

Installation and Operating Manual



CONTENTS

1	IMPORTANT information about this manual	5
1.1	Scope	5
1.2	Supported products	5
1.3	Documentation contents	5
1.4	Meaning of symbols	5
1.5	General safety information	6
1.6	Disclaimer	6
1.7	Appropriate use	6
1.8	Guarantee	7
1.9	Requirements for installers	7
2	Safety	8
2.1	Safety information	8
2.2	Data security	9
3	Preparation	. 10
3.1	Required tools and resources	. 10
3.2	Preparatory work	. 10
3.3	Preparation for installation	. 10
4	Technical Data	. 11
5	TESVOLT Energy Manager	. 12
5 5.1	TESVOLT Energy Manager Scope of delivery	. 12 . 12
5 5.1 5.2	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager	. 12 . 12 . 13
5 5.1 5.2 5.3	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface.	. 12 . 12 . 13 . 16
5 5.1 5.2 5.3 6	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit.	. 12 . 12 . 13 . 16 . 18
5 5.1 5.2 5.3 6 6.1	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure.	. 12 . 12 . 13 . 16 . 18 . 18
 5.1 5.2 5.3 6 6.1 6.2 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs	. 12 . 12 . 13 . 16 . 18 . 18 . 21
 5.1 5.2 5.3 6 6.1 6.2 6.3 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation.	 . 12 . 12 . 13 . 16 . 18 . 21 . 21
 5.1 5.2 5.3 6 6.1 6.2 6.3 6.4 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul.	. 12 . 12 . 13 . 16 . 18 . 21 . 21
 5.1 5.2 5.3 6 6.1 6.2 6.3 6.4 6.5 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply.	 12 12 13 16 18 21 21 21 21 22
 5.1 5.2 5.3 6 6.1 6.2 6.3 6.4 6.5 6.6 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network.	 . 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 21 . 22 . 22
 5.1 5.2 5.3 6.1 6.2 6.3 6.4 6.5 6.6 6.7 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network. RS-485.	. 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 22 . 22 . 22
 5.1 5.2 5.3 6 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network. RS-485. DIGITAL OUTPUTS.	. 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 22 . 22 . 22 . 23
 5.1 5.2 5.3 6 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network. RS-485. DIGITAL OUTPUTS. Connection of the Energy Manager	 . 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 22 . 22 . 22 . 22 . 23
 5.1 5.2 5.3 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7 7 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network. RS-485. DIGITAL OUTPUTS. Connection of the Energy Manager Unit setup.	 . 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 22 . 22 . 22 . 22 . 23 . 24
 5.1 5.2 5.3 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7 7.1 	TESVOLT Energy Manager . Scope of delivery . Connections and setup of the TESVOLT Energy Manager . TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network. RS-485. DIGITAL OUTPUTS. Connection of the Energy Manager Unit setup. Switch on the TESVOLT Energy Manager.	 . 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 22 . 22 . 22 . 22 . 23 . 24
 5.1 5.2 5.3 6 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7 7.1 7.2 	TESVOLT Energy Manager Scope of delivery Connections and setup of the TESVOLT Energy Manager TESVOLT Energy Manager user interface. Installing the unit. Network structure. Maximum cable lengths for TESVOLT Energy Manager inputs and outputs Top hat mounting rail installation. Connection of KC4S and DIO-Modul. 24 V power supply. Network. RS-485. DIGITAL OUTPUTS. Connection of the Energy Manager Switch on the TESVOLT Energy Manager Switch on the TESVOLT Energy Manager	. 12 . 12 . 13 . 16 . 18 . 21 . 21 . 21 . 22 . 22 . 22 . 23 . 23 . 24 . 25

7.4	Network configuration	28
7.5	User management	29
8	Topology setup	. 33
8.1	Setting up logical devices	33
8.2	Setting the topology	51
9	Setting up strategies and energy services	. 59
9.1	Procedure	59
9.2	Overview of energy services	59
9.3	Actuators and actuator groups	60
9.4	BASIC licence applications	65
9.5	Applications (PRO licence)	84
10	System monitoring in myTESWORLD	. 107
10.1	myTESWORLD user interface	. 107
10.2	User management	. 109
10.3	EMS configuration	. 112
10.4	Technician role	. 122
10.5	Customer view	. 126
11	Decommissioning	. 139
12	Firmware-Update	139
13	Analysis function and troubleshooting	140
13.1	Network analysis	. 140
13.2	Inputs and outputs analysis	. 140
14	Example energy service strategies (multi-use)	. 141
14.1	Peak shaving + self-consumption optimisation	. 141
14.2	Forecast-based charging + self-consumption optimisation	. 142
15	Maintenance	. 144
16	Disposal	. 144
17	Legal notice	. 144

1 IMPORTANT INFORMATION ABOUT THIS MANUAL

1.1 SCOPE

This document applies to the TESVOLT Energy Manager energy management system from version 3.0.3 or higher.

Read this manual thoroughly to ensure error-free installation, initial commissioning and maintenance of the TESVOLT Energy Manager. Installation, initial commissioning and maintenance must be carried out by qualified and authorised specialists. The Installation and Operating Manual should be kept close to the unit and must be accessible at all times to all individuals involved in installation or maintenance.

This Installation and Operating Manual applies to Germany only, without restriction. Ensure that you adhere to the applicable local legal regulations and standards. The standards and legal regulations in other countries may contradict the specifications in this manual. In this case, please contact the TESVOLT Service Line +49 (0) 3491 87 97 - 200.

1.2 SUPPORTED PRODUCTS

The TESVOLT Energy Manager can be used with the TS-I HV 80 battery storage system. Other compatible devices and systems can be found in our technical document "TESVOLT Energy Manager – Compatible Systems and Devices".



Firmware updates during a component's lifetime may change the communication protocol. If this causes any issues, please contact **service@tesvolt.com** or the **TESVOLT Service Line +49 (0) 3491 87 97 - 200**.

The TESVOLT Energy Manager software is constantly being improved and expanded. Automatic online updates may lead to changes in the design of the configuration menus and their use. Functions may also be added or removed.

1.3 DOCUMENTATION CONTENTS

- TESVOLT Energy Manager installation and operating manual (this document)
- "TESVOLT Energy Manager Compatible Systems and Devices" technical document

1.4 MEANING OF SYMBOLS

Symbols in the manual

This manual contains the following types of warnings and information:



DANGER! Warning notice indicating that death or serious injury may result if you fail to follow the instruction.



CAUTION! Warning notice indicating that injury may result if you fail to follow the instruction.



WARNING! Warning notice indicating that material damage may result if you fail to follow the instruction.



NOTE: This symbol indicates information relating to the use of the unit.

Symbols on the unit

The following types of warnings and information are used on the unit:



The CE marking indicates that the TESVOLT Energy Manager meets the requirements established by the European Union for attaching this marking.

UK The UKCA marking indicates that the TESVOLT Energy Manager meets the requirements established by the United Kingdom for attaching this marking.



Old electrical and electronic devices frequently contain valuable materials. Old devices should not therefore be disposed of in general waste. Take this unit to a municipal collection point for electronic waste.

1.5 GENERAL SAFETY INFORMATION



DANGER! Failure to observe the safety information can result in danger to life Improper use can lead to life-threatening injuries. Any person tasked with working on the system must

have read and understood this manual, particularly the section "2 Safety" on page 8. All safety information must be followed without fail.

Everyone who works on the TESVOLT Energy Manager must follow the specifications in this manual.

This manual cannot describe every conceivable situation. For this reason, the applicable standards and corresponding occupational health and safety regulations always take priority.

In addition, installation may also involve residual hazards under the following circumstances:

- Installation, commissioning and configuration has not been carried out properly.
- Installation, commissioning and configuration has been carried out by personnel who have not received the relevant training or instruction.
- The warnings and safety information in this manual have not been followed.

1.6 DISCLAIMER

TESVOLT GmbH assumes no liability for personal injury, damage to property, damage to the product and follow-on damage attributable to the following causes:

- Non-compliance with this manual,
- Improper use of the product,
- Repairs, opening the cabinet and other actions performed on or with the product by unauthorised and/or unqualified personnel,
- Use of non-approved spare parts.

Unauthorised modifications or technical changes to the product are forbidden.

1.7 APPROPRIATE USE

TESVOLT Energy Manager is an energy management system comprising a control unit including the relevant measuring equipment and corresponding software. The components were built in accordance with the current state of the art in technology and product-specific standards.

TESVOLT Energy Manager is designed for used with compatible battery storage systems and inverters. Any other use must be agreed with the manufacturer.

The TESVOLT Energy Manager is used for energy management in a commercial enterprise. The unit may only be operated in enclosed spaces. The working ambient temperature range for the

TESVOLT Energy Manager is 0 °C to 50 °C and the maximum relative humidity is 5 to 95 % (non-condensing).

The unit must not be exposed to direct sunlight or placed directly beside sources of heat.

The TESVOLT Energy Manager hardware must not be exposed to corrosive environments.

The hardware and software must not be tampered with.

Adherence to the specifications in this Installation and Operating Manual also forms part of appropriate use.

1.8 GUARANTEE

The current guarantee conditions can be downloaded from the internet by visiting **www.tesvolt.com**.

1.9 REQUIREMENTS FOR INSTALLERS

The locally applicable regulations and standards are to be adhered to for all work.

The TESVOLT Energy Manager may be installed only by qualified electricians with the following qualifications:

- Training in dealing with hazards and risks encountered when installing and operating electrical equipment and systems,
- Training in installing and commissioning electrical equipment,
- Knowledge of and compliance with the technical connection conditions, standards, guidelines, regulations and laws applicable on site,
- Knowledge of and adherence to this document and the associated product documentation, including all safety instructions,
- Successful participation in the TESVOLT Energy Manager certification training (information about training courses can be found at www.tesvolt.com; alternatively, please email academy@tesvolt. com).

2 SAFETY

2.1 SAFETY INFORMATION



DANGER! Life-threatening voltage results in danger to life and health due to electric shock.

- All work on the electrical devices may only be completed by qualified electricians.
- Do not operate the units when damp.
- Do not take the power supply components out of a cold environment into a warm environment immediately before commissioning.



CAUTION! Danger from working on open current transformer circuits. If current transformers are used in the system, care must be taken to ensure that the secondary circuit of the current transformer is short-circuited before working on the current transformer circuits. The current transformer circuit must never be operated open under any circumstances, as this can lead to personal injury and damage to the device.

Avoiding physical injury

- When working with the unit, note all safety notices attached to the packaging and the unit.
- Check whether there is no damage to the unit, any accessories and the power supply both before commissioning and regularly during continuous operation. If there is any doubt, have a qualified electrician check whether the technology is sound.
- If the unit is damaged or needs to be repaired, always leave this to authorised personnel.
- Make sure the accompanying power supply is used and the unit's mains voltage is identical to the mains voltage in your country.
- The Energy Manager may only be operated with the power supply provided or via the internal 24 V power supply from the TESVOLT PCS. Any damage caused by using a different power supply is not covered by the manufacturer/supplier guarantee.
- Do not open either the Energy Manager or the power supply! Removing or damaging the casing can expose live components and compromise the functioning of the unit.

Avoiding damage to the TESVOLT Energy Manager

- The Energy Manager has a protection class of IP20 and may only be installed indoors in dry, dustfree environments. Protect the unit from dust, moisture, aggressive substances and vapours.
- The ambient temperature must be between 0 °C and +50 °C.
- Do not touch any electronic components or connections on the unit as this may damage or destroy them. Ground yourself before working on the unit.
- If the unit or power supply is damaged or destroyed, it must be decommissioned immediately by a specialist.
- Only operate the unit if it is in a technically perfect condition.
- If there are error messages on the unit, always contact service@tesvolt.com or the TESVOLT Service Line +49 (0) 3491 87 97 200 directly.

2.2 DATA SECURITY

In order to be able to make full use of all the functions of the TESVOLT Energy Manager, it must be connected to the local network and the internet. Although the communication path between the Energy Manager and internet services is secured in accordance with the latest technology, there are security risks involved in connecting to a network or the internet: Third parties could access your network and misuse your energy data. Please take the same care with passwords that allow access to your network as you do when protecting data on your computer.

You should therefore operate the TESVOLT Energy Manager in a separate area on your network (subnet or VLAN) or on a completely separated network, e.g. using an LTE router. In any case, the network should be protected by a firewall. Remote access should only be possible via an encrypted VPN connection.

Protecting your personal energy data is extremely important to us. The myTESWORLD platform is therefore permanently kept up to date with the latest security technology in order to ensure that energy data can be retrieved only by the owner and participants who are entitled to do so.



NOTE: The data collected by the Energy Manager may deviate from the electricity meter data, depending on how the data is captured. If we read existing power measurement meters, the meter readings we use correspond to those of the meters. However, data from the Energy Manager are not to be used for billing purposes.

3 PREPARATION

3.1 REQUIRED TOOLS AND RESOURCES

TOOL/RESOURCE	USE
0.4 x 2.5 screwdriver	Connection to the terminal blocks
Laptop	Configuration of the TESVOLT Energy Manager
Wireless router if necessary	If there is no communications infrastructure available, an easy way to carry out initial configuration is with a wireless router.
Patch cable	Connection of laptop and TESVOLT Energy Manager and to router/LAN.
At least 3x IP addresses for LAN 1 network	You need at least 3 IP addresses to configure and commission the TESVOLT Energy Manager. If dynamic addresses are not assigned using DHCP, you must have static addresses set up.

3.2 PREPARATORY WORK

For all installed components:

- Update firmware to the most recent version,
- Activate Modbus TCP (e.g. SMA),
- Activate external control (e.g. Fronius).

3.3 PREPARATION FOR INSTALLATION

The TESVOLT Energy Manager is installed in control cabinets or in small installation distributors on a 35 mm mounting rail as per DIN 43880. It can be installed in any position.



4 TECHNICAL DATA



TECHNICAL DATA FOR THE TESVOLT ENERGY MANAGER

Electrical connection	
Voltage	12–24 V_{DC} (-15%/+20%), protected against reverse polarity
Current (at U = 24 V_{DC})	max. 210 mA
Power	max. 20 W (incl. max. 1 A USB power supply)
Interfaces	
2 x RJ 45 10/100 Ethernet (with independent MAC addresses)	2 x Ethernet 10/100 Mbit/s, RJ45
Micro USB jack (exclusively for image transfer to eMMC)	1 x micro USB (exclusively for image transfer to eMMC)
RS-485	1 x RS-485, terminal connections
USB	2 x USB 2.0 type A (total power draw from both jacks max. 1 A)
Micro HDMI	HDMI 2.0a (4K)
Other:	1 x PiBridge system bus, 1x ConBridge system bus
Terminal blocks/connections	
Wire cross-section	0.5–1.5 mm², 28–16 AWG
Stripping length of the cable	7 mm
Ambient conditions	
Operating temperature	-25 to +55°C
Max. (air) humidity at 40°C	max. 93% (non-condensing)
Storage/transport temperature	-25 to +85°C
Protection class	IP 20
Miscellaneous	
Casing dimensions (H $\rm x$ W $\rm x$ D)	96 x 45 x 110.5 mm
Weight	197 g (224 g incl. plug)
Place of installation	Indoors
Type of installation	35 mm mounting rail
Standards	EN 61326-1:2013, EN 55011 group 1 class A, EN 55011 group 1 class B

5 TESVOLT ENERGY MANAGER

5.1 SCOPE OF DELIVERY



TESVOLT Energy Manager KC4S





Pi-Bridge plug



TESVOLT Energy Manager DIO Modul



Serial number sticker



Installation and Operating Manual Energy Manager

ITEM	QUANTITY	DESCRIPTION
	1	TESVOLT Energy Manager KC4S
2	1	TESVOLT Energy Manager DIO module (with terminal block)
3	2	Terminal block 14-pin plug
4	1	Pi bridge plug
5	3	Serial number sticker
6	1	Installation and Operating Manual for the TESVOLT Energy Manager

NOTE: Keep serial number safe

Keep the serial number of your unit in a safe, accessible place in case of potential support enquiries. It is advisable, for example, to stick the sticker with the serial number in the control cabinet or in the manual.

POS.	DESIGNATION	DESCRIPTION			
A	X2 DIO	X2 DIO terminals			
B	X2 KC4S	X2 KC4S terminals			
C	LED DIO	DIO LED indicators			
	02/12	Digital outputs/digital inputs			
E	01/I1	Digital outputs/digital inputs			
F	LED KC4S 1	KC4S – 1 LED indicators			
G	LAN A	LAN 1 port			
Ð	LAN B	LAN 2 port			
0	LED KC4S 2	KC4S - 2 LED indicators			
	Micro-USB				
K	RS485				
	USB	USB A port			
M	USB	USB A port			
	X4 DIO	24 V power supply			
	X4 KC4S	24 V power supply			

5.2 CONNECTIONS AND SETUP OF THE TESVOLT ENERGY MANAGER

Description of the connections

X2 DIO

A		0 2 3 4	
\bigcirc	24 V I		
\bigcirc	0 V I		
3	0 V 0		
4	24 V 0		

X2 KC4S







X4 DIO

	_	Ð	\ominus	\ominus	Ð
				-0-	
			2	3	4
1	24 V				
2	0 V				
3	WD (no	it used, p	oreinsta	lled brid	dge to 🤇

X4 KC4S



\bigcirc GND 2 Data B

3 Data A

5.3 TESVOLT ENERGY MANAGER USER INTERFACE

The TESVOLT Energy Manager is operated via a graphic user interface. The display is viewed in a browser. The unit can be configured from the user interface and live values and other data can be read from here. The PRO and BASIC licence user interfaces differ in terms of the number of functions available in the Settings section **C**.

	=		(<u></u>
DIAGNOSTICS	System Settings / Network		
B Interfaces Y			y
* No.	Network Configuration		
112 INELWORK	Dynamic or static Network Configuration	O Dynamic (DHCP)	
💭 10s 🗉 OneWire		O Static Dynamic complement the network automatically by obtaining settings from a DHCP server (recommended). Static allows to manually configure the network addresses.	
	IP Address	192.168.50.36	
	Netmask	255.255.255.0	
	Gateway	192.168.178.1	
		Configure the Gateway Server	
	DNS Settings	Obtain DNS from DHCP Manually configure DNS address	
	Primary DNS Server	8888	
System Settings ~	Secondary DNS Server	8.8.4.4	
®0 License Management			
🚓 Network	-		
E Device Settings (E Save Neset		
⊛ Energy Manager →			
14 Topology			
ኤሮ Topology ਦੇ Device Replacement			
ليات Topology ح Device Replacement ⊡ Energy Services			
1/2 Topology e ² Device Replacement Image: Energy Services Image: Services	-0 -0		
Lif Topology c ² Device Replacement Life Energy Services Life User Management	-C -0		
34 Topology e ² Device Replacement Intergy Services Itser Management	C C		
 Japology Porvice Replacement Energy Service User Managements 	C 0		
52 Exposingy e ² Device Replacement Energy Services El User Menagements	-0 -0		
52 Topology e ² Device Replacement Device Newsgeneers El User Menagements	C		
Signatogy Torice Replacement Dencys Service User Managument	-C -Ü		0

PRO-Licence

	≡		f-~~ Je A
DIAGNOSTICS	System Settings / Network		
투 Interfaces 🗸			g
🚓 Network	Network Configuration		
C 106	Dynamic or static Network Configuration	Dynamic (DHCP) Static	
E OneWire		Dynamic configures the network automatically by obtaining settings from a CHCP server (recommended). Static allows to manually configure the network addresses.	
	IP Address	192.168.90.55	
	Netmask	255.255.255.0	
	Gateway	192.168.178.1	
		Configure the Gateway Server	
	UNS Settings	Obtain DNS from DHCP Manually configure DNS address	
SETTINGS	Primary DNS Server	111.1	
System Settings ~	Secondary DNS Server	1.1.1.2	
© License Management			
郄 Network	🖹 Save 📀 Reset		
茬 Device Settings 《			
Su2 Topology			
← ² Device Replacement			
Energy Services			
✓ Load-Peaks			
Iime Series Prohies			
Formula blocks			
신S User Management			
	e		_
ę			1241

a	Expanding and collapsing the menu	Show or hide the menu		
b	Analysis	Information on the status of the networks, the inputs and outputs, and the 1-Wire input		
C	Settings	Configuration of the Energy Manager and logical devices		
d	User settings	Info on the cache, user settings and logout of current users		
e	Menu display	Reduced menu display with symbols or full display including text		
ſ	Bright/dark display	Switch between bright or dark user interface		
g	Sprache	Sprachumstellung Deutsch/Englisch		
h	User settings	Info on the cache, user settings and logout of current users		
0	Firmware version	Shows the version of the firmware of the TESVOLT Energy Manager		

6 INSTALLING THE UNIT



NOTE: When connecting new units, the Energy Manager must be taken out of operation and be voltage-free.

6.1 NETWORK STRUCTURE

Note that in particular the LAN 1 network is separated from the internal network, as with a guest network. A firewall or VLAN can also be used here. An alternative option is separate internet access, e.g. via an LTE router.

TS-I HV 80

The illustration shows a typical communications architecture setup with a TS-I HV 80.



SMA STPS X

The illustration shows a typical communications architecture setup using an SMA STPS X inverter together with a TESVOLT TS HV 30-80 E storage system.



SMA Inverter Manager

The illustration shows a typical communications architecture setup with an SMA Inverter Manager. This allows an SMA STPS 60 to be used with a TESVOLT HV storage system, for example.



6.2 MAXIMUM CABLE LENGTHS FOR TESVOLT ENERGY MANAGER INPUTS AND OUTPUTS



STOP

NOTE: Disruption to data transfer due to insufficient shielding of energy cables

Insufficient shielding of energy cables produces an electromagnetic field during operation which can disrupt data transfer through network cables. When laying network cables without separators, a minimum distance of 200 mm must therefore be maintained from unshielded energy cables. When laying network cables with separators, the following minimum distances apply depending on the separator material: aluminium 100 mm, steel 50 mm.

INPUT/OUTPUT	MAXIMUM CABLE LENGTH
Power supply	3 m
Digital inputs/outputs	10 m
Ethernet 10/100Mbit	30 m
RS-485	30 m

6.3 TOP HAT MOUNTING RAIL INSTALLATION

Install the TESVOLT Energy Manager in a control cabinet or small installation distributor on a 35 mm mounting rail as per DIN 43880. It can be installed in any position. Note the installation dimensions shown in the illustration in section "3.3 Preparation for installation" on page 10 as well as the maximum cable lengths in the previous section.

6.4 CONNECTION OF KC4S AND DIO-MODUL

WARNING! The DIO module must only be connected on the left side using the black PiBridge plug. If a module is connected on the right side (the connect port), the units may be damaged or destroyed.



Connect the PiBridge to the PiBridge connections on the KC4S and DIO module as shown.

6.5 24 V POWER SUPPLY



WARNING! Do not connect the KC4S to the power supply until all other units and connectors have been connected. If the KC4S is already connected to the voltage source and a unit is connected later, it is possible that the KC4S and/or connected units may be damaged or destroyed.



WARNING! Make sure that the wiring is correct, otherwise the KC4S and/or connected units may be damaged or destroyed.

Connect the 24 V power supply of the KC4S and the DIO module. If possible, consolidate the connections for the functional ground and connect them to an appropriate grounding point. Please note that the supply line must be switchable. The fuse protection should be 3 A.



Operating voltage 24 V		
Power	max. 20 W	
Wire cross-section	0.5–2.5 mm², 28–16 AWG	
Cable length	max. 3 m	
Stripping length of the cable	7 mm	

6.6 NETWORK

Connect the LAN A connection of the Energy Manager 6 for the internet connection to the LAN 1 switch, and then connect the LAN B connection () to the LAN 2 switch (dedicated Modbus network). If units cannot be connected to the dedicated network (LAN 2), they can also be connected to the LAN 1 network. When configuring the DHCP server, make sure that an infinite lease time is set for the IP of the connected units of the topology. Otherwise, a connection failure of a ModBus unit may result in it receiving a new IP from the DHCP server and it will no longer be possible to control the units with the Energy Manager. If you do not use a DHCP server as recommended, a fixed IP address must also be assigned to all units manually.

6.7 RS-485

The integrated RS-485 interface ((1)(2)(3) can be used, for example, to connect Modbus RTU units. Terminal assignment can be found in the section "Description of the connections" on page 13 et seq. Please note the technical specifications for the connection.

Transmission speed	10/100 Mbit
Cable length	max. 30 m

Wire cross-section 0.5-1.5 mm², 28-16 AW			
Cable length	max. 30 m		
Stripping length of the cable 7 mm			
Terminal tightening torque	0.2 Nm		

6.8 DIGITAL OUTPUTS

The digital outputs ① ① ...⑦ and ⑤ ① ...⑦ can be used, for example, to connect relays (e.g. for heat pumps that are smart grid ready) or NA box signals. Terminal assignment can be found in the section "Description of the connections" on page 13 et seq. Please note the technical specifications for the connection.

No. of channels	14
Max. current	500 mA in total
Max. voltage	$24 V_{\text{DC}}$
Wire cross-section	0.5–1.5 mm², 28–16 AWG
Cable length	max. 10 m
Stripping length of the cable	7 mm

6.9 CONNECTION OF THE ENERGY MANAGER



2

DANGER! Life-threatening voltage

- Connect the Energy Manager when it is voltage-free.
- Make sure the unit cannot be switched back on.
- Do not supply the 24 V power supply unit with 230 V mains voltage until the final step.
- Connect the 24 V power supply in accordance with section "6.5 24 V power supply" on page 22.

Now, connect the grid connections of the TESVOLT Energy Manager and all units connected in the network to the switches according to sections "6.1 Network structure" on page 18 and "6.6 Network" on page 22. Check all cables beforehand with a network tester. For use with a TS-IHV80, please refer to the "Establishing communication links" section in the Installation and Operating Manual for the model.

7 UNIT SETUP

In systems with TESVOLT battery inverters, please follow the commissioning instructions provided in the relevant installation and operating manual.

7.1 SWITCH ON THE TESVOLT ENERGY MANAGER

Follow the steps below to switch on the TESVOLT Energy Manager:

- Connect the 24 V power supply.
 - > The LED of the POWER button flashes during start-up.

> The LED of the POWER button lights up continuously when the system has successfully started up.



2

NOTE: Email notification of inactivity

If the unit has been inactive for more than 45 minutes, it will not send a heartbeat to the myTESWORLD portal. In this case, you will receive an email prompting you to take action.

When you receive this email, please check that the unit has started up correctly and is connected to the network.

Check activity and connectivity

Follow the steps below to check whether the TESVOLT Energy Manager has correctly started up and is connected to the network:

Check that the power LED on the unit is lit up.

The power LED is not lit up:

- Check the voltage supply (see "6.5 24 V power supply" on page 22).
- If necessary, disconnect and restore the power supply (see "6.9 Connection of the Energy Manager" on page 23).
- The unit may be defective. Contact TESVOLT Service.

The power LED is lit up:

- Go to 2 and follow the instructions.
- Check that the network LEDs on the LED inputs are flashing (see "Description of the connections" on page 13).

The network LEDs are not flashing:

- Check the network cabling on the unit and correct it if necessary (see "6.6 Network" on page 22).
- Restart the unit if necessary.
- The unit may be defective. Contact TESVOLT Service.
- The network LEDs are flashing:
- Go to 3 and follow the instructions.

3 Check the unit connectivity in the user interface (see "Checking network configuration and status" on page 29).

Unit not connected:

- Check network settings such as firewall and IP.
- Check internet availability.
- Contact TESVOLT Service if necessary.

The unit is connected:

It is operating correctly.

7.2 SCANNING THE NETWORK ENVIRONMENT

Scan the network environment using an IP scanner, e.g. the Advanced IP Scanner.

In the IP scanner results list, double-click on the IP address of the TESVOLT Energy Manager (manufacturer: Kunbus GmbH), or copy the IP address and paste it in the browser address bar.

7.3 REGISTRATION AND LICENSING



Connect your laptop to the dedicated Modbus network to access the TESVOLT Energy Manager user interface. In the factory configuration, the unit is pre-configured for the use of a DHCP server.

WARNING! Please note that the PRO licence is a fee-based subscription. If you do not extend the licence, all PRO functions will cease at the end of the licensed period. In some circumstances this can result in high subsequent costs.



STOP

2

 \prod



Enter the IP address of the TESVOLT Energy Manager in a browser to access the configuration interface. Before you can commission the Energy Manager, the unit must be registered with a licence. To do this, click on the "Registration" button (a).

5	©¬	Register	
	Choose	e a username and password and enter your TESVOLT Energy Manager license key.	
	<u>گ</u>	k_docht@byom.de	
	ð	gyhna9-ragbEj-hezkin	
	0	gyhna9-ragbEj-hezkin 📀	
	©~	 MFPWz8oZrm_8GUQTw9UMJ6CxrmT9n1S_U2Zz2qhtTnglj-XhgBt8C_FFlaUDC1004z5N4p- u60w6Bknyxum9p_PkjYUVcQ47KBVIV0MWBAGNk23u0ayzkzhsp65srM8GalL0W- gxzfWyzFfcrllerRoQj9Z3QsMjHykRdL_zlBQ07hQ89n12yPLjzdYUR24tWA- 	
		NmNXRNYejNLUYIVFaQagS4MYntYHiwZmhfmS8CHuzhjMnduS6MsluCAGRpR9YXtQDizQGLCiO9YTdrNFHYFg9t FpG_JGVarXfH6Nv-f-f_w	
	Enter y	our license key or copy it from the license file sent to you and then paste it here. You can also upload the license file using the button below.	
	Reg	Go to Login	

Enter a user name in the input field a and enter the password for the user in the fields b. Then copy the character string of the licence key into the field c. Instead of copying the licence key into the input field, you can also upload it as a TXT file. To do this, click on the "Upload" button d and select the relevant file. Then click on the "Register" button c.

Login Username Password Login Forgot your credentials? Initial registration completed Username Registration account. Please log in if you already have an user account. Otherwise, contact the administrator, who can create additional users. Registration

On the right, green half of the login window, you will now see the message "Initial registration complete". Log into the unit again with the newly created user details.



(6)

NOTE: Serial number displayed

The serial number is displayed in the bottom right-hand corner of the TESVOLT Energy Manager login page. This number is important for potential support enquiries. You can also find it on the stickers included in the delivery (see section "5.1 Scope of delivery" on page 12).

Licence management

0	
	/

NOTE: After a PRO licence has expired, a BASIC licence must be installed for operation

When a TESVOLT Energy Manager has been operated with a PRO licence that has not been extended, a BASIC licence must first be installed in order to continue operating the Energy Manager with the free BASIC functions.

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NOTE: Getting a licence reset by Support

To have your licence reset, please contact the Support team by emailing **service@tesvolt.com** or by calling the **TESVOLT Service Line +49 (0) 3491 8797-200**.

	=	s the second sec
DIAGNOSTICS	System Settings / License Management	
🖶 Interfaces 🔸	© License Management	
	License Information	Edit License
	TESVOLT ISSUER To NOR MARK - Tesvolt TYPE Basic - D TV-010-9499312	License Key Ge
SETTINGS	LICENSE ID	Enter your license key or copy it from the license file sent to you and then paste it here. You can also upload the license file using the button below.
🕸 System Settings 🗸 👻	1b0c4be9-c1f5-11eb-b47f-7f926dbe554d	Submit Cancel
👓 License Management 😋	May 31, 2021 11:46 AM May 31, 2021 11:46 AM May 31, 2121 12:46 PM	
لم Network		
🔁 Device Settings 🔇		

Access the licence management by clicking on "Licence Management" in the side menu (a). In the licence information section you can find details such as your licence type (b) and the period of validity (c). If you would like to enter a new licence (e.g. if you subsequently purchase a PRO licence), you can either copy the licence key into the relevant field (e) or upload a text file with the key by clicking on the "Upload" button (f).

Then click on "Submit" d.

7.4 NETWORK CONFIGURATION

Setting up the network configuration

NOTE: In dynamic network configuration (factory setting), the IP address of the TESVOLT Energy Manager is automatically assigned by the DHCP server. Determining the IP numbers of the Energy Manager and the other units can be very time-consuming. This is a significant drawback especially when it comes to error diagnosis. For this reason, the use of static network configuration is recommended. Note the IP addresses used and what they are used for in a separate document.



