

SUBLICON®

Power Supply for Titanium Sublimation Pumps

Instruction Manual



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1. Legal Instructions

1.1 Conventional Application

The SUBLICON® is used for the operation of titanium sublimation pumps (TSP) with up to four filaments at a maximum heating current of 50 A. The current rises to the preset maximum value within about 30 s. In this way, the degassing process of the filaments is improved. The selection of filaments can be done automatically or manually. The device provides various operating modes: manual, timer and remote-control mode. SUBLICON® is available as a 19" rack mounted unit (3.5" height).

1.2 Warranty

For the perfect function of the device we assume a warranty of one year. During this, material and manufacturing defects are eliminated free of charge. The JEVATEC GmbH assumes no responsibility and warranty, if the operator or third parties

- do not observe the information given in this document.
- do not use the product as intended.
- modify the product in any way (conversions, repair work etc).
- operate the product with accessories not listed in the corresponding product documentation.

Subject to technical alterations without prior notice. The figures are not binding.

1.3 Transport Damages

- Check the packaging for visible damages
- Send an advice of damage to the carrier and to the insurer in case of damage
- Retain the packaging material, because the reconsignment in the original packaging of the manufacturer is prerequisite for warranty claims
- Check the consignment for completeness
- Check the instrument for visible damages



WARNING: Damaged Product.
Starting a damaged product can be perilously.

2. Safety

2.1 Signs and Symbols



DANGER or WARNING:
Information on the prevention of injury.



DANGER:
Information on the prevention of injury by electrical impact.



REFERENCE:
General lead on further information and articles respectively.

2.2 Basic Safety Regulations

- During all work, such as installation, maintenance and repair, please comply with respective safety regulations.



DANGER: Mains voltage
Coming into contact with components inside the instrument carrying the mains voltage can, when introducing object or liquids, cause danger to life.



DANGER: Mains voltage
Before opening of the device always switch-off the mains switch and unplug the mains plug or make sure that the device is de-energized.



WARNING: Improper usage
Improper usage can damage the instrument. Use the instrument only in accordance to the manufacturers' instructions.



WARNING: Incorrect connection and operation data
Incorrect connection and operation data can damage the instrument. Comply with all prescribed connection and operation data.

2.3 Operational Safety Instructions

- Observe the following safety instructions to ensure safe operation of the device.



WARNING:

The device operates with high currents that may cause electrical fire if handled improperly.
Before switching on the device, make sure all connections are firmly and reliably mounted.



WARNING:

Make sure live conductors do not contact any casings or the vacuum chamber which the TSP is mounted to.



WARNING:

Do not disconnect the heater during operation (risk of arcing)!



WARNING:

Do not apply any voltage to the output as this may cause irreversible damage to the device.



WARNING:

Do not cover the fan on the rear wall of the device to avoid heat accumulation.



WARNING:

Do not squeeze or notch the used silicone cable.

3. General Description

3.1 General Functional Characteristics

The SUBLICON® is used for the operation of titanium sublimation pumps (TSP) with up to four filaments at a maximum heating current of 50 A. The current rises to the preset maximum value within about 30 s. In this way, the degassing process of the filaments is improved. The selection of filaments can be done automatically or manually. The device provides various operating modes: manual, timer and remote-control mode.

The SUBLICON® supplies an ungrounded heating current of 10 – 50 A with 12 V max. which is switched to a filament. On the pump, the neutral conductor of the filaments must be connected with the ground contact of the system. The ungrounded design of the power supply prevents current from flowing through the neutral conductor particularly in case of any interruption of the neutral conductor to the pump.

The device operates with pulsating direct current of double line frequency and regulates to a constant effective value. The current control by means of phase shift regulation keeps the power loss in the device below 100 W so that it may be used without any problems in switch cabinets. The steepness of the signal edge when switching off the power FET's has been reduced with regard to electromagnetic compatibility (EMC).

If the temperature at the heat sink increases to 40 °C the fan will be turned on. At temperatures above approximately 100 °C, the heater switches off and the over-temperature LED starts shining.

The transformer for the heater is switched on only when the heating process is started. Thus, in the standby mode the current consumption of the device is low and you may keep it always switched on.

3.2 Application Notes for Titanium Sublimation Pumps (TSP)

On titanium sublimation pumps, the adsorption of chemically active gases on the surface of a thin getter film is utilised for pumping. The absorption rate is particularly high when the getter film has just been applied and is kept at a low temperature by cooling. As the absorption rate decreases considerably with growing coverage, the getter film must be regenerated after half a monolayer of adsorbed gas particles has built up.

