

Contents

1. Description
2. Safety Information
3. Operating Instructions
4. Transport, Storage, Installation
5. Electrical Installation
6. Power-Up, Shut-Down, Maintenance
7. Malfunctions
8. Enclosure

1. Description

The energy system EBL208 S contains the charging module LAS 1216, the battery monitor module BW 208, the complete 12V distribution, fused 12V circuits, a connector for a solar regulator and additional control and monitoring devices.

The charging unit is designed as a primary controlled switch-mode power supply. This modern design ensures high power output with compact dimensions and light weight.

To operate the energy system and to control the living-area functions including accessories an instrument panel is compulsory.

1.1 Suitable Accessories (not supplied)

control and switch panel instrument panel IT 204

solar regulator LR 1214, art.no 922.202, for solar modules with a total maximum current of 14A, with 3-p connector and a connecting cable 0.5m.

1.2 Technical Data

1.2.1 General Data

sizes (h x w x d in mm) 130 x 275 x 170 incl. mounting sockets

weight 1.8 kg

cabinet PA (Polyamid), gentian blue RAL 5010

frontpanel aluminium, powder painted, light grey RAL 7035

1.2.2 Electrical Data

mains supply * 230V (+ 10 / - 15%), 47 - 63Hz, safety class 1

power consumption * 280W

suitable batteries * 6 cell lead-acid or lead-gel batteries, more than 55Ah

steady load off * without mains supply, battery alarm 'OFF', a battery voltage
living-area battery of 12.6V and with IT 204: 0.6mA

load current of alternator's * approx 0.4A without load at D+ terminal,
D+ output by EBL see schematic diagram

permissible load... * maximum current draw up to the fuse rating of each output,
...on 12V outputs see enclosed schematic diagram

...anti-freeze valve * max 0.1A

...D+ terminal * 1A, with D+ input fused by 2A.

note: operating instruction manual is intended for the owner and has to come with the EBL

1.2.2.1 Battery charging on mains supply

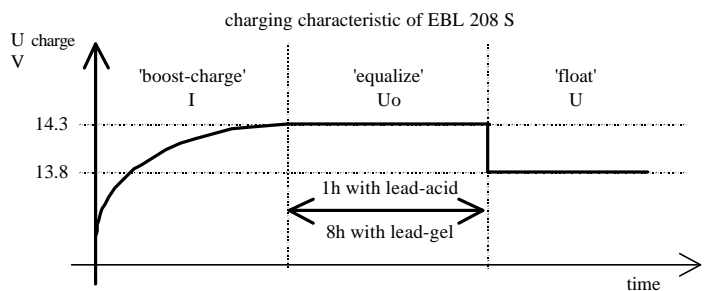
living-area battery:

control system	* thyristor controller
charging characteristic	* IUoU
maximum charging voltage	* 14.3V
charging current	* 16A within mains supply range, electronically limited
floating voltage	* 13.8V, automatic change-over

new charging cycle
(change-over to boost-charge) * if battery voltage approx < 13.8V, about 5 sec delay

3-phase characteristic:

- * boost-charge at 16A
(arithmetic mean, electronically limited)
up to maximum charging voltage,
- * then equalize-charge at constant 14.3V
(selectable: 1h duration for lead-acid;
8h duration for lead-gel batteries),
- * then automatic change-over to float-charge
at 13.8V.



If due to high loads the 13.8V floating voltage can't be provided the battery charger switches over from float to boost-charge after a delay of approx. 5 sec.

safety circuits	* overheat protected
	* overload protection by electronic current limiting
	* short-circuit protected by a FK2 automotive fuse

starter battery:

charging current	* trickle-charge of starter battery with max. 2A
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...by solar regulator

max. allowed charging current (camping battery)	* 14A
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...while driving

charging current	* simultaneous charging of starter and living-area battery by alternator, batteries in parallel by cut-off relay, maximum charging current of living-area battery by alternator must not exceed 30A. See block diagram.
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1.2.2.2 Battery Monitor Module

switch-off voltage	* 10.5V \pm 0.1V
minimum switch-on voltage by 12V main-switch on instrument panel	* 11.0V \pm 0.1V

3.2 Relay Functions

battery cut-off relay	This relay separates the starter and living-area battery when the engine is not running and if there is no voltage on terminal 'D+'. Both batteries are connected in parallel and therefore simultaneously charged while engine is running.
main-switch relay bistable	This relay is controlled by the push-button switch on the instrument panel '12V EIN/AUS'. It switches off all 12V load, except the automatic step and the AES-refrigerator.
awning-light relay	The awning-light is operational only with turned on main-switch and if the engine is not running with no voltage on terminal 'D+'.
refrigerator cut-off relay	This relay controls the power supply of the refrigerator. The refrigerator gets its power from the starter battery only if the engine is running and if there is a voltage on terminal 'D+'. An AES refrigerator is provided from the living-area battery when the engine is not running.
charging relay battery 1 (starter battery)	This relay automatically provides a 2A trickle-charge to the starter battery if mains supply is on.

