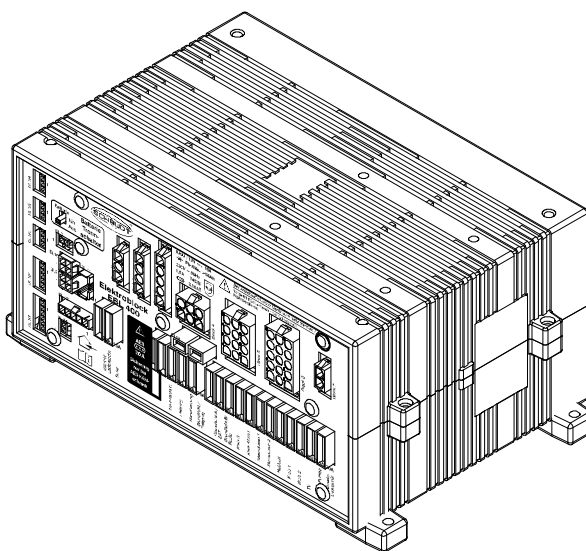


Operating Instructions



Electroblock EBL 400 A

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1 Safety information

1.1 Meaning of safety symbols



▲ DANGER!

Failure to comply with this sign may result in danger to life or physical condition.



▲ WARNING!

Failure to comply with this sign may result in injury.



▲ ATTENTION!

Failure to comply with the sign may result in damage to equipment or other connected consumers.

1.2 General safety instructions

The design of the device is state-of-the-art and complies with approved safety regulations. Failure to observe the safety instructions may nonetheless lead to injury or damage to the device.

Only use the device when it is in perfect technical condition.

Any faults affecting the safety of individuals or the proper functioning of the device must be repaired immediately by specialists.



▲ DANGER!

Parts carry 230V mains voltage.

Risk of fatal injury due to electric shock or fire:

- Do not carry out maintenance or repair work on the device
- If cables or the device housing are damaged, no longer use the device and isolate it from the power supply
- Ensure that no liquids enter the device
- The mains connection line may only be replaced by an authorised customer service department or by those qualified.



▲ WARNING!

Hot components

Burns:

- Only change blown fuses when the device is fully de-energised
- Blown fuses may only be replaced once the cause of the fault is known and has been rectified
- Never bypass or repair fuses
- Only use original fuses rated as specified on the device
- Device parts can become hot during operation. Do not touch them.
- Never store heat sensitive objects close to the device (e.g. temperature sensitive clothes if the device has been installed in a wardrobe)

1.3 Liability limitation

All technical information, data and instructions pertaining to installation, operation and maintenance contained within this operating manual and associated installation guide were up-to-date when the documents were printed, and were compiled in good faith in due consideration of experience and findings gained previously.

No legal claims can be derived from the specifications, illustrations and descriptions in this operating manual or associated installation guide.

The manufacturer assumes no liability for damage due to:

- a failure to comply with this operating manual and associated installation guide
- improper assembly and/or installation
- non-intended use
- improper repairs
- technical modifications
- use of non-approved spare parts

2 Introduction

This instruction manual contains important information for the safe operation of equipment supplied by Schaudt. Make sure you read and follow the safety instructions provided.

The operating instructions should always be kept in the vehicle. All safety information must be passed on to other users.



- ▲ This device is not intended to be used by those (including children) with limited physical, sensory or mental aptitude or lack of experience and/or knowledge unless they are supervised by a person responsible for their safety or have received instruction from this person as to how the device is used.

Children must be supervised to ensure they do not play with the device.

This device is intended for installation into a vehicle.

3 Operation

The electrobloc is operated solely from the operator and control panel connected (apart from battery isolation).

Operation of the electrobloc is not required for daily use.

Settings only have to be configured when the battery type is changed (AGM or lead-gel), during initial start-up or when retrofitting accessories (refer to Section 3.2 and the installation instructions EBL 400 A).

3.1 Switching system on/off



▲ ATTENTION!

Incorrect electrobloc settings.

Damage to connected devices. Therefore prior to starting:

- Ensure the leisure area battery is connected.
- Ensure the correct battery type is set. The prompt about which type is set is shown on the associated LT ... control panel. Refer to the relevant operating instructions.
- Ensure that the AES fuse (Fig. 3, Pos. 15) is only inserted when an AES refrigerator is connected. The leisure area battery may totally discharge otherwise. Damage to the battery is possible.

Battery cut-out

Deactivate the battery cut-out (shutdown) as required (refer to Section 3.4)

12 V main switch (on operator and control panel)

Use the main 12 V switch (see instruction manual of relevant control and switch panel) to switch on/off all the consumers and the control and switch panel.

