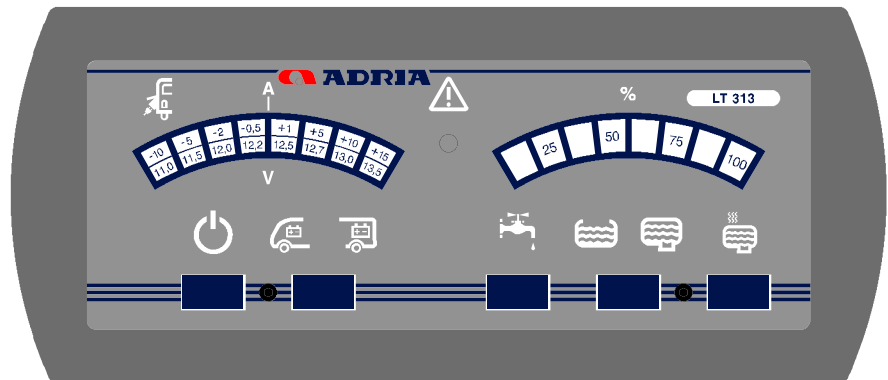


## Instruction Manual



## LT 313 LED panel

### Contents

1	Safety Information .....	2
1.1	Meaning of Safety Symbols .....	2
1.2	General safety information .....	2
2	Introduction .....	3
3	Operation .....	3
3.1	Starting up .....	4
3.2	Switching on and off .....	4
3.3	Battery and tank display .....	4
3.4	Switching on and off water pump and tank heater .....	8
3.5	Troubleshooting and remedies .....	9
3.6	Shutting down and starting up after shutting down .....	11
4	Application and Functions in Detail .....	12
5	Design .....	13
6	Maintenance .....	13
	Appendix .....	14

## 1 Safety Information

### 1.1 Meaning of safety symbols



**▲ DANGER!**

Failure to heed this warning may result in death or serious injury.



**▲ WARNING!**

Failure to heed this warning may result in personal injuries.



**▲ ATTENTION!**

Failure to heed this warning may result in damage to the device or connected consumers.

### 1.2 General safety information

The device is state-of-the-art and complies with approved safety regulations. Nonetheless, personal injuries or damage to the device may occur if the safety instructions contained herein are not followed.

Ensure that the device is in perfect working order before use.

Any technical faults which may have an adverse effect on personal safety or device safety must be rectified immediately by qualified personnel.



**▲ WARNING!**

Hot components!

Burns:

- Only replace blown fuses when the device is completely de-energised.
- Only replace blown fuses once the cause of the fault has been identified and 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.
- Never store heat sensitive objects close to the device (e.g. temperature sensitive clothes if the device has been installed in a wardrobe).

## 2 Introduction

This instruction manual contains important information on the safe operation of equipment supplied by Schaudt. Read and always follow the safety instructions.

The instruction manual should be kept in the vehicle at all times. Ensure that other users are made aware of the safety regulations.

## 3 Operation

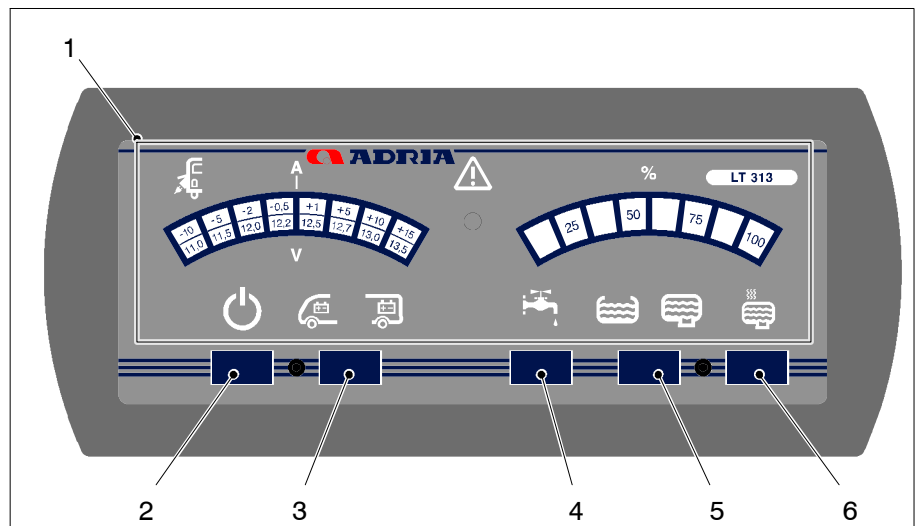


Fig. 1 Layout of the LT 313 LED panel

- 1 Display field
- 2 "12V On/Off" button
- 3 "Batteries" button
- 4 "Pump" button
- 5 "Tanks" button
- 6 "Tank Heater" button

