TarCom datalogger for the Tarom system manager
## Installation and operation manual

GB

The TarCom is used as datalogger and PC interface for all Tarom and PowerTarom systemmanagers. It stores up to 8000 data sets with all the systemparameters as voltage, currents, state of charge and system status. Additionally you can use the analog input of the TarCom to trace radiation data. The alarm output switches exactly at the limits predefined by the user. A detailed system analysis can be done with the included PC-program.

The modem versions of the TarCom allows you to remote monitoring your Tarom Solarsystem, for computer ethernet networks an ethernet modem is available, too.

1. Installation

a. (Power)Tarom cabling

Connect the TarCom-Logger with the Tarom-Regulator via the attached RJ45 cable. The green LED at the logger will blink once every minute to indicate the correct data transfer from the Tarom regulator. If a temperature sensor for the Tarom235/245/430 is used, the sensor can be plugged into the second terminal labeld "HS200". For the RM/GSM/ETN versions you can use an optional Y-adapter.
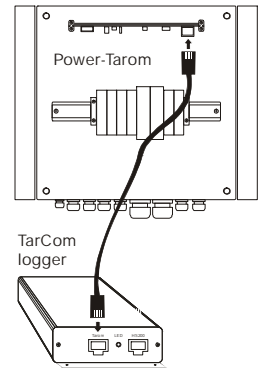
b. PC configuration

To check or modify the actual data logging parameters of the TarCom use the included serial cable to connect the logger to the PC or laptop. You can either connect to the serial interface COM1 or COM2 of the PC. An optional USB adapter is available.
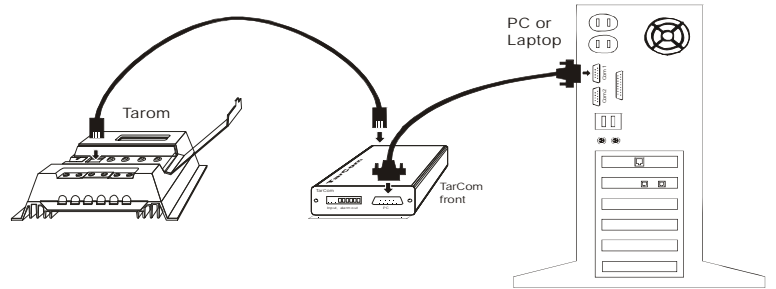
cabling for the PC communication

During PC connection the logger needs the power supply from the Tarom regulator. For the TarCom without modem you can read the logger independently from your Tarom regulator. Connect a 9V battery with the included adapter to the Tarom socket instead of the Tarom itself. Check the "logger time" value in the program to get the right time stamps.

c. modem connection

Use the included phone cable to connect the TarCom RM with the wall phone connector. Since most countries have different phone connectors we can only supply a standard RJ45 6-4 cable The phone line is connected to pin 3+4 at the RJ45 socket.
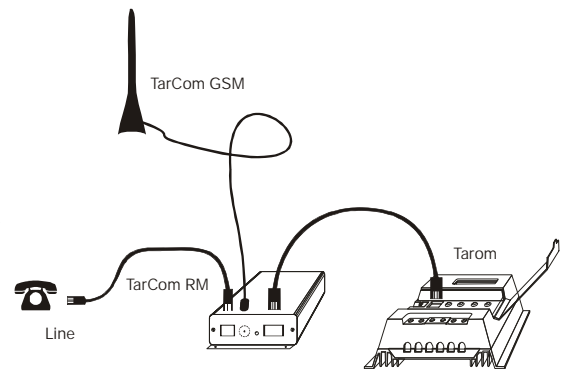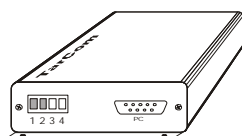
Modem connections

The TarCom GSM comes with an external GSM antenna. Plug in the antenna jack and screw it tight. Place the antenna outside from a metal case and look for a barrier free position.
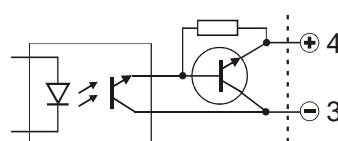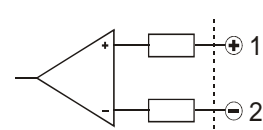
d. input/alarm terminals

The sensor input and alarm output terminals are on the green plug as indicated.

terminals: sensor and alarm

potential free alarm contact

input 0..150 mV

The high impedance analog input can be used to attach a radiation sensor to the data logger. Any voltage source from 0 .. 150 mV can be logged together with the Tarom regulator data. This input is relative to the battery minus pole.

