Innovation in energy storage

Version 1.1 – 20-01-2023

MG Energy Monitor Display

- User Guide EN -

MG Energy Systems B.V.

Copyrights © 2023 MG Energy Systems B.V.
All Rights Reserved

This publication or parts thereof, may not be reproduced in any form, by any method, for any purpose.

For conditions of use and permission to use this manual for publication in other than the English language, contact MG Energy Systems B.V.

MG ENERGY SYSTEMS B.V. MAKES NO WARRANTY, EITHER EXPESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE MG ENERGY SYSTEMS B.V. PRODUCTS AND MAKES SUCH MG ENERGY SYSTEMS B.V. PRODUCTS AVAILABLE SOLELY ON AN “AS IS” BASIS.

IN NO EVENT SHALL MG ENERGY SYSTEMS B.V. BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF PURCHASE OR USE OF THESE MG ENERGY SYSTEMS B.V. PRODUCTS. THE SOLE AND EXCLUSIVE LIABILITY TO MG ENERGY SYSTEMS B.V.., REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THE MG ENERGY SYSTEMS B.V. PRODUCTS DESCRIBED HERE IN.

MG Energy Systems B.V. reserves the right to revise and improve its products as it sees fit. This publication describes the state of this product at the time of its publication and may not reflect the product at all times in the future.

Table of contents

1 GENERAL 1
1.1 Document history 1
1.2 Terms, definitions, and abbreviations 2
2 USER INTERFACE 3
2.1 Page map 3
2.2 Quick start 4
2.2.1 Status icons 4
2.2.2 Common interface elements 5
2.2.3 Main page indication 6
2.2.4 Display status icons 6
2.2.5 System status icon 6
2.2.6 Device name 6
2.3 Main pages 6
2.3.1 Minimal start 6
2.3.2 Expanded start 7
2.3.3 Devices 8
2.3.4 Events 13
2.3.5 Settings 14
2.3.6 System settings 16
2.4 Settings pages 17
2.4.1 Settings list page 17
2.4.2 Detailed setting pages 17
3 EXAMPLE USER INTERACTIONS 19
3.1 Changing protection level 19
3.2 Changing device name 20
3.3 Changing default start page 21
3.4 Changing temperature unit 22
3.5 Changing W-Fi settings 23
3.6 Changing battery strategy 24
3.7 Changing current limit setting 25
4 CONTACT DETAILS 26

1 GENERAL

1.1 Document history

Table 1 - Document history

Revision	Date	Changes	Revision author
0.1	26-03-2020	Initial document.	Diederik Glashouwer
1.0	15-5-2020	Minor changes.	Mark Scholten
1.1	20-01-2023	Added support for SmartLink MX. Updated images. General improvements	Diederik Glashouwer

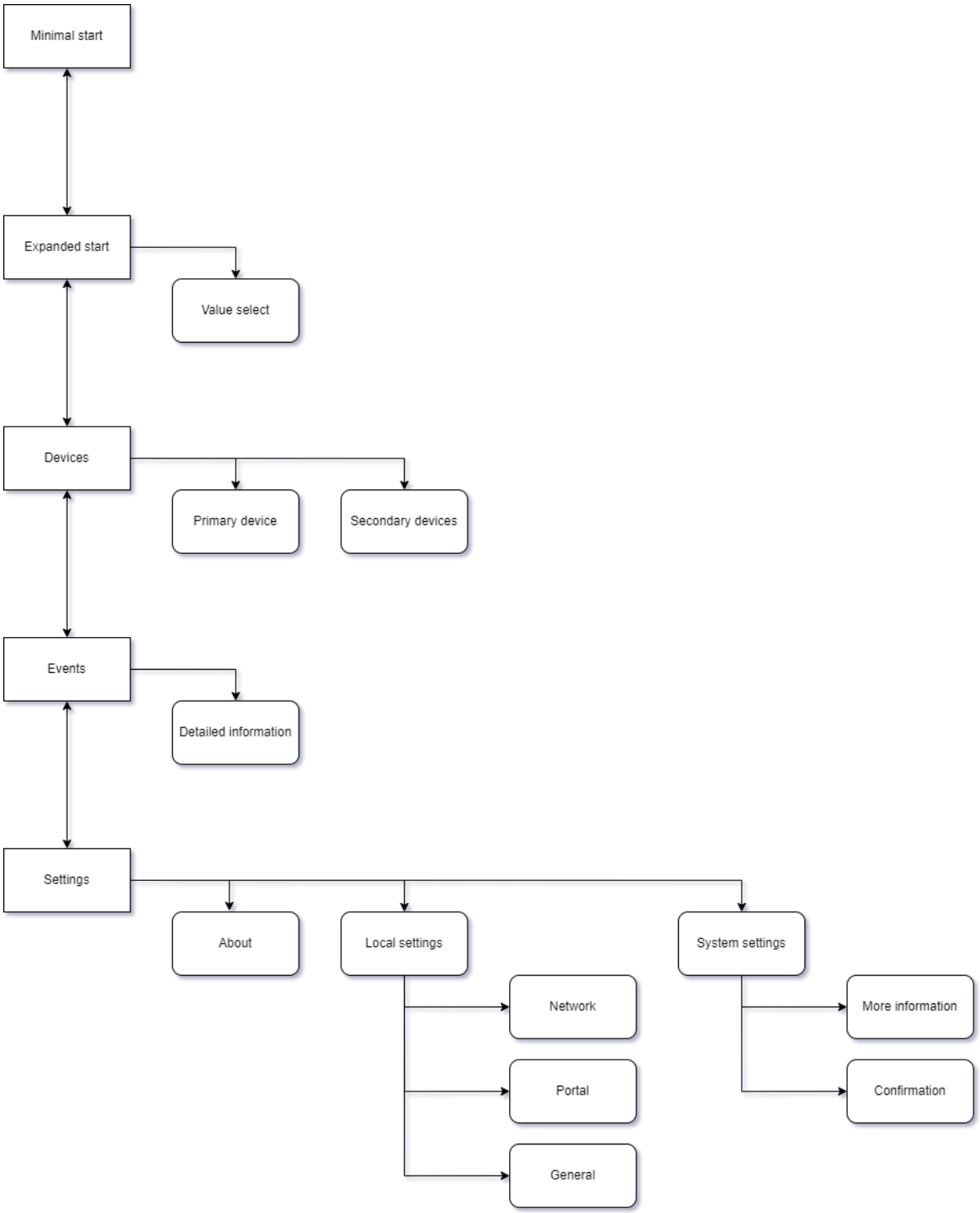
1.2 Terms, definitions, and abbreviations

Table 2 - List of terms, definitions, and abbreviations

	Name	Description
	Battery module	An assembly of battery cells including BMS.
	Battery pack	Consists of one or more battery modules in combination with a battery management controller (BMS).
	Battery system	Consists of one or multiple battery packs connected to a common DC-bus.
	Battery management controller	Controls, manages and protects one or multiple battery modules.
	BMS	Battery Management System that is integrated in the battery pack.
	Master BMS	Shorthand for a *battery management controller* in a MG energy systems battery system.
	Slave BMS	The part of the BMS that is integrated in the battery module.
	Redundancy BMS	The redundancy BMS that is integrated in the battery module.
	DC-bus	The main DC-bus of the application where all user equipment is connected too, like generators, propulsion systems and other chargers and loads.
	CAN-bus	*Controller Area Network bus;* CAN-bus is a standard serial data bus that provides data communication between two or more devices.
	NMEA 2000	National Marine Electronics Association's NMEA 2000 is a plug-and play communications standard used for connecting marine sensors and display units within ships and boats, standardized in the IEC 61162-1.
	SOC	State-of-Charge – reflects the level of charge of a battery pack or battery module relative to its capacity. The units of SOC are percentage points where 0% indicates discharged and 100% indicates charged.

2 USER INTERFACE

2.1 Page map



2.2 Quick start

2.2.1 Status icons

A number of status icons can appear in the top right of each of the main pages. These gives the user a quick indication about the status of the Energy Monitor.

Table 3 - Status icons

Icon	Function
	Wi-Fi connected
	Establishing Wi-Fi connection
	Wi-Fi connection failed
	Portal connected
	Establishing connection to portal
	Portal connection failed
	Full synchronization used
	Connected device not fully supported or not fully up-to-date
	Connected device not supported or not up-to-date or CAN bus violated
	System settings not as saved
	Main contactor closed, system is connected to the DC-bus
	Device is part of a combined system and is actively participating
	System has been set up to participate in a combined system but is waiting for a start command
	System is part of a combined system but is currently monitoring the DC-bus, ready to join as soon as it is safe to do so.
	System is not setup to join a combined system
	Demonstration mode is enabled

2.2.2 Common interface elements

Using the touchscreen, the user can swipe left and right to switch between the different main pages described in section “2.3 Main pages”. Swiping up or down will scroll through lists. In “Table 4 - Common buttons” a number of common buttons are shown, these are used across the user interface of the Energy Monitor and are used for most of the user interactions.

Table 4 - Common buttons

Icon	Function
	Go back to previous page
	Scroll up or down on a list. Greyed out icons indicate the end of a list.
	Toggle button. Enables or disables a particular setting or function.
	Increment or decrement the value. When not available the icon will turn grey.
	Touch to show keyboard.
	Show or hide variable, used for fields like passwords.
	Menu button
	General purpose button, will have text indicating its function. Outlined in white if this is the current selection.
	Clicking this button will show a page where more information will be available.
	Icons indicating which one of the main pages the user is looking at.
	Show QR code containing a link, used to refer the user to online resources like the latest version of this manual

2.2.3 Main page indication

There are five main pages. These pages are indicated at the bottom of the screen with five dots, as seen in “Figure 1 - Example main page”. The white dot indicates the current page. Swiping to the left or right will change the page.

