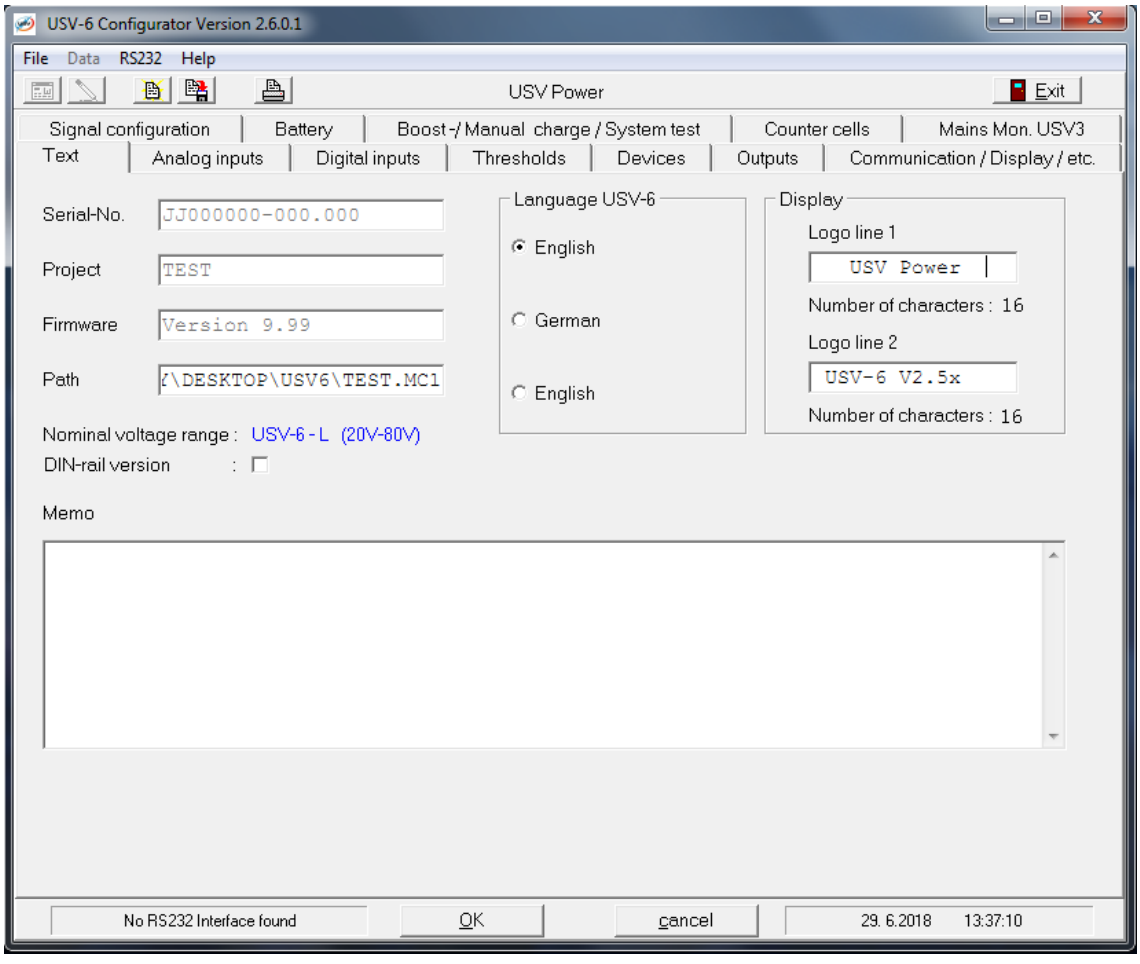
DC-CONTROLLER

USV6 – Configurator

USER MANUAL



Information about the user manual

IMPORTANT! Please read this user manual very carefully before assembling and starting this device!

The user manual is a part of the delivery of this device, i.e. it should be made available to each and every person involved with the starting, maintenance or operation of the device. The device should be transported, mounted, started, maintained and operated only by Electro technical personnel.
The local specifications for the prevention of accidents as well as the general guidelines according to IEC 364 should always be followed!

constant revision of the operation manual.
The device complies to the EN- and VDE-standards applicable at the time of the publication. The CE symbol on the device confirms the conformation of the EU-guidelines 2006/95/EG (Low voltage directive) and 2004/108/EG (EMC directive).

The devices are delivered exclusively according to our delivery and sales conditions. Alterations in the technical details in this operation manual as well as the respective data sheets are reserved.

Complaints about the delivered goods should be made as soon as possible on receiving them along with the packing invoice as well as the information about the type, serial number and complaint.

Guarantee claims of the customer will not be entertained in the case of visible external influences (e.g. absent or loose screws, welding, loose sheets, etc.), that could be attributed to a non permitted opening of the device.

The current revision status of this manual is the following:

Revision:	01
Date:	2018-06-29
System:	USV6
System voltage:	24/48/108/216VDC

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1. Introduction

The U configurator is a program to change and adjust values of a USV6-unit. The values are changed using a PC and transmitted via serial interface RS232 to the USV6.

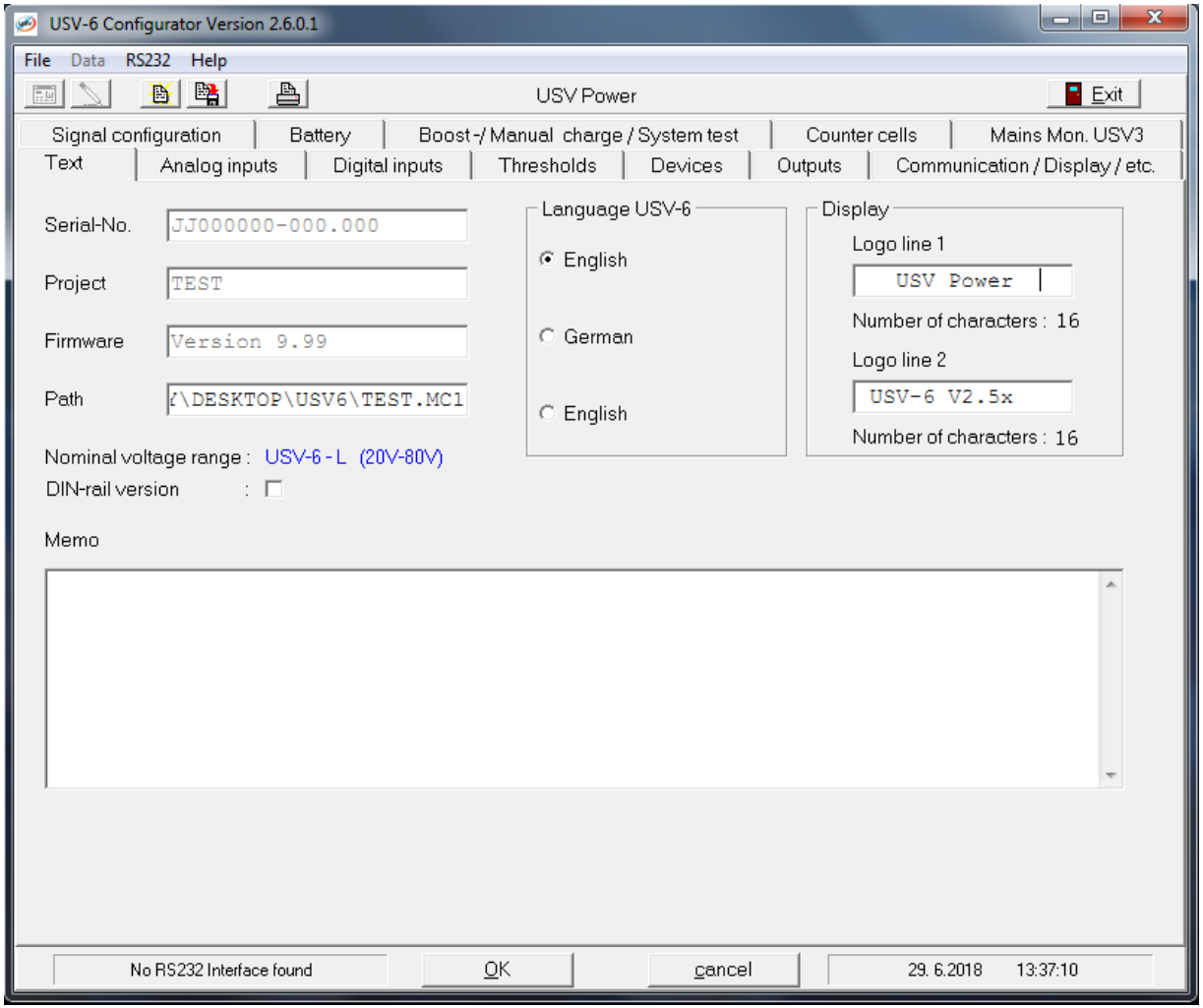
1.1 Requirements to start programming of USV6

To start with configuration of USV6 via this program you have to check whether the following requirements are fulfilled:

1. USV6 is switched on and the display shows the main menu
2. RS232 port is connected via an null modem cable (Sub-Min D 9-pole) to an free COM port of your computer
3. The transmission speed of the used COM port is set to 9600 Bps
4. The file USV6_V2_6_0_1.EXE (delivered on CD) has been saved in a specific directory on your hard disk

The software is tested with following operation systems: Microsoft Windows 95 , Microsoft Windows 98 , Microsoft Windows 2000 +XP.

2. Program start



Click on USV6_V2_6_0_1.exe in the specific directory on your hard disc.

The picture on the left shows the main screen after starting the USV6-Configurator.

In the main menu bar you find following items:

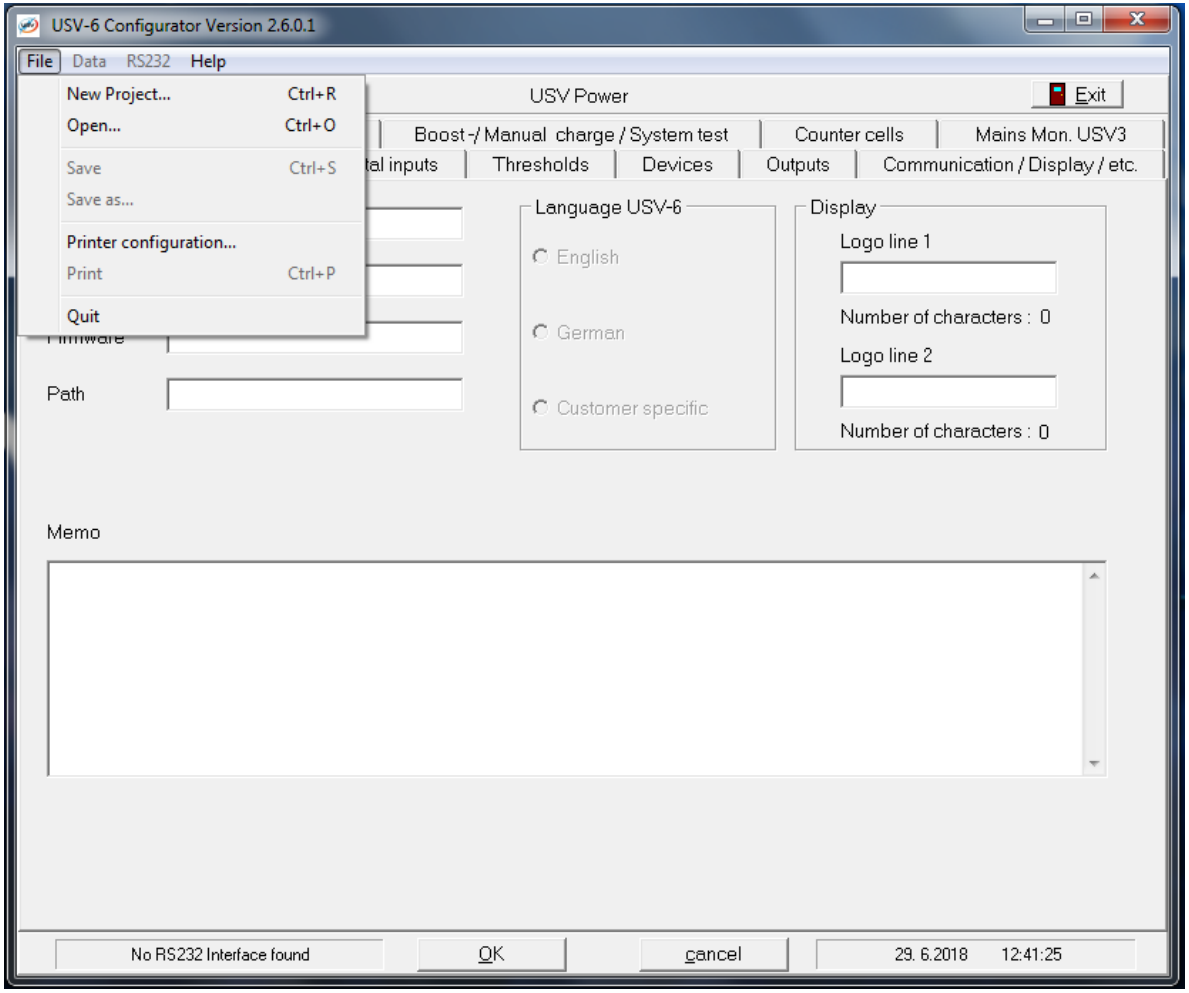
"File" for open/close/save/print project files
"Data" to start the transmission of data to and from USV6
"RS232" to check and change the baudrate and COM port for transmission cable
"Help" with USV6 version and registration code information

In the icon bar you find buttons for "Read data from USV6", "Write data to USV6", "Open project file", "Close project file", "Print configuration data" and "Exit".

The configuration values are arranged in 12 registers.

3. Main menu items

3.1 Main menu item – "File"



New Project – generate a new project file

Open – open a saved project file

Save – save the changed project file

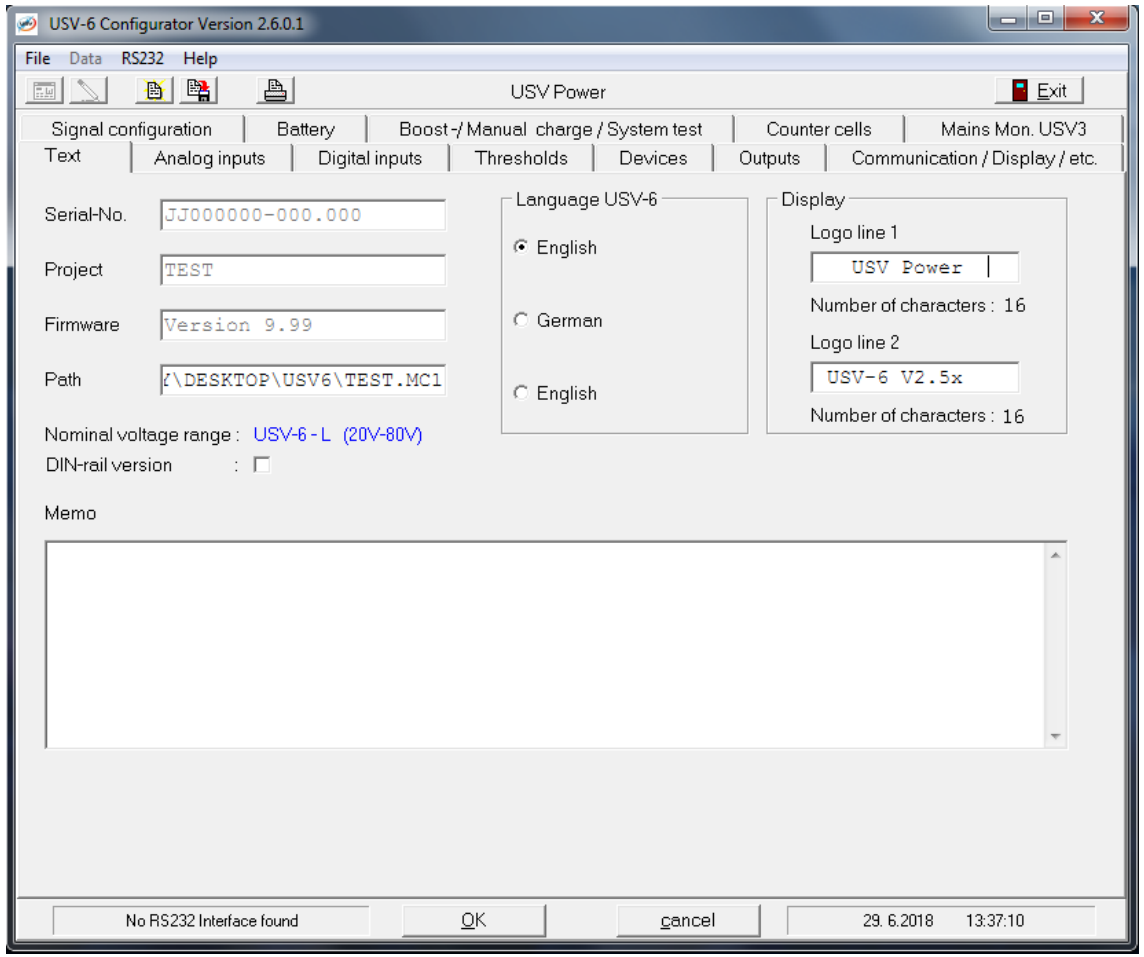
Save as – save the changed project file with another name

Printer configuration – set the default printer for printing the configuration data list

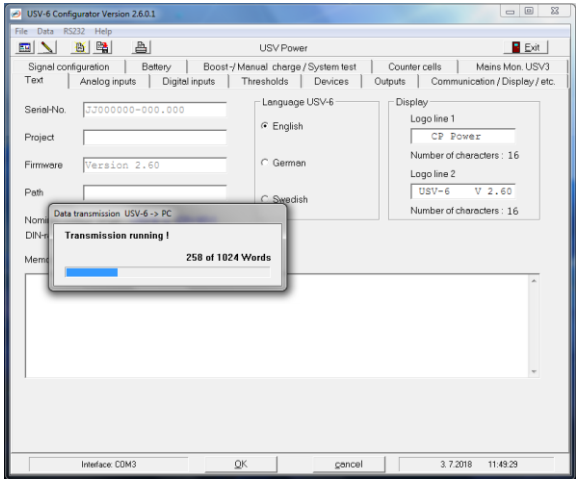
Print – print out the configuration data list

Quit – exit the program

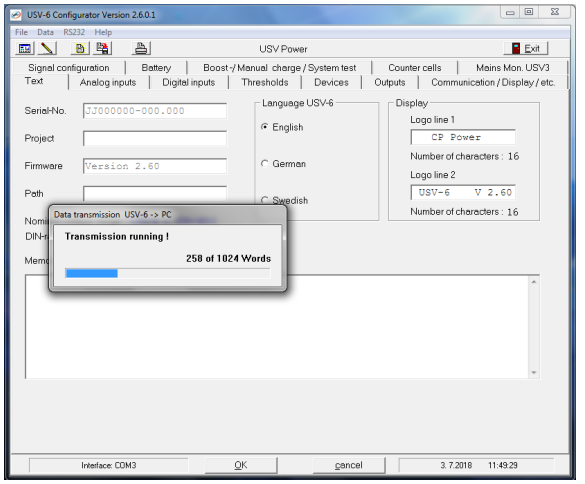
3.2 Main menu item – "Data"



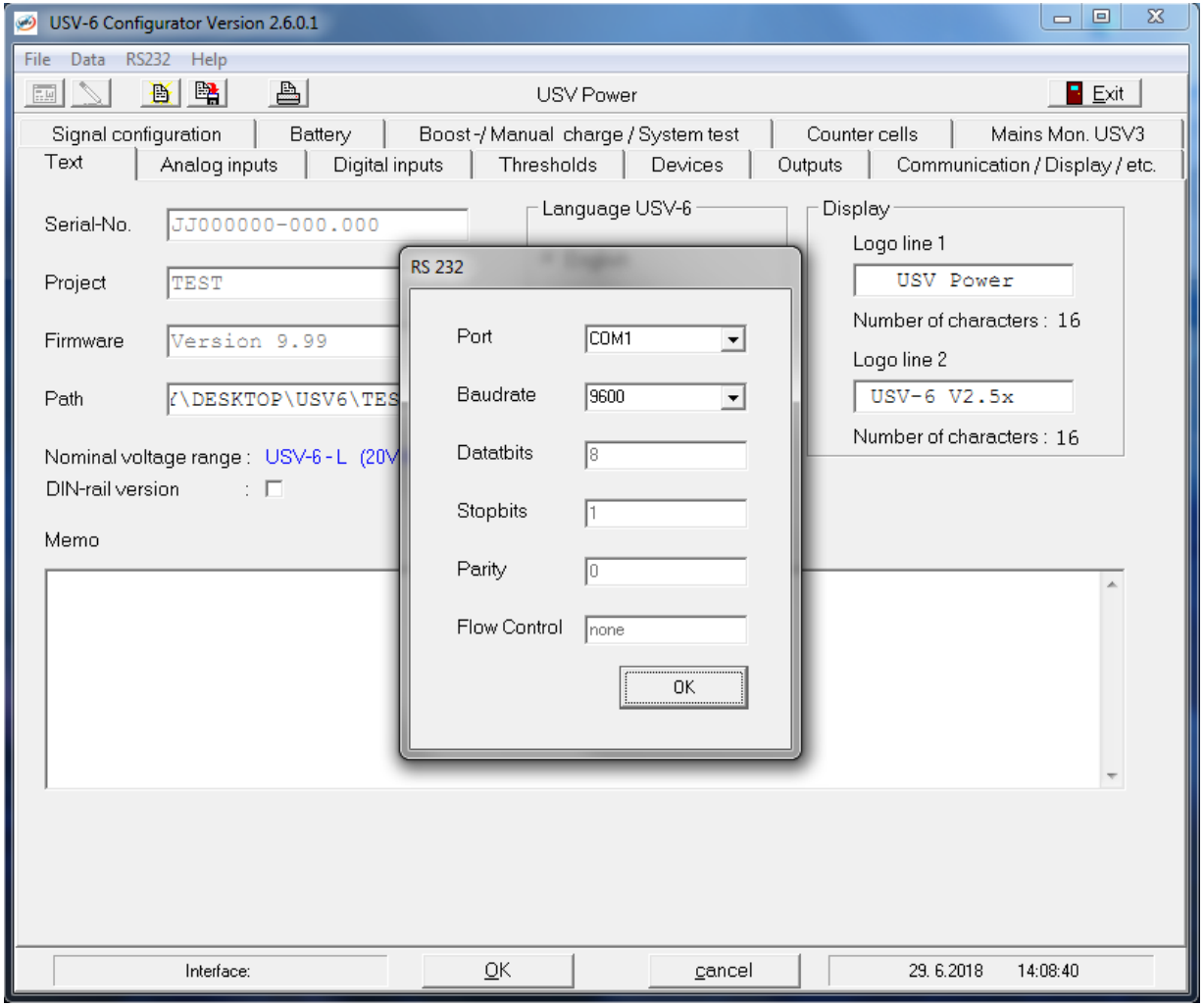
Read USV6->PC – start data transmission from USV6 to your computer



Write PC->USV6 – start data transmission from your computer to USV6



3.3 Main menu item – "RS232"



During startup of the software a free COM port is automatically detected. In case of detection failures you can adjust the correct COM port manually.

