Overview:

PQMS is an optional system available on all VPHK Products (single and 3 Phase PropSava and LiteSava). PQMS consists of a smart metering system (hardware) installed into VPHK Power Optimisation Systems. Windows based management software reads the data collected by the hardware via USB (for direct connection to a PC or Laptop) or BJ45 sockets to LAN or via a wireless system to LAN. The PQMS software allows management to record and access all historic power quality readings of the site/building(s).

The PQMS readings can help to identify:

a. Areas/sites that can benefit from additional energy saving effort.
b. Areas/sites of high energy use.
c. Increased energy use.
d. Potential equipment failure.
e. Areas/sites for reduction of CO_2 emissions.

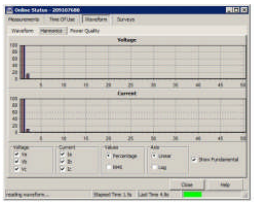
Hardware Meter

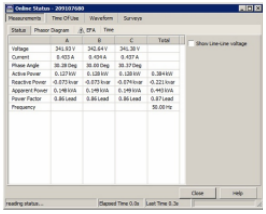
There are 4 PQMS Options Available:

1. **PQMS Direct:** Single USB socket on Product with USB lead connection to PC or Laptop.
2. **PQMS LAN Wired**: BJ45 socket connection on Product for wired connection to LAN.
3. **PQMS LAN Wireless:** BJ45 socket connection on Product for wires connection to LAN with wireless connection.
4. **PQMS Multi-Drive:** Multi-Site, multi-product system with LAN (wired & wireless) and Internet connectivity.

Contents of PQMS:

5. **PQMS Direct**:
   a. Meter and all wiring fitted to Product with USB socket. 2Mb on-board memory for all readings.
   b. Hardware warranted for 5 years parts and labour based upon 'return-to-base'.
   c. 3 meter USB cable for computer connections.
   d. 1, 2 or 3 User Windows Software License without Database. Full on-line tutorial for software installation and set-up of PQMS.
   e. 1st year upgrade and bug fixes (Software Maintenance) for Windows Software FOC. Additional years available upon request.
   f. Free email Technical support for 1 month after installation. Additional email Technical support available upon request.
   g. Installation of software and connection to PQMS available upon request.
   h. Software and PQMS Training available upon request.





Contents of PQMS Continued…

6. **PQMS LAN Wired:**
    a. Meter and all wiring fitted to Product with BJ45 socket. 2Mb on-board memory for all readings.
    b. Hardware warranted for 5 years parts and labour based upon 'return-to-base'.
    c. 1, 3, 5 and 10 User Windows Software License with database. Full on-line tutorial for software installation and set-up of PQMS.
    d. 1st year upgrade and bug fixes (Software Maintenance) for Windows Software FOC. Additional years available upon request.
    e. Free email Technical support for 1 month after installation. Additional email Technical support available upon request.
    f. Installation of software and connection to PQMS available upon request.
    g. Software and PQMS Training available upon request.

7. **PQMS LAN Wireless:**
    a. Meter and all wiring fitted to Product with BJ45 socket. 2Mb on-board memory for all readings.
    b. Hardware warranted for 5 years parts and labour based upon 'return-to-base'.
    c. 1, 3, 5 and 10 User Windows Software License with database. Full on-line tutorial for software installation and set-up of PQMS.
    d. 1st year upgrade and bug fixes (Software Maintenance) for Windows Software FOC. Additional years available upon request.
    e. Free email Technical support for 1 month after installation. Additional email Technical support available upon request.
    f. Installation of software and connection to PQMS available upon request.
    g. Software and PQMS Training available upon request.

8. **PQMS Multi-Drive:** Prices subject to quotation and customer needs.

Benefits for Users:

- Real time access to site energy usage – not looking backward from bills.
- Comparison of current and historic energy usage to measure savings.
- Early indications of possible equipment failure from software system Alarms.
- Measure and record what you need, when you need - 64 different user programs for measuring time and energy usage
- Identify which sites, zones and areas use the least/most energy – using Multi-Drive Internet System.
- Construct a full energy saving plan to reduce energy costs.
- Accurately show savings for Carbon tax credits.
- Interface included for Computer control of power output for VP Products – reduce your power in any site, zone or area at the 'push' of a button.

