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1. Description

The electrical management system Elektroblock EBL 109-5 E is intended for the use in caravans. It consists of a charging module, a booster unit to raise the charging voltage, the complete fuse-protected 12V distribution, a plug connection 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, a control panel is compulsory.

To make use of all functions the trailer connector has to be connected according to EN 1648-1. Refer to the attached schematic diagram and to the instruction manual of the caravan.

1.1 Suitable Accessories (not supplied)

control and switch panel	LED control panel LT 212, LT 109 and its models
solar regulator	LR 1214 A, for solar modules with a total maximum current of 14 A, with connector plug and 0.5 m cable.

1.2 Technical Data

1.2.1 General Data

sizes	130 x 275 x 170 (h x w x d in mm) incl mounting sockets
weight	1.8 kg
cabinet	PA (Polyamide), Gentian blue RAL 5010
front panel	aluminium, powder painted, light grey RAL 7035

1.2.2 Electrical Data

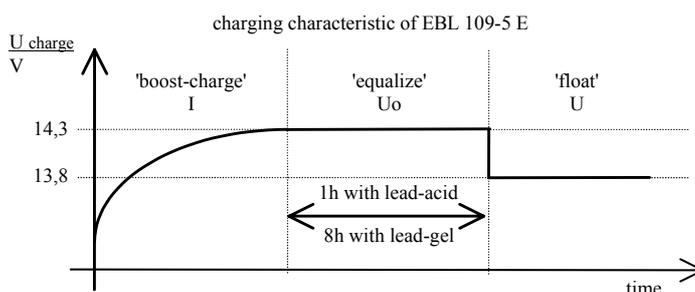
mains supply	* 230 V, $\pm 10\%$, 207- 253V, 47 to 63 Hz, sinusoidal, safety class 1
power consumption	* 1.9 A
suitable batteries	* 6-cell lead-acid or lead-gel batteries of more than 55 Ah
steady load off caravan battery	* without mains supply, battery alarm 'OFF', a battery voltage of 12.6 V and with LED panel LT 212: approx 6 mA
load current of alternator's D+ output by EBL	* approx 0.2 A
permissible load on 12V outputs	* maximum current draw of each output: up to 90 % of the fuse rating. See enclosed schematic diagram. However, total current of all load is: - on mains supply: 25 A with battery, 18 A without battery - on tow vehicle: 15 A, see fuse in tow vehicle.

note: this operating instruction manual is intended for the end customer and has to be supplied with the device

1.2.2.1 Charge Module LAS 1218, battery charging on mains supply

- charging characteristic * IUoU
 - maximum charging voltage * 14.3 V
 - charging current * 18 A within mains supply range, electronically limited
 - float voltage * 13.8 V, automatic change-over
 - new charging cycle
 - change-over to boost-charge * if battery voltage < approx 13.8 V, with about 5 sec delay
- 3-phase characteristic:

- I** boost-charge at 18 A arithmetic mean, electronically limited up to maximum charging voltage
- Uo** equalize-charge at constant 14.3 V, selectable: 1 h duration for lead-acid, 8 h duration for lead-gel batteries
- U** automatic change-over to float-charge at 13.8 V



If, due to high loads, the 13.8 V float voltage can't be provided, the battery charger starts a new charging cycle by switching over to boost-charge after a delay of approx 5 sec.

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

1.2.2.2 Booster Unit WA 1214-8, battery charging while driving

The booster unit WA 1214-8 raises the charging voltage supplied by the tow vehicle up to 14.4 V to get the caravan (living-area) battery fully charged while driving.

- input voltage range * 9 - 14.5 V
- maximum charging voltage * 14.4 V
- charging current * charge current typically 8 A, living-area battery gets charged by alternator of tow vehicle through booster module
 - input voltage = 12 V → charging current 8 A at 14.4 V
 - charging current 9 A at 13 V
 - input voltage = 11 V → charging current 7 A at = 14.4 V
 - charging current 8 A at = 13 V

- stand-by current with ignition off * none, if wired according to EN 11648-1
- safety circuit * short-circuit protected by build-in automotive safety fuse

1.2.2.3 Solar regulator

- max allowed charging current at Block 4 'Solar' * 15 A, only the caravan (living area) battery gets charged

note: this operating instruction manual is intended for the end customer and has to be supplied with the device

3.2 Relay functions

main-switch relay
bistable

This relay is controlled by the push-button switch '12V' on the instrument panel. It switches all 12 V load off.

automatic cut-off

If the caravan is connected to the tow vehicle and if the ignition is turned on, all load is switched off automatically.