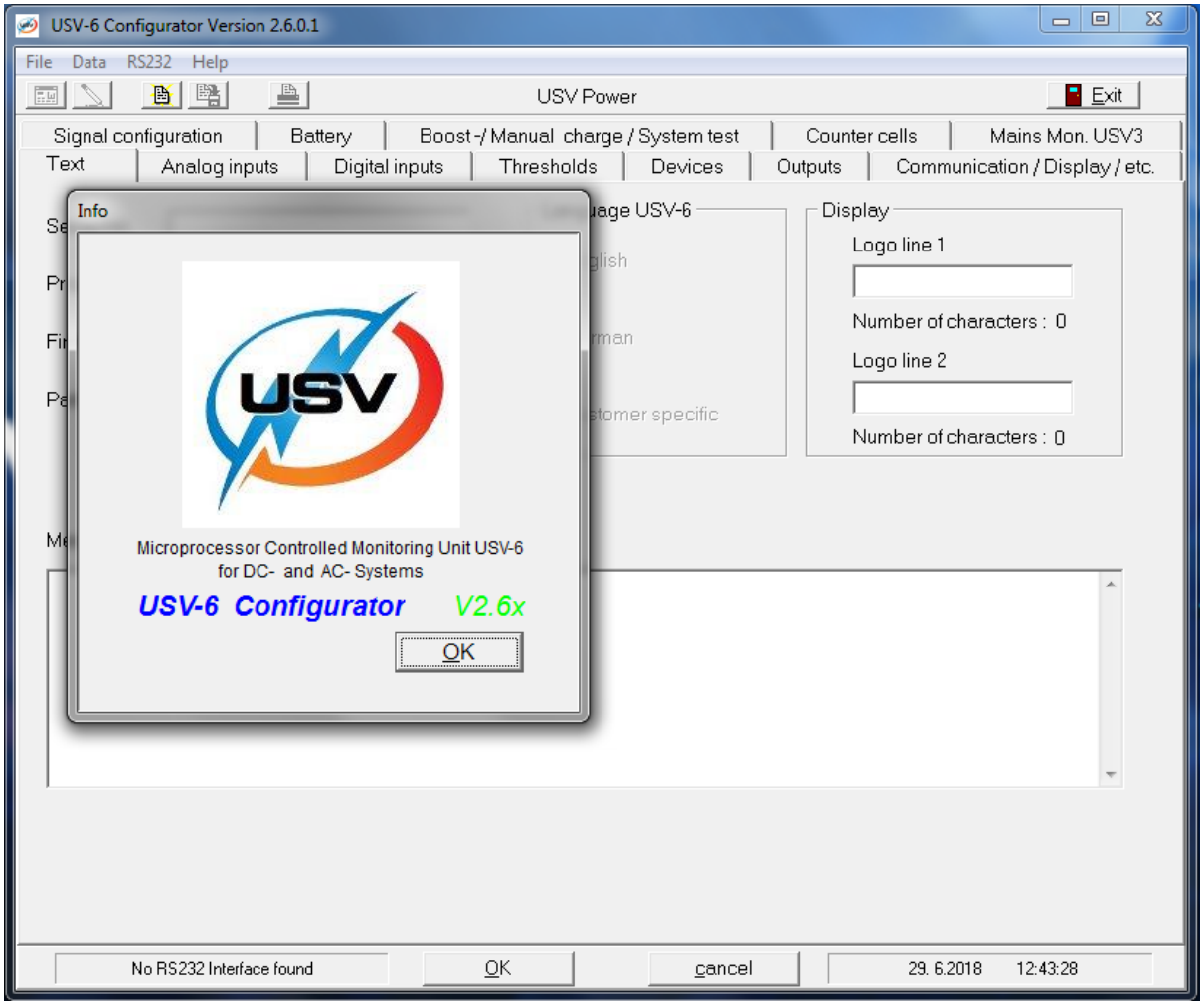
Comm. Port – COM port on which the serial transmission cable is connected

Baud Rate – the default rate is 9600

Data bits – the standard value is "8"

Stop bits – the standard value is "1"

3.4 Main menu item – "Help"

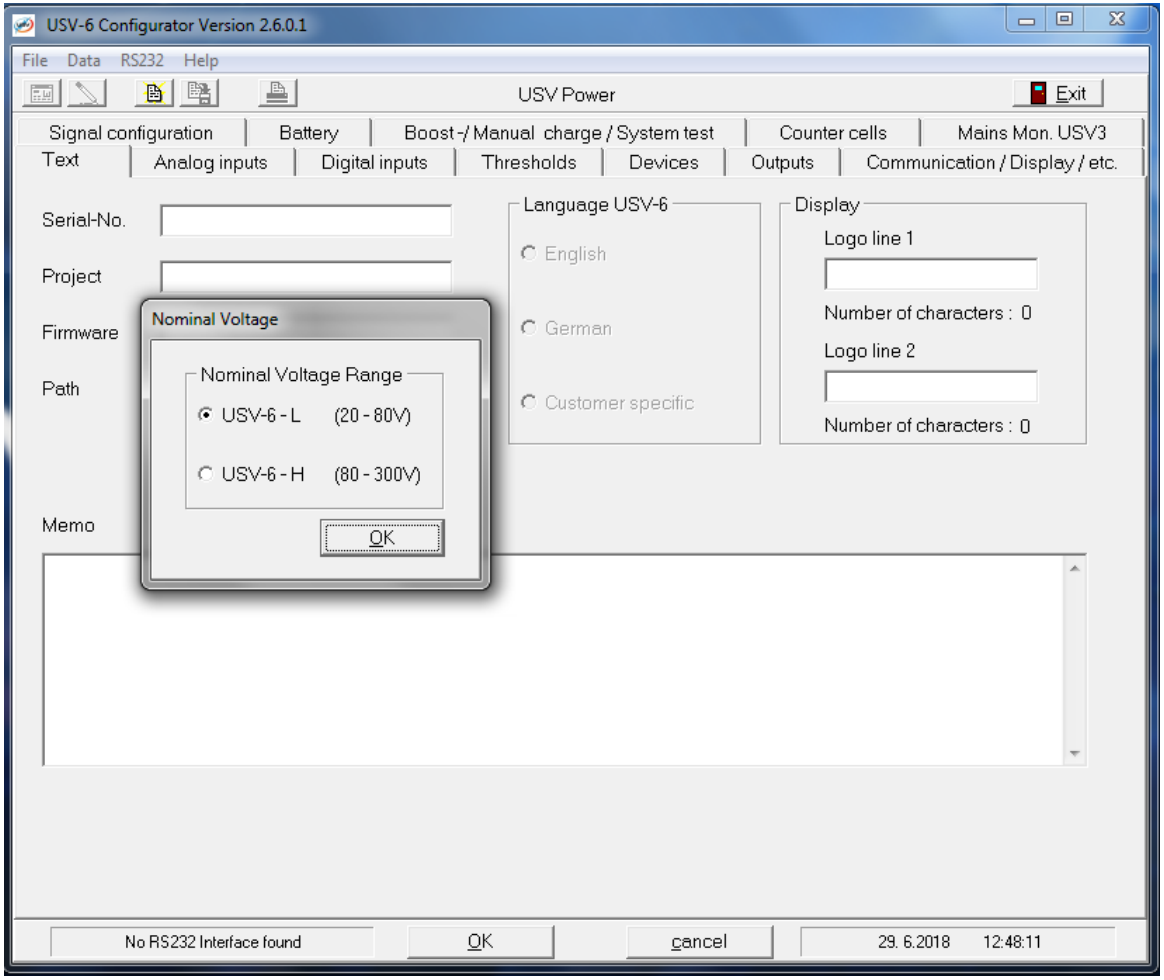


This menu item shows the main service parameters of the actual configurator software and the online help:

Menu item – "Info":

4. Generate a project file

4.1 New project file

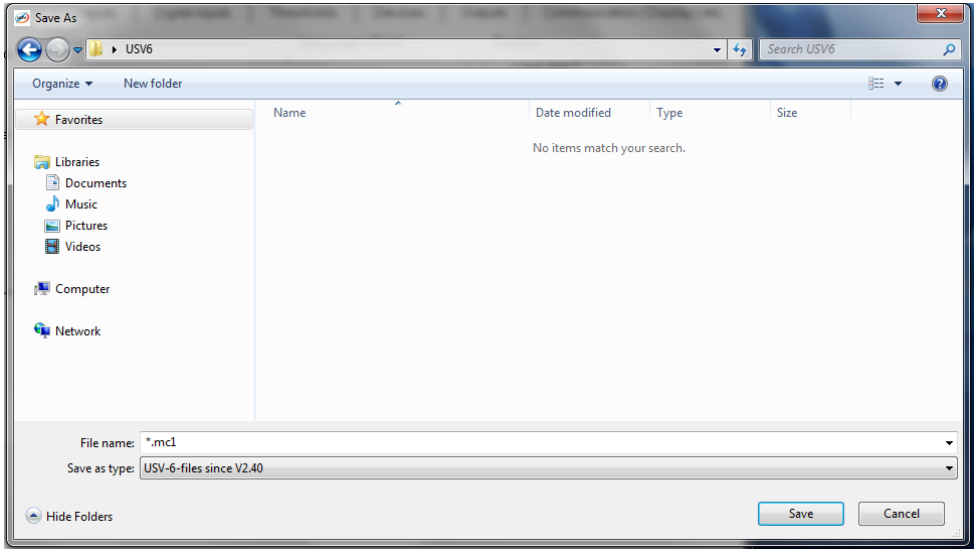


If you try to fill in data for USV6 configuration before you opened a new project file or a saved project file you get the message: "Please open a file, new project or read data from USV6!"

To generate a new project file select *File/New…*

Choose the *Nominal Voltage Range* of the USV6 unit that you are using.

Confirm with "OK".



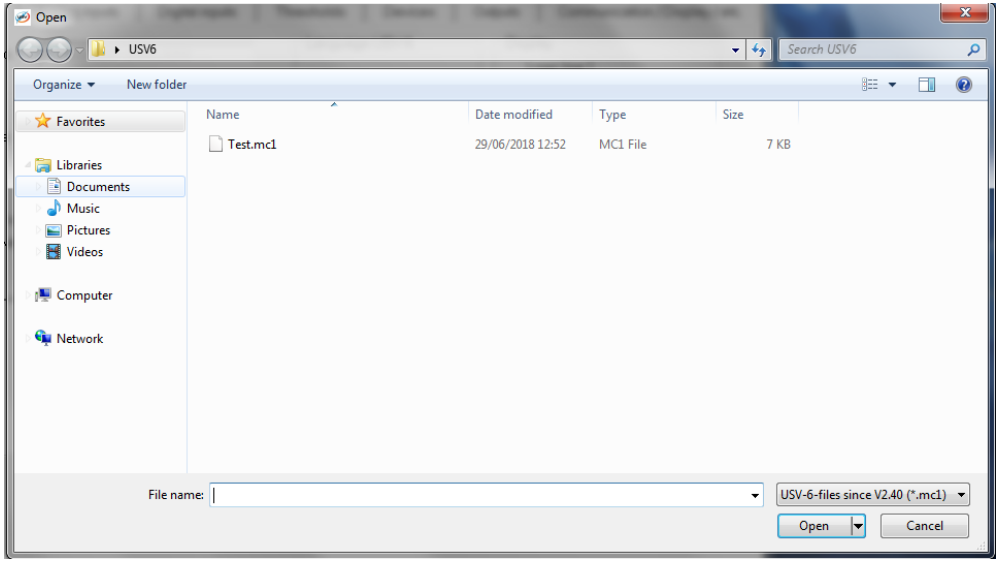
The window “Save as” will appear.

Give a name for the new project file.

The project file suffix is “mc1”.
You do not need to fill in the suffix, because the software will generate it automatically.

Confirm with “OK”.

4.2 Open existing project file



To open an existing project file select *File/Open…*

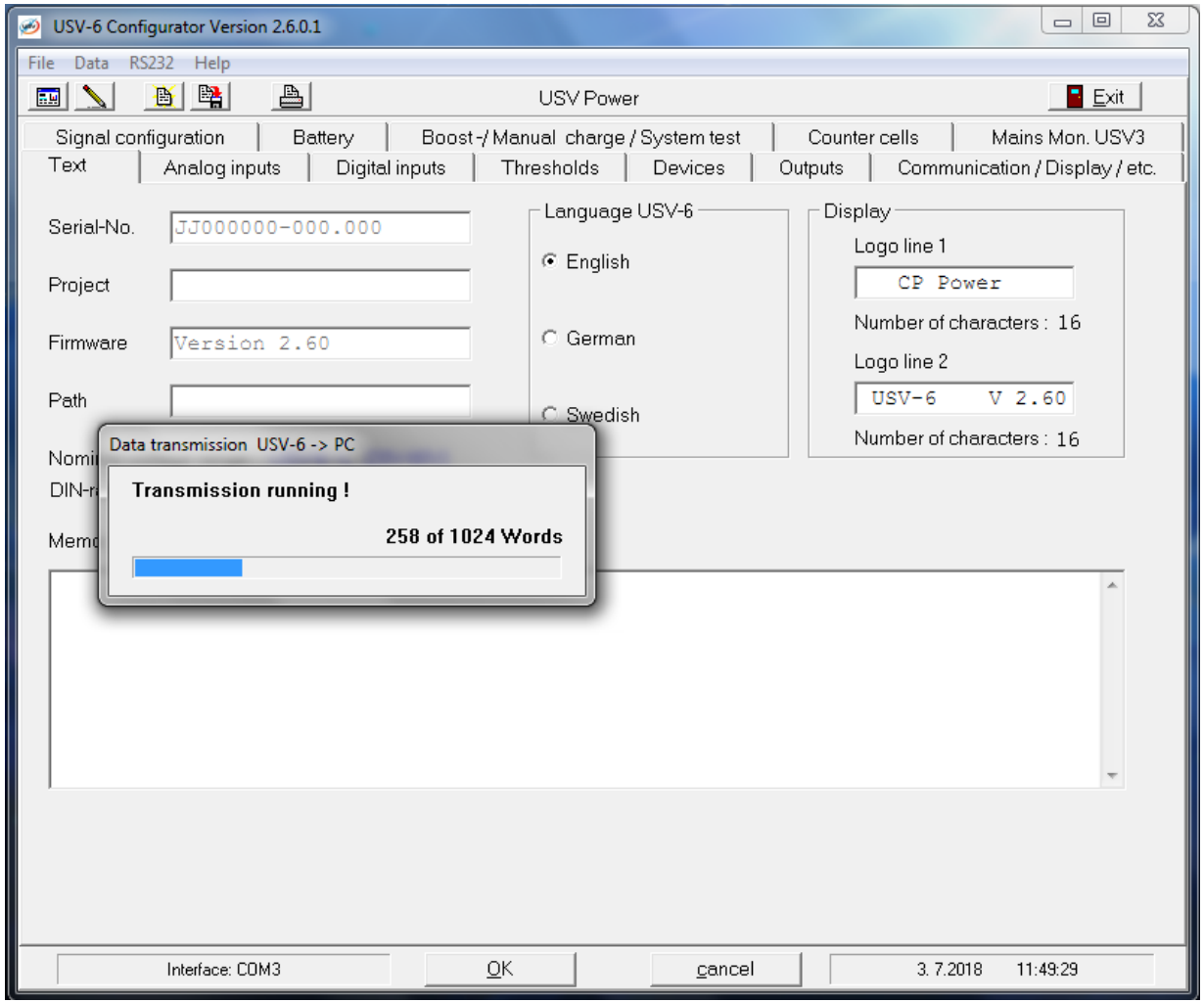
The window “File open” will appear.

Search for the right file in your harddisk subdirectories (suffix “.mc1” is preadjusted).

Click on the file name and confirm with “OK”.

Note, you must open the USV6 Configurator first, and then open the file. The .MC1 file will not automatically open the USV1.

4.3 Read data from USV6



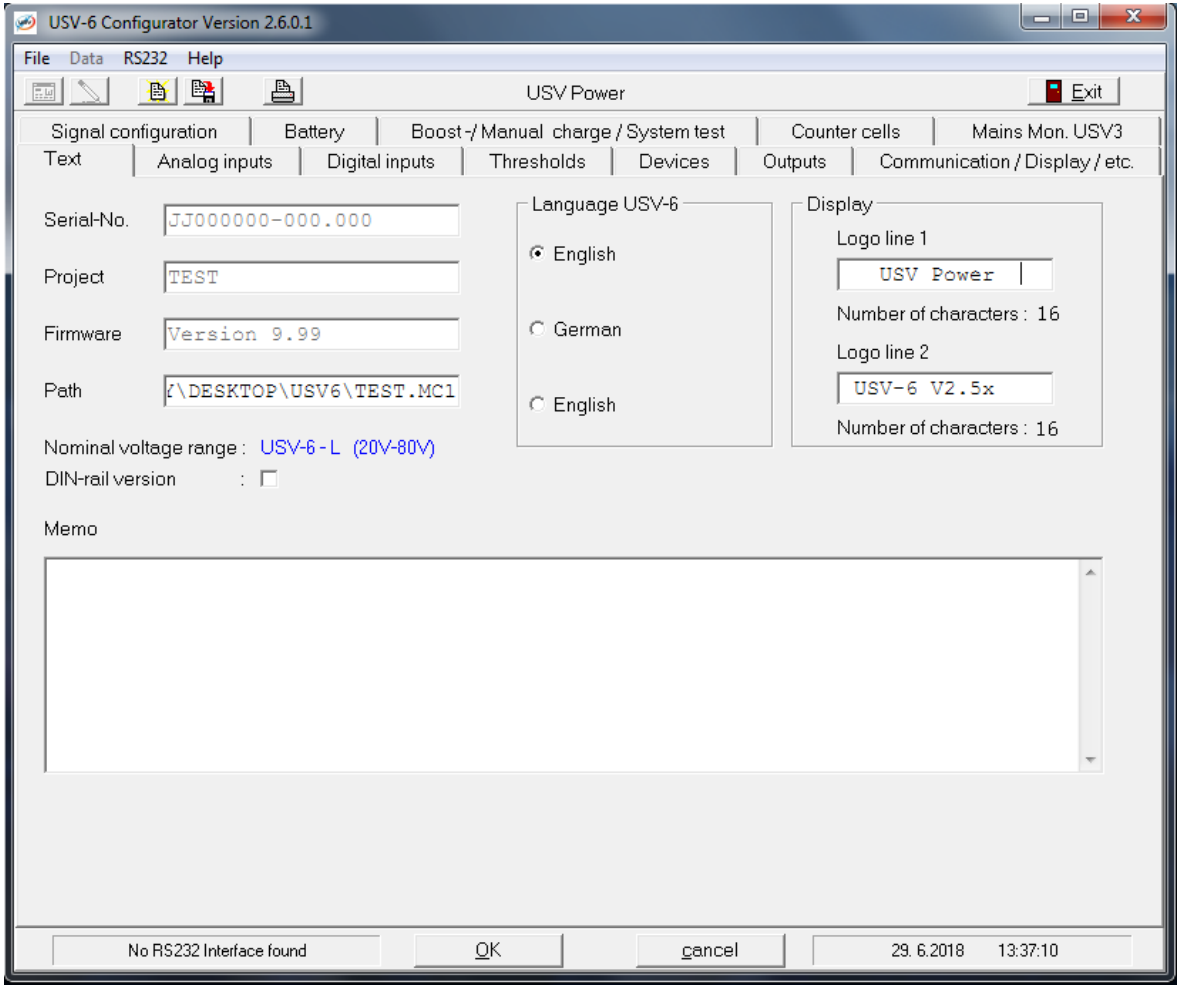
To read data from USV6 select Data/Read USV6->PC…

The window “Data transmission PC <- USV6” will appear.

With “cancel” you stop the data transmission.

5. Configuration registers

5.1 Register – "Text"

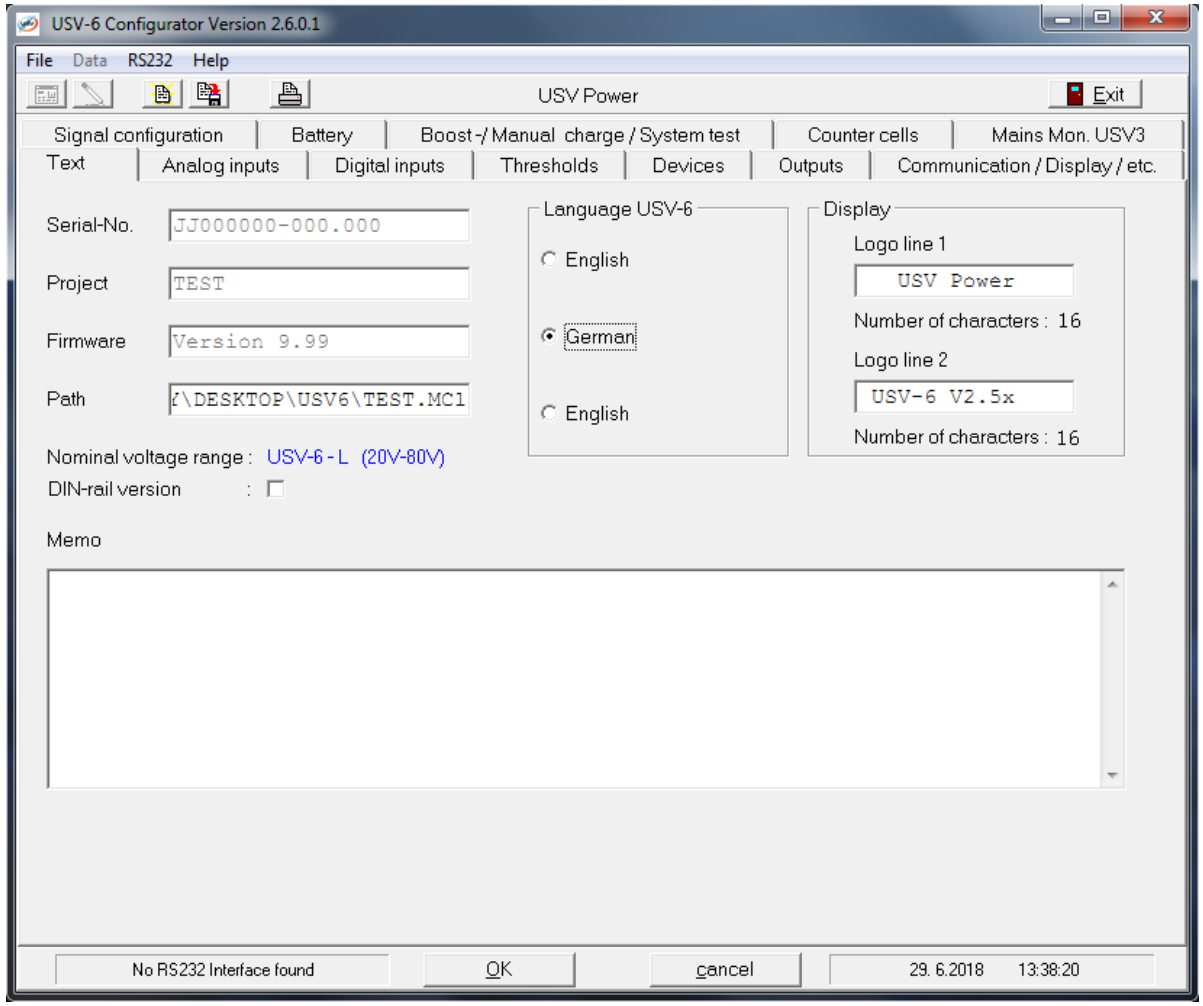


Serial no. – the serial number of the USV6 hardware is shown automatically in this line

Project – project file name
You can change this name if you save the project file with "File/Save as…" with another name.

