

Manual: QA Energy Sharing Spot Duo

Mutual energy sharing between two sites with spot control — automatic decision-making according to the spot plans of both sites and allocation in the EDC.

Introduction

QA Energy Sharing Spot Duo extends systems with SHE spot control with mutual optimal energy sharing between **two sites** with photovoltaics that buy and sell on the spot market. The application compares the spot plans of both sites, determines energy surpluses and shortages and, if the economic advantage is sufficient (including the distribution fees), transfers energy from the site with a surplus to the other site — from direct production or from the home battery.

The shared energy is allocated to the other site according to the registration in the Energy Data Centre (**EDC**). The user thus saves on the purchase of the commodity at the other site and makes better use of their own production. The application always prefers the better economic result: it keeps energy primarily for own consumption and uses only the surplus for sharing, which is preferred in the spot plan over selling to the grid.

The application is installed at **both sites**; each site is both a production plant and a consumption location (CL). From the point of view of each installation, its own site is **Local** and the other site is **Remote**. Both installations exchange data (spot plans, battery state, measurements) via MQTT. The application controls the inverter export power (via the inverter QA) and optionally also passes requests to energy management (**QA Consumption Control**).

For clear visualisation and access to measurement history and graphs, we recommend connecting to Mervis SCADA.

Warning: The application requires the user to be registered in the EDC system as a production plant and a consumption location at both sites and a valid sharing licence (SSE) from Smart Home and Energy at both sites. The shared energy is allocated by the EDC according to the registration; the application only controls and evaluates the sharing.

Upstream and downstream applications

Upstream applications

Mandatory at both sites:

- **QA Spot Pro** — full SHE spot control; the application takes over the spot plan and prices.
- **Meter QA** (measurement of the site's consumption and supply) — source of the energy data in the quarter-hour.
- **QA Energy Sharing Spot Duo** at the other site — the counterpart for mutual energy sharing.

Downstream applications

Mandatory:

- **Inverter QA** with the export power control function — through this QA the application controls the export power to the grid (option **Power Control to QA Inverter**).

Optional:

- **QA Consumption Control** — energy management; with the **Power Control to QA EMS** option, the application also passes the sharing requests to the control of local appliances.

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 application is installed into the unit automatically and allows future automatic updates. Requires the “superuser” credentials for the unit. See the separate “Installation Application” manual for details.
- **Standalone installation file (*.fqax)** — 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.

A trial version (TRIAL) is available on request — contact Smart Home and Energy support.

The application is installed into the controller at each of the two sites. After a successful installation, the following are displayed on the unit desktop in the **Sharing** section:

- a set of cards (tiles): **Sharing Control spotToSpot** (main card), **Energy overview**, the remote site card (tile with the serial number of its unit, e.g. HC3-00038674), **Consumption Locations**, **Sharing Settings**, **SSE Installation** and **Installation**,
- value tiles (**Period time**, **Battery SOC**, **Battery Remote**, power setpoints and target energies of import and export for the local and the remote side, import and export energy in the period).

Operating prerequisites

- **Controller:** Fibaro HC3 or HC3L (or Yubii Home / Home Pro) at both sites.
- Fully functional **SHE spot control (QA Spot Pro)** at both sites, a compatible inverter with an inverter QA with export power control and a meter QA for measurement.
- Both units have internet access — they exchange data via MQTT.
- The user is registered in the **EDC** at both sites as a production plant and a consumption location and has a valid **SSE licence** (energy sharing) from Smart Home and Energy at both sites.

Opening the application control card

To open the application card in a web browser, move the cursor over the application tile (e.g. **Sharing Control spotToSpot**, **Sharing Settings**) and click the eye icon in its top-right corner. The application card 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

Carry out the settings at both sites using the same procedure; at each of them, the other site is the remote consumption location.

Initial setup procedure

1. "SSE Installation" card

- Check the validity of the sharing licence (SSE).
- In the **SUPPLY LOCATIONS** field, select the other site (its unit).
- Check the local settings (production plant and consumption location of this site: name, **EAN**).
- Save with the **SAVE** button.

2. "Installation" card

- Check the parameters taken over from the inverter.
- In the **CONTROLS SELECT** field, choose where the application passes the power control (inverter QA, EMS QA).
- Check that the MQTT **Connection Status** is Connected.
- Save with the **SAVE** button.

3. Remote site card (tile with the serial number of its unit)

- Check that the remote values are being loaded (**Status OK**, **Update** time).
- Set the sharing **Coefficient**.

