Statistics

> **Note!**
> The described functionality is available for CLU version 5.14.1 or higher.

Statistics

Description and configuration of statistics functionality

The statistics functionality enables:

- displaying energy consumption calculated based on the device's operating time and receiver power,
- displaying data from sensors read directly from devices within the system,
- displaying configurable data sent from dedicated virtual objects.

Data is recorded every 15 minutes (starting from the full hour as per the CLU clock) and displayed in the myGrenton mobile application. The application displays detailed charts illustrating the collected data (energy consumption, sensor readings). Measurements can be displayed in various time ranges, such as hours, days, or months. Additionally, the myGrenton application provides clear summaries for quick insights into key information without delving into detailed data.

Measurement statistics can be configured for:

- output objects (`DOUT`, `DIMM`, `LEDRGBW`, `ZWAVE_DOUT`, `ZWAVE_LED`),
- input objects (`DIN`, `ZWAVE_DIN`) - operating in either continuous mode (tracking operating time) or pulse mode (counting pulses detected on the binary input),
- sensors (`TEMPERATURE_SENSOR`, `LIGHT_SENSOR_LUX`, `HUMIDITY_SENSOR`, `PRESSURE_SENSOR`, `AIR_CO2_SENSOR`, `AIR_VOC_SENSOR`, `SOUND_SENSOR`, `PANELSENSTEMP`, `ONE_WIRE`, `ZWAVE_1W_SENSOR`),
- virtual objects `Statistics`, `StatistcsPulse`.

> **Note!**
> Real media measurement is available only for RELAY 2HP REL-202-D-01 and RELAY 4HP REL-204-D-01.

> **Note!**
> Measurement statistics from the temperature sensor are available for Smart Panel modules version v6 and higher, as well as for Touch Panel modules version 1.0.1 and higher.

A. Obtaining a unique measurement key

To obtain a unique measurement key:

1. Create an account and log in at https://grenton.cloud/pl.
2. Create a new statistics configuration.
3. Once created, the system will generate a **unique measurement key**, required to activate the function in the CLU module.

After obtaining the measurement key, you can proceed with the setup in the Object Manager.

B. Creating a configuration in Object Manager

> **Note!**
> To use the statistics functionality, the CLU must have an active connection to the cloud. Ensure that:
>
> - the built-in feature `CloudConnection` is set to True,
> - the CLU has internet access.
>
> **A lack of cloud connection will prevent the media measurement functionality from working correctly.**

To enable the functionality:

1. Go to the *Embedded Features* tab of the CLU object.
2. Enter the unique measurement key in the initial value of the `MeasurementKey` feature (see section X.1.1.A).
3. Navigate to the *Embedded Features* tab of the media measurement object.
4. Set the `StatisticState` feature to:
    - `Real` or `Continuous` for output objects,
    - `Continuous` or `Pulse` for input objects,
    - `On` for sensor objects,
    - the appropriate value depending on the measurement type for the virtual objects `Statistics` and `StatisticsPulse`.
5. For virtual media measurement (`Continuous` or `Pulse`) in input and output objects, the `Load` feature will appear - set its initial value to the device's active power consumption in watts per hour.
6. Confirm with the *OK* button.
7. Add measurement settings for additional modules - repeat the steps above.
8. Send the configuration to the CLU.

> **Note!**
> To collect measurements from multiple CLUs, the same unique measurement key should be entered into all CLU units in the project with the `MeasurementKey` feature.

C. Mapping object names

The object name mapping functionality allows for customizing object names displayed in the myGrenton application. Users can assign names consistent with Object Manager settings or give them any custom names for greater intuitiveness.

To configure object name mapping:

1. On https://grenton.cloud/en, edit the previously created configuration.
2. Load the project from Object Manager in the corresponding object name mapping tab. **Ensure that measurement has been configured for the relevant objects in the selected project.**
3. Assign names to objects:
    - keep the automatically set names matching those in Object Manager,
    - alternatively, enter custom, more readable names.
4. Save the configuration.

The saved names will appear in the myGrenton application, aiding in object identification during data review or system management.

