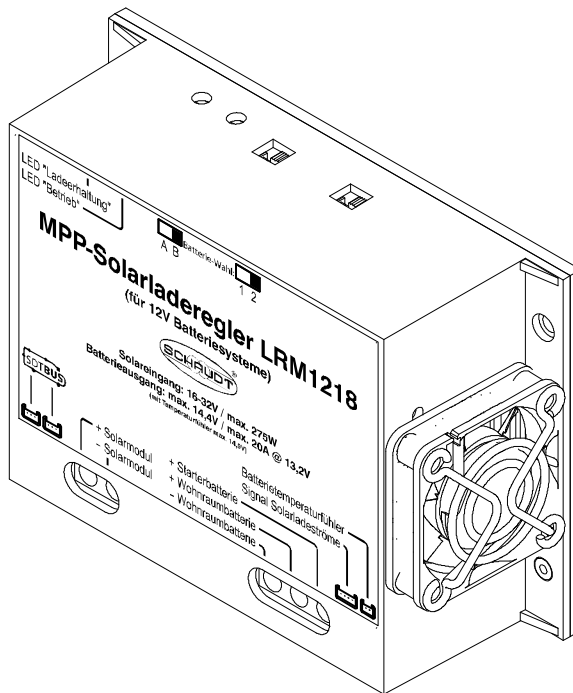


Installation Instructions



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

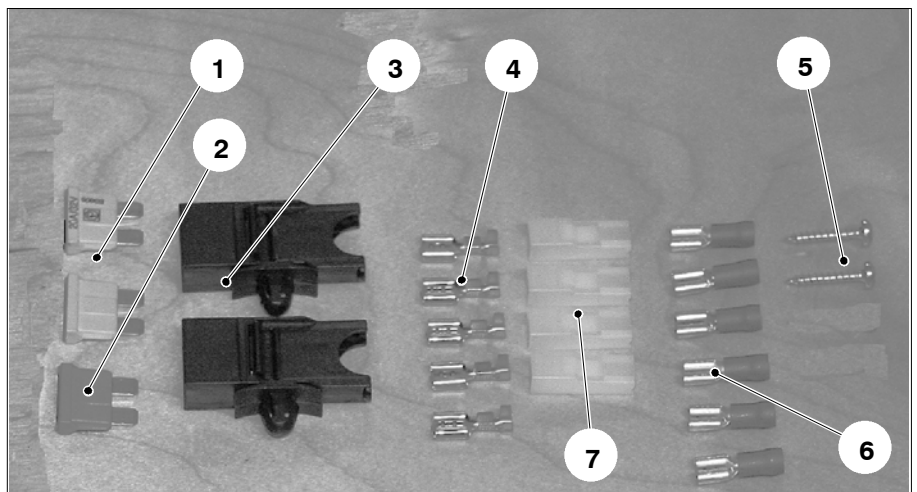


Fig. 1 Small parts and accessories delivered with the LRM 1218 solar charge regulator

