

41. Energy

This chapter explains how to setup Energy Demand Settings to monitor and record energy consumption and calculate future energy demands.

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41.1. Energy Demand Setting

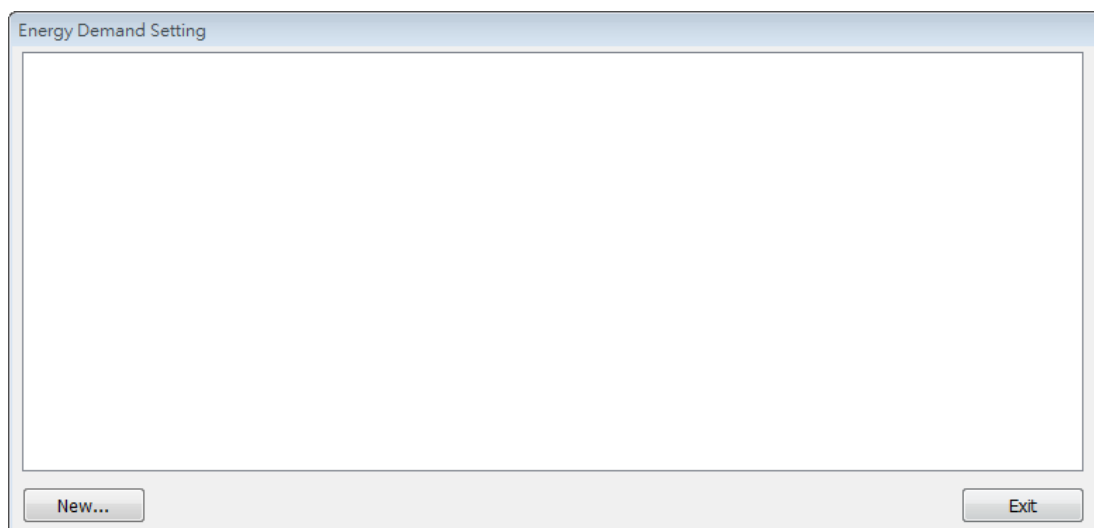
41.1.1. Overview

By monitoring the recorded energy consumption in a specified period, the Energy Demand Setting feature can calculate future energy demands, and help saving energy.

41.1.2. Configuration



Click [Data/History] and then click [Demand Setting] to open the settings dialog box. Configure General and Demand Threshold settings and click OK; an Energy Demand Setting object will be created.



General Tab

Setting	Description
Accumulative energy address	This address records energy consumption. The unit can be 0.1/0.01/0.001 kWh (kilowatt-hours).
Control	Giving control command 1 in the designated address can clear the energy consumption record.
Demand update frequency	The frequency to record energy consumption, the range is from 1 to 60 minutes.
Demand duration	The frequency to calculate energy demand. The range is from 1 to 60 minutes.