The LT 313 LED panel has five controls (from left to right):

- A button to switch the 12V supply on and off
- A button to query the battery voltages and the current of the living area battery
- A button with a switch function to enable and disable the supply voltage for the water pump
- A button to query the tank fill levels
- A button with a switch function to enable and disable the supply voltage for the tank heater

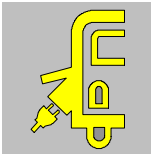
### Light intensity of the display

The luminance of all LEDs and symbols automatically adjusts to the surrounding brightness (in 15 increments). In the event of a sudden change in the surrounding brightness (such as the light in the living area being turned on), the luminance of the LEDs changes by one increment per second.

## 3.1 Starting up

### 230V mains operation

- ▶ Connect the plug for mains operation to the 230V power supply.

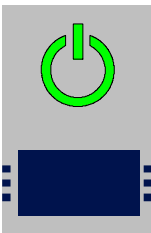


Mains indicator LED illuminates. The batteries are charged.



- ▲ The mains indicator LED also illuminates when the LT 313 LED panel (and hence the 12V supply of the living area) is switched off.

## 3.2 Switching on and off



- ▶ Briefly press the "12V On/Off" button.
  - The indicator LED illuminates.
  - The 12V living area supply is switched on.
- ▶ Briefly press the "12V On/Off" button again.
  - The indicator LED goes out.
  - The 12V living area supply is switched off.



- ▲ Battery isolation is enabled if, after pressing the "12V On/Off" button, the indicator LED, the "Living Area Battery" symbol and the alarm display flash three times. This must first be ended. See section 3.6.2.

The 12V supply of the living area is switched on/off via the "12V On/Off" button. Exceptions:

- Heater
- Floor light/step
- Frost protection valve
- Other circuits are excluded if required (see instruction manual of Electrobloc EBL ...)

These consumers are still operable even when the 12V power supply is switched off.



- ▲ The system must be switched on using the "12V On/Off" button on the LED panel to first start up these consumers after the Electrobloc has been switched off by the battery isolator (see section 3.6.2) or by the battery monitor (see section 3.5.1), after a battery change or after connection of the living area battery after a long break.

## 3.3 Battery and tank display



- ▲ The LT 313 LED panel must be switched on to be able to display battery and tank values.
- ▶ Turn on LT 313 LED panel (see section 3.2).

### 3.3.1 Battery voltages and living area battery current

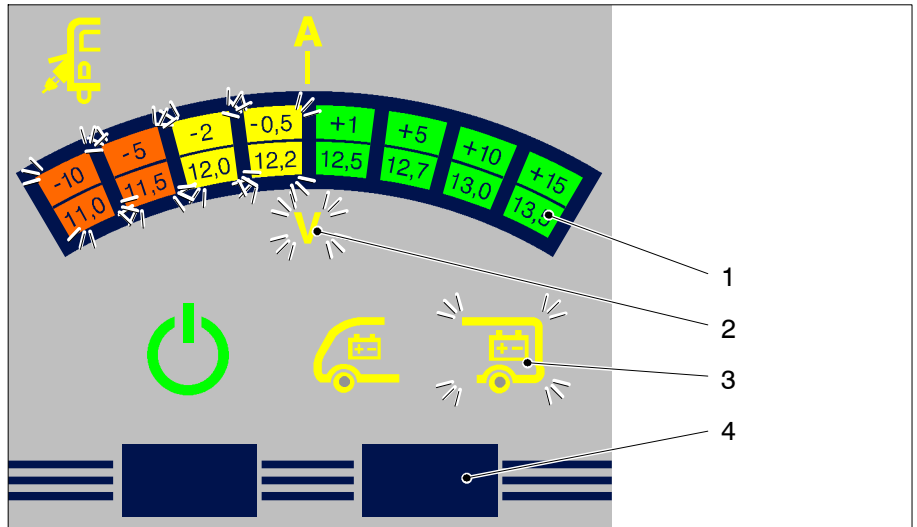
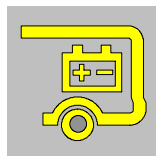


Fig. 2 Battery display - example: Living area battery voltage 12.2V

#### Living area battery voltage



► Press the "Batteries" button once (underneath the two battery symbols, Fig. 2, Pos. 4).

