

SHM J-LOGGERS

User Manual



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Reference	Title or Description of Publication	Publication Reference
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Terms & Abbreviations

Term or Abbreviation	Definition
CSV	Comma Separated Variable. A type of text file used to represent row/column data.
DB	Database.
DDNS	Dynamic Domain Name Service. A service that keeps track of a device with a varying IP Address.
DHCP	Dynamic Host Control Protocol. Allows a network device to have its network settings automatically configured whenever it is plugged into the network.
DIN	Deutsches Institut für Normung. A German Standards Organization.
FTP	File Transfer Protocol. A method of transferring files over a network.
GPRS	General Packet Radio Service. A data service on cellular networks that can be used to provide IP communications.
HMI	Human Machine Interface. A politically-correct of the more sensible "Man Machine Interface"
HTML	Hypertext Markup Language. A language used to build Web pages.
IEEE	Institute of Electrical & Electronic Engineers. An American professional association.
IP	Internet Protocol
JACE	Java Application Controlled Engine. A device designed to run Java code.
Java	A platform-independent language for developing and running software applications.
LAN	Local Area Network.
M-Bus	Meter Bus. A European Standard protocol (EN 13757) for the remote reading of utility meters.
Modbus (RTU)	A serial protocol that is used widely for monitoring and control. It has a network variant, Modbus/TCP.
NAT	Network Address Translation. A system used in Internet routers to map several devices on an internal network to a single IP Address on the Internet.
Niagara AX	A proprietary software platform used to implement control and monitoring applications. It is Java-based.
NTC	(Of thermistors) Negative Temperature Coefficient

Term or Abbreviation	Definition
NTP, SNTP	(Simple) Network Time Protocol. A UDP Protocol designed to synchronize device clocks within a network.
oBIX	Open Building Information Exchange. A standard for Web Services-based interfaces to building control systems.
PC	Personal Computer
PDF	Portable Document Format. A proprietary format for distributing printable documents.
PPC	Power PC. A Reduced Instruction Set processor developed by Motorola.
PSU	Power Supply Unit.
QNX	An embedded operating system similar to Unix.
RJ45	A Registered Jack. An 8-way connector.
RS232	A serial data link format that uses asynchronous transmission.
RS485	A serial data link format that uses asynchronous transmission with differential voltage levels.
SMTP	Simple Mail Transfer Protocol. A TCP Protocol used to send Emails.
TCP	Transmission Control Protocol. A connection-oriented family of Internet Protocols.
UDP	Universal Datagram Protocol. A non-connection-oriented family of Internet Protocols.
URL	Uniform Resource Locator. A text string that is used to access a resource (typically a Web page) on the Internet.
VPN	Virtual Private Network. A secure way of connecting computers or networks via the Internet such that intrusion from the Internet is effectively impossible.

1. Introduction

1.1 Overview

SHM's range of J-Loggers run on a Tridium JACE hardware platform that comes in a variety of forms depending on the application :-

- Enclosure – DIN Rail or Wall Mount
- Memory
- Additional Input/Output modules – eg. Digital, extra RS485 ports, GPRS modem
- PSU – 24 Volt DC or 230 Volt AC

The software that performs the logging function and provides the HMI also comes in a variety of forms depending on the application :-

- Number of Logger Channels – 32 or 64 (standard configurations)
- The type of Inputs – eg. M-Bus, Modbus or Pulses (a combination of these is permitted). Other protocols are supported.
- **“Panel Supervisor”** version of the J-Logger has several pop-up “Meter Mimics” showing instantaneous values (eg. Phase currents, phase voltages).
- **“Basic Logger”** version of the J-Logger does not have any “Meter Mimics” showing instantaneous values.

Each Channel in the Logger is normally connected to a meter to record its readings. This connection is usually either via Modbus, M-Bus or a volt-free pulse connection.

The Logger has an Ethernet network connection, and this is used for all User access to the Logger (to view the HMI or collect logged data).

The Logger stores the value of its inputs in memory at a regular interval (typically every 30 minutes) to form a “Load Profile” Channel. The historic data is made available on the network via the oBIX protocol. Any Energy Management Software that supports the oBIX protocol can download this historic data from the Logger. Historic data can also be “pushed” to a central location as CSV files by FTP or Email.

1.1.1 HMI

The HMI allows anyone on the network with a Web Browser to view the Logger's data without the need for special software (NB. Browser needs a Java plug-in). For security, a Username and Password is required to access the data. Facilities available via the HMI include :-

- Viewing the current readings of each Channel input, and the status
- Displaying a graphical Load Profile of a Channel
- Exporting historic data for a Channel as a CSV, PDF or HTML file
- Displaying a Report of all the current Channel readings and optionally export this as a CSV, PDF or HTML file
- Building charts for one or more Channels

- **(Panel Supervisor version only)** Multi-parameter views of instantaneous meter measurements.
- Viewing and acknowledging any Logger Alarms. Alarms are generated if any Modbus or M-Bus device attached to the Logger fails to communicate.

1.1.2 FTP

If required, the Logger can be configured to export files using the FTP protocol as follows :-

- A Load Profile report of the previous day's consumption as a CSV file can be exported on a daily basis.
- A Report of all the current Channel readings as CSV file can be exported. This can be sent on a regular basis (eg. daily) and/or on the 1st of every calendar month.

1.1.3 Emails

If required, the Logger can be configured to send Emails as follows :-

- A Load Profile report of the previous day's consumption can be Emailed as a CSV file attachment on a daily basis.
- A Report of all the current Channel readings can be Emailed as a CSV file attachment. This can be sent on a regular basis (eg. daily) and/or on the 1st of every calendar month.
- An Alarm Email can be sent whenever the alarm status of a Channel changes. This is very useful for Modbus or M-Bus meters as it informs the User immediately of any meter failures.

1.1.4 Commissioning

Every J-Logger needs to be specially commissioned to configure the inputs, to link these inputs to the appropriate Channel, and to set up network and other parameters in order for it to work.

This process requires special training and cannot be carried out by the customer. SHM will always carry out the commissioning.

Certain Logger settings (eg. FTP and Email parameters) can be set by the end user. However configuring these parameters requires a special login, which SHM will provide if this is needed.

1.2 Scope

This document describes access to the Logger via the HMI, oBIX, Emails sent by the Logger, files sent using FTP and User configuration of the Logger.

It does not cover any of the Commissioning process carried out by SHM.

Screenshots in this document are of a J-Logger running **Panel Supervisor** Version 3. The **Basic Logger** firmware is very similar, but does not have a **[Meters]** Navigation Tab. Earlier versions of firmware largely operate in the same way, but the screens have a slightly different appearance.

2. HMI

2.1 Accessing the HMI

The HMI screens of the Logger provide a user-friendly interface to the Logger. The HMI can be accessed by any standard Web Browser that has a Java plug-in installed. To test if your PC has Java installed, go to <http://www.java.com> and follow the “Download” link. This will test if Java is installed and allow to download the latest version if necessary. If your PC does not have Java installed, you will not be able to access the HMI.

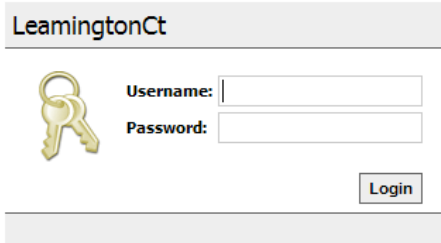
The first time you use a particular PC to access the Logger HMI, it will go through a process of downloading the Java code that implements the HMI, and this can take some time. Subsequently, access to the HMI is much faster.

If you have a J-Logger from SHM, you will be given a Web URL (if the device is accessible over the Internet) or an IP address if it is on a private network. You will also be given a User Name and Password to log in.

The first step is to access the login screen. Use the following URL :-

`{Supplied URL or IP Address}/login`

You should then see a login screen similar to this :-

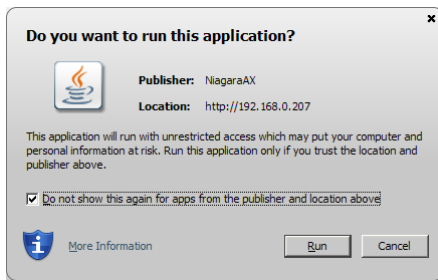


Enter the Username and Password supplied. You should then be directed to the Logger’s Home Page (see section 2.2).

NB. When accessing HMI screens, it may take a few seconds for the screen to build up. However, be aware that it can take several seconds for the complete screen to appear, as it takes time to retrieve data from the J-Logger.

2.1.1 First-time Access to HMI

If this is the first time the PC has accessed a J-Logger, the screen may then go blank for up to 1 minute while the Java applet’s digital certificate is verified. Once it is verified, you should see something like this :-



Click the [Run] button to install the Java applet.

After a short delay you will see the “Niagara AX” logo and various messages as software modules are loaded :-



Loading (this can take several minutes depending on connection speed)
Downloading module "workbench" (686 kb) ...

The screen may go blank again for a minute and then you should then be directed to the Logger's Home Page (see section 2.2).

2.2 Home Page

The home page is shown below :-

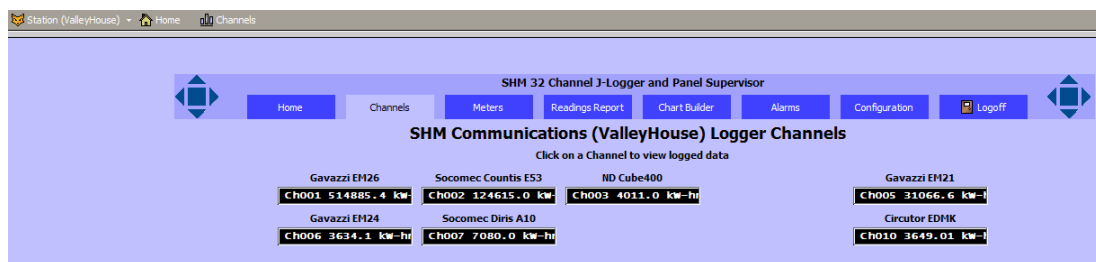


You can navigate to other HMI pages either by clicking the Navigation Tabs or by using the toolbar at the top of the page.

