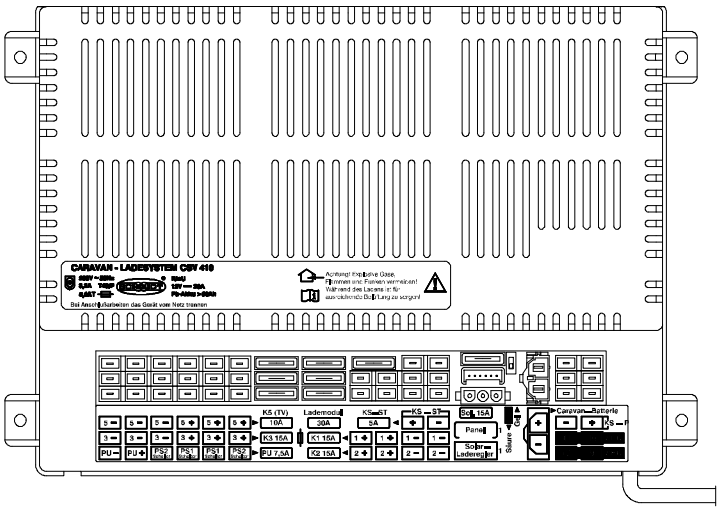
Instruction Manual



Caravan-charging system CSV 410

Contents

1 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 instruction manual should always be kept in the vehicle. All safety information must be passed on to other users.

2 Safety information

2.1 Meaning of the safety signs

▲ 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.

▲ CAUTION!
Failure to comply with the sign may result in damage to equipment or other connected loads.

▲ This symbol references recommendations or special features.

2.2 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 impacting the safety of persons or the proper functioning of the device must be repaired immediately by specialists.

▲ DANGER!
230V units carrying mains voltage.
Risk of fatal injury due to electric shock or fire:

- The motorhome or caravan's electrical system must comply with DIN, VDE and ISO regulations.
- Never try to modify the electrical system.
- Do not try to modify the device.
- Only qualified electricians are permitted to make the electrical connections in accordance with the installation instructions supplied by Schaudt.
- Connection work may only be carried out after the power has been disconnected.
- Never try to start the device using a defective mains cable or a faulty connection.
- Never undertake maintenance on the device when it is live.

▲ DANGER!
Incorrect installation
Electric shock or damage to connected devices:

- Install as shown in installation instructions.
- The mains connection line may only be replaced by an authorised customer service department or by those qualified.

▲ WARNING!
Hot components
Burns:

- Blown fuses may only be changed after the power to the system has been disconnected.
- Blown fuses may only be replaced once the cause of the fault is known and has been rectified.
- Never bypass or repair fuses.
- The back of the device can get hot during operation. Do not touch it.
- Only use original fuses rated as specified on the device.
- Never store heat sensitive objects close to the device (e.g. temperature sensitive clothes if the device has been installed in a wardrobe).

3 Application and function

▲ This device is not intended to be used by persons (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.

