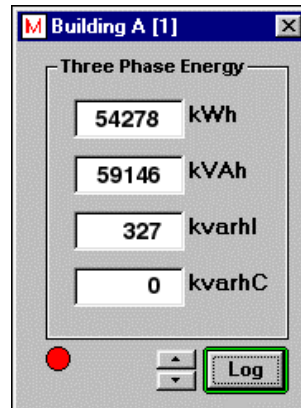




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Meter Manager



Meter Manager Software License

By using Meter Manager you accept the terms of this license.

Meter Manager is licensed to the user for use at their own risk.

When un-registered, Meter Manager may be freely copied.

When meter manager is purchased a registration number is provided, this registration is for a single copy of Meter Manager to be used on one computer. Duplication is not permitted.

Meter Manager

Meter Manager is a remote reading and data logging utility for meters connected to a central computer via an RS485 interface.

Multiple meter windows may be displayed simultaneously on screen, each window allowing independent configuration of displayed parameters and logging facilities.

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Starting Meter Manager For The First Time

Meter Manager is installed by running the file SETUP.EXE on the installation disk.

The following assumes that at least one power meter is connected to the PC via an RS485 interface. All meters should be set-up prior to running Meter Manager, each meter should be allocated a unique address number and should be set to the same baud rate.

Check the PC's Time and Date

Ensure the PC's time and date are correct and set to the British format with 24 hour clock. Refer to Windows help if in doubt about the settings. It is important to have the correct clock settings in order to produce valid logged data. The PC's clock is also used to set meters with internal clock facilities.

Start Meter Manager

Double click on the Meter Manager icon to start the program.

Meter Manager Registration

Contact your supplier for the registration number and enter this in the Product Registration Window. If you do not enter a valid registration number at this point Meter Manager may still be used for a 30 minute evaluation period.

Set-up the Communications Port

Click: File - Setup - Set Port

Set the Serial Port to the port with the RS485 interface connected. E.g. 2 for port COM2. If the port with the mouse connected is accidentally selected the mouse will work intermittently and no meters can be read. In this case re-start the program and select the correct port.

Set the Baud Rate to the same value to which all meters have been set. The recommended value is 9600 baud.

The Enable FIFO Buffer box should be ticked unless communication problems are experienced with older computers,

Click the Apply button and Close the port set-up window.

Create a Meter Window

Click Meter Windows - Add Meter Window

Two windows will appear, a Meter Window and the Connection Window.

In the Connection Window, type in a name for the first meter you wish to read e.g. Compressor Room Energy.

Enter the address for this meter in the Connection Window. This value should be in the range 1 to 250 and should correspond with the address setting of the meter. Before using Meter Manager each meter on a site needs to be assigned an address number to identify its location. The address is entered via the front panel push buttons on each meter. Camax Addressable Count Module pulse to RS485 converters are usually pre-programmed and have their address shown on their label.

Set the meter type to correspond with the meter at this location.

Click - Apply and then Close in the Connection Window.

The new meter window should now begin to display readings. Select Meter Windows - Meter Function to display the required reading e.g. Three Phase Power.

To add additional meters to the display use Meter Windows - Add Meter Window again.

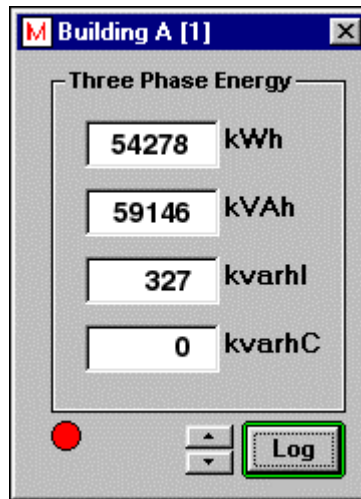
Save Your Settings

Click File - Save Current Settings.

Retain the ".met" file extension shown when entering a file name, this ensures Meter Manager can recognise it as a meter configuration file.

The Meter Window

A meter window is an on screen representation of the displays available on an actual meter. Multiple meter windows may be displayed within the main Meter Manager window. Each window displays selected parameters read from a meter at a particular location.