- The "Living Area Battery" symbol lights up (Fig. 2, Pos. 3).
- The "Volt" symbol lights up (Fig. 2, Pos. 2).
- The voltage of the living area battery is displayed on the left (lower scale, Fig. 2, Pos. 1), 12.2V in this example.

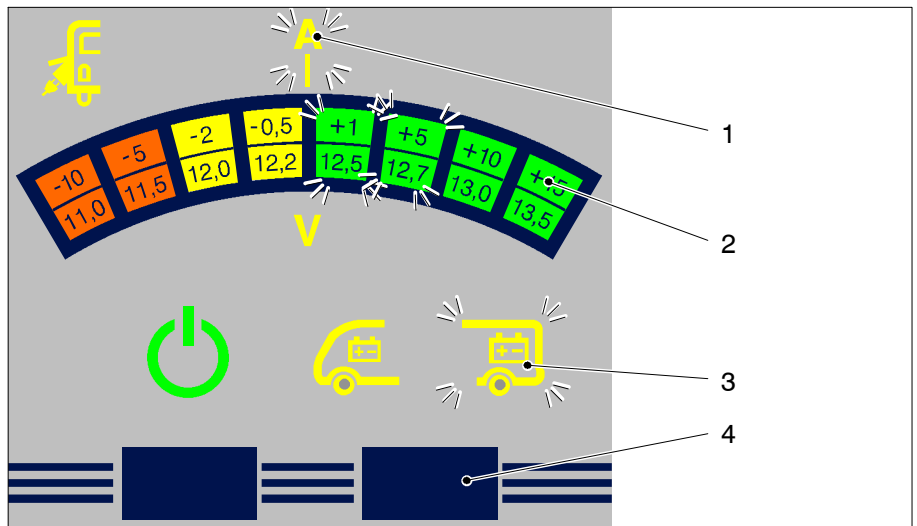
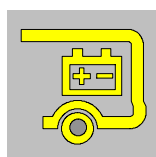


Fig. 3 Battery display - example: Living area battery current; charging with 5A

#### Living area battery current



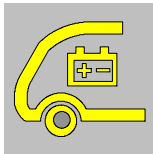
► Press again the "Batteries" button (underneath the two battery symbols, Fig. 3, Pos. 4).

- The "Living Area Battery" symbol lights up (Fig. 3, Pos. 3).
- The "Ampère" symbol lights up (Fig. 3, Pos. 1).
- The current of the living area battery is displayed on the left (upper scale), +5A in this example.

The following table shows the interpretation of the current displayed.

Display value for current	State of the system
-10A to -0.5A (negative current)	Battery is being discharged
No current (zero point: line under symbol "A")	Battery current is low or 0A
+1A to +15A (positive current)	Battery being charged

**Voltage starter battery**



▶ Press the "Batteries" button again (underneath the two battery symbols, Fig. 2, Pos. 4). The display is analogous to the living area battery (see Fig. 2):

- The "Starter Battery" symbol lights up.
- The "Volt" symbol lights up.
- The battery voltage of the starter battery is displayed on the left (lower scale).

▲ The display goes out after approx. 20 seconds if no more buttons are pressed.

The following table shows the correct interpretation of the voltage of the living area battery displayed on the scale. These values apply to actual operation, not off-load voltage.

