



PASAN
MEASUREMENT SYSTEMS

Training Manual

Module: Maintenance and troubleshooting



SunSim 3b/3c

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 A member of Meyer Burger Group

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1 Learning Objectives

The trainee will learn the necessary skills to keep the SunSim in good working conditions. In case of malfunction he gains the knowledge to perform first tests and then to supply a qualified damage report to Pasan headquarter or its service centers.

2 Security

Never open the lamp housing while the power cable is still connected to the lamp. Risk of severe eye injury and electrocution. High voltage inside.

Never open the flash generator cabinet. Risk of electrocution. High voltage inside.

Never touch the contactors for the module while a measurement is taking place. Risk of electrocution. High voltage can be applied during the measurement.

Never look towards the flash lamp while a flash can occur. Risk of eye injury.

Always switch off the flash generator cabinet when approaching the lightning side of the flash lamp closer than the distance that you have between the module and the flash lamp (SunSim 3c →5.5m, SunSim 3b →8m). Risk of very severe eye injury.

3 Maintenance

The maintenance of the SunSim is limited to exchanging the flash tubes and cleaning of the optical filters and the monitor cell.

3.1 Monitor Cell

The monitor cell's function is to control the light intensity and to read the received irradiance. If the monitor cell is shaded, you will not receive the desired amount of light onto your device under test. This is difficult to notice in the measurement results as you will still receive measurement results that look valid. As dust and dirt give shade to the monitor cell it is important to clean it on a regular basis. Now environmental conditions are different at each setup for the SunSim. Depending on the amount of dust/dirt in your location a more or less frequent cleaning will be necessary. You clean the monitor cell's cover glass with optical tissue and isopropyl alcohol. Take care not to leave fluff on the glass. Start cleaning once a week. If you notice, that the tissue didn't take on dirt you can extend the cleaning period. However it is a good practise to clean it when you also exchange the flash tubes.



Fig 1: Monitor cell is located near the DUT and measures the received irradiance.

3.2 Light Box

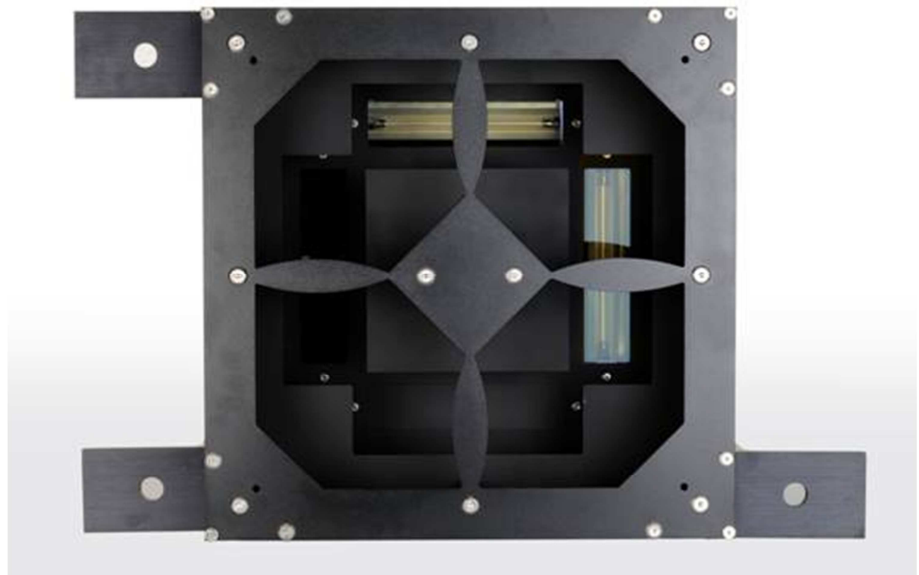


Fig 2: Standard Light Box

On Fig. 2 a standard light box for the SunSim 3c can be seen. The light box holds the flash tubes and will emit the flash light that is needed to perform a measurement. The flash tubes are located behind the so called interferential filters as can be seen on above picture. These filters are made from glass and covered with a substrate. These filter the emitted light from the flash tubes so that the spectrum of that light gets close to the one of the sun. When dust is located on the filters the spectrum might change to undesired characteristics corrupting the quality of the measurement. Bigger particles can have an influence on the uniform distribution of the light and your device under test will see less light in some zones which will also corrupt the quality of your measurement results. Therefore a regular cleaning is advised. Same as for the monitor cell you use optical tissue and isopropyl alcohol. Take care only to wipe softly over the glass to avoid scratches on the substrate.

