

SAN

He-Ne-Laser Power Supply for Laboratory Use

Operating Instructions



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1. Legal Notices

1.1 Validity

1.1.1 Part Number

This document applies to the following products:

Part Number	Product	Version	Serial Number
200002-0000-000	SAN 3513 Laboratory power supply for He-Ne laser	1.00 ff	00100 ff
200003-0000-000	SAN 5015 Laboratory power supply for He-Ne laser	1.00 ff	00100 ff
200004-0000-000	SAN 6530 Laboratory power supply for He-Ne laser	1.00 ff	00100 ff
200005-0000-000	SAN 7037 Laboratory power supply for He-Ne laser	1.00 ff	00100 ff

Table 1 – Part numbers

1.1.2 Name Plate

The name plate is located on the rear of the device (🔑📖 Figure 1, page 6 and Figure 3, D, page 15). When dealing with LASOS Lasertechnik GmbH regarding the device, the information on the rating plate is required. It also provides information about the respective product and its dimensions.



Figure 1 – Name plate (example)

1.2 Conforming Utilisation

The He-Ne laser laboratory power supply SAN is used exclusively as a power supply for the ignition and operation of LASOS He-Ne laser modules and is intended for laboratory use. The laser laboratory power supply unit is designed as a series and, in accordance with its dimensions, is specially designed for the operation of certain LASOS laser modules.



NOTICE:

Operate all LASOS laser modules used in conjunction with the He-Ne laser laboratory power supply unit in accordance with the corresponding operating instructions.

**NOTICE:**

Please use the technical data to check whether the laser laboratory power supply unit is suitable for your application.

**NOTICE:**

The protection provided by the device may be impaired if the device is not used in the manner specified by the manufacturer.

1.3 Nonconforming Utilisation

The He-Ne laser laboratory power supply SAN is designed and constructed exclusively for the intended use specified in Chapter 1.2 Conforming Utilisation, page 6 may only be used for this purpose.

Use for purposes other than those specified is considered improper use, in particular the connection of unauthorised or unsuitable laser modules and accessories.

Any improper use is considered unauthorised. Any liability and warranty claims are void in the event of damage resulting from this. The risk for this is borne solely by the user or operator.

1.4 Assuming of Responsibility and Warranty

LASOS Lasertechnik GmbH guarantees that the device is free of material and manufacturing defects when it is delivered to the customer. Any defects that occur must be reported immediately and every effort must be made to minimise the damage.

No responsibility or warranty is accepted if the operator or third parties disregard this document.

- disregard this document.
- operate the appliance incorrectly or handle it improperly.
- do not use the appliance as intended.
- tamper with the appliance in any way (modifications, repairs, etc.).
- operate the appliance with accessories that are not listed in the associated product documentation or operate it with accessories from other manufacturers.

Likewise, no warranty is given for defects due to natural wear and tear (in particular for wearing parts).

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These operating instructions have been prepared with great care to ensure that the data and information in this document are correct. However, LASOS Lasertechnik GmbH accepts no responsibility or warranty of any kind, either express or implied, with regard to this document, in particular for direct or indirect damage caused by errors in this document.

Drawings, illustrations, tables, specifications and other information are subject to change without notice. These operating instructions are not subject to the revision service.

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1.5 Shipping Damage

- Examine the shipping package as to any external damage.
- In case any damage is determined, file a damage report to the forwarding agent and the insurer.
- Retain the packaging material since damages can only be claimed when returning the device in the original packaging of the manufacturer.
- Examine the delivery to ensure that it is complete.
- Examine the device as to any visually apparent damage.



DANGER: Damaged product.

Commissioning or operating a damaged product is dangerous to life.

2. Safety

2.1 General Information

The He-Ne laser laboratory power supply SAN is supplied ready for use. Nevertheless, we recommend that you read these operating instructions carefully to ensure optimum and safe operation right from the start.

These operating instructions contain important information for understanding, setting up, commissioning, operating and troubleshooting the device.

2.2 Key of Symbols

Important instructions relating to technical safety and safe operation are emphasised by symbols.



DANGER or WARNING:

Information designed to prevent any kind of injury to persons.



DANGER:

Information designed to prevent injury to persons and damage to equipment in connection with electricity.



