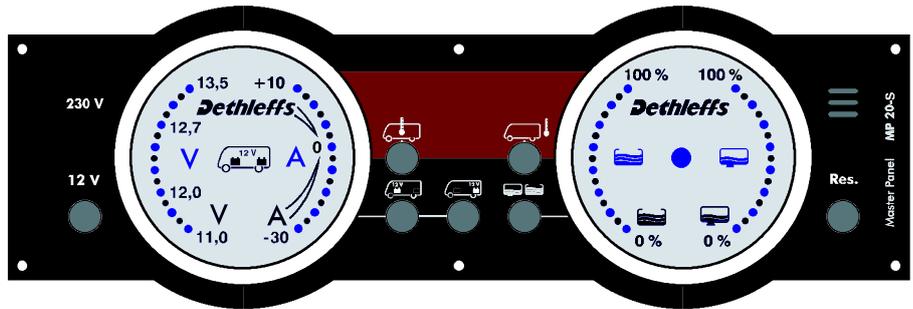


Instruction Manual



MP 20-S Display Panel

Table of 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 an additional device	9
3.5	Troubleshooting and remedies	9
3.6	Shutting down and starting up after shutting down	12
4	Application and functions in detail	13
5	Design	14
6	Maintenance	14
	Appendix	15

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 impact personal safety or the safety of the device must be rectified immediately by qualified personnel.



▲ WARNING!

Hot components!

Burns:

- Only change 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. Make sure you read and follow the safety instructions provided.

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

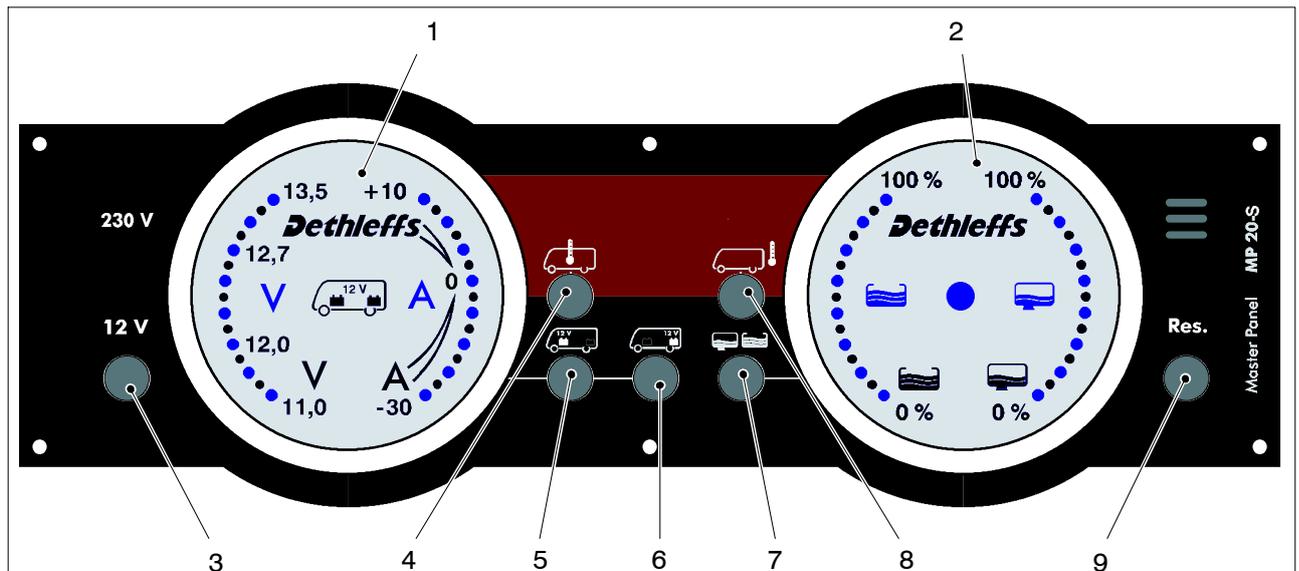


Bild 1 Layout of the MP 20-S display panel

- 1 "Batteries" display panel
- 2 "Tanks" display panel
- 3 "12V On/Off" button
- 4 "Interior room temperature" button
- 5 "Vehicle battery" button
- 6 "Living area battery" button
- 7 "Tanks" button
- 8 "External temperature" button
- 9 "Reserve" button