Exceptions:

- | | |
|---|---|
| <ul style="list-style-type: none"> ● Continual 12 V, A, B and C (used for radio, satellite system and others) ● Heating and heating controller ● Aux. heating ● Refrigerator controller | <ul style="list-style-type: none"> ● AES refrigerator supply ● Step ● "Power" supply outputs (2 connectors on back of EBL) |
|---|---|

Please refer to the operating instructions for the operator and control panel for further information.

Operation with solar regulator



▲ ATTENTION!

If there is no backup function for the battery, damage to devices connected may result. So therefore:

- Do not operate solar regulator without battery connected.

Use on a 230 V generator or car ferries

If a current generator is used for the 230V motorhome supply, the generator must not exceed the mains connection ratings (see "Technical details", Section 5.2).



▲ ATTENTION!

- To avoid voltage peaks during warm-up, do not connect the generator until it is running in a stable manner. Otherwise the electrobloc, the 12 V consumers or other devices connected could be damaged. It is essential the generator conforms to mains supply specifications.

3.2 Changing the battery



▲ ATTENTION!

Use of incorrect battery types or incorrectly rated batteries.

Damage to the battery or devices connected to the electrobloc:

- Batteries may only be changed by qualified personnel.
- Follow the battery manufacturer's instructions.
- Only use the electrobloc to connect to 12V power supplies with rechargeable 6-cell lead (gel or acid), AGM or lithium (LiFePo4) batteries. Never use non-approved battery types such as NiCd batteries.

Changing the battery

- ▶ Electrically isolate the battery from the electrobloc. For this, activate the battery cut-out (refer also to Section 3.4).
- ▶ Remove "+ solar cell" connector on the solar charge regulator (if available).
- ▶ Isolate the electrobloc from the mains voltage (230V AC).
- ▶ Replace the battery.
- ▶ After changing the battery, recheck which type of battery has been inserted.



- ▲ Normally only batteries of the same type and rating should be used, i.e. the same as those originally installed by the manufacturer. It is possible to swap from lead-acid batteries to other battery types. Switching to lead-acid batteries is only possible in certain circumstances. Contact the vehicle manufacturer for more information.



- ▲ **Changing the battery type from the operation and control panel is only possible with certain panels that are configured for this. Refer to the respective operating instructions for whether the panel in the vehicle is intended for this. If there is no "Battery setting" section, the charging parameters of the EBL 400 A cannot be changed.**



▲ DANGER!

Incorrect setting of the battery type.

Risk of explosion due to build up of explosive gases:

- Correctly set the battery type on the operator and control panel.



▲ ATTENTION!

Incorrect setting of the battery type.

Damage to battery.

- Correctly set the battery type on the operator and control panel.



- ▶ Disconnect the electroblock from the mains before setting the battery type.
- ▲ However, suitability must be checked on a case-by-case basis using the specifications from the battery manufacturer and the charging parameters of the electroblock.
The charging parameters are specified in Section 5.2.
- ▶ Set the battery type from the operator and control panel – refer to the operating instructions for the associated "LT ... operator and control panel" (**refer to the information above**).
- ▶ Plug the "+ solar cell" connector into the solar charge regulator (if available).
- ▶ Start up the system as described in section 3.1.

Starting up the system

3.3 Faults

Flat vehicle fuses

A fault in the power supply system is usually caused by a blown fuse.

For faults with the control and switch panel, the entire system must be switched off from the battery cut-off and turned on again after about 1 minute.

Please contact our customer service address if you cannot rectify the fault using the following table.

If this is not possible, such as when you are abroad, a specialist workshop will be able to repair the device. In this case, you must ensure that the warranty is not invalidated by incorrect repairs being carried out. Schaudt GmbH will not accept any liability for damage resulting from such repairs.

Fault	Possible cause	Remedy
Leisure area battery is not charged during 230 V operation (battery voltage constantly below 13.3 V)	No mains voltage	Switch on the automatic fuse in the vehicle
		Have the mains voltage checked
	Defective electroblock	Contact customer service
Leisure area battery is overcharged during 230 V operation (battery voltage constantly above 14.5 V)	Defective electroblock	Contact customer service
Starter battery is not charged during 230 V operation (battery voltage constantly below 13.0 V)	No mains voltage	Switch on the automatic fuse in the vehicle
		Have the mains voltage checked
	Defective electroblock	Contact customer service
Leisure area battery is not charged during mobile operation (battery voltage below 13.0 V)	Defective alternator	Have the alternator checked
	No voltage on D+ input	Check fuses and wiring
	Defective electroblock	Contact customer service
The leisure area battery is overcharged during mobile operation (battery voltage permanently above 14.3 V)	Defective alternator	Have the alternator checked

