



IP Sub Metering Appliance



IP-SM-101

RoHS



All you need is a web browser running on any laptop, PDA, or cell phone anywhere in the world to monitor and log electric, gas, water or compressed air consumption. Receive email alerts if consumption crosses a threshold.

The *Maverick* IP Sub Metering Appliance incorporates a web server, accepts a pulse input from any energy meter (KWH, water, gas, steam or compressed air) and displays consumption by the minute, hour, day, week and month. The appliance logs the data in CSV format and usage can be viewed as bar graphs for the minute, hour, day, week and month. The appliance can also email periodic consumption reports every hour, day, week or month which can be imported into Excel, Word or any other application which accepts CSV data. Data is also available formatted for XML and any application can retrieve the data for storage or analysis.

Power the appliance with any 24VAC transformer, plug it into a hub/router, launch any web browser, punch in the default IP and connect. No custom software to load, no discovery routines, no custom cables or training. The Sub Metering *Maverick* serves up static web pages with dynamic energy consumption data updates every second or two. Most users can configure and utilize the appliance without any training or support in less than 5 minutes.

For effective utilization of energy and natural resources, waste and inefficiency have to be eliminated. This can only be accomplished by holding energy consumers accountable. The *Maverick* IP Sub Metering Appliance provides an ideal low cost solution for consumption data acquisition and analysis.



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GENERAL:

The Maverick Sub Metering Appliance has an embedded lean TCP-IP stack including HTTP, SMTP, DHCP, DNS, FTP, and ARP.

The Maverick also has XML embedded with formatted usage data. In this way, the Maverick can communicate directly with any IT system which has an XML parser. Similarly, any simple JavaScript can be used to communicate and acquire HTML data. These unique features enable the Maverick to function as a extremely low cost XML & HTML node for large enterprise IT systems.

METERING:

The Maverick SM-101 accepts a pulse input (dry contact) directly from any electric, water or gas meter. Computes consumption by multiplying the pulse with the user programmed meter coefficient and displays usage by the minute, hour, week and month. The appliance also displays the total accumulated pulses from the meter. This usage data is available in XML format to be imported into any database management application. The data for hourly, daily, weekly, monthly and the total pulses is stored in non-volatile RAM. In this way, in case of a power loss, only the current minute data is lost.

The Sub Metering Maverick also has a time countdown feature and displays the time remaining prior to the next update for the minute, hour, week and month consumption. At a glance one can estimate if the current consumption will exceed the previous usage.

If a new sub metering application is started, a meter reset function is available under the configuration page. With the input pulse disconnected, if the meter reset icon is clicked, the meter will reset and all accumulated data including total accumulated pulses will be flushed out and all counts will revert back to zero.

EMAIL ALERTS:

The biggest shortcoming of all existing sub metering systems is their inability to directly send email alerts and alarms. The Maverick appliance has a very user friendly email alert capability and can send email alerts to up to two different addresses. Email alerts can be configured for the minute, hour, day, week or month consumption. If the usage exceeds a predefined threshold, the appliance will transmit an email alert. The Maverick SM-101 also has an option available to attach a CSV log to the email alert. The user does not only receive an alert but also can parse the log file and review what the consumption has been prior to the alert condition.

The Maverick appliance can also send email alerts in case of a power outage. The appliance logs the time the power went out, and when the power is restored, it sends an email with a time stamp when the power went out and when it was restored.

Similarly, the appliance can be configured to send an email if the DHCP IP assignment has been changed. If the Maverick is running as a DHCP client, it can keep the users abreast of its DHCP IP assignment and the user does not have to discover the appliance.

PERIODIC EMAIL REPORTS:

The Sub Metering Maverick also has a feature to send consumption data periodic email reports in CSV format every minute, hour, day, week or month. These usage reports can be imported into Excel, Word or any other application which accepts CSV data for analysis and archiving. This consumption data is also available in XML format and can be easily parsed by any application for data mining purposes. The Minute report provides 1440 minutes (24 hour) rolling data for each minute usage. The Hour report has 744

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hours (31 days) of rolling hourly consumption data, the Weekly report has 53 weeks of data and the Monthly report accumulates 12 months of rolling consumption data.

The appliance can be configured to email data for any or all desired periods to either one or two email addresses. The user may configure both multiple periodic email reports and multiple email alerts at the same time.