Reading statistics in the myGrenton application

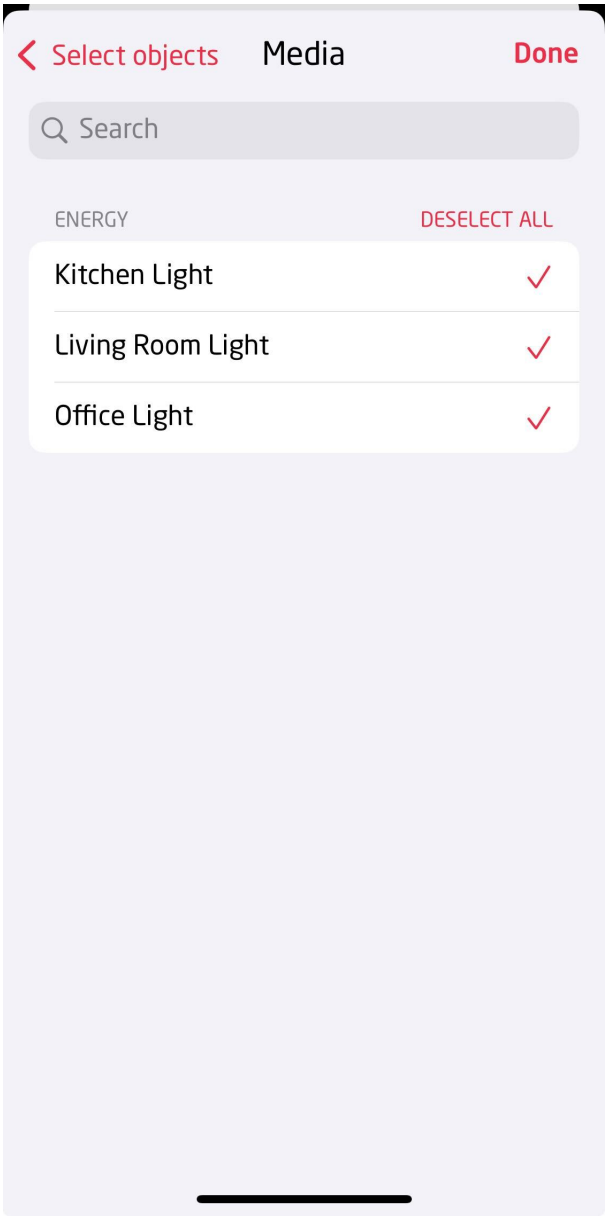
> **Note!**
> Statistics are available in the myGrenton application version 1.13.0 (Android) / 1.15.0 (iOS) or higher.
> To read measurement statistics, the mobile device must have internet access.

To read measurement statistics in the myGrenton application:

- Ensure that a configuration containing the unique key has been sent to the CLU. The key is generated during configuration on https://grenton.cloud/en and is essential for proper data retrieval.
- Enable the functionality in the interface settings – in the myGrenton application, activate function by toggling the Statistics switch in the interface settings. Enabling this option will add a statistics tab on the last page of the interface.

After enabling the function, navigate to the Statistics tab in the application. The following options are available on the tab:

- Selecting objects for data display (up to 5 objects):

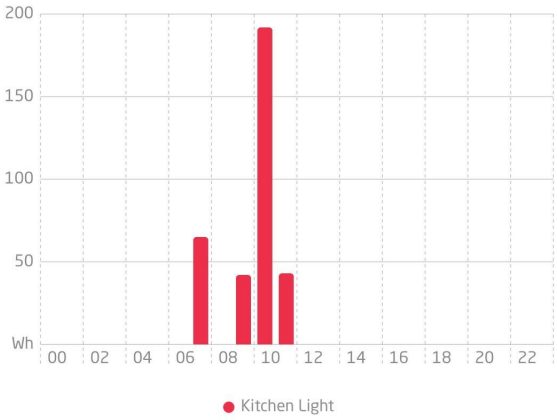


- Viewing detailed graphs representing data from selected objects. Graphs can be viewed for various time periods: day (hours), week, month (days) and year (months):