Clicking the “Home” icon in the Navigation Toolbar will load the “Home” page. Clicking the small arrow next to an icon on the toolbar presents a list of pages beneath that page.

2.3 Channels

The Channels page shows the current reading for all Logger Channels :-



The number of Channels shown depends on which Channels have been enabled. The screenshot above shows a 32-channel J-Logger with Channels 1, 2, 3, 5, 6, 7, and 10 enabled.

Each box shows the Channel Number (eg. Ch001), the current reading and the units. The label above each box is user-configurable and is used to provide identification in HMI screens and reports.

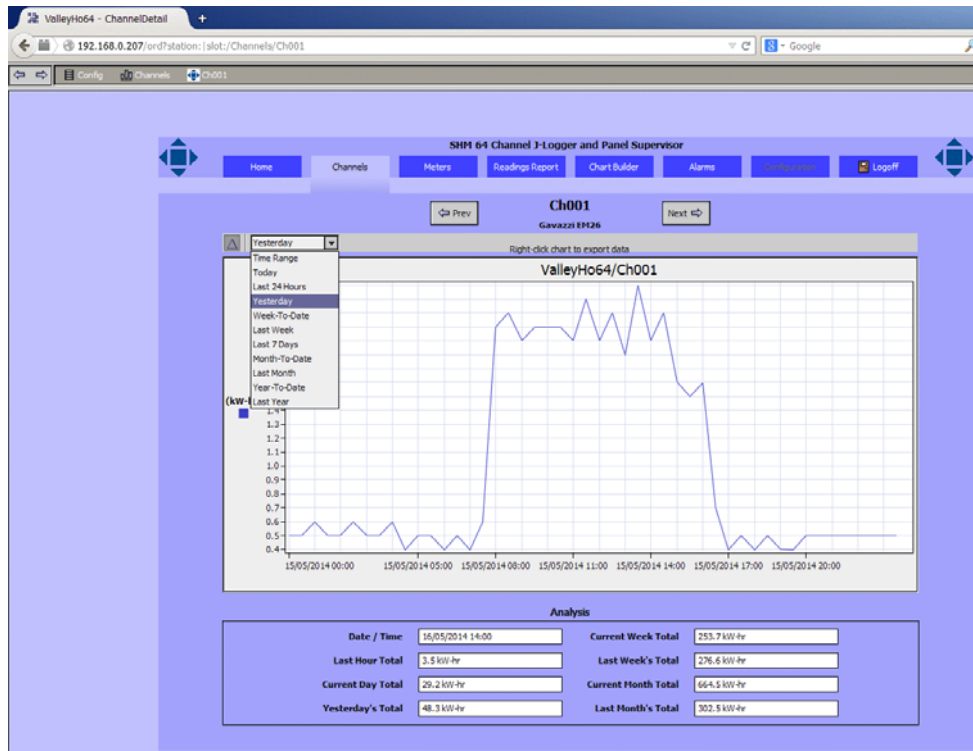
The status of a Channel is colour-coded. If the Channel is “Ok”, it will appear with a black background. However if there is some kind of error (eg. communications failure with the associated meter) then the background will change to orange or yellow.

If you click on one of the Channel boxes, you will bring up the Historic Data page for that page (see section 2.4).



2.3.1 Historic Data

The Historic Data page shows the logged data for a single Channel :-



The drop-down list at the top of the graph allows you to select an arbitrary Time Range or specific periods.

Clicking the Delta button [Δ] displays the difference in reading from one period to the next. This is the most useful format for energy meter readings, where the meter reading increases progressively as energy is consumed. The [Prev] and [Next] buttons are used to select other Channels.

You can right-click on the chart to export the data in various formats (see section 2.10).

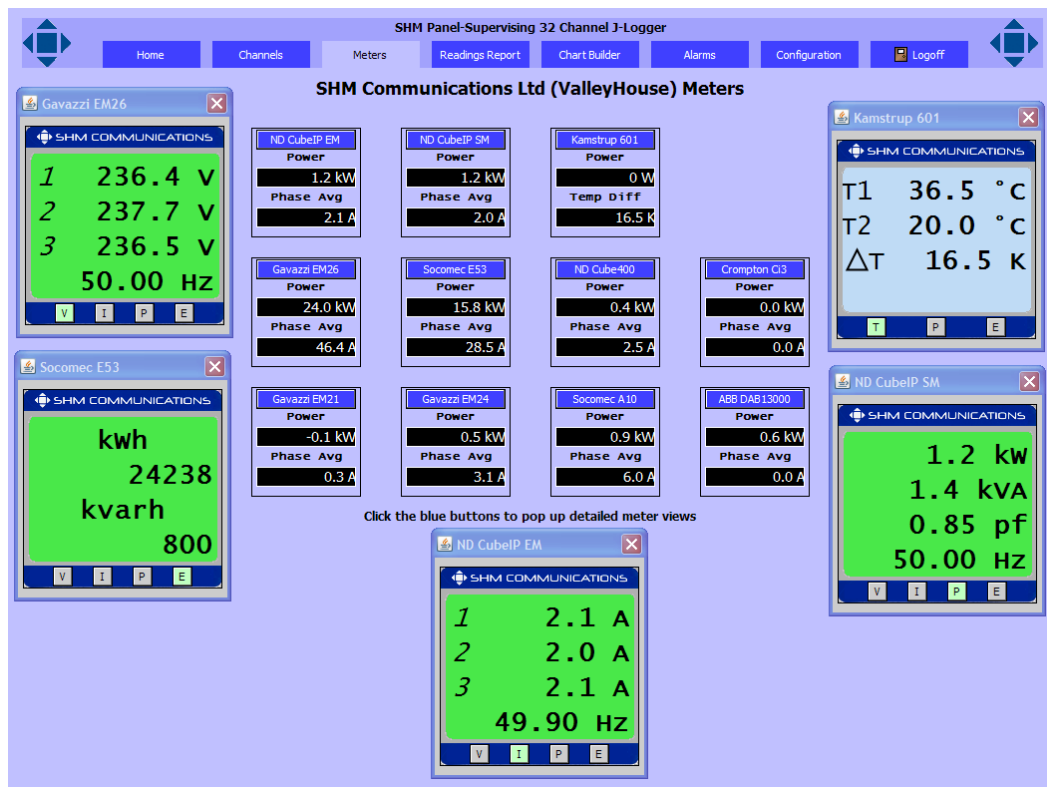
The block at the bottom shows a historic analysis of the energy consumed for this Channel for different time spans. The totals will only be valid if the J-Logger has a full set of data stored for the appropriate time period.

2.4 Meters

This page is only available on the **Panel Supervisor** version of the J-Logger.

The page shows summaries for up to 12 Meters (64 Channel Loggers can accommodate up to 32 Meters) , which can be of various types. Currently 3-phase electricity and heat meters are available, but SHM will be expanding this range and can supply custom types if required. The summary meter icons show two parameters. For an electricity meter these are kW and average Amps per phase. For a heat/cooling meter, these are kW and temperature difference.

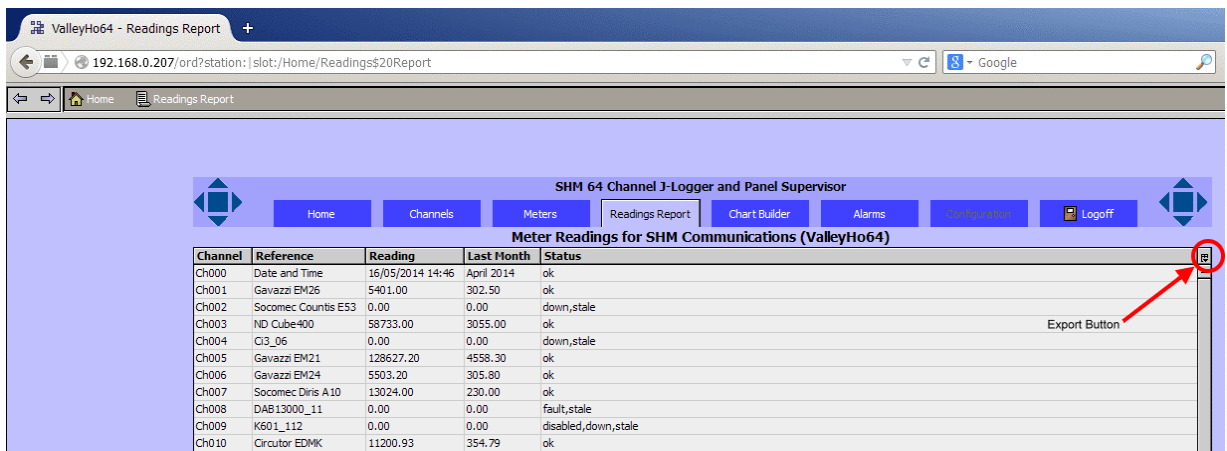
Clicking on the blue title bar of a meter icon produces a pop-up Meter Mimic which displays the instantaneous values of key meter measurements. Buttons on the mimic determine which parameters appear on its display. You can have as many pop-up meter mimics as you want, and move them around the screen.



