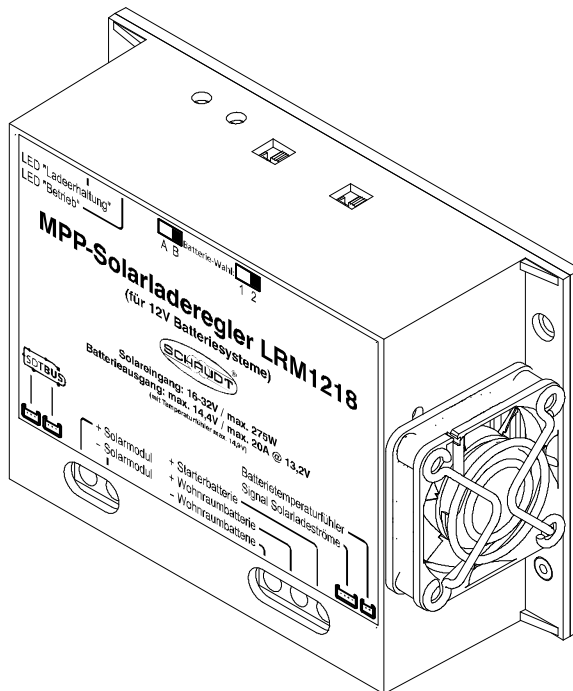


Operating Instructions



LRM 1218 Solar Charge Regulator

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1 Safety information

1.1 Meaning of the safety symbols



▲ 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.



▲ ATTENTION!

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

1.2 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 affecting 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:

- Do not carry out maintenance or repair work on the device
- If cables or the device housing are damaged, no longer use the device and isolate it from the power supply
- Ensure that no liquids enter the device



▲ WARNING!

Hot components!

Burns:

- Only change blown fuses when the device is fully de-energised.
- Blown fuses may only be replaced once the cause of the fault is known and has been 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 them.
- 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 safe operation of the device. 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.

2.1 Purpose

The MPP LRM 1218 solar charge regulator is for charging the batteries of the motorhome by means of the solar modules connected.

Electroblocks

The solar charge regulator limits and controls the charging voltage of the batteries. The LRM 1218 solar charge regulator can be connected to:

- a Schaudt electroblock with an STDBUS connection and a separate connection for solar current
- a Schaudt electroblock with a separate connection for solar current
- a Schaudt electroblock with a retrofit adapter for charging the starter battery

Batteries

- directly to the batteries



- ▲ To use the solar charge regulator with an electroblock, refer to the instruction manual for the electroblock.

Solar current display

For vehicles with SDTBUS, or when a digital control panel with solar current display is available, the charging current is read by the shunt fitted in the solar charge regulator, and displayed on the panel as solar current.

LT 320 (accessory)

When used on systems without an integrated solar current display, the separately available LT 320 control panel can be used as an accessory. It enables the display of the solar charging current for the leisure and starter batteries.

2.2 Function of the LRM 1218 solar charge regulator

Function of solar cell

The power output of a solar cell is dependent on its load and temperature, as well as other factors such as lighting intensity. A certain off-load voltage is applied to a non-loaded solar cell under light irradiation.

Maximum Power Point MPP

The maximum power can be taken in the Maximum Power Point (MPP) of a solar module. Because the solar module **only** delivers its highest yield in this point, a regulator connected must be able to find this point, and keep it continually even under changing conditions.

Functional principle of the LRM 1218

The LRM1218 solar regulator is used to charge 6-cell, 12V lead batteries (lead-acid, lead-gel and AGM batteries).

The solar regulator is a clocked converter featuring a very high efficiency level. A microcontroller controls it such that the solar modules connected always operate within the point of maximum power (the MPP) independently of sun exposure, battery voltage and module temperature, whilst the battery is in the main charging phase.

The charge voltages provided are aligned perfectly to the leisure battery by means of a temperature sensor and the ability to set three battery types.

The starter battery is also charged – as soon as the leisure battery has finished the main charging phase.

The solar regulator has an SDTBUS connector and so can be integrated perfectly into bus systems from Schaudt. For the upgrading of older systems (such as the DT 201 and DT 220 control panels in conjunction with EBL 101 and EBL 220), a connector with an appropriate analogue signal to display the solar currents in the leisure and starter batteries is provided.

Two LEDs for "Operation" and "Charge retention" provide information on function and broadly full battery. The device has a very compact and light-weight design. The fan fitted is very quiet and runs only when the performance is high.

Its function means the MPP LRM 1218 solar regulator is able to deliver (depending on conditions such as outside temperature and level of sunshine) a 5 ... 30% higher solar current than conventional series regulators (a low outside temperature and high level of sunshine would be ideal).

Leisure battery Three different charging curves ("Lead-acid", "Lead-Gel/AGM I" and "AGM II"), or supply with a fixed voltage, can be set from two slide switches.

The charge curve however is dependent not only on the setting of the battery type switch, but also on the battery temperature determined (when an optionally available battery temperature sensor is connected or when the LRM 1218 is connected to an SDTBUS system having a battery temperature sensor).

Starter battery The preference is to load the leisure battery. As soon as the LRM 1218 restricts the loading voltage of the leisure battery, it indicates the broad charging of the leisure battery. Charging of the starter battery is activated at this moment.

3 Operation

The solar charge regulator has no controls.

The LRM 1218 solar regulator may have to be readjusted when the battery type is changed:

Battery type set	Switch settings	
	Switch S1	Switch S2
Supply mode	1	A
AGM2	1	B
Lead-gel / AGM1	2	A
Lead-acid	2	B



▲ The charge regulator supplies a constant output voltage in supply mode.



▲ The two switches are well recessed to stop them being used incorrectly. A small screwdriver may have to be used to change the switches.

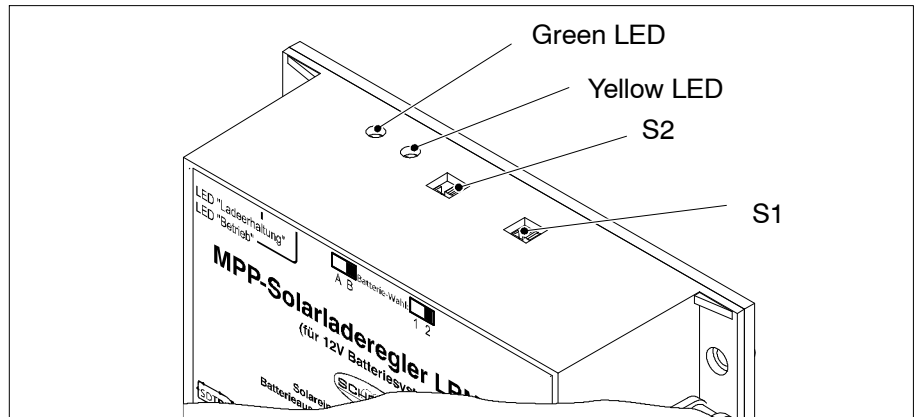


Fig. 1 Battery setting switches and LEDs

Two LEDs show the current status of the regulator:

- Yellow LED: Device in charge mode (leisure and/or starter battery)
- Green LED: Charge retention active (leisure battery full)
- The two LEDs flash alternately: Supply mode

The solar currents are displayed on a control panel connected (such as an LT 320) – refer to the separate operating instructions.

