3kW LLC_Graphical User Interface (GUI): getting started sequence

Francesco Di Domenico - IFAT PMM ACDC AE
Alfredo Medina Garcia - IFAG PMM IMC M BD CES

July 2016

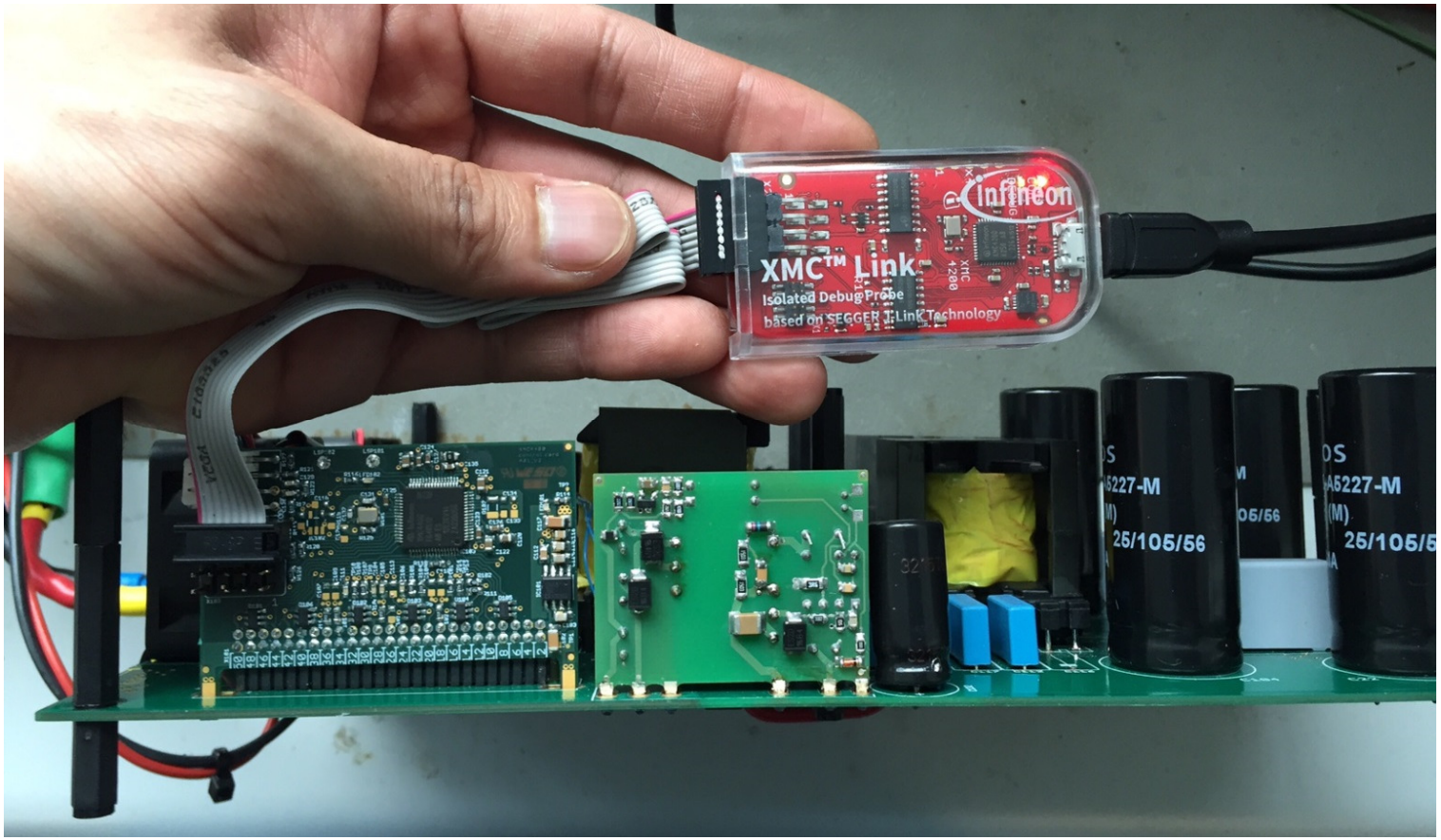
Introduction

- The 3kW Dual Phase demo board is able to immediately work without connection to the Graphical User Interface (GUI), since a set of operating parameters is already stored in the Memory of the MCU during the mass production.
- The GUI provides an immediate and intuitive way to set some electrical parameters and to monitor them during the operation
- The following procedure shows:
  - How getting started with the operation when the control board is connected to the GUI.
  - How to pre-set the converter parameters
  - How to measure some parameters during the converter operation
- The setting of the converter parameters via GUI shall be done in accordance with the max specified ratings of the board:
  - Vin_nom=380Vdc; Vin: [350, 410]Vdc
  - Vout_nom= 54V; Vout: [44, 58]V.
  - Iout_max=55A, so max OverCurrent level=62A.

Copyright © Infineon Technologies AG 2016. All rights reserved.

