CHAPTER 6: DATA COMMUNICATION

This section is applicable only for PM1200 power meter.

RS 485 Data Port

Data Port advantages:

- Rapid, on-line, real time readings into
- Your own SCADA software or PLC.
- Schneider Electric Energy Management software products such as IONE, Vijeo Citect, PowerLogic SCADA for pinpointing energy usage and wastage.
- Schneider Electric ConPAD – meter programming and basic data reading utility.
- Data Port has built-in impedance matched design for low reflectance on long data cables at high Baud rates. Eliminates need for complicated impedance matching resistors at the ends of long data cables.
- Fast 16 ms power meter response, average timing to read 10 parameters is of 90 to 100 ms (9600 Baud, Even parity, One stop bit).
- Direct reading, pre-scaled Float readings. Accurate, full precision Low and High readings. No need for additional scaling factors or decimal adjustment.
- Fast, easy to use grouping of parameters tuned for field requirements.
- TURBO area for single point polling (upto 50 per query)
- Block area for even faster access to pre-configured data blocks

Installation

Figure 6-1: 2 Wire Half Duplex Communication Connection

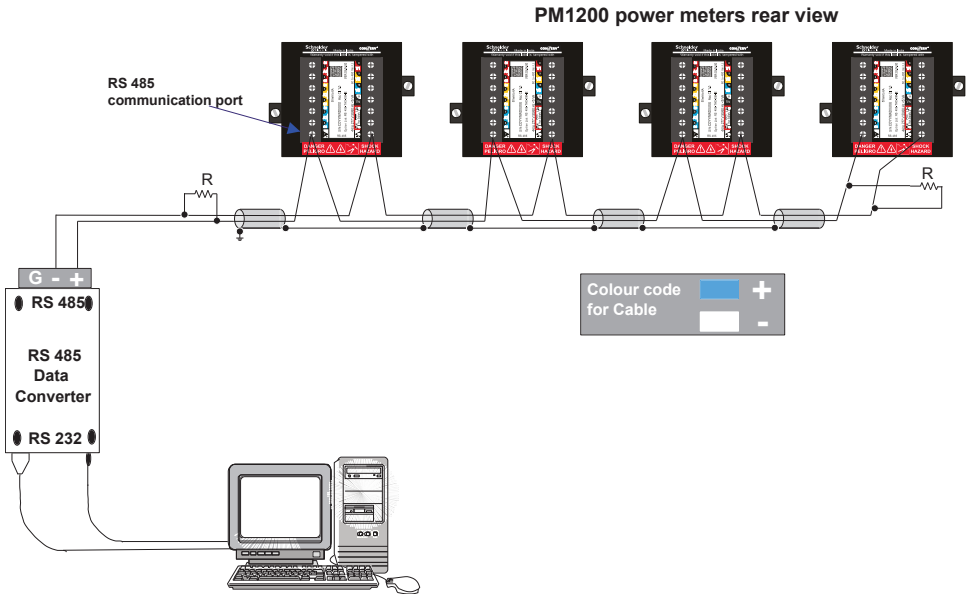
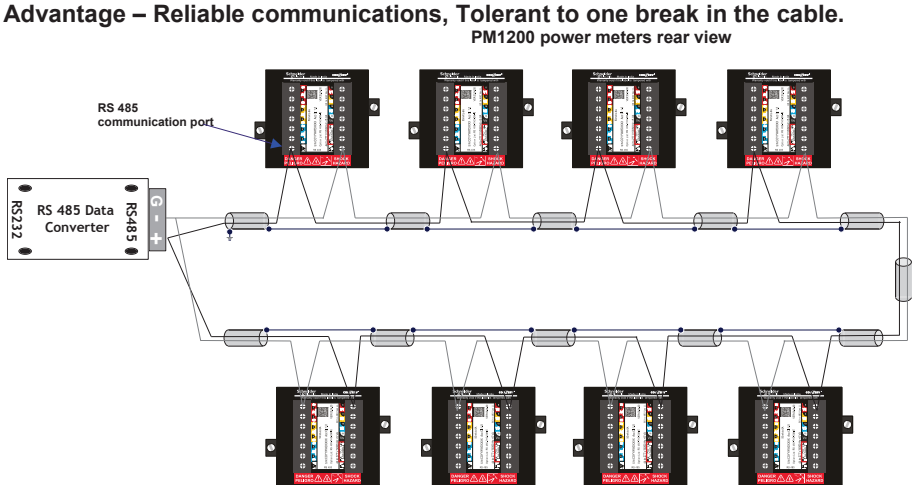


Figure 6-2: Closed Loop, 2 Wire Half Duplex.
Advantage – Reliable communications, Tolerant to one break in the cable.