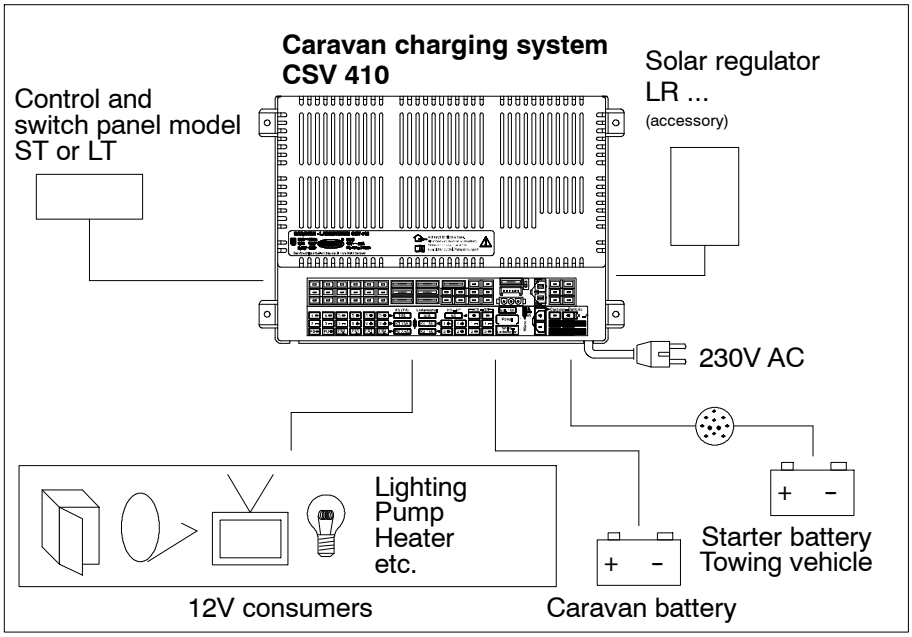


Fig. 1 On-board power supply system

The CSV 410 caravan charging system is the central power supply unit for all 12 V consumers connected to the caravan's electrical system. It is usually located in a cupboard or storage area and is accessible from the front in order to change fuses.

The caravan charging system has been designed solely for connecting to a 12 V onboard supply.

Connected units can be supplied from the caravan battery or the towing vehicle's battery if a mains supply is not available.

Because the device provides a hum-free, stabilised output voltage, sensitive consumers such as transistor lights and radios can be connected and powered.

Modules

The CSV 410 caravan charging system consists of:

- a charge module for charging all connected batteries
- the complete 12V distribution system
- fuses for the 12V circuits
- a battery booster

Required control circuits

An ST ... switch panel must be installed as a minimum to run the system.

Connections are provided for:

- Solar charge regulator
- Control and display panel

Flat vehicle fuses protect the various circuits.

Protective circuits

- Excess temperature
- Overload
- Short circuit

Mains connection

230V AC ±10%, 47 – 63 Hz sinusoidal, protection class I

Current-carrying capacity

12V outputs may only be loaded up to a maximum of 90% of the rated current of the associated fuse (see block diagram or nameplate).

3.1 Battery functions

Suitable batteries

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

Battery charging whilst moving

Charging the caravan battery whilst driving; increasing the supply voltage coming from the towing vehicle via the battery booster

12V main switch

The 12 V main switch (rocker switch with centre position on the control and switch panel) disconnects all the 12 V consumers from the caravan battery (exception: the fridge controller electronics).

This prevents the caravan battery from being slowly discharged by standby currents.

The batteries can still be charged using the caravan charging system, the towing vehicle or the solar charger, even when the main battery switch is OFF.

Battery selector switch

The switching option provided by the battery selector switch ensures optimum charging of the two battery types, lead gel and lead acid.

Automatic disconnector

The consumers are switched off (except for the refrigerator) when the caravan is hitched to the towing vehicle and the ignition is switched on (power on terminal 10 and trailer hitch TH). Consumers can be switched on again at any time (the automatic disconnector does not prevent this).

Standby current from towing vehicle battery

No standby current when towing vehicle ignition is off; additional current consumption by the fridge's control electronics (see documentation supplied by the fridge manufacturer);
Measured when all the consumers inside the caravan are switched off.

Battery charging via mains connector

Caravan battery

Characteristic charging curve	IUoU
End of charge voltage	14.4V*
Charging current	28 A
Voltage for float charge	13.7V* with automatic switch function

*Until 03/2020:
Final charging voltage 14,3 V; trickle charge voltage 13,8 V

Battery charging via towing vehicle operation

Charging current typ.	8 A

3.2 Additional functions

Refrigerator controller

This output supplies the control electronics of a fridge:

- From the caravan battery
- From the towing vehicle's battery when the ignition is switched on
- From the mains supply when it is connected up

▲ The refrigerator only operates on 12 V when the caravan is hitched to the towing vehicle and the ignition is switched on.

▲ **CAUTION!**
Total discharge.
Damages the caravan battery/towing vehicle battery:

- Avoid continuous 12V operation. The refrigerator only operates on 12 V when the caravan is hitched to the towing vehicle and the ignition is switched on.

