

# 3 Phase Power Quality Analyser with Flicker & Harmonics

## Ranger Power Master 3000HF (PM3000HF)

Three Phase Power Quality Recording Analyser with Flicker and Harmonics



### Take Control of your PQ Measurements Today

- Are your machines deteriorating due to poor power quality?
- Can you save money distributing your load?
- Are you wasting energy?
- Find out...and much more with the PM3000.

### Wireless Communication

Manage your PM3000 remotely. Both Bluetooth and our **PMGateway App.** enable remote communications including data download to your inbox, visibility of live results and remote control of your PM3000.

### Correct Data First Time

Our patented **Single Cycle Adaptive Store™** recording process provides single cycle measurements over long recording periods.

All the measurements you need first time out, without setting any thresholds!

### The PM3000HF...is for everyday use

A 3 phase power quality analyser with a user-friendly, graphical touch screen provides you with all the information you need to get the answers to your power quality questions.

### ...gives detail in your recordings where you need it

Record detail down to a single cycle whenever a disturbance occurs, without setting any thresholds, with our unique data storage technique **Single Cycle Adaptive Store™**. Record this detail up to 2 months with our new Memory Extension to 64MB.

### ...records 16 Channels, from 100s of measurements

The PM3000 records and displays up to 16 detailed channels simultaneously. Choose from voltage, current, power, power factor, VAR's, phase angle, frequency, unbalance, THD, and much more. The PM3000 can measure 100s of individual parameters.

### ...is easy to set-up, you don't have to set thresholds

Setting up is easy. Simply use it as a meter or download recordings to your PC for further analysis.

Technical help: [support@outramresearch.co.uk](mailto:support@outramresearch.co.uk) +44 (0)1243 573050  
Sales enquiries: [sales@outramresearch.co.uk](mailto:sales@outramresearch.co.uk) +44 (0)1243 573050

### Highly Accurate

- **Individual Harmonics** to the 15th, %THD to the 25th.
- **Instantaneous Flicker** sensation, short term and long term Flicker to IEC61000-4-15
- **Power Parameters, Unbalance, Phase Angle, Frequency, inrush current** and much more.

**Ranger** PRODUCTS

designed and manufactured  
in the UK by



05/09/2018

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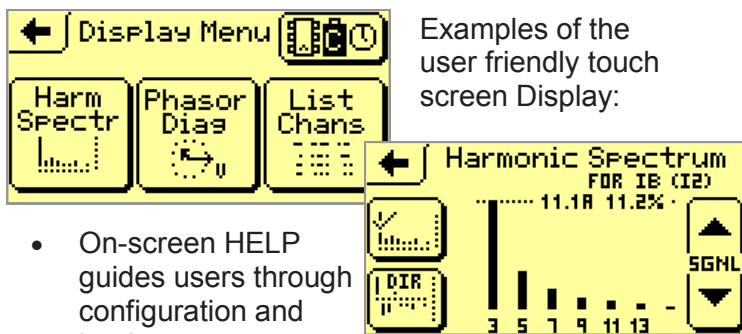


# 3 Phase Power Quality Analyser with Flicker & Harmonics

## PM3000HF with Harmonics and Flicker

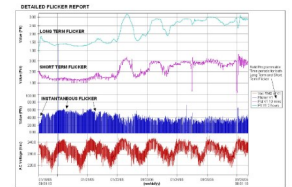


- 23 pre-loaded configurations are set for 3, 2 and single phase hook ups with a variety of recording channels. These are selected for measuring voltage, current, power, power factor, harmonics, flicker, unbalance and more.
- Phasor Diagram Display is a graphical touch screen interface that ensures correct hook up, provides suggestions upon detecting errors and determines if current sensor is properly orientated.