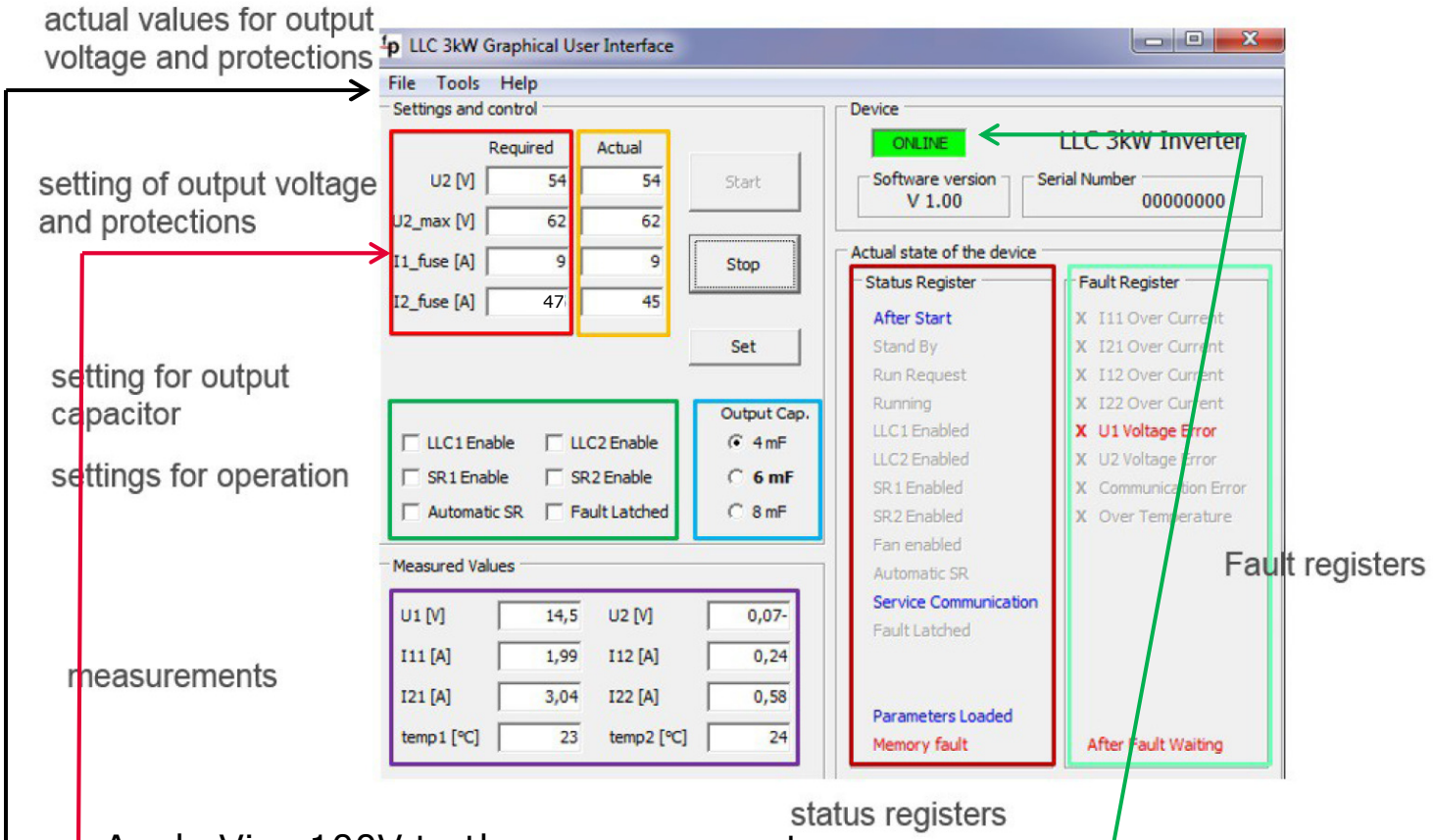
Preliminary operations with XMC-Link

- Install in your laptop the Segger driver, which can be downloaded at the following link: https://www.segger.com/jlink-software.html
- Connect the XMC Link to the control card as illustrated in the picture below, then you go to the USB port of your laptop through a proper adapter cable.



Copyright © Infineon Technologies AG 2016. All rights reserved.

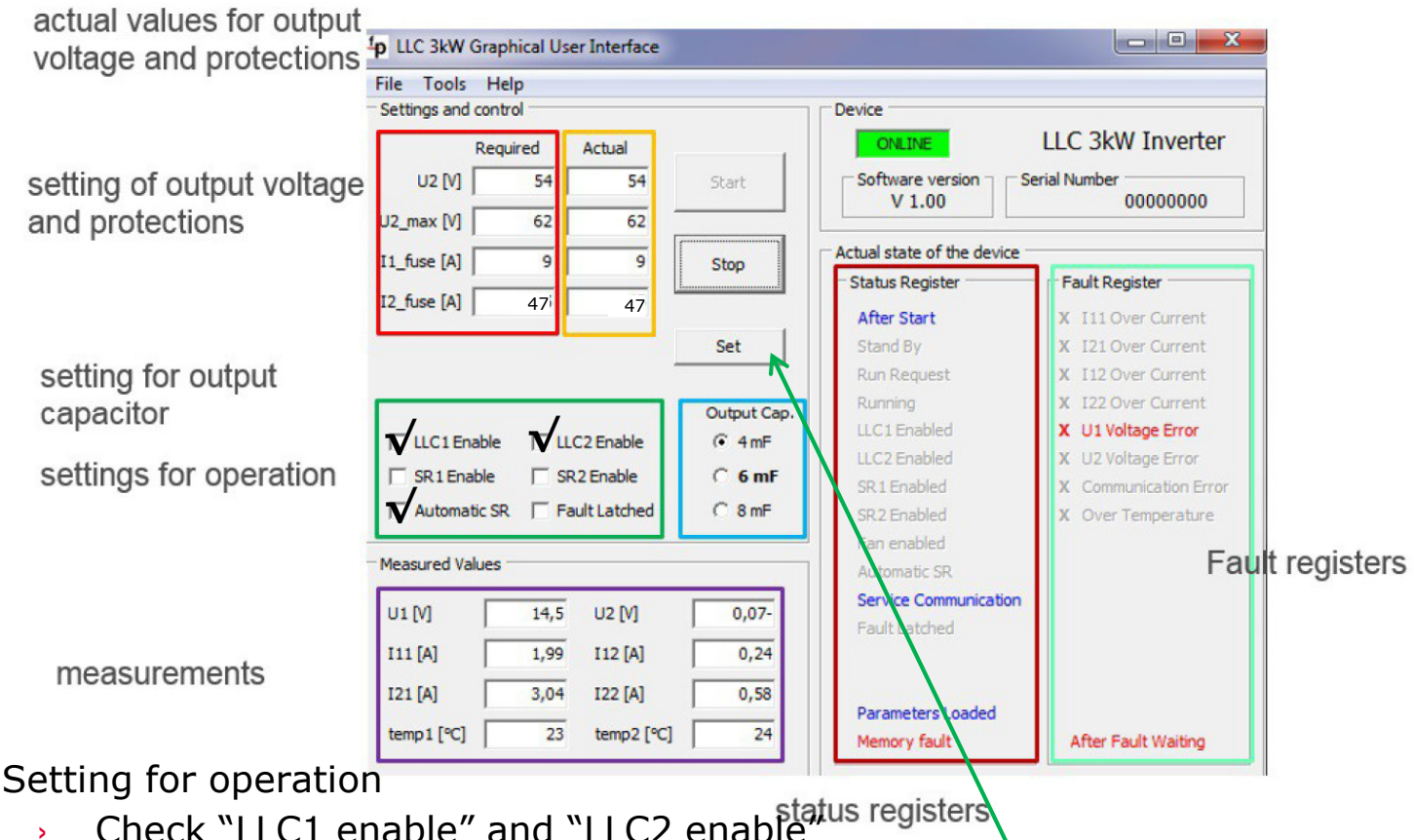
Step 1. First Connection and initial setting