Firmware – firmware version of USV6 processor software.
The firmware version will be read out from the USV6 during data transmission from USV6 to PC.

Path – file path for your project file
You can change this file path if you save the project file with "File/Save as…" in another subdirectory on your harddisk.



Language – choose the language that you usually use to display in the USV6.

The third language is customer specific. If you read from the USV6 than you will see the language in the Configurator.

Logo name line 1 – fill in your company name (max. 16 letters)
The logo name will appear in the main menu on USV6 display.

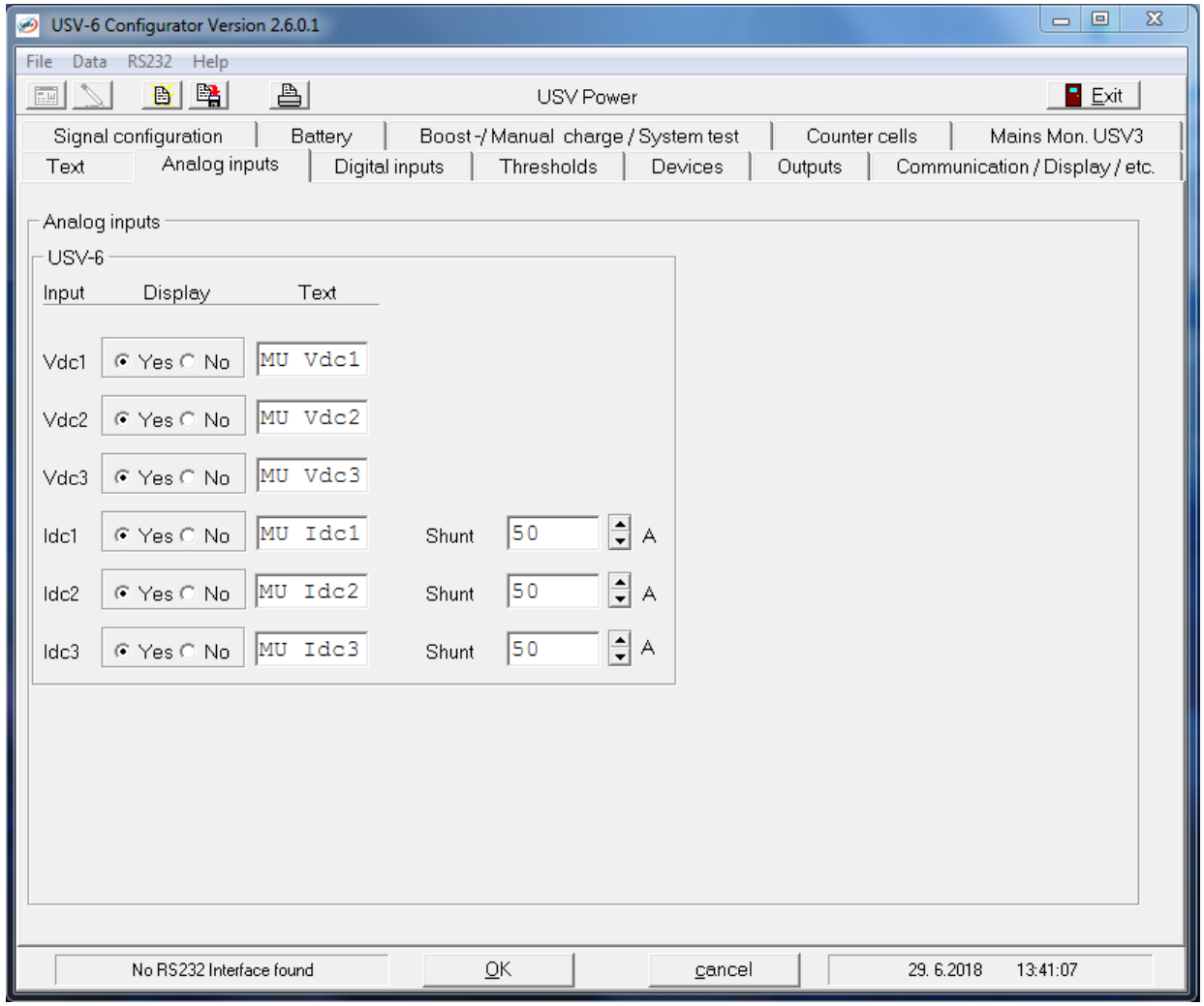
Logo name line 2 – fill in any statement or note (max. 16 letters)
The logo name will appear in the main menu on USV6 display.

In the Logo lines you can also put in special characters like Cyrillic, to display in the USV6.

Click on the right mouse button to get a LCD character set, than paste the string into the line.

5.2 Register – "Analog inputs and Shunts"

5.2.1 Analog inputs



On this page you are able to assign the designations for the analogue measuring inputs of USV6.

Following designations are possible for every measuring input:

Display – Yes – value is displayed on USV6 display
(use this selection if the measuring input is used)

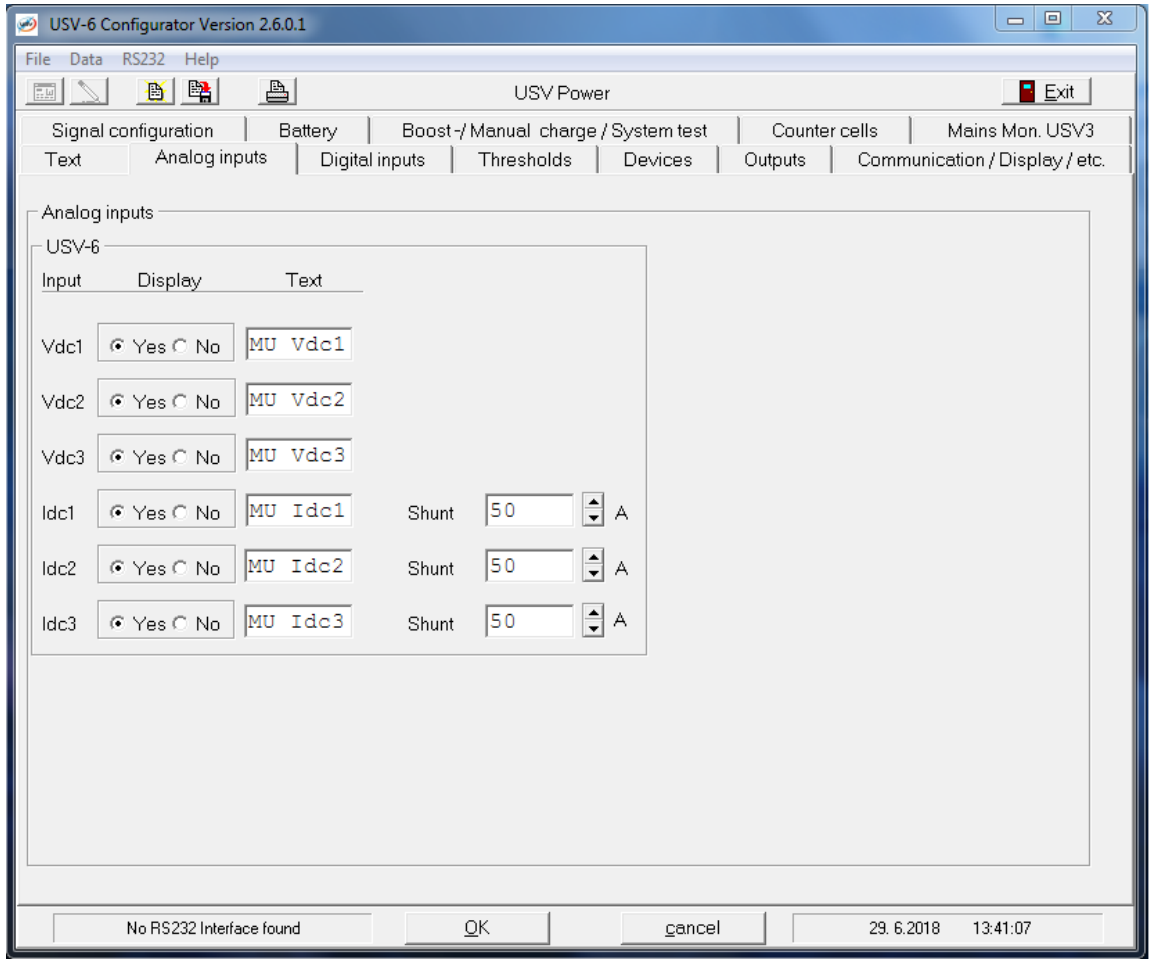
Display - No – value is not displayed on USV6 display (use this selection if the measuring input is not used)

Text - User defined voltage and current measurement designations – fill in your own measurement designation if you do not want to use predefined designators
(max. 8 letters)

You can also put in specific characters such as Cyrillic, to display the text in the USV6 (for details see section 8.)

Click the right mouse button to get a LCD character set, than paste the string into the line.

5.2.2 Shunts



Idc1 – set the correct shunt size connected to measuring input Idc1

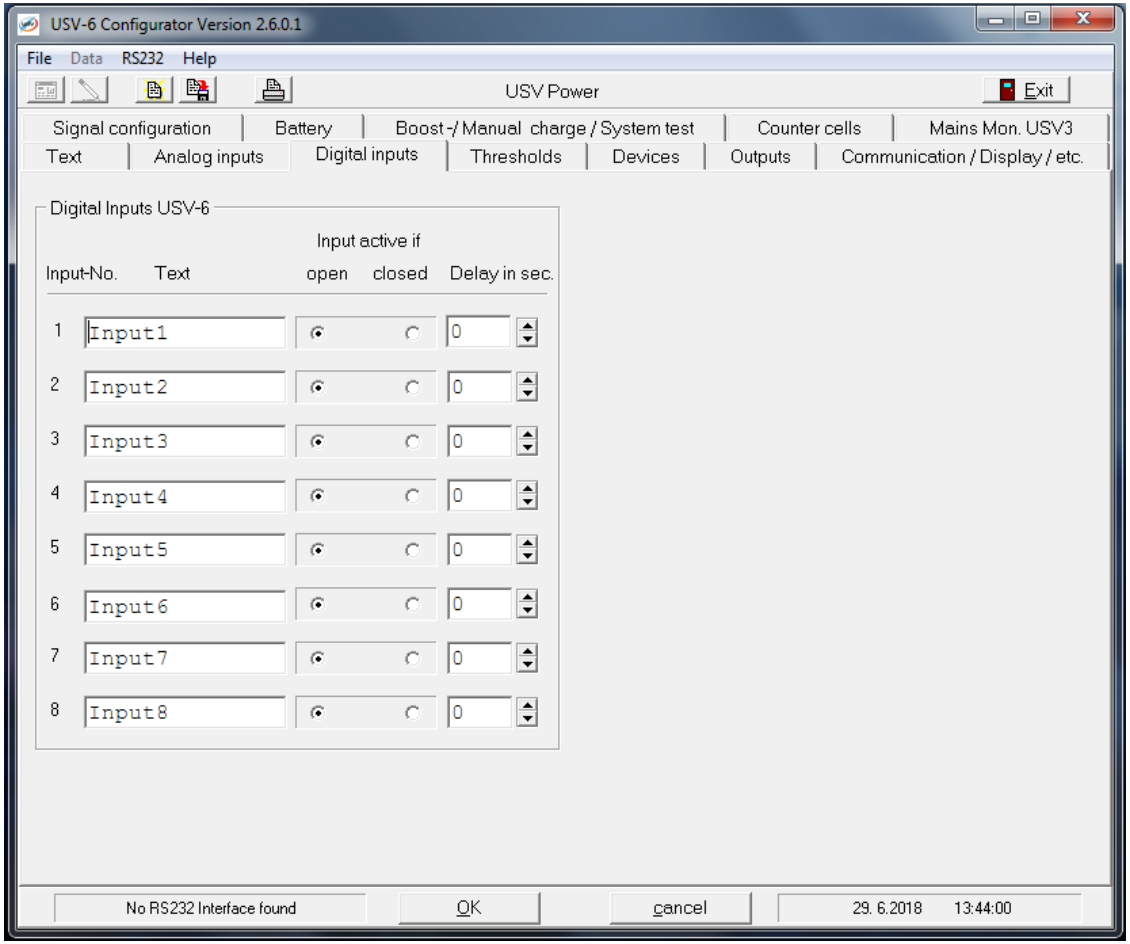
☞ To measure the battery charge/discharge current you have to use Idc1 input because this input can handle positive and negative measurement values.

Idc2 – set the correct shunt size connected to measuring input Idc2

Idc3 – set the correct shunt size connected to measuring input Idc3

5.3 Register – "Digital inputs"

If you connect external signalling loops to USV6 digital input interface you can configure every input (16 in total, 8 inputs from USV6 and 8 inputs from external I/O-Board or DIG8) as following:



Input no. – number of used digital input
If you use the optional USV6-I/O board to increase the numbers of outgoing relay contacts you have to use the digital inputs on this board instead of the inputs on USV6 hardware!

Text – fill in a error text (max. 16 letters)
This text will be used to show the signal change on digital input during operation in the error list and/or history list on USV6 display.

Break contact/Close contact – USV6 detects an error on the input if the input contacts are "open"/"close"

Delay – delay time for digital input error detection in sec.

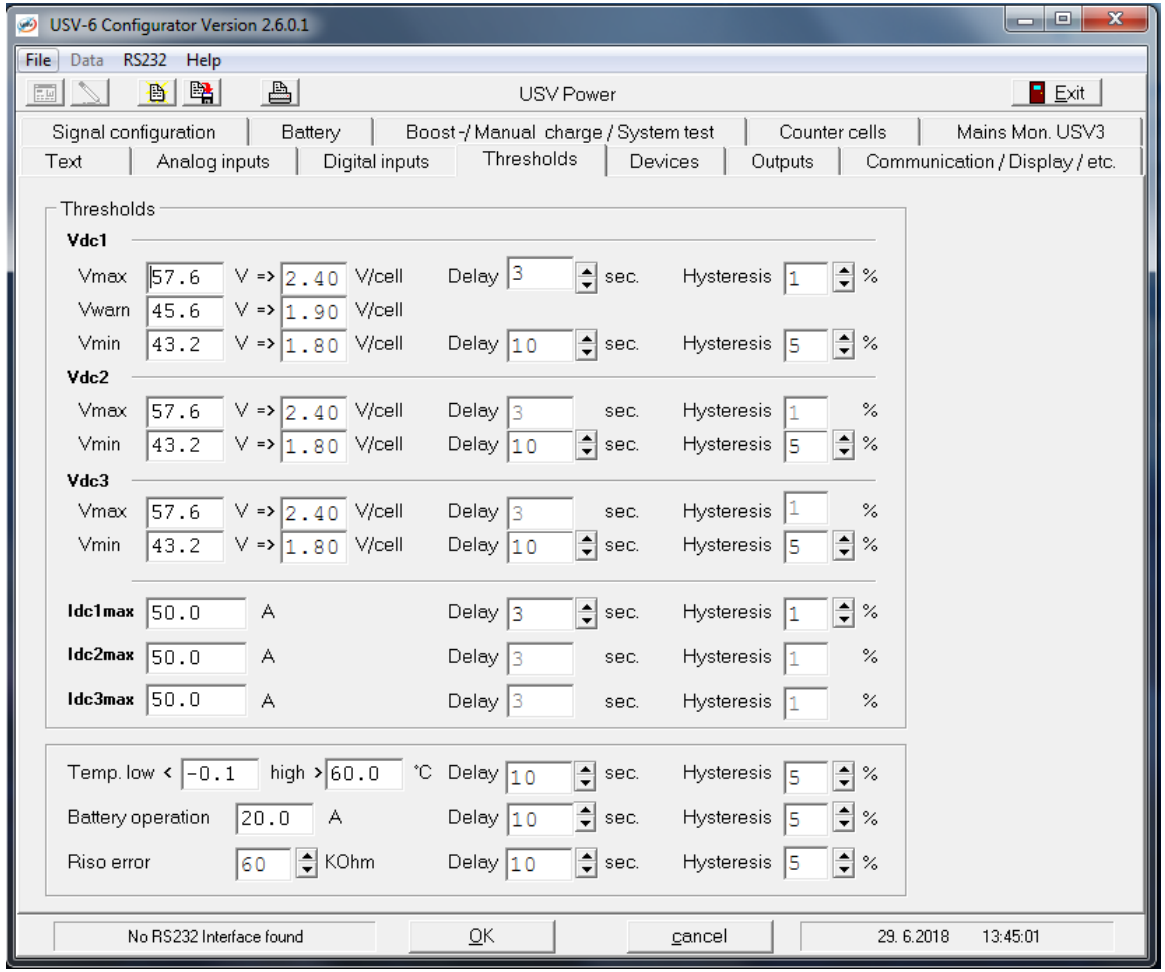
You can also put in especial characters such as Cyrillic, to display the input text in the USV6.

You can click the right mouse button to get a LCD character set, than paste the string into the edit field.

The panel "I/O- or DIG8 inputs" appears only if an I/O-board or a DIG8-board is configured.

5.4 Register – "Thresholds"

Configuration of monitoring thresholds for measuring inputs Vdc1, Vdc2, Vdc3, Idc1-3max, temperature and isolation resistance.



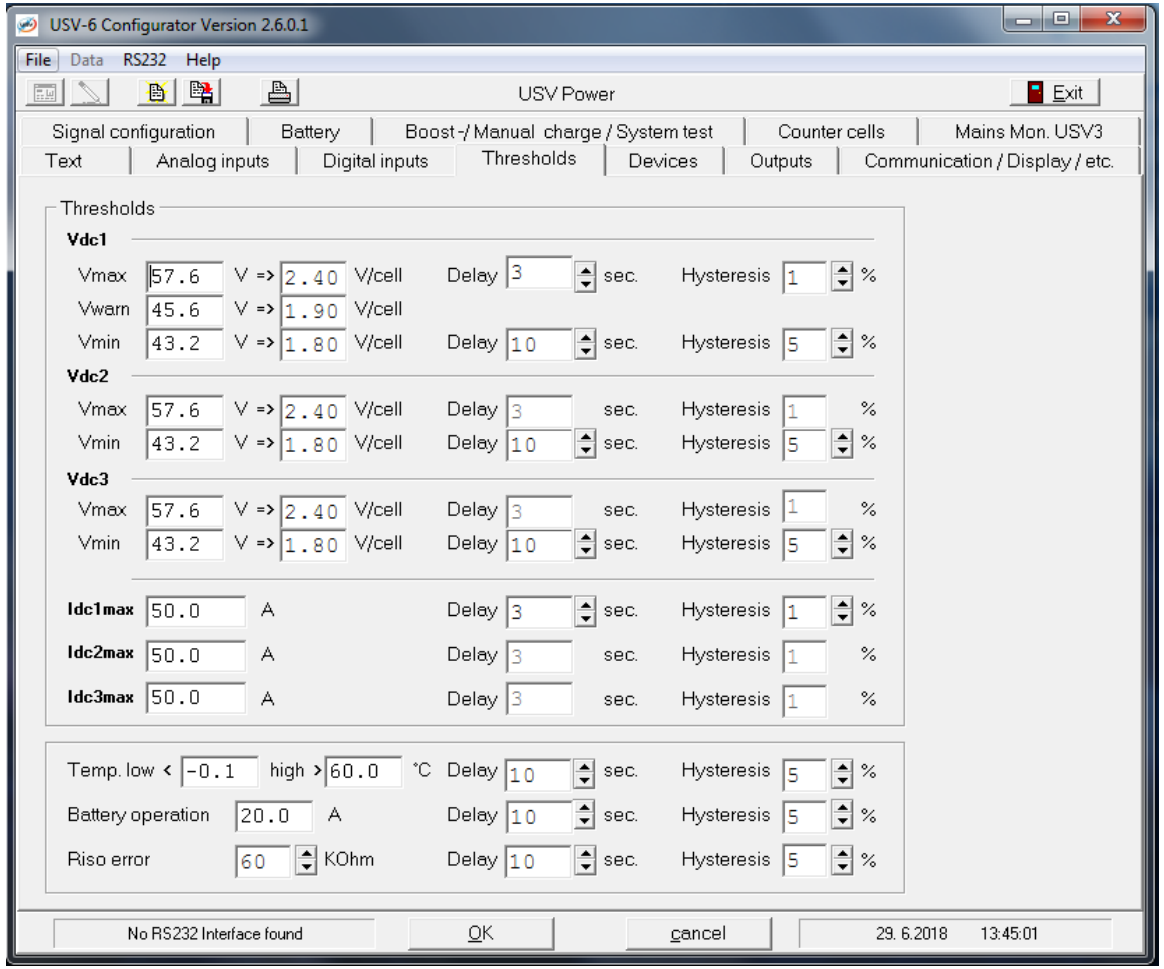
Vdc1 –
Vmax: over voltage threshold for measuring point Vdc1 You can put in the value in V or in V/cell. This threshold is used also for controlling of LED "Udc>" on USV6 front panel.

Vwarn: prewarning threshold for measuring point Vdc1 You can put in the value in V or in V/cell.

Vmin: under voltage threshold for measuring point Vdc1 You can put in the value in V or in V/cell.

Delay: delay time for error signalization in sec.

Hysteresis: range between error detection start and stop value in % of programmed value



Vdc2 –
Vmax: over voltage threshold for measuring point Vdc2
You can put in the value in V or in V/cell.

Vmin: under voltage threshold for measuring point Vdc2
You can put in the value in V or in V/cell. This threshold is used also for controlling of LED "Udc<" on USV6 front panel.

Delay: delay time for error signalization in sec.