- On-screen HELP guides users through configuration and hook up.
- Capable of storing up to 127 configuration or data files.
- The PM3000 measures both AC and DC Power (optional)
- 3 memory options available: 8MB (Standard), 16MB & 32MB

- Measures to the EN50160 Standard
- The PM3000 runs off the voltage being measured. For voltages below 50V use an AC/DC 12V charger.
- Battery back up provides 10 minutes resettable timed ride-through in case of power outage
- Fused voltage leads and internally fused voltage inputs protect valuable equipment
- Rugged, compact, portable case is lockable. Unit is lightweight, reliable and easy to use.
- Safety: 600V Cat III, pollution level 2 unit. Very small size, will fit in most panels and allow the door to be closed. Review screen remotely via Bluetooth.
- Field programmable software and firmware updates
- USB, with MODBUS ASCII protocol or modem communications.
- Data analysis is easy with our and comprehensive software Pronto for Windows (included in your kit).



### Great value 3 Phase Power Quality Analyser with Flicker and Individual Harmonics to the 15th

#### PM3000HF Kit

- PM3000HF Power Quality Analyser
- Three 24" 3000 Amp flexible current clamps (max. conductor size 8")
- Four voltage input cables with fusing
- USB Download Cable
- Three Neutral Common Leads
- Mains Lead
- Customised Bag with Tool Roll
- Pronto For Windows Analysis Software
- Customer CD with Operation Manual
- Braid for personal cable management



- Optional Android Tablet/ Mobile Phone for Bluetooth Communication



## Exclusive! Single Cycle Adaptive Store™

*“Starting from scratch we would have spent weeks zeroing in on something like this on a conventional recorder, but the PM logger caught it on the first try, with no special setup”*

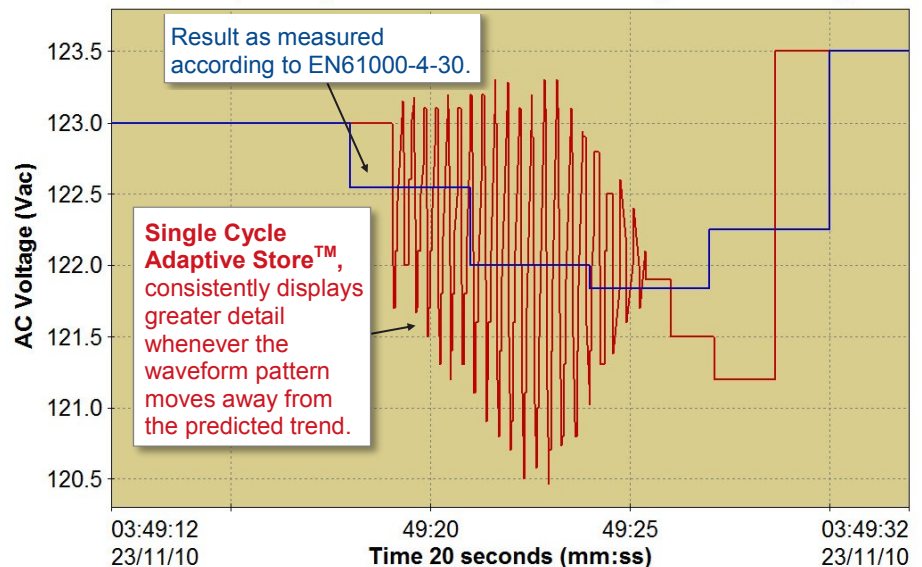
*Pat Coleman, Southern Company, USA, 2010*

Adaptive Store is our patented compression technology available in all PM Series Analysers. It automatically records the chosen parameters in great detail and at high sampling rates when anomalies and deviations from the predicted trend occur.

**Adaptive Store is designed to make the best use of available memory,** whilst meeting two conflicting requirements:

- to provide long-term trend data, observing the worst extremes of max and min values, and;
- to provide detail where new activity occurs, i.e., detecting and capturing sudden changes.