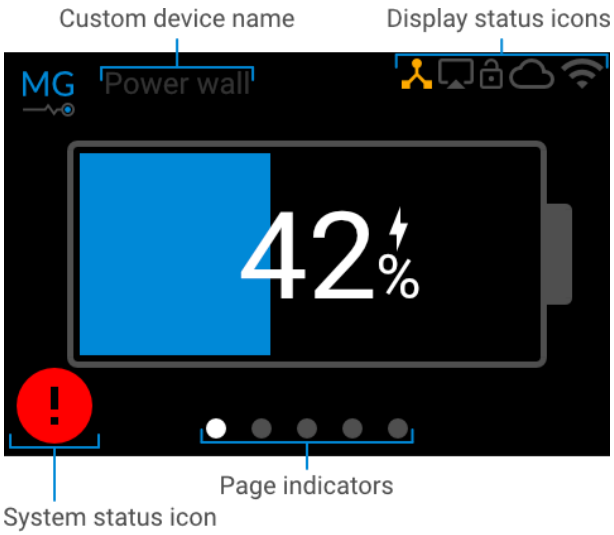


Figure 1 - Example main page

2.2.4 Display status icons

The general status of the Energy Monitor can be determined based on the status icons as indicated in image “Figure 1 - Example main page”. Possible options and their descriptions can be found in “2.2.1 Status icons”.

2.2.5 System status icon

A simplified representation of the system state can be found on both of the start page options. This is based on the status of the connected primary device. A red circle indicates an error, an orange triangle indicates a warning.

2.2.6 Device name

If a custom name was set for the Energy Monitor it will be displayed as shown in “Figure 1 - Example main page”, please refer to section “3.2 Changing device name” for instructions as to changing the name.

2.3 Main pages

2.3.1 Minimal start

This page shows a graphical and numerical representation of the state of charge of the system. A number of icons indicate the current operating state of the primary device.

The minimal start page is one of the two options for the default start up screen of the Energy Monitor. Default the monitor will use minimal start as the start screen. To change please see section “3.3 Changing default start page”.

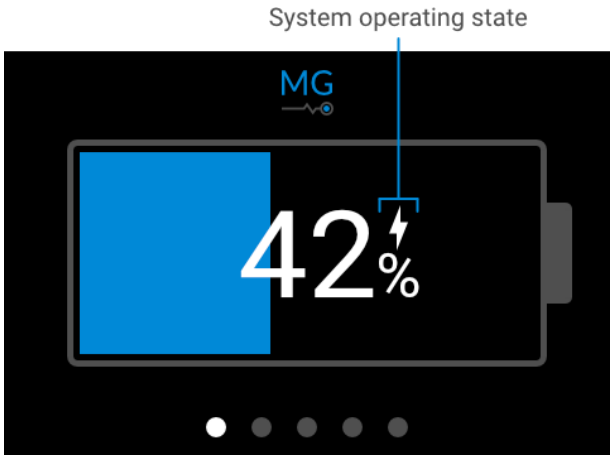


Figure 2 - Minimal start page

2.3.2 Expanded start

Expanded start displays 4 variables each in one quarter of the screen. Long pressing on any of these shows the "2.3.2.1 Value selection Page" where a new option can be selected.

The expanded start page is the second of the two options for the default start up screen of the Energy Monitor. To change please see section "3.3 Changing default start page".

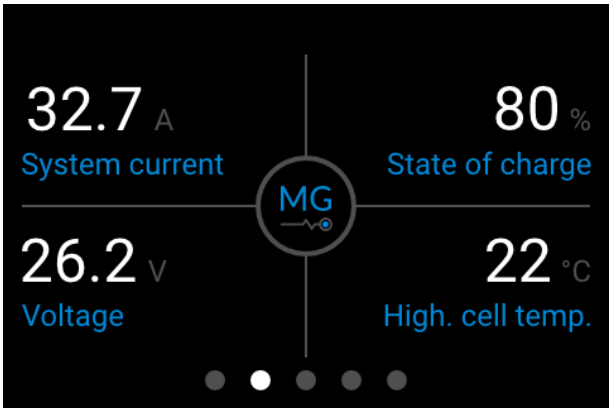


Figure 3 - Expanded start page

2.3.2.1 Value selection

The value indicated white is the existing selection. Any of the available options can be chosen, please note that greyed out options are not recommended as these are not provided by the currently connected primary device.

An icon in the top right indicates the quadrant where the new value will be shown.

Navigation is done via the up down buttons or by swiping up and down.

Pressing the back button will change the view back to the previous page without saving changes.

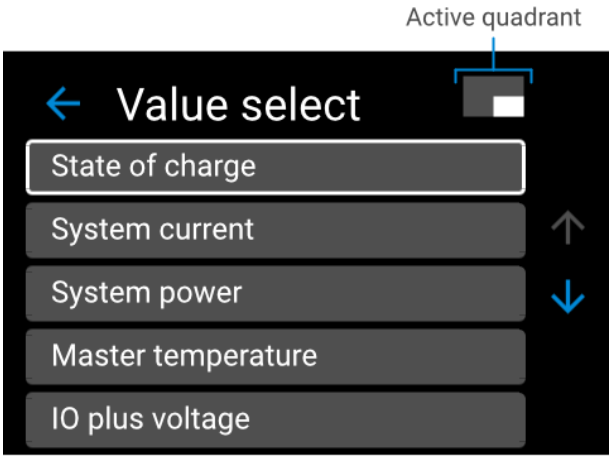


Figure 4 - Expanded start page value selection

Table 5 - Start page variable availability

Value availability	SmartLink MX	BMS	Master LV | LV 12V	Master HV	Battery
System state of charge	✓		✓	✓	
System Time to go	✓		✓	✓	
System current	✓		✓	✓	
System power	✓		✓	✓	
System voltage	✓		✓	✓	
Device temperature	✓		✓	✓	
Device IO plus voltage			✓	✓	
Device IO minus voltage			✓		
Device power supply voltage	✓				
Highest cell voltage		✓			✓
Lowest cell voltage		✓			✓
Highest cell temperature		✓			✓
Lowest cell temperature		✓			✓

2.3.3 Devices

The Devices page shows an overview of all the devices in the connected system.

Top device is the primary connected device, remainder are secondary devices.

Simplified data is available for each device:

- Device type
- Device serial number
- Device state (alarm, warning)
- Device contactor state
- Device combined state

Navigation is done via the up down buttons or by swiping up and down. Clicking on any of the device buttons will show specific information about the selected device.

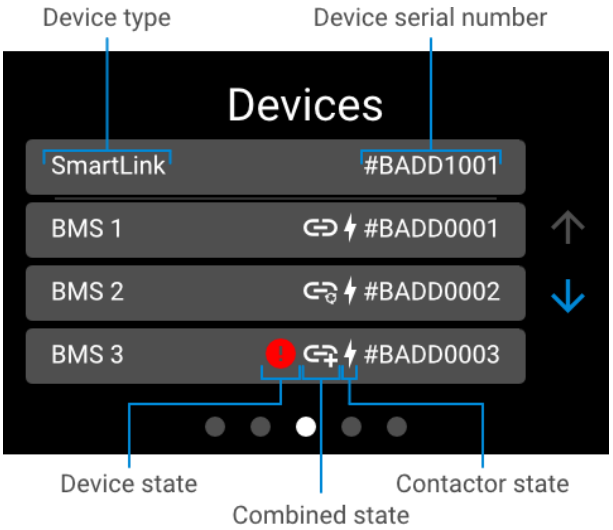


Figure 5 - Devices page

2.3.3.1 *Device specific pages*

For each device there are a number of detailed pages. Page selection can be done via the selection menu, this menu can be accessed by pressing on the page name bar button as indicated by the menu icon and selecting the requested page. Incrementing through the pages can be done by swiping left or right on the data page.

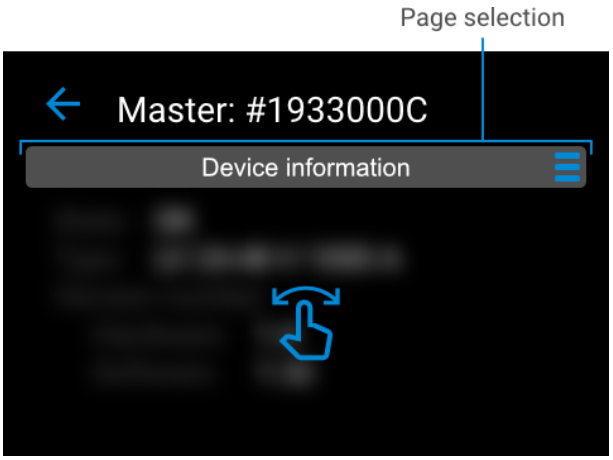


Figure 6 - Devices page specific page selection

Table 6 - Device details page availability

Specific page	SmartLink MX	BMS	Master LV | HV | LV 12V	Battery	Redundancy unit
System configuration	✓	✓	✓		
System battery values	✓	✓			
System highest values			✓		
System lowest values			✓		
Device information			✓	✓	✓
Device cell voltages				✓	
Device temperatures				✓	
Device miscellaneous variables	✓	✓	✓	✓	
Device status	✓	✓	✓	✓	✓
Device tracked data	✓	✓	✓		
Device combined mode		✓			

