

Solar Charge Controller



Tarom 4545 - 4548

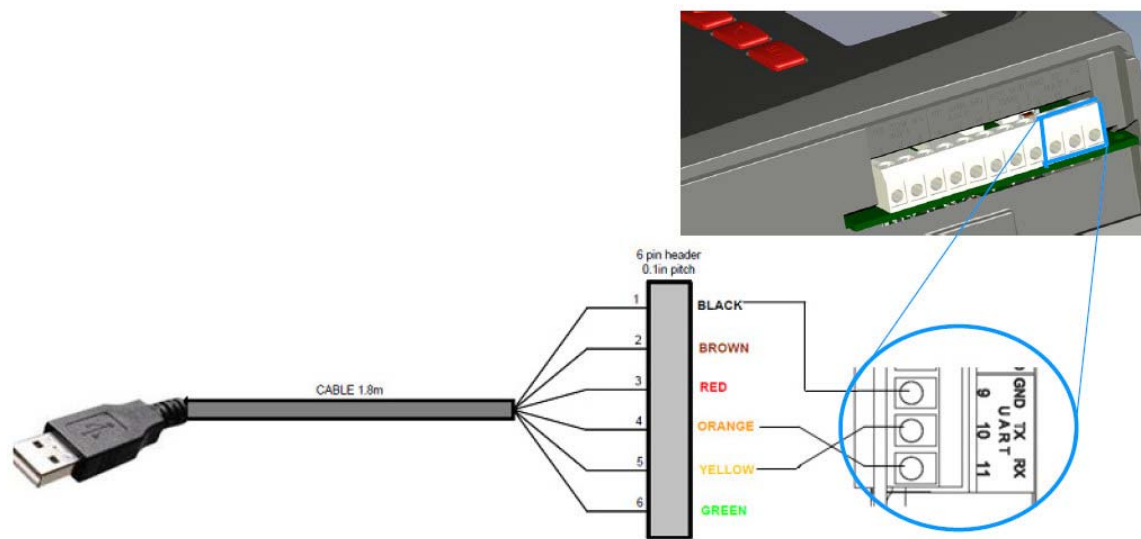
additional UART operating instructions

Instructions for connecting the Tarom 4545 and Tarom 4545-48 to a serial interface on a computer or microcontroller

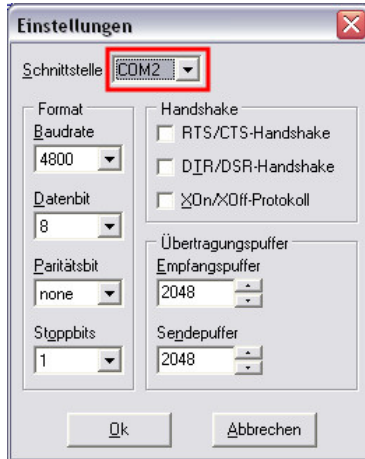
1. Use the PA CAB2 data cable to connect your Tarom to the USB port on your PC:

(If you are using a microcontroller instead of a PC: The PA CAB2 is probably not required. The UART output signal of the Tarom is between 0V and 3.3V and can, depending on your microcontroller, be connected directly to the UART on the controller. Please note that the UART output from the Tarom is not galvanically isolated.)

Cut the 6 pin header from the PA CAB2, remove about 5mm of insulation from the end of the black, yellow and orange cables and connect them to the Tarom as follows:

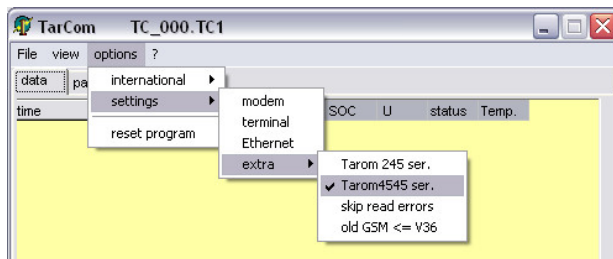


- Transmit of CAB2 (4 orange) to receiver of the Tarom (11 RX)
 - Receiver of CAB2 (5 yellow) to transmit of the Tarom (10 TX)
 - GND of CAB2 (1 black) to GND of the Tarom (9 GND)
2. Install the FTDI driver software from here if you are using Windows or Mac OS X (for most Linux distributions the drivers are included from kernel version 3.0.0-19):
<http://www.ftdichip.com/Drivers/VCP.htm>
 3. Plug the USB end of the PA CAB2 into a USB port on your computer. Now, under Windows, find out the COM port number in your device manager. The CAB2 should show up as "USB Serial Port (COM XX)" under the "Ports (COM & LPT)" device category. Please note this COM port number. We will use COM2 as an example.
 4. If you have not yet installed the TarCom software please do so now by launching the SETUP file for Windows.
 5. Switch the serial/UART interface of your Tarom under "System settings → Open UART/RS232" to "On". Make sure that the date and time of the Tarom are set.
 6. You can now launch the TarCom software from your start menu on your PC.
 7. In the Tarcom program select the COM port you have noted before in step 3 under "File → interface → user defined". In our example this was COM2:

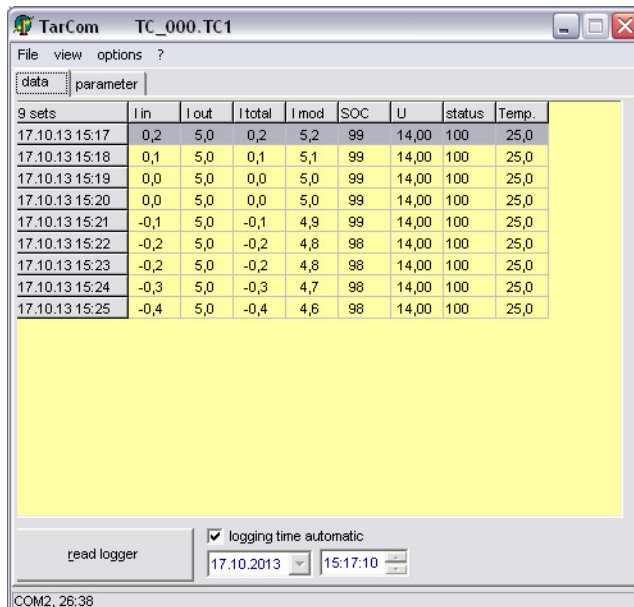


Leave the remaining fields as they are by default.

- Under "options → settings → extra" select "Tarom4545 ser.". This will activate the checkmark beside the "Tarom4545 ser." entry as shown below:

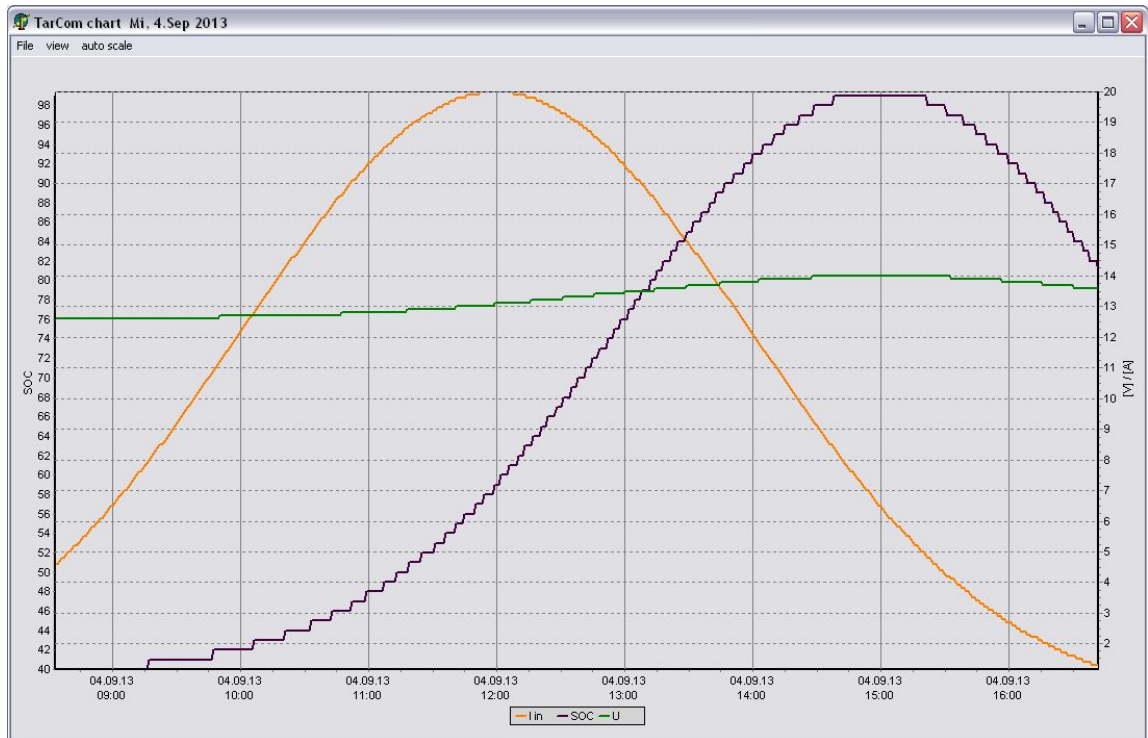


- If you wait a few minutes you should start seeing a new data entry about once every minute in the Tarcom program:



- Under "view → system analysis" you will find a graphical display of the energy flows in your PV system.

11. Once data has been collected for a few hours you can find that data in a chart under "view → Chart":



12. As long as you wish to collect data the PC must be on with the Tarcom software running.
13. If you are using a Mac or Linux PC (or on Windows as well if you do not wish to use the Tarcom software) you can still read the data through a serial console/terminal. The relevant settings for the terminal program are:
- 4800 baud
 - 8 data bits
 - No parity
 - 1 stop bit
 - No flow control
14. These settings will allow you to collect the data through your serial port. You can then save that data with your serial program. As mentioned a new data set is sent every 60 seconds +/- 1s.
15. For more information on the meanings of the data string please download the full operating instructions from our website, this also has a complete protocol description:
http://www.steca.com/index.php?Steca_Tarom_en

16 Protocol of the open UART interface

16.1 Settings

Signal / information	Value	Units	Action
RS232 data output	OFF		RS232 output switched on/off via the display
RS232 data output	ON		RS232 output switched on/off via the display
RS232 bits per second	4800	Baud	Fixed value, not configurable
RS232 data bits	8	bit	8 bit data, fixed value, not configurable
RS232 parity	none		Fixed value, not configurable
RS232 stop bits	1		Fixed value, not configurable
RS232 flow control	none		Fixed value, not configurable
RS232 transmission interval	60 ± 1	s	<ul style="list-style-type: none"> ■ The data is output at a non-configurable fixed interval of 60 s. ■ No external transfer request
RS232 data output			<ul style="list-style-type: none"> ■ Data is output in a fixed, non-configurable sequence. ■ The units are not specified, e.g. V, A, °C, Ah. ■ The values are sent as ASCII characters. ■ The decimal point is denoted with a full-stop. A maximum of 1 decimal character is displayed. ■ A semicolon { ; } is output as the separating character between values. ■ If a value is not available then {#} is output. ■ A CRC 16 using the CCITT polynomial, 2 bytes long, high byte, low byte is created. The CRC is calculated including semicolons but excluding CR + LF. ■ A CR + LF sequence is output at the end of the data transmission.

16.2 Data

Signal / information	Value	Units	Action
RS232 data info 1	Version number		1, compatible with MPPT and Tarom 4545
RS232 data info 2	Date		YYYY/MM/DD
RS232 data info 3	Time		hh:mm, 24 h format

Signal / information	Value	Units	Action
RS232 data info 4	Battery voltage U_{bat}	V	Value and format corresponding to the battery display setting (value from RS485 Master)
RS232 data info 5	Module voltage 1, string 1, U_{mod1}	V	Value and format corresponding to display setting (value from RS485 Master)
RS232 data info 6	Module voltage 2, string 2, U_{mod2}	V	Value and format corresponding to display setting (value from RS485 Master); Tarom 4545 only
RS232 data info 7	State of charge SOC	%	Value and format corresponding to display setting (value from RS485 Master)
RS232 data info 8	SOH (State of health)	%	Value and format corresponding to display setting (value from RS485 Master); Tarom 4545 only
RS232 data info 9	Total battery current $I_{\Sigma bat}$	A	<ul style="list-style-type: none"> ■ Battery charge current for Master + battery charge current for Slave (0...x) + battery charge current for external current sensors (0...x) ■ Charge current is shown as a positive value ("+" is not shown) ■ Discharge current is shown as a negative value ("–" is shown) ■ Value and format corresponding to display setting ■ Value and format corresponding to battery current display setting
RS232 data info 10	Maximum module input current 1, string 1	A	<ul style="list-style-type: none"> ■ $I_{PV\ max}$ (PWM switched on) ■ Module input current is shown as a positive value ("+" is not shown)
RS232 data info 11	Maximum module input current 2, string 2	A	<ul style="list-style-type: none"> ■ $I_{PV\ max}$ (PWM switched on) ■ Module input current is shown as a positive value ("+" is not shown) ■ Tarom 4545 only
RS232 data info 12	Momentary module input current	A	<ul style="list-style-type: none"> ■ $I_{PV\ in} = I_{bat} + I_{load}$ ■ Module current is shown as a positive value ("+" is not shown)
RS232 data info 13	Total charge current (shunts over all generators)	A	<ul style="list-style-type: none"> ■ Charge current for Master + charge current for Slave (0...x) + charge current for external current sensors (0...x) ■ Total charge current is shown as a positive value ("+" is not shown) ■ Value and format corresponding to display setting
RS232 data info 14	Device load current	A	Discharge current is shown as a negative value ("–" is shown)

Signal / information	Value	Units	Action
RS232 data info 15	Total load current/discharge current	A	<ul style="list-style-type: none"> ■ Discharge current is shown as a negative value ("-" is shown) ■ Sum of battery discharge currents for external current sensors (0...x) ■ Value and format corresponding to display setting
RS232 data info16	Temperature of the battery sensor used (internal/external)	°C	<ul style="list-style-type: none"> ■ Set "-" (minus) as {-} before the value, no "+" (plus); (value from RS485 Master) ■ Output integer values ■ With Master/Slave system only the value of the sensor connected to the Master is used. Individual devices do not have RS232!
RS232 data info 17	Error status		0 = no error, 1 = info, 2 = warning, 3 = error
RS232 data info 18	Charging mode		<ul style="list-style-type: none"> ■ Information on the currently active charging mode (float, boost, equalise, IU/A, NiMH, li-ion); (value from RS485 Master) ■ Letter corresponding to status display
RS232 data info 19	Load		Load switch: 0 = off, 1 = on
RS232 data info 20	AUX 1		Relay 1: 0 = off, 1 = on
RS232 data info 21	AUX 2		Relay 2: 0 = off, 1 = on
RS232 data info 22	Max. Ah into the battery over 0 – 24 hours	Ah	Output integer values
RS232 data info 23	Max Ah into the battery since initial commissioning	Ah	Output integer values
RS232 data info 24	Max. Ah into the load over 0 – 24 hours	Ah	Output integer values
RS232 data info 25	Max. Ah into the load since initial commissioning	Ah	Output integer values
RS232 data info 26	Derating		0 = derating off, 1 = derating on

Signal / information	Value	Units	Action
RS232 data info 27	Cyclic redundancy code CRC		A CRC 16 is generated. Name: "CRC-16-CCITT/openUART" Width: 16 Direction: right shift Polynomial: 0x8408 CCITT reversed, 2 bytes long, high byte, low byte. The CRC is calculated including semicolons but excluding CR + LF.
RS232 data info 28	End of data		

17. Exclusion of liability

The manufacturer can neither monitor the compliance with this manual nor the conditions and methods during the installation, operation, usage and maintenance of the controller. Improper installation of the system may result in damage to property and, as a result, to bodily injury.

Therefore, the manufacturer assumes no responsibility and liability for loss, damage or costs which result from or are in any way related to incorrect installation, improper operation, incorrect execution of installation work and incorrect usage and maintenance.

Similarly, we assume no responsibility for patent right or other right infringements of third parties caused by usage of this controller.

The manufacturer reserves the right to make changes to the product, technical data or installation and operating instructions without prior notice.

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