2.5 Readings Report

The Report page shows the current reading for all Logger Channels in tabular format. It provides the same information as the Channels page (section 2.3) with the addition of a timestamp and status for each reading and the ability to export this information in various formats. The report also contains a “Last Month” column which gives details of consumption for the previous month. This column will only be valid if the J-Logger contains a full set of historic data for the previous month.

NB. When accessing this page only the title will appear initially. It can take several seconds to retrieve all the data and display the table – be patient.



ValleyHo64 - Readings Report

192.168.0.207/ord?station:|slot:/Home/Readings\$20Report

Home Readings Report

SHM 64 Channel J-Logger and Panel Supervisor

Home Channels Meters Readings Report Chart Builder Alarms Configuration Logoff

Meter Readings for SHM Communications (ValleyHo64)

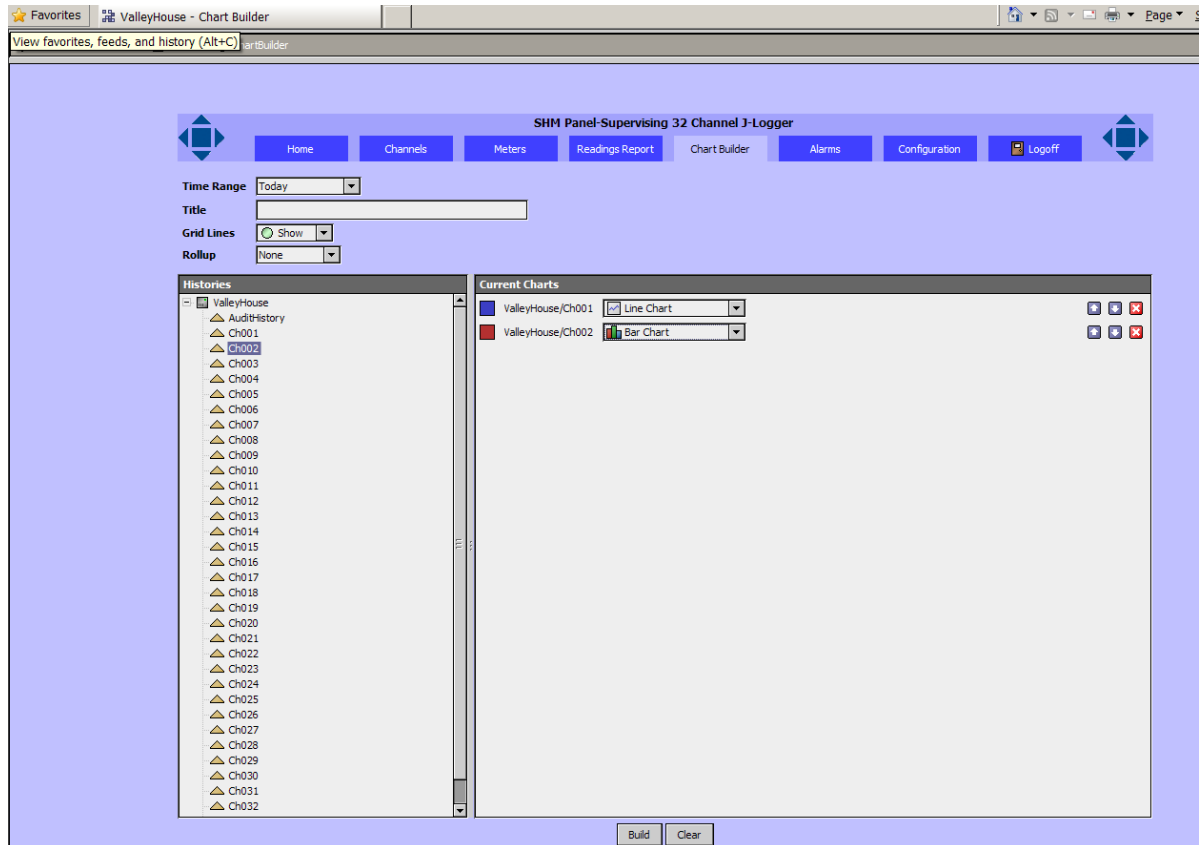
Channel	Reference	Reading	Last Month	Status
Ch000	Date and Time	16/05/2014 14:46	April 2014	ok
Ch001	Gavazzi EM26	5401.00	302.50	ok
Ch002	Socomec Counts ES3	0.00	0.00	down,stale
Ch003	ND Cube400	58733.00	3055.00	ok
Ch004	Q3_06	0.00	0.00	down,stale
Ch005	Gavazzi EM21	128627.20	4558.30	ok
Ch006	Gavazzi EM24	5503.20	305.80	ok
Ch007	Socomec Diris A10	13024.00	230.00	ok
Ch008	DAB13000_11	0.00	0.00	fault,stale
Ch009	K601_112	0.00	0.00	disabled,down,stale
Ch010	Circutor EDMK	11200.93	354.79	ok

Export Button

To export the report's data to another application (eg. Excel), click the Export button at the upper right of the chart (see diagram) and select Export. This is described in more detail in section 2.10.

2.6 Chart Builder

The Chart Builder allows you to build charts for one or more Channels :-



Double-click a History in the left-hand pane or drag it to the right-hand pane to build a list of Channels to chart.

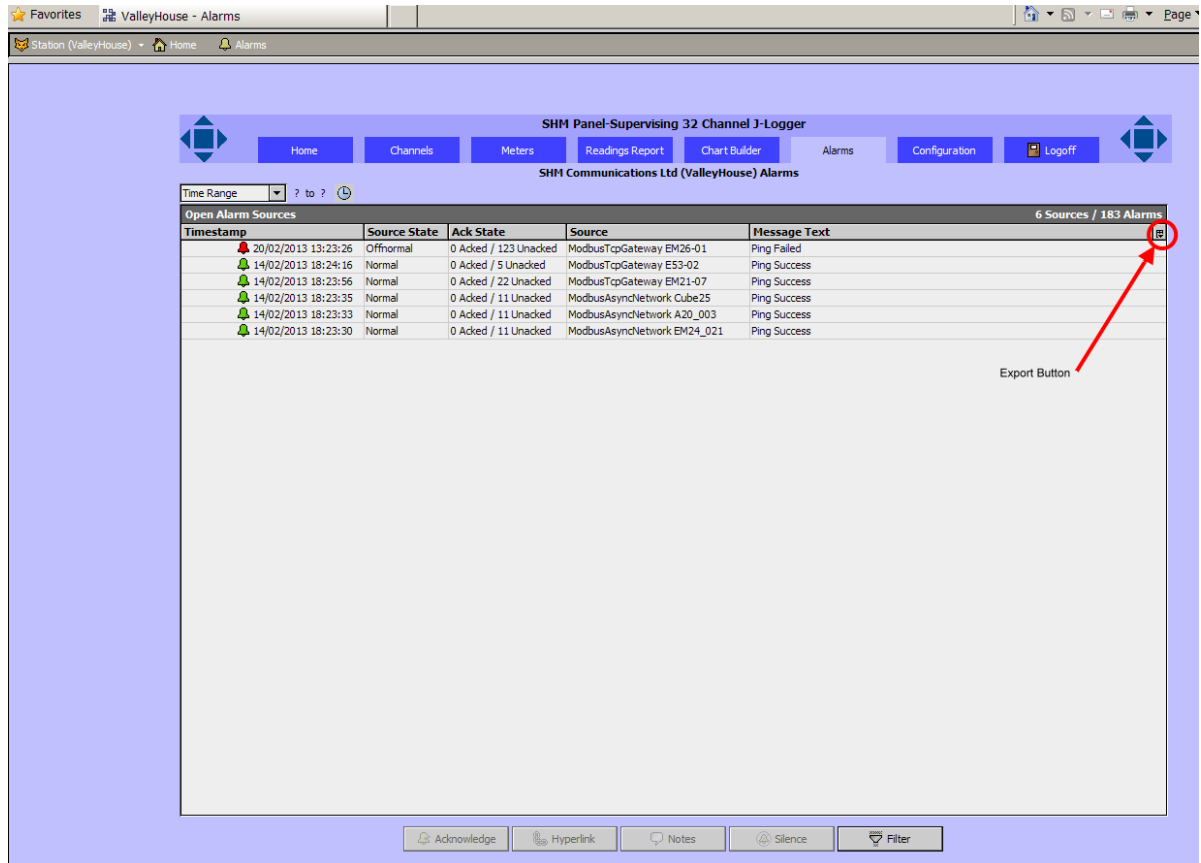
You can select the Time Range etc. and the type of chart for each Channel. Click the [Build] button to display the chart. You can then use the “Back” button on the browser to get back to the Chart Builder page.

The Chart Builder does not plot Deltas, so for energy meters it is less useful than the Channel Historic Data chart (see section 2.3.1).

You can right-click on the chart to export the data in various formats (see section 2.10).

2.7 Alarms

The Alarms page shows a list of currently active Logger Alarms :-



The state of the alarm is shown by the colour-coded icon. The above screenshot shows 5 alarms that have been in the “alarming” state and are now back to normal, but have not been acknowledged. If an alarm in this state is acknowledged (by selecting the alarm and clicking the [Acknowledge] button) then the alarm will be removed from the list.

The [Notes] button adds a note to the alarm and changes the icon. You can right-click on an alarm to view any notes, acknowledge the alarm or view alarm details.

The [Filter] button filters the list of alarms using various criteria.

You can click the Export button at the upper right of the list to export the data in various formats (see section 2.10).

2.8 Log Off

Clicking the **Logoff** Tab logs you out of the HMI and returns you to the Login screen (see section 2.1). The User accounts for the J-Logger are normally set up to logoff the user automatically after 15 minutes of inactivity.



