

## Programmable Battery Chargers Software Manual



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# 1. Connect with PC

Before connecting the PC to the charger, you should read the next instructions carefully:

- ! Disconnect mains when accessing the charger.

## 1.1. PC Interface Connection

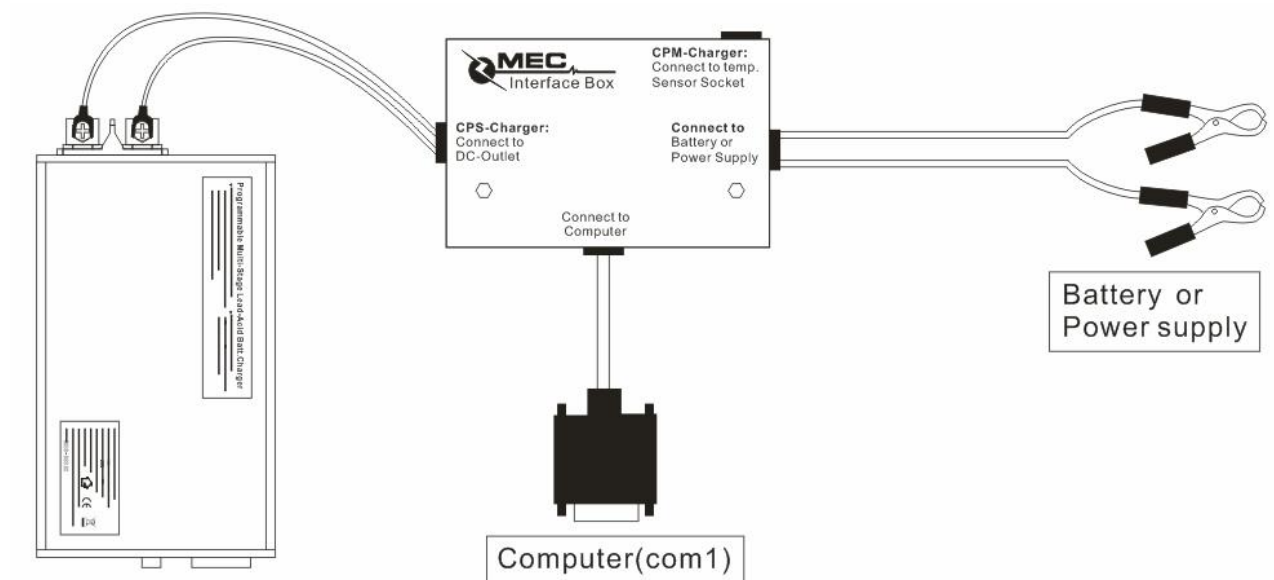
The PC interface comes with 3 connectors:

**PC:** Connect the serial interface to the serial port of the PC.

**Charger:** Connect these 2 wires to the output terminal of the charger. Mind the polarity.

**Battery:** Connect a battery (or any other DC power supply) to these connectors. Mind the polarity and use only voltage according the nominal voltage of the battery

- ! Example: A 24V charger needs to be connected with a 24V battery or power supply at the Battery connector.



## 2. MEC Profiler Software

- ! For accessing the charger-parameters it is necessary to connect the PC via the interface to the charger. Modifying the charge profile only does not require a connected charger.
- ! The software should not be started from a write protected medium like CD-ROM or write protected Flash disk. If this will be done, the charger parameters may be transferred and inspected. However, other data read from the charger (Ah, Status) may not be displayed correctly.
- ! This software uses the serial interface (RS-232) to communicate with the charger. Make sure to close any software using the serial interface, which may result in connection failures.

### 2.1. System Requirement

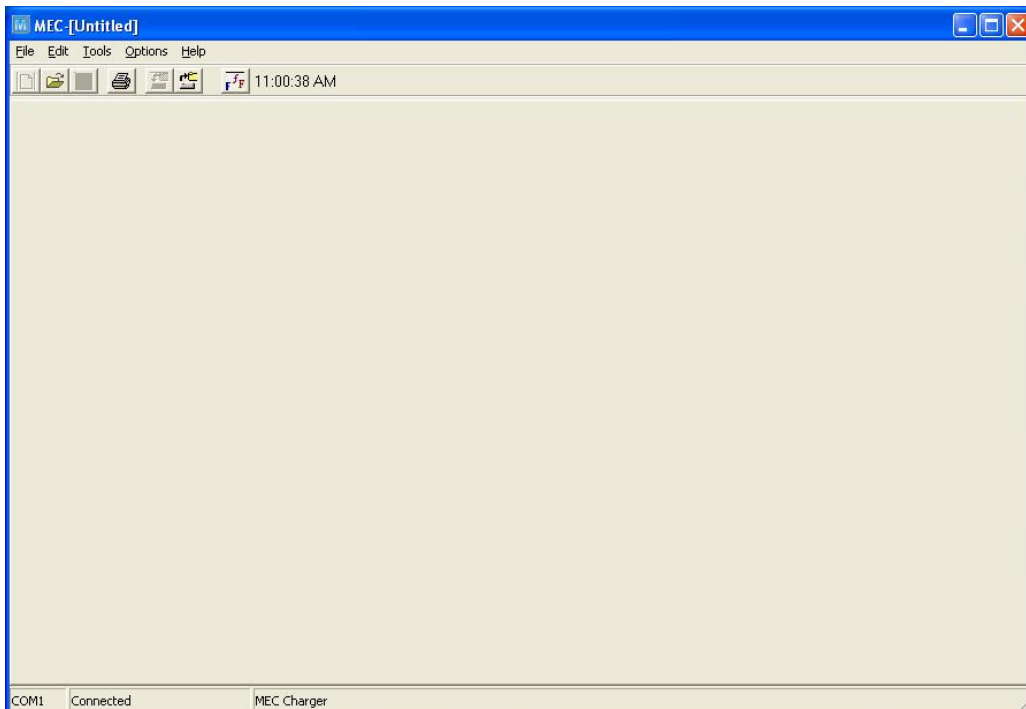
The software runs on a standard PC under operating systems from Windows 95 to Windows XP.

### 2.2. Software Installation

- The software is delivered as a compressed file (MecProfilerCPS.zip):  
Unzip the archive into a suitable folder (e.g. "C:\Mec") using WinZip or any other appropriate un-archive software.
- The software is delivered as an executable file (MecProfilerCPS.exe):  
Open MecProfilerCPS.exe and you'll be asked for the name of the destination folder.

### 2.3. Starting MEC Profiler

Navigate to the installation folder and start the software by double clicking **MecProfilerCPS.exe**. The software should be shown as below:



In the **Status Bar**, it will show the connection status between the charger and the PC:

COM1	<b>Connected</b>	MEC Charger
<p><b>Connected</b> means that the software successfully detected an MEC charger at the COM port. Anything different than <b>Connected</b> means that the connection could not be established.</p>		

When the connection cannot establish between the charger and PC, one of the following errors will be shown:

COM1	<b>Not responding</b>	Please check if charger is connected to the communication box
Error description	The charger does not respond to the PC Interface. The PC successfully detected the PC Interface, but a connection to the charger could not be established.	
Possible source of error	<ol style="list-style-type: none"> <li>1. The charger is not connected to the PC Interface.  <ul style="list-style-type: none"> <li>à Make sure there is a connection between charger and PC Interface.</li> </ul> </li> <li>2. In case the charger is connected to the PC Interface, it is possible that the polarity of the connection is wrong.  <ul style="list-style-type: none"> <li>à Check the polarity of the connection (the black lead with the white stripe indicates positive polarity)</li> </ul> </li> </ol>	
COM1	<b>Disconnected</b>	Please check if the cable is connected to the communication box
Error description	The PC Interface is not responding to the PC.	
Possible source of error	<ol style="list-style-type: none"> <li>1. The PC Interface is not connected to the serial port of the PC.  <ul style="list-style-type: none"> <li>à Connect the PC Interface to the serial port of the PC.</li> </ul> </li> <li>2. There is no battery connected to the PC Interface.  <ul style="list-style-type: none"> <li>à Connect a battery to the PC Interface. Mind the polarity!</li> </ul> </li> <li>3. The battery and PC are connected to the PC Interface.  <ul style="list-style-type: none"> <li>à The polarity of the connected battery may be wrong. Check the polarity.</li> <li>à The voltage provided by the battery is much less than the nominal voltage. Measure the voltage and increase it if necessary.</li> </ul> </li> </ol>	

**!** Instead of using a battery, there is possible to use a DC power supply – but mind the voltage (= nominal voltage of the charger) and polarity.

## 2.4. Working with the Charger

! Before editing the charge profile it is necessary to enter a **PIN code**. Without the correct pin code all editing functions are disabled. A user without a correct pin code can only inspect the parameters/data, but cannot change them.

! PIN Code needs to be entered every time when the software starts.

1. Help → About.
2. Enter the PIN code and press "OK"

! The PIN code is sent to you by e-mail.

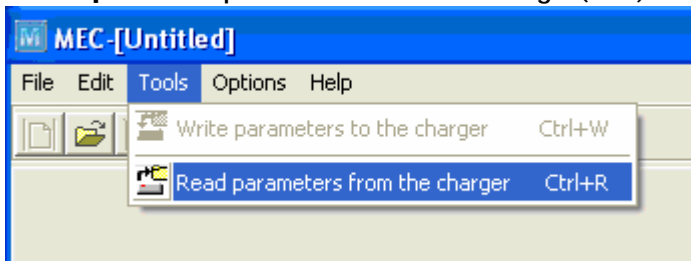


## 2.5. Accessing the Charge Profile


The Charge profile can be retrieve from 2 sources:Charger and Profile File.

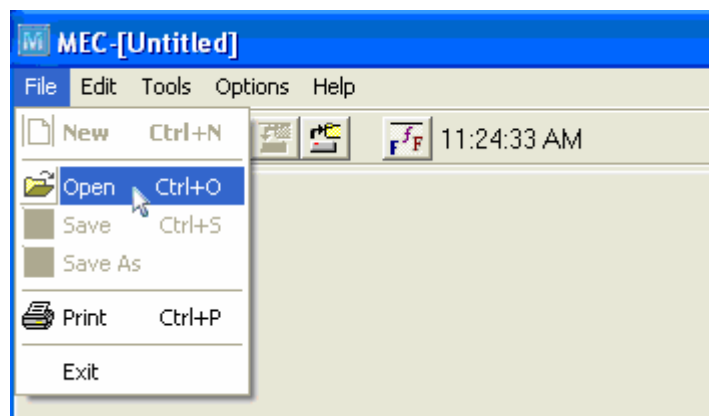
1. From the Charger

Tools → Read the parameters from the charger (  )

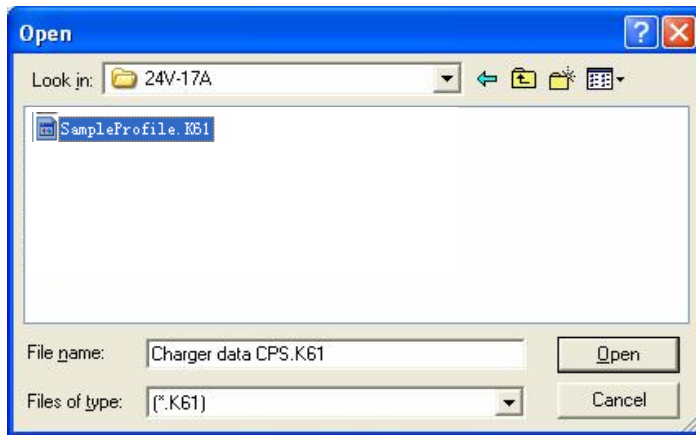


2. From the Profile File

Open a file: File → Open (  )

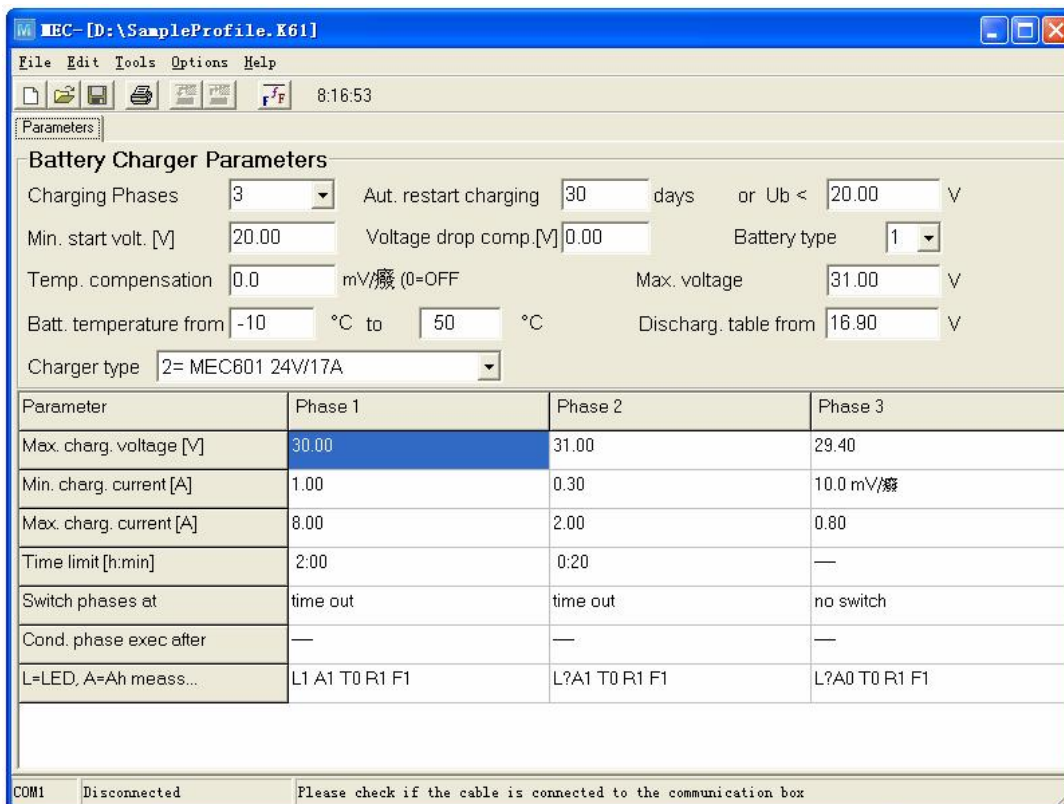


Select the Profile File:



! It is not necessary to connect the Charger when opening the Profile File

After loading Charge Profile from the Charger or from the Profile File, a charge parameters screen will be shown as below:



## 2.6. Parameter Description

This chapter contains a description of all parameters and their effects. There are 3 levels of parameters:

1. General Parameters
2. All phase parameters: Parameters apply for all charge phases
3. Single phase parameters: Parameters only apply for a single charge phase

General Parameters	
Charging Phases	3 ▾ Aut. restart charging 30 days or Ub < 24.30 V
Charge phases	Number of charge phases (1...5)
Aut. restart charging days or Ub <	If the charger is permanently connected to the battery and supplying mains, this parameter defines, when the charging is automatically restarted (either time is exceeded or battery voltage is below target)

2. All phase parameters: These parameters apply for all charge phases	
Min. start volt. [V]	17.00 Voltage drop comp.[V] 0.20 Battery type 1 ▾
Temp. compensation	0.0 mV/°C (0=OFF) Max. voltage 30.00 V
Batt. temperature from	-10 ? to 50 ? Discharg. table from 16.90 V
Min. start volt.	If the voltage in the beginning of charging process is lower than this value, the charger does not start.
Voltage drop comp.	With this parameter the voltage drops between the charger output and battery terminals are compensated.
Battery type	After the charger has been connected to the battery, the red LED flashes as often as this parameter has been set. This parameter can be set to distinguish between different battery types.
Temp. compensation	<p>The value of this parameter indicates how much the charging voltage will be increased or decreased, if the battery temperature changes for 1°C.</p> <p>If this parameter is zero, the temperature compensation is turned off. In this case the temperature sensor does not need to be connected.</p> <p>Reference temperature is 25 °C. Temperatures exceeding 25 °C decrease the output voltage while lower temperatures increase it. 25 °C does not have any effect on the output voltage.</p> <p>The value for trickle (maintenance) charge phase is set separately.</p> <p>The Temp. compensation directly depends on the parameter <b>Enabling</b>. Enabling determines how the charger reacts to a charge profile with activated temperature compensation, but missing temperature sensor.</p>
Max. voltage	This parameter is used only during the active temperature compensation. It defines to which voltage the charger can increase the voltage due to temperature compensation.
Batt. temperature from ___ °C to ___ °C	The battery temperature at which the charger is allowed to operate. If the measured battery temperature is not within this range, the charger stops charging. The charger checks periodically the temperature whether it is in range again or not.
Discharg. table from	<p>The charger stores the battery voltage in a table when the charging is started. This value defines the lowest voltage being recognized by the charger.</p> <p>The battery voltage table divides the voltage range into 15 "voltage windows". Each "voltage windows" has a counter, which increases, whenever a battery has this voltage at the beginning of the charging process.</p>

### 3. Single phase parameters: These parameters have to be set separately each charge phase

Parameter
Max. charg. voltage [V]
Min. charg. current [A]
Max. charg. current [A]
Time limit [h:min]
Switch phases at
Cond. phase exec after
L=LED, A=Ah meas...

<p><b>Max. charg. voltage</b></p>	<p>The <i>Max.charg.Voltage [V]</i> for one charge phase is set here. No higher voltage than this can be reached for this phase, unless temperature compensation is activated. With activated temperature compensation higher voltages can be reached, depending on [Temp. compensation] setting and [Max. voltage].</p> <p>This parameter can be used as a criterion for switching to the next charge phase:</p> <ul style="list-style-type: none"> <li>- When <i>Switch phases at</i> is set to <math>U_b \geq U_{max}</math>, the charger increases the voltage to maintain the current set in <i>Max charg. current [A]</i>. When the charging voltage reaches <i>Max.charg.Voltage [V]</i>, it changes to the next phase.</li> <li>- When <i>Switch phases at</i> is set to <math>I_b &lt; I_{min}</math>, the charging voltage is increased, until it reaches <i>Max.charg.Voltage [V]</i>. As a consequence, the charging current is reduced as the voltage remains stable.</li> </ul> <p>With activated temperature compensation the <i>Max.charg.Voltage [V]</i> is only valid for 25 °C, where the temperature compensation has no effect. Temperatures exceeding 25 °C decrease the output voltage while lower temperatures increase it (depending on the <i>Temp. compensation</i> setting).</p>												
<p><b>Min. charg. current</b></p>	<p>This parameter defines the minimum charge current for a charge phase and can be used as a criterion for switching to the next charge phase:</p> <ul style="list-style-type: none"> <li>- When <i>Switch phases at</i> is set to <math>U_b \geq U_{max}</math>, this setting has no effect.</li> <li>- When <i>Switch phases at</i> is set to <math>I_b &lt; I_{min}</math>, the charging voltage is increased, until it reaches <i>Max.charg.Voltage [V]</i>. As a consequence, the charging current is reduced as the voltage remains stable. When the current drops below <i>Min. charg. current [A]</i>, the charger switches to the next phase.</li> </ul> <p>In the so called trickle charge phase ( <i>Switch phases at</i> = <b>No switch</b>) this parameter represents the value of temperature compensation for this charge phase.</p>												
<p><b>Max. charg. current</b></p>	<p>This is the maximum output current the charger will provide. The charger will always try to reach this current by increasing or decreasing the charge voltage if necessary.</p>												
<p><b>Time limit (h:min)</b></p>	<p>Max. duration of a charge phase (hours : minutes). This parameter can be used in two different ways. If this parameter is set as time switch for the next charge phase, on "Switch phases at ", then the charger just switches the phases when this time elapses.</p>												
<p><b>Switch phases at</b></p>	<p>The following criteria can be selected for the termination of a charge phase. Click into the cell to open a drop down menu.</p> <table border="1"> <tr> <td><math>U_b \geq U_{max}</math></td> <td>Phase switches when battery voltage exceeds <math>U_{max}</math>.</td> </tr> <tr> <td><math>I_b &lt; I_{min}</math></td> <td>When the charging current falls below <math>I_{min}</math>, the phase switches.</td> </tr> <tr> <td>Time out</td> <td>When the entered time is elapsed, the next phase starts.</td> </tr> <tr> <td>No switch</td> <td>No switch of charge phases. This is always the last phase. It is used for trickle (maintenance) charge.</td> </tr> <tr> <td><math>T + U_b \geq U_{max}</math></td> <td>It is switched over, after the time T or when the battery voltage reaches the voltage determined by this parameter.</td> </tr> <tr> <td><math>T + I_b &lt; I_{min}</math></td> <td>The phase is switched over, when the time T passes over or when the battery current drops under the minimal value.</td> </tr> </table>	$U_b \geq U_{max}$	Phase switches when battery voltage exceeds $U_{max}$ .	$I_b < I_{min}$	When the charging current falls below $I_{min}$ , the phase switches.	Time out	When the entered time is elapsed, the next phase starts.	No switch	No switch of charge phases. This is always the last phase. It is used for trickle (maintenance) charge.	$T + U_b \geq U_{max}$	It is switched over, after the time T or when the battery voltage reaches the voltage determined by this parameter.	$T + I_b < I_{min}$	The phase is switched over, when the time T passes over or when the battery current drops under the minimal value.
$U_b \geq U_{max}$	Phase switches when battery voltage exceeds $U_{max}$ .												
$I_b < I_{min}$	When the charging current falls below $I_{min}$ , the phase switches.												
Time out	When the entered time is elapsed, the next phase starts.												
No switch	No switch of charge phases. This is always the last phase. It is used for trickle (maintenance) charge.												
$T + U_b \geq U_{max}$	It is switched over, after the time T or when the battery voltage reaches the voltage determined by this parameter.												
$T + I_b < I_{min}$	The phase is switched over, when the time T passes over or when the battery current drops under the minimal value.												

<b>Cond. phase exec after</b>	Define a conditional setting whether this phase is executed or not. Possible conditions are Ah and number of phases.
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- The next set of parameters can be accessed by clicking into a cell in the last row of a phase. In this cell you are allowed to set 5 different parameters. In order to remain clearly arranged, these 5 parameters are displayed in a short form – for instance **L1 A1 T0 R1 F1**.

With these parameters you are able to set

- the blink status of the **Charging LED**
- to switch on/off the **Ah measurement**
- to switch on/off the **Temperature compensation**
- whether to load new **Time out limit** or not
- to switch on/off **automatic fan control**

Parameter	Phase 1	Phase 2	Phase 3
Max. charg. voltage [V]	30.00	31.00	29.40
Min. charg. current [A]	1.00	0.30	10.0 mV/°C
Max. charg. current [A]	8.00	2.00	0.80
Time limit [h:min]	2:00	0:20	—
Switch phases at	time out	time out	no switch
Cond. phase exec after	—	—	—
L=LED, A=Ah meas...	<b>L1 A1 T0 R1 F1</b>	L?A1 T0 R1 F1	L?A0 T0 R1 F1



LED Charging

 Off  
 On  
 Blink slow  
 Blink fast

Measure Ah

 No  
 Yes

Temperature compensation

 No  
 Yes

Load time limit

 No  
 Yes

Fan control

 No  
 Yes





### Detailed information

L=LED, A=Ah meas...

<b>LED Charging</b>	<p>The blink characteristic of the <b>Charging LED</b> can be set here. You can choose between on, off, slow or fast blinking. <b>On</b> means that the LED is constantly on while charging, <b>Off</b> means no LED activity at all. <b>Blink slow/fast</b> means a slow/fast blink frequency of the <b>Charging LED</b>.</p> <p>Short representation: L  <b>L1</b> - LED is switched ON  <b>L0</b> - LED is switched OFF  <b>LX</b> - LED flashes slowly  <b>L_</b> - LED flashes fast</p>
<b>Measure Ah</b>	<p>This parameter switches the internal <b>Ah Measurement</b> on or off. The charger stores the charged Ah of the last 32 chargings. With this history you are able to monitor the development of your battery over a long period.</p> <p>Short representation: A  <b>A1</b> = Ah measurement switched on  <b>A0</b> = Ah measurement switched off</p>
<b>Temperature compensation</b>	<p>This parameter switches the <b>Temperature compensation</b> on or off. The value of the <b>Temperature compensation</b> is set</p> <p>Short representation: T  <b>T1</b> = temperature compensation switched on  <b>T0</b> = temperature compensation switched off</p>
<b>Load time limit</b>	<p>This parameter allows you to prevent the <b>Time out counter</b> from being loaded with the new value of the next phase. For example in the second phase a duration period of 5 hours was programmed and only 3 hours charged. In that case the max. duration time for the next phase is 2 hours.</p> <p>Short representation: R  <b>R0</b> – The charging time out counter is not reloaded with the new value – the remaining time from the previous phase is used.  <b>R1</b> – the time limit is set separately for this phase.</p>
<b>Fan control</b>	<p>This parameter allows you to switch between the 2 fan control modes:</p> <ul style="list-style-type: none"> <li>- <b>Yes</b> means that the charger automatically regulates the speed of the internal fan.</li> <li>- <b>No</b> means that the fan is switched on when charging and switched off when idle.</li> </ul> <p>Short representation: F  <b>F0</b> – cooling fan operates at either at full speed or it is switched off (by low ambient temperatures or low charge current)  <b>F1</b>- The speed of the cooling fan is regulated regarding the charging current and ambient temperature.</p>


#### Example

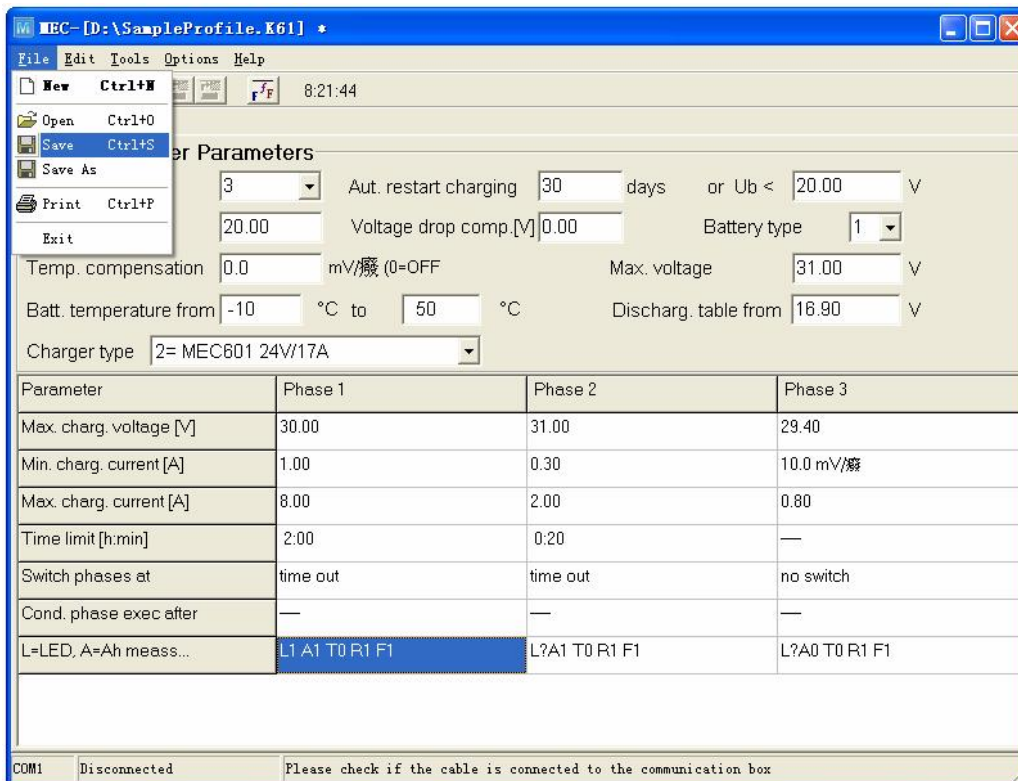
L1A1T0R1F1 is a short representation of the parameters. The next table contains a detailed description and means for this phase:

- L1: LED is on
- A1: Ah measurement is on
- T0: Temperature compensation is off
- R1: Charging counter is not reloaded
- F1: Fan speed is automatically adapted

## 2.7. Saving the Charge Profile

To save the Charge Profile to Profile File:

File à Save (  )



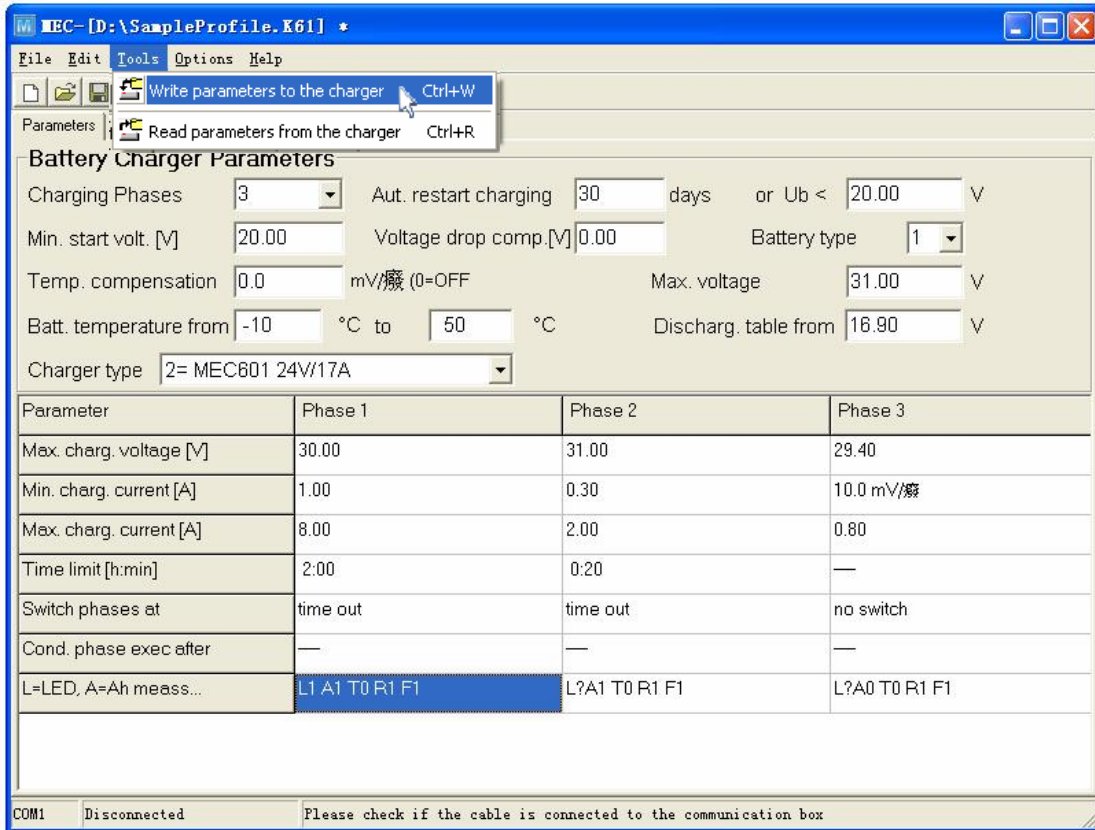
! Saving the parameters to the Profile File does not require the connection with the Charger.

## 2.8. Writing Parameter to the Charger

! It is recommended that to save the default Charge Profile for future use.

! A modified parameter need to be saved to a Profile File before writing to the Charger, otherwise the unmodified Profile File will be written to the Charger.

Tools à Write parameter to the charger (  )



The screenshot shows the 'MEC- [D:\SampleProfile.K61] \*' window with the 'Tools' menu open, highlighting 'Write parameters to the charger' (Ctrl+W). Below the menu, the 'Parameters' section shows 'Read parameters from the charger' (Ctrl+R). The main area is titled 'Battery Charger Parameters' and includes the following settings:

- Charging Phases: 3
- Aut. restart charging: 30 days or  $U_b < 20.00$  V
- Min. start volt. [V]: 20.00
- Voltage drop comp. [V]: 0.00
- Battery type: 1
- Temp. compensation: 0.0 mV/°C (0=OFF)
- Max. voltage: 31.00 V
- Batt. temperature from: -10 °C to 50 °C
- Discharg. table from: 18.90 V
- Charger type: 2= MEC801 24V/17A

Below these settings is a table with the following data:

Parameter	Phase 1	Phase 2	Phase 3
Max. charg. voltage [V]	30.00	31.00	29.40
Min. charg. current [A]	1.00	0.30	10.0 mV/°C
Max. charg. current [A]	8.00	2.00	0.80
Time limit [h:min]	2:00	0:20	—
Switch phases at	time out	time out	no switch
Cond. phase exec after	—	—	—
L=LED, A=Ah meas...	L1 A1 T0 R1 F1	L?A1 T0 R1 F1	L?A0 T0 R1 F1

At the bottom of the window, the status bar shows 'COM1 Disconnected' and a message: 'Please check if the cable is connected to the communication box'.