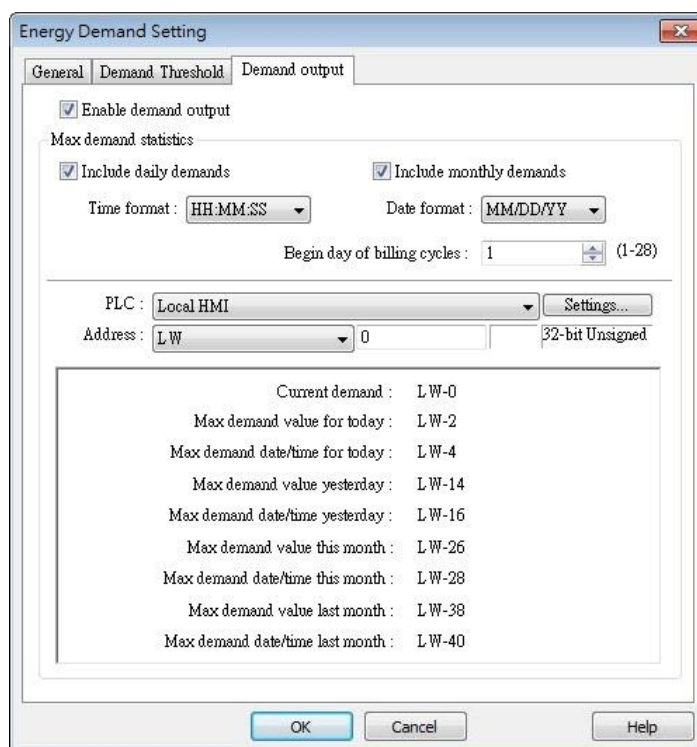
Note

- Please note that Demand Duration (T) must be an integral multiple of Demand Update Frequency (t).

Demand Threshold

Setting	Description
Threshold	When the values in the specified addresses reach the values specified in Warning and Alarm fields, the warning and alarm will be triggered. The threshold limits can be dynamically changed at runtime.
Notification	When the estimated energy demand reaches the threshold limit, the status of the specified bit address will change accordingly.
Follow	If selected, when the estimated energy demand falls less than the threshold limit, the status of the notification bit address will return to its original state.

Demand Output



Setting	Description
Enable demand output	Opens [Max. demand statistics] settings.
Max demand statistics	The maximum energy demand of today/yesterday, and current month/last month, can be recorded in the corresponding addresses. The time/date format, and the beginning day of the billing cycle, can be specified.

41.2. Energy Demand Display

41.2.1. Overview

Energy Demand Display object graphs the result from Energy Demand Setting object at runtime.

The font, grid and watch line style can be specified, and the threshold limits can be shown in the graph.

41.2.2. Configuration



Click [Data/History] and then click [Demand Display] to open the settings dialog box. Configure the attributes and click OK; an Energy Demand Display object will be created.

General Tab

The screenshot shows the 'New Energy Demand Display Object' dialog box with the 'General' tab selected. The dialog is divided into several sections:

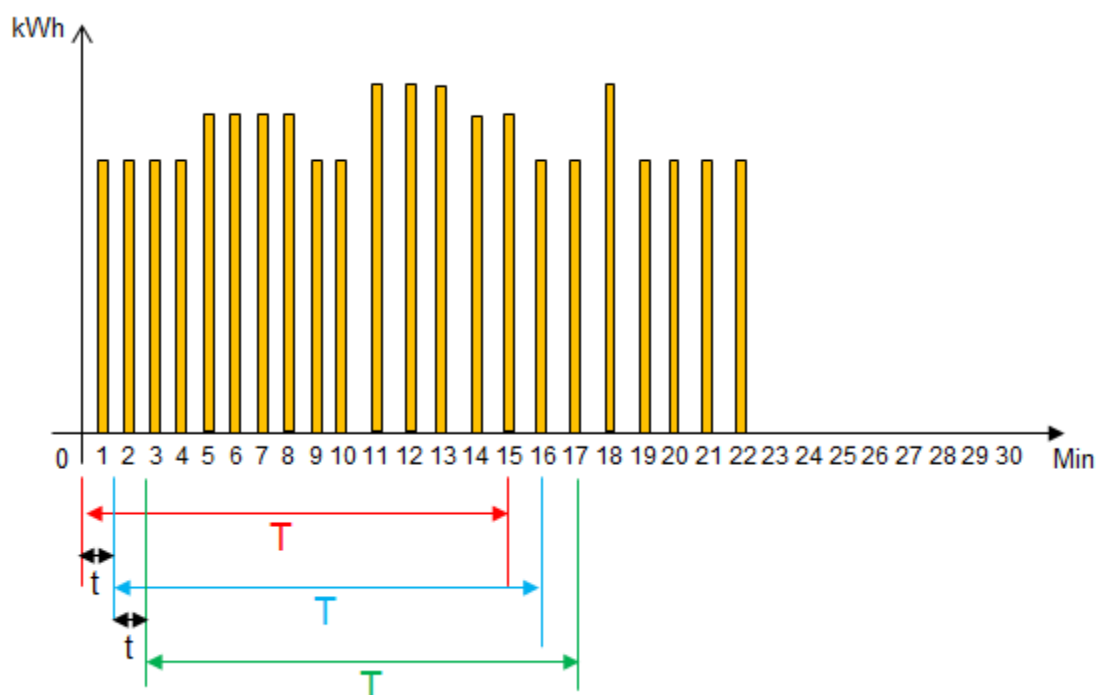
- General:** Contains a preview chart showing a blue line graph on a grid. The Y-axis ranges from 0.0 to 1000.0, and the X-axis shows time intervals (06/0, 06/0, 06/0, 06/0, 06/0, 06/0).
- Chart:** Includes dropdown menus for 'Demand setting' (set to 1), 'Time format' (HH:MM:SS), 'Date format' (MM/DD/YY), 'Grid' (black), 'Frame' (grey), and 'Background' (blue).
- X axis:** Features 'Division' (5), 'Duration' (30 minute(s)), and 'Latest position ratio' (90).
- Y axis:** Features 'Division' (5), 'Minimum' (LW-0), and 'Maximum' (LW-1).
- Dynamic:** A checked checkbox.
- PLC:** A dropdown menu set to 'Local HMI' with a 'Settings...' button.
- Address:** A dropdown menu set to 'LW' and a text field containing '0', with a '16-bit Unsigned' label.
- Scale text:** Includes 'Font' (Arial [Arial] [Droid Sans]) and 'Color' (black).
- Line:** Includes a dropdown menu set to 'Demand', 'Line type' (Solid line), 'Line width' (1), and 'Color' (blue).