Back Statistics Kitchen Light

Day Week Month Year

Today



DAILY CONSUMPTION

342 Wh

Updated at: 11:47

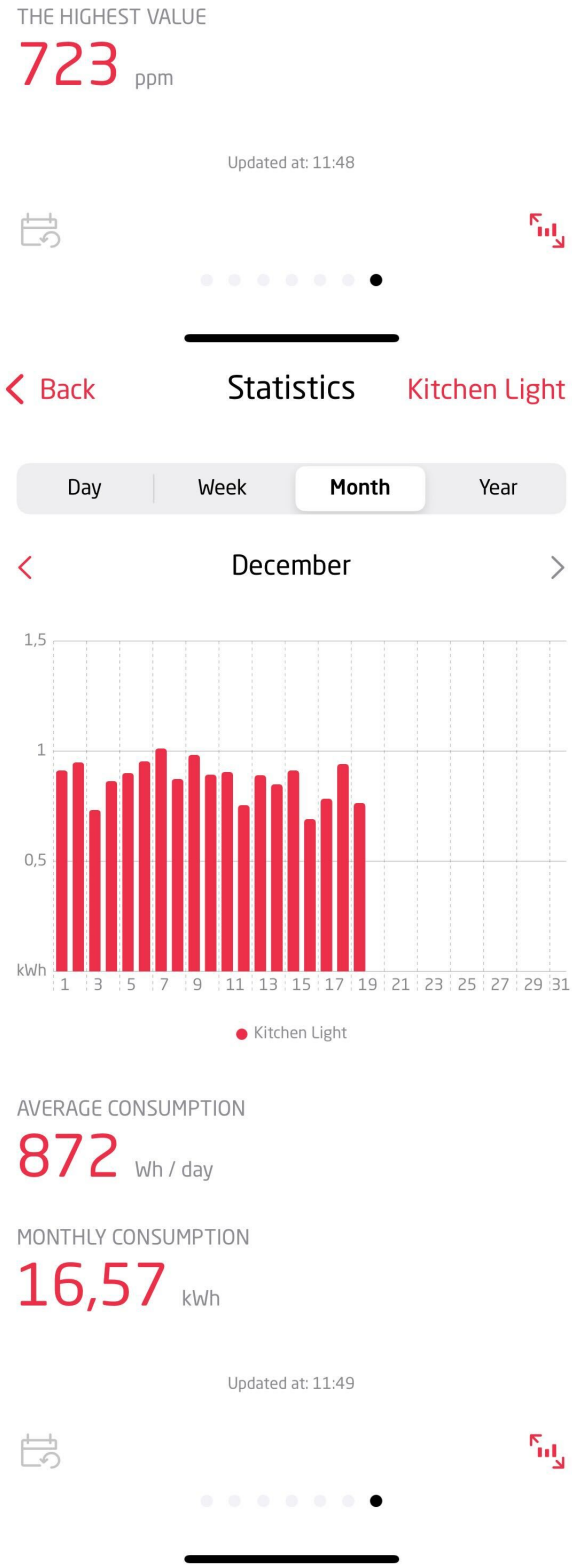
Back Statistics Living Room CO...

Day Week Month Year

Today

AVERAGE VALUE

471 ppm



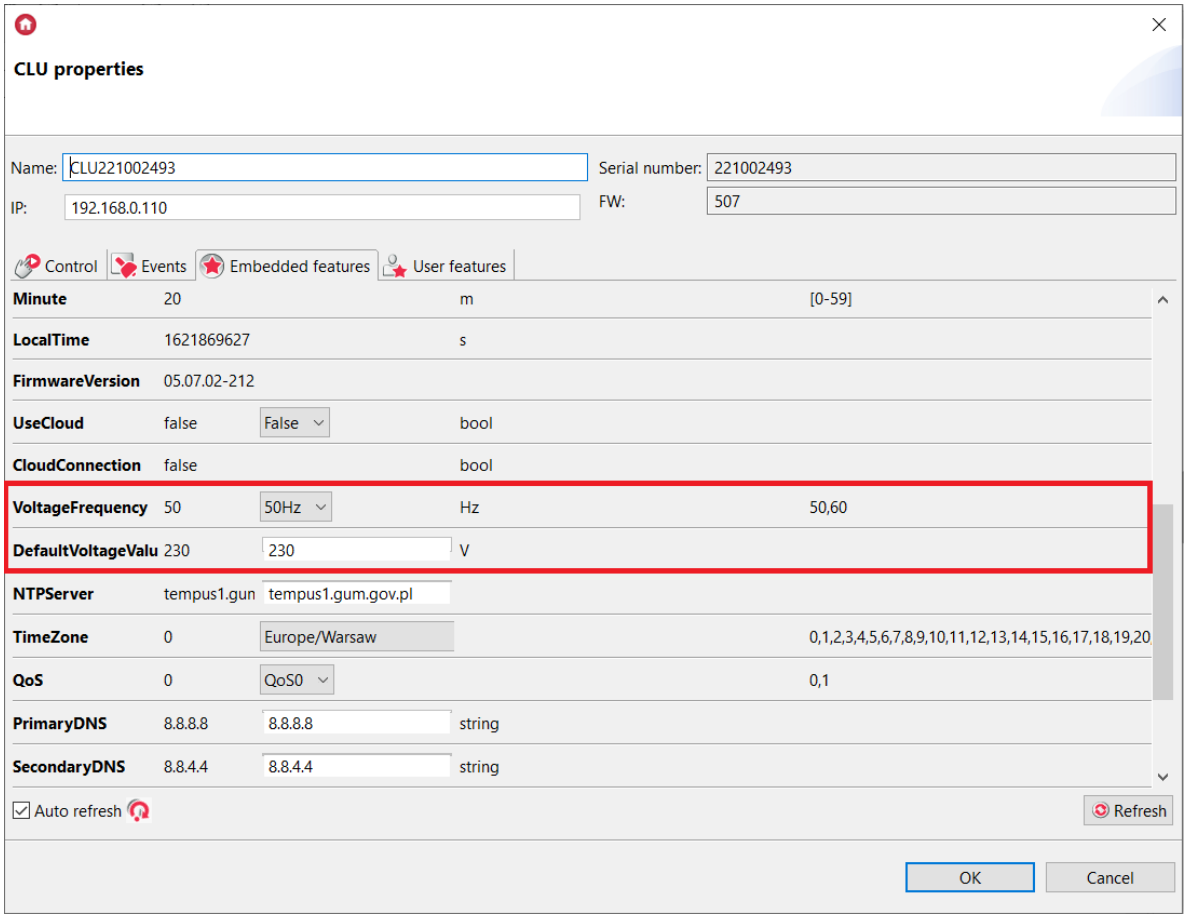
- Viewing summaries containing key information about the collected data.
- (for iOS application) Buttons for navigating to the current day and displaying the graph in full-screen mode.