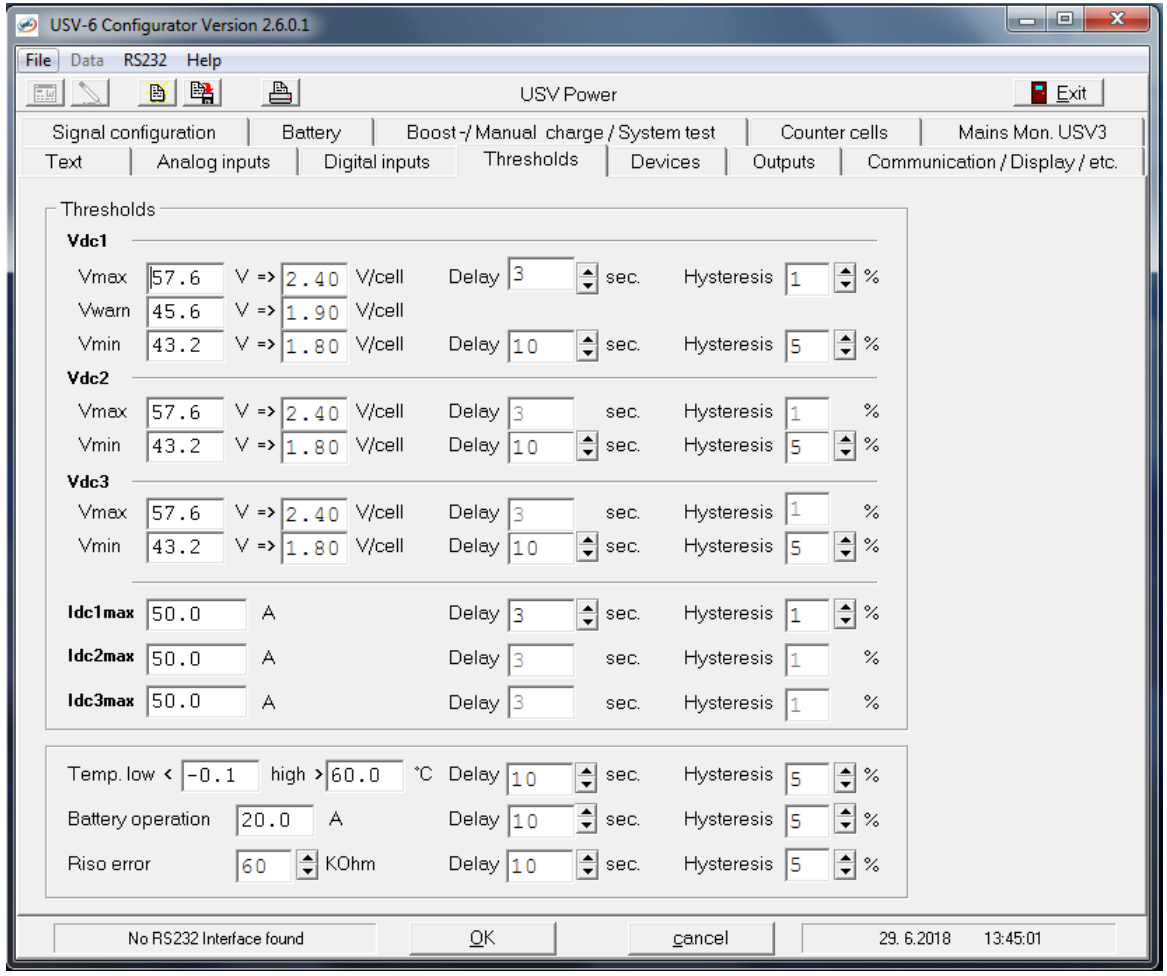
Hysteresis: range between error detection start and stop value in % of programmed value

Vdc3 –
Vmax: over voltage threshold for measuring point Vdc3
You can put in the value in V or in V/cell.

Vmin: under voltage threshold for measuring point Vdc3
You can put in the value in V or in V/cell.

Delay: delay time for error signalization in sec.

Hysteresis: range between error detection start and stop value in % of programmed value



Idc1 – 3
Idc1-3max: over current threshold for measuring point

Temperature high –

threshold for temperature monitoring inside the cabinet (an external connected temperature sensor is required)

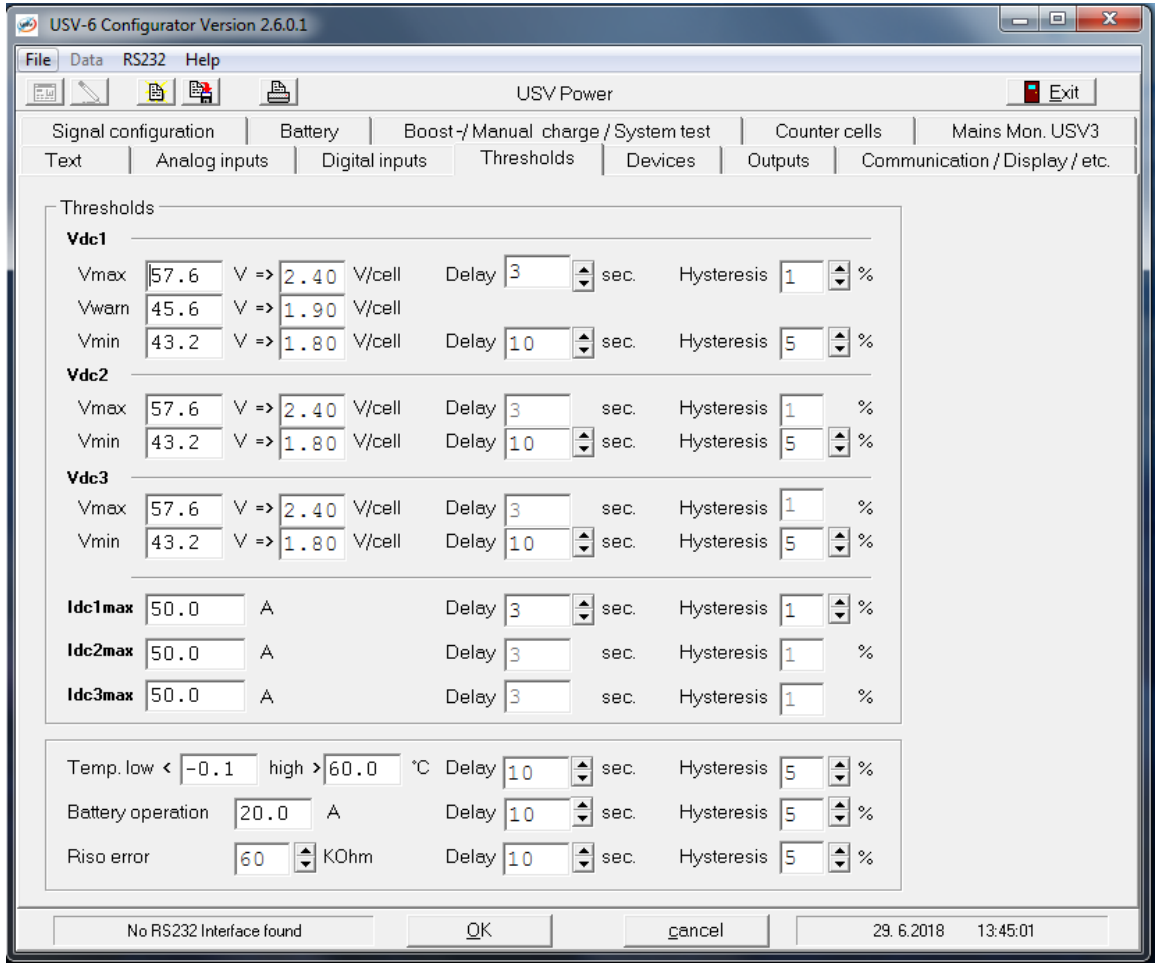
Delay: delay time for error signalization in sec.

Hysteresis: range between error detection start and stop value in % of programmed value

Battery operation –

threshold for signalization of "Battery discharge operation"

The signal occurs if the measured negative voltage drop on battery current shunt exceeds this value.



Delay: delay time for error signalization in sec.

Hysteresis: range between error detection start and stop value in % of programmed value

Riso error –

threshold for signalization of "Isolation fault"

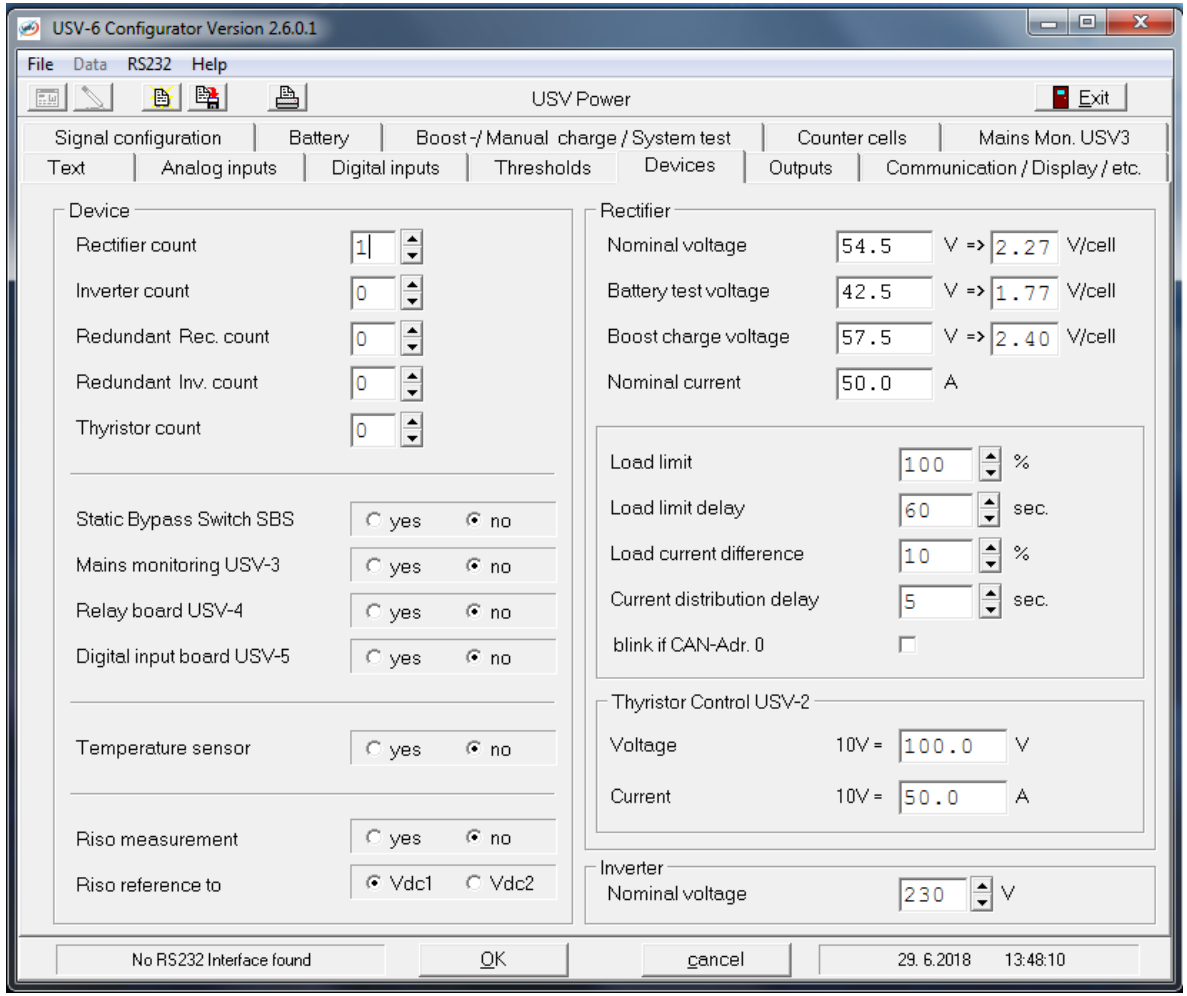
The signal occurs if the measured resistance between pluspole and earth or minuspole and earth exceeds this value.

Delay: delay time for error signalization in sec.

Hysteresis: range between error detection start and stop value in % of programmed value

5.5 Register – "Devices"

5.5.1 Device



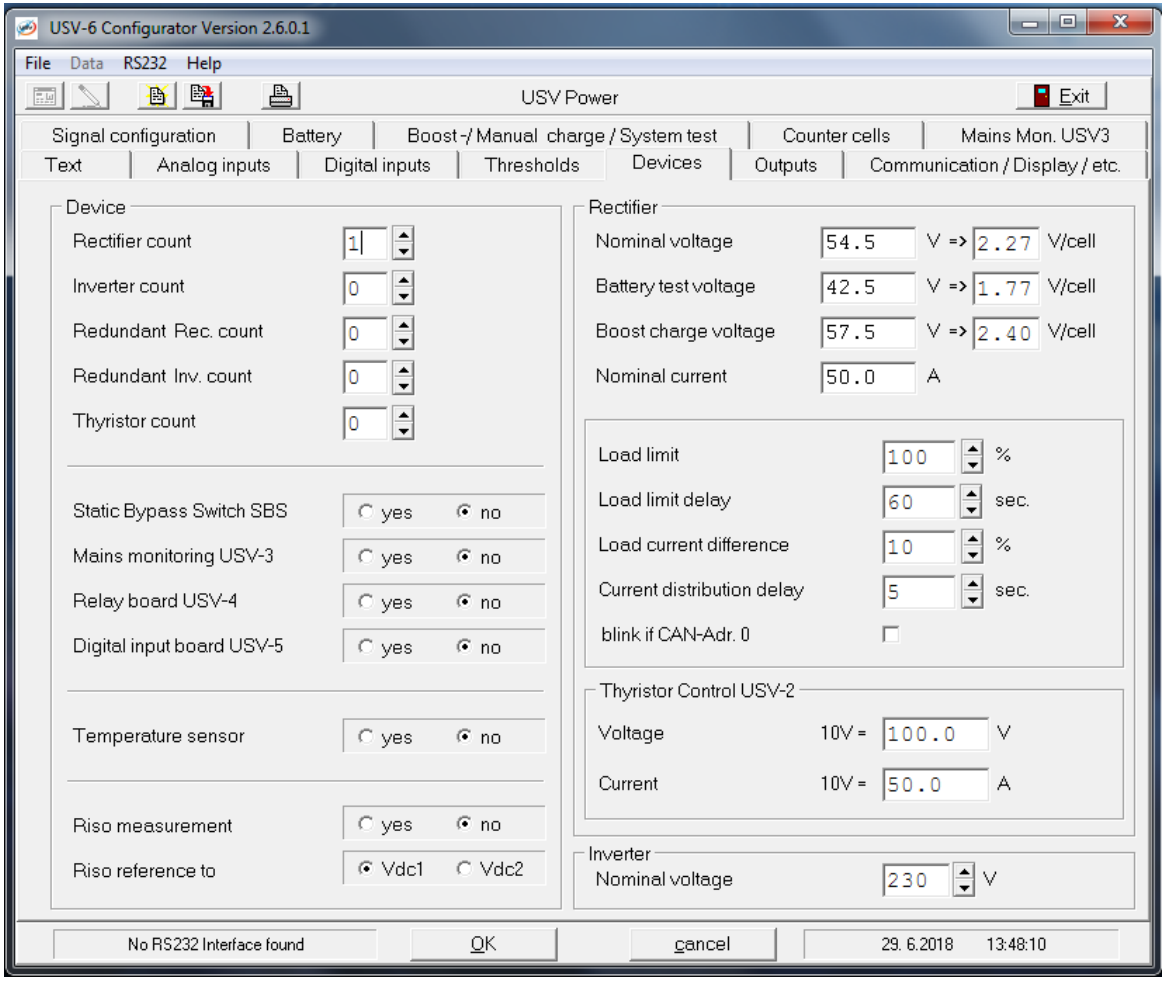
On this page you have to configure the main operation parameter for controlling of connected (via CAN-Bus) power supply modules.

Module count – number of CAN- connected MT or MTS rectifier modules

☞ This value is used to detect the error state of connected rectifier modules. Every single module in the system has its own CAN address.

Example: If you have 5 units inside of your power supply you have to set the "Rectifier count" to 5 and the addresses on modules from 1 to 5.

Redundant Rectifier count – number of CAN-connected rectifier modules for redundant operation



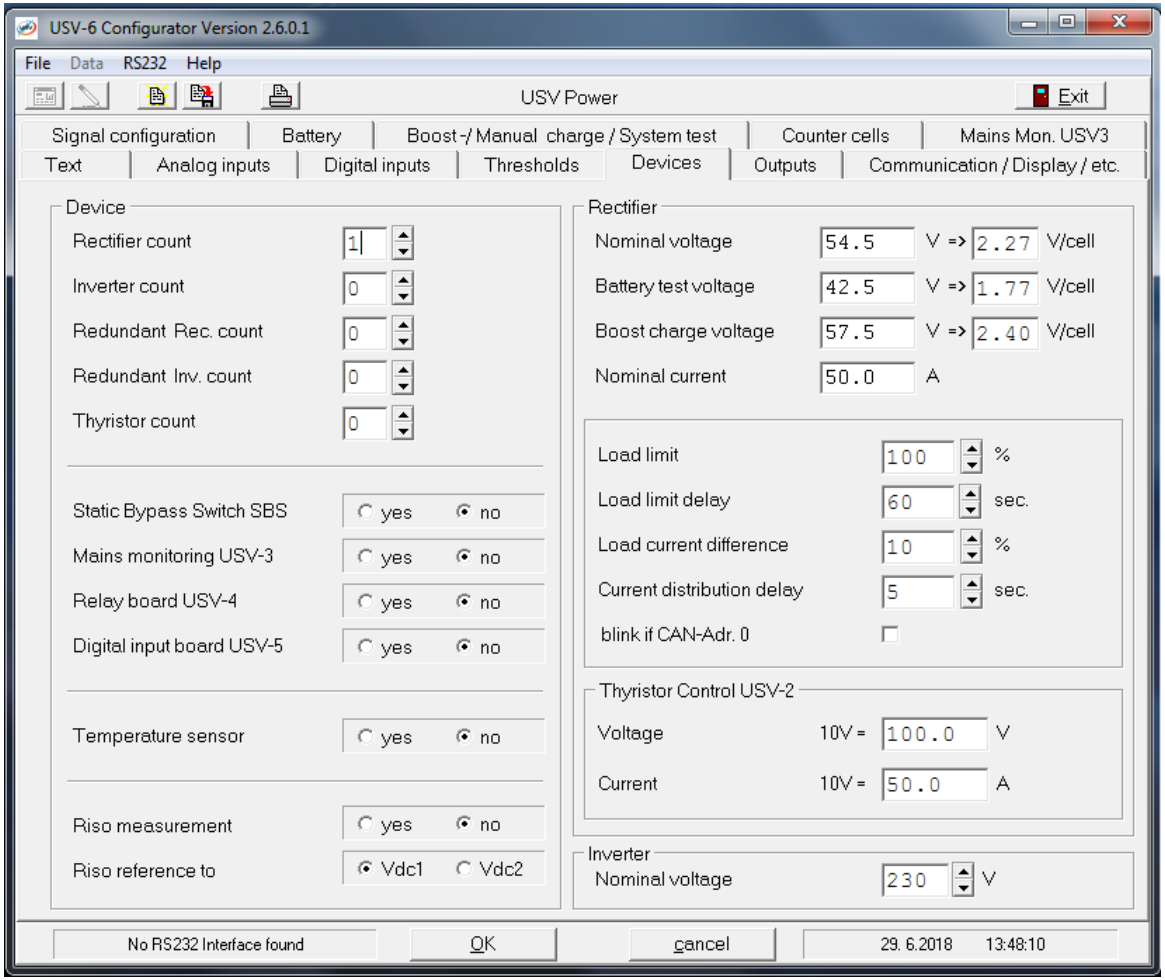
redundant connected rectifier modules.
Every single module in the system has its own CAN address.

Example: If you have 5 units inside of your power supply and you use 4 for load supply + battery charging and 1 module for redundancy operation - you have to set the "Rectifier count" to 5 , the "Redundant Rec count" to 1 and the addresses on modules from 1 to 5.

Inverter count – number of CAN- connected inverter modules

☞ This value is used to detect the error state of connected inverter modules. Every single module in the system has its own CAN address.

Example: If you have 5 units inside of your power supply you have to set the "Inverter count" to 5 and the addresses on modules from 1 to 5.

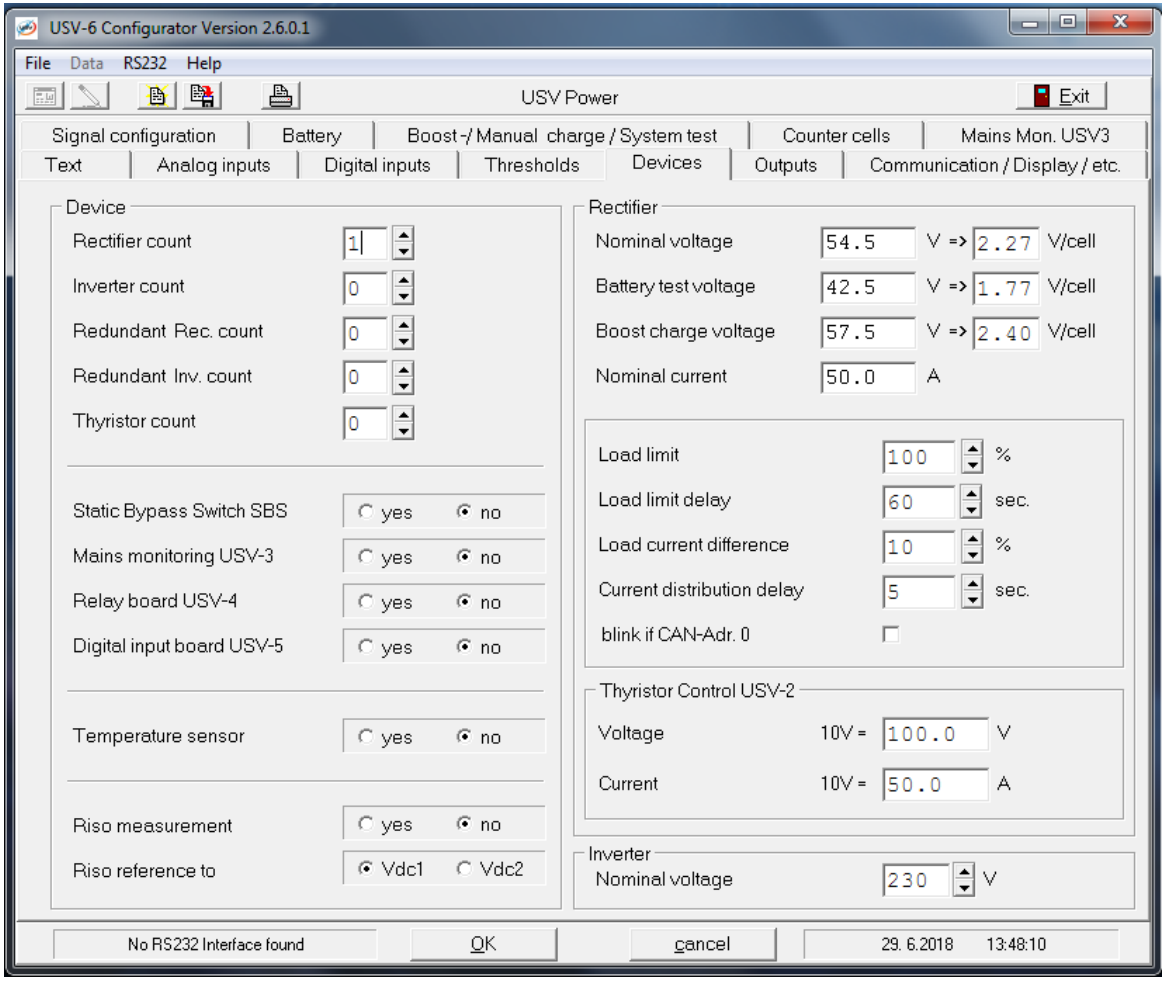


Redundant Inverter count – number of CAN-connected inverter modules for redundant operation

☞This value is used to detect the error state of redundant connected inverter modules.
Every single module in the system has its own CAN address.