Fault	Possible cause	Remedy
The refrigerator does not work during mobile operation	No power supply to the refrigerator	Have the fuse and cabling checked
	Defective electrobloc	Contact customer service
	Defective refrigerator	Have the refrigerator checked
Solar charger does not work (power supply and engine are off)	Solar panel in (partial) shade or covered (snow or dirt)	Move solar panel out of shade or clean it.
	Solar charge regulator not plugged in	Plug in solar charge regulator
	Defective fuse or cabling	Have the fuse and cabling checked
	Solar charge regulator defective	Have solar charge regulator checked
No 12 V supply in the leisure area	Main 12 V switch for leisure area battery switched off (on the associated operator and control panel)	Switch on the main 12 V switch for the leisure area battery (on the associated operator and control panel)
	Battery cut-out activated	Deactivate the battery cut-out
	Defective fuse or cabling	Have the fuse and cabling checked
	Defective electrobloc	Contact customer service
Operation of the electrobloc not possible from the control panel.	Defective electrobloc	Contact customer service
	Associated operator and control panel defective	Contact customer service



- ▲ The charging current is reduced automatically if the device becomes too hot due to excessive ambient temperature or lack of ventilation. Always prevent the device from overheating nevertheless.
- ▲ If the automatic shutdown mechanism of the battery monitor is triggered, fully charge the leisure area battery.

3.4 Shutting down

3.4.1 Shutting down the system



▲ ATTENTION!

Total discharge results in damage to the leisure area battery. So therefore:

- Fully charge the leisure area battery before and after a shutdown (connect the vehicle to the mains for at least 12 hours and 24 hours for an 80Ah and 160Ah battery respectively)



▲ ATTENTION!

Exceeding permitted input voltages can cause damage to consumers connected. So therefore:

- Do not operate the solar charge regulator without a battery.
- When the battery is changed or removed, first unplug the "+ solar cell" connector on the solar charge regulator.

Isolate the leisure area battery from the on-board 12 V supply

Disconnect the leisure area battery from the 12V power supply when the motorhome is not used for a longer period (during the winter for example). For this, the system has a battery cut-out mechanism which isolates electrically the leisure area battery from the vehicle.

- ▶ Fully charge the leisure area battery before closing down the system.
- ▶ Switch off the 12V main switch on the control panel.
- ▶ Move battery cut-out switch (switch, see Fig. 3, Pos. 5) to position "Battery OFF".

The battery cut-out switch isolates all connections from the leisure area battery:

- Continual 12 V, A, B and C (used for radio, satellite system and others)
- Heating and heating controller
- Aux. heating
- Refrigerator controller
- AES refrigerator supply
- Step
- Operator and control panel
- "Power" supply outputs (2 connectors on back of EBL)



- ▲ The battery alarm is no longer active.

The leisure area battery **is also** charged by the internal charger module, an additional battery -charger, the solar charger regulator and the alternator **when the battery-cut-out is activated**.

3.4.2 Cancelling the shutdown

- ▶ Move battery cut-out switch (switch, see Fig. 3, Pos. 15) to position "Battery ON".
- ▶ After having disconnected the leisure area battery from the electroblok using the battery cut-off switch or after changing the battery, briefly switch on the 12 V main switch on the control and switch panel to start up the consumers.

4 Application and functions in detail

4.1 General



▲ This device is intended solely for installation in a vehicle.

The electroblock is the central power supply unit for all 12V consumers in the motorhome's electrical system. It is usually located in a cupboard or storage area and is accessible from the front in order to change fuses.

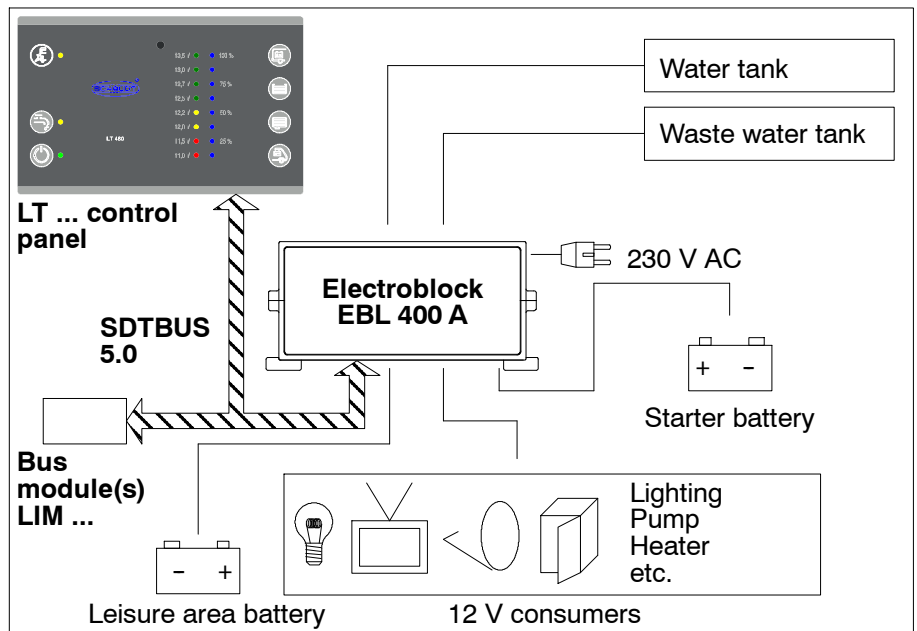


Fig. 1 On-board power supply system

Modules The EBL 400 A electroblock comprises:

- a charge module for charging all batteries connected
- the complete 12V distribution unit
- the fuses for the 12V circuits
- a main switch module
- battery monitor
- other control and monitoring functions

System devices A bus-compatible LT ... control panel must be connected for operation. This device controls the electrical functions of the electroblock as well as the accessories connected there.

There is a connection for a solar charge regulator. Probes/sensors for measuring the water and waste water tank levels are also connected to the electroblock.

Flat vehicle fuses protect the various circuits.

Protective circuits

- Excess temperature
- Overload
- Short circuit

4.2 Battery functions

Suitable batteries 6-cell AGM or lead-gel batteries, 80 Ah and above


Battery cut-out The battery cut-out (at the battery cut-out switch of the electrobloc, see Fig. 3, Pos. 15, see also Section 3.4) isolates the following connections from the leisure area battery:

- all 12 V consumers
- the frost protection valve

This prevents slow discharge of the leisure area battery by the standby current during shutdown of the vehicle (discharge with approx. 4 Ah in month).


The batteries can still be charged using the electrobloc, the alternator, an auxiliary charging unit or the solar charge regulator, even when the battery cut-out switch is switched off.

Battery types The setting option on the associated control panel ensures optimal charging of different battery types (lead-gel, lead-acid, different AGM types, constant voltage for LiFePo4).

Battery monitor with automatic disconnect The battery monitor measures the voltage of the leisure area battery. As soon as the battery voltage falls below 11.0 V for longer than 10 seconds (or 10.5 V for longer than 1 second), all 12 V consumers are switched off. Only the consumers not activated from the main "12 V ON OFF " switch continue to be powered.

If the voltage falls to a value below 10.5 V for longer than 1 second, ALL consumers are switched off to protect the leisure area battery from total discharge.

If an overload or an insufficiently charged leisure area battery causes the voltage to fall so low that the automatic disconnecter is triggered, any non-essential consumers should be switched off.

It may be the case that only the 12 V supply is started for a short time. For this, switch on the main "12 V ON OFF " switch from the control panel.

However, if the battery voltage remains below 12.0 V, you cannot switch the 12 V power supply back on.


Fully charge the leisure area battery as soon as possible. For more information, see the description of "battery voltages".

4.3 Additional functions

**Automatic switch
function for
AES/compressor
refrigerator**

This relay supplies the AES/compressor refrigerator with power from the starter battery when the vehicle engine is running and the D+ connection is live. An AES/compressor refrigerator is powered by the leisure area battery when the vehicle engine is not running.

Step fuse

The "Step" output is protected by a 25 A fuse and is powered continually. This is also the case when the main "12 V ON OFF " switch is OFF.

**Battery charging with
solar charging regulator**

Permitted charge current 14 A, with 15 A fusing (maximum charge current can be increased to 18 A when the 15 A fuse is replaced by a 20 A fuse). Depending on the solar charge regulator used, either only the leisure area battery is charged or the leisure area battery and the starter battery.

**Mains charging
Starter battery**

This feature provides an automatic float charge for the starter battery at up to 5 A when the 230 V mains is connected to the electrobloc.


**Tank probe/sensor
inputs**

The EBL 400 A has connectors for 2 tank sensors, one for fresh water (FW) and one for waste water (WW). Each sensor has a base electrode and 4 level electrodes (25%, 50%, 75% and 100%). The water level is determined by the electrobloc reading the probes immersing into the water.

If the vehicle engine is running, the level measured last when the vehicle was stationary is displayed. This prevents the value displayed from changing continually due to the water sloshing around.

In the event of a sensor fault, the display on the control panel changes enabling the fault to be detected (e.g. rod probe for 25% and 75% in the water, but not 50%) – also refer to the operating instructions for the associated "LT ... control panel".

Water pump output

The output for supplying the water pump can be activated. The prerequisite for this is an LT ... control panel having a corresponding button. It is used to switch on and off the pump supply separately. This means the pump for pressure-controlled systems can be deactivated (e.g. over night). If the control panel does not have a water pump switch, the voltage supply for the pump is switched on and off from the main "12 V ON OFF " switch.

