

## Steca Tarom MPPT 6000-S, 6000-M

The Steca Tarom MPPT solar charge controller sets new standards in the area of Maximum Power Point trackers. Outstanding efficiency along with unique safety features make it a universal top-grade charge controller.

There are two inputs that can be connected in parallel or used separately. Each input has its own MPP tracker. So there are two charge controllers available in one device. Different module arrays can be flexibly combined in one charge controller.

With an input voltage of up to 180 V, all kinds of solar modules can be used in various connection schemes. This charge controller combines high flexibility, maximum yields, professional battery care and an appealing design on the basis of advanced technology. One Steca Tarom MPPT 6000-M can communicate with up to 22 Steca Tarom MPPT 6000-S units.

### Product features

- Two independent maximum power point trackers (MPP trackers)
- Two inputs (connected in parallel or used separately for two different module arrays)
- Robust metal casing
- Comprehensive data logging of energy values for up to 20 years
- MicroSD slot for data logging of all minute values (6000-M only)
- Voltage and current regulation
- Temperature compensation
- Monthly maintenance charge
- Three configurable multifunctional contacts (6000-M only)
- Adjustable cut-off voltages
- Battery type: gel/liquid lead battery (for 6000-M also Li and NiCd batteries)
- Integrated, automatic module switch
- 36 V and 60 V batteries can be charged with special settings in expert menu level
- Parallel connectable

### Electronic protection functions

- Overcharge protection
- Reverse polarity protection of module and battery
- Automatic electronic fuse
- Open circuit protection without battery
- Reverse current protection at night
- Overtemperature and overload protection
- PE connection

### Displays

- Multifunction graphical LCD display with backlighting
- Configuration via display unit

### Interfaces

- StecaLink Bus
- Open Steca RS-232 interface (6000-M only)
- Battery emergency off signal connection (optional, 6000-M only)

### Options

- Connection for battery voltage sensor cable

### Certificates

- Compliant with European Standards (CE)
- RoHS compliant
- Made in Germany
- Developed in Germany
- Manufactured according to ISO 9001 and ISO 14001

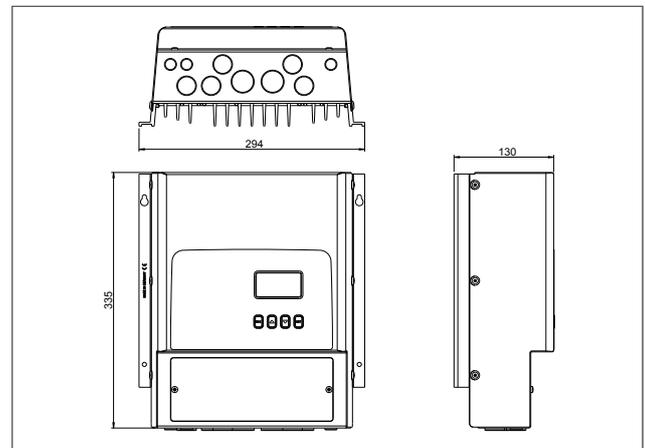
### Steca accessories

- External temperature sensor Steca PA TS-S (for 6000-M included in the scope of delivery)
- Data cable Steca PA CAB3 Tarcom (6000-M only)
- Current sensor Steca PA HS400 (6000-M only)