You need to monitor how often a cleaning will be necessary. The optical filters get more dust on the side facing the tunnel and you clean them by going inside the tunnel and taking a torch with you. The opposite side you can only reach when opening the light box housing, so it is advised to combine this with the flash tube exchange.



When cleaning the optical filters of the light box, you must reassure yourself, that first the flash generator is turned off and that the anaconda cable that connects the flash generator with the light box has been pulled off from both, generator and light box.

3.3 Exchange of the flash tubes

The flash tubes guarantee is for 10000 flashes, typical lifetime is 15000 flashes.

After 15000 flashes the tubes can degenerate to a level, where the ionisation of the gas inside of the tubes will not reach a sufficient level for flashing. Further the spectrum of the light degenerates with time and until 15000 flashes we know that it falls within our double class A. If you use the tubes over this period you lose the high quality of your spectrum.

When exchanging the flash tubes you always need to exchange both (SunSim 3C) or all four tubes (SunSim 3B) at the same time. Used tubes normally show white spots on them. This is normal. The exchange procedure as follows:

1. Switch off the flash generator.
2. Remove the anaconda cable on both sides (light box and flash generator).
3. Open the light box.
4. Replace the old lamps by the new ones as described in the user's manual. Be careful on the lamp's polarity. One side of the flash tubes carries a nose on its end. This one fits to the round mark on the reflector. To loosen the two screws that hold the flash tube in place you need a small Allen key. After fastening the screws, double check that the tube is well centered in the middle of the reflector and if necessary (in very rare cases) undo again and slightly bend the legs of the flash tube a bit to guarantee a centered position.

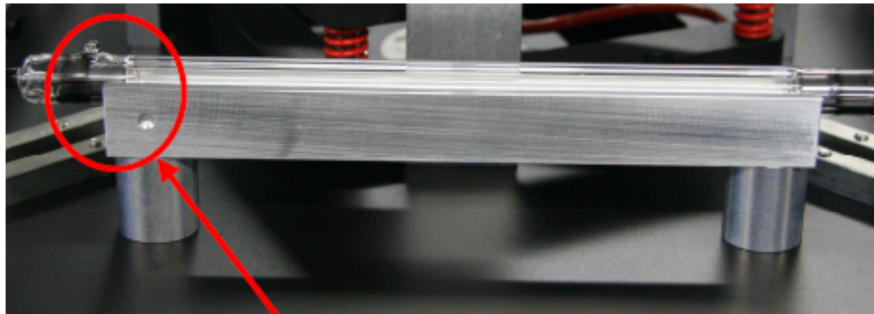


Fig 3: Reflector and flash tube. Within the red circle, the mark on the reflector can be seen as well as the nose on the flash tube.

5. Close the light box.
6. Reconnect the "anaconda" cable on both sides.
7. Turn on the flash generator, the electronic load and the software.
8. Lower the flash capacitance load in the SPROD config → setup settings to a value of 82%.
9. Perform 5 invalid flashes.
10. Verify the calibration by either using your silver or golden module and recalibrate if necessary.

4 Troubleshooting

Intention of this chapter is to provide the necessary knowledge to perform the initial troubleshooting on site. Furthermore you gain the ability to provide a detailed report so that the responsible Pasan service location can provide you the fastest solution for your problem.