The potential free alarm relays inside the TarCom is realized by an opto coupler and a transistor with the collector on terminal 6 (+) and the emitter on terminal 5 (-). (terminlas 4 and 3 for the modem versions) The transistor is able to switch maximal 50V and 50 mA.

The alarm changes its status only when the TarCom logger receives data from the Tarom regulator (one per minute).

2. PC-program

TarCom for windows offers you a lot of features to get most of your data logger. Choose menu help/contents to get the first help screen. Use all the links to read more about these topics:

C configure the data storage parameters
C configure the alarm settings
C read, edit and visualize the data from the TarCom datalogger
C store all the logger data on the hard drive or on a diskette
C export the data to an excel sheet
C continuously display the system data on the PC in an extra window

a. installation

The program setup for *TarCom* for windows is done from the included CD. The program runs under windows 98/NT/2000/XP/Vista. If the installation does not start automatically double click on the file Setup-Tarcom on the Diskette/CD.

To start the program double click the TarCom icon on your desktop. Use the menu file/interface/automatic to connect the TarCom program with the logger. (For ethernet setup see special chapter ethernet below)

Pressing the F1 key at any time will help you by using this software.

b. data table

All collected data from the logger is displayed in a table. These data sets can be stored to a file, exported to an Excel sheet or visualized in a chart

To reduce the shown data you can reduce the displayed amount of sets by calculating averaged values over a choosen period of time.

Right or left click in the first row to sort upon each column.After selecting subsets of rows you can copy them to the clipboard or delete them.

14 sets	I in	I out	I total	I mod	SOC	U	status	mV
04.01.04 12:45	0,1	0,1	0,0	0,4	93	14,31		2,0
04.01.04 14:54	0,1	0,1	0,0	0,3	98	14,30		1,2
04.01.04 17:03	0,1	0,1	0,0	0,1	99	13,09	N	0,0
04.01.04 19:10	0,0	0,1	-0,1	0,0	98	12,76	N	0,0
04.01.04 21:17	0,0	0,4	-0,4	0,0	96	12,59	N	0,0
04.01.04 23:25	0,0	0,4	-0,4	0,0	94	12,54	N	0,0
05.01.04 01:32	0,0	0,1	-0,1	0,0	93	12,62	N	0,0
05.01.04 03:38	0,0	0,1	-0,1	0,0	91	12,63	N	0,0
05.01.04 05:46	0,0	0,1	-0,1	0,0	90	12,63	N	0,0
05.01.04 07:53	0,1	0,0	0,0	0,0	89	12,64	N	0,0
05.01.04 10:00	0,4	0,0	0,3	0,5	88	12,84		1,4
05.01.04 12:08	0,6	0,0	0,4	0,5	88	13,38		3,1
05.01.04 14:15	0,1	0,1	0,0	0,4	93	14,30		2,1
05.01.04 16:24	0,1	0,0	0,0	0,2	98	13,63	N	0,2

c. charts

To visualize all your collected data the program offers a powerful charting possibility. Displays the actual data table in a line chart. You can modify the chart in several ways:
- resize the whole chart window
- switch on or off every serie: the 4 currents, 2 voltages, SOC and status information. See menu view/ view lines.
- you can shift the time axis by clicking the right mouse button and pull it in any direction.
- you can zoom in by clicking the left mouse button on the top left and