ADVANCED



60 A



	6000-S / 6000-M
<b>Characterisation of the operating performance</b>	
System voltage	12 V / 24 V / 48 V
Nominal power	900 W / 1,800 W / 3,600 W
Max. DC-DC efficiency	99.4 % ( $U_{\text{Batt}}=48 \text{ V}$ ; $U_{\text{in}}=70 \text{ V}$ ; $P=0,65 \cdot P_{\text{nom}}$ )
European efficiency	96.6 % ( $U_{\text{Batt}}=24 \text{ V}$ ; $U_{\text{in}}=30 \text{ V}$ ) 98.9 % ( $U_{\text{Batt}}=48 \text{ V}$ ; $U_{\text{in}}=70 \text{ V}$ )
European efficiency (weighted across all $U_{\text{Batt}}$ and $U_{\text{in}}$ )	96.4 %
Static MPP efficiency	99.9 % (DIN EN 50530)
Dynamic MPP efficiency	99.8 % (DIN EN 50530)
Weighted REW (Realistic Equally Weighted efficiency)	94.8 %
Own consumption	< 1 W
<b>DC input side</b>	
Min. MPP voltage / input	17 V / 34 V / 68 V
Max. MPP voltage / input	180 V*
Min. open circuit voltage solar module / input (at minimum operating temperature)	20 V / 40 V / 80 V
Max. open circuit voltage solar module / input (at minimum operating temperature)	200 V*
Module current	2 x 30 A / 1 x 60 A
<b>Battery side</b>	
Charge current	60 A
End of charge voltage	14.1 V / 28.2 V / 56.4 V
Boost charge voltage	14.4 V / 28.8 V / 57.6 V
Equalisation charge	15 V / 30 V / 60 V
Set battery type	liquid (adjustable via menu)
<b>Operating conditions</b>	
Ambient temperature	-25 °C ... +50 °C
<b>Fitting and construction</b>	
Terminal (fine wire)	35 mm <sup>2</sup> - AWG 2
Degree of protection	IP 31
Dimensions (X x Y x Z)	294 x 335 x 130 mm
Weight	approx. 6,300 g

programmable

Technical data at 25 °C / 77 °F

\* Starting software version PU-APP 1.2.0

# DOUBLE AWARDEE

The Steca Tarom MPPT solar charge controller sets new standards in the area of Maximum Power Point trackers. Therefore the Steca Tarom MPPT 6000-M has won even two famous awards

The Steca Tarom MPPT 6000-M dual MPPT peak charge controller, which won the renowned OTTI Innovation Prize, was awarded the Intersolar Award 2014 at the world's largest trade fair for the solar sector.

This innovative product won over the judges due to its outstanding benefits. At 3.6 kW, the unit is suitable for use with all types of lithium-ion batteries. In addition to complex charging algorithms, the charge controller features battery diagnosis, a long-term data logger, interfaces and exceptionally high efficiency: the Steca Tarom MPPT 6000-M is the first charge controller to achieve a conversion efficiency of 99 percent as measured in the field. The unit provides extremely practical answers to issues raised by the current wave of technological change gripping the photovoltaic sector.



## Overview of functions:

	Tarom MPPT 6000-S	Tarom MPPT 6000-M
Comprehensive, integrated data logger for 20 years of data recording	✓	✓
Buzzer for alarms	✓	✓
Three configurable multifunctional contacts for... <ul style="list-style-type: none"> <li>• ... programmable deep discharge protection (LVD)</li> <li>• ... generator/surplus manager</li> <li>• ... automatic switch functions (day, evening, night)</li> <li>• ... four timers</li> </ul>		✓ ✓ ✓ ✓
Unique lithium-ion battery charge strategy		✓
Innovative charge strategy for NiCd batteries		✓
Determination of the actual battery capacity during ongoing operation		✓
Optimised SOC algorithm		✓
IUIa charging for increased battery capacity (optional)		✓
Capacity test		✓



**Revolutionary innovative algorithms for lead batteries**

### State of charge (SOC):

The Steca Tarom MPPT 6000-M is equipped with a new type of highly-flexible algorithm for precise state of charge (SOC) calculation enabling automatic adaptation to battery and user behaviour. This enables the current state of charge to be assessed at any time.

### Battery capacity test

The Steca Tarom MPPT 6000-M has an entirely new and professional battery capacity measurement system, which determines the actual capacity of the battery. To date, capacity generally had to be measured by the battery manufacturer in a complex process or locally with additional measuring equipment. In the Steca Tarom MPPT 6000-M, the Steca PA HS400 electricity sensor can measure the capacity and supply information on battery ageing.

This revolutionary new development provides advanced inspection options for users, operators and manufacturers – e.g. for awarding battery warranties based on the actual residual capacity.

### IUIa charging:

Depending on the type of battery and its state, the battery capacity can be increased by up to 20 percent by means of a constant current charge phase following full charging (IUIa charging). This function is now available for the first time for stand-alone PV systems too in the Steca Tarom MPPT 6000-M.



**Professional charging strategy for all lithium-ion batteries**

The Steca Tarom MPPT 6000-M is the first MPPT charge controller to also offer the option of charging lithium-ion batteries professionally using PV current. The latest research results in this area were used in its development, which took place in close cooperation with renowned, international research institutes. A self-developed charge strategy can be perfectly adapted to all available lithium chemistries using a wide range of parameters.



**Professional charging of NiCd batteries**

Alkaline chemicals like NiCd batteries can also be charged using the innovative Steca Tarom MPPT 6000-M. A professional, configurable charging characteristic curve is available for this, which can be adapted to special battery and system prerequisites. Particularly with professional use, this charge strategy opens up entirely new possibilities.

**Greater efficiency. Greater flexibility. Greater comfort.  
Less devices. Less modules. Less costs.**

**Save in the right places with Steca Tarom MPPT**

With its innovative functions, the Steca Tarom MPPT not only offers greater efficiency, flexibility and comfort but also helps to avoid certain unnecessary costs that are incurred during the planning, implementation and ongoing operation of PV systems.

**No need for additional devices!**

**... due to added flexibility as a result of the wide input voltage range**

The Steca Tarom MPPT can be used with a wide input voltage range, which allows greater flexibility when selecting modules.

**... due to the two separate inputs**

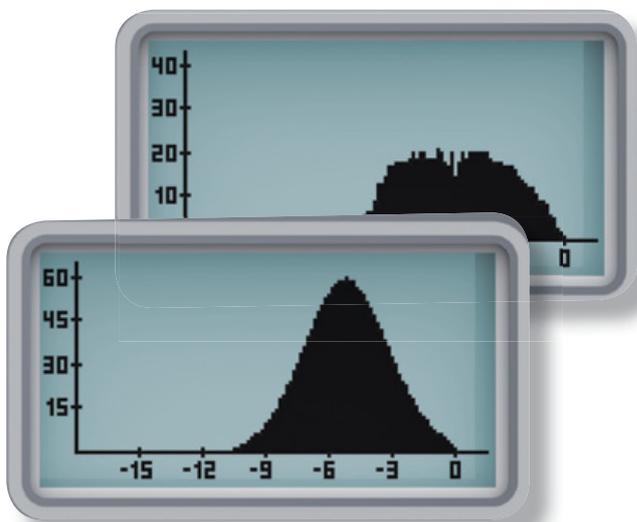
Two inputs each with independent MPP tracking in one charge controller provide greater options when it comes to system planning. With the Steca Tarom MPPT you can not only vary the module types for each input but the circuits too. Series and parallel circuits can be combined easily in one system using the universal and flexible Steca Tarom MPPT. There is no need for an external module circuit box as all module strings can be connected directly to the charge controller leading to savings on installation costs.

**... due to two maximum power point trackers (MPPT)**

The two independent separate maximum power point trackers enable various module types to be used with just one Steca Tarom MPPT charge controller. Leftover module stock can also be used in a system without any problems. Significantly greater options are also available when upgrading existing systems – without the extra cost of replacing an existing charge controller. The Steca Tarom MPPT is particularly suitable for systems where partial shading of the module array is unavoidable. Due to the two separate MPP trackers, the charge controller can power different strings with an individually adjusted MPP. This enables the maximum efficiency to be exploited for each string enhancing the total output of the system – in spite of partial shading. The same principle applies also for use on roofs or areas with various angles of inclination or orientations.

**... due to the comprehensive, integrated data logger**

The Steca Tarom MPPT is equipped with a unique, comprehensive data logger, which enables data of the two inputs to be monitored and saved independently over a period of up to twenty years. The previous 18 hours can be graphically displayed. Daily, monthly and annual totals are summarised automatically for an outstanding overview of system utilisation at a glance.