Communication Capabilities

Table 6-1: RS 485 Communication Distances

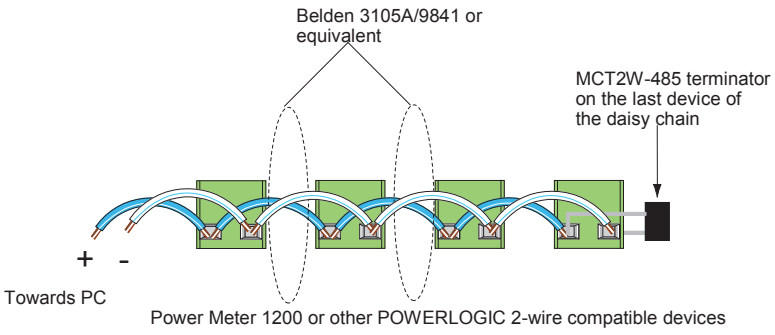
Baud Rate	Maximum Communication Distances 1 to 32 Devices	
	Feet	Meters
9600	8000	**1200**
19200	6000	**900**

NOTE: Distances listed should be used as guide only and cannot be guaranteed for non-POWERLOGIC devices.

Daisy-chaining Devices to the Power Meter

RS 485 slave port allows the power meter to be connected in a daisy chain with up to 31, 2-Wire devices. In this bulletin, communications link refers to a chain of devices that are connected by a communications cable. See Figure 6-3.

Figure 6-3: Daisy-chaining 2-Wire devices



NOTE: Belden 3105A/9841 colors: Blue (+), White (-)

- If the power meter is the first device on the daisy chain, connect it to the host device using a RS 232 to RS 422/RS 485 converter or RS 485 to Ethernet converter.

- If the power meter is the last device on the daisy chain, terminate it with the terminator provided.
- See Table 6-1 for the maximum daisy-chain communications distances for 2-Wire devices.
- The terminal's voltage and current ratings are compliant with the requirements of the EIA RS 485 communications standard.

Data Formats and Settings

Your SCADA software must be configured for Modbus RTU communication, before integrating the Schneider Electric PM1200 power meter.
The mode of transmission is defined in the following which is compatible with Modbus RTU Mode:

Table 6-2: Power meter communication and Protocol settings

Power meter Communication Settings	
Protocol	Modbus RTU
Data bits	8
Baud rate	9600 Baud, User set 1200 to 19200 Range:1200, 2400, 4800, 9600, 19200 Normally use: 9600 Baud Noisy, EMI, RFI, long data cable: 4800/2400 Baud Short cable (<300 meters or 975 feet): 19200 Baud
Parity	Even
Device Address	1
Stop bit	1
Modbus Protocol	
Device Address	1 to 247 Upto 247 meters per COM Port with Repeaters
Function Code	03 (Read)
Data Address	Refer Section Data address
Data type	32-bit float (real) : • All parameters. • Direct reading, Little Endian Float, no scaling required 32-bit unsigned integer : • INTR (number of interruptions (Outages) - RMS Blocks) • RunSec (Run seconds – Integ Block)
No of Registers	2 to 50 (optional) per PM1200 data block of 10 x 32 bit values must be configured to suit the power meter

NOTE: The polling interval to poll the data from PM1200 will depend on baud rate. We recommend polling interval of 1 sec at 9600 baud rate.

Parameter Settings for different SCADA software

The following table explains how to read the parameter VA (Refer “Individual parameter address” in page 49 for more information) in different MODBUS Master Software/PLC’s.