Meter Positioning/Connectivity:

The meter is positioned/mounted at the bottom of the 3 Phase PropSava and in various other positions in single Phase Products. All PQMS are hard wired with USB or BJ45 sockets to the rear left of the case; front facing.

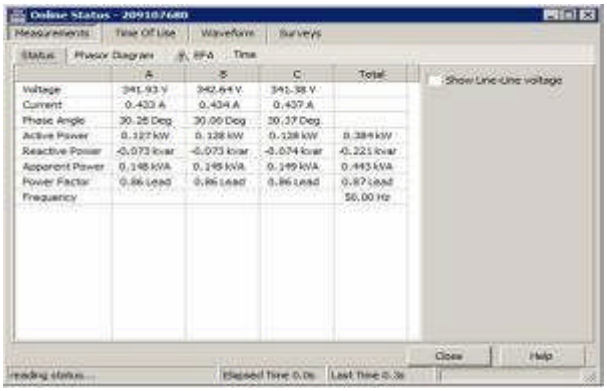
Meter mounted inside 3 Phase PropSava (Forward view)

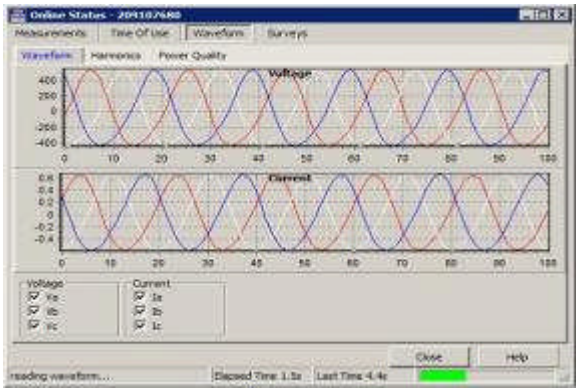
LAN/P.C - External connection-rear left (Left side Panel)

Connectivity comes in the form of either a USB (for Direct to PC or Laptop) or BJ45 connection to a LAN or wireless network. Alternatively a USB connection can be fitted for use with a PC or Laptop.

Software Applications:

PQMS software is a 32 bit Windows-based application primarily used to configure and retrieve data in a user-friendly manner from the PQMS. It can keep track of single or multiple PQMS Product systems spread across multiple sites. This PQMS software allows Users to see current and past power quality readings with customisable displays, presented as tables, waveforms or as graphs.





Example Screens showing on line readings in a table and waveform format.

Software Applications Continued…

The PQMS Software comes with a Tutorial section enabling the user to familiarise themselves with all applications; from setting up the meter to customising the relevant data required for live applications and historical records.

Security:

Security is controlled by PQMS software using usernames and passwords on a meter by meter basis. When PQMS loads it will ask for a username and password.

The PQMS meter allows for up to six (6) users, before any operations can be performed a user must log on. Each user has a user name and password, each up to 7 and 15 characters long respectively. The user remains logged on until logged out.

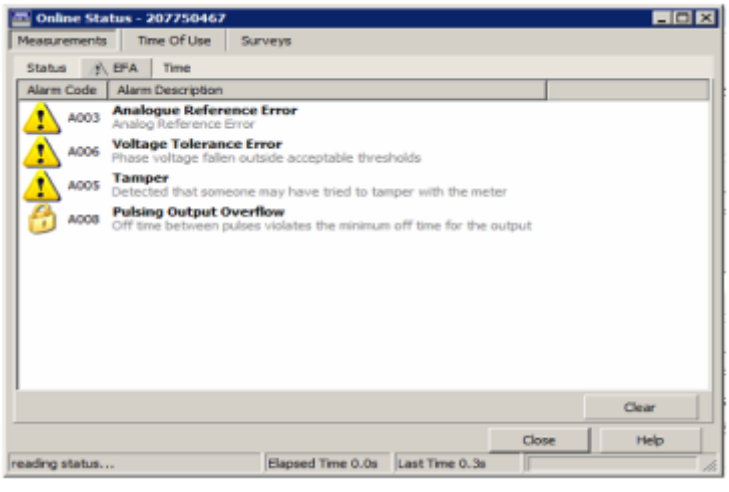
Each user has a user level, when a user logs on the level they belong to is used to decide what they can access. There are 7 user levels numbered 0-6, each successive level can do all that the lower levels can do.