data visualization

pulling to the bottom right point of the zooming rectangle. Unzoom by drawing a rectangle down to up or with the view menu unzoom.
- click with the left mouse button on a colored line: the data table of the main window shows you the corresponding data set.
- you can copy the chart to the clipboard, in a file or print it.
- the scaling can be modified by the user or automatic, see view/scaling
- pressing the D,W,M key will limit the chart to a single day, week or month.
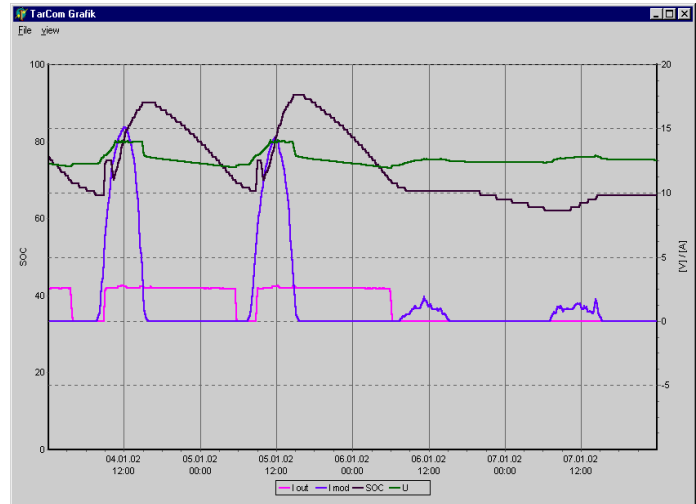
d. logging parameters

Please check after the installation whether you have predefined the right time between single data storage (logging frequency).
To check the actual parameter setting of the TarCom logger click on the get logger parameters button.
For demonstration use you can switch on the direct output option. In this mode all the Tarom data will be transmitted directly to the PC. This will happen every minute. The internal data logging is not stopped in this mode.
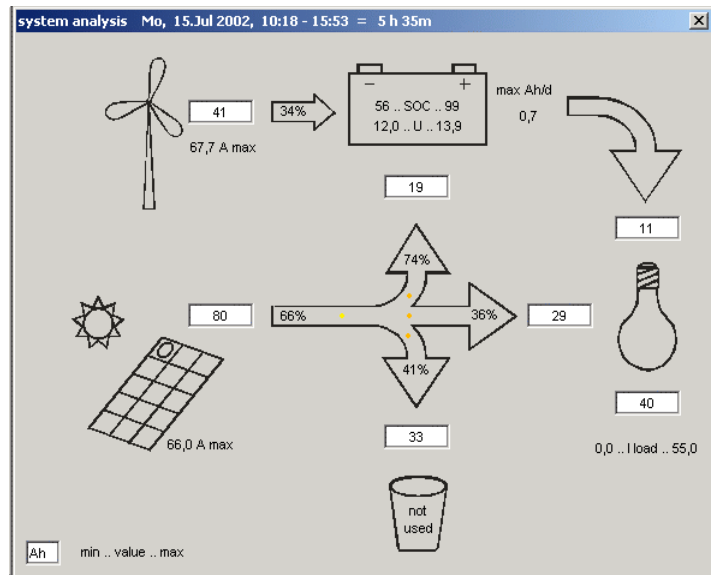If you need the alarm signalization just pick out one predefined alarm

example and modify only the necessary parameters. All irrelevant limits have a gray background.
Click the "store" button to transfer all changed parameters to the logger.
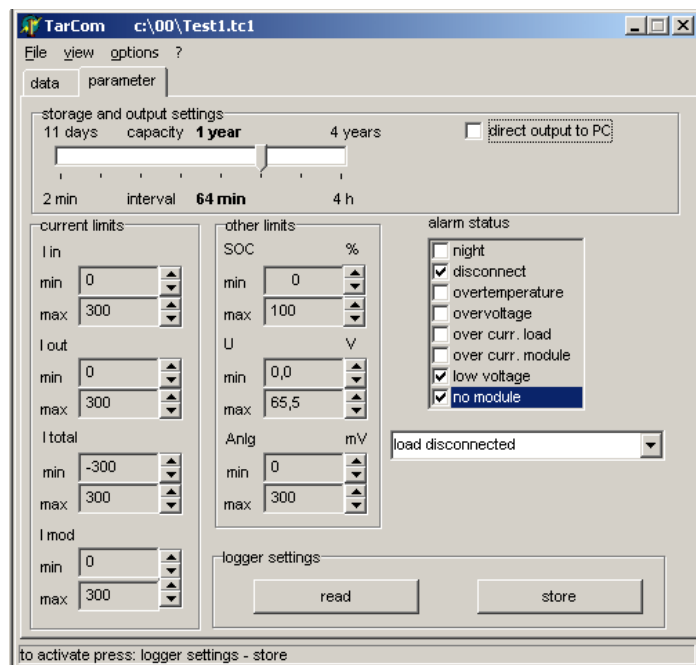
e. system analysis

