

# PA HS400 Current Sensor



## Installation and User Instructions Accessory for Tarom MPPT 6000-M

# Datasheet and Operating Instructions

PA HS400 current sensor for the Tarom MPPT 6000-M

## General information :

Actual PV systems can be quite complex. Due to the high power going into and out of the battery, it is commonly necessary to connect the load or external chargers directly to the battery. The high sophisticated state of charge (SOC) algorithm of the MPPT 6000-M regulator needs to know about this external

currents. The HS400 sensor measures currents up to 400A and transmits them to the MPPT 6000-M. Since the current measurement is potential free using a magnetic hall sensor, it is not necessary to cut off the wire and insert a shunt resistor. Up to 8 HS400 sensors can be part of your PV-installation. All relevant data will then be available for the MPPT 6000-M for Indication, data logging and state of charge calculation.



## Three sensor types :

The HS400 is connected to the regulator via a patch cable. The power supply and data transfer runs through this cable. There are three different sensor modes: load sensor, charge sensor and charge/load sensor. The working mode of the HS4000 is selected at MPPT 6000-M display.

In “charge/load mode” the H400 detects all currents through the main battery cable, in “load mode” the sensor is used to detect the load currents. In “charge mode” all external charging devices (diesel generators, wind generators or else) which are not controlled by the MPPT 6000-M itself. These currents are shown at the LC display.

A single charge/load sensor will be enough to support the MPPT 6000-M with all necessary current data of your PV-system.

## Installation:

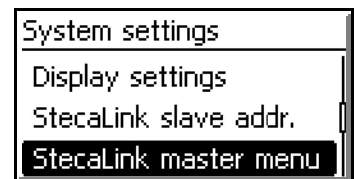
In a PV installation you can use up to eight HS400 current sensors. Each sensor must have its own unique address number in the range of 40..49 for the StecaLink data bus. The address number can be set at the rotating switch on the left side of the HS400. Use a small screw driver for setting. The indicated

numbers 0..9 stand for address #40..49. Please restart the HS400 after changing the address number.

- 1) Lead the DC main cable through the hole in the HS400 case. Check the right direction (+ / -) on the HS400 case ! The adhesive label shows to the negative side. The current direction can be changed later via the MPPT 6000-M display.
- 2) Then attach the included patch cable to the charge regulator. The HS400 works as a StecaLink slave with the MPPT 6000-M as a StecaLink master. If you have more than one HS400 to install, you can connect them in a chain, using the two StecaLink sockets on the HS400. On the last HS400 in the chain you should plug in the included termination resistor. This stabilizes the data transmissions and prevents from distortions.

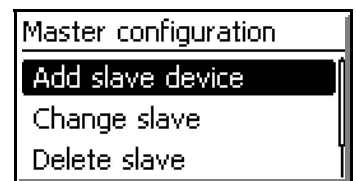
### Configuration:

Except the address selection at the HS400 rotating switch, all configuration settings have to be done at the charge regulator.



- register this HS400 in the StecaLink bus:  
main menu» system settings » StecaLink master » add slave :

1. Press [SET] > -1-- blinks
2. press [SET] again and press [UP] / [DOWN] to set to the address #0..9 of your sensor. The internal address number range for current sensors is 40..49.
3. Press [SET] to confirm your address #.



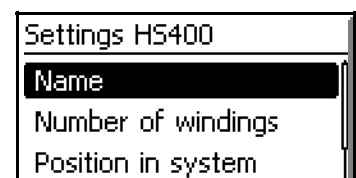
The master tries to connect to the HS400 with this address number. <HS400> will be indicated upon success. If no HS400 with this number is found, you will see <no slave found>. If there is already another HS400 using this number you will read: <address in use>



4. press [SET] to confirm or [ESC] to cancel

- configuration of name, coil, position in system, direction and zero adjust:

»**Name:** choose your own description name for this sensor (up to eight ASCII characters:  
!"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLM  
NOPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxy{  
|}~ .



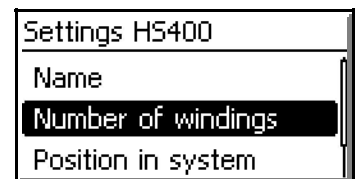
1. press ^ \ to select "name".
2. press [SET] to change the slave displayname.



3. press  $\wedge \vee$  to choose character position
4. press [SET], cursor is blinking.
5. press  $\wedge \vee$  for the right character.
6. pres [SET] to confirm character.
7. repeat 1.-6. for up to eight characters.
8. pres [ESC] to quit

»**number of windings**: for small currents far below 400A ,you can improve the resolution of your measurement. If you wind the current cable several times through the HS400, the current sensing is multiplied. Then you have to set the number of coils in the configuration part. Default is 1, but you can use up to 254 windings.

