Pulsed Solar Simulator System
PSS 8 / PSS 8 HS

Solar Simulator Device

Operating Manual

Optimized for module production lines, Research & Development and off-line measurement

BERGER Lichttechnik

Revision 3.4

Date 02.03.2012

Table of Contents

BERGER Lichttechnik GmbH & Co. KG
Wolfratshauser Str. 150
D-82049 Pullach · Germany
Phone +49 (0)89 793 55 266
Fax +49 (0)89 793 55 265
info@bergerlichttechnik.de
www.bergerlichttechnik.de

Operating Manual Remarks

Dear Customer,

This manual is designed to teach you how to operate the **Pulsed Solar Simulator type PSS 8 / PSS 8 HS** of your BERGER system.

Please read this manual carefully and follow the instructions, as the system can only operate properly and reliably if the PSS 8 / PSS 8 HS is installed and used correctly.

As the PSS 8 and the PSS 8 HS only differ in the throughput of modules per hour and their electrical requirements, from this point forward only the name PSS 8 is used but the instructions apply to both types of unit.

Make this manual available to all personnel involved in operating the unit and keep it available for future reference.

› **The unit must only be operated by trained and qualified personnel and in observance of the technical instructions given by BERGER Lichttechnik.**

› **The manufacturer accepts no liability for any damage or personnel injury resulting from incorrect use or not following the instructions and warnings given in this manual.**

Notes, Notices and Warnings

Throughout the manual the following types of warning notices will be used:
(The signs shown here are examples and do not represent hazardous situations which may arise during the usage of the unit.)

⚠ DANGER

High voltage source
⃠ Touching the connections will result in serious injuries or death
➔ Do not touch the connections if the unit is plugged in

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

High intensity light source
⃠ Looking at light source during flash could cause retinal burns
➔ Do not look into light source
➔ Avoid looking at specular reflected light

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Hot surface. Temperature > 60°C
⃠ Touching the surface may result in burns
➔ Do not touch the hot surface.
➔ Let the surface cool down before touching

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Sensitive electrical equipment
⃠ Do not expose the unit to dust or moisture
➔ Use the unit only as directed in the manual

NOTICE indicates a situation which, if not avoided may result in property damage.

NOTE

The metallic sound of the PSS unit when the flash is triggered is normal and does not indicate a problem with the unit.

A NOTE indicates important information that helps you make better use of the BERGER System.

Introduction

The PSS 8 is optimized for module production lines, R & D applications and off-line measurement while the PSS 8 HS is designed for high speed testing and classification of solar modules in full automatic production lines. Both can be easily integrated into automatic and semi-automatic handling systems by automatization suppliers.

The PSS 8 Solar Simulator produces a stable 1000 W/m² illumination on the test area. Each measurement has a maximum measurement time of 10ms. The test area has a diagonal of 2.4 m. The space required above the module surface is 4.6 m. The uniformity as well as the spectrum (AM 1.5) of the lamp is constant over the lifetime of the lamp.

The uniformity of the system is heavily influenced by the surrounding of the test area. Therefore a BERGER Tunnel or Tower System is strongly recommended. The tower or tunnel can easily be integrated into a full automatic handling system.

An optional filter system for Multi Junction and R&D applications is available.

There are two types of PSS 8 units. The normal PSS 8 with a test cycle time of 50 modules per hour and the PSS 8 HS with 80 modules per hour.

General Safeguards

This unit is manufactured and tested according to the safety regulations for electronic measuring devices. Faultless operation and safety of the unit can only be guaranteed if all usual safety precautions as well as the specific safety regulations in this manual are observed when operating the unit.

Use

⚠ WARNING

Incorrect power supply voltage

⃠ Possibility of electrical shock and damage to the system

➔ Make sure that the voltage stated on the unit and the power supply voltage match

Power Sources
The system must be operated only with the type of power sources indicated on the marking label of the respective unit. A wrong connection may cause damage to the unit/system and hazardous voltages may occur on the unit.

Overloading
Do not overload wall outlets, extension cords or convenience receptacles beyond their capacity, since this can result in fire and/or electrical shock.

Object and Liquid entry
Never push objects of any kind into the unit through openings as they may touch dangerous voltage points or short out parts that could result in a fire, electrical shock and / or will damage the unit. Never spill liquid of any kind on the unit.

Attachments
Do not install and use attachments not recommended by the manufacturer, as they may cause hazards.

Cleaning
Unplug the whole system before cleaning any of the accessible parts. Do not use liquid cleaners or aerosol cleaners. Use a cloth lightly dampened with water for cleaning the exteriors of the system.
If necessary add a mild household detergent to the water.

Damage
If you can assume that the unit can no longer be operated safely it is to be decommissioned and marked appropriately so it will not be used again. The operator's safety can be affected by the unit if the unit i.e.:

› shows visible damages
› does not work as specified anymore
› has been stored under inappropriate conditions for any length of time

In case of doubt generally send in the unit to the manufacturer for repair or maintenance.

Safety Instructions

⚠ DANGER

High voltage source

- ⃠ Touching the connections will result in serious injuries or death
- ⃠ Removing the lamp cable or the insert may result in dangerous arcing
- ➔ Do not touch the connections if the unit is plugged in and charged
- ➔ Do not remove the lamp cable or the insert if the unit is plugged in and charged
- ➔ Let the capacitors discharge for at least 3 minutes after switching it off and disconnecting it from the power grid before doing any work on the unit

The charged PSS 8 unit needs at least 3 minutes to discharge to a safe level.

Do not disconnect the lamp cable during discharge time.

Do not remove the insert in the top of the generator during discharge time. In both cases a disconnection may result in an electrical arc which will destroy the connections and may lead to serious injuries.

Installation of the PSS 8 unit

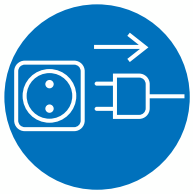
⚠ WARNING

Electrical connections

⃠ Possibility of electrical shock and damage to the system

➔ Make sure that the system is not plugged into the main grid

➔ Protect the system against accidental activation.



NOTICE

Lamp cable

⃠ Sharp bending may damage the lamp cable

➔ Make sure that a bending radius of not less than 15 cm is used

➔ Pay attention to the bending angles at the lamp housing and the plug.

Power-Cord Protection

Route the power cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to the plugs, receptacles, and the points where the cords exit from the respective units.

NOTICE

Fiber optic cable

⃠ Sharp bending may damage the fiber optic cable

➔ Make sure that a bending radius of not less than 15 cm is used

➔ Pay attention to the bending angles at the converter and the plugs

Fiber optic Cable Protection

Route the fiber optic cables so that they are not likely to be walked on or pinched by items placed upon or against them.