The length of the period between the phases of regenerating the getter films depends on the pressure range (👉📖 Table 1, page 10). Towards high pressures, the getter film must be regenerated at very short intervals as in this case the number of adsorbed gas particles is very high. Towards low pressures, the intervals between the phases of regeneration of the titanium layer are extended. In this case, the number of adsorbed gas particles is continuously decreasing.

Pressure Range	Time Off Settings
1·10 ⁻⁷ Torr – 5·10 ⁻⁸ Torr	1 hour
5·10 ⁻⁸ Torr – 1·10 ⁻⁸ Torr	1 – 12 hours
1·10 ⁻⁸ Torr – 1·10 ⁻⁹ Torr	12 – 24 hours
1·10 ⁻⁹ Torr – 1·10 ⁻¹⁰ Torr	more than one day
1·10 ⁻¹⁰ Torr – 1·10 ⁻¹¹ Torr	more than one week

Table 1 – Time setting for different pressure ranges

4. Technical Data

4.1 General Data

4.1.1 Mechanical Data

Dimensions:	Width: 449 mm 483 mm (with side fixing straps)
	Height: 88 mm (2 U)
	Depth: 280 mm approx.
	19" rack unit, 2 U
Weight:	9 kg approx.
Build-in depth:	ca. 350 mm (including connected plugs)
Application:	Benchtop instrument Rack installation

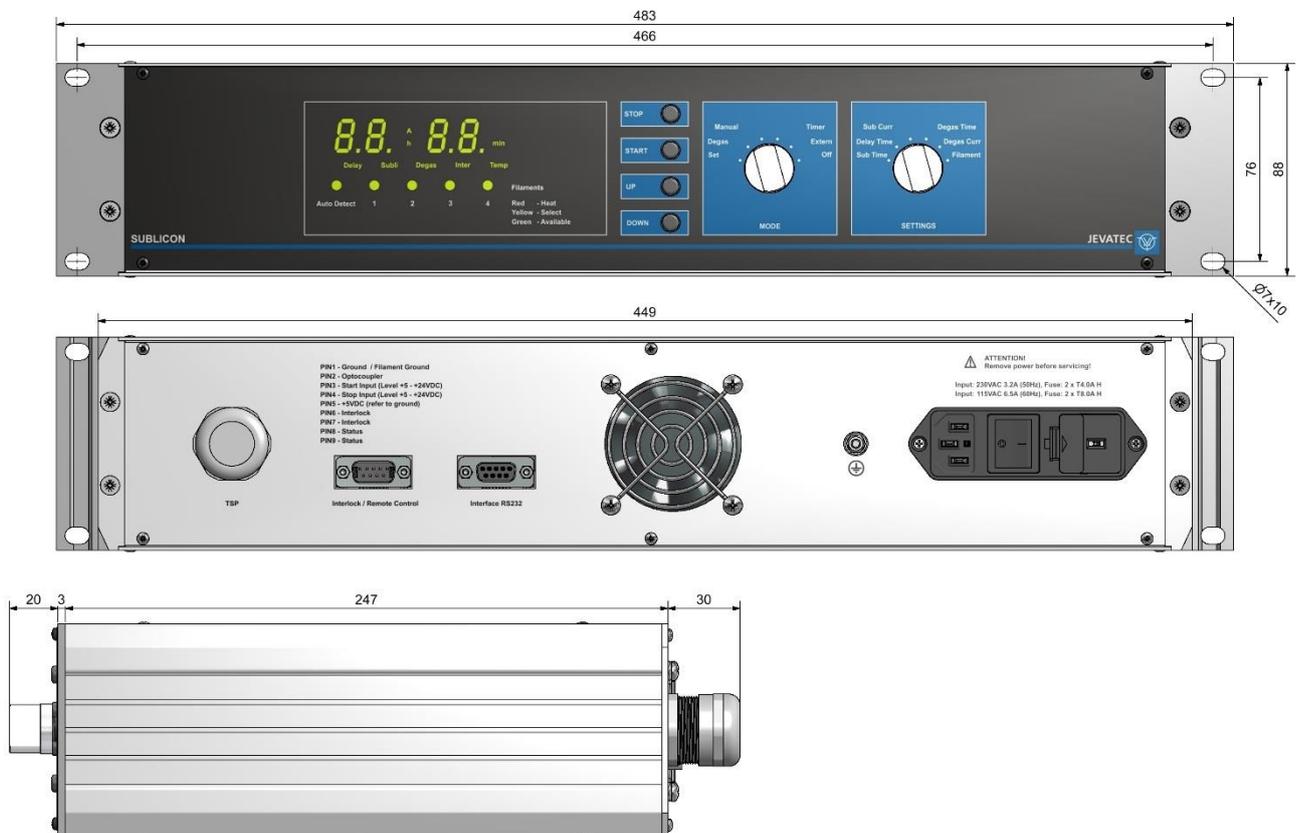


Figure 1 – Dimensions of SUBLICON® (mm)