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ESVOLT	=		C Ex	1 2
DIAGNOSTICS	System Settings / Network			
F Interfaces <	↔ Network Configur	ation		
	Dynamic or static Network Configuration	Dynamic (DHCP) Static pratic configures the network automatically by obtaining settings from a DHCP server (recommendum). Static allows to manually configure the network addresses.		
	IP Address			
	Netmask			
SETTINGS	Gateway			
🕲 System Settings 🛛 🖌	DNS Settings	Obtain DNS from DHCP Manually configure DNS address		
 Device Settings < Energy Manager < 	Primary DNS Server	8888		
요. User Management	Secondary DNS Server	8.8.4.4		
	9	Set the secondary DNS Server		
	Save 🛞 Reset			

If you would like to use a DHCP server (factory setting), in the "Settings" section of the side menu, click on the "System Settings" menu item and then "Network". For the first item "Dynamic or static Network Configuration", click on the option "Dynamic (DHCP)" a. This option enables fully automatic network configuration of the unit, meaning the Energy Manager automatically obtains an IP address, netmask and gateway when the DHCP server is started. You can also configure the following settings: b automatic DNS configuration yes/no. If automatic DNS configuration is set to "no": c primary DNS server, d secondary DNS server. To apply the changes, click on "Save" c.

a Opynamic (DHCP) Configuration Static Dynamic ded, Static allows to manually configure the network addresses. IP Address 192.108.178.2 Static Static	
IP Address IP Address I Address IP Addres IP Address IP Address IP Address IP Addres IP Addres	
SETTINOS Set a Netmask	
System Settings Gateway Gateway Gateway Gateway Configure the Gateway Server	
Image: Settings Image: Settings	
User Management Primary DNS Server B8.8.8 Set the primary DNS Server	
Secondary DNS Server 8.8.4.4	

To adjust the static network settings of the ethernet connection, click on the "System Settings" menu item in the side menu and then on "Network". For the first item "Dynamic or static Network Configuration", click on the option "Static" (a). You can now configure the following settings for the static network configuration: **b** the future IP address of the Energy Manager, **c** the netmask of the network, **d** the IP address of a gateway (usually the router), **e** primary DNS server, **f** secondary DNS server. To apply the changes, click on "Save" **g**.

	=	6 Fz L
DIAGNOSTICS	Interfaces / Network	
 Interfaces da Network C IOs ED OneWire 	Uplink Network Interface eth8: edfress: 122.106.128.31/24 edfress: 122.305/f1fe65ica6d/64 tW edfress: 78183/d5166ica:66	Uplink Network Connectivity There is a working route to the internet. BKS resolution is working. The myTESMORLO-Plattform is online. Retain
SETTINOS	TESVOLT Energy Manager Network Network 1s. down.	TESVOLT Energy Manager Network Connectivity Reload
 System Settings Device Settings Energy Manager ① User Management 	Maintenance Network Interface twel: eddress: 10,55,94/32 address: fc80:102a12a261105:7697/64 Interface twel: address: 10,81,254/32 address: fc80:104a3120651976c:bb8c/64	Maintenance Network Connectivity Maintenance connection is active. Reload

Checking network configuration and status

To check the network settings and the status of the connections and the network, click on "Interfaces" in the side menu and then on the item "Network". In the "Uplink Network" section a you will find the current IP address (IPv4) of the TESVOLT Energy Manager on the second line. In the "Uplink Network Connectivity" section b you can see if there is a connection to the internet, if a DNS server is available and if there is a connection to the myTESWORLD platform. The other sections are relevant for servicing.

7.5 USER MANAGEMENT

Both the TESVOLT Energy Manager (hardware) and the myTESWORLD portal have their own user management. In order to monitor and control a system using myTESWORLD, you must first create a user on the TESVOLT Energy Manager and then in the myTESWORLD portal.

Creating users

NOTE: Protect access to user accounts by using secure passwords (at least 8 characters long including lower case and upper case letters, numbers and special characters). Preferably use different passwords for accessing the TESVOLT Energy Manager and the myTESWORLD platform.



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NOTE: In order to remain capable of swift responses during servicing, we recommend always creating a user account for the TESVOLT service team. You can then provide us with the access data when servicing is required.

When the TESVOLT Energy Manager has started up again, access the user interface again (http://IP address of the unit).

	ŧ				C	A.
DIAGNOSTICS						
🖗 Interfaces 🗸						
a Network	밄 User management					
iOs	Registered users	Add user	accounts			
DneWire		Add new as	counts by creating a	username that does not already exist and by assigning a		
	User	password, 1 password, 2	The new user can log i	in with these credentials and will have to change the		
	k_docht@byom.de	Userna	me	Schmidt		
	Thomas			Assign a username		
	ww-support	Passwo	ord	pozbit-cY/ Starkes Passwort		
				Assign a password		
		Confirm	n password	pozbit-CYI Starkes Passwort		
SETTINGS			C			
System Settings <		Add		Cancel		
😂 Device Settings 🛛 🔇						
Energy Manager <						
岛 User Management						

To set up an additional user, click on "User Management" in the side menu. In the window this brings up, you can set up additional users using the dialogue box on the right-hand side under "Add user accounts". Enter the relevant name in the field "Username" and the corresponding password in the two following fields **b**. Finally, click on "Add" **t** to save the details.

Deleting users



Click on "User Management" in the side menu. Then click on the "Delete" button (a) next to the entry in the user list you wish to delete, and confirm the action in the following dialogue box. The user is now deleted.

Editing users

 $\left(2\right)$

TESVOLT	=				
- ENERGY MANAGER -	-				
DIAGNOSTICS	Device Configuration / Charge-Point				
🖣 Interfaces 🗸	Mater Inverter Charge-Reint CPIC				
蟲 Network	index inverter charge-rom orie				
C 10s	Existing Configurations				
E OneWire	Add new Charge-Point				
	Online				
	Driver Name	Device Name	S/N	Status	Model



	=			6 🖷 2
DIAGNOSTICS				
투 Interfaces ~	User Settings			
品 Network				
C 10s	Username: k_docht@byos.de	New username	New username	
➡ OneWire	In order to change your password and/or your user name or to delete your user account, please enter your current password		If you just want to change your password, please leave this field blank.	
	Password ••••••	New Password	New Password	
	You cannot delete a user when it is the only one.		If you just want to change your username, please Jeave this field blank.	
	Delete Account	Confirm new password	Confirm new password	
		Save	Cancel	
SETTINGS				

To make changes to the name or password of the current user, you must first enter your password (a). You can then enter a new user name for the active account in the field (b). If you would (also) like to change the password, enter a new password in the fields (c). Then click on the "Save" button (d) to save the changes.

Resetting a password



If you have lost your password, user name or both, click on "Forgot your credentials?" (a) on the login page.



In the next dialogue box, enter your user name in the field "Username" (a) or, if you have forgotten it, a new one. In the two fields "Password" (b) and "Confirm password" (b), you must enter your new password. In the field "PUK" (c) the PUK must now be entered. If you did not write down the PUK, you can find the PUK on a black sticker on the left side of the KC4S casing (on the side of the DIO). After entering the PUK, click either on "Create account" (d) if you also want to set up a new user name, or on "Reset password" (e) if you only need to reset the password.

8 TOPOLOGY SETUP

8.1 SETTING UP LOGICAL DEVICES

The devices whose setup is described in this section are referred to as "logical devices". In contrast, all devices that you will go on to set up in the topology (see section "8.2 Setting the topology" on page 51) are described as "physical devices". Later, logical and physical devices will be linked with each other, as described in the section "Procedure – Adding physical devices" on page 52.

Meter configuration

3

1	DIAGNOSTICS	Device Configuration / Meter				
	Finterfaces Y	Meter Inverter Charge-Point G	SPIO			
	C IOS	Sector Existing Configurations				
	OneWire	Add new Meter				
		Online				
		Driver Name	Device Name	S/N	Status	Model

Log into the TESVOLT Energy Manager and access the page "Existing Configurations" (Meter). In the side menu, click on: "Device Settings" \rightarrow "Meter" and then on the button "Add new Meter" (a).

	=			6
DIAGNOSTICS	Device Configuration / Meter / New			
🖗 Interfaces 🗸 🗸	Add new Meter			
蟲 Network				
C 10s	Show all Configurations		Modbus TCP Assistant	
OneWire	Select a model	Choose a model	¢	
		Please select a model for which the device driver should be installed.		

On the window that appears, click on "Choose a model" and select the type of meter used from the drop-down menu (e.g. Janitza UMG 604).



Fill in the fields and then click on the "Save" button (a). If you know the IP address of the meter and this is already in operation, you can simply copy the address using the Modbus TCP Assistant, rather than entering it. To do this click on the button (b) and select the IP address of the meter from the drop-down menu. The address is saved to the clipboard and can be pasted in the field "Modbus TCP Address".



NOTE: If you are using a meter from Janitza or SIEMENS, please note:

- The default value for the port is :502 (e.g. 192.168.29.8:502).
- The default Modbus slave ID is 1. In Janitza meters it can be changed if necessary in the meter configuration.
- 4 The page "Existing Configurations" is now loaded again. If the added meter is already in operation and online, the new meter will appear in the "Online" list after 20 seconds at the latest. If the meter is not yet online/operational, it is found in the "Offline" list.
- 5 The second meter and any additional meters can then be added in the same way. The meter installation location (utility grid transmission/inverter) is assigned during the topology assignment (see section "8.2 Setting the topology" on page 51 et seq.) and for TS-I HV systems with backup functionality, additionally in the configuration of the PCS.

Battery inverter configuration



Log into the TESVOLT Energy Manager and access the page "Existing Configurations" (Inverter). In the side menu, click on: "Device Settings" \rightarrow "Inverter" and then on the button "Add new Inverter" a.

	=			C
DIAGNOSTICS	Device Configuration / Inverter / New			
🛡 Interfaces 🗸 🗸	8			
蟲 Network	a Add new Inverter			
C 10s	Show all Configurations		d Modbus TCP Assistant	
OneWire		a		
	Select a model	Choose a model	\$	
		Please select a model for which the device driver should be installed.		
SETTINGS				
l System Settings 🔹 📢				
🔁 Device Settings 🗸 👻				
6) 14-1				

On the page that appears, click on "Choose a model" (a) and select the type of inverter used from the drop-down menu (e.g. TESVOLT PCS).

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		э.	
_			

	=		6 Hz L
DIAGNOSTICS	Device Configuration / Inverter / New		
투 Interfaces 🗸			
蟲 Network	Add new Inverter		
C 10s	Show all Configurations	d [/] Modbus TCP Assistant	
OneWire			
	Select a model	TESVOLT PCS \$	
		Please select a model for which the device driver should be installed.	
	Modbus TCP Address of Inverter CCU (anybus)	192.168.29.210:502	
		The Modbus TCP address of the Inverter CCU (anybus). The Mode form "hostsport". Host is an IPv4 address, an IPv6 and bostsmare. And not is nitibe a delenation	
	Modbus Slave ID of Inverter CCU (anybus)	0 0	
		offive power per IPU is 86000 W. Example: -86000 for 86 kW discharging	
		0 0	
		Enter the number of installed IPUs here.	
	Q-Control	FUNDFREQMODE_DISABLED \$	
		The Q+Control config of the inverter. Allowed values are: 0 = disabled, 1 = Qref, 2 = PCF, 3 = Vref	
	Symmetry Mode	SYMMODE_DISABLED \$	
		The symmetry mode config of the inverter. Allowed values are: 0 = disabled, 1 = negative sequence 2 = positive sequence, 3 = zero negative sequence	
	Harmonic Mode	HARMMODE_DISABLED \$	
		The harmonic mode config of the inverter. Allowed values are: 0 = disabled, 1 = delta, 2 = Y, 3 = Y delta	
	a Disable Eco Mode		
	Save		
<			

Fill in the fields and then click on the "Save" button (a). If you know the IP address of the inverter and this is already in operation, you can simply copy the address using the Modbus TCP Assistant, rather than entering it. To do this click on the button (b) and select the IP address of the inverter from the drop-down menu. The address is saved to the clipboard and can be pasted in the field "Modbus TCP Address".



NOTE: SMA Data Manager

You can also use the configuration wizard to set up the SMA Data Manager.

TESVOLT	=		
ENERGY MANAGER	Device Configuration / Inverter / New		
	Add new Inverter		
品 Network			
	Show all Configurations	& Modbus TCP Ass	sistant
			_
OneWire			
	Select a model	TESVOLT PCS +	
		Please select a model for which the device driver should be installed.	
	Modbus TCP Address of Inverter CCI	J (anybus) 192.168.29.210:502	
		The Modibus TCP address of the Inverter CCU (anybus). The Modibus TCP Address is a string of the form 'hostport'. Host is an IP-V4 address, an IP-V4 address enclosed in square brackets, or a hostmane. And port is either a decimal port number or a service name.	
	Modbus Slave ID of Inverter CCU (an	ybus) 0 0	
		Enter the Modbus TCP Slave ID. The ID should be in the range from 1 to 247, and 0 as well as 255 are allowed too. If omitted, 1 will be taken as default value.	
	Float charging power in W	0	
l System Settings		Enter the float charge power in W.	
←	Power-Limit-Mode is active		
⇒ Device Settings	Lower power-threshold for Power-Li	nit-Mode in W 0	
	Unner nower-threshold for Power-Li	mit-Mode in W	
	opper porter til canola to r orter ta	Enter the second default power limit of the inverter in W.	
🛱 - Charge Deint	-		
V Charge-Point	Select a BMS (optional)	······································	
@ GPIO	fact such as a		
	Select a NA-Box (optional)	Y	
	Charging power limit	0	
		The maximum value of the active power per IPU is 86000 W. Example: 86000 for 86 kW charging	
	Discharging power limit		
	Discusion ging power mine	The maximum value of the active power per IPU is 86000 W. Example: -86000 for 86 kW discharging	
		power limit.	
	Number of IPUs	Enter the number of installed IPI is here	
	Q-Control		
		The Q-Control config of the inverter. Allowed values are: 0 = disabled, 1 = Qref, 2 = PCF, 3 = Vref	
	Symmetry Mode	SYMMODE_DISABLED	
		The symmetry mode config of the inverter. Allowed values are: 0 = disabled, 1 = negative sequence 2	
	Harmonic Mode	HARMMODE_DISABLED	
		The harmonic mode config of the inverter. Allowed values are: 0 = disabled, 1 = delta, 2 = Y, 3 = Y	
	Disable Eco Mode	delta	
	Sore Resel		

- 3 Show all Configurations > Back to overview of battery inverters
- **b** Select a model > Drop-down menu to select the type of battery inverter
- C ModbusTCP Address of Inverter CCU (anybus) > Enter the Modbus TCP address of the battery inverter here. This is stored on the SD card and is also shown on a sticker on the CCU.
- **Modbus Slave ID of Inverter CCU (anybus)** > Modbus slave ID of the inverter. The default value is "0".
- Float charging power in W > Enter what power should be used for float charging the batteries (e.g. 1,000 W per IPU plus 1,000 W if a transformer is present).
- Power-Limit-Mode is active > Using the power limit function, the inverter can limit the power via the MIO (e.g. physical peak shaving with control speed <1 ms). However, a specific system configuration is required for this.

If necessary, please contact the TESVOLT Service Line +49 (0) 3491 8797-200.

- g Lower power-threshold for Power-Limit-Mode in W > The default value is "0".
- Upper power-threshold for Power-Limit-Mode in W > The default value is "0".
- i Select a BMS (optional) > Drop-down menu to select a BMS
- **j** Select a NA-Box (optional) > Drop-down menu to select the NA-Box used
- **(Charging power limit in W** > Limits the charging power to the value set (positive value).
- **()** Discharging power limit in **W** > Limits the discharging power to the value set (negative value).
- **Number of IPUs** > Enter the number of active IPUs.
- **Q-Control** > Configuration of the Q-Control (FUNDFREQMODE_DISABLED, FUNDFREQMODE_QREF, FUNDFREQMODE_PCF, FUNDFREQMODE_VREF)
- Symmetry Mode > Configuration of the Symmetry Mode (on/off)
- Harmonic Mode > Configuration of the Harmonic Mode (on/off)
- **Disable ECO Mode** > If the fastest response times in the millisecond range are required, ECO Mode must be disabled.
- Save

3

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2 Enter the values in the fields on the screen according to the explanations above.

Then click on "Save" 🚺 to apply the settings.

Where "TESVOLT EMS" is selected in Step 1 (i), use the following settings:

=		6 F± L
Device Configuration / Inverter / New		
Tesvolt BMS	÷	
Modbus TCP Address of Battery (Master) APU	e.g. 192.4.0.0:508	
	The Modbus TCP Address of the battery master APU. The Modbus TCP Address is a string of the form 'hostsport'. Host is an IPv4 address, an IPv6 address inclosed in square brackets, or a hostamare. And port is either a decimal port number or a service name.	
Modbus Slave ID of Battery (Master) APU	0 0	
	Enter the Modbus TCP Slave ID. The ID should be in the range from 1 to 247, and 0 as well as 255 are allowed too. If omitted, 1 will be taken as default value.	
Lower SoC float charge threshold in %	0	
	State of charge threshold below which the float charge should start.	
Upper SoC float charge threshold in %	0 0	
	State of charge threshold above which the float charge should stop.	
Calact a NA Day (actional)	*	

- Modbus TCP Address of Battery (Master) APU > Enter the Modbus TCP address of the battery (master) APU here. You can display the IP address via the APU display (2nd page). Remember to enter port :502.
- b Modbus Slave ID of Battery (Master) APU > Enter the slave ID of the battery (master) APU here. The default value is "0".
- Cover SoC float charge threshold in % > The threshold for the float charge defines the lower limit of the depth of discharge protection zone as a percentage of the state of charge. If it goes below this value, the battery system recharges itself back to the upper limit d, at a power level corresponding to the value set for "Float charging" in Step 1 e.
- **Upper SoC float charge threshold in %** > Defines the upper threshold of the depth of discharge protection zone as a percentage of the state of charge. Above this value, the float charging is stopped and the battery system switches to standby mode.

DIAGNOSTICS	Device Configuration / Invester / New	
₽ Interfaces <	Add new Inverter	
	Show all Configurations	/ Monthers TSP Accessed
	Select a model	SNAS Suring Trippower Storage STFS50 Prese select a model for which the institutes Texture select a model for which the institutes
SETTINGS	Modbus TCP Address of Inverter	u.g. 102.4.0.2.003 The Molon ZP Addres of the Investment The Molonus TI2 Address is a long of the form Interpret. He is a Here address (e.g. 102.163.111.1) as the Address exceeded in a second and interpret address and a second in the Address and a second
System Settings	Modbus Slave ID of Inverter	a more manual page parameters and an and a second
() Meter	Lower SoC float charge threshold in %	0 Totals of charge three and taken which the float charge should start.
1 Inverter	Upper SoC float charge threshold in %	0 Date of charge threaded above which the fload charge should step.
♀ Charge-Point	h Float charge power in W	0 Driver the food charge power in W.
⊛ Energy Manager →	Reat	
Sec Topology		
Cevice Replacement Energy Services		
v> Load-Peaks		
Time Series Profiles Exemula blocks		
User Management		
 (depending Storage S Modbus T the port!) Slave ID S Lower So limit of th battery sy value set Upper So 	STPS50) TCP address > Modbus ⁻ > Slave ID of the SMA S C trickle charge thres he depth of discharge as ystem recharges itself for the trickle charge () C trickle charge thres	TCP address of the SMA STPS X (default: Port 502, you must enter STPS X (default: 3) hold in % > The threshold for the trickle charge defines the lower s a percentage of the state of charge. If it falls below this value, th back to the upper limit (1), at a power level corresponding to the g. (Default: 1%) hold in % > Defines the upper threshold of the depth of discharge
protection stopped a	n zone as a percentage and the battery system	of the state of charge. Above this value, the trickle charging is switches to standby mode. (Default: 3 %)
g Trickle ch 1,000)	harge power in W > Ent	ter the power to be used for trickle charging the batteries (default
1 Save		
Enter the val	lues in the fields on the	screen according to the explanations above.
T I I' I	n "Save" 🅕 to apply the	e settings.
Then click or		5

Example – SMA STPS X configuration

value set for trickle charging.

recharges itself back to the upper SoC trickle charge threshold at a power level corresponding to the

			S Pe
DIAGNOSTICS	evice Configuration / Inverter / New		
🖗 interfaces	D Add new Inverter	0	I Madbus TCP Assistant
	Select a model	SMA Inverter Manager \$	
		Please select a model for which the device driver should be installed.	
SETTINGS	Modbus TCP Address	s.g. 192.1.1.2:502	· · · · · · · · · · · · · · · · · · ·
钧 System Settings 〈		The Modbus TCP Address is a string of the form 'hostport'. Host is an IPv4 address, an IPv6 address enclosed in square brackets, or a hostname. And port is either a decimal port number or a service name.	0
😂 Device Settings 🛛 🗸 👝	Slave ID	125 0	
 Meter Inverter Charge-Point 	Has PV Allows to enable/disable the PV Inverter functionality. Has Battery Allows to enable/disable the Battery inverter functionality.	Enter the Modius TCP Slave ID. The ID should be in the range from 1 to 247, and 0 as well as 255 are allowed too.	g
@	Lower SoC float charge threshold in %	0	Î 🚯
C GPIO		State of charge threshold below which the float charge should start.	
🛞 Energy Manager 👻	Upper SoC float charge threshold in %	0	
ኤዴ Topology		State of charge threshold above which the float charge should stop.	
→ Device Replacement	Ploat charge power in w	Enter the float charge power in W.	
Energy Services	Bave		
✓ Load-Peaks			
, TE			

Example – SMA Inverter Manager configuration

- Show all configurations > Back to the inverter overview
- **b** Choose a model > Drop-down menu to select the type of battery inverter
- C Modbus TCP address > ModbusTCP address of the SMA Inverter Manager (IMPORTANT: Port 502)
- **d** Slave ID > Slave ID of the SMA Inverter Manager (default: 125)
- Has PV > Must always be set to "Off" (tick box not ticked)
- f Has battery > Must always be set to "On" (tick box ticked)
- **Unver SoC trickle charge threshold in %** > The threshold for the trickle charge defines the lower limit of the depth of discharge protection zone as a percentage of the state of charge. If it falls below this value, the battery system recharges itself back to the upper limit ^(h), at a power level corresponding to the value set for "Trickle charging" ⁽ⁱ⁾. (Default: 1 %)
- **b Upper SoC trickle charge threshold in %** > Defines the upper threshold of the depth of discharge protection zone as a percentage of the state of charge. Above this value, the trickle charging is stopped and the battery system switches to standby mode. (Default: 3 %)
- Trickle charge power in W > Enter the power to be used for trickle charging the batteries (default: 1,000)

Save

2

1

Enter the values in the fields on the screen according to the explanations above.

Then click on "Save" () to apply the settings.

NOTE: When the upper SoC trickle charge threshold has been reached, trickle charging is stopped, until the upper SoC trickle charge threshold is exceeded again. As a result of the battery inverter's self-consumption, the battery falls to the lower SoC trickle charge threshold if there is no charging. It recharges itself back to the upper SoC trickle charge threshold at a power level corresponding to the value set for trickle charging.

Settings in the SMA Inverter Manager



NOTE: The SMA STPS-60 battery inverter must already be commissioned and updated to the latest software version (2.05.007, released 19 September 2024).

NOTE: The software version of the LCS tool must match the firmware installed on the SMA STPS.

⊚ LCS		-		×
Local Commission	ning & Service Tool			
Inverter Mar	Login	Sea	arching O	0
	Inverter Manager 'IVMZyk1'			
办 IVMLadesaeu	User group Installer •			•
IP: 192.168.90	Password)	0 0 0	
IP: 192.168.90			0 🔳 🔘	
	Forgot password? Login Cancel			
		1		

Log in to the LCS tool as "Installer". The password can be found on the device unless it has been changed.

Check the firmware version of the inverter. Do this by clicking on the right arrow keys in the inverter display until "communication version" is displayed. The version of the LCS tool can be queried using the "i" symbol in the top right corner of the programme window.

If the firmware versions do not match, carry out any necessary updates to make them match.

) LCS			a >	<
Local Commissioning	& Service Tool		日本語	
< 🚠 IVMZyk1	139F0215020901M367	UserLevet. Installer	Plant Start	
👁 Status 🛛 🖉 Logs	Reports & Setup & Service			
Date and Time				
Naming	Meter IP-Address:	192.168.90.8		
Ftp Upload	Meter Modbus Port:	502		
Portal Upload	Meter Modbus Unit ID:	1		
Network Settings	Meter Power Modbus Register:	19026		
Plant fallback	Meter Reactive Power Modbus Register:	19042		
Operation mode	Meter Voltage Modbus Register:	19006		
Password				
Inverter Parameter	Meter Frequency Modbus Register:	19050		
	Safety Offset:	0		
	Meter Connection Timeout:	10		
	Limited Export Enabled		۰ ۲	
	Peak Load Shaving	a	u .	
	Time Of Use		• •	
			Save	

Open the "Power Management" page from the "Setup" menu. Do not change the grid meter settings. Please note that with the Janitza 604 the maximum number of reading devices is five.

For control via Modbus, all applications (a) on this page must be set to "Off". No Modbus commands are executed if time of use or peak load shaving are active. "Limited export enabled" is already deactivated in the normal configuration of the Inverter Manager.

f

7

NOTE: A personal Grid Guard code is required for the following configuration steps. You must request this code from SMA.

⊚ LCS						-	o ×
Local Commissioni	ng & Service Tool						日本語 i
< 🚠 IVMZył	1 139F0215020901M367				UserLevel: Installer		Plant Start
👁 Status 🛛 🖉 Logs	🖹 Reports 🛛 🕫 Setup						
Commission Software Update	Grid Guard						
Grid Guard		Ind	ividual access code				
				Save			

Go to the "Service" menu on the "Grid Guard" page and enter your personal Grid Guard code.

۲ ۲	© LCS								-	o ×
U	Local Commissionin	ng & Service To	ool							日本語 i
	< 🚠 IVMZyk	(1 139F0215020	901M367					UserLevel: Installer	đ	Plant Start
	👁 Status 🖉 Logs	s 🖹 Reports	08 Setup	🖋 Service						
	Commission Software Update	Grid Guard								
	Grid Guard				Individual acc	cess code				
							Save			

Successful entry is indicated by a message and a symbol (a) in the top right corner:

1	-				
🛔 IVMZyk	1 139F0215020901M367			UserLevel: Installer	Pk
					d 🤛
Status 🖉 Logs	🖺 Reports 🕫 Setup 🖌 Service				
ommission oftware Update	Grid Guard				
rid Guard		Individual access code			
			Save		

Before making the next changes, please stop the inverter(s)using the "Plant Stop" button¹. If the inverter(s) is/are switched off, the button is labelled "Plant Start".

•		
_		

2016		_	· 0	3 >	<
Local Commissioning & Service Tool				本語	
C	Installer		Pl	lant Start	
Status			r		
General Key: DELAR-STS-MLX Version: 00092 Date and Time Name: Germany_VDE-AR N4105 2018_STP560_modified_2024-09-11 11:06:06 Version: 00092	ID: 278				
Naming a + Protection settings Plu Upload + Protection settings					
Network Settings Power Management + Fault ride through					
Plant failbact					
Password Immediate controls					
Inverter Parameter Enable the connection within a defined voltage and frequency range (ReleaseToStart)	1	(1 - 0)			
Shutdown delay time (T_DELAY_SHUTDOWN)	2	(o - 600 (el)			
Ramp In (RmpIncTmm_ONLINE)	1200	(0.6 - 1200 [%/min])			
Maximum reactive power reduction rate (RmpDecTmm_Q)	-1200	(-12000.0 [%/min])			
Maximum reactive power increase rate (RmpIncTmm_Q)	1200	(0.8 - 1200 [%/min])			
Maximum active power reduction rate after external setpoint change (RmpDecTmm_EXT)	-1200	(-12000.6 (%/min))			
Maximum active power increase rate after external setpoint change (RmpincTmm_EXT)	1200	(0.0 - 1200 ("Wining)			
Active power (P_ref)	0	(-100 - 100 [%])			
Reactive power (Q_ref) c	0	(-100 - 100 [%])			
Power factor (PF_ref)	• 1	(0.8 - 1)			
S (S_ref) c	0	(-100 - 100 [%])			
SR (SR_ref)	0	(0 - 100 [%])			

Go to the "Inverter Parameters" page via the menu item "Setup". Loading these parameters may take several minutes. On this page, open the "Support Settings" (a) section and then the "Immediate controls" subsection (b).

Change the following parameters (marked green in the figure):

Parameter New value

Ramp In (RmpIncTmm_ONLINE) 1200%/min

Maximum active power reduction rate after external setpoint change (RmpDecTmm_EXT) -1200%/min Maximum active power increase rate after external setpoint change (RmpIncTmm_EXT) 1200%/min

Save the changes by clicking the "Save" button. The inverter will then restart.

Optional: Fallback when Modbus communication is interrupted



s				- 0
cal Commissioning & Ser	vice Tool			日本語
🛔 IVMZyk1 139F0	215020901M367		UserLevel: Installer	Plant
🕏 Status 🛛 🖉 Logs 🛛 🖺 Rej	ports 🕫 Setup 🎤 Service			
Date and Time Der	fined fallback parameter			No
Etp Upload Portal Upload		Save		a
Vetwork Settings Power Management				
Nant fallback				
assword				
werter Parameter				

We recommend using a fallback setting to protect the battery against deep discharge in the event of a prolonged communication interruption between the SMA Inverter Manager and the

TESVOLT Energy Manager. To do this, go to "Plant Fallback" in the "Setup" menu and set the switch to "Yes".



ğ) LCS			- a ×
Local Commissioning	& Service Tool		日本語 :
< 🚠 IVMZyk1	139F0215020901M367	UserLevel: Installer	Plant Start
👁 Status 🛛 🖉 Logs	Reports & Setup & Service		
Date and Time	Defined fallback parameter		Yes •
Ftp Upload	Timeout:	30	(5 - 85400 [k])
Network Settings	P ref:	-1	(-100 - 100 [%])
Power Management Plant fallback	Q ref:	0	(-100 - 100 [%])
Operation mode	PF ref:	1	(4/-0.8 - 1)
Password Inverter Parameter		Save	

Once activated, you can define the interruption period "Timeout" after which the inverter should react. We recommend the following settings:

Parameter	Value
Timeout	60 s
P ref	-1% (corresponds to charged with 1% of available inverter power)
Q ref	0
PF ref	1 (Power Factor)

Controlling the inverter

To ensure safe work on the unit, you can control and switch off the selected inverter.

For example, you can activate automatic start/stop mode in the inverter configurations.

Open the unit configurations for the relevant inverter by clicking on "Inverter" in the side menu under "Unit Configurations".

2

 $\left(\right)$

	=								G	A.
DIAGNOSTICS	Dev	vice Configuration / Inverter								
ण् Interfaces <		Meter Inverter Charge-Point G	PIO							
		<u> <u> </u> Existing Configurations </u>								
		Add new inverter								
		Online								
		Driver Name	Device Name	S/N	Status	Model				
		SMA Sunny Tripower Storage	SMA_STPS50_3015294433	3015294433	S	STPS50	Details	Control	Edit	
බ System Settings 🗸 👻		SMA Sunny Tripower Storage	SMA_STPS50_3015294434	3015294434	0	STPS50	Details	Control	Edit	
®n License Management										
品 Network										
🕾 Device Settings 🗸 🗸										
🕲 Meter										
Inverter										
To control the in	ivert	ter, click the "Contr	ol" button 📵.							

S 🗈 S	how all Configurations		Settings Status-inf
a. ~	Status THE DEVICE IS WORKIN	5	
b Serial N	lumber:	3015294433	
Device	Name:	SMA_STPS50_3015294433	
d Vendor	:	SMA	
e Model:		STPS50	
f Status	nfo:	N/A	
Last U	pdate: 01/01/1970 01:00:00		invZINV0.manR
g Last	Value:) activate manRstr		b _{Pset}
Last U	pdate: 04/10/2023 15:30:51		
Last	Value: OPEN		invZINV0.manStrSt
	activate manStrStop		D _p set
Last U	pdate: 04/10/2023 15:32:00		
Last	Value: CLOSED		INVZINVU.strSt
	activate strStop		(D) Set
StatuSerial	is > Unit status il number > Displa	y inverter serial number	
C Unit	Name > Display th	e inverter unit name	
Manu Manu	ufacturer > Display	/ inverter manufacturer	
	el > Display inverte is info > Display et	er model number atus information	
I Last	value > Activation	of manual start	
i Last	value OPEN > Unit	is off – activation of manual start/s	top
🚺 Last	value CLOSED > L	nit is on – activation of start/stop	
			Latart Than click on "Sat"

Or tick the box next to "activate StrStop" () to activate the automatic start/stop mode. Then click on "Set" ().

NOTE: For safety reasons, the settings made here override the settings in the energy services of the switch (see section "Switch/set point" on page 70).