The MP 20-S display panel has seven controls (from left to right):

- A button to switch the 12V supply on and off
- A button to show the interior room temperature
- A button to query the battery voltage of the vehicle
- A button to query the battery voltage and the current of the living area battery
- A button to show the external room temperature
- A button to query the tank fill levels
- A reserve button

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



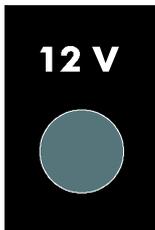
- ▶ Connect the plug for mains operation to the 230V power supply.

Mains indicator LED illuminates. The batteries are being charged.



- ▲ The mains indicator LED also illuminates when the MP 20-S display 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.



- ▲ If the MP 20-S display panel will not switch on, this is because:
 - If, after pressing the "12V On/Off" button, the "11.0V" LED and symbol "V" flash, the battery voltage of the living area battery is low. See section 3.5.1.
 - If, after pressing the "12V On/Off" button, the indicator LED, the "Living Area Battery" symbol and the alarm display flash three times, battery isolation is enabled. This must first be stopped. 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 EBL ... electrobloc)

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 display 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 MP 20-S display panel must be switched on to be able to display battery and tank values.
- ▶ Turn on MP 20-S display panel (see section 3.2).

3.3.1 Battery voltages and current of living area battery

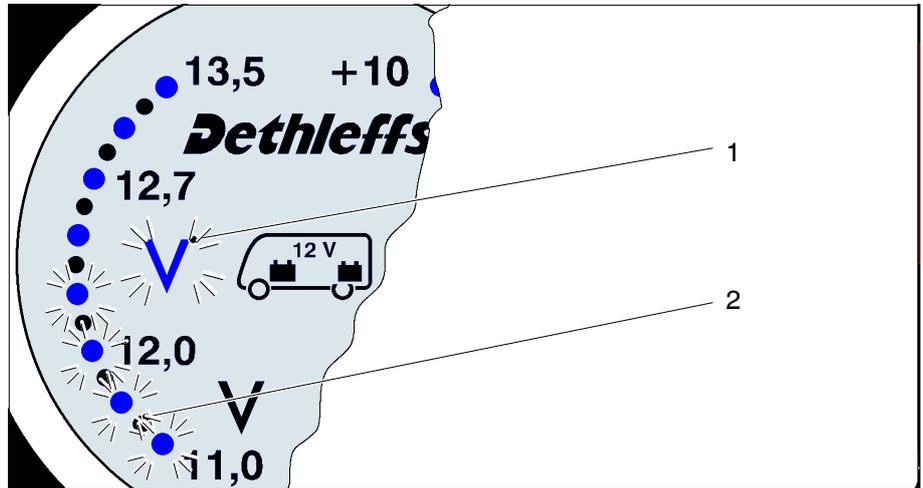
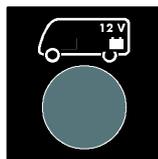


Bild 2 Battery display - example: Living area battery voltage 12.2V

Voltage and current, living area battery



- ▶ Press the "Living Area Battery" button once (underneath the living area battery symbol, Fig 1, Pos. 6).
 - The "Volt" symbol lights up (Fig 2, Pos. 1).
 - The voltage of the living area battery is displayed in the "Batteries" display field (left scale, Fig 2, Pos. 2), 12.2V in this example.

