

Manual: QA Consumption Control

Energy management application for real-time control of appliances according to the values from the inverter, the photovoltaic production forecast and the house load forecast.

Introduction

QA Consumption Control is the central application for Energy Management. It enables efficient self-consumption of surplus PV energy — it controls the connected appliances so that the surplus power and energy are consumed even before the battery is fully charged or, in zero-export installations, are used directly in the load as much as possible.

The application works with three inputs: the current values from the inverter (per phase), the irradiance forecast from an external service and its own production and consumption statistics. From these it calculates the overproduction forecast for the following day and controls the operating mode of the inverter and the appliances connected to Energy Management.

For each appliance it respects the control type (on/off, continuous, stepped), the number and connection of the phases (single-phase, three-phase and phase-to-phase), the priority and the time parameters for its protection (minimum on/off time, power increase and decrease delay). For each device you can also choose whether it is to use only the production surplus over the current load, or also power from the battery. The application also works in installations without permitted grid export, detects load oscillation and limits the power of the appliances so that the battery is not unnecessarily overloaded, and respects the maximum load according to the main circuit breaker.

The application cooperates with Mervis SCADA for visualisation and with other QA applications of the Energy Management family — for spot prices, energy sharing, controlled wallboxes, DHW heating and more.

Upstream and downstream applications

Upstream applications

Mandatory:

- **QA Inverter** (any of the supported variants — GoodWe ET, Growatt SPH, RCT Power, SolarEdge SE, Solax X3-Hybrid G3 / G4 / ULTRA, Wattsonic GEN2 / GEN3) as the source of instantaneous power values and battery state. The application can also work with combinations of inverters (e.g. on-grid + retrofit) and imports the values needed for control from each of them.
- **QA PV Forecast** or **QA Solcast** as the source of the irradiance forecast for the overproduction calculation.

Optional cooperation with add-ons:

- **QA Spot Pro** for control according to spot electricity prices.
- **QA Energy Sharing Surplus / QA Energy Sharing Spot Single / QA Energy Sharing Spot Duo / QA Energy Sharing Apartment Buildings** for community energy sharing.

Downstream applications

QA Consumption Control does not control hardware directly — the output is always a compatible QA application that switches or continuously regulates a specific appliance on EMS commands:

- **QA DHW Boiler** and **QA DHW Boiler 2 Heating Elements 6SSR** for electric heating.
- **QA Wallbox**
- **QA Wallbox SPOT Planner** together with a specific wallbox (**QA Wallbox ABL eMH1**, **EcoVolter / EcoVolter II**, **Olife Energy**, **Solax EVC X3 / X3 G2**) for EV charging.
- **QA Heat Pump**, **QA Klimatizace Mitsubishi (Intesis)**,
- other QA applications compatible with the EMS system for appliance control.
- **Mervis SCADA** for visualisation, measurement history and graphs.

If information about the installation of any of the upstream QA applications is missing, the application limits certain functions (e.g. without an irradiance forecast source it cannot calculate the overproduction statistics).

Installation and initial setup of the QA

Installation

Purchase the application in the Smart Home and Energy e-shop (<https://eshop.smarthomeenergy.cz>). After the purchase you receive an e-mail with a link to the activation form, in which you choose one of the two installation methods:

- **Installation via the SHE Installation Application (recommended)** — the activation form provides a link to download the Installation Application. Install it into the unit; it then automatically downloads and installs the purchased licences. It provides automatic updates of all applications and easy licence management (requires the "superuser" credentials for the unit). See the separate "Installation Application" manual for details.
- **Standalone installation file** — the activation form provides links to download an encrypted *.fqax file bound to the entered unit S/N. Install the file manually into the unit according to the unit manufacturer's instructions (logged in as "superuser"). This option does not allow automatic updates.

After a successful installation, the main tile **Consumption Control** and the cards **Values overview**, **Energy overview**, **EMS Overview**, **EMS settings** and **Installation** appear on the unit desktop.