Outram's Adaptive Store vs. Interval Store (3 sec averages) of Van



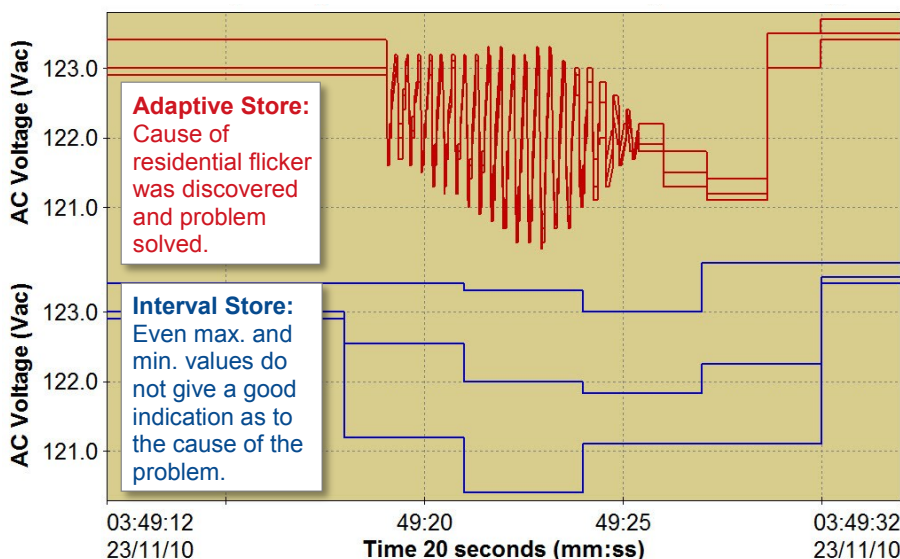
Adaptive Store assesses signal conditions in real time without having to set thresholds. The only required user parameter is the total time of the recording.

### Adaptive Store recognises the unpredictability of future signal activity

This unique method of *anticipating* the possible signal path has many advantages. For example:

- it allows for immediate reaction to transients capturing the entire duration of the disturbance, and;
- it works with extremely long recording periods.

Max, Min and Average of Van: Adaptive Store vs. Interval Store



By automatically adjusting the thresholds distinguishing the anomalies from the trend as signal dynamics change or the available memory becomes full, Adaptive Store ensures that less significant phenomena can be summarised and greater detail recorded for abnormal behaviour.

The Single Cycle Adaptive Store™ recording mode is the most powerful automatic data compression system available in any data logger on the market.



# 3 Phase Power Quality Analyser with Flicker & Harmonics

## Exclusive Software, Pronto for Windows



How to make the most of all your recorded data:

Use our **Pronto for Windows Software**, the best graphing software on the market for use with all PM Analysers

### UPSTREAM OR DOWNSTREAM?

Our Adaptive Store recording regime can deliver enough detail to indicate whether a disturbance is coming from upstream or downstream of where the measurement was taken. Work it out by looking at the relationship between the voltage and current data streams.

### COMPARE LIKE WITH LIKE?

From your own recorded data in Pronto you can load the same configuration back into the analyser to record the same measurements again and again.

### TECHNICAL SUPPORT

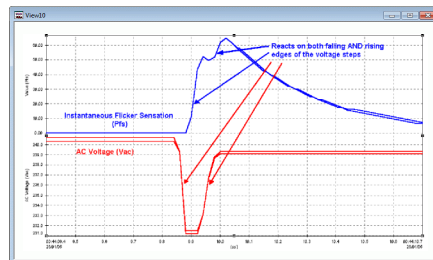
Technical support is available from those who either designed the unit or have over 20 yrs experience with the Ranger and PM series.

Who better to instruct you on how to make the most of your analyser?

### STANDARD REPORTS

Generate graphs and tables suitable for EN50160 reports. (PM7000, PM7000FLM and PM7500 only)

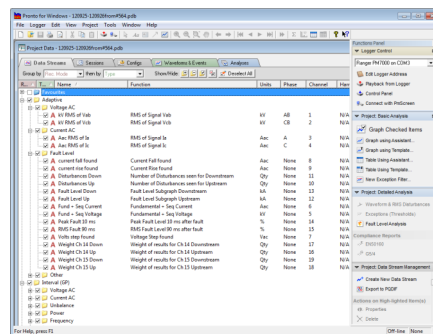
**Pronto for Windows** is a full-featured, Windows based program designed to extract data from the Power Master series and present it either graphically or in tables for straightforward analysis.



Analyse detailed data that Single Cycle Adaptive Store™ has captured automatically

Pronto for Windows is the only program you will need to communicate, analyse, report, and manage your data (as well as configure the analyser itself).