A quick but detailed overview of your solar system can be done by this diagram. The efficiency of your module output and the usage of your battery can be seen at a glance. The maximum load current and the duration of any deep discharge protection is mentioned, too.
The current flow from the module on the left side goes to the battery (charging current I in), directly to the load output or could be discarded in the case the battery charging is limited.
This analysis can be done with the complete data set or only a distinct

Data analysis

selection in the data table. To select one day, week, month you can use the "d", "w" and "m" keys.
Click menu view/system analysis to start.

3. Modem configuration

This part is valid only for the TarCom RM or GSM (line modem or GSM wireless modem)
Very often the solar systems are far away from regular roads and so hard to reach. To get regular informations about the status of your photovoltaic installation without going there you can use our TarCom with modem. It informs you about the actual system status or whether a failure arises. This will save maintenance costs and reduces the reaction time in case of a breakdown.
All communication will be initialized by the TarCom RM/GSM. Any configurations of the Tarom System Manager remain unaltered. Nobody can disturb your solar system from outside via the phone line.
The TarCom with modem can be configured to call you every day at sunrise or once a week for example.
The internal modem of the TarCom logger has to be configured to transfer all collected data to the right place at the right time. You have to provide:
C the phone number to be called
C the dial mode (pulse or tone)
C how often or when to call (dial interval)
C customer and project Ids
C special calling conditions

   i. **Dial interval**: The TarCom logger calls the external terminal in regular time intervals. This time can vary between hours up to 45 days. Pick one time interval from the drop down list or enter an own one. Use "h" for hours and "d" for days. If

you want to be called every
two days you can write "2
d" or "48 h". See "alarm
and dialing options", too.

ii. **IDs**: To identify which
TarCom logger is calling
each logger should be given
its individual names. There
are three parts of the ID.
The customer ID identifies

Example 1, calls once per day and if an alarm occurs

each user. The project ID stands for the different user projects and the Nr specifies
the single TarCom logger.

iii. **Dial mode**: modern phone systems work with modulated tone dialing. This method
is faster than the older pulse
mode.

iv. **phone number**: type in the
complete phone number of
your receiving terminal
station. Sometimes you have
to dial a special number (0)
to get the dial tone. A "," in
the number string let the
modem wait for two
seconds. For example:
0,004912345. The modem

Example 2, calls every second day at midnight

has no dial tone detection (always blind dialing). For testing the TarCom line can
be reached under (00 49) 7641 9542647.

v. **PIN-Nr**: this code is necessary for the GSM modem only. The GSM modem works
only with a valid SIM card (the same as for your cellular phone). Enter the pin
code for your SIM card if necessary or leave this field blank. Caution: You should
enter the right PIN code immediately because after three tries entering a wrong
code the SIM card will be locked. (Then you have to unlock it with your PUK
code) Upon instalation the logger starts to dial automatically after one minute. So
please enter your PIN code immediatley.

vi. **Log In code**: only necessary for an internet web server. If you use your own
terminal station this code will not be used.

vii. **alarm and dialing options**: In addition to the regular calling by time intervals you
can advice the TarCom to call conditionally. The TarCom can call you if an alarm
condition occurs. Or you can tell him to call each day at sunrise (before recharging the
battery) , sunset (after charging stopped) or one hour after midnight (to reduce phone
costs). All special calls can be combined with the regular calls. Or you can set the
calling interval to null to be called only at the specified conditions. (See example 2)

C All TarCom modem functions can be disabled by uncheck the Box "use modem".
C Make sure to store your configuration to the TarCom logger with the "store" button.
C After each initialization (connecting to the Tarom regulator) the TarCom logger calls

the given phone number after one minute. So you can test the phone connection by plug out and in the TarCom cable.

C A complete data transmission takes about 30 seconds. Each dataset to be transfered needs one second more. In regular mode the TarCom transfers all unsent datasets stored since last connection. During data transfer the info LED is continuously on. If an error occurred during the transmission the LED flashes after the dialing. The number of flashes indicates the error code.