Battery voltage	Battery operation	Mobile operation	Power operation
	Vehicle stationary, no 230V connection	Vehicle moving	Vehicle stationary, 230V connection
Less than 11V Risk of total discharge	When consumer is switched off: Battery flat	No charging via the alternator	No charging via the Electrobloc
	If many consumers are switched on: Possible battery overload	12V power supply overloaded	12V power supply overloaded
11,5V to 13.0V	Normal range	The alternator is not charging the battery <sup>1)</sup>	No charging via the Electrobloc <sup>1)</sup>
		12V power supply overloaded <b>1)</b>	12V power supply overloaded <sup>1)</sup>
13,5 V and over	Occurs only briefly after charging	Battery being charged	Battery being charged

<sup>1)</sup> If the voltage does not exceed this range for several hours.

**Off-load voltage**

Measuring the off-load voltage is a simple and effective method of checking the condition of the battery. Off-load voltage is the voltage of the charged battery in a passive state, with no current being supplied or drawn.

Take the measurement several hours after the last charging. In the meantime, no significant load should have been placed on the battery, meaning no current should have been drawn from it. There is a risk of total discharge if the off-load voltage of the battery is less than 12.0V.

The following table shows the correct interpretation of the off-load voltage displayed. The values specified are guidelines for Gel batteries.

Values for off-load voltage	Charge state of the battery
12V or less	discharge or total discharge
12.2V	approx. 25%
12.3V	approx. 50%
more than 12.8V	full

### 3.3.2 Tank fill levels

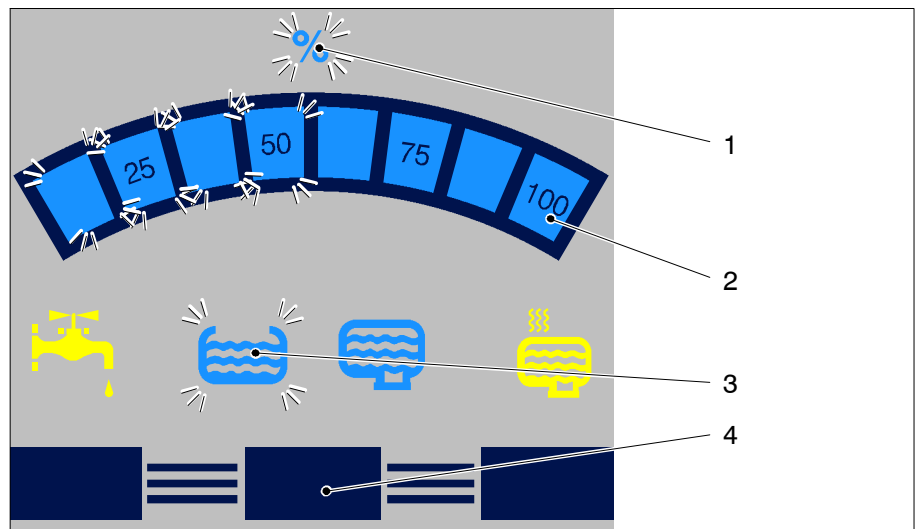
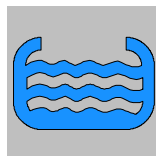


Fig. 4 Tank display - example: Water tank, half full

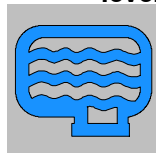
#### Water tank fill level



- ▶ Press the "Tanks" button once (underneath the two tank symbols, Fig. 4, Pos. 4).

- The "Water Tank" symbol lights up (Fig. 4, Pos. 3).
- The "%" symbol lights up (Fig. 4, Pos. 1).
- The fill level of the water tank is displayed on the right-hand scale (Fig. 4, Pos. 2), 50% in this example.

#### Waste water tank fill level



- ▶ Press the "Tanks" button again (Fig.4, Pos. 4).

- The "Waste Water Tank" symbol lights up.
- The "%" symbol lights up.
- The fill level of the waste water tank is displayed on the right-hand scale.



- ▲ The display goes out after approx. 20 seconds if no more buttons are pressed.

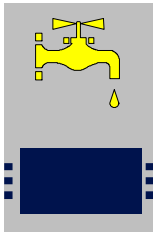
If the light symbols for the fill level flash whilst a tank fill level is being displayed, a sensor fault has occurred with that tank. This means that one of the fill level sensors currently below the fill level currently being displayed is not returning a measurement signal.



- ▲ No more measurements are read after the motorhome engine is started. The most recent fill level of the tank is stored on starting up the engine and displayed accordingly when queried. This prevents an incorrect display as a result of water sloshing around whilst moving.