Charge point configuration

1	DIAGNOSTICS	Dev	ice Configuration / Charge-Point				
	투 Interfaces ~		Meter Inverter Charge-Point GPIO				
	C 10s		Existing Configurations				
	OneWire		Add new Charge-Point				
			Online				
			Driver Name	Device Name	S/N	Status	Model
	SETTINGS						
	settings (ब्रि System Settings र						
	SETTINOS छि System Settings २ इन्ह Device Settings २						

Log into the TESVOLT Energy Manager and access the charge point overview ("Existing Configurations") via the side menu: "Device Settings \rightarrow Charge-Point". Then click on the "Add new Charge-Point" button (a).



[6]

	≡	6 4 2
DIAGNOSTICS	Device Configuration / Charge-Point / New	
🖗 Interfaces 🗸	Ö Add new Charge-Point	
கீ Network		
C 10s	Show all Configurations	
➔ OneWire	a (1)	
	Select a model ¢ Please select a model ¢ Please select a model for which the device driver should be installed.	
SETTINGS 101 System Settings (
serTINGS ঠি System Sattings ব		

On the page that appears, click on "Choose a model" (a) and select the type of charge point used from the drop-down menu (e.g. Mennekes Amtron). Then complete the fields.

~		
	-	
	. 3	
	- ٦	
	_	

	=			
	Device Configuration / Charge-Point / New			
	H Add new Charge-Point			
	B Show all Configurations		& Modbus TCP Assistant	
	Select a model	Mennekes Amtron	\$	
		Please select a model for which the device driver should be installed.		
	Host	e.g. localhost		
		Is the host name or the network address of the charge-point. This can correspond to an IPv4 address, an IPv6 address in square brackets, or the DNS name of the charge-point.		
	SEMP port	10080	÷	
		Enter the port number for SEMP connections (usually 10080).		
	Web port	25000	0	
		Enter the port number of the web interface to the wallbox (usually 25000).		
	Min. charging time in min	0	\$	
Davice Sattings		Enter the minimum charging time in minutes.		
. Device occurigo	Min. waiting time in min	0	0	
Meter		Enter the waiting time in minutes for which charging should not take place after the charging stopped.	has	
	PIN	e.g. 1234		
		Enter the PIN to connect to the charge-point using the web interface.		
Charge-Point	Save Reset			
) GPIO				

Finally, click on "Save" (a), to apply the settings.

Digital outputs (GPIO) configuration

"GPIO" refers to the digital outputs of the TESVOLT Energy Manager (10 (1...7) and (1...7)). The unit has a total of 14 of these outputs, which allow relays for load control or generation control (e.g. for heat pumps that are smart grid ready) to be switched separately. Further information can be found in the section "6.8 DIGITAL OUTPUTS" on page 23.



	=			6	£ £
DIAGNOSTICS	Device Configuration / GPIO				
🖗 Interfaces 🗸	Meter Inverter Charge-Point	GPIO			
☐ 10s	 Existing Configuration 	IS			
OneWire	Add new GPIO				
	Online				
	Driver Name	Device Name	S/N Status	Model	C I
SETTINGS					
System Settings <					
😇 Device Settings 🗸 👻					
🖒 Meter					
<u>Î</u> Inverter					
♥ Charge-Point					
Ø GPIO					
Energy Manager <					
必 User Management					

Log into the TESVOLT Energy Manager and access the GPIO overview ("Existing Configurations") via the side menu: "Device Settings \rightarrow GPIO". Then click on the "Add new GPIO" button (a).

	=		C	A Ż	2
DIAGNOSTICS	Device Configuration / GPIO / New				
🖗 Interfaces 🗸 🗸	Add new GPIO				
蟲 Network					
₽ 10s	Show all Configurations	d [#] Modbus TCP Assistant			
DineWire					
	Select a model	Choose a model \$			
		Please select a model for which the device driver should be installed.			
SETTINGS					
System Settings <					
😇 Device Settings 🗸 👻					
🖒 Meter					
<u>D</u> Inverter					
♥ Charge-Point					
Ø GPIO					

On the page that appears, click on "Choose a model" (a) and select "Generic GPIO TEM Output" from the drop-down menu.

3		Ξ		S	₽± 2
_	DIAGNOSTICS	Device Configuration / GPIO / New			
	🖗 Interfaces 🗸 🗸	Add new GPIO			
	ക്ക് Network	a			
	ට 10s	Show all Configurations	d' Modbus TCP Assistant		
	OneWire	0			
		Select a model	Generic GPIO TEM Output \$		
			Please select a model for which the device driver should be installed.		
		Output	Select output \$		
		•	Select the output being switched/allocated.		
		Device Name	e.g. Device_XYZ_000		
			Assign a unique identifier to this device.		
		Hold-time 'ON' in s	0		
	SETTINGS	g,	Defines the minimum amount of time, the output will stay 'ON', before allowing to switch back to 'OFF'.		
	l System Settings 《	Hold-time 'OFF' in s	0		
	😇 Device Settings 🗸 🗸		Defines the minimum amount of time, the output will stay 'OFF', before allowing to switch back to 'ON'.		
	🛇 Meter	Save Reset			
	D Inverter				
	♡ Charge-Point				
	@ GPIO				
	Energy Manager <				

Complete the fields.

- 3 Show all configurations > Back to the GPIO overview
- **b** Modbus TCP assistant
- C Select a model > Currently only generic GPIO TEM output
- **Output** > Digital output of the TESVOLT Energy Manager to be used

Device name > Device name can be freely selected for the device to be switched (Warning: the unit cannot be renamed again later.)

- **f** Hold-time "ON" in s > Enter the amount of time the output will stay ON before it is possible to switch it OFF again
- **G** Hold-time "OFF" in s > Enter the amount of time the output will stay OFF before it is possible to switch it ON again

Save

4

- i Reset
- Then click on "Save" 🜔 to apply the settings.

Digital input (GPIO) configurations

The digital and potential-free inputs on a TESVOLT Energy Manager can be used to control the EMS. As soon as there is a signal at a GPIO input, it can be used to determine the outcome of a decision in a decision tree, to control generators/consumers through energy services or for calculations, e.g. in formula blocks. The switching of this input can determine the use of strategies, the power level setting points or other calculations. For this purpose, a specific input is defined which can then be selected in all "Simple Sensors" fields. This enables the targeted use of key switches on wall boxes, control panels in production halls and much more.

For information on connecting the digital inputs of the Energy Manager, see section "5.2 Connections and setup of the TESVOLT Energy Manager" on page 13.

1		:					6 % 8
	🖗 Interfaces	Zähler Wechselrichter Wallbox	GPIO Externe Vorgaben Container				
		② Existing Configurations					
		Add new GPIO					
	•	Online					_
	SETTINGS	Driver Name	Device Name	S/N	Status	Model	
	System Settings						
	†≬† Device Settings						
	හ Meter						
	0 Inverter						
	⇔ Charge Point						
	Ø GPIO						
	🗰 Remote Control Signals						

To read and use the GPIO input, proceed as follows:

Add a new GPIO by selecting Device Configuration > GPIO from the menu on the side and then clicking on "Add GPIO" (a).

- ENERGY MANAGER	Ξ		
DIAGNOSTICS	Add new GPIO		
🖗 Interfaces	B Show all Configurations	C Modbus TCP Assistant	
	Select a model	Choose a model ~	
		Generic GPIO Input TEM Input	
		Generic GPIO Output TEM Output	
SETTINGS			
System Settings			
†∔† Device Settings			
රී Meter			
ā Inverter			
Charge Point			
@ GPIO			

1		
	-	
	- 1	
	-	

	=		6 % 8
🖗 Interfaces 🗸 🗸	Add new GPIO		
	Show all Configurations	S ⁴ Modbus TCP Assistant	
	Select a model	Generic GPIO Input TEM Input	
	Input	d Please select a model to be integrated.	
	mput	18 FLOATING	
SETTINGS	Device Name	Input_Signal	
System Settings		b Assign a unique identifier to this device. Note that the identifier can't be changed afterwards.	
†∦ Device Settings	Save Reset		

Under input (a) select one of the available inputs. Under device name (b) enter a name that helps you recognise it. Click "Save" to complete the setup.

Container configuration

1	DIAGNOSTICS	Device Configuration / Container				
_	투 Interfaces <	Meter Inverter Charge-Po	vint GPIO Container			
		a 🖾 Existing Configura	ations			
		Add new Container				
		Online				
	SETTINGS	Driver Name	Device Name	S/N	Status	Model
	ि System Settings 🗸 🗸	Offline				
	👁 License Management	Driver Name				
	器 Network	Tesvolt Container				Edit
	æ Device Settings →					
	🛇 Meter					
	ព្ទី Inverter					
	⇔ Charge-Point					
	@ GPIO					

Log into the TESVOLT Energy Manager and access the container overview ("Existing Configurations") via the side menu: "Unit Configuration \rightarrow Container". Then click on the "Add container" button (a).

2		≡			C	Â	2
	DIAGNOSTICS	Device Configuration / Container / New					
	🖗 Interfaces <	Add new Container					
		Show all Configurations		& Modbus TCP Assistant			
		Select a model	Choose a model v Pease select a model for which the device driver should be installed.				
	SETTINGS						
	छि System Settings <						
	æ Device Settings ←						
	Energy Manager <						
	ı User Management						
	On the name that	annears under "Choose	a model" select a "TESVOLT Co	ntainer TPS"	from the	dro	nn-

On the page that appears, under "Choose a model", select **1** "IESVOLI Container IPS" from the dropdown menu.



	≡		6 Fz 2
DIAGNOSTICS	Device Configuration / Container / New	,	
면 Interfaces <	Add new Container		
	Show all Configurations	🧷 Modius TCP Assistent	
	Select a model	Tesvolt Container TPS *	
SETTINGS	Modbus TCP Address	Please select a model for which the device driver should be installed. e.g. 192.1.1.2:502 The Moduu IT2 Address is a drivin of the form 'hort-nort'. Hord is either an IPAI address is a.	
छि System Settings 🗸 🗸		b 192:163.178.01, an IPA6 address enclosed in square brackets (e.g. (2007):dba65a.20000:000062073733Q, or a hostname (e.g. amperid). Port is either a demail port number or a service name.	
🕫 License Management	Unit ID		
ൽ Network		are allowed too.	
🔁 Device Settings 🛛 👻	d Device Name	e.g. Device_XYZ_000 Assign a unique identifier to this device.	
🖒 Meter	Save Reset		
🖞 Inverter			
♡ Charge-Point			
(P) GPIO			

Complete the fields.

Modbus TCP Address > Here enter the Modbus TCP address and port (:502) of the container.
 Unit ID > Modbus TCP unit ID (default: 1)

C Unit name > Freely selectable name for the unit (warning: the unit cannot be renamed again later.)



Then click on "Save" d to apply the settings.

NOTE: Topology settings

Once the unit is configured, the corresponding physical unit in the topology of the TESVOLT Energy Manager must be assigned to the container. For assignment and further procedures for configuring the topology, please refer to section "Procedure – Adding physical devices" on page 52.

8.2 SETTING THE TOPOLOGY

Compatible devices such as meters, battery inverters and charge points have been installed, connected to the TESVOLT Energy Manager and configured in terms of software, as described in the previous section "8.1 Setting up logical devices" on page 33 et seq. This also goes for devices that will be controlled by means of the digital outputs (GPIO), where applicable. Now the

TESVOLT Energy Manager must be told how these logical devices stand in relation to each other (e.g. Battery Inverter 1 is connected to Battery 1 and measured by Meter 2). This is one of the purposes served by the topology, but it is also a requirement for accurate visualisation in the myTESWORLD portal and for many energy services.



In order for it to be able to configure and display the relationships between the logical devices, "physical devices" are set up in the Energy Manager topology configuration. These devices are later displayed 1:1 in the myTESWORLD system visualisation. Each physical device must be measured by at least one meter. This does not mean that every physical device requires its own meter, but that its consumption must be able not only to be measured but also clearly identified.

Meter requirements

Absolute requirements:

- There are at least as many meters as physical devices.
- All physical devices are measured by at least one meter.
- It must be possible to clearly identify the power of each physical device. For example, it will not work if Battery 1 and Battery 2 are only ever measured together (or not at all) by all meters.

Conditional requirements:

 There must be a utility grid transmission meter, or else the visualisation in myTESWORLD will be limited.



NOTE: Where they exist, internal meters in devices such as inverters can be used, provided that the devices are connected to the TESVOLT Energy Manager by Modbus. However, please be aware of the following important restriction. Not every internal measuring device is suitable for use as a meter for power measurement.

Be aware, that this meter does not provide counter-values for energy demand and/or supply. This might lead to restricted functionality.

If you want to use the internal meter in this kind of device, it will alert the Energy Manager. In general we advise against the use of these meters within the topology.

Actuator requirements

For implementing energy services, the behaviour of logical devices (which are not meters) is controlled at specific measuring points in accordance with a defined strategy. These logical devices are known as actuators.

Absolute requirements for actuators:

- Every actuator that is to be used in the energy services must be configured in the topology! The only exception to this is devices controlled via the digital outputs (GPIO). Missing configurations are not recognised by the TESVOLT Energy Manager.
- Two actuators must not affect the same device. The only exception to this is devices controlled via the digital outputs (GPIO).

Procedure - Adding physical devices



NOTE: We recommend mapping out a circuit diagram of the topology on which all significant system components are represented. As well as the designation for the topology, also note down important parameters such as maximum currents. If you have planned to use SoC-dependent decisions within the framework of a decision tree, it is sensible to create a diagram for this showing the allocation of the capacity of the battery inverter for the various energy services including the respective SoC thresholds.

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DIAGNOSTICS	Energy Manager / Topology		
🗄 Interfaces <	🐰 Energy Manager Topology Configura	tion	
	Supported Device Types	Device Type Picker Your Devices	
	Battery	0	
	CHP	0	
SETTINGS	Fuel-cell	0	
ல System Settings 🗸 👻	Heating-element	0	
👓 License Management	Heatpump	() ()	
ن Network	PV	() ()	
😇 Device Settings 🔹 🤇	User	0	
 Energy Manager 	Wallbox	0	
Sec Topology			
Device Replacement		Device Assignment	
Energy Services	In	order to assign devices and configure the topology, click on an item in the list below.	

Log into the TESVOLT Energy Manager and in the side menu under "Settings" select "Energy Manager" → "Topology" ⓐ. The next steps are first to select the devices in your system in the left-hand column "Supported Device Types" ⓑ by clicking on the [+] button, causing them to be added to the right-hand column "Your Devices" €. When adding the physical devices, it is best to proceed in order from top to bottom.

B				
ų Interfaces <	🐭 Energy Manager Topology Configura	tion		
		Device 1	Type Picker	
	Supported Device Types		Your Devices	
	Battery		Battery 1	
	CHP	•		
SETTINGS	Fuel-cell	• •		
छि System Settings 🗸 🗸	Heating-element	Θ		
Icense Management	Heatpump	• 9		
د Network	PV	Θ		
😤 Device Settings <				

To set up a battery, find the item "Battery" in the "Supported Device Type" list and click on the [+] button at the end of the line **a** . You will now find the item "Battery 1" **b** in the "Your Devices" list.

DIAGNOSTICS	Energy Manager / Topology		
부 Interfaces <	🐭 Energy Manager Topology Config	ration	
		Device Type Picker	
	Supported Device Types	Your Devices	
	Battery	Battery 1	
	CHP	© 0 PV 1	
SETTINGS	Fuel-cell		
🕸 System Settings 🗸 🗸	Heating-element	0	
Se License Management	Heatpump		
蟲 Network	PV		
😇 Device Settings 🔇			

To set up a PV installation, find the item "PV" from the "Supported Device Type" column and click on the [+] button of the item (a). "PV 1" will now appear under "Your Devices" (b).



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NOTE: Power used by unspecified consumers (e.g. household electricity), which is only recorded by the utility grid transmission meter (i.e. the sum of the loads not assigned to a physical device), is automatically assigned to "User 1" by the system. Even though it does not refer to a device in the traditional sense, "User 1" must be set up as a physical device, as this represents unspecified consumption in the middle of the circle of the system visualisation (a) in the myTESWORLD portal. In accordance with the principle outlined above, users must also be measured by at least one meter and if no specific measurement is taken, calculation is not possible. If more than one user is set up, the additional users (b) are positioned alongside the other physical devices outside the circle in the visualisation.

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	=			6 B
	Energy Manager / Topology			
	👷 Energy Manager Topology Config	uration		
		Device Type Picker	r	
	Supported Device Types	Your Dev	vices	
	Battery	Battery Battery	1	
	CHP	(B)		
	Fuel-cell	⊕ ⊖ PV 1		
छि System Settings 🗸 🗸	Heating-element	(B) (C) User 1		
	Heatpump	() (O) Wallbox	1	
	PV	•		
	User			
🛞 Energy Manager 🗸 👻	Wallbox			
e.e. Topology				
	0	A modemundel terminity own	Cin A	Δ± 00
	v	Investional estolic com		eD 0
-TESWORLD =				
Current Status	Energy-flow		Autohaus Mask Self-sufficiency	y
		Power-Grid		
00 Energy-Balance		40.0 kW	55.6	
🖂 Measurement-Analysis	•	•	pure delivery se	eir-sumcient
REPORTS	· · · · · · · · · · · · · · · · · · ·		Self-supply	Grid delivery
ensor Report	Tenant 30.0 kW	30.0 KW		
🔅 PV Yield		Consumption	Feed-in	
Energy Report	/	60.0 KW	0	
III Meter Report	>		% self-sufficient p	oure feed-in
SETTINGS	S	Q	0 %	100 %
📾 E-Car		50 %	Grid feed-in	Self-consumption
Charging-Infrastructure	Ladepunkt 0 W	20.0 kW		
O PV Yield				

To set up a user, select the item "User" from the "Supported Device Type" list and click on the [+] button at the end of the line. You will now find the item "User 1" in the "Your Devices" list.

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	Ξ	G	
OneWire	Energy Manager / Topology		
	Wallbox		
	Device Assignment In order to assign devices and configure the topology, click on an item in the list below.		
	Внки	Configure 🔗	
	Demo_Wallbox	Configure 🐟	
	▲ Geraet_1	Configure 🐟	
System Settings	▲ Janitza_UMG_70079442	Configure 😞	
Stall License Management			

In front of each entry in the "Device Assignment" list there is a symbol. The symbols provide information about the logical device type and the colour gives information about the configuration status:



The colour of the entry also provides information about the status of the respective logical device. Yellow entries denote devices that are not yet assigned, while green entries are assigned.

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	Ξ	C		8
OneWire	Energy Manager / Topology			
	🛆 внихи	Configure		
	Demo_Wallbox	Configure		
	▲ Geraet_1	Configure		
	Assign a device to: Genet_1	Expert mode	•	
	No device	\$ 1		
SETTINGS				
🕲 System Settings 🛛 👻	A Janitza_UMG_70079442	Configure		
Icense Management € 100 million	Janitza_UMG_70079447	Configure		
路 Network	A Janitza_JUMG_70092536	Configure		

Now assign all devices that are not meters. Meters can be recognised by their names, which start with the name of the manufacturer and/or with "mtr" and are followed by a combination of numbers and letters. Click on the first non-meter device to select and assign it. When the entry is expanded, click on the drop-down menu that is now visible a.

	Ξ	Č.
OneWire	Energy Manager / Topology	
	🛆 внки	Configure 🗞
	A Demo_Wallbox	Configure 🔅
	Geraet_1	Configure 🔗
	Assign a device to: Geraet_1	Expert mode
	User 2	÷ (1)
SETTINGS		
System Settings +	Janitza_UMG_70079442	Configure 😞
So License Management	Janitza UMG 70079447	Configure 🔗

You will now see a drop-down menu (a) with the devices you set up previously. Click on one of the devices to select and assign it. The warning icon at the start of the entry changes to a device symbol if the assignment is successful, and the colour changes from yellow to green (as does the colour of the word "Configure" at the end of the line).

Now assign the remaining devices in the same way.

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Meter configuration

Note down the serial numbers of the meters installed in the system. They are needed for further configuration to identify and assign the meters. The serial number of the meter is part of its designation (e.g. the 8-digit number for Janitza meters).

	Device Assignment In order to assign devices and configure the topology, click on an item in the list below.		
	Внки	Configure 🐟	
	A Demo_Wallbox	Configure 🚕	
	8 Geraet_1	Configure 🐟	
BETTINGS	A Janitza_UMG_70079442	Configure 🔗	
🕲 System Settings 🛛 👻	Janitza_UMG_70079447	Configure 🔗	
🗫 License Management			
蟲 Network	Please activate this selection, if the meter measures the power at the grid-delivery point.		
😇 Device Settings 👻	Assign devices to: mtr.Janitza_UMG_70079447.0		
🛇 Meter	Choose a Device	÷ (1)	

First, find the entry for the meter of the utility grid transmission point. Click on the list entry to open it. Tick the square box a next to "Grid Meter" by clicking on it. The grid meter is defined as the sum of the power levels of all physical devices at the grid connection point.

	 OuteCi. 	comigure
SETTINGS	A Janitza_UMG_70079442	Configure
🕸 System Settings 🗸 🗸	O Janitza_UMG_70079447	Configure 🗇
👳 License Management	▲ Janitza_UMG_70092536	Configure 🐟
蟲 Network	O Janitza_UMG_70092543	Configure 🔗
😇 Device Settings 🛛 👻	Grid Meter	
🖒 Meter	Please activate this selection, if the meter measures the power at the grid-delivery point. Assign devices to:	
D Inverter	a mtr.Janitza_UMG_70092543.0	• •
Charge-Point	Suan Mater's demond and sundu	•
Ø GPIO	Output meters a volume and supply Please activate this selection, if the demand and supply register of the meter should be swapped. E.g. if the demand register of the meter measures the supply of a PV.	
	▲ Last_1	Configure 🔗
🐭 Topology	A SMA STD11060 A0122504746	Configure

Next, select and open the battery storage system meter (a) from the list. Click on the drop-down menu under the label "Assign devices to:" and select the item "Battery 1" by clicking on it.

Then, one after another, select and open any other meters present in the system. Then click on the field labelled "Choose a Device" and select all devices that, viewed from the grid connection point, come behind the relevant meter and are recorded by it.

SETTINOS		
🕸 System Settings 👻 👻	Janitza_UMG_70092543	Configure 😞
📾 License Management	▲ Last_1	Configure 🙈
ക്ക് Network	SMA_STP11060_A2132504746	Configure 🔗
🐲 Device Settings 🗸 👻	Assign a device to:	a Expert mode
🖒 Meter	SMA_STP11060_A2132504746	÷ (1)
D Inverter		
♡ Charge-Point	TesvoltPCS_Tesvolt_41728	Configure 🔅
Ø GPIO	TesvoltPCS_Tesvolt_43989	Configure 🔗
 Energy Manager + 	A Waermepumpe	Configure 🔗
😹 Topology		
→ Device Replacement	Save Topology Street Topology	

If you want to use a device's internal meter, click on its entry to expand it. Next, click on "Expert mode"

	Assign a device to:	
	IIV.SMA_S1P11000_A2132904/46.0	
SETTINGS	PV 1	\$
段 System Settings 🗸 🗸	Use internal meter	
	Grid Meter	
🗢 License Management	Please activate this selection, if the meter measures the power at the grid-delivery point.	
岛 Network	Assign devices to:	
	inv.SMA_STP11060_A2132504746.0	
😂 Device Settings 🗸 👻	PV1 X Choose a Device	• (1)
🖒 Meter	Swap Meter's demand and supply	
	Please activate this selection, if the demand and supply register of the meter should be swapped. E.g. if the demand register of the meter measures the supply of a PV.	
D Inverter		
Ö Charge-Point	Assign a device to:	
	pv.SMA_STP11060_A2132504746.0	
Ø GPIO	PV 1	÷ (
the second s		

In the expert view, additional configuration options are visible. Tick the "Use internal meter" option (a). In the "Assign devices to:" section that now appears, select which device is measured by the internal meter (b) (normally the same physical device that this logical device is assigned to).

Finally, assign the appropriate meters and devices to all positions not yet assigned in the topology.

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Device replacement

If it is necessary to replace one of the devices in the topology, you can avoid the time-consuming process of reconfiguration by means of the "Device Replacement" feature.



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NOTE: Only inactive devices can be replaced.

WARNING: If you are replacing a meter, it is essential to ensure that it is installed with the exact same orientation as its predecessor. This applies even in cases where the orientation was/is actually not correct and the generation/consumption registers have been exchanged via the topology configuration of the meter. The register exchange via the topology configuration only corrects the values displayed, leaving the raw data of the meter unchanged. If the new meter is installed with a different orientation from its predecessor, the raw data will have a different sign from this point onwards and all past data becomes unusable.

Before replacing a device, you must have applied the necessary settings on the new device, connected it to the Modbus and switched it on. This does not apply to devices connected via the digital outputs (GPIO). These devices can be replaced at any time without the "Device Replacement" feature.



To replace a device, click on "Device Replacement" a in the side menu. Find the entry of the device to be replaced from the "Offline devices" list b and click on "Edit" c.

3	👳 License Management	TesvoltPCS_Tesvolt_43989		Edit 😞
	نگه Network	Offline devices		
	🐲 Device Settings 🗸 👻	ө внки		Edit 🗇
	🖒 Meter	Geraet_1		Edit 🐟
	<u> </u>	e Last_1		Edit 🐟
	♥ Charge-Point	e Waermepumpe		Edit 🗇
	Ø GPIO			
		Device	Janitza_UMG_70079442 Replace this device by selecting one of the listed 'online' devices.	\$
	Soc Topology		Remove	
	→ Device Replacement		Remove this device if you no longer need it.	
	Energy Services	S\/(¹) T		

The entry is now expanded. Click on the drop-down menu "Choose a Device" a and select the new device by clicking on it. Confirm the action in the following dialogue box.

If you do not want to replace the device but to permanently delete it, do not select a replacement in the drop-down menu and instead click on the "Remove" button **b**.

Warning: This action cannot be undone!

9 SETTING UP STRATEGIES AND ENERGY SERVICES

9.1 PROCEDURE

An energy services strategy is the implementation of a specific application, such as self-consumption optimisation, in a strategy for controlling actuators. The procedure for this is as follows:

- 1. Definition of actuator groups that will implement the energy service, e.g. a battery that performs self-consumption optimisation at the grid meter, or a PV installation that is not allowed to feed into the public utility grid.
- 2. Configuration of energy services, e.g. self-consumption optimisation.
- 3. Assignment of the configured energy services to actuator groups.

Using a decision tree (PRO version), several strategies can also be linked to each other and carried out dependent on conditions. This combination of applications is also known as "multi-use". Very complex scenarios can be implemented in this way. Be aware that each actuator can only ever implement one strategy at a time. The procedure for setting up a decision tree is as follows:

- 1. Definition of standard strategy
- 2. Definition of strategy links and decision paths
- 3. Activation of energy service strategies

9.2 OVERVIEW OF ENERGY SERVICES



NOTE: Only inactive devices can be replaced.

First, strategies must be defined. As part of this, an energy service (e.g. target power self-consumption) is assigned to an actuator group (e.g. Battery 1), which implements the service.

The following energy services are available for selection:

BASIC licence

- Target power
 - Advanced
 - Self-consumption
 - Physical peak shaving
 - PV regulation
- Grid isolation
- Switch/set point
- Switchable loads/generation

PRO licence (fee-based)

- RLM peak shaving
- Forecast-based charging
- Remote control
- Off-grid generator curtailment for target SoC
- Charging station control
- Dynamic electricity tariffs

9.3 ACTUATORS AND ACTUATOR GROUPS

Actuators with a similar function (e.g. generators or batteries) can be combined to form actuator groups. There are four different types of groups:

- "Simple priority" actuator group Actuator priorities for performing an energy service are determined by the order in the group. This parameterisation is suitable for easy creation of cascade connections.
- 2. "Extended priority" actuator group Actuator priorities can be freely defined and differentiated by generator and consumer.
- 3. Multi-battery actuator group Used to combine multiple batteries into a virtual battery.
- 4. "Charging station infrastructure" actuator group combines different wallboxes.



NOTE: The batteries are also listed individually in the actuator groups and can be used individually in strategies.



Click on "Energy services" in the side menu to access the "Strategies" page. This page shows all the actuators known to the system.

		promn_01111000_na10a0011100	Actuator group is not used.	
	PV 1	SMA_STP11060_A2132504746		Add to strategy
	Details	Edit Delete		
SETTINGS	Actuators:	NV SMA STD11060 A2123002578.0		
🕸 System Settings 🔹 🔇	PV	SMA_STP11060_A2133002578	Actuator group is not used.	
🚰 Device Settings 🔹	Details	Edit		Add to strategy
ີ່ 🐭 Topology	Actuators:	pv.SMA_STP11060_A2140102382.0	Actuator group is not used.	
→ Device Replacement	PV	SMA_STP11060_A2140102382		Add to strategy
Energy Services	a Details	Edit Delete		
✓ Load-Peaks	New Actuator-Group		Auto-complete	
🎸 Time Series Profiles				
风 User Management				Cione (1) Delete (1)
	(S) Reset			back next

Click on "Energy services" in the side menu to access the "Strategies" page. Scroll all the way to the bottom and click on "New actuator group" a.

"Simple priority" actuator group



NOTE: There should never be more than one battery integrated in an actuator group with "simple priority".

NOTE: If a PV installation and a battery are integrated in an actuator group with "simple priority", this battery will never be charged by the integrated PV installation.

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	Energy Manager / Energ	New Actuator-Group		×	
	Actuators:				
	Wallbox 1	Name	Producer 1	~	
		Actuator(s)	Select actuator(s)	•	
	Actuators:		Please select actuator(s).		
SETTINGS	Fo	Parametrization	Simple priority	\$	Add to strategy
l System Settings 《	Details	Simple actuator group with fixe prefer loading/not generating.	ed priorities. Actuators in the front of the list prefer generation/not loading.	Actuator to the end of the list	
😓 Device Settings 🗸 🗸	Actuatore	Confirm Reset		Cancel	
🛇 Meter	Inverter				
<u>0</u> Inverter	Details		Delete		

Give the new actuator group a name in the "Name" (a) field . Next, select the "Simple priority" setting in "Parametrization" (b).



TESVOLT	= 100				
- ENERGY MANAGER -		New Actuator-Group		×	
	Wallbox 1	Name	Producer 1	•	
			Unique name of the actuator-group		
		Actuator(s)	pv.SMA_STP11060_A2132504746.0 🗙 fc.Demo_Fuelcell.0 🗙 Select ac 🕈		
			c.Demo_Fuelcell.0		
	FC	Parametrization	Ch.Demo_Wallbox.0		
	Details	Simple actuator group with fixed p prefer loading/not generating.	pv.SMA_STP11060_A2132504746.0		
		Confirm Pasat	bat.TesvoltPCS_Tesvolt_41728.0	H	
		Reset	bat.TesvoltPCS_Tesvolt_43989.0		
				í.	
			Delete		

Select the actuators (a) you wish to combine in the group. The sequence indicates the priority when performing the energy service. The first actuator selected has the highest priority during generation. The actuators selected afterwards have the highest priority during consumption and charging. Then click on "Confirm". (b).

Image: Decision Settings Image: Dec

"Extended priority" actuator group

Give the new actuator group a name in the "Name" field (a). Next, select the "Advanced priority" setting in "Parametrization" (b).

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ENERGY HANAGER -				×	
	Actuators:				
	Wallbox 1	1921	Fact of		The second se
		Name	Group 1 Unique name of the actuator-group	×	200 C SURGY
	Actuators:	Actuator(s)	fc.Demo_Fuelcell.0 x pv.SMA_STP11060_A2132504746.0 x bat.TesvoltPCS_Tesvolt_41728.0 x Select actuator(s)	٠	
	Fc		Please select actuator(s).		Add to strategy
SETTINGS		Parametrization	Advanced priority	\$	
System Settings <		fc Demo Euclicell 0	1		
😂 Device Settings 🛛 👻	Antiphone	teresente_r denotine			
🛇 Meter	Inverter	pv.SMA_STP11060_A213 2504746.0	3	0 🗸	
0 Inverter	Details	bat.TesvoltPCS_Tesvolt_	2	0 🗸	Add to strategy
Charge-Point		41720.0			
Ø GPIO	Actuators:	prefer loading/not generating. Act	priority. Actuators with negativ priority preter generation(not loading, Actuators with neg tuators with higher absolute priority will keep their preferred setting longer.	jativ priority	
🛞 Energy Manager 🗸 👻	Details	Confirm		Cancel	Add to strategy
အီ Topology					
→ Device Replacement	New Actuator-Grou		Auto-complete		

Next, select the actuators (a) you wish to combine in the group. Any sequence is possible. Next, determine the priority of the actuators (b) when they are used to perform an energy service. Use a sign to indicate whether the actuator prefers to generate (positive sign) or charge (negative sign). The absolute value determines the level of priority compared to the other actuators (higher value = high priority). Finally, click on "Confirm" (c).