2.9 Configuration

The Configuration pages are not accessible from the standard login, as the [Configuration] Tab is disabled. To access this page you need to log in with a special User Name and Password, which can be obtained from SHM. SHM will normally set up the configuration of the Logger when it is commissioned.

The page is divided into several sub-pages which can be selected by clicking on the tab. These are described in the following sections.

2.9.1 Basic Settings

The **Basic Settings** Tab allows you to change the Logging Interval and various FTP and Email reporting functions :-

The screenshot shows the 'SHM 32 Channel J-Logger and Panel Supervisor' configuration interface. The 'Basic Settings' tab is active. At the top, there are navigation tabs: Home, Channels, Meters, Readings Report, Chart Builder, Alarms, Configuration, and Logoff. Below these, there are sub-tabs: Basic Settings, Network Settings, History DB Maintenance, Channel Refs, Meter Names, Chan Config, Set Time/Date, and Admin. The 'Basic Settings' sub-tab contains the following fields and sections:

- System Name:** SHM Communications
- Logging Interval:** 30 Mins (Warning! Changing this will immediately clear historic data)
- FTP Server to receive Daily Load Profiles:**
 - FTP Server Hostname/IP: ftp.plus.net
 - FTP Server Port: 21 [1-65535]
 - FTP User Name: shmcommscot
 - FTP Password: [masked]
 - Repeat FTP Password: [masked]
 - FTP Server Path: htdocs/csv
- SMTP Email Server for Alarms & Reports:**
 - SMTP Mail Server Hostname/IP: auth.smtp.1and1.co.uk
 - Account Login: xlems_archive@shmcomms.com
 - Password: [masked]
 - Reply-to Email Address: xlems_archive@shmcomms.co.uk
- Immediate Meter Readings Report Schedule:**
 - ☒ Enable additional Monthly Schedule (1st Month)
 - Time Of Day: 09:00:00
 - Randomization: +00000h 00m 00s
 - Days Of Week: ☒ Sun ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri ☒ Sat
 - Report Email Recipient: john@woyce.org.uk
 - Report Email BCC: xlems_archive@shmcomms.co.uk
 - ☒ Send Report via FTP
 - ☒ Send Report via Email
- Daily Load Profile Report:**
 - Generate Now button
 - Time Of Day: 02:30:00
 - ☒ Send Report via FTP
 - ☒ Send Report via Email
- Logger Alarms:**
 - Alarm Emails Recipient: john@shmcomms.co.uk
 - Alarm Emails BCC: xlems_archive@shmcomms.co.uk
 - ☒ Send Alarm Emails

A 'Save' button is located at the bottom right of the configuration area.

The Logging Interval can be set to one of 1, 2, 5, 10, 15, 30 or 60 minutes. Be aware that changing the Logging Interval will effectively delete all existing Channel Histories and you will also need to carry out DB Maintenance (see section 2.9.3). In fact the old Histories are renamed and new ones are created, but you need to delete the old Histories to avoid running out of memory.

The **System Name** box changes the name that is displayed on various screens.

The Logger can send Reports and Alarms via Email to various recipients. To do this the Logger needs access to an SMTP Server via the network. To get Emails to work you will at least need an IP Address or Host Name for this server. Normally you will also need an account login and password for the server.

The Logger can also export Reports via FTP. To do this the Logger needs access to an FTP Server via the network. To get FTP to work you will need an IP Address or Host Name for this server and a username and password to log in with permission to create files.



To enable alarms to be sent, tick the **Send Alarm Emails** checkbox and enter an Email address in the **Alarms Email Recipient** box. You can only have one recipient.

To enable reports to be sent via Email, enter an Email address in the **Report Email Recipient** box. You can only have one recipient.

There are two types of report that can be sent; Immediate Meter Readings and Daily Load Profiles. Each of these can be sent by Email and/or FTP, provided the appropriate server settings are configured.

Immediate Meter Readings

Tick the **Send Report via Email** box to send this report via Email. Tick the **Send Report via FTP** box to send this report via FTP.

Tick the **Enable additional Monthly Schedule** checkbox to send a report on the 1st of every month.

Use the Schedule group of controls to set up a regular schedule. Set the Schedule Type to one of Daily, Interval or Manual and fill in the appropriate parameters. Selecting "Manual" effectively disables the regular schedule.

Daily Load Profiles

Tick the **Send Report via Email** box to send this report via Email. Tick the **Send Report via FTP** box to send this report via FTP.

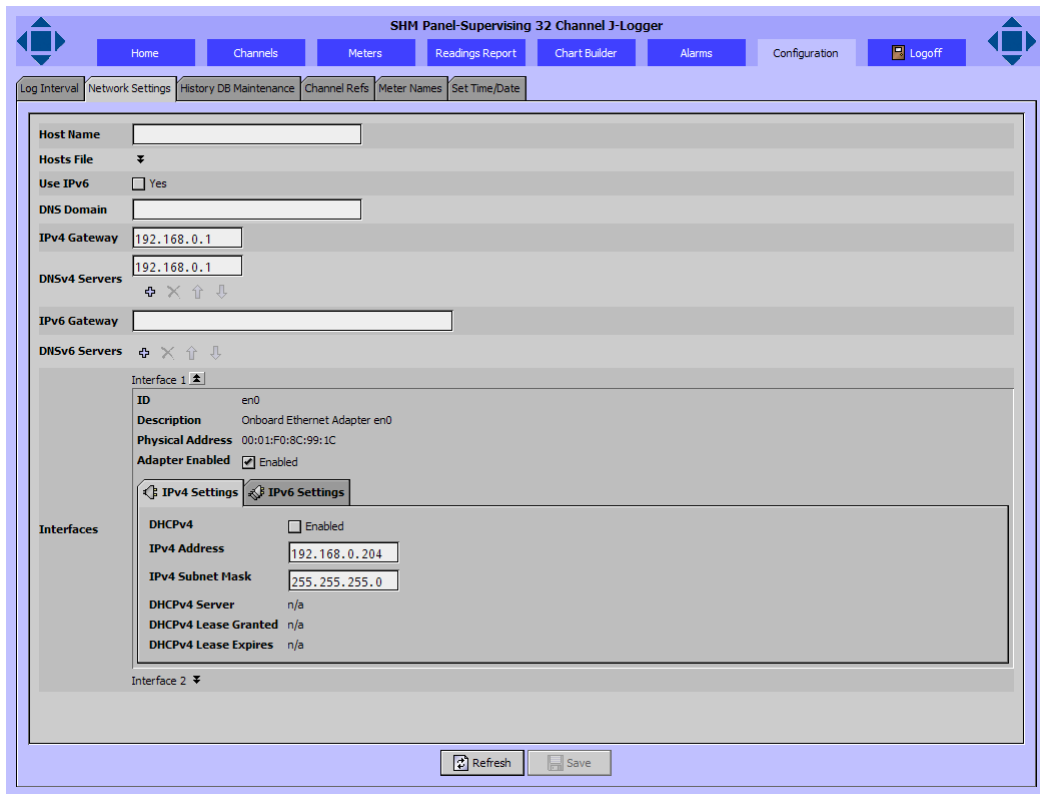
Set the **Time Of Day** box to an appropriate time to send the file.

Both report types have a [Generate Now] button that can be used to test that all the server settings are working.

When making changes on this Tab, the checkboxes take affect immediately, but other changes will enable the [Save] button, and you should click this button to commit the new data.

2.9.2 Network Settings

The **Network Settings** Tab allows you to change the IP settings of the two network connections :-



Click the chevrons next to “Interface 1” or “Interface 2” to show/hide the details.

If the Logger is to have access to the Internet or other subnets within an Intranet, then the “IPv4 Gateway” needs to be set to the IP address of the Router on the local subnet connected to Interface 1.

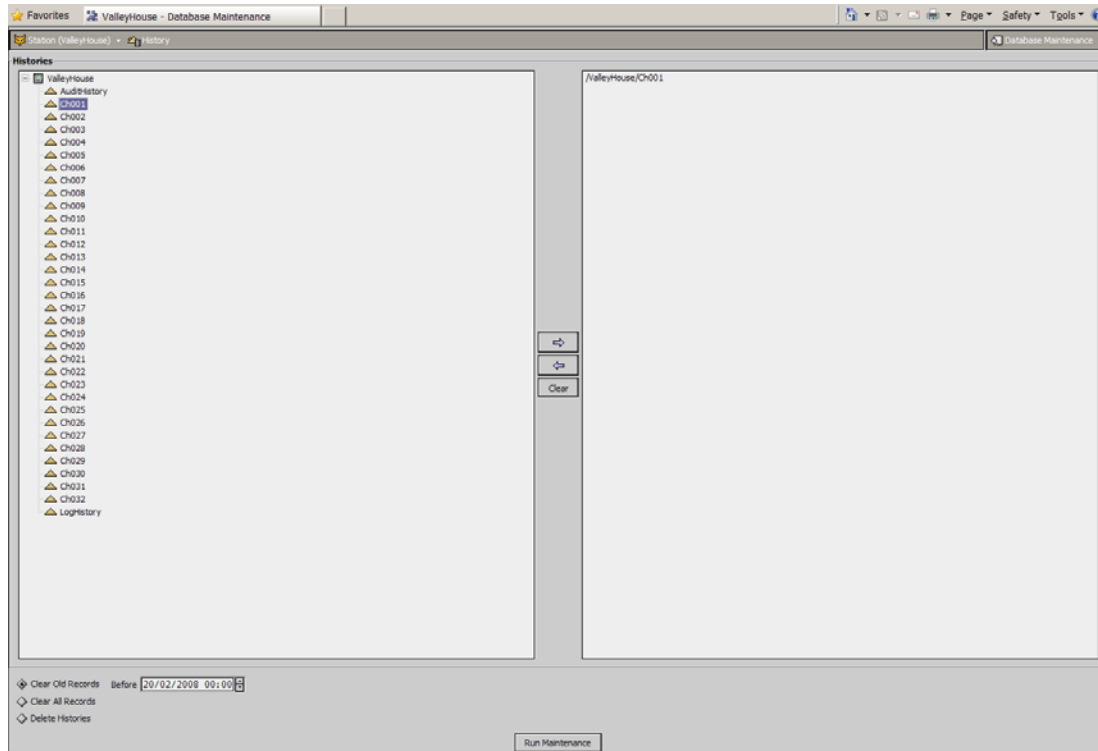
Interface 1 can either have a fixed IP address, or have one assigned automatically by a DHCP server on the Interface 1 network. A DHCP server will often assign a different IP address if the Logger is rebooted, which can be inconvenient. Most DHCP servers can be programmed to always re-allocate the same IP address to a particular device every time it boots up, and this should be done whenever possible.