System configuration

MG Master BMS systems:

- Battery type
- Number of batteries
- Number of batteries in series
- Number of batteries in parallel
- System capacity
- Redundancy unit type
- Number of redundancy units

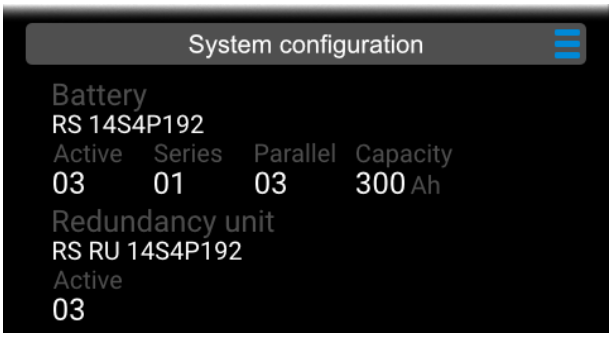


Figure 7 - Device page system configuration Master BMS

MG SmartLink MX systems:

- Number of BMS's
- Number of combined BMS's
- Number of batteries in combined system
- Number of batteries in combined system in series
- Number of batteries in combined system in parallel
- Capacity of combined system

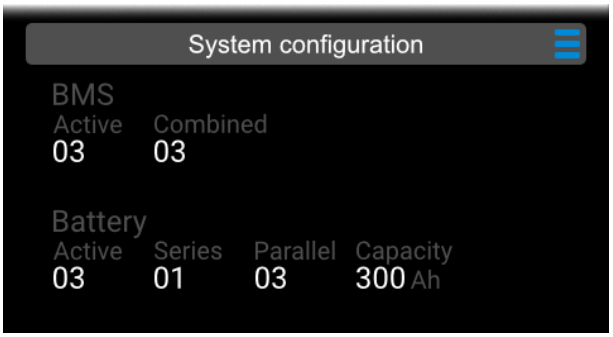


Figure 8 - Device page system configuration SmartLink MX

System battery values

Shows the highest and lowest cell voltage and temperature for the given system as well as the delta between the two extremes.

- Cell voltage
  (highest / lowest / delta)
- Cell temperature
  (highest / lowest / delta)

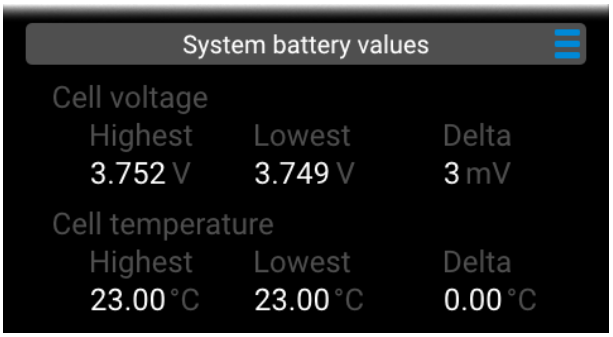


Figure 9 - Device page Battery values

System highest values

Shows the highest cell voltage and temperature in the connected battery system. The cell / sensor number and the serial number of the battery that measured the value is available as well.

- Cell voltage
  (value / cell number / battery serial number)
- Cell temperature
  (value / cell number / battery serial number)

Clicking on the arrow button will jump to the dedicated battery information page.

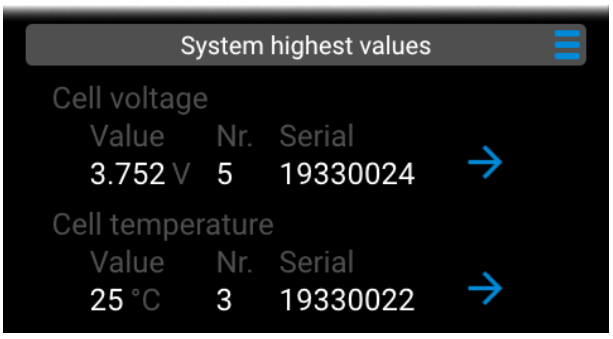


Figure 10 - Device page highest values

System lowest values

Shows the lowest cell voltage and temperature in the connected battery system. The cell / sensor number and the serial number of the battery that measured the value is available as well.

- Cell voltage
  (value / cell number / battery serial number)
- Cell temperature
  (value / cell number / battery serial number)

Clicking on the arrow button will jump to the dedicated battery information page.

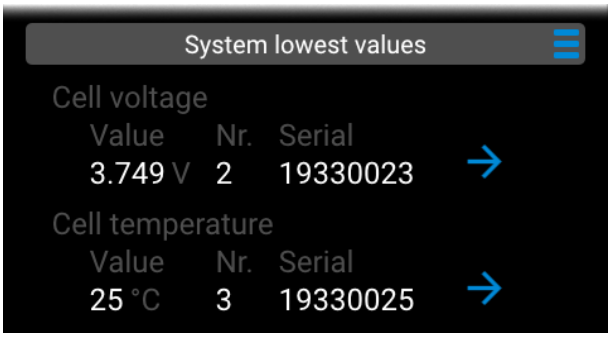


Figure 11 - Device page lowest values

Device information

Page contains detailed information about the selected device as well as a simplified device status.

- Simplified device status
- Device type
- Hardware version number
- Software version number

Figure 12 - Device page device information

Device cell voltages

The cell voltages page shows the voltage of each individual voltage sensor in the selected battery. The number of sensors varies for each battery type.

- Cell voltages of battery

Press on a value to show the sensor number in blue.

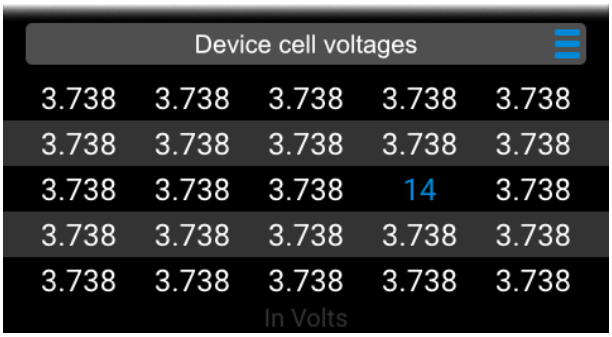


Figure 14 - Device page cell voltages

Device temperatures

The temperatures page shows the temperature of each individual temperature sensor in the selected battery. The number of sensors varies for each battery type.

- Temperatures of battery

Press on a value to show the sensor number in blue.

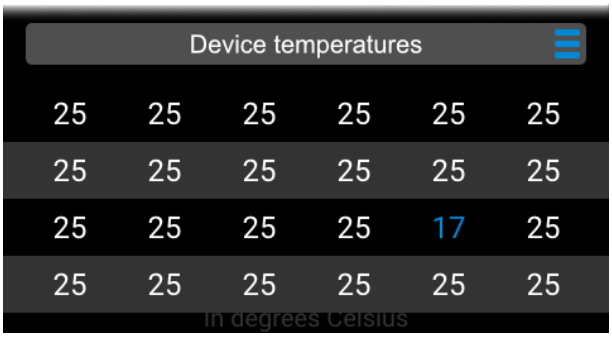


Figure 13 - Device page temperatures

To change the temperature unit please see section “3.4 Changing temperature unit”.

Device miscellaneous variables

Shows miscellaneous values relating to the selected device.

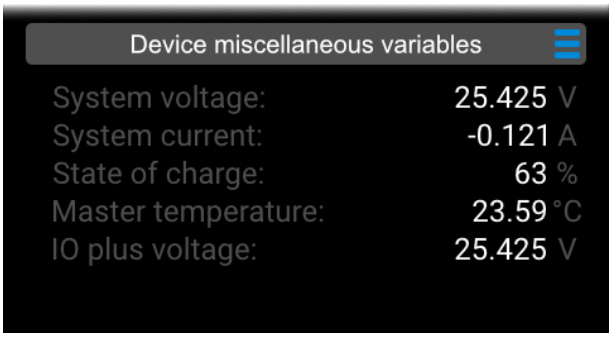


Figure 15 - Device page miscellaneous variables

- System voltage
- CAN power supply voltage
- External power supply voltage
- IO plus voltage
- IO minus voltage
- System current
- Highest terminal temperature
- Positive terminal temperature
- Negative terminal temperature
- Contactor temperature
- System temperature
- Humidity sensor temperature
- Relative humidity

Availability depends on connected device type

Device status

Shows the active device status. Statuses are color coded

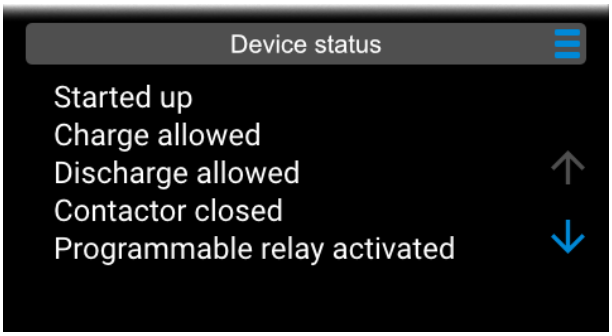


Figure 16 - Device page device status

- White: information
- Orange: warning
- Red: alarm

Navigation is done via the up down buttons or by swiping up and down.

Device tracked data

Figure 17 - Device page tracked data

Shows device tracked data.