Example: If you have 5 units inside of your power supply and you use 4 for load supply and 1 module for redundancy operation - you have to set the "Inverter count" to 4, the "Redundant Inverter count" to 1 and the addresses on modules from 1 to 5.

Relay board USV4 – turn on/off the CAN-connected relay board USV6-I/O



☞ If you turn on the relay board option you can use the digital input interface on I/O board and on USV6 hardware to connect external signaling loops. You can use either an I/O board or a RB6 and/or DIG8 board.

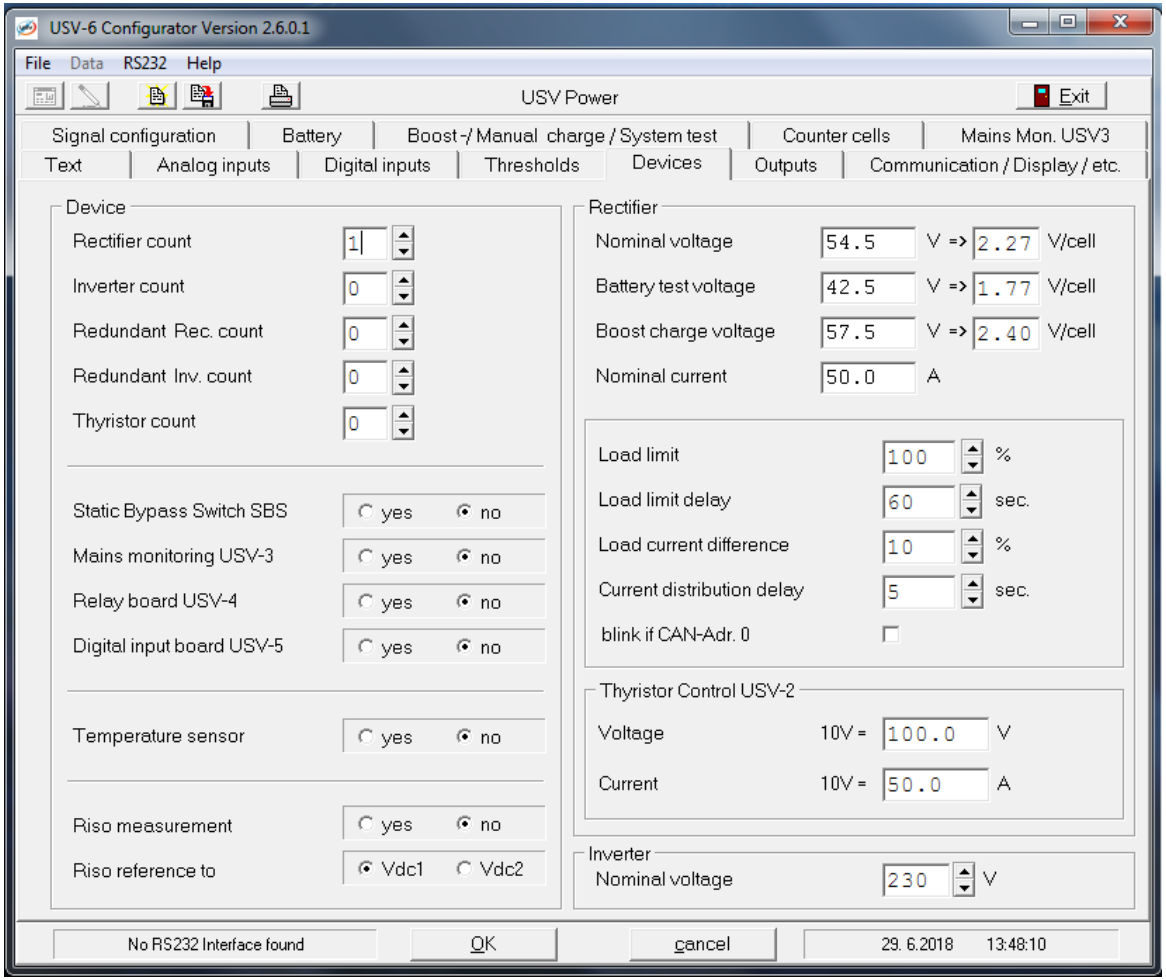
Mains monit. USV3 – turn on/off the CAN-connected mains monitoring board USV6-MM

UNB – turn on if static bypass switch UNB is also connected to the CAN bus

☞ This feature prevents "Master" collisions on CAN bus.

Temperature sensor – turn on/off an external connected active temperature sensor

You need this feature if you want to use temperature compensation of charge voltage or to monitor the cabinet temperature.

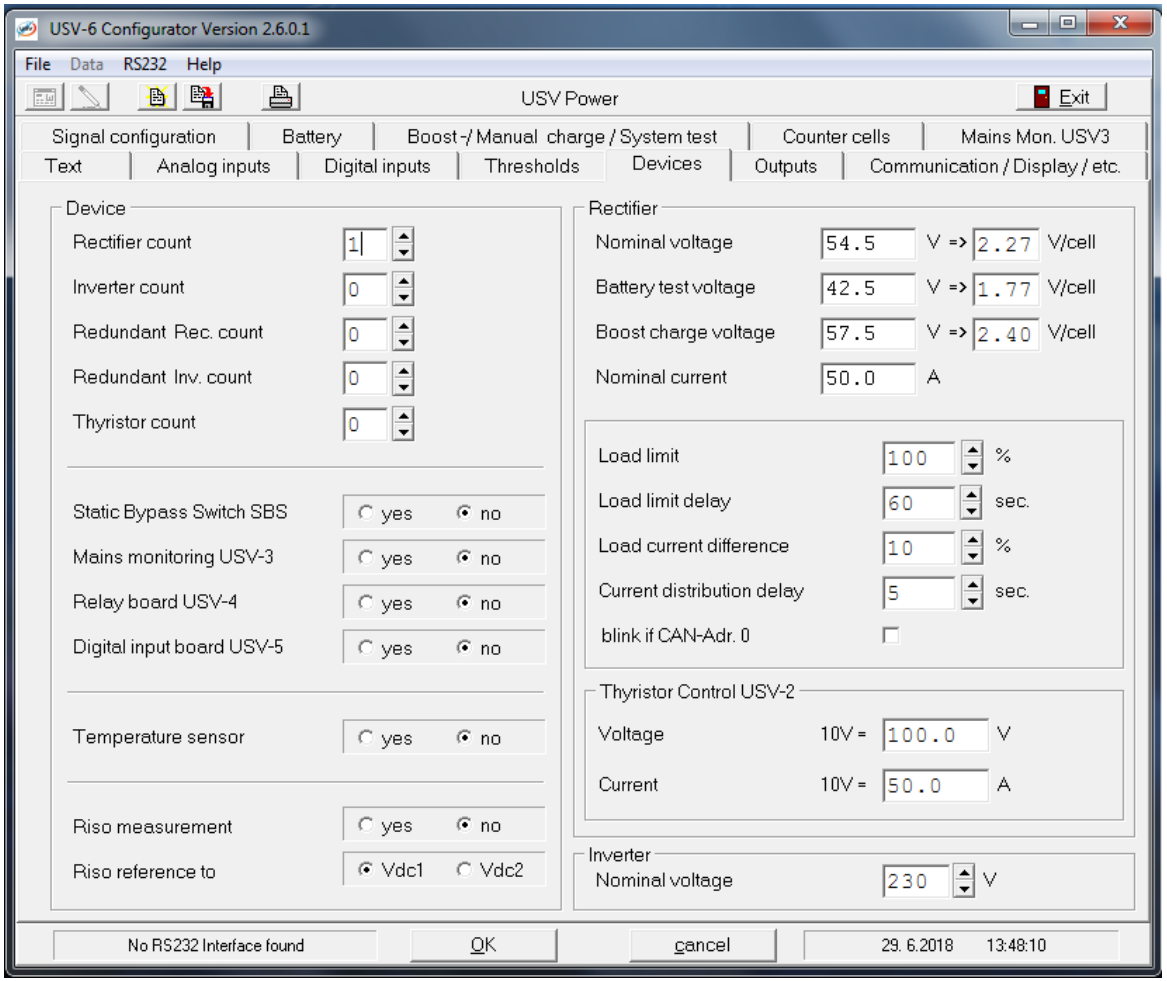


The number of the temperature sensors depends on the count of the batteries.
(see register "Battery").
The picture shows 2 sensors
(sensor1 – MU;
sensor2 – BM1)

Riso measurement – turn on/off the isolation fault monitoring

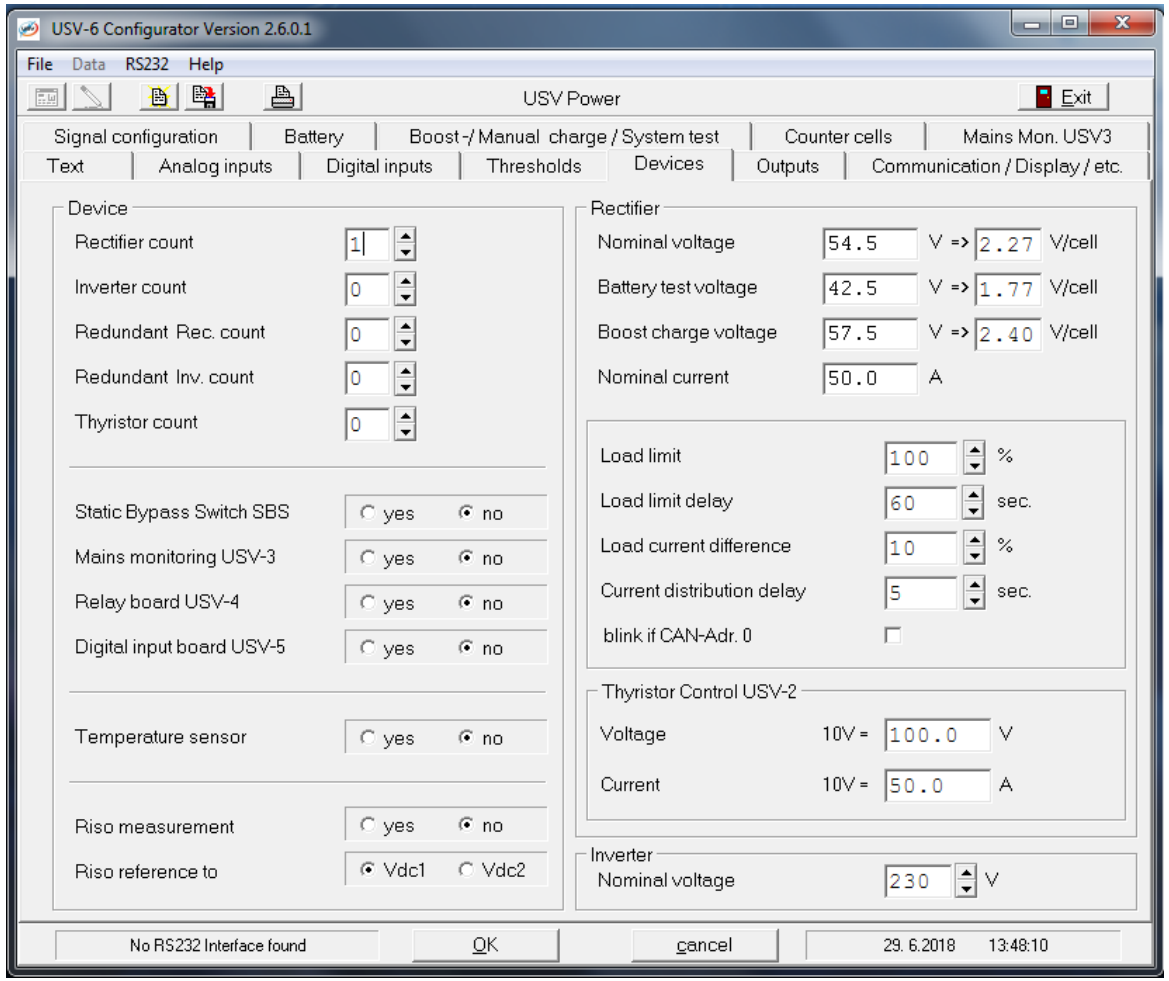
☞ Turn off if one pole is earthed in the system or if two monitoring units are connected to the same DC bus.

5.5.2 Inverter



Nominal voltage: set the nominal output voltage for the connected rectifiers or inverters

5.5.3 Rectifier



Nominal voltage: set the nominal charge voltage for the connected rectifier modules.
You can put in the value in V or in V/cell.

Battery test voltage: set the voltage level for decreasing the rectifier output voltage during battery test

☞ To secure an uninterruptable load supply you have to set this value higher than battery low threshold of your system. That way the rectifiers are able to take over the load before the battery will disconnected from the load.
You have to turn on the battery test function before this value will have any influence on the system function.

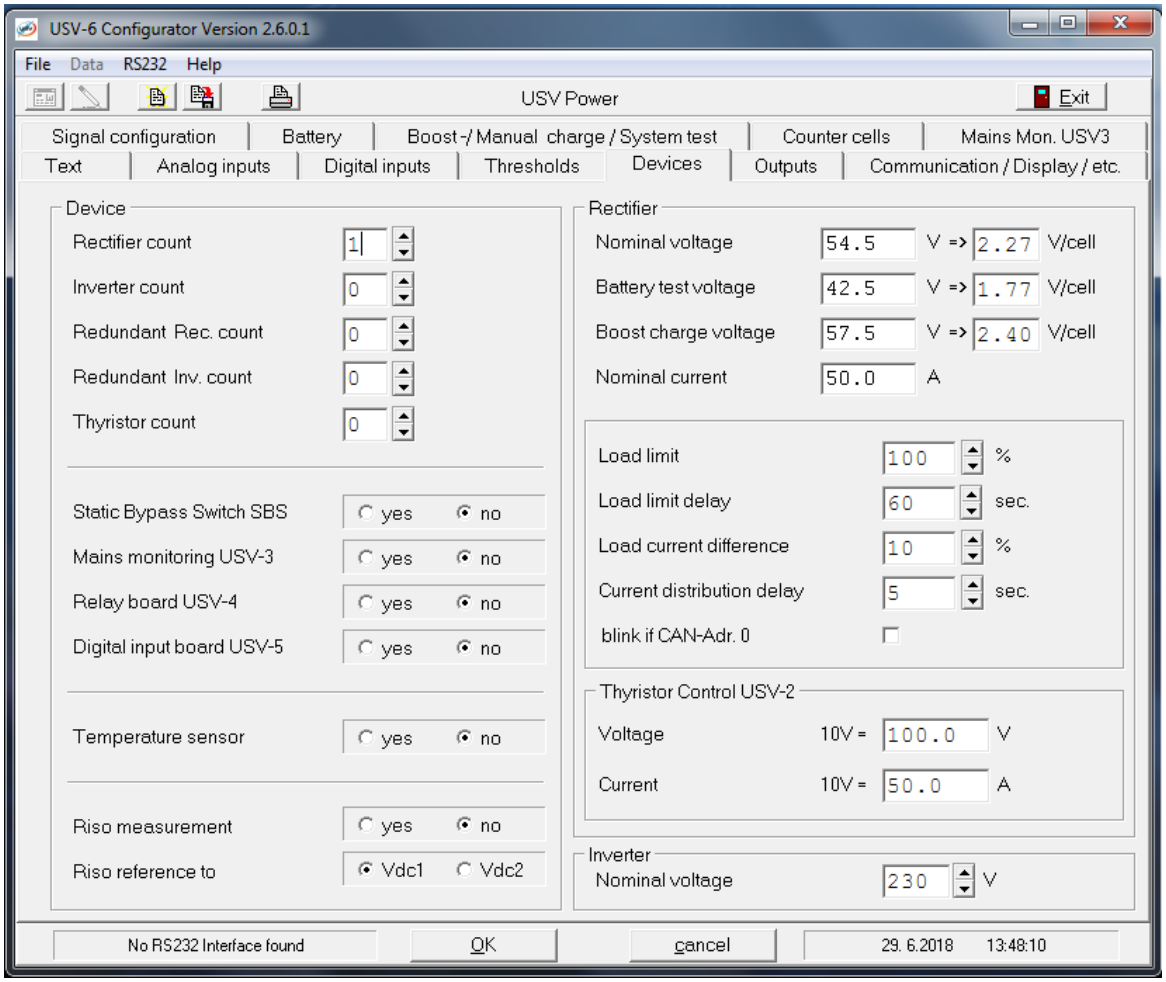
Boost charge voltage – set the value for boost charge voltage

☞ You have to turn on the boost charge function before this value will have any influence on the system function.

Nominal current – set the nominal current limitation of the single rectifier module

☞ Please check the specific data of the used rectifier module type to adjust the correct current limitation.

Load limit – pre warning threshold for total rectifier output power



Example: You defined a maximum load on system output of 80% because you do not want that every rectifier operates permanent with 100% output power. The 100% load value will be calculated with number of connected rectifier modules multiplied by max. output current of the single module.
If the connected load exceeds the adjusted load limit level the system generates an alarm signal.

Load limit delay – delay time for load limitation alarm

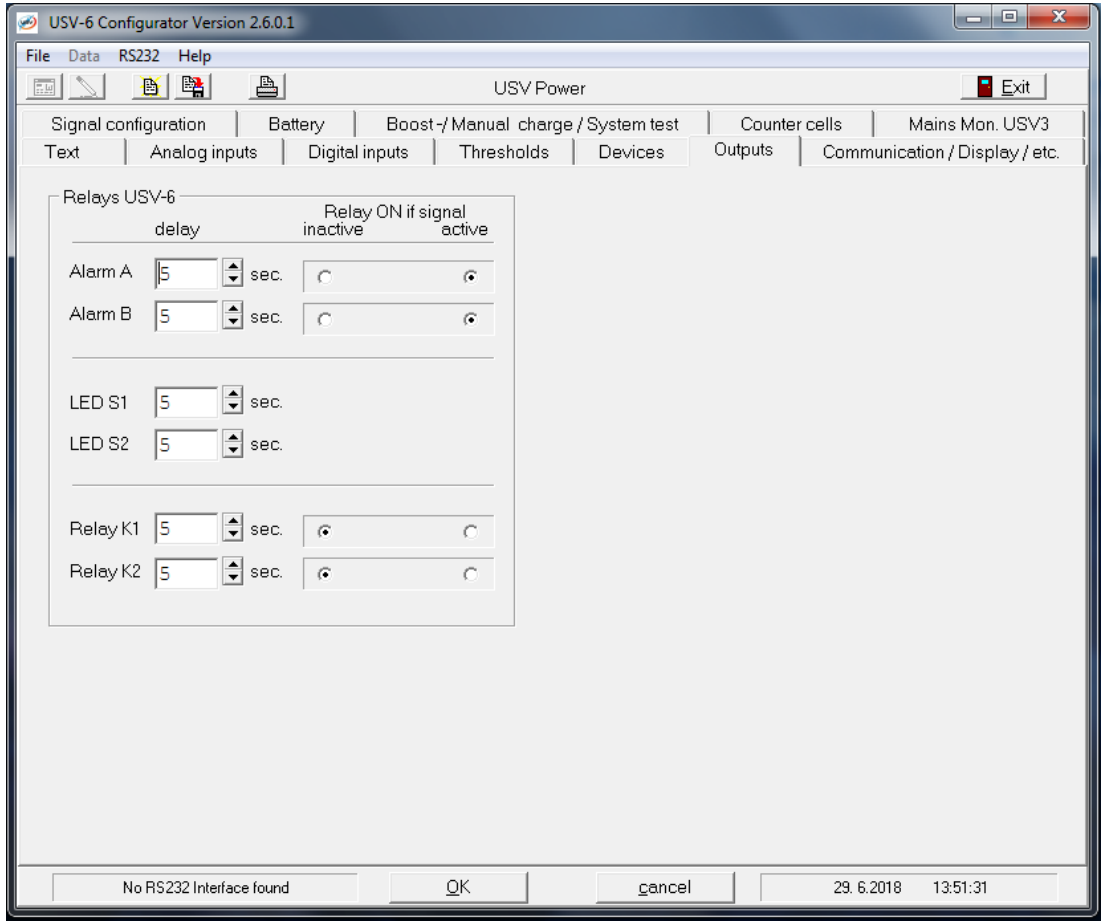
Blink if CAN-ID 0 – enable this value if you want to know whether a module has the CAN address "0"

☞ This feature is used when you get new modules for system extension. Usually the new modules have the CAN address "0". If you put in all new modules you can see by blinking display that only these modules have to be reprogrammed with a new CAN address.

5.6 Register – "Outputs"

On this page you can configure the isolated relay outputs.