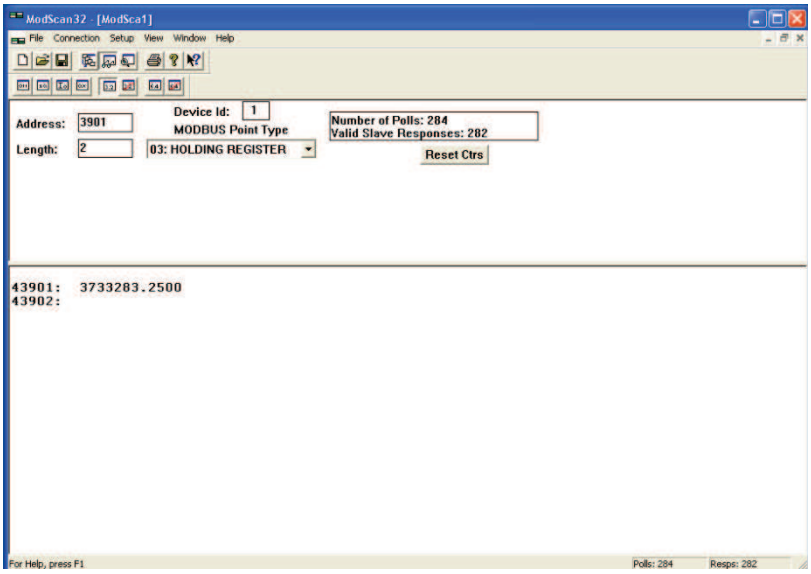
Table 6-3: Parameter settings

SL. No	SCADA software	Start Address	Function Code	No. of Register	Data Type	Remarks
1	IONE	43901	Internally configured	2	Swapped Float	Direct conversion
2	PowerLogic SCADA	43901	Internally configured	2	Real	Direct conversion
3	Vijeo Citect	43901	Internally configured	2	Real	Direct conversion
4	Intouch	43901 F	Nil	2	Float	Direct conversion
5	MODSCAN (Master)	3901	03 – Holding Registers	2	Floating point	Unswapped FP mode
6	MODTEST	43901	03 – Rosemount	Points -1	Float-Rosemount	
7	CIMPLICITY	43901	Nil	100	Real	Direct conversion. The array concept can be used here to poll all the data in single scan
8	Allenbradly – Micrologix PLC (Slave/Master)	43901	03-Holding Registers	2	Floating point	Direct
9	GE Fanuc PLC	43901	03-Holding Registers	2	Real	Direct
10	ABB RTU 560 (Mater)	Index-3900	03- Read Holding Registers	Query Range - 2	MFI – Analog measured Floating value	Under Sub parameters “Sign and Exponent in First Register” should be disabled (Unchecked)
11	SEIMENS PLC (Master)	3900	03-Holding Registers	2	Real	Direct
12	MOVICON	43901	Nil	2	Real	Direct
13	RSVIEW	43901	03-Holding Registers	2	Real	Direct
14	ABB Microscada	3900	Format – 9	Interval – 2	Real	Direct

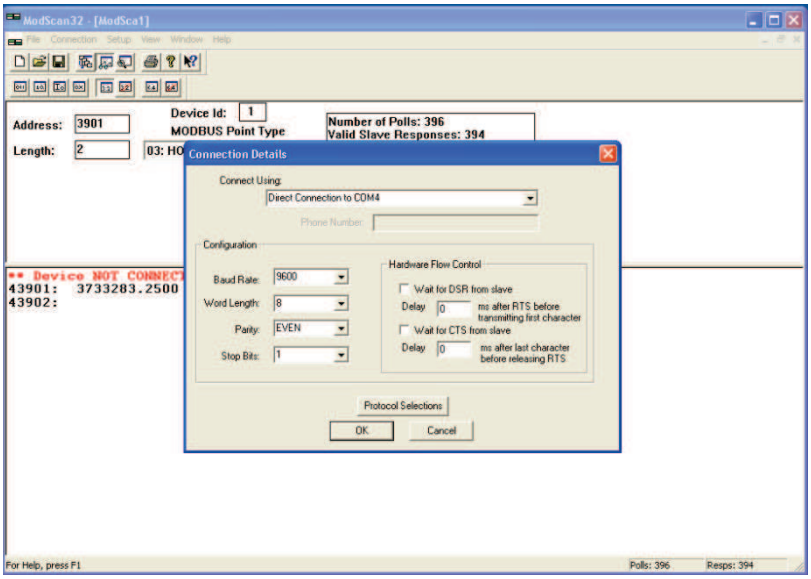
Communication Test

Communication test: PM1200 power meter can be successfully used for communication using MODSCAN Software as Modbus master in PC. Details of the settings in MODSCAN are given below.

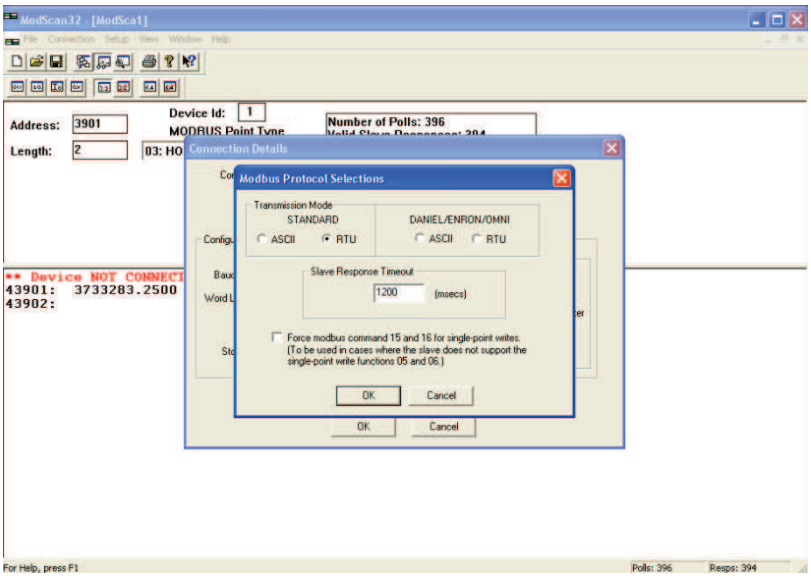
Settings in MODSCAN v3.D05-00 Software to establish communication with PM1200 power meters: Free download Demo MODSCAN Software from http://www.win-tech.com. E.g. To read the voltage V1 from 0131H Register, follow the instructions-