- Discharge:
  - Historic highest discharge
  - Cumulative discharge
  - Discharge since full
  - Discharge today
- Charge count
  - Fully charged
  - Fully discharged
- Energy charged (today / historic)
- Energy discharged (today / historic)
- System voltage
  - Highest system voltage (today / historic)
  - Lowest system voltage (today / historic)
- System current
  - Highest system current (today / historic)
  - Lowest system current (today / historic)
- Cell voltage
  - Highest cell voltage (today / historic)
  - Lowest cell voltage (today / historic)
- Cell temperature
  - Highest cell temperature (today / historic)
  - Lowest cell temperature (today / historic)

Please note that not all tracked data is available for BMS's in SmartLink MX systems.

Device combined mode

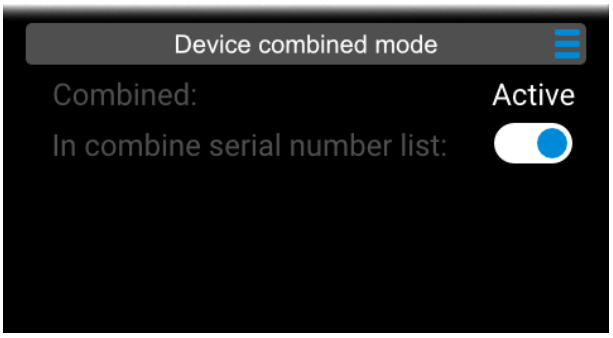


Figure 18 - Device page combined mode

Shows the active combined status, if the status is not active a possible cause for this is also shown.

- Combined state
- Combine inactive reason
- In "Serial number" combine mode:
  - Device in "combine serial number" list (with button to add or remove)
- In "Device instance" combine mode:
  - Device instance

2.3.4 Events

The Events page shows a list of all the errors that where reported or stored by the connected MG device.

Navigation is done via the up down buttons or by swiping up and down.

To the left side of the page a small scroll bar is shown, this will indicate how for the events list has been scrolled.

Clicking on an event will show the “2.3.4.1 Detailed information” page.

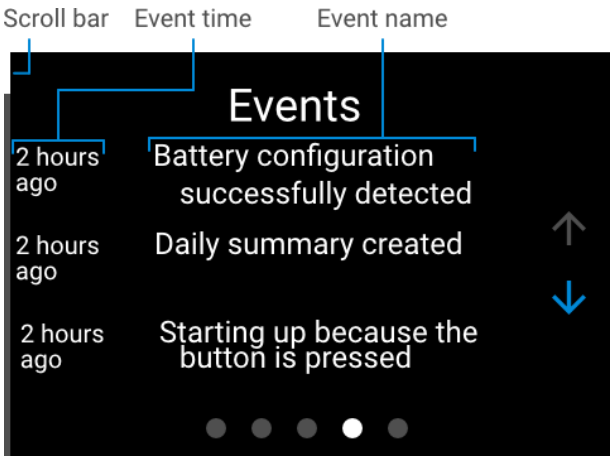


Figure 19 - Events page

2.3.4.1 Detailed information

This page will show more information about the selected event.

- Event name
- Event parameters
- Event type
- Event time

The time keeping of the connected MG device is used for this value, please refer to the device specific manual for information about changing the time.

Figure 20 - Events page detailed information

2.3.4.2 Pop-ups

A pop-up will appear if an issue is encountered by either the Energy Monitor or the connected MG Master. This pop-up will show the user what kind of issue occurred and it will give a description of what caused the issue or what can be done to solve it.

If an issue is automatically resolved the pop-up will clear. If the issue is still active when the user has clicked the dismiss button an icon on the start screens will indicate that the issue is ongoing.

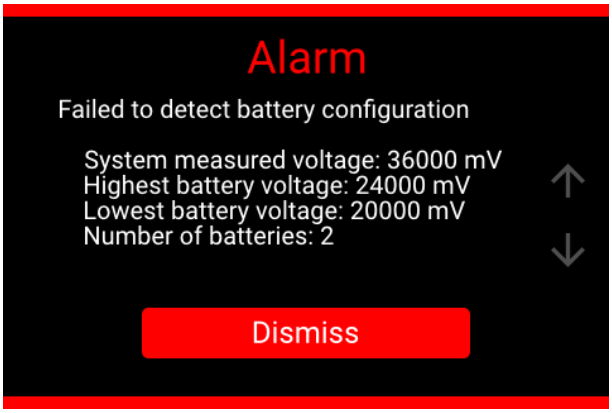


Figure 21 - Pop-up

2.3.5 Settings

The settings page offers the user the option to jump to 3 specific pages:

2.3.5.1 About: information about the Energy Monitor being used.

2.3.5.2 Local settings: settings applicable to the Energy Monitor.

2.3.6 System settings: settings applicable to the system the Energy Monitor is connected to.

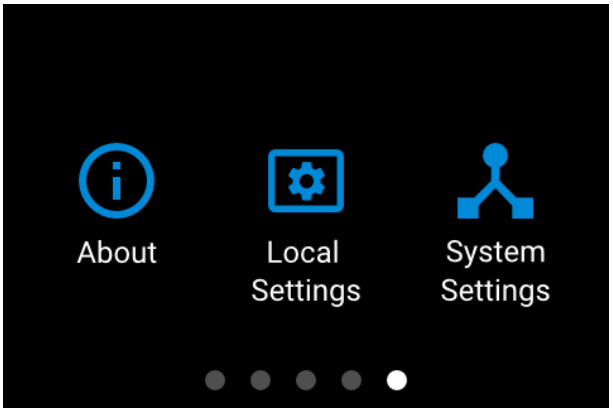


Figure 22 - Settings page

2.3.5.1 About

The About page shows information about the MG Energy Monitor being used. The information is shown across three tabbed pages.

- General
  - Energy Monitor device type
  - Energy Monitor custom name (with option to change)
  - Energy Monitor serial number
  - Energy Monitor hardware version number
  - Energy Monitor software version number
- Status
  - Energy Monitor status (color coded)
- Advanced (Adv.)
  - Reboot device
  - Protection level (with option to change)

Figure 23 - Settings page - About - general

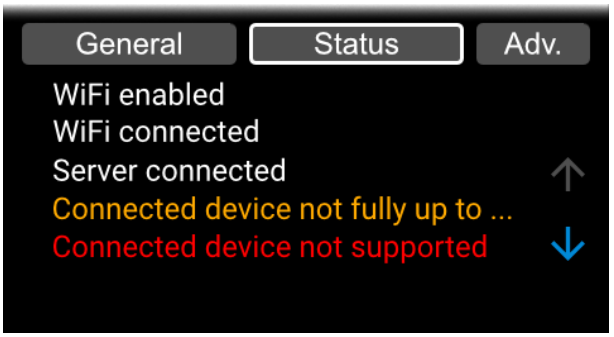


Figure 24 - Settings page - About - Status

To change the protection level the user needs to enter a set password. The different levels and their effects are:

- All access
  - All device and system settings are available
- Local access (default)
  - Changes are only allowed to device settings. System settings are locked.
- Protected access
  - System and device settings are locked. Only a limited selection of general device settings is still available.

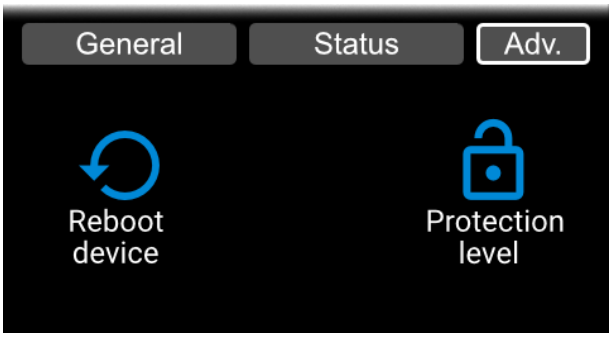


Figure 25 - Settings page - About - Advanced

2.3.5.2 Local settings

The local settings page allows the user to change a range of parameters about the monitor, including the brightness of the display or what wireless network it should connect to. Depending on the monitor's access level some of these settings may be locked, preventing the user from making changes, but not from viewing them.

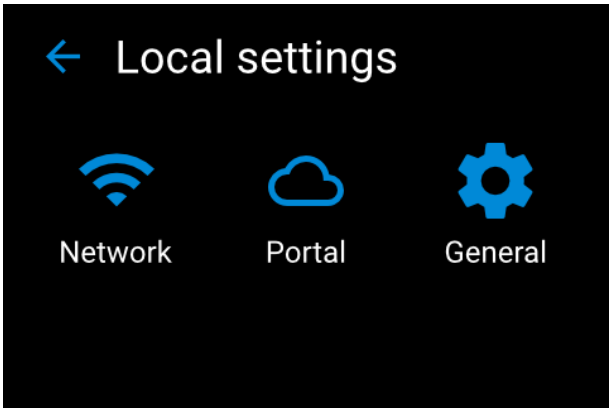


Figure 26 - Settings page - Local settings

Network settings

This page shows the user information about the current network connection.

- Networking enabled (with button to toggle)
- Networking status
- Network details (Strength / name (SSID) / IP address / MAC address)
- Network configuration option

Please refer to section "3.5 Changing W-Fi settings" for a configuration example.