Operating prerequisites

- A Fibaro HC3 / HC3L or Yubii Home / Yubii Home Pro controller.
- At least one **QA Inverter** and an irradiance forecast application (**QA PV Forecast** or **QA Solcast**) are already installed in the unit.
- The QA applications for the appliances to be controlled by the EMS (boiler, wallbox, air conditioning...) are installed in the unit.
- The user has valid access to the unit.

Opening the application control card

To open the application card in a web browser, move the cursor over the application tile and click the **eye** icon in the top-right corner of the tile. The card detail with the current state and settings opens.

Warning: Not all cards and tiles are displayed to all users. Each user selects which cards and tiles are displayed on the Display Settings card (sheViewControl application) – levels **SHORT**, **ADVANCED** and **ADMIN**. If you cannot see a described card, check the settings on this card.

User settings

The application consists of the main tile **Consumption Control**, which displays the current operating mode, and several additional tiles for a detailed overview and configuration. To open the detail of each card, move the cursor over the tile and click the eye icon in its top-right corner.

In addition to these cards, the desktop also shows quick indicators of individual values (Self-sufficiency, Self-consumption, Pred.PV, Pred.Load, Battery SOC, inverter and load power per phase, daily sell / buy balance, state of the controlled devices and more). Their specific list depends on the installation configuration, the meaning is clear from the tile label and the value corresponds to the data the application further processes in the Overviews.

Initial setup procedure

1. Installation card — in this order:

- First set the **main circuit breaker** parameters (maximum phase current from the grid).
- Then, in the **Controls select** section, tick the functions the EMS is to perform in the given installation (consumption control by PV surplus, power control to QA Inverter, mode control from QA Spot / QA Energy Sharing, export power control). The options depend on which other QA applications are present in the installation.
- After saving, the values taken from the inverter (battery capacity, max power) are automatically loaded from the linked QA applications and the sources and control configuration is completed.
- The EMS cannot control appliances until the settings on the Installation card are configured correctly.

2. **EMS settings card** — select the mode (typically AUTO), set the battery limits (min / max SOC), the parallel mode parameters and, if applicable, the discharge mode and the Panels Production Limit mode.

3. **Values overview, Energy overview, EMS Overview cards** — are used only for monitoring the operation and checking that the control really responds to the current data.

Consumption Control card

The main tile of the application. It displays a graphical overview of the current state:

- control mode (for example AUTO-PARALLEL OPERATION, AUTO-DISCHARGE, SPOT-PV->DEVICE, AUTO-OFF),
- current and daily values of PV production, battery (SOC, charging / discharging power), house load per phase, export / import to / from the grid,
- also separately the individual controlled appliances with their current power.

The card also includes a graph of the forecast of production, load and energy surplus above the battery, for an easy check of how the EMS will consider deploying the appliances. Use the **Today** / **Tomorrow** switches to select the day for which the graph is displayed. The details of the other cards are opened from this tile.

Installation card

Used for the basic EMS configuration — main circuit breaker parameters, selection of control functions, definition of sources and output devices.

 **Warning: When saving settings, always wait until Run status changes to Running. Do not press SAVE before that.**

Recommended order of the initial card setup:

1. Setting of the main circuit breaker

- **Maximum phase current from the mains** — rated current of the main circuit breaker (A). Set it first; the EMS respects it as a hard limit during control.
- **Max Phase Power Grid** — the derived power input (W) is calculated automatically.

2. Controls select

Tick the functions the EMS is to perform in the given installation. The specific options depend on which other QA applications are installed in the unit – in an installation without QA Energy Sharing, the corresponding option is not ticked.

- **Consumption control by solar power surplus** – basic function: the EMS actively directs the production surplus to the connected appliances (boiler, wallbox, air conditioning...).
- **Power Control to QA Inverter** – via QA Inverter, the EMS can control the modes and power limits of the inverter (export limitation, battery charging / discharging control).
- **Mode control from QA Spot** – the EMS receives instructions from QA Spot Pro (deployment according to spot prices).
- **Mode control from QA Energy Sharing** – the EMS works with the energy sharing applications (ESG sets).
- **Export power control from QA Export power** – the EMS regulates the power exported to the grid according to instructions from the QA for power export.