- Apply Vin=100V to the power converter
- File->Setting->COM Port->select the proper port
- Press "connect" button->ON LINE is highlighted in green
- Setting of output voltage and protections:
  U2=**54**; U2_max=**62**; I1_fuse=**9**; I2_fuse=**47**

Copyright © Infineon Technologies AG 2016. All rights reserved.

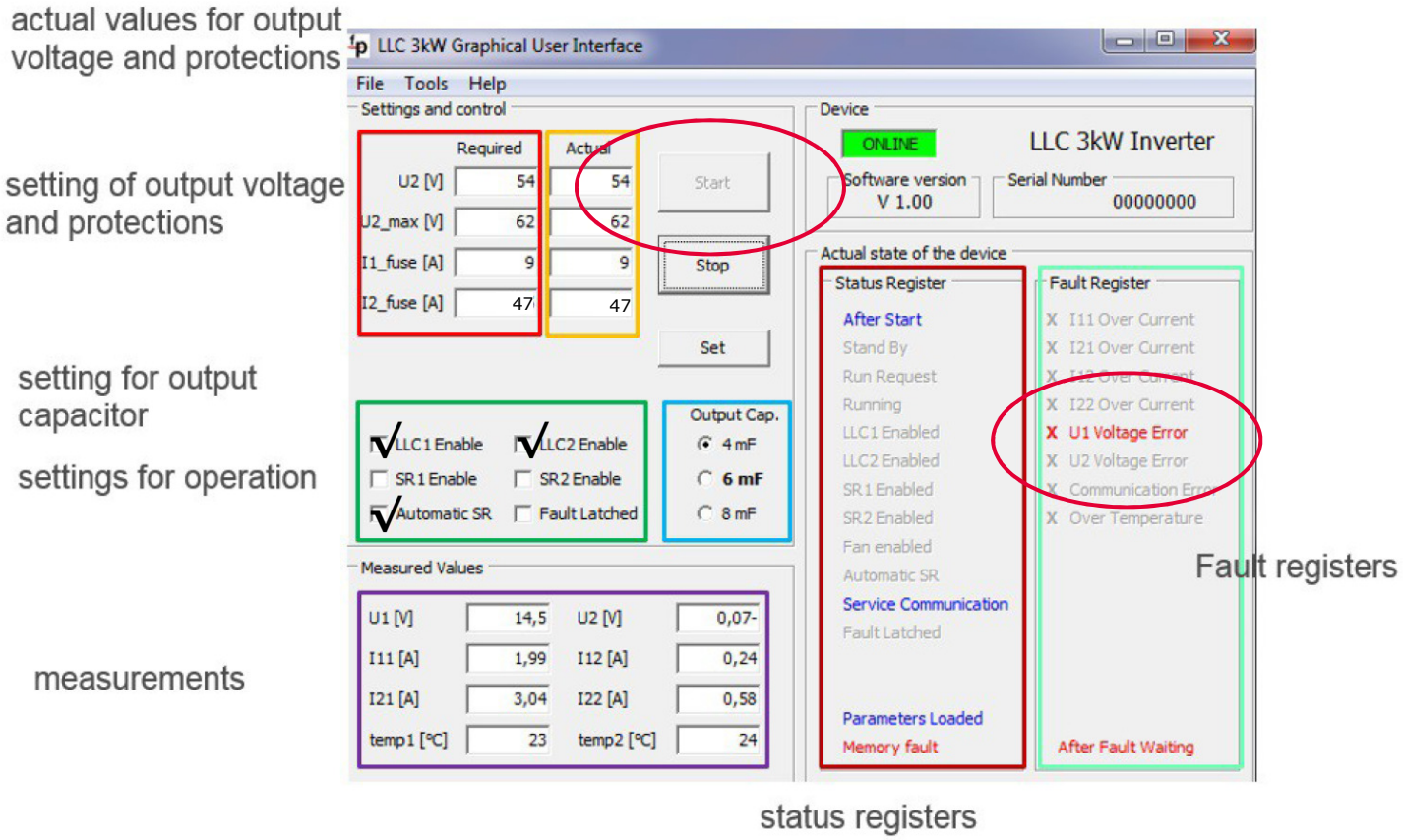
Step 2. Setting for operation



- Setting for operation
  - Check "LLC1 enable" and "LLC2 enable"
  - Check "Automatic SR"
  - **Do not check "SR1 Enable", nor "SR2 Enable" (done by only expert users for fine tuning)**
- Press "Set" to store the settings (status register update)

Copyright © Infineon Technologies AG 2016. All rights reserved.