"Multi battery" actuator group

If the TESVOLT Energy Manager detects several batteries in a system, they are automatically combined in a group. However, you can also combine just one part of the storage system in a group manually. The batteries that are combined in a group make configuration easier for you, as all batteries combined in the group are controlled collectively and you only have to configure the group, rather than each individual battery.

The combined batteries are kept at a uniform state of charge (SoC) in operation. To avoid excessive cycling during charging, the TESVOLT Energy Manager allows the individual storage systems a defined deviation from the specified (joint) SoC. This deviation can be set as the delta SoC window in % (see step 3).



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NOTE: The batteries are also listed individually in the actuator groups and can be used individually in strategies.

NOTE: The functions "off-grid use" and "grid replacement operation" are not available when you combine different TESVOLT storage systems into one actuator group.

NOTE: If your system features several batteries set up in master/slave systems, these are only ever treated as an individual storage system in the TESVOLT Energy Manager. Master/slave systems can only be controlled collectively.

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ENERGY HANAGER				×	
🖣 Interfaces <		a			
	Wallbox 1	Name	Batteries	~	Add to strategy
			Unique name of the actuator-group		
		Actuator(s)	Select actuator(s)	٠	
			Please select actuator(s).		
	Fc	Parametrization	Multi Battery	\$	Add to strategy
SETTINOS		Delta-SoC Window in %	10	0	
段 System Settings 《			Defines a Delta-SoC (state of charge) window in procent. All batteries, being members of this group, an handled collectively. The Energy Manager aims to keep the maximal SoC difference (delta) between batteries inside this defined window.	re	
Device Settings Y					Add to strategy
🛇 Meter		Confirm Reset	Car	ncel	

Give the new actuator group a name in the "Name" field (a). Next, select the "Multi-battery" setting in "Parameterisation" (b).



=	New Actustor Group		×	6 F 2
Energy Manager / Energ	new Actuator Group			
Actuators:				
Wallbox 1	Name	Batteries	~	Add to strategy
Details		Unique name of the actuator-group	_	
	Actuator(s)	bat.TesvoltPCS_Tesvolt_41728.0 x bat.TesvoltPCS_Tesvolt_43989.0 x		
Actuators:		Select actuator(s)		
Fc		Please select actuator(s).		Add to strategy
Details	Parametrization	Multi Battery	¢	
_	Delta-SoC Window in %	20		
	Denta-SOC WINDOW IN 76	Defines a Delta-SoC (state of charge) window in procent. All batteries, being members of this group	are	
Inverter		handled collectively. The Energy Manager aims to keep the maximal SoC difference (delta) between batteries inside this defined window.		
Details				Add to strategy
	Confirm Reset	c	ancel	
			_	

Then click on "Select actuator(s)..." and select the battery storage system that you would like to group by clicking on the relevant option field. In the "Delta-SoC Window in %" field b, enter the maximum deviation of the state of charge for the storage systems in the group. The tolerated deviation prevents cycling or ON/OFF oscillation during charging. Finally, click on the "Confirm" button **c**.

	=			5 A
	Energy Manager / Energy Services / C	onfiguration / Strategies		
	Actuators: Battery 1 Battery 2 Details	Battery TerrothCc, Terrot, 4728 TerrothCc, Terrot, 4288 TerrothCc, Terrot, 4288 Devec	Actuator group is not used.	Add to strategy
	Actuators: Wallbox 1 Details	ch.Demo_Wallbox.0 Cene, Waller Son Detete	Actuator group is not used.	Add to strategy
 System Settings Device Settings 	Actuators:	inv.TesvolIPCS_Tesvol1_41728.0	Actuator group is not used.	
	Details	Edit Delete		Add to strategy

If you would like to change the delta SoC window or the name of the actuator group, find the actuator group with the combined batteries and click on the "Edit" button (a). Now make the desired changes to the delta SoC window or the name and then click on the "Confirm" button.

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Finally, click on "next". You will now see the page "Energy Services Activation". Click on "next" again. On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button.



"Charging station infrastructure" actuator group

Name > Give the new actuator group a name in the "Name" field.

b Type > Select the power set point as the type.

C Parametrization > Select charging station infrastructure from the drop-down menu.

d Actuators > Select the required wallboxes from the drop-down menu.

Save your details by clicking on "Confirm" 😐.

For the charging station infrastructure actuator group, you can, for example, configure the "Physical peak shaving" energy service strategy; see "Example – configuration of the TESVOLT PCS" on page 36.

Information on control via the TESWORLD portal can be found in the section "Charging station control" on page 96.

9.4 BASIC LICENCE APPLICATIONS

All applications are configured by means of energy services in the form of strategies. In the PRO version, it is also possible to carry out various strategies on a case-dependent basis using a decision tree. A system with the BASIC licence, however, can still carry out several applications at the same time, as long as these use different actuators. For example, you can use a battery for peak shaving or self-consumption optimisation, and at the same time limit the feed-in of a PV installation (active power limitation) and also switch generators or consumers.



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NOTE: On the "Strategies" page itself, no changes can be saved. To save permanent changes, click on "next" at the bottom of the page. You will then see the page "Energy Services Activation". Click on "next" again. On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button.

Self-consumption optimisation

Energy service: "Target power" with "Self-consumption" preselection
Target power: 0 kW
Position in topology: Grid connection point
Actuator group: Battery used.
Description: The battery tries to reduce the amount drawn from the grid to 0 by discharging, and charges in the case of excess power.

1	and the second se	 The concerning or bails or activator group and energy service is called energy service strategy. For call owner multiple strategyes.
	SETTINGS	Define activation rules for each strategy
	🕸 System Settings 🔹 🔇	Define the default strategy. Configuration of case-dependent strategy activation (multi-use).
	😂 Device Settings <	Check and submit your energy service configurations
	🛞 Energy Manager 🗸 🗸	 All done configurations can be checked on a final overview page. Submission of your configuration to the energy manager.
	్లే Topology	
	→ Device Replacement	a next
	Energy Services	
	✓ Load-Peaks	
	炎 Time Series Profiles	
	员 User Management	
	,	

In the side menu, click on "Energy Manager" \rightarrow "Energy Services" and then on "next" 1.

	=			C.
DIAGNOSTICS	Energy Manager / Energy Services / Configur	ration / Strategies		
	a	New Straf	tegy	
	Self Consu	Enter the name of you	r new strategy	
	Actuator-Group	S	Energy Services	
	Actuators: Battery 1 Battery 2	BAT TesvaltPCS, Tesvalt, 41728 TesvaltPCS, Tesvalt, 43989	Actuator group is not used.	Add to strategy
ĝ System Settings 《	Détails	Edit		
😂 Device Settings 🛛 🔇				
ⓒ Energy Manager ~	Actuators: Battery 1	bat.TesvoltPCS_Tesvolt_41728.0 TesvoltPCS_Tesvolt_41728	Actuator group is not used.	Arid to stratego

Set up a new strategy. If a strategy has already been set up previously, first click on the right arrow button c and keep clicking on it until the strategy name "New Strategy" can be seen above the input field. Enter a name for the strategy in the input field labelled "Your Strategy Name" (e.g. "Self-con-sumption") a and then click on the [+] symbol b to the right of the input field.

3

CALINATION Entry Manager / Entry Services / Configuration / Strategies P interfaces		=			6 Hz L
Interfaces	DIAGNOSTICS	Energy Manager / Energy Services / Configuration / Stra	ategies		
Strems Entry Services Statesy Self Consumption Entry Services Statesy Self Consumption Entry Services Self Consumption Actuator-Groups Self Consumption Entry Services Self Consumption Actuator: Resultics: PersultCls. Insured: Dray-Service: Self Consumption Battery 12 ResultCls. Insured: Entry Service: Self-Consumption S System Sattings Entry Entry Entry					
Actuator-Groups Self Consumption Energy Services Self Consumption scrrnucs Actuator - Groups Self Consumption Self Consumption Self Consumption © System Settings Desate East Delete Delete Delete		KI	Energy Service Self Const	i Strategy umption	Ð
Actuators: Energy-Service: Self-Consumption SETTINGS Battery 1 Battery 2 PrevolitCS, Tenutr, 43889 Target-power (Self-Consumption) 1 Edit S System Settings Dataset Edit Detect Detect		Actuator-Groups	Self Consumption	Energy Services	Self Consumption
SETTINGS Battery 1 Revolt/CS_Revolt Target-power (Self-Consumption) Edit © System Settings Details Edit Details Details Edit Details		Actuators:	6	Energy-Service:	Self-Consumption
System Settings < Dotatis Orop from strategy		Battery 1 Battery 2	TesvoltPCS_Tesvolt_43989	Target-power (Self-Consumption)	¢ Edit
	龄 System Settings 《	Details	Delete		Drop from strategy
楚 Device Settings 〈					
Energy Manager Actuator :: ch.Demo_Wallbox.0 Actuator group is not used. Walbox 1 Demo_Wallbox.0		Actuators: Wallbox 1	ch.Demo_Wallbox.0 Demo_Wallbox	Actuator group is not used.	

Under "Actuator-Groups" you can see the same number of "Battery" sections as there are logical devices of this type. If you want all batteries to behave the same, then combine them into an actuator group (see "9.3 Actuators and actuator groups" on page 60). Otherwise, find the entry of the battery you want and in the right-hand column next to the entry, click on the drop-down menu "Select an Energy Service" a. Select "Target-power" from the list.

4



In the "Target power – Self-consumption" dialogue box (a), the "Target Power in W" (b) is preset to "0". Next to "Position in Topology" you will see a switch icon (c). The "Grid" setting is always preset to ON. This means that the values from the grid meter are used for control. Finally, click on "Confirm" (d).



Even though we generally try to use all actuator groups within one strategy, remove all actuators/ actuator groups that are not being used from the strategy. To do this, click on the button "Drop from strategy" in the section of the relevant actuator ^a. When the group has been removed from the strategy, a message ^b appears, which you can close.

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	=			Some Actuator-Group(s) were 🗙 🛓 🔒
diagnostics ₽ Interfaces	Energy Manager / Energy Services	/ Configuration / Strategies Cot: Delete	6	The following actuator-group(s) were automatically added to your strategy "EVO": bat.TesvoltPCS_Tesvolt_41728.0, bat.TesvoltPCS_Tesvolt_43389.0,
	Actuators: Invertor Details	inv.TesvoltPCS_Tesvolt_41728.0 ResettPCS_Record_4728	Actuator group is not used.	cn.Deme_Wallbock,0 pv:SMA_STP11060_A3132504746.0 Now, each actuator is employed exactly once in this strategy.
SETTINOS	Actuators: PV 1 Details	pv.SMA_STP11060_A2132504746.0 3MA_STP1060_A2132504746 East Dokto	Select an Energy Service	(C) East Drop from strategy
오 Device Settings ④ Energy Manager 요 User Management	< Actuatore: PV Details	pv.SMA_STP11060_A2133002578.0 SMA_STP1006_A7133002578 EXET Dekte	Actuator group is not used.	Add to strategy
	Actuators: PV Details	PV:SMA_STP11060_A2140102382.0 SMA_STP11060_A2140102382.0 SMA_STP11060_A2140102382 ED1	Actuator group is not used.	Recording

If you have accidentally removed too many actuator groups, you can restore them by clicking on the button "Auto-complete" (a). When this function has been executed, a message confirming this is displayed (b).

1	SETTINGS	к к	Actuators: PV Details	Edit	pv.SMA_STP11060_A2133002578.0 SMA_STP17060_A2133002578 Delate	Actuator group is not used.	vide to strategy
	<u> 段</u> User Management	L	Actuators: PV Details	Edit	pv.SMA_STP11060_A2140102382.0 SMA_STP11060_A2140102382 Delete	Actuator group is not used.	Add to strategy
		L	New Actuator-Group			Auto-complete D	Close () Delete () Back next
		< TE:	SVØLT Røy sturme experts				



	≡	C.	Ę	×
DIAGNOSTICS	Energy Manager / Energy Services / Configuration / Activation			
투 Interfaces	Energy Service Activation			
	a Default Strategy Initialize the decision-tree			
	Self Consumption For multi-use multiple strategies can be defined and performed	by the Energy Manager. Which strategy will run is o	case	
	Please select a default strategy. This is used in case that no decision tree is configured, or the decision tree cannot be evaluated.	e tree by clicking this button.	50	
	⊗ Reset	b back n	next	
SETTINGS				
段 System Settings				
😂 Device Settings	- 4			
Energy Manager				
(I) Use Management				

You now come to the "Energy Service Activation" page. Here, you must specify a default strategy if applicable a. Then click again on "next" b.

1

		Fieldse review your strategy settings a	ind the corresponding activation rules.	
		Self_Consumpt	ion	Default Strates
	ACTUATOR-GROUP			ENERGY SERVIC
	BAT	ACTUATORS		SELF-CONSUMPTION
	TesvoltPCS_Tesvolt_41728		Target Power	01
SETTINGS			Position	
🕄 System Settings 🔹 🔇				
😂 Device Settings 🛛 🖌	You have not specified any activation rules for this strategy.	Activatio	on Rules	
⊗ Energy Manager <				
	Save (Sect			b

On the next page, "Energy Service Configurations Summary", you can check the energy service configuration (a) once more. Finally, click on "Save" (b).

Grid isolation - battery discharge protection mode

Energy service: "Grid isolation – battery discharge protection mode" Actuator group: Battery

Description: To prevent the battery discharging too deeply, the system is switched off after a set time in battery discharge protection mode. The system is switched on at periodic intervals to recharge the uninterruptible power supply (UPS).

Create a new strategy (as described in section "Self-consumption optimisation" on page 65, step 2). Enter a new name for the strategy (e.g. "Grid isolation") and then confirm your entry by clicking on the "+" symbol.

- ENERGY MANAGER -	-			U.
	Energy Manager / Energy Services / Configuration / Str	ategies		
	B	Energy Service S Self_Const	Strategy Imption	Ы
	Actuator-Groups	Self_Consumption	Energy Services	Self_Consumption
	Actuators:	A		
	Battery 1 Battery 2	TesvoltPCS_Tesvolt_43989	Select an Energy Service	()t
钧 System Settings 〈	Details	Delete		Drop from strate
	Actuators:	bat.TesvoltPCS_Tesvolt_41728.0	Actuator group is not used.	
岛 User Management	Battery 1 Details Edit	Tesvol/PCS_Tesvolf_41728 Delete		Add to strate

Under "Actuator groups", you can see the same number of "Battery" sections as there are logical units of this type. If you want all batteries to behave the same way, combine them into an actuator group (see "9.3 Actuators and actuator groups" on page 60). Otherwise, find the entry of the battery you want and in the right-hand column next to the entry, click on the drop-down menu "Select energy service" (a). Select "Grid isolation – battery discharge protection mode" from the list.

In battery discharge deep. Periodically it enough power-gen off again.	2-protection mode the system is turned off in order to avoid discharging the battery too will be turned on again, to charge the uninterruptible power supply (UPS) and to check i eration exists to charge the battery. If not enough generation exists, the system will be tu	f
a.SoC threshold		0 %
	Please define a threshold below which the system will be put into battery discharge-protection mode	4
b. ON-duration	30	
	The ON-duration (in min) defines how long the system will be turned on to charge the UPS and to check for power-generation. Please provide a time-duration in minutes.	
C.OFF-duration	240	
	The OFF-duration (in min) defines how long the system will be turned off. ON- plus OFF-duration defines the periodicity. Please provide a time-duration in minutes.	

3 SoC limit > Define the SoC limit using the slider.

b ON time > Enter the time in minutes (greater than 0) that the system should be switched on for to charge the uninterruptible power supply (UPS).

C OFF time > Enter the time in minutes (greater than 0) that the system remains switched off for. Confirm your entries by clicking on "Confirm" **d**.

		0	Please review your strategy settings a	and the corresponding activation rules.	
			Peakshaving	9	Default Strate
		ACTUATOR-GROUP			ENERGY SERVI
		BAT	ACTUATORS		PHYSICAL PEAKSHAVIN
		TesvoltPCS_Tesvolt_41728		Target Power	80000 1
SETTINGS				Position	
lo System Settings	< 1				
			Activati	ion Rules	
Se Device Settings	*	You have not specified any activation rules for this strategy.			
Energy Manager	<				
段 User Management					

Then click on "Next" (at the bottom). You will now see the page "Energy Services Activation". Click on "Next" again. On the next page, "Energy Service Configurations Summary," click on the "Save" button b at the very bottom to save your entries.

Switch/set point

Energy service: "Switch/set point" Actuator group: Battery Description: For switching the on/off switch on the TESVOLT Energy Manager and for defining a set point (expert mode).

Create a new strategy (as described in section "Self-consumption optimisation" on page 65, step 2).
 Enter a new name for the strategy (e.g. "Set point") and then confirm your entry by clicking on the "+" symbol.

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	Energy Manager / Energy Services / Configuration	n / Strategies		
	R	Energy Serv	ce Strategy	FI
		Self_Co —	isumption	
	Actuators: Battery 1	Self_Consumption	Energy Services	Self_Consumption
ि System Settings <	Battery 2 Details	TesvoltPCS_Tesvolt_43989 Edit Delete		Drop from strategy
Device Settings <				
 Energy Manager << ① User Management 	Actuators: Battery 1 Details	bat.TesvoltPCS_Tesvolt_41728.0 TesvoltPC2_Tesvolt_41728 Edit Delete	Actuator group is not used.	Add to strategy

Under "Actuator groups", you can see the same number of "Battery" sections as there are logical units of this type. If you want all batteries to behave the same way, combine them into an actuator group (see "9.3 Actuators and actuator groups" on page 60). Otherwise, find the entry of the battery you want and in the right-hand column next to the entry, click on the drop-down menu "Select energy service" **a**. Select "Switch/set point" from the list.

Switch/Setpoint		×
	a V D	Expert Mode
Confirm Reset		Cancel

b Confirm your entries.

NOTE: In expert mode, setpoint settings can only be made by administrators.

4

		Please review your strategy settings a	nd the corresponding activation rules.	
		Peakshaving		Default Strategy
🤇	ACTUATOR-GROUP			ENERGY SERVICE
	BAT	ACTUATORS		PHYSICAL PEAKSHAVING
	TesvoltPCS_Tesvolt_41728		Target Power	80000 W
igs				
System Settings		Activati	on Rules	
Device Settings <	You have not specified any activation rules for this strategy.			
Energy Manager 🗸				

Then click on "Next" (at the bottom). You will now see the page "Energy Services Activation". Click on "Next" again. On the next page, "Energy Service Configurations Summary," click on the "Save" button **b** at the very bottom to save your entries.

Physical peak shaving

Energy service: "Target power" with "Physical peak shaving" preselectionTarget power: Freely selectable output at the grid connection point (positive value)Actuator group: Battery

Description: The value of the target power must be positive and determines the maximum output drawn from the utility grid. If this value is exceeded, the storage system discharges to cap the load peak. The battery charges up to the specified target power from any available source, which can include from the utility grid.

Set up a new strategy (as described in the previous section "Self-consumption optimisation" on page 65, step 2). Enter a new name for the strategy (e.g. "Physical peak shaving") and then confirm your entry by clicking on the [+] symbol.

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<u> </u>	DIAGNOSTICS	Energy Manager / Energy Services / Configuration / St	trategies		
	昂 Interfaces く				
		В	Energy Servic Self_Con	e Strategy sumption	ы
		Actuator-Groups	Self_Consumption	Energy Services	Self_Consumption
	SETTINGS	Actuators: Battery 1 Battery 2	TesvolPCS, TesvolCA	Select an Energy Service	()‡ Eait
	System Settings <	Details	Delete		brop nom suategy
	菜 Device Settings く ④ Energy Manager く 郎 User Management	Actuators: Battery 1 Details Edit	bat.TesvoltPCS_Tesvolt_41728.0 TesvoltPC3_Tesvolt_41728 Celete	Actuator group is not used.	And to strategy

Under "Actuator-Groups" you can see the same number of "Battery" sections as there are logical devices of this type. If you want all batteries to behave the same, then combine them into an actuator group (see "9.3 Actuators and actuator groups" on page 60). Otherwise, find the entry of the battery you want and in the right-hand column next to the entry, click on the drop-down menu "Select an Energy Service" (a). Select "Target-power" from the list.

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- ENERGY MANAGER -				×	
DIAGNOSTICS			•		
🖗 Interfaces <		Preselection	d Physical Peakshaving	\$	
			Choose a preselection.		
		Target Power in W	80000	0 🗸	
			Maximum power (positive sign) that	t must not be exceeded.	
	Ac		Grid		Peakshaving
		Position in Topology			
	Actuators:	Confirm Reset		Cancel	
SETTINGS			TesvoltPUS_Tesvolt_43989		Ct Edit
🕄 System Settings 🛛 🔇			Delete		
😂 Device Settings 🗸		_			
Energy Manager					
Chergy Manager				Coloct on Energy Convine	0

In the "Target-power" dialogue box, select the "Physical Peakshaving" preselection (a). Then, for the "Target Power in W" (b), enter the desired value for the power limit, e.g. 80000 for 80 kW. Next to "Position in Topology" you will see a switch icon (c). The "Grid" setting is preset to ON. This means that the values from the grid meter are used for regulation. If you want the peak shaving to take place in a different position in the topology, first click on the "Grid" switch and then select the appropriate meter from the drop-down menu. Then, click on "Confirm" (d) to apply the settings.

		Please review your strategy settings and the corresponding activation rules.					
			Default Strate				
	a	ACTUATOR-SROUP			ENERGY SERVI		
		BAT	ACTUATORS		PHYSICAL PEAKSHAVIN		
		TesvoltPCS_Tesvolt_41728		Target Power	800001		
SETTINGS				Position			
🕸 System Settings	۰.						
·		Activation Rules					
⇒ Device Settings	,	You have not specified any activation rules for this strategy.					
Energy Manager	*						
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0 U							

On the next page, "Energy Service Configurations Summary", you can check the energy service configuration a once more. Finally, click on "Save" **b**.

PV installation active power limitation

Energy service: "Target power", "PV curtailment" preselectionTarget power: Freely selectable output at the grid connection point (negative value)Actuator group: PV

Description: The specified target power must be negative and defines the maximum power fed in to the public utility grid. If this value is exceeded, the output of the PV installation is reduced in order to limit the feed-in to the specified value.

 $\left(1 \right)$

As applicable, set up a new strategy (as described in the previous section "Self-consumption optimisation" on page 65, step 2), or edit an existing strategy. Enter a new name for the strategy (e.g. "Active power limitation_PV") and then confirm your entry by clicking on the [+] symbol.
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DIAGNOSTICS	Energy Manager / Energy Services / Configuration / Strategies	
투 Interfaces ·	Inverter Trevell/C3, Trevell/4728 Donals Ech Counts	Add to strategy
	Artuators: pv.SMA_STP11060_A2132504746.0 Pv 1 SMA_STP11060_A2132504746.0 Details Ext Details Ext Details	Ot Edit Drop from strategy
SETTINGS	Actuators: pv.SMA_STP11060_A2133002578.0	
æ System Settings ·	Pry and Philosop	Ot Edit Drop from strategy

Under "Actuator-Groups", find the section "PV". If there is more than one PV installation in the system, these are called "PV 1", "PV 2", etc. (PV installations cannot be combined into groups). In the right-hand column under the heading "Energy Service", click on the drop-down menu "Select an Energy Service" for the actuator group "PV 1" (a) and select "Target-power".

3	TESVOLT	=			C F2 2
	DIAGNOSTICS		Target-power	×	
	🖗 Interfaces <		Preselection Target Power in W	a PV-Curtaliment ¢ Chorea a presidentian.	Add to strategy
			Position in Topology	Legally required maximum feed-in power (regative sign) of your PV system.	C Tert Prog. From strategy
	SETTINGS		Confirm	Cancel	
	회 System Settings 《			SMA_STP11060_A2133002578 Select an Energy Service	tib 1 0
	See Device Settings <		Edit	Delete	

In the "Target-power" dialogue box, select "PV-Curtailment" from the drop-down menu (a), and for the "Target Power in W" (b) enter, for example, "-7000", which corresponds to a feed-in of 7 kW (70% of a 10 kWp PV installation). Next to "Position in Topology" you will see a switch icon. The "Grid" setting is preset to ON. This means that the values from the grid meter are applicable for regulation. Then, click on "Confirm". If you have several PV inverters to configure in your system, repeat the process from step (2) for each additional PV inverter.

[4]

SETTINGS	Position	Grid
l钧 System Settings	Activation Dulas	
😂 Device Settings 🛛 🔇	You have not specified any activation rules for this strategy.	
🛞 Energy Manager 🛛 🖌		
B User Management		back

Finally, click on "next". You will now see the page "Energy Services Activation". Click on "next" again. On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button.

PV installation active power limitation zero feed-in

Energy service: "Target power", "PV curtailment" preselection

Target power: 0 Actuator group: PV

Description: The specified target power must be 0 and prevents the PV installation feeding into the utility grid. If the power falls below this value (which means the PV installation is feeding in), the output of the PV installation is reduced to the point that feed-in stops.



NOTE: In order to meet the normative guidelines for zero feed-in in Germany, you require a PRO licence, as only by means of a decision tree is it possible to limit the SoC of the battery storage system so that it can absorb surplus production at any time, meaning it can reliably prevent feed-in.

As applicable, set up a new strategy (as described in the previous section "Self-consumption optimisation" on page 65, step 2), or edit an existing strategy. Enter a new name for the strategy (e.g. "Zero feed-in_PV") and then confirm your entry by clicking on the [+] symbol.



Under "Actuator-Groups", find the section "PV". If there is more than one PV installation in the system, these are called "PV 1", "PV 2", etc. (PV installations cannot be combined into groups). In the right-hand column under the heading "Energy Service", click on the drop-down menu "Select an Energy Service" for the actuator group "PV" and select "Target-power".



TESVOLT	=			
— ENERGY MANAGER —			x	
DIAGNOSTICS	Energy Manager / Energ			
🖗 Interfaces <		Preselection	PV-Curtailment Choose a preselection.	
	EI.	Target Power in W	0 C C C C C C C C C C C C C C C C C C C	ы
	Act	Position in Topology	Grid Grid	PV_surfailment
	Actuators:			PV-Curtailment
SETTINGS	PV 1	Confirm Reset	Cancel	÷ Edic
② System Settings · ·	Details		Delite	Drop from strategy.
📚 Device Settings 🛛 <				

In the "Target-power" dialogue box, select "PV-Curtailment" from the drop-down menu (a), and for the "Target Power in W" (b) enter, for example, "0", which corresponds to a feed-in of 0 kW. Next to "Position in Topology" you will see a switch icon. The "Grid" setting is preset to ON. This means that the values from the grid meter are applicable for regulation. Then, click on "Confirm". If you have several PV inverters to configure in your system, repeat the process from step (2) for each additional PV inverter.

4	SETTINGS	Position	Grid
	System Settings <	Activation Bulae	
	😂 Device Settings ✓	You have not specified any activation rules for this strategy.	
	Energy Manager <		
	B. User Management		back

Finally, click on "next". You will now see the page "Energy Services Activation". Click on "next" again. On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button a.

Generation control during utility grid operation

Energy service: "Interruptible loads/yields" **Upper/lower threshold:** Freely selectable output at any point (negative/positive value)

Actuator group: Switchable generator

1

Description: If the power exceeds the upper threshold, a switchable generator is switched on. If the power falls to a value below the lower threshold, the generator is switched off again.

As applicable, set up a new strategy (as described in the previous section "Self-consumption optimisation" on page 65, step 2), or edit an existing strategy. Enter a new name for the strategy (e.g. "CHP_peak shaving") and then confirm your entry by clicking on the [+] symbol.



Under "Actuator-Groups", find the section "CHP" (it must be a switchable generator). If the device cannot be controlled via Modbus, then configure one of the digital outputs for it (see also "Digital outputs (GPIO) configuration" on page 46). In the right-hand column under the heading "Energy Service", click on the drop-down menu "Select an Energy Service" for the actuator group "CHP" a and select "Interruptible loads/yields".

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	Energy Manager / Energ	Interruptible loads/yields		×
y interfaces		Upper threshold in W	80000 🗘 🗸	
	K		If power is above this value, the digital switch is turned on. Note, the threshol can be negative.	E
		Lower threshold in W	40000 © 🗸	
	Act	•	If power is below this value, the digital switch is turned off. It is recommended to choose the distance to the upper threshold at the same magnitute as the interruptible power. This avoids on/off-oscillations. Note, the threshold can be negative.	PV_curtailment
	Actuators:	Digital switch-state above upper threshold	On (switches interruptible yields)	Self-Consumption
SETTINGS	PV 1		Defines how the digitial switch is set above the upper threshold. Hint: For interruptible yields, define the digital switch to be 'on' above the upper thresh ('off' below the lower threshold). For interruptible loads, define the digital swit	old \$ Edit
🕸 System Settings 🔸	Details		to be 'off' above the upper threshold ('on' below the lower threshold).	Drop from strategy.
Se Device Settings		Tolerance time-window in s	60 Control Con	
			Example: If you choose 60 seconds and the switch is 'off', it will turn 'on' once the threshold is exceeded for 60 seconds. If you enter 0, the switch will be	
	Ratiery 1		toggled immediately after exceeding the threshold.	
🐭 Topology	Battery 2		Para Grid	Add to strategy
→ Device Replacement	Details	Position in Topology		
Energy Services		Confirm Reset	Cancel	
✓ Load-Peaks	Actuators:		Toronalities Transition 21728	su

In the "Upper threshold" field (a) enter the power value above which the generator should be switched on. In the "Lower threshold" field (b) enter the power value below which the generator should be switched off again. The difference should equate to at least the output of the generator (ideally make it a bit larger to avoid on-off oscillation). The switch "Digital switch-state above upper threshold" (must be set to "On" for switchable generators (factory setting). As an additional measure against on-off oscillation, you can specify a start-up delay for the generator in the field "Tolerance time-window in s" (d). The threshold must then be exceeded for the specified time before the switch-on process is activated. In the "Position in Topology" field, enter where the specified threshold should be measured. If this is not at the grid meter, deactivate the "Grid" switch (e) by clicking on it and then select the desired measuring point from the drop-down menu. Next, click on "Confirm".

	INTERRUPTIBLE LONGYTELDS
SETTINGS	Yield seatches interruptible yield's Upper threshold 80000 W
A	Lower threshold 40000 W Tolerance time-window 001
ស្រុ System Settings	Position Origi
😂 Device Settings	
O Meter	Activation Rules
<u> </u>	ток ник тох ток постанов на и тох ча найду.
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Charge-Point	
 Charge-Point GPIO Energy Manager 	Const
 ♥ Charge-Point ♥ GPIO ♥ Energy Manager ₩ Topology 	
Charge-Point Charge-Point CPIO CPIO Energy Manager L Copology C Device Replacement	
Charge-Point GPIO Energy Manager Charge Analysis Device Replacement Charge Services	
Charge-Point GPIO Energy Manager Charge Analysis Energy Manager Charge Analysis Control	

Finally, click on "next". You will now see the page "Energy Services Activation". Click on "next" again. On the following page, "Energy Service Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button **a**.

Load control

Energy service: "Interruptible loads/yields" **Upper/lower threshold:** Freely selectable output at any point (negative/positive value)

Actuator group: switchable consumer (via GPIO)

Description: If the power exceeds the upper threshold, a consumer is switched off. If the power falls to a value below the lower threshold, the consumer is switched on again. The difference between the upper and lower threshold should equate to at least the power drawn by the consumer (ideally make it a bit larger) to avoid on-off oscillation. A start-up delay can also be employed.

- Configure one of the digital outputs for switching the load (see "Digital outputs (GPIO) configuration" on page 46 et seq.) and call this "Load_1".
- Now access the page "Topology" via the side menu under "Device Settings". Scroll down to the "Device Assignment" section and click on the entry "Load_1". Click on the drop-down menu "No device" and select either a dedicated meter to measure "Load_1" or, if there is no dedicated meter, select "User_1", as long as Load_1 is recorded by the grid meter. Finally, click on "Save Topology".
- As applicable, set up a new strategy (as described in the previous section "Self-consumption optimisation" on page 65, step 2), or edit an existing strategy. Enter a new name for the strategy (e.g. "Drop Load") and then confirm your entry by clicking on the [+] symbol.