5.6.1 USV6



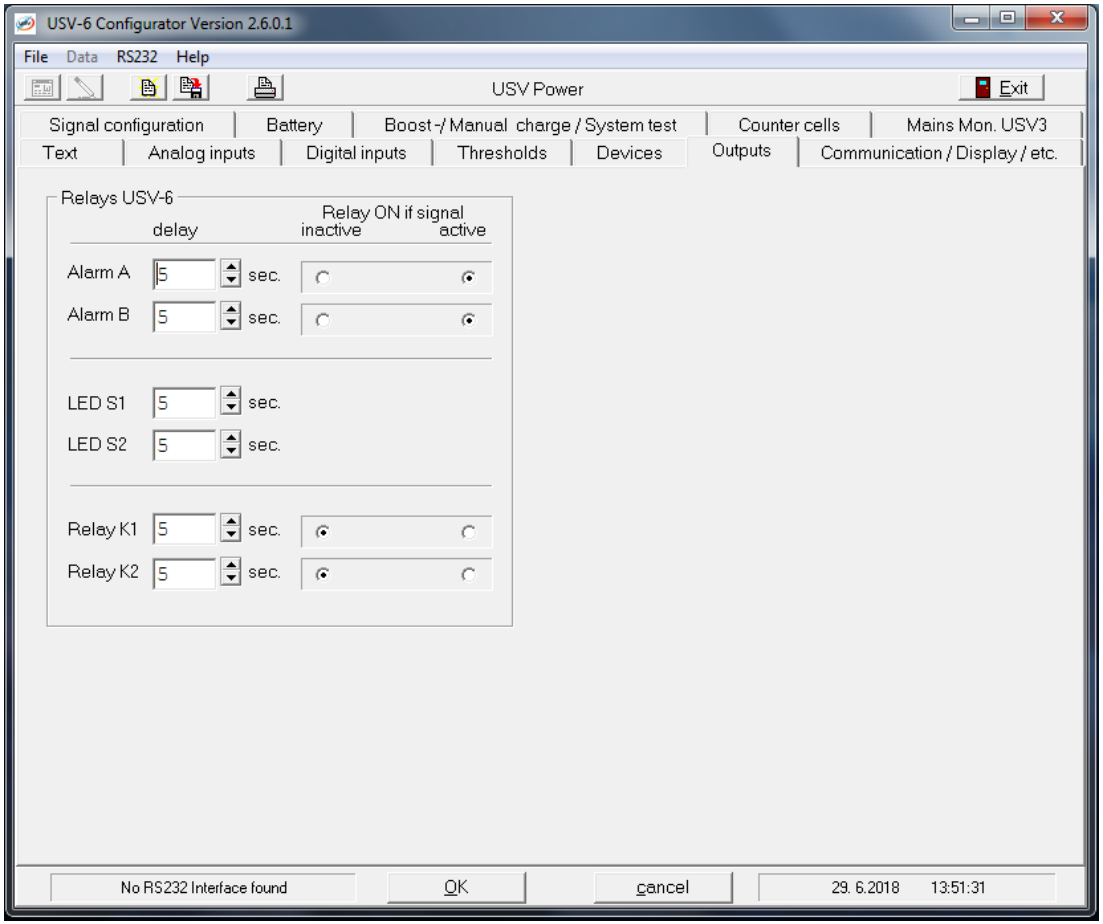
Alarm A - delay time for alarm signalization on relay A

Alarm B - delay time for alarm signalization on relay B

Break/close cont. – in case of failure the relay contacts are opened/closed

☞ We recommend to include all urgent single alarm signals to alarm A (urgent alarm) and all non-urgent alarms to alarm B (non-urgent alarm). The alarm configuration will be made in Register "Signal configuration".

LED S1/S2 – delay time for LED signalization S1/S2 on USV6 front panel



☞ You can set a single failure signalization to LED S1/S2. In that way you are able to expand the front side LED functionality for two additional LED signals.

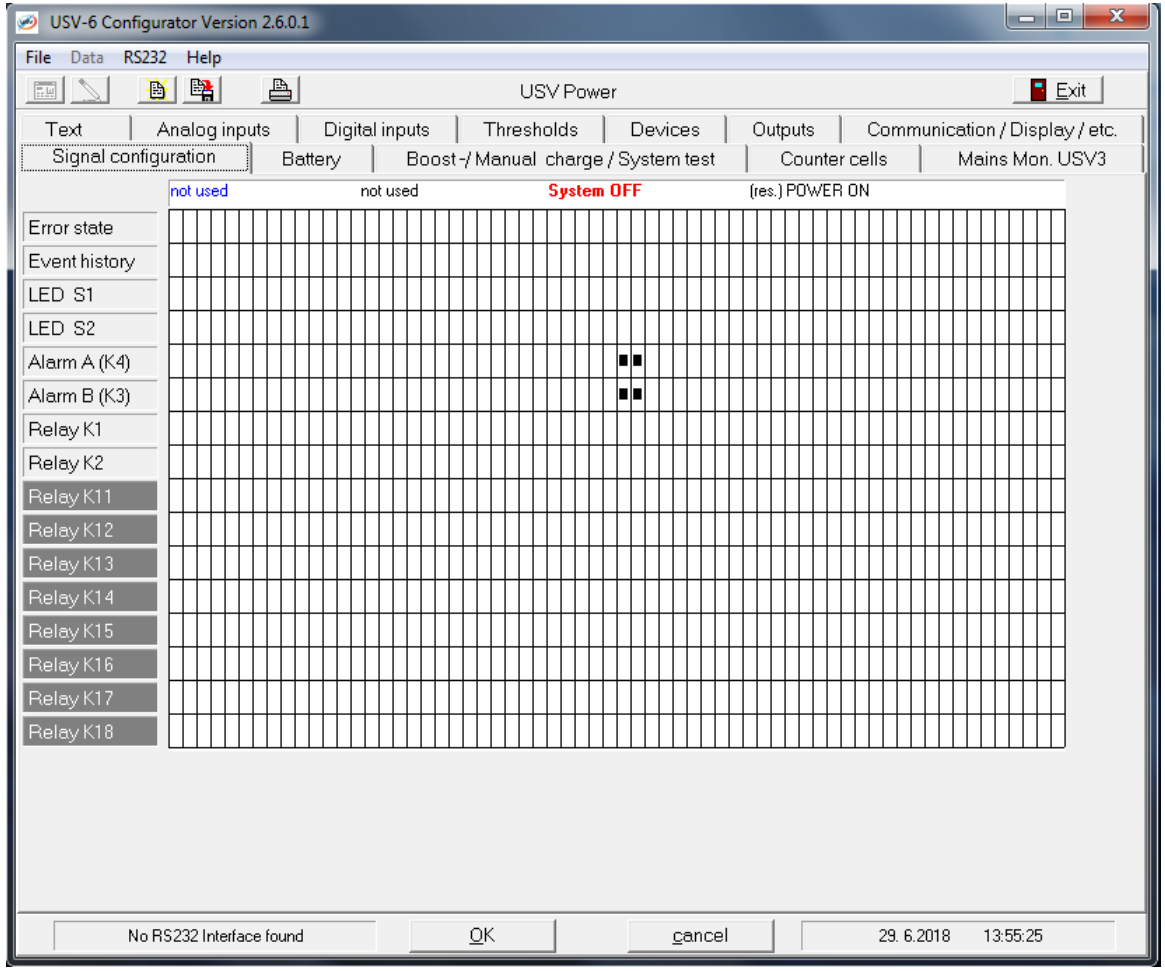
Relay K1 - delay time for alarm signalization on relay K1

Relay K2 - delay time for alarm signalization on relay K2

Break/close cont. – in case of failure the relay contacts are opened/closed

☞ You can use relay K1 and relay K2 on USV6 to signalize single failures by single relay outputs. It is possible to include more than one single failure to one relay output.

5.7 Register – "Signal configuration"



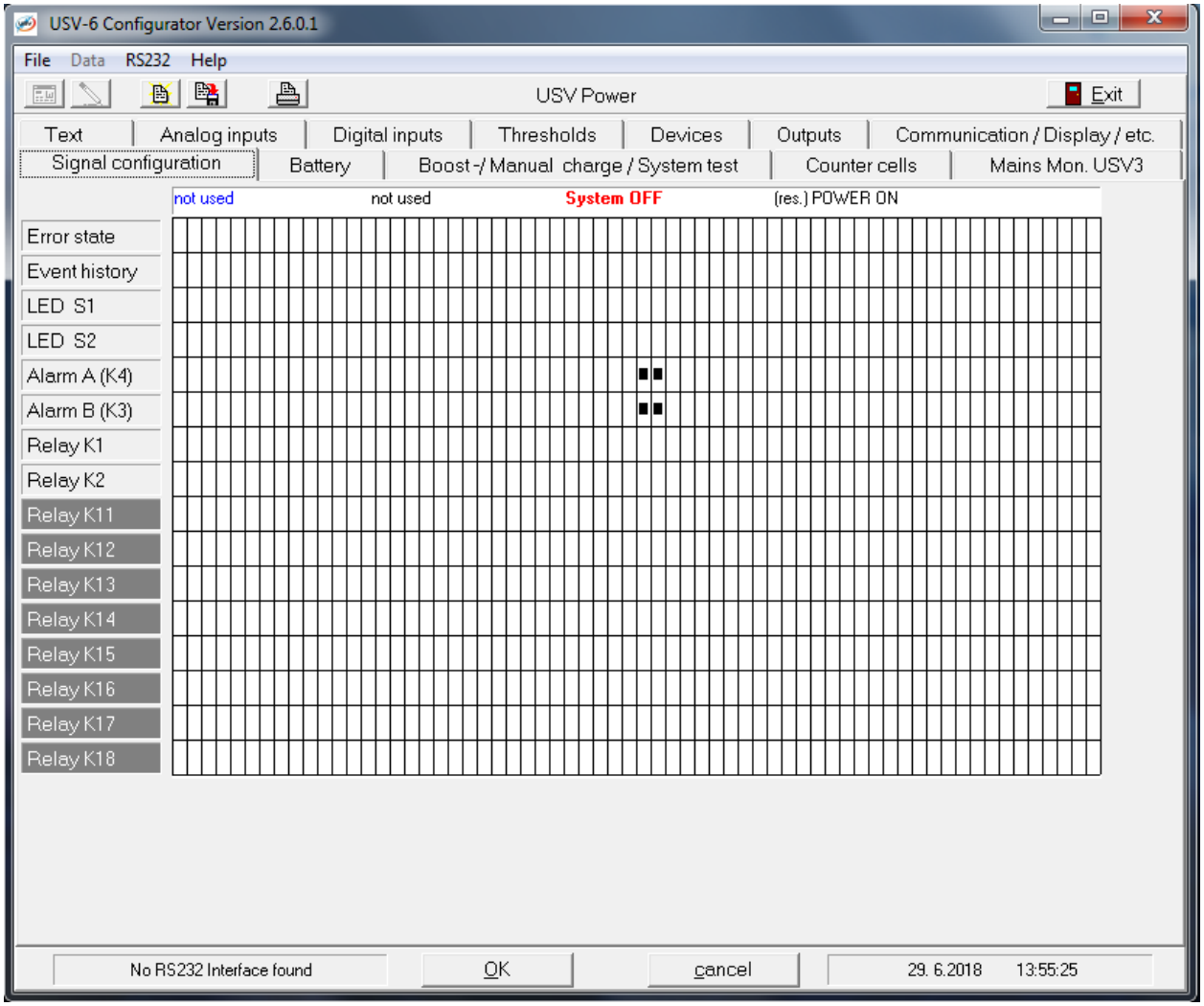
On this page you can assign every single failure signal in the system to one or more output channels.
Click in the row of output device you want to add a fault signal. The actual fault signal is marked in red. The black sign shows that the fault is enabled on this output device.

Error state – assign a single error to error state list on USV6 display

Event history – assign a single fault to USV6 event history list

☞ The event history show time and date when the fault occurs and time and date when the fault is gone. The event history is a memory stack for 100 messages. If the stack limit is reached the oldest message will be erased.

LED S1/S2 – assign a single fault to front side LED S1/S2



Alarm A/B – assign a single fault to alarm relay K4/K3 on USV6 hardware

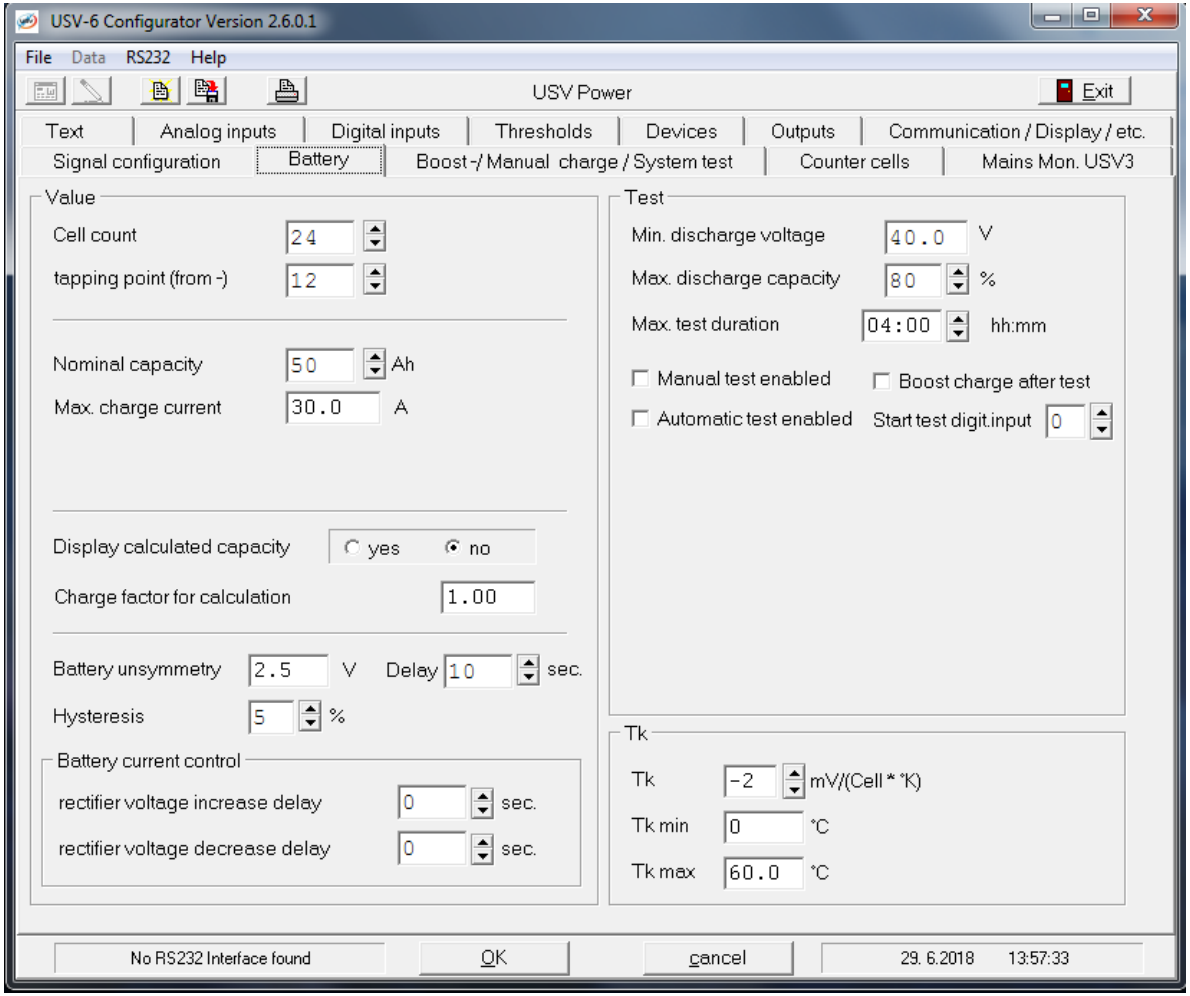
Relay K1/K2 – assign a single fault to alarm relay K1/K2 on USV6 hardware

Relay K11-K18 – assign a single fault to alarm relay K11-K18 on USV4 relay board (optional board has to be connected on CAN bus)

All fault signals are OR-operation.

5.8 Register – "Battery"

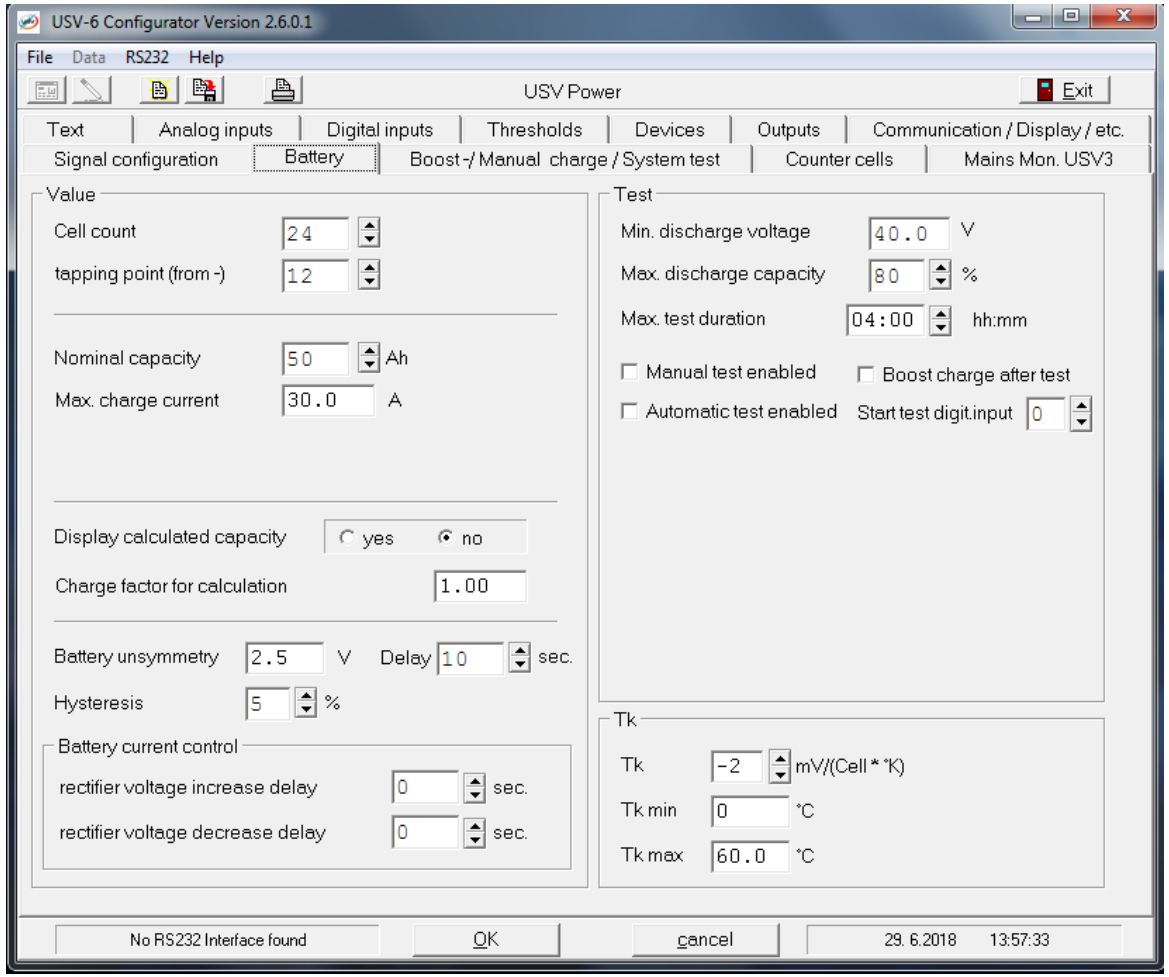
5.8.1 Value



Cell count – number of installed battery cells of each bank

Tapping point – number of cells where the tapping point for battery unsymmetric voltage measurement is connected (counted from minus side)

Nominal capacity – nominal battery capacity of bank

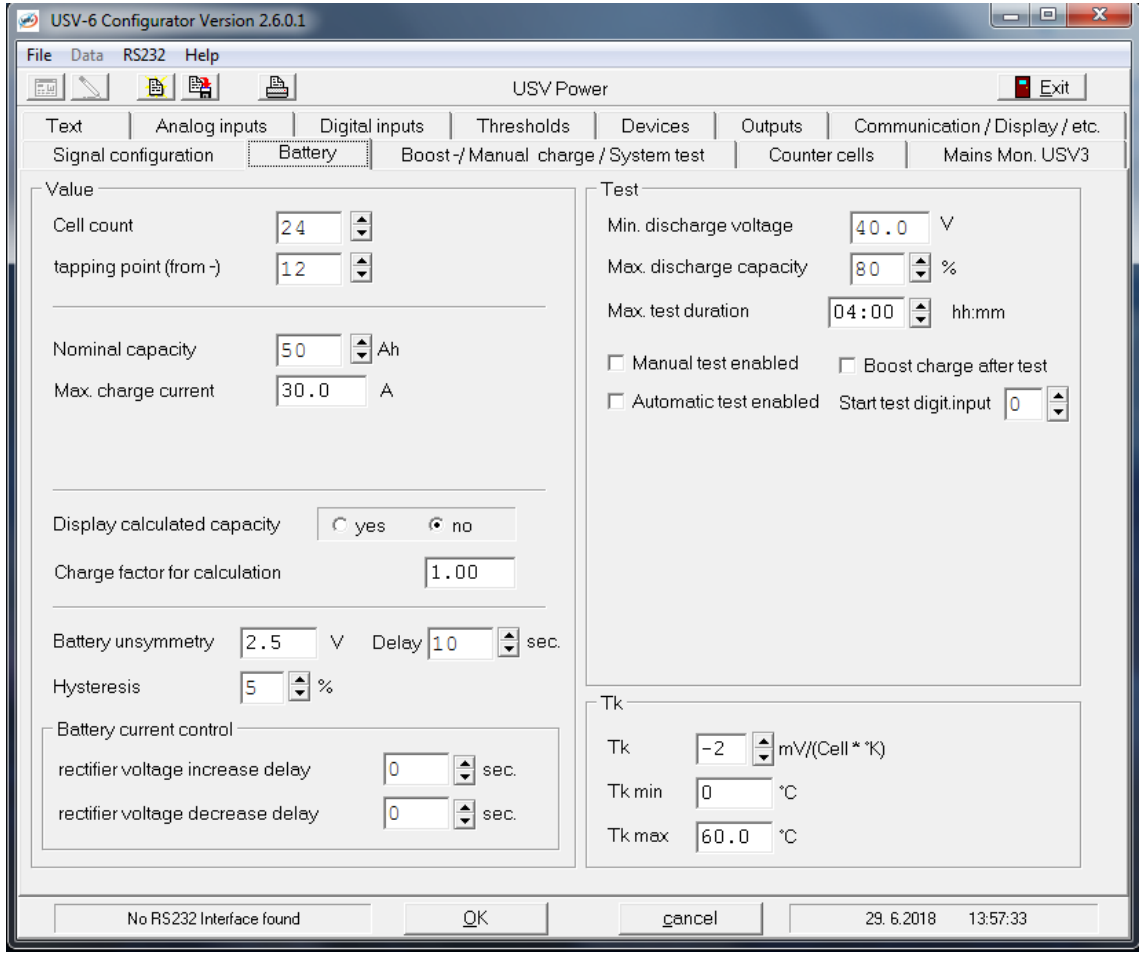


Max. charge current – value for charging current limitation of bank

Delay – delay time for unsymmetric fault signalization in sec.