Through the use of easy to follow 'assistants' and pre-loaded templates create graphs and tables for emails and hard copy reports simply and quickly. Manage and save your favourites to create the same graphs recording after recording.

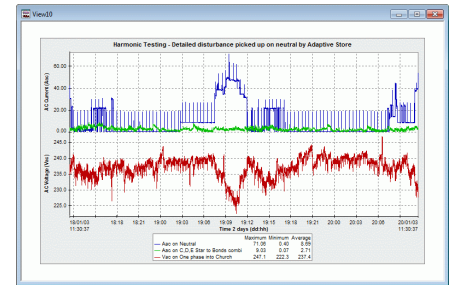
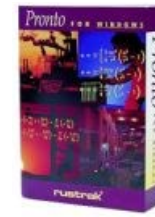


Pronto for Windows Project Browser

The selection of icons on the toolbar makes all commonly used instructions such as zooming, statistical analysis, annotation, downloading, and printing as easy as pointing and clicking the mouse.

Simply 'copy & paste' graphs into any word processing program and export tables straight to Excel or PQDIF for further analysis.

Sales enquiries: [sales@outramresearch.co.uk](mailto:sales@outramresearch.co.uk)  
+44 (0)1243 573050  
Technical help: [support@outramresearch.co.uk](mailto:support@outramresearch.co.uk)  
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Sample Graphical Data of Voltage & Current

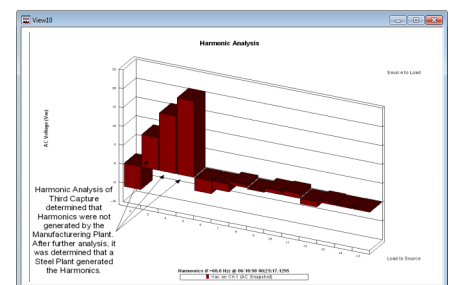
### More Pronto Features:

- Analyser configuration is saved with data for retrieval any time
- Easy file management tools
- Watch our New video tutorials on-line
- Reporting Tools:
  - Exceedence reports
  - Summary statistics
  - Tabular Listings
  - Custom Reports saved as templates



Exceedence Report - Multiple reports generated after recording is concluded

- Unlimited traces on a screen
- Arrange traces on any axis, full freedom of editing on all aspects of a graph
- A comprehensive, context-sensitive help system



Harmonic Analysis of Waveform Events (PM7000, PM7000FLM, PM7500 series and PM4000 only)



# 3 Phase Power Quality Analyser with Flicker & Harmonics

## Ranger PM3000 Product Specification

**Input Voltage:** 3 channels 0-480Vac. Sensors: In-line shrouded 4mm banana plugs and fused crocodile clips. 0-480Vdc optional.

**Input Current:** 3 channels. Sensors: Three 24" 3000 Amp Flexible Current Clamps supplied (Ranges 0-3000A, 0-400.0A, 0-50.00A) or can use with conventional 0-0.5Vac voltage output current clamps. DC measurement with suitable sensors optional.

**Channels:** 16

**Accuracy:** Volts and wide range current < 0.25% True RMS +/-2 LSB's excluding sensors. Narrow range current < 1% True RMS excluding sensors. Zeroing function for DC

**Resolution:** Programmable to 0.1 Vac and 0.1 Aac 0.01V, 0.01A high resolution mode

### Maths Channels:

**AC 1 Phase:** RMS, Stray Voltage RMS Hi Res < 35V, Real power, VARS (fund), Apparent Power, Power Factor, Phase angle, Frequency, Instantaneous Flicker Sensation, Short Term & Long Term Perceptibility, Flicker Flag

**AC 2 Phase:** Real Power, VARS (fund), Apparent Power, Power Factor

**AC 3 Phase:** Real Power, Reactive Power VARS (fund), Apparent Power, Power Factor, Voltage Unbalance, (Conventional & Sequential Components) Current Unbalance, Voltage Phase-Neutral (where applicable) and Phase-Phase

**DC:** DC component may be extracted on all 6 channels

**Harmonics:** Odds, Evens, Triplens, Individual Harmonics and Harmonic Direction to the 15th, K Factor, % Total Harmonic Distortion to the 25th, Harmonic Value