Under "Actuator-Groups", find the section "Input/Output". In the right-hand column under the heading "Energy Service", click on the drop-down menu "Select an Energy Service" for the actuator group "Input/Output" and select "Interruptible loads/yields".

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TESVOLT					6 Hz 2
DIAGNOSTICS	Energy Manager / Energ			×	
F Interfaces 4	anorg/ manager / anorg				
		Upper threshold in W	80000	0 🖌	
	K	6	If power is above this value, the digital switch is turned off. Note, the can be negative.	threshold	Ð
		Lower threshold in W	60000	0 🖌	
	Ac	•	If power is below this value, the digital switch is turned on. It is recom to choose the distance to the upper threshold at the same magnitute interruptible power. This avoids on/off-oscillations. Note, the thresho negative.	mmended a as the old can be	Drop Load
	Actuators:	Digital switch-state above upper threshold	Off (switches interruptible loads)	_	
SETTINGS	Input/Output		Defines how the digitial switch is set above the upper threshold. Hint: interruptible yields, define the digital switch to be 'on' above the upp	: For er threshold	C Edit
🕄 System Settings 🔹 📢	Details		to be "off" above the upper threshold. "On" below the lower threshold.).	Drop from strategy
😂 Device Settings 🗸 🗸		Tolerance time-window in s	60	0 🖌	
S Meter			Delay time in seconds. Use this parameter, to avoid on/off-oscillation Example: If you choose 60 seconds and the switch is 'off', it will turn the threshold is exceeded for 60 seconds. If you enter 0, the switch is	is. 'on' once	
B toronto	Actuators:		toggled immediately after exceeding the threshold.		
ŭ inverter	Battery 2		🔁 🔳 Grid		Add to strategy
Charge-Point	Details	Position in Topology		_	
@ GPIO				Quart	
🛞 Energy Manager 🗸 🗸	Actuators:	Commit		Cancer	
Sec. Topology	Battery 1		TesvoltPCS_Tesvolt_41728		Add to strategy
	Details	Edit	Delete		

In the "Upper threshold" field (a) enter the power value above which the consumer should be switched off. In the "Lower threshold" field (b) enter the power value below which the consumer should be switched on again. The difference should equate to at least the power drawn by the consumer (ideally make it a bit larger to avoid on-off oscillation). The switch "Digital switch-state above upper threshold" (c) must be set to "Off" for switchable consumers. As an additional measure against on-off oscillation, you can specify a start-up delay for the consumer in the field "Tolerance time-window in s" (d). The threshold must then be exceeded for the specified time before the switch-off process is activated. In the "Position in Topology" field, enter where the specified threshold should be measured. If this is not at the grid meter, deactivate the "Grid" switch (2) by clicking on it and then select the desired measuring point from the drop-down menu. Next, click on "Confirm".

		Drop_Load	Default Strategy
	ACTUATOR-GROUP		ENERGY SERVICE
	io.Load.0 Load	ACTUATORS switches interruptible (sads	INTERRUPTIBLE LOADS/YIELDS
		Upper threshold	80000 W 80000 W
		Tolerance time-window	60 s
System Settings		Position	Grid
😂 Device Settings			
	You have not specified any activation rules for this strategy	Activation Rules	
♡ Charge-Point			
Ø GPIO			bac
at Topology			
r≓ Device Replacement			
→ Device Replacement Energy Services			

Finally, click on "next". You will now see the page "Energy Services Activation". Click on "next" again. On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button a.

Back-up power

If the battery inverter used in your system has off-grid capability, you can use also this function when using a TESVOLT Energy Manager with the Basic licence. Since, in the case of grid isolation, a suitable battery inverter takes over grid formation independently, the Energy Manager has no function in this. It can therefore in principle configure any strategy that is carried out in grid operation. However, as no SoC case distinctions can be made with a Basic licence, it is not possible to define a minimum SoC in order to have sufficient energy available for the case of grid isolation. If possible, therefore, you should use a strategy that keeps the storage system at a higher state of charge most of the time, such as peak shaving.



NOTE: Please note that the provision of back-up power is dependent on the use of a battery inverter with off-grid capability, such as the TESVOLT PCS. Warning – the SMA STPS 60 does not have off-grid capability.

Charging station infrastructure

The **charging station infrastructure** (CSI) is a specific actuator group that consists exclusively of charging points. The technician uses their parameters to define how electricity is distributed to the charging points.

Actuator groups for energy services are assigned in "Strategies". You can create multiple CSI actuator groups. However, only one CSI can be active within a strategy, i.e. assigned to an energy service. You can select different distribution parameters using different strategies. The active strategy is defined by the decision tree.

The CSI only controls the current levels of the charging points, not the charging power. The charging power can differ significantly between two charging points with the same assigned current.

Parameters:

• **Name:** You are free to choose an actuator group name, as long as it is not already being used by another actuator group.

If multiple charging infrastructures are in use, they are distinguished by this name.

- **Type/parametrization:** Select *Power set point* as the type. Then for parametrization, *Charging infra-structure*.
- **Total limits:** In this section, define the limits that the charging infrastructure as a whole must adhere to.

Please note that there will be a slight delay in charging points/cars implementing new requirements. The EMS only generates new specifications for the charging infrastructure every 20 seconds. If no command has been sent within the last 20 seconds, the last command received will be executed.

- **Maximum current on the utility grid:** Specifies the maximum permissible current at the grid connection point. This means that the charging infrastructure also adapts to the consumption of other units. This value refers to each individual phase, not its sum. If you do not wish to set a limit, e.g. because the charging infrastructure cannot reach the limit, you can set the limit to unlimited.
- **Maximum current for the charging infrastructure:** Specifies the maximum electricity drawn by the charging infrastructure. Unlike the maximum current on the utility grid, this limit does not consider other units.
- **Electricity limits for charging points:** In this section, set the maximum permitted current for each charging point separately.
- Charging points: Enter the charging points to be controlled by the charging infrastructure. The sequence also defines the sequence of settings on myTESWORLD.
 You can only select charging points that have been assigned to a unit in the *Topology* section.
 If charging points are not displayed, check the settings in the *Topology* section and adjust as necessary.

Setting up the charging station infrastructure on myTESWORLD

The charging infrastructure actuator group is configured on myTESWORLD under "Settings \rightarrow Charging infrastructure".

If there is only one charging infrastructure set up for the EMS, this is selected automatically.

If multiple charging infrastructures have been set up for the EMS, first select the one you wish to configure. Here the names defined in the actuator groups are used.

For each charging point, the wallbox assigned to it in the topology and the unit name are displayed.

Ripple control receiver

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Network operators can use ripple control receivers to transmit information to their customers such as limits for the grid feed-in of large photovoltaic installations. This is often a requirement for registering large-scale generation plants. The ripple control receivers pick up the radio signals from the utility grid operator. These signals are encoded on four contacts connected to the TESVOLT Energy Manager. The set limits can be entered in the UI of the TESVOLT Energy Manager and then implemented in energy services and strategies.

The four contacts of the ripple control receiver are connected to four inputs of the TESVOLT Energy Manager.

2		Ξ.				6 % L
	♥ Interfaces	Zähler Wechselrichter Wallbox	GPIO Externe Vorgaben Containe	er		
	a	🗰 Existing Configurations				
		Configure a Remote Control Signal				
		Online				
	SETTINGS	Driver Name	Device Name	S/N	Status	Model
	System Settings					
	†↓† Device Settings					
	🖒 Meter					
	ā Inverter					
	🜣 Charge Point					
	∉ GPIO					
	🗰 Remote Control Signals					
	🖻 Container					
	⑤ Energy Cost Provider					
	S Energy Manager					

To add a ripple control receiver in the TESVOLT Energy Manager open the [Device Configuration > External Settings] page and click on "Configure External Settings".

3		=		6 % L
	₽ Interfaces	🗰 Configure a Remote Control Sign	al	
		B Show all Configurations	d ⁴ Modbus TCP Assistant	
		Select a model	Choose a model v	
	SETTINGS		RUNDSTEUEREMPFÄNGER Rundsteuerempfänger (RRCR) RippleControl	
	System Settings		TESVOLT-AG	
	tit Device Settings		TESVOLT-AG Vermarkterschnittstelle	
	🖒 Meter			
	<u>ĝ</u> Inverter			
	🔆 Charge Point			
	Ø GPIO			
	# Remote Control Signals			
	🖻 Container			
	S Energy Cost Provider			
	Energy Manager			
	User Management			powered by

Now click on "Select a model" and select the entry "Ripple Control Receiver (RRCR) RippleControl" from the drop-down menu.

4		Ξ		6 × 2
	🖗 Interfaces	🗰 Configure a Remote Control Signal		
		Show all Configurations	d' Modbus TCP Assistant	
		Select a model	Rundsteuerempfänger (RRCR) RippleControl	
	SETTINGS	Device Name	Please select a model to be integrated. e.g. Davice_XYZ_000	
	System Settings	Contactor 1	Assign a unique identifier to this device. Note that the identifier cart's be changed attenuards.	
	Notor	Contactor 2	· · ·	
		Contactor 3		
	♡ Charge Point	Contactor 4 Fallback Power Limit		
	GPIO GPIO Remote Control Signals		The Power limit which will be used if none of the defined combination is given. Energy generation is given as negative.	
	🖻 Container	C1 C2 C3 C4	Power limit in W	
	S Energy Cost Provider		0 0	
	Energy Manager Liser Management		Define combinations of inputs and the corresponding power limit. Energy generation is given as negative.	

Configure the available settings: In the a field, enter a name and under connections 1 to 4 b select the matching wired inputs of the Energy Manager. The numbers 1 to 4 correspond to the outputs of the ripple control receiver.



NOTE: Please note that the assigned name cannot be changed later.

			ricase select a model to be integrated.	
	Device Name		e.g. Device_XYZ_000	
🖗 Interfaces			Assign a unique identifier to this device. Note that the ident	tifier can't be changed afterwards.
	Contactor 1			~
	Contactor 2			~
	Contactor 3			•
	Contactor 4			~
	Fallback Power Limit		0	0
			The Power limit which will be used if none of the defined co	mbination is given. Energy generation is given as
System Settings			negative.	
	C1 C2 C3 C4	Power lin	nit in W	
THE Device Settings		Ĵħ.	U U	1 1
🖒 Meter		-10000	0	o 🗸 💼
1 Inverter				
🜣 Charge Point		 Ø) J	◎ ✓] 💼
@ GPIO		 -30000)	۵ 🗸 💼
关 Remote Control Sign	als	Ø		۵) 💼
Container			Define combinations of inputs and the corresponding powe	r limit. Energy generation is given as negative.
© Energy Cost Provider	Save			
Energy Manager				

Please enter the corresponding generation limits in watts for the connection combinations (4 bits = 16 combinations) below the connection assignment. If you only want to use the four default settings, click the [+] button c three times to configure three additional switching combinations and activate only one contact A1 to A4 for each. The generation limits b are assigned to the contacts a in the next step. Now enter the corresponding power setting points for these switching combinations. Save these settings by clicking [Save].



You can then use these feed-in limits in an energy service strategy by assigning the energy service "Marketer Interface/Ripple Control Receiver" to the corresponding actuator group.

```
1
```

	Direct marketer interface / Radio ripple control	د 🛪 ۵ ×
🖗 Interfaces	Curtailment target for ripple control Orid	
	Confirm Reset	Cancel
	All Batteries 🛞	Multi Battery
	Battery 1 TesvolPCS_Tesvolt_41728 Actuator group is not used.	Add +
	All PVs 🛞	Advanced priority
SETTINGS	PV 1 SMA_STP11060_A2132504746 Energy-Service	Drop ×
ø System Settings	Select an Energy Service	0 ~
tit Device Settings	Chp 1 Switch 🔅	Single switch

Then, determine the position in the topology that the restrictions should affect. "Utility grid" should normally be selected here.

Control using GPIO inputs

Once you have completed the configuration of the input according to section "Digital input (GPIO) configurations" on page 48 and the input is shown as "Online" in the overview on the GPIO page, it is available as a sensor under "Simple Sensors". You can now evaluate it in decision trees and use it to control switching and setting points, for example. Here is an example of a decision question in a decision tree:



Select "Time switch on?" as the decision question and click "Edit". Select "Simple Sensors" in the upper field and the input in the lower field, e.g.: "Input_Signal_io_0_SwitchInput". If this contact is now closed, the decision leads to the YES path. If the contact is open, the decision leads to the NO path of the other tree.

9.5 APPLICATIONS (PRO LICENCE)

Multi-use

	Ξ	S	A.	2
DIAGNOSTICS	Energy Manager / Energy Services / Configuration / Activation			
₽ Interfaces <	Energy Service Activation			
	Default Strategy Load Peakshaving Peaks extent a default strategy. This is used in case that no decision tree is configured, or the decision tree cannot be evaluated. Case-dependent strategy activation (multi-use)			
SETTINGS	Decision Decision			
छि System Settings K	Grid state: on-grid? Eat			
😂 Device Settings 🛛 🔇	Remove the decision-tree			
🛞 Energy Manager 🗸 👻				
ິພະ Topology	Decision Strategy			
→ Device Replacement				
Energy Services	Tes No Stratogy Stratogy (
✓ Load-Peaks	Load_peakshaving (♥) 1W_charging (♥)			
🖑 Time Series Profiles	© Reset	ack nex	.t	
武, User Management				

Multi-use enables you to execute different strategies on a case-dependent basis. To achieve this, decision nodes are set up in a decision tree a, at which point certain conditions are checked and one of two strategies b is activated. In place of the strategies, additional decision nodes c can also be configured with new conditions. Options that can be selected as conditions:

1. SoC > ... %?

2. Network status? (Grid operation, off-grid operation, error, grid isolation process, grid connection process, etc.)

3. Time switch on?

In addition, you must specify a default strategy **d**, which is used if problems occur with evaluation within the decision tree.

) System Settings <	Actuators: PV Details	pv.SMA_STP11060_A213300 SMA_STP1060_A213 Edit Delete	02578.0 Actuator group is not used.	Add to strategy
Energy Manager	Actuators: PV Details	pv.SMA_STP11060_A214010 SMA_STP1060_A214 SMA_STP1060_A214 Delete	22382.0 Actuator group is not used.	Ref to strategy
Load-Peaks Time Series Profiles User Management	New Actualor-Group		Auto-complete ①	Cione Delete 0
	⊗ Reset			back next

In order to configure the decision tree, first you must set up all the strategies that will be used (as described in the section "Self-consumption optimisation" on page 65, step 2). Then, click on "next"

2	TESVOLT	=	6 5 2
\bigcirc		Energy Manager / Energy Services / Configuration / Activation	
	₿ interfaces <	Energy Service Activation Default Strategy Case 2 Prease stetct addust strategy. This is used in case that no decision tree is configured, or the decision tree cannot be Prease stetct addust strategy. This is used in case that no decision tree is configured, or the decision tree cannot be	itrategy will run is case ditions. For multi-use
		© Reset	back next
	SETTINOS ③ System Settings ← 楚 Device Settings ←		
	First, select the	default strategy (a). Then click on "Initialize the decision-tree" (b).	
3		=	5 Hz L
	DIAGNOSTICS	Energy Manager / Energy Services / Configuration / Activation	
	F Interfaces <	l 印 Energy Service Activation	
		Case 2 Passe select a default strategy Case Case Case Case that no decision tree is configured, or the decision tree cannot be evaluated. Case-dependent strategy activation (multi-use)	
	SETTINGS	Decision	
	段 System Settings 〈	Choose a decision-question	
	😂 Device Settings 🛛 🔇	Remove the decision-tree ①	
	Energy Manager +	Ves No	
	Sec Topology	Strategy Choose a strategy (*	
	Cevice Replacement Finerox Services	Choose a strategy \$	
	v Load-Peaks	Convert to Decision	
	🕑 Time Series Profiles	© Reset	back next
	以 User Management		

Once the page has automatically refreshed, you will see the unconfigured decision tree. Now start setting up the first decision node by clicking on the drop-down menu "Choose a decision-question" (a).

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	=				6 H 2
DIAGNOSTICS	Energy Manager / Energ	Parametrization of a So	C dependent decision	×	
₽ Interfaces <	ঞ্টি Energy S	SoC Threshold in %	Please define the SoC (State of Charge) threshold.		
		SoC deadzone in %	Please define a deadzone for the SoC (State of Charge) threshold. A reasonable default is 3%.		+
		Physical Device	Battery 1 Please select a physical device for which the SoC will be evaluated.	one	t be
SETTINGS		Confirm Reset	Cancel	ī	
			Choose a decision-question		

In this example, the condition to be checked is whether the SoC is more than 90%. To set this up you must adjust the slider next to "SoC Threshold in %" (a) to a value of 90%. "SoC deadzone in %" (b) defines by how much the threshold must be exceeded after a switching process, before another switching process can take place. This aims to prevent ON-OFF oscillation. Then, under "Physical Device" (c), select the device that the settings should refer to.

5	F Interfaces <	1 Energy Service Activation
		Default Strategy
		Case 2 \$
		Please select a default strategy. This is used in case that no decision tree is configured, or the decision tree cannot be evaluated.
		Case-dependent strategy activation (multi-use)
	SETTINGS	Decision SoC 9 00%2
	🕸 System Settings 🔹 🗸	
	≅ Device Settings <	Ves No
	Energy Manager	Case_1
	Chergy Manager	
	້ Topology	O Reset
	→ Device Replacement	

Now select the strategy that should be carried out if the answer to the question in the first decision node is "Yes". To do this, click on the drop-down menu (a) on the left side of the decision node and select the planned strategy. Now configure the right side ("No") of the decision node (b) with the alternative strategy and then click on "next" (c).

► CONCURSE

 ENERGY
 Energy Service Configuration / Confirmation

 Interfaces
 Image: Energy Service Configurations Summery

 Image: Energy Service Configurations Summery
 Image: Energy Service Configurations Summery

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 Image: Energy Service Service

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On the next page you can see an overview of the configured energy services. First, the strategies used in the decision tree are listed (a). You can expand these by clicking on "Activation Rules" (b). Finally, click on "Save" (c). The decision tree is saved and activated.

Time of Use

The Time of Use application enables time-dependent generation and load control in grid operation. The function is based on time series profiles, in which switching points are temporally defined. The time series profiles can then be evaluated in decision trees and linked with the desired actuators. A distinction is made between "generic" and "time switch" time switch profiles. A "time switch" time switch profile can only contain "On/Off" values. As with a time switch, this enables actuators to be switched on and off at specific times. Generic time series profiles can contain any positive or negative numerical values. These values can be sent to the relevant actuators at the specific times.



In the side menu under "Energy Manager", click on "Time Series Profiles". In the field "Name" (a) enter a name for the time series profile you are creating. Then click on "Create empty profile".

2		=			6 E 2
		Energy Manager			
		الله الله الله الله الله الله الله ا	iguration		
	SETTINGS	Time Series Profiles		Time Series Profile Configu	ration
	System Settings +	Time Series Profile Selection	1	Edit time series profile	
	🗞 License Management	Profile_1	unsaved]a	Selected time series profile: Profile_1
	க் Network	Please select the time series prof	lie that you want to edit.	Туре	time switch Please specify the type of time series profile.
	😂 Device Settings 🗸 🗸	∯ Export	曽 Remove		
	🕲 Meter	Create a time series profile		- Periodicity	Off Hour Day
	1 Inverter	Name	e.g. profile-1		O Week O Custom
	Charge-Point		To create a profile, please enter a name for it. Note that the name must not be already taken and that the unique identifier may only contain alphaaumoric observation.		The periodicity allows you to continue a time series profile periodically.
	@ GPIO	Format for imported time	series profiles	Interpolation	The interpolation of the time series indicates from which
	🛞 Energy Manager 🗸 🗸	You can import time series profile CSV file (header) must be 'timest entries in the 'timestamp' column	is in CSV format. Please note the following requirements: The first line of the amp, value'. You must use a '' as a separator for the time-value pairs. The i must be valid unix timestamps, those in the 'value' column must be floating		direction the value of a defined point is applied in time.Example: In the time series the value "ON" is set for 12 pm. With an alignment from "left" this value applies FROM 12 pm, with an
	چې Topology	point numbers. Furthermore, no e	entry may remain empty in a line.		alignment from "right" the value applies UNTL 12 pm. The option "linear" changes the value over time from one setting point to the next.
	→ Device Replacement	ste mitente - 222 er cante antite	A because		
	Energy Services	Save time series profile		Edit time series	
	√ Load-Peaks	Changes of your configuration, e. saved. As long as this is not done	g. newly created or imported profiles as well as updated one, have to be by those changes are not activated on your energy-manager.	Time Switch (On/Off)	On Off
	🖑 Time Series Profiles	3 Save	(③ Reset		The time switch type enables activation/deactivation at a defined point in time.

The page will refresh with several additional sections. You now need to configure the time series profile on the right side. Click on the switch next to "Type" to select the setting "time switch". "Time switch" only recognises the states "On" and "Off".

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	=		S
	Energy Manager		
	Time Profile configuration		
SETTINGS	Time Series Profiles	Time Series Profile Configuration	
🕸 System Settings 🔹 👻	Time Series Profile Selection	Edit time series profile	
🗞 License Management	Profile 1	Selected time series pr	ofile: Profile_1
蟲 Network	Piculie_) Please select the time series profile that you want to edit.	Type time switch Please specify the type of time series profile.	
😂 Device Settings 🗸 👻	(C) Export		
🛇 Meter	Create a time series profile	Periodicity a Hour	
1 Inverter	Name e.g. profile-1	O Week Custom	
♥ Charge-Point	To create a profile, please enter name must not be already taker may only contain alphanumeric	a name for it. Note that the The periodicity allows you to continue a time serie i and that the unique identifier periodically: characters, ¹ / ₂ and ¹ / ₂ .	is profile
@ GPIO	Format for imported time series profiles	Interpolation The interpolation of the time series indicates from	n which
🛞 Energy Manager 🗸 👻	You can import time series profiles in CSV format. Please note the following rec CSV file (header) must be 'timestamp, value'. You must use a ', as a separator i entries in the 'timestamp' column must be valid unix timestamps, those in the ' point numbers, Furthermore, no entry may remain empty in a line.	uirements: The first like of the direction the value of a defined point is applied in for the time-value splar. The In the times are inst the value "ON" is set for 12 pure value" column must be floating alignment from "right" the value applies UNTL12 alignment from "right" the value applies UNTL12 and "right" the value applies UNTL12 alignment from "right" the value applies UNTL12 alignment from "right" the value appli	time.Example: With an pm, with an 2 pm. The
😹 Topology	() import	option "linear" changes the value over time from o point to the next.	one setting
→ Device Replacement			
Energy Services	Save time series profile	Edit time series	
√ Load-Peaks	Changes of your configuration, e.g. newly created or imported profiles as well a saved. As long as this is not done, those changes are not activated on your energy of the saved of the sa	rs updated one, have to be rgy-manager. On Off	
🖑 Time Series Profiles	E Save	Reset Reset	nion at a

Now specify the periodicity **a**, i.e. what time span the time series profile covers (before it repeats). If you leave the setting on "Off", you can select any time in the future. In this case, the switching process is only carried out once and not repeated. For our example, we select a periodicity of a day.



In the next step, in the "Edit time series" section, define the switching times/states. For "Time Switch (On/Off)" select the desired switch state, and for "Time" set the time for the first switching process by adjusting the slider or using the arrow keys on your keyboard. Then click on "Add" c. You can now see the new entry for the switching process in the "Profile Overview" list d. Finally, under the heading "Save time series profile" click on "Save" c. The profile status in the section "Time Series Profile Selection" should now have changed to "saved".

	Energy Manager				
	Č Timo Profilo confi	guration			
		guaton			
SETTINGS	Time Series Profiles		Time Series Profile Config	uration	
钧 System Settings 🗸 👻	Time Series Profile Selection		Edit time series profile		
👦 License Management	Profile_1	saved		Selected time serie	s profile: Profile
品 Network	Please select the time series profi	le that you want to edit.	Туре	generic Please specify the type of time series profile.	
😓 Device Settings 🗸 🗸	Export	Remove			
🖒 Meter	Create a time series profile		Periodicity	Off Hour	
0 Inverter	Name			O Day O Week	
⇔ Charge-Point		To create a profile, please enter a name for it. Note that the name must not be already taken and that the unique identifier may only contain alphanumeric characters, ' <u>u</u> ' and '-'.		The periodicity allows you to continue a time a periodically.	series profile
@ GPIO	Format for imported time	eries profiles	Interpolation	The interpolation of the time series indicates f	from which
	You can import time series profile CSV file (header) must be 'timesta entries in the 'timestamp' column	i in CSV format. Please note the following requirements: The first line of the mp, value'. You must use a 'i as a separator for the time-value pairs. The must be valid unix timestamps, those in the 'value' column must be floating		direction the value of a defined point is applie In the time series the value "ON" is set for 12 alignment from "left" this value applies FROM	d in time.Example: pm. With an 12 pm, with an
ఫిఢి Topology	point numbers. Furthermore, no e	try may remain empty in a line.		alignment from "right" the value applies UNTI option "linear" changes the value over time fro point to the next.	. 12 pm. The om one setting
→ Device Replacement	Cos mitions El cicate ambra	prome			
Energy Services	Save time series profile		Edit time series		
✓ Load-Peaks	Changes of your configuration, e.s saved. As long as this is not done,	. newly created or imported profiles as well as updated one, have to be those changes are not activated on your energy-manager.	Value	1000	٢
🖒 Time Series Profiles	B Save	⊗ Rese		With the 'generic' type, on the other hand, you value which should be activated.	J can specify any
R User Management		Save All Changes	Time	10/05/2022 17:46	Ē
				Specify the time at which the value you have of become active. After you have clicked on the also use the arrow keys (←/→ or ↑/↓) for adju	lefined should slider, you can isting the minute.
			Add I		音 Remove All
	Profile Overview				
					Name: Profil Periodicity: r
					Interpolation: L

If you would like to create a generic time profile, begin as described in step 1 (if necessary select a new name). In the configuration of the time series profile, set the type 3 to "generic". Under "Periodicity" b select the desired option if applicable or select "Off" to set a time in the future at which the value **1** should be sent to the actuator. Then click on "Add" **1**. You can now see the new entry for the switching process in the "Profile Overview" list **2**. Finally, under the heading "Save time series profile" click on "Save" **1**. The status **1** of the profile in the section "Time Series Profile Selection" should now have changed to "saved".

6

TESVOLT	
- ENERGY MANAGER -	Parametrization of the time switch X Energy Manager / Energy
DiADHOSTICS ♥ Interfaces <	Energy S Time series selection Terrent Mode Profile_1 Prose select a line series, if you would like to view, create or edit time series profiles, please click on "Configure time series Configure time series readed as a readed as
	Cancel
SETTINGS	Decision Choose a decision-question
l System Settings <	Time switch on?
Device Settings <	Remove the decision-tree

You can now control actuators that are dependent on the time series profile created in a decision tree. Proceed as described in the section "Multi-use" on page 84) to set up a decision tree. In a decision node, click on the drop-down menu "Choose a decision-question" and select "Time switch on?". You will now see the dialogue box "Parameterisation of the time switch". In the drop-down menu "Time series selection" a select the desired time series profile by clicking on it and then click on "Confirm" b. Then continue with the configuration of the decision tree.

Load peak shaving

The "Load peak shaving" function optimises the behaviour of the connected battery storage system on the grid connection point. Unlike physical peak shaving, a freely selectable time period is considered here during which the average drawn output from the public utility grid may not exceed a specific value. In Germany, the interval for load peak shaving is 15 minutes.

6

NOTE: If the peak shaving fails, i.e. the specified maximum value for the amount drawn from the grid is exceeded, the peak demand reached in this case is automatically set as the new maximum power value. If necessary, you can manually reset this value via the load peaks configuration and the function "Schedule Peak Power thresholds" at any time in the future, or via "Current Peak Power and Interval".

1

2



First, configure the global settings for load peak shaving. In the side menu, click on "Energy Manager" \rightarrow "Load-Peaks". In the field "Peak Power in W" a enter the value for the power limit. To confirm the value, click on "Override" b. The interval is preset at 15 minutes. If you would like to specify a different interval, click on the "Edit Interval" switch c and enter a new interval in the field "Interval in min". In the section "Schedule Peak Power thresholds" you have the option to activate a new peak power at a specified time. To do this, enter the new peak power in the field "Peak Power in W" d. Next, set the activation time. As soon as you move the mouse pointer over the "Activation Time" field e, a small calendar display appears, where you can enter a date and time. To apply the changes, click on "Add" f. In the section "Former and scheduled Peak Power thresholds", you can now see a grey entry g with the current peak power limit and an entry recorded in green h with the date you have scheduled. If the details are correct, then click on "Save" 1.

Now, in the side menu go to "Energy Manager" → "Energy Services". Set up a new strategy (as described in the section "Self-consumption optimisation" on page 65, step 2). Enter a new name for the strategy (e.g. "Load peak shaving") and then confirm your entry by clicking on the [+] symbol.

	-	
	-	
	-	

	=	Land analysis		×	6 F 2
DIAGNOSTICS		Load-peaksnaving		^	
		Interval in min	a 15	0	
			Please enter the interval in minutes of the registered power measure Hint: The interval is a global parameter. Changing it, will update the pathalwing interval to all load packaharing entrys partices. Also energy-manager has to be restarted. During this restart period (ma is not in operation.	rement. e load- o, the ax. 1 minute)	
	A	Peak Power in W	80000	÷ 15	
			Enter the (initial) upper threshold (maximal grid power) for the peak This threshold will be adapted dynamically by the Energy Manager operation. Hirt: updating the peak value is a global operation and w the lead-peak value for all lead-peakshaving energy services.	ik-shaver. during will update	
SETTINGS		Safety margin in W	1600	٥	¢ Edit
ĝ System Settings 〈	Details		Please define a safety margin. Typically this should be 2% of the pl	eak power.	Drop from strategy
😂 Device Settings 🛛 🔇		Confirm Reset		Cancel	
🛞 Energy Manager 🗸 🗸			bat.TesvoltPCS_Tesvolt_41728.0 Actuator group	o is not used.	
Sac Topology					Add to strategy
.→ Davice Replacement	Details	Edit	Delete		

Then, on the "Strategies" page, select the item "Load-peakshaving" for the actuator group "Battery" in the drop-down menu "Select an Energy Service". In the "Load-peakshaving" dialogue box, for the field "Interval in min" (a) you can enter the length of the interval over which the average value of the peak load should be calculated.

For "Peak Power in W" (b) enter the value for the maximum power drawn (e.g. 80000 for 80 kW). You have already specified both values previously in step 1. If you adjust the values, they will be changed across the system. For "Safety margin in W" (c) you can define a safety margin, which should prevent the threshold being unintentionally exceeded. Then, click on "Confirm" (d). If you have several batteries in your system that are not configured as a group, repeat this step for each additional battery as needed.

4

Finally, click on "next". You now come to the "Energy Service Activation" page. Here, select a default strategy and/or create a decision tree with the new strategy (see also the following section "Back-up power", which describes a multi-use application with load peak shaving), or click again on "next". On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button.

Back-up power (Multi-use with peak shaving)

In a power outage, a battery inverter supplies the grid independently, without the TESVOLT Energy Manager having to step in. For the "Back-up power" application, therefore, strategies are required that ensure that the storage system has sufficient energy available in the case of back-up power being needed, and that additional applications can still be employed where applicable. As requirements and topologies vary widely, only the basic procedure is explained here using an example.

Energy service: "Multi-use" with the applications peak shaving and back-up power Strategy 1-1: Load peak shaving with actuator group battery Position in topology: Grid connection point Strategy 1-2: Target power advanced with actuator group battery Position in topology: Battery Strategy 2: Grid isolation with actuator group battery Description: The first decision node checks whether there is grid operation. If "Yes": next decision node; if "No": grid isolation. The second decision node checks whether the SoC is over 50%. If "Yes": load peak shaving is carried out; if "No" the battery is charged with 1 W (setting for dead zone 50%: the battery cannot be discharged as this is only possible if both strategies demand it – which is not possible due to Strategy 1. Following discharge through grid isolation, charging of the battery storage system resumes when there is grid operation again, taking into account the max. load power limit). 6

- 1 First, configure the global settings for load peak shaving as described in the previous section "Load peak shaving" on page 90.
- Set up a new "Load peak shaving" strategy (Strategy 1-1) (as described, for example, in the section "Self-consumption optimisation" on page 65, step 2). For the actuator group Battery 1, select "Load peak shaving" as the energy service and configure the function.
- 3 Set up a new "1 Watt battery charging" strategy (Strategy 1-2). For the actuator group Battery 1, select "Target-power/advanced" as the energy service. Set the target power to 1 W, and the position in the topology as "Battery".
- 4 Set up a new "Grid isolation" strategy (Strategy 2). Select Battery 1 for the actuator group, and "Grid isolation" as the energy service.
- 5 Scroll to the bottom of the page and click on "next".