5 Technical details

5.1 Mechanical details

Dimensions	130 x 275 x 170 (H x W x D in mm), including attachment feet
Weight	2.0 kg
Casing	PA (polyamide), gentian blue (RAL 5010)
Front	Aluminium, powder coated, light grey (RAL 7035)

5.2 Electrical details

Mains connection	230 V AC voltage ±10 %, 47-63Hz sinewave, protection class I		
Current consumption	Approx. 2.4 A at full load		
	Approx. 3.0 W in idle		
Suitable batteries	6-cell batteries from 80 Ah		
Standby current from Leisure area battery	Dependent on the control panel: Less than 1 mA, plus consumption of refrigerator control electronics		
	Conditions for the measurement:		
	<ul style="list-style-type: none">● approx. 10 minutes after disconnection from the mains● 12.6V battery voltage● Battery alarm OFF● Battery cut-out switch ON● Lighting for operator and control panel OFF● All consumers switched off● 12 V main switch OFF		
	D+ loading	Loading of D+ output of the alternator by the electroblock approx. 1 mA without current consumption on D+ point	
	Current-carrying capacity	12 V outputs	A maximum of 90% of the nominal current
		of the relevant fuse may be drawn.	
	D+ point	Approx. 400 mA given fusing D+ input with 2 A	
Battery charging via mains connector	Leisure area battery		
	Charge curve	IUoU (in 5 phases)	
	End of charge voltage between 14.3 V and 14.8 V		
	Charge current	20 A in the entire mains voltage range, electronically limited, minus the charge current into the vehicle battery	
	Voltage for float charge	between 13.2 V and 13.8 V (depending on battery type), with automatic switchover	
	New charge cycle, Switchover to main charge	with battery voltage below 13.2 V and 13.8 V (depending on battery type) with a couple of seconds delay	

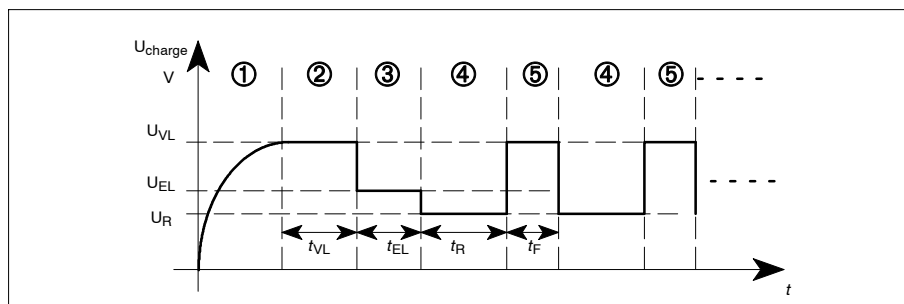


Fig. 2 Example of the charging voltage curve with the EBL 400 A electroblock

- ① **I ("Bulk")**
Main charge with maximum 20 A charging current, electronically limited, up to end-of-charge voltage U_{VL} . Start of charge also for completely discharged batteries.
- ② **Uo ("Absorption")**
Automatic switchover to full charging with constant voltage U_{VL} . The duration of the full charge phase is based on the battery type (is set from an EBL ... control panel connected). This sets a full charge time and minimal charge current.
- ③ **U ("Float")**
Automatic switchover to trickle charging with constant U_{EL} . In the trickle charge phase, a constant voltage is applied to the charger module output.
- ④ **U ("Standby")**
Further reduction of charge voltage to U_R . This phase lasts time t_R .
- ⑤ **U ("Refresh")**
A refresh with full charge voltage U_{VL} for time t_F is started once idle phase time t_R has expired.



▲ All voltages and times are dependent on the battery type used. These parameters are set automatically by setting the correct battery type on the associated control panel:

	Phase 1	Phase 2		Phase 3		Phase 4		Phase 5
	I ("Bulk")	Uo ("Absorption")		U ("Float")		U ("Standby")		U ("Refresh")
Battery type	I_{max}	U_{VL}	t_{VL}	U_{EL}	t_{EL}	U_R	t_R	t_F
Lead-acid	20 A	14.40 V	4 hours	13.40 V	72 hours	13.00 V	120 h	1 hours
Lead-gel	20 A	14.40 V	8 hours	13.80 V	72 hours	13.20 V	120 h	1 hours
AGM 1	20 A	14.50 V	4 hours	13.50 V	72 hours	13.20 V	120 h	1 hours
AGM 2	20 A	14.70 V	4 hours	13.70 V	72 hours	13.20 V	120 h	1 hour
LiFePo4	Max. 20 A with 14.4 V constant (CCCV)*							
No. 6	-							
No. 7	-							
No. 8	-							

* Only batteries with their own battery management system fitted may be used.