4.2 Standard Parameters (Factory Settings)

Parameter	Parameter Description	Setting
Sub Time	Sublimation time	1 min
Delay Time	Delay time	1 h
Sub Curr	Sublimation Current	10 A
Degas Time	Degas time	1 min
Degas Curr	Degas current	10 A
Filament	Filament selection	Auto Detect

Table 2 – Factory settings

4.3 Environment

Temperature:	Storage: -20 – +60 °C Operation: +5 – +40 °C (sea level) +5 – +30 °C (2000 m NN)
Relative humidity of the air:	max. 80 % (to 30 °C), non-condensing decreasing to max. 50 % (from 40 °C), non-condensing indoors (max. 2000 m NN)
Usage:	
Protection class:	IP20

4.4 Standards

- Compliance with Low Voltage Directive 2014/35/EU
- Compliance with EMC Directive 2014/30/EU
- Compliance with RoHS Directive 2011/65/EU

International/national standards as well as specifications:

- EN 61010-1 (2011)
(Safety requirements for electrical equipment for measurement, control, and laboratory use)
- DIN EN 61326-1 (2013)
(Electrical equipment for measurement, control and laboratory use – EMC requirements. Industrial interference immunity; electromagnetic emissions household sector Class B).

4.5 Mains Connection

Voltage:	115/230 VAC
Frequency:	50/60 Hz
Device fuses:	115 VAC: 2 x T8,0A H 230 VAC: 2 x T4,0A H
Power consumption:	700 VA max.
Current consumption:	115 VAC: 6.5 A max. 230 VAC: 3.2 A max.
Protection class:	1
Connection:	Rubber connector IEC 60320 C14

4.6 TSP Connection

Number:	1
Output:	12 V / 50 A
Connection:	Cable, 5-pole (10 m length max.)

4.7 Outputs and Inputs

4.7.1 Interlock

Number:	1
Connection:	SUB-D, 9-pole, connector (used together with connection Remote Control)

4.7.2 Remote Control

Number:	1
Connection:	SUB-D, 9-pole, connector (used together with connection Interlock)

4.8 Schnittstelle

Standard:	RS232
Parameters:	8 data bits, 1 stop bit, no parity, no protocol
Signals:	RXD and TXD
Baud rate:	9600, 19200, 38400 Baud
Connection:	SUB-D, 9-pole, socket

5. Installation

5.1 Scope of Delivery

Description	Number
SUBLICON®	1
Mains cord with shockproof plug (EU)	1
Instruction Manual	1
Interlock connector	1

Table 3 – Scope of Delivery

5.2 Mechanical Installation

The SUBLICON® can be used as follows:

- Benchtop instrument
- Rack installation

5.2.1 Benchtop instrument

When intending to use the SUBLICON® as a benchtop instrument, then proceed as follows:

- Place the device in the desired location.



WARNING: Power disconnection

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

5.2.2 Rack Installation

The SUBLICON® has been designed for installation as a rack-mount housing (19“, 2 U) within a rack system. When intending to use the SUBLICON® for rack installation, then proceed as follows:

- Remove the 4 rubber feet located on the bottom.
- Insert the SUBLICON® into the rack system.
- Attach the device.



WARNING: Power disconnection

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

5.3 Connections

5.3.1 Rear of the Instrument

Figure 2, page 15 shows the rears of the SUBLICON®. The pin assignment of the individual connections is described in the following chapters.