**Symmetrical Components:** NPS, NPS/PPS (Voltage and Current)

**Other Maths Option:** Channel X \* Constant, Channel X / Channel Y, Filtered Channel X, Internal Temperature, On Charge, Battery Volts, DC optional

**Sampling:** Continuous sampling at 64 times per cycle

**Recording:** Single cycle True RMS response time; 16 bit simultaneously sampling all signals

**Memory:** 3 options available: 8MB, 16MB & 32MB RAM

### Recording Mode and Rate:

**Adaptive Store:** Unique storage management enables extended recording & single cycle resolution on significant signal changes

**Point Store:** Selectable from single cycle rate to once every 12 hours

**Data Retention:** Back-up battery provides 2 month's retention @ 25°C (77°F)

**Power:** Requires 50-480 Vac from Phase A voltage measurement or separate power supply

**Battery:** 4 AA NiMH battery pack & 1 Lithium battery

**Safety & Standards:** IEC 61010, 600V Cat. III, Pollution level 2, CE, IEC 61326(EMC), IEC 61000-4-15

**Internal fusing:** PSU, Battery stack, fused voltage leads

### Communications:

**Serial Ports:** USB, isolation>2.5kV.

**Bluetooth:** Wireless interface (isolated) reception up to 10m (optional).

**PMGateway App.:** Enables Android mobile phone to act as a Gateway. Send data files to your inbox, start and stop recordings.

**Protocol:** MODBUS ASCII touch-screen display 100 x 35 mm

### Computer Requirements for Pronto Software:

Windows 2000, XP, Vista, 7, 8, 10; 250MB hard drive space

**Display:** Backlit LCD graphic touchscreen display 2.5" x 1.35"

**Case:** Pelican 1120 Guard Box: Dimensions 8" x 6.5"x 3.5"

**Weight:** 2.5lbs. without leads and clamps

**Operating Temp:** 14°F (-10°C) to 140°F (60°C)

### DELVING INTO THE DETAIL

Single Cycle Adaptive Store™ records more detail when the measurement deviates from the predicted trend.

This PM series EXCLUSIVE storage technique means only the necessary information is captured in detail making the most of the unit memory and reducing analysis time.

### FIND THE SOLUTION

Could there be fire risks in your warehouse or problems with your power network?

Do not leave it to chance.

Find out with a **PM3000HF**.



sales@outtramresearch.co.uk

### TESTIMONIAL

*In short, we are very happy with the [Outram Analyser], and glad we found each other. Really because it does things and finds things which other kit doesn't touch! The "detailed recording" channels, and the ability to relate different channels, makes it ideal for answering questions like "what happened and why?"*

R. Ball, National Grid UK.



# High Speed Comprehensive Power Quality Analyser

## Ranger Power Master 7000 (PM7000)

Three Phase, High Speed Power Quality Recording Analyser with Flicker and Harmonics available in Turbo, High Speed and Standard models



### All your P.Q. needs in a single unit

A comprehensive high performance tool for all your P.Q. measurement requirements.

Set up your first recording in just 15 mins!

### Wireless Communication

Bluetooth, **PMGateway** and Ethernet enable remote communications including data download to your inbox, visibility of live results and remote control of your PM7000.

### Correct Data 1st Time

Our patented **Single Cycle Adaptive Store™** recording process provides single cycle measurements over long recording periods.

All the measurements you need first time out, without setting any thresholds!

### Disturbances Ranked

Our **Auto-Ranking Waveform Capture** technique retains and ranks the waveforms of the 'worst' disturbances throughout the recording.

We take you straight to the core of your P.Q. problem.

### Automatic measurements

No need to set thresholds! Our intelligent data handling technique, the patented **Adaptive Store**, and our **Auto-Ranking Waveform Capture** selectively retain detail when the 'worst' disturbances occur during your recording. The PM7000 will save you time and money when you solve your P.Q. problems more quickly than ever before.