Battery charging of the starter battery

Starter battery

Charging current float charge max. 5 A

Influence of the leisure area battery temperature on battery charging

The target charging voltage varies with battery temperature, if it is read (e.g. by a TFS 01 A battery sensor connected to Bl. 9 or 10, or by the battery temperature value via the SDTBUS 5.0).

5.3 Environmental parameters

Operating temperature	-20 °C to +45 °C
Storage temperature	-20 °C to +70 °C
Protection rating	IP 20
Humidity	Operation in dry environment only
CE	CE mark

6 Maintenance

The electrobloc requires no maintenance.

Cleaning Clean the electrobloc with a soft, slightly damp cloth and mild detergent. Never use spirit, thinners or similar substances. Do not allow liquids to enter the electrobloc.

Appendix

A Special fittings/accessories

Controlpanel	Schaudt control panel with SDTBUS 5.0 DT ..., LT ... (required for operation)
Solar charge regulator	Schaudt solar charge regulator, type LR ... , LRS ... or LRM ... for solar modules with a total charge current of 18 A with 3-pin connector (charging of leisure area and starter batteries possible)
Bus modules LIM ...	Schaudt bus modules of types LIM 410 and/or LIM 403 are connected to the Schaudt-bus SDTBUS 5.0 for the light control depending on vehicle type.

B Upgrades



▲ ATTENTION!

No consumers or chargers should be connected directly to the leisure area battery. They would bypass the current measurement and so could cause erroneous charging of the battery.

All consumers and chargers (solar regulators, additional chargers, audio devices, etc.) must therefore be connected to the EBL400 connectors provided.

C Customer service

Customer service Schaudt GmbH, Elektrotechnik & Apparatebau
Planckstraße 8
88677 Markdorf
Germany

Phone: +49 7544 9577-16

Website: www.schaudt-gmbh.de

Email: kundendienst@schaudt-gmbh.de

Send in device Returning a faulty device:

- ▶ Complete and enclose the fault report, see Appendix D.
- ▶ Send it to the addressee (free delivery).

D Fault report

In the event of damage, please fill in the fault report and send it with the faulty device to the manufacturer.

Device type: _____

Part no.: _____

Vehicle: _____ Manufacturer: _____

Model: _____

Own installation? Yes ☐ No ☐

Upgrade? Yes ☐ No ☐

Following fault has occurred (please tick):

- ☐ Electrical consumers do not work - which?
(please specify below)
- ☐ Switching on and off not possible
- ☐ Persistent fault
- ☐ Intermittent fault/loose contact

Other comments:

[illegible]