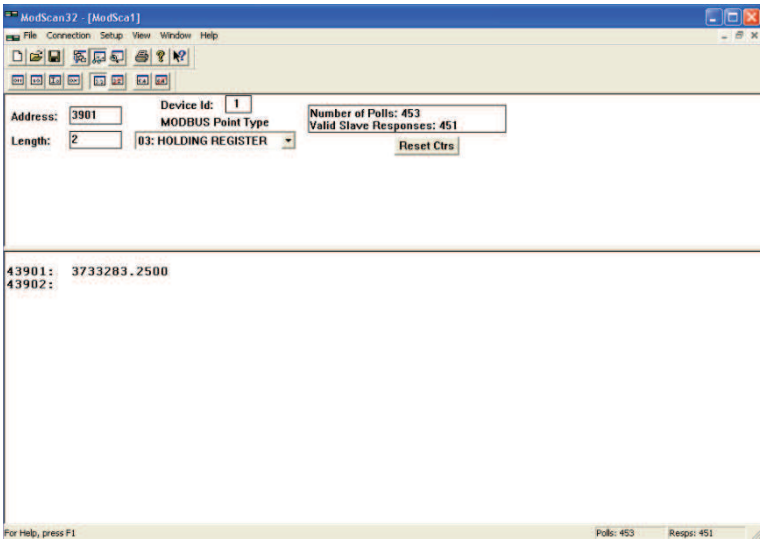
1. After starting the Modscan, to read Apparent power total (VA total), enter Address as 3901 (decimal) Length as 2; Device ID as 1; Modbus Point type as 03: HOLDING REGISTER as shown below.
2. **Modify the connection details:** Click on the connection->Connect, you will see the Connection Detail Window. Change all the settings to match with the below shown screen which are default settings of PM1200 meter.



3. Set the Modbus protocol selections: **On "Connection details"** window (shown in previous step), click on **"Protocol Selections**". Set the settings of the protocol as shown below and click 'OK' in all the windows.



4. Click 'OK', the MODSCAN Software starts polling the configured COM port for the Device ID 1.
   Modscan Demo software will stop polling after 3.5 minutes on successful communication.



This shows that the power meter is communicating with the MODBUS MODSCAN Master Software successfully on the PC. The power meter is MODBUS RTU compliant.

Data Address

The PM1200 power meters support the transfer of whole block and also of individual Data values (2 registers are used for storing single data value)

- In transfer of individual data values, it basically treats 2 registers as an object with the starting address (e.g. 3900) considered as the object name. This enables to transfer required data values for energy management.
- In transfer of whole block, it basically treats each block as an object with the starting address (e.g.3000) considered as the object name. This enables fast block-transfers, since energy management usually requires a block of related readings as of the same point of time. This method also eliminates time-skew within readings of that block.
- The Device Address, Block Start Address, number of registers, must be configured to suit the power meter. Additionally, related SCADA settings for polling priority, logging and viewing the data must also be made. Refer your SCADA software instructions on how to do this.

Individual Parameter Address

- Function Code: 03 Read
- No scaling required
- Read as block or individual parameters

