

Application Note: Web Display of Existing Meter Data

Description of application: Using either the AcquiSuite™ or AcquiLite™ data acquisition servers (DAS) from Obvius to connect existing electrical, gas or flow meters to the Web. Once Web-enabled, meter data is available for viewing from any Web browser at <http://www.buildingmanageronline.com> (BMO).

Background: Many owners of commercial and industrial (C&I) buildings have meters installed in their buildings that either provide or could provide outputs (either pulse or serial) that will allow users to see energy information on the Web. Many of these meters were installed by the utility for primary metering or as submeters within the building to monitor usage.

How does it work: Each AcquiSuite can support up to 32 Modbus meters and 744 pulse meters and each AcquiLite EMB can support up to 4 pulse meters. There are two basic connection approaches, depending on the type of output available:

- Pulse output meters: The two wires from the pulse output from the meter (electric, gas, water, steam) are connected to one of the eight inputs on the AcquiSuite (A8812-1). The installer uses a Web browser to set the type as Pulse, name the meter, and add the appropriate multiplier to convert each pulse to valid engineering units. The DAS is then connected to the Internet (either via phone line or LAN connection) and data is pushed to the website for viewing.

The screenshot shows a web browser window with a navigation menu on the left and a main configuration area on the right. The navigation menu includes: Accounts, Modbus, Device List (highlighted), Framework, Alarms, Setup, Wireless, Log File Data, Networking, System, and Testing / Diags. The main area is titled 'Onboard IO' and displays the following information:

- Device Address: 250
- Device Type: Obvius, A8812, Internal I/O (id=48)
- Status: OK

Below this is the 'Unconfigured' section with the following fields:

- Current Reading: invalid
- Sensor Name: Input 1 - Pulse Meter
- Input Mode: Pulse (dropdown menu)
- Sensor Make and Model: (custom)
- Sensor Minimum range: 0.000
- Sensor Maximum range: 100.000
- Pulse Multiplier: 1.000
- Curve scaling: (Not Used) (dropdown menu)
- Engineering units: (empty text field)
- Rate: Per Hour (dropdown menu)

At the bottom of the configuration area are 'Save Profile' and 'Cancel' buttons. The footer contains the Obvius logo, contact information (3300 NW 211th Terrace, Hillsboro, OR 97124; Ph: +1-503-601-2099; Fax: +1-503-601-6878), a support email link (support@obvius.com), and a copyright notice (Copyright © 2001-2011 Obvius, All rights reserved. Current time: Wednesday, April 04 2012 17:06:02 PDT).

Figure 1 - Pulse input setup screen

- Modbus RTU meters: Devices from the supported device list with a serial output (Modbus) will be automatically recognized by the AcquiSuite as soon as they are connected. The DAS has drivers for these devices that will recognize and configure the device in unit, so the installer only needs to give the meter a name and setup the parameters for reading interval data from the meters and uploading to the remote server.

Function	Current Reading	Low Alarm	High Alarm	Console
Vln a	347 Volts	0 Volts	0 Volts	
Vln b	347 Volts	0 Volts	0 Volts	
Vln c	347 Volts	0 Volts	0 Volts	
Vln ave	347 Volts	0 Volts	0 Volts	
Vll ab	601 Volts	0 Volts	0 Volts	
Vll bc	601 Volts	0 Volts	0 Volts	
Vll ca	601 Volts	0 Volts	0 Volts	
Vll ave	601 Volts	0 Volts	0 Volts	
I a	0 Amps	0 Amps	0 Amps	
I b	0 Amps	0 Amps	0 Amps	
I c	0 Amps	0 Amps	0 Amps	
I ave	0 Amps	0 Amps	0 Amps	
V unbal	0 %	0 %	0 %	
I unbal	15 %	0 %	0 %	
Freq	0 Hz	0 Hz	0 Hz	
Phase Rev	0	0	0	
kW a	0 kW	0.0 kW	0.0 kW	
kW b	0 kW	0.0 kW	0.0 kW	
kW c	0 kW	0.0 kW	0.0 kW	
kW tot	0 kW	0.0 kW	0.0 kW	
kVAR a	0 kVAR	0.0 kVAR	0.0 kVAR	
kVAR b	0 kVAR	0.0 kVAR	0.0 kVAR	
kVAR c	0 kVAR	0.0 kVAR	0.0 kVAR	
kVAR tot	0 kVAR	0.0 kVAR	0.0 kVAR	
kVA a	0 kVA	0.0 kVA	0.0 kVA	
kVA b	0 kVA	0.0 kVA	0.0 kVA	

Figure 2 – Modbus RTU setup screen

Regardless of whether the input is pulse or Modbus, the DAS gathers data on user-selected intervals (from 1 to 60 minutes) and stores the data until it is uploaded to the BMO server (typically daily). Once uploaded, the data from all the meters is available for viewing from any Web browser (see “Reports” below for sample reports).