Condensation

Rapid changes in the ambient temperature may cause condensation water to form in the unit. This can result in fire or electrical shock and may damage the unit. Wait an adequate amount of time for the unit to reach thermal equilibrium with the ambiance.

Ventilation
The slots and openings in the unit are provided for necessary ventilation. To ensure reliable operation of the unit, and to protect it from overheating, these slots and openings must never be blocked or covered.

Installation location
The unit is designed to be used in closed rooms. Any kind of electromagnetic field or disturbance in the power supply can influence the measurement or render it useless. The lamp housing is prepared for mounting with mounting plates.

Transportation

NOTICE

Transportation requirements 1
⃠ The PSS 8 must not be lifted or transported with a lift truck or fork lift.
➔ Use the provided special pallet for transportation with a fork lift.

The mounted castors are only for movements on indoor floors. Rough road surfaces may damage the castors. To lift the unit, use the grips on its top sides. Take care that the castors are equally weighted and that the base plate is not put under a strain when you put the unit back down.

Do not use a forklift or lift truck to lift or transport the unit. Only when the unit is placed on the special pallet you can use a fork lift for transportation.

NOTICE

Transportation requirements 2
⃠ Do not put the PSS 8 unit on its side for transportation
➔ Only transport the unit in an upright position.

Do not transport the unit lying on its side. Only transport it in an upright position.

Maintenance and Service

The PSS 8 generator does not need regular maintenance besides keeping it clean. If you experience problems with the unit look at the chapter called “**Troubleshooting**” in this manual or contact the manufacturer.

Due to the use of a single special high performance bulb there are no aging or wear out effects like which can be observed with a multi bulb system. The lamp will age by getting darker with the increasing number of test cycles. So you have to increase the power level of the generator to maintain a constant irradiance level. You have to change the lamp when a generator level of 99 % is reached.

You have to set a regular cleaning cycle for the monitor cell to prevent dust from accumulating. Use a microfiber cloth, like it is used for cleaning spectacles, or a soft, damp and lint free cloth. Do not use pressured air or aerosol cleaners as the monitor cell is not sealed.

NOTE	Check the calibration of the system after cleaning the monitor cell with a daughter module. If the measured values of the daughter module are out of your specified limits you have to check the system.

If you see a difference after cleaning the monitor cell you have to check the system. Do not just make a new calibrate. First search for the cause of the change. For causes refer to the cell tester issues leaflet or the cell tester issues in the Calibration Classification and General Measurement Setup document.

If you have the AM 1.5 Filter Glass installed you have to schedule a regular cleaning to stop dust from accumulating if the BERGER system was not installed in a clean room. Clean the filter glass with a microfiber cloth, like it is used for cleaning spectacles, or a soft, damp and lint free cloth. Do not use detergents because they may damage the coating of the filter glass.

⚠ CAUTION

Glass filter

⃠ Too much pressure during cleaning may result in breaking the glass panes and injuries.

➔ Do not apply to much pressure during cleaning.

NOTE	Check the calibration of the system after cleaning the filter glass with a daughter module. If the measured values of the daughter module are out of your specified limits you have to check the system.

If you see a difference after cleaning the filter you have to check the system. Do not just make a new calibrate. First search for the cause of the change. For causes refer to the module tester issues leaflet or the module tester issues in the Calibration Classification and General Measurement Setup document.

For questions regarding problems with the operation of the unit contact the manufacturer at:

BERGER Lichttechnik GmbH & Co. KG
Wolfratshauser Str. 150
D-82049 Pullach / Germany
Phone +49 (0)89 793 55 266
Fax +49 (0)89 793 55 265
info@bergerlichttechnik.de
www.bergerlichttechnik.de

Connections on the PSS 8 unit

Front side connectors

Fiber optics connection from the Pulsed Solar Load (PSL) [circled in red].

Back side connectors

The connections for the main power, the lamp cable and two laboratory plug sockets marked **"Trigger"** are on the back side of the unit. A discharge is started by short circuiting the Trigger input.

NOTE	Short circuiting the Trigger input only leads to a discharge not a measurement.

Assembly

If you are installing the PSS 8 unit in a new system you can skip the following part named **»Shutdown procedure«** of the installation manual and go directly to the part named **»Installation procedure for a PSS 8 system«.** If you have to exchange the PSS 8 unit in a system that is already in use, follow the instructions in the chapter named **»Shutdown procedure«.**

Shutdown procedure

This procedure describes the steps to shutdown the BERGER system for installation of the PSS 8 unit. This is **not** a complete shutdown of the production system. **Only** the BERGER system is affected by this procedure. If there are other systems like conveyors, etc. they have to be shutdown according to their respective instruction manuals if it is necessary during the installation of the PSS 8 unit.

⚠ WARNING

High intensity light source

⃠ Looking at light source during flash from a short distance may cause retinal burns

➔ Do not look into light source

➔ Avoid looking at specular reflected light

⚠ DANGER

High voltage source

⃠ Touching the connections will result in serious injuries or death

➔ Do not touch the connections if the unit is plugged in

➔ Leave the capacitors time (at least 3 minutes) to discharge before working on the unit

To install the PSS 8 unit you have to make sure that the PSS unit is switch off and discharged. To switch off the generator press the red button labeled “**Emergency Stop**” on its front. Disconnect the unit from the main power and prevent it from being reconnected accidentally. Then you have to wait for **at least 3 minutes** to give the capacitors time to discharge. Unscrew and remove the lamp cable afterwards. Remove the fiber optic cables. Now you can remove the PSS 8 unit.

Installation procedure for a PSS 8 system

Check the PSS 8 unit for possible transport damage.

Lamp installation
If everything is ok insert the flash tube into the open lamp head by aligning the pins and pushing them in their respective sockets. It is not possible to mount the lamp in a wrong direction due to the asymmetrical spacing of the sockets and pins. Secure it with the four knurl screws. Put the lamp head with the flash tube on the lamp housing, connect the protective earth wire, slide the lamp head to the stop and secure it with the star – grip nuts and plastic washers. (see figures 1 to 5)