A single meter can have more than one Meter Window associated with it. E.g. A meter with address 23 measuring power in the boiler house could have two displays "Boiler House Energy [23]" and "Boiler House Voltage [23]". The first would show kWh, kVAh & kvarh and the second the voltage on each of the three phases.

Meter windows are created and configured via the Main Menu Bar.

Each window has the same basic elements:-

- Title Bar
- Function Description
- Reading Displays
- Reading Units
- Reading Indicator
- Log/File Button

(Each function is described in the glossary)

Main Menu Bar

Program operation is controlled from the Meter Manager window main menu bar. Each function in the following list is described in the glossary.

- File-Load Settings
- File-Save Current Settings
- File-Close All Meters
- File-View Log File
- File-Setup-Auto Start
- File-Setup-Read Rate
- File-Setup-Set Port
- File-Exit

- Meter Windows - Add Meter Window
- Meter Windows - Set-up Meter Window
- Meter Windows - Delete Meter Window
- Meter Windows - View Meter Log File
- Meter Windows - View Meter Settings
- Meter Windows - Set Meter Clocks
- Meter Windows - Meter Function - Per Phase
- Meter Windows - Meter Function - Three Phase
- Meter Windows - Meter Function - Energy

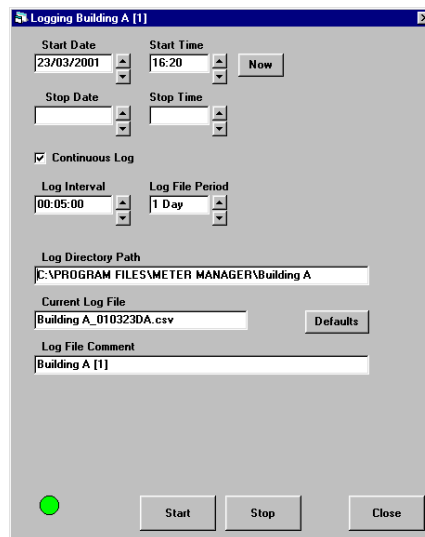
- Arrange Meters

Data Logging

The readings shown in any meter window may be periodically saved to a file for subsequent analysis.

The log file is saved in a simple text format known as Comma Separated Variable and has a .CSV file extension. Files in this format can be readily opened by spreadsheet applications such as Microsoft Excel.

The Log/File Button in the meter window changes function via the adjacent spin buttons.



Clicking Log reveals the Logging Window which controls the logging process via the following settings:-

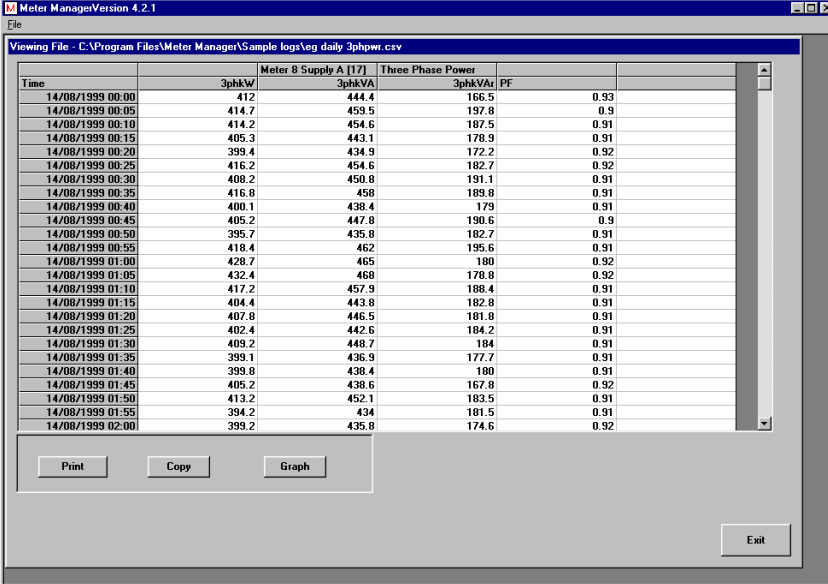
- Start Date & Time
- Stop Date & Time
- Fast Spin
- Log Interval
- Log File Name
- Log File Comment
- Logging Start Button
- Logging Stop Button
- Logging Window Close Button