Hysteresis – value between fault detection and fault deleting in % of programmed battery unsymmetry value

5.8.2 Test



Min. discharge voltage – battery low threshold for battery test

Max. discharge capacity – maximum discharge capacity in % of nominal battery capacity
Max. test duration – maximum battery test time in hour:minutes

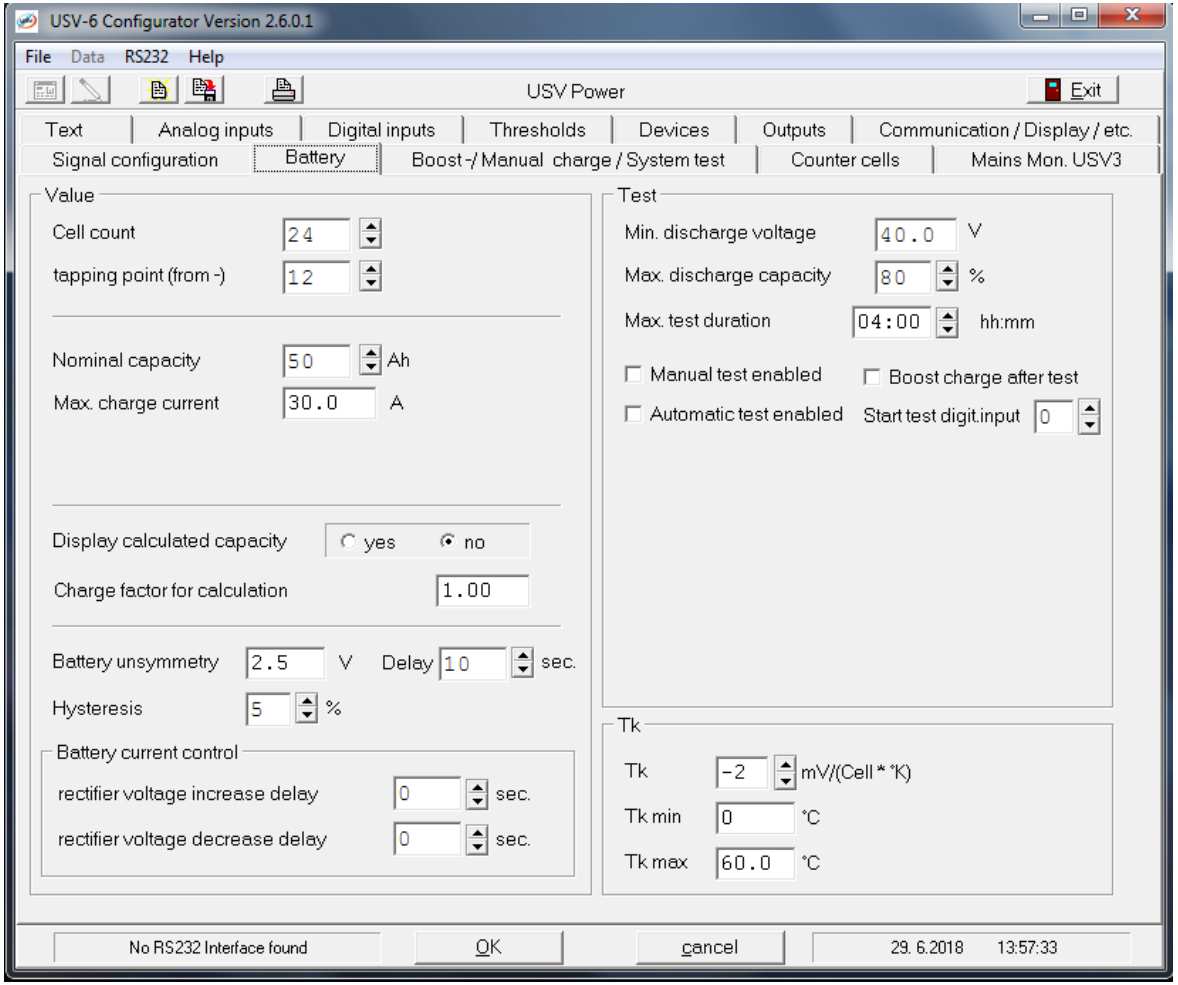
Manual test enable – enables the possibility to start the battery manual via front side keys

Automatic test enable – enables the automatic battery test function

Test start at – date of first battery test (year/month/day and hour/min)

Repetition – interval for new battery tests beginning from first test date (in days)

5.8.3 Tk



With these values you can have influence on the charge line characteristic (inclination, start/stop temperature for temperature compensation).

Tk – temperature coefficient for temperature compensation of charge voltage
Put in the value without sign (“4” means “–4” mV/cell/K).

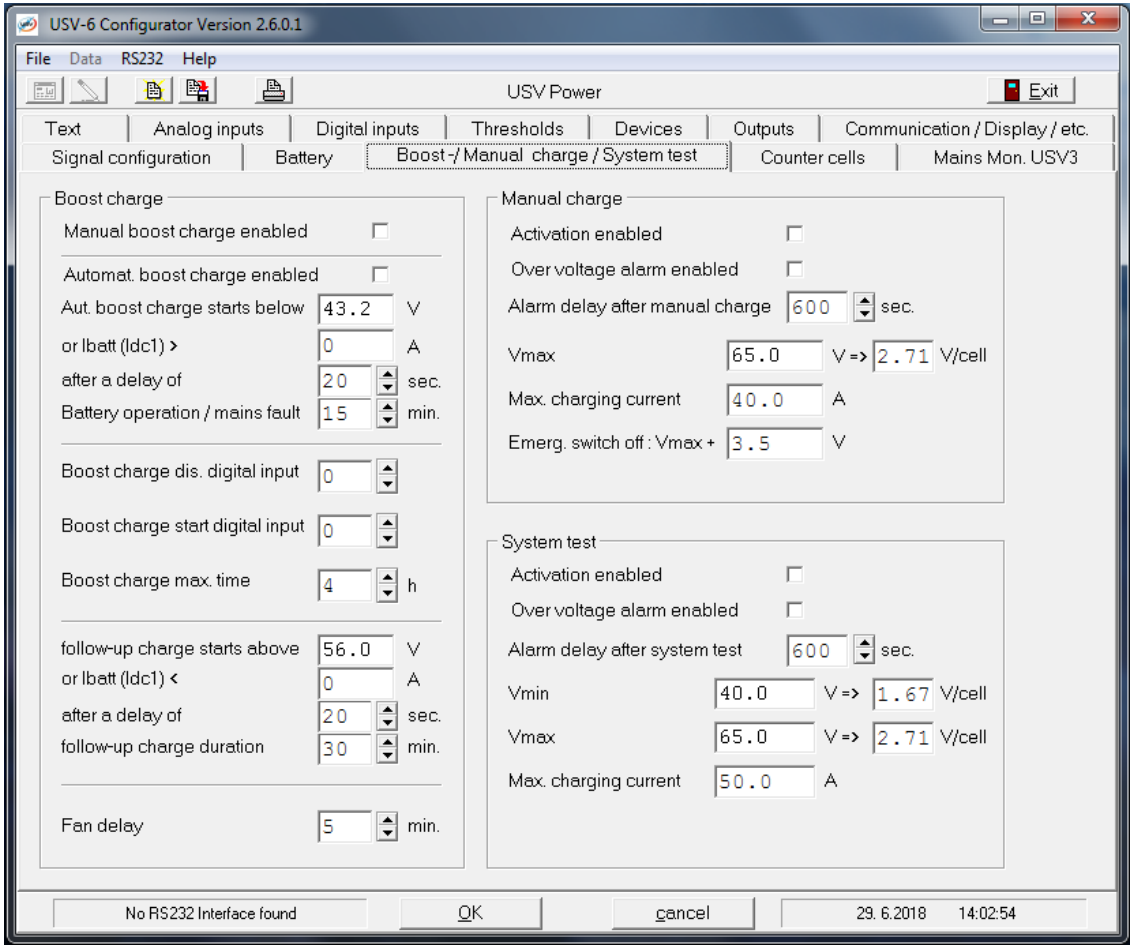
Tk min – minimum temperature for temperature compensation of charge voltage

Tk max – maximum temperature for temperature compensation of charge voltage

☞ If temperature of battery is out of the defined range the temperature compensation is switched off. Also during boost charge the temperature compensation is switched off.

5.9 Register – "Boost-/Manual charge/System test"

5.9.1 Boost charge



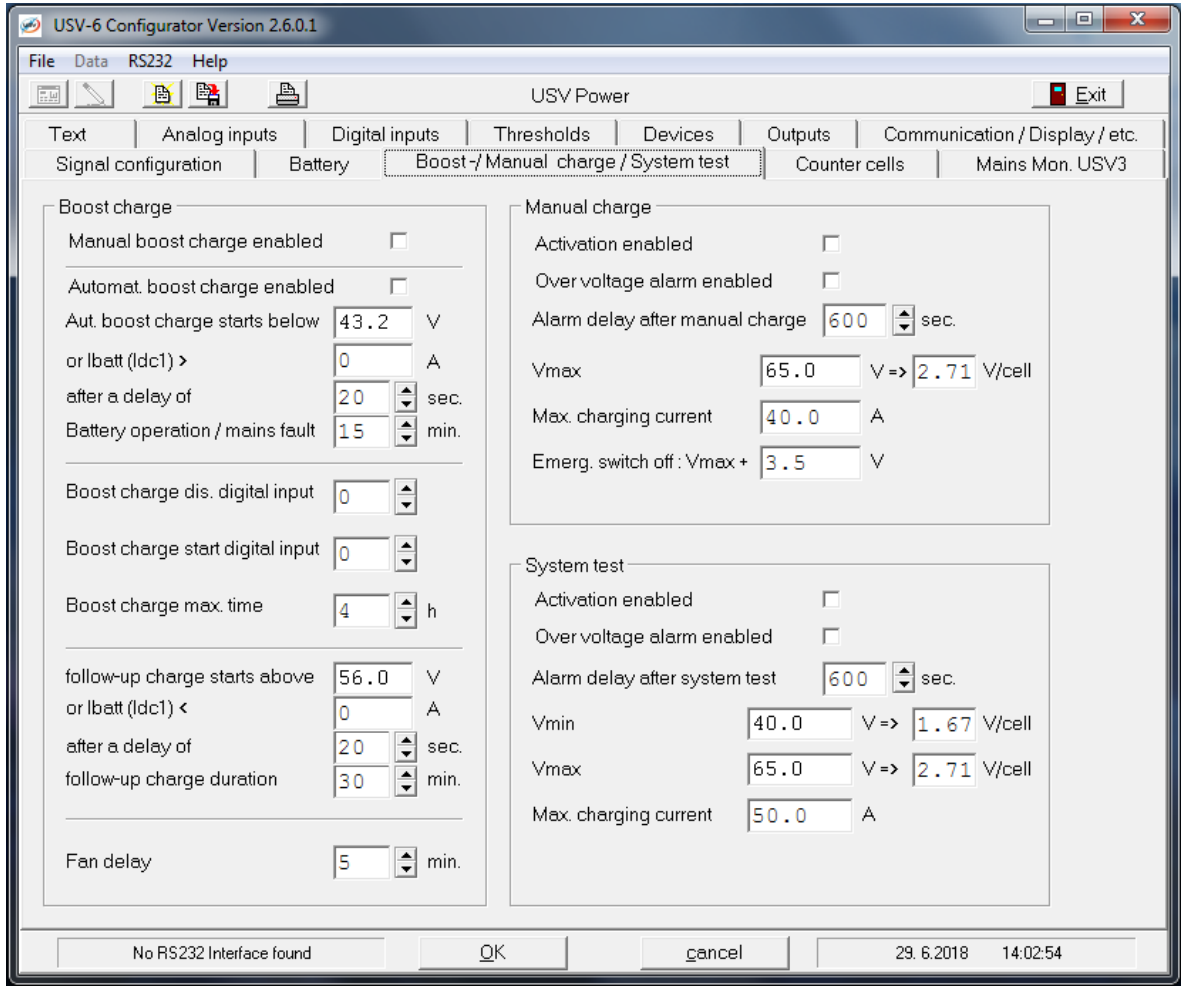
Manual boost charge enabled – enables the possibility to start battery boost charging function manually via front side keys

Automat. boost charge enabled – enables the automatic boost charging function
(reasons to start boost charge automatically: battery voltage low and/or mains fault)

Aut. Boost charge starts below – minimum battery voltage level where automatic boost charge starts

After a delay of – delay time for start boost charge after voltage level was reached

Battery operation/Mains fault – maximal time duration for mains failure or battery operation to start boost charging automatically



Boost charge inhibit –
By activing this item you can choose the input to cut off fast

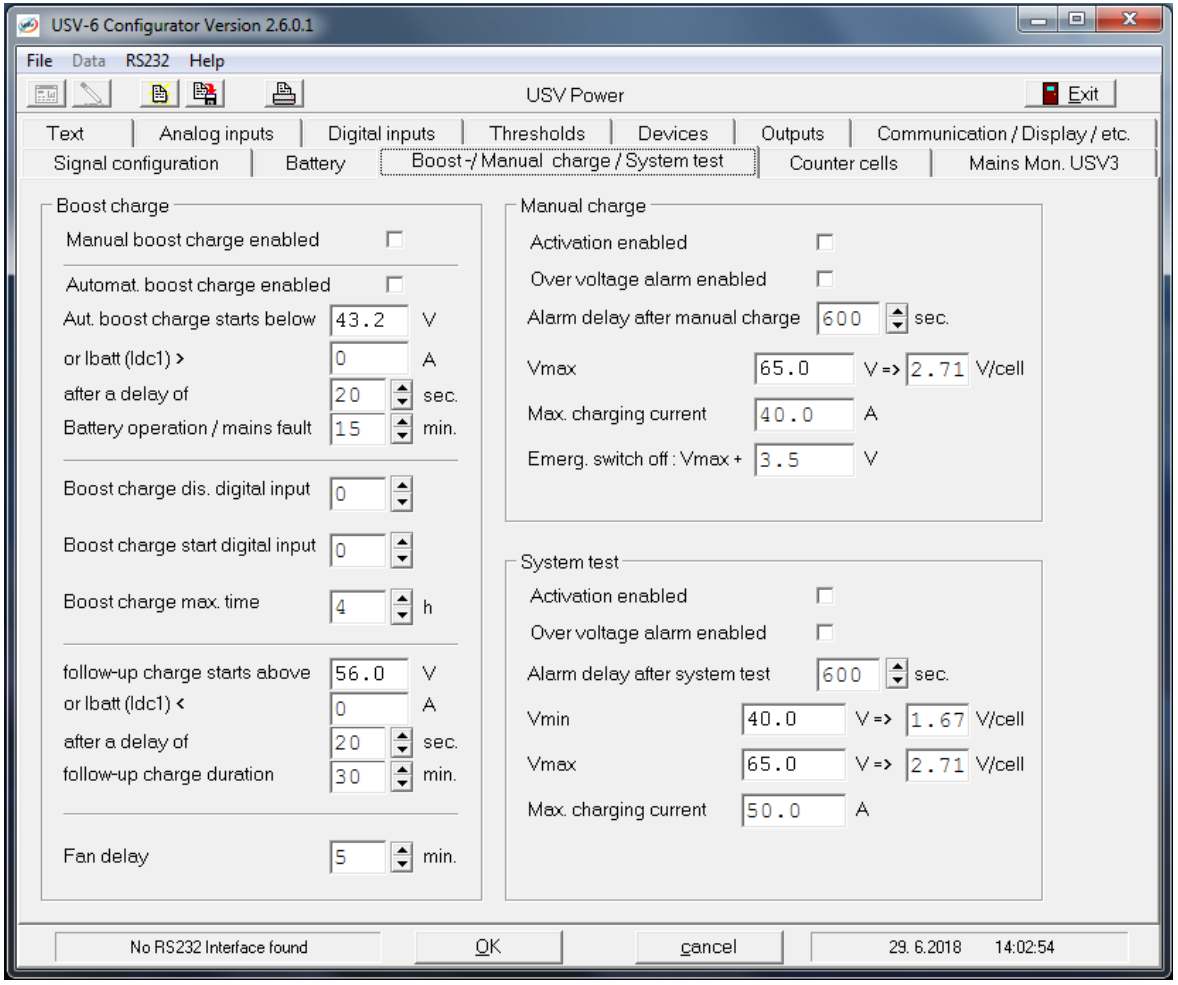
Follow-up charge starts above – battery voltage level where follow-up charging time will start

After a delay of – delay time for start follow-up charging time after boost charge end voltage level was reached

Follow-up charge duration – duration time for follow-up charging (in minutes)

Fan delay – delay time for battery room ventilation fan (an external fan has to be connected to an outgoing alarm relay for this function)

5.9.2 Manual charge



Activation enabled – enables the possibility to start manual charge with front side keys

Over voltage alarm enabled – possibility to disable the over voltage alarm if the voltage level is reached due to manual charging

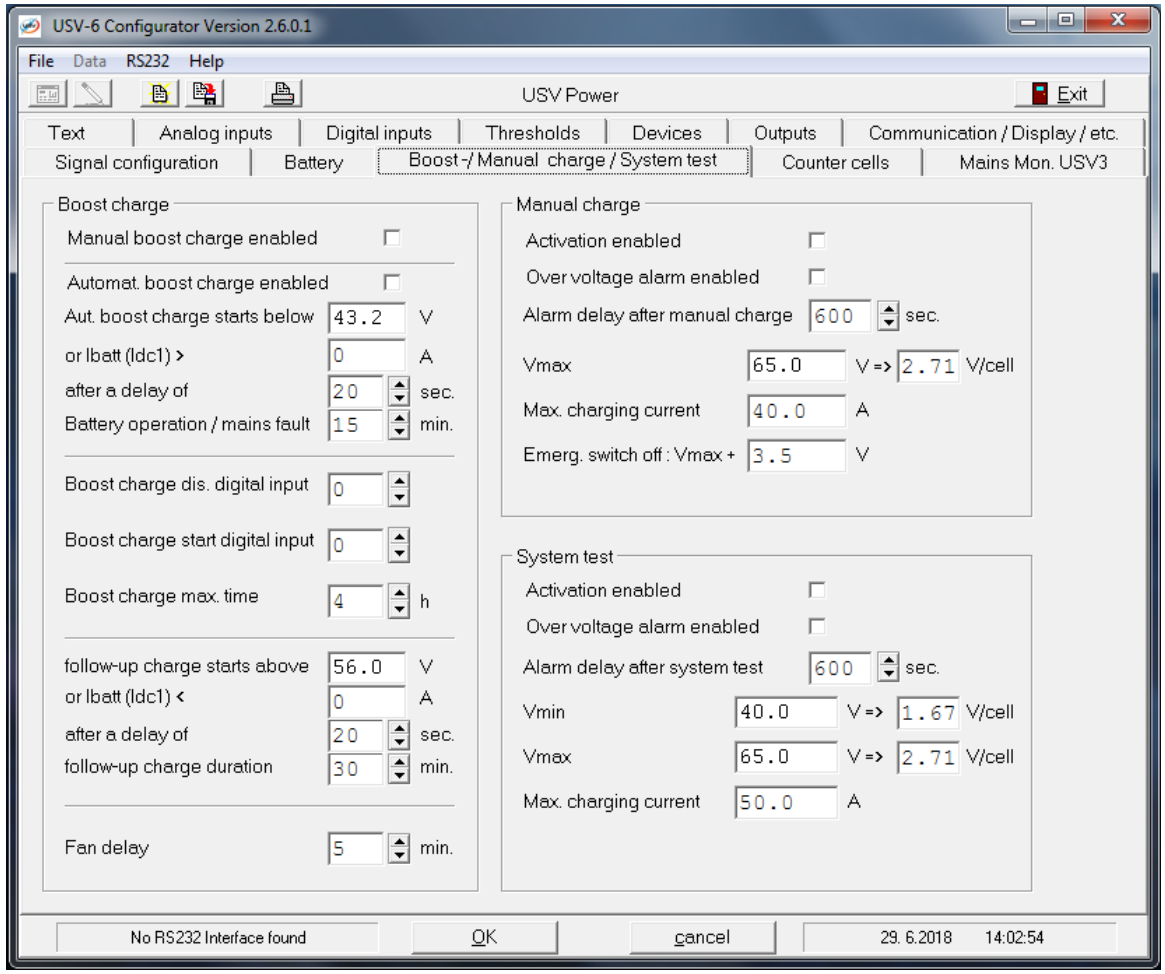
Alarm delay after manual charge – time to give a reminding alarm to the user after manual charge have been started (to avoid over charging of the battery in case that the user has forgotten to switch off manual charging)

Vmax – maximum allowed charging voltage

Max. charging current – maximal battery charging current during manual charge operation

Emerg. Switch off – not used

5.9.3 System test



This function can be used to test all monitoring thresholds of the system during commissioning.

Activation enabled – enables the possibility to start system test with voltage variation function

Over voltage alarm enabled – possibility to disable the over voltage alarm if voltage level is reached due to manual system test.