E Layout

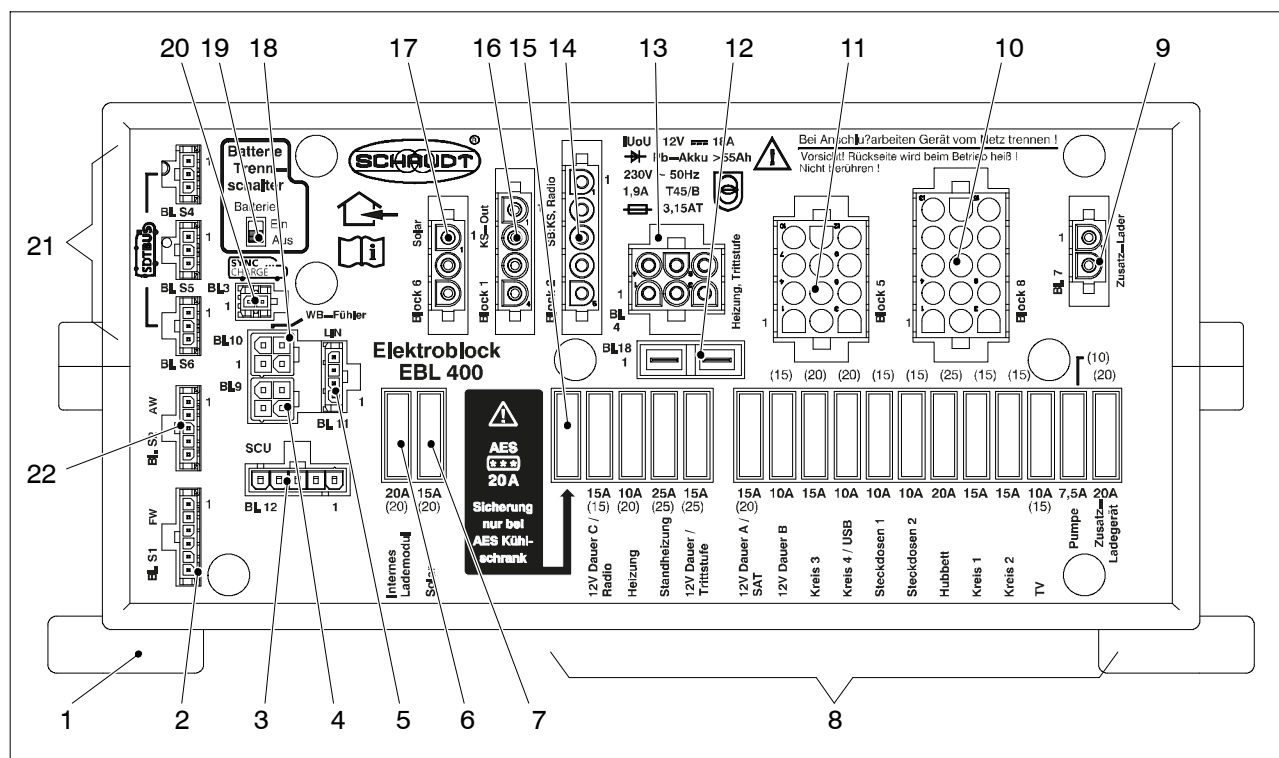


Fig. 3 Layout of the EBL 400 A electroblock (front)

Pos.	Name	Meaning	Use
1	Installation feet (4 x)		
2	Bl. S1	Block S1	Sensor for fresh water
3	Bl. 12	Block 12	SCU (not used)
4	Bl. 9	Block 9	TSF01 (parallel to Bl. 10)
5	Bl. 11	Block 11	LIN bus
6	Internal charger module	Fuse	
7	Solar	Fuse	
8	Flat vehicle fuses	Fuses	Protection of 12 V consumers
9	Block 7	Block 7	Auxiliary charger
10	Block 8	Block 8	Supply to 12 V consumers
11	Block 5	Block 5	Supply to 12 V consumers
12	Bl. 18	Block 18	Aux. heating
13	Block 4	Block 4	Heating, step
14	Block 2	Block 2	D+ input, fridge starter battery
15	AES 20 A	Fuse	Fuse, only used for AES refrigerator
16	Block 1	Block 1	Refrigerator
17	Block 6	Block 6	Solar charge regulator
18	Bl. 10	Block 10	TSF01 (parallel to Bl. 9)
19	Battery ON/OFF	Battery cut-out switch	
20	Bl. 3	Block 3	SYNCHAR®
21	Bl. S4, Bl. S5, Bl. S6	Blocks S4, S5 and S6	SDTBUS®
22	Bl. S2	Block S2	Probe/sensors for waste water