The booster separates the living-area battery from the starter battery of the tow vehicle if the engine is not running and if there is no voltage on the charge-control terminal.

With ignition on or while driving, the alternator of the tow vehicle charges the caravan battery.



Caution !

To ensure proper starting of the tow vehicle, always switch off ignition. With engine off and ignition still on, the starter battery may get discharged.

4. Transport, Storage, Installation

4.1 Transport, Storage

- * The EBL should be stored and transported in suitable packing and in a dry environment only.
- * Storage temperature range: - 20 °C to + 70 °C.

4.2 Installation

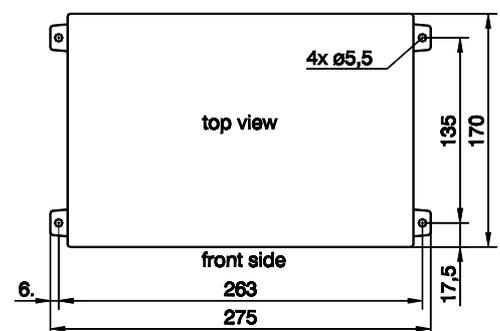
- * The EBL is designed for use in a dry and sufficiently ventilated environment within a temperature range of - 10 °C to + 45 °C.
- * A minimum distance of 5 cm to the surrounding equipment has to be maintained above and to all sides. In operation, a temperature of max + 45 °C at a distance of 2.5 cm to the sides must not be exceeded.



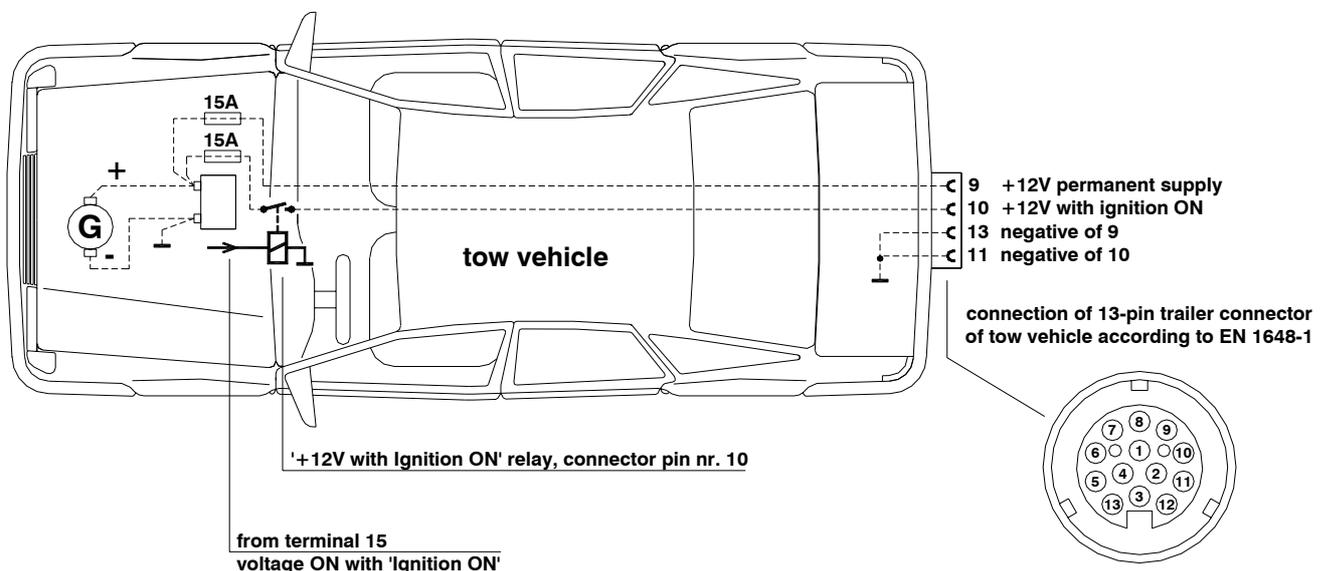
Caution !

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

- * The EBL 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 holes.



5. Electrical Installation



note: this operating instruction manual is intended for the end customer and has to be supplied with the device

- * Electrical installation has to be fitted by qualified personnel only.
- * Electrical connection is made on the front side according to the enclosed block diagram.
- * The trailer connector has to be connected according to EN 1648-1.
- * For installation purposes the mains plug or mains supply of the vehicle has to be disconnected.