Depending on your location you need to contact the service centers as listed below:

<p>Europe (except Spain)</p> <p>Pasan SA Jaquet-Droz 8 CH - 2000 Neuchâtel</p> <p>Technical support:</p> <p>Phone: +41 32 391 16 16 Email: service@pasan.ch</p> <p>Admin & Logistics support:</p> <p>Phone: +41 32 391 16 21 Email: aurelie.knuchel@pasan.ch</p> <p>China</p> <p>Meyer Burger Machinery (Shanghai) Co., Ltd. Cherry Xu Room 20A, No. 800, Nanjing Road (E) Shanghai, 200001 Phone: +86 (21) 6360 2455 Email: cherry.xu@meyerburger.cn</p> <p>Taiwan</p> <p>MB Services Co., Ltd. Samantha Chang 1F, No.86-50, Wenhua 1st Rd., Gueishan Township, Taoyuan Coutry 33382, Taiwan R.O.C. Phone: +886 3 396 0636 Email: service@meyerburger.tw</p>	<p>Korea</p> <p>MB Systems Co. Ltd Sujeong lee 7th floor, Othrys B/D, 154-3 Samsung-dong Gangnam-gu, Seoul 135-090, Korea Phone +82-2-3454-0703 Fax +82-2-3454-0760 Mobile +82-10-8799-8910 Email: sujeong.lee@mbsystems.kr</p> <p>India</p> <p>Meyer Burger India Pvt. Ltd. Rajkumar Mohite 14, Commerce Avenue, Paud Road, Pune, Maharashtra, India. Mobile - +91 95525 17442 Email: Rajkumar.Mohite@meyerburger.in</p> <p>USA</p> <p>MBT Systems Ltd. Donna Reidel 309 Route 94 Columbia, NJ 07832 Phone: +1 520 623 7701 Email: spoc@MBT-Systems.com</p> <p>Spain</p> <p>Meyer Burger S.L. Beatriz Osuna Alaba, 61· Planta 6ª ES-08005 Barcelona Tel.: +34 931 131 132 Fax: +34 933 208 626 Email: b.osuna@meyerburger.es</p>
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4.1 Generator is in Alarm mode

On the BV 85-3 card there is a red light indicating an alarm on the generator. This alarm comes on, if there is a non-equal charge on the capacitors or if the capacitors don't charge up to the set value. In most cases this is due to four reasons.

4.1.1 Broken lamp or broken ignition card

Symptoms: In Sprod software you get an invalid measurement with an irradiance error. The electronic load and the generator turn into alarm mode indicated by the red alarm light.

If you switch off the generator – wait 5 minutes – turn it back on again. Perform an invalid flash to start the charging cycle. Watch the voltage display, it will charge up to its working voltage and **no** Alarm comes on. You perform a flash and now yes the generator turns into Alarm mode.

In most cases one of the tubes has broken. Exchange the set of flash tubes.

If the problem remains, turn off the generator – wait 5 minutes – and pull out the electronic card which is located at the very right of the generator. In most cases it carries the designation BV 85-81.



Fig 4: electronic cards on the flash generator

Turn on the generator again and initiate the charging cycle by performing the first invalid flash.

Place yourself at the height of the module holder and look towards the light box. Perform a flash while looking towards the flash tubes. As the BV 85-81 card is pulled out from the generator the ignition of the tubes will take place, but not the actual discharge, so no flash can actually occur. You will notice, that only one tube (3 tubes with the SunSim 3B) will show the ignition spark. This indicates that the ignition card which is located within the light box is broken. You need to contact your nearest service location. It will provide you with a replacement and an exchange procedure.

If you want to be very sure, that the problem doesn't come from the tubes, you can swap the position of the tubes. If the single ignition that you observe remains in the same place, you can be sure, that the ignition card is broken.

4.1.2 Electronic card BV 85-4 is broken

Symptoms: The alarm on the generator comes on while it is charging. It doesn't charge up to more than approx. 400V.

Turn off the generator and be ready to immediately and rapidly remove the BV 85-4 card. Turn on the generator again and continue working without this card. Contact your service center for replacement. This card controls the discharge of the capacitors once you switch off the generator. Without this card it takes 12 hours

for the capacitors to unload themselves. When you receive the replacement card, before plugging it into the generator make sure that the generator was turned off for 12 hours.

4.1.3 Bridge rectifier is broken

The alarm on the generator comes on while it is charging. It doesn't charge up to more than approx. 60V.

