

RANGER PM7000 POWER QUALITY RECORDING ANALYZER



OUR SOFTWARE DISPLAYS & PRINTS INSTANTANEOUS FLICKER SENSATION FOR THE ENTIRE LENGTH OF RECORDING A RANGER / PRONTO EXCLUSIVE ASK OUR COMPETITORS TO SHOW YOU IF THEIR SOFTWARE CAN DO THIS BEFORE YOU BUY!

Each Unit Includes

PM7000 HIGH PERFORMANCE POWER QUALITY & HARMONIC ANALYZER

- FIVE VOLTAGE PROBES 600V CAT IV POLLUTION LEVEL 2
- FOUR 24" Dual Range 6000/400.0 Amp FLEXIBLE CURRENT CLAMPS (MAX CONDUCTOR SIZE 8")
- PRONTO FOR WINDOWS ANALYSIS SOFTWARE POCKET PC—COLOR DELL AXIM
- 12 VOLT WALL CHARGER
- OPERATION MANUAL ON CD
- CARRYING CASE
- 1 YEAR WARRANTY
- CONFORMS TO IEEE 1453

SPECIFICATIONS

<p>Input Voltage Four 0—600 Vac Safety 4mm Banana Sockets</p> <p>Input Current Four Sensors 2 ranges on two types. Menu Selectable Rogowski coil 0-6000A, 0-400A, OR Voltage type 0-1 Vac/0-10A—Safety BNC Socket</p> <p>Channels 32 Channels Single Cycle Adaptive Store™ for detail data and troubleshooting, also > 460 channels of general parameters</p> <p>Accuracy < 0.25% excluding sensors, +/- 2LSBs (in target ranges) Narrow range current < 1% True RMS</p> <p>Programmable Math Channels Recorded using Adaptive Store For extra detail or troubleshooting</p> <p>AC 1 Phase: RMS, Stray Voltage RMS Hi Res < 35V, Real power, VARS, Apparent Power, Phase angle, Power Factor (Real & Displacement), Frequency, Instantaneous Flicker Sensation, Flicker Flag, (Pst, Plt already recorded)</p> <p>AC 2 Phase: Real Power, VARS, Apparent Power, Power Factor</p> <p>AC 3 Phase: Real Power, VARS, Apparent Power, Power Factor, Voltage Unbalance (Conventional & Sequential Components), Current Unbalance</p> <p>Harmonics: Total Harmonic Value, % Total Harmonic Distortion, Odds, Evens, Triplens and individual harmonics with direction, K-Factor</p> <p>Basic Maths: Channel X * Constant, Channel X/Channel Y Filtered Channel X, Internal Temperature, On Charge, Battery Volts</p> <p>Waveform Capture Sample Rate: 8 channels at up to ~ 1.2288Ms/s (~20,480 samples / cycle)</p> <p>Selectable Waveform Parameters Greatest disturbances (automatic ranking and low rank discard) & first past a threshold. Wavesets: from 20ms to 160ms. Offending wave/complimentary current or voltage, all voltages, all currents.</p> <p>Triggers Transient, ring, notch, sag, surge, THD volts, THD current</p> <p>Wave Allocation Waves allocated across trigger functions</p> <p>Wave Sets TBD—but will be in 1000's</p> <p>Recording PM7000S (standard)—Sample rate per cycle ~ 320 PM7000H (high speed)—Sample rate per cycle ~ 2560 PM7000T (turbo)—Sample rate per cycle ~ 20,480</p> <p>Memory 128MB Flash memory for all files 32MB RAM for waveform capture data 64MB working RAM Firmware (program memory) - 2MB Flash upgradeable User Preferences - Stored in non-volatile RAM/EEPROM</p> <p>Recording Mode and Rate</p> <p>Point Store: Selectable from single cycle rate to once every 12 hours</p> <p>Adaptive Store: Extended recording with single cycle (half cycle?) resolution on changes. Statistics closed (at least) every 5 minutes.