### 3.4 Switching on/off the water pump and tank heater

#### 3.4.1 Water pump



The 12V supply of the water pump is enabled with the "Pump" button.

- ▶ Turn on LT 313 LED panel (see section 3.2).
- ▶ Press the "Pump" button once (underneath the "Water Tap" symbol).

The power supply for the water pump is switched on:

- The "Water Tap" symbol lights up.
- The pump may switch on briefly (e.g. in a pressure system).

- ▶ Press the "Pump" button again.

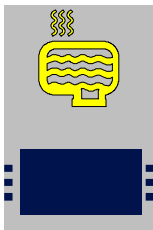
The power supply for the water pump is switched off:

- The "Water Tap" symbol goes out.



- ▲ The button has no effect when the LED panel is switched off. The switch state is stored after switching off the LED panel. This means that if the supply voltage for the water pump was switched on when the LED panel was switched off, it is automatically switched on again after the LED panel is switched on.

#### 3.4.2 Tank heater, waste water tank



The 12V supply of the tank heater is enabled with the "Tank Heater" button.

- ▶ Turn on LT 313 LED panel (see section 3.2).
- ▶ Press the "Tank Heater" button once (underneath the "Tank Heater" symbol).

The power supply for the tank heater is switched on:

- The "Tank Heater" symbol lights up.

- ▶ Press the "Tank Heater" button again.

The power supply for the tank heater is switched off:

- The "Tank Heater" symbol goes out.



- ▲ The supply voltage for the tank heater is **not switched off when the LED panel is switched off**. This is why the "Tank Heater" symbol continues to light up when the LED panel is switched off when the tank heater is on. In this state, the tank heater can be switched off separately using the appropriate button. It is not possible to power on again however. To do this, the LED panel must be switched on first.



### 3.5 Troubleshooting and remedies

#### 3.5.1 Alarms



**▲ ATTENTION!**


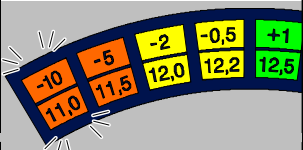







Total discharge!


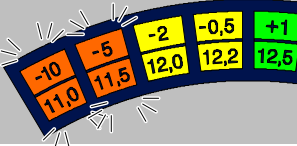




Damage to the living area battery:

- Prevent low battery charge (indicated by low voltage).
- Check the voltage regularly (see section 3.3.1).



▲ Carry out checks in the mornings before 12V consumers have been switched on.

Alarm	Possible cause	Remedy
 	<p>When LT 313 LED panel is switched on (when "Living Area Battery" voltage is displayed, the "11V" LED flashes):</p> <ul style="list-style-type: none"> <li>- Risk of total discharge of the living area battery.</li> <li>- Voltage of the living area battery has fallen below 11.0V.</li> </ul>	<p>Switch off all 12V consumers.</p>
 	<p>When the LT 313 LED panel is switched off:</p> <ul style="list-style-type: none"> <li>- The LT 313 LED panel, and hence the 12V living area supply, can no longer be switched on (to protect the battery).</li> <li>- On attempting to switch on the LT 313 LED panel, the "11.0V" LED and the alarm display flash. The "Living Area Battery" symbol and the "V" LED also light up.</li> </ul>	<p>Charge the battery:</p> <ul style="list-style-type: none"> <li>- start the engine</li> <li>or</li> <li>- connect to the 230V power supply</li> </ul>
	<p>Risk of total discharge of the living area battery.</p> <p>Voltage of the living area battery has fallen below 10.5V.</p>	<p>The battery monitor in Electrobloc EBL ... automatically switches off all consumers.</p> <p>The battery must be charged immediately.</p> <p>See Electrobloc EBL... instruction manual. .</p>
 	<p>On display of the "Water Tank" fill level:</p> <p>The water tank is empty</p>	<p>Fill tank.</p>
 	<p>On display of the "Waste Water Tank" fill level:</p> <p>The waste water tank is full.</p>	<p>Empty tank.</p>