**No need for additional modules!**

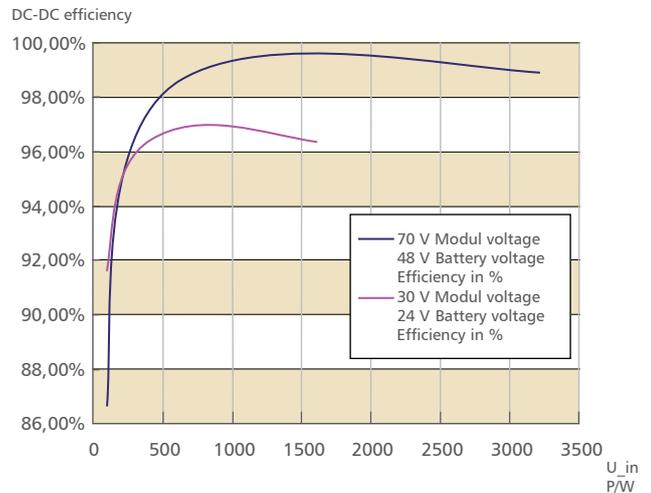
**... due to the extra high efficiency**

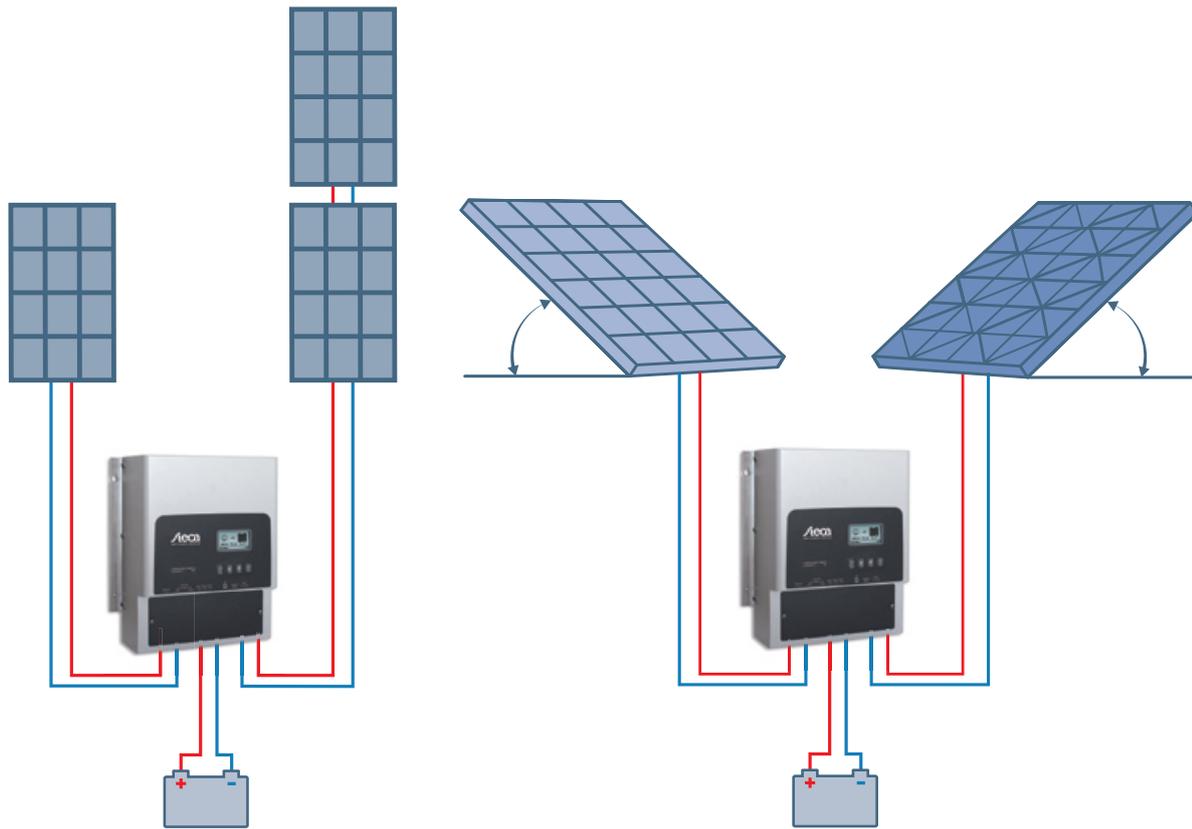
The Steca Tarom MPPT is one of the few MPPT charge controllers that can reliably attain a high and – more importantly – constant efficiency across all input and output voltage ranges. The high level of reliability of the MPPT solar charge controller enables you to obtain even more power from your PV system. For example, significantly less energy is lost due to unnecessary heat losses. Conversely this means that, using the same power, as much as an entire module can be saved during planning if required. Particularly with limited mounting options or a limited budget this is an indisputable benefit.