Retrofitting a TF ... battery temperature sensor

Proceed as follows if a battery temperature sensor is to be retrofitted:

- ▶ Switch off the system from the main switch (control panel)
- ▶ Remove the "Solar modules" connector on the LRM 1218
- ▶ Remove the "Leisure and starter battery" connectors on the LRM 1218
- ▶ Plug the battery temperature sensor into the LRM 1218
- ▶ Plug the "Leisure and starter battery" connectors into the LRM 1218
 - The LRM 1218 solar regulator reconfigures itself automatically – changed battery charge curves are now used.
- ▶ Plug the "Solar modules" connector into the LRM 1218
- ▲ A battery temperature sensor connected directly to the solar regulator has the benefit that charging is temperature-controlled even when the bus is not active (such as when not in use in the winter break).



4 Faults

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

If this is not possible, such as when you are abroad, the solar regulator can continue to be used. For faults E271 and E272 (display of only SDT ... bus systems possible), standard curves are used for charging. Charging is then no longer temperature-controller.

Fault	Possible cause	Remedy
No display of the solar current on the control panel (if available)	Defective wiring	Have the wiring checked
	Solar charge regulator defective	Contact customer service
	Defective electroblock	Contact customer service

Fault	Possible cause	Remedy
Batteries are not being charged	Defective batteries	Have the batteries checked
	If batteries are in perfect working order: Solar charge regulator defective	Contact customer service
	Defective electroblock	Contact customer service
	Defective wiring	Have the wiring checked
Yellow LED flashing	Output stage disabled (regulator not being used) due to overcurrent or overvoltage	Incorrect solar module (or too many solar modules) connected (input power too high) – contact customer service
SDT ... bus system fault messages:		
E270	No LRM 1218 on bus	Check bus wiring Contact customer service
E271	Battery temperature sensor short-circuit*	Check wiring/ connector Contact customer service
E272	Battery temperature sensor cable break or defective sensor*	Check wiring Replace sensor
E273	Overload/overcurrent and/or overtemperature	Incorrect solar module (or too many solar modules) connected (input power too high) – contact customer service
*The temperature value available on the bus is used as an alternative for bus systems with another battery temperature sensor (such as a HELLA battery sensor).		

5 Technical details

5.1 Mechanical details

Dimensions 135 x 48 x 90 (W x H x D in mm)

Weight 360 g

Casing Plastic, blue (RAL 5010)

5.2 Electrical details

Nominal voltage 12 V DC

Charging current Up to 20 A for leisure and starter battery together; leisure battery has priority; e.g. only leisure battery for solar power 275 W:

- 20 A @ 13.2 V leisure battery voltage
- 18 A @ 14.4 V leisure battery voltage

Suitable batteries 6-cell lead batteries, 55 Ah and above (lead-acid, lead-gel, AGM)

Suitable solar modules

- 36-cell modules as a minimum
- Off-load voltage 20 ... 32 V
- Maximum total capacity of solar modules 275 Wp

Calculation example For example, five solar modules each rated at 55 Wp can be connected in parallel:

Per solar module e.g. $U_{\text{offload}} = 22 \text{ V}$, $U_{\text{MPP}} = 17.2 \text{ V}$
 $I_{\text{MPP}} = 3.2 \text{ A}$
 Total nominal current $I_{\text{MPP}} = 16 \text{ A}$

End-of-charge-voltages

Battery type set	Charging-voltage	Charge retention voltage	At reference temperature	Time phase
Supply mode	Fixed voltage 13.4 V			
AGM2	14.7 V	13.7 V	25° C	4 h
Lead-gel/AGM1	14.4 V	13.8 V	25° C	12 h
Lead-acid	14.4 V	13.4 V	25° C	4 h

The temperature correction of end-of-charge voltages is -20 mV per degree of temperature increase (in relation to 25° C) or $+20 \text{ mV}$ per degree of temperature reduction (voltage limits: $U_{\text{min}} 13.4 \text{ V}$; $U_{\text{max}} 14.9 \text{ V}$; the top voltage limit at 14.9 V is in consideration of the maximum input voltage of the consumers connected).

Suitable EBL ... electroblocks and other connection options

- Schaudt electroblocks with SDTBUS (they have a separate input for the solar currents of leisure and starter batteries, and a connector for the SDTBUS)
- Schaudt electroblocks with a separate connector for the solar currents of leisure and starter batteries; possibly also a connection for current display (relayed to the DT .../LT ... control panel connected to the EBL ...)
- Schaudt electroblocks with a retrofit adapter for charging the starter battery
- Direct connection to leisure and starter batteries for external systems; solar current display by LT 320 (available optionally) possible

5.3 Environmental parameters

Operating temperature $-10 \text{ }^\circ\text{C}$ to $+50 \text{ }^\circ\text{C}$
Storage temperature $-20 \text{ }^\circ\text{C}$ to $+70 \text{ }^\circ\text{C}$
Humidity Operation in dry environment only
CE CE marked

6 Maintenance

The device requires no maintenance.

Cleaning Clean the device with a soft, slightly damp cloth and mild detergent. Never use spirit, thinners or similar substances. Do not allow liquids to enter the device.

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Appendix

A EC Declaration of Conformity

Schaudt GmbH hereby confirms that the design of the LRM 1218 solar charger regulator complies with the following relevant regulations:

The original CE declaration of conformity is available for reference at any time.

Manufacturer Schaudt GmbH, Elektrotechnik & Apparatebau

Address Daimlerstraße 5
88677 Markdorf
Germany

B Special fittings/accessories

Panel LT 320 instrument panel for connection to systems without a direct solar current display by the control panel

Battery temperature sensor TF 50 A battery sensor to read the battery temperature – is read automatically and has a bearing on the charging characteristics

C 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

Following fault has occurred (please tick):

- Battery is not charged when solar modules are connected
- Persistent fault
- Intermittent fault/loose contact

Other comments:

D Customer service

Customer service address

Schaudt GmbH, Elektrotechnik & Apparatebau
Planckstraße 8
88677 Markdorf, Germany

Phone: +49 7544 9577-16 Email: 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:

- ▶ Complete and enclose the fault report, see Appendix C.
- ▶ Send it to the addressee (free delivery).

