Installation and Operating instructions

a-TroniX MPPT solar charge controller A100/20 A100/40 A150/60

Model	item number
a-TroniX MPPT Solar Charge Controller A100/20	9887580
a-TroniX MPPT Solar Charge Controller A100/40	9887582
a-TroniX MPPT Solar Charge Controller A150/60	9887584

INTRODUCTION

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Thank you
for purchasing our MPPT solar charge controller from the a-TroniX series.

The solar charge controller is based on advanced MPPT technology specially developed for solar systems.
It has a number of outstanding features, such as a combination of multiple tracking algorithms that enable fast and accurate tracking of the maximum power point.

The LCD display allows you to easily read the operating data and real-time operating status.
The solar charge controller is protected from overheating by the built-in power reduction function and provides automatic protection to avoid exceeding the rated charging power and rated current.

Read carefully before use!
Read this user manual carefully before installation.
It contains important regulations and notes for the use of this product and provides technical support for the operator of the device.

AKKU SYS Akkumulator- und Batterietechnik Nord GmbH cannot be held responsible for any inaccuracies or inappropriate information in these operating instructions.
We assume no liability for errors in this manual and the resulting consequences.

The information in this document is subject to change without prior notice, but there is no obligation to keep it up to date.
We reserve the right to make design and device changes that serve to improve the production process or the product.

Table of Contents

1. Symbols and abbreviations used

In this manual, the abbreviation **MPPT** stands for: Maximum Power Point Tracking.

Solar charge controllers are used in connection with a photovoltaic system. These are also referred to as **PV systems .**

Accumulators are usually used as energy stores in a PV system . These are colloquially referred to as **rechargeable batteries** or batteries.

Warnings and notes are identified by the appropriate symbols (pictograms) and must be observed:

WARNING!

Danger high voltage.

General warning of danger spots.

Warning when handling accumulators.

A NOTICE:

This symbol indicates text, hints or tips.
Failure to take preventive protective measures may result in damage to the product and/or its functions or something in its vicinity.

ENVIRONMENT:

Indicates information about recycling.

Identifies assemblies or parts that must be disposed of properly. Do **not** throw them in the household waste.

Make use of the certified and professional recycling service of our AKKU SYS team.
For more information contact us by phone
on the hotline +49 4101/3 76 76-0, info@akkusys.de or use the QR code:

2. Important Safety Instructions

Be sure to follow all warnings and instructions in this manual.
Keep them safe and read the following notes carefully before installing and starting up the device.

The operating instructions must be read and understood by all persons and specialists who work with this device and all points must be observed.

Do not try to disassemble the device. It contains no user-serviceable parts. During installation, operation or maintenance carried out by qualified personnel, observe the local safety instructions and the relevant laws. Otherwise personal injury or equipment damage may occur.
The safety instructions in this manual serve as a supplement to the local safety instructions. Our company assumes no liability for damage caused by non-observance of the safety instructions.
This also applies if no regular maintenance or maintenance/repairs were not carried out by qualified specialist personnel. The device must also be set up by qualified specialist personnel.

The solar charge controller may only be used in photovoltaic systems that correspond to the specifications of the device described in these operating instructions. No other energy sources may be connected to it.
Any further use or use that goes beyond this is considered to be **improper** and can lead to personal injury, damage to property and/or damage to the device.

2.1 Transportation and Storage

- Only transport the solar charge controller in the original packaging to protect it from bumps and knocks.
- The device must be protected from moisture and may therefore only be stored in dry rooms.
  Always store the device and the corresponding accessories in the original packaging.

2.2 Installation Notes

- Only use the solar charge controller in connection with the intended photovoltaic systems.
- Before installing and adjusting the solar charge controller, be sure to turn off the PV modules. Make sure the circuit breaker, fuse, or disconnect switches on the battery terminals are turned off.

- Only use batteries that match the voltage range of the charger to store energy.
- Batteries store a large amount of energy. Therefore, be careful not to short-circuit the battery.
- Batteries can produce flammable and possibly toxic gases (oxyhydrogen). Avoid creating any sparks near the battery. Batteries must be installed in a well-ventilated area to allow gases to escape.
- Be extremely careful when handling batteries. Always wear eye protection and avoid eye contact with battery acid. Have fresh water ready for rinsing. If you have any symptoms, consult a doctor immediately.
- Do not use metal objects near batteries.
- When handling batteries, only use insulated tools and never touch uninsulated cable ends.
- When installing the solar charge controller, avoid direct sunlight, water and heat accumulation. After
- installation, check that all connections are tight.
- Keep children away from all electrical devices/connections etc.

3. Functions of the solar charge controller

- Multiple tracking algorithms enable fast and accurate tracking of maximum PV module power.
- The solar charge controller has a high efficiency of up to 98%.
- An LCD display allows easy reading of the operating data.
- Automatic DC detection (12V / 24V / 48V).
- The use of AGM, acid and gel batteries as well as lithium batteries is possible.
- Battery life is extended by a precise temperature sensor.
- The built-in power reduction function protects against overheating.
- The following battery charging methods are possible: MPPT, rapid charging, equalization and trickle charging.
- The device has a double automatic protection to avoid exceeding the nominal charging power and the nominal current.

- It is possible to set different load modes.
  (Always on, dusk, evening and manual).
- The device has a Bluetooth app, a Bluetooth function is available.
- Monthly load data can be displayed as a summary in the form of graphics.

- The RS-485 standard protocol Modbus with RJ11 interface enables optimal communication in various applications.
- A fully automatic electronic protection function ensures increased reliability of the solar charge controller.

3.1 MPPT technology **current**

amplification MPPT

technology enables the PV charging current to be increased.

Power supplied **(Pmax)** = solar charge controller output power **(Pout)**

Iin x Vmp = Iout x Vout

Assuming 100% efficiency.
In fact, there are slight losses in wiring and conversion.

If the maximum power voltage of the solar panel **(Vmp)** is greater than the battery voltage, the battery current must be proportionately greater than the solar input current to balance the input and output power.