Table 6-4: Individual parameter address

Parameter	Description	Address	Type	PM1200
Metering				
Metering - Current				
A	Current Average	3913	Float	●
A1	Current, Phase 1	3929	Float	●
A2	Current, Phase 2	3943	Float	●
A3	Current, Phase 3	3957	Float	●
Metering – Voltage				
VLL	Line to Line Average Voltage	3909	Float	●
VLN	Line to neutral voltage	3911	Float	●
V12	Voltage phase1 to phase2	3925	Float	●
V23	Voltage phase2 to phase3	3939	Float	●
V31	Voltage phase3 to phase1	3953	Float	●
V1	Voltage phase1 to neutral	3927	Float	●
V2	Voltage phase2 to neutral	3941	Float	●
V3	Voltage phase3 to neutral	3955	Float	●
Metering - Power				
W	Active Power, Total	3903	Float	●
W1	Active Power, phase1	3919	Float	●
W2	Active Power, phase2	3933	Float	●
W3	Active Power, phase3	3947	Float	●
VAR	Reactive Power, Total	3905	Float	●
VAR1	Reactive Power, phase1	3921	Float	●
VAR2	Reactive Power, phase2	3935	Float	●
VAR3	Reactive Power, phase3	3949	Float	●
VA	Apparent Power, Total	3901	Float	●
VA1	Apparent Power, phase1	3917	Float	●
VA2	Apparent Power, phase2	3931	Float	●
VA3	Apparent Power, phase3	3945	Float	●
Metering – Power Factor				
PF	Power factor average	3907	Float	●
PF1	Power factor, phase1	3923	Float	●
PF2	Power factor, phase2	3937	Float	●
PF3	Power factor, phase3	3951	Float	●
Metering - Frequency				
F	Frequency, Hz	3915	Float	●

Parameter	Description	Address	Type	PM1200
Power Quality				
THD				
%V1	Voltage THD, phase 1	3861	Float	•
%V2	Voltage THD, phase 2	3863	Float	•
%V3	Voltage THD, phase 3	3865	Float	•
%A1	Current THD, phase 1	3867	Float	•
%A2	Current THD, phase 2	3869	Float	•
%A3	Current THD, phase 3	3871	Float	•
NOTE: The meter will return -999.0 for invalid number/range.				
Energy				
FwdVAh	Forward Apparent Energy	3959	Float	•
FwdWh	Forward Active Energy	3961	Float	•
FwdVARh	Forward Reactive Inductive Energy	3963	Float	•
FwdVARh	Forward Reactive Capacitive Energy	3965	Float	•
RevVAh	Reverse Apparent Energy	3967	Float	•
RevWh	Reverse Active Energy	3969	Float	•
RevVARh	Reverse Reactive Inductive Energy	3971	Float	•
RevVARh	Reverse Reactive Capacitive Energy	3973	Float	•
On hrs	On hours	3993	Long	•
FwdRun secs	Forward Run seconds	3995	Long	•
RevRun secs	Reverse Run seconds	3997	Long	
Intr	Number of power interruption	3999	Long	•
Demand				
Present Demand	Present Demand	3975	Float	•
Rising Demand	Rising Demand	3977	Float	•
Max MD	Maximum demand	3979	Float	•
Max DM Occurrence Time	Maximum demand occurrence time	3981	Long	•
Percentage of Load parameters				
% Avg Load	Average Load percentage	3881	Float	•
%L1	Percentage of phase1 load	3883	Float	•
%L2	Percentage of phase2 load	3885	Float	•
%L3	Percentage of phase3 load	3887	Float	•
Unbalanced %Load	Unbalanced %Load	3889	Float	•
Unbalanced % Voltage	Unbalanced % Voltage	3891	Float	•

Block Parameter Address

Total RMS Block

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-5: Total RMS block

Parameter	Description	Address	Type	PM1200
VA	Apparent Power, Total	3001	Float	●
W	Active Power, Total	3003	Float	●
VAR	Reactive Power, Total	3005	Float	●
PF	Avg PF	3007	Float	●
VLL	Average Line to Line voltage	3009	Float	●
VLN	Average Line to neutral voltage	3011	Float	●
A	Average Current	3013	Float	●
F	Frequency, Hz	3015	Float	●
Reserved	Reserved	3017	Long	
Intr	Number of interruption	3019	Long	●

R phase RMS Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-6: R phase RMS block

Parameter	Description	Address	Type	PM1200
VA1	Apparent power, phase1	3031	Float	●
W1	Active power, phase1	3033	Float	●
VAR1	Reactive power, phase1	3035	Float	●
PF1	Power factor, phase1	3037	Float	●
V12	Voltage phase1 to phase2	3039	Float	●
V1	Voltage phase1 to neutral	3041	Float	●
A1	Current, phase1	3043	Float	●
F1	Frequency, Hz	3045	Float	●
Reserved	Reserved	3047	Long	
Intr1	Number of interruption	3049	Long	●

Y phase RMS Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-7: Y phase RMS block

Parameter	Description	Address	Type	PM1200
VA2	Apparent power, phase2	3061	Float	●
W2	Active power, phase2	3063	Float	●
VAR2	Reactive power, phase2	3065	Float	●
PF2	Power factor, phase2	3067	Float	●
V23	Voltage phase2 to phase3	3069	Float	●
V2	Voltage phase2 to neutral	3071	Float	●
A2	Current, phase2	3073	Float	●
F2	Frequency, Hz	3075	Float	●
Reserved	Reserved	3077	Long	
Intr2	Number of interruption	3079	Long	●