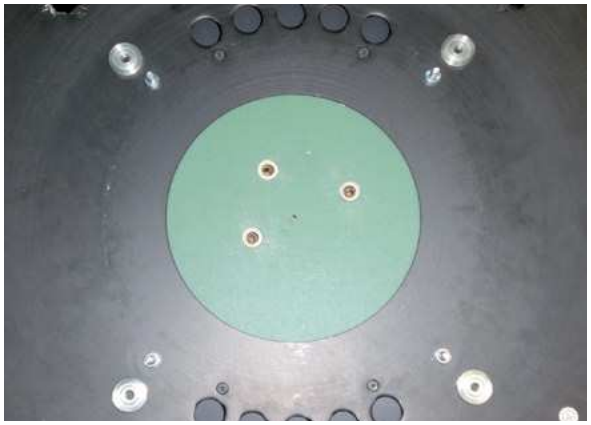


Figure 1 | Open lamp head with knurl screws

Figure 2 | Lamp bulb inserted and fastened

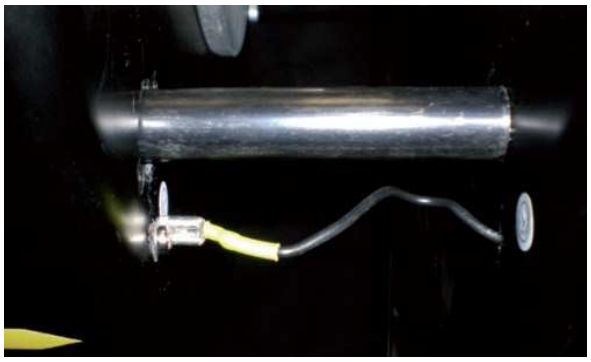


Figure 3 | Protective earth cable

Figure 4 | Plastic washer

Figure 5 | Star-grip nut with plastic washer

Fiber optic cable and electrical connections
Plug the lamp cable in the back of the PSS 8 unit and tighten it with the coupling ring. Always tighten the coupling ring to the end otherwise arcing will occur and destroy the plug.

Check that the voltage stated on the unit's plate and your main grid is the same. Afterwards connect the power cable and plug the power plug into the power grid.

The sketch below shows the sequence of the fiber optic connections for a PSS 8 / PSL 8 system.

PC COM-Port › **PT 100** › **IR Sens** › **PSL 8** › **PSS 8**

The pictures in figures 6 to 8 show the correct connection of the fiber optic cables for a PSS 8 unit. You have to connect the output of one unit to the input of the next. This can be achieved by always connecting the fiber optic jack which is marked red with the socket marked "out" on the respective unit.

Figure 6 | Fiber optic cable connections at the PT 100 unit

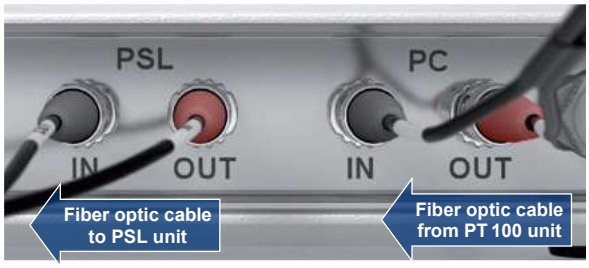


Figure 7 | Fiber optic cable connections at the IR Sens unit

Figure 8 | Fiber optic cable connections at PSL unit

Mind the labels on the fiber optic cable (see figure 9). You have to connect always the red "IN" connector with the corresponding "OUT" on the unit and the black "OUT" connector with the corresponding "IN" on the unit!

Figure 9 | Fiber optic cable labels

For setting up the PSS 8 unit with a PSL AU refer to the PSL AU Hardware manual.

The Display of the PSS 8

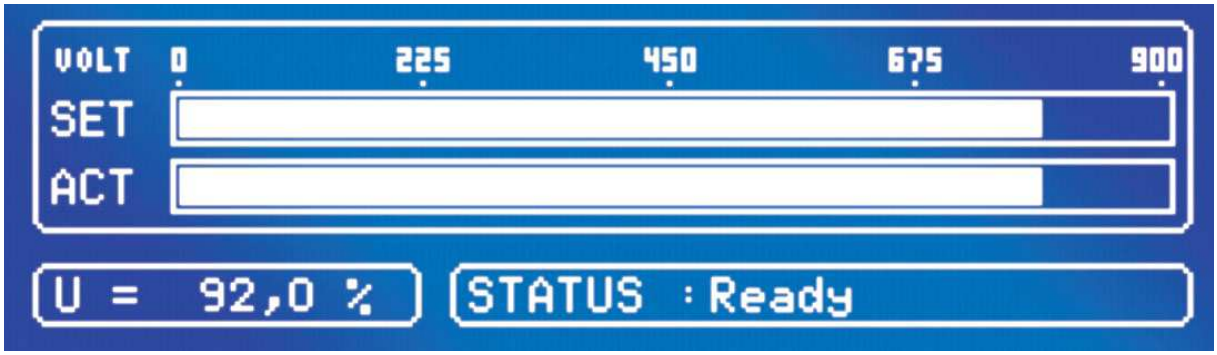


Figure 10 | Display of the PSS 8 unit in STATUS Ready

The two horizontal bars show the charging status. **“SET”** is the intended voltage level and **“ACT”** is the actual voltage level of the electricity charge. The full scale of the voltage bars is divided in 200 steps.

The percentage display in the bottom left-hand corner shows the intended voltage level as a percentage value.

The voltage level is selected with the 10-gear potentiometer or via remote control from the PSL Software on the PC.

The voltage level can only be selected in 0.5 % steps.

Unit status and errors are displayed in the status line in the display. The following message may be displayed:

Ready	The unit is charged and ready for operation.
Charging	The power capacitors are charging.
Discharge	The power capacitors are being discharged.
Lampe ?	The flash tube did not fire. The cause may be that the charging **voltage** was too low or the flash **tube** or the lamp **fuses** are defective. The system will attempt to fire the lamp two more times. Also a sound signal is given.
< R >	Remote control of the PSS unit from PC Software is active.

If the display shows illegible characters then the processor controlling the display had an error. This does not interfere with the function of the generator. To reset the display you have to go to the flasher menu in the software as described in **»Remote control via the PSL Software«.**

First start and operation

Unlock the **“Emergency Stop”** by twisting it either clock- or counterclockwise. Then switch the unit on by pressing the green button labeled **“On”** on the front side.

After 2 – 3 seconds a start screen appears on the display, which is then replaced by the main screen.

The status line will read **“STATUS : Format C”** and the indicator bar for the set voltage (“SET”) will show a jump to the 2.5 % level of total capacity. When this is reached by the bar for the actual voltage level (“ACT”) the set voltage will increase again by 2.5 % until 100 % is reached. This procedure will take about 5 minutes and is performed at every start of the generator. This slow ramp up is performed as a check for the capacitor banks in the generator. After reaching 100 % the set voltage (“SET”) will jump to the level set with the 10-gear potentiometer on the front and the generator will discharge and re-charge to this level. The status line will read **“STATUS : Ready”** afterwards.

The voltage level is selected with the 10-gear potentiometer or via remote control from the PSL Software on the PC. The voltage level can only be selected in 0.5 % steps.