Real media measurement

> **Note!**
> Real media measurement is only available for modules of the Grenton 2.0 series: GRENTON RELAY 2HP (DIN), GRENTON RELAY 4HP (DIN), GRENTON ROLLER SHUTTER (DIN), GRENTON ROLLER SHUTTER (Flush), GRENTON I/O MODULE 2/2(Flush).

Real media measurement settings in Object Manager

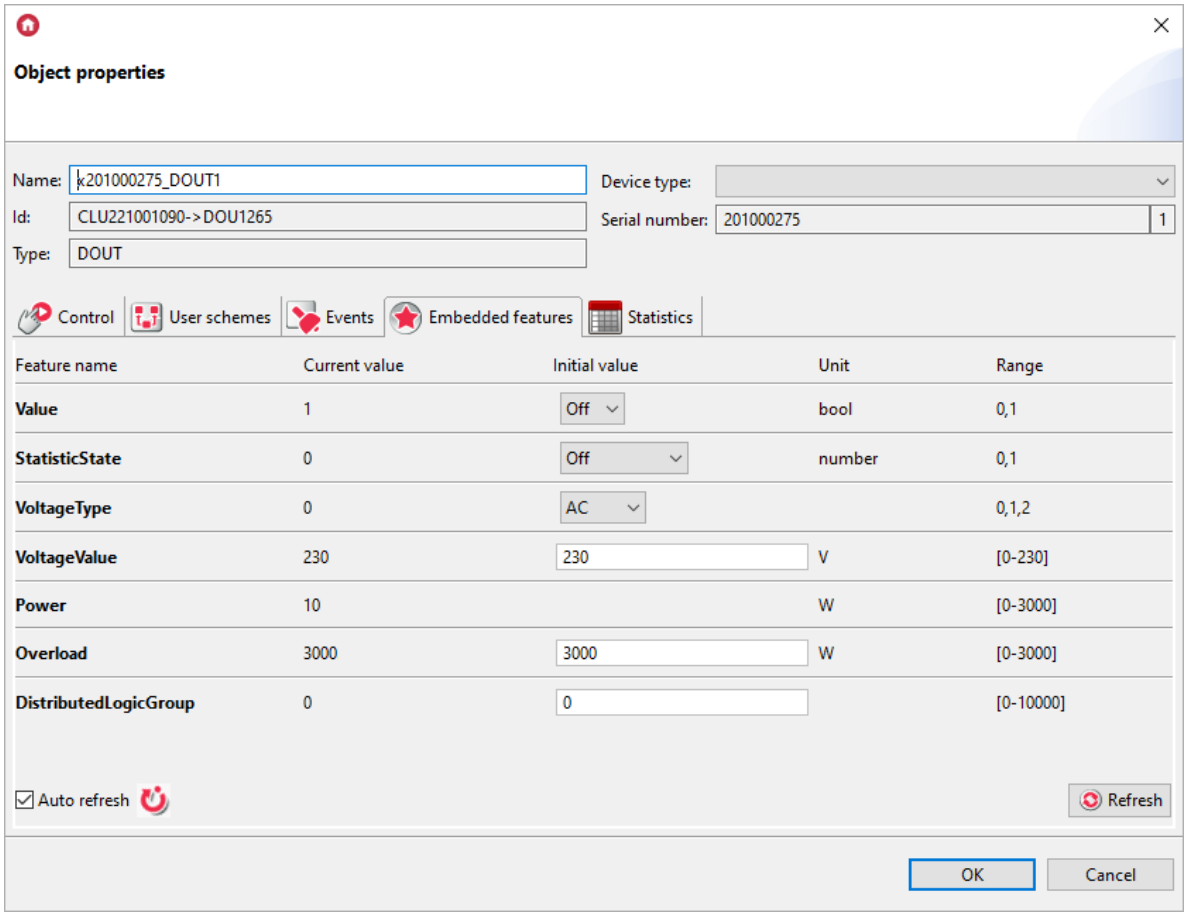
Object Manager allows you to carry out media measurement, which allows real presentation of consumed energy (based on the `VoltageValue` and `VoltageType` parameters of the device). The configuration of media measurement is done in OM and should be parameterized for each output separately. In order for the media to be measured correctly, it is necessary to determine the electrical parameters of the network to which the entire system is connected. For this purpose, in the embedded features of the CLU module, define the frequency (`VoltageFrequency`) and the rated voltage (`DefaultVoltageValue`) of the network.