(Each function is described in the glossary)

Saving the Settings

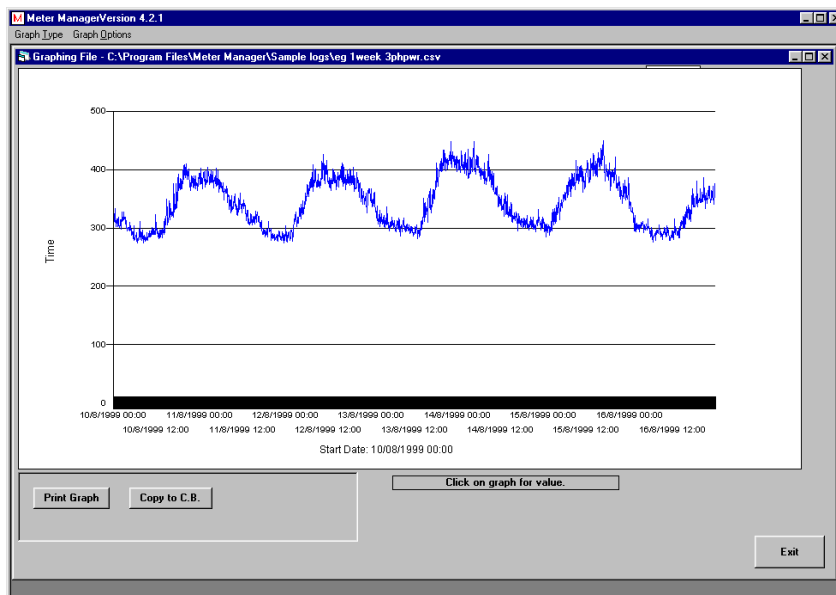
To save the settings for all windows use File - Save Current Settings.

Clicking File opens the logged data file, this is equivalent to using File-View Log File . The logged data is shown in a tabulated format. Selected data may be graphed, printed and copied to other applications via the windows clipboard.



The screenshot shows the 'Viewing File' window in Meter Manager Version 4.2.1. The window title is 'Viewing File - C:\Program Files\Meter Manager\Sample logs\veg daily 3phprw.csv'. The data is presented in a table with the following columns: Time, 3phkW, Meter 8 Supply A [17], 3phkVA, Three Phase Power, 3phkVAr, and PF. The data points are listed in 5-minute intervals from 14/08/1999 00:00 to 14/08/1999 02:00. Below the table are buttons for 'Print', 'Copy', 'Graph', and 'Exit'.

Time	3phkW	Meter 8 Supply A [17]	3phkVA	Three Phase Power	3phkVAr	PF
14/08/1999 00:00	412	444.4	166.5	0.93		
14/08/1999 00:05	414.7	459.5	197.8	0.9		
14/08/1999 00:10	414.2	454.6	187.5	0.91		
14/08/1999 00:15	405.3	443.1	178.9	0.91		
14/08/1999 00:20	399.4	434.9	172.2	0.92		
14/08/1999 00:25	416.2	454.6	182.7	0.92		
14/08/1999 00:30	408.2	450.8	191.1	0.91		
14/08/1999 00:35	416.8	458	189.8	0.91		
14/08/1999 00:40	400.1	438.4	179	0.91		
14/08/1999 00:45	405.2	447.8	190.6	0.9		
14/08/1999 00:50	395.7	435.8	182.7	0.91		
14/08/1999 00:55	418.4	462	195.6	0.91		
14/08/1999 01:00	428.7	465	180	0.92		
14/08/1999 01:05	432.4	468	178.8	0.92		
14/08/1999 01:10	417.2	457.9	188.4	0.91		
14/08/1999 01:15	404.4	443.8	182.8	0.91		
14/08/1999 01:20	407.8	446.5	181.8	0.91		
14/08/1999 01:25	402.4	442.6	184.2	0.91		
14/08/1999 01:30	409.2	448.7	184	0.91		
14/08/1999 01:35	399.1	436.9	177.7	0.91		
14/08/1999 01:40	399.8	438.4	180	0.91		
14/08/1999 01:45	405.2	438.6	167.8	0.92		
14/08/1999 01:50	413.2	452.1	183.5	0.91		
14/08/1999 01:55	394.2	434	181.5	0.91		
14/08/1999 02:00	399.2	435.8	174.6	0.92		



Hardware Set-up

For Meter Manager to function it is important that the power meters, PC, interface and cabling are correctly configured.