E Mechanical layout

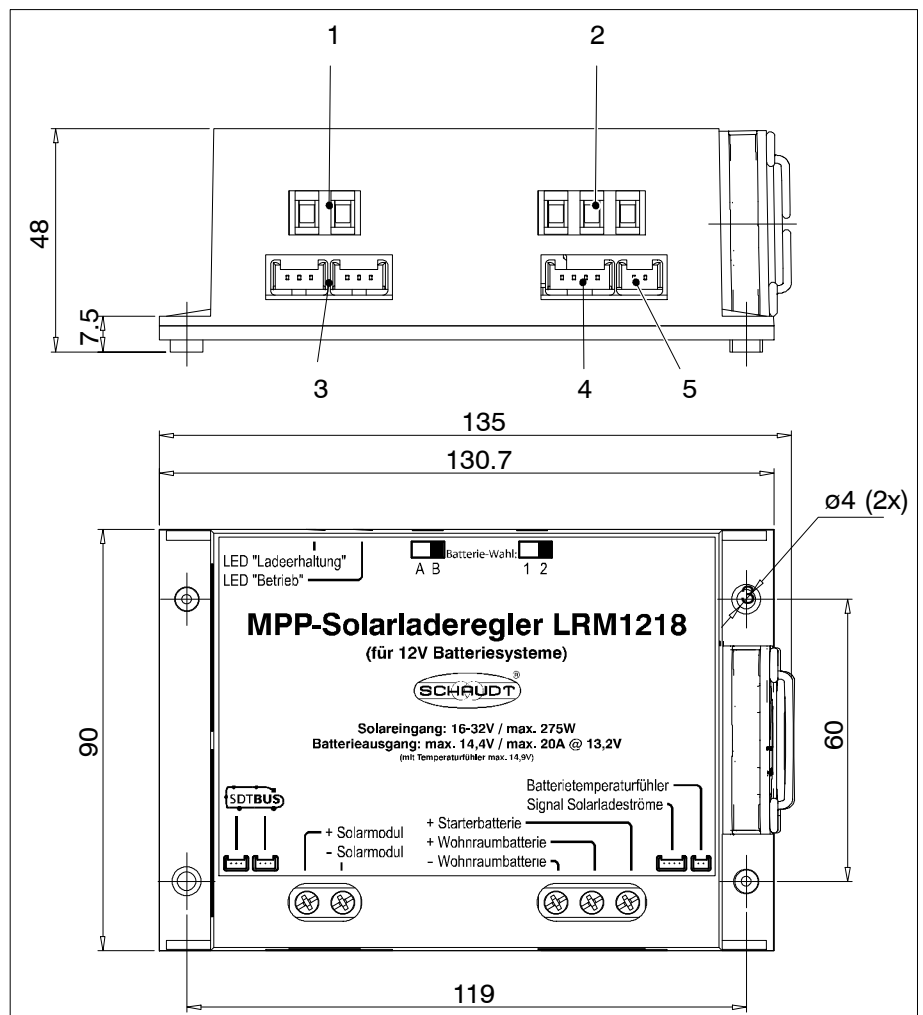
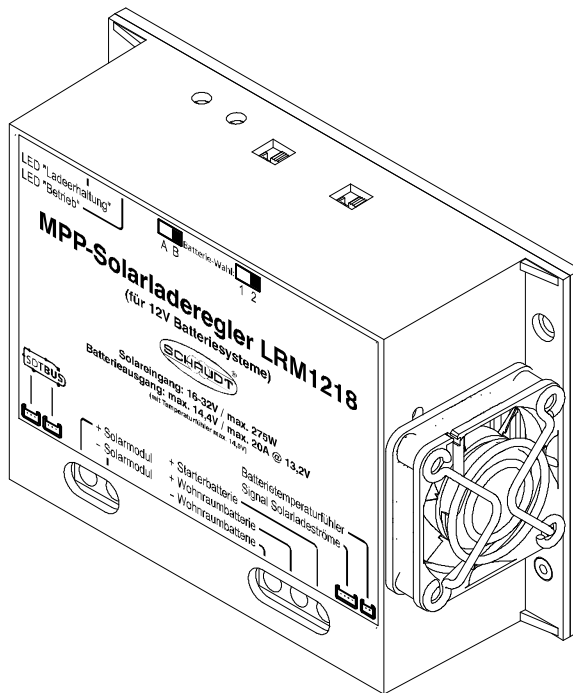


Fig. 2 Dimensions and connectors for the LRM 1218 solar charge regulator

- 1 Solar module connection
- 2 Leisure and starter battery connections, via electroblock as required
- 3 STDBUS connector
- 4 Control panel connector, via electroblock as required
- 5 Battery temperature sensor connector

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Installation Instructions



LRM 1218 Solar Charge Regulator

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1 Safety information

1.1 Meaning of the safety symbols



▲ 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.



▲ ATTENTION!

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

1.2 General safety instructions



▲ 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.
- The back of the device can get hot during operation. Do not touch it.



▲ ATTENTION!

Voltage carrying parts

Damage to devices:

- The motorhome or caravan's electrical system must comply with DIN, VDE and ISO regulations.
- Do not try to modify the device.
- Never try to start the device using a defective mains cable or with a faulty connection.
- Never undertake maintenance on the device when it is live.
- Ensure proper electrical connections are made.
- Ensure correct electrical fuses are used.

2 Introduction

These installation instructions are aimed at trained personnel.

They contain important information on the connection and safe operation of the device. The safety information provided must be observed.

Always follow the relevant instruction manual in addition to the installation instructions.

3 Deliverables

Delivered as part of the LRM 1218 solar charge regulator:

- 1 x LRM 1218 solar charge regulator
- Connector set (small parts and connector cables) for the different applications
- Operating instructions
- Installation instructions

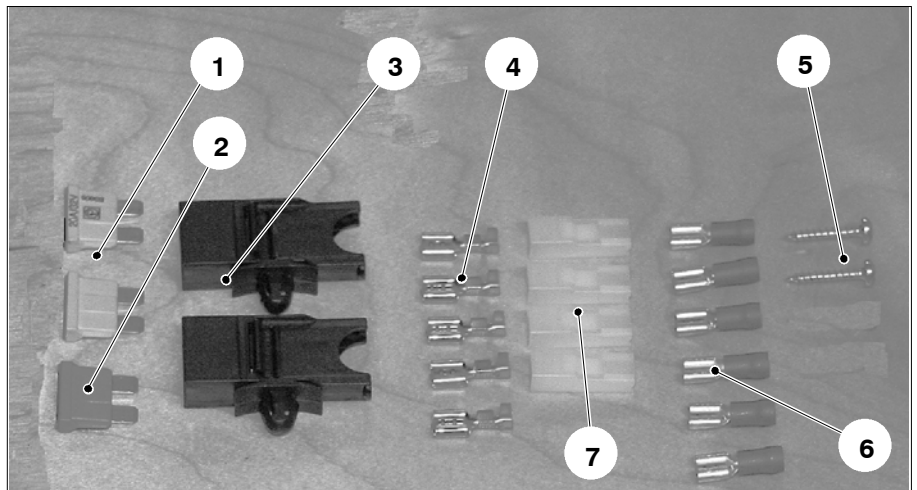


Fig. 1 Small parts and accessories delivered with the LRM 1218 solar charge regulator

Pos.	Qty	Name
1	2	Flat vehicle fuse, 20A
2	1	Flat vehicle fuse, 15 A
3	2	Fuse holder for flat vehicle fuse
4	5	Flat push-on contacts, 6.3 x 0.8 without sleeve
5	2	Screws, 3.5 x 20
6	6	Flat push-on contacts, 6.3 x 0.8 (blue)
7	4	Insulating sleeves for pos. 4

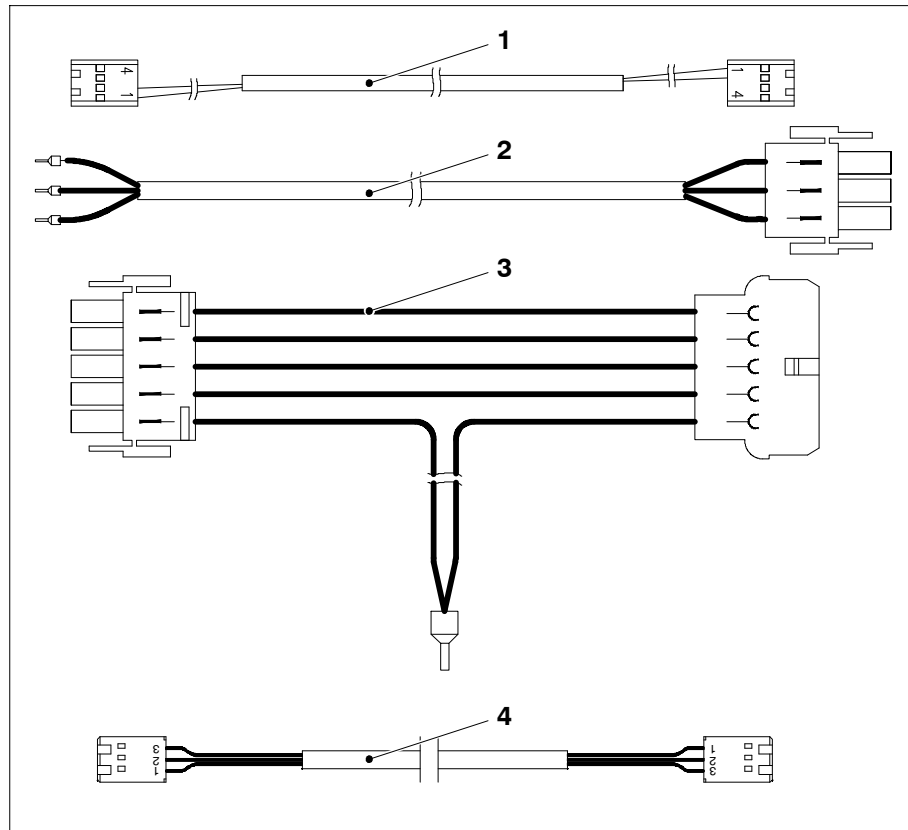


Fig. 2 Connector cables delivered with the LRM 1218 solar charge regulator

Pos.	Qty	Name
1	1	EBL ... connector cable (signals for display charge currents on DT ... / LT ...)
2	1	EBL ... connector cable (batteries for charge currents)
3	1	EBL ... adapter cable (charge current for starter battery) for EBLs without direct starter battery solar charge current input
4	1	SDTBUS connector cable



▲ Not all parts/cables are required for every different application.

4 Mechanical installation



▲ This device is intended for installation into a vehicle.

Environment

- ▶ For applications in which the cables provided are used to connect to an EBL ... electroblock from Schaudt (as in Sections 5.2 and 5.3), the solar charge regulator **must** be installed in the direct vicinity of the electroblock (max. distance to front plate 30 cm).
- ▶ For other applications, a dry and sufficiently ventilated place in the insulated interior is to be selected for installation. No condensation is allowed to form on the device. To prevent a build-up of heat, ventilation holes facing the living area must be provided in the upper and lower areas of the place of installation. Its cross-section is based on the size and average temperature of the place of installation.

- Minimum clearance** ► Ensure a minimum clearance to the surrounding fixtures and fittings:
- Maintain a gap of at least 5 cm on all sides (except mounted side).
 - Whilst in operation, the ambient temperature must not exceed +45 °C, measured 2.5 cm away from the sides of the device.
- Fitting** ► On a stable and even surface, attach the solar charge regulator to the drillholes with two screws (Fig. 1, Pos. 5).

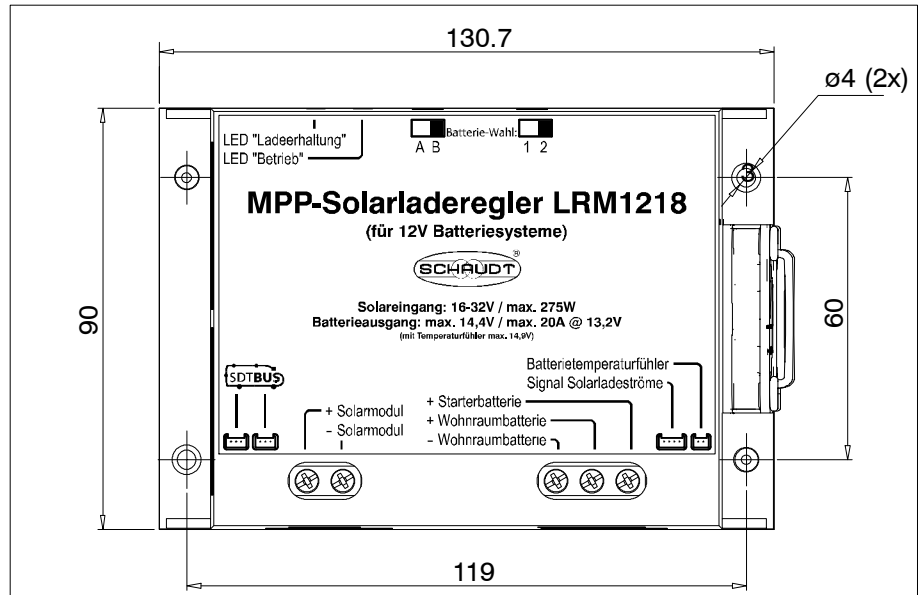


Fig. 3 Attachment points for LRM 1218 solar charge regulator (dimensions in mm)

5 Electrical connection



▲ ATTENTION!