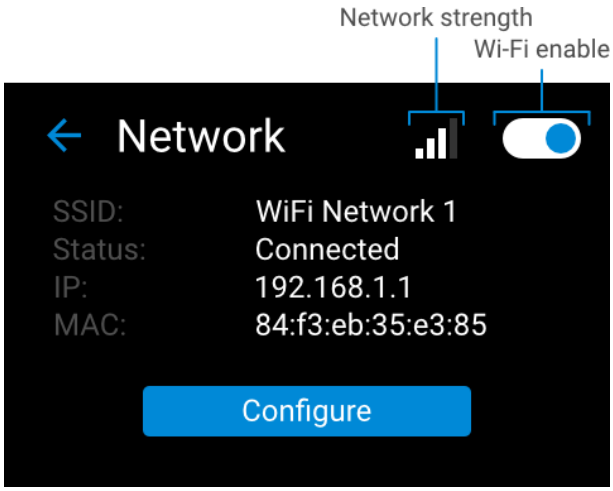


Figure 27 - Settings page - Local settings - Network

Portal settings

This page shows the user information about the current MG Energy Portal connection.

- Domain of portal (including QR code)
- Portal connection status
- Transmission interval
- Device access code
- Portal configuration option

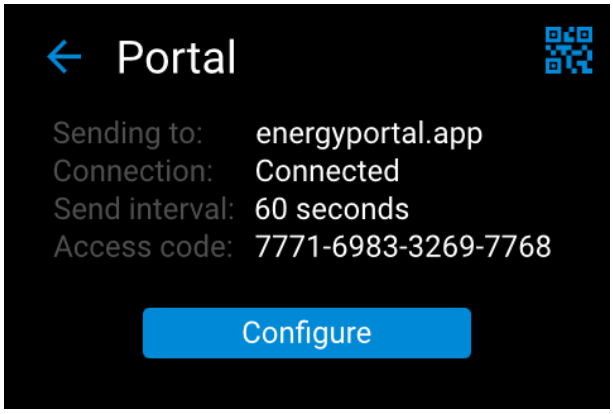


Figure 28 - Settings page - Local settings - Portal

General settings

A list of more general settings that apply to the Energy monitor can be found on this page.

- Display brightness
- Display timeout
- Buzzer enabled
- Start screen selection
- Displayed unit selection
- Notify on status almost discharged
- Show information events in log

Please refer to section “2.4 Settings pages” for details of settings page usage.

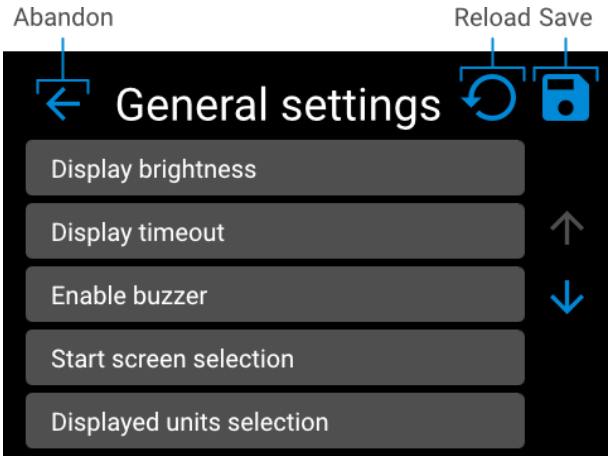


Figure 29 - Settings page - Local settings - General

2.3.6 System settings

Clicking System Settings will show the user a list of settings applicable to the connected MG Master or SmartLink MX device.

Before making any changes please refer to the manual of the respective device being used. The manual contains a full rundown of all the available settings and their effects.

Please refer to section “2.4 Settings pages” for details of settings page usage.

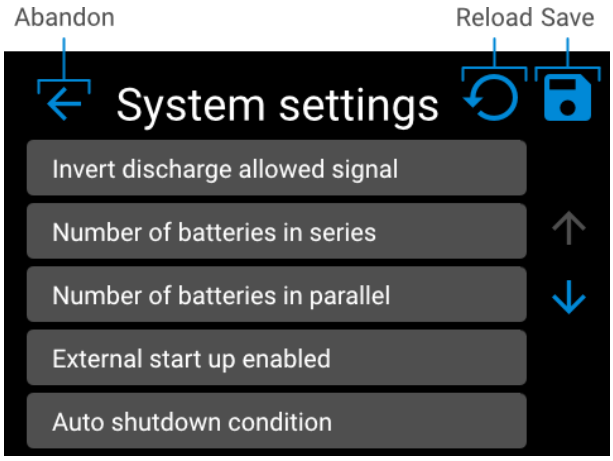


Figure 30 - Settings page - System settings

2.4 Settings pages

2.4.1 Settings list page

The icons in the top right are used to refresh or save the settings. If any changes were made the display will ask for confirmation before committing or abandoning the changes.

Changed settings are indicated by a white mark on the left edge of the button.

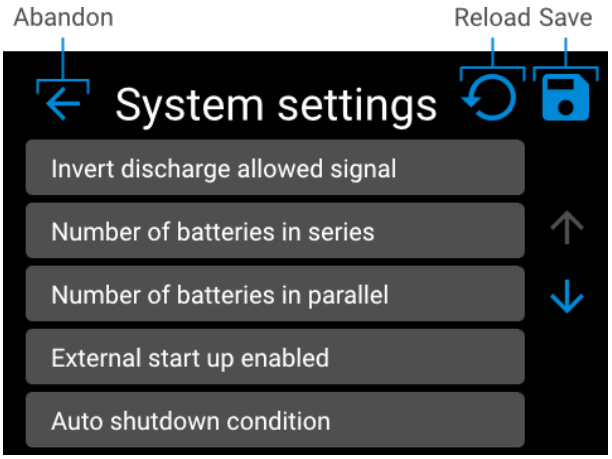


Figure 31 - Settings list page

2.4.2 Detailed setting pages

There are a number of different setting types, each has a dedicated page.

Pressing on the information icon, as seen in “Table 4 - Common buttons”, will show a more information page, the icon will only be visible if more information is available for a given setting. Always refer to the documentation of the given device for the most up to date information.

2.4.2.1 Numerical

The number highlighted in blue can be incremented by using the plus minus buttons. Use the arrow buttons to change the highlighted location.

Some settings can be disabled by using the toggle button.

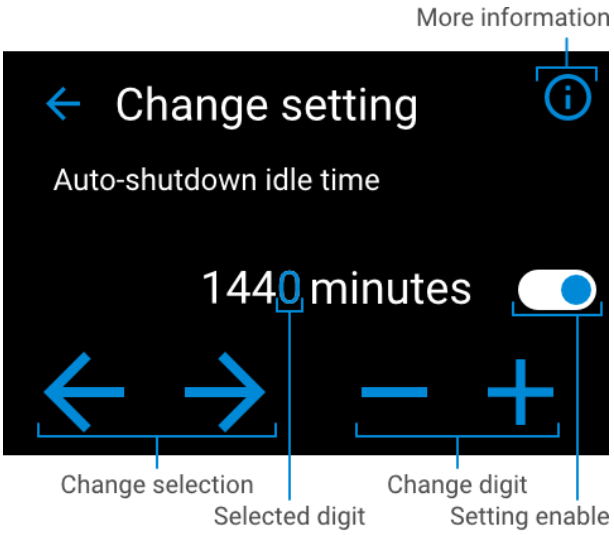


Figure 32 - Setting - Numerical

2.4.2.2 List

The currently selected option is highlighted by the white outline. Press on the requested option to change the selection.

Navigation is done via the up down buttons or by swiping up and down.

Figure 33 - Setting - List

2.4.2.3 Yes/No

The currently selected option is highlighted by the white outline. Press on the requested option to change the selection.

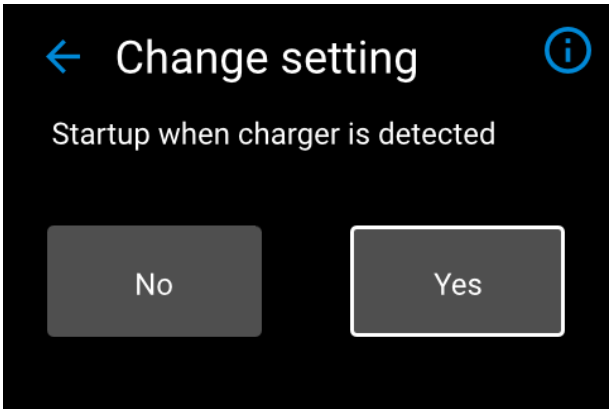


Figure 34 - Setting - Yes/No

2.4.2.4 Relay

Relay settings are split in to two parts; the mode selection and the parameter settings. Mode selection is done via the list type setting as seen in section "2.4.2.2 List". Parameter settings are split in to multiple sections, one or more of these can be active for a given mode. Please refer to the manual of the connected device for more information about the given setting.

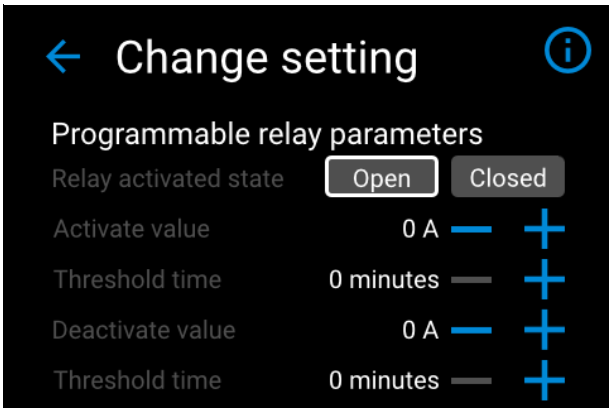


Figure 35 - Setting - Relay parameters

Open / Closed

Set the activated state of the relay to either opened or closed. The activated state depends on the selected mode and possible additional parameters

Value and time threshold

Set thresholds on activation based on the parameter set in the mode selection.
Activate and deactivate value thresholds should not be the same.