This version of Meter Manager is for use with power meters type: ND Multicube, ND PM305, ND PM390 (ND meters must have the RS485 option fitted) and a wide range of pulse output meters by using the Camax Addressable Count Module pulse to RS485 converters. The correct Meter Type must be selected for each meter.

Meters must be connected together using the cabling described in their operating manuals.

The PC requires an RS485 interface. This is normally a plug-in unit connected to one of the serial ports, COM1 or COM2 at the rear of the PC. This unit interfaces the cabling from the meters with the PC.

The maximum number of meters that can be read is 250. The actual number of meters may be limited by the interface and wiring configuration.

Every meter must be set to the same baud rate, 9600 is the recommended setting.

Every meter must have its own unique address. This is a number that identifies each meter within the system. More than one meter with the same address will prevent communication between the PC and meters.

Refer to the meter's operating manual for instructions as to how to set the baud rate and address via its front panel push buttons.

File-Setup-SetACM - A feature is presently provided to set the address and count of Camax ACM485 addressable count modules from within Meter Manager. This feature *MUST only be used with one count module temporarily connected to the computer*. Use on a working system will result in programming all units to the same address and render the installation inoperative.

Troubleshooting

Settings needed for correct Meter Manager operation:-

The PC's clock should be set correctly and to British format (day-month-year) with 24 hour clock selected. Logging operations rely on the PC's clock to produce valid data, meters with internal clocks may also use the PC for synchronisation.

All meter Baud Rate settings should be the same e.g. 9600. This is set via the meter front panel, refer to meter operating manual.

The Baud Rate (in File - Setup - Set Port) should be set to the same rate as the meters e.g. 9600.

All meters must be set to different addresses e.g. if the system has 10 meters connected set them 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and note their locations for reference. Do not use address 0 or addresses above 250. The address is set via the meter front panel, refer to meter operating manual. Addressable count modules may have their addresses pre-programmed, the address should be indicated on their label.

Use Meter Windows - Set-up Meter Window to match the address of on-screen meters with the address of actual meters connected to the system. Meter names and types should be set at this point at this point. The appropriate Meter Type must be selected to obtain correct readings.

The Serial Port setting (in File - Setup - Set Port) must correspond with the port where the interface to the meters is connected. In some cases PC serial ports are not clearly labeled, some experimentation may be needed.

If you have an externally powered RS485 interface, ensure that its power supply is connected and switched on.

The FIFO buffers setting (in File - Setup - Set Port) should normally be ticked except for older PCs without a 16550 compatible UART. Try changing the setting if readings are failing intermittently.

Power meter Auto Rotate. If the Export Energy display always remains at zero despite the fact that the 'load' is now generating power. This is because export energy does not accumulate if the meter has 'Auto-Rotate' set. This is configured via the meter's front panel, refer to its operating manual.

Power meter - correct settings. If the on screen meter readings are not as expected try the following solution. Check that the Meter Manager display matches the readings shown on the meter. If not, verify the meter address and ensure you are reading the correct meter. If the readings agree refer to the meter's manual, check for correct voltage transformer ratio (Pt), current transformer ratio (Ct), phase rotation etc. and adjust the meter to correct the problem.

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Glossary

Arrange Meters

Arrange Meters provides options which change the layout of the meter windows displayed within the Meter Manager window.

Fast Spin

Setting the Fast Spin check box speeds the operation of the time and date spin buttons.

File-Close All Meters

Close All Meters clears all meter windows from the Meter Manager display and discards the current configuration information. Use File-Save Current Settings before closing all meters if the configuration is required again.

File-Exit

Exit closes Meter Manager. Ensure that your Current Settings are saved for future use.