Alarm	Possible cause	Remedy
   	<p>When the LT 313 LED panel is switched on and on display of the "Starter Battery" voltage:</p> <ul style="list-style-type: none"> <li>- Voltage of the starter battery is below 11.5V (both orange LEDs are flashing) or below 11.0V (only this LED is flashing).</li> </ul>	<p>Charge the battery:</p> <ul style="list-style-type: none"> <li>- start the engine</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>- connect to the 230V power supply</li> </ul>
	<p>Engine of the basic vehicle when stationary:</p> <p>There is no supply after the 230V supply is connected.</p>	<p>Check the camping site mains supply. Reconnect if necessary.</p> <p>Check motorhome connector and plug in correctly.</p> <p>Check motorhome power cutout and enable if required.</p> <p>If the supply has been disconnected intentionally, the alarm can be disabled by pressing any button. The alarm is automatically disabled when the engine is started.</p>
	<p>Engine of the basic vehicle when moving:</p> <p>The 230V supply is connected although the engine is running.</p>	 <p>Remove motorhome connector before moving off.</p>


### 3.5.2 Faults

Faults in the power supply system are usually caused by a discharged battery or a blown fuse.

**Start the engine** If the battery is discharged, the 12V supply can be reestablished by starting the engine.

**Flat vehicle fuses** If fuses are blown: Refer to the instruction manual of the relevant Electrobloc for information on the voltage distribution and fuse.

Please contact our customer service department if you are unable to rectify the fault using the following table. If this is not possible (such as when you are abroad), you can have the LED panel repaired at a specialist workshop. Please note that the warranty will become void if incorrect repair work is carried out. Schaudt GmbH shall not accept liability for any damages resulting from such repairs.

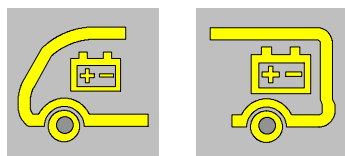
Fault	Possible cause	Remedy
12V supply does not function (or some areas are not powered).	12V supply is switched off.	12V supply must be switched on (see section 3.2).
	Fuse blown.	See Electrobloc EBL... instruction manual. .
12V indicator LED (green) does not illuminate.	12V supply is switched off.	12V supply must be switched on (see section 3.2).
	Living area battery not charged, battery monitor has switched off.	Charge the living area battery.
	Fuse blown.	See Electrobloc EBL... instruction manual. .
Living area battery is flat.	Living area battery is discharged.	Charge the living area battery immediately. The living area battery will be damaged beyond repair if it remains totally discharged for a lengthy period.
	 The battery can be discharged by inactive consumers, such as the frost protection valve in the heater system.	Prior to leaving the motorhome standing for long periods, completely charge the living room battery and then enable battery isolation (see section 3.6.1).
The mains indicator LED (yellow) does not illuminate even though it is connected to the 230V mains supply.	The mains connection is dead.	Check the mains supply (e.g. camping site).
	The power cutout to the Electrobloc has tripped or is disabled.	Connect power cutout.

### 3.6 Closing down and starting up again after stopping

#### 3.6.1 Closing down the system

The system should be switched off if the vehicle is not going to be used for a longer period, e.g. during the winter.

- ▶ Turn off LT 313 LED panel (see section 3.2).
- ▶ Press, and keep pressed, the "Batteries" button (underneath the two battery symbols, Fig. 1, Pos. 3).



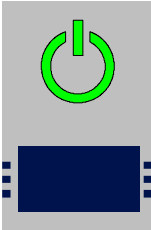
After a certain time (about 10 seconds), the indicator LED, the "Living Room Battery" symbol and the alarm display flash three times.

- ▶ Release the "Batteries" button.
  - Battery isolation is enabled.
  - All consumers are switched off.
- ▲ The remaining standby current is lower than 5mA (approx. 4 Ah per month). A motorhome with a fully charged (and intact) 80 Ah living area battery can stand for approx. 6 months without problem. For longer periods, the battery terminals should be disconnected.
- ▶ More detailed information on closing down the system can be found in the Electrobloc EBL... instruction manual.



### 3.6.2 Starting up

Battery isolation is enabled if, after pressing the "12V On/Off" button to switch on, only the indicator LED, the "Living Area Battery" symbol and the alarm display flash. End as follows:



- ▶ Press, and keep pressed, the "12V On/Off" button (underneath the indicator LED, Fig. 1, Pos. 2).
  - After about 5 seconds, the indicator LED and the "Living Room Battery" symbol flash three times.
- ▶ Release the "12V On/Off" button.