The output voltage of the charge regulator is also suitable for direct supply without battery. **The solar charge regulator must be set accordingly for this however.**

The electrical connection of the solar charge regulator is ready for the following applications:

- Connections to leisure area battery and starter battery
- Connection to an EBL ... electroblock with connected DT ... / LT ... control and display panel
- Connection to an EBL ... electroblock with 3-pin MNL connection and adapter for starter battery
- Connection to 3-pin MNL connector and adapter for starter battery and SPTBUS connector (bus systems)

5.1 Connections to leisure area battery and starter battery



▲ ATTENTION!

Short circuits!

Damage to the solar charge regulator or fire damage to cable:

- To protect the supply lines in the event of a short circuit, connect the fuses directly to the positive pole of battery.

Select cable cross-sections in line with EN 1648-1/-2. The maximum current load must not exceed 90% of the individual fuse rating.

Recommended cable cross-sections:

Line length (sum of supply and return lines)	Cable cross-section
Up to 4 m	2,5 mm ²
Up to 8 m	4,0 mm ²
Up to 12 m	6,0 mm ²

For this application, the follow parts are required from those delivered:

Fig./Pos.	Qty	Name
-	1	LRM 1218 solar charge regulator
1/2	2	Flat vehicle fuse, 20A
1/3	2	Fuse holder for flat vehicle fuse
1/4	4	Flat push-on contacts, 6.3 x 0.8 without sleeve
1/7	5	Insulating sleeve for Pos. 1/4
-	5	Wire end sleeves (not included in delivery)

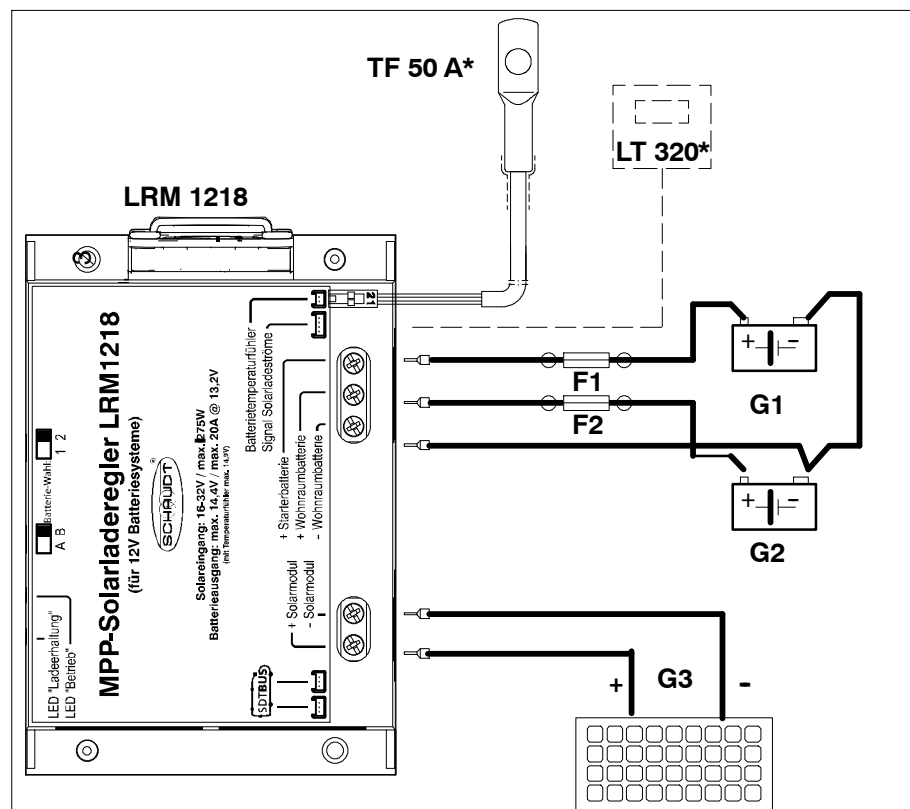


Fig. 4 Circuit diagram for LRM 1218 to starter battery and leisure area battery connectors
* Optional

Pos.	Name
F1	Fuse for starter battery charge current (20A)
F2	Fuse for leisure area battery charge current (20A)
G1	Starter battery
G2	Leisure battery
G3	Solar module(s)
LRM 1218	Solar charge regulator
LT320*	Control panel solar charge currents (optional special configuration; cable delivered with the panel)
TF 50 A*	Temperature sensor (special configuration, see also Section 5.5)

Connection sequence

Establish the connection on the side of the solar charge regulator in the following order:

- ▶ 1. Connect the two fuse holders with fuses to the connection cable in accordance with the circuit diagram in Fig. 4. Use the flat push-on contacts (6.3 x 0.8) without sleeve for this (Fig. 1, Pos. 5). After crimping, attach the insulating sleeves (Fig. 1, Pos. 7). Insert the two fuses.
- ▶ 2. First connect the connection cables for living area battery and starter battery to the solar charge regulator, observing the polarity of the connections. Use wire end sleeves for this (not included in the delivery).
- ▶ 3. Connect the cables for leisure area battery and starter battery to the batteries.
- ▶ 4. **Finally**, connect solar modules to the solar charge regulator. Use wire end sleeves for this (not included in the delivery).
- ▲ Steps 5. ... 9. **ONLY** when a TF 50 A temperature sensor is fitted (optional):
 - ▶ 5. Clamp the TF 50 A battery sensor to one of the terminals (preferable the negative terminal) of the leisure area battery (note: this is NOT an electrical connection – only the temperature of the battery terminal is read with this mechanical connection; this is virtually identical to the internal temperature of the battery)
 - ▶ 6. Guide the cable through the vehicle to the LRM 1218 solar charge regulator.
 - ▶ 7. Plug the TF 50 A battery sensor connector into the LRM 1218 solar charge regulator.
 - ▶ 8. Secure the battery sensor cable at a suitable place (particularly near the connector on the LRM 1218 to prevent the 2-pin connector from coming loose).
 - ▶ 9. Unplug the "Solar modules" and "Leisure area and starter batteries" connectors from the LRM 1218 and plug them back in again after 30 seconds. This "registers" the sensor.