</p> <p>General Store: Statistics to IEC EN50160 via PC Software</p> <p>Waveforms: Examined RANKED and stored in real time at full speed—Exclusive</p> <p>Flicker Flicker (3 voltage inputs) NEW IEEE 1453 INSTANTANEOUS FLICKER FOR ENTIRE LENGTH OF RECORDING</p> <p>Fixed Functions Recorded on (selected) Intervals (Max, Min, Avg) >492 CHANNELS</p> <p>Voltage & Current RMS (8 inputs) THD/Harmonic Value (8 inputs) Power (kW, VAR, AP, PF) Individual Harmonics 2-51 (8 * 50 signals)</p>	<p>Configurations On Board Storage of over 200 configs—Exclusive</p> <p>Data Retention Flash Memory: During recording sequential data is saved to Flash memory. Waveform capture data is held in RAM and transferred to Flash memory when recording ends Configurations etc stored in Flash memory</p> <p>User Interface Via Remote Screen: PC via Bluetooth or USB running PMScreens or Pronto, Pocket PC (not Palm Pilot) provided with each unit via Bluetooth running PMScreens</p> <p>Setup/Configuration: Via remote screen</p> <p>Data Review: Real Time via Bluetooth Pocket PC, laptop or PC</p> <p>Displays PMScreen: Pocket PC over Bluetooth to program and display Power & Energy, Waveforms, Harmonics, Phasors, Harmonic Phasors, Trends, Statistics, list of channels & more</p> <p>Communications Bluetooth: Wireless interface (isolated)</p> <p>USB: Serial interface to PC (isolated > 2.5kV)</p> <p>USB: Memory module interface (non-isolated).</p> <p>Download to PC & control through PDA or Pronto for Windows, MODBUS Ascii support</p> <p>Power Requirements: Powered from V1 input (90-660 VRMS, 15W Max) OR from charger input @ 12Vdc, 6W Max.—Auto Switching</p> <p>Battery Capacity: 1600mAh (5 HI-Temp NiMH batteries)</p> <p>Charge Method: From V1 input or from 12V Wall Charger (auto switching) Battery Ride Through: 10 minutes at a time</p> <p>A/D Converter Resolution: 24 bit (top 16 bits used normally) for harmonics, power & energy, flicker</p> <p>Resolution Programmable to 0.1 Vac and 0.1 Aac(0.01V high res mode)</p> <p>Environmental Operating & Storage Temp: -10° F to 140° F</p> <p>Case Type: Pelican 1150 Box</p> <p>Dimension: 9" x 7.5" x 4.3"</p> <p>Weight: 7.7 LBS</p> <p>IP Rating: IP67 (immersion for limited time)</p> <p>Certification IEC 61010 (600V Category IV. Pollution level 2,1000V Cat III if PSU fuses removed), CE Fused voltage leads (lead fuses 500mA, 1000V, 50kA rupture current) GS38 compliant Internal Fusing: PSU (x2), Charger input, Battery stack Internal Thermal Fuse IEC61326 (EMC), IEC61000-4-15, IEEE1453 (Flicker)</p> <p>Computer For Pronto Software: Windows 9x, ME, NT, XP: Pentium</p> <p>PDA Requirements For PMScreens: Microsoft Pocket PC 2003</p> <p>Applicable Patents 6424277, 0230712, 4910692</p>
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24 -7 Technical Assistance @ 248-408-7852