Blue LED	1. LED	2. LED	3. LED	4. LED	5. LED	6. LED	7. LED	8. LED
Voltage	< 11.0V	11.5V	12.0V	12.2V	12.5V	12.7V	13.0V	>13.5V

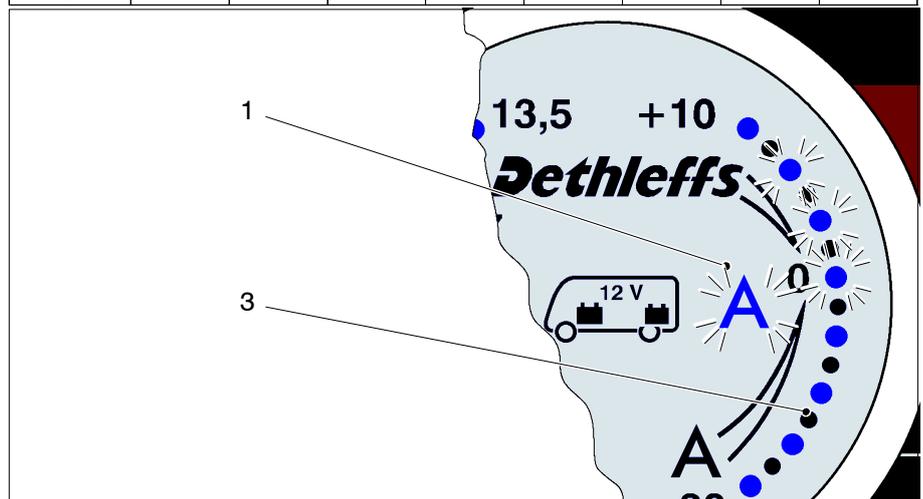
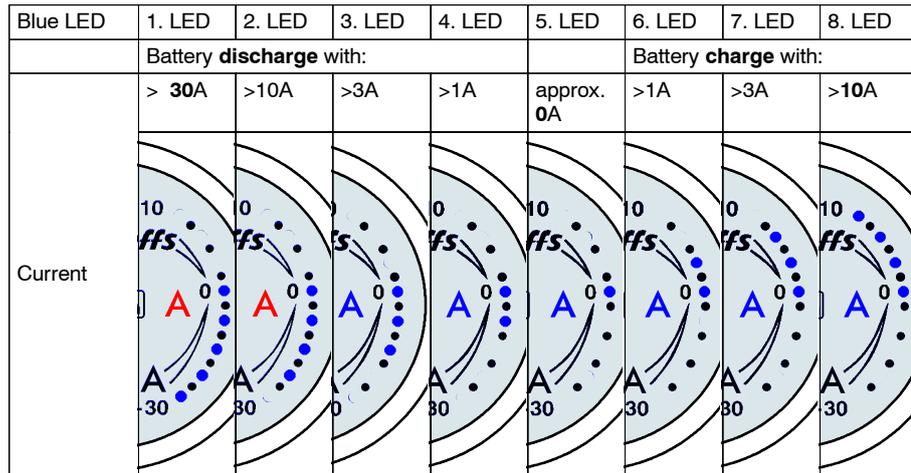


Bild 3 Battery display - example: Living area battery current; charging with 3A

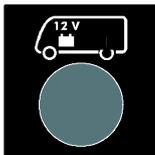
- The "Ampère" symbol lights up red or white (Fig 3, Pos. 1).
 - red: the battery is currently being heavily discharged with more than 10A
 - white: the battery charge/discharge is in the normal range
- The current of the living area battery is displayed in the "Batteries" display field (right scale, Fig 2, Pos. 2), +3A in this example.



The following table shows the interpretation of the current displayed.

Display value for current	State of the system
-30A to -1A (negative current)	Battery is being discharged
No current (zero point: LED next to number "0")	Battery current is low or 0A
+1A to 10A (positive current)	Battery being charged

Voltage Starter battery



- ▶ Press the "Vehicle Battery" button once again (underneath the living area battery symbol, Fig 1, Pos. 5). The display is analogous to the living area battery (see Fig. 2):
 - The "Volt" symbol lights up.
 - The voltage of the starter battery is displayed in the "Batteries" display field (left scale, Fig 2, Pos. 2), 12.2V in this example.
- ▲ 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.