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

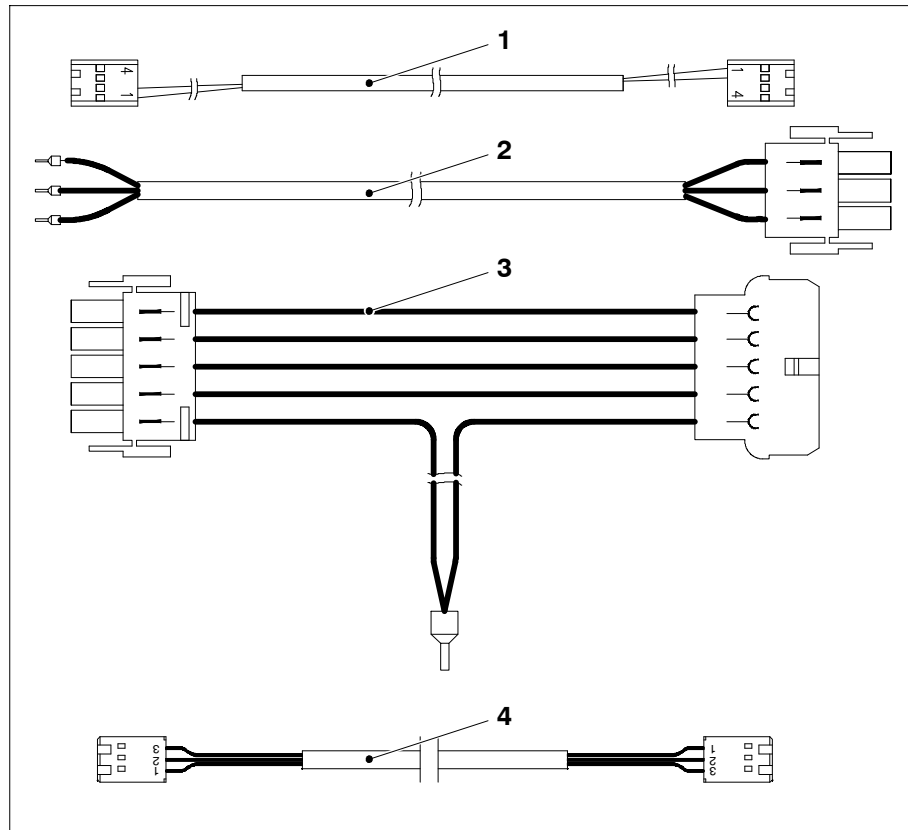


Fig. 2 Connector cables delivered with the LRM 1218 solar charge regulator

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 2.5cm away from the fans opposite side 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).

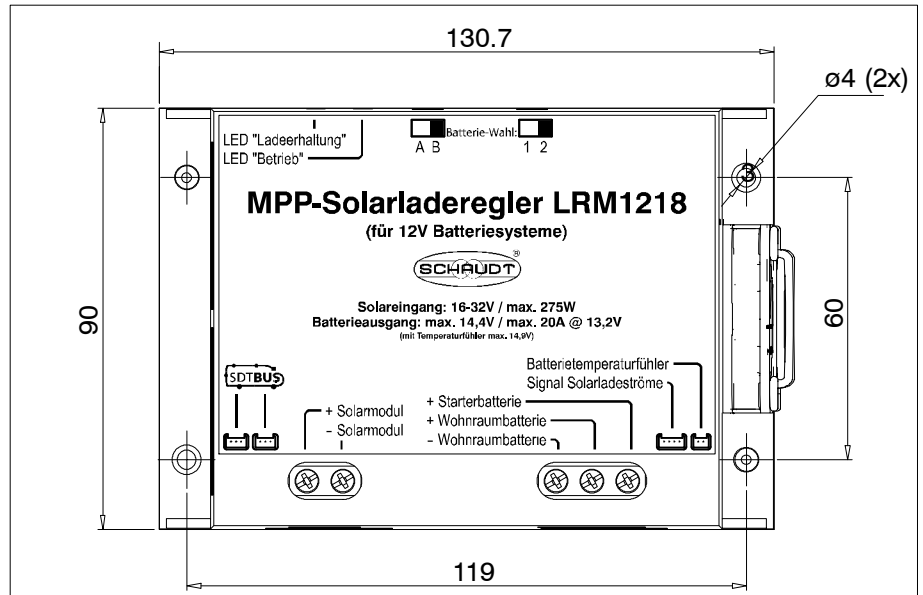


Fig. 3 Attachment points for LRM 1218 solar charge regulator (dimensions in mm)

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)

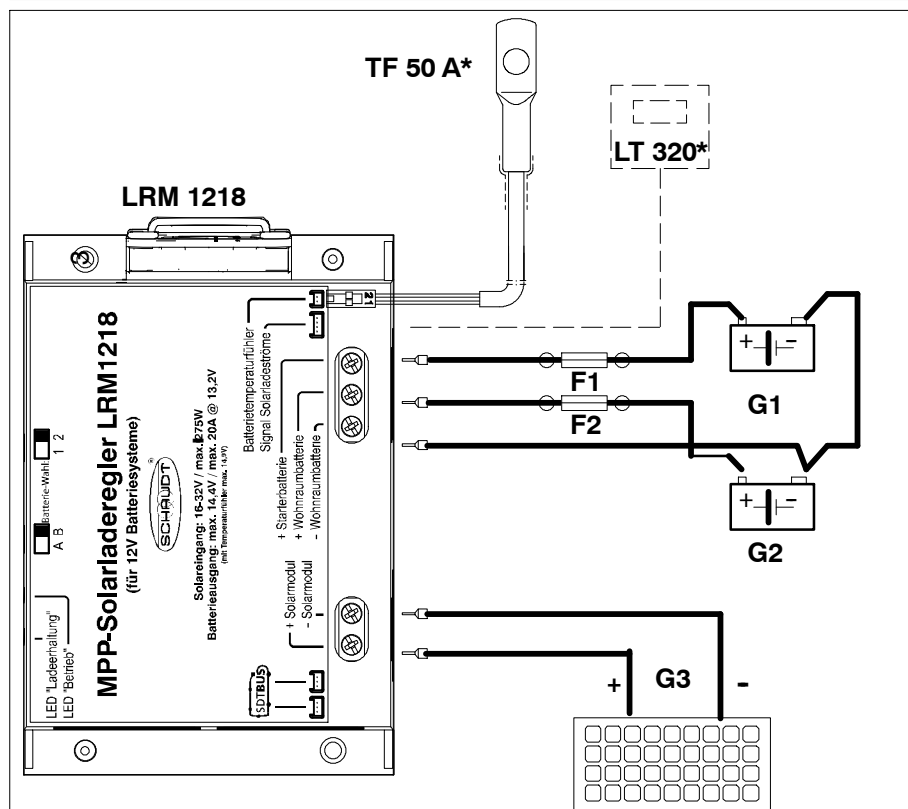


Fig. 4 Circuit diagram for LRM 1218 to starter battery and leisure area battery connectors
* Optional