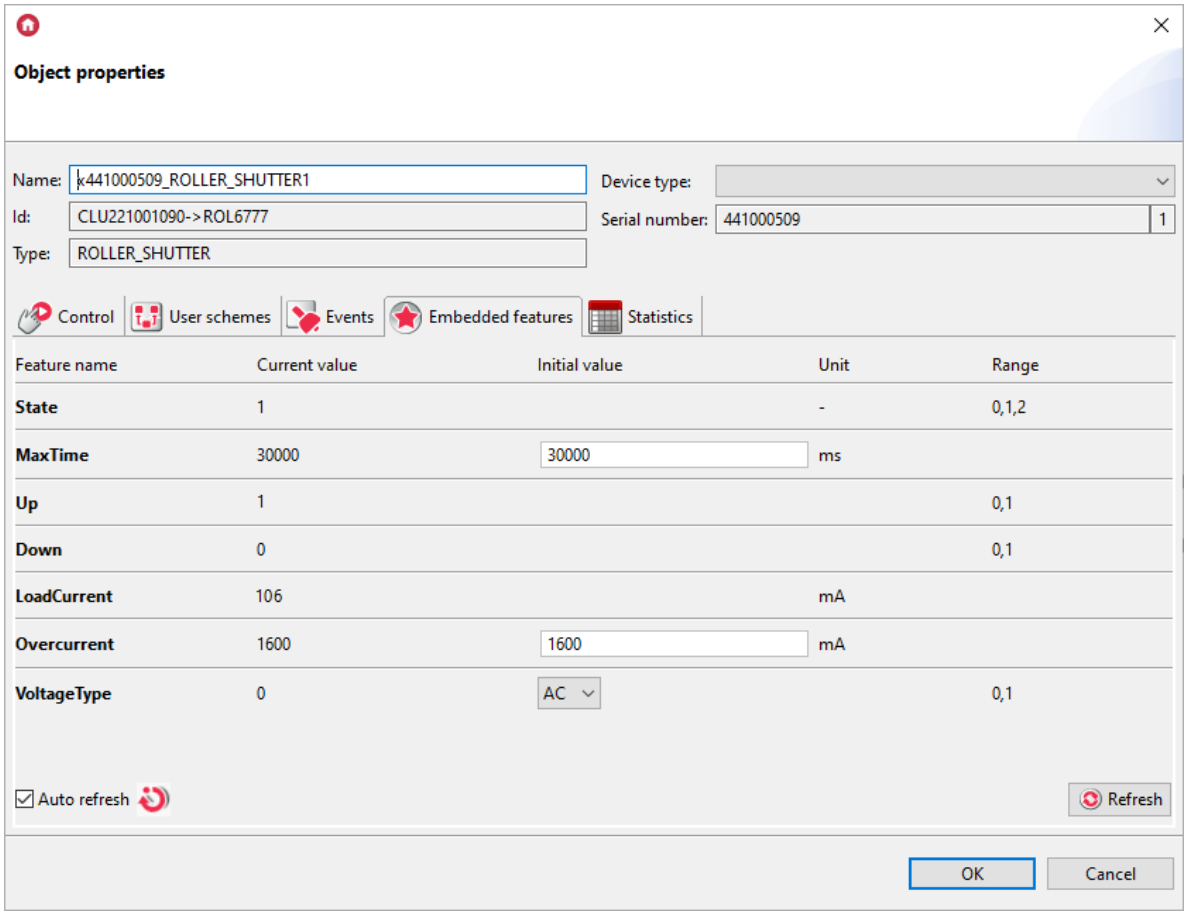
Media measurement is recorded in real time. `Power` features are expressed in watts for relay output modules and `LoadCurrent` are expressed in milliamperes for blind drive control modules.