Battery charging with solar charging regulator

Maximum permitted charge current 14 A, protected with 15 A

4 Layout

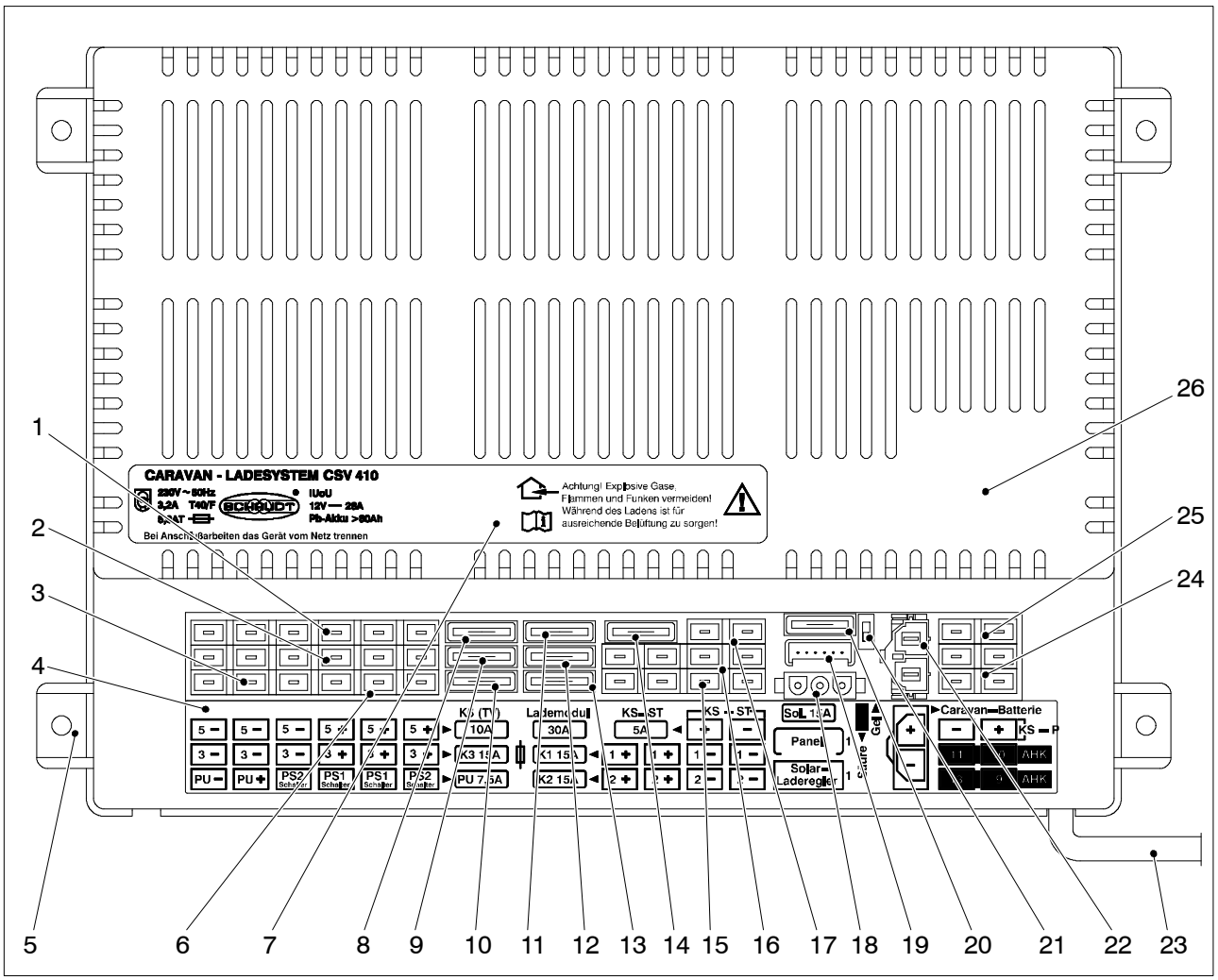


Fig. 2 Front view of CSV 410 caravan charging system

1 Connections for circuit 5
2 Connections for circuit 3
3 Pump connections
4 Adhesive label
5 Bracket with hole
6 Switch 1 and 2 pump connections
7 Adhesive label
8 Flat vehicle fuse for circuit 5
9 Flat vehicle fuse for circuit 3
10 Flat vehicle fuse for pump
11 Flat vehicle fuse for charger module
12 Flat vehicle fuse for circuit 1
13 Flat vehicle fuse for circuit 2
14 Flat vehicle fuse for fridge controller
15 Connections for circuit 2
16 Connections for circuit 1
17 Fridge controller connection
18 Connector for solar charge regulator LR ...
19 Indicator and control connections
20 Solar flat fuse
21 Selector switch for lead/gel/lead-acid battery
22 Caravan battery connection
23 Mains cable
24 Trailer hitch plugin connection
25 Refrigerator supply connection
26 Casing

5 Operation

The caravan charging system is operated solely from the control and switch panel connected.

The CSV 410 caravan charging system does not require daily operation.

Initial setting is only needed after the type of battery (lead-acid or lead-gel) has been changed or during commissioning or when upgrading with accessories (see Section 5.3 and CSV 410 installation instructions).

5.1 Switching on and off

5.1.1 Control and switch panels of type LT ...

Control and switch panels of type LT ... are supplied with a separate operating manual (kept with the vehicle). Please refer to this manual for instructions on operation.

5.1.2 Switch panel ST02 or ST05HS+PU

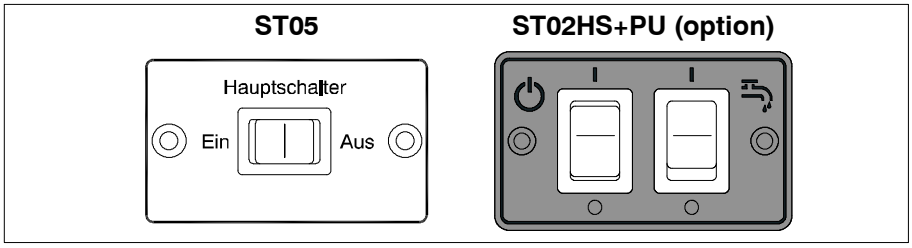


Fig. 3 Switch panels ST05 and ST02HS+PU

In the simplest case, an ST05 switch panel is connected to the caravan charging system. It only has one rocker switch with a centre position. The optional ST02HS+PU also has a pump switch.

The 12V supply of the living area is switched on using the button. Exceptions:

- Compressor/AES-refrigerator-control unit

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

Switching on

➤ Press rocker switch ⏻ (12V main switch) so that it is briefly in the ”I” position (ON).

- The 12V supply to the living area is now switched on.

Switching off

➤ Press 12V main switch ⏻ so that it is briefly in the ”O” position (OFF).

The 12V supply to the living area is now switched off.

5.1.3 Connect pump (option)

For the pump to be switched on, the 12V supply voltage must first be switched on (see Section 5.1.2 for the main supply).

Switching on

➤ Move the switch with the pump symbol upwards.

The supply voltage for the water pump is enabled:

- The pump may switch on briefly (e.g. in a pressure system).
- In other systems, the pump is enabled by the water tap contacts.

Switching off

➤ Move the switch with the pump symbol downwards.

5.2 Starting up the system

▲ **CAUTION!**

Incorrect settings on the caravan charging system.

Damage to connected devices. Therefore prior to starting:

- Ensure that the battery selector switch (Fig. 2, Pos. 21) is set to the correct position for the battery installed.

12V main switch

➤ Press rocker switch (12V main switch) so that it is briefly in the ”I” position (ON).

The 12 V main switch switches all consumers on and off (exception: the fridge controller electronics).

Generator operation and passenger vehicle ferries

▲ **CAUTION!**

Exceeding the thresholds of the 230V mains supply.

Will damage the caravan charging system, 12 V consumers or other connected devices:

- Do not connect a generator until it is running smoothly.
- It is essential that the generator conforms to the specifications of the mains supply.
- Do not connect the caravan charging system to the onboard mains voltage on car ferries (non-problematic mains voltage cannot always be guaranteed on car ferries).
  The use of an upstream overvoltage protection device is recommended.

Operation with solar regulator

▲ **CAUTION!**

No battery buffer function

Damage to connected devices:

- Do not operate solar regulator without battery connected.

Operation on towing vehicle

▲ CAUTION!

Battery discharge

Towing vehicle can no longer start:

- Switch off the ignition when the towing vehicle is stationary.

5.3 Changing the battery

▲ CAUTION!

Use of incorrect battery types or incorrectly rated batteries.

Will damage the battery or the devices connected up to the caravan charging system:

- Batteries should only be changed by qualified personnel.
- Follow the battery manufacturer's instructions.
- The caravan charging system is to be used solely for connecting the 12 V power supply to 6-cell lead-gel or lead-acid batteries. Never use non-approved battery types such as NiMH batteries.

▲ Normally only batteries of the same type and capacity should be used, i.e. the same as those installed by the manufacturer.