 **NOTE**	To ensure that the lamp fires you should not set the voltage level lower than 87 %

To find the right distance between the lamp and the test surface, set the unit to a **voltage level of 92 %.** This is the recommended starting level. The distance between the front of the lamp housing (without the optional light reducer system) and the surface of the module should not be less then 3.90m. Adjust the distance of the lamp to the test area in such a way that the irradiation reaches approximately 1000 W/m² on the test surface.

The irradiation can be influenced via the voltage level and the distance to the test surface. A bigger distance results in a larger illuminated area and a low voltage level results in less strain on the unit.

 **NOTE**	If the distance of the lamp cannot be adjusted to be big enough to work with the voltage level at 87 %, you have to insert a grid in the lamella light source in order get the best possible light curve.

To switch the PSS 8 unit off press the **“Emergency Stop”** button on the front of the unit. This button is also the off switch under normal conditions.

In countries with non-polarized shock proof sockets, including Germany, there can be disturbing influences on the processor in the insert if the phase is on the internal mass of the PSS 8 unit. This shows up in the small ringing of the “SET” bar in the display.

If so, switch off the unit, wait for 5 minutes, rotate the mains plug 180°, plug it back in and restart the unit. This should solve the problem.

Remote control via the PSL Software

To control the PSS 8 with the software you have to setup the whole measuring system and connect the hardware with the fiber optic cables. The connections are described in the manual. Switch all the hardware components of the system on and then start the BERGER software on the PC.

The BERGER software is already installed on the PC of the system if the PC was ordered with the system. If you need to re-install the BERGER software refer to the BERGER software manual for advice.

To setup the PSL 8 unit in the software you have to check the RS232 PSL settings.

First you have to change from operator mode to manager mode by clicking **"Settings"** then **"Operating mode…"**. (See figure 11).

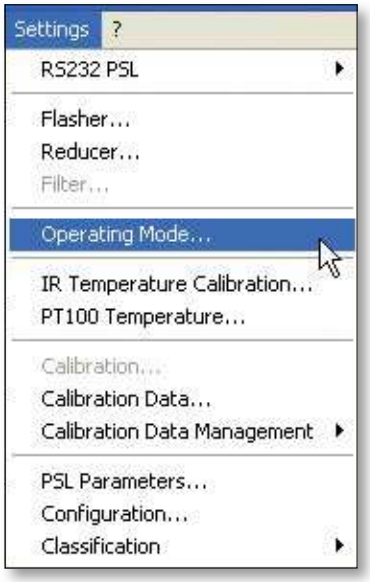


Figure 11

After entering the manager mode password go to the **"RS232 PSL"** item in the settings menu and choose **settings**. (See figures 12 and 13).

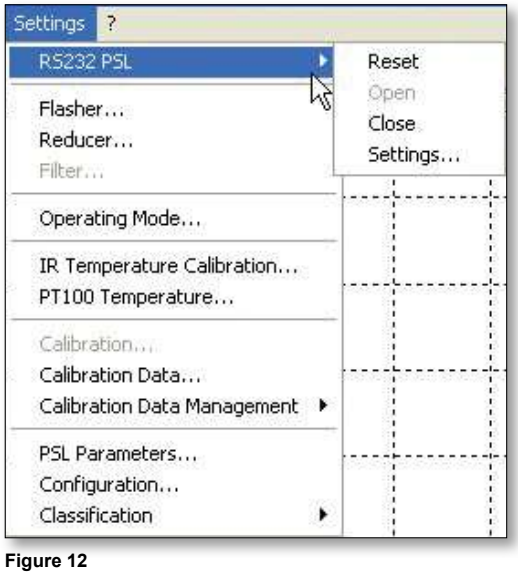


Figure 12

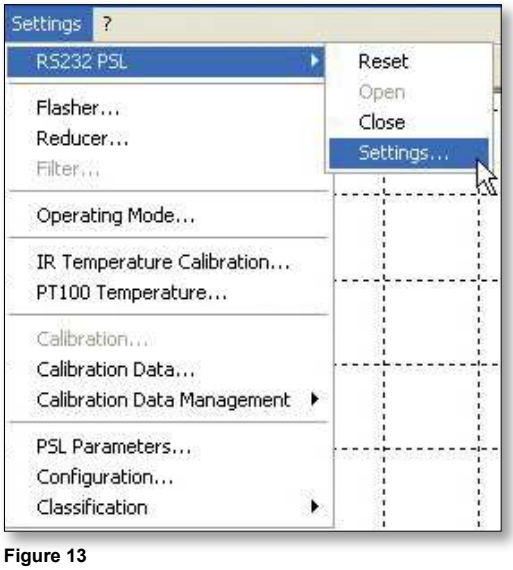


Figure 13

The following setup window for the RS232 connection of the PSL 8 will pop up:

Figure 14

Check that the COM port number in the window corresponds to the COM port you have connected the fiber optic cable via the converter with. If necessary change the number. Then press “OK”. The window with the COM port settings will open.

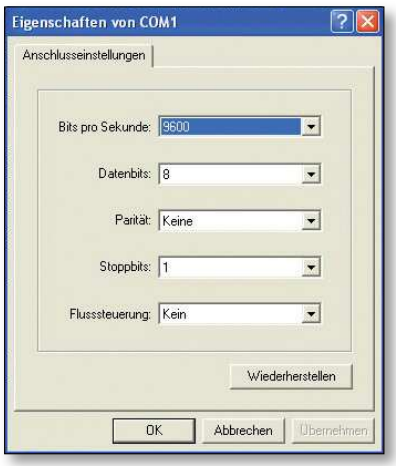


Figure 15

Check that the Baud rate (Bits per second) in the settings is the same as the Baud rate given on the label on the PSL 8 unit. If it does not match you have to change the value in the software.

After pressing “OK” the communication between the PC and the PSL 8 unit is setup.