Ranger PM7000
 BETA: 0.206 Serial No: 1.018.0246.550203
 14:16:12 10 Jul 06 Main Menu Help ?

Connections Rogowski Coil 3Ø 4w Wye

← Back Main Menu

Operations
 Explore Configure Stop Recording Power Off

Display Graphs & Tables
 General Parameters (Volts Current Power) Detail Recording Channels
 Harmonics and Phasors Compare to Standards (EN50160 GS/4 IEEE519)
 Waveforms

14:26:03 10 Jul 06

← Back Information

Ranger PM7000 Power Master Series
 Serial No: 1.018.0246.550203
 Date calibrated: 4/Jul/06

← Back PM7000 Help

Help for the PM7000 series products is available primarily by pressing a button and holding it down for a second or more.

Try it here... Contents
 Then press briefly for more help. Index General
 Press here to skip this introduction in future (re-enabled on next Logger power-up). Skip

← Back Configure

Preferences Utilities Available Configs

Current Configuration is: Initial Config

Hook Up Record Mode & Times Review
 Detail Recording Channels Save as..
 Input Signals Waveform Capture Flicker

← Undo Select Hook-up Accept

3-Phase 4-Wire Wye (Optional)

Some connections may be suspect Details

← Undo Input Signals Accept

VOLTAGE GROUP Secondary PT Ratio 20.0:1
 Set signals individually

CURRENT GROUP Secondary CT Ratio 200:5
 Set signals individually

Select Current Sensor (& Range)
 Rogowski Coil High 3000A Mid 320.0A
 or Voltage Output CT 0-1V rms Ratio 10:1

← Undo Set Waveform Capture parameters Accept

Retain Wave Sets on basis of
 Greatest Disturbances First Past Threshold

Captured Wave Bracket 100 ms
 Press within waves to choose start & stop

Signals to be Captured
 V or I V & I All V All I
 Triggers to be used Set

← Undo Setup Record Mode & Times Accept

General Parameters
 Record Every 1 min

Detail Recording (Trouble Shooting)
 Storage Mode Adaptive Store Point Store
 Record Time 7 days

Recycling FIFO On Off

← Undo Detail Recording Channels Accept

Setup the recording channel functions: (press function TWICE to edit or use buttons) Suggest New Functions

10	RMS Ic (I3)	Aac
11	RMS In (I4)	Aac
12	Flicker Sensation Van	Pfs
13	Flicker Sensation Vbn	Pfs
14	Flicker Sensation Vcn	Pfs
15	Flicker PLT Van (V1)	PLT

List by: Channel Name Signal

← Undo Edit Channel Function Accept

+/- % One Harmonic Apply to Channel: 16 (Change Channel)

1	2	3	4	5
6	7	8	9	10
11-20	21-30	31-40	41-50	

of Signal Units %
 Van Vbn Vcn Vne
 Ia Ib Ic In

High Alarm Low Alarm
 +0.0 Off +0.0 Off

Recording Suggestions Return to List

Most recent channel defined: (press to edit, or clear using button)
 7 Calculated RMS Vac Vac Clear

No. of next channel to be defined: 8
 Suggestions for next channel: (press on a function to select then edit above)

RMS Ia (I1)	Aac
THD Van (V1)	%
Other	

← Back Detail Recording Channels

1: RMS Van (V1)	2: RMS Vbn (V2)
+222.1 Vac	+0.0 Vac
3: RMS Vcn (V3)	4: RMS Vne (V4)
+0.1 Vac	+0.0 Vac
5: Calc RMS Vab	6: Calc RMS Vbc
+222.1 Vac	+0.1 Vac
7: Calc RMS Vac	8: RMS Ia (I1)
+222.2 Vac	+12. Aac

Set Channels to Display

← Back General Parameters - Live Summary

Summary	Volts	Current	Volts Flicker
Signal V-rms [V]		Signal I-rms [A]	
Van	222.0	Ia	12.
Vbn	0.1	Ib	0.
Vcn	0.1	Ic	6.
Vne	0.0	In	7.
Parameter	Parameter		
Unbal %	199.73	kW	+2.
NPS/PPS	100.00	kVar	+0.
PF	+0.94	kVA	2.
Freq. (Hz)	49.89	kWhr	7.

← Back Harmonic Presentation

BarGraph Phasor Trend Table

Signal All
 Harm. 1-21
 F Remove Fund. Show Direction

← Back Harmonic Presentation

Harm	Rel(%)	Phase	Value
1	100.0	0	222.6
2	0.0	0.0	0.0
3	0.9	204	1.9
4	0.0	0.0	0.0
5	0.9	114	1.9
6	0.0	0.0	0.0
7	1.9	189	4.3
8	0.0	0.0	0.0
9	0.3	236	0.7
10	0.0	0.0	0.0

← Back Live Waveforms Stored Waveforms

Zoom History

← Back Live Waveforms Stored Waveforms

Zoom History

← Back Live Waveforms Stored Waveforms

Zoom History

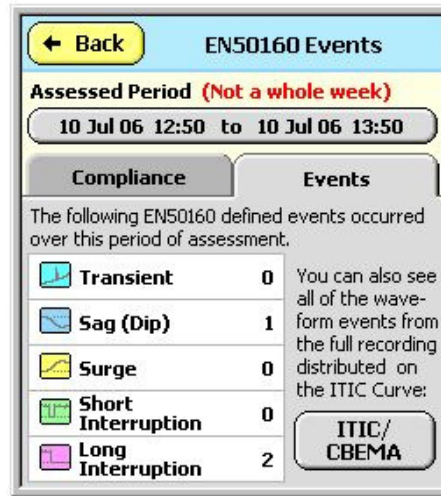
← Back Live Waveforms Stored Waveforms

Zoom History

RANGER PM7000 POCKET PC SCREEN EXAMPLES FOR "REAL TIME" COMPLIANCE & EVENT PRESENTATION



Screen a)