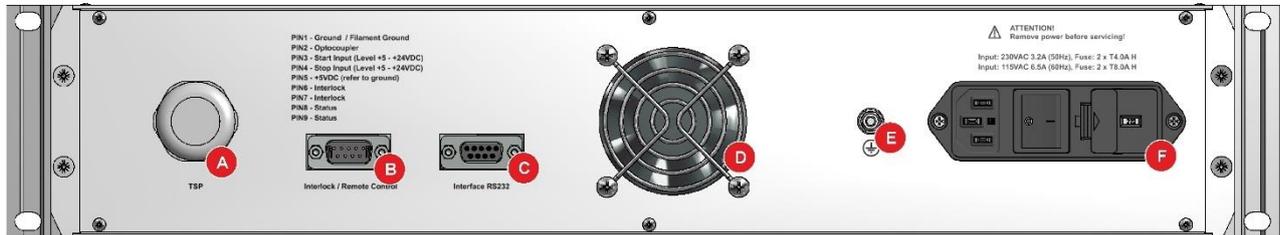


Figure 2 – Rear of the Instrument

- A Connection Titanium Sublimation Pump (TSP)
- B Connection interlock and remote control (Interlock / Remote Control)
- C Connection serial interface RS232 (Interface RS232)
- D Fan
- E Ground connection
- F Mains connection with mains switch and device fuses

5.3.2 Mains Connection

The mains connection on the rear of the instrument (  Figure 2, F, page 15) is intended only for a mains cord which on the instrument side is provided with an inlet connector for non-heating apparatus. The connection data can be found on the nameplate and also on the rear of the instrument.



NOTICE: Mains cord

Included in the delivery of the instrument 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 instrument.
- Insert the mains plug of the mains cord into the mains outlet.

5.3.3 Earthing

With the aid of the earthing screw (  Figure 2, E, page 15) the SUBLICON® can be connected to the protective ground of 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 instrument.

5.3.4 Connection Titanium Sublimation Pump (TSP)

The connector TSP (🔗📖 Figure 3, page 16 such as Figure 2, A, page 15) is designed to connect the titanium sublimation pump (TSP) with a suitable power cable.

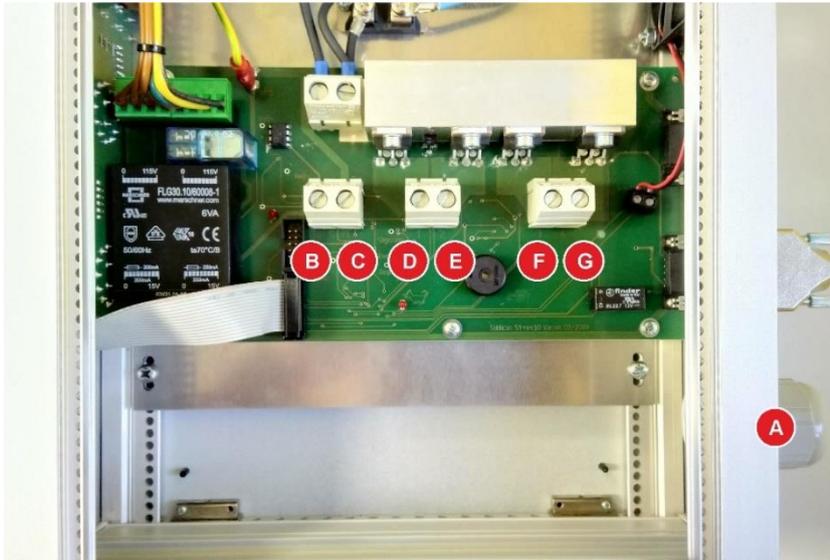


Figure 3 – Connection Titanium Sublimation Pump (TSP)

- | | |
|---|---|
| A | Cable gland at the rear side of the device for connecting titanium sublimation pump (TSP) |
| B | GND Common neutral of the TSP |
| C | PE System ground |
| D | 1 Filament 1 of the TSP |
| E | 2 Filament 2 of the TSP |
| F | 3 Filament 3 of the TSP |
| G | 4 Filament 4 of the TSP |

Connecting:

- Turn off the device and disconnect the power plug.
- Make sure that the device is de-energized.
- Loosen the four screws at the top of the device and open the cover plate. Be careful with the connected protective conductor cable.
- Route the power cable through the cable gland on the back of the device and connect the wires according to the assignment (🔗📖 Figure 3, page 16). Pay attention to a clean installation and the tightness of the clamping screws.
- Close the device properly.



DANGER: Mains voltage

Before opening of the device always switch-off the mains switch and unplug the mains plug or make sure that the device is de-energized.



NOTICE: Connection cable for TSP

You will need a cable which meets the following specifications:

- Five-wire cable with protective earthing
- Conductor cross-section: 3 x 6 mm² (screw terminals suitable up to max. 10 mm²)
- Cable length 10 m maximum

The pump connection can optionally be made via a factory-connected 5-wire power cable with the following assignment:

Core 1 (black)	Filament 1 of the TSP
Core 2 (black)	Filament 2 of the TSP
Core 3 (black)	Filament 3 of the TSP
Core 4 (black)	Filament 4 of the TSP
Core 5 (black)	Common neutral of the TSP
Core (green / yellow)	System ground

5.3.5 Interlock and Remote Control (Interlock / Remote Control)

The connector Interlock / Remote Control (🔗📖 Figure 4, page 17 such as 🔗📖 Figure 2, B, page 15) allows the electrical locking as well as the remote control of the device.