B phase RMS Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-8: B phase RMS block

Parameter	Description	Address	Type	PM1200
VA3	Apparent power, phase3	3091	Float	●
W3	Active power, phase3	3093	Float	●
VAR3	Reactive power, phase3	3095	Float	●
PF3	Power factor, phase3	3097	Float	●
V31	Voltage phase3 to phase1	3099	Float	●
V3	Voltage phase3 to neutral	3101	Float	●
A3	Current, phase3	3103	Float	●
F3	Frequency, Hz	3105	Float	●
Reserved	Reserved	3107	Long	
Intr3	Number of interruption	3109	Long	●

Forward Integrated Block

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-9: Forward Integrated block

Parameter	Description	Address	Type	PM1200
FwdVAh	Forward Apparent Energy	3121	Float	●
FwdWh	Forward Active Energy	3123	Float	●
FwdVARh	Forward Reactive Inductive Energy	3125	Float	●
Reserved	Reserved	3127	Float	
Reserved	Reserved	3129	Float	
FwdVARh	Forward Reactive Capacitive Energy	3131	Float	●
Reserved	Reserved	3133	Float	
Reserved	Reserved	3135	Float	
Reserved	Reserved	3137	Long	
FwdRunsecs	Forward Run Seconds	3139	Long	●

Reverse Integrated Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-10: Reverse Integrated block

Parameter	Description	Address	Type	PM1200
RevVAh	Reverse Apparent Energy	3151	Float	●
RevWh	Reverse Active Energy	3153	Float	●
RevVARh	Reverse Reactive Inductive Energy	3155	Float	●
Reserved	Reserved	3157	Float	
Reserved	Reserved	3159	Float	
RevVARh	Reverse Reactive Capacitive Energy	3161	Float	●
Reserved	Reserved	3163	Float	
Reserved	Reserved	3165	Float	
Reserved	Reserved	3167	Long	
RevRunsecs	Reverse Run Seconds	3169	Long	●

Total Integrated Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-11: Total Integrated block

Parameter	Description	Address	Type	PM1200
TotVAh	Total Apparent Energy	3181	Float	●
TotWh	Total Active Energy	3183	Float	●
TotVARh	Total Reactive Inductive Energy	3185	Float	●
Reserved	Reserved	3187	Float	
Reserved	Reserved	3189	Float	
TotVARh	Total Reactive Capacitive Energy	3191	Float	●
Reserved	Reserved	3193	Float	
Reserved	Reserved	3195	Float	
Reserved	Reserved	3197	Long	
TotRunsecs	Total Run Seconds	3199	Long	●

Demand Block:

- Function Code: 03H Read
- No of Registers: 22
- No Scaling Required
- Read as Block only

Table 6-12: Demand block

Parameter	Description	Address	Type	PM1200
Reserved	Reserved	3721	Long	
Reserved	Reserved	3723	Float	
Reserved	Reserved	3725	Float	
Reserved	Reserved	3727	Float	
Reserved	Reserved	3729	Float	
Reserved	Reserved	3731	Float	
Reserved	Reserved	3733	Float	
Present demand	Present demand	3735	Float	●
Rising demand	Rising demand	3737	Float	●
Time remaining	Time remaining	3739	Long	●
Reserved	Reserved	3741	Float	

Note: The address 3741 is overlapped between the Demand and Max Demand blocks

Max Demand Block:

- Function Code: 03H Read
- No of Registers: 36
- No Scaling Required
- Read as Block only

Table 6-13: Max Demand Block

Parameter	Description	Address	Type	PM1200
MaxDM	Maximum demand	3741	Float	●
MaxDMTime	Maximum demand occurrence time	3743	Long	●
Reserved	Reserved	3745	Float	
Reserved	Reserved	3747	Long	
Reserved	Reserved	3749	Float	
Reserved	Reserved	3751	Long	
Reserved	Reserved	3753	Float	
Reserved	Reserved	3755	Long	
Reserved	Reserved	3757	Float	
Reserved	Reserved	3759	Long	
Reserved	Reserved	3761	Float	
Reserved	Reserved	3763	Long	
Reserved	Reserved	3765	Float	
Reserved	Reserved	3767	Long	
Reserved	Reserved	3769	Float	
Reserved	Reserved	3771	Long	
Reserved	Reserved	3773	Float	
Reserved	Reserved	3775	Long	