The greater the difference between **Vmp** and battery voltage, the greater the current gain. Current gain can be significant in systems where the solar array is rated at a higher voltage than the battery.

High-voltage strings and grid-connected modules

Another advantage of MPPT technology is the charging of batteries with PV modules of a higher nominal voltage.
For example, a 12 V battery with a nominal voltage of 12 V / 24 V / 36 V or 48 V can be charged.
Grid-connected solar modules can also be used as long as the open circuit voltage of the solar system does not exceed the maximum input voltage at the worst case (coldest) module temperature.
Higher PV input voltage results in lower PV input current for a given input power.

The documentation of the solar modules should contain corresponding data depending on the temperature.

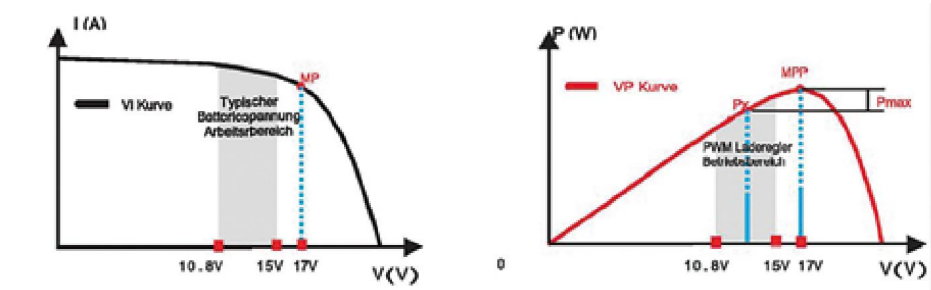
A higher PV input voltage enables a smaller cross-section of the PV wiring. This is particularly helpful and economically interesting for systems with long cable runs between the solar charge controller and the solar system.

Advantage over conventional solar charge controllers

Conventional solar charge controllers connect the PV module directly to the battery when charging. This requires the PV module to operate in a voltage range that is typically below the module's Vmp value.
For example, in a 12 V system, the battery voltage can range from 10.8 V to 15.0 V, but the maximum power voltage (Vmp) values of PV modules are typically 16 V to 17 V.

Because traditional solar charge controllers are not always operating at the **Vmp** of the solar array, energy is wasted that could otherwise be used to charge the battery and power grid loads.

The greater the difference between the battery voltage and the **Vmp** of the module, the more energy is wasted.



IV-Kurve und Leistungsgrafik eines 12-Volt-Solarmoduls.

In contrast to conventional PWM solar charge controllers (pulse width modulation), the a-TroniX solar charge controller can reproduce the maximum output of the PV module, so that a larger charging current can be supplied. In general, the energy efficiency of the solar charge controller is 15% to 20% higher than that of the PWM solar charge controller.

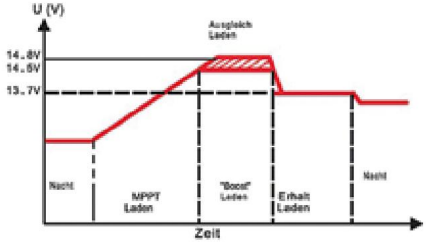
The **Vmp** of a PV module decreases with increasing temperature.
In very hot weather the **Vmp** can be close or even below the battery voltage. Under these conditions, the MPPT gain is very low or non-existent compared to conventional solar charge controllers.
However, in systems with modules whose rated voltage is higher than the battery voltage, the **Vmp** of the solar array will always be higher than the battery voltage.

3.2 MPPT - Four Stage Charging Process

The solar charge controllers of the a-TroniX series have a 4-stage battery charging algorithm for fast, efficient and safe battery charging.

MPPT charging

In this phase, the battery voltage has not yet reached the "boost" charging voltage and 100% of the available PV energy is used to charge the battery.



Fast Charge (Boost)

Once charging reaches the “boost” voltage set point, constant voltage regulation is applied to prevent battery heating and excessive gassing. By default, fast charging takes about 2 hours and then switches to trickle charging (“float”).

Each time the solar charge controller is switched on, the charging process changes to the "boost" charging stage, provided no overdischarge or overvoltage is detected.

Trickle Store (Float)

After the "boost" charging process, the solar charge controller reduces the voltage setpoint to "trickle charging".

When the battery is fully charged, the desired chemical reactions no longer occur in the battery and the charging current is converted to heat and gas.

For this reason, the charge controller sets the charging voltage to "trickle charging" so that charging is carried out with a reduced voltage and current.
This process lowers the temperature of the battery and prevents gas formation.
At the same time, the battery is slightly charged.

The purpose of the “Float” stage is to balance the current consumption due to self-consumption and small loads in the entire system and to obtain full battery storage capacity in a timely manner. Float charging allows loads to continue drawing current from the battery. If the system loads exceed the PV charge current, the solar charge controller will no longer be able to keep the battery at the float charge setpoint. If the battery voltage remains below the quick recharge voltage, the charge controller exits trickle charging and returns to charging mode.

Equalization (Equilization)

Certain battery types benefit from periodic equalization charging.
By balancing the charge, the battery voltage increases.

This is higher than the standard complementary voltage, which converts the battery electrolyte into gas. When the battery is detected to be overcharged, the solar charge controller will automatically switch the battery to equalization charge.
By default, this takes about 2 hours.

Equalizing charge and quick charge are not performed continuously in each full charge to avoid over-voltage and/or overheating of the battery.

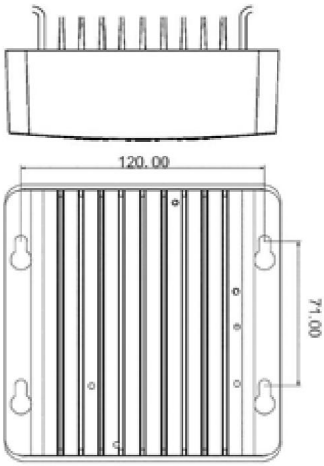
WARNING:

There is a risk of explosion!
Explosive gases may be generated when equalizing a fully charged battery. Good ventilation of the battery is therefore necessary.

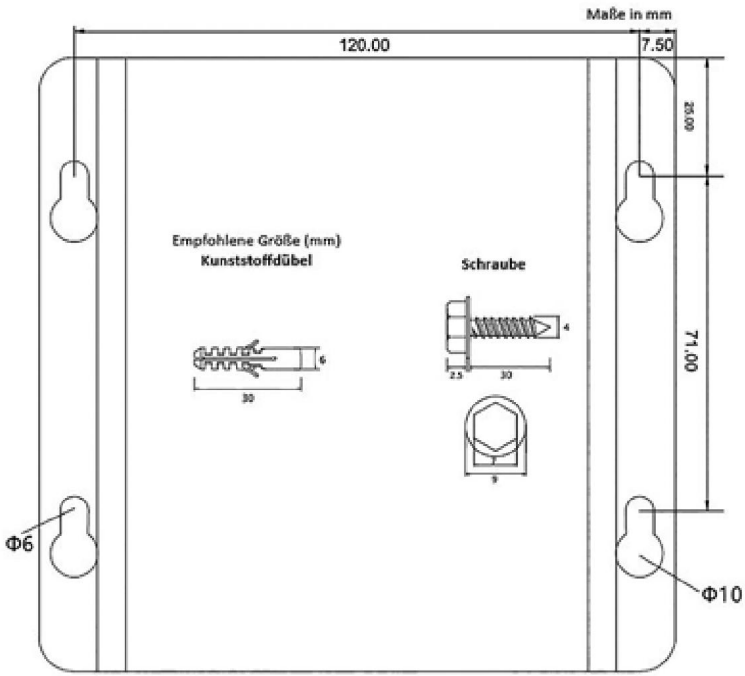
4. Device description

4.1 Dimensions A100/20

Dimensions: mm

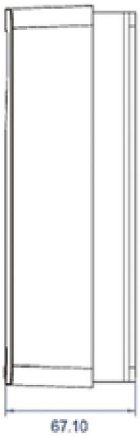


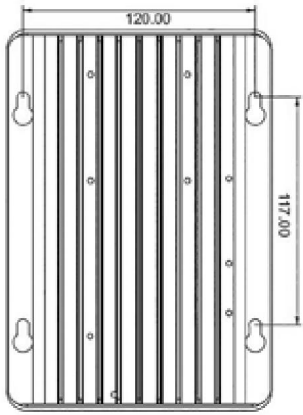
4.2 The installation position A100/20

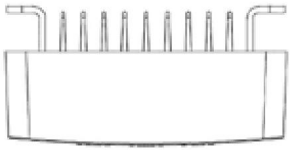


4.3 Dimensions A100/40

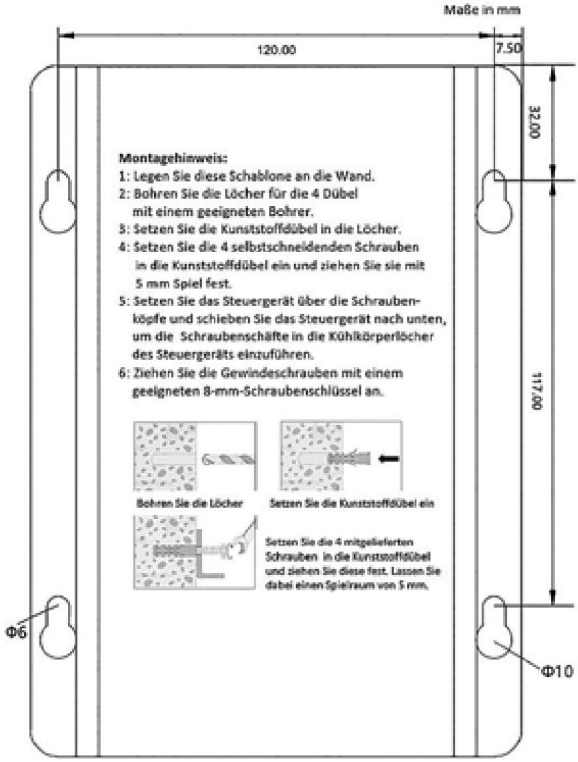
Dimensions: mm





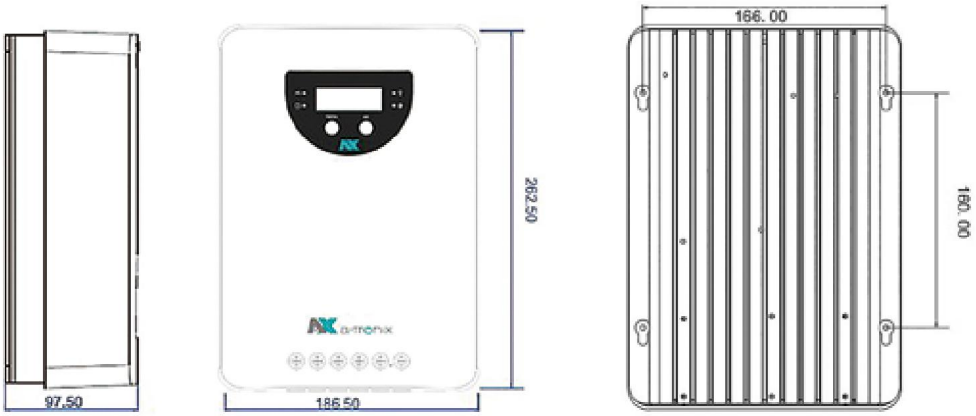


4.4 Installation positions A100/40

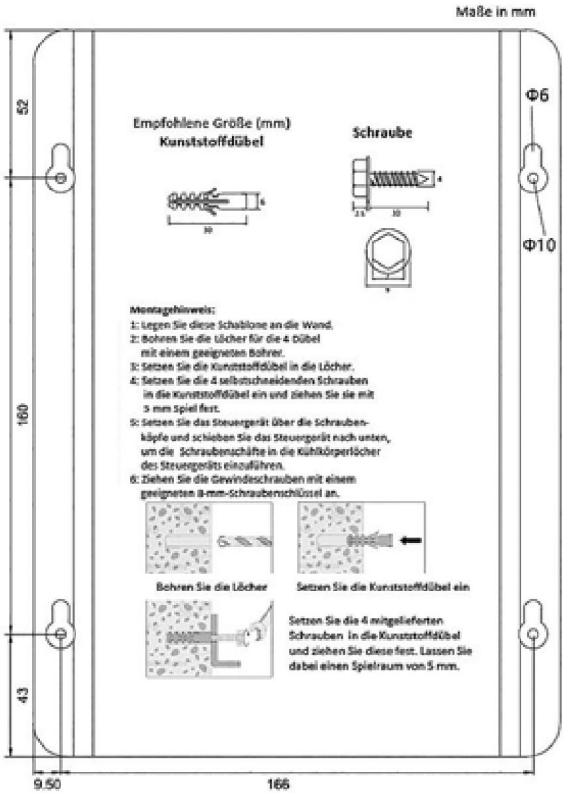


4.5 Dimensions A150/60

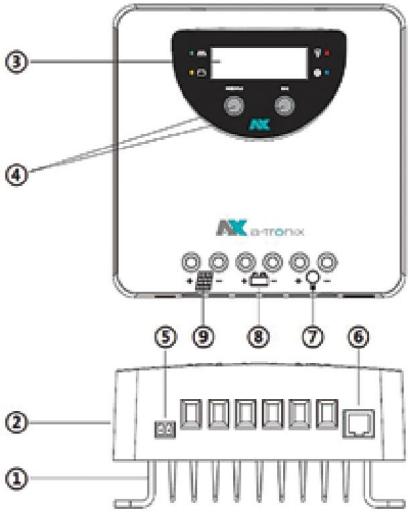
Dimensions: mm



4.6 Installation positions A150/60



4.7 Structure and Features



1 **heatsink** for
heat dissipation

2 **plastic housings** to
protect internal components

3 **LED + LCD display** to
show settings and working status

4 **buttons Menu + OK**
for setting and displaying the
operating parameters

5 **temperature sensor**
for collecting temperature information

6 **RJ11 interface**
for connecting monitoring devices

7 **load connection**
for connecting consumers

8 **Battery connector** to
connect the battery

9 **solar panel connector**
for connecting the solar module

4.8Temperature sensor

In order for the solar charge controller to be able to charge the battery precisely, the battery temperature data is recorded via a temperature sensor for temperature compensation.

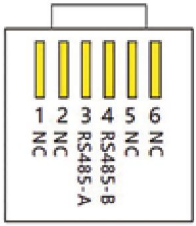
The sensor is connected via interface 5.
An 80 mm long temperature sensor cable is included with the charger. Larger cable lengths must be ordered separately.

NOTE: If
the external temperature sensor is damaged or not connected, the solar charge controller will use the internal temperature information by default.

4.9 RS485 port

The solar charge controller is equipped with an RS485 connection and an RJ25 6P2C plug. The contacts are assigned as follows:

Pin Nr.	Belegung
1	NC
2	NC
3	RS485-A
4	RS485-B
5	NC
6	NC



Für diesen Solarladeregler geltendes Protokoll: Modbus V3.9

WARNING:

The RS485 interface of the solar charge controller is not galvanically isolated and must therefore not be grounded. Do not short unused pins (note NC).

4.10 Bluetooth communication

There are two options:

1. Bluetooth intern
2. Bluetooth external (Cyber-BT), via connector type RJ25 6P2C.

The Bluetooth communication has the following properties: 1.

Android & iOS app is supported.

2. Realizes the solar charge controller wireless monitoring function.
3. Uses high-performance, ultra-low current Bluetooth chip consumption.
4. Uses Bluetooth 4.2 e BLE technology.

A NOTICE:

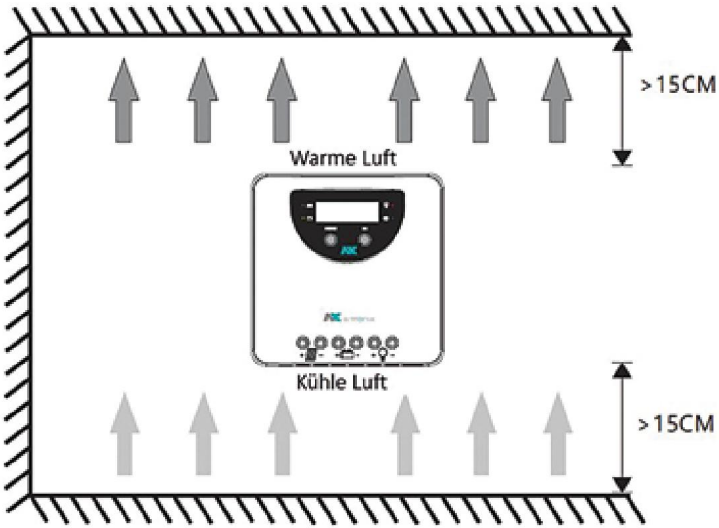
For operation details, refer to the Bluetooth app instructions.

5. Installation

5.1 Installation site requirements

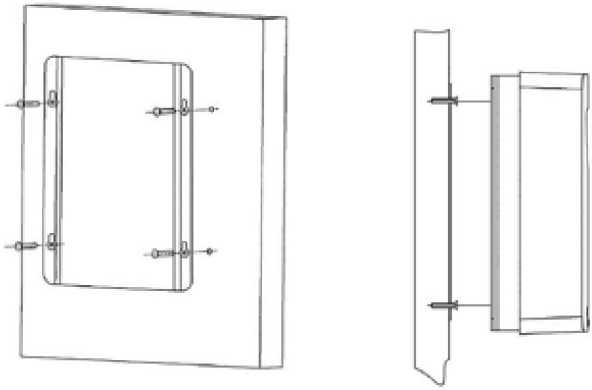
Only install the solar charge controller in places that are protected from direct sunlight or other heat sources, dirt and moisture.
Fix it upright on the wall. Make sure that this is a non-combustible wall material.

A minimum distance of 15 cm under and around the device should be kept free for unhindered air circulation.
If possible, mount the solar charge controller close to the battery.
Attach it so that the cable holes are facing down.



5.2 Fasten the solar charge controller

First, drill the 4 mounting holes according to the installation positions in “5. Device description” on the wall.
Then attach the solar charge controller to the pre-drilled holes.



5.3 Connecting connections

WARNING:

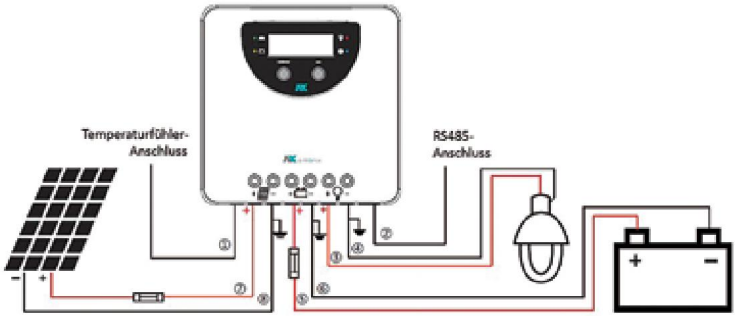
The PV module can exhibit open circuit voltages of more than 100 V when exposed to sunlight. Watch out for this hazard.

WARNING:

Explosion Hazard: There is a risk of fire or explosion if the battery terminals or cables are shorted.

DANGER:

The inside temperature is automatically displayed if no solar charge controller is connected. An inverter must always be mounted directly on the battery, never on the load terminals of the solar charge controller.



5.4 Connecting accessories

1. Connect the temperature sensor cable.
2. Then connect the cable for the RS485 communication.

5.5 Connect load

Connect the load cable to the right pair of terminals on the solar charge controller with the correct polarity.
To avoid tension in the cables/wires, first connect them to the load before connecting them to the solar charge controller.

5.6 Connecting the battery

Connect the battery to the middle pair of terminals on the solar charge controller with correct polarity. Never reverse the positive (+) and negative (-) poles.

- With a nominal voltage of 12 VDC, the battery voltage should be in the range of 5.0 to 15.5 VDC.
- With a nominal voltage of 24 V DC, the battery voltage should be in the range of 20.0 to 31.0 V DC.
- With a nominal voltage of 36 VDC, the battery voltage should be in the range of 31.0 to 42.0 VDC.
- With a nominal voltage of 48 VDC, the battery voltage should be in the range of 40.0 to 62.0 VDC.
- Voltages are noticeable when the controller is set to a lithium battery.

If the polarity is set correctly, these are displayed on the LCD of the solar charge controller.

5.7 Connecting the PV module

Connect the solar module connection cable to the solar charge controller with the correct polarity of the left pair of clamps (solar module symbol). Pay attention to the requirements of the mounting location.

When connecting the PV module, make sure that it is protected from direct sunlight.
Make sure that the PV module does not exceed the maximum permissible input current of the solar charge controller (see section "Technical data").

5.8 Final Work

Tighten all cables that you connected to the solar charge controller.

Remove any objects/obstacles that are in the immediate vicinity of the device. Keep a distance of at least 15 cm.

5.9 Wiring Specifications

Wiring and installation methods must comply with national and local electrical codes. The PV system battery wiring specifications must be selected according to the rated currents.

Please check the values using the following table:

model nominal	nominal	PV	Battery	Last
	Charging current	Discharging current	Cable cross-section	Cable cross-section	Cable cross-section
	(A)	(A)	mm2 /AWG	mm2 /AWG	6/10 6/10 10/8 10/8 16/5	mm2 /AWG
A100/20	20	20	16/5	6/10
A100/40	40	30		10/8
A150/60	60	30		16/5

NOTE:

The specified cable sizes are for reference only.
In order to improve the voltage drop and the system efficiency, if there is a longer cable length between the PV module and the solar charge controller or between the solar charge controller and the battery, a cable with a larger cross-section must be used.

5.10 Grounding

Note that the negative terminals of the solar charge controller are connected to each other. If grounding is required, always do so on the negative terminal cable.

ATTENTION:

For systems with common negative poles, such as mobile homes, the use of a common negative pole solar charge controller is recommended.

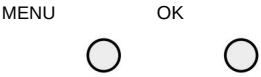
However, if some devices with common positive poles are used in a common negative system and the positive pole is grounded, the solar charge controller may be damaged.

6. Operation

6.1 LED display

LED	Status	functions
Green (PV-Module)	on	The PV module is connected but not charging.
	Blinking fast (0,1 / 0,1 s)	Load MPPT
	Blink (0.5 / 0.5 s)	"Boost" charging or equalizing charging
	Flashing slowly (0.5 / 2 s)	preservation store
Yellow (Battery)	on	Battery operation normal
	off	Overvoltage protection
	Flashing fast (0.1 / 0.1 s)	undervoltage protection
	Flashing slowly (0.5 / 2 s)	Low battery voltage
Rot (Last)	on	load is switched on
	off	load is off
	Flashing, fast (0.1 / 0.1 s)	Short circuit or over current protection
	Flashing, slow (0.5 / 2 s)	overheat protection
Blue (Communication)	off	No communication
	Flashing fast (0.1 / 0.1 s)	normal communication

6.2 Key Functions



Advertisement	Occurrence
user interface choose	Briefly press OK
pause display	Simultaneously press the MENU and OK buttons for one second. The LCD display stops scrolling. Press the MENU and OK button again for one second. The LCD display unlocks and scrolling is active again.
Set parameters	Press the MENU button for one second to activate the setting mode, followed by the gear icon on the display. The display goes out automatically after 30 seconds.
load on/off („On“/“Off“)	When the solar charge controller works in street light mode, press the MENU button for three seconds to turn on the load. Press the (On/Off') MENU button again so that the load turns off after one minute.

6.3 LCD-Display

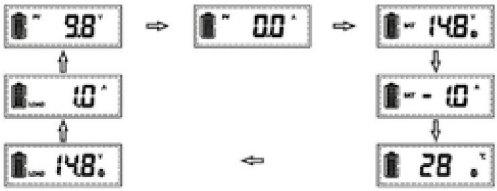
Position	Symbol	Status
PV Module		loads
		PV voltage
		PV Strom

Position	Symbol	Status
PV Module	PV 6 Ah	PV-Tages Ampere hours
	PV 8.0 kAh	Total PV amp hours
Battery		battery capacity
	BAT 12.3 V	battery voltage (adjustable)
	BAT 1.0 A	battery power
	BAT GEL	Battery type (adjustable)
	26 °C	Temperature
Last	LOAD 12.0 V	load voltage (reconnection voltage LVR, adjustable)
	LOAD 1.0 A	Laststrom
	LOAD 3 Ah	Last amp hours of the day
	LOAD 6 kAh	The total discharge amp hours the load
	LOAD USE	Load mode (adjustable)

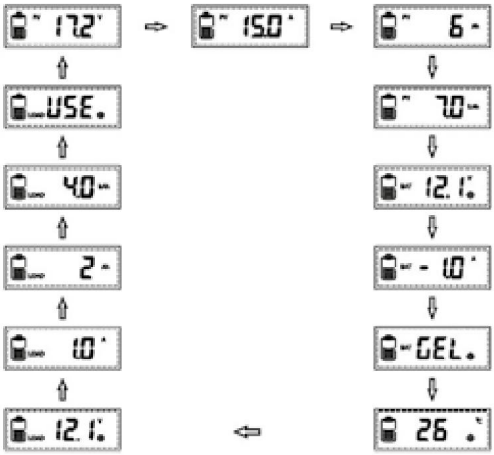
A NOTICE:

The PV ampere-hours (PV panel/kit) and load ampere-hours will expire after a power failure.

automatic display cycle,
order as follows:



Press OK to cycle
through the interface:



6.4 Error display

Status	Symbol	Occurrence
short circuit		Load off, error icon display, LCD display shows E1.
overcurrent		Load off, error icon display, LCD display shows E2.
undervoltage		Load off, battery status shows "empty", error icon display battery frame flashes, LCD display shows E3.
Overload		Battery status shows "full", error icon display, battery frame flashes, LCD display shows E4.
overheating		Charging and discharging are switched off. Error symbol display, symbol °C flashes, the LCD display shows E5.
system voltage		Solar charge controller does not recognize the correct system voltage.

6.5 Parameter setting

When the setting icon (gear) appears in the display interface, it means the parameters can be set.
Press the **MENU** button for one second, the gear icon will flash.
Then press **OK** to change the corresponding parameter.
After you finish the setting, you can wait 30 seconds to exit the setting mode automatically.
You can exit the setting mode immediately by pressing the **MENU** button .

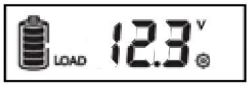
6.6 Under Voltage Protection

When the LCD display is as shown on the left, press the **MENU** button for one second. The gear icon flashes. You can now get down
set the voltage protection of the solar charge controller.

Lithium Battery - Under Voltage Protection Setting Range
(V): 12/24: 9.0 to 30.0 (Default: 10.6).
12/24/36/48: 9.0 to 60.0 (default: 21.0).

Liquid, gel and AGM battery - Setting range of undervoltage protection (V):
10.8 - 11.8 / 21.6 - 23.6 / 32.4 -3 5.4 / 43.2 - 47.2 (standard : 11.2 / 22.4 / 33.6 / 44.8).

6.7 Reconnection Voltage



When the LCD display is as shown on the left, press the **MENU** button for one second. The gear icon flashes. You can now set the reconnection voltage value.

Lithium Battery - Reconnect Voltage Setting Range (V): 12/24:
9.6 - 31.0 (Default: 12.0)
12/24/36/48: 9,6 -62,0 (Standard: 22,4).

Liquid, gel and AGM battery - reconnection voltage setting range (V): 11.4 - 12.8 / 22.8 - 25.6 / 45.6 - 51.2 (default: 12 / 24 / 48).

A NOTICE:

The turn on voltage (LVR) should be at least 0.6/1.2/2.4V higher than the under voltage lockout (LVD).
If you want to adjust the value of the LVD, you must first increase the LVR value.

6.8 Delete Bluetooth device password

When the LCD display is as shown on the left, press the **MENU** button for one second.
The gear icon flashes. You can now confirm with **OK** to reset the set password via the mobile app.

A NOTICE:

For device passwords, see the Bluetooth app instructions.

6.9 Battery type

When the LCD display shows the screen shown at left, press the **MENU** button for one second.
The gear icon flashes.
You can now set the battery type.

LCD display	Battery type
GEL	GEL (Standard)
AG-	AGM
L 1	Lithium
L19	liquid electrolyte

6.10 Charge Voltage Parameters

When choosing a liquid, gel or AGM battery, the charging parameters “boost, equalize and float voltage” can be set via mobile phone app, RS485 or We Chat app.

The following voltage parameters apply to 25 °C / 12 V systems.
For systems with 24 / 36 / 48 V, the values given should be multiplied by a factor of 2, 3 or 4 accordingly.

charge level	“Boost”	compensation	receipt
charging voltage range	14.0 - 14.8 V	14.0 - 15.0 V	13.0 - 14.5 V
Ladespannung „Standard“	14.5 V	14.8 V	13.7 V

Ladespannungsparameter (Lithium)

The solar charge controllers of the a-TroniX series are suitable for all types of lithium batteries. When selecting the lithium battery type, the overcharge protection and recovery voltage of the lithium battery can be set via RS485 interface or via Bluetooth App.

Setting range of the charging voltage:
12 / 24 V: 10 – 32 V (Standard: 14.4 V)
12 / 24 / 36 / 48 V: 10 – 64 V (Standard: 29.4 V)

Recovery voltage adjustment range:
12 / 24 V: 9.2 - 31.8/ V (Standard: 14.0 V)
12 / 24 / 36 / 48V: 9.2 - 63.8V (default: 28.7V)

DANGER:
(Recovery voltage + 1.5V) ÿ Lithium overcharge protection voltage ÿ (Recovery voltage + 0.2V).
Out of range parameter settings are not supported.

WARNING:
The required accuracy of the BMS must be at least 0.2V.
If the tolerance is greater than 0.2 V, the manufacturer assumes no liability for any resulting system malfunctions.

6.11 Charging modes

When the LCD display shows as left, press the MENU button for one second, the gear icon will flash. Now you can set the charging mode.

LCD display charging mode	
0	Permanently on: The load output is permanently switched on.
'	Dusk to Sunrise: The load output stays on from sunset to sunrise.
2 3 4 5 6 7 8 9	Night: The load output stays on 2-9 hours after sunset.
USE	Manual: The load output can be switched on and off by briefly pressing the MENU button.

Always On: When the
solar charge controller is set to “Continuous On” mode regardless of the charging or discharging state, the load is always on (except in the protection state).

Dusk to Sunrise: When the load is set to Dusk
to Sunrise, the day/night threshold voltages and day/night delay time can be set via RS485 or Bluetooth App.

Day/night threshold voltage: The solar
charge controller recognizes day and night based on the no-load voltage of the solar system. This day/night threshold voltage can be set under different circumstances according to the local light conditions and the solar system used.

Setting range for day/night threshold values (V): 3.0 - 10 /
6.0 - 20 / 9.0 -30.0 / 12.0 - 40 (default: 8 / 16 / 24 / 32)

Day/Night Delay Time: In the
evening, when the solar array open circuit voltage reaches the set day/night detection voltage, you can adjust the day/night delay time. In this way, the load can be switched on with a slight delay.

Setting range of day/night delay time: 0 - 30 minutes
(default: 0 - 30 minutes).

Test function:

When the solar charge controller is between dusk and dawn, long press the **MENU** button for 3 seconds to turn on the load.

User-defined mode: When

“USE” load mode is selected, you can turn on/off the load output manually by short pressing the **MENU** button .
The default switching state of the load in manual mode can be set via RS485 or Bluetooth app.

At the same time, the load output can be switched on or off.

DANGER:

When the solar charge controller turns off the load due to low-voltage protection, over-current protection, short-circuit protection, or over-heat protection, the load will automatically turn on again when the device exits the protection state.

Please note: By
pressing the MENU button, the function of this button can also be activated during the four types of protection states mentioned above.

7. Troubleshooting

Mistake	Caused	Error Description
	short circuit	Switch off all loads, eliminate short circuit. Last is switched on again automatically after one minute.
	overcurrent	Reduce the load, the solar charge controller will resume normal function after one minute.
	Battery low voltage	When the battery is charged, the load is switched on again.
	battery overvoltage	Check whether other sources are overcharging the battery and whether the parameters are correct. If not, the solar charge controller is probably damaged.
	over temperature	After the temperature has dropped again, the solar charge controller works normally again.
	The battery voltage Charge or discharge the battery is not in when starting so the battery voltage is in normal range	normal working range (8.5 - 15.0 or 20 - 30.0 or 40 - 60.0 V).

8. Protections

Caused	Description
PV overcurrent	The solar charge controller limits the charging power to the nominal value. Oversized PV systems cannot be operated at maximum power.
PV short circuit	If a PV short circuit occurs, the solar charge controller will stop charging. Fix the short circuit to continue normal operation.
PV Reversal	Full protection against PV reverse polarity, no damage to the solar charge controller. Correct the connection to resume normal operation.
Battery polarity	Full protection against battery polarity reversal, no damage to the solar charge controller. Correct the connection to resume normal operation.

Caused	Description
Battery overvoltage	If there are other energy sources charging the battery when the battery voltage exceeds 15.8 / 31.3 / 46.8 / 62.3 V, the solar charge controller will stop the charging process to protect the battery from overcharging to protect against damage. (Lithium battery overcharge protection voltage is equal to target voltage plus 0.2V.)
Battery over-discharge	When the battery voltage drops to low-voltage cutoff, the solar charge controller will stop discharging to protect the battery from over-discharge damage.
Load overcurrent protection	When the load current exceeds the maximum factor of 1.25, the solar charge controller disconnects the load.
Short-circuit protection	Once a load short-circuit occurs, the load will short-circuit while charging circuit protection triggered automatically.
Overtemperature protection	The solar charge controller records the internal temperature via the internal sensor. If the temperature exceeds the set value, the charging current will decrease, and consequently the temperature of the solar charge controller. Should the temperature of the solar charge controller and approach the temperature protection threshold, the solar charge controller will stop operating. It restarts the process when the temperature has dropped again or returned to an acceptable level.
Damaged remote temperature sensor	Should the temperature sensor short circuit or damaged, the solar charge controller automatically adopts the internal temperature. This prevents the battery from being overcharged or discharged.

9. Maintenance

WARNING!

Electric shock hazard!
Make sure all power is off before performing any maintenance.

For optimal system performance, the following inspection and maintenance tasks should be performed at least twice a year:

- Make sure the airflow around the solar charge controller is not blocked is cked.
- Remove dirt and objects from the radiator.
- Check for dirt, nesting insects, or signs of corrosion. Take corrective action as soon as possible.
- Tighten all terminal screws with the specified torque. Check if the LCD meets the
- requirements.
  Look for troubleshooting or error indications.
  If necessary, take corrective action.
- Ensure that all system components are effectively and securely connected to ground.
- Inspect all connectors for signs of corrosion, damaged insulation, or discoloration from elevated temperature/combustion. Check cables for loose,
- broken, or burned areas.
  Make sure the insulation is not damaged.
  Have an authorized electrician repair or replace defective cables if necessary.

9.1 Disposal of Batteries

Make use of the certified and professional recycling service of our AKKU SYS team.
For more information contact us by phone
on the hotline +49 4101/376760, at info@akkusys.de or use the QR code:

10. Specifications A100/20, A100/40

	Designation	A100/20	A100/40
Battery Parameter	Max. charge current (A)	20	40
	System Voltage (V)	12 / 24 (automatic detection)	
	MPPT Charge Voltage	before the boost or equalizer charging stage	
	Boost Voltage (V)	14-14.8 / 28-29.6 @25°C (default: 14.5 / 29) 14-15.0 /	
	Compensation Voltage (V)	28-30 @25°C (default: 14, 8 / 29.6) (Liquid, AGM battery)	
	Float Voltage (V)	13-14.5 / 26-39 @25°C (Standard: 13.7 / 27.4)	
	Undervoltage (V)	10,8-11,8 / 21,6-23,6 (Standard: 11,2 / 22,4)	
	Reconnection Voltage (V) Overcharge	11,4-12,8 / 22,8-25,6 (Standard: 12,0 / 24,0) 15,8 /	
	Protection (V)	31,3	
	Max. voltage at the battery terminal (V)	35	
	Temperature compensation (mV/K)	-4.17 per cell (boost, balance) -3.33 per cell (maintenance)	
	Charging target voltage (V)	10,0-32,0 (Lithium, Standard: 14,4)	
	charge recovery Voltage (V)	9,2-31,8 (Lithium, Standard: 14,0)	
	Low Voltage Cutoff (V)	9,0-30,0 (Lithium, Standard: 10,6)	
	low voltage again compound (V)	9,6-31,0 (Lithium, Standard: 12,0)	
	Battery type	Gel, AGM, Liquid Electrolyte, Lithium (Standard: Gel)	
PV Module Parameter	Max. voltage at PV terminal (V) *1 Maximum	100 (-20°C), 90 (25°C)	
	input power (W)	260 / 520 520 / 1040	3.0-10.0 / 6.0-20.0
	day/night threshold (V)	(Standard: 8/16)	
	MPPT-Trackingbereich (V)	(Batteriespannung + 1,0) -Voc*0.9 *2	
Last	Output current (A)	20	30
	Charging mode	Permanent On, Twilight, Night, Manual (Default: Permanent On)	

	Designation	A100/20	A100/40
System Parameter	Maximum efficiency (%)	>99,9	
	Maximum Charge Conversion (%)	98,0	
	Dimensions (mm)	136,6*136,6*67,1	196,5*136,6*97,1
	weight (kg)	0,83	1,30
	Own consumption (mA)	<12	
	Communication RS485	(Interface RJ25 6P6C), Bluetooth	
	Optional	IoT	
	grounding	Common negative pole	
	Power connections (mm²)	16 (6AWG)	
	Ambient temperature (°C)	-20 - +55	
	Storage temperature (°C)	-25 - +80	
	Humidity (%)	0 - 100	
	degree of protection	IP32	
	Maximum height (m)	4000	

*1 Maximum solar panel voltage at minimum operating temperature.
*2 Voc: PV module open circuit voltage.
*3 Slash: separate values for 12V, 24V, 36V and 48V nominal system voltage.

11. Specifications A150/60

	Designation	A150/60
Battery Parameter	Maximum charging current (A)	60
	System Voltage (V)	12 / 24 / 36 / 48 (automatic detection) before the boost
	MPPT-Ladespannung	or equalizer charging stage 14-14.8 / 28-29.6 /
	Boost Voltage (V)	42-44.4 / 56-59.2 @25°C (Standard: 14,5/29/43,5/58) 14-15 /
	Compensation Voltage (V)	28-30 / 42-45 / 56-60 @ 25°C (Standard: 14,8 / 29,6 / 44,4 / 59,2) (Liquid, AGM battery) 13-14.5 /
	Float Voltage (V)	26-29 / 39-43.5 / 52-58 @ 25°C (Standard: 13, 7/27 ,4/41, 1/54,8)
	Undervoltage (V)	10,8-11,8 / 21,6-23,6 / 32,4-35,4 / 43,2-47,2 (Standard: 11,2/22,4/33,6/44,8)
	Reconnection Voltage (V)	11,4-12,8 / 22,8-25,6 / 34,2-38,4 / 45,6-51,2 (Standard: 12/24/36/48)

	Designation	A150/60
Battery Parameter	overcharge protection (V)	15,8/31,3/46,8/62,3
	Max. battery terminal voltage (V)	65
	Temperature Compensation (mV/K)	-4.17 per cell (boost, balance) -3.33mV/ K per cell (maintenance)
	Charging target voltage (V)	10,0-64,0 (Lithium, Standard: 29,4)
	charge re- Manufacturing Voltage (V)	9,2-63,8 (Lithium, Standard: 28,7)
	low voltage Shutdown (V)	9,0-60,0 (Lithium, Standard: 21,0)
	Low Voltage Reconnect (V)	9,6-62,0 (Lithium, Standard: 22,4)
	Battery type	Gel, AGM, Liquid Electrolyte, Lithium (Standard: Gel)
PV Module Parameter	Max. PV terminal voltage (V) *1 Maximum	150 (-20°C), 138 (25°C)
	input power (W)	750 / 1500 / 2250 / 3000
	day/night threshold (V)	3,0-10,0 / 6,0-20,0 / 9,0-30,0-40,0 (Standard: 8/16/24/32)
	MPPT-Trackingbereich (V)	(Batteriespannung + 1,0) – Voc *0,9 *2
Last	Output current (A)	30
	Charging mode	Permanent On, Twilight, Night, Manual, (Default: Permanent On)
System Parameter	Maximum tracking efficiency (%)	>99,9
	Maximum charge conversion (%)	98,0
	Dimensions (mm)	262,5 x 186,5 x 97,5
	weight (kg)	2,5
	Own consumption (mA / V)	<6 (12), <2 (24/36/48)
	Communication	Bluetooth, RS485 (RJ25 6P2C interface)
	Optional	IoT
	grounding	Common negative pole
	Power connections (mm²)	16 (6AWG)
	Ambient temperature (°C)	-20 - +55
	Storage temperature (°C)	-25 - +80
	Humidity (%)	0 - 100
	degree of protection	IP32
	Maximum height (m)	4000

*1 Maximum solar panel voltage at minimum operating temperature.
*2 Voc: PV module open circuit voltage.
*3 Slash: separate values for 12V, 24V, 36V and 48V nominal system voltage.

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If you have any questions, please do not hesitate to contact us!

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