Turn off the generator. Pull the power supply. Wait until the lamp on the generator indicating high voltage comes off. Open the front door. Check the eight fuses (Fig. 8). If they are OK continue to check the bridge rectifiers. They are located on the back side of the fuses (Fig.7). To test them you need a multimeter with diode test function. Refer to the schematic (Fig. 5) and test between pin neighbors (Fig.6). Replace the broken rectifier. Contact your service center, if you don't have such rectifier in stock.

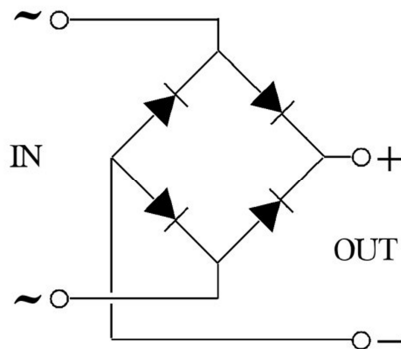


Fig 5: Schematic of a bridge rectifier

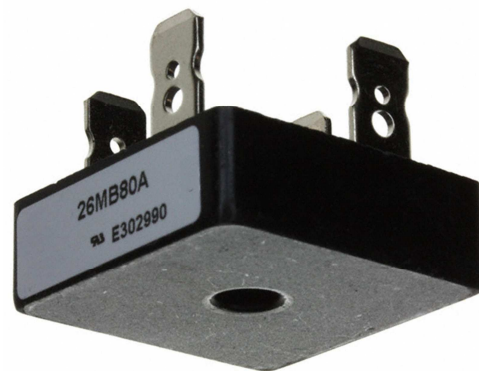


Fig 6: Bridge rectifier

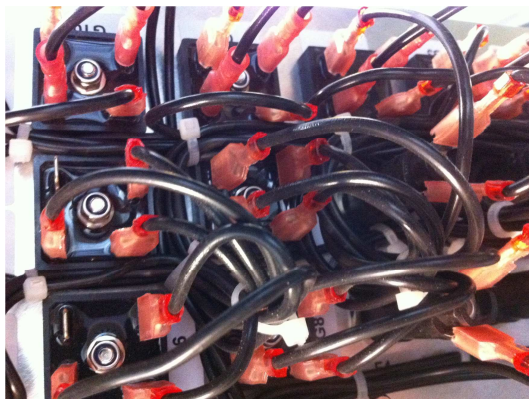


Fig 7: The bridge rectifiers inside the SunSim 3B generator



Fig 8: The fuses inside the generator

4.2 The generator doesn't power up

When switching on the generator, the LCD-Display doesn't come on.

First check your own power supply.

Then check the main power supply fuse on the generator as shown in Fig 9. You can pull it out with the tip of a knife, a screwdriver or very strong fingernails. Unplug the power cable before you do so.