3.3 Battery Monitor Module

The battery monitor compares the voltage of the living-area battery with a reference voltage.

As soon as the battery voltage is lower than 10.5V all 12V load will be switched off.

Only the automatic step and a AES-refrigerator are still provided with power. Short falls (< 2 sec) below the threshold voltage, due to high inrush currents of connected load do not affect the automatic cut-off function.

If the automatic shut-down has been triggered due to overload or an insufficiently charged battery all non-essential load should be switched off.

By actuating the '12V on/off' push-button switch on the instrument panel it may be possible to reactivate the 12V system for a short period of time.

However, the 12V System can not be switched on if the battery voltage stays under 11.0V.

In any case the living-area battery should be fully recharged as soon as possible.

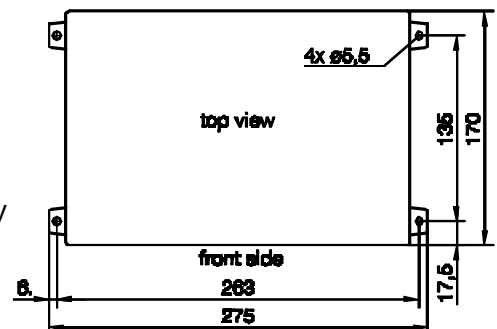
4. Transport, Storage, Installation

4.1 Transport, Storage

- * The energy system should be stored and transported in a suitable packing and in a dry environment only.
- * Storage temperature range : - 10°C to + 50°C.

4.2 Installation

- * The energy system has been designed for wall and floor mounting.
- * It has to be fitted onto a stout and level surface by use of the four provided mounting sockets.
- * The energy system is designed for use in a dry and sufficiently ventilated environment within a temperature range of - 10°C to + 45°C.



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- * A minimum distance of 5 cm to the surrounding equipment has to be maintained above and to all sides. In operation a temperature of max + 45°C at a distance of 2.5 cm to the sides must not be exceeded.



Caution !

Danger of overheating if distances to equipment are too short or if ventilation is blocked.

5. Electrical Installation

- * Electrical installation has to be executed by qualified personnel only.
- * The device must be used only with a living-area battery.



Caution !

The energy system must not be used without a connected living-area battery, otherwise connected appliances might be damaged in unfavorable conditions.

- * Electrical connection is made on the frontside according to enclosed block diagram.
- * For installation purposes, the mains plug or mains supply of the vehicle must be disconnected.



Caution !

Danger of life due to electrical shock or **danger of burning** with a defective mains cable, incorrect connection or service work with mains supply on.

- * Electrical connection has to be in accordance to the following sequence:
 1. all socket connectors on frontpanel
 2. battery cables at battery terminals
 3. 230V mains supply plug
- * Disconnection has to be executed vice versa.
- * AES-refrigerator fuse This fuse must be used only in conjunction with a AES-refrigerator



Caution !

The AES-refrigerator fuse must not be used with other refrigerator types. The battery might get deeply discharged. Battery damage is possible.

5.1 230V Mains Supply

- * Mains supply has to be connected to an earthing-contact socket outlet.
- * The power supply line must be a H05VV-F 3x1.5 cable.
- * For connection, the mains plug or mains supply of the vehicle has to be disconnected.



Caution !

Danger of life due to electrical shock or **danger of burning** with a defective mains cable, incorrect connection or service work with mains supply on.

5.2 Batteries, Battery-Sense Cable, Refrigerator and D+ (Alternator)

- * Leads have to be fused according to their cross-sections.

Maximum allowed fuse ratings:			
batteries	battery 1 for refrigerator	sensor cable battery 2	D+ (alternator)
30A	15A	2A	2A

- * Fuses need to be installed close to the battery terminals or alternator for short circuit protection of the leads.