After setting up the communication between the hardware components you can enter the flasher menu. (see figure 16 and 17)

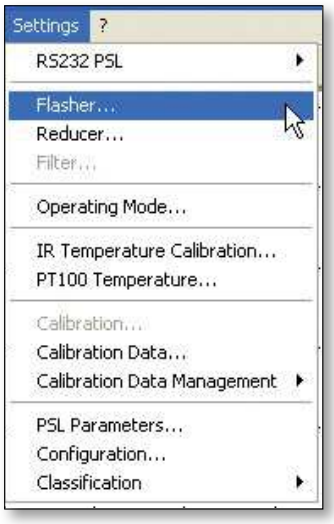


Figure 16

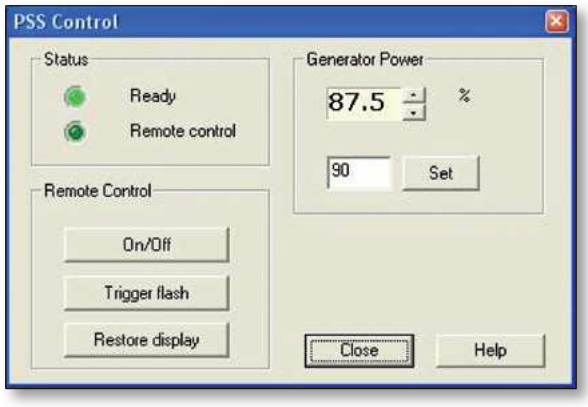


Figure 17

The PSS Control dialog elements are as follows:

› **Activate remote control:**
The remote control is activated by clicking the **On/Off button** or by making changes in **Generator Power.** The potentiometer is deactivated if the display on the flasher shows **<R> for REMOTE.**

› **Deactivate remote control:**
A repeated push of the On/Off button de-activates the remote control. The flasher power is set to the value of the potentiometer on the front panel. Closing the dialog does not de-activate the remote control!

› **Trigger flash:**
Triggers a test flash; no measurement is performed.

› **Restore display:**
Switching between modes or quick charge and discharge can lead to interference in the flasher display. Click **Restore display** to correct the situation.

› **Generator Power:**
The nominal value of the generator power can be set between 40 % –100 % and confirmed by clicking **Set.** Use the arrows to change the value with 0.5 % incremental steps (corresponds to about 1 % of intensity)

NOTE

The values entered here are lost when the PSS is switched off. Use the remote control **ONLY** for setup purposes or when experimenting. For regular production operation, always set the PSS power directly with the PSS potentiometer.

⚠ WARNING

High intensity light source

- ⃠ Looking at light source during flash from a short distance may cause retinal burns
- ➔ Do not look into light source
- ➔ Avoid looking at specular reflected light
- ➔ Make sure nobody is looking into the lamp before a flash is triggered

Troubleshooting

1) The system did not perform a measurement / flash and the display of the PSS unit shows the message “Lampe?”

The message “Lampe?“ on the PSS unit can appear due to different causes:

› The lamp is defective
› The power settings is too low. It has to be set to at least 87 % to be sure that the lamp will work. Lower settings may result in lamp dropouts.
› The two 125A fuses in the insert of the PSS unit are broken
› The small fuse on the front PCB in the insert of the PSS unit is broken
› The current control system is broken
› The cable of the lamp is not connected or damaged

Perform the following steps to check the cause:
STEP 1: Check if the lamp cable is connected and undamaged. If the lamp cable is damaged contact BERGER Lichttechnik
STEP 2: Check if the power setting is too low. Settings lower than 80 % may result in lamp dropouts.
a) Increase the power setting to 99 %
b) Press the black test button on the front of the PSS unit
c) If the lamp flashes make about 100 test flashes then re-adjust the power level of the PSS unit
STEP 3: Check if the lamp is defective by replacing it with a spare one
To replace the lamp you have to switch the PSS unit off.

⚠ WARNING

High intensity light source
⃠ Looking at light source during flash from a short distance may cause retinal burns
➔ Do not look into light source
➔ Avoid looking at specular reflected light

⚠ DANGER

High voltage source
⃠ Touching the connections will result in serious injuries or death
⃠ Removing the lamp cable or the insert may result in dangerous arcing
➔ Do not touch the connections if the unit is plugged in and charged
➔ Do not remove the lamp cable or the insert if the unit is plugged in and charged
➔ Let the capacitors discharge for at least 3 minutes after switching it off and disconnecting it from the power grid before doing any work on the unit

a) Press the red button labeled “**Emergency Stop**” on the front of the PSS unit.
b) Disconnect the PSS unit from the main power and prevent it from being reconnected accidentally.
c) Wait for **at least 3 minutes** to give the capacitors time to discharge.
d) Unscrew and remove the plug of the lamp cable.
e) Change the lamp according to the instructions in the section “Lamp installation”

Power the PSS unit back up and press the test button to check the function of the PSS unit.

STEP 4: If the lamp still does not flash check the fuses inside the insert.

⚠ WARNING

High intensity light source

⃠ Looking at light source during flash from a short distance may cause retinal burns
➔ Do not look into light source
➔ Avoid looking at specular reflected light

⚠ DANGER

High voltage source

⃠ Touching the connections will result in serious injuries or death
⃠ Removing the lamp cable or the insert may result in dangerous arcing
➔ Do not touch the connections if the unit is plugged in and charged
➔ Do not remove the lamp cable or the insert if the unit is plugged in and charged
➔ Let the capacitors discharge for at least 3 minutes after switching it off and disconnecting it from the power grid before doing any work on the unit

NOTICE

Opening of the control insert

⃠ Some parts of the insert are susceptible to damage by static electricity
➔ Only qualified and trained personnel should work on the opened insert

a) Check if the centering laser is still working and/or the fan in the lamp housing is running.
b) Press the red button labeled "**Emergency Stop**" on the front of the PSS unit.
c) Disconnect the PSS unit from the main power and prevent it from being reconnected accidentally.
d) Wait for **at least 3 minutes** to give the capacitors time to discharge.
e) Unscrew the four screws of the insert at the top of the PSS unit
f) Pull out the insert and open its top cover by unscrewing the top screw in the centre of its back side and slightly loosening the screws on the two top edges
g) Slide the top cover off
h) If the centering laser was not working and/or the fan in the lamp housing was not running check the fuse on the front PCB (seen from the display side of the insert; marked pink in figure 18)
i) If it is broken replace it with one from the spare parts of your system.
j) Check the 125 A fuses located in the gray plastic holders in the back right corner of the insert (seen from the display side of the insert; marked red in figure 18)
k) If they are broken replace both of them with the ones from the spare parts of your system.
l) Check the current control system (marked green in figure 18) if you see some soot on them.
m) If you see some soot you have to contact BERGER Lichttechnik for repair of the unit.

After replacing the fuses and re-inserting the insert in the PSS unit, power the unit back up and press the test button to check the function of the PSS unit.