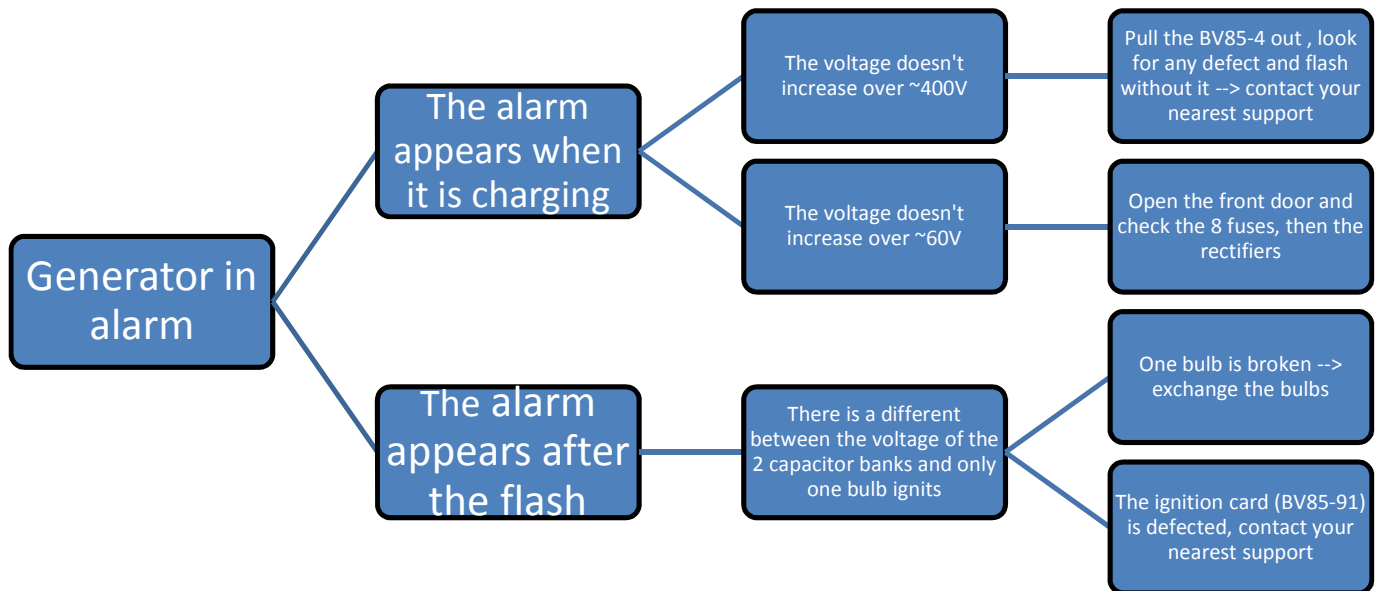


Fig 9: Location of the main power supply fuse

If the fuse is blown, replace it by an equivalent 10A fuse. You find a set in our maintenance kit.

If the fuse keeps blowing, our experience shows, that in 90% of the cases the customers own power supply has some problems. Consider then using an UPS system and get your power supply tested by an electrician. For example we have once seen problems arising from a simple fluorescent light that was flickering and was on the same power line. So it is a good idea to also make some tests while not operating any other electronic consumers on the supply line for the generator.

4.3 Overview of the generator related problems



4.4 Tester not ready

In the Sprod flasher software's main window there is a status line showing the status of the flasher.

In Fig.10 the status: "Tester not ready" can be seen. This indicates, that there is no connection between the electronic load and SPROD. Check the USB connection, if you are using a USB-repeater, this can cause problems. Exchange the USB-Cable, try another USB port on the PC, check if the electronic load is turned on. Finally if all this doesn't show any effect, we need to assume that the BV 67-2 USB-card is broken. Then contact your nearest service center.