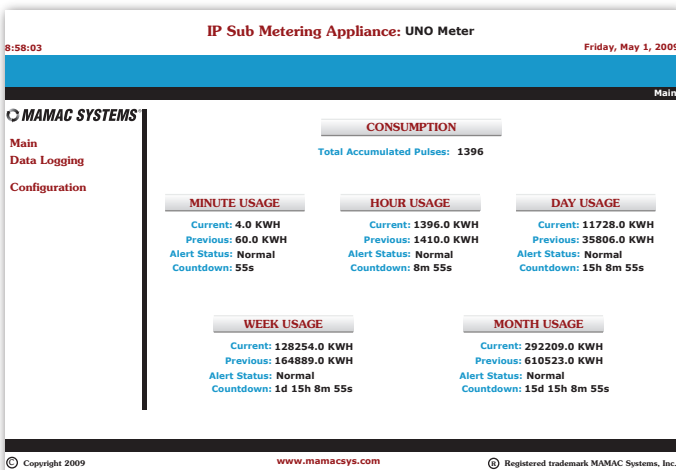
DATA LOGGING:

The logged data which is used by the periodic email reports can also be viewed as bar graphs. The Minute consumption data is displayed

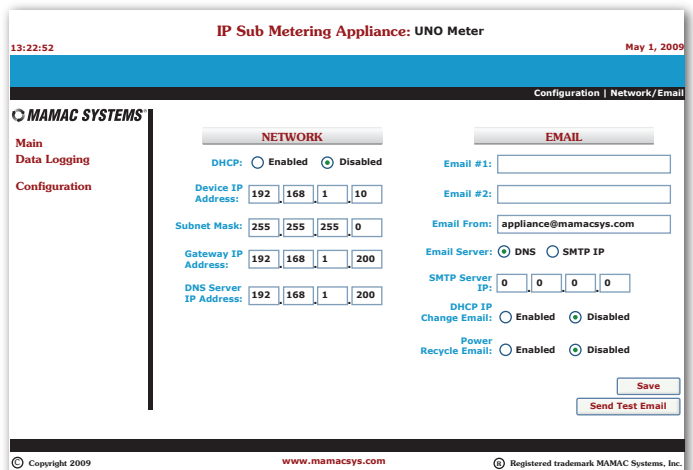
by 60 bar graphs for each minute of usage. The Hour data is displayed by 24 bar graphs for each hour of consumption. The Daily usage is displayed by 31 bar graphs for each day's usage, the Weekly data is shown by 8 bar graphs for each week's consumption and the Monthly usage is displayed by 12 bar graphs for each month's consumption.

The appliance provides a visual display of consumption for any desired period. Data can also be viewed as a CSV file and imported into Word, Excel or any other application which accepts CSV files.

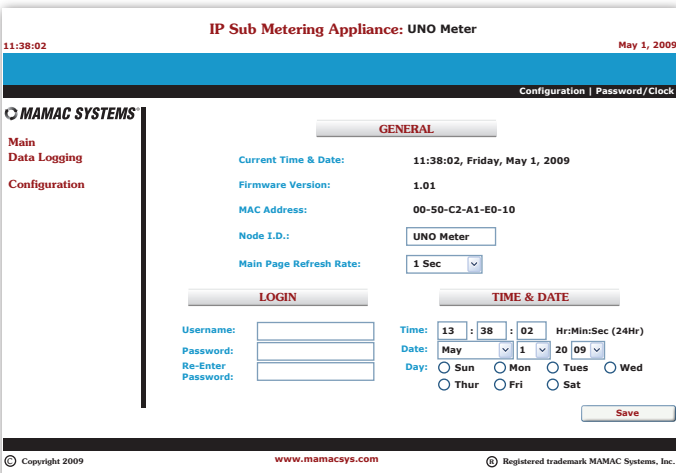
MAVERICK BROWSER SCREEN SHOTS:



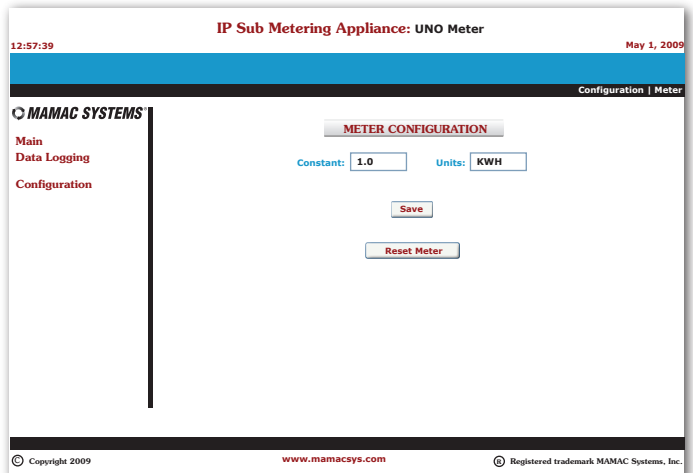
Main page with status of minute, hour, day, week and month usage