Interface 2 is normally set up for diagnostic analysis by SHM with an IP address of 192.168.100.204 to allow a laptop PC to be connected via an Ethernet crossover cable. The laptop needs to be configured with an IP address in the 192.168.100.xxx subnet.

Click the [Save] button to commit the changes (this will result in a reboot of the J-Logger).

2.9.3 History DB Maintenance

Click the [DB Maintenance] button on this Tab to view the History DB Maintenance screen :-



Double-click any Histories that you want to run maintenance on to display them on the right-hand pane. Then select the type of maintenance you want to carry out and click the [Run Maintenance] button.

If you change the Logging Interval (see section **Error! Reference source not found.**) then the Histories taken with the old Logging Interval will be renamed with a “_cfg0” suffix. You should select all Histories like this to the right-hand pane, select “Delete Histories” and click the [Run Maintenance] button.



2.9.4 Channel Refs

The **Channel Refs** Tab allows you to specify a label to be associated with each Channel. This label is shown on the Channels and Reports pages and in Report Emails. It is not used anywhere else.

Channel	Label	Enable
Ch001	ND CubeIP (EM) kWh	<input checked="" type="checkbox"/>
Ch002	ND CubeIP (SM) kWh	<input checked="" type="checkbox"/>
Ch003	Unused	<input type="checkbox"/>
Ch004	Unused	<input type="checkbox"/>
Ch005	Gavazzi EM26 kWh	<input checked="" type="checkbox"/>
Ch006	Socomec E53 kWh	<input checked="" type="checkbox"/>
Ch007	ND Cube400 kWh	<input checked="" type="checkbox"/>
Ch008	Crompton Ci3 kWh	<input checked="" type="checkbox"/>
Ch009	Gavazzi EM21 kWh	<input checked="" type="checkbox"/>
Ch010	Gavazzi EM24 kWh	<input checked="" type="checkbox"/>
Ch011	Socomec A10 kWh	<input checked="" type="checkbox"/>
Ch012	ABB DAB13000 kWh	<input checked="" type="checkbox"/>
Ch013	Unused	<input type="checkbox"/>
Ch014	Unused	<input type="checkbox"/>
Ch015	Unused	<input type="checkbox"/>
Ch016	Unused	<input type="checkbox"/>
Ch017	Unused	<input type="checkbox"/>
Ch018	Unused	<input type="checkbox"/>
Ch019	Unused	<input type="checkbox"/>
Ch020	Unused	<input type="checkbox"/>
Ch021	Unused	<input type="checkbox"/>
Ch022	Unused	<input type="checkbox"/>
Ch023	Unused	<input type="checkbox"/>
Ch024	Unused	<input type="checkbox"/>
Ch025	Unused	<input type="checkbox"/>
Ch026	Unused	<input type="checkbox"/>
Ch027	Unused	<input type="checkbox"/>
Ch028	Unused	<input type="checkbox"/>
Ch029	Unused	<input type="checkbox"/>
Ch030	Unused	<input type="checkbox"/>
Ch031	Unused	<input type="checkbox"/>
Ch032	Unused	<input type="checkbox"/>

Enter text in the boxes and click the [Save] button. Entering more than 20 characters will result in the label being truncated on the Channels page.

The “Enable” checkboxes select which Channels appear on the **Channels** and **Readings Report** pages and on Immediate Meter Readings Reports sent via Email or FTP. The “Enable” does not affect the logging of histories for the Channel, or the Channels reported in a Load Profile Report.

When making changes on this Tab, the checkboxes take effect immediately, but other changes will enable the [Save] button, and you should click this button to commit the new data.



2.9.5 Meter Names

This feature is only available on **Panel Supervisor** versions of the J-Logger.

The **Meter Names** Tab allows you to set the displayed Names for each Meter and enable/disable individual Meters :-

Meter Name 1	Meter Name 2	Meter Name 3	Meter Name 4
IND CubeIP EW	IND CubeIP SW	Kamstrup 601	Unused
<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable
Meter Name 5	Meter Name 6	Meter Name 7	Meter Name 8
Gavazzi EW26	Socomec E53	IND Cube400	Crompton Ci3
<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable
Meter Name 9	Meter Name 10	Meter Name 11	Meter Name 12
Gavazzi EW21	Gavazzi EW24	Socomec A10	ABB DAB13000
<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable

Save

When making changes on this Tab, the checkboxes take effect immediately, but other changes will enable the [Save] button, and you should click this button to commit the new data.

2.9.6 Chan Config

The **Chan Config** Tab allows you to program the metered parameter that you wish to log for each channel. This is an advanced function and settings should only be changed by qualified SHM engineers :-

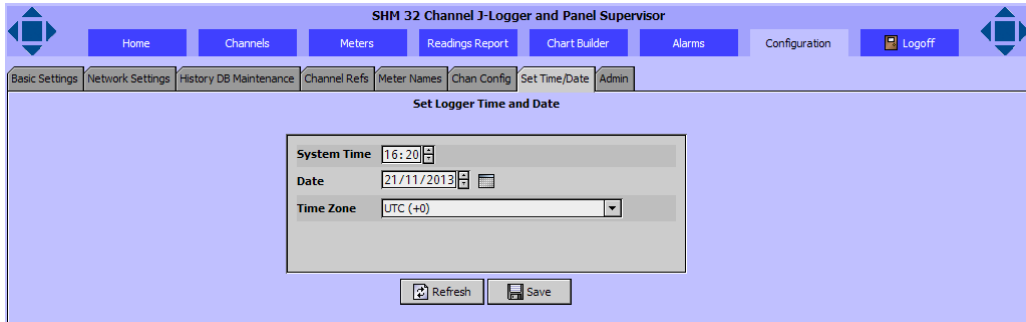
Channel	Station Address	Meter Type
Ch001	station:/slot:/Drivers/ModbusTcpGateway/EW26\$2d01/points/kWh	Modbus
Ch002	station:/slot:/Drivers/ModbusTcpGateway/E53\$2d02/points/kWh	Modbus
Ch003	station:/slot:/Drivers/ModbusTcpGateway/C400\$2d03/points/kWh	Modbus
Ch004	station:/slot:/Drivers/ModbusTcpGateway/Ci3\$2d06/points/kWh	Modbus
Ch005	station:/slot:/Drivers/ModbusTcpGateway/EW21\$2d07/points/kWh	Modbus
Ch006	station:/slot:/Drivers/ModbusTcpGateway/EW24\$2d08/points/kWh	Modbus
Ch007	station:/slot:/Drivers/ModbusTcpGateway/A10\$2d09/points/kWh	Modbus
Ch008	station:/slot:/Drivers/ModbusTcpGateway/DAB13000\$2d11/points	Modbus
Ch009	station:/slot:/Drivers/ModbusTcpGateway/K601_112/points/Ener	Modbus
Ch010	station:/slot:/Drivers/ModbusTcpGateway/EDMK_05/points/kWh	Modbus
Ch011	null	
Ch012	null	
Ch013	null	
Ch014	null	
Ch015	null	
Ch016	null	
Ch017	null	
Ch018	null	
Ch019	null	
Ch020	null	
Ch021	null	
Ch022	null	
Ch023	null	
Ch024	null	
Ch025	null	
Ch026	null	
Ch027	null	
Ch028	null	
Ch029	null	
Ch030	null	
Ch031	null	
Ch032	null	

Save

Click the [Save] button to save changes. On a 64-Channel J-Logger, there are two tabs; [Chan Config A] and [Chan Config B], each of which control 32 Channels.

2.9.7 Set Time/Date

The **Set Time/Date** Tab allows you to manually set the Logger time and date :-



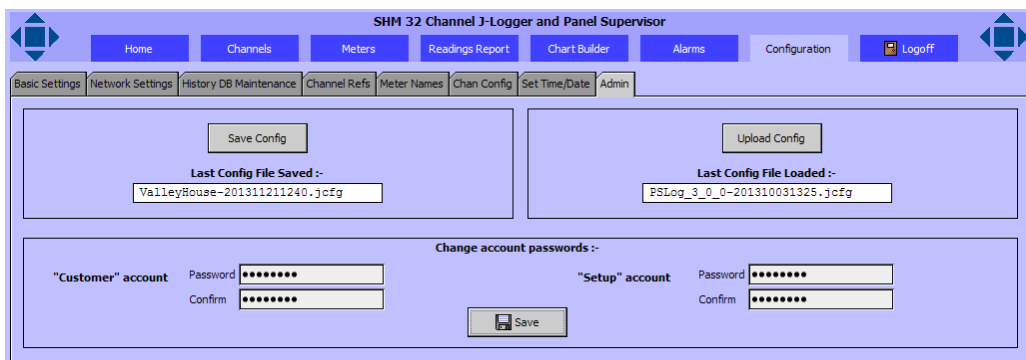
Set the new time and date and click the [Save] button. It is recommended to use a Time Zone that does change during the year, eg. UTC (GMT).