Guidelines for voltages during operation

Battery-voltage	Battery operation	Mobile operation	Mains operation
	Vehicle stationary, no 230V connection	Vehicle moving	Vehicle stationary, 230V connection
Less than 11V Risk of total discharge	If consumers are switched off: battery flat	the alternator is not charging the battery	The electrobloc is not charging the battery
	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 ¹⁾	the electrobloc is not charging the battery ¹⁾
		12V power supply overloaded ¹⁾	12V power supply overloaded ¹⁾
13,5V and over	occurs only briefly after charging	Battery being charged	Battery being charged

¹⁾ 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, which means no current should have been drawn from it. There is a risk of total discharge if the off-load voltage of the battery is 12.0V or less.

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

Guidelines for off-load voltage

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 Temperature

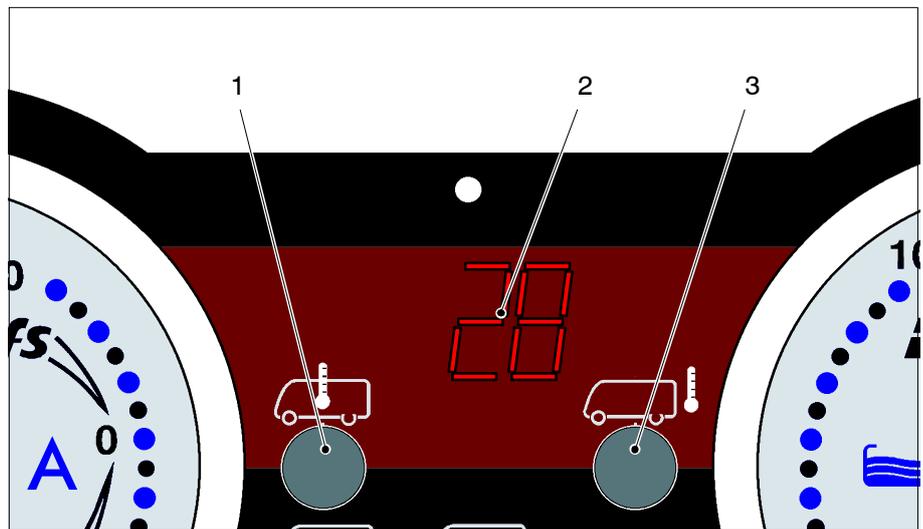
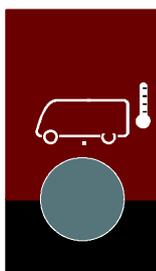


Bild 4 Battery display - example: Living area battery voltage 12.2V



► Press the "Interior Room Temperature" button once (underneath the interior room temperature symbol, Fig 4, Pos. 1).

- The internal temperature is shown as a two-digit 7-segment display in ° C (28° C in this example).



► Press the "Exterior Temperature" button once (underneath the interior room temperature symbol, Fig 4, Pos. 1).

- The external temperature is shown as a two-digit seven-segment display in ° C.



▲ The sensor has a fault if the display is flashing. Contact your specialist workshop.