Disconnection

Disconnect in the reverse order.

5.2 Connection to an EBL ... electroblock with connected DT ... / LT ... control and display panel

For this application, the follow parts are required from those delivered:

Fig./Pos.	Qty	Name
1	1	LRM 1218 solar charge regulator
1/1 or 2	1	20A or 15A flat vehicle fuse (depending on EBL ...)
2/1	1	EBL ... connector cable (signals for display charge currents on DT ... / LT ...)
2/2	1	EBL ... connector cable (batteries for charge currents)
-	2	Wire end sleeves (not included in delivery)

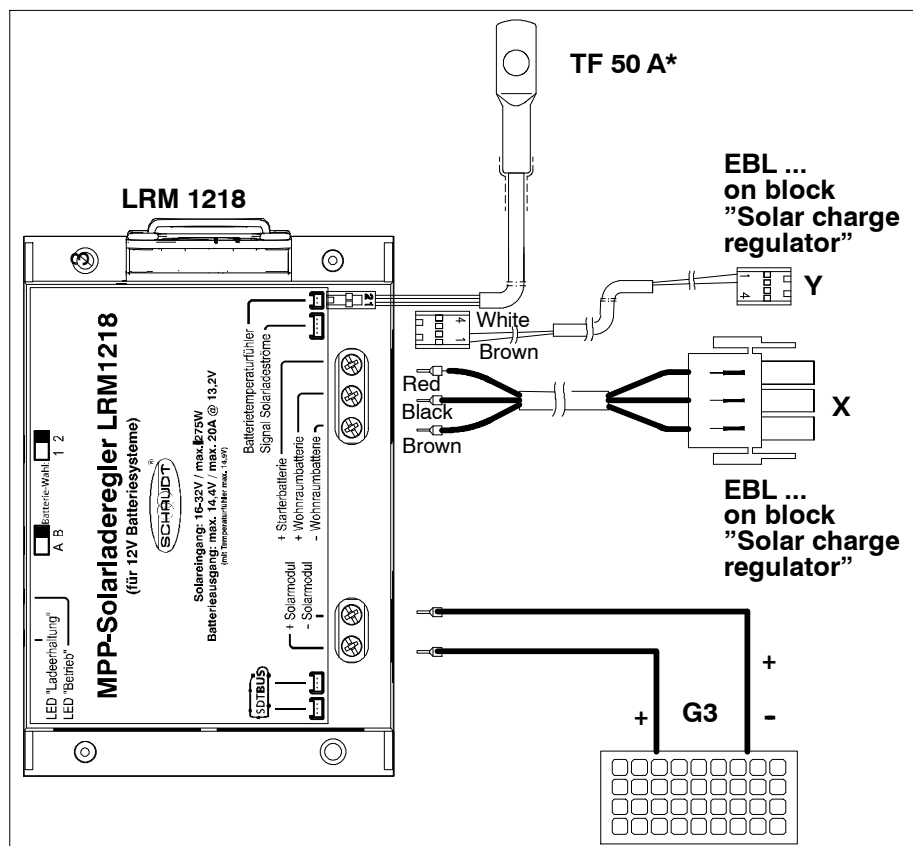


Fig. 5 Circuit diagram for LRM 1218 connection to EBLs with solar regulator connector and connector for current display (* optional)

Pos.	Name
X	Cable with electroblock connector: - X1 Brown Negative battery - X2 Red + Starter battery - X3 Black + Leisure area battery
Y	Cable with DT .../LT ... control and display panel connector - Y1 Brown Leisure area battery signal - Y2 White Starter battery signal
G3	Solar module(s)
LRM 1218	Solar charge regulator
TF 50 A*	Temperature sensor (special configuration, see also Section 5.5)

Connection sequence

Establish the connection on the front of the solar charge regulator in the following order:

- ▶ 1. Connect the electroblock with cable X (connection cable EBL ... (charge currents for batteries), Fig. 2, Pos. 2).
- ▶ 2. Connect the electroblock with cable Y (signals for display of charge currents on DT ... / LT ..., Fig. 2, Pos. 1).
- ▶ 3. Fit the right flat vehicle fuse (15A or 20 A; Fig. 1, Pos. 1 or 2) into the "Solar" fuse on the EBL ...
- ▶ 4. **Finally**, connect solar modules to the solar charge regulator. Use wire end sleeves for this.



- ▲ The correct fuse rating is printed on the front plate of the EBL... electroblock. See also the block diagram in the operating instructions for the electroblock.



- ▲ Steps 5. ... 9. **ONLY** when a TF 50 A temperature sensor is fitted (optional):
- ▶ 5 Clamp the TF 50 A battery sensor to one of the terminals (preferable the negative terminal) of the leisure area battery (note: this is NOT an electrical connection - only the temperature of the battery terminal is read with this mechanical connection; this is virtually identical to the internal temperature of the battery)
- ▶ 6. Guide the cable through the vehicle to the LRM 1218 solar charge regulator
- ▶ 7. Plug the TF 50 A battery sensor connector into the LRM 1218 solar charge regulator
- ▶ 8. Secure the battery sensor cable at a suitable place (particularly near the connector on the LRM 1218 to prevent the 2-pin connector from coming loose)
- ▶ 9. Unplug the "Solar modules" and "Leisure area and starter batteries" connectors from the LRM 1218 and plug them back in again after 30 seconds. This "registers" the sensor.

Disconnection

Disconnect in the reverse order.

5.3 Connection to an EBL ... electroblock with 3-pin MNL connection and adapter for starter battery

When using an electroblock which only has a 3-pin connection for a solar charge regulator, an adapter for charging the starter battery can be retrofitted. It is then possible to charge the leisure area and starter batteries simultaneously.

The following electroblocks (as of April 2008) can be used with the adapter:

- EBL 99
- EBL 100
- EBL 264-9
- EBL 240
- EBL 269

An LT 320 operating and display panel, for the display of solar charge currents, can be used as an optional accessory.