Number	Access	Description
0	Read only	Only allows values to be read
1	Read All/ Limited Timeset	Also allows the time to be set by a limited amount, as per the shift limit setting.
2	Read All/Billing Reset	Also allows a billing reset to be performed.
3	Read All/Clear	Clear EFA alarms, surveys and other systems. Control user programmable pulsing outputs. Unlimited timeset ability.
4	Read All/+Setup/ Write User	Allows the setup to be read, and allows limited setup change. Added in firmware version 1.27
5	Read All/+Setup	Allows the setup to be read, but not written.
6	Read/Write All	Allows the setup of the meter to be changed.

User Access Levels

Alarms:

During operation the PQMS meter monitors a variety of external and internal conditions. If a problem is detected an alarm is raised called an Equipment Failure Alarm or EFA. These tests are designed to detect measurement failure, tampering attempts and hardware failure.



Alarm Status Screen

Alarms Continued…

There are 17 alarms each representing a different fault. Each alarm has a corresponding flag letter that represents it.

Flag Letter	Alarm Name	Alarms Page Code
E	Analog Reference Failure	A003
S	Asymmetric Power on Mk10 Neutral current Mismatch on Mk7	A000
V	Voltage Tolerance Error.	A006
F	VT Failure.	A007
R	Incorrect Phase Rotation. (not on Mk7)	A002
T	Lid Tamper	A005
C	Clock Failure.	A017
M	Reverse Power.	A004
L	Calibration Data Lost.	A001
H	Modem Failure.	A012
X	RAM Failure or LCD Failure.	A015
Y	Program Flash Failure.	A015
Z	Data Flash Failure.	A015
N	Pulsing Output Overflow.	A008
D	Battery Failure	A016
U	Tamper	A005
O	Overcurrent (Extra EFAs group)	

Alarm names and Flag letters

An Alarm Flag can have one of 3 states. The Active state means that the alarm has been detected and is still occurring. The latched state means the alarm was active but isn't now. The inactive state means the alarm is not active and has not been in the past.

Event Logs:

The PQMS system keeps a variety of events that occur to the Meter. The size of these logs may be configured.

Log Name	Description
System Log	Used for system events like power on and off.
Access Log	Used to track user accesses to the meter.
Tamper Log	Records when tamper events occur. (Also used as LCD Alarm LOG for UPS meters, and previously was used as a billing reset log)
Sag/Swell Log	Records Sag and Swell events.
Debug Log	Only used for diagnostics. Also used as the Push Alarm log for UPS meters and meters with Push alarming enabled.

Event Log Types

Event Logs Continued…

Event logs can be downloaded as a text file. Each file has a unique number starting from when the meter was started, which is only reset if a survey is cleared.

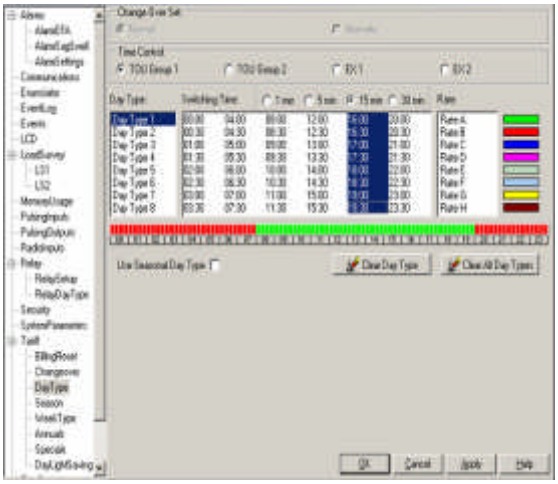
[LoadSurvey]
LastRecord=0000000061
StartTime=01/01/1996 00:20:50