▲ It is possible to swap lead acid batteries with lead gel batteries. You cannot change over from lead-gel to lead-acid batteries. Contact the vehicle manufacturer for more information.

Changing the battery

➤ Disconnect the battery from the caravan charging system by switching the 12 V main switch off.

➤ Unhitch the caravan from the towing vehicle.

➤ Replace battery.

➤ After changing the battery, recheck which type of battery has been inserted.

▲ DANGER!

Incorrect setting of the battery selector switch.

Risk of explosion due to build up of explosive gases:

- Move the battery selector switch to the correct position.

▲ CAUTION!

Incorrect setting of the battery selector switch.

Damage to the battery.

- Move the battery selector switch to the correct position.

➤ Disconnect the caravan charging system from the mains before resetting the battery selector switch.

➤ Move the battery selector switch (Fig. 2, Pos. 21) to the correct position using a thin object (e.g. a ballpoint pen):

- Lead gel battery: Set the battery selector switch to "Lead-gel".
- Lead acid battery: Set the battery selector switch to "Lead-acid".

Starting up the system

➤ Start up the system as described in Section 5.2.

5.4 Faults

Flat vehicle fuses

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

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

If this is not possible, e.g. if you are abroad, you can have the caravan charging system repaired at a specialist workshop. 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
Caravan battery is not charged during 230 V operation	No mains voltage	Switch on the automatic circuit breaker in the vehicle; check the mains voltage
	Defective caravan charging system	Call customer service
Caravan battery is not charged whilst driving	Defective alternator	Check the alternator
	No voltage applied to ”Ignition ON” input or permanent plus	Check the fuse and wiring
		Check the towing vehicle plug connection
	Defective caravan charging system	Call customer service
Solar charger is not working (mains supply off)	Solar charge regulator not plugged in	Plug in solar charge regulator
	Defective fuse or wiring	Check fuse and wiring
	Solar charge regulator defective	Check solar charge regulator
12V supply does not work in the living area	12V main switch is switched off	12V main switch must be switched on
	Defective fuse or wiring	Check fuse and wiring
	Defective caravan charging system	Call customer service
Caravan charging system cannot be switched on using the rocker switch	Defective caravan charging system	Call customer service
	No supply voltage	Check the battery or mains connection
	Rocker switch is defective	Call customer service
Pump will not switch on	12V main switch is switched off	12V main switch must be switched on
	Pump switch disabled	Turn on pump switch
	For immersion pumps: Contact in the water tap of pump defective	Contact a dealer.
	For pressure pumps: Pressure switch or pump defective	Contact a dealer.

Fault	Possible cause	Remedy
Pump will not switch on	If only one ST02 switch panel is connected, there must be a jumper between pins 8 and 6 on the CSV 410 on the connector to the panel (Fig. 2, Pos. 19). This may be missing.	Contact a dealer.
	Defective caravan charging system	Call 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.

5.5 Shutting down the system

➤ Press the rocker switch (12 V main switch) so that it is briefly in the ”OFF” position.

5.6 Closing down the system

▲ **CAUTION!**

Total discharge.

Damages the caravan battery:

- Fully charge the caravan battery before and after closing down the system. Connect a vehicle with an 80 Ah battery and a vehicle with a 160 Ah battery to the mains for at least 24 and 36 hours respectively.

▲ **CAUTION!**

Permitted input voltages exceeded.

Damage to connected consumers:

- Do not operate any connected Schaudt solar charge regulator without battery.
- When the battery is changed or removed, first unplug the ”+ solar cell” connector on the solar charge regulator.

Closing down the system for up to 6 months

➤ Fully charge the caravan battery before closing down the system.

The caravan battery is then protected against total discharge. This only applies if the battery is intact. Follow the battery manufacturer’s instructions.

Closing down the system for more than 6 months

➤ Fully charge the caravan battery before closing down the system.

➤ Remove the clamps from the battery terminals.

➤ Remove the ”+ solar cell” connector on the solar charge regulator.