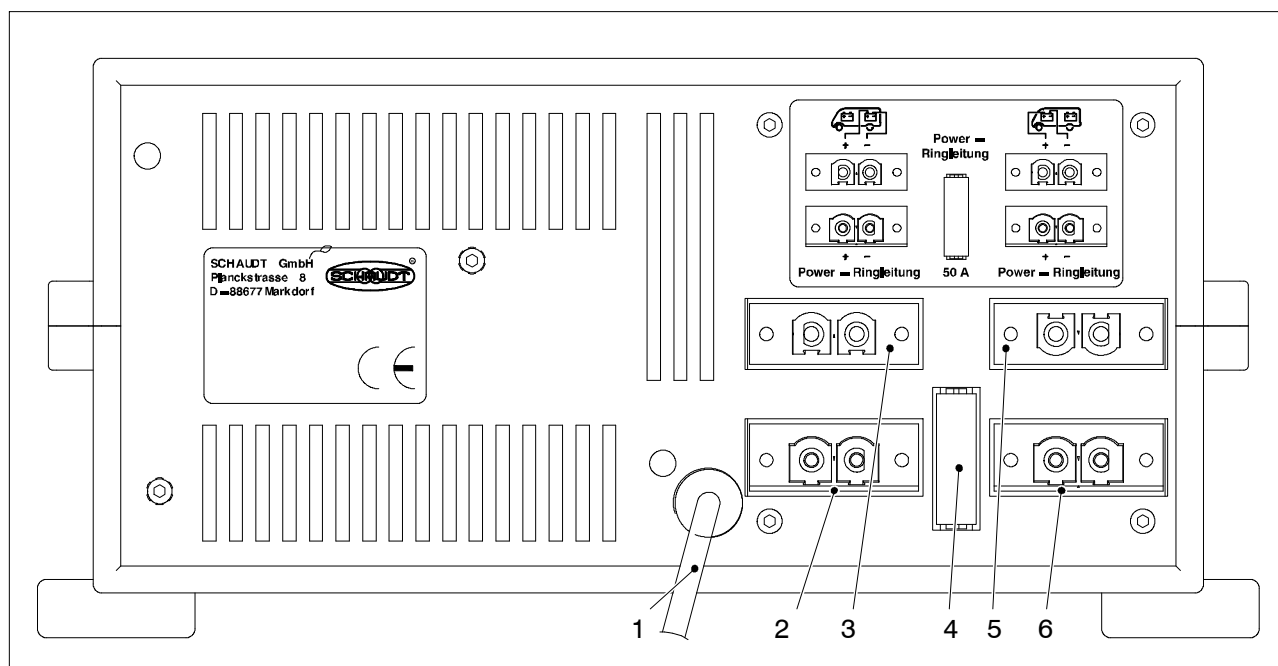
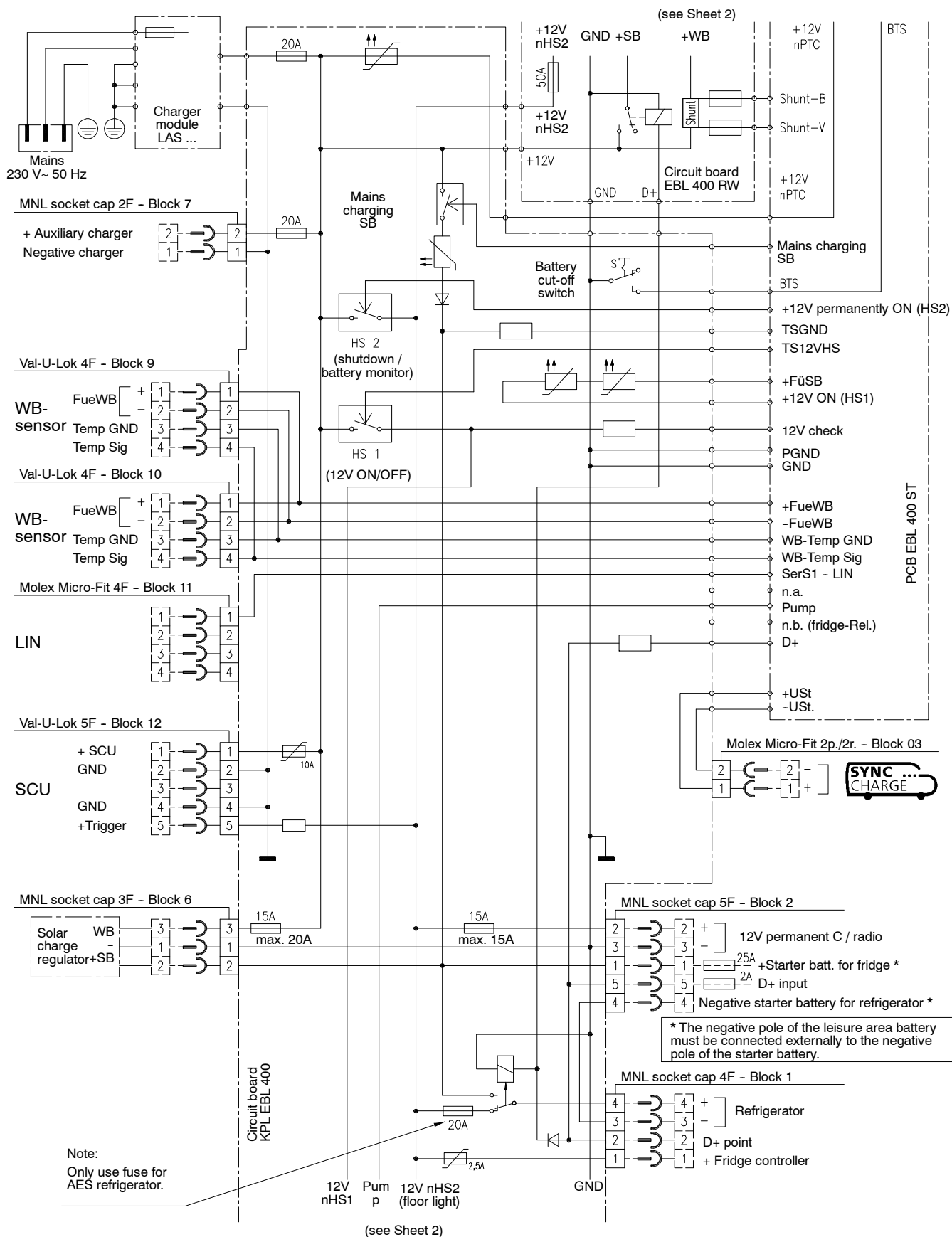


Fig. 4 Layout of EBL 400 A electroblock (rear)

Pos.	Name	Meaning	Use
1	Cable	Mains connection	230 V AC voltage supply (WAGO connector)
2	Power	Plug connectors	Output "12 V Power"
3	WB	Plug connectors	Leisure area battery connector
4	Fuse	50 A	Fusing for outputs "12 V Power" supply
5	SB	Plug connectors	Starter battery connector
6	Power	Plug connectors	Output "12 V Power"

F Block/connection diagram (I of II)



Block/connection diagram (II of II)