- Activate threshold (value / time)
- Deactivate threshold (value / time)

A subset of this option only allows setting of activate and deactivate time thresholds.

Status flag

The relay is activated if the set status flag is active.

2.4.2.5 Serial number list

To remove a device from the list; press on the serial number of the given device, this will show a red outline. Next long press on this button to clear the device from the list.

This setting can only be used to remove devices, to add a device to the list navigate to the device using the devices page, please refer to section "2.3.3.1 Device specific pages"

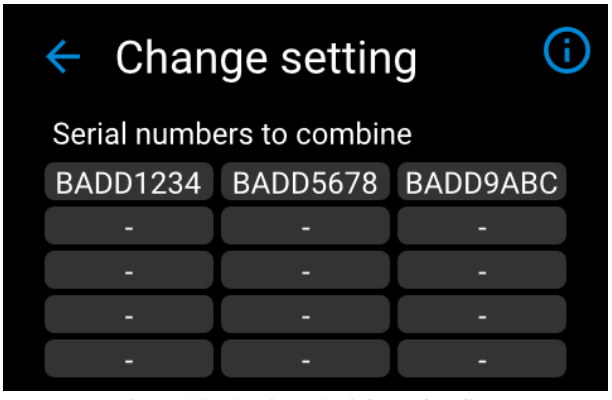
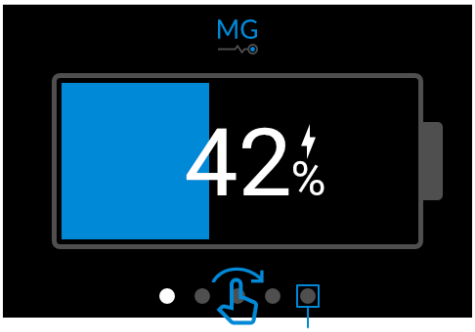


Figure 36 - Setting - Serial number list

3 EXAMPLE USER INTERACTIONS

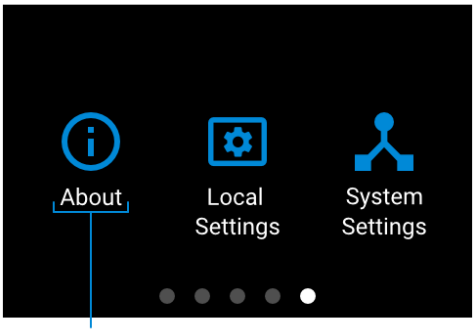
3.1 Changing protection level

1/7



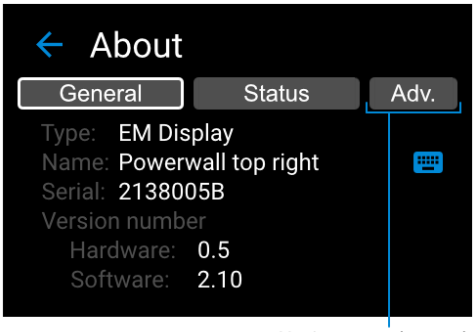
Swipe right to reach settings page

2/7



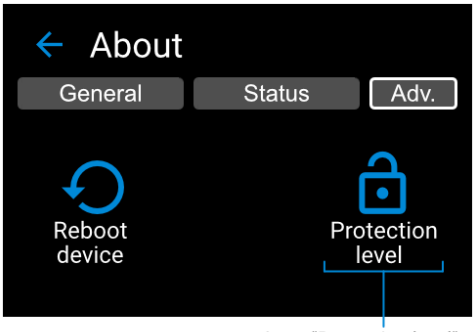
Open "About" page

3/7



Navigate to advanced tab

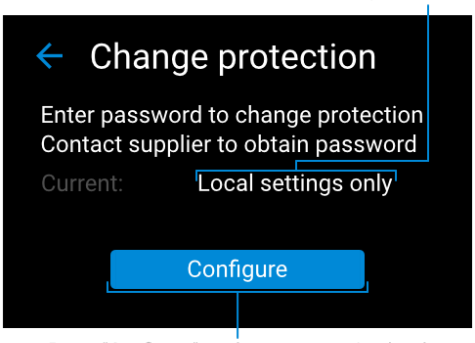
4/7



Open "Protection level" page

5/7

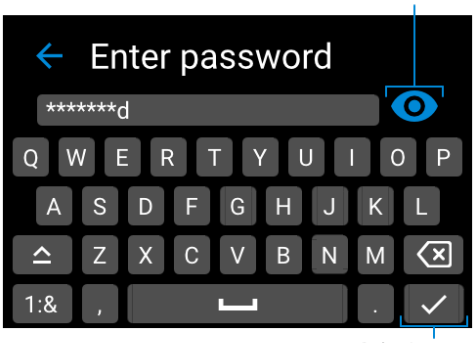
Current protection level



Press "Configure" to change protection level

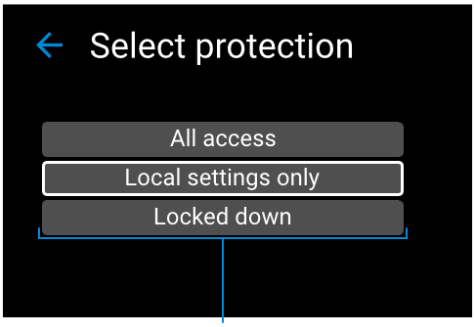
6/7

Show or hide entry



Submit password

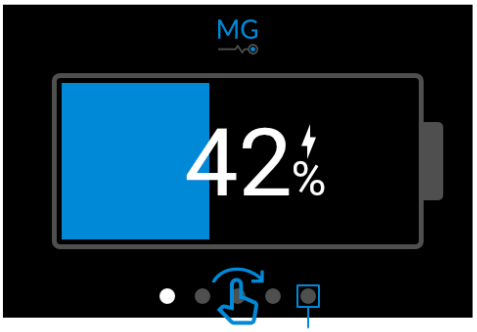
7/7



Outlined button indicates active selection
Select requested protection level. Setting is saved on change