3.3.3 Tank fill levels

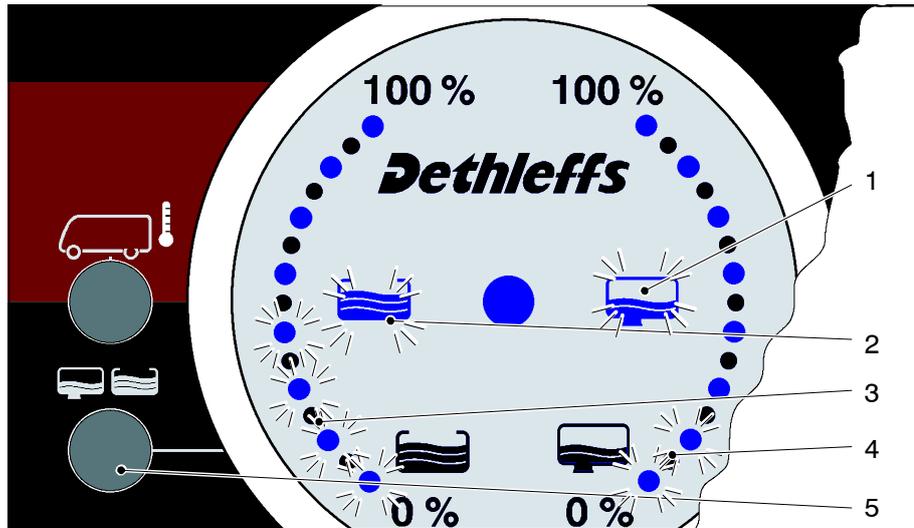
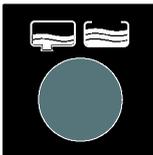


Bild 5 Tank display - example: Water tank 50% full, wastewater tank 25% full

Fill level of water and wastewater tank



- ▶ Press the "Tanks" button once (underneath the two tank symbols, Fig. 5, Pos. 5).
 - The "Water Tank" symbol lights up (Fig. 5, Pos. 2).
 - The "Wastewater Tank" symbol lights up (Fig. 5, Pos. 1).
 - The fill level of the water tank is displayed in the "Tanks" display field (left scale, Fig. 5, Pos. 3), 50% in this example.
 - The fill level of the waste water tank is displayed in the "Tanks" display field (right scale, Fig. 5, Pos. 3), 25% in this example.

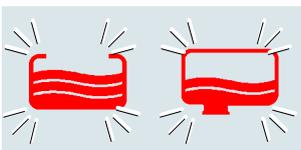
Blue LED	1. LED (0%)	2. LED	3. LED	4. LED	5. LED	6. LED	7. LED	8. LED (100%)
	25 %		50 %		75 %		100 %	
Fill level								

No LEDs light up if the tank is empty.



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

If one of the LEDs is flashing red, this has the following meaning:



- The "Water Tank" symbol is flashing (Fig. 5, Pos. 2). The water tank is empty.
- The "Wastewater Tank" symbol is flashing (Fig. 5, Pos. 1). The wastewater tank is full.

If the symbol for the fill level and the LEDs of the scale 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.

3.4 Enabling/disabling an option



- ▲ Please refer to the instruction manual of the motorhome manufacturer for which function the manufacturer has implemented on output "Reserve" (optional).



The 12V supply "Reserve" is enabled with the "Reserve" button.

- ▶ Turn on the MP 20-S display panel (see section 3.2).
- ▶ Press the "Reserve" button once.

The supply voltage is enabled:

- The "Res." symbol lights up.

- ▶ Press the "Reserve" button again.

The supply voltage is disabled:

- The "Res." symbol goes out.



- ▲ This supply voltage is also switched off on powering off the display panel. This supply voltage remains off after switching on the display panel.

The button has no effect if the display panel is switched off.

3.5 Alarms and faults

3.5.1 Alarms



▲ ATTENTION!