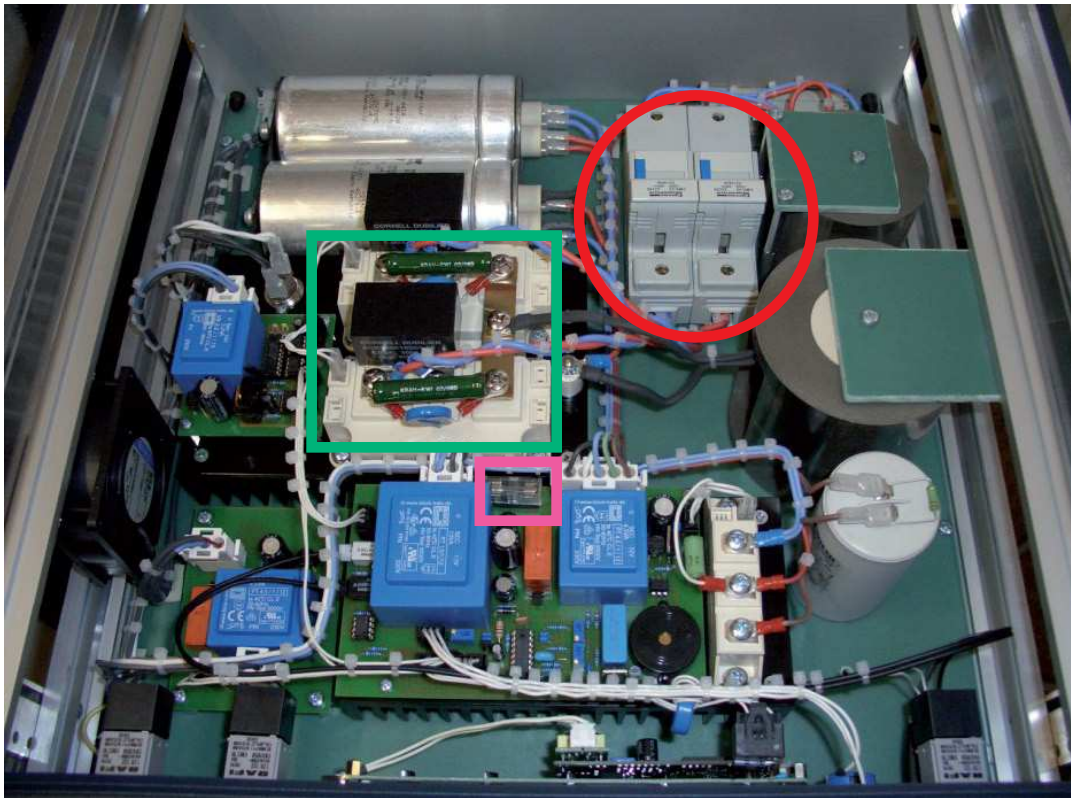


Figure 18

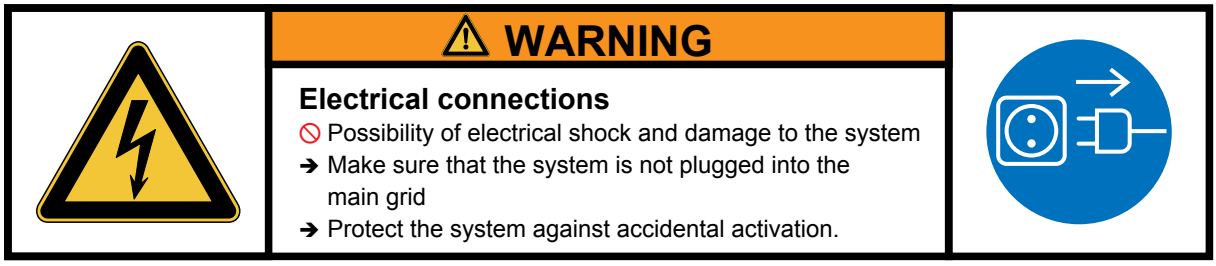
2) The PSS unit does not start after releasing the emergency stop button and pressing the start button.

If the PSS unit does not start and the display stays dark there are also different possible causes:

› The mains socket has no power
› The fuse in the socket of the main power cable on the back side of the generator is broken

STEP 1: Check if the mains socket has power.

STEP 2: Check the mains fuse on the back side of the generator



a) Unplug the main power connection of the PSS unit
b) Open the small fuse holder
c) Check if the fuse is broken and if it is, replace it a suitable fuse from your spare parts kit.

The type of fuse is depending on the operating voltage and if the unit is a HS unit.
Refer to the Technical Data chapter for the type of fuse.

Figure 19

Figure 20

Figure 21

Try to power the PSS unit back up and press the test button to check the function of the PSS unit.

STEP 3: When you press the green “ON” button on the front of the generator you hear the main relays closing but when you release the button the PSS unit does not start up

To check the overload relays you have to open the main part of the PSS unit.

⚠ WARNING

High intensity light source

⃠ Looking at light source during flash from a short distance may cause retinal burns

➔ Do not look into light source

➔ Avoid looking at specular reflected light

⚠ DANGER

High voltage source

⃠ Touching the connections will result in serious injuries or death

⃠ Removing the lamp cable or the insert may result in dangerous arcing

➔ Do not touch the connections if the unit is plugged in and charged

➔ Do not remove the lamp cable or the insert if the unit is plugged in and charged

➔ Let the capacitors discharge for at least 3 minutes after switching it off and disconnecting it from the power grid before doing any work on the unit

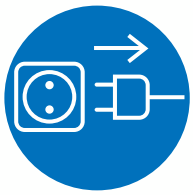
⚠ WARNING

Electrical connections

⃠ Possibility of electrical shock and damage to the system

➔ Make sure that the system is not plugged into the main grid

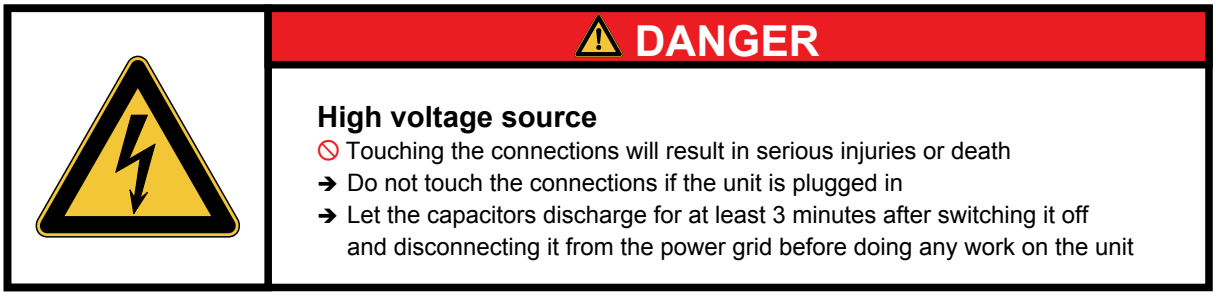
➔ Protect the system against accidental activation.



a) Press the red button labeled “**Emergency Stop**” on the front of the PSS unit.
b) Disconnect the PSS unit from the main power and prevent it from being reconnected accidentally.
c) Wait for **at least 3 minutes** to give the capacitors time to discharge.
d) Unscrew and remove the plug of the lamp cable.
e) Remove the back cover of the PSS unit by unscrewing the six Philips screws marked in figure 22.