3. SAVE and wait for Run status: Running

After pressing **SAVE**, wait until Run status changes to Running. Once Run status changes to Running, the following information is populated from the linked QA applications:

- **Inverter settings** – battery capacity, maximum inverter power per phase and total. The values are taken over automatically from the linked QA Inverter, are for information and cannot be edited manually.
- **Sources configuration** – list of the connected sources in the format Source ID, Type, Name, Priority (for example Type: inverter, Name: Wattsonic Inverter). The application can also work with several inverters (e.g. on-grid + retrofit) and imports the values needed for control from each of them.
- **Control configuration** – overview of the QA applications from which the EMS receives data or instructions: Solar Forecast QA (irradiance forecast), Inverter QA (inverter), Spot QA (spot prices), Sharing QA (community sharing).
- **Missing values** – check indicator; in the ideal state it displays “All required values available”. If something is missing, the specific values are listed here and the EMS restricts the corresponding functions.
- **EMS Output devices** – list of the appliances currently controlled by the EMS, in the format ID, Name, line:[phase], power:[power], controlType:[switch / continuous]. The EMS receives the data from the downstream QA applications (boiler, wallbox, fan coil...).

For every later change of an option in Installation, proceed in the same way – save and wait for Run status: Running, so that the configuration is loaded correctly.

EMS settings card

The main configuration card. It defines the operating mode and the parameters according to which the EMS decides when to operate the appliances.

Mode selection:

- **AUTO** – the application automatically selects the most suitable sub-mode according to the current situation (overproduction forecast, battery state, enabling of parallel operation / export / discharge / panel limitation).
- **MANUAL-OFF** – consumption control is deactivated.

Limits Settings:

- **Battery Charge Status Min** – below this SOC value, EMS control is off (battery charging has priority).
- **Battery Charge Status Max** – above this value, the export control / parallel operation modes are activated (the battery is no longer in priority charging mode).

Parallel Mode (simultaneous battery charging and use of the surplus for appliances, asymmetric inverters only):

- **Insensitivity band** – limits the EMS response to small power fluctuations and ensures control stability.
- **Power reserve** – the overproduction forecast must be higher than the current EMS consumption by at least this value for the mode to be activated.
- **Energy reserve Difference** – downward band in which the mode remains active (hysteresis, prevents unnecessary switching).

The **Enable Parallel**, **Enable Parallel Export** and **Enable Phased Export** buttons enable or disable the individual control modes. "Phased" is suitable for symmetric inverters without a battery, "Parallel" for asymmetric inverters after the battery is charged.

Discharge settings (zero-export installations, maximising energy use after the battery is charged):

- **SOC Min discharge / SOC Max discharge** — SOC limits within which the mode is active.
- **Discharging Power** — power at which the battery is deliberately discharged into the load to free up capacity for balancing surpluses.
- **Only by PV surplus** — choose whether the mode should be active only when overproduction is forecast, or permanently.

The **Enable discharge** button enables or disables the discharge mode.

Settings Panels Production Limit (zero-export installations where the inverter limits production after the battery is charged):

- **Battery SOC Minimum** — minimum SOC from which the mode starts to work.
- **Performance Added in Step** — the EMS gradually increases the load by this power to find out whether the inverter is able to increase production.
- **Minimum valid power added** — for the step to be considered successful, production must actually increase by at least this value.
- **Maximum Errors** — if production cannot be increased after this number of attempts, the test is paused.

The **Enable Production Panels Limit** and **Enable Export Restrictions** buttons enable or disable the respective control modes.

Changes are saved automatically.

Values overview card

Read-only. Summary of the current data from the inverter, forecasts and meters.