Network & email configuration



Password & Time configuration



Meter Configuration

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The screenshot shows the 'Minute Email Alerts & Email Reports' configuration page. The page title is 'IP Sub Metering Appliance: UNO Meter' with a timestamp of 10:55:28 and the date May 1, 2009. The navigation bar includes 'Configuration | Email Alerts/Reports | Minute'. The left sidebar shows 'MAMAC SYSTEMS' with links for 'Main', 'Data Logging', and 'Configuration'. The main content area is titled 'MINUTE EMAIL ALERTS & EMAIL REPORTS' and 'Email Minute Usage Alert Configuration'. It features two sections: 'Alert Enable' with radio buttons for 'On' (selected) and 'Off', and 'Alert Value' with a text input field containing '100.0'. There is also an 'Attach Log' section with radio buttons for 'On' (selected) and 'Off'. Below these is the 'Email Report Interval' section with a dropdown menu set to 'Daily' and a 'Save' button. The footer contains copyright information for 2009 and the website www.mamacsys.com.

Minute Email Alerts & Email reports configuration

The screenshot shows the 'Email Alerts & Email Reports' navigation page. The page title is 'IP Sub Metering Appliance: UNO Meter' with a timestamp of 11:16:28 and the date May 1, 2009. The navigation bar includes 'Configuration | Email Alerts/Reports'. The left sidebar shows 'MAMAC SYSTEMS' with links for 'Main', 'Data Logging', and 'Configuration'. The main content area is titled 'EMAIL ALERTS & EMAIL REPORTS' and contains a list of links: 'Minute Email Alerts & Email Reports', 'Hour Email Alerts & Email Reports', 'Day Email Alerts & Email Reports', 'Week Email Alerts & Email Reports', and 'Month Email Alerts & Email Reports'. The footer contains copyright information for 2009 and the website www.mamacsys.com.

Email Alerts & Email Reports navigation page

EMAIL ALERT SCREEN SHOTS

The screenshot shows an email window titled 'Mail From: Uno Meter <appliance@mamacsys.com>'. The email header includes 'From: Uno Meter <appliance@mamacsys.com>', 'To: Anthony Geye', and 'Subject: Test Email from: Uno Meter'. The body text reads: 'Test Email from Appliance: Uno Meter' and 'Appliance Time and Date: 18:29:34, May 5, 2009'.

Test email

The screenshot shows an email window titled 'Mail From: Uno Meter <appliance@mamacsys.com>'. The email header includes 'From: Uno Meter <appliance@mamacsys.com>', 'To: Anthony Geye', and 'Subject: ALERT - Power Interruption to Appliance: Uno Meter'. The body text reads: 'Power was interrupted to Appliance: Uno Meter', 'Power Loss Time: 18:00:52, May 5, 2009', and 'Power Restored: 18:01:14, May 5, 2009'.

Power cycle email

The screenshot shows an email window titled 'Mail From: Uno Meter <appliance@mamacsys.com>'. The email header includes 'From: Uno Meter <appliance@mamacsys.com>', 'To: Anthony Geye', and 'Subject: New IP Assignment Appliance: Uno Meter'. The body text reads: 'The following IP address has been assigned by DHCP Server to Appliance: Uno Meter', 'New IP Address: 192.1681.26', and 'Appliance Time and Date: 18:07:53, May 5, 2009'.

DHCP Assignment

The screenshot shows an email window titled 'Mail From: Uno Meter <appliance@mamacsys.com>'. The email header includes 'From: Uno Meter <appliance@mamacsys.com>', 'To: Anthony Geye', and 'Subject: ALERT - Appliance ID: Uno Meter'. The body text reads: 'Alert from appliance: Uno Meter.', 'Minute usage is in Alert Condition.', 'Usage has exceeded Alert Setpoint: 100.0 kw.', and 'Appliance Time and Date: 18:42:11, May 5, 2009'. Below the text is an attachment icon and the filename 'Maverick Sub Metering Log File.csv'.

Email Alert (CSV log file attached)

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SPECIFICATIONS:

Supply Voltage: 24 VAC/VDC

Supply Current: 250 mA (6 VA)

Ethernet: 10-Base T

IP Assignment: Static or DHCP

Email: SMTP to two email addresses

Meter Pulse Input: Dry contact closure (1.0 mA load)

Data Logging CSV files:

Minute	- 1440 samples
Hour	- 744 samples
Day	- 366 samples
Week	- 53 samples
Month	- 12 samples

Data Logging Graphs:

Minute	- 60 samples
Hour	- 24 samples
Day	- 31 samples
Week	- 8 samples
Month	- 12 samples

Environmental: 10-90%RH non-condensing

Operating Temp: -40°F-125°F (-40°C-52°C)

Storage Temp: -40°F-150°F (-40°C-66°C)

Enclosure: UL 94V-5-O Polycarbonate plastic

Termination: Removable terminal blocks 16 Ga max, RJ-45 Ethernet jack

Weight: 0.5 lbs. (.25 kg)