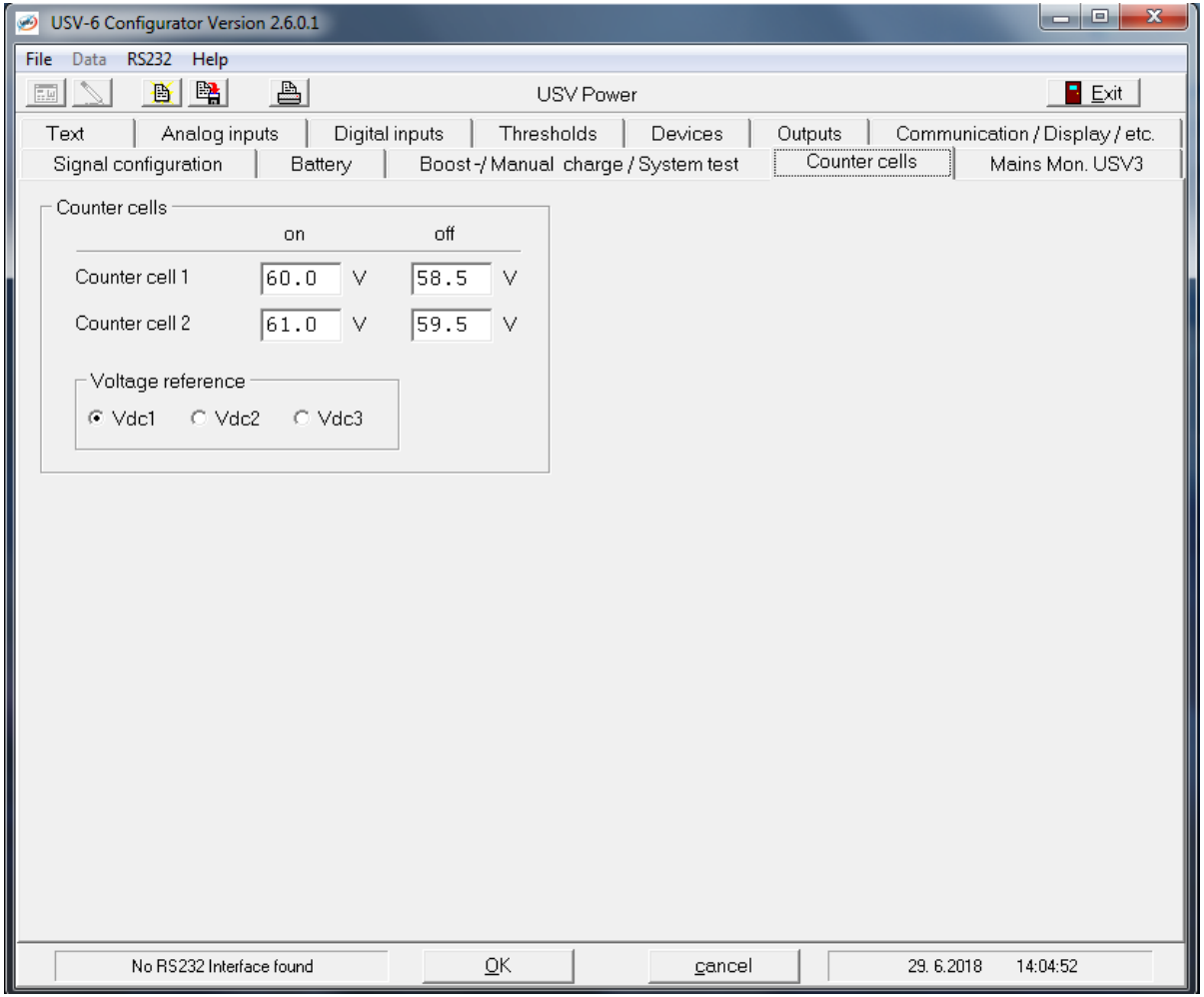
Alarm delay after manual charge – time to give a reminding alarm to the user after system test have been started (to avoid that system operates permanent in wrong mode in case that the user has forgotten to switch off system test)

Vmin – minimal allowed system test voltage

Vmax – maximal allowed system test voltage

Max. charging current – maximal battery charging current during system test operation

5.10 Register – "Counter cell"



On this page you can configure the values for switching a one-level or two-level counter cell. For this function one or two external contactors have to be connected to outgoing alarm relays. The counter cell function has to be assigned in signal configuration menu to the used alarm relays.

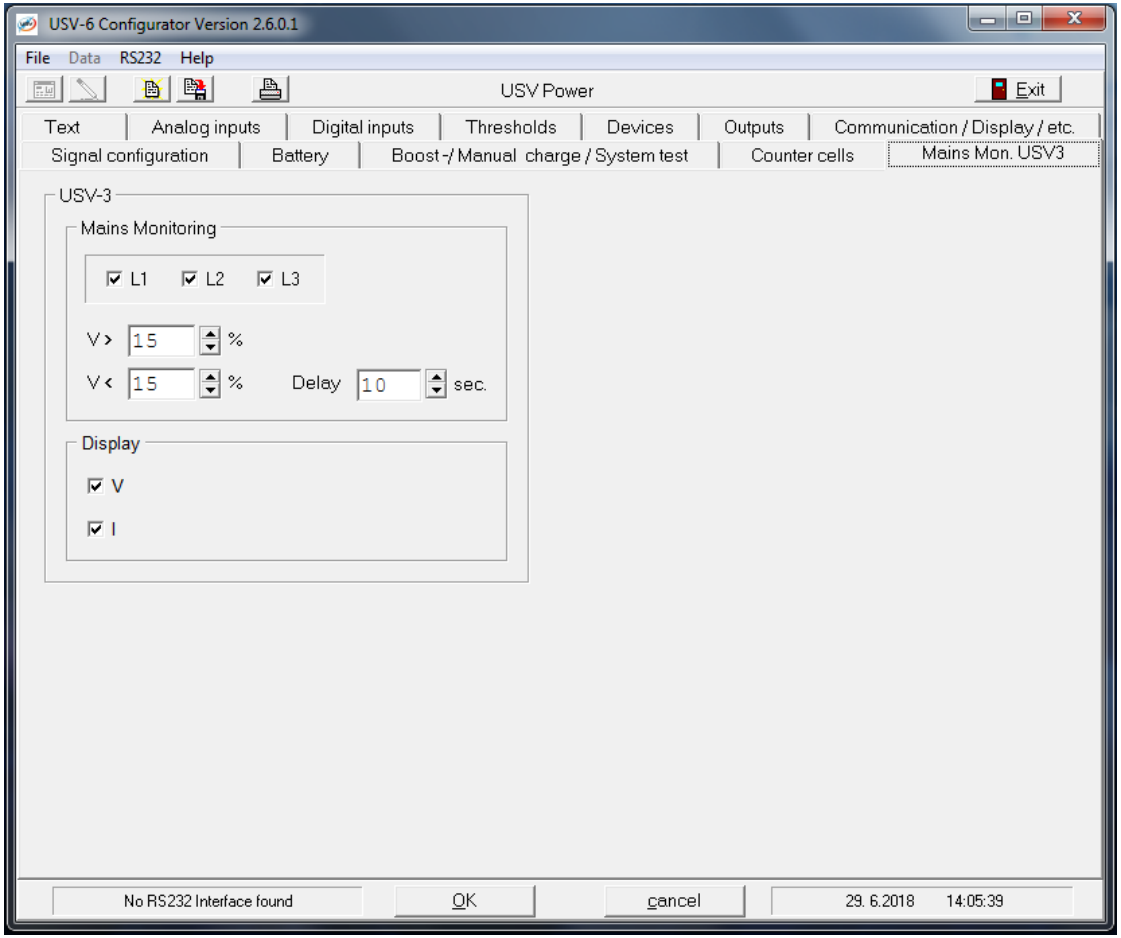
Counter cells-

Counter cell 1 – voltage value for open (on) and close (off) the dropping diode contactor 1

Counter cell 2 – voltage value for open (on) and close (off) the dropping diode contactor 2

Voltage reference – sets the measuring input that is used to measure the reference voltage

5.11 Register – " Mains Mon. USV3"



Configuration of the optional CAN connected mains monitoring board USV3.

USV3 –

Monitoring L1/L2/L3 – enables the monitoring channel for phase L1. L2, L3

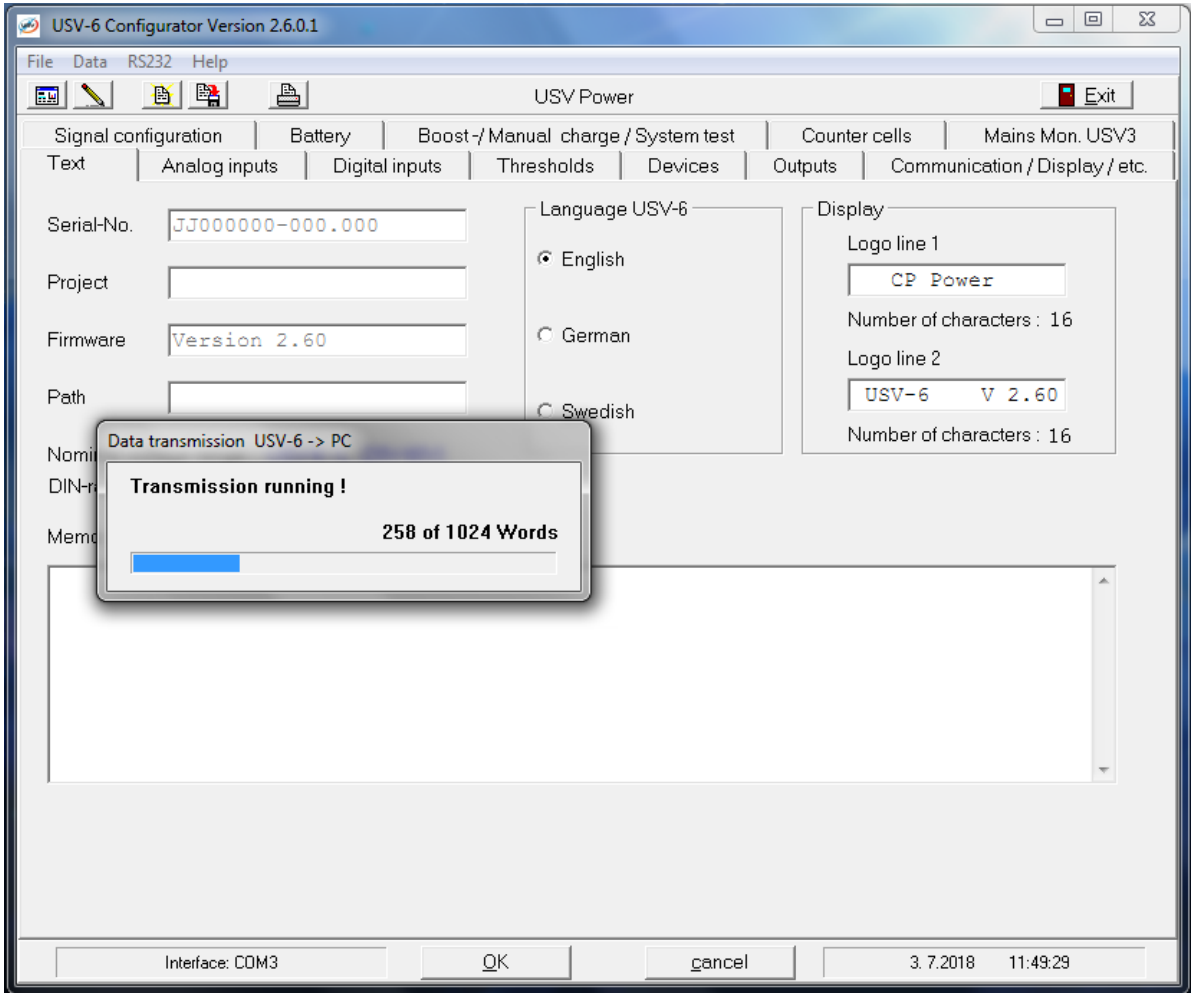
V> - monitoring threshold mains voltage high alarm in % of measuring value

V< - monitoring threshold for mains voltage low alarm in % of measuring value

Delay – delay time for mains fault detection

Display – enables the display for measured voltage and/or current value of all enabled phases

6. Send new data to USV6

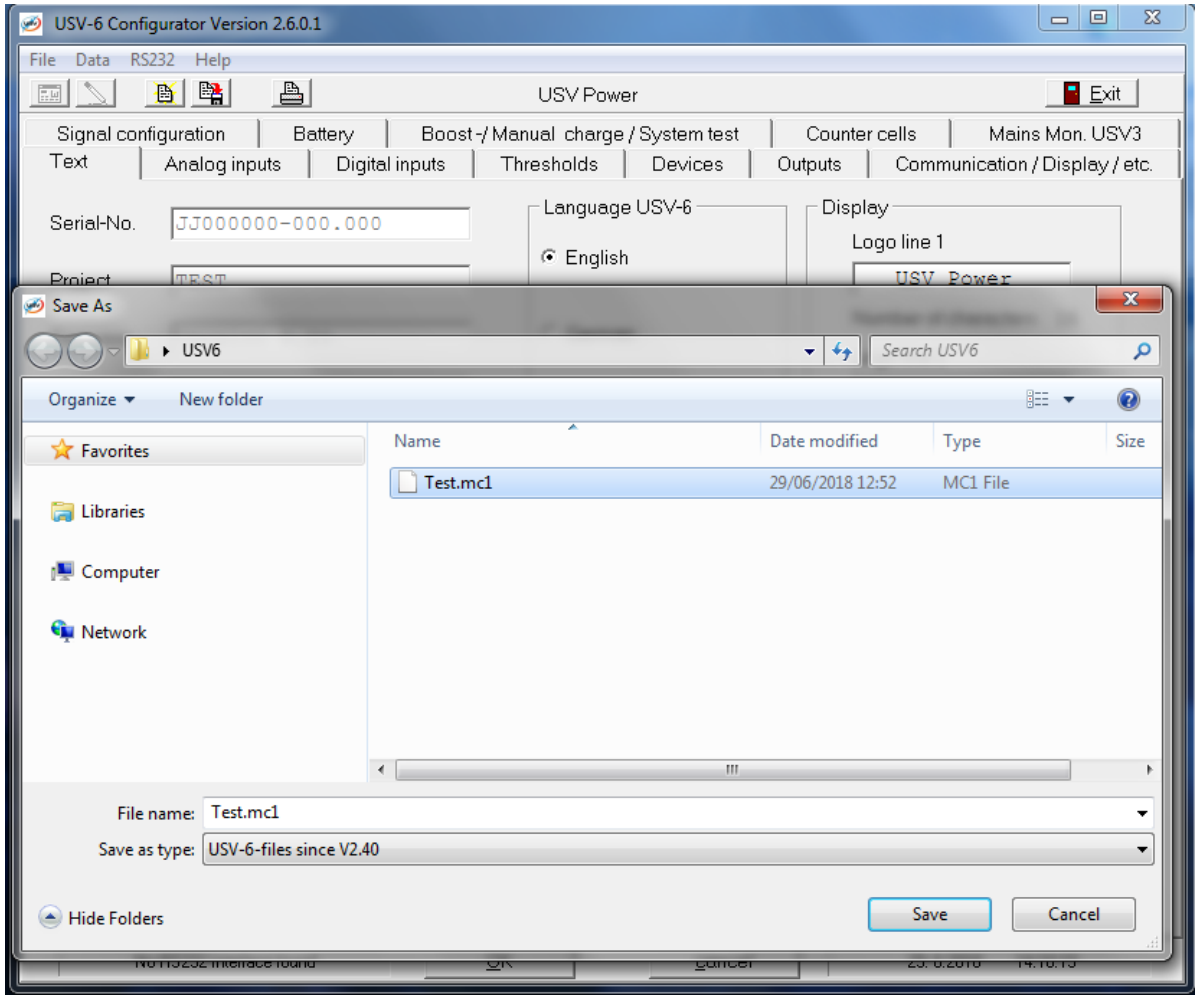


If you finished the configuration on all register entries, you have to send the new data to USV6.

Select *File/Data/Write PC->USV6…*

If any error occurs please try to start the transmission again.

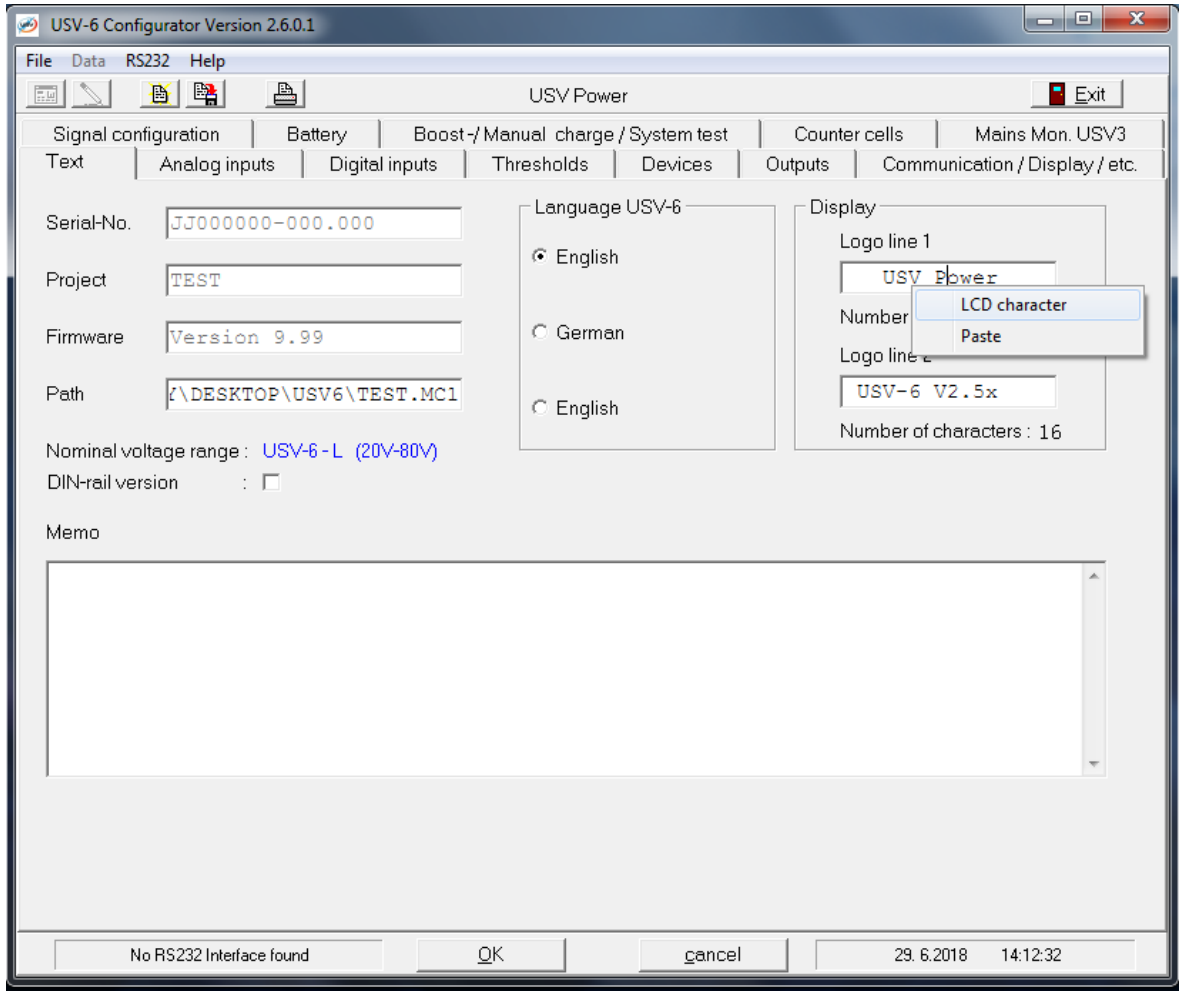
7. Save project file



To save the changed project file select *File/Save…*

To save the new generated project file select *File/Save as…,* search for right subdirectory on your harddisk, put in a new file name and confirm with "OK".

8. Input LCD characters (especial for cyrillic characters)



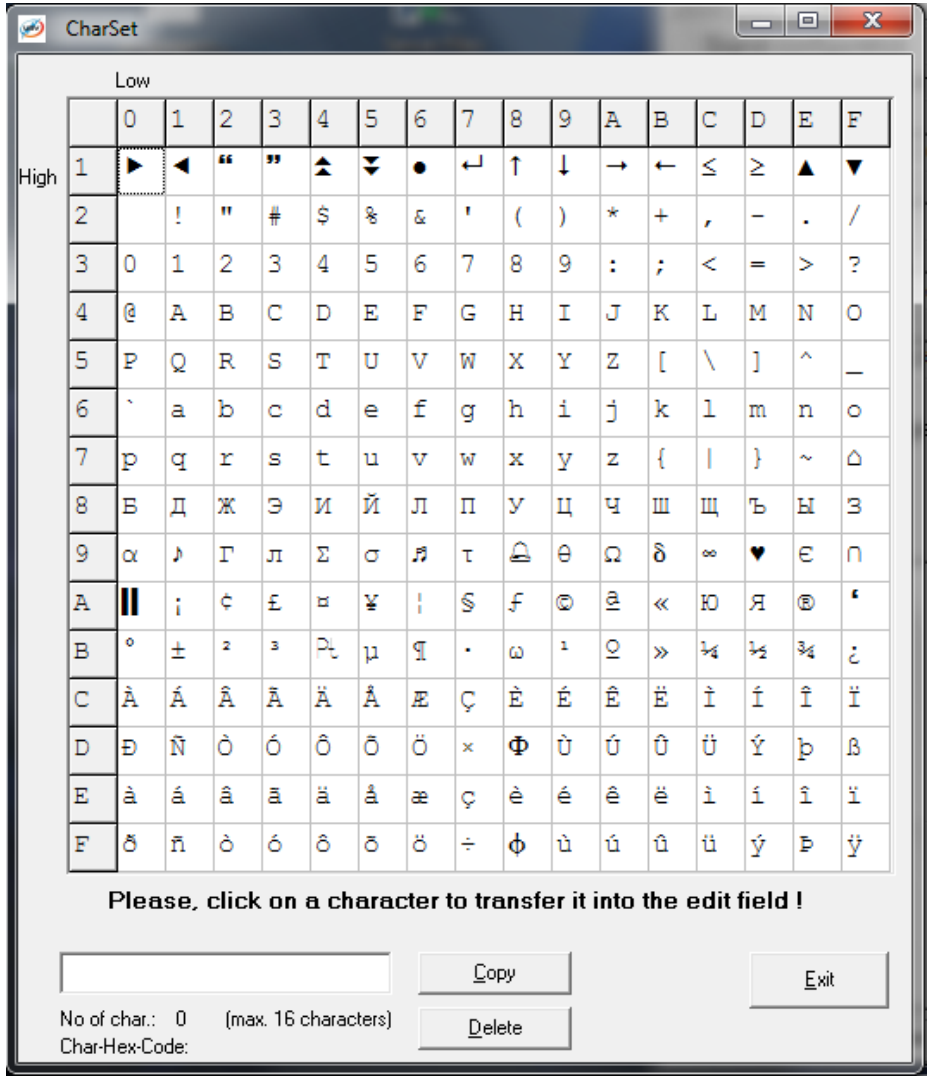
There is the possibility to key in specific LCD characters in different text fields, as for example in the *Logo line 1* and *2*, in *Analog inputs* or *Digital inputs* (see section 8.1.).

Press the right mouse key in the respective text field. After that there appears a Popup menu with the choice of "LCD character" and "paste".

With the choice of "LCD character" a form appears such as shown at section 8.1. (see the following page).

It is possible to key in a maximum of 16 characters. These characters appear in the edit field below.
Click on *Copy* to load the required character(s) into the buffer, leave the form with *Exit* and copy this into the text field with another click on the right mouse key choosing *Paste*.

8.1. LCD character set



The picture on the left shows the especial LCD character set.

9. Notes

10. Data transmission Error / Data transmission abortion

Transmission Error:

On display	Error	Error probability	
"Transmission Error No answer from the USV6"	Communication error	The USV6 is not switched on	The USV6 switch on
		The USV6 is in the menue (to push on the Enter-button) communication is not possible	Leave the menue by pressing the ESC-button
		Read/write-error: the USV6 is in timeout	Wait until timeout is over (display)
		Chose wrong interface	Check the interface in the menue RS232/com
		Interface connection defect (Hardware)	Check the communication between PC and USV6
"Checksum error"	Check sum	Data transmission failed	

Transmission abortion:

Pressing the abort button during the data transmission

Transmission abortion during the write cycle:

Important: The USV6 lost their new values during the transmission time. At this point the USV6 gets internal default values. At this time you have to repeat the write cycle.