If the Logger has access to the Internet, then it will normally be configured by SHM to synchronize its time regularly with an SNTP Time Server. If the local Intranet has a SNTP Server then the Logger can use that to keep its time up to date. In these cases you should never need to set the time manually, as it should always be close to the correct time.

If the Logger does not have access to an SNTP Server then you may need to check the time regularly to ensure it does not drift too far.

2.9.8 Admin

The **Admin** Tab allows you Load and Save configurations and change the passwords of the main accounts :-

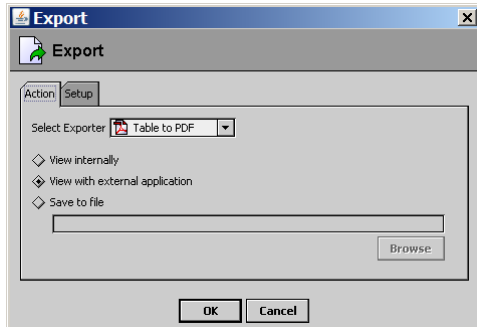


The standard "Customer" login is used for read only access to the HMI. It does not allow any configuration changes, but Alarms can be acknowledged. The standard "Setup" login allows access to the Configuration pages.

The [Save Config] and [Upload Config] buttons allow configuration files to be read and written on the Logger file system (not on the PC accessing the Logger). This is for use by qualified SHM engineers only.

2.10 Exporting Data

Data can be exported via the HMI either by right-clicking the page or clicking the small Export Button at the upper right of the page. Which method is available depends on the context. This brings up the following dialog box :-



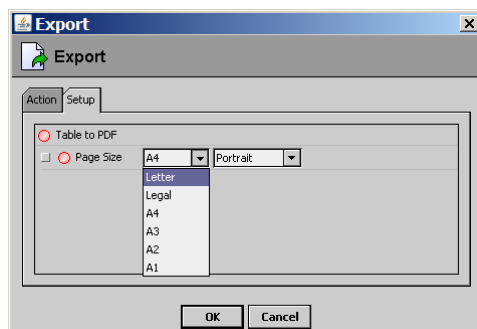
You can export data from the Logger in a variety of formats (not all may be available depending on the context) :-

- oBIX (You will not normally need this format)
- HTML (for displaying in a Web Browser)
- Text (for displaying in a text editor, eg. Notepad)
- CSV (for displaying in a spreadsheet, eg. Excel)
- PDF (for printing)

Options for viewing the exported data are :-

- View Internally (not normally used)
- View with external application
- Save to file

For certain export formats, you can set up parameters (eg. paper size for PDF) by clicking the Setup tab :-





The following data can be exported :-

Page	Method	Data
Channels – Logged data	right-click Export Data	Selected History range as chart or table
Channels – Logged data	right-click Export View	Selected History range as chart or table, but with different formats.
Report	Export button	Current Channel readings as table.
Chart Builder – Chart	right-click Export Data	Selected History range as table
Alarms	Export button	Current alarms as table



3. Extracting Historic Data

The Logger stores Channel readings at regular intervals as Histories. However these Histories can only store 4000 readings, and so when logging every 30 minutes this corresponds to 80 days of information.

If you want to maintain a continuous detailed historical record then you will need to use an external software application (Energy Monitoring Software) that maintains its own historian database and interrogates the Logger periodically to extract the latest historic data and store it in this database.

Alternatively, you can extract historic data manually or semi-automatically from the Logger and process it manually. This may be the best solution if you only need monthly meter readings for billing purposes and have a relatively small system.

This section details the various methods that can be used to extract this data.

3.1 Via oBIX

The Logger supports the oBIX protocol, which among other things can supply historic data in the form of XML files. Energy Monitoring software such as Stark's Reality and eSight Enterprise have drivers that support the oBIX protocol.

You can browse and view the historic data in a Logger using a browser. Open a browser window with the following URL :-

<http://{Logger Hostname or IP}/obix>

You do not need to log in to view this data. You should see something like this :-

```
<?xml version="1.0" encoding="UTF-8" ?>
<obj href="http://192.168.0.204/obix/" is="obix:lobby" xsi:schemaLocation="http://obix.org/ns/schema/1.0 /obix/xsd">
  <ref name="batchService" href="/obix/batchService/" is="obix:BatchService"/></ref>
  <ref name="config" href="/obix/config/" is="obix:config" display="Station" displayName="Config" icon="/ord/module//icons/xls/database.png"/></ref>
  <ref name="about" href="/obix/about/" is="obix:about"/></ref>
  <ref name="histories" href="/obix/histories/" display="com.tridium.history.db.ELocalHistoryDatabase" displayName="History" icon="/ord/module//icons/xls/historyDatabase.png"/></ref>
  <ref name="continuousControl" href="/obix/config/Drivers/ObixNetworkExport/" is="obix:ObixNetworkExport" display="Obix Export Folder" icon="/ord/module//icons/xls/exportFolder.png"/></ref>
  <ref name="batch" href="/obix/batch/" is="obix:Batch" display="Obix Batch" icon="/ord/module//icons/xls/batch.png"/></ref>
  <ref name="alarms" href="/obix/config/Services/AlarmsService/" is="obix:AlarmsService" display="Alarms Service" displayName="AlarmsService" icon="/ord/module//icons/xls/alarms.png"/></ref>
</obj>
```

Click on the "histories" hyperlink :-

```
<?xml version="1.0" encoding="UTF-8" ?>
<obj href="http://192.168.0.204/obix/histories/" display="com.tridium.history.db.ELocalHistoryDatabase" icon="/ord/module//icons/xls/historyDatabase.png" xsi:schemaLocation="http://obix.org/ns/schema/1.0 /obix/xsd">
  <ref name="MLog32" href="/obix/histories/MLog32/" display="javac.baja.history.EHistoryDevice" icon="/ord/module//icons/xls/device.png"/></ref>
</obj>
```

You will see the Logger's Station Name (MLog32 in the example). Click on the hyperlink :-

```
<?xml version="1.0" encoding="UTF-8" ?>
<obj href="http://192.168.0.204/obix/histories/MLog32/" display="javac.baja.history.EHistoryDevice" icon="/ord/module//icons/xls/device.png" xsi:schemaLocation="http://obix.org/ns/schema/1.0 /obix/xsd">
  <ref name="Ch001" href="/obix/histories/MLog32/Ch001/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
  <ref name="Ch002" href="/obix/histories/MLog32/Ch002/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
  <ref name="Ch003" href="/obix/histories/MLog32/Ch003/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
  <ref name="Ch004" href="/obix/histories/MLog32/Ch004/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
  <ref name="Ch005" href="/obix/histories/MLog32/Ch005/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
  <ref name="Ch006" href="/obix/histories/MLog32/Ch006/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
  <ref name="Ch007" href="/obix/histories/MLog32/Ch007/" display="com.tridium.history.db.ELocalHistory" icon="/ord/module//icons/xls/history.png"/></ref>
</obj>
```

This brings up a list of all the Histories in the Logger (Ch001 etc.) Click on one of these hyperlinks



```

<obj href="http://192.168.0.204/obix/histories/MLon32/Ch002/" is="obix:History" display="com.tridius.history.db.ELocalDbHistory" icon="ord?module://icons/x16/history.png"
  <int name="count" val="4"/></int>
  <abstime name="start" val="2011-02-03T13:30:00.010Z"/></abstime>
  <abstime name="end" val="2011-02-03T15:00:00.893Z"/></abstime>
  <op name="query" href="/obix/def/obix:HistoryFilter" out="/obix/def/obix:HistoryQueryOut"/></op>
  <op name="rollup" href="/obix/def/obix:HistoryRollupIn" out="/obix/def/obix:HistoryRollupOut"/></op>
  <feed name="feed" href="/obix/def/obix:HistoryRecord" in="/obix/def/obix:HistoryFilter"/></feed>
  <op name="append" href="/obix/def/obix:HistoryAppendIn" out="/obix/def/obix:HistoryAppendOut"/></op>
  <ref name="unboundedQuery" href="/obix/Query?limit=1000"/></ref>
  <ref name="today" href="/obix/Query?start=2011-02-03T00:00:00.000Z&end=2011-02-03T15:22:14.178Z"/></ref>
  <ref name="last24Hours" href="/obix/Query?start=2011-02-03T15:22:14.178Z&end=2011-02-03T15:22:14.178Z"/></ref>
  <ref name="yesterday" href="/obix/Query?start=2011-02-02T00:00:00.000Z&end=2011-02-02T23:59:59.999Z"/></ref>
  <ref name="weekToDate" href="/obix/Query?start=2011-01-31T00:00:00.000Z&end=2011-02-03T15:22:14.178Z"/></ref>
  <ref name="lastWeek" href="/obix/Query?start=2011-01-31T23:59:59.999Z&end=2011-01-31T23:59:59.999Z"/></ref>
  <ref name="last7Days" href="/obix/Query?start=2011-01-27T00:00:00.000Z&end=2011-02-03T15:22:14.178Z"/></ref>
  <ref name="monthToDate" href="/obix/Query?start=2011-01-01T00:00:00.000Z&end=2011-02-03T15:22:14.178Z"/></ref>
  <ref name="lastMonth" href="/obix/Query?start=2011-01-01T00:00:00.000Z&end=2011-01-31T23:59:59.999Z"/></ref>
  <ref name="yearToDate (limit=1000)" href="/obix/Query?start=2011-01-01T00:00:00.000Z&end=2011-02-03T15:22:14.178Z&limit=1000"/></ref>
  <ref name="lastYear (limit=1000)" href="/obix/Query?start=2010-01-01T00:00:00.000Z&end=2010-12-31T23:59:59.999Z&limit=1000"/></ref>
</obj>