At the bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

Setting	Description
Object index	Select an existing Energy Demand Setting object as the data source of Energy Demand Display object.
Time/Date format	Set Time and Date format.
Chart	Set the colors of Grid, Frame, and Background.
X axis	Set the number of divisions and time duration on the X axis. Latest position ratio: The ratio represents a position along the X axis, where 50% represents the middle and 100% represents the right end. This field sets the position to mark the latest data, and the acceptable range is: 50%~100%.
Y axis	Set the number of divisions, maximum and minimum scale values on the Y axis. The limits can be changed dynamically at runtime.
Scale text	Set the font and color of the scale text.
Line	Three watch lines marking Demand, Alarm, and Warning can be shown. The type, width, and color of the lines can be customized.

Example 1

The following example illustrates the relationship between Demand Duration (T) and Demand Update Frequency (t) mentioned in Energy Demand Setting guide above.



1. As shown in the above figure, when $t=1$, the frequency to record energy consumption will be once per minute. When $T=15$, each 15 minutes the sum of the energy consumption measured every minute ($t=1$) will be calculated.
2. From the 1st to the 15th minute (red zone), the energy consumption measured each minute will be added up to get the total sum. The total sum times 4 (15 minutes is a quarter of an hour) to obtain a value (kWh) indicating the estimated energy demand.
3. From the 2nd to the 16th minute (blue zone), the energy consumption measured each minute will be added up to get the total sum. The total sum times 4 (15 minutes is a quarter of an hour) to obtain a value (kWh) indicating the estimated energy demand.
4. From the 3rd to the 17th minute (green zone), the energy consumption measured each minute will be added up to get the total sum. The total sum times 4 (15 minutes is a quarter of an hour) to obtain a value (kWh) indicating the estimated energy demand.
5. The Energy Demand Display object will graph the estimated energy demand.
6. If $t=3$ and $T=15$, the estimated energy demand will be: Sum of the latest 5 records ($15/3=5$) times 4 (15 minutes is a quarter of an hour).
7. If $t=5$ and $T=30$, the estimated energy demand will be: Sum of the latest 6 records ($30/5=6$) times 2 (30 minutes is half an hour).



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