Caution !

Danger of life due to electric shock or fire hazard 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 front panel of EBL
2. battery cables at battery terminals
3. 230 V mains supply plug

- * Disconnection has to be executed vice versa. See section 6.2 'Shut-Down' for details.



Caution !

The energy system might get damaged in unfavourable conditions such as being connected with reversed polarity.

5.1 230V Mains Supply

- * Mains supply has to be connected to an earthing-contact socket outlet.
- * The power cord must be a H05VV-F 3x1.5 cable. If used in Australia and New Zealand, the mains plug must have insulated pins according to AS/NZS 3112.
- * If a generator is used for mains supply of the caravan, it is imperative that the generator's output is conform to power supply regulations.



Caution !

To avoid voltage peaks during warm-up, it is advisable to connect the generator only after it runs stable. Otherwise the electrical management system, 12 V load and other connected equipment might get damaged in unfavourable conditions.

- * Mains supply on board car ferries might not always be perfect. During a ferry crossing it is therefore advisable to disconnect the electrical management system or the caravan from the mains supply.



Caution !

Do not use mains supply when on board car ferries. Otherwise the electrical system, 12 V load and other connected equipment might get damaged in unfavourable conditions.

5.2 Battery, Battery Sensor, Charge Cable, Charge-Control Cable

- * Leads have to be fuse-protected according to their cross-sections.

maximum allowed fuse ratings:				
	caravan battery	charge cable	caravan battery sensor	charge control cable (formerly D+)
	25 A	15 A fuse in tow vehicle	2 A	2 A
installation as close as possible to positive pole caravan battery	... positive pole starter battery	... positive pole caravan battery	... trailer connector

- * Fuses need to be installed close to the battery terminal or trailer connector for short circuit protection of the leads.

note: this operating instruction manual is intended for the end customer and has to be supplied with the device



Caution !

Danger of burning because of incorrect connection and fuse protection.

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



Caution !

Unsuitable batteries will be damaged.

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



Caution !

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

5.3 12 V-Load

- * The choice of cable cross sections has to comply with EN 1648-1. Maximum current drain of the load must not exceed 90% of the respective fuse rating.

6.0 Starting Up, Shutting Down, Maintenance

6.1 Starting Up

- * **Prior** to start-up special attention must be paid to:
 1. Caravan (living-area) battery connected?
 2. Correctly set battery-type switch. See section 3.1 'Controls'.

6.2 Shutting Down

1. Switch off 12 V main switch on instrument panel.
 2. Take off positive lead '+ Solar Module' at Schaudt solar regulator LR 1214. See below.
- * Before and after shutdown (eg winter season), the battery should be fully recharged. Connect the caravan to mains supply and charge the battery 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 shutdown of the caravan.

- * Before lengthy periods of disuse, the caravan battery should be disconnected from the 12 V system. Take off terminals at battery poles.
- * Schaudt solar regulators must not be operated without a connected battery. If the battery needs to be replaced or is taken off during wintertime, please at first take off positive lead '+ Solar Module' at the Schaudt solar regulator LR 1214.



Caution !

Solar regulators must not be operated without a connected battery. Otherwise the solar regulator might get damaged in unfavourable conditions.

6.3 Maintenance

- * The EBL 109-5 E is maintenance-free.
- * For cleaning use a soft moisturized cloth with a mild detergent. Do not use 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. +49 7544 9577-16 or e-mail 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 its 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 EBL 109-5 E, art no 911.532.

This operating instruction manual with all its enclosures must be delivered together with the EBL 109-5 E, art no 911.532. It must be part of the manufacturer's instruction manual, if it belongs to complete system installed in a caravan.

