

# PowerMonic

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## FAQs

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### **FAQ 1. Why do I need to connect Phase A?**

The PowerMonic is powered from the phase A connection, and will not record any data unless it is powered up.

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### **FAQ 2. What is the purpose of the internal battery in a PowerMonic?**

The internal rechargeable sealed lead acid battery is used to enable the PowerMonic to ride through brief power interruptions and to enable an orderly shutdown when there is a long power interruption.

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### **FAQ 3. What power does a PowerMonic draw from Phase A?**

The power consumption is approximately 12 VA.

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### **FAQ 4. Can I measure the Ground/Earth voltage?**

To measure the voltage between Ground/Earth and neutral, you need a PowerMonic PM45.

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### **FAQ 5. What version of PowerView do I need?**

The latest version of PowerView can be downloaded from the GridSense web site at <http://www.gridsense.com>

PowerView will configure all models of PowerMonic, and will display and analyse data from all PowerMonics.

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### **FAQ 6. How much memory does a PowerMonic have?**

PowerMonic models PM35, PM40 and PM45 have 15 MB of internal flash memory.

The PowerMonic PM25 has 10 MB of internal flash memory

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### **FAQ 7. For how long can a PowerMonic record power quality data?**

The recording time depends on the Log Interval period and on the parameters recorded.

A PM35 or PM40 configured to record three phase voltage and current power quality data at a 5 second rate, all 48 harmonics and interharmonics, and with 50 RMS and 50 Waveform events will fill the 15 MB data memory in approximately 4 hours.

Conversely, a PM45 configured to record only basic three phase power quality data (no harmonics or interharmonics and no events) at 10 minute intervals will record data for in excess of 400 days.

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### **FAQ 8. Can a PowerMonic be configured off line?**

Using the File/Configuration Off Line menu, a PowerMonic configuration script can be created and saved to disk. This script can then be loaded by PowerView and used to configure a PowerMonic.

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### **FAQ 9. Is it necessary to stop logging before downloading data from a PowerMonic?**

PowerView allows data to be downloaded from a PowerMonic while it is logging data. It is not necessary to stop logging. This allows recorded data to be checked during a recording period without creating a gap in the logged data.

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### **FAQ 10. Why must the PowerMonic memory be cleared before synchronising the clock?**

The memory must be cleared and logging must be turned off before the internal clock is synchronised to prevent data corruption.

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### **FAQ 11. Why does the progress counter count down during a memory erase?**

The memory is erased backwards – i.e. from the newest to the last – so that if a memory erase procedure is started inadvertently it is possible to cancel the memory erase and not lose data.

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### **FAQ 12. Can an event be created?**

If event recording is enabled, you can create an event by briefly interrupting any of the voltage or current channels. This is often useful to obtain a snapshot of the normal voltage and current waveforms.

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### **FAQ 13. Why must the arrows on CTs point towards the load?**

When the arrows on CTs are pointed towards the load (and away from the generator or point of supply) the PowerMonic will calculate load flow correctly. Power and energy flowing towards the load will be positive while power and energy flowing towards the point of supply will be negative.

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### **FAQ 14. What does a negative power factor mean?**

If a PowerMonic was installed with the CT arrows pointing towards the point of supply rather than the load, the True (TPF) and Displacement (DPF) Power Factors will be negative.

If the PowerMonic was installed with the CT arrows pointing towards the load, then a negative TPF or DPF implies that power is flowing from the load towards the point of supply. This commonly occurs with distributed power generation – e.g. when a solar panel and inverter has been installed at a customers premises.

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### **FAQ 15. What is the difference between DPF and TPF?**

TPF is True Power Factor and is calculated by dividing the real power  $P$  in Watts by the apparent power  $S$  in VAs. It is a dimensionless quantity.

DPF is Displacement Power Factor and is calculated by taking the cosine of the difference between the phase angle of the fundamental component of the current and the phase angle of the fundamental component of the voltage.

DPF and TPF have similar values when there is minimal distortion in the voltage and current waveforms.

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### **FAQ 16. What is the difference between THD-R and THD-F?**

THD-R is Total Harmonic Distortion (THD) as a percentage of the Root Mean Square (RMS) value of the waveform.

THD-F is Total Harmonic Distortion (THD) as a percentage of the Fundamental RMS value of the waveform.

Both THD-R and THD-F are normally expressed in percent.

THD-R and THD-F have similar values when there is minimal distortion in the voltage or current waveforms.

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### **FAQ 17. What is flicker?**

Flicker is a measure of the variation in light output of electric lights caused by variations in supply voltage.

Flicker is calculated in accordance with international standards, and is normalised and dimensionless. The processing of flicker is based on the physical properties of incandescent lights and the physiology of the human eye and brain.

Short term flicker Pst is calculated once every 10 minutes, while long term flicker Plt is calculated once an hour.

If Pst and Plt are less than 1, a majority of observers will not find flicker objectionable.

Conversely, if Pst and Plt are greater than 1, flicker will be observed by a majority of observers.

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### **FAQ 18. How are Sags and Swells detected?**

Sags and swells are short term variations in voltage which exceed the normal supply voltage tolerances.

The PowerMonic calculates the Root Mean Square (RMS) value of each half cycle of the voltage, and compares this with the supply voltage tolerance, which can be specified as either absolute voltages or as percentages of the nominal voltage.

When the upper threshold (swell) or lower threshold (sag) is exceeded, a record is saved of the exceedance (swell or sag), the start time, duration, half cycle RMS trigger value and maximum (swell) or minimum (sag) half cycle RMS value. A user selectable hysteresis, expressed as a percentage of the nominal voltage, is used to modify the ending thresholds to reduce the effects of noise when the voltage remains close to the thresholds.

PowerView allows the sag/swell information to be viewed in tabular form or graphically using the ITI/CBEMA recommendations.

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### **FAQ 19. How are voltage transients detected?**

The PowerMonic samples the supply voltages at approximately 100  $\mu$ s intervals. Successive samples are compared and a transient event recording is triggered if the absolute difference exceeds a user selectable threshold.

For an undistorted voltage signal, the maximum waveform slope occurs at the zero crossings. For a 230 VRMS 50 Hz voltage, this corresponds to approximately 100 V/ms (60 V/ms for a 110 VRMS 60 Hz voltage). GridSense recommend setting the threshold at 500 V/ms for 230 VRMS 50 Hz voltage and 300 V/ms for 110 VRMS 60 Hz voltages.

These settings correspond to absolute voltage differences of approximately 50 V and 30 V respectively between samples.