The `VoltageType` feature takes the values:

- For DOUT objects: 0-AC, 1-DC, 2-Signal



- For ROLLER SHUTTER objects: 0-AC, 1-DC



Statistics

The Statistics virtual object enables adding measurement values to the statistics module, taking into account their category and type. A measurement can be recorded as an average, continuous, or differential value and processed at regular intervals (every 15 minutes). The collected data can be presented in the myGrenton mobile app.

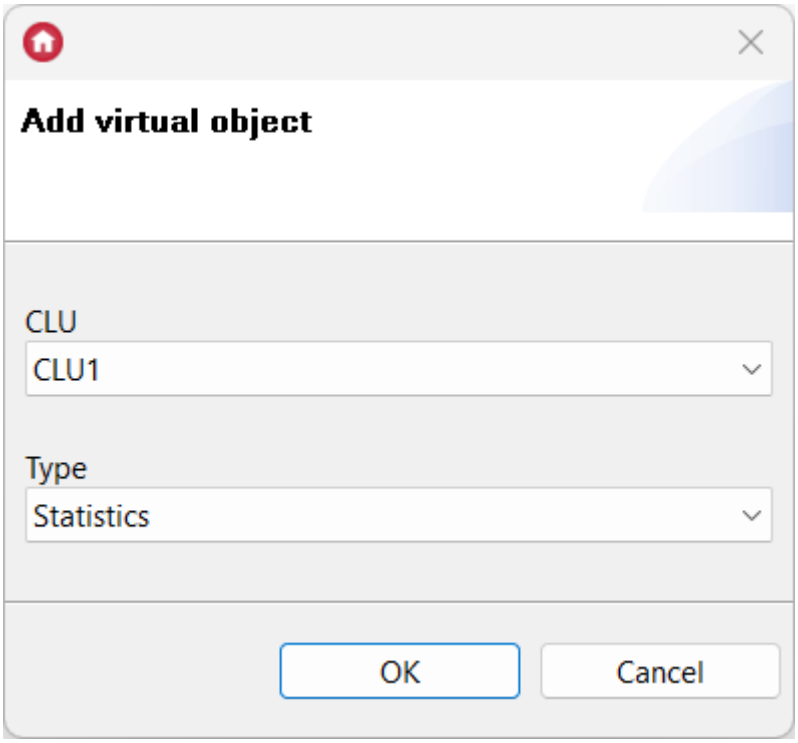
> **Note!**
> Proper functioning of the virtual object requires configuration of the statistics, which is described here: X. Statistics.

> **Note!**
> To use the Statistics object functionality, CLU-Z version 5.15.01 or higher is required.

A. Creating the Statistics object

To create the object, select the CLU in which it should be placed, then from the top menu, choose `Add CLU Object`.

In the opened selection window, find and choose `Statistics`.