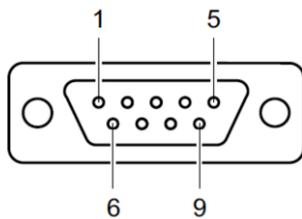


Figure 4 – Connector for Interlock / Remote Control (SUB-D, 9-pole)

1	Device ground	6	Interlock
2	Optocouplers	7	Interlock
3	Start input, level +5 – +24 VDC	8	Status
4	Stop input, level +5 – +24 VDC	9	Status
5	+5 VDC relative to device ground		

Connecting:

- Connect the peripheral components using a shielded cable to the connector Interlock / Remote Control on the rear of the SUBLICON®.



NOTICE:

If the interlock is not used, the supplied plug with the jumper between PIN 6 and PIN 7 must remain attached. If the interlock circuit is interrupted, the evaporation will switch off automatically.

5.3.6 Interface RS232 (Interface RS232)

The connector Interface RS232 (🔗📖 Figure 5, page 17 such as 🔗📖 Figure 2, C, page 15) enables the operation of the device by a computer or a terminal.

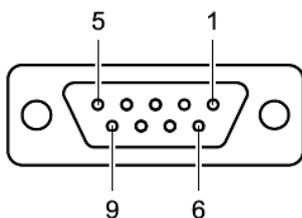


Figure 5 – Socket Interface (SUB-D, 9-pole)

1	-	6	Bridge to 4
2	TxD (RS232)	7	Bridge to 8
3	RxD (RS232)	8	Bridge to 7
4	Bridge to 6	9	-
5	Ground		

Connecting:

- Connect the serial interface of the computer using a shielded cable to the connector interface RS232 on the rear of the SUBLICON®.



WARNING:

Apply a serial extension cable with a 9-pole connector and a 9-pole socket for use of the interface RS232. The cable must not have crossed conductors.

6. Operation

6.1 Front Panel

Figure 6, page 18 shows the front panel of the SUBLICON®.

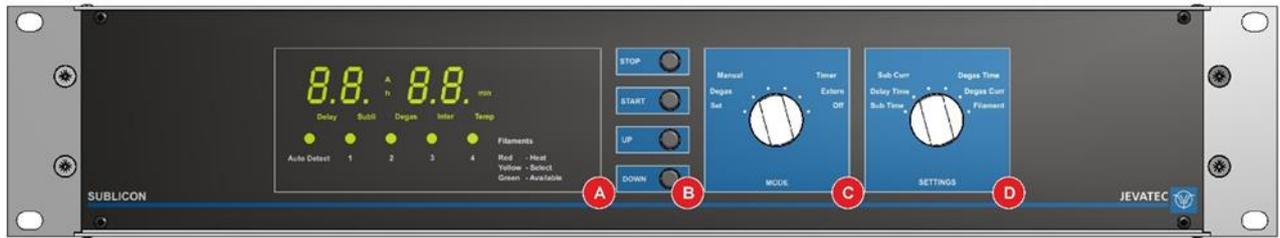


Figure 6 – Front Panel

- A Display field with multifunction display
- B Control buttons
- C Selector switch for operating mode (MODE)
- D Selector switch for settings (SETTINGS)

6.1.1 Display



Figure 7 – Display Field

Display	Description
8.8. 8.8.	Display value for current and time or error output
A	Display of current in amperes
h	Display of time in hours
min	Display of time in minutes
Delay	Configuration or operating state "Delay" active
Subli	Configuration or operating state "Sublimation" active
Degas	Configuration or operating state "Degas" active
Inter	Interlock active
Temp	Heating disabled
Auto Detect	Automatic filament selection active
1, 2, 3, 4	Status display for filament 1 – 4 red = sublimation or degassing active yellow = filament selected green = filament available

Table 4 – Display Structure and Description

6.1.2 Operating Elements

There are four control buttons (STOP, START, UP, DOWN) and two selector switches (MODE, SETTINGS) for operating the device (👉📖 Figure 8, page 19).