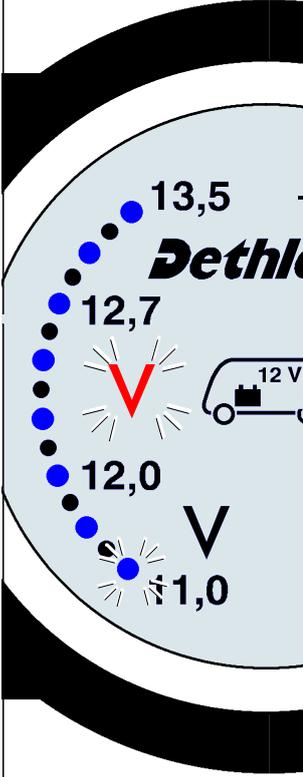
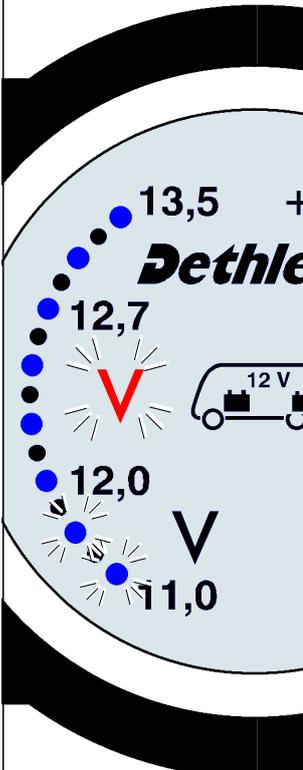
Total discharge.

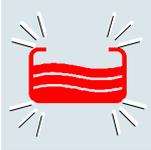
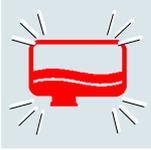
Damage to the living area battery:

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



- ▲ It is best to carry out checks in the morning before 12V consumers have been switched on.

Alarm	Possible cause	Remedy
	<p>When MP 20-S display panel is switched on (when "Living Area Battery" voltage is displayed, the "11V" LED flashes):</p> <ul style="list-style-type: none"> - Risk of total discharge of the living area battery. - Voltage of the living area battery has fallen below 11.0V. <p>When MP 20-S display panel is switched off:</p> <ul style="list-style-type: none"> - The MP 20-S display panel, and hence the 12V living area supply, can no longer be switched on (to protect the battery). - The "11.0V" LED and the "V" symbol flash on trying to switch on the MP 20-S display panel. 	<p>Switch off all 12V consumers.</p> <hr/> <p>Charge the battery:</p> <ul style="list-style-type: none"> - start the engine <p>or</p> <ul style="list-style-type: none"> - connect to the 230V power supply
	<p>When the MP 20-S display panel is switched on and on display of the "Starter Battery" voltage:</p> <ul style="list-style-type: none"> - Voltage of the starter battery is below 11.5V (both orange LEDs are flashing) or below 11.0V (only this LED is flashing). 	<p>Charge battery:</p> <ul style="list-style-type: none"> - by driving <p>or</p> <ul style="list-style-type: none"> - connect to the 230V power supply

Alarm	Possible cause	Remedy
	On display of the "Water Tank" fill level: The water tank is empty	Fill tank.
	On display of the "Wastewater Tank" fill level: The wastewater tank is full.	Empty tank.

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 voltage distribution and fusing.
- 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), you can have the display 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 EBL ... electrobloc instruction manual. .
	The "12V" symbol flashes three times on attempting to switch on: Shutdown is enabled.	Start up system (see section 3.6.2).
12V indicator LED 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 EBL ... electrobloc 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).

Fault	Possible cause	Remedy
The mains indicator does not illuminate although the 230V mains supply is connected.	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.
"-40" or "60" flashes when selecting the temperature display	The external temperature sensor or the connection cable to the external temperature sensor is defective.	Contact customer service.

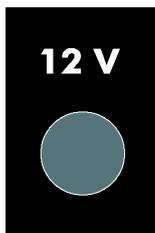
3.6 Closing down and starting up again after stopping

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.

Standstill is performed in different ways depending on electrobloc used (electrobloc with or without battery isolator on the front panel).

Standstill for electrobloc without battery isolator on the front panel (such as EBL 220):



- ▶ Switch off display panel (see section 3.2).
- ▶ Press, and keep pressed, the "Living Area Battery" button.

Symbols "V" and "A" flash three times after a certain time (approx. 10 seconds).