	=	C	[
OneWire	Energy Manager / Energy Services / Configuration / Activation		_
	1 Energy Service Activation		
	Default Strategy		
	Peakshaving For multi-use multiple strategies can be defined and performed by the Energy Manager. Whi	ch strategy will run is case	
	Prese select a default stategy. This is used in case that no decision tree is configured, or the decision tree cannot be scenarious you should define a decision-tree. Prese situation the tree by clicking this buttom weak used.	5.	
	(© Reset	back	next
هی Network			
😇 Device Settings			

On the newly loaded page, first select your default strategy (a). This is used if problems occur with evaluation in the decision tree. Then click on "Initialize the decision-tree" (b).

7		≡	C	A.	8
_	OneWire	Energy Manager / Energy Services / Configuration / Activation			
		1 Energy Service Activation			
		Default Strategy Peakshaving Peaks select default strategy. This is used in case that no decision tree is configured, or the decision tree cannot be evaluated.			
	SETTINGS	Case-dependent strategy activation (multi-use)			
	🕸 System Settings 🗸 👻	Decision Grid state: on-grid?			
	👳 License Management	Yes No			
	ع Network	Strategy Choose a strategy			
	😇 Device Settings 🗸 👻	Choose a strategy \$			
	S Meter	Convert to Decision			

First select the question for the first decision node ⓐ. In back-up power applications, the question about the grid state is normally at the start. Select the "on-grid" state as the parameter. If the system is in grid operation, this question is answered with "Yes"; in grid isolation, with "No".

	=	د. ۴
OneWire	Energy Manager / Energy Services / Configuration / Activation	
	1 Energy Service Activation	
	Default Strategy	
	Peakshaving	\$
	Please select a default strategy. This is used in case that no decision tree in evaluated.	is configured, or the decision tree cannot be
SETTINGS	Case-dependent strategy activa	ntion (multi-use)
System Settings	Decision	8
👓 License Management	Grid state: on-grid?	
A Natwork	Yes	No
ass Network	Choose a strategy	Choose a strategy
Settings	Choose a strategy 💠	Choose a strategy \$
🛇 Meter	Convert to Decision	Convert to Decision
<u>Î</u> Inverter		
♡ Charge-Point	⊚ Reset	back next



9

TESVOLT					Fa Ω
- ENERGY MANAGER -			×		
OneWire					
	SoC Threshold in %	area define the Col (State of Charge) threshold	50 %		
	SoC deadzone in %		50 %		
	Physical Davies	ase define a deadzone for the SoC (State of Charge) threshold. A reasonable default	t is 3%.	÷	
	Pie	ase select a physical device for which the SoC will be evaluated.			
SETTINGS	Confirm Reset		Cancel		
🕄 System Settings 🗸 👻		Grid state: on-grid?			
👳 License Management					
ᇔ Network	Decision Choose a decis	ion-question 🛞		Strategy Choose a strategy	
😂 Device Settings 🗸 👻	SoC >%?	¢ Edit		Choose a strategy \$	
🕅 Meter	Remove decision-node (
*					

When the strategy has been converted into a decision node, select as the decision question "SoC > ...?". In the dialogue box that opens for setting the parameters, select for "SoC Threshold in %": 50 % (a); for "SoC deadzone in %": 50 % (b); for "Physical Device" (c): Battery 1. Finally, click on "Confirm" (d)

10	2 OneWire	Energy Manager / Energy Services / Configuration / Activation					
		段 Energy Service Activation					
		Default Strategy					
		Peakshaving	\$				
		Please select a default strategy. This is used in case that no decision tree is con evaluated.	figured, or the decision tree cannot be				
	SETTINGS	Case-dependent strategy activation	n (multi-use)				
	System Settings ~	Decision Grid state: on-grid?					
	License Management	Yes	No				
	🚓 Network	Decision SoC > 50%?	Strategy 🔞				
	😂 Device Settings 🗸 👻	Yes Mo	Choose a strategy \$				
	🖒 Meter	a Strategy Strategy Strategy (1)	Convert to Decision ①				
	0 Inverter	Choose a strategy \$					
	🗘 Charge-Point						

Now select the strategy for the left, "Yes" side a of the second decision node. Here you select the strategy that is to be used if the SoC is 50–100%. So select "Load peak shaving".

1.1.1	

DneWire	Energy Manager / Energy Services / Configuration / Activation							
	Energy Service Activation							
	Default Strategy							
	Peakshaving	\$						
	Please saliet a rédefuit strategy. This is used in case that no decision tree is configured, or the decision tree cannot be evaluated.							
SETTINGS	Case-dependent strategy ac	tivation (multi-use)						
🕸 System Settings 🗸 🗸	Decision Grid state: on-gri	d7 🐵						
🖙 License Management	Vas	No.						
عَثْمَ Network	Decision SoC > 50%? (8)	Strategy Choose a strategy						
😴 Device Settings 🗸 👻		Choose a strategy \$						
🖒 Meter	Tes No Strategy Backebauing () 111 (Desping ()	Convert to Decision ①						
<u> </u>								
♡ Charge-Point	(S) Reset	back next						

Now select the strategy for the right, "No" side a of the second decision node. Here you select the strategy that is to be used if the SoC is 0–50%. Select "1 W battery charging" here.

12	OneWire	Energy Manager / Energy Services / Configuration / Activation
		③ Energy Service Activation
		Default Strategy
		Peakshaving ¢
		Please where a default strategy. This is used in case that no decision tree is configured, or the decision tree cannot be evaluated.
	SETTINGS	Case-dependent strategy activation (multi-use)
	🕄 System Settings 🗸 🗸	Decision Grid state: on-grid?
	🖙 License Management	
	蟲 Network	Decision Scc > 50%? ◎
	😓 Device Settings 🗸 👻	
	🖒 Meter	Tres No Strategy Peakshaving () 100, Strategy 100, Charging ()
	D Inverter	
	♡ Charge-Point	© Read
	@ GPIO	

Finally, select the strategy for the right, "No" side a of the first decision node. Here you select the strategy that is to be used if there is no grid operation. Select the strategy "Grid isolation" here and finally click on "next" **b**.

			SoC > 5	50%?
SETTINGS	SoC > 50%?	0	No	
JET INOS	Yes			
🕸 System Settings 🛛 👻	Peakshaving		1W_Ch	larging
Icense Management				
र्ड्ड Network	Off_grid			
😂 Device Settings 🗸 👻	ACTUATOR-GROUP	ENERGY SERVICE		
🖒 Meter	BAT ACTUATORS	OFF-GRID		
<u>Î</u> Inverter	TesvoltPCS_Tesvolt_41728 No Paramet TesvoltPCS_Tesvolt_43989	ers required.		
♡ Charge-Point				
Ø GPIO	Activation Rules			
⊗ Energy Manager 👻				
Sal Topology				
→ Device Replacement	Save ® Reset			
Energy Services				

You come to the page "Energy Service Configurations Summary". Here you can see three demarcated sections with the existing strategy configurations. Click on "Activation Rules" (a), and these are also displayed. Finally, click on "Save" (b).

Forecast-based charging

To maximise self-consumption while simultaneously minimising feed-in peaks, battery capacity is maintained according to the weather forecast in order to avoid feed-in and/or curtailment of the PV installation (e.g. 70% regulation). The TESVOLT Energy Manager automatically controls the charging and discharging of the battery such that curtailment of the PV installation is kept to a minimum. The Energy Manager has a smart way of doing this, namely by determining the forecast PV output from local meteorological data. The Energy Manager therefore always knows how much energy is available at what point in time.

Set up a new strategy (as described in the section "Self-consumption optimisation" on page 65, step 2). Enter a new name for the strategy (e.g. "Forecast-based charging") and then confirm by clicking on the "+" symbol.

2 Now, in the side menu go to "Energy Manager" → "Energy Services". Add the actuator group "Battery" to the strategy. Click on the drop-down menu "Select an Energy Service" and select "Forecast-based Charging".



4

1



In the "Forecast-based Charging" dialogue box, enter the capacity of the battery in the field "Capacity in kWh" (a). Then click on "Confirm" (b). If you have several batteries to configure in your system, you can group them beforehand, or repeat the process from step (2) for each additional battery.

Finally, click on "next". You now come to the "Energy Service Activation" page. Here, select a default strategy and/or create a decision tree with the new strategy (see also the section "Back-up power (Multi-use with peak shaving)" on page 91, which describes a multi-use application with load peak shaving), or click again on "next". On the following page, "Energy Services Configurations Summary", scroll all the way down to the very bottom of the page and click on the "Save" button.

NOTE: Please note that the energy service strategy **forecast-based charging** must be approved by TESVOLT Support.

Charging station control

During operation, a wide range of settings can be adjusted by the user.



Off-grid generator curtailment for target SoC

The energy service off-grid generator curtailment enables generator systems to be curtailed off-grid. The energy management system ensures that the maximum charging capacity of the generator's battery is never exceeded.

The generator installation (e.g. photovoltaic installation) complies with the battery's maximum SoC limit and keeps battery discharge and charge to a minimum.



3

NOTE: Please note that, for the energy service strategy **off-grid generator curtailment for target SoC**, you must select a generator.

Create a new energy service strategy (as described e.g. in section "Self-consumption optimisation" on page 65, step 2). Enter a new name for the strategy (e.g. "Generator curtailment") and then confirm by clicking on the "+" symbol.

2 Now go to "Energy Manager" → "Energy Services" in the side menu. Add the actuator group "PV 1" to the strategy. Click on the drop-down menu "Select energy service" and select "Off-grid generator curtailment for target SoC".

	_	
This service must be ass output in the off-grid ca	igned to one or more generation units. It regulates the generator ise and causes the battery not to be charged beyond a SoC of 95%.	Expert Mode
Gridforming battery	Battery 1	~
	Please select the gridforming battery for the backup/off-grid case. The 'generation contro on this battery.	ol' will be performed
Capfirm Reset		Canc

Then click on "Confirm" **b**.

4	Off-Grid Generation control at target-SoC				
	This service must be assi output in the off-grid ca	gned to one or more generation units. It regulates the generator Expert Mode e and causes the battery not to be charged beyond a given SoC.	,		
	Gridforming battery	Battery 1			
		Please select the gridforming battery for the backup/off-grid case. The 'generation control' will be performed on this battery.			
	Maximum SoC	95 %			
		Please define the maximum SoC of the battery, that should not be exceeded.			
	d Confirm Reset	Cance			
	Or activate the expert mod ment for target SoC". Select a battery in the dro Use the slider to set the m Then click on "Confirm"	le	il-		
5	On the overview page of the you to the "Energy Service	ne new energy service strategy, click on "Next" (at the bottom). This take is Activation" page.	S		



Select a standard strategy (a) here if required and/or create a decision tree with the new strategy by clicking on "Initialise the decision tree" (b). Also see section "Back-up power (Multi-use with peak shaving)" on page 91, which describes a multi-use application with load peak shaving.

Then click on "Next" 💽.

 $\left[7 \right]$

The "Energy Service Configurations Summary" page opens.

On this "Energy Service Configurations Summary" page, scroll to the very bottom and click on the "Save" button.

Dynamic electricity tariffs

There are a number of ways you can use the TESVOLT Energy Manager dynamic electricity tariffs:

Energy cost provider: you can store your access data for the providers aWATTar and Tibber in the configuration so that the TESVOLT Energy Manager can retrieve and process this data.

Classification into high/medium/low: the TESVOLT Energy Manager automatically classifies the electricity prices it receives into three categories: high, medium and low. You can use this classification in the time series format as a basis for various strategies, energy services and decisions.

Electricity price-based switching: you can also switch consumers on or off based on fixed, individually defined electricity price limits. It is also possible to set the desired power consumption depending on the price level.

Electricity price-based wall box control: you can charge electric vehicles automatically at the optimum cost based on electricity price fluctuations. Simply enter the desired amount of energy in kWh and the desired departure time.

Energy cost provider

The linkage of dynamic data from energy cost providers (e.g. Tibber, aWATTar) allows this data to be used by the TESVOLT Energy Manager e.g. for price-based switching of generators, charging of electric cars or calculations of energy services or in decision trees.

To configure a provider for dynamic electricity prices, please proceed as follows:

	Ξ				
핵 Interfaces	-				
	(\$) Existing Configuration	ons d			
	Configure a new energy cost p	provider			
	Online				
	Driver Name	Device Name	S/N	Status Model	
SETTINGS					
ø System Settings					
₩ Device Settings					
S Energy Cost Provider					
Energy Manager					
ಟೆ Topology					
💩 Time Series Profiles					
疑 Topology き Time Series Profiles					

Clicking on (a) "Set up new energy cost provider" will take you to the selection page of energy cost providers that are currently available.

	Ξ		C.
	S Configure a new energy cost p	rovider	
	Show all Configurations	d ^{er} Modbus	TCP Assistant
	Select a model	Choose a model	~
		Please select a model to be integrated.	
SETTINGS			
ep System Settings			
해 Device Settings			
(5) Energy Cost Provider			

Now click on "Select a model" (a) and select the desired provider from the drop-down field with a mouse click. Please provide any additional information that may be required.

Click on "Save" to receive and use the data of the configured provider in the TESVOLT Energy Manager.



4

NOTE: The Energy Manager must be able to access the Internet in order to set up an energy provider.



WARNING: Only one energy cost provider should be configured to ensure consistency of the electricity price data used.

Price classification

In order to respond to the options provided through dynamic electricity pricing, the Energy Manager records the data from the configured provider and automatically classifies it into three categories: high, medium and low. The classification is applied to the prices received on a daily basis:

- The electricity price is considered "high" when it is in the upper third for the day
- It is considered "low" when in the lower third
- Otherwise it is considered to be "medium"

These categories are then made available to you in the form of time series profiles, with the option of having them evaluated accordingly by the TESVOLT Energy Manager:

		=				6 × 2
	Interfaces	C	3 Time Profile Configurat	ion		
			Time Series Profile Selection		Edit time series profile	electricity_price
			electricity_price	saved	Туре	generic
			high_price	saved		Please specify the type of time series profile.
			low_price	saved	Periodicity	Off
	INGS		medium_price	saved		Hour
	System Settings		Please select the time series profile tha	t you want to edit.		Week
	Device Settings		@ Export	🗎 Remove		Custom
	Energy Cost Provider		Create a time series profile			The periodicity allows you to continue a time series profile periodically.
	Energy Manager		Name	e.g. profile-1		
	Tanalami			To create a profile, please enter a name for it. Note that the name must not be already taken and may	Interpolation	O left
22	ropology			only contain alphanumeric characters, as well as '_' and '-'.		right
			Format for imported time ser	ies profiles		The interpolation of the time series is based on

The time series profile "electricity_price" contains the entire list of dynamic electricity prices received. The "high_price" profile shows the periods in which a high price is to be expected, the "medium_price" profile shows those with medium prices and the "low_price" profile those with low prices.

6

NOTE: Please note that these profiles are created in such a way that the price shown is valid up to the specified hour.

			TYDE INFIDIT OF ITST. WHILE THE BITCHT SATISFIT THINKS
		Changes of your configuration, e.g. newly created or imported profiles as well as updated one, have to be saved. As long as this is not done, those changes are not activated on your energy-	sense for the "generic" type (specific value).
ģ	Interfaces	Edit time series Time Switc	h (On/Off) on off The time switch 'type enables the activation/deciritation at a defined point in time. When using this option, it is recommended to use itett' interpolation. D/21/2/024 18:33 Decrify the time at which the value you have defined should become active.
	INGS		
	System Settings	Name: low_price Periodicity: none interpolation: left	: Type: time switch
	Device Settings	Valid since and including \$\phi\$ On/Off	
	Energy Cost Provider	Mon, Dec 2, 2024 6:00 PM +0100 On	8
	Energy Manager	Mon, Dec 2, 2024 7:00 PM +0100 Off	
	Topology	Mon, Dec 2, 2024 9:00 PM +0100 Off	
¢	Time Series Profiles	Tue, Dec 3, 2024 12:00 AM +0100 Off	
@	Formula Blocks	Tue, Dec 3, 2024 1:00 AM +0100 On	

In this example, the time series profile "low_price" indicates that low prices still apply until 6 pm Central European Summer Time (the value is "On"). However, prices starting at 6:01 pm are no longer considered low (the value is "Off" until midnight). This classification continues until 12:01 am, because low prices apply again from then until 1:00 am (the value is "On").

Electricity price-based switching

With the "Electricity price-based switching" function, devices can be switched on or off when a certain electricity price is exceeded or not reached, or can be operated at a certain power setting point.

A distinction is made here based on the type of actuator group:

- Switch setting point actuator group (e.g. heat pumps with SGReady connection)
- Power setting point actuator group (e.g. PV inverter)

		=			6.
		New Actuator-Group +	Ele	ctricity_price_switch	 ✓
	le l	Filter by Name	Filter by Actuators	~	Only show used Groups
		Ø	All Batterie	es 🚯	Multi Battery
		Battery 1	TesvoltPCS_Tesvolt_41728	Energy-Service	Drop ×
SETTIN	igs			Select an Energy Service	0 ~
٥	System Settings	Ø	all PVs ۞	e e e e e e e e e e e e e e e e e e e	Advanced priority
ŧit	Device Settings	PV 1	SMA_STP11060_A2132504746	Actuator group is not used.	Add +
6	Energy Cost Provider	Ø	Chp 1 Swite	ch 🛞	Single switch
۲	Energy Manager	CHP 1	СНР	Actuator group is not used.	Add +
22	Topology	0	ECar 1 {	٥	Single powe
¢	Time Series Profiles	Wallbox 1	Demo_Wallbox	Actuator group is not used.	Add +
@	Formula Blocks			a) (a) # 1 2	
~	Load Peaks		io.Waermepumpe.	0-switch ⊕	Single switch
	Energy Services	Input/Output	Waermepumpe	Actuator group is not used.	Add +
-	Realiting	Save 🐻 Reset 🕥			Overview 🔳

Create a new strategy in the energy services area (e.g. "electricity_price_switching"). First, click on the "Add" button for the actuator group that will execute the strategy and then on "Select energy service" a. 1

	=			C
	New Actuator-Group +	Ele	ctricity_price_switch	~
	Filter by Name	Filter by Actuators	~	Only show used Groups
	0	All Batterie	es (ē)	Multi Batte
	Battery 1	TesvoltPCS_Tesvolt_41728	Energy-Service	Drop
setTINGS গ্রি System Settings		All DVs (A	✓ Select an Energy Service Target-power Load-peakshaving	
tit Device Settings	PV 1	SMA_STP11060_A2132504746	Switch/Setpoint Price based switching	
⑤ Energy Cost Provider	Ø	Cnp 1 Swite	ch (8)	Single swit
S Energy Manager	CHP 1	CHP	Actuator group is not used.	Add -
🐭 Topology	P	ECar 1 {	٢	Single pow
الله الله الله الله الله الله الله ا	Wallbox 1	Demo_Wallbox	Actuator group is not used.	Add -
@ Formula Blocks	0	io.Waermepumpe.	0-switch 🚯	Single swit
✓ Load Peaks	Input/Output	Waermepumpe	Actuator group is not used.	Add -
Energy Services				
間 Backups	Save 🐻 Reset 🔊			Overview 📙

Select "Price-based switching" from the drop-down menu.

NOTE: This energy service can only be selected if (variable) electricity prices are also activated.

Electricity price-based switching of switch setting point actuator groups

1	TESVOLT				6 🛪
	LACKET MARAGEN	Price b	based switching	×	Statement of the local division of the local
		Set a swi	itch based on the currer	t electricity price.	
		Price li	imit		nly show used Groups
		0 Swite	ch behaviour	Activate switch. if price > price limit	Multi Battery
	•			Activate switch, if price < price limit	Add +
SETT		Confir	Reset	Cancel	Advanced priority
۲			PV 1	SMA_STP11060_A2132804748 Actuator group is not used.	Add +
111			0	Chp 1 Switch 🚯	Single switch
\$				CHP Actuator group is not used.	Add +
۲				ECar 1 🚯	Single power
5.2			Wallbox 1	Demo_Wellbox Actuator group is not used.	Add +
Ċ					
@				io.Waermepumpe.O-switch 🛞	Single switch
	Load Peaks			Waermepumpe Energy-Service 2	Drop ×
E9				Select an Energy Service	•
6			Save 🐻 Re	set)	Overview 🕒

You can set the switching threshold in ct/kWh in the "Price limit" (a) input field. When you configure the settings for the switch behaviour, (b) you can determine the direction in which the price limit should apply when activating the switch.

TESVOLT		
- ENERGY HANAGER -	Price based switching	XAdd +
DIAGNOSTICS	Set a setpoint based on the current electricity price.	Single power
Interfaces	Price limit	Add +
	• 0	•
	Setpoint (smaller)	Single power
	-• 0	≎ Add +
	Setpoint (larger/equal)	
	0	C Single power
U	Confirm Reset	Add +
SETTINGS	ECar 3 (9)	Single power
System Settings	Wallbox 3 Aften_Mock_MOCK_9999 Actuator group is not	used. Add +
Device Settings	io.Waermepumpe.0-switch 🖗	Single switch
Energy Manager	Input/Output Waermepumpe Energy-Service	Drop X
ಟಿ Topology	Select an Energy Se	rvice 0 v
ⓒ Time Series Profiles	Vehicle Charging Infrastructure 🙆	Charge point infrastructure
@ Formula Blocks		
	Wallbox 2 Alfen_Mock_MOCK_9999 Energy-Service	Drop ×
Load Peaks	Select an Energy Se	rvice O ~
Energy Services		and the first sector of the se

Electricity price-based switching of power set point actuator groups

Enter the switching threshold in ct/kWh in the "Price limit" a input field. In the "Set point (less than)", b input field you can define the set point for the actuator group when the price is below the set price limit. This means that the specified power value is sent to the corresponding actuator group as a default setting as long as the price is less than the set price limit.

This means the "Set point (greater than or equal to)" (a) defines the set point for the actuator group when the price is equal to or greater than the set price limit.

NOTE: If the energy service strategy cannot be evaluated, then no set point is transmitted to the actuator group. Reasons for a failed evaluation may be missing price information from the energy cost provider or a prolonged loss of connection between the TESVOLT Energy Manager and the internet.

Cost-optimised charging

1

With price-based charging, you can tell the TESVOLT Energy Manager at what price you want to charge your electric car, when you want charging to be completed, and how much energy you want to charge during this time. For this purpose, the corresponding wall box is assigned an energy service called "Cost-optimised charging". Further settings can be made on the myTESWORLDportal.

To enable electricity price-based charging, please proceed as follows:

TESV/01T			, interest group in not about	Add T
ENERGY MANAGER	D	All PVs 🕸		Advanced priori
	PV 1	SMA_STP11060_A2132504746	Actuator group is not used.	Add H
	Ø	Chp 1 Swite	ch 🛞	Single swit
	CHP 1	СНР	Actuator group is not used.	Add -
	0	ECar 1 {	0	Single pow
SETTINGS	Wallbox 1	Demo_Wallbox	Actuator group is not used.	Add -
System Settings	D	ECar 2 {	۵	Single pow
Nevice Settings	Wallbox 2	Alfen_Mock_MOCK	Energy-Service	Drop >
S Energy Cost Provider			✓ Select an Energy Service	
Second	_		Load-peakshaving	
	Ø	ECar 3 4	Switch/Setpoint	
54 Topology	Wallbox 3	Alfen_Mock_MOCK	Cost optimized charging	
& Time Series Profiles	R	io Waarmanumpa	0-switch 🚯	Sinale swite
@ Formula Blocks		lo.maerinepunipe.		
✓ Load Peaks	Input/Output	waermepumpe	Actuator group is not used.	Add -
Eneroy Services	0	Vehicle Charging Infrastru	icture (3)	Charge point infrastructu
	Wallbox 2	Alfen_Mock_MOCK	Actuator group is not used.	Add -
Backups	Wallbox 3	Alfen_Mock_MOCK		

Open energy service strategy settings and select the energy service "Cost-optimised charging" for a wall box.



You can now specify the maximum charging power in watts for this energy service in the settings. Checking the box "unlimited" removes this limitation. The charging power is then limited by the charging point and the electric car.

~		
	- e -	
L	Ъ.	

Customer		& Energy Manager Charging-Infrastructure	Name not visibl	le j
Current Status The Ladestation is ready to be edited.		The Ladestation is ready to be edited.		_
NALYSIS				
Balance				
Measurement-Ar	nalysis	Charge infrastructure Ladestation		
S Forecast		Start timeout [s]	Charge power distribution	
		300 \$	Fair	
ANAGEMENT		Maximum time for the initiation of the charging process. If exceeded, another attempt to charge will not occur until at least 2 hours have passed.	Fair: equal current distribution for all vehicles as much as possible. Prioritized: distribution of remaining power according to priority once all vehicles are minimally charging.	
Reports	~	Chargepoint 2 (Wallbe_0000003822.0)	Chargepoint 1 (Wallbe_0000003872.0)	
Settings	~	Priority	Priority	
1 01 1 1 1 1 1		1 0	2	1
Charging-Infrastructure PV Yield Devices		Charging points with smaller values charge first. In case of same values, the order in the list decides. VIP-charging Charges with the maximum power released by the EMS, even if other charging points must be	Charging points with smaller values charge first. In case of same values, the order in the list decides. VIP-charging Charges with the maximum power released by the EMS, even if other charging points must be	0
Administration	~	disabled. With several charging points having VIP charging, priority decides. Phases	disabled. With several charging points having VIP charging, priority decides. Phases	
		3 ~	3	
Ĵ Select plant		The number of phases that the charging point provides to the vehicle for charging. Minimum required current [A]	The number of phases that the charging point provides to the vehicle for charging. Minimum required current [A]	
		6	6	
Switch Role	~	For vehicles requiring an increased minimum charging current. Must be at least 6 amperes. Expected minimal charge power [W]	For vehicles requiring an increased minimum charging current. Must be at least 6 amperes. Expected minimal charge power [W]	
		4500 0	4500	
		Set to 0 for automatic computation.	Set to 0 for automatic computation.	

As soon as an energy service "Cost-optimised charging" is available, you can make the dynamic settings in the myTESWORLD portal under [Settings > Electric car]. Select the appropriate actuator group first if there is more than one actuator group with cost-optimised charging.

4 You will then have the following input options:

Mode

5

- Desired amount of energy in kWh
- Planned departure time

For mode, you can choose from the following predefined options:

- Optimum cost: the vehicle is charged when the electricity price is low.
- One-time fast charging: one time full charge as quickly as possible, regardless of the price.
- Continuous fast charging: always charge as quickly as possible when the vehicle is charging.
- Desired amount of energy in kWh: here you enter the desired amount of energy to be charged within the defined time.
- Planned departure time: specifies the time by which the specified amount of energy should be charged.
- Click on "Transfer" to send the values to your Energy Manager, where they will be implemented.

Further applications

The implementation of the following applications is carried out exclusively on a project-specific basis:

- Off-grid
- Micro-grid
- Semi-off-grid operation
- Power quality

Our TESVOLT Service Line +49 (0) 3491 8797-200 will be happy to plan and configure your system together with you according to your requirements.

10 SYSTEM MONITORING IN MYTESWORLD

10.1 myTESWORLD USER INTERFACE

The myTESWORLD portal is operated from a graphic user interface and displayed in a browser. Current and past data are visualised in the portal. In addition to this, settings can also be adjusted on compatible devices on the connected systems.

Customer view



1	Show/hide the menu	Show or hide the menu	
b	Role	Shows the role of the current user	
C	Analysis	Access to forecast data, current data and past data	
	Reports	Access to past data incl. download as Excel/PDF	
e	Settings	Configuration of: electric car/charging infrastructure (optional), presentation of PV yield, device names	
Ĵ	Administration	User rights settings and automatic report setup	
g	Go to	Go to the system displayed or switch roles	
h	Menu display	Reduced menu display with symbols or full display including text	
0	Bright/dark display	Switch between bright or dark user interface	
0	User settings	User settings and logout of current users	

Technician view

TESWORLD	≡•—•■		∫ →0 ♪
Technician •	by e status		Autor Disk
MONITORING		Energy Manager	•
About EMS		Alive 🥝	
EMS Measurements	Connectivity: Accessible 🔏	Latest EMS status: Alive 🥹	minute and
Energy Manager Condition	Latest real toeat: less than a minute ago	Latest EM3-alive: less tian a	minute ayo
🗢 Energy Manager Heartbea	Cetails of the Energy Management System		Autohaus Mask
Energy Manager Logs	ID: 349	Owners: • bat-service@byom.de	Latitude: 52.39332° N
💠 Energy Manager Sensors	Name: Autohaus Mask	k_docht@byom.de	Longitude: 13.79057° E
00.70	Version: 2.12.3	Technicians:	Time-zone: UTC
Administration			
Administration	Description:		
Monitoring	notable		
B Switch Role ∨	Serial No.	MAC:	Service Connection Mode:
	TEM9447007096	70:b3:d5:66:ca:6d	Online 10.9.5.94
	e Constant Con	bel Subtraction Description D	Hangelsberger Hangelsberger Heden He

1	Show/hide the menu	Show or hide the menu	
b	Role	Shows the role of the current user	
C	Monitoring	Access to current and past data incl. download as Excel/PDF	
	Go to	Go to the system displayed, switch role or go to the administration section	
e	Menu display	Reduced menu display with symbols or full display including text	
Û	Bright/dark display	Switch between bright or dark user interface	
g	User settings	User settings and logout of current users	
10.2 USER MANAGEMENT

User roles

1

2

In the myTESWORLD portal, you have two possible user roles available. The "Customer" role enables the user to view the current system status and various visualisations of power and energy values, and to manage user permissions if necessary. If you want to make changes to settings in the myTESWORLD portal, you need the technician role for this. To assign a technician role to a newly created user, you need another user account with administrator permissions, or you can contact TESVOLT Service Line +49 (0) 3491 8797-200 to have the new account assigned the relevant permissions.

Administrator rights

Rights for the administration of the system can be assigned to the customer and technician roles. In the customer role, settings can only be managed for the rights of other users. Administrator rights can be transferred in two ways. First, administrator rights can be assigned to a user when creating a new EMS, but these rights only apply to this EMS. However, administrator rights can also be granted to entire groups or sub-groups. Administrator group rights can only be set up via the TESVOLT Service Line +49 (0) 3491 8797-200.

New registration in myTESWORLD via the TESVOLT Partner Portal

NOTE: Please only create one account per installer/customer via the partner portal. To register other necessary accounts, for example for employees of your company, please use the "Sign up" link on the https://mytesworld.tesvolt.com/ page.



Access https://tesvolt.com/ in an internet browser. Click on the "Login Partner Portal" link (a) in the top right hand corner. If you (as an end customer) already have an account in the myTESWORLD portal, you can move straight on to the next section.

	DESERVENT JEIN IN You have already registered for our Partner Portal? Then simply log in here sith your e-mail and password. Email Address Forget your password? Password Sign in You don't have access data to our partner portal yet, but would like to enjog at the benefits? Then simply register here	
On the login page that opens, cli	ick on the "here" link a.	11111

© TESVOLT AG Subject to technical changes! RD_TI_093_E_250305_en-EN Revision: H.01 03/2025

[4]

In		
	Please provide the following details.	
	I agree to the information I have entered into the contact form being collected and processed for the purpose of answering my enquiry. Please note: Tou can withdraw your consent at any time with halve effect by sending an email to indiglewold.6. For more information on how processes et dial, because serve information performs.	
	lagree to the Terms of Use for the Partner Portal.	

Now fill in the user registration form and, if you can agree to the information provided, tick the privacy a and terms of use b boxes. Finally, click on "Create" c.

You will first receive a confirmation email and then a verification email. Click on the "Verification" link in the email. Create and confirm a password in the dialogue box.

5 You can now log in to the TESVOLT Partner Portal. To log in to the myTESWORLD portal, open the dashboard page in the partner portal and click on the "myTESWORLD" tile. If you are already on the login page of the myTESWORLD portal, please use the "Log in with Tesvolt" button to log in via the partner portal.

Register a new user directly in the myTESWORLD portal

en	TESWORLD	۵
	요 Log in	
	E-Mail	
	Password	
	Remember m	
	Login	
	Sign up Forgot your password? Didn't receive confirmation instructions?	
	Didn't receive unlock instructions?	