6 Technical details

6.1 Mechanical details

Dimensions 111 x 320 x 217 (H x W x D in mm), including attachment feet

Weight 2 kg

Casing PA (polyamide), gentian blue (RAL 5010)

6.2 Electrical details

Mains connection 230V AC ± 10%, 47 – 63 Hz sinusoidal, protection class I

Current consumption 3.2 A

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

Standby current from Caravan battery Without control and switch panel: 0 mA, plus consumption of refrigerator control electronics;
With control and switch panel (e.g. LT310/LT409): approx. 2 – 3 mA, plus consumption of controller electronics of refrigerator

Conditions for the measurement:

- Approx. 10 minutes after mains isolation without mains connection
- 12.6V battery voltage
- Battery alarm OFF
- All consumers switched off
- 12V main switch off

Current-carrying capacity

12V outputs	A maximum of 90% of the nominal current
	of the relevant fuse may be drawn.

Battery charging via mains connector

Caravan battery	
Charging curve	IUoU
Final charging voltage	14.4 V
Charge current	28 A in the entire mains voltage range, electronically limited, minus the charge current into the towing vehicle battery
Voltage for float charge	13.7 V with automatic switchover
New charge cycle, Switchover to main charging	with battery voltage below 13.7 V with approx. 5 seconds delay

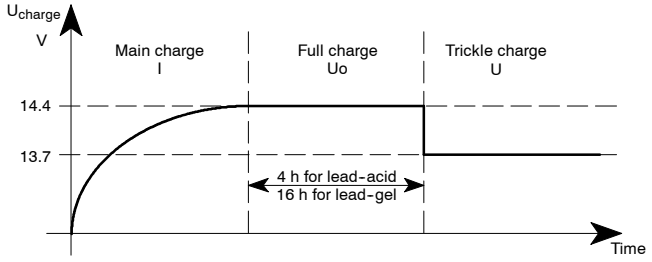


Fig. 4 Example of the charge voltage behaviour with the CSV 409 A caravan charging system

I Main charge with maximum 28 A charging current, electronically limited, up to final charging voltage. The battery is now charged up to approx. 80%. Start of charge also for completely discharged batteries.

Uo Automatic changeover to full charge with constant 14.4 V. The duration of the full charge phase depends on the type of battery and is configured on the device: Lead-acid batteries, 4 hour, lead-gel batteries, 16 hours.

U Automatic changeover to compensation charge with constant 13.7V. In the compensation charge phase, the voltage at the output of the charging module is constant. The battery is now charged up to approx. 95%.

Start of a new charging cycle by switching over to main charge, if the battery voltage falls below 13.7V for more than 5 seconds when loaded. Start of charge also for completely discharged batteries. The internal charger module can also be operated without the caravan battery.

Battery charging via solar charge regulator

Max. permitted charging current 14 A, protected by 15 A fuse

Battery charging whilst moving

Simultaneous charging of caravan battery by alternator

Maximum charge current to caravan battery 8 A, electronically restricted

6.3 Environmental parameters

Operating temperature -10 °C to +40 °C

Storage temperature -20 °C to +70 °C

Humidity Operation in dry environment only

Yes CE mark?

7 Maintenance

The CSV 410 caravan charging system requires no maintenance.

Cleaning

Clean the caravan charging system using a soft, slightly damp cloth and mild detergent. Never use spirit, thinners or similar substances. Do not allow fluid to ingress the caravan charging system.

Appendix

A EC Declaration of Conformity

Schaudt GmbH hereby confirms that the design of the device 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

Solar charge regulator Schaudt solar charger LR ... model for solar modules with a total current of 14A, including 0.5 m connection cable and connector plug

C Customer service

Customer service address

Schaudt GmbH, Elektrotechnik & Apparatebau
Planckstraße 8
D-88677 Markdorf

Phone: +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

Send in device

Returning a faulty device:

➤ Always use well-padded packaging.

➤ 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: _____
Item no.: _____
Vehicle: Manufacturer: _____
Model: _____
Own installation? Yes ❑ No ❑
Upgrade? Yes ❑ No ❑
Upstream overvoltage protection? Yes ❑ No ❑

There is the following defect:

no Battery-charge during mains operation					
no Battery-charge during mobile operation		Voltage		Current	
The following electrical consumers do not work:					
Cannot switch on/off					
Permanent fault					
Intermittent fault/loose contact					

Other comments:

_____

_____

_____

_____

_____

E Block diagram/wiring diagram

* (…) Trailer hitch towing vehicle/ caravan connecting plug assignment as per EN 1648-1

* (9) (10) Connections 9 and 10 must be fused ext. in the vehicle up to a maximum of 15A.