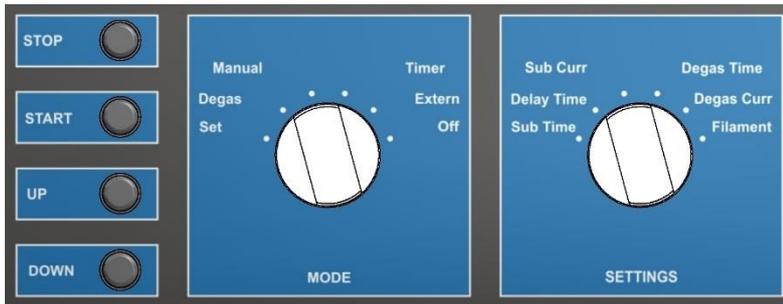


Figure 8 – Control Field

6.1.2.1 Control Keys

STOP

End a process with the STOP key.

START

Start a process with the START key.

UP

The UP button is required to change values in the configuration mode. By pressing the key, a default value can be increased.

DOWN

The DOWN key is required to change values in the configuration mode. By pressing the key, a default value can be reduced.

6.1.2.2 Selector Switch MODE

Set

Configuration Mode. Set the selector switch to this position to be able to configure the various process parameters with the SETTINGS selector switch.

Degas

Degas. Set the selector switch to this position to activate the degassing mode.

Manual

Manual operation. The sublimation process can be started or stopped via the START / STOP buttons.

Timer

Timer function. The sublimation process runs automatically via the internal timer.

Extern

External operation. The sublimation process can be started or terminated via the remote control or the serial interface.

Off

Off. All processes are terminated.

6.1.2.3 Selector switch SETTINGS

Various parameters can be set via the SETTINGS selector switch.



NOTICE:

In order to make settings using the selector switch SETTINGS, the selector switch MODE must be set to the position "Set".

Sub Time

Sublimation time. Duration of the sublimation process.

Delay Time

Delay time. Duration of delays between sublimation processes.

Sub Curr

Sublimation current. Value for the sublimation current.

Degas Time

Degas time. Duration of the degassing process.

Degas Curr

Degas current. Value for the degassing current.

Filament

Filament selection.

6.2 Switching On and Switching Off

6.2.1 Switching On

- Activate the instrument by switching-on the mains switch.

After switching on the SUBLICON® will operate the following:

- Self-test
- Display test
- Display of the used software version
- Re-establish the parameters set up last
- Activate the display mode

6.2.2 Switching Off

- Disconnect the instrument by switching off the mains switch.



CAUTION: Waiting Time

Wait for at least 5 seconds before switching on the device again.

6.3 Operating Modes

The SUBLICON® may be operated in the following modes:

Configuration Mode

In the configuration mode you have access to different parameters. You can simply view these parameters or change them with the aid of the keys UP and DOWN. In this way you can configure the SUBLICON®.

  Chapter 6.4 Configuration Mode, page 21

Operating Mode

In operating mode, it is possible to operate the TSP.

  Chapter 6.5 Operating Mode, page 21

6.4 Configuration Mode

- Set the selector switch MODE to the position Set to enter the configuration mode.
 - The display values of the multifunction display flash.
 - Now you can use the selector switch SETTINGS to configure the various process parameters. (  Chapter 6.1.2.3 Selector switch SETTINGS, page 20).
- Set the selector switch SETTINGS in the position of the desired process parameter.
 - The display values flash.
 - The status display of the selected parameter lights up.
 - The status indicator for the selected filament lights up yellow.
- Press the UP or DOWN buttons to change the setting values.
 - The values are saved immediately.
- Exit the configuration mode by moving the selector switch MODE to a different position.
 - You are back in the operating mode.
 - The display values of the multifunction display light up permanently.
 - The available filament status indicator lights green.

6.5 Operating Mode

There are several operating modes available for the sublimation process. Select the following operating modes with the selector switch MODE:

Manual

Manual operation. The sublimation process can be started or stopped via the START / STOP buttons.

Timer

Timer function. The sublimation process runs automatically via the internal timer.

Extern

External operation. The sublimation process can be started or terminated via the remote control or the serial interface.

6.5.1 Manual Operation

- Set the selector switch MODE to the position Manual and press the START button.
 - The sublimation process starts and ends automatically after the previously selected sublimation time.
 - The LED for the selected filament lights red during the process.
 - The status display Subli lights up green. The multi-function display shows the sublimation current and the remaining time of the current process.
- You can terminate the process at any time by pressing the STOP key or by pressing the selector switch MODE.



NOTICE:

When the currently used filament burns out during an evaporation cycle the current supply will be interrupted and after finishing the cycle a new filament will be selected automatically. When the manual operation mode is selected the key Start has to be pushed again for starting the evaporation process with a new filament.