For this application, the follow parts are required from those delivered:

Fig./Pos.	Qty	Name
1	1	LRM 1218 solar charge regulator
1/1 or 2	1	20A or 15A flat vehicle fuse (depending on EBL ...)
2/2	1	EBL ... connector cable (leisure area battery charge current). Here the middle wire on the connector must be detached and the red cable be pulled from the insulating sleeve.
2/3	1	EBL ... connector cable (starter battery charge currents) is looped in between cable loom and EBL
-	2	Wire end sleeves (not included in delivery)

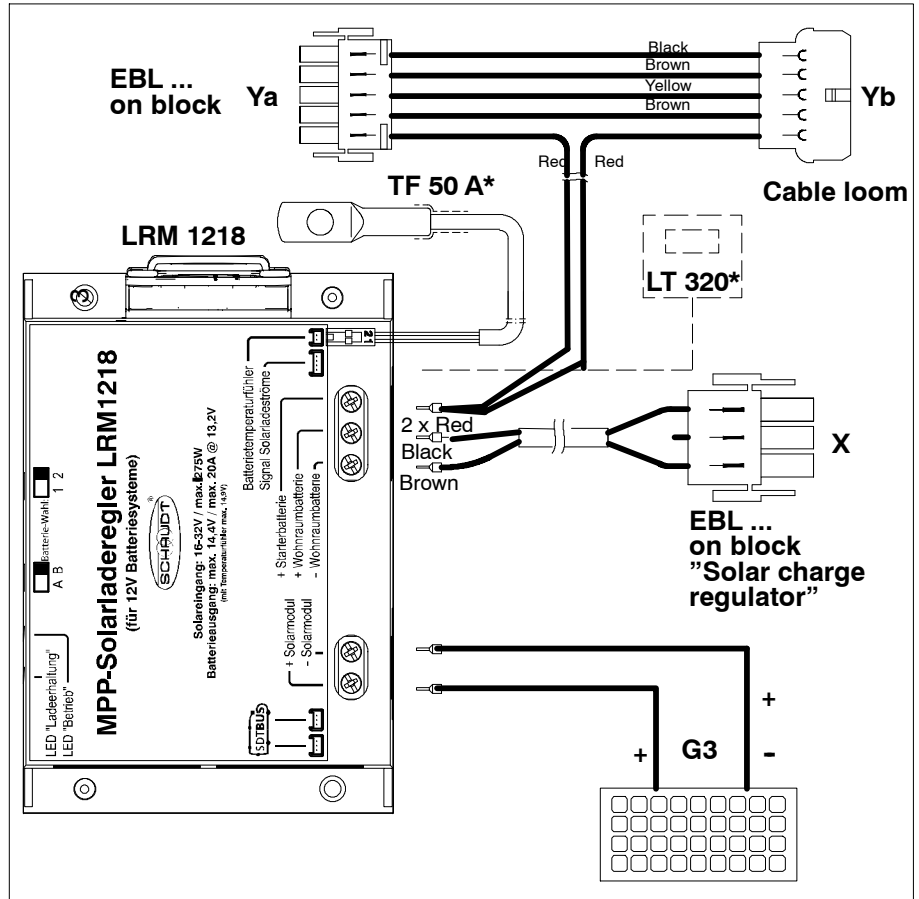


Fig. 6 Circuit diagram for LRM 1218 connection to EBL ...

Pos.	Name
X	Cable with electroblock connector: - X1 Brown Negative battery - X2 - Not assigned (detach red cable on connector and remove from insulation sleeve) - X3 Black + Leisure area battery
Y	Electroblock adapter cable - Ya To available electroblock cable - Yb To electroblock - Y1 Red + Starter battery - Y2 Brown Negative sensor, leisure area battery - Y3 yellow D+ input - Y4 Brown Negative starter battery for refrigerator - Y5 Black + Leisure area battery sensor
G3	Solar module(s)
LRM 1218	Solar charge regulator
LT320*	Control panel solar charge currents (optional special configuration; cable delivered with the panel)
TF 50 A*	Temperature sensor (special configuration, see also Section 5.5)

Connection sequence Establish the connection on the front of the solar charge regulator in the following order:

- ▶ 1. On the electroblock, disconnect the vehicle-side 5-pin cable carrying the starter battery supply.
- ▶ 2. Connect the electroblock with cable Y (adapter cable EBL ... (starter battery charge current), Fig. 1, Pos. 3):
 - Ya to the vehicle-side cable
 - Connect Yb on the electroblock
- ▶ 3. On cable X (Fig. 1 Pos. 2), detach the red cable on the connector housing and pull the cable from the insulating sleeve. It is no longer required.
- ▶ 4. Connect the electroblock with cable X (connection cable EBL ... (now only for caravan battery charge current, Fig. 1, Pos. 2).
- ▶ 5. Fit the right flat vehicle fuse (15A or 20 A; Fig. 1, Pos. 2 or 3) into the "Solar" fuse on the EBL ...



- ▲ The correct fuse rating is printed on the front plate of the EBL... electroblock. See also the block diagram in the operating instructions for the electroblock.
- ▶ 6. **Finally**, connect solar modules to the solar charge regulator. Use wire end sleeves for this.



- ▲ The correct fuse rating is printed on the front plate of the EBL... electroblock. See also the block diagram in the operating instructions for the electroblock.



- ▲ Steps 7. ... 11. **ONLY** when a TF 50 A temperature sensor is fitted (optional):
- ▶ 7. Clamp the TF 50 A battery sensor to one of the terminals (preferable the negative terminal) of the leisure area battery (note: this is NOT an electrical connection - only the temperature of the battery terminal is read with this mechanical connection; this is virtually identical to the internal temperature of the battery)
- ▶ 8. Guide the cable through the vehicle to the LRM 1218 solar charge regulator
- ▶ 9. Plug the TF 50 A battery sensor connector into the LRM 1218 solar charge regulator.
- ▶ 10. Secure the battery sensor cable at a suitable place (particularly near the connector on the LRM 1218 to prevent the 2-pin connector from coming loose).
- ▶ 11. Unplug the "Solar modules" and "Leisure area and starter batteries" connectors from the LRM 1218 and plug them back in again after 30 seconds. This "registers" the sensor.

Disconnection Disconnect in the reverse order.