DANGER:

Information on the prevention of personal injury or damage to property caused by laser radiation.



NOTICE:

General information pointing to further information, respectively reference sections.

2.3 Basic Safety Information

During all work like installation, maintenance and repair activities, comply with the pertinent safety regulations.



DANGER: Mains Voltage

Coming into contact with components at mains voltage level within the device can be dangerous to life when inserting objects or allowing liquids to enter the device.



WARNING: Improper usage.

Improper usage can damage the device. Use the device only in agreement with the specifications issued by the manufacturer.



WARNING: Wrong Connection and Operating Data.

Wrong connection and operating data can damage the device. Comply with all specified connection and operating data.

3. General Description of the Device

3.1 General Function Description

The He-Ne laser laboratory power supply SAN is a separate unit for the external power supply of He-Ne laser modules.

To ensure laser safety and to protect against unauthorised use, the device is equipped with an emission control and a key switch.

As soon as the key switch is activated, a high voltage is already present at the connection socket for the laser and the white emission control lamp lights up. Laser radiation can now be emitted from the connected laser module.

Operation of the laser laboratory power supply unit requires the integration of external safety switches via the "Interlock" connection on the rear of the device. If no safety loop is set up, the device cannot be switched on. Alternatively, the supplied interlock plug (jumper plug) can be used.

3.2 Usable Laser Modules

The following table contains an overview of the various models of He-Ne laser laboratory power supply units SAN and the He-Ne laser modules that can be connected to each.

He-Ne Laser Laboratory Power Supply	He-Ne Laser Module
SAN 3513	LGx 7600 z LGx 7650 z LGx 7655 z LGx 7656 z LGx 7695 z LGx 7696 z
SAN 5015	LGx 7606 z LGx 7610 z LGx 7621 z LGx 7634 z LGx 7672 z
SAN 6530	LGx 7627 z LGx 7628 z LGx 7654 z LGx 7653 z LGx 7512 z LGx 7785 z LGx 7786 z
SAN 7037	LGx 7665 z

Table 2 – Usable laser modules

x – may be R or Z

z – may be a series of numbers or characters

4. Technical Data

4.1 General Data

4.1.1 Mechanical Data

Dimensions:	Width: 165 mm
	Height: 56 mm (incl. device feet)
	Depth: 219 mm
Mass:	1.5 kg
Installation:	Table-top device



Figure 2 – Dimensions of He-Ne laser laboratory power supply SAN (in mm)

4.1.2 Ambient

Use:	indoors (altitude 2000 m max. above sea level)
Temperature:	Storage: -20 – +60 °C Operating: +5 – +40 °C (sea level)
Relative atmospheric humidity:	80 % max. (up to 30 °C) decreasing to 50 % max. (over 40 °C)
Ingress protection type:	IP20
Contamination level:	2

4.1.3 Directives and Standards

Directives:

- Conformity with the Low Voltage Directive 2014/35/EU
(EU Low Voltage Directive, EU Office Journal, L 96/357 of 26-February-2014)
- Conformity with the EMC Directive 2014/30/EU
(EU EMC Directive, EU Office Journal, L 96/79 of 29-March-2014)
- Conformity with RoHS Directive 2011/65/EU
(EU RoHS Directive, EU Office Journal, L 174/88 of 1-July-2011)
in accordance with
 - Commission Delegated Directive (EU) 2015/863 of 31-March-2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances.
 - Commission Delegated Directive (EU) 2018/740 of 1-March-2018 amending, for the purposes of adapting to scientific and technical progress, Annex III to Directive 2011/65/EU of the European Parliament and of the Council as regards an exemption for lead as an alloying element in aluminum
 - Commission Delegated Directive (EU) 2018/741 of 1-March-2018 amending, for the purposes of adapting to scientific and technical progress, Annex III to Directive 2011/65/EU of the European Parliament and of the Council as regards an exemption for lead as an alloying element in copper
- Conformity with the WEEE Directive 2012/19/EU
(EU WEEE Directive, EU Official Journal L 197/38 of 24-July-2012)
- Conformity with the Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18-December-2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

International/national standards as well as specifications:

- DIN EN 61010-1:2020-03 (VDE 0411-1:2020-03)
Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016/COR1:2019); German version EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
- DIN EN 61326-1:2013-07 (VDE 0843-20-1:2013-07)
Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements (IEC 61326-1:2012); German version EN 61326-1:2013
- DIN EN 60825-1:2022-07 (VDE 0837-1:2022-07)
Safety of laser products - Part 1: Equipment classification and requirements (IEC 60825-1:2014); German version EN 60825-1:2014 + AC:2017 + A11:2021 + A11:2021/AC:2022

4.2 Mains Power Connection

Voltage:	100 – 240 VAC ($\pm 10\%$)
Frequency:	50/60 Hz
Fuses:	2 x T1.6A H
Power consumption:	75 W max.
Current consumption:	0.5 A max.
Overvoltage category:	II
Protection class:	1
Connection:	Cold-device plug IEC 320 C14
Building-side fuse protection:	16 A max.

4.3 Laser Connection

Number:	1
Connection:	High-voltage socket ALDEN 8102F
Usable laser modules:	 Table 2 – Usable laser modules, page 11
Voltage:	1.3 kV DC max. (SAN 3513) 1.5 kV DC max. (SAN 5015) 3.0 kV DC max. (SAN 6530) 3.7 kV DC max. (SAN 7037)
Current:	3.5 mA max. (SAN 3513) 5.0 mA max. (SAN 5015) 6.5 mA max. (SAN 6530) 7.0 mA max. (SAN 7037)

4.4 Interlock

Connection:	Miniature plug connector M16, socket, 4-pin.
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5. Installation

5.1 Supplied Equipment

Designation	Quantity
SAN	1
Mains power cord with safety plug	1
Manual (each EN and DE)	1
Spare fuse	2
Interlock plug (jumper plug)	1

Table 3 – Supplied equipment

5.2 Mechanical Installation

The SAN is intended exclusively for use as a table-top device.



WARNING: Powering down

Install the device or place it so that you are in a position to operate the mains power switch at any time or ensure that the device can be deenergised at any time.



WARNING: Device warming

Position the device so that heat cannot build up. The device must stand freely.

5.3 Connections on the back of the device

5.3.1 Rear of the Device

Figure 3, page 15 shows the rear of the He-Ne laser laboratory power supply SAN. The assignment of the individual connections is described in the following sections.

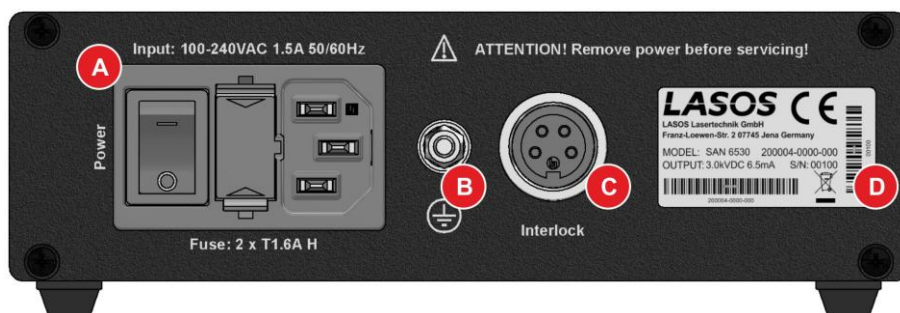


Figure 3 – Rear of the device

- A Mains power connection with mains switch and device fuses
- B Earth connection
- C Connection for interlock (🔗📖 Figure 4, page 16)
- D Name plate

5.3.2 Mains Power Connection

The mains connection on the rear side (🔑📖 Figure 3, A, Seite 15) has been designed to accept a mains cord which on the device side is equipped with a cold-device plug.



NOTICE: Mains cord

Included in the delivery of the device is a mains cord. If the plug on the mains power side is not compatible with your mains power outlets, you will need a mains cord which meets the following specifications:

- Three-wire cable with protective earthing.
- Conductor cross-section: 3 x 0.75 mm² or greater.
- Cable length 2.5 m maximum.



DANGER: Mains voltage

Appliances, which have not been professionally connected to Earth, can be life-threatening in the event of a malfunction. For this reason use three-wire mains cords, respectively extension cords with protective earthing only. Insert the mains plug into a mains power socket, which provides an Earth contact.