### Do not miss anything during your first recording

- > 470 channels reporting to the Standards
- 32 troubleshooting channels with single cycle detail
- 8 channels for Waveform Capture, at High Speed over 1 Ms/sec (24576 samples per cycle at 50Hz per channel, Turbo model)
- All channels recorded simultaneously.

### RMS accuracy 0.1% excluding sensors\*

- Individual Voltage and Current **Harmonics** to the **127th**, %THD to the 50th and Interharmonics.
- Instantaneous **Flicker** sensation, short term and long term Flicker to IEC61000-4-15
- **Power parameters, unbalance, phase angle, frequency, inrush current** and much more.

### Expect safety as standard

The PM7000 is a Cat IV 600V Power Quality Analyser, powered off the voltage being measured.

### Multiple modes of direct & remote comms

Great choice of communication methods to suit any situation. Choose from USB, Bluetooth, Ethernet and USB memory stick connectivity.

### The PM7000 is easy to use

Our Hook-up Checklist, Configuration Guide and Step-by step Quick Start Guide all make setting up and using your PM7000 quick and simple.

### Water resistance to IP65

**Ranger** PRODUCTS

designed and manufactured in the UK by



\*For more information on the PM7000, including a full technical specification, download its datasheet from [www.outtramresearch.co.uk/shortforms/pm7000.pdf](http://www.outtramresearch.co.uk/shortforms/pm7000.pdf)

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## Ranger Power Master 1000



### Use the Right Tool for the Job

The PM1000F is a single phase, power quality troubleshooting tool with Flicker measurements to IEC61000-4-15, including Instantaneous Flicker Sensation

### Simply plug it in and play

The PM1000 will begin recording without requiring any user skill.

### Wireless Communication

Bluetooth to phone, tablet or PC as well as remote data download, live results and remote control of your analyser via our **PMGateway App**.

### Correct Data First Time

Our patented **Single Cycle Adaptive Store™** recording process provides single cycle measurements over long recording periods.

All the measurements you need first time out, without setting any thresholds!

### Detail in your recordings where you need it

Record detail down to a single cycle whenever a disturbance occurs using our unique data storage technique Single Cycle Adaptive Store™. It's automatic, no need to set thresholds.

### Straight forward communication

A virtual user interface on your PC or portable device allows you to set the PM1000F up and see real time data without it needing a display. Talk to your PM1000F via Bluetooth using a PDA or Windows compatible mobile phone and to your PC via an infra-red communication device.

### Simple Analysis

Adaptive Store, combined with our comprehensive data analysis software, Pronto for Windows, enables you to analyse your data with speed and confidence, zooming in easily on the readings that matter.

### What makes using the PM1000F so easy to use?

- Up to 16 channels of recorded information in the same session enables you to get all the information you want first time.
- Three flashing red/green LEDs give status information when the PM1000 is recording so you can check all is in order with no fuss.
- On screen 'Help' guides you through setting up so you can get it right first time.
- The PM1000 comes with 13 configurations for single phase hook ups already stored so you can get started with confidence.
- You can store up to 127 configurations or data files in the PM1000 so you only have to create each of your unique set ups once. The logger remembers them for your future use saving you much time and effort.
- Set ups can be programmed in on-site for your convenience.
- Compact and light, the PM1000 comes with a protective boot and specifically designed bag to make carrying it around easy.

### Parameters Measured

- ⚡ Voltage
- ⚡ Current
- ⚡ Stray voltage Hi Res <35V
- ⚡ Real Power
- ⚡ Reactive Power
- ⚡ Power Factor
- ⚡ Apparent Power
- ⚡ Phase Angle
- ⚡ Frequency
- ⚡ Total Harmonic Value
- ⚡ Total Harmonic Distortion
- ⚡ Flicker
- ⚡ Inrush Current (automatic)



designed and manufactured  
in the UK by



For more information on the PM1000F, including a full technical specification, download its datasheet from [www.outtramresearch.co.uk/shortforms/pm1000.pdf](http://www.outtramresearch.co.uk/shortforms/pm1000.pdf)



**Did you know you can now predict Fault Level  
from measurements on the network with our new  
PM7000 Fault Level Monitor?**



## **Power Quality Monitoring and Analysis**

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