Energy Monitoring and Control System
Local and multi-site energy management solutions
Connect now and plan for tomorrow....
The VMU-C energy management evolution

- Manage peak demand and implement an energy plan that works for you
- Reduce your running and maintenance costs
- Achieve better returns and higher occupancy
- Protect your assets and improve your capital value
- Attain longer lease terms
Scalable Energy Management Solutions for Local and Multi-site Applications

Multi-Site Energy Management

VMU-Y
Embedded Energy Management
pg 7
OR

EM²-Server
Cloud based energy management software pg 7

Local Site/ Zone

VMU-C
Webserver Master pg 4

Field Device Level

Energy, Gas and Water Meters
Also other energy measuring field devices i.e. energy meter circuit breakers, PFC controllers, VSDs and so on Remote connection of VMU-O and VMU-P modules

Modbus TCP, FTP, HTTP
Energy Management Controller VMU-C

The VMU-C Energy management controller is the ideal web-server based solution for monitoring small to medium size installations. Gathering data from energy meters, power analysers and VMU series I/O modules (refer below), the VMU-C provides an easy to use monitoring system assisting organisations to optimise their energy and resource consumption and achieve good industry efficiency ratings such as NABERS and Green Star.

With its integrated machine to machine (M2M) functionalities it is capable of automatically transferring data via FTP, HTTP or MODBUS/TCP to a remote server where a SCADA, BMS or other specific database software is running.

By combining VMU-C with VMU-Y or EM²-Server, the end user has the ability to remotely manage multi-site installations (more detail on the following pages).

An integrated Wired Web-Server Solution

Since plant data is very important, VMU-C dedicates 4 GB of memory to secure data storage. VMU-C provides also a micro SD slot (up to 32 GB SDHC cards) and a hot-swap USB interface (for direct memory stick connection) on the top of the unit for:

- Plant configuration backup and restore;
- Plant database backup and restore

The Ethernet interface allows to operate and configure the VMU-C, by means of LAN or direct connection to a PC, thanks to the integrated web-interface. In the case Ethernet cannot be accessed, the mini USB can be connected to a PC.

Advantages of the VMU-C Onsite Database

- No need for a dedicated PC for monitoring
- No crash problems which lead to data loss
- No compatibility problems due to different operating systems, different languages, libraries, etc
- Polling device, datalogger, Ethernet gateway all available in a single compact unit
- Modular concept for additional input/output whenever needed

Ordering Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webserver master unit 12-28V DC Ethernet USB RS485</td>
<td>VMUCEMAWSSUX</td>
</tr>
</tbody>
</table>
VMU Series Optional Modules

Additional signalling modules can be added easily and quickly to the VMU-C control unit, either connected directly to the local bus or remotely connected via the VMU-M master unit.

Application examples of where these modules are best suited include:
- Remote signalling when event or alarm is triggered on the VMU-C control unit
- Temperature and other analogue measurements
- Event/Alarm signalling to the VMU-C
- General speed/flow measurements

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Modules Combination Connected to the RS485 Port</th>
<th>Catalogue No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMU-M</td>
<td>Master module and data logger Required when using VMU-P and VMU-O modules</td>
<td>10 ¹)</td>
<td>VMUM4XS1T2EM</td>
</tr>
<tr>
<td>VMU-P</td>
<td>Environment variable module Two temperature inputs, 1 analogue input and 1 pulse rate input ¹)</td>
<td>MAX 1x per VMU-M</td>
<td>VMUP2TIXWSEM</td>
</tr>
<tr>
<td>VMU-O</td>
<td>I/O unit Two digital inputs and two relay outputs managed by the VMU-C or VMU-M unit</td>
<td>MAX 3x per VMU-M</td>
<td>VMUOXI2R2EM</td>
</tr>
</tbody>
</table>

¹) VMU-P does not count pulses. Pulse aggregator D4CR12 or meter with pulse aggregator function such as EM24DIN should be used if required

²) VMU-M connects to RS485 port COM1 should be used if required

Example Architecture of VMU-C connected to VMU modules and energy meters
Examples of Embedded Webserver Dashboards

By simply opening your internet browser and logging into your VMU-C via the IP address, a number of pages are available to analyse and monitor the information recorded.

The **home page** provides a dashboard containing:

- Energy consumption information (active and reactive power and energy);
- Cost information (yearly, monthly and daily expenses);
- Instantaneous 3-phase variables of the plant (voltages and currents);
- Graph comparing present day to previous days total energy consumption

Refer below image for example

From the home screen, the user can easily navigate to other pages including:

- **Monitor page**: Displays instantaneous variables on a daily, monthly or annual basis. The variables can be monitored by specific set points. In the case of problems or faults, it is possible to analyse the plant’s history before the event, so as to understand the relevant reasons and act accordingly.
- **Plant page**: All the real-time variables of any meter can be displayed in this section. This is very useful for confirming meter operation and fault diagnosis.
- **Economy page**: The consumption of each energy meter can be analysed on a daily, monthly or annual basis. In the same section information acquired by pulses from the gas, water or remote heating meters, and also the analogue and environmental variables acquired by the VMU modules, can be displayed and analysed.
- **Export page**: The database, including all the history of the plant, can be accessed to get a set of data in a defined time period. The data is then available in Excel compatible format for further analysis by the user.