```

This provides a number of hyperlinks that extract different time ranges of historic data for the Logger. Click on one of these hyperlinks :-

```

<obj href="http://192.168.0.204/obix/histories/MLon32/Ch002/" historyQuery="obix:HistoryQueryOut" xsi:schemaLocation="http://obix.org/ns/schema/1.0 /obix.xsd">
  <list name="data" of="#RecordDef obix:HistoryRecord">
    <obj>
      <abstime name="timestamp" val="2011-02-03T13:30:00.010Z" tz="GMT"/></abstime>
      <real name="value" val="6.0"/></real>
    </obj>
    <obj>
      <abstime name="timestamp" val="2011-02-03T14:00:00.893Z" tz="GMT"/></abstime>
      <real name="value" val="6.0"/></real>
    </obj>
    <obj>
      <abstime name="timestamp" val="2011-02-03T14:00:00.843Z" tz="GMT"/></abstime>
      <real name="value" val="6.0"/></real>
    </obj>
    <obj>
      <abstime name="timestamp" val="2011-02-03T15:00:00.893Z" tz="GMT"/></abstime>
      <real name="value" val="6.0"/></real>
    </obj>
  </list>
  <int name="count" val="4"/></int>
  <abstime name="start" val="2011-02-03T13:30:00.010Z" tz="GMT"/></abstime>
  <abstime name="end" val="2011-02-03T15:00:00.893Z" tz="GMT"/></abstime>
  <obj href="#RecordDef" is="obix:HistoryRecord">
    <abstime name="timestamp" tz="GMT"/></abstime>
    <real name="value" unit="obix:units/kilowatt_hour"/></real>
  </obj>
</obj>

```

This displays the historic data for this Channel for the selected time range. You can use the Browser menu command **File | Save** to save this data as an XML file.

The above sequence is shown for information only. Energy Monitoring Software that supports oBIX will be able to locate and store historic data automatically.

3.2 Via FTP "Push"

The use of FTP can be useful in circumstances where firewalls etc. block access to the Logger from an external PC (eg. when using GPRS). Because the Logger acts as an FTP Client, and firewalls do not usually block outbound access to the Internet or other networks, data can be pushed to an FTP Server on the Internet.

You can configure the Logger to send regular Reports as CSV files via FTP (see section 2.9.1), which can be opened in Microsoft Excel. You can then copy and paste the readings into your own reporting/analysis spreadsheet. There are two types of report :-

3.2.1 Immediate Meter Readings

This report is a snapshot of the Channel readings and Status, for example :-

```

Channel,Reference,Reading,Last Month,Status
"Ch000","Date and Time","16/05/2014 14:59","April 2014 ", "ok"
"Ch001","Gavazzi EM26","5401.80","302.50","ok"
"Ch003","ND Cube400","58741.00","3055.00","ok"
"Ch005","Gavazzi EM21","128632.20","4558.30","ok"
"Ch006","Gavazzi EM24","5504.00","305.80","ok"
"Ch007","Socomec Diris A10","13025.00","230.00","ok"
"Ch008","DAB13000_11","0.00","0.00","fault,stale"

```

The name of the file indicates the date and time that the readings were taken. The file name has the following format :-

```
StationName_Imm-YYYYMMDDhhmm.csv
```



Where YYYY is the Year, MM the month, DD the day, hh the hours and mm the minutes.

This method is useful if you only need meter readings at fairly long time intervals (eg. daily, weekly, monthly). It does not provide a Load Profile.

3.2.2 Daily Load Profile

This report contains all the logged data for the previous day, for all Channels, for example :-

```
timestamp,Ch001,Ch002,Ch003,Ch004,Ch005,Ch006,Ch007, ...
19/11/2013 00:00:00,513280.81,123602.00,3998.00,0.00,29900.00,3589.10,6989.00, ...
19/11/2013 00:30:00,513332.09,123634.00,3998.00,0.00,29912.10,3589.70,6990.00, ...
19/11/2013 01:00:00,513379.31,123664.00,3998.00,0.00,29924.50,3590.70,6992.00, ...
19/11/2013 01:30:00,513387.81,123669.00,3998.00,0.00,29936.90,3591.20,6993.00, ...
19/11/2013 02:00:00,513395.00,123674.00,3998.00,0.00,29949.60,3591.50,6994.00, ...
etc. etc.
```

The name of the file indicates the date and time that the file was generated. For a 32-Channel logger the file name has the following format :-

StationName_Chans-YYYYMMDDhhmm.csv

For a 32-Channel logger the file name has the following formats :-

StationName_Chans_A-YYYYMMDDhhmm.csv	Channels 1 to 32
StationName_Chans_B-YYYYMMDDhhmm.csv	Channels 33 to 64

Where YYYY is the Year, MM the month, DD the day, hh the hours and mm the minutes.

3.2.3 FTP Failures

As soon as a report is generated, an attempt is made to export it via FTP. However an FTP file transfer can fail for a number of reasons; the FTP server might be down, or the network connection from the Logger to the Server might be temporarily disconnected.

Should the transfer fail, the file is stored locally on the Logger so that data is not lost. At a later time the Logger will re-attempt the transfer of these locally stored files. If the transfer should succeed, the file will be deleted. If it fails again, the file will remain on the Logger ready for the next attempt 24 hours later.

This mechanism ensures that data should never be lost – it will eventually be transferred once the connection to the FTP Server is working again. Be aware that if the connection is down for too long, the file system could become full.

The configured time for the daily Load Profile report (See section 2.9.1) determines when the first attempt is made. Re-attempts are made 12 hours after this time and every 24 hours after that.

3.3 Via Email

The use of Email can be useful in circumstances where firewalls etc. block access to the Logger from an external PC (eg. when using GPRS). Because the Logger acts as an SMTP Client, and firewalls do not usually block outbound access to the Internet or other networks, data can be sent to an SMTP Server and thence over the Internet.

You can configure the Logger to send regular Reports via Email (see section 2.9.1). The Logger will then send Emails with a CSV file attached, which can be opened in Microsoft Excel. You can

then copy and paste the readings into your own reporting/analysis spreadsheet. The files sent are identical to the FTP files described in the previous section.

3.4 Via HMI

3.4.1 Current Readings

You can view the current readings for all Channels via the Readings Report page (see section 2.4). You can export this data in various formats (see section 2.10) including CSV, by clicking the small icon at the top right of the Report. The resulting report is very similar to the one sent via Email (see section 3.2) except that it has an additional "Date" row.

This method is useful if you only need meter readings at infrequent intervals. It does not provide a Load Profile.

3.4.2 Historic Data

The best way to manually extract historic data for a Channel is to go to the Channels page and click on the Channel you are interested in (see section 2.3.1). Select the time range you require and click the Delta button [Δ] if you are interested in increments rather than absolute values.

Right-click the chart and select **Export Data**. Choose **Table to CSV** and click [OK]. This will display the historic data that is plotted on the chart in Excel. There will be two columns, **timestamp** and **value**. You can then copy and paste these readings into your own reporting/analysis spreadsheet.

This method provides Load Profiles one Channel at a time. Collecting data for all Channels this way would be a labourious process.

4. Logger Alarms

The Logger can detect several alarm conditions that can be reported to the user. These include :-

1. **Primary Power Alarm.** This occurs if the primary power fails. You will normally only see the "Primary Power Restored" alarm, as the Logger shuts down shortly after primary power failure.
2. **Battery Alarm.** The on-board backup battery is designed to keep the Logger running for sufficient time to allow it to shut down cleanly. The battery capacity is tested automatically at intervals, and an alarm will be generated if the battery has insufficient capacity. This alarm can occur if the primary power has been off for a long time and the battery has had insufficient time to recharge fully before the automatic test.
3. **Communication Failures.** For meter inputs via Modbus or M-Bus (but not discrete inputs), the Logger will detect communication failures and raise an alarm. Failures could be caused by the meter itself or the cabling that connects it to the Logger. These failures are reported as "ping failure", and a recovery as a "ping success".

In the case of (3) above, at infrequent intervals, you may get a "ping failure" for an input followed a few minutes later by a "ping success" for the same input. This does not indicate a problem and is normal for this type of communication network.

Alarms can be viewed via the HMI (see section 2.7). They can also be sent as Emails to a chosen recipient which can be configured by a user with Configuration privileges (see section 2.9.1). Note that this can be a different recipient to the Reports recipient.

Alarm states go from "Normal" to "Offnormal" or "Fault" depending on context. Alarms can be acknowledged via the HMI. Once an alarm in the "Normal" state has been acknowledged, it is removed from the list.

5. Networking Issues

All remote access to or from the Logger goes via its Network Connections. Local access to interrogate meters will also be via the network for protocols such as Modbus/TCP. This section describes how the network is used and how it may need to be configured.

5.1 Network Connections

There are two network connections on the Logger –

Name	Position	Function
LAN1	Right-hand RJ45 connector	Normal access to Logger
LAN2	Left-hand RJ45 connector	Diagnostic access to Logger

LAN1 must be used to connect to your network or to a Broadband router.

5.2 GPRS Access

The Logger can be ordered with an optional GPRS module which allows remote communications via the cellular network. A suitable SIM card is required, and the mobile service provider must enable GPRS for this SIM.