Figure 22

e) Reconnect the PSS unit to the main power and press and hold the green **"ON"** button. Check if the lights on both of the overload relays are on (see figures 23 and 24)



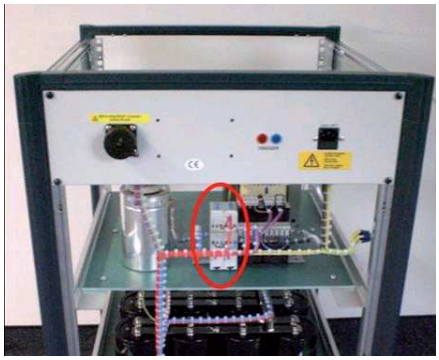


Figure 23 | Position of overload relays

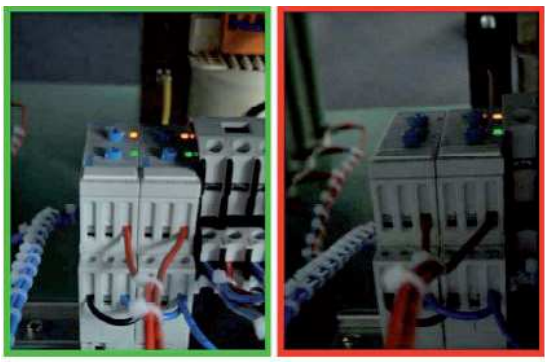
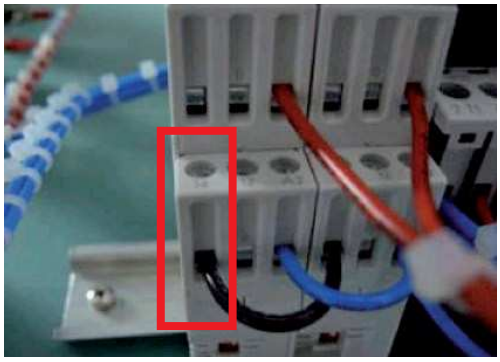


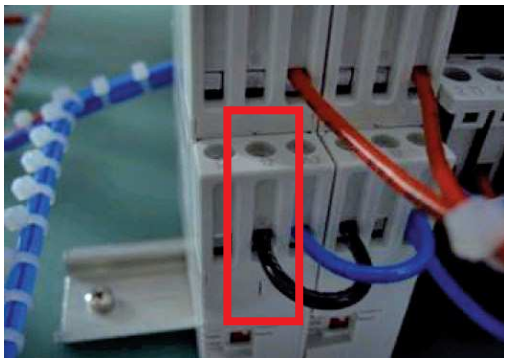
Figure 24 | Green frame -> relays ok
Red frame -> relay defective

g) If the lights of one relay are not on when the **“ON”** button is pressed you can circumvent the defective relay as follows (the left one is defective in the pictures):

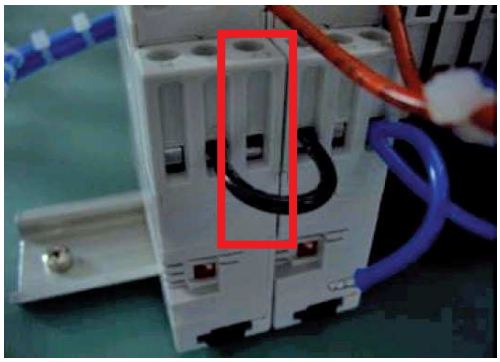
I. Normal connections

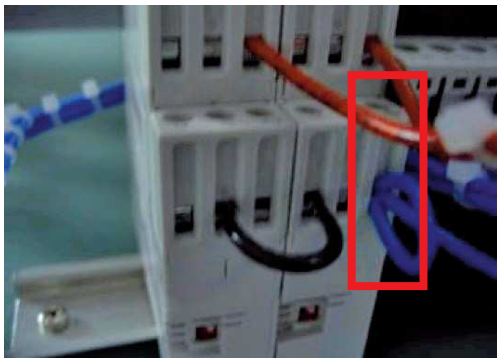


II. Change connection no. 14 to 12 on the defective relay



III. Remove connection A2 on the defective relay. For security reasons you can add the cable to the A2 connection on the working relay.





h) Now check that the generator can be switched on and on the display shows “Format C”. Make a few test flashes before closing the generator.

STEP 4: When none of the above measures help, you have to contact BERGER Lichttechnik at

BERGER Lichttechnik GmbH & Co. KG
Wolfratshauser Str. 150
D-82049 Pullach · Germany
Phone: +49 (0)89 793 55 266
Fax: +49 (0)89 793 55 265
Email: info@bergerlichttechnik.de

Technical Data

Basic Device

	PSS 8				PSS 8 HS	
Model Type:	230 V	120 V	230 V	120 V	230 V	230 V
Power Supply requirements:	50 Hz		60 Hz		50 Hz	60 Hz
	1100 W				1700 W	
Fuses: Miniature fuse	3.15 A TT	6.3 A TT	3.15 A TT	6.3 A TT	6.3 A TT	
Weight:	90 kg				100 kg	