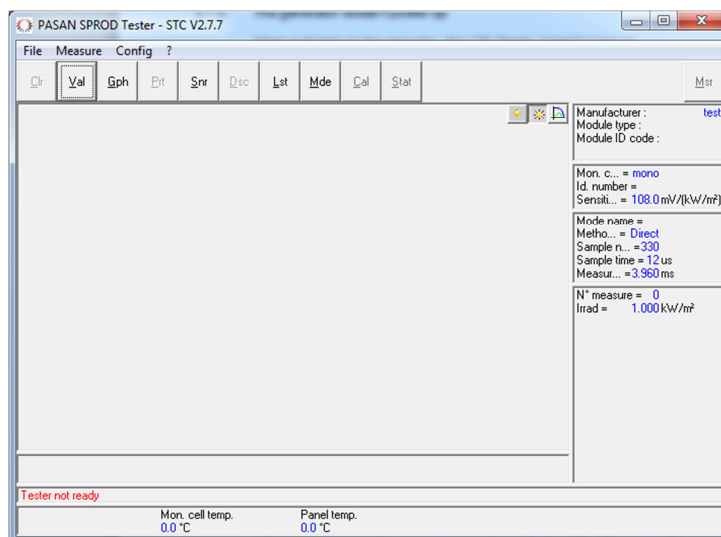
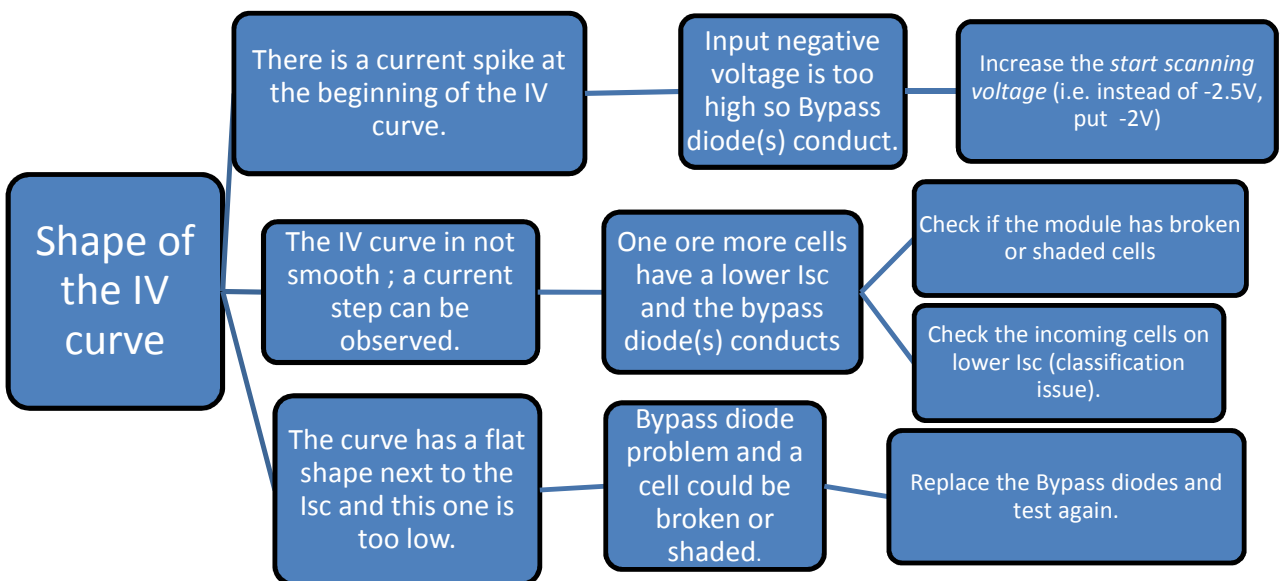
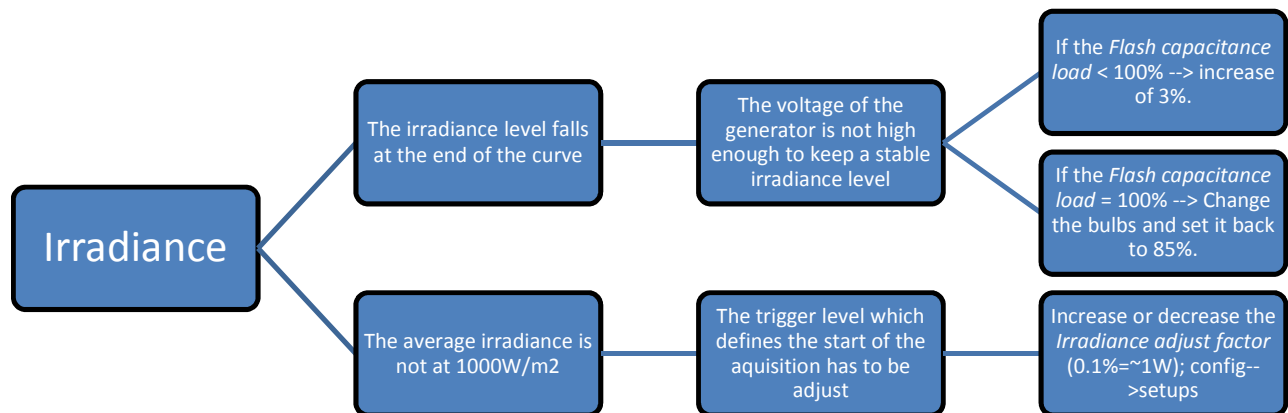


Fig 10: Status "Tester not ready" can be seen in the SPROD software's bottom line

4.5 Overview of software related problems



Remarks: