# USER MANUAL FOR MASCOT CONFIGURATION TOOL

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# 1   Contents

# 1   Installing software and connecting the charger

## 1.1   Hardware and software requirements:

a)   Mascot Blueline CBC charger with CBC mark.(If print space is limited, we only use the arrows)

 OR 

b)   CBC Module, Mascot model no. 4099000000. (Included in tool kit 4099000040).

c)   Computer with MS Windows, Mascot Configuration software, hereby called MCS, and support files.

## 1.2   Preparations

Install the CBC Software. All support files for versions available at the time of release are included in the installation pack. Minimum requirements are one HW definition file and one parameter file. If you need some support files that are not included, you may download these from Mascot web site. www.mascot.no, and manually put them in the same folder as the other support files or use the config tool software update tool.  Default location is C:\Mascot\Configurator\configurations.  The updated files can be downloaded from Mascot website. (ZIP-format). Please download driver for FT232R USB UART interface Integrated Circuit Devices from www.ftdichip.com if not installed automatically.

## 1.3   Illustration of connection to PC and charger
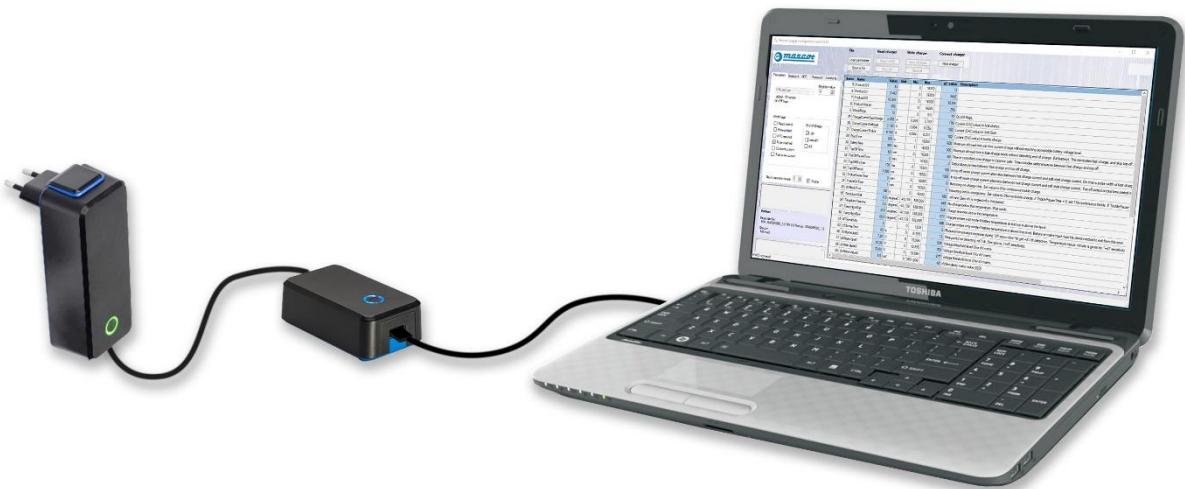


Make sure you have the correct polarity – marked wire/ centre is positive.

## 1.4   About parameter files and HW-definition files

To be able to configure a charger the HW definition of the charger must match the HW definition of the parameter file. This is only partly handled by the software. If you are not sure which parameter file to use, we recommend that you get this information by reading the charger. If there is a mismatch you will not be able to send the new setup to the charger. Both the ten-digit part number and major revision must be identical, while minor revision number may be different. Major revision is the first number after the underscore – minor revision is the second.  If you have two parameter files with the same ten-digit part number and the same major revision you may use them both.

*Example of major change – files <u>may not</u> be used interchangeably:*
HW-ID: 3546205000_1.1
HW-ID: 3546205000_2.1

*Example of minor change – files <u>may</u> be used interchangeably:*
HW-ID: 3546205000_1.1
HW-ID: 3546205000_1.2

Be aware that if minor revisions are different in the charger and in the parameter file there may be some differences in some parameters. Our recommendation is that you always use the newest file. If you wish to keep the parameters as they are, except the ones you are changing, you cannot use the send all button. Use Send Changes only.

You may verify the HW_ID prior to making changes by first loading the parameter file you wish to use and then connect the charger**.** The **HW-ID** will automatically be read and you will either get the "OK" in upper left corner. If there is a mismatch you will get a "fail" message.

Example of correct HW-ID:
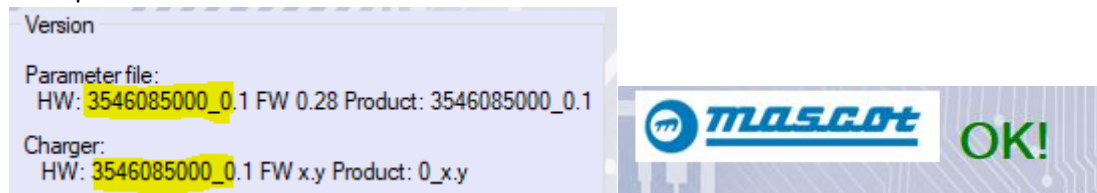


Example of incorrect HW-ID:



HW-ID is not configurable, so it is important that you have the correct file as a starting point.

I addition to HW-ID there is also a Product ID. This ID is not write-protected so you may change this ID if you want to. This may be useful when making your own configurations. The number is built up by entering numbers in 4 memory locations. You may use the «calculator» provided with the tool to calculate the numbers to be entered in these memory locations. The "calculator can be found in the same folder as the software and is called productID_calc.xlsx

## 1.5   About parameter levels

There are three different parameter levels to choose from in the configuration software. This is done to make it easier to navigate in the tool. Simply use the arrows to change level. You may also uncheck the simple-box if you want to see the default values.

Change level:
Go to the **Parameter tab** and **use the arrows** to change to desired level, **Check/uncheck** the simple box for wanted view.
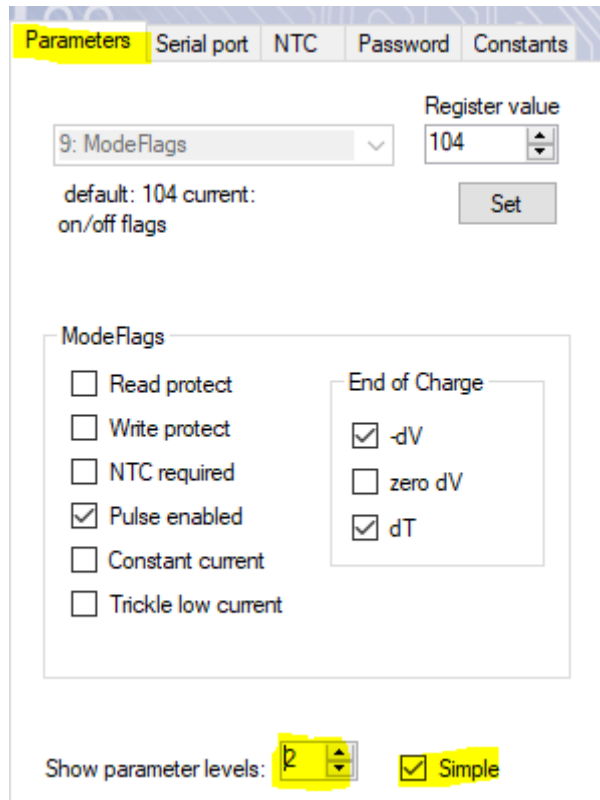
Level 1 parameters: Parameters that are commonly changed. It is rather straight forward to change these parameters.

Level 2 parameters: This is for the bit more advanced users. Caution is advised.

Level 3 parameters: These parameters are for skilled users. Caution is advised.

## 1.6   Open a parameter file

To open a parameter file, go to the **Parameter tab** and press **Load Parameters**.
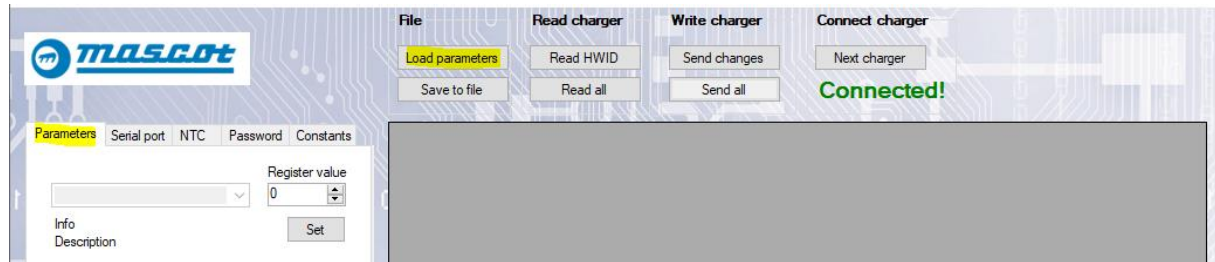


The Level 1 parameters and values will be visible in the window to the right. You may change parameter level as described in 1.5.

## 1.7   Setting up the USB communication

Connect the CBC Module, 4099000000, to the computers USB port and to the charger to be configured. Make sure you have correct polarity. Do not plug into mains supply yet.

*Start the configuration SW* and load the correct parameter file
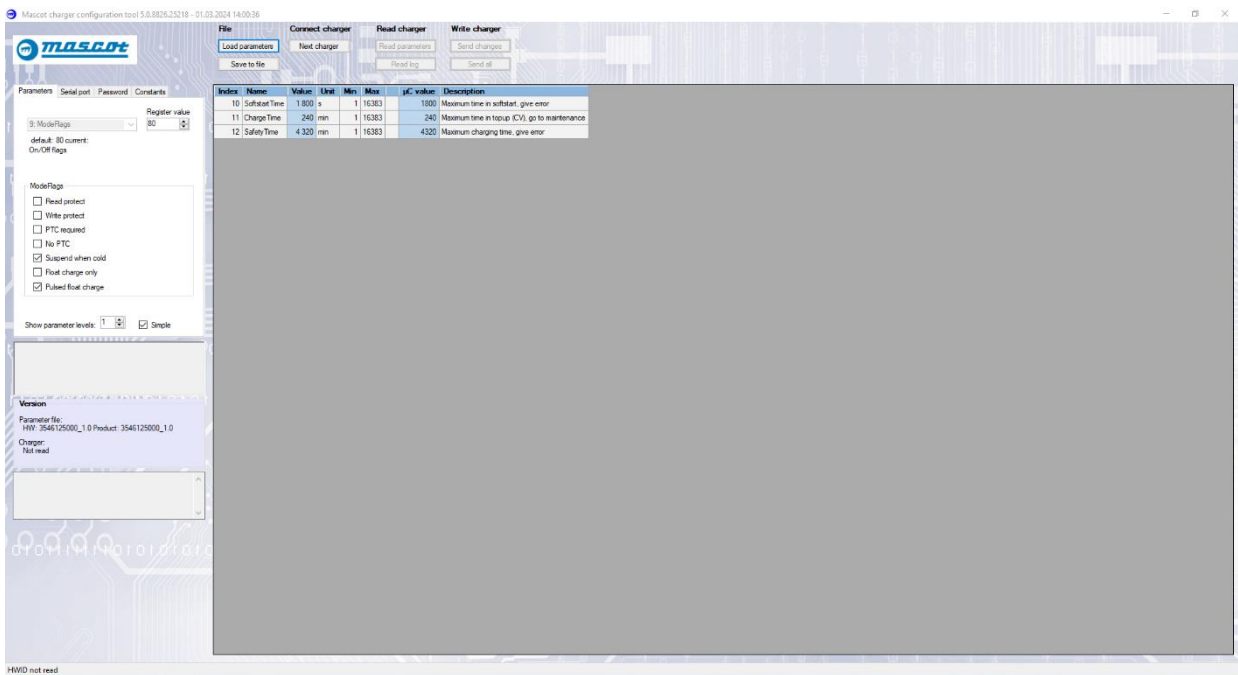


Go to the **serial port tab (or clock the next charger button)** and **select the correct Com port. Click Refresh** if the port is not listed:
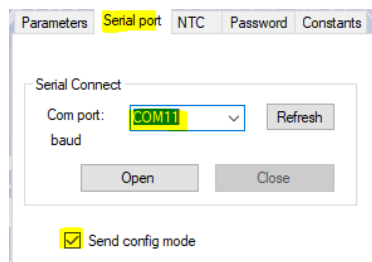


The Com Port for the configurator may have a different number, com9, com7 etc. "Send config mode" should be checked by default. Please check this box if this is not the case.

Click **Open**. Dots will appear in the log window indicating that the port is open, and the tool is ready.
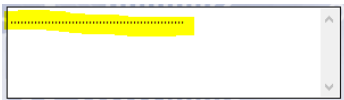


Connect the charger to mains supply and check that the connection status is reported back as Connected and OK. The OK verifies that the HW-ID is correct.
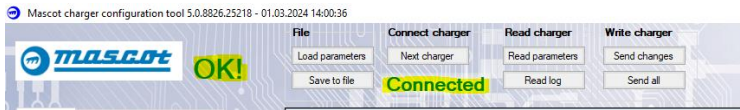


The connection to the charger is established and we may continue with the configuration. If any of the steps are failing, please start over.
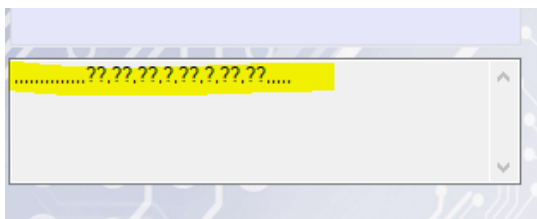


Sometimes you may experience that the charger do not connect correctly to the tool. If you se question marks (or other symbols) in the log window (as shown above) and/or the charger is flashing green, and you do NOT get the OK status within 15 seconds after you connected the mains voltage , the connection has probably failed. Disconnect the charger from mains, check that the LED on the charger turns off (may take as long as 30s) and then try again.

## 2    Reading historical charge data (for chargers with this option)

Some chargers will record data for up to ten of the latest charge cycles. After opening the parameter file for a charger with this option you will get an additional button for reading these data. The option will not be activated before you have connected the charger.

Prior to connection:
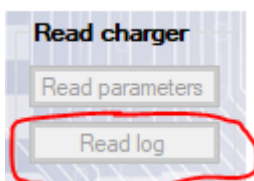


After connection, the button will be activated and you may read the log by pressing this button. It is important to keep the config tool window active while reading these data. Do not use your computer for other tasks in the time the tool is reading data. When the reading is complete a new table will appear. Se example below.

| Index | Vbatt Start (V) | Vbatt Max (V) | Time Step 0 (SS) (hrs:min) | Time Step 1 (CC) (hrs:min) | Time Step 2 (CV) (hrs:min) | Time Step 3 (float) (d hrs:min) | Charged Capacity (Ah) | Temperature Start (°C) | Temperature End (°C) | Temperature Max (°C) | Temperature Min (°C) | Status (Hover) | Summary |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 13,11 | 14,54 | 0:00 | 0:00 | 0:00 | 14:38 | 0,0 | 23,5 | 26,0 | 27,0 | 23,5 | 33 | Complete (log complete) |
| 7 | 13,30 | 14,53 | 0:00 | 0:00 | 0:00 | 1 d 16:28 | 0,0 | 27,0 | 25,5 | 27,0 | 25,5 | 1 | Complete |
| 6 | 12,37 | 14,61 | 0:00 | 1:54 | 1:00 | 1 d 19:00 | 20,2 | 25,5 | 25,0 | 25,5 | 24,0 | 33 | Complete (log complete) |
| 5 | 13,21 | 14,51 | 0:00 | 0:00 | 0:00 | 0:00 | 0,0 | 25,5 | 25,5 | 25,5 | 25,5 | 1 | Complete |
| 4 | 12,18 | 14,61 | 0:00 | 2:16 | 0:55 | 19:18 | 22,2 | 27,0 | 25,5 | 27,0 | 24,0 | 33 | Complete (log complete) |
| 3 | 13,11 | 14,56 | 0:00 | 0:00 | 0:00 | 1 d 2:36 | 0,8 | 25,5 | 27,5 | 27,5 | 24,0 | 33 | Complete (log complete) |
| 2 | 12,72 | 14,53 | 0:00 | 0:00 | 0:04 | 5:32 | 1,7 | 26,0 | 25,5 | 26,0 | 25,0 | 33 | Complete (log complete) |
| 1 | 13,27 | 14,47 | 0:00 | 0:00 | 0:00 | 4 d 18:24 | 0,0 | 27,0 | 28,0 | 35,0 | 26,0 | 33 | Complete (log complete) |
| 0 | 0,00 | 0,00 | 0:00 | 0:00 | 0:00 | 0:00 | 0,0 | -55,0 | -55,0 | -55,0 | -55,0 | 0 | |
| 0 | 0,00 | 0,00 | 0:00 | 0:00 | 0:00 | 0:00 | 0,0 | -55,0 | -55,0 | -55,0 | -55,0 | 0 | |

In this example there are eight charge cycles stored. The newest cycle is on top (#8)

How to interpret the log:

Vbatt Start  - This is the voltage on the battery when we start the charging.

Vbatt Max – This is the end charge voltage. Maximum voltage measured on the battery during this charge cycle.

Timers: The next four slots are the total time in the four different states – Soft start mode, Constant current mode, Constant voltage mode and float mode.

Charged capacity – This is total Ah delivered to the battery. There may be some mismatch if the charger has been in float for a long time. Due to the low current it is difficult to get this correct.

The next four slots are for temperature measurements if the charger is equipped with a temperature sensor.

The two last columns are a summary of the charge cycle. If you hover over (or double click) the status number (33 in this case) you will see what incidents did or did not happen. It this case it is:
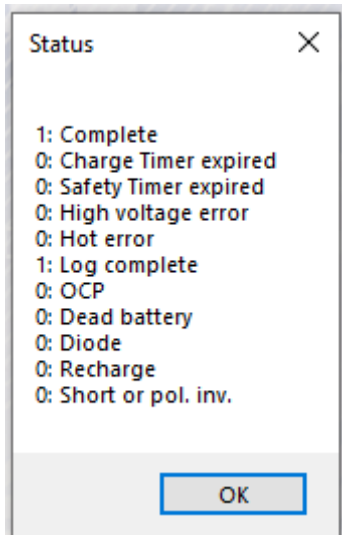


Complete: Yes. This means that the charger completed the charge cycle. Battery is full and the charger completed the charge cycle.

Charge timer expired: No. The charge timer has not expired.

Safety timer expired: No. The safety timer has not expired.

High voltage error: No. No high voltage during charge cycle.

Hot error: No. The temperature has never been higher that error limit.

Log complete: Yes. This means that this log entry is complete. All data are recorded. The only way to get a complete log is to disconnect the battery before disconnecting the mains. If you disconnect mains before you disconnect the battery you may be missing as much as half an hour of the log.

OCP: No. This is an over charge protection state in the charger. If the voltage in float rises, we will stop charging until the level drops to a safe level.

Dead battery: No. This is an error message if the battery is behaving abnormal.

Diode: No. No diode in series with the battery detected.

Recharge: No. This entry in the log will show if the voltage has dropped below recharge level after a complete charge cycle.

Short or polarity inversion: No. No short or wrong polarity detected.

## 3   Configuration

As described earlier it is important to use the correct parameter file when configuring a charger. If you got the OK message in previous step everything is ok. If you got a fail instead of OK you must load the correct file. You may find this information below the log window.



```
Parameter file:
  HW: 3546125000_1.0 Product: 3546125000_1.0
Charger:
  HW: 3546125000_1.0 Product: 3546125000_1.0
  FW: 1.1
```

In this case the parameter file and the charger has the same number 3546125000_1.x and all is OK.

There may be several parameter files that uses the same HW-ID but have different parameters. Any of these files may be used if the HW-ID is the same but be aware that if parameters not visible are different this may alter the behaviour of your charger. To be absolutely sure you don't unintentionally change any parameters we recommend you use the Send changes button.

Press **Load Parameter** and open the file you want to use as a starting point for your new configuration. In this example we will use a standard 3546 4-8 cell with part no. 3546085000.

All parameter file names from Mascot are in the format

XXXXXXXXXX_Y_PARAMETER_VZ.0_YYYYMMDD, where:

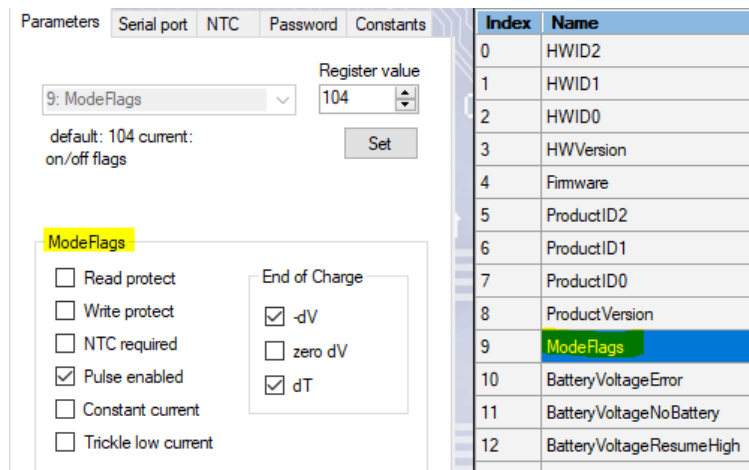- XXXXXXXXXX = Ten digit part no. This number is printed on the label of the unit box. It can also be found on the order confirmation from Mascot, or you may call us to get the correct part no.
- Y = HW-revision
- V = Version
- Z.0 = Revision number of the parameter file.
- YYYY = Year
- MM = Month
- DD = Day

For the charger in this example the parameter file is called
3546085000_1_PARAMETER_V1.0_20210628

## 3.1 Setting up charger modes

### 3.1.1 Mode setup for NiMH battery chargers

When configuring a NiMH battery charger, you need to consider what type of EoC (end of charge)method you want to use and some other options. To change these settings, open the config software and load the parameter file you want to use. Select the **Parameter tab** and **choose Mode flag in the parameter list**. The different Mode flag options may be changed by checking/unchecking the boxes.



The available options are:

| Read Protect | Protect your settings from being read by enabling Read protection with a password of your choice. |
|---|---|
| Write Protect | Protect your settings from being changed by enabling Write protection with a password of your choice. |
| NTC required | If you use temperature detection as the only EoC method we recommend that you check this box. This will prevent overcharge of the battery if the NTC is missing/not working properly. Be aware that if you check this box you will not be able to charge batteries that do not have NTC. |
| Pulse enabled | This box must be checked for the charger to be able to detect short/ wrong polarity and if there is a diode in series with the battery. |
| Constant current | Charger in CC mode - No EoC. |
| Trickle low current | Extra low current in trickle pause instead of no current. |
| -dV | Check this box to use this EoC method. |
| Zero dV | Check this box to use this EoC method. |
| dT | Check this box to use this EoC method. |

Note: Several EoC methods may be used simultaneously.

### 3.1.2    Mode setup for Lead Acid battery chargers

When configuring a Lead Acid battery charger, you need to consider if you want pulsed float charge, mandatory PTC etc. To change these settings, open the config software and load the parameter file you want to use. Select the **Parameter tab** and **choose (click on) Mode flag in the parameter list**. The different Mode flag options may be changed by checking/unchecking the boxes.



The available options are:

| Read Protect | Protect your settings from being read by enabling Read protection with a password of your choice. |
|---|---|
| Write Protect | Protect your settings from being changed by enabling Write protection with a password of your choice. |
| PTC required | If you check this option the charger will go into error mode if the temperature sensor stops working properly. |
| No PTC | If the charger is equipped with a temperature sensor you may disable it by checking this box. |
| Suspend when cold | If the charger is equipped with a temperature sensor you may disable low temperature wait mode by unchecking this box. Low temperature will be ignored. |
| Float charge only | The charger will charge the battery at float voltage only. The charge profile remains the same, but the charge voltage is lower. (Float voltage level) |
| Pulsed float charge | With this option you may turn off pulse charging in float state. The charger will still charge at safe float voltage level, but no current pulses will be applied. |

## 3.2    Changing NTC values β and nominal resistance value for chargers with NTC

Select the **NTC tab**, fill in the correct values and press Update. Please note that the temperature limits will change and must be re-entered. See 3.3
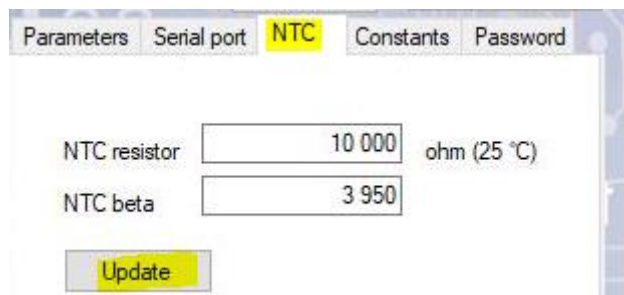


## 3.3    Changing Temperature limits for chargers with NTC

If you connect a temperature sensor (NTC) to the charger the charger will go to wait mode or error mode if the battery is too hot/cold. The default values configured are for 10k NTC with a β value of approx. 4000.

### 3.3.1    Temperature limits for NiMH battery chargers:

| TempLowWait | 0°C | No charge below this temperature. Wait mode |
|---|---|---|
| TempLowResume | 2.5°C | Charge resumes above this temperature |
| TempHighWait | 40°C | Charger enters wait mode if battery temperature at start-up is above this level. |
| TempHighError | 60°C | Charger enters error mode if battery temperature is above this level. Battery or mains input must be disconnected to exit from this error. |

### 3.3.2    Temperature limits for LiFePO$_4$ and Li-Ion battery chargers :

| TempLowWait | 0°C | No charge below this temperature. Wait mode |
|---|---|---|
| TempLowResume | 2.5°C | Charge resumes if temperature rises above this temperature |
| TempHighWait | 45°C | Charger enters wait mode if battery temperature is above this level. |
| TempHighResume | 42.5°C | Charge resumes if temperature falls below this temperature. |
| TempHighError | 60°C | Charger enters error mode if battery temperature is above this level. Battery or mains input must be disconnected to exit from this error. |

To modify these values make sure you have set up the correct NTC values in section 3.2 then simply change the values in the table and click **Send Changes** to send the changes to the charger. This will only send parameters that are marked yellow and thereby save some time. Alternatively you may use the send all button but it will take a longer time. The send all button is preferably used to set the charger back to default in cases where you are unsure of previous changes. Make sure that the status is reported back as OK.

## 3.4 Configuring timers

### 3.4.1 Timer setup for NiMH battery chargers

In this example we will show you how to change dV mask timer (earlier called start timer) and safety timer.

- Open the parameter file you wish to use as a starting point for your configuration by clicking **Load Parameters**. We will open 3546085000_1_PARAMETER_V1.0_20210628 in this example.
- Set up the communication as described in section 1.7
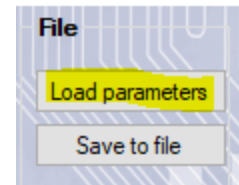
- As you can see this list has two columns for value. One is the value programmed in the microcontroller and the other one is a calculation to a more common value like V, A or °C. Please enter the new value in the column with the calculated values. The column to the left. Timers are in seconds or minutes. Please pay attention to the unit of these parameters.

Enter new value in this column

| Name | Value | Min | Max | Unit | µC value |
|---|---|---|---|---|---|
| ChargeCurrentFastCharge | 1,991 | 0,218 | 2,445 | A | 203 |
| ChargeCurrentTrickle | 0,100 | -0,009 | 0,137 | A | 190 |
| StartTime | 120 | 1 | 600 | s | 120 |
| SafetyTime | 240 | 1 | 16383 | min | 240 |
| TopOffTime | 60 | 0 | 16383 | min | 60 |
| dVMaskTime | 180 | 0 | 16383 | s | 180 |

- We will change dV Mask Time to 4 minutes and the Safety timer to 5 hours. Simply write the new values and **press enter (or down arrow).** The boxes will turn yellow to show differences from default value.
  If you want to save this file for later use you may save it using the save to file button.

| Index | Name | Value | Min | Max | Unit | µC value |
|---|---|---|---|---|---|---|
| 25 | ChargeCurrentFastCharge | 1,991 | 0,218 | 2,445 | A | 203 |
| 26 | ChargeCurrentTrickle | 0,100 | -0,009 | 0,137 | A | 190 |
| 28 | StartTime | 120 | 1 | 600 | s | 120 |
| 29 | SafetyTime | 300 | 1 | 16383 | min | 300 |
| 30 | TopOffTime | 60 | 0 | 16383 | min | 60 |
| 49 | dVMaskTime | 240 | 0 | 16383 | s | 240 |
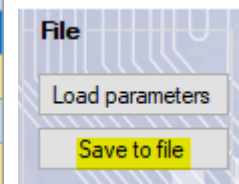
- Click **Send Changes** to send the changes to the charger. This will only send parameters that are marked yellow and thereby save some time. Alternatively you may press the send all button but it will take a longer time. The send all button is preferably used to set the charger back to default in cases where you are unsure of previous changes.

### 3.4.2 Timer setup for Lead Acid battery chargers

The procedure for setting up the timers is the same as I previous example except for types of timers.

Basic timers (often changed) :

| Index | Name | Value | Unit | Min | Max | | µC value | Description |
|---|---|---|---|---|---|---|---|---|
| 10 | Softstart Time | 1 800 | s | 1 | 16383 | | 1800 | Maximum time in softstart, give error |
| 11 | Charge Time | 240 | min | 1 | 16383 | | 240 | Maximum time in topup (CV), go to maintenance |
| 12 | Safety Time | 4 320 | min | 1 | 16383 | | 4320 | Maximum charging time, give error |

Special timers for advanced users:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 16 | Battery Error Timeout | 15 | s | 0 | 16383 | | 15 | Time with short/polarity inversion before pulsing is stopped, and stays in error mode until power is reconnected |
| 17 | Float Pulse Time | 5 | ms | 0 | 16383 | | 5 | Length of CC pulses in float state (CVL high) |
| 18 | Float Pulse Interval | 8 | s | 0 | 16383 | | 8 | Interval between CC pulses |

## 3.5 Configuring currents for NiMH battery chargers (for chargers with this option)

You may change the fast charge current, soft start current and the trickle current in the parameter list. In this example we will reduce the current by approx. 50% for fast charge, Soft start and trickle.

As you can see in the parameter list below the default value for fast charge current is 2.0A, soft start is 150mA and trickle charge current it is 100mA. We will change these values to 1.0A, 75mA and 50mA respectively.

| 25 | ChargeCurrentFastCharge | 2,000 | A | 0,218 | 2,227 | | 204 |
| 26 | ChargeCurrentSoftstart | 0,150 | A | 0,007 | 0,299 | | 125 |
| 27 | ChargeCurrentTrickle | 0,100 | A | 0,007 | 0,271 | | 81 |
| 29 | StartTime | 600 | s | 1 | 16383 | | 600 |
| 30 | SafetyTime | 240 | min | 1 | 16383 | | 240 |
| 31 | TopOffTime | 60 | min | 0 | 16383 | | 60 |
| 50 | dVMaskTime | 180 | s | 0 | 16383 | | 180 |

The easiest way to do this is simply to change the values in column C, and write the currents we want, making the values yellow and then press **Send Changes**.

| 25 | ChargeCurrentFastCharge | 1,00 | A | 0,218 | 2,227 | | 90 |
| 26 | ChargeCurrentSoftstart | 0,100 | A | 0,007 | 0,299 | | 81 |
| 27 | ChargeCurrentTrickle | 0,075 | A | 0,007 | 0,271 | | 59 |
| 29 | StartTime | 600 | s | 1 | 16383 | | 600 |
| 30 | SafetyTime | 240 | min | 1 | 16383 | | 240 |
| 31 | TopOffTime | 60 | min | 0 | 16383 | | 60 |
| 50 | dVMaskTime | 180 | s | 0 | 16383 | | 180 |

Make sure that the status reported back is OK!

## 3.6 Configuring -dV parameters for NiMH battery chargers

Mascot recommendation for -dV EoC is to use approx. 3mV/cell. To set up these levels we use a 4x1 matrix or 4x4 matrix if you want to use time dependent levels. Mascot standard is to use not time dependent levels of approx. 3mV/cell. Since the chargers are for a range of battery packs e.g. 4-8cells the values will be different in the 4 voltage ranges.

### 3.6.1 Changing the voltage range

To change the voltage levels simply enter new values in the parameter list (You cannot change this in the matrix) and press **Send Changes** to send the changes to the charger. This will only send parameters that are marked yellow and thereby save some time. Alternatively you may press the send all button but it will take a longer time. The send all button is preferably used to set the charger back to default in cases where you are unsure of previous changes.

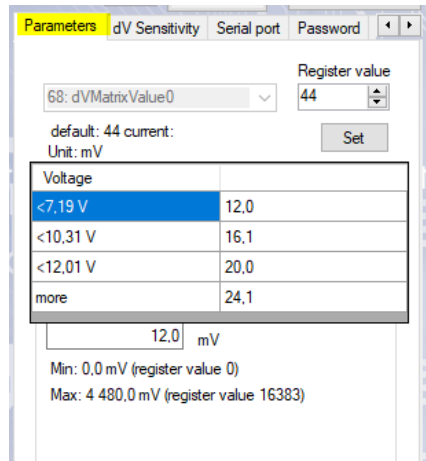| dVMatrixLimit0 | 7,19 | V |
| dVMatrixLimit1 | 10,31 | V |
| dVMatrixLimit2 | 12,01 | V |

Make sure that the status reported back is OK!

### 3.6.2 Changing -dV level for not time dependent -dV EoC

Select the **parameters tab** and **one of the dV matrix levels** in the table.

| 67 | dVMatrixLimit2 | 12,01 | 0 | 17,903 | V | 686 |
|----|----------------|-------|---|--------|---|-----|
| 68 | dVMatrixValue0 | 12,0 | 0 | 4479,951 | mV | 44 |
| 69 | dVMatrixValue1 | 12,0 | 0 | 4479,951 | mV | 44 |
| 70 | dVMatrixValue2 | 12,0 | 0 | 4479,951 | mV | 44 |

The 1x4 matrix will appear in the parameter tab window.

Parameters | dV Sensitivity | Serial port | Password

Register value

68: dVMatrixValue0          44

default: 44 current:          Set
Unit: mV

| Voltage | |
|---------|---|
| <7,19 V | 12,0 |
| <10,31 V | 16,1 |
| <12,01 V | 20,0 |
| more | 24,1 |

12,0 mV

Min: 0,0 mV (register value 0)
Max: 4 480,0 mV (register value 16383)

To change the -dV level simply change the value in the matrix in the voltage range applicable.

| Voltage | |
|---------|---|
| <7,19 V | 16 |
| <10,31 V | 24 |
| <12,01 V | 28 |
| more | 32 |

This will change the value in the table and mark it yellow (in the main table). Click **Send Changes** to transfer the new settings to the charger.

### 3.6.3 Changing -dV level for time dependent -dV EoC

**Select the parameter tab and one of the dV matrix levels** in the table as in section 3.6.2. The 1x4 matrix will appear in the parameter tab. To extend this to 4x4 matrix check the check box called time **dependent -dV**. This will expand the matrix to 4x4 and values can be entered individually in the 16 positions. Time is on the horizontal scale. This is the safety timer divided in four steps. This is fixed and cannot be changed. In this example the safety timer is set to 240 minutes giving timeslots of 1 hour for each time frame. The -dV levels are in mV and are the total -dV level for the battery pack. In the example below the 24mV will be 6mV/cell for a 4C battery pack in the start of the charging cycle. After 1 hour the sensitivity is decreased to approx. 5mV/cell, then to 4mV/ cell and the last hour the sensitivity will be 3mV/cell.

☑ Time dependant -dV

| Voltage | T<60 | T<120 | T<180 | more |
|---------|------|-------|-------|------|
| <7,19 V | 24 | 20 | 16 | 12 |
| <10,31 V | 16 | 15 | 14 | 13 |
| <12,01 V | 20 | 19 | 18 | 17 |
| more | 24 | 23 | 22 | 21 |

## 3.7 Configuring dT/dt EoC parameters for NiMH chargers

There are two parameters that must be considered when setting up temperature rise detection as EoC. In addition to this, the detection method must be enabled, and you need to consider if you want the NTC to be mandatory. The dT EoC is enabled by default but you may check this, by selecting the Modeflags parameter in the list and selecting the parameters tab as shown below. Mascot has not set NTC as mandatory/required since we also use -dV detection. If you are only using dT as EoC method we recommend that you make it mandatory. If you make it mandatory the charger will go to error mode if the NTC is missing or not functioning as intended, e.g. poor connection.



As you can see in the mode flag section the dT checkbox is checked and thereby enabled. The same is -dV detection. These are the EoC methods recommended by Mascot. Mascot do not recommend using Zero dV because this may cause premature EoC detection. Please contact Mascot if you want to fine tune Zero dV parameters.

dT is enabled and we may proceed setting up the parameters. If you want the NTC to be mandatory just check the box.

The next step is to setup the temperature parameters. Mascot recommendation is to use the following values:

|  | dT sensitivity (1bit ≈ 0.1°C) | dT sense time (In seconds) |
|---|---|---|
| Very Slow charge (C/8): 0.2°C/min | 4 | 120 |
| Slow charge (C/4): 0.5°C/min | 5 | 60 |
| Fast charge (1C): 1.0°C/min | 10 | 60 |

1. Very Slow charge (C/8): 0.4°/2 minutes = 0.2°C/min
2. Slow charge (C/4): 0.5°C/1 minute = 0.5°C/min
3. Fast charge (1C): 1.0°C/1 minute = 1.0°C/min

Temperature rise pr. minute is given by "dT sensitivity" devided by "dT sense time.

We will change the values to 4 bits and two minutes. Giving a dT/dt detection level of 0.2°C/min.

| 60 | dTSensitivity | 4 | | 0 | 1023 | | 4 |
| 61 | dTSenseTime | 120 | s | 0 | 81915 | | 24 |

Change the values and press the **send changes** button.

Send changes
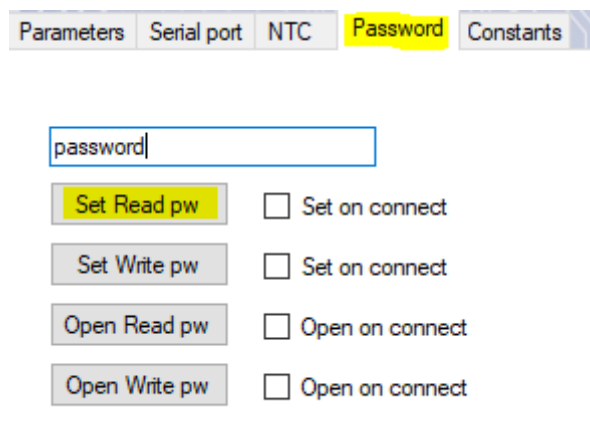
# 4 Read/write protection

You may activate read and/or write protection of the charger if you want to protect your settings from being copied or changed. Please be aware that if you forget your password, and has enabled write protection, the charger must be reprogrammed by Mascot if you need to change some parameter(s). If you have enabled read protection only and forget your password, you may set the charger parameters back to default but not be able to read it. The password will not be reset in this case – only the parameters. For resetting the password follow the instruction in section 4.1.3 or 4.2.3 in this user guide. If you want to use both read and write protection we recommend that you use the same password for both.

## 4.1 Setting up password and enabling/disabling read protection

### 4.1.1 Setting the Password

If you want to enable read protection the first thing you must do is to set the password. If you skip this, the default password will be Mascot (capital M). To set the password, connect the charger, go to the **Password Tab,** write the wanted password in the password field and the klick **Set Read pw.** This will set the desired password. The charger must be restarted for this change to take effect.



### 4.1.2 Enabling Read Protection

I addition to setting the desired password you must also enable the protection. Go to the **Parameter Tab,** check the **Read Protect checkbox** and click **Send Changes.** The charger must be restarted for this change to take effect.

### 4.1.3    Configure a Read Protected charger and/or Disabling Read Protection

To disable the read protection and keep the parameters as they are you must know the password for the charger.

    a)  Connect the read protected charger
    b)  Go to advanced mode (**uncheck simple box** on parameter tab)
    c)  Select **Password Tab**.
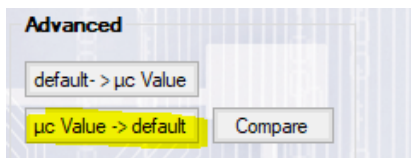    d)  **Enter password** in password field
    e)  Click **Open Read pw**
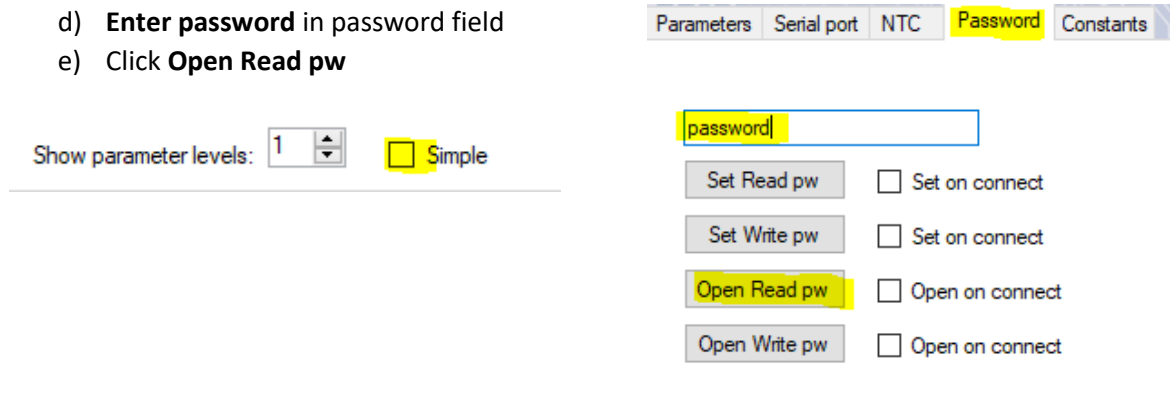
Make sure that the operation was successful (**OK** in upper left corner)

The charger is still read protected though since the read protection is still activated. 
If you want to make a change to a parameter and keep the protection you may make your changes and after a restart the charger is still protected with the same password as before.  If you want to disable the protection but keep non-standard parameters you must do the following:

    a)  Connect the read protected charger
    b)  Go to advanced mode (**uncheck simple box** on parameter tab)
    c)  Select **Password Tab**.
    d)  **Enter password** in password field
    e)  Click **Open Read pw**

To be able to only disable the password protection we must use the **Send Changes** button. This button will only send the yellow values, so what we need to do is to make sure that we get a yellow value on the flag parameter (mode flags no. 9) If we by turning off the read protection set it back to default, it will turn blue, and that is not desired. To omit this "issue", we will first read all parameters from the charger and the click the **µc Value ->default** button.
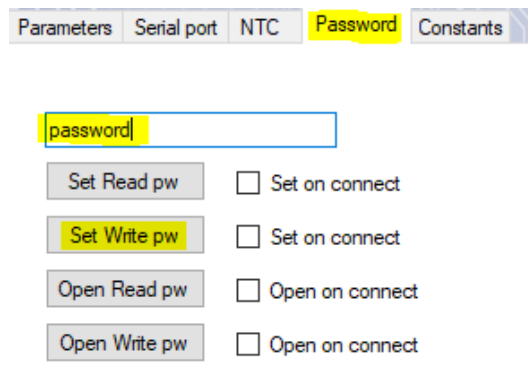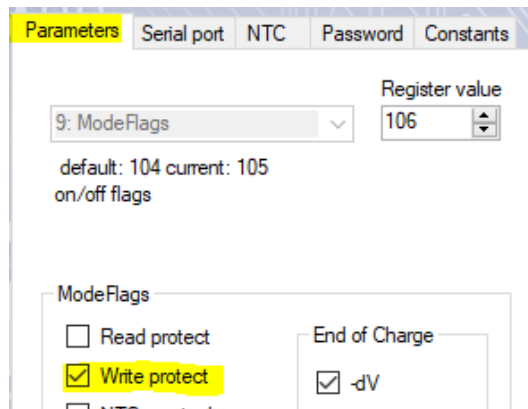
This will set the current configuration as our default configuration. Then we will uncheck the **Read Protect checkbox** (making the flag value yellow) and click **Send Changes.** Please be aware that this do not reset the password. If you later turn on the read protection, the password will be the one you have set earlier. It is our recommendation that you set the password back to default (Mascot) when disabling the read protection.

## 4.2   Setting up password and enabling/disabling write protection

### 4.2.1   Setting the Password

If you want to enable write protection the first thing you must do is to set the password. If you skip this, the default password will be Mascot (capital M). To set the password, connect the charger, go to the **Password Tab,** write the wanted password in the password field and the klick **Set Write pw.** This will set the desired password. The charger must be restarted for this change to take effect.



### 4.2.2   Enabling Write Protection

I addition to setting the desired password you must also enable the protection. Go to the **Parameter Tab,** check the **Write Protect checkbox** and click **Send Changes.** The charger must be restarted for the change to take effect.
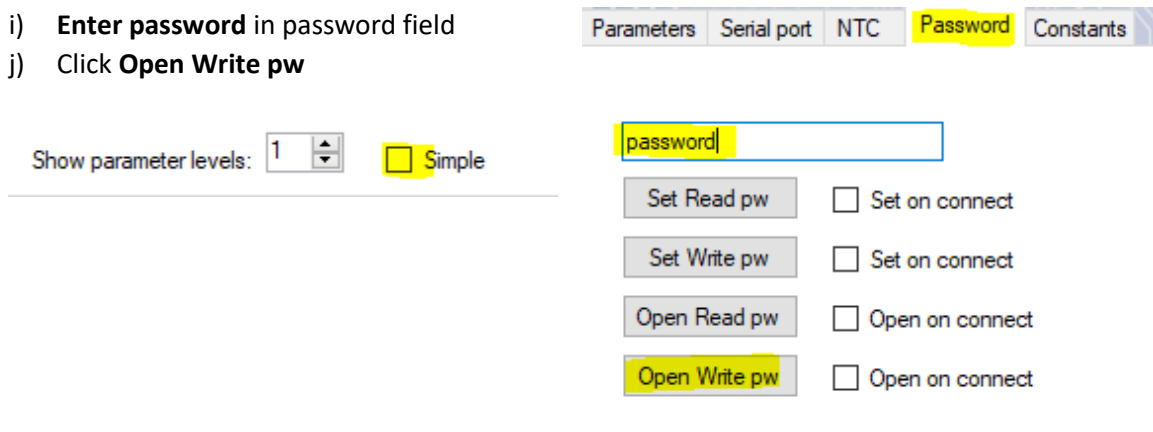
### 4.2.3 Configure a Write Protected charger and/or Disabling Write Protection

To disable the write protection and keep the parameters as they are you must know the password for the charger.

f) Connect the write protected charger
g) Go to advanced mode (**uncheck simple box** on parameter tab)
h) Select **Password Tab**.
i) **Enter password** in password field
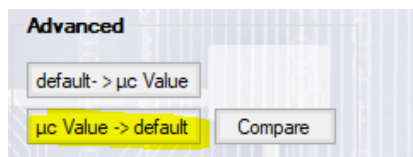j) Click **Open Write pw**



Make sure that the operation was successful (**OK** in upper left corner)

The charger is still protected though since the write protection is still activated. If you want to make a change to a parameter and keep the protection you may make your changes and after a restart the charger is still protected with the same password as before. If you want to disable the protection but keep non-standard parameters, you must do the following:

f) Connect the write protected charger
g) Go to advanced mode (**uncheck simple box** on parameter tab)
h) Select **Password Tab**.
i) **Enter password** in password field
j) Click **Open Write pw**

To be able to only disable the password protection we must use the **Send Changes** button. This button will only send the yellow values, so what we need to do is to make sure that we get a yellow value on the flag parameter (mode flags no. 9) If we by turning off the read protection set it back to default, it will turn blue, and that is not desired. To omit this "issue", we will first read all parameters from the charger and the click the **µc Value ->default** button.



This will set the current configuration as our default configuration. Then we will uncheck the **Write Protect checkbox** (making the flag value yellow) and click **Send Changes.** Please be aware that this do not reset the password. If you later turn on the write protection, the password will be the one you have set earlier. It is our recommendation that you set the password back to default (Mascot) when disabling the write protection.

# 5 Tips and tricks

## 5.1 Preparing parameter files for later use

If you want to prepare a parameter file to be used later, we recommend that you use this guide. To be able to do this you need to know which file to use as a starting point. We will use Mascot 3546 4-8C (3546085000_1_PARAMETER_V1.0_20210628) in this example. There is no need to connect the tool or the charger – you may use the software stand-alone to prepare the file.

1. Open the MCS and press **Load Parameters**.
2. Open the file you want to use as a starting point for your configuration. Note! It is important that the HW-ID of this file matches the charger you want to configure later.  When we open this file all the parameter boxes are coloured blue. This is because the parameters have default value i.e. there are no changes from default.

| 25 | ChargeCurrentFastCharge | 1,994 | A | 0,213 | 2,186 | | 204 |
|---|---|---|---|---|---|---|---|
| 26 | ChargeCurrentSoftstart | 0,100 | A | 0,01 | 0,201 | | 108 |
| 27 | ChargeCurrentTrickle | 0,100 | A | 0,01 | 0,218 | | 108 |

3. Change the value(s) you want to configure (In colums C - Value) and you will see that the boxes changes colour to yellow.

4. Press **Save To File** and save this file with your desired name. We will in this example reduce the currents and save the file.

| Index | Name | Value | Unit | Min | Max | | µC value |
|---|---|---|---|---|---|---|---|
| 9 | ModeFlags | 104 | | 0 | 511 | | 104 |
| 25 | ChargeCurrentFastCharge | 1 | A | 0,213 | 2,186 | | 90 |
| 26 | ChargeCurrentSoftstart | 0,05 | A | 0,01 | 0,201 | | 56 |
| 27 | ChargeCurrentTrickle | 0,05 | A | 0,01 | 0,218 | | 56 |

Save to file

## 5.2   Configuring several chargers with a pre prepared parameter file

1. Press the **Load Parameters** and chose a previously stored parameter file that includes the changes you want to apply and set-up the communication. (See section 1.7)
2. In this example we want to configure the 3546 4-8C with the reduced currents. (Described in 5.1)

| Index | Name | Value | Unit | Min | Max | | µC value | |
|---|---|---|---|---|---|---|---|---|
| 9 | ModeFlags | 104 | | 0 | 511 | | 104 | |
| 25 | ChargeCurrentFastCharge | 1 | A | 0,213 | 2,186 | | 90 | |
| 26 | ChargeCurrentSoftstart | 0,05 | A | 0,01 | 0,201 | | 56 | |
| 27 | ChargeCurrentTrickle | 0,05 | A | 0,01 | 0,218 | | 56 | |

3. Press **Send Changes** to transfer the new parameter values marked yellow. Make sure you get the OK feedback in upper left corner.

The first charger is configured. To configure a new, follow these steps:

1. Disconnect previously configured charger.
2. Press **next charger**. Check that the dots appear in status window.

**Connect charger**

Next charger
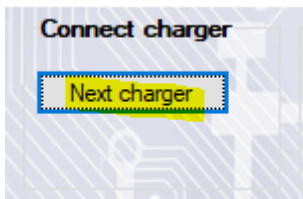
3. Plug in mains supply for the new unit.
4. Check connection status.

**Connect charger**

Next charger
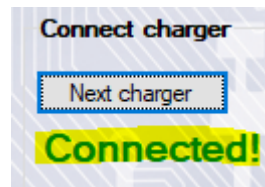
**Connected!**

5. The new charger is connected, and you may transfer the changed parameters by clicking **Send Changes**.

Check the **Send changes** checkbox on the Password-tab if you wish to automatically send changes on connect. If the charger is password protected, you must also open the charger on connect by writing the password in the password field and checking the **Open on connect** for read or write.

Parameters | Serial port | NTC | Password | Constants

Set Read pw    ☐ Set on connect
Set Write pw    ☐ Set on connect
Open Read pw    ☐ Open on connect
Open Write pw    ☐ Open on connect

Send values on connect
○ None
◉ Send changes
○ Send all

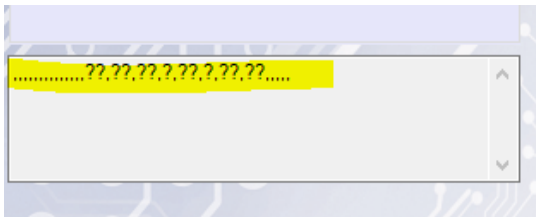# 6   Glossary

MCS – Mascot Configuration Software. Software to be used for configuration of Mascot configurable battery chargers.

EoC – End of charge

# 7   FAQ

1.  The charger is not connecting to the tool



Sometimes you may experience that the charger do not connect correctly to the tool. If you see question marks (or other symbols) in the log window (as shown above) and/or the charger is flashing green, and you do NOT get the OK status within 15 seconds after you connected the mains voltage , the connection has probably failed. Disconnect the charger from mains, check that the LED on the charger turns off (may take as long as 30s) and then try again.