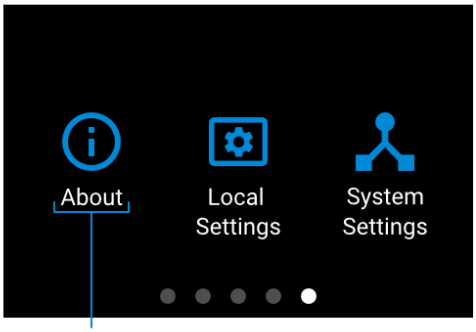
3.2 Changing device name

1/5



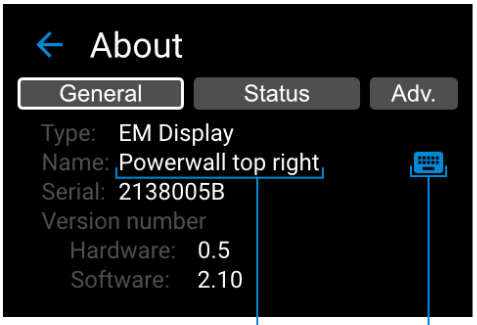
Swipe right to reach settings page

2/5



Open "About" page

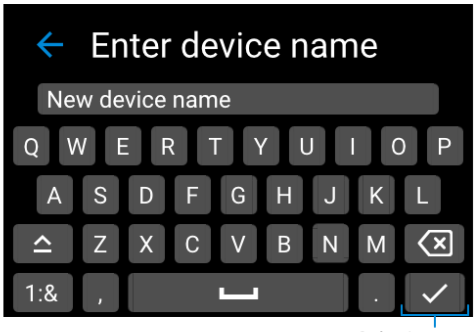
3/5



Navigate to keyboard

Current device name

4/5



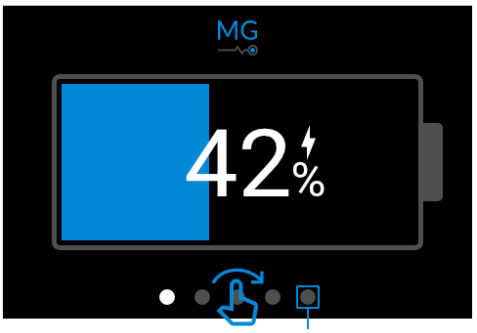
Submit new name

5/5

Press "Confirm" to save new name

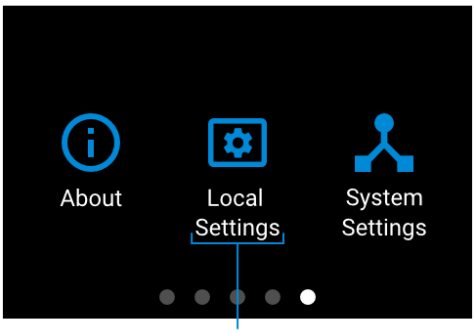
3.3 Changing default start page

1/7



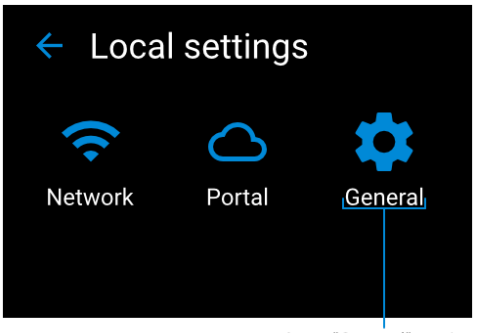
Swipe right to reach settings page

2/7



Open "Local settings" page

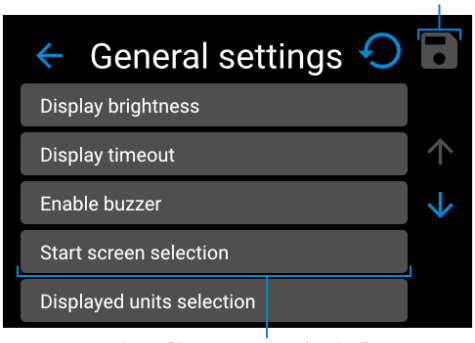
3/7



Open "General" settings

4/7

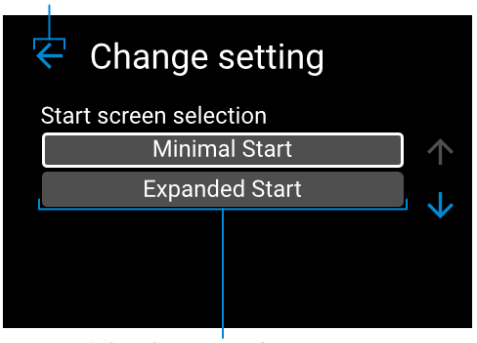
Save icon disabled



Open "Start screen selection" page

5/7

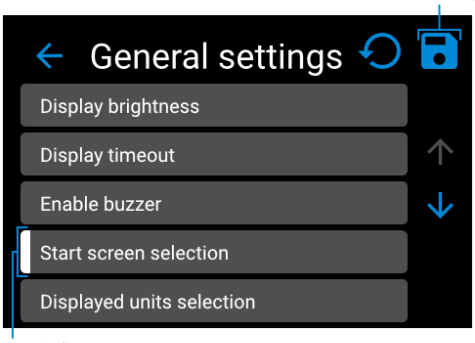
Leave page once setting is set as desired
Settings are not saved on change



Select the requested start page

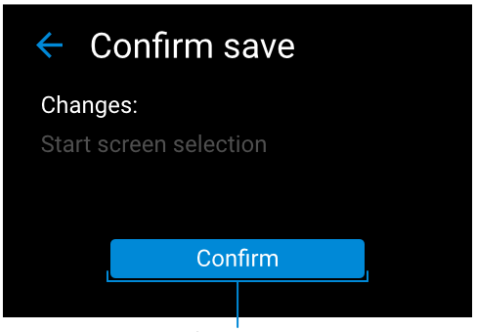
6/7

Save changes



Accent indicates changed setting

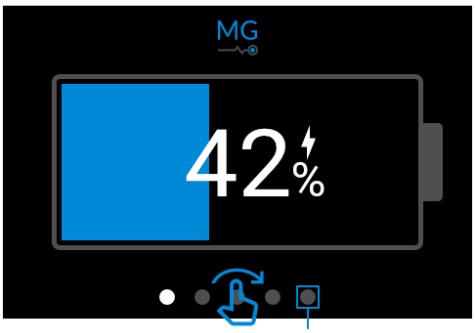
7/7



Press "Confirm" to save changes

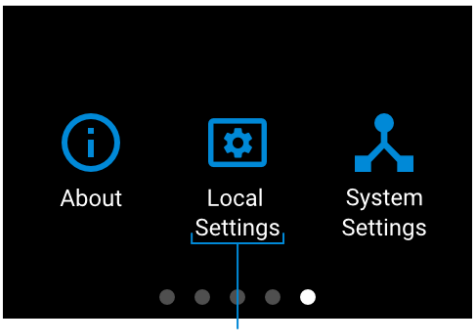
3.4 Changing temperature unit

1/7



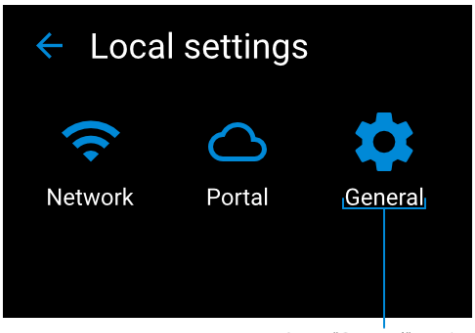
Swipe right to reach settings page

2/7



Open "Local settings" page

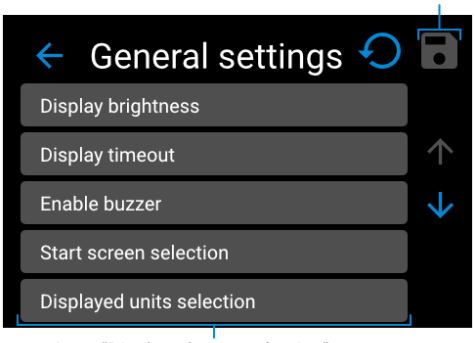
3/7



Open "General" settings

4/7

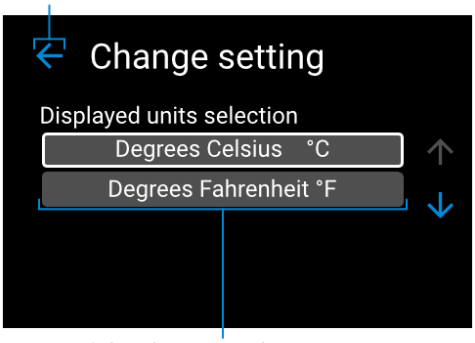
Save icon disabled



Open "Displayed units selection" page

5/7

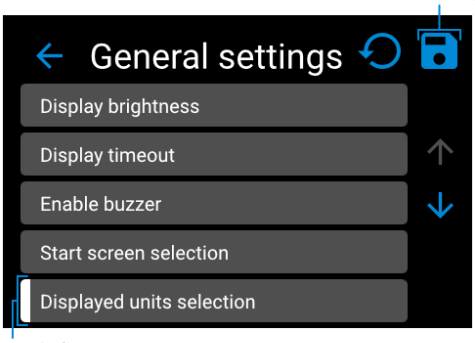
Leave page once setting is set as desired
Settings are not saved on change



Select the requested start page

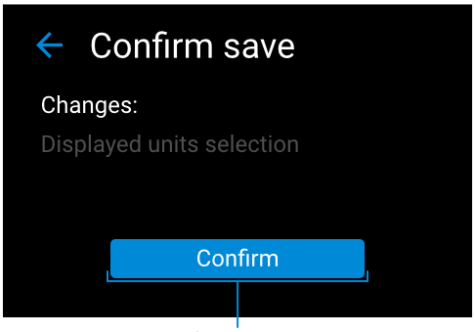
6/7

Save changes



Accent indicates changed setting

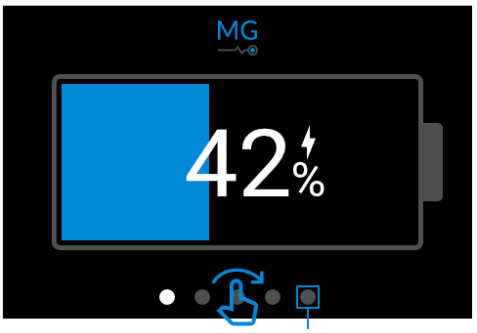
7/7



Press "Confirm" to save changes

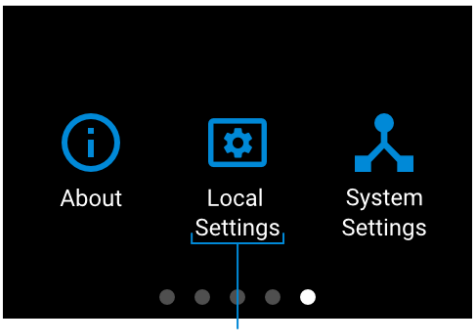
3.5 Changing W-Fi settings

1/7



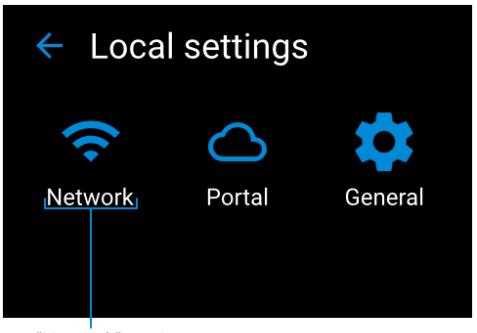
Swipe right to reach settings page

2/7



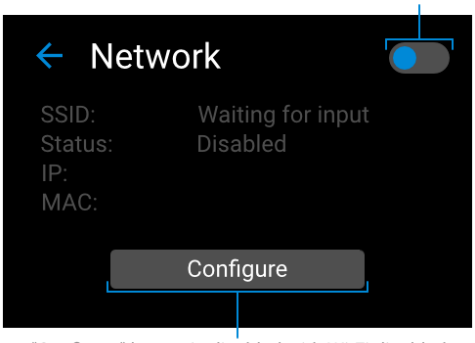
Open "Local settings" page

3/7



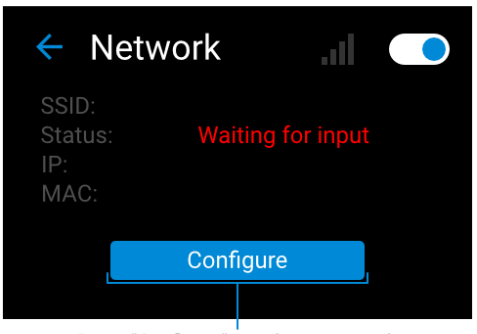
Open "Network" settings

4/7



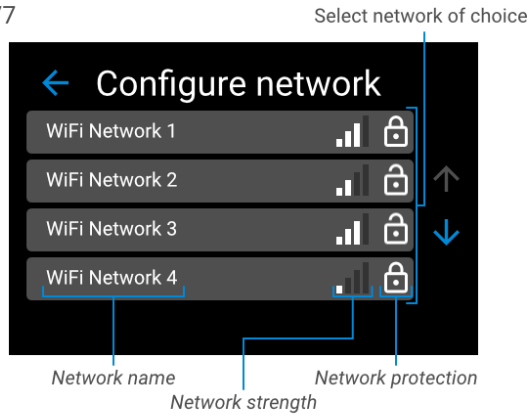
"Configure" button is disabled with Wi-Fi disabled