Dialing error results at info LED		
flashes	error	to do
none	-	successful transmission
2	wrong PIN code	no SIM card; check PIN code for SIM card
3	no "CONNECT"	no modem cable, wrong phone number or busy
4	failed log in	check "log in code" for this customer ID
5	transmission error	transmissiont interrupted, line fault

C If a dialing fails the logger retries five times after waiting for 15, 30, 60, 120 and 240 minutes. Then it returns to regular calling conditions.

C After fixing the dialing interval and the call options the program informs you about the number of calls the TarCom will do per week. This should prevent you from unnecessary phone costs.
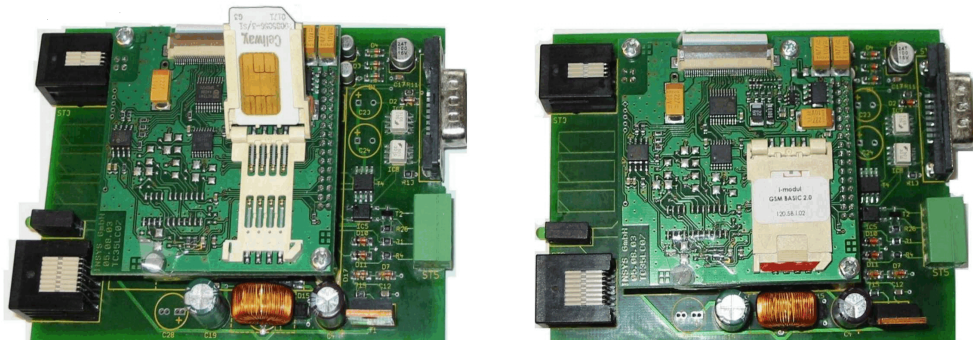
SIM Card installation

SIM card installation (GSM modem only)
To install the SIM card for your GSM modem you have to open the TarCom data logger. Unscrew the two black screws on one side and pull out the printed circuit board. Open the white card holder on the top board (see arrow "LOCK" on top) and insert the card. See the photo for orientation. Close the card holder and shift the little latch to the outside to lock the card inside the holder. Be careful not to damage card or holder!

Terminal installation
If you want to manage your data collection at a loacal station you have to provide a terminal computer with a modem. This can be a regular PC running with the TarCom program. You have to install a modem and to connect it to the phone line. Modems are available from your Tarom dealer, but you can use any standard modem. (ELSA, Robotiks,..) The modem should be configured with the "ATV1Q0E0&K0S0&W". This is predefined under terminal/expert settings/ AT commands.

The terminal software, which handles the incoming calls and stores the TarCom data is included in the TarCom program (menu settings/terminal).

Activate the terminal facility under menu options/settings/terminal. Enter the apropriate serial port (COM 1 ..4) and activate the PC modem.
- enter the directory for the incoming data
- for your local terminal station you can switch off the "log in code" checking
- enter the expiration date for older data
See the online help for more information.
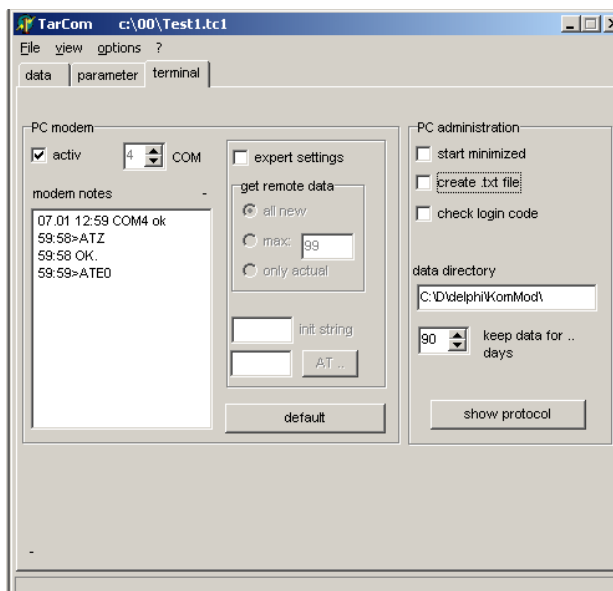
4. Ethernet configuration

This part is valid only for the TarCom ETN (ethernet version)
The TarCom ETN data logger comunicates with the remote PC program TarCom.exe via an ethernet connection, not via the RS232 serial COM port. To use the ethernet module you need Windows NT or newer. The local area network (LAN) must be running prior to this installation.

The internal data logging works independently from the LAN connection, all data sets will be stored without an active LAN connection.
The ethernet module in your TarCom logger communicates via its individual IP-address with the remotely running TarCom program. The ethernet module comes with the IP-address 192.168.0.77 as a factory default. If you have to change this address to your own value you will need the attached RS232 interface cable .
If you can use the factory default 192.168.0.77 go ahead with point 4.)
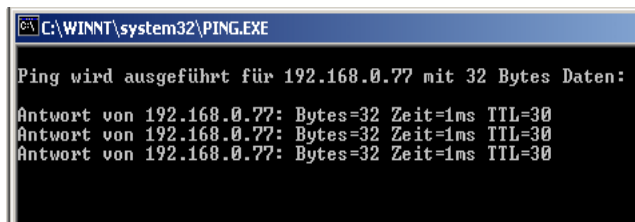
changing IP-address

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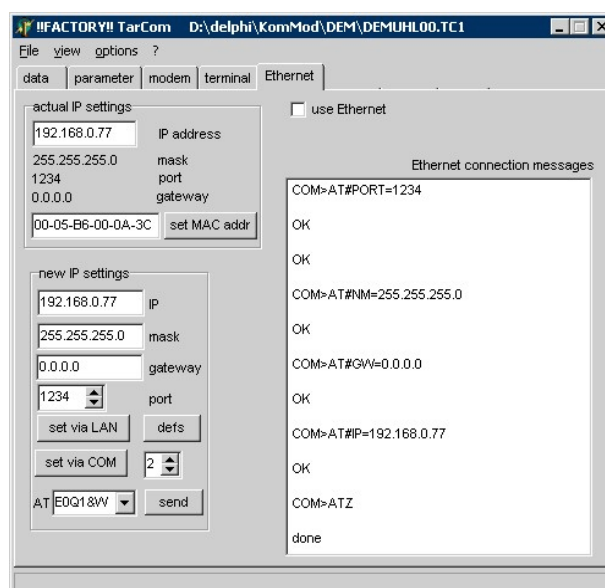
Changing IP-address of TarCom ETN:

1.) Connect the TarCom to a running Tarom or PowerTarom regulator for power supply. Connect the included RS232 cable with your PC/Laptop. Switch the TarCom switch to "RS232 configuration mode" (left position)

2.) Start the TarCom.exe program on the PC and change to the "Ethernet" tab. (Make sure that this tab is activated under menu options/settings/ethernet)

3.) Write your individual IP-address into "new IP settings". Use the private range numbers like 192.168.0.x or 10.10.x.y . Replace x|y by a number between 0..255. Leave the mask, gateway and port values on standard values if not otherwise needed. Define the COM port for your serial connection (right of the button "set via COM). Click the "set via COM" button.

Check the messages on the memo for error messages or OKs. If everthing has been OK, you can remove the RS232 cable.

Connecting the TarCom ETN to your LAN:

4.) Switch the TarCom switch to "LAN" (right position). Connect the TarCom to your LAN router with the short adapter cable RJ45-6 - RJ45-8. Connect the TarCom to a running Tarom or PowerTarom regulator for power supply.

5.) Your windows system has to be informed about the new network member. The IP-address of your TarCom (default: 192.168.0.77) has to be linked to the hardware MAC number of your ethernet module (see the label on the TarCom case). This has to be done only once since windows remembers this permanently

- Check the part "actual IP settings" for propper values: IP-address of your TarCom ok? MAC-address as written on the TarCom logger?

- Press button "set MAC address". A new window opens and informs you about the connection. The PC calls the TarCom module via ARP.EXE and PING.EXE and reports the answers. Check if there are no error messages in this screen.

PING.EXE

6.) Until now all the work has to be done to establish the network connection between windows and the ethernet modem of your data logger. If this has been completeted we finally can comunicate with the data logger itself.

- Activate the communication between your PC and the logger by checking the box "use ethernet".

- the IP-address will be connected and afterwards the data logger will be called.

At last you can use the TarCom program as usually to set the logging parameters or read data sets. Note: these TarCom logger functions can be reached only via the LAN not via the serial interface! The serial interface RS232 in the ethernet logger is only used to configure the ethernet module configuration.

5. Operation

a. data collection

The logger records all important system parameters and an additional analog input available for the user. Recorded data:

system parameter	range	resolution
relative time	0..255 min	1 s
total charge current	0 .. +300A	0.1A
load current	0 .. +300A	0.1A
battery current	-300 .. +300A	0.1A
module current	0 .. +300A	0.1A
state of charge	0 .. 100%	1 %
battery voltage	0 .. 65.5V	0.01V
status flags	Night, load Disconnect, over-Temp., over-Volt., loW volt., over-Current load, no Module	on/off
analog input	0 .. 150mV	0.1mV

After connection to the Tarom regulator the logger starts to collect data. The Tarom sends each minute the actual system values to the logger. Depending on the defined logging frequency all values collected during one period are used to calculate the average which will be stored. Only the status flags (night, overload ..) will not be averaged. If they occur at least once during the collecting period they will stay on until the end of this period.

intervall	logging capacity
2 min	11 days
4 min	22 days
8 min	1.5 month
16 min	3 months
32 min	6 months

If all 8176 data sets are completely used, the TarCom logger overwrites the oldest data again (circular storage). With this method you have always the newest data of the actual logging period available.

b. alarm programming

The TarCom logger checks every minute whether the system parameters are within the predefined alarm limits. Via the PC program all possible ranges are as follows:

parameter	possible range
Load/Charge/Module current	min/max: 0 .. +300A
Battery current	min/max: -300 .. +300A
Battery voltage	min/max: 0V .. 65.5V
SOC, state of charge	min/max: 0..100%
analog input	min/max: 0 .. 150mV
status: night, load disconnected, low/over volt., over load,over temp., over current module, no module.	checked or ignored

If one or more of this parameter is outside the given ranges the alarm contact will be closed. If one or more of the status flags is on and the user checked the equivalent box the alarm will be set, too. If you are observing the actual system data with the direct output option on the PC will display the alarm message, too.
If you want to check only one value you have to set the limits for all other parameters to the min/max value.
Example: You want to be alarmed if the voltage runs under 11 Volt or over 15 Volt. Open in the TarCom program the parameter page and set the voltage range to this values, set all current values to min. -300 and max +300A, set the SOC min/max to 0/99, the analog input min/max to 0/5000 and disable all status checkboxes. Store the parameters to the logger.

6. Warranty

The manufacturer will remove all construction and material faults that occur during the warranty time of two years and that do not impair the proper functioning of the device. Guarantee is effected by either rectification or replacement This does not include the costs involved in exchanging, dispatching or re-installing. Any further claims against the manufacturer arising from this obligation, particularly compensation claims due to losses in sales, reimbursement payments as well as indirect damages are excluded if not forced by law.

7. Technical data

system voltages via Tarom regulator	12, 24, 48V
min./max. battery voltage	8 .. 65.5V
logging intervals	2, 4, 8, 16 .. 256 min
memory size	8176 data sets
own consumption	5 mA (ETN: 60mA)
sensor input range	0 ..150 mV
max. current alarm relays	50mA, 50V
ambient temperature	-20...+50°C
protection	IP 22
case	aluminium
dimensions, weight	130 x 80 x 30 mm, 150-250 g

type overview:
- TarCom 01 data logger with modem
- TarCom RM data logger with modem, phone line terminated
- TarCom GSM data logger with GSM-modem Dual Band 900/1800 MHz (not for the 1900 MHz band in USA/Canada)
- TarCom ETN logger with ethernet connection (LAN)

TarCom shipment list:
- data logger with grenn terminal plug
- RJ45 8-8 modular cable (black) (TarCom -> (Power)Tarom charge regulator)
- serial cable, 1:1, female:female (TarCom -> PC)
- diskette or CD with TarCom for windows software
- this manual
- cable for a 9V battery with clips ("TarCom 01" only)
- phone line cable RJ45 modular 6-4 ("TarCom RM" only)
- GSM antenna ("TarCom GSM only)

Option:
- USB adapter, if no serial port is available.
- HS200 current sensor