- Insert the plug of the mains cord into the mains socket provided on the device.
- Insert the mains plug of the mains cord into the mains outlet.

5.3.3 Erdung

Through the earthing screw (🔑📖 Figure 3, B, Seite 15) the SAN is connected to the Earth connection on the vacuum chamber.



NOTICE: Earthing

Connect the Earth connection on the vacuum chamber by means of a protective earth conductor to the earthing screw on the device

5.3.4 Interlock

The device has several internal safety interlocks to ensure that the laser can only be ignited under safe conditions.

In addition, an external interlock connection is provided to integrate the device into a safety circuit provided by the customer. The “Interlock” connection (🔑📖 Figure 3, C, page 15 and Figure 4, page 16) allows the device to be enabled or disabled by an external safety system.

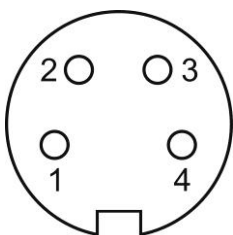


Figure 4 – Connection for interlock (Miniature plug connector M16, socket, 4-pin.)

- | | |
|---|-----------|
| 1 | Contact 1 |
| 2 | not used |
| 3 | not used |
| 4 | Contact 2 |

Connecting:

- If you want integration into your safety circuit, connect a suitable safety device via the interlock connection. In this case, laser operation is only possible if the external safety circuit is closed via contacts 1 and 2.
- If no external safety connection is required, use the supplied interlock plug (jumper plug) to close the interlock circuit internally and enable laser operation.



NOTICE: Interlock circuit

Laser operation is not possible without a correctly closed interlock circuit. Therefore, make sure that either an external safety device is correctly connected or the jumper plug is inserted.

5.4 Connections, Operating and Control Elements on the Front of the Device

5.4.1 Front of the Device

Figure 5, page 17 shows the front view of the He-Ne laser laboratory power supply SAN.



Figure 5 – Front of the device

- A High-voltage socket for laser connection
- B Key switch for switching on the laser
- C LED (white) “Laser On” for emission control
- D LED (green) “Power” for operating status

5.4.2 LED for Operating Status (Power)

The green “Power” LED (👉📖 Figure 5, D, page 17) indicates the operating status of the device.

LED Display	Description
 Off	Device is switched off or operating voltage is missing
 Lights green	Device is switched on; operational readiness is established

Table 4 – Display states “Power” LED

5.4.3 LED for Emission Control (Laser On)

The white “Laser On” LED (  Figure 5, C, page 17) is used for emission control.

LED Display	Description
 Off	Laser is switched off
 Lights white	Laser is switched on

Table 5 – Display states “Laser On” LED

5.4.4 Key Switch LASER

Use the key switch (  Figure 5, B, page 17) to ignite the connected He-Ne laser module.



DANGER: High voltage
Leave the key switch in the 0 position as long as there is no connection between the laser module and the high-voltage socket of the He-Ne laser laboratory power supply SAN.

5.4.5 Laser Connection

The high-voltage socket (  Figure 5, A, page 17) is used to connect the laser module to the He-Ne laser laboratory power supply unit SAN.



DANGER: High voltage
The laser modules are supplied by a high voltage with an ignition voltage of up to max. 3.7 kV.

Connecting:

- Connect the connector plug of the laser module to the high-voltage socket on the front of the He-Ne laser laboratory power supply SAN.



DANGER: High voltage
Set the key switch to the 0 position before establishing or disconnecting the connection between the laser module and the high-voltage socket of the He-Ne laser laboratory power supply SAN.



GEFAHR: Electric arc
Never disconnect the laser module from the high-voltage socket of the He-Ne laser laboratory power supply SAN when it is switched on.

6. Operation

6.1 Switching the Device on and off

6.1.1 Switching the Device on

- Switch the device on through its main switch.
 - The “Power” LED lights up green.
 - The device is ready for operation.

6.1.2 Switching the Device off

- Switch the device off through its main switch.



CAUTION: Waiting Time

Wait for at least five seconds before switching the device on again.