Access https://mytesworld.tesvolt.com/ in an internet browser. If you are not yet set up as a user in the portal, click on the link "Sign up" (a). If you already have an account in myTESWORLD, you can move straight on to the next section.



en	"TESWÖRLD	요 Sign in
	윤 Sign up	
	We are happy to welcome you on our myTESWORLD platform.	
	You are new?	
	Feel free to create your own demo account. Then, you can explore our myTESWORLD platform and gain first insights.	
	We have already started first steps together?	
	1. Please register on our myTESWORLD platform. 2. Thereafter, we will activate your services.	
	E-Mail	
	bat-service@byom.de	
	Password	
	jajkuM-xyhfu3-yewton Starkes Passwort	
	Password confirmation	
	jajkuM-xyhfu3-yewtu Starkes Passwort	
	I agree with the terms of use and took note of the privacy policy.	
	Ich bin kein Roboter:	
	Sign up	
	Log in Forgot your pasword? Didn't receive confirmation instructions? Didn't receive unlock instructions?	

Enter the email address of the new user in the field "E-Mail" (a). The password must be entered in the next two fields (b). After agreeing to the terms of use and confirming the reCaptcha, click on the "Sign up" button (c). You will then receive an email with a link to confirm your registration. Click on this link and log in again if needed.



NOTE: It is only possible to configure the TESVOLT Energy Manager in myTESWORLD in the technician role. If you do not have a technician account or access to a user account with administrator permissions, please contact the TESVOLT Service Line +49 (0) 3491 8797-200 to activate the role for the desired user(s).

NOTE: If you have access to a user account with administrator permissions and would like to activate the role for the desired new user(s), follow the procedure described in the section "10.4 Technician role" on page 122.

Groups

Groups combine any number of energy management systems (EMS) for user management. Within a group, global rights can be granted to users, i.e. the rights granted to a user via the group apply to all EMSs in that group. For example, if a new EMS group is added, all users in the group will automatically have access to the EMS according to their group rights, without the user having to register in the EMS. This makes it easier to manage users and rights. For example, if a new technician is hired in a company, a user does not need to be added to each individual EMS, but only once to the group.

The "Group" functionality is therefore recommended for all installation companies with several employees who regularly purchase and install TESVOLT Energy Managers.

Administrator rights can be delegated to qualified users within a group, allowing them to create new EMSs, add users to the EMS, delete users and edit user rights.



NOTE: If you want to set up one or more user subgroups for your company in myTESWORLD, please contact the TESVOLT Service Line +49 (0) 3491 87 97 - 200.

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10.3 EMS CONFIGURATION

Setting up the EMS and linking it with the hardware

NOTE: To link an existing EMS to a TESVOLT Energy Manager, you will need a technician clearance, which you will receive after successfully completing the certification training.. For questions about setting up the myTESWORLD portal, please contact the TESVOLT Service Line +49 (0) 3491 8797-200.

1	"TESWORLD	≡	D 2
	© Technician	Welcome to myTESWORLD your Energy Manager.	

Log into myTESWORLD and in the side menu select the "Technician" role (a).

	-					6
Technician						
бото	Search by Name	¥.		×		
Administration						
a? Manifasian	Inaccessible or F	ailing				
28 Montoning	Name	↑↓ Serial No.	↑↓ Latest EMS-status	Latest EMS-alive	Latest Heartbeat	
요. Switch Role ~						
	Accessible and 0	ОК				
	Name	↑↓ Serial No.	↑↓ Latest EMS-status	Latest EMS-alive	Latest Heartbeat	
	Autohaus Mask	TEM9447007096	alive	about a minute ago	about a minute ago	
	Feriuliu Setubs					
	Name	[↑] ↓ Serial No.	↑↓ Latest EMS-status	Latest EMS-alive	Latest Heartbeat	
	Name Autohaus Diess	↑↓ Serial No.	1↓ Latest EMS-status	Latest EMS-alive	Latest Heartbeat	
	Name Autohaus Diess Deprecated	î↓ Serial No.	ि Latest EMS-status	Latest EMS-alive never	Latest Heartbeat never	
	Name Autohaus Diess Deprecated Name	↑J Serial No. ↑J Serial No.	1↓ Latest EMS-status 1↓ Latest EMS-status	Latest EMS-alive never Latest EMS-alive	Latest Heartbeat never Latest Heartbeat	

Go to the administration section by clicking on the corresponding item 💿 in the side menu.

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]	TESWORLD	=			
	Technician				
	ADMINISTRATION	Create new EMS		List EMSs	Claim Energy Manager
	🚱 Overview 🚹	Click here to create a new EMS.		Click here to list all registered EMSs for editing.	Click here to link an Energy Manager to a newly created or unclaimed EMS.
	+ Setup new EMS				
	List registered EMSs	EMS-Information			
	Claim Energy Manager	Claimed EMSs / Total EMSs : EMSs using PVCast :	1/2 0		
	00.70	EMSs using Load Forecast :	0		
	Administration				
	Monitoring				
	() Switch Bala				
	23 Switch Kole				

Click the button "Create new EMS" (a) or the menu item "+ Set up a new EMS" (b) in the side menu.

Technician	Initialize a new EMS		
MINISTRATION	Name (required)	Owner (optional)	
Overview		user@mail.info	
Setup new EMS	Please enter a unique name.	Please enter the email of the owner input is case-insensitive.	of the Energy Manager. The owner has to register on our platform before. Th
List registered EMSs	Description		
Claim Energy Manager			
то	Latitude	Longitude	Time-zone
Administration			UTC (PTOS)
Monitoring	Please enter the latitude of your Energy Manager. This input is optional. A latitude has to be a number between -90° (south-pole) and +90° (north pole). For example, geo-coordinates are required to provide yield- or load- forecasts to your Energy Manager.	Please enter the longitude of your Energy Manager. This input is optional. A longitude has to be a number between -180° (west) and +180° (east). For example, geo-coordinates are required to provide yield- or load-forecasts to your Energy Manager.	Please select the time-zone of your Energy Manager, e.g. "Europe/Berlin This input is optional. For example, the time-zone will be used to correct compute energy consumption or generation of a day. If it is not provide "UTC" will be used as default.
, Switch Kole 🗸 🗸		tuni norge Ramin verige Unite Kir na	Россия

The page "Initialising new EMS" opens. Complete the following fields: Name (required) > Name freely selectable Owner (optional) > Email address of the owner Description (optional) > Information about the EMS Latitude (optional) > Coordinates of the EMS (geographical latitude) Longitude (optional) > Coordinates of the EMS (geographical longitude) Time-zone (optional) > Time zone that the EMS is located in Finally, confirm your entries by clicking on the "Save" button ³.

5	
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-	

TESWORLD			L (1)
Technician	-		a
ADMINISTRATION	Create new EMS Click here to create a new EMS.	List EMSs Click here to list all registered EMSs for editing.	Claim Energy Manager
Overview			unclaimed EMS.
+ Setup new EMS Ist registered EMSs Claim Energy Manager corr Administration Image: Administration <td< th=""><th>EMS-Information Claimed EMSs / Total EMSs : 1/2 EMSs using VCast : 0 EMSs using Load Forecast : 0</th><th></th><th></th></td<>	EMS-Information Claimed EMSs / Total EMSs : 1/2 EMSs using VCast : 0 EMSs using Load Forecast : 0		

Now click on the button "Claim Energy Manager" (a).

TESWORLD	=	٢
Technician	⊘ Claim EMS	
	Your Energy Manager (your local Energy Manager) has to be integrated into the platform, in order to use all features of After claiming your Energy Manager, data of the Energy Manager, e.g. metry values, are transferred to and stored by the	myTESWORLD. Thereto, your Energy Manager has to be linked to an Energy Management System (EMS) of the platform. platform. Stored data are associated with the linked EMS and visible by selection finked EMS.
G Overview	Serial number of Energy Manager	Energy Management System (EMS)
+ Setup new EMS	TEM9447007096	✓ Please select an EMS Autohaus Diess
List registered EMSs	The Serial number is printed on your Energy Manager. Or, can be found in the documents delivered together with your Energy Manager.	the list above, the following is likely: You haven't created the EMS yet. If so, please do this first. Or, the EMS is alread
Claim Energy Manager		iinked to another energy manager. I han, you have to unlink it before.
60.10		Cancel Create new EMS Submi
S Administration		
Nonitoring		
0 Outst Data		

Enter the serial number of the TESVOLT Energy Manager (hardware) to be linked in the "Serial number of Energy Manager" field a of the new dialogue window. The serial number is found on the stickers included in the packaging of the unit. The serial number begins with "TEM", followed by a 10-digit number. Then select the EMS to be linked from the drop-down menu "Energy management system (EMS)" b. Then click on the "Confirm" button (

7

TESWORLD	=		D
Technician			
DMINISTRATION	Successfully linked TEM9447007096 to Autohaus Mask.		
Overview	Claim EMS		
+ Setup new EMS	Your Energy Manager (your local Energy Manager) has to be integrated into the platform, in order to use all features After claiming your Energy Manager, data of the Energy Manager, e.g. meter values, are transfered to and stored by	of myTESWORLD. Thereto, your Energy Manager has to be linked to an Energy Management System (EMS) of the pli the platform. Stored data are associated with the linked EMS and visible by selecting the linked EMS.	atform
A List registered EMSs	Serial number of Energy Manager	Energy Management System (EMS)	
Claim Energy Manager	TEM9447007096		~
אדס Administration	The Serial number is printed on your Energy Manager. Or, can be found in the documents delivered together with your Energy Manager. Your Energy Manager with serial number TEMI9447007096 is now linked to your EMS Autohaus Mask. Click	You can select one EMS which will be linked to your Denryy Manager. In cases the EMS you are tooking for is not pro- tee in tatabow, the following is likely: You haven't created the Sty st. If as, please do this first. Or, the EMS is alrea linked to another Energy Manager. Than, you have to unlink it before. here to check status information.	isen ady
Monitoring		Cancel Create new EMS Subn	hit
🖞 Switch Role 🗸			

When the EMS has been successfully linked, the page will refresh automatically and you can see a confirmation (a) of the procedure at the top of the page.

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=		D &
🖵 List Groups	🕅 Invite User	Permission Management
List all existing Groups	Add an existing User to a root Group via Email	Set Users permissions for Groups
风 List Users	O Claim EMS	🖳 Group Management
List all existing Users	Add an existing EMS to a root Group via its Serial Number	Show the hierarchy for all Groups
↓ List EMSs	Role Management	
List all existing EMSs	Set the Roles of Users	
	E List Groups List all existing Groups Int List Users List all existing Users ↓ List EMSs List all existing EMSs	Image: List Groups Image: List Groups List all existing Groups Image: List Group via Email Image: List Users Image: Comparison of Group via Email Image: List Users Image: Comparison of Group via Email Image: List Users Image: Comparison of Group via Email Image: List Users Image: Comparison of Group via Email Image: List EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number Image: List all existing EMSs Image: Comparison of Group via Its Serial Number

Switch back to the administrator role.

Now click on the "Claim EMS" button in the overview a.

TESWÔRLD	=	_ ۵
Admin	Dashboard / Claiming	
MANAGEMENT	0 Claiming	
A Dashboard		
8= Liet V	Serial number of Energy Manager	Pick root Group
	e.g. XXX0123456789	Search for Group
🖉 Manage 🔷 🔿		Claim
Permissions		
Roles		
Groups		
Claim EMS		
Invite User		
GO TO		
🖳 Switch Role 🗸 🗸		

Re-enter the serial number of the TESVOLT Energy Manager (hardware) to be linked in the "Serial number of Energy Manager" ¹ field of the new dialogue window. Select your organisation from the drop-down menu "Add organization objective" ^b (this was created during certification training). Finally, click on the "Claim" button **t**.

Editing the EMS

6	NOTE: To edit	an EMS, you need technicia	n clearance.		
1	Log into the my (see steps 1) 112).	yTESWORLD portal, select th and 2 in the section "Settir	ne "Technician" role an ng up the EMS and linl	id go to the "Admir king it with the har	istration" section "dware" on page
2	TESWORLD	=			<u>۹</u>
	Technician				
	ADMINISTRATION	Create new EMS	List EMSs Click here to list all registered EMSs for editing	Claim Energy N Click here to link an E unclaimed EMS.	Aanager
	Setup new EMS List registered EMSs Claim Energy Manager	EMS-Information Claimed EMSs / Total EMSs : 1/2 EMSs using PVCast : 0 EMSs using Load Forecast : 0			
	● Administration ♪ Monitoring ① Switch Role				
	Now click on th	ne button "List EMSs" 💿 or '	'List registered EMSs'	b in the side me	nu.
3	-TESWORLD	=			1
_	Technician	Edit an existing Energy Management System			
	ADMINISTRATION				
	Overview	Search by Name V	×		
	+ Setup new EMS	Name [↑] ↓ Serial No.	↑↓ Description		0
	List registered EMSs	Autohaus Diess		Users Edit	Delete
	Claim Energy Manager	Autohaus Mask TEM9447007096		Users Edit	Delete
	GO TO				
	S Administration				
	N Monitoring				
	Find the entry	of the EMS/TESVOLT Energy	/ Manager and click or	n the "Edit" button	a .
4	-TESWORLD	=			D 2
		Edit Energy Management System			
		Name (required)	Owner (option	al)	
	+ Sature new EMP	Autohaus Mask Please enter a unique name.	bat-service@	byom.de, owners is not possible here. Please go to the EMS's is	user administration view. Be aware, that user
	Jist registered EMCs	Description	administration c administration	an be done by an technician with administrative privi	leges, or the owners theirself. Go to: User
	Claim Fnerov Manager	Description			
	Statin Energy Manager				4
	GO TO	Latitude	Longitude 13.79057	Time-zone	
	Monitoring	Please enter the latitude of your Energy Manager, This input is optional. A latitude has to be a number between -90° (south-pole) and +90° (porth	Please enter the longitude of your Energy Manager. This longitude has to be a number between -180° (west) and	input is optional. A Please select the time-zone +180° (east). For This input is optional. For each	of your Energy Manager, e.g. "Europe/Berlin". kample, the time-zone will be used to correctly
	용 Switch Role ~	pole). For example, gro-coordinates are required to provide yield- or lead- foreur over Energy Manager.	example, geo-coordinates are required to provide yield- your Energy Manager.	or load-forecasts to compute energy consumpti "UTC" will be used as defau	on or generation of a day. If it is not provided,
		Benergy Manager			
		Serial number: TEM944			

Make the desired changes and then click on the "Save" button 1.

Unlinking an EMS from hardware

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NOTE: To unlink an EMS from a TESVOLT Energy Manager, you need technician clearance.

Log into the myTESWORLD portal, select the "Technician" role, go to the "Administration" section and click on "List registered EMSs" in the side menu or on the button "List EMSs". Then, in the entry for the relevant EMS, click on "Edit" (see steps 1 to 3 in the section "Editing the EMS" on page 116 et seq.).

Technician					
reconnector	Bedit Energy Management System				
ADMINISTRATION	Name (required)	Ov	vner (optional)		
S Overview	Autohaus Mask bat-service@byom.de,				
+ Setup new EMS	Please enter a unique name.	Ediada	iting existing owners is not possible ninistration can be done by an tech	here. Please go to the EMS's user administration view. Be aware, that inician with administrative privileges, or the owners theirself. Go to: Us	use
List registered EMSs	Description	adi	ministration		
Claim Energy Manager					
GO TO	Latitude	Longitude		Time-zone	
Administration	52.39332	13.79057		UTC (PTOS)	
N Monitoring	Please enter the latitude of your Energy Manager. This input is optional. A latitude has to be a number between -90° (south-pole) and +80° (north pole). For example, one-coordinates are required to provide vield, or load-	Please enter the longitude of your Energy N longitude has to be a number between -180 example den-contributes are required to p	lanager. This input is optional. A ^e (west) and +180° (east). For rovide yields or load forecasts to	Please select the time-zone of your Energy Manager, e.g. "Europe/It This input is optional. For example, the time-zone will be used to co compute energy consumption or deneration of a day. If it is not pro-	Berl
ℜ Switch Role ∨	forecasts to your Energy Manager.	your Energy Manager.		"UTC" will be used as default.	
	Bergy Manager				
	Serial number: TEM944				
	Unlink Energy Manager				
					-

Now click on the button "Unlink Energy Manager" a.

The page will then automatically refresh and in the "Energy Manager" side section there will only be a

"Link" button alongside the text "There is currently no Energy Manager linked with this EMS."

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Adding users to an EMS

NOTE: To add a user to an EMS, you need administrator permissions.

NOTE: A user who has registered via the TESVOLT Partner Portal must have logged into the myTESWORLD portal once before the user in question is visible in the portal's user management.

Log into the myTESWORLD portal, select the "Technician" role, go to the "Administration" section and click on "List registered EMSs" in the side menu or on the button "List EMSs" (see steps 1 to 2 in the section "Editing the EMS" on page 116 et seq.). Alternatively, you can also make the changes in the customer role. For this, see the section "Administration – notifications" on page 136.

Ξ 02 TESWORLD Technician Edit an existing Energy Management System ADMINISTRATION Search by Name V × Overview Name + Setup new EMS Autohaus Diess Users List registered EMSs Edit Autohaus Mask TEM944 0 Claim Energy Manage GO TO Administration & Monitoring A Switch Role

You will now see a list of all the EMSs you have access to. In the entry of the relevant EMS, click on the button "Users" (3).

recimician	I User Administration							Autohau
	Hide users without permission	ŝ						
+ Setup new EMS	User	↓ Role	†⊨ Read †≟	Create 1	Update 1	Delete †	Admin 🐩 D	emo
C List registered EMSs	bat-service@byom.de	Technician 🕸	4	4	4	4	4	Ø
Claim Energy Manager	bat-service@byom.de	Customer 요	ø	ø	ø	ø	ø	Ø
ADMINISTRATION	k_docht@byom.de	Technician 🕸	ø	ø	\$	ø	ø	0
🕸 User Permissions	k_docht@byom.de	Customer &	ø	ø	ø	\$	ø	Ø
GO TO							Items per pa	ige: 5
S Administration				•		er 🛞 Change Li		Pamaua I
N Monitoring					1 744 03	er or onlinge o.	, permanona	. nemore i

Now click on the button "+ Add User" (a).

TESWORLD	Ξ	۵ ۵
Technician	网 Add User	Autohaus Mask
ADMINISTRATION		
© Overview	User Email	
+ Setup new EMS	h_diess@byom.de	
List registered EMSs		Back Submit
Claim Energy Manager		
ADMINISTRATION		
🕸 User Permissions		
GO TO		
Administration		
Nonitoring		

Enter the email address of the user in the field "User Email" (a) and then click on "Submit" (b). The user must have previously registered on myTESWORLD with this email address.

4 You now return to the "User Administration" page. The new user will be visible in the table. However, newly added users have no permissions assigned to them. Assigning permissions to users is explained in the following section.

NOTE: If you are an installer, please make sure that you remove the demo rights of customer users at the latest after commissioning, otherwise these users will be unable to access the actual installation data.

Editing the rights of users of an EMS

NOTE: To edit user permissions for an EMS, you need administrator permissions.

Log into the myTESWORLD portal, select the "Technician" role, go to the "Administration" section and click on "List registered EMSs" in the side menu or on the button "List EMSs"". Then, in the entry of the relevant EMS, click on the button "Users" (see steps 1 to 2 in the section "10.4 Technician role" on page 122). Alternatively, you can also make the changes in the customer role. For this, see the section "Administration – notifications" on page 136.

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TESWORLD	=							1
Technician	User Administration							Autohaus Mask
DMINISTRATION								
S Overview	Hide users without permissions	1						
+ Setup new EMS	User	↓ Role	t Read t	Create ta	Update 1	Delete 1	Admin 🖏	Demo 敗
List registered EMSs	hat-service@hvom.de	Technician 🕅		~	el el	~	-1	0
Claim Energy Manager	bat-service@byom.de	Customer &	÷ ۲	\$	\$	ø	\$	0
DMINISTRATION	k_docht@byom.de	Technician 🐵	\$	\$	ø	\$	ø	0
3 User Permissions	k_docht@byom.de	Customer &	4	ø	ø	ø	ø	0
ю то							Items pe	er page: 5 V
Administration						`		
Monitoring					+ Add Use	r 🛞 Change Us	ser permissions	× Remove User
🖳 Switch Role 🗸 🗸								
ow click on t	he button "Chan	ne User permissi	ions" 🔒					

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[4]

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Technician									
	Change User permiss	ions						Auto	haus Masi
DMINISTRATION				_	_	_	_	_	_
Overview	User	↓ Role	1 Read	t Create	t Update	1 Delete	1. Admin	t. Demo	
+ Setup new EMS									
// List registered EMSs	bat-service@byom.de	Customer A	٥	2	0	۲	٥	0	
Ø Claim Energy Manager	bat-service@byom.de	Technician 🕸	0	8	8	8	8	•	
	k_docht@byom.de	Customer A	a 📍			•	٢	0	
DMINISTRATION	k_docht@byom.de	Technician 🕲		2	8	2	8	•	
User Permissions								Items per page:	5 ~
ото									
Administration								Back	Submit
Monitoring									
D Switch Polo									
23 Omici Noic									

You can now adjust the permissions for the two available roles of the user. If you would like to assign a particular permission to the user, click on the corresponding tick box (see example (a)). Usually, the "Customer" role is only assigned read permissions, while the "Technician" role is granted all available permissions. When you have made all the desired changes, click on "Submit" (a).



A confirmation page is now displayed, which again shows all the user's rights. If you are happy with the details, click on "Submit" (a).

Deleting users of an EMS

NOTE: To edit user permissions for an EMS, you need administrator permissions.

Log into the myTESWORLD portal, select the "Technician" role, go to the "Administration" section and click on "List registered EMSs" in the side menu or on the button "List EMSs". Then, in the entry for the relevant EMS, click on "Users" (see steps 1) to 2 in the section "10.4 Technician role" on page 122 et seq.). Alternatively, you can also make the changes in the customer role. For this, see the section "Administration – notifications" on page 136.

<i>(</i>
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3

TESWORLD	=							
Technician	User Administration							Autohaus Mask
DMINISTRATION								
Overview	Hide users without permission	15						
+ Setup new EMS	User	↓ Role	t, Read t	Create 1	Update 🔃 🕻	Delete 👘	Admin 🔃	Demo 🗘
// List registered EMSs	hat-service@hvom.de	Technician 🕅		-1	a.	~	d	0
Claim Energy Manager	bat-service@byom.de	Customer &	<i>«</i>	~	ø	~	<i>«</i>	0
DMINISTRATION	k_docht@byom.de	Technician 🕸	\$	\$	ø	ø	ø	0
User Permissions	k_docht@byom.de	Customer &	\$	ø	ø	\$	ø	Ø
אדס Administration					+ Add User	Change U	Items per	xage: 5 ~ × Remove User
Switch Role								

Now click on the button "X Remove User" a.

TESWORLD	=	(1)
Technician	网 Remove User	Autohaus Mask
G Overview	m_hoffmann@byom.de x	× •
+ Setup new EMS	Select all	
Ø List registered EMSs	bat-service@byom.de	
Claim Energy Manager	k_docht@byom.de	
ADMINISTRATION	2 m_hoffmann@byom.de	
User Permissions		
20.70		
Administration		
28 Monitoring		
B Switch Role ✓		

Click on the entry field (a) and select the user to be deleted by clicking on the tick box (b).

4	TESWORLD	Ξ	D 2
	Technician	网 Remove User	Autohaus Mask
	ADMINISTRATION		
	Overview	m_hoffmann@byom.de x	× 🗸
	+ Setup new EMS		
	List registered EMSs		Back Submit
	Claim Energy Manager		
	ADMINISTRATION		
	User Permissions		
	60 TO		
	Administration		
	Nonitoring		
	🖳 Switch Role 🗸	×	

You now need to click once more outside the expanded drop-down menu in order to collapse it. Finally, click on "Submit" (a).

10.4 TECHNICIAN ROLE

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Log into the myTESWORLD portal, select the "Technician" role and go to the "Monitoring" section.

About EMS



You can now see an overview of all EMSs that the user currently logged in has access to. Select the desired entry by clicking on it a.



You now come to the overview page for the selected "EMS: Technician" \rightarrow "Monitoring" \rightarrow "About EMS".

EMS Measurements

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TESWORLD		٢
Technician		Plant name
MONITORING		
About EMS	last 7 days V 10/21/2022 5:36 PM 🗰 Select	
EMS Measurements		
Energy Manager C.	Meters & Sensors	
🛇 Energy Manager Hearth	19	
Energy Manager Logs	Battery	
Energy Manager Senso	Orid	
со то		
S Administration	PV	2
N Monitoring	Home	
01 Switch Pole		

In the side menu, click on "Technician" \rightarrow "Monitoring" \rightarrow "EMS Measurements". In the window that opens, you can see various sections of grouped measurements. The first section, "Meters & Sensors" a encompasses the sensors of all logical devices. To open a section, click on it.



At the top of the page, directly below the title "Measurement-Analysis" (a) you can define the period and start date of the measurements displayed. To apply the filter, click on "Select" (b). In the opened section, you can see graphs of the measurements in the centre. If you would like more specific information, you can click on any point in the diagram (c). This will open a small window (d) showing the numerical values of all measurements displayed in the diagram for the selected point in time. By clicking on an item in the legend of the diagram (e), you can hide individual series of measurements. You can also change more settings by clicking on "Measurement-series selection" (f) (see next step).

NOTE: Delay between measurement and display

Please note that there may be a delay of 45 minutes between the actual measurement and the display of the measurement data in the portal. This delay only occurs when selecting a view that is more than 24 hours old. If you select the current day or the last 24 hours in the view, the display is in near real time.

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we can a set of the		
Technician	🗠 Measurement-Analysis	Plant name
ONITORING		
About EMS	last 7 days V 08/29/2022 4:04 PM 🖾 Select	
EMS Measurements		Extended filter
③ Energy Manager Condition	Meters & Sensors	~
🗢 Energy Manager Heartbea		
Energy Manager Logs	Devices	Measurement-series selection 🔗 🔞
Energy Manager Sensors	bat.TesvoltPCS_Tesvolt_8451.0 × inv.SMA_STP11060_A2110902304.0 ×	
	mtr.Janitza_UMG_70079441.0 × mtr.Janitza_UMG_70083781.0 ×	
ото	pv.SMA_STP11060_A2110902304.0 × pv.SMA_STP11060_A2110902304.1 ×	
Administration	pv.SMA_STP11060_A2110902304.10 × pv.SMA_STP11060_A2110902304.11 ×	
Administration	pv.SMA_STP11060_A2110902304.2 × pv.SMA_STP11060_A2110902304.3 × × ×	
N Monitoring	pv.SMA_STP11060_A2110902304.4 × pv.SMA_STP11060_A2110902304.5 ×	
	pv.SMA_STP11060_A2110902304.6 × pv.SMA_STP11060_A2110902304.7 ×	
Switch Role	pv.SMA_STP11060_A2110902304.8 × pv.SMA_STP11060_A2110902304.9 ×	
	pvp.SMA_STP11060_A2110902304.0 ×	
	Measurands	
•	Power (demand) × Power (supply) × × × ×	
	Diralay	

If you open the section "Measurement-series selection", under "Devices" (a) you can see all the sensors whose measurements are displayed in the diagram. Under "Measurands" (b) you can see the measurands currently being measured and displayed. If you would like to remove sensors or restore previously removed sensors, click on the tick (c). This will open a pop-up window when you can activate or deactivate sensors by clicking on them. If you would like change the selection of measurands, click on the tick (d). To apply the changes to devices (sensors) or measurands, click on "Display" (e).

Energy Manager Condition



At the top of the section, directly below the section heading "Course" ^(a) you can define the period and start date of the measurements displayed. To apply the filter, click on "Select" ^(b). In the opened section, you can see graphs of the measurements in the centre. If you would like more specific information, you can click on any point in the diagram. This will open a small window showing the numerical values of all measurements displayed in the diagram for the selected point in time. By clicking on an item in the legend of the diagram, you can hide individual series of measurements. By clicking on "Measurement-series selection" ^(c), you can select or deselect the available measurands.

TESWORLD		Ξ														٢
Technician MONITORING About EMS EMS Measurement Energy Manager (nts		Current status (Ene Currently the Heartbeat is pres The EMS is reported alive. Latest Heartbeat: 2022-10-21 EMS Status: alive	ergy Manager ^{sent.} 16:01:00 UTC												6
Energy Manager I Energy Manager I	Heartbea															
Energy Manager	Sensors		♡ Heartbeat Details	1												Plant name
GO TO	1	-	From		То				EM	√S Status	,	~ ×		Filter	C	
N Monitoring						Disk [M	iB]	Swap [I	AiB]	Memory	(MiB)		DiskIno	des		
Switch Role	~		Date (local)	EMS Status	Thermal [°C]	Used	Total	Used	Total	Used	Free	Total	Used	Total	Uptime	Load-APM
			2022-10-21 18:01:00	🛩 alive	47.8	294	351	0	0	828	532	933	2085	98304	a day ago	0.57
			2022-10-21 18:00:00	alive	47.8	294	351	0	0	828	531	933	2085	98304	a day ago	0.16
			2022-10-21 17:59:00	🥣 alive	47.2	294	351	0	0	828	530	933	2085	98304	a day ago	0.45
			2022-10-21 17:58:00	alive	48.3	294	351	0	0	829	530	933	2085	98304	a day ago	0.49
			2022-10-21 17:57:00	📌 alive	48.3	294	351	0	0	828	531	933	2085	98304	a day ago	0.64
			2022-10-21 17:56:00	alive	48.3	294	351	0	0	828	532	933	2085	98304	a day ago	0.6
			2022-10-21 17:55:00	✓ alive	47.8	294	351	0	0	828	531	933	2085	98304	a day ago	0.56
			2022-10-21 17:54:00	alive	47.2	294	351	0	0	829	532	933	2085	98304	a day ago	0.65
			2022-10-21 17:53:00	🤟 alive	47.2	294	351	0	0	828	533	933	2085	98304	a day ago	0.91
			2022-10-21 17:52:00	alive	47.8	294	351	0	0	829	533	933	2085	98304	a day ago	0.24

Energy Manager Heartbeats

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At the top of the section "Heartbeat Details", directly below the section heading, you can set the period a and the EMS status b to filter the data displayed in the table. To apply the filter, click on "Filter" c.

Energy Manager Logs



At the top of the section "Listing of all log events", directly below the section heading, you can create a filter for displaying the log events: time period selection (a), device selection (b), content of the message (c). Confirm the filter settings by clicking on "Filter" (d). If you are only looking for errors, you can click to deactivate (c). This makes the list clearer, as all "OK" messages will be hidden. Alternatively/additionally, you can also search for specific terms in the messages using the (d) box.

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Energy Manager Sensors

TESWORLD				
Technician	# Devices			Plant name
MONITORING	Eliter by Nome			
About EMS a	Battery 1			
EMS Measurements			Sensors	~
C Energy Manager Condition	Grid 1		U Sensors	~
🛇 Energy Manager Heartbea			Grid Feedin	
Energy Manager Logs			Grid Delivery	
tte Energy Manager Sensors	PV 1		Sensors	~
сото				
(5) Administration	User 1		Sensors	~
A Monitoring				
A Switch Role	1 Meters			
	Filter by Name			
	bat.TesvoltPCS_Tesvolt_59905.0	C Devices	Sensors	^
		Battery 1	bat.TesvoltPCS_Tesvolt_59905.0 Se	tpoint Power
			bat.TesvoltPCS_Tesvolt_59905.0 D0	Current
			bat.TesvoltPCS_Tesvolt_59905.0 M	ax Temperature
			bat.TesvoltPCS_Tesvolt_59905.0 Mi	n Temperature
			bat.TesvoltPCS_Tesvolt_59905.0 D0	C Voltage

At the top of the page you will find the "Devices" section. All physical devices are listed here, along with the sensors assigned to them. Use the filter a to search for a specific device/meter. To see the individual sensors, click on the "Sensors" field b, which will then be expanded. In the following section, "Meters", you will find all logical devices described as meters. To see the physical devices assigned to them, click on the corresponding "Devices" field c. For information on the corresponding sensors, click on the "Sensors" field d.

10.5 CUSTOMER VIEW

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Log into the myTESWORLD portal and select the "Customer" role. A list of all EMSs assigned to the user will be displayed. Select the desired EMS by clicking on it.



Current Status

In the section "Energy-flow" (a) you can see a schematic diagram of the physical devices in the system, including current energy flow. "Consumption", in the middle of the circle, is always the physical device "User 1". In the section "Self-sufficiency" (b) (on the right), you can see what percentage of the system's own demand is currently covered by its own electricity production. To see the numerical values, move the mouse pointer over the graphic (mouse-over). In the section "Feed-in" (c) you can see how much electricity is being fed into the utility grid.