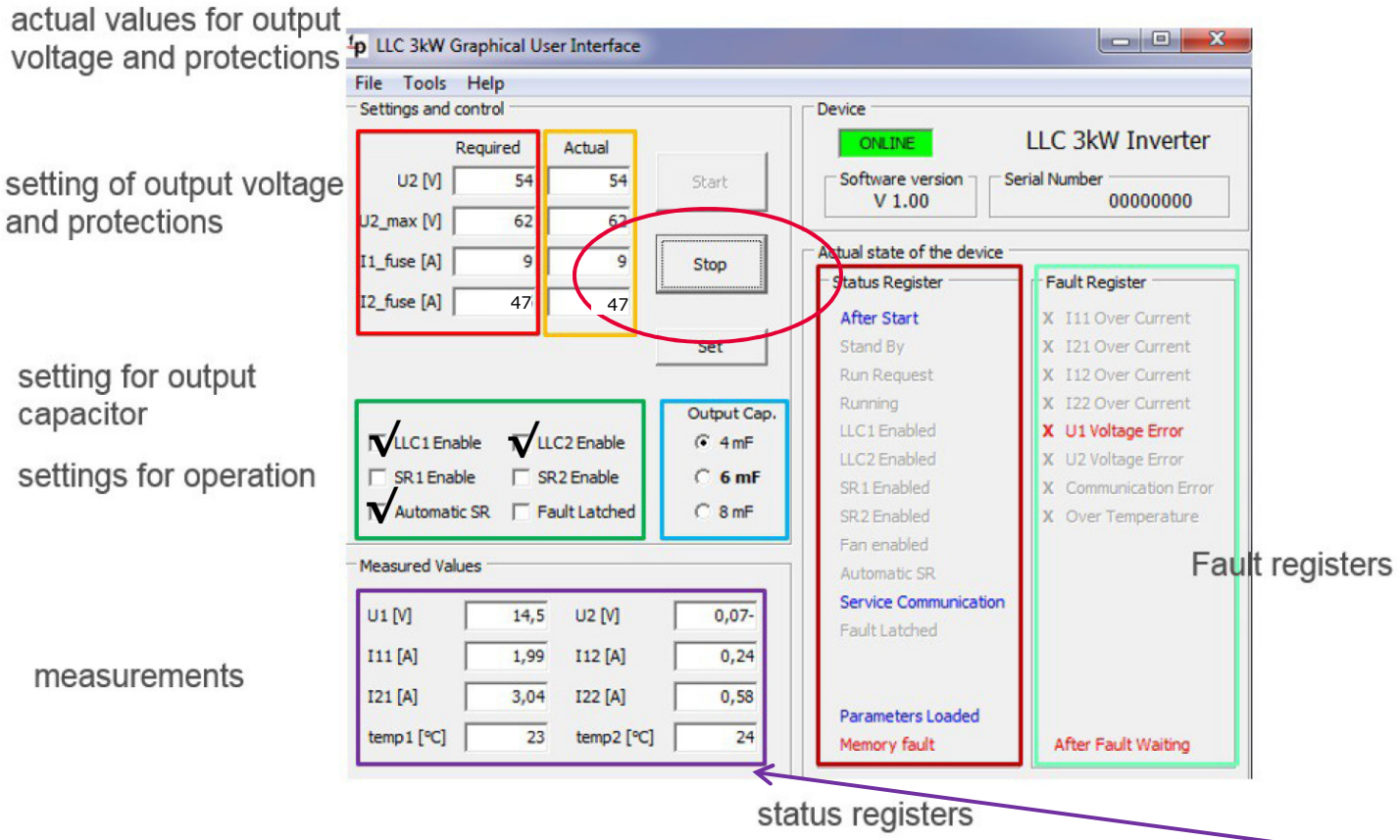
Step 3. Start-up procedure



- Increase Vin of the power converter. Until Vin<350Vdc, "U1 voltage error" is highlighted in red in the Fault Register and the START button will remain "grey"
- When Vin ≥360Vdc, "U1 voltage error" is removed and "START" will become available for activation.
- Increase Vin up to **380Vdc**, then press "START"

Copyright © Infineon Technologies AG 2016. All rights reserved.