After confirmation, a window will open with three tabs:

- **Control**
- **Events**
- **Embedded features**

B. Measurement calculation methods

The calculation method for the measurement value send to the statistics is determined by the configuration of the embedded features of the virtual object. The following methods are available:

- Average – the value is calculated as the average of the data collected over a 15-minute interval. The calculation requires at least one measurement (the `SetValue` method call) after restarting the CLU-Z unit. If there is no change in the value for a 15-minute interval, the value from the previous interval will be used.
- Continuous – the value calculated based on the `Load` embedded feature (load in Watts) and the `Value` embedded feature (simulates the on state of the object in the range from 0.0 to 1.0). If there is no change in the value for a 15-minute interval, the measurement value of that interval will be 0.
- Difference (Energy) – the value is calculated based on the difference between the last and the first set values during the 15-minute interval. The calculation requires at least two positive changes (the `SetValue` method call) after restarting the CLU-Z unit. Setting a value lower than the current one will be ignored (to prevent errors in the graphs). If there is no change in the value for a 15-minute interval, the measurement value of that interval will be 0.
- Difference (Charging) – the value is calculated based on the difference between the last and the first set values during the 15-minute interval. The calculation requires at least two positive changes (the `SetValue` method call) after restarting the CLU-Z unit. Setting a value less than the current value of the object will result in the next difference being calculated from this value. If there is no change in the value for a 15-minute interval, the measurement value of that interval will be 0.

Object configuration and calculation methods table:

Object configuration	Calculation method
`StatisticsState` = Media (1)	Continuous
`StatisticsState` = Sensor (4) + `StatisticTypeSensor` = Temperature (0) + `StatisticTypeSensor` = Humidity (1) + `StatisticTypeSensor` = Lux (2) + `StatisticTypeSensor` = Pressure (3) + `StatisticTypeSensor` = CO2 (4) + `StatisticTypeSensor` = VOC (5) + `StatisticTypeSensor` = Sound (6) + `StatisticTypeSensor` = Average Value (18) `StatisticsState` = Grid (5) + `StatisticTypeGrid` = Power (7) + `StatisticTypeGrid` = Voltage (8) + `StatisticTypeGrid` = Reactive Power (9) `StatisticsState` = Energy Production (6) + `StatisticTypeEnergyProduction` = Power (7) `StatisticsState` = Energy Storage (7) + `StatisticTypeEnergyStorage` = Battery Level (15) `StatisticsState` = Charger (8) + `StatisticTypeCharger` = Power (7) `StatisticsState` = Other (9)	Average
`StatisticsState` = Grid (5) + `StatisticTypeGrid` = Energy Consumption (20) + `StatisticTypeGrid` = Energy Export (11) `StatisticsState` = Energy Production (6) + `StatisticTypeEnergyProduction` = Energy Production (12)	Difference (Energy)
`StatisticsState` = Energy Storage (7) + `StatisticTypeEnergyStorage` = Energy Charging (13) + `StatisticTypeEnergyStorage` = Energy Discharging (14) `StatisticsState` = Charger (8) + `StatisticTypeCharger` = Energy Charging (13)	Difference (Charging)

C. Configuration Parameters of the Statistics Object

FEATURES

Name	Description
`Value`	The measurement value is calculated and sent as a statistic to the server every full 15 minutes. For 'Media' measurement – set the value within the range of 0.0 to 1.0 (the energy consumption will be automatically calculated based on the Load value). For 'Sensor', 'Battery Level', 'Voltage', 'Power', 'Reactive Power' and 'Other Average Value' measurements – set the current value (the average value will be calculated automatically).For 'Energy' measurements – set the current total energy value in watt-hours (the difference will be calculated automatically).
`StatisticsState`	Enables measurement reporting to the statistics and defines the measurement category. Warning! Once a statistic is sent, it remains in the statistics history on the server. It is possible to manually delete statistics from the cloud account panel. Off - Statistics are not sent to the cloud.

Depending on the selected type of `StatisticsState`, the following features appear:

Name	Description
`Load`	The load value in watts.
`StatisticTypeSensor`	Statistics are sent based on the calculation of the average value of the Value feature over a 15-minute period.
`StatisticTypeGrid`	For energy measurement, statistics are sent based on the difference in the Value feature over a 15-minute period. The Value feature should be updated with the total energy value in watt-hours. For other measurement types, the average value over a 15-minute period is calculated.
`StatisticSubtypeGrid`	Measurement subcategory. It can be a general measurement or a specific phase: L1, L2, or L3.
`StatisticTypeEnergyProduction`	For energy measurement, statistics are sent based on the difference in the Value feature over a 15-minute period. The Value feature should be updated with the total energy value in watt-hours. For other measurement types, the average value over a 15-minute period is calculated.
`StatsticTypeEnergyStorage`	For charge level measurement, the average value over a 15-minute period is calculated. For charging and discharging energy measurement, statistics are sent based on the difference in the Value feature over a 15-minute period. The Value feature should be updated with the total energy value in watt-hours.
`StatisticTypeCharger`	For energy measurement, statistics are sent based on the difference in the Value feature over a 15-minute period. The Value feature should be updated with the total energy value of the current charging session in watt-hours. For other measurement types, the average value over a 15-minute period is calculated.