File-Load Settings

Load Settings restores Meter Manager to a previously saved configuration. Meter windows are arranged on screen and both the display of readings and logging begins. Also see File-Save Current Settings.

File-Save Current Settings

Save Current Settings saves the current Meter Manager set-up to a file for future recall. The file retains the position of all the meter windows, their functions, logging status, names, meter addresses, types and port settings. Also see File-Load Settings.

File-Setup-Auto Start

Setup Auto Start permits the entry of a configuration file name which will be loaded when Meter Manager starts. Auto Start is equivalent to automatically using Load Settings. If Meter Manager is included in the PC's Start-Up folder and Auto Start is enabled meter display and logging may automatically begin whenever the computer is switched on.

File-Setup-Read Rate

Setup Read Rate controls the rate at which the meter display window is updated. The time is in seconds and applies to all meters in the Meter Manager window.

File-Setup-Set Port

Set Port configures the serial port that connects the power meters to the PC. Set the port number to the port with the RS485 interface connected. E.g. 2 for port

COM2. If the port with the mouse connected is accidentally selected the mouse will work intermittently and no meters can be read. In this case re-start the program and select the correct port. Set the Baud Rate to the same value to which all meters have been set. The recommended value is 9600 baud. The Enable FIFO Buffer box should remain ticked unless communication problems are experienced, this is most likely with an older computer without a 16550 compatible UART.

File-View Log File

View log file allows logged data to be viewed in a spreadsheet format. Readings may be selected (e.g. by dragging the mouse pointer down a column with the left hand mouse button held down) then printed, copied to the clipboard for pasting into other windows documents or displayed in graphical format.

Function Description

The function description indicates what type of readings are displayed in the meter window, e.g. "Three Phase Power".

Log File Comment

The log file comment is added as a heading for the data in the log file. The text originates from the title bar of the Meter Window.

Log File Name

A different log file name should be allocated for each meter window with active logging. Each logging interval the current meter window readings will be added to this file.

Changing the name of a log file will start a new log at that point.

Keeping the .CSV file extension initially shown will ensure that the file type can be recognised as a valid file to view in spreadsheet format.

Log Interval

The log interval is the time between entries in the log file. Entries to the log file are always made at fixed points in the hour, e.g. if the interval is set to five minutes the meter readings will be recorded at - the hour, five past, ten past etc.

Log/File Button

The colour of the Log/File button border shows if logging is in progress for the parameters shown in the meter window.

Green = logging enabled

Red = logging disabled

Momentary red (while green) = adding reading to log.

Clicking the spin buttons next to the Log/File button changes the button from Log to File.

Clicking Log opens the Logging window, where logging parameters are set-up. Clicking File opens the file containing the logged data. Refer to Data Logging for details.

Logging Start Button

The start button begins the logging process at the beginning of the next logging interval.

Logging Stop Button

The stop button suspends the logging process. No further entries will be added to the log file until logging is re-started.

Logging Window Close Button

The close button in the logging window closes the window. Use File - Save Current Settings to save any changes made.

Meter Type

Meter Type must be set to correspond with the meter to which you are connecting. It ensures that Meter Manager uses the appropriate commands to obtain data from the meter.

Meter Windows - Add Meter Window

Add Meter Window creates new meter windows, initially two windows will appear, a Meter Window and the Connection Window. Enter a meter address in the Connection Window. This value should be in the range 1 to 250 and should correspond with the address setting of a meter within the system. Before using Meter Manager each meter on a site needs to be assigned an address number to identify its location. The address is entered via the front panel push buttons on each meter or may be pre programmed if an addressable count module is used. Select the meter type to correspond with the meter at this address. Also enter a Meter Name, this assists in identifying the meter window. E.g. meter address 5 could be labelled "Compressor Room Current" to show its location on screen along with the readings. Click - Apply and then Close in the Connection Window. The new meter window should now begin to display readings. Select Meter Windows - Meter Function to display the required reading e.g Three Phase Power.

Meter Windows - Delete Meter Window

Delete Meter Window removes the currently selected window. When the current settings are saved the change cannot be reversed without re-entering the Meter Window's details. Deleting a Meter Window does not delete any associated logged data.