Summarising the energy flow

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If there are several physical devices of the same type, the system overview on the "Energy-flow" page can become hard to read. In this case, you can select a grouped display of the energy flow (a) by clicking as shown.



In the grouped display, all devices of the same type are represented in the overview by just one symbol. Click on "E-Board" (a) to switch back to the ungrouped view.

Analysis – Energy-Balance

Consumption



At the top of the page "Energy-Balance" \rightarrow "Consumption", you can filter the period and start date (a) of the data displayed in the diagram. To apply the filter, click on "Select" (b). By clicking on the menu symbol (c) you can access options to print the diagram, export it as a graphic, or download it as a document (xls, csv). Click on an entry in the legend (d) to hide or show the corresponding values in the diagram. For the other diagrams of the energy balance, click on one of the other menu options (e).



At the top of the page "Energy-Balance" \rightarrow "Generation", you can filter the period and start date \bigcirc of the data displayed in the diagram. To apply the filter, click on "Select" \bigcirc . By clicking on the menu symbol \bigcirc you can access options to print the diagram, export it as a graphic, or download it as a document (xls, csv). Click on an entry in the legend \bigcirc to hide or show the corresponding values in the diagram. For the other diagrams of the energy balance, click on one of the other menu options \bigcirc .

Generation

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At the top of the page "Energy-Balance" → "Energy Balance", you can filter the period and start date a of the data displayed in the diagram. To apply the filter, click on "Select" b. By clicking on the arrow symbol c you can flip the diagram horizontally. Click on the drop-down menu d to select which values (generation/consumption) should be displayed. The numerical values are displayed if you move the mouse pointer over the relevant areas of the diagram (mouse-over). For the other diagrams of the energy balance, click on one of the other menu options e.

Indexes

1



At the top of the page "Energy-Balance" \rightarrow "Indexes", you can filter the period and start date \bigcirc of the data displayed in the diagram. To apply the filter, click on "Select" \bigcirc . Click on an entry in the legend \bigcirc to hide or show the corresponding values in the diagram. The numerical values are displayed if you move the mouse pointer over the relevant areas of the diagram (mouse-over). For the other diagrams of the energy balance, click on one of the other menu options \bigcirc .

Energy Balance

[1]



Power

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At the top of the page "Measurement-Analysis" \rightarrow "Power", you can filter the period and start date a of the data displayed in the diagram. To apply the filter, click on "Select" **b**. By clicking on the switch labelled "Stack", you can switch between display as a stacked chart or as a line graph. In the stacked chart display, the positive values show the generation and the negative the consumption. By clicking on the menu symbol **d** you can access options to print the diagram, export it as a graphic, or download it as a document (xls, csv). Click on an entry in the legend **e** to hide or show the corresponding values in the diagram. Click on "Breakdown of Consumption" **f** or "Breakdown of Generation" **g** to show a corresponding diagram in each case. The numerical values are displayed if you move the mouse pointer over the relevant areas of the diagram (mouse-over). For the "Battery" diagram, click on the menu option **b**.

Battery

1)

TESWORLD	=	۵ ۵
Customer	2 Massurgment-Analysis	Plant name
Q Current Status		
ANALYSIS	last 7 days V 09/06/2022 1:02 PM 🛍 Select	
00 Energy-Balance	Power Battery Heat	Extended filter
Measurement-Analysis		
REPORTS	Measurement-series	selection 🛛 🖓 👔
Sensor Report		
🔅 PV Yield		
Energy Report		
Meter Report	x 8. 50	
SETTINGS	O.	
📾 E-Car	8	
Charging-Infrastructure		
🔅 PV Yield	0 12:00 31. Aug 12:00 1. Sep 12:00 2. Sep 12:00 3. Sep 12:00 4. Sep 12:00 5. Sep 12:00	6. Sep 12:00
All Devices	Hide/Show all — SoC	
At the state of the	· · · · · · · · · · · · · · · · · · ·	a sala al a la sala 🗖

At the top of the page "Measurement-Analysis" \rightarrow "Battery", you can filter the period and start date of the data displayed in the diagram. To apply the filter, click on "Select" **b**. By clicking on "Measurement-series selection" **c**, you can select or deselect the measurands available to display. By clicking on the menu symbol **d** you can access options to print the diagram, export it as a graphic, or download it as a document (xls, csv). Click on an entry in the legend **e** to hide or show the corresponding values in the diagram. The numerical values are displayed if you move the mouse pointer over the relevant areas of the diagram (mouse-over). For the "Power" diagram, click on the relevant menu option **f**.

Reports – Sensor Report



TESWORLD		
Customer	# Devices	Plant name
Current Status	w bonces	
ANALYSIS	Filter by Name Battery 1	
Iol Energy-Balance	Se	ensors 🗸
Measurement-Analysis	Grid 1	ensors ^
REPORTS	b	Grid Feedin
Sensor Report	-	Grid Delivery
🔅 PV Yield	PV 1	ensors
Energy Report		
Meter Report	User 1 Sr	ensors 🗸
SETTINGS		
O PV Yield	1 Meters	~
🗰 Devices 🕻		×
Iser Permissions		
60 TO		
🖄 Switch Role 🗸		

At the top of the page you will find the "Devices" section. All physical devices are listed here, along with the sensors and measurands assigned to them. Use the filter a to search for a specific device. For information on the corresponding sensors or the available measurands, click on the "Sensors" field b. To open the next section, "Meters", click on the field c In this section you will find all logical devices described as meters, as well as the physical devices they measure and the available measurands. To open the last section, "Download", click on the field d In this section you can download any sensor data.

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-TESWORLD				1
Customer	# Devices			Plant name
Current Status	w Devices			
ANALYSIS	Filter by Name			
00 Energy-Balance			Sensors	~
🗠 Measurement-Analysis	PGrid 1		Sensors	~
REPORTS			Grid Feedin	
Sensor Report			Grid Delivery	
O: PV Yield	PV 1		Sensors	~
Energy Report	lleer1			
Meter Report	User I		Sensors	~
SETTINGS				
O PV Yield	1 Meters			^
## Devices	Filter by Name			
ADMINISTRATION	bat.TesvoltPCS_Tesvolt_59905.0	Devices	Sensors	~
③ User Permissions	inv.TesvoltPCS_Tesvolt_59905.0			
GO TO	mtr.Janitza_UMG_70083774.0	Devices A	Sensors	~
Ĵ Select plant		PV 1	mtr.Janitza UMG 70083774.0 Mean Power-0	Quality
岛 Switch Role ~		User 1	mtr.Janitza_UMG_70083774.0 Reactive Powe	Ir
		Battery 1	mtr.Janitza_UMG_70083774.0 Demand	
		e	mtr.Janitza_UMG_70083774.0 Supply	
	mtr.Janitza_UMG_70083779.0	Devices ~	 Sensors 	~
	mtr.Janitza_UMG_70100833.0	Devices V	Sensors	~
()	⊕ Download			^
g	Choose time mode			
	Select resolution			
	• Select data type V			
	Seperator , V Decimal .	~	Previe	w Download

In the "Devices" section, select a physical device, e.g. the grid meter (a). In the corresponding "Sensors" section (b), you can see that the meter measures the amount drawn from the grid and the grid feed-in. Open the "Meters" section by clicking on it, and look for the corresponding logical device (c). The first two device names begin with "bat" (battery) and "inv" (inverter), so they cannot be the grid meter. Click on the "Devices" field of the third meter to check whether this is the "Grid" meter. As it is measuring all existing physical devices, this must be the "Grid" meter. Now click on the corresponding "Sensors" field to see the available measurands (e). If you would like to download the measurements, open the "Download" section by clicking on it.

Select the desired time period incl. date and time zone. Enter the temporal resolution required g. In the "Select data type" field is you can choose between power and energy, or whether you want interpolated data (missing data is calculated), average values or original meter data. When you have made a selection, another field appears where you can select the sensors and measurands. Finally, specify separators and decimals i. If you want to check the data before the final export, click on "Preview" (j), or click on "Download" (k) to download the data straight away. Reports – PV Yield and Settings – PV Yield

 $\left(1\right)$

Customer		January	February	March	April	May	June	July	August	September	Oktober	November	December	Sum	Specific Annual Yield
Current Status	2021 [kWh]		,		1769.3	7950.3	9579.0	10516.6	8080.2	5769.0	2299.2	985.6	216.9	47166.1	47166.1
ALYSIS	2022 [kWh]	871.3	2691.8	8232.5	8279.7	9972.7	10231.2	9500.2	7405.7	6153.7				63338.8	63338.8
Energy-Balance	Average [kWh]	871.3	2691.8	8232.5	5024.5	8961.5	9905.1	10008.4	7743.0	5961.4	2299.2	985.6	216.9	62901.2	62901.2
Measurement-Analysis	Percentage of year [%]	1.4	4.3	13.1	8.0	14.2	15.7	15.9	12.3	9.5	3.7	1.6	0.3	100	
RTS	Predicted yields [kWh]	0	0	0	0	0	0	0	0	0	0	0	0	1	
Sensor Report															
PV Yield	© Settings														SIEMENS - Swee
PV Yield Energy Report	© Settings														SIEMENS - Swee
PV Yield Energy Report Meter Report	© Settings														SIEMENS - Swed
PV Yield Energy Report Meter Report	© Settings														SIEMENS - Swee
PV Yield Energy Report Meter Report	Settings			PV 1	- Please	fill in the	predicte	d yields ir	n kWh and	d the peak-p	ower in kW	/p.			SIEMENS - Swed
PV Yield Energy Report Meter Report INOS PV Yield	Settings	C Feb	ruary	PV 1	- Please	fill in the	predicte	d yields ir	n kWh and	d the peak-p	ower in kW	/p. y		June	SIEMENS - Swed
PV Yield Energy Report Meter Report NOS PV Yield Devices	© Settings PV1 PV2	C Feb	ruary	PV 1	- Please	fill in the arch	predicte	d yields ir	h kWh and April 0	d the peak-p	ower in KW Ma	/р. У	\$	June 0	SIEMENS - Sweet
PV Yield Energy Report Meter Report TNOS PV Yield Devices INISTRATION	Settings	C Feb	ruary	PV 1	- Please	fill in the arch	predicte ¢	d yields ir	h kWh and April O	d the peak-pe	ower in kW Ma	/р. У	9	June 0	SIEMENS - Swee
PV Yield Energy Report Meter Report INOS PV Yield Devices INISTRATION	Settings	C Feb 0 Aug	ruary	PV 1	- Please Ma	fill in the arch ptember	predicte ¢	d yields ir	a kWh and April 0 Oktober	d the peak-p	ower in kW Ma O	/p. y vember	\$	June 0 December	SIEMENS - Swee
PV Yield Energy Report Meter Report TINGS PV Yield Devices IINISTRATION User Permissions	Settings PV1 PV2 January January 0 July 0	C Feb 0 Aug 0	ruary ust	PV 1	- Please Ma Se	fill in the arch) ptember	predicte 0	d yields ir	April 0 Oktober 0	d the peak-pe	ower in kW Ma 0 No	/p. y vember	\$	June 0 Decembe	SIEMENS - Sweet
PV Yield Energy Report Meter Report TNOS PV Yield Devices INISTRATION User Permissions	Settings PV1 January 0 July 0	C Feb 0 Aug 0	ruary ust	PV 1	- Please	fill in the arch ptember	e predicte	d yields ir	April 0 Oktober 0	d the peak-pr	ower in kW Ma 0 No 0	/p. y vember	© ©	June 0 Decembe 0	SIEMENS - Sweet
PV Vield Energy Report Meter Report PV Vield Devices NISTRATION User Permissions	Settings	C Feb 0 Aug 0	ruary ust	PV 1	- Please Ma	fill in the arch ptember	o predicte	d yields ir	April 0 Oktober 0	d the peak-pr	ower in kW Ma 0 No	/p. y vember	0	June 0 Decembe 0	SIEMENS - Swed

Open "Settings" \rightarrow "PV Yield" (a) for the configuration of "Reports" \rightarrow "PV Yield". At the bottom of the page, an additional section, "Settings", is shown. If applicable select the PV installation (b) whose settings you want to configure. Enter the predicted yields of the PV installation (c) and the installation size (d) and then click on "Submit" (b)



At the top of the page "Reports" \rightarrow "PV Yield", you can switch the display between the different PV installations if applicable (a). By clicking on the menu symbol (b) you can access options to print the diagram, export it as a graphic, or download it as a document (xls, csv). Click on an entry in the legend (c) to hide or show the corresponding values in the diagram. The table allows you to see the values as either "kWh" or "kWh/kWp", and you can switch between these displays using the buttons (d) (please note that for this the installation size must have been entered in "Settings" \rightarrow "PV Yield").

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Reports – Energy Report

At the top of the page you can select the year (a) whose data you want to display. By clicking on the menu symbol (b) you can access options to print the diagram, export it as a graphic, or download it as a document (xls, csv). Click on an entry in the legend (to hide or show the corresponding values in the diagram. Using the two buttons (d) below the table, you can export the data in the table as a PDF or XLS file.

Reports – Meter Report

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	TESWORLD	=														
	Customer		III Makar												Plant	ama
Q	Current Status														runer	lume
NALY	IS		Mater reading for					[
lol	Energy-Balance		G	rid Feedin	~	Selec	1									
~	Measurement-Analysis		Monthly Meter Read	dings			C								Plant r	name
POR	S		2021 2022													
Ċ:	PV Yield	d	Info Missing Values	January	February	March	April	May	June	July	August	September	Oktober	November	December	January
2	Energy Report		Grid Feedin in kWh	6393	6418	7516	13392	20523	33160	48602	61857	73818	75871	-	-	-
1	Meter Report		Grid Delivery in kWh	79969	101047	117853	130908	143090	153384	163118	176641	189136	203057	-	-	-
TTIN	3S		Battery Supply in kWh	522	577	724	1736	2733	4163	5316	6269	7272	8294	-	-	-
ġ:	PV Yield		Battery Demand in kWh	1696	2064	2458	3918	5392	7362	8974	10277	11658	13150	-	-	-
60	Devices		Q Internelated Values												(a) not (D view
DMIN	STRATION		+ interpolated values												- share	AIDX
3	Jser Permissions	e														

At the top of the page you can define the terms for a specific meter report. Enter the desired date and time in the field (a), select the relevant meter (b) and click on "Select" (c) to display the meter report. At the top of the section "Monthly Meter Readings", you can select the year (d) whose data you want to display in the table below. Clicking on "Interpolated Values" (e) will take you to the page "Reports" \rightarrow "Sensor Report", where you can download interpolated data, among other things (see the section "Reports – Sensor Report" on page 131, step (2)).

Settings - PV Yield

In this section you can configure the settings for the section "Reports" \rightarrow "PV Yield". Detailed information can be found in the section "Reports – Sensor Report" on page 131, step 2.

Settings – Devices

=TESWORLD	=				Ð
Customer	W Devices				Plant name
2 Current Status	Filter by Name				
ALYSIS	Battery 1 🍖	Grid 1 🔞	PV 1 💿	User 1 🔯	
Energy-Balance					
Measurement-Analysis	•				
PORTS					
Sensor Report					
PV Yield					
Energy Report					
Meter Report					
TTINGS					
O PV Yield					
🛱 Devices					

Here you can change the names of physical devices. If necessary, use the search field **a** to find the device. To edit a name, click on the cog symbol next to the device entry **b**.

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≡TESWÔRLD		Change Name of Grid 1	×	D 2
Customer	d			0 and an and
Current Status	# Devices	Grid 1	Delete	Plant name
ANALYSIS	Filter by Name Battery 1	The new name may consist of Numbers, Letters and ' N	Reset the given name. User 1 😒	
Boll Energy-Balance			Close Submit	
🤟 Measurement-Analysis				
REPORTS				
Sensor Report				
PV Yield				
Energy Report				
Meter Report				
SETTINGS				
O PV Yield				
000 Devices				

Enter a new name in the field a . To reset the name to the original, automatically assigned name, click on "Delete" b. To apply the changes, click on "Submit" c.

TESWORLD	-			
Customer	Notifications			Plant na
Current Status				
ANALYSIS	Name	↓ Type	↑↓ Enabled	Subscribed
00 Energy-Balance				
Measurement-Analysis				Create new Repo
REPORTS				
Sensor Report				U
© PV Yield				
Energy Report				
Meter Report				
SETTINGS				
📾 E-Car				
4 Charging-Infrastructure				
Ø PV Yield				
000 Devices				
ADMINISTRATION a				
Notifications				
1 User Permissions				

Administration – notifications

The TESVOLT Energy Manager can automatically send notifications to any users when devices generate messages or sensors detect measurement values inside or outside certain value ranges. To set up notifications, click on notifications (a) in the side menu and then on "Create new reporter" (b).

	_
	-
	_
۰.	

	TESWORLD	=		R
	Customer	Create Reporter Plant nam	2	
0	Current Status			
ANAL	YSIS	Reporter Name		
000	Energy-Balance	Warning The Reporter Name only has identication purposes.		
M	Measurement-Analysis	Probing Window [seconds] BO0		
REPO	RTS	The Probing Window describes the bucket size of latest checked values. (>= 600, <= 604800)		
222	Sensor Report	Fulfill for Any		
iộ:	PV Yield	Decides whether the Reporter sends a notification if Any or All checks in the probing window are fulfilled.		
	Energy Report	bat-service@byom.de x X Y User Faail Push ""cation		
	Meter Report	Select the Users, which need to be notified. Afterwards enable the desired Notification channel for each User.		
SETT	INGS	bat-service@byom.de		
69	E-Car	Reporter-Type: Log-Event-Reporter Sensor-Report	er	
4	Charging-Infrastructure	A Log-Event-Reporter triggers IF log notifications for a certain device include a given text. A Sensor-Reporter checks IF the sensor values fulfil a certain condition.		
Q.	PV Yield			
888	Devices	Back	omit	
ADMI	NISTRATION			
(0)	Matifications			

Enter a descriptive name in the "Reporter name" field (a). A time period must be specified in the "Probing window" (b) within which the conditions specified below must be met in order to create and send a report. If you tick the "Notify on no longer triggered" box (c), a notification will be sent as soon as the conditions are no longer met. The "Fulfill for" field (d) determines whether a notification is sent when "all" conditions are met or when "one" of the conditions is met. In the "Select user" box (e), you must now select the recipient(s) of the notifications (only registered users can be selected). As soon as a user is selected, a table with the email address appears on the right side. After the entry, you can use two tick boxes to select whether a notification is sent via email (f) and/or push notifications (g). Below the table there are two buttons: "Log Event Reporter" (h) and "Sensor Reporter" (i). Here, you can select the data to be evaluated for notifications. Clicking on "Log Event Reporter" evaluates the log messages from the device, and clicking on "Sensor Reporter" evaluates the actual measurement values. Click on desired button.

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	•	- 1
		- 1
		- 1

0	PV Yield				
	Energy Report		Reporter-Type:		Log-Event-Reporter Sensor-Reporter
EE	Meter Report	a	A Log-Event-Reporter triggers if log notifications for a certain device include a given text. A Sensor-Report condition.	S is i	f the sensor values fulfill a certain
SETTI	NGS		Fulfill for devices All		Send a Message on not OK Enables to send a notification on any message for the selected device, that does not equal "OK"
	E-Car		Decides whether to send a notification, if ALL or ANY chosen devices send a matching message.		Message matcher
\$	Charging-Infrastructure	h			Send a notification every time, a message is received that includes the matcher.
0	PV Yield		Devices		
668	Devices	e	Probe all devices Allows to probe all devices of the EMS, or select specific devices.		
ADMI	VISTRATION	f	Select Device	+	
Q	Notifications	xit Reporter-Type: nt A Log-Venet-Reporter triggers if leg notifications for a certain device include a given text. A Sensor-Report it Fulf for devices it Fulf for devices it Decides whether to send a notification, if ALL or ANY chosen devices send a matching message. it Decides whether to send a notification, if ALL or ANY chosen devices send a matching message. it Devices it Devices it Devices it Send a fortification, if ALL or ANY chosen devices send a matching message. it Devices it Devices it Send a fortification every text it Setted Device it Its text Device it Its text Device it Its text Device			
1	User Permissions		Insert Device	+	O
GO TO					
Ĵ	Select plant		Back		Submit

Clicking on "Log Event Reporter" will display other fields. In the "To be met for devices" box (a), specify whether a notification is to be sent if all messages from a device meet the conditions, or if only one message meets the conditions. If you tick the "Send message on not OK" box (b), all messages from the selected device that are not OK messages will be sent as a notification. If it is not ticked, all messages are sent that contain the text entered in box (c). If you tick the "Probe all devices" box (d), messages from all devices will be checked. If the box is not ticked, you can select a specific device using the "Select device" (e) or "Insert device" (f) boxes. Finally, click on "Submit" (g).

1			
1	- 1	- 1	
1	<u> </u>	- 1	
	- 7	- 1	
- 1	_	_	

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		bat-service@byom.de		
SETTINGS				
🖾 E-Car	a Reporter-Type:			Log-Event-Reporter Sensor-Reporter
4 Charging-Infrast	cture A Log-Event-Reporter triggers if log notifications for a certain device include alive	n text. A Sensor-Reporter checks if the sensor values fulfill a certain co	indition.	
O PV Yield	Measurement Kind Sensor Average Sensor bat.Demo_TesvoltPCS	_Tesvolt_11111.0 DC Current	 Time Resolution 1 Minute 	~
# Devices	Condition for Trigger	Threehold		
ADMINISTRATION			÷	6
Notifications		2		
User Permission	Back			Submit
go to				
	TESVOLT		1	Contact Privacy Policy Legal Notice Terms of servic
	< THE ENERGY STORAGE EXPERTS			powered by Wendeware AG

Clicking on "Sensor Reporter" will display other fields. In the "Measurement Kind" box (a), you can select whether the value is an average value, energy value or power value. In the "Sensor" drop-down menu (b) you can select the desired sensor. The "Time Resolution" box (c) allows you to determine the temporal resolution of the measurements. The "Condition for Trigger" box (d) allows you to define how the "Threshold" (e) is interpreted (the "Threshold" is always positive, depending on the selection for "Measurement Kind" W/Wh/V/A/°C/%). Then, click on "Submit" (f).

Ξ D 8 TESWORLD Customer I User Administration Plant name Q Current Status Hide users without permissions ANALYSIS Energy-Balance Measurement-Analys 0 REPORTS mer & Ø bat-service@byom.de ø _docht@byom.de Technician @ 0 Sensor Report 0 \$ \$ \$ \$ t@hvom.de 1 0 O PV Yield Items per page: 5 ~ Energy Report Meter Report Change User permissions × Remove User + Add User SETTINGS 📾 E-Car b 4 Charging-Infrastructure

Administration – User permissions

If you would like to set up a new user, click on "+ Add User" (a). To change the permissions of existing users, click on "Change User permissions" (b). On the page that opens, you can then add or remove permissions by clicking on them. Finally, click on "Confirm". You must then confirm the changed permissions again on a new page.

To delete a user, click on "X Remove User" **c**. On the page that opens, select the user to be removed and click on "Confirm".

User permissions can also be managed from the technician role (see also the section "7.5 User management" on page 29).

11 DECOMMISSIONING



WARNING: Not following the decommissioning procedures for the system components can lead to damage to the units.

Before decommissioning the system, take careful note of the decommissioning procedures for the individual system components in the relevant product documentation, as not following the prescribed decommissioning processes can lead to damage to the units.

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To decommission the Energy Manager, disconnect it from the power supply and ensure it is voltage-free.

12 FIRMWARE-UPDATE

NOTE: With version 3.0.0 and higher, users can update the firmware themselves. If you are running a version prior to 3.0.0, please contact TESVOLT Support.

Proceed as follows to update the firmware:

In the side menu, click on System Settings > FW Upgrade.

	=			C	沟
	C Firmware Upgrade				
iterfaces	Current version 3.0.2		O Your TESVOLT Energy Manager is up to date. Your TESVOLT Energy Manager firmware is up to date. The current version is 3.0.2.		
	Check for new version 3 L	Jpgrade			
	Since Management Ork State No Filter Imstalled version 3.0.2 is up to date. So.2 PWU TESVOLT Energy Manager firmware is up to date. The current version is 3.0.2. Check for new version State No Filter Imstalled version 3.0.2 is up to date. Feb 3, 2025 10:41:22 AM System is rebooting: Feb 3, 2025 10:40:26 AM Upgrade in progress from 2.0.2 to 3.0.2. 100% done. Updating slots done. Feb 3, 2025 10:40:22 AM Upgrade in progress from 2.0.2 to 3.0.2. 100% done. Copying image to bootfs.0				
stem Settings	 The set of the set o				
Elicense Management	Image				
Network	Feb 3, 2025 10:40:26 AM	Rebooting	System is rebooting.		
	Feb 3, 2025 10:40:26 AM	Upgrading	Upgrade in progress from 2.0.2 to 3.0.2. 100% done. Installing done.		
DAAMONOSTICS Interfaces Current version 3.0.2 Your TESVOLT Energy Manager is up to date 3.0.2 Your TESVOLT Energy Manager firmware is up 3.0.2 Peload log Firmstamp Interfaces Your TESVOLT Energy Manager firmware is up 3.0.2 Peload log Firmstamp Imestamp Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager firmware is up Your TESVOLT Energy Manager firm Your TESVOLT Energy Manager firm Your TESVO	Upgrade in progress from 2.0.2 to 3.0.2. 100% done. Updating slots done.				
ergy Manager	Feb 3, 2025 10:40:22 AM	Upgrading	Upgrade in progress from 2.0.2 to 3.0.2. 100% done. Copying image to bootfs.0 done.		
	Feb 3, 2025 10:40:07 AM	Upgrading	Upgrade in progress from 2.0.2 to 3.0.2. 95% done. Copying image to bootfs.0		

You will see the status of the FW version (a) used by your TESVOLT Energy Manager, as well as log entries from past FW updates (b).

3 If there is a newer firmware version available, start the update by clicking on "Upgrade". The new firmware version is then installed, followed by an automated restart. Notifications indicate the progress.

4 As soon as the TESVOLT Energy Manager is restarted, check whether your EMS appears to be working. As soon as you have ensured fault-free operation, complete the update by clicking on "Finalise". The TESVOLT Energy Manager will then install the update a second time. After the TESVOLT Energy Manager is restarted for the second time, you have successfully completed the process.

13 ANALYSIS FUNCTION AND TROUBLESHOOTING

13.1 NETWORK ANALYSIS

					C	A ×	ß
	nterfaces / Network						
₹ Interfaces ✓ ﷺ Network C IOs Æ OneWirre	Uplink Network Interface eth0: address: 192.168.178.31 address: 760:7281:326 HW address: 70:b3:d5:66	24 : fol61:ca6d/64 : Ca166	a	Uplink Network Connectivity There is a working route to the internet. DHS resolution is working. The wyTENADRU-PlatIform is online.			
	TESVOLT Energy Manage	Network	b	TESVOLT Energy Manager Network Connectivity	Reloa	•	
SETTINGS					Reloa	a	
段 System Settings 〈	Maintenance Network			Maintenance Network Connectivity			
Device Settings Interface tun0: address: 10.9.5.94/32 address: 16.9.:824/32 address: 16.9.:82412ai		:105:7697/64	C	Naintenance connection is active.			
函 User Management	Interface tun1: address: 10.8.1.254/32 address: fe80::dea3:266	:976c:bb8c/64			Reloa	đ	
a Network status LA	AN 1	Status of the local network (interne	et)				
b Network status LAN 2		Status of the dedicated Modbus network					
C Maintenance network		Status of the maintenance network					

13.2 INPUTS AND OUTPUTS ANALYSIS

DIAGNOSTICS	Interfaces / IOs		
🖗 Interfaces 🗸 🗸			
蟲 Network	Digital Inputs		
🛱 10s	Digital opto-isolated inputs: Digital opto-isolated input II state: OFF Digital costs.colated digut I2 state: OFF		
OneWire	bijital opto-isolated input 13 state: OFF Digital opto-isolated input 14 state: OFF		
	Digital opt-sloated Dupt 15 states OPF Digital opt-sloated Dupt 15 states OPF Digital opt-sloated Input 17 states OPF Digital opt-sloated Input 18 states OPF		
	Digital Ouputs		
seттнюs @ System Settings < 楚 Device Settings <	Digital outputs: Digital output 0: state: 0FF Digital output 0: state: 0FF		
 Energy Manager 			
B User Management Dry-Contact Inputs			
	Dry contact inputs: Dry contact input 101 state: 0FF Dry contact input 102 state: 0FF Dry contact input 104 state: 0FF Dry contact input 104 state: 0FF		
	TESV//blT		
Opto-isolated ir	nputs () Status of opto-isolated inputs		
Digital outputs	K Status of digital outputs		
C Dry contact inp	uts 1 Status of dry contact inputs		

14 EXAMPLE ENERGY SERVICE STRATEGIES (MULTI-USE)

14.1 PEAK SHAVING + SELF-CONSUMPTION OPTIMISATION



In this energy service strategy, the energy service strategies peak shaving and self-consumption optimisation are combined to achieve the benefits listed below.

For this multi-use application, only the Basic version of the TESVOLT Energy Manager is required.

Configuring this energy service strategy in the decision tree

© Energy Service Activation					
Default Strategy SOO Passe seed a default shalege. This is used in case that ne	excision tree is configured, or the decision the cannot be evaluated.				
Case-dependent strategy activation (multi-use)					
	b i Decim				
CC States	d a stray of the second strain				
© Reat	. bba:				
a Standard strategy	Self-consumption optimisation				
b Case-dependent strategy activation (multi-use)	Decision SoC > 40%?				
C SoC > 40%	Strategy: Self-consumption optimisation				
d SoC < 40%	Strategy: Peak shaving				

Benefits

- Maintains a minimum usable energy content to guarantee peak shaving
- With the Pro version and dynamic peak shaving, a maximum battery lifespan can be guaranteed.

14.2 FORECAST-BASED CHARGING + SELF-CONSUMPTION OPTIMISATION



In this energy service strategy, the energy service strategies forecast-based charging and self-consumption optimisation are combined to achieve the benefits listed below.

For this multi-use application, the Pro version of the TESVOLT Energy Manager is required.

Configuring this energy service strategy in the decision tree

Energy Service Activation	
Default Strategy BOO Presse sereet a default strategy. This is used in case that m	 no decision the is configured, or the decision tree cannot be evaluated.
	Case-dependent strategy activation (multi-use)
	b E becinn @
Durkay Porecast-based charging	d Storage @
(Reat	bal bal
a Standard strategy	Self-consumption optimisation
b Case-dependent strategy activation (multi-use)	Decision SoC > 70%?
C SoC > 70%	Strategy: Forecast-based charging
d SoC < 70%	Strategy: Self-consumption optimisation

Benefits

- Extends the battery lifespan (lithium-ion batteries age more quickly in the 80–100% SoC range)
- Battery is used effectively during its lifespan
- Guarantees maximum degree of system self-sufficiency



Forecast-based charging + peak shaving + self-consumption optimisation

In this energy service strategy, the energy service strategies forecast-based charging, peak shaving and self-consumption optimisation are combined to achieve the benefits listed below.

For this multi-use application, the Pro version of the TESVOLT Energy Manager is required.

Configuring this energy service strategy in the decision tree

段 Energy Service Activation	
Peak strategy Peak strategy Peak strate 1 deftwid strategy. This is used in case that no decision th	 er is configured, or the doction tree cannot be evaluated.
b	Case-dependent strategy activation (multi-uso)
vs Sorbary Sorbary @	d d berson boos boos boos boos boos boos boos b
	Dealy aboving
• Standard strategy	Peak snaving
b Case-dependent strategy activation (multi-use)	Decision: SoC > 80%?
C SoC > 80%	Forecast-based charging
d SoC < 80%	Decision: SoC > 40%?
€ SoC > 40%	Strategy: Self-consumption optimisation
f SoC < 40%	Strategy: Peak shaving

Benefits:

- Extends the battery lifespan (lithium-ion batteries age more quickly in the 80–100% SoC range)
- Maintains a minimum usable energy content to guarantee peak shaving even where forecast data differs (e.g. weather report)
- Battery is used effectively during its lifespan

15 MAINTENANCE

Check all screwed electrical connections: Loose connections must be retightened.

Use a dry cleaning cloth to clean the unit. The connections must be kept free of moisture. Do not use solvents of any kind!

16 DISPOSAL

Once a unit has been withdrawn from service, it must be disposed of in accordance with the locally applicable disposal regulations for electronic waste.

17 LEGAL NOTICE

TESVOLT Energy Manager Installation and Operating Manual Last revised: 03/2025 Applies to Tesvolt Energy Manager version 3.03 or higher Subject to technical changes.

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