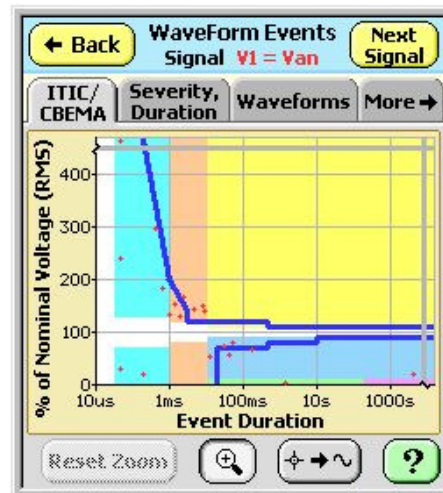
Screen b)

Recorded results may be compared against various Standards, for example EN50160 the European Public Voltage Supply characteristic.

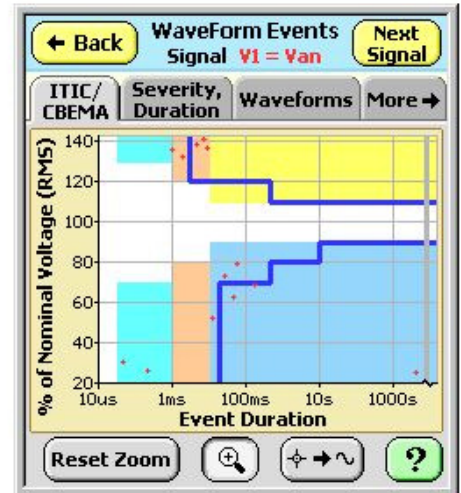
The screens here show examples a) of the summaries for compliance of the supply during the assessed period, and b) the number of specific events.

For both of these screens the assessment period can be adjusted.

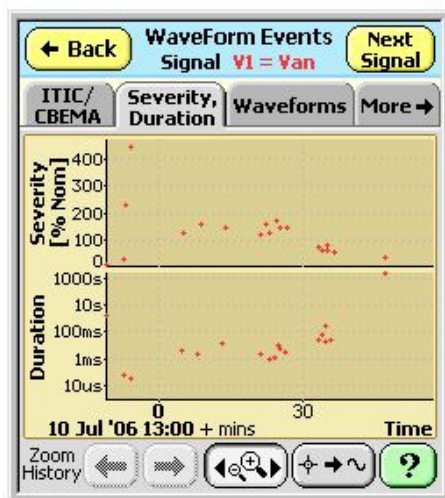
The screens to the right and below show different ways of presenting recorded event data. Screen c) is the conventional ITIC (CBEMA) presentation. This graph can be zoomed (d) to distinguish elements of a cluster, then the relevant waveform can be displayed.



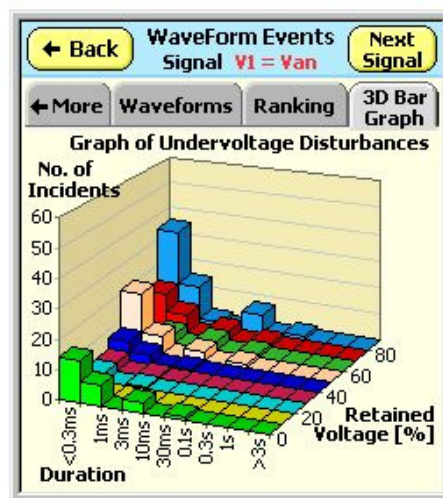
Screen c)



Screen d)



Screen e)



Screen f)

Screen e) shows event severity and duration against time for the recording. This too can be zoomed in.

Screen f), the 3D Undervoltage Disturbance graph, shows how serious the supply disruptions have been in terms of an industrial process being disturbed.

Remember that sags/dips may affect processes more seriously than complete outages.