Note: The address 3741 is overlapped between the Demand and Max Demand blocks

Old Forward Integrated Block

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-14: Old Forward Integrated Block

Parameter	Description	Address	Type	PM1200
OldFwdVAh	Old forward Apparent Energy	3122	Float	●
OldFwdWh	Old Forward Active Energy	3124	Float	●
OldFwdVARh	Old Forward Reactive Inductive Energy	3126	Float	●
Reserved	Reserved	3128	Float	
Reserved	Reserved	3130	Float	
OldFwdVARh	Old Forward Reactive Capacitive Energy	3132	Float	●
Reserved	Reserved	3134	Float	
Reserved	Reserved	3136	Float	
Reserved	Reserved	3138	Long	
OldFwdRunsecs	Old Forward Run Seconds	3140	Long	●

Old Reverse Integrated Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-15: Old Reverse Integrated Block

Parameter	Description	Address	Type	PM1200
OldRevVAh	Old Reverse Apparent Energy	3152	Float	●
OldRevWh	Old Reverse Active Energy	3154	Float	●
OldRevVARh	Old Reverse Reactive Inductive Energy	3156	Float	●
Reserved	Reserved	3158	Float	
Reserved	Reserved	3160	Float	
OldRevVARh	Old Reverse Reactive Capacitive Energy	3162	Float	●
Reserved	Reserved	3164	Float	
Reserved	Reserved	3166	Float	
Reserved	Reserved	3168	Long	
OldRevRunsecs	Old Reverse Run Seconds	3170	Long	●

Old Total Integrated Block:

- Function Code: 03H Read
- No of Registers: 20
- No Scaling Required
- Read as Block only

Table 6-16: Old Total Integrated block

Parameter	Description	Address	Type	PM1200
OldTotVAh	Old Total Apparent Energy	3182	Float	●
OldTotWh	Old Total Active Energy	3184	Float	●
OldTotVARh	Old Total Reactive Inductive Energy	3186	Float	●
Reserved	Reserved	3188	Float	
Reserved	Reserved	3190	Float	
OldTotVARh	Old Total Reactive Capacitive Energy	3192	Float	●
Reserved	Reserved	3194	Float	
Reserved	Reserved	3196	Float	
Reserved	Reserved	3198	Long	
OldTotRunsecs	Old Total Run Seconds	3200	Long	●

Phase Angle Block:

- Function Code: 03H Read
- No of Registers: 18
- No Scaling Required
- Read as Block only

Table 6-17: Phase Angle block

Parameter	Description	Address	Type	PM1200
Neutral voltage	Neutral voltage	3701	Float	●
An	Neutral current	3703	Float	●
V1	Voltage Phase Angle, phase1	3705	Float	●
V2	Voltage Phase Angle, phase2	3707	Float	●
V3	Voltage Phase Angle, phase2	3709	Float	●
A1	Current Phase Angle, phase1	3711	Float	●
A2	Current Phase Angle, phase2	3713	Float	●
A3	Current Phase Angle, phase3	3715	Float	●
RPM	Rotations per minute	3717	Float	●

Note: The parameters V1, V2, V3 (Voltage phase angles) and neutral voltage are available only through communication.

SETUP Block:

- Function Code: 03H Read, 10H Write
- No of Registers: 40
- No Scaling Required
- Read and write as block only

Table 6-18: SETUP block

Parameter	Description	Address	Type	Range	Default value	PM1200
A.Pri	Current Primary	0101	Float	1.0 to 99 k	100.0	●
A.Sec	Current Secondary	0103	Float	1.0 to 6.5	5.000	●
V.Pri	Voltage Primary	0105	Float	100.0 to 999 k	415.0	●
V.Sec	Voltage Secondary	0107	Float	50.00 to 601.0	415.0	●
SYS	System Configuration	0109	Float	2.0 to 6.0 2.0 – Delta 3.0 – Star 4.0 – Wye 5.0 – 2 Ph 6.0 – 1 Ph	3.000	●
LABL	Phase Labeling	0111	Float	0.0 to 4.0 0.0 – 123 1.0 – ABC 2.0 – RST 3.0 – PQR 4.0 – RYB	0.000	●
VA Fn	VA Function selection	0113	Float	0.0 to 1.0 0.0 – 3D 1.0 – Arth	0.000	●
D sel	Demand Selection	0115	Float	0.0 to 1.0 0.0 – Auto 1.0 – User	0.000	●
D Par	Demand parameter	0117	Float	0.0 to 2.0 0.0 – VA 1.0 – W 2.0 A	0.000	●