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)

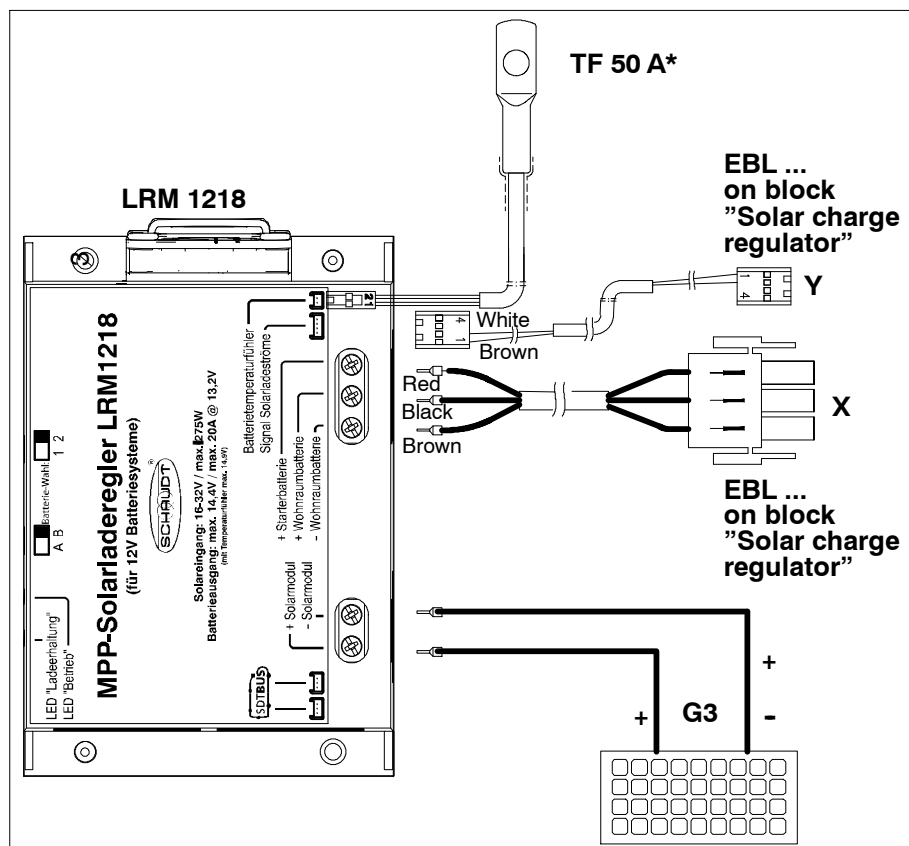


Fig. 5 Circuit diagram for LRM 1218 connection to EBLs with solar regulator connector and connector for current display (* optional)

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)