5/7

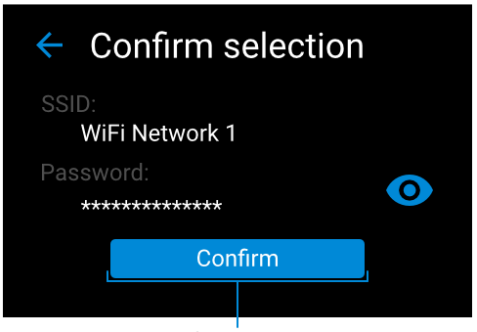


Press "Configure" to select a network

6/7

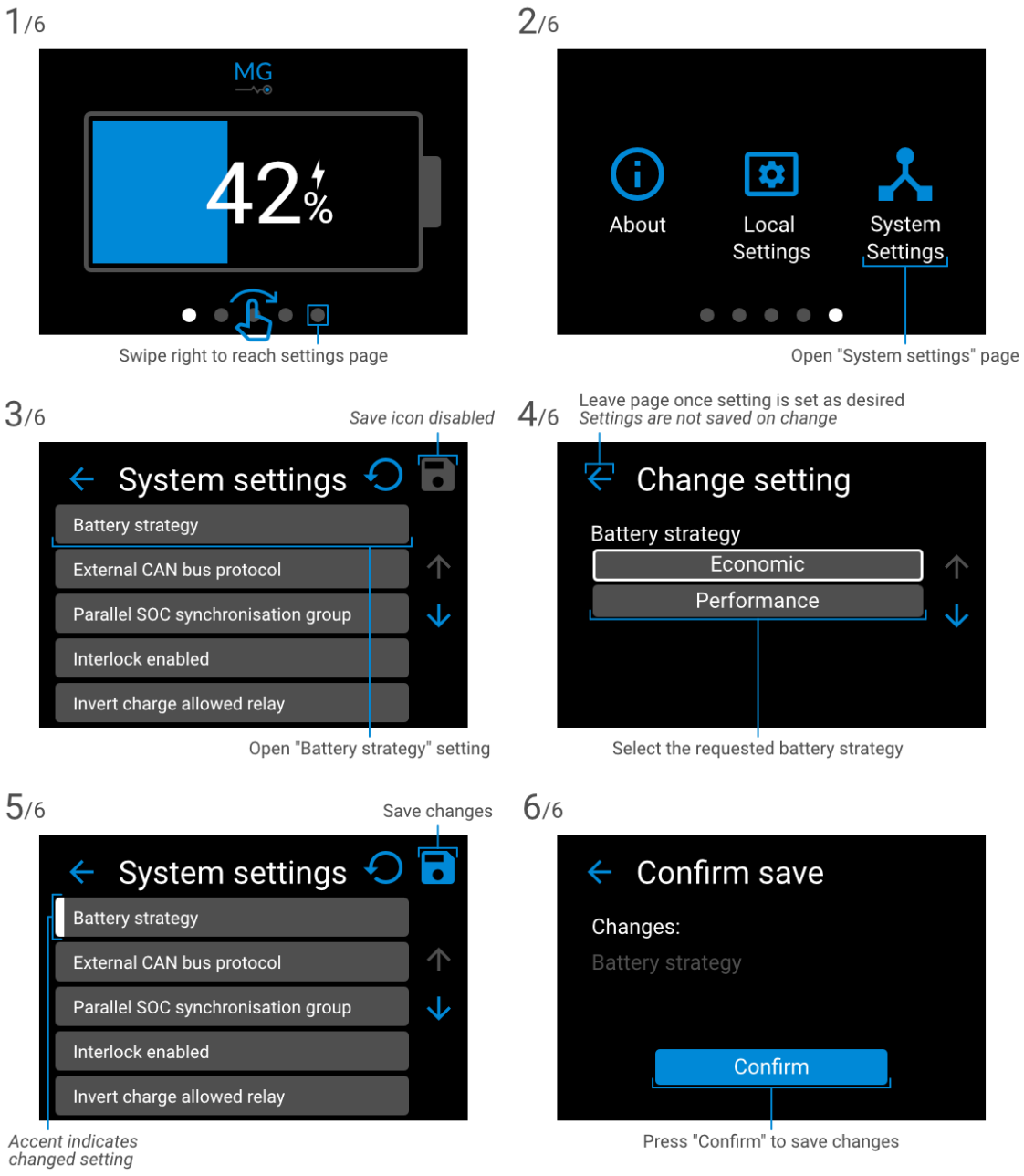


7/7



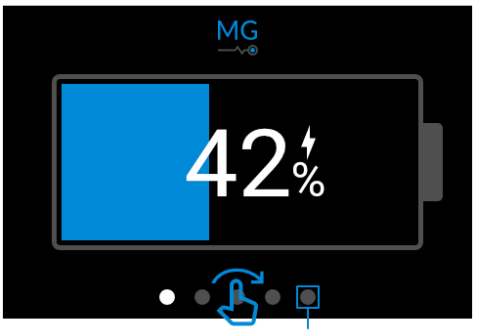
Press "Confirm" to save changes

3.6 Changing battery strategy



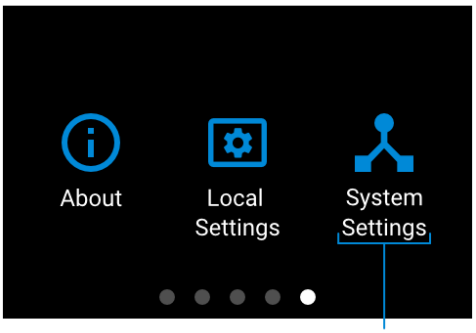
3.7 Changing current limit setting

1/7



Swipe right to reach settings page

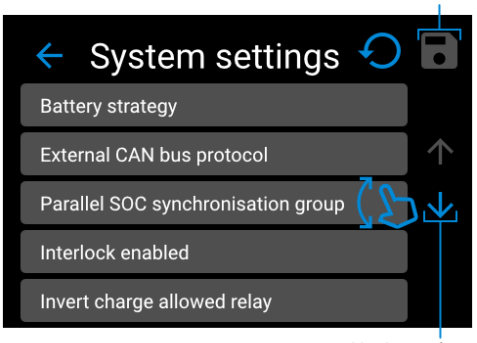
2/7



Open "System settings" page

3/7

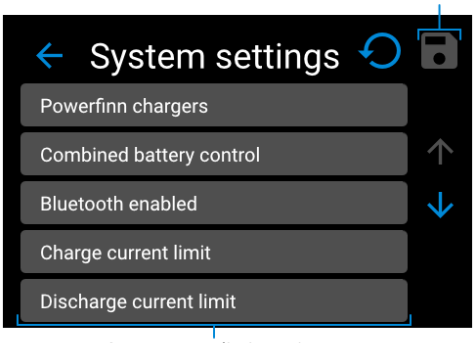
Save icon disabled



Navigate down to requested setting

4/7

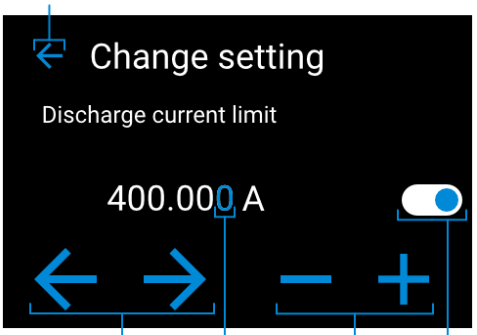
Save icon disabled



Open current limit setting

5/7

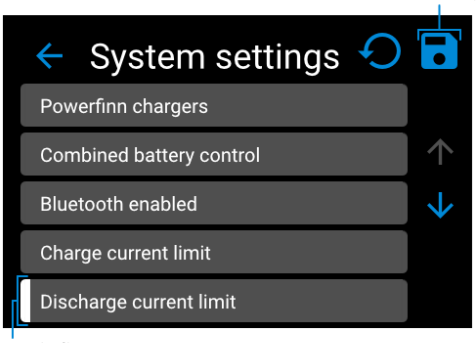
Leave page once setting is set as desired
Settings are not saved on change



Change selection
Selected digit
Increment digit
Setting enable

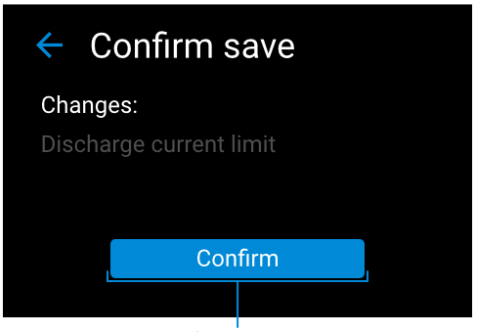
6/7

Save changes



Accent indicates changed setting

7/7



Press "Confirm" to save changes

4 CONTACT DETAILS

For specific questions please feel free to contact us.

MG Energy Systems B.V.
Foeke Sjoerdswei 3
NL-8914 BH Leeuwarden
The Netherlands

For support contact your local dealer:

https://www.points.mgenergysystems.eu/