Benefits: Many C&I building owners have installed submeters with local display options that are also capable of providing pulse or serial outputs, but the meters have never been connected to a local or remote server due to cost or other constraints. Having only local display means that someone must physically read the meter, record the values and input this information into a spreadsheet or database for calculation. This approach is not only inefficient, but is also prone to error. It is virtually impossible to synchronize readings with the utility bills, which means that accurate accounting is unlikely.

Because the AcquiSuite automatically recognizes supported Modbus meters, installation can be done by any electrician or local building personnel without the need for expensive software and integration.

Using a DAS provides many benefits, including:

- Continuous interval reading makes synchronizing to utility bills simple
- Data from multiple, geographically dispersed buildings is automatic as all data comes to a single site for viewing
- Information can be viewed and downloaded from any web browser in spreadsheet and database compatible file formats
- All data is stored at a secure site and record-keeping is minimized
- The DAS can be programmed to call out on alarms via email or pager in the event of a problem

Drawbacks: The major obstacle to this approach is that it requires some investment of time and materials to connect the meter(s) to the DAS and to provide phone line or LAN connection for communications.

Installation requirements: The requirements for installation depend on the type of installation and whether new meters are being installed. Generally the only requirements for connection to one or more existing meters are the following:

- AcquiSuite DAS – used for Modbus or pulse meters, can support up to 32 Modbus meters or up to 744 pulse meters
- AcquiLite EMB DAS – used for pulse meters only, supports up to 4 pulse inputs
- Phone line (can be shared) or LAN connection for communications

Reports: Once the data from the various buildings is uploaded to the BMO website (<http://www.buildingmanageronline.com/>), it can be viewed using any standard Web browser.

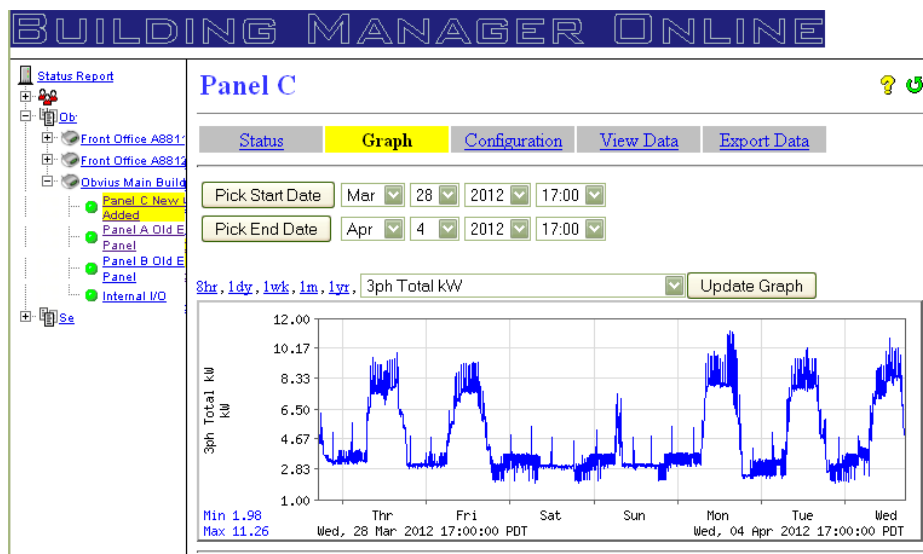


Figure 3 - Sample kW report from BMO site

In addition to viewing the data from a Web browser, users can also download the data in a file format compatible with spreadsheets or databases:

Figure 4 - Export setup page from BMO site

Analysis/Actions: Once the data is exported from BMO to a local spreadsheet, the submeter energy usage can be allocated to the tenant or department.

Costs: Typical installed costs will vary depending on the specific requirements of the job (wiring runs, number of meters, etc.), but in general the installed cost for the DAS will be in the following range*:

- AcquiLite™ EMB DAS - \$900 to \$1,500
- AcquiSuite™ DAS - \$1,800 to \$2,200
- Data storage and reports - \$20 per month per AcquiSuite™ or AcquiLite™ EMB (note: the cost is the same no matter how many meters are connected to a DAS)

** General figures based on available information; contact Obvius for the latest pricing*

Notes/miscellaneous: As this paper shows, it is both practical and economical to add Web display capability to existing meters from both local and remote sites. It is important to note that the building owner or manager who wants to gather data from existing meters can also add new submeters to existing buildings at the same time and spread the cost of the installation over more points.

For more information or a demonstration:

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