4. "Sharing Settings" card — set **Min Sharing Request** and **Energy Change Max** (the values in the screenshots are an example from a sample installation).

5. Carry out the same procedure at the other site.

- Only when the data of the counterpart unit are being loaded at both sites, select the **AUTO** mode on the **Sharing Settings** card at both sites.

6. "Sharing Control spotToSpot" card

- Monitor the sharing chart, the spot plans and the energy offers and demands of both sites.
- The **Energy overview** and **Consumption Locations** cards are used to check the values.
- Zero shared energy does not in itself mean an error — energy is shared only when there is a surplus at one site, a shortage at the other and an economic advantage.

"SSE Installation" card

The card is used to set up the sharing licence and select the other site.

- **License SSE** — name of the sharing installation (both sites), **License Validity**, **Valid until** and **SSE Number** (sharing licence number). Use the **Update** button to reload the licence state from the server. The licence is assigned by Smart Home and Energy support; if it is not valid, contact support.
- **SSE Configuration** — **SUPPLY LOCATIONS**: selection of the other site by the serial number of its unit (e.g. **HC3-00038674**).
 - A separate tile is created on the desktop for the selected remote site.
 - If the serial number of the other unit is not in the list, check the validity of the sharing licence (SSE) and contact support.
- **Local settings** — data of this site registered in the **EDC**, separately for **Type Production** (**Name**, **EAN**, **Priority**, **HC** — serial number of the controller) and for **Type Consumption location** (**Name**, **EAN**, **HC**). The production plant and the consumption location have different **EAN** codes; compare them with the registration in the **EDC**.

The **Run status** row shows the run state of the application. Save the settings with the **SAVE** button.

"Installation" card

- **Inverter settings** — **Battery capacity**, **Inverter Power Max Phase** and **Inverter Power Max Total** of the inverter; the application takes the values over from the inverter QA.
- **CONTROLS SELECT** — where the application passes the power requests:
 - **Power Control to QA Inverter** (control of the inverter export),
 - **Power Control to QA EMS** (passing the requests to energy management so that local appliances use the surplus preferentially).
 - Both options can be ticked at the same time.
- **MQTT Settings** — **Connection Status** to the server through which both sites exchange data (Connected); use the **Connect / Disconnect** buttons to establish or terminate the connection manually.

The **Run status** row shows the run state of the application. Save the settings with the **SAVE** button. The application version is shown at the bottom of the card (e.g. sheEsgManagementSpotToSpot 1.03.05).

Remote site card

The tile bears the serial number of the unit of the other site (e.g. **HC3-00038674**).

- **Remote values** — **Device**, **Period time** (elapsed time of the current quarter-hour, mm:ss), **Battery** (SOC in %), **Battery Energy**, **Battery Capacity**, communication **Status** (OK) and **Update** (time of the last reading).
 - Check that the **Update** time keeps changing; if it does not, check the MQTT connection on the **Installation** card at both sites.
- **Import / Export table** — for the other site **Power setpoint** (W), **Energy setpoint** (Wh), energy **Period** and **Period recalculated** (Wh), **Today** and **Today recalculated**, **Total** and **Total recalculated** (kWh).
 - Recalculated energy is energy adjusted for the sharing calculation (according to the coefficient and the calculation rules of the application).
 - **Import** means consumption into the described site, export means supply from it.
- **ESG Settings** — **Coefficient** (share of the other site's energy to be covered by sharing, e.g. 100.00 %); change the value with the **-0.01 / +0.01**, **-0.1 / +0.1**, **-1 / +1**, **-10 / +10** buttons, or set **0** or **100**.

"Sharing Settings" card

Setting of the sharing mode and the calculation parameters.

- **Control Mode** — current mode (e.g. **AUTO-OFF** = automatic mode, sharing is not currently in progress; on the main card and the tile the same state is shortened to **AUT-OFF**). Buttons:
 - **AUTO** — automatic sharing according to the spot plans of both sites and the economic advantage (recommended mode),
 - **MANUAL-EXPORT-DIRECT-BAT** — export to the other site, primarily from direct production, then from the battery,
 - **MANUAL-EXPORT-BATTERY-DIRECT** — export to the other site, primarily from the battery, then from direct production,
 - **MANUAL-IMPORT-DIRECT** — import from the other site for direct consumption,
 - **MANUAL-IMPORT-BATTERY** — import from the other site into the battery,
 - **MANUAL-OFF** — sharing switched off.
- **Min Sharing Request** — minimum energy to be shared in the period (kWh, e.g. 0.2 kWh); set the value with the **-- / - / + / ++** buttons, the **0** button resets it to zero.
- **Calculation parameters** — **Energy Change Max**: maximum change of the energy to be shared between periods (kWh, e.g. 0.5 kWh); set the value with the **-- / - / + / ++** buttons (**- / +** change the value in small steps); the **Nothing** button clears the value and **--** is displayed.