6.2 Switching the Laser on and off

Before switching on the laser, make sure that

- the connector plug of the laser module is connected to the high-voltage socket on the front of the He-Ne laser laboratory power supply SAN.
- the external safety switch is closed via the “Interlock” connection on the rear of the He-Ne Laser Laboratory Power Supply SAN ([👉📖 Chapter 4.4 – Interlock, page 14](#)).
- the He-Ne Laser Laboratory Power Supply SAN is switched on and the “Mode” LED on the front lights up green.

6.2.1 Switching the Laser on

- Insert the device key in the correct position into the key switch on the front of the He-Ne laser laboratory power supply SAN (“0” position).
- Turn the device key to the right to position “I”.
 - The “Laser On” LED lights up white.
 - High voltage is present at the laser connection.
 - The laser of the connected laser module ignites and emits laser radiation.



DANGER: High voltage

The laser modules are supplied by a high voltage with an ignition voltage of up to max. 3.7 kV.



DANGER: Laser radiation

When the laser is switched on, laser radiation can be emitted immediately from the connected He-Ne laser module. Take the necessary protective measures and work with care.

**NOTICE: Safety shutdown in the event of a power failure**

After a power failure and switching on again, there is no voltage at the laser connection.

To switch the laser module back on, first turn the device key to the “0” position and then to the “I” position.

**NOTICE: Safety shutdown when removing the connector plug**

As soon as the laser module connector plug is removed while the laser is switched on, the power supply to the laser connection is interrupted.

After restoring the connection, you must first turn the device key to the “0” position and then to the “I” position to switch the laser module back on.

6.2.2 Switching the Laser off

- Turn the device key to the left to the “0” position.
 - The “Laser On” LED goes out.
 - There is no longer any high voltage at the laser connection.
 - The laser of the connected laser module goes out.

**ATTENTION: Safety instructions**

Always remove the appliance key from the appliance when you have finished using it. Keep it in a safe place to prevent unauthorised use.

7. Maintenance and Servicing

7.1 Maintenance

7.1.1 General Maintenance Information

For external cleaning please only use a dry piece of cotton cloth. Do not use any aggressive or abrasive cleaning agents.

**DANGER: Mains voltage**

The device contains voltage carrying components inside. Do not insert any objects into the openings of the device. Protect the device against moisture. Do not open the device.

7.1.2 Regular Inspections

- Visual inspection of the device for damaged or deformed housings and connectors as well as damaged cable insulation
- Check of the safety equipment assembled
- Electrical safety test in accordance with the national / international standard or internal specifications
- Check the protective conductor connection to the housing

7.2 Troubleshooting

7.2.1 Help in Case of Malfunctions

If the fault is in the device, please contact LASOS Lasertechnik GmbH.

**NOTICE:**

If a fault occurs, switch off the appliance and protect it against accidental start-up.

7.2.2 Replacing the Built-in Fuses

To replace blown device fuses, use only the type of fuse 1.6 A H as printed on the rear of the device. The two device fuses are located in the fuse insert at the mains filter (🔗📖 Figure 3, A, page 15), The fuse insert can be prised out with a small screwdriver.

7.2.3 Repair

Send any defective products for repair to the LASOS Lasertechnik GmbH. The LASOS Lasertechnik GmbH will not assume any responsibility or warranty in case of repair work done by the operator or third persons on the device.

8. Storing and Waste Disposal

8.1 Packaging

Please retain the original packaging. You will need this packaging if you want to store the He-Ne laser laboratory power supply SAN or send it to LASOS Lasertechnik GmbH.

8.2 Storing

The He-Ne laser laboratory power supply SAN must only be stored in dry room. During storage, the following ambient conditions need to be maintained:

- Ambient temperature: -20 – +60 °C
- Humidity of the air: As low as possible.
Preferably in a sealed plastic bag with desiccant.

8.3 Waste Disposal

As to waste disposal of the device, the branch specific and local waste disposal and environmental regulations for systems and electronic components apply.

When returning the device, proper waste separation and waste disposal is ensured by the LASOS Lasertechnik GmbH.

Notes:

Notes:

LASOS Lasertechnik GmbH

Franz-Loewen-Str. 2

07745 Jena • GERMANY

Phone: +49 3641 2944-0

Fax: +49 3641 2944-300

LASOS