CONFORMANCE & TESTING:

RoHS Compliant

FCC Testing -

- Rule Part 15, Subpart B - Unintentional Radiators Class B Limits 15.107 & 15.109

EMC/EMI Testing -

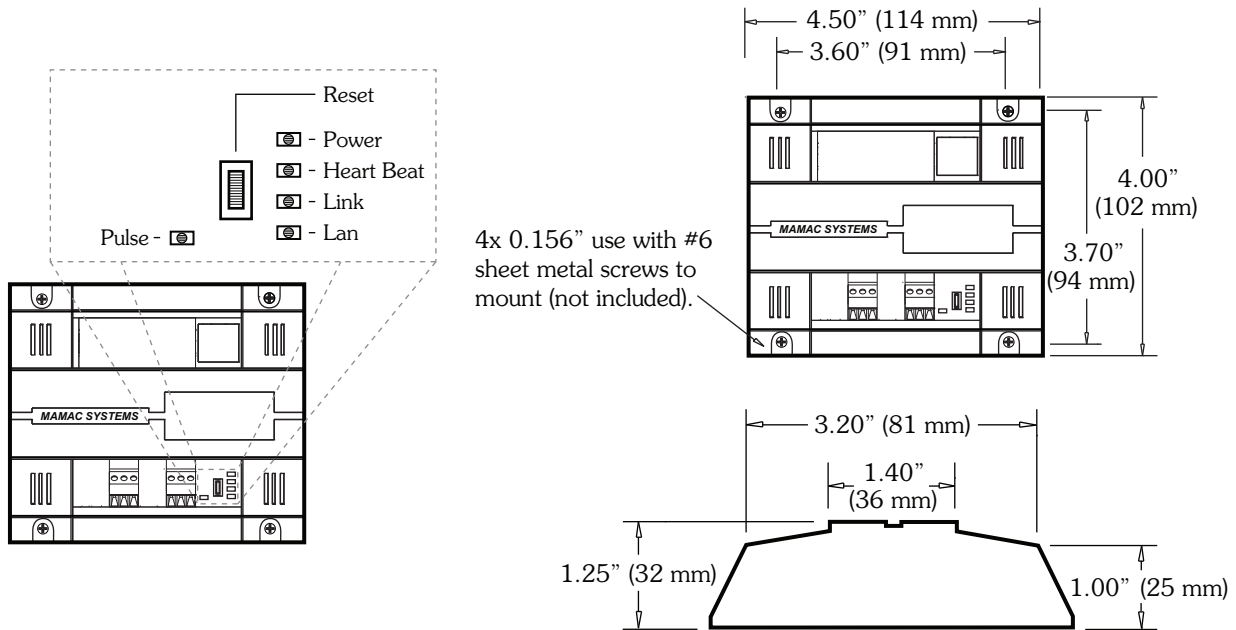
- BS EN 55022:1998, CISPR 22:1997 Amendments 1 & 2
- BS EN 55024:1998 CISPR 24:1997 Amendments 1 & 2
- EN 61000-3-3: Limitations of voltage fluctuations and flicker in low-voltage supply systems <16A
- EN 61000-4-2: Electrostatic Discharge (ESD)
- EN 61000-4-3: Radiated, radio frequency, Electromagnetic field immunity test
- EN 61000-4-4: Electrical Fast Transient/burst immunity test (EFT)
- EN 61000-4-5: Surge Immunity Test (Mains)
- EN 61000-4-6: Immunity to conducted disturbances, induced by radio frequency fields
- EN 61000-4-11: Voltage dips, short interruptions & voltage variations immunity test

ORDERING INFORMATION: IP-SM-101

SUB METERING APPLIANCE XML:

The *Maverick* Sub Metering data displayed on the main page is available in XML format by requesting: <http://192.168.1.10/sm101.xml>. A complete listing is also available in the SM-101 Installation Instruction - IS-IPSM101.1. Additional programming information for AJAX, JAVA and VB 6 is available in TI-IPPC101.1 and TI-IPPC102.1

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WARRANTY: MAMAC Systems, Inc. warrants its products to be free of defects in material and workmanship for a period of two (2) years from date of shipment. If a unit is malfunctioning, it must be returned to the factory for evaluation. A return authorization number (RMA) will be issued by the customer service department and this number must be written or prominently displayed on the shipping boxes and all related documents. The defective part should be shipped freight pre-paid to the factory. Upon examination by MAMAC Systems, Inc., if the unit is found to be defective, it will be repaired or replaced at no charge to the customer. However, this warranty is void if the unit shows evidence of being tampered with, damaged during installation, misapplied, misused, or used in any other operating condition outside of the unit's published specifications.

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