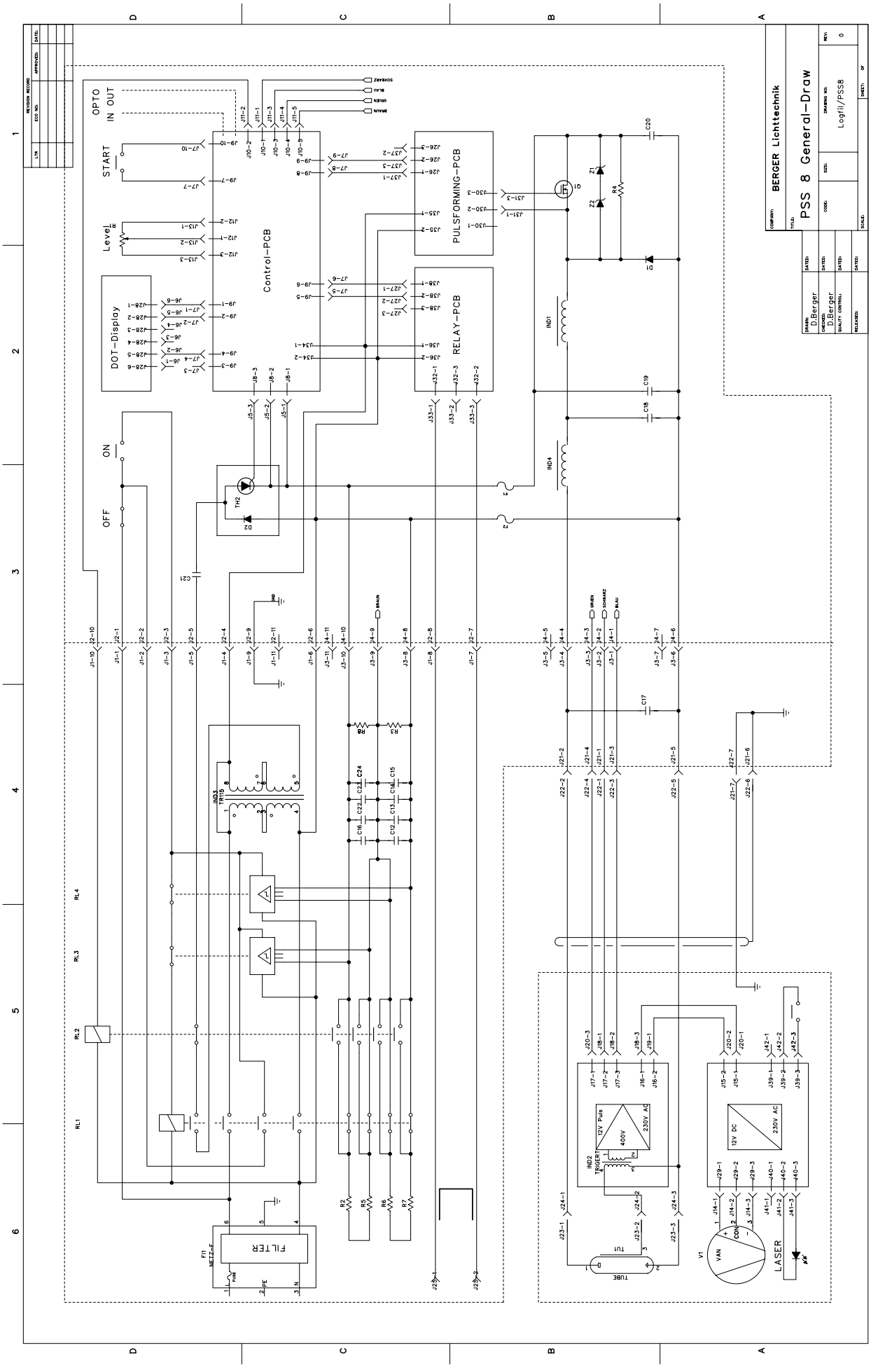
Protection Class: Protection Class I
Dimensions: Housing Metal
940 x 560 x 600 (H x W x L in mm)

Lamp

Dimension: Housing Metal
550 x 750 (D x L in mm)
Protection Class: Protection Class I
Weight: approx. 30 kg
Cable length: 8 m
Ignition device: Integrated; approx. 16 kVss
Laser: 670 nm; class 2
Feature: 230 Volt Outlet on back of the lamp housing for the optional light reducer unit (optional)

General Specifications

Rate of repetition: 50 test cycles per hour | 80 test cycles per hour
Total pulse time: 12 ms
Measure time: 10 ms
Spectrum: AM 1.5 according IEC 60904 or adjustable
Uniformity: Class A according IEC 60904
Temporal stability: Class A according IEC 60904
Irradiance: 500–1100 W/m^2 at a distance of 4.9 m including the lamp
Relative Humidity: 0 to 70 % r.F. (non-condensing)
Working Temperature: 10 to 35 °C | 10 to 28 °C
Nominal Temperature: 25 °C


OPTO
IN OUT
START
Level
DOT-Display
Control-PCB
PULSFORMING-PCB
RELAY-PCB
ON
OFF
FILTER
TUBE
LASER
12V Puls
400V
230V AC
12V DC
230V AC
BERGER Lichttechnik
PSS 8 General-Draw
Logfil/PSS8

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY / DÉCLARATION DE CONFORMITÉ

entsprechend / in accordance with / selon ISO/IEC 17050-1/-2:2004

EG EMV Richtlinie / EMC directive / Directive EMC: 2004 / 108 / EC
EG Niederspannungsrichtlinie / EC Low voltage directive / Directive Basse Tension 2006 / 95 / EC

Hersteller / Supplier / Fournisseur:

BERGER
Lichttechnik GmbH & Co. KG
Wolfratshauser Str. 150
D – 82049 Pullach

Produkt / Product / Produit:

Typ: / Type: / Type: **PSS**
Seriennr.: / Serial No.: / Numéro de Série: **XXXX**

Das oben beschriebene Produkt ist konform zu: / The product described above is in conformity with: / Le produit décrit ci-dessus est conforme à:

Dokument Nr. / Document No. / Document Numéro	Titel / Titel / Intitulé	Edition - Datum Edition - Date Édition - Date
IEC 61010-1 ed. 3	Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte Teil 1: Allgemeine Anforderungen Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire Partie 1: Exigences générales	2010-06
DIN EN 55014-1	Elektromagnetische Verträglichkeit - Anforderungen an Haushaltgeräte, Elektrowerkzeuge und ähnliche Elektrogeräte – Teil 1: Störaussendung Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission – Product family standard Compatibilité électromagnétique – Exigences pour les appareils électrodomestique, outillages électriques et appareils analogues – Partie 1: Emission – Norme de famille de produits	2010-02
DIN EN 55014-2	Elektromagnetische Verträglichkeit - Anforderungen an Haushaltgeräte, Elektrowerkzeuge und ähnliche Elektrogeräte – Teil 2: Störfestigkeit - Produktfamiliennorm Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 2: Immunity – Product family standard Compatibilité électromagnétique – Exigences pour les appareils électrodomestique, outillages électriques et appareils analogues – Partie 2: Immunité – Norme de famille de produits	2009-06
DIN EN 55015	Grenzwerte und Messverfahren für Funkstörungen von elektrischen Beleuchtungseinrichtungen und ähnlichen Elektrogeräten Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment Limites et méthodes de mesure des perturbations radioélectriques produites par les appareils électriques d'éclairage et les appareils analogues	2009-11

CE

BERGER
Lichttechnik
BERGER Lichttechnik GmbH & Co. KG
Wolfratshauser Str. 150
D-82049 Pullach im Isartal, Germany
Tel./Fax. +49(0)89 79355-266 / -285

Pullach, 2012

. . . . . .

Ort und Datum der Ausstellung
Place and date of issue
Endroit et date d'émission

D. Berger
Managing Director

BERGER Lichttechnik GmbH & Co. KG
Wolfratshauser Str. 150 · D-82049 Pullach · Germany
Phone +49 (0)89 793 55 266 · Fax +49 (0)89 793 55 265
info@bergerlichttechnik.de
www.bergerlichttechnik.de