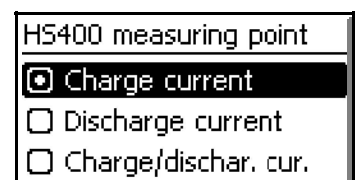
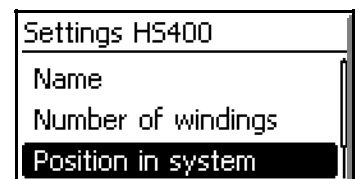
1. press  $\wedge \vee$  to select “coil”
2. press [SET] to change the coil number
4. press [SET], cursor is blinking at the number .
5. press  $\wedge \vee$  to change the number.
6. pres [SET] to confirm the number.
7. pres [ESC] to quit



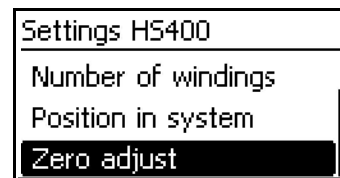
»**position in system** the HS400 can be a charging sensor, for any source charging the battery. A load sensor for any loads connected to the battery. For these both types the direction of the current is fixed by the type of the sensor.

Or you specify the HS400 as a charge/discharge sensor, for example on the main battery cable. In these cases the direction of the current will be important. You can invert the **current direction** in the menu.

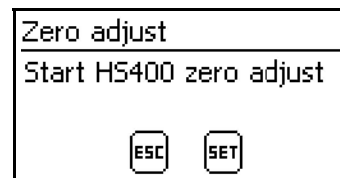
1. press  $\wedge \vee$  to select “position in system”.
- 2 press [SET] to confirm for menu “position”
3. press  $\wedge \vee$  to select right position
4. press [SET] to confirm
5. press [ESC] to quit



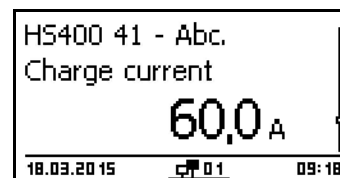
»**zero adjust:** The current measurement used in the HS400 depends on magnetic fields. If there are magnetic distortions inside the sensor, this can result in inaccurate current values and a wrong zero position. To reset the zero position of the HS400, make sure that no current is flowing through the sensor and activate the menu zero adjust. Wait for about ten seconds for a complete reset.



1. press  $\wedge \vee$  to select “zero adjust”.
- 2 press [SET] to confirm for dialog “zero adjust”
4. press [SET] and hold for one second to start adjustment  
The red LED will blink to confirm adjustment
5. or press [ESC] to quit without adjustment



- all registered HS400 sensors will be shown in the status menu of your charge regulator with their names. They will be part of your PV-system and contribute to a correct state of charge (SOC) calculation.



### Operation:

After installation the charge regulator gets each 4s the actual current values from the HS400. Each data transmission is visualized by the blinking green info LED.

### Indication:

- the green LED shows data transmissions between charge regulator and HS400.
- the red LED will show you over currents above 400A. For better detection the LED will stay on for at least 10 seconds, even if the current peaks are very short. The maximum current measured and indicated will be limited to 400A. However, over currents will not damage the sensor. You should check the zero position and probably do a zero adjust after an over current condition.

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## **Transferability of the commercial guarantee**

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The guarantee described here is not transferable to a third party. The customer shall not transfer his rights or responsibilities resulting from this in any way, without the prior written approval of Steca Elektronik GmbH. Furthermore, Steca Elektronik GmbH shall in no case be liable for indirect damage or loss of profit. Unless otherwise specified by any applicable compulsory legislative regulations, Steca Elektronik GmbH shall also not be liable for any other damages other than those for which Steca Elektronik GmbH has hereby explicitly accepted liability.

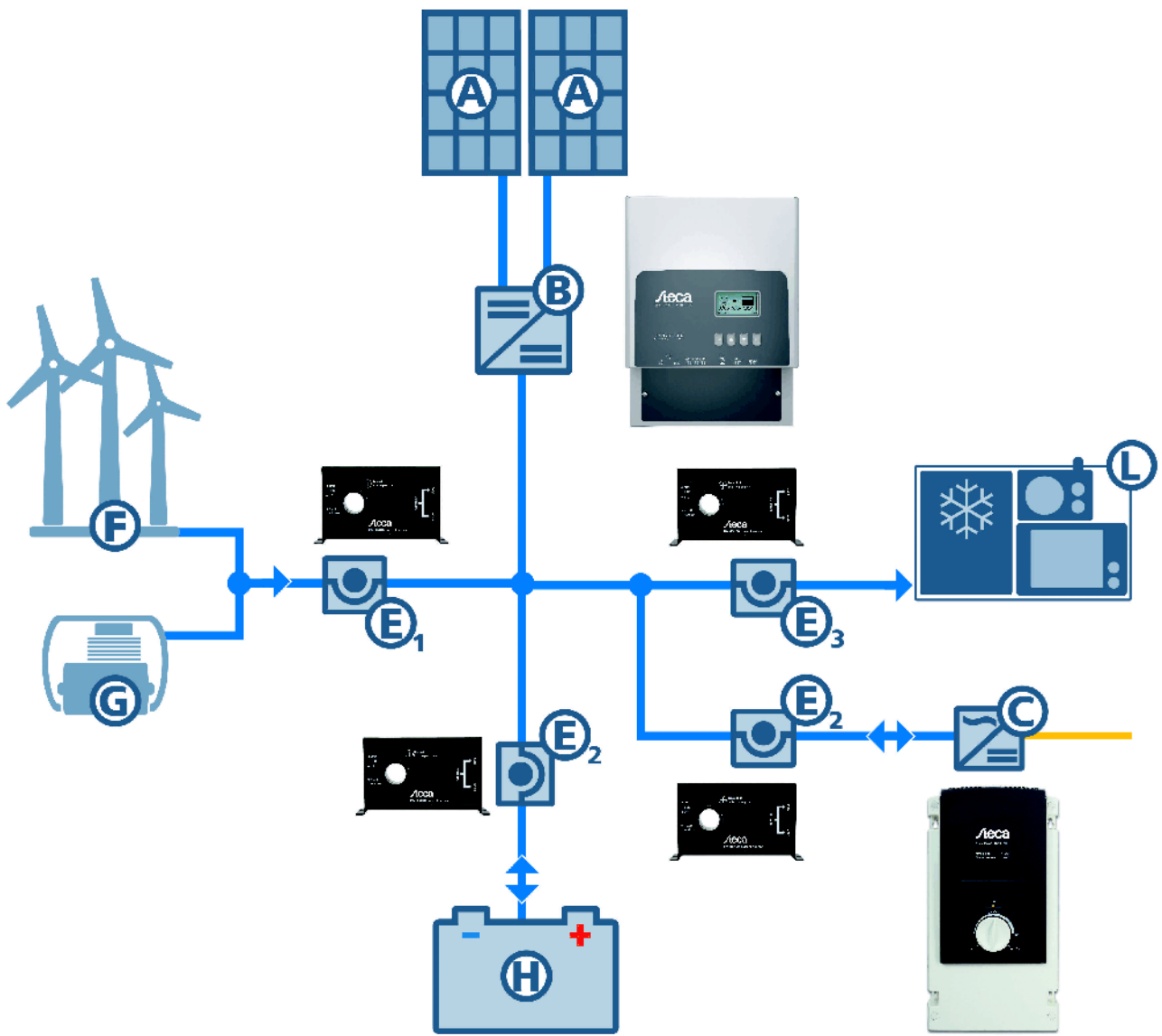
## General rules

Claims of the commercial guarantee entitled operator from this commercial guarantee are only transferable to a third party with the previous written approval of Steca.

The effectivity of the remaining rules of the commercial guarantee remains unaffected should one of the stipulations in this commercial guarantee be or become ineffective. In place of the ineffective stipulation or stipulation that becomes ineffective, an effective rule is automatically agreed, that comes as closely as possible to the ineffective stipulation/stipulation that becomes ineffective in terms of its economic content. In the case of a missing stipulation, the preceding rule applies accordingly. This commercial guarantee is exclusively subordinate to the legislation of the Federal Republic of Germany excluding the regulations of international private law and UN CISG (Convention on Contracts for the International Sale of Goods). The exclusive place of jurisdiction for all contentions resulting from or in connection with this commercial guarantee is Memmingen, Germany; provided the customer is a registered trader.

<b>Technical data</b>	<b>HS400</b>
operating voltage (via regulator)	10-60V
quiescent power	$\leq 200\text{mW}$
nominal current	+/- 400A
current range	-400A .. +400A / $\pm 10\%$
precision   resolution	$\pm 2\%$ / +0.2A   0,1A
sample/transfer interval	8 sec
indication	red & green LED
address range	#40..#49
operating temperature range	-25...50°C
max. admissible humidity	75 %
ingress protection of enclosure	IP22
case	aluminium
max. cable diameter for current sensor	22mm
overall dimensions	140 x 80 x 28mm
weight incl. accessories	250g





## Integration of the HS400 in your PV-Installation

- A Solar modules
- B Tarom MPPT 6000-M charge controller
- C Sinewave inverter (e.g. Solarix PI)
- E1 PA HS400 (mode: charge sensor)
- E2 PA HS400 (mode: charge- / discharge sensor)
- E3 PA HS400 (mode: discharge sensor)
- F Wind generator
- G Diesel generator
- H Batteries
- L Electrical load (DC)