![VMU-C Webserver home page](image)
Scalable Multi-site Energy Management Solutions

A single centralised energy management database is possible with the VMU-Y or EM²-Server options available from NHP.

Ideal for applications involving monitoring many different zones and different site locations, information recorded by the multiple VMU-C control units is easily accessible by users from any location simply by using a standard web-browser.

More comprehensive data exporting is available from both the VMU-Y and EM²-Server packages with any variable from any connected meter exportable.
Embedded Solution VMU-Y

The VMU-Y can connect to 10x VMU-C control units collating all the information to one centralised database.

The VMU-Y is embedded within a compact 2-DIN module hardware similar in appearance to the VMU-C control unit, providing a comprehensive multi-site energy management database. There is no need to install any software, with quick and easy connection to the VMU-C control units.

Examples of VMU-Y dashboards are described on the following page.

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web server data concentrator unit</td>
<td>VMUYEMAWSXUX</td>
</tr>
</tbody>
</table>

Cloud Based Solution EM²-Server

The EM²-Server is a software solution provided as a virtual machine to be hosted in the cloud, either in the customer’s facility or in a hosting farm.

With the ability to connect to 100x VMU-C control units, (i.e. maximum of 3200x measuring field devices), the EM²-Server packages also includes an additional feature of a synoptics page, useful for visually showing the layout and locations of the connected meters.

Combining the EM²-Server software with an industrial PC, NHP can provide a ready to go energy management solution.

Basic PC Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU (minimum)</td>
<td>64 bit (AMD Opteron / Intel Itanium)</td>
</tr>
<tr>
<td>RAM (minimum)</td>
<td>8GB</td>
</tr>
<tr>
<td>Free disk space (minimum)</td>
<td>According to portfolio size (4GB for the bare virtual machine) Suggest at least 64GB</td>
</tr>
<tr>
<td>Host operating system</td>
<td>VMWare compliant</td>
</tr>
</tbody>
</table>

Ordering Information – please contact NHP
Examples of VMU-Y and EM²-Server Dashboards

Multiple Screen, Multiple Views
Em²-Server’s web interface allow users to match the needs of control rooms, by allowing the simultaneous displaying of different charts and information on the same monitor or on same screens. Position and size of the desired displaying tools can be saved for later use.

Multi-site Information Management
By using the Map and Navigator tools it is possible to locate information from distributed installations with ease, according to user’s access rights. Present or historical values and charts are displayed according to the selected parameters and filters.

Devices ‘Status and Installations’ Alerts Monitoring
Dedicated tools allow users to immediately check if any abnormal situation or unexpected condition is affecting the monitored plants and the monitoring devices. Distributed VMU-C EM units can be surfed via VPN and commands may be broadcasted to pools of units.

Tariff Profiling
Multiple tariffs may be set, splitting days in hourly slices, and defining calendars based on different daily profiles according to company needs: monthly cost reports are available as XLS files based tariffs and real consumption data.

Synoptics (only available on EM² Server)
It is possible to create synoptic views as combinations of maps, diagrams, schematics and live icons representing the desired meters.

Load Profiling
The load profile tool allow statistical calculation of consumption in the single demand interval for the chosen interval of analysis. It is possible to estimate the typical daily consumption profile according to the desired confidence ratio.
# Features Matrix

<table>
<thead>
<tr>
<th>Group</th>
<th>Feature</th>
<th>VMU-C</th>
<th>VMU-Y</th>
<th>EM²-Server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation type and scalability</strong></td>
<td><strong>Single installation</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Multiple installations</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Number of meters</strong></td>
<td>32</td>
<td>320</td>
<td>3200</td>
</tr>
<tr>
<td></td>
<td><strong>Form factor</strong></td>
<td>2-DIN</td>
<td>2-DIN</td>
<td>Virtual machine</td>
</tr>
<tr>
<td><strong>User management</strong></td>
<td><strong>User and admin profiles (multiple users)</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Access rights management at instrument level</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Online help</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Variable monitoring</strong></td>
<td><strong>Variable monitoring</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Custom trend analysis tool</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Virtual main meter management</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Free virtual meter management</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Synoptic tool</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Excel data export</strong></td>
<td>Fixed</td>
<td>Free</td>
<td>Free</td>
</tr>
<tr>
<td><strong>Tariffs and costs</strong></td>
<td><strong>Tariff profiles</strong></td>
<td>2</td>
<td>Free</td>
<td>Free</td>
</tr>
<tr>
<td></td>
<td><strong>Custom calendars</strong></td>
<td>No</td>
<td>1</td>
<td>Free</td>
</tr>
<tr>
<td><strong>Alarms management</strong></td>
<td><strong>Dedicated web-view</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>E-mail</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>VMU-C remote management</strong></td>
<td><strong>Remote broadcast commands via web interface</strong></td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Please contact NHP*
Call on the NHP TSG for your energy management and building automation solutions needs. We can help implement solutions to maximise production value, optimise performance and minimise downtime.

With the optimal balance of knowledge and experience, NHP’s newly created Technology Specialist Group (TSG) offers customers exclusive access to leading experts within our industry.

The result? Value-add product and application support that helps deliver the best possible solution for customers and their projects.