5.4 Connection to an EBL ... electroblock with SDTBUS

For this application, the follow parts are required from those delivered:

Fig./Pos.	Qty	Name
1	1	LRM 1218 solar charge regulator
1/1 or 2	1	20A or 15A flat vehicle fuse (depending on EBL ...)
2/2	1	EBL ... connector cable (batteries for charge currents)
2/4	1	SDTBUS connector cable
-	2	Wire end sleeves (not included in delivery)

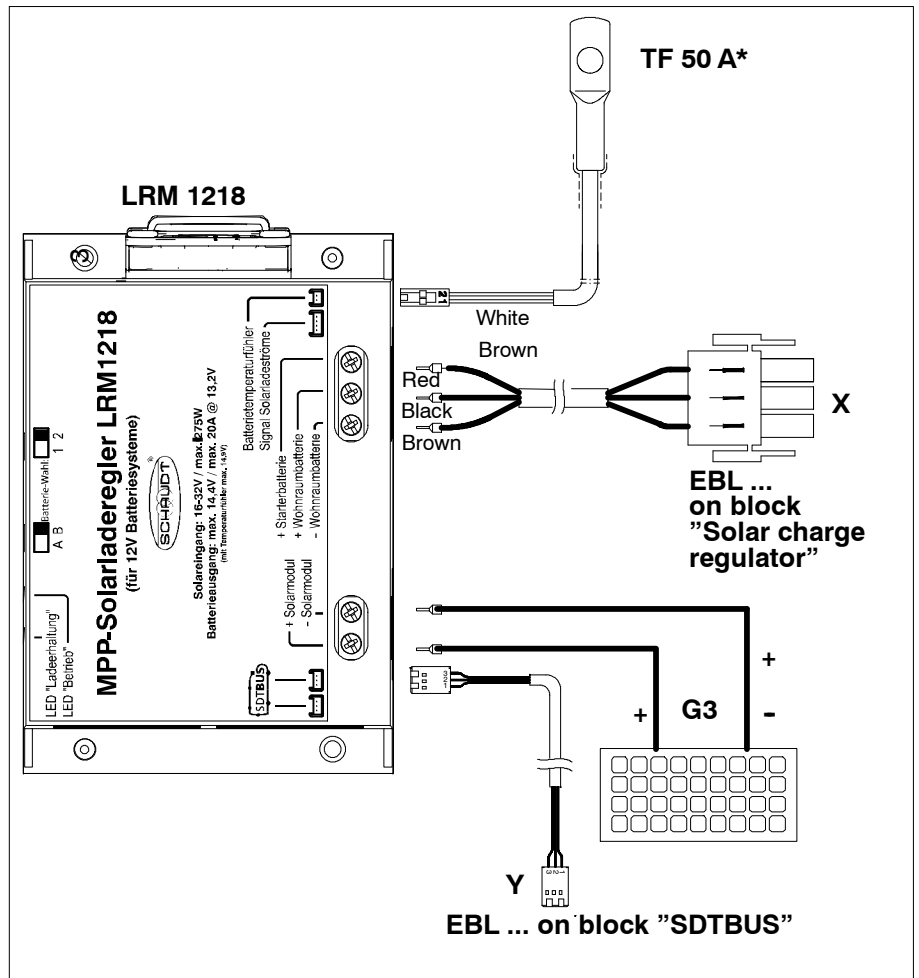


Fig. 7 Circuit diagram for LRM 1218 connection to EBLs with SDTBUS

Pos.	Name
X	Cable with electroblock connector: - X1 Brown Negative battery - X2 Red + Starter battery - X3 Black + Leisure area battery
Y	SDTBUS to electroblock connector cable
G3	Solar module(s)
LRM 1218	Solar charge regulator
TF 50 A*	Temperature sensor (special configuration, see also Section 5.5)

Connection sequence Establish the connection on the front of the solar charge regulator in the following order:

- ▶ 1. Connect the electroblock with cable X (connection cable EBL ... (charge currents for batteries), Fig. 2, Pos. 2).
- ▶ 2. Connect the electroblock with cable Y (**SDTBUS**, Fig. 2, Pos. 4).
- ▶ 3. Fit the right flat vehicle fuse (15A or 20 A; Fig. 1, Pos. 1 or 2) into the "Solar" fuse on the EBL ...
- ▶ 4. **Finally**, connect solar modules to the solar charge regulator. Use wire end sleeves for this.



- ▲ The correct fuse rating is printed on the front plate of the EBL... electro-block. See also the block diagram in the operating instructions for the electroblock.



- ▲ Steps 5. ... 9. **ONLY** when a TF 50 A temperature sensor is fitted (optional):

- ▶ 5. Clamp the TF 50 A battery sensor to one of the terminals (preferable the negative terminal) of the leisure area battery (note: this is NOT an electrical connection - only the temperature of the battery terminal is read with this mechanical connection; this is virtually identical to the internal temperature of the battery).
- ▶ 6. Guide the cable through the vehicle to the LRM 1218 solar charge regulator.
- ▶ 7. Plug the TF 50 A battery sensor connector into the LRM 1218 solar charge regulator.
- ▶ 8. Secure the battery sensor cable at a suitable place (particularly near the connector on the LRM 1218 to prevent the 2-pin connector from coming loose).
- ▶ 9. Unplug the "Solar modules" and "Leisure area and starter batteries" connectors from the LRM 1218 and plug them back in again after 30 seconds. This "registers" the sensor.

Disconnection Disconnect in the reverse order.

5.5 TF 50 A battery temperature sensor (optional)

The optional TF 50 A battery temperature sensor is used to implement battery temperature-controlled charging. The LRM 1218 solar regulator must be fully isolated from the power for the sensor to be detected (unplug the connectors for solar modules and batteries, and plug them in again after 30 seconds).

A battery temperature sensor can also be "deregistered" by first unplugging the connectors for solar modules and batteries on the LRM 1218, and then disconnecting the temperature sensor.

Once the connectors for solar modules and batteries are plugged in again, the sensor is "deregistered" and no faults are displayed (bus system).

6 Block diagram/wiring diagram



- ▲ The block diagram and connection diagram are appended to the instruction manual of the solar charge regulator.

7 Initial use

7.1 Checks prior to initial use

- Before starting up**
- ▶ Ensure that all the connections are correct (only for initial use).
 - ▶ Ensure that the batteries or the electroblock are connected (depending on operating mode).
- Starting up the system**
- ▶ Connect the solar module to the solar charge regulator with the correct polarity. The solar charge regulator is ready to use.

8 Technical details

8.1 Mechanical details

Dimensions	135 x 48 x 90 (W x H x D in mm)
Weight	360 g
Casing	Blue plastic (RAL 5010)

8.2 Electrical details

Nominal voltage	12 V
Regulating principle	MPP regulator (Maximum Point Tracking)
Final charge voltage	Dependent on setting, see operating instructions table
Charge current	See operating instructions
Solar charge regulator consumption	For shaded solar module: Approx. 4 mA from leisure area battery Approx. 0.5 mA from starter battery
Suitable batteries	6-cell lead acid or lead gel batteries, rated 55 Ah or higher
Suitable solar modules	<ul style="list-style-type: none">● At least 36-cell modules● Open circuit voltage 20 ... 32 V● Maximum overall capacity of solar modules 275 Wp

8.3 Environmental parameters

Operating temperature	-10 °C to +50 °C
Storage temperature	-20 °C to +70 °C
Humidity	Operation in dry environment only
CE	CE marked

9 Storage, packaging and transportation

Only transport and store the solar charge regulator if the packing is suitable and ambient conditions are dry.

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