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- * The negative pole of the living-area battery has to be connected to the negative pole of the starter battery externally.



Caution !

Danger of burning because of incorrect connection and fusing.

- * The energy system has to be used exclusively on 12V power systems with rechargeable 6-cell lead-acid or lead-gel batteries.



Caution !

Unsuitable batteries will be damaged.

- * Batteries have to be mounted in sufficiently ventilated areas or must be fitted with vent lines. Please refer to installation instructions of the battery manufacturer.



Caution !

Exploding hazard by detonating gas with defective batteries, defective energy system or at too high battery temperature (>30°C).

- * The refrigerator input cables 'battery 1 for refrigerator' and 'negative battery 1 for refrigerator' to the energy system have to be wired separately from other battery cables to the battery terminals.



Attention !

Without separately wired refrigerator and battery cables an optimum charge of the living-area battery can not be achieved.

5.3 12V-Load

- * The choice of battery cable size dimensions has to comply with EN 1648-1 or -2. Maximum current drain of the load must not exceed the respective fuse rating.

6. To Put Into Operation, Shut-Down, Maintenance

6.1 To Put Into Operation

- * **Prior** to power-up special attention must be paid to:

1. Properly connected living-area battery
2. Correctly selected battery-type switch. See section 3.1 'Controls'.
3. AES-fuse inserted only if a AES-refrigerator is used.

- * Power-up procedure:

1. Turn battery cut-off switch 'Battery' into 'on' position.
See user's manual section 3.1 'Controls'.
2. To reactivate the system after a cut-off by battery cut-off switch or after a battery change, please actuate 12V main switch on the instrument panel.

6.2 Shut-Down

- * Before long periods of nonusage of the motorhome (eg during wintertime), the living-area battery should be disconnected from the 12V system. Disconnect cables at the battery terminals.

1. Switch off 12V main-switch on instrument panel
2. Turn battery cut-off switch on energy system into 'off' position. See section 3.1 'Controls'.



Caution !

Please note, the anti-freeze valve of the boiler opens automatically if vehicle is shut down by the battery cut-off switch 'Battery'.

- * Before and after long periods of nonusage (eg. during wintertime), the vehicle should be hooked up to mains supply to fully recharge the batteries for a minimum of 12 hours (80Ah battery) or 16 hours (160Ah battery).



Caution !

To prevent battery damage the battery should be fully charged before shut-down of the vehicle.

Note: A recharge of the batteries by the built-in charging unit, by solar regulator or by alternator is still possible even if battery cut-off switch is off.

6.3 Maintenance

- * The energy system EBL 208 S is maintenance-free.
- * For cleaning use a soft moisturized cloth with a mild detergent. Do not use methylated spirit, paint thinner, etc. Liquids must not be allowed to get into the cabinet.

7. Malfunctions

- * If due to high surrounding temperature or bad ventilation the EBL gets too hot, the charging current will be decreased automatically. However, overheating should in any case be prevented.
- * Should repairs be necessary, please contact the service department of Schaudt GmbH, ph. 0049-(0)7544-9577-16, eMail: kundendienst@schaudt-gmbh.de
- * If it is not possible to see the manufacturer for service (eg being overseas), necessary repairs can be carried out by a qualified workshop.
- * Unqualified repairs enforce expiration of warranty. The manufacturer Schaudt GmbH disclaims it's liability and is therefore not liable to resulting damages.

8. Enclosures

To this operating instruction manual belongs the enclosed schematic diagram and the drawing of the front view of the energy system EBL 208 S, art.no 911.470.

This operating instruction manual with all it's enclosures must be delivered together with the energy system EBL 208 S, art.no 911.470.

It has to be part of the instruction manual if it is part of a system installed in a motorhome.

8.1 EC declaration of conformity

We hereby certify that the type of construction of the energy management system EBL 208 S corresponds accordingly to appropriate provisions:

EC low-voltage guide line 73/23/EWG i.d.F. der Änderung vom 22.07.93
Electromagnetic compabitibility guide line 89/336/EWG mit Änderung 92/31/EWG

Employed standards and technical specifications, particularly:

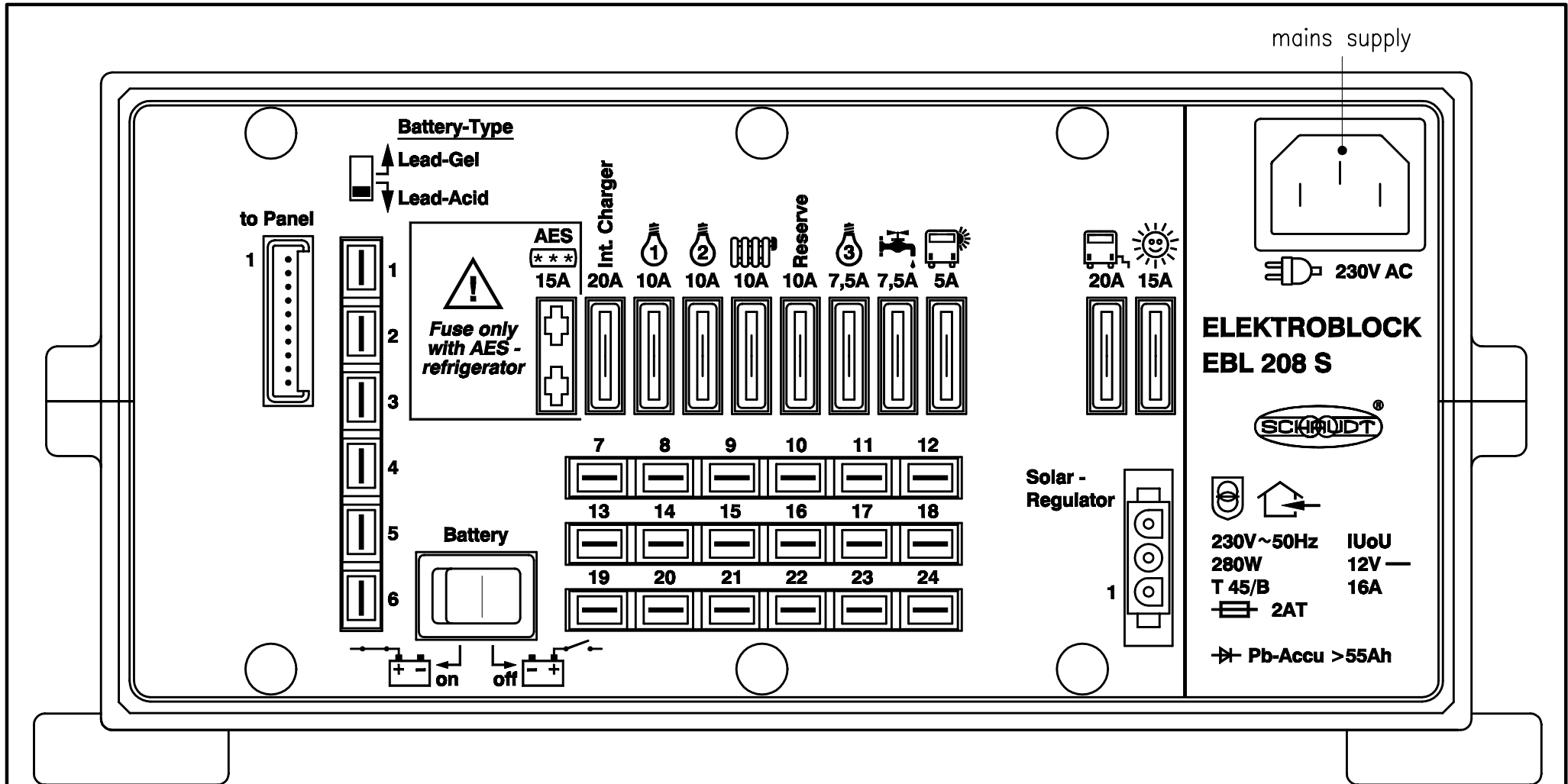
DIN EN 60335-1:1994 +A11+A1+A12+A13+A14
DIN EN 60335-2-29:1996 + A11
DIN EN 50081-1:3.1993
DIN EN 50082-1:3.1993
DIN EN 61000-3-2:10.1998

The EC declaration of conformity in original is available and can be looked at any time.

Manufacturer: Schaudt GmbH, Elektrotechnik & Apparatebau

Address: Daimlerstraße 5
88677 Markdorf
Germany

note: operating instruction manual is intended for the owner and has to come with the EBL



Änderungen nur über A-CAD!

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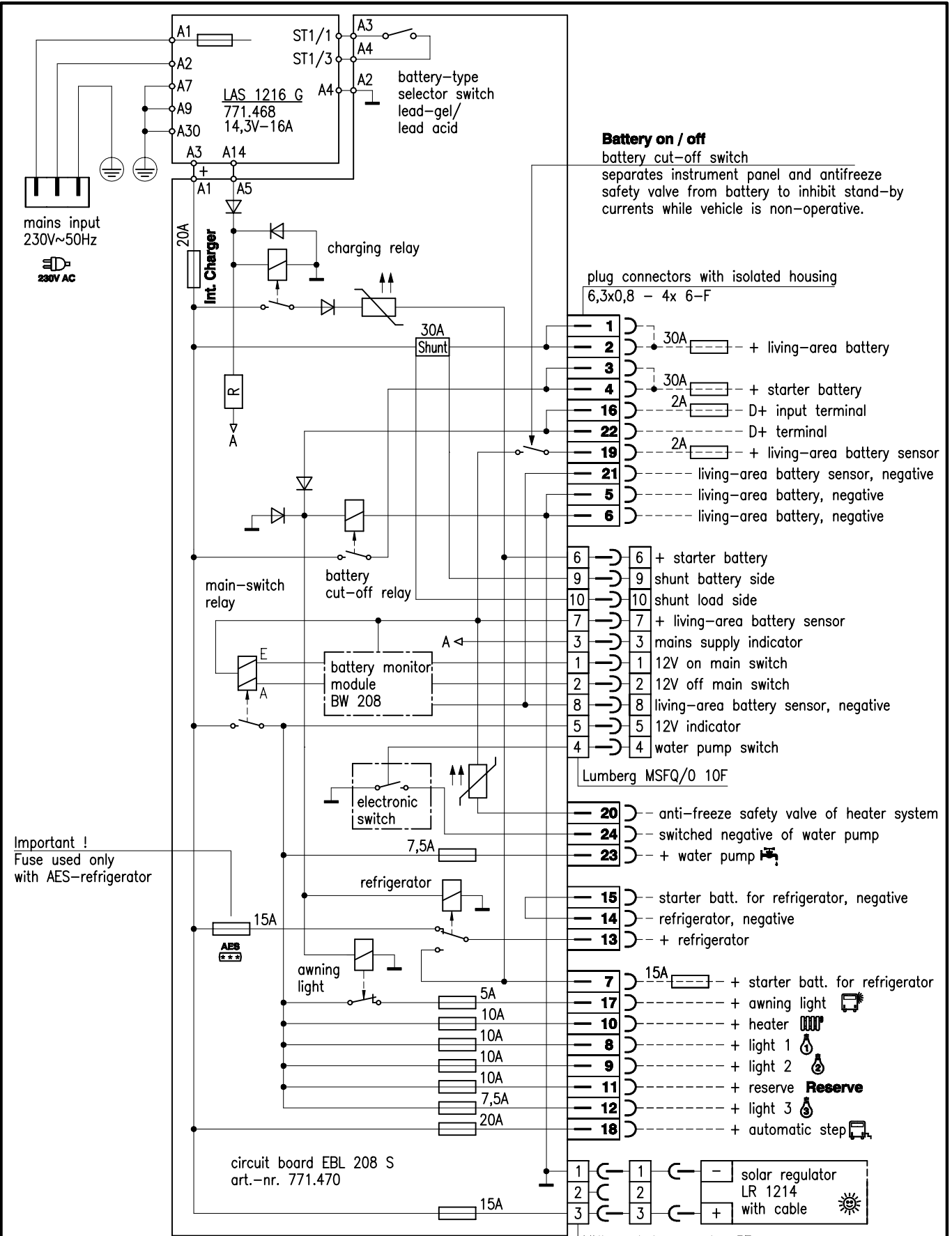
Daimlerstraße 5
88677 Markdorf/Bodensee
Postfach 1150
Telefon (07544) 9577-0

	Datum	Name
Gez.	13.12.2001	Schliecker
Gepr.	13.12.2001	Hüttner
Gepr.		

front view – Energy
Management System EBL 208 S

Art-Nr	911.470
Ablage	911470V1 Engl.

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			Gez.	13.12.2001	Schliecker		
			Gepr.	13.12.2001	Hüttner		
			Gepr.				
				Schaudt GmbH		Art-Nr	911.470
				Daimlerstraße 5 88677 Markdorf/Bodensee Postfach 1150 Telefon (07544) 9577-0		Ablage	911470A1 Engl.
Zust.	Aenderung	Datum	Name				Blatt 1 von 1

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