For automatic decision-making according to the economic advantage, use the **AUTO** mode; after using a manual mode, switch back to **AUTO**.

“Sharing Control spotToSpot” card

The main card — overview of the current sharing state, the chart and the spot plans of both sites.

The meaning of each symbol on the card is shown when you move the mouse cursor over the symbol (tooltip). In the upper part there are the symbols of the **Local** site (left), of the control mode (centre) and of the **Remote** site (right). Below them are the current values:

- energy exported from the local site and energy imported from the remote site in the current quarter-hour (Wh),
- control state (e.g. OFF),
- battery state of the local and the remote site (% and kWh),
- time.

The **Sharing chart** shows the course of the day hour by hour: energy **Surplus** and **Lack**, **Battery** state (%) and, for the local and the remote site, **Export**, **Import** and **Export plan**. Use the **Today** / **Tomorrow** buttons to switch the displayed day.

Tables:

- **Energy Period Recalculated** — **Import** and **Export** in the current period (Wh) for the local site and for the remote site (row with its serial number).
- **Plan Spot Local** and **Plan Spot Remote** — spot plan of each site by hours: **Hour**, price **Now** and **New** (price after allocation of sharing), **Energy** (kWh) and energy path (symbols source → destination).
- **Demands energy Spot** — demands according to the spot plan.
- **Demands energy Local** and **Demands energy Remote** — energy demands of each site (**From**, **To**, **Price Max**, **Energy**, path).
- **Offer energy Local** and **Offer energy Remote** — energy that each site can offer (**From**, **To**, **Price**, **Energy**, source — direct production or battery).

The message No plan or No demands means that there is currently no spot plan or demand for the given site; it is not an error. If the No plan message persists, check the spot plan in **QA Spot Pro** of the given site.

Rows marked D26:hh belong to the 26th day of the month (the following day in the example); hh is the hour.

Use the **Update** button to reload the values and the **Detailed view** button to switch the detailed display of the tables.

“Energy overview” card

- **Period time** — elapsed time of the current quarter-hour (mm:ss; e.g. 10:00 = 10 minutes from the start of the quarter-hour).
- **Current period** — for the local and the remote site **Import Specified** and **Export Specified** (power setpoint, W), **Import Target** and **Export Target** (target energy in the period, Wh) and the actual **Import** and **Export** (Wh).
- **Local Values** — **Import** and **Export** energy of this site for the period (Wh), today and in total (kWh), communication **Error status** and **Update**.
- **Remote values** — **Battery SOC**, **Battery Energy** and **Battery capacity** of the other site.
- **Energy Remote recalculated Import** and **Export** — energy of the other site adjusted for the sharing calculation (rows **Selected** / **Featured**, **Tot.Calc.**, **Total**) for the period, today and in total, **Status** and **Update**.

“Consumption Locations” card

Configuration CL — overview of the consumption locations and their sharing coefficients (**Name**, **Coefficient**) and the sum **Total**. Set the **Coefficient** on the remote site card.

Value tiles

The following tiles are displayed on the desktop:

- **Period time** (elapsed time of the current quarter-hour in seconds and in the mm:ss format),

- **Battery SOC** and **Battery Remote** (% and kWh),
- import and export power setpoints for the local and the remote site (**Setpoint Imp.Local / Setpoint Exp Local / Setpoint Imp.Remote / Setpoint Exp.Remote**, W),
- target energies in the period (**Target Imp Period Local / Target Imp.Period Remote / Target Exp.Period Remote / Export Target Period**, Wh, and state),
- energy in the period (**Period Imp Local / Period Exp Local**, Wh).

The meaning of each symbol on the tile is shown when you move the mouse cursor over the symbol.

Notes

- Sharing takes place in quarter-hours: the application compares the spot plans, offers and demands of both sites and, if the advantage is sufficient (including distribution fees), transfers energy from the site with a surplus to the site with a shortage.
- Sharing is preferred over selling photovoltaic energy to the grid; the site's own consumption always has priority.
- The user arranges the registration in the **EDC** (production plant and consumption location at both sites) on their own; the **SSE licence** is assigned by Smart Home and Energy before the application is put into operation.
- For clear visualisation and access to measurement history and graphs, we recommend connecting to Mervis SCADA.