- **Prediction over production** — current irradiance forecast (W/m^2), sunrise / sunset time, energy passed through the battery today.
- **Inverter** — state (Ready, Error), validity of the PV and load statistics, export / panel production limitation, current battery charge (SOC + kWh), set SOC limits, maximum charging and discharging power.
- **Powers** — for each phase (R, S, T) and in total, the values of PV, battery, inverter, load, oscillation and meter. Used as the primary diagnostics of whether the EMS reads valid values from the inverter.

Energy overview card

Summary of cumulative energies in kWh for Today and Total since the start of measurement:

- **PV** — energy produced by photovoltaics.
- **Charging / Discharging** — energy to / from the battery.
- **Load** — total house consumption.
- **EMS Load** — the part of the load redirected by EMS control to the appliances.
- **Load without EMS** — the remaining normal consumption.
- **Sell / Buy** — balance with the distribution grid.

Below the summary is the **Energy overview devices [kWh]** section.

Used for evaluating the benefit of the EMS — comparing the "EMS Load" and "Sell" values shows how much energy the application redirected instead of supplying it to the grid.

EMS Overview card

Operating state of the EMS control itself — a diagnostic card.

- **EMS** — current mode and the "Ems Mode" state (Off / active subtype).

- **Status positive / negative** – verbal description of the current situation (e.g. “Not exporting power”).
- **External control mode** – information on whether the EMS receives instructions from the Spot application or from the energy sharing applications, or other external control inputs.
- **States** – summary of the current indicators: **Excess PV Energy Over Load, 1st stage even at low PV power, 1st stage from Battery Active, 1st stage from Battery from Grid Active, 1st stage from Grid Active, Forced Discharge Battery Active, 1st stage Permanently Enabled, 1st stage Permanently Active**, further **Battery Over Today, Power Export, Power Import, Battery Charging Limit** and **Power PV Over**, and their validity.
- **Prediction over production** – forecast in the time slices **Day Rest, Today from now, Today** and **Tomorrow** broken down into **PV, Load** and **Over**.
- **EMS Power [W]** – **Power available PV, Power available Total, EMS Load Power Available, EMS Power Current Total** and, for each phase (R, S, T), the values **Meter, Available** and **Power EMS**.

EMS operating modes

In the AUTO mode, the application automatically switches between several operating modes according to the forecast, the battery state and the enabling in EMS settings:

- **AUTO-OFF** – control inactive (typically below the minimum SOC or with an insufficient forecast).
- **AUTO-PARALLEL OPERATION** – simultaneous battery charging and use of the surplus for appliances (asymmetric inverters).
- **AUTO-EXPORT CONTROL PHASES** – phase control of the appliances so that the entire exported power is consumed (symmetric inverters without a battery).
- **AUTO-EXPORT CONTROL PARALLEL** – parallel control after the battery is charged (asymmetric inverters).
- **AUTO-PANEL PRODUCTION LIMIT** – for zero-export installations; tests the ability to increase production by gradually adding load.
- **AUTO-DISCHARGE** – for zero-export installations; discharges part of the battery into the load to free up capacity for balancing surpluses.
- **AUTO-SHARING-...** – set of modes for cooperation with the energy sharing applications (parallel, discharging, export control, device switch-off).
- **AUTO-SPOT-... / SPOT-...** – set of modes for cooperation with the Spot applications (on / off, use of PV power for devices, device off / on).

The current mode is always displayed on the main Consumption Control tile and in the EMS Overview.

Notes

- The EMS itself does not control the downstream devices directly — control must be performed via the downstream QA applications (DHW Boiler, Wallbox, Air Conditioning, Heat Pump ...), which have their own installation manual.
- Oscillation detection protects the battery from unnecessary cycling — if the application detects that the load is oscillating, it automatically limits the power of the appliances.
- For evaluating the long-term benefit, we recommend a connection to **Mervis SCADA** (value export, graphs, history).
- Before purchase, the functions can be verified in the trial version (TRIAL) for 2 days — the download link is in the product description in the e-shop.