Setting up a GPRS logging system is **not** straightforward and beyond the scope of this document. Sending emails and exporting files via FTP to the Internet is not normally a problem, but accessing the Logger **from** the Internet is not easy, and usually requires setting up a VPN to access the mobile service provider's network (if the service provider allows this).

Assuming a VPN has been set up, accessing historic data via oBIX using GPRS is not a problem, but accessing the HMI results in very slow page loading due to the low data rate.

5.3 Internet Access

It is possible to connect a single Logger to the Internet via a Broadband connection. This is useful if the Logger is in a remote location, and there is no on-site connection to a corporate network available. The Broadband connection can be used in one direction to send emails and export files via FTP, and the other direction to access the HMI and fetch historic data. It also allows remote support by SHM. Security is provided by user names and passwords.

Connection of more than one Logger to a single Broadband connection is complex and beyond the scope of this document.

5.3.1 Broadband Requirements

If the Broadband line is to be used only by the Logger, then any Broadband package will suffice – the volume of data downloaded/uploaded is small. A "Fixed IP Address" connection is **not** required. SHM would normally supply and configure the router as some routers supplied as part of a Broadband package are not be suitable.



If the Logger is sharing an existing Broadband connection, then changes to the router configuration would be required. If the router is not capable of being configured (see section 5.3.3) then the router must be changed.

5.3.2 DDNS

To connect to the Logger via the Internet, you need to know its IP address. However, most common Broadband packages do not offer a fixed IP address – the address assigned to the connection may change from time to time.

This does not present a problem to the Logger, as it is capable of registering via the Internet with a DDNS Service Provider. This service provider provides a fixed URL that you can type into an Internet Browser, and it will always direct the Browser to the appropriate IP address (and hence the Logger) even if the IP address changes.

The Logger only supports one DDNS Service Provider – www.tzo.com who provide this service for a small annual fee. SHM can set this up for you, or you can set an account up for yourself.

5.3.3 Router Setup

If SHM is supplying the router, this will be set up for you.

The first task is to establish an IP address for the Logger's LAN1 connection. There are two approaches to this, dynamic or fixed :-

With the Dynamic approach, the Logger is configured to use DHCP, which lets the router assign its IP address. With this approach, once the Logger is connected to the router, you must access the router configuration to find what IP address has been assigned, and then configure the router to assign this same IP address every time the Logger is plugged in.

With the Fixed approach, the Logger is configured with a fixed IP address in the same subnet as the router. For example if the router's IP address is :-

192.168.1.1 *This is a default address used by many different types of router*

You might set the Logger IP address to :-

192.168.1.2 *Assuming no other device is using this address*

Next you need to configure NAT to route requests from the Internet to certain TCP Ports so that they go to the Logger at its local IP address (determined above). These ports are :-

Port	Type	Function
80 (HTTP)	TCP	Access to HMI and historic data via oBIX
1911	TCP	Access to HMI
3011	TCP	Access by SHM to diagnostic information

Access to port 3011 is only required if SHM are providing support for your Logger.



Depending on the type of router, you may also need to enable these ports through the firewall. On other routers, setting up NAT automatically enables these ports.

Most routers do not block outgoing traffic on specific ports, but if required the following ports should be enabled from Logger to Internet :-

Port	Type	Function
21	TCP	FTP Server Access
25	TCP	Sending Emails (SMTP protocol)
123	UDP	Access to Internet Time Server (NTP protocol)

5.4 Firewalls

This section details the openings that must be made in any firewalls that exist between the PC and the Logger. If the Logger is on a Broadband connection set up as described in section 5.2 there may still be a firewall between your PC and the Internet. If the Logger is on a corporate network, then there will probably be firewalls between your PC and the Logger. In these cases you may need to ask your IT department to open certain ports in the firewall before you can gain access. You could send this section to your IT department to show what needs to be done.

If the Logger is configured to send emails, then firewalls may need to be configured to allow the Logger access to the email server.

5.4.1 HMI Access

The following ports must be opened for HMI access :-

Port	Type	Direction	Notes
80	TCP	PC to Logger	If Logger is on Broadband connection, its IP address will probably be variable.
1911	TCP	PC to Logger	See above

5.4.2 oBIX Access

The following ports must be opened for oBIX access to historic data :-

Port	Type	Direction	Notes
80	TCP	PC to Logger	If Logger is on Broadband connection, its IP address will probably be variable.



5.4.3 FTP Sever Access

The following ports must be opened to allow the Logger to send files to an FTP Server :-

Port	Type	Direction	Notes
21	TCP	Logger to FTP Server	Logger FTP transfer uses "Passive" mode, so the Logger will also open an additional port to transfer the file data.

5.4.4 Email Sever Access

The following ports must be opened to allow the Logger to send Emails :-

Port	Type	Direction	Notes
25	TCP	Logger to Email Server	

It is a common requirement to have a valid login and password to send emails via an SMTP Email Server. The following information is normally needed to configure the Logger to send emails :-

- Server Hostname or IP Address
- Login username
- Login password

5.4.5 NTP Server Access

The following ports must be opened to allow the Logger to synchronize its time and date :-

Port	Type	Direction	Notes
123	UDP	Logger to NTP Server	

APPENDIX A Specification

Discrete Inputs (Optional 1 to 4 Extra Modules for DIN-Rail J-Logger)		
Quantity	8 off per Module	Universal Inputs for DIN-Rail J-Logger
	8 off	Universal Inputs (standard on Wall-mount J-Logger)
Pulse Counting	Volt-free contact closure	10k pullup to +3.3V
	Minimum pulse width	25 ms
	Maximum frequency	20 Hz
Voltage	Range 0 to 10 V	Input impedance >5kΩ
	Accuracy	±2% full scale
Current	Range 0 to 20 mA	Input impedance 500Ω (external)
	Accuracy	±2% full scale
Temperature	Range -25 °C to +100 °C	Range depends on sensor type
	Sensor type	10kΩ nominal NTC. Various linearizations.
	Accuracy	±1% full scale
Modbus Inputs (Standard)		
Modbus Serial Ports	1 off	RS485
	Additional Ports	Dual RS485 Option Module available
	Protocol	Modbus RTU
	Baud Rate	9600 (standard), but up to 115200 available
	Number of devices	32 "unit loads" or 128 "¼ unit loads"
Modbus TCP Ports		Devices can be on LAN1 and LAN2
	Number of devices	Limited by Logger Channel capacity
Data Formats		16-bit signed integer, 16-bit unsigned integer, 32-bit unsigned integer, 32-bit IEEE floating point
Byte Order		3-2-1-0 or 1-0-2-3

M-Bus Inputs (Standard)		
M-Bus Serial Ports	1 off	RS232. Requires external M-Bus Master or internal M-Bus Master (10 unit loads max).
	Additional Ports	Single RS232 Option Module available
	Baud Rate	2400 (standard) or 300 to 38400 available
	Number of devices	Determined by M-Bus Master. Maximum 250. NB Polling cycle can be very slow (up to 30 sec per device)
Channels		
Quantity		32 or 64 (Standard)
Source		Each Channel can be linked to any input. In the case of M-Bus or Modbus, this can be any parameter from the device.
Logging Interval		1, 2, 5, 10, 15, 30 or 60 minutes
Capacity		4000 readings per Channel
Pop-up Meters (Panel Supervisor Version)		
Quantity		12 or 32 (Standard)
Types	3-phase Electricity	Phase Voltages Phase Currents Frequency Real Power (kW total) Apparent Power (kVA total) Power Factor (total) Active Energy (kWh) Reactive Energy (kvarh)
	Single-phase Electricity	Voltage Current Frequency Real Power (kW) Apparent Power (kVA) Power Factor Active Energy (kWh) Reactive Energy (kvarh)

	Heat/Cooling	Flow Temperature Return Temperature Temperature Difference Power (kW) Volume flow rate Energy (kWh) Volume flow (total)
Update Rate	Depends on achievable polling rate	Less than 30 sec (typical)
Logging		The pop-up meters are independent of the logging function. Any of the above parameters can be logged subject to the channel capacity of the Logger (32 channels as standard).
Communications		
Ethernet	2 off	LAN1 and LAN2 (RJ45 skt)
RS232	1 off	9-pin D male connector
RS485	1 off	3-way 2-part terminal block (non-isolated)
GPRS	Option Module	Data rate rather slow for HMI use
Power		
(A) External Mains	90 to 230 V AC, 30 VA	DIN-Rail mounting for DIN-Rail J-Logger
(B) External Low V.	24 V AC/DC	DIN-Rail mounting for DIN-Rail J-Logger
(C) Internal Mains	90 to 230 V AC	Wall-mounting J-Logger has built-in PSU
Battery	Internal NiMH	12 V (replaceable)
	Running time	5 mins (typical). Shutdown begins within 10 s
	Database & RTC backup	3 months
Enclosure Options		
DIN-Rail J-Logger	Mounting	DIN-rail
	Material	Plastic
	Cooling	Internal air convection
	Dimensions	164w x 104h x 63d (mm) (Excludes PSU and IO Modules)

Wall-mount J-Logger	Mounting	Wall (3 screw fixings)
	Material	Plastic
	Cooling	Internal air convection
	Dimensions	187w x 310h x 50d (mm)
Miscellaneous		
Temperature	Operating	0 to 50 °C
	Storage	0 to 70 °C
Relative Humidity		5 to 95%, non-condensing
Date / Time	Internal RTC	Can be synchronized to Internet time source via NTP
Security	Username / Password	Configurable per-user Privileges
Platform	Processor	PPC 250 MHz (32 Chan), 524 MHz (64 Chan)
	DRAM	128 MB (32 Chan), 256 MB (64 Chan)
	Flash Memory	64 MB (32 Chan), 128 MB (64 Chan)
	Operating System	QNX / Java