After about 2 seconds, the LED panel and the 12V supply switch on:

- Battery isolation is disabled.
- All consumers can be switched on.

## 4 Application and Functions in Detail

The LT 313 LED panel is the central console for the Electrobloc EBL ... which powers all 12V consumers in the vehicle's electrical system. It is usually installed in an easily accessible place high up near the door of the motorhome/caravan.

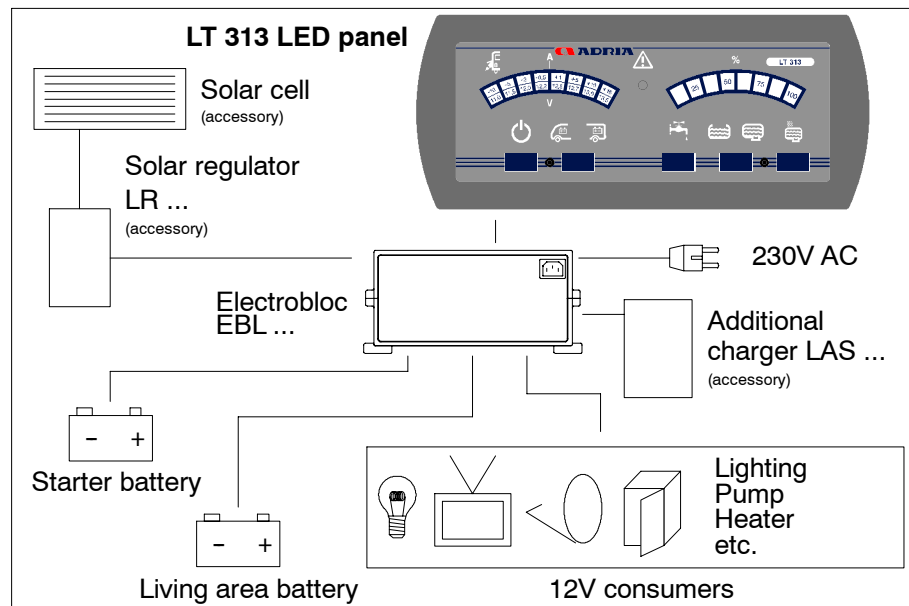


Fig. 5 On-board power supply system

#### System devices

An Electrobloc EBL ... has to be connected for operation. This provides the 12V-supply for the devices in the motorhome/caravan and charges the living area and starter batteries.

The following connection options are available:

- Electrobloc EBL ...
- Sensors or probe for water tank
- Sensors or probe for waste water tank

Water pump and tank heater are connected to the Electrobloc and enabled from the LED panel.

## **5 Design**

The LED panel is flush-mounted in a cabinet or wall (see Fig. 1, page 3).

## **6 Maintenance**

The LT 313 LED panel needs no maintenance.

**Cleaning** Clean the front plate with a soft, slightly damp cloth and a mild detergent. Never use spirit, thinners or similar substances. Do not allow fluid to penetrate the inside of the LED panel.

© No part of this manual may be reproduced, translated or copied without express written permission.

## **Appendix**

### **A EC Declaration of Conformity**

Schaudt GmbH hereby confirms that the design of the LT 313 LED panel complies with the relevant regulations.

The device has been registered for e1 testing.

**Manufacturer** Schaudt GmbH, Elektrotechnik & Apparatebau

**Address** Daimlerstrasse 5  
88677 Markdorf  
Germany

### **B Special fittings/accessories**

- Rod tank probes** Per tank:  
1 x rod-type tank probe, 1 x seal, type no. 126.007,  
1 x locking nut, type no. 102.106, 1 x probe cable (5 x 0.5)
- Tank sensors** Alternative (per tank):  
5 x tank sensor, type no. 933.663, 1 x sensor cable (5 x 0.5)
- Mixed operation** Mixed operation of tank probes and tank sensors is possible.

### **C Customer service**

**Customer service address** Schaudt GmbH, Elektrotechnik & Apparatebau  
Daimlerstrasse 5  
D-88677 Markdorf

tel.: +49 7544 9577-16 e-mail: kundendienst@schaudt-gmbh.de

Office hours	Mon to Thurs	08.00 – 12.00, 13.00 – 16.00
	Fri	08.00 – 12.00

- Sending in the device** Returning a defective device:
- ▶ Fill in and enclose the fault report, see Appendix D.
  - ▶ Send it to the addressee (free of charge).