- ▶ Release the "Living Area Battery" button.
 - Battery isolation is enabled.
 - All consumers are switched off.



- ▲ The remaining standby current is lower than 8 mA (approx. 6 Ah per month). A motorhome with a fully charged (and intact) 80 Ah living area battery can stand for approx. 4 months without problem. For longer periods, the battery terminals should be disconnected.

Standstill for electrobloc with battery isolator on the front panel (such as EBL 101):

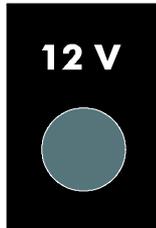
- ▶ Disable battery isolator on electrobloc.
- ▶ For both cases, more detailed information on closing down the system can be found in the EBL ... electrobloc instruction manual.

3.6.2 Starting up

Start-up is performed in different ways depending on electrobloc used (electroblock with or without battery isolator on the front panel).

Start-up for electrobloc without battery isolator on the front panel (such as EBL 220):

Battery isolation is enabled if the "12V" symbol flashes three times after a power-on attempt (by pressing the "12V On/Off" button). End as follows:



- ▶ Press, and keep pressed, the "12V On/Off" button (underneath the indicator, Fig 1, Pos. 2).
 - After about 5 seconds, press the "12V" symbol three times.
- ▶ Release the "12V On/Off" button.
 - Battery isolation is disabled.
 - The display lights up after about 2 seconds.
 - The 12V living area supply is switched on.

Start-up for electrobloc with battery isolator on the front panel (such as EBL 101):

- ▶ Enable battery isolator on electrobloc.

4 Application and functions in detail

The MP 20-S display panel is the central control panel for the EBL ... electrobloc 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.

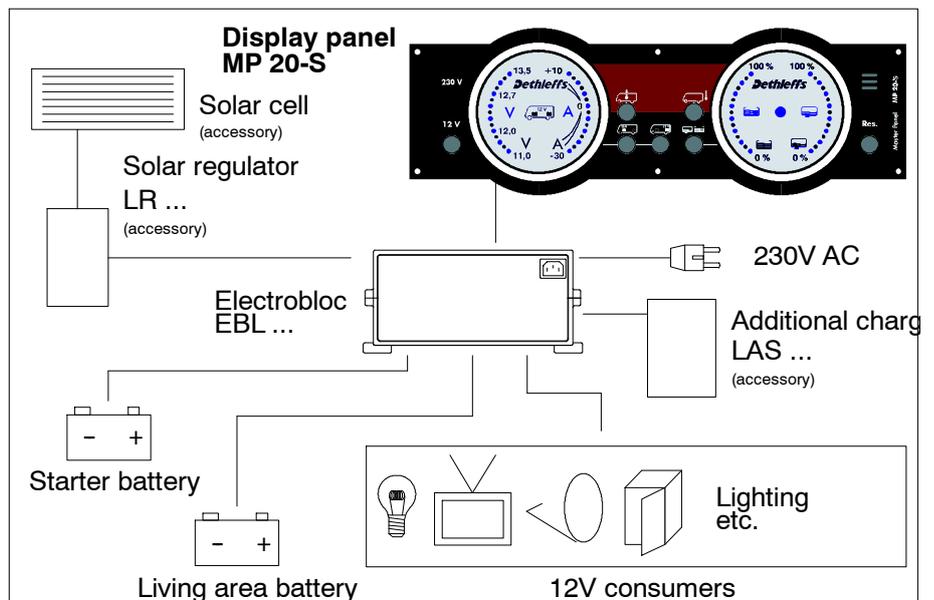


Bild 6 On-board power supply system

System devices

An EBL ... electrobloc must be connected for operation. This powers the 12V devices in the motorhome/caravan and charges the living area battery and starter battery.

The following connection options are available:

- EBL ... electrobloc
- Sensors or probe for water tank
- Sensors or probe for wastewater tank
- Sensor for external temperature

5 Design

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

6 Maintenance

The MP 20-S display panel requires no maintenance.