Meter Windows - Meter Function - Energy

Energy sets the selected meter window to display accumulating energy totals. Three Phase Energy shows kWh, kVAh, kvarh(accumulates when the load is inductive), kvarhC(accumulates when the load is capacitive).

Maximum demand indicates the peak and accumulating kW & kVA totals for the current period. Note that Maximum Demand is not available on all models of meter and may not be selectable.

Export Energy indicates the kWh & kVA totals when the 'load' is generating power. Export energy will not accumulate if the meter has its Auto-Rotate function enabled, refer to meter manual.

Meter Windows - Meter Function - Per Phase

Per Phase sets the selected meter window to display the value of the chosen parameter for each of the three phases. Current, Voltage phase to neutral, Voltage line(phase) to line(phase), Power (kW), Apparent power (kVA), Reactive power (kvar) and Power factor may be displayed.

Meter Windows - Meter Function - Three Phase

Three Phase sets the selected meter window to display the total of the selected parameters from the addition of all three phases, Power (kW), Apparent power (kVA), Reactive power (kvar) and Power factor are displayed together. Frequency may also be displayed via this menu.

Meter Windows - Set Meter Clocks

Set Meter Clocks sets meters with internal clocks to the same time and date as the PC's clock. Always ensure that the PC's clock is correctly set and that the time and date format is British, with 24 hour clock selected.

Meter Windows - Set-up Meter Window

Set-up Meter Window displays the Connection Window which allows a name, type and address to be assigned to the currently selected meter window. The name is used to identify the on-screen meter's function e.g. "Boiler House Power". The address controls which physical meter is read to provide data for the Meter Window. Each meter in a system should be assigned a unique address prior to using Meter Manager. Refer to the meter's operating manual for details. The Meter Type setting ensures that the appropriate commands are used to read the meter. Note that a single power meter may have several on-screen Meter Windows displaying and logging its readings.

Meter Windows - View Meter Log File

View Meter Log File displays any data logged for the currently selected meter window. Other log files may now be opened by using File-View.

Meter Windows - View Meter Settings

View Meter Settings reads and displays the configuration and serial number from the power meter supplying data to the currently selected Meter Window.

Reading Displays

The reading displays show data read from the meter at the address shown on the title bar.

Reading Indicator

The reading indicator shows the update status for each meter window.

Green = last reading successfully read and displayed.

Red = reading in progress.

Amber = error taking last reading, previous reading shown, will retry next time (after the time set by the Read Rate).

Reading Units

The reading units annotate the contents of the reading displays.

- ~ 1 following the units denotes phase 1 (red phase).
- ~ 2 following the units denotes phase 2 (yellow phase).
- ~ 3 following the units denotes phase 3 (blue phase).
- ~ k preceding the units denotes the value is 1000 X the basic unit.
- ~ M preceding the units denotes the value is 1000,000 X the basic unit.
- ~ V = voltage (volts).
- ~ I = current (amperes).
- ~ W = power (watts) {negative indicates exporting energy}.
- ~ VA = apparent power (voltamperes).
- ~ var = reactive power (voltamperes) {negative indicates capacitive load}.
- ~ PF = power factor {negative indicates capacitive load}.
- ~ Wh = energy watt hours.
- ~ VAh = energy VA hours.
- ~ varhI = energy var hours, accumulating when load is inductive.
- ~ varhC = energy var hours, accumulating when load is capacitive.
- ~ Ac-(kVA or kW) = maximum demand accumulated value.
- ~ Pk-(kVA or kW) = maximum demand peak value.

Start Date & Time

The start date and start time values determine when logging begins. The spin buttons may be used to change the entries. The start may not be set to before the present time or after the stop time. Clicking the Now Button sets the start time to the present time.

Stop Date & Time

The stop date and stop time values determine when logging ends. The spin buttons may be used to change the entries. The end of logging may not be set to before the start time & date.

Title Bar

The Title Bar shows the name allocated to the meter window and the address of the meter providing the readings, [this is shown in square brackets after the name]. Names and addresses are allocated to a meter window using Meter Windows - Set-up Meter Windows on the main menu bar.