METHODS

Name	Description
`SetValue`	Sets the Value feature.

EVENTS

Name	Description
`OnValueChange`	Event occurs after the Value feature changes.

StatisticsPulse

The StatisticsPulse virtual object enables adding measurement values to the statistics module based on pulses (e.g., from a water meter or an energy meter), sent every 15 minutes. The collected data can be presented in the myGrenton mobile app.

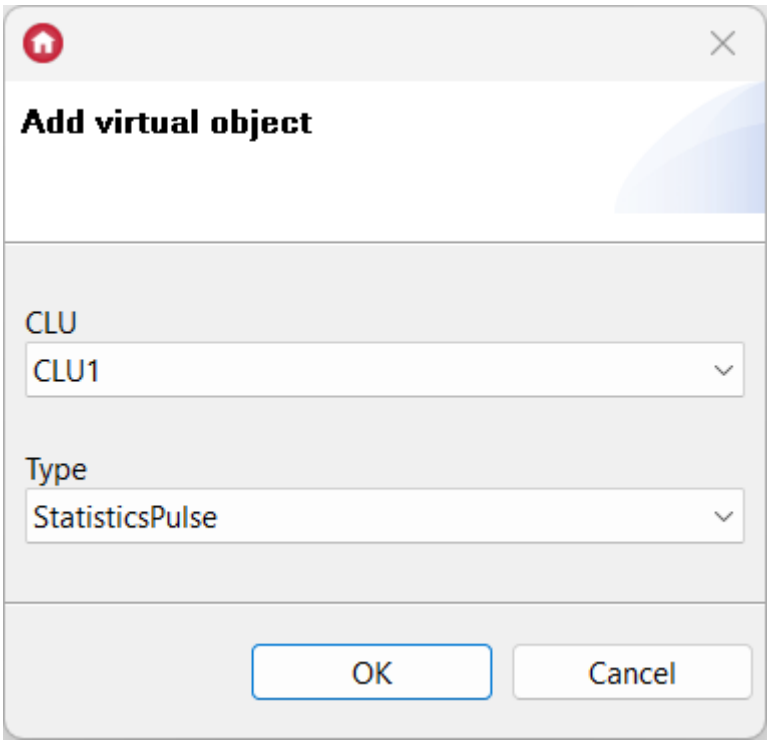
> **Note!**
> Proper functioning of the virtual object requires configuration of the statistics, which is described here: X. Statistics.

> **Note!**
> To use the StatisticsPulse object functionality, CLU-Z version 5.15.01 or higher is required.

A. Creating the StatisticsPulse object

To create the object, select the CLU where it should be added, then from the top menu, choose `Add CLU Object`.

In the selection window, find and choose `StatisticsPulse`.



After confirmation, a window will open with three tabs:

- **Control**
- **Events**
- **Embedded features**

B. Measurement calculation methods

Only one calculation method is available for this object:

Pulse – the value is calculated based on the `Load` embedded feature (in Watts or cubic meters) and the number of impulses (number of `TriggerPulse` method calls). The `Value` embedded feature represents the interval value that will be sent to the statistics. If there is no change in the value for a 15-minute interval, the measurement value of that interval will be 0.

C. Configuration Parameters of the StatisticsPulse Object

FEATURES

Name	Description
`Value`	The measurement value is calculated and sent as a statistic to the server every full 15 minutes. Use the TriggerPulse method to add another value to the measurement. For 'Media' measurement – the Load feature value will be added to the counter. After sending the value to the server, the counter is reset.
`StatisticsState`	Enables measurement reporting to the statistics and defines the measurement category. Warning! Once a statistic is sent, it remains in the statistics history on the server. It is possible to manually delete statistics from the cloud account panel. Off - Statistics are not sent to the cloud.

Depending on the selected type of `StatisticsState`, the following features appear:

Name	Description
`Load`	The value per pulse in watts or cubic meters.
`StatisticTypePulse`	Statistics are sent based on pulse counting using the `TriggerPulse` method, and the declared value for one pulse expressed in watts or m^3. The Value represents the current value to be sent to the server.

METHODS

Name	Description
`TriggerPulse`	Triggers a pulse for a Pulse measurement type or for a pulse counter.

EVENTS

Name	Description
`OnPulseTriggered`	Event occurs after a pulse is triggered.