**D Fault report**

In the event of damage, please return the defective device together with the completed fault report to the manufacturer.

Device type: \_\_\_\_\_  
Article no.: \_\_\_\_\_  
Vehicle:           Manufacturer: \_\_\_\_\_  
                          Model: \_\_\_\_\_  
                          Own installation?           Yes  No   
                          Upgrade?                        Yes  No   
Upstream overvoltage protection?           Yes  No

Following fault has occurred (please tick):

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

Other remarks:

---

---

---

---

---

---

---

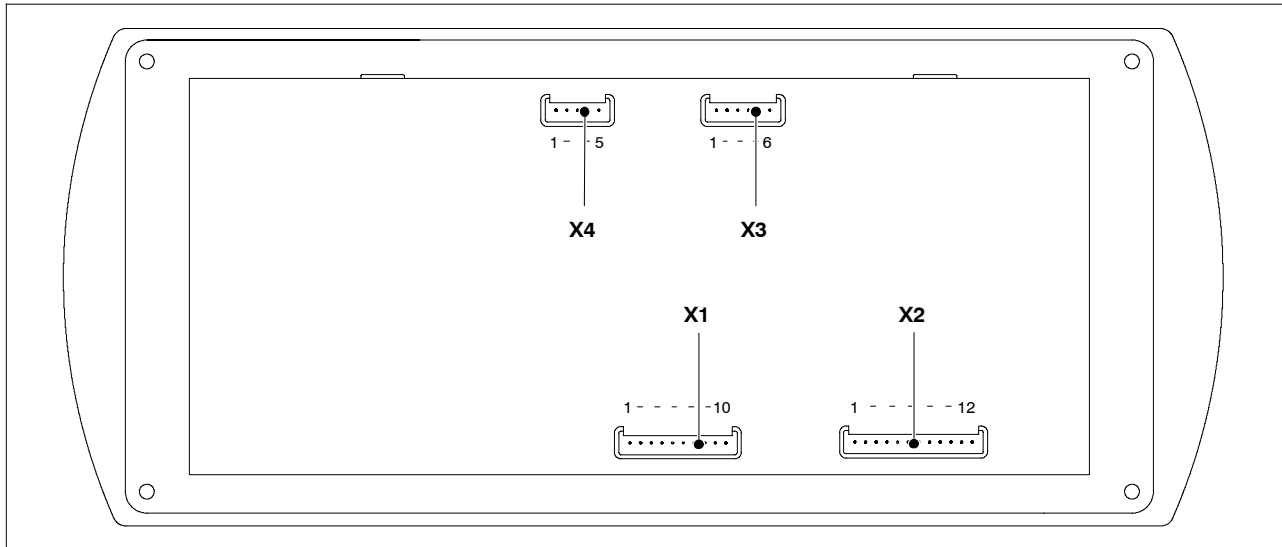
---

---

---

---

## E Block diagram/connection diagram



### X1 Lumberg MSFQ 10-way on EBL ...

- 1 D+
- 2 Pump
- 3 Tank heater
- 4 Frost protection valve
- 5 n.c.
- 6 n.c.
- 7 n.c.
- 8 n.c.
- 9 n.c.
- 10 n.c.

### X2 Lumberg MSFQ 12-way on EBL ...

- 1 Main switch relay 1 Off
- 2 Main switch relay 1 On
- 3 Main switch relay 2 Off
- 4 Main switch relay 2 On
- 5 Mains signal
- 6 Shunt consumer
- 7 Shunt battery
- 8 Negative living area battery sensor
- 9 n.c.
- 10 + living area battery sensor
- 11 + starter battery 12V
- 12 +lighting

### X3 Lumberg MSFQ 6-way on water tank

- 1 full
- 2 3/4
- 3 1/2
- 4 1/4
- 5 Base water tank
- 6 n.c.

### X4 Lumberg MSFQ 5-way on waste water tank

- 1 full
- 2 3/4
- 3 1/2
- 4 1/4
- 5 Base waste water tank