When all filaments are used up a warning signal can be heard during the next start.

6.5.2 Timer Function

- Set the selector switch MODE to the position Timer and press the START button.
 - The evaporation process starts and runs according to the selected parameters for sublimation times and delay times.
 - The LED for the selected filament lights red during the process and yellow during the delay time.
 - The status display Subli or Delay lights up green. The multi-function display shows the sublimation current and the remaining time of the current process.
- You can terminate the process at any time by pressing the STOP key or by pressing the selector switch MODE.



NOTICE:

When the currently used filament burns out during an evaporation cycle the current supply will be interrupted and after finishing the cycle a new filament will be selected automatically.

When all filaments are used up a warning signal can be heard during the next start.

6.5.3 External Operation

- Set the selector switch MODE to the position External to control the sublimation process via remote control or serial interface.
- Start the sublimation process by means of a control signal at the Interlock / Remote Control port (  Figure 4, page 17) or the corresponding command via the serial port (  Chapter 8.2.3 Command Set (Mnemonics), page 26).
 - The evaporation process starts and runs according to the selected parameters for sublimation times and delay times.
 - The LED for the selected filament lights red during the process and yellow during the delay time.
- You can stop the process at any time by means of a control signal at the Interlock / Remote Control port (  Figure 4, page 17), the corresponding command via the serial interface (  Chapter 8.2.3 Command Set (Mnemonics), page 26), by pressing the button STOP or by setting the selector switch MODE.

**NOTICE:**

When the currently used filament burns out during an evaporation cycle the current supply will be interrupted and after finishing the cycle a new filament will be selected automatically. Restart the sublimation process with a control signal at the Interlock / Remote Control port (  Figure 4, page 17) or the corresponding command via the serial port (  Chapter 8.2.3 Command Set (Mnemonics), page 26) to start the evaporation process with a new filament.

When all filaments are used up a warning signal can be heard during the next start.

**NOTICE:**

The remote control is performed by internal optocouplers. If a potential isolation is required a positive control voltage fed to PIN 3 or PIN 4 related to PIN 5 starts or stops the device. If relays shall be used, bridge PIN 1 and PIN 2 in the plug and reconnect the relays from PIN 5 to PIN 3 or PIN 4.

6.6 Degas Function

Proceed as follows to use the degassing function of the device:

- Set the selector switch MODE to the position Degas and press the START button.
 - The degassing process starts and ends automatically after the previously selected degassing time.
 - The LED for the selected filament lights red during the process.
 - The status display Degas lights up green. The multi-function display shows the degas current and the remaining time of the degassing process.

7. Parameters

Various process parameters are available for the sublimation process.

- In configuration mode (  6.4 Configuration Mode, page 21), set the process parameters.

7.1 Sublimation Time (Sub Time)

Set the selector switch SETTINGS to the position Sub Time to set the duration of the sublimation process in the range 1 – 10 minutes via the Up and Down buttons.

7.2 Delay Time (Delay Time)

Set the selector switch SETTINGS to the position Delay Time to set the delay time between the sublimation processes in the range 1 – 48 hours via the Up and Down buttons.

7.3 Sublimation Current (Sub Curr)

Set the selector switch SETTINGS to the position Sub Curr to set the value of the sublimation current in the range 10 – 50 amperes via the Up and Down buttons.



NOTICE:

The sublimation current can be changed at any time during the evaporation process.

7.4 Degas Time (Degas Time)

Set the selector switch SETTINGS to the position Degas Time to set the duration of the degassing process in the range 1 – 20 minutes via the Up and Down buttons.

7.5 Degas Current (Degas Curr)

Set the selector switch SETTINGS to the position Degas Curr to set the value of the degassing current in the range 10 – 30 amperes via the Up and Down buttons.

7.6 Filament

Set the selector switch SETTINGS to the position Filament to select the desired filament 1 – 4 or the automatic selection of an available filament via the Up and Down buttons.

8. Computer Interface

8.1 Connection

The SUBLICON® can communicate with the computer through a serial interface RS232. Set the selector switch MODE to the position Extern.

The corresponding connection socket and the required connection cable are described in 5.3.6 Interface RS232 (Interface RS232), page 17.

8.2 Communication

8.2.1 Log

The following log is used for communication:

- 8 data bits
- no parity bit
- 1 stop bit

The baud rate is fixed at 9600 baud.