Parameter	Description	Address	Type	Range	Default value	PM1200
D Prd	Demand Period	0119	Float	1.0 to 6.0 1.0 – 5 Min 2.0 – 10 Min 3.0 – 15 Min 4.0 – 20 Min 5.0 – 25 Min 6.0 – 30 Min	3.000	●
BAUD	Baud rate	0121	Float	1.0 to 5.0 1.0 – 1200 2.0 – 2400 3.0 – 4800 4.0 – 9600 5.0 – 19200	4.000	●
PRTY	Parity & Stop bit	0123	Float	0.0 to 5.0 0.0 – Even 1 1.0 – Even 2 2.0 – Odd 1 3.0 – Odd 2 4.0 – No 1 5.0 – No 2	0.000	●
ID	Unit ID	0125	Float	1.0 to 255.0	1.000	●
F.S%	% Full scale	0127	Float	1 to 100	100.0	●
OFLo	Overflow parameter selection	0129	Float	0.0 to 1.0 0.0 – Wh 1.0 – VAh	0.000	●
POLE	Number of poles for RPM	0131	Float	1.0 to 8.0 1.0 – 2 2.0 – 4 3.0 – 6 4.0 – 8 5.0 – 10 6.0 – 12 7.0 – 14 8.0 – 16	2.000	●
PWD	Password	0133	Float	1000	1000	●
Reserved	Reserved	0135	Float	-	2.0	●
Reserved	Reserved	0137	Float	-	4126	●
Reserved	Reserved	0139	Float	-	0.0	●

NOTE: For efficient setup, Read the setup parameters first and then edit the required setup parameter value.

CLEAR Block

- Function Code: 10H Write
- No of Registers: 2
- No Scaling Required
- Write as block only

Table 6-19: CLEAR block

Parameter	Description	Address	Type	Range	PM1200
CLR_INTG_DMD _SETDEFAULT	INTG and demand clearing and setting up the setup default	0311	Long	1 - INTG and MD Clear 2 - MD Clear 256 - Setup default	•

NOTE: For setup default, meter will send an exception for values other than 256.

Model Info Block:

- Function Code: 03H Read
- No of Registers: 14
- No Scaling Required
- Read as block only

Table 6-20: Model Info Block

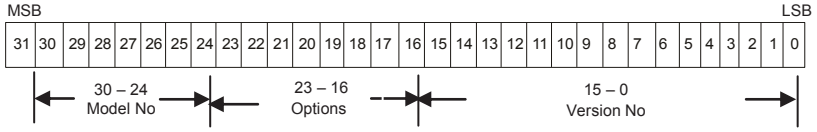
Parameter	Description	Address	Type	Range	PM1200
Reserved	Reserved	0081	Long		
Reserved	Reserved	0083	Long		
Model Version	Model, Options and version numbers	0085	Long	Bits 30 to 24 – Model No Bits 23 to 16 - Options Bits 15 to 0 – Version number E.g. PM1200 model no is 22	•
Reserved	Reserved	0087	Long		
Reserved	Reserved	0089	Long		
Reserved	Reserved	0091	Long		
Reserved	Reserved	0093	Long		

Model register details

This section explains about the model register and helps you to understand the model number, version number and options (Mentioned in table 6-20: Model Info Block).

The following figure explains how the bits are organized in the model register.

Figure 6-4: Bits in Model register



Meter Model and number: The following table bitwise explanation for Meter model and number.

Table 6-21: Meter Model and number

Meter model	Model no (5A)	Model Options
PM1200	**22 (0x16)**	**IE** **DM** **THD**

Model options description: The following table gives the model options bitwise description.

Table 6-22: Model options description

Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16	Remarks
0	0	0	0	0	0	0	0	No options available
0	0	0	0	0	0	0	1	Imp/Exp option available
0	0	0	0	0	0	1	0	DM option available
0	0	0	0	0	0	1	1	Imp/Exp and DM option available
0	0	0	0	0	1	0	0	THD option available
0	0	0	0	0	1	0	1	Imp/Exp and THD available
0	0	0	0	0	1	1	0	DM and THD available
0	0	0	0	0	1	1	1	Imp/exp, DM and THD available

Interpretation of firmware version number: The following steps clearly explain how to interpretate the FW version number.

1. Convert the hexadecimal value both MSB & LSB into decimal value.
2. Apply the formula ((MSB*256)+LSB)
3. The resultant value will be 30400 for the hexadecimal value 0x76 0xC0.
4. Insert a **0** before the result and parse it from right with 2 digits each.
5. The result will be the FW version = 03.04.00

Table 6-23: Firmware version interpretation

	MSB	LSB
Hexadecimal	0x76	0xC0
Decimal	118	192
VALUE=((MSB*256)+LSB)	30400	
FW Version	03.04.00	