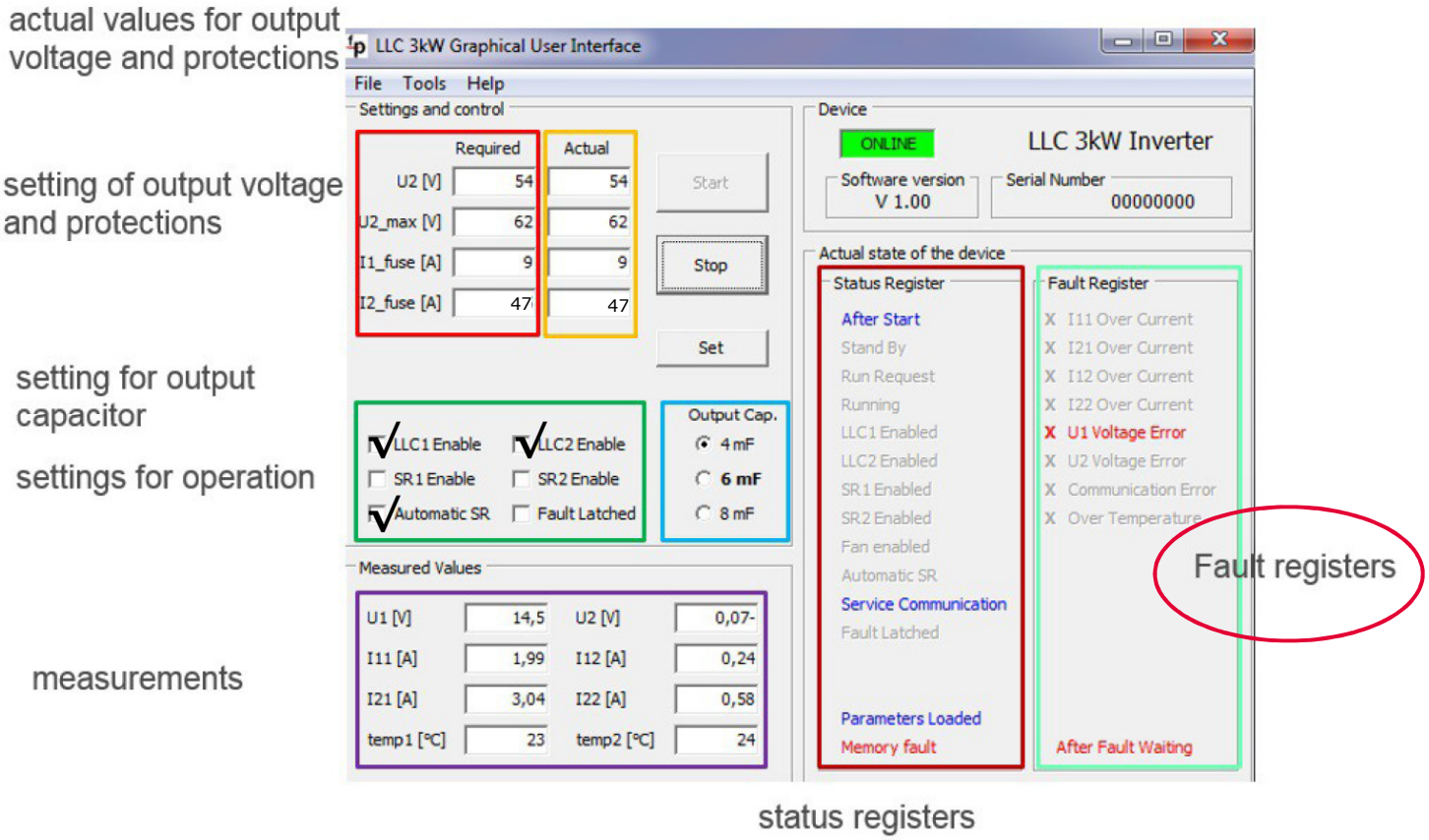
Measurements info



- Increase the output load: the measured values are visible in the dedicated box
- Press “STOP” in case you want to shut down the converter

Copyright © Infineon Technologies AG 2016. All rights reserved.

Example of Protection Mode: Input Under-Voltage protection



- Reduce Vin below 350Vdc at Iout=25A: the converter will be automatically shutdown and the related notification will appear in the Fault Registers panel. A red LED is lighted in the main board
- After increasing again the Vin up to 380Vdc, the fault is removed, and you can re-start the converter by clicking on the "START" button.

Copyright © Infineon Technologies AG 2016. All rights reserved.

GUI User Manual

- For any other detail about the GUI usage and functions, you can refer to the Chapter 3 of the document **“LLC3kW_GUI_Manual_v1.01”**, which is included in the boards documentation.

Copyright © Infineon Technologies AG 2016. All rights reserved.

Additional Info

- The XMC-Link is a new communication tool still under evaluation. Sometime, during the power converter operation, losses of communication have been observed. Communication can be recovered with a new power up (remove input supply).
- The user has the option to:
  - Operate the board without parameters setting by GUI
  - Set parameters by GUI when input voltage is 100V (power stage OFF, auxiliary supply ON) and remove the XMC-Link connection before applying nominal input voltage
- Monitoring while operation is possible but communications may be lost due to noise (it has been observed that RC filters added to communication lines correct the issue)

Copyright © Infineon Technologies AG 2016. All rights reserved.



Part of your life. Part of tomorrow.