8.1 EC declaration of conformity

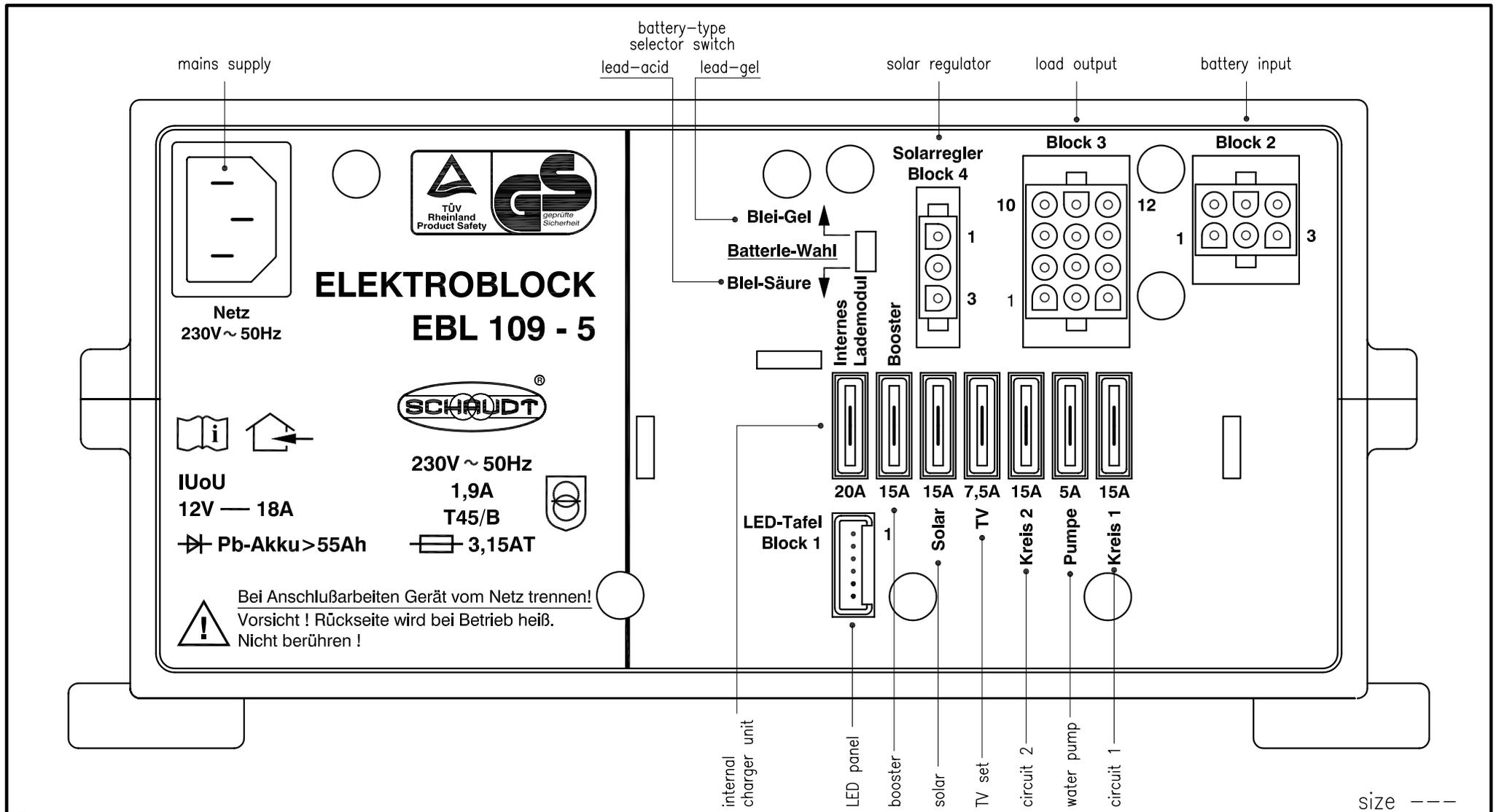
We hereby certify that the type of construction of the energy management system EBL 109-5 E complies with the following regulations:

EC low-voltage guide line	73/23/EWG amendment of 22.07.93
Guide line for electromagnetic compatibility	89/336/EWG amended to 92/31/EWG
Applied standards and technical specifications, particularly:	DIN EN 60335-1 DIN EN 60335-2-29 DIN EN 61000-6-1 DIN EN 61000-6-3

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



Änderungen nur über A-CAD!

Schaudt GmbH

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

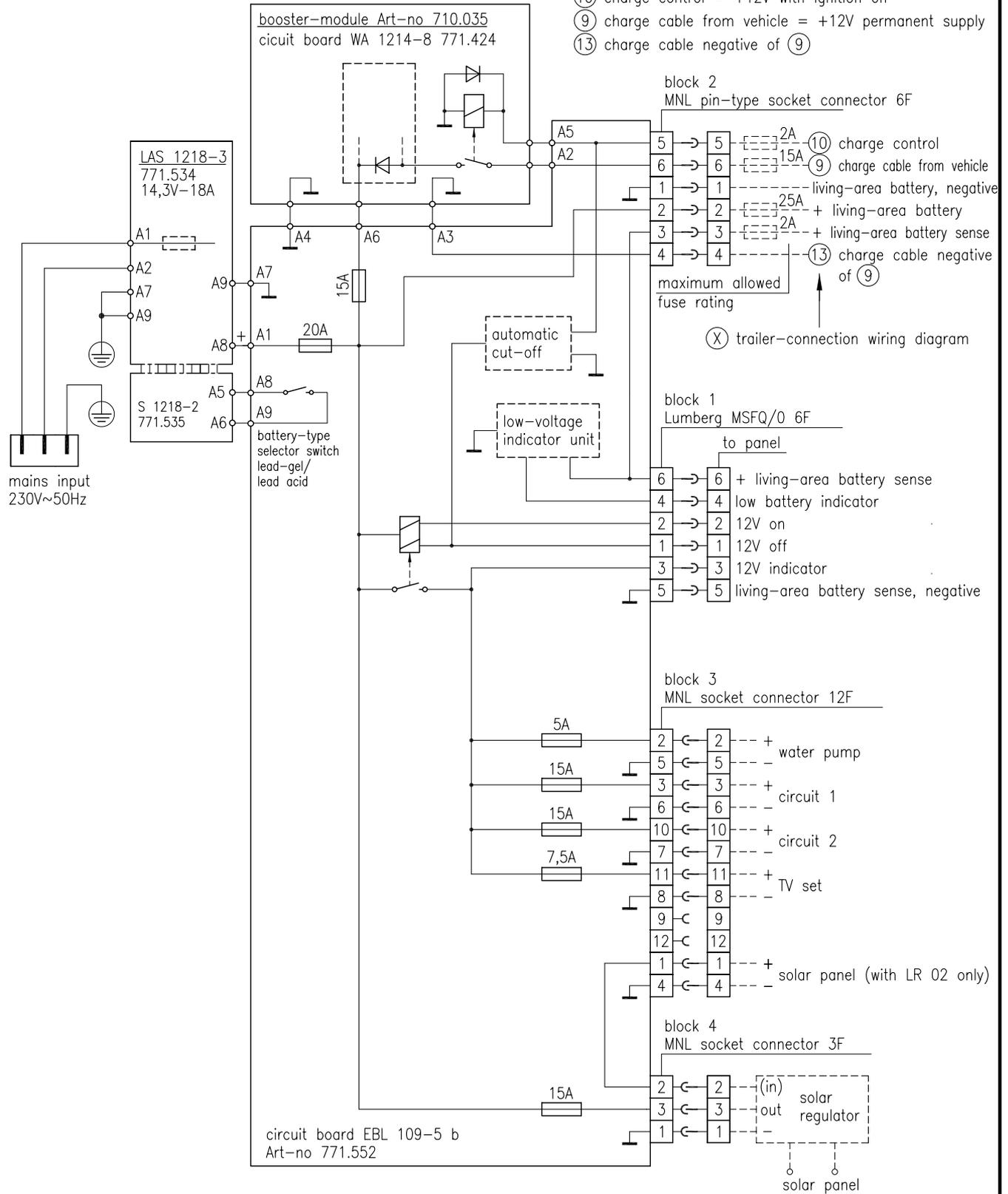
	Datum	Name
Gez.	15.12.2004	Schliecker
Gepr.	08.02.2005	Hüttner
Gepr.		

Energy Management System
EBL 109-5 E - front view

Art-Nr	911.532	Blatt	1
Ablage	911532V1 En.	von	1

The trailer connector of the tow vehicle has to be connected according to EN 1648-1.

- ⑩ charge control = +12V with ignition on
- ⑨ charge cable from vehicle = +12V permanent supply
- ⑬ charge cable negative of ⑨



Änderungen nur über A-CAD!

			Datum	Name	Energy Management System EBL 109-5 E			
			Gez. 15.12.2004	Schliecker				
			Gepr. 08.02.2005	Hüttner				
			Gepr.					
Schaudt GmbH Daimlerstraße 5 88677 Markdorf/Bodensee Postfach 1150 Telefon (07544) 9577-0					Art-Nr	911.532	Blatt	1
					Ablage	911532A1	En.	von
Zust.	Aenderung	Datum	Name					

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