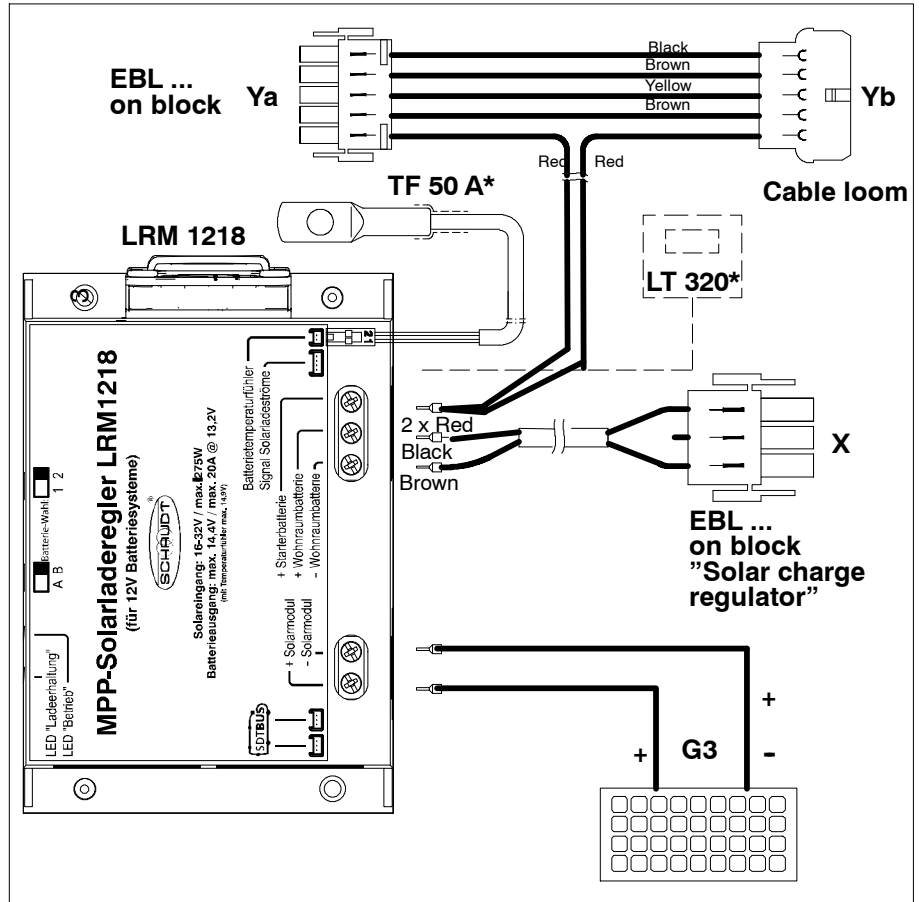


Fig. 6 Circuit diagram for LRM 1218 connection to EBL ...

Pos.	Name
X	Cable with electroblock connector: <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 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)

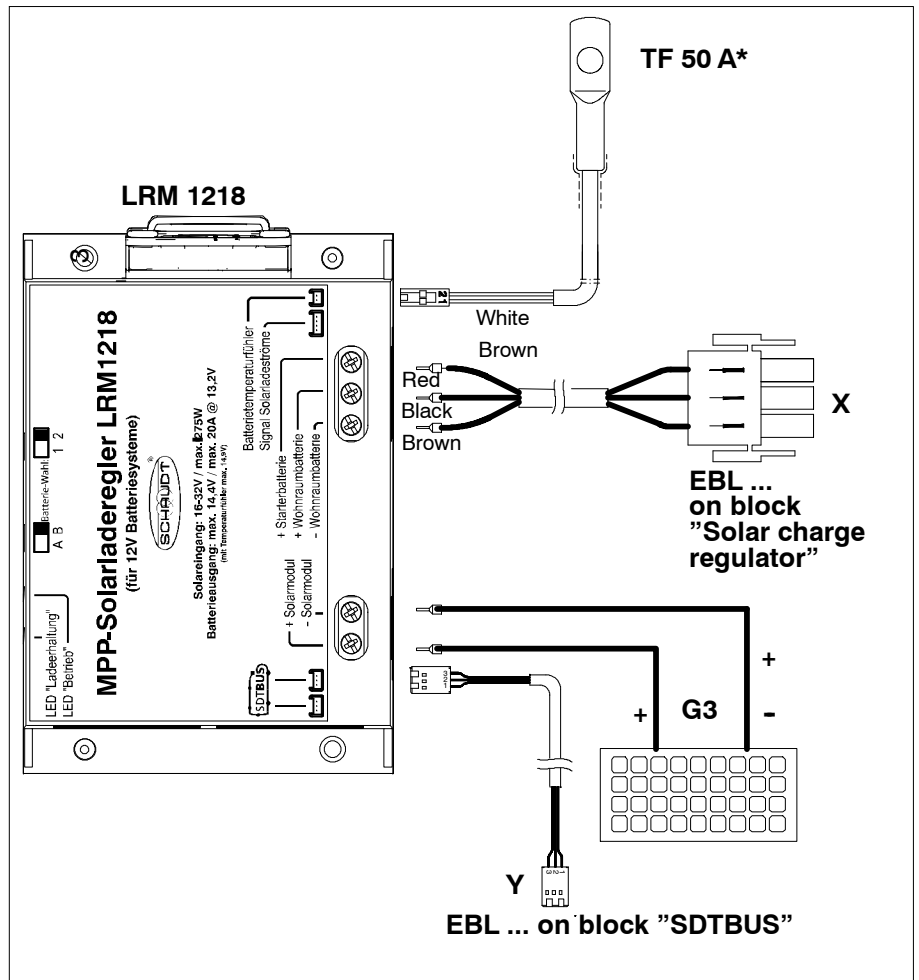


Fig. 7 Circuit diagram for LRM 1218 connection to EBLs with SDTBUS

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... 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.

5.5 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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