Cleaning Clean the front panel 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 display 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 95 F LED panel complies with the relevant regulations.

The original EU conformity declaration is available and can be referred to at any time.

Manufacturer Schaudt GmbH, Elektrotechnik & Apparatebau

Address Planckstrasse 8
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.

External temperature sensor AT ... (the sensor can be delivered with different cable lengths)

C Customer service

Customer service address Schaudt GmbH, Elektrotechnik & Apparatebau
Planckstrasse 8
D-88677 Markdorf

Tel.: +49 7544 9577-16

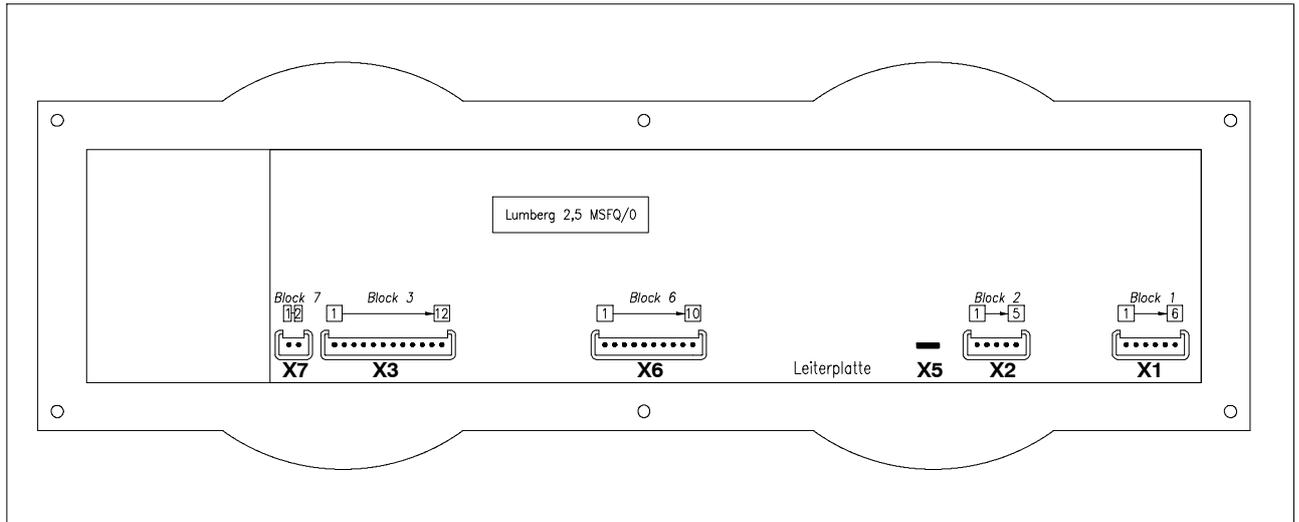
E-mail: kundendienst@schaudt-gmbh.de

Web: www.schaudt.gmbh

Send 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).

E Block diagram/connection diagram



X1 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.

X2 Lumberg MSFQ 5-way on wastewater tank

- 1 full
- 2 3/4
- 3 1/2
- 4 1/4
- 5 Base wastewater tank

X3 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

X5 contact lug, 2.8mm (use optional)

12V for Res. "ON", loading max. 200mA, parallel X6 pin 2

X6 Lumberg MSFQ 10-way on EBL ... (only certain EBL ..., optional)

- 1 n.c.
- 2 Pump. switched by pushbutton "Reserve", parallel X5
- 3 n.c.
- 4 Frost protection valve
- 5 n.c.
- 6 n.c.
- 7 n.c.
- 8 n.c.
- 9 n.c.
- 10 n.c.

X7 Lumberg MSFQ 2-way external temperature sensor

- 1 KTY pin 1
- 2 KTY pin 2

(blank page)