Record No	DateTime (0x0000F03D)	Event (0x0000FFFF)
34	01/01/1996 21:39:50	User: 1 changed database stage: Misc=>2041
35	01/01/1996 21:39:55	User: 2 changed database stage: Pulse=>2042
36	01/01/1996 21:39:57	Log off port: Optical=>2081
37	03/01/1996 07:56:58	User: 0 logged in on port: Optical=>2000
38	03/01/1996 07:56:58	Bad password on port: Optical=>2080
39	03/01/1996 07:56:58	User: 0 logged in on port: Optical=>2000
40	03/01/1996 07:57:28	Inactivity timeout on port: Optical=>2082

Downloaded Event Log

Time of Use (TOU) Channels:

An energy quantity such as import W/h is recorded in a TOU channel. Each TOU channel records both accumulated energy and the maximum demand and the time the maximum demand occurred. It can record these quantities separately for different times of the day, week, seasons, specials and year. Hence the term 'Time of Use'. These are called different rates and a calendar controls when these rates occur. The calendar allows different rate structures for different days of the week and for different special days during the year. It can take account of seasons or complete customised rate conditions.

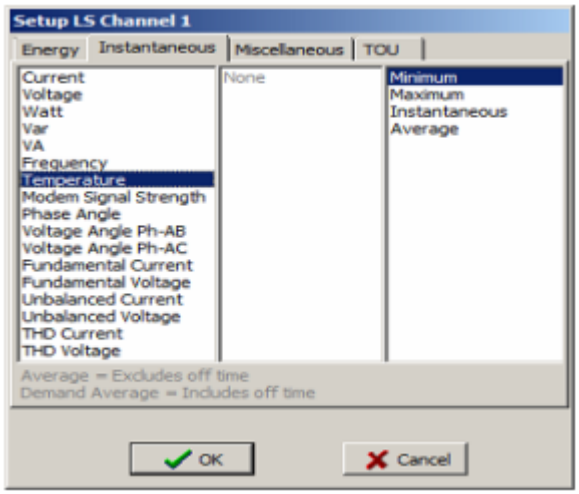


Day type TOU set up

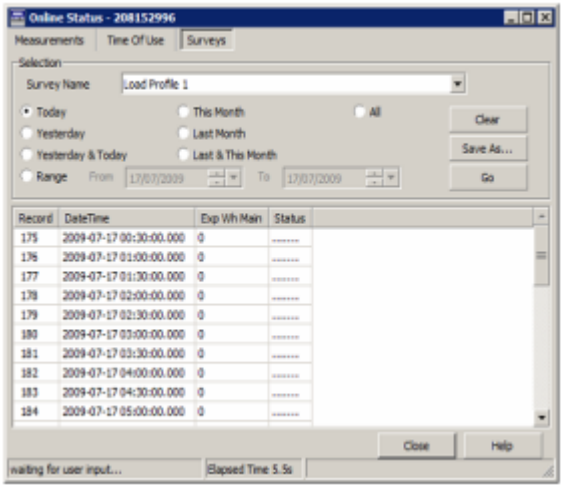
Week type TOU set up

Load Survey:

A load survey is designed to give a detailed record of energy usage. PQMS has two load surveys available each independently programmable and each can record up to 32 channels. The load surveys in PQMS also have the ability to record instantaneous figures such as voltage and current.



Instantaneous Channel selection



Load Survey On-line Status

Load Surveys can be downloaded as text files, similar to Event Logs.

The Load Survey on line status screen allows periods of time to be downloaded or entire surveys.

For further information contact your Distributor.

Vanguards Power, Power Optimisation Systems – Single & 3 Phase:

PropSava 3 Phase SCRF

PropSava 3 Phase SCRV
User Programmable

PropSava 3 Phase ESF

LiteSava Single Phase SCR
User Programmable

PropSava Single Phase ES
User Programmable