**Save time and effort during installation!**

**... due to the easily accessible, easy-to-connect terminals**

The extra spacious connection terminal area can be accessed via two screws on the front of the device meaning installation of cables with a thickness of up to 35 mm<sup>2</sup> is simple, fast and secure. An integrated module switch means the Steca Tarom MPPT can be connected without any voltage connection, sparks or light arcs. Only when the charge controller is switched on via the menu are the module arrays connected up. This makes installation child's play.





**Enjoy numerous added benefits!**

**User-friendly graphical LCD display**

All system states are displayed intuitively via icons on the graphical multifunction display enabling simple understanding of the energy flow. All parameters can be configured using the multi-lingual, intuitive menu.

**Communication options**

The StecaLink bus facilitates communication between a Steca Tarom MPPT 6000-M and up to 22 further Steca Tarom MPPT 6000-S units. Accessories like the Steca PA HS400 electricity sensor or the Steca PA Link1 parallel switch box can also be integrated via the StecaLink bus. All currents and other data are recorded in this way in the system and tracked in the data logger. The charge controller determines and displays the battery's current state of charge (SOC) (Steca PA HS400 and/or PA Link1 required). The connected Steca Tarom MPPT 6000-S units even continue working in a special redundancy mode when communication errors occur. The Steca Tarom MPPT 6000-M also has an RS-232 interface, which can output all relevant system data once a minute. A MicroSD card slot allows you to record comprehensive data for all devices in the StecaLink communication system on a standard MicroSD card. Professional control of loads and generators is possible via the multifunctional contacts.

The Steca Tarom MPPT 6000-M is equipped with three multifunctional contacts, which can be programmed independently of one another. These versatile individual functions can be combined virtually as required:



**Function overview of multifunctional contacts:**

**Deep discharge protection**

Deep discharge protection automatically protects the battery against harmfully low levels of discharge. All voltage thresholds can be freely configured via a menu based either on the battery's current state of charge (SOC) or on the battery voltage.

**Evening, night light and daylight function**

The charge controller allows configuration of three different automatic timer functions: evening light, night light and daylight. All the important time and delay values can be set with this. With the evening light function, the load is automatically switched on at sunset and the time after which the load is switched off again can be individually specified. The night light function specifies the time after which the load is switched on after sunset and switched off again before sunrise. With the morning light function, the load is switched on automatically at night and automatically switched off again at sunrise.

**Four freely programmable timers with week day function**

The four freely programmable timers can be set individually based on day of the week, start and finish time. With the week day function, each timer can be used for just one or several days of the week at a time if required.

**Generator function**

Using the generator function, the Steca Tarom MPPT 6000-M – based on the SOC or the battery voltage – can start a generator automatically when the battery is discharged, and switch this off again when the battery is full. Using the surplus manager, an additional load can be activated automatically when the battery is full. This is switched off again as soon as no more energy surplus is available in the solar system. This guarantees that all available energy is used.