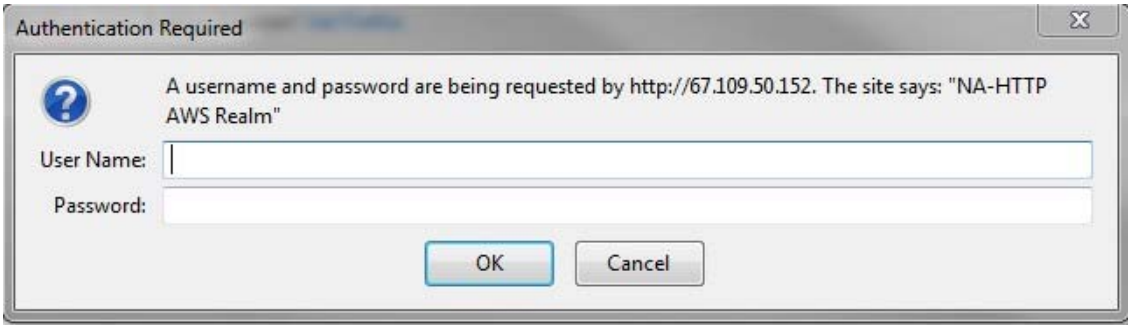

Figure: C-type Processor Authentication

Figure: xD Web Interface

Appendix B

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 and 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 4 registers are the RTC registers, giving you 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 (2 logs), and the Circuit Group registers. Logs 8 and 9 are blank by default.

Event Log

The Even 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)	

Threshold Alarm

Register Offset	Register Name	Comments
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 C

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 3 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