No hardware handshake is used. Messages are transferred as ASCII strings. Comma(0x2C) is considered as divider. Blank(0x20) and tabulator(0x09) are considered as hyphen. For the communication, the computer is always the master. The input buffer of the computer has to have a capacity of 50 bytes at least. The receive buffer of the SUBLICON® is deleted two seconds after receipt of the last indication.

8.2.2 General String Structure

Write command

S: **Command [Parameter] <CR>**
E: **OK**

Reading command

S: **Command <CR>**
E: **Command [Parameter] <CR>**



NOTICE:

- Commands can be written large or small.
- The parameter input is case-sensitive.
- In the case of an impermissible command or incorrect parameters, an error message is output (🔗📖 Table 8, page 27).

8.2.3 Command Set (Mnemonics)

Read Commands	Description
RVN	Read Version Number. Reading the version number of device software. Answer: '2.04<CR>' at version 2.04
RTP	Read Temperature. Reading the heat sink temperature and interlock status. Answer: '25<HT>1<CR>' at 25°C and closed interlock '73<HT>0<CR>' at 73°C and open interlock
RAP	Read Actual Power. Reading the actual current value and the actual time. Answer: '33<HT>00:03:23<CR>' at 33 A and 3 more minutes and 23 seconds
RFS	Read Filament Status. Reading the filament status. Answer: '1011<HT>A<CR>' Filament 2 not recognized, AUTO mode selected

Table 5 – Mnemonics for Read Commands

Write Commands	Description
SFN	Set Filament Number. Setting the filament number. 1 = Filament 1 2 = Filament 2 3 = Filament 3 4 = Filament 4 A or a = automatic filament selection Example: 'SFN 3 <CR>' when selecting filament 3
SSO	Set Sublimation OFF/ON. Turning sublimation off or on. 0 = Sublimation off 1 = Sublimation on

Table 6 – Mnemonics for Write Commands

Read and Write Commands	Description
RSP	Read Sublimation Power. Reading the nominal values of sublimation current and sublimation time. Answer: '40<HT>00:05:00<CR>' set at 40A and 5min for sublimation
SSP	Set Sublimation Power. Changing the nominal values of sublimation current and sublimation time. Example: 'SSP 25A 5 <CR>' when selecting sublimation current of 25 A and sublimation time of 5 min

Table 7 – Mnemonics for Read and Write Commands

8.2.4 Error Output

Error Output	Description
'? X'	Unknown command
'? N E'	Command currently not allowed (output error signal - beeper)
'? N M'	Command currently not allowed (wrong MODE)
'? N X'	Command currently not allowed (locked externally)
'? N T'	Command not allowed at the moment (blocked by overtemperature)
'? P *'	Incorrect parameter (* = parameter number)

Table 8 – Error Output via Interface RS232

9. Maintenance and Servicing

9.1 Maintenance

9.1.1 General Maintenance Advices

For external cleaning you use please a dry cotton cloth. Do not use any aggressive or abrasive detergents.



WARNING: Mains voltage

The instrument contains inside voltage carrying components. Do not introduce any objects into the openings of the instrument. Keep the instrument dry. Do not open the instrument.

9.2 Trouble Shooting

9.2.1 Trouble Indication

A malfunction within the SUBLICON® is shown by an error message on the display (🔑📖 Table 9, page 28) or is output via the serial interface.

9.2.2 Error Messages

Error (Display)	Cause and Remedy
0A 02	In AUTO mode, no filament was found to be turned on.
0A 03	It was tried to turn on unrecognized filament 1.
0A 04	It was tried to turn on unrecognized filament 2.
0A 05	It was tried to turn on unrecognized filament 3.
0A 06	It was tried to turn on unrecognized filament 4.
0A 07	Internal error in filament selection.
0A 09	Large deviation of the current value from the nominal value (filament breakage / bad contacts).
0b 0B	Internal error with filament control.
rr **	Microcontroller has been reset. (** = Error code, please send to JEVATEC for diagnosis!)

Table 9 – Error Messages

9.2.3 Help in Case of Malfunctions

If the malfunction persists even after having acknowledged and / or having replaced the sensor, please contact JEVATEC.

9.2.4 Exchange of fuses

Use for the exchange of defective device fuses exclusively the fuse type T4,0A H respectively T8,0A H indicated on the rear site of controller. The both device fuses you can find in the fuse holder of mains connection (👉📖 Figure 2, A, page 15), which can be pried off with a small screwdriver.

9.2.5 Repair

Defective products must be sent to JEVATEC. JEVATEC cannot assume any responsibility or warranty if the operator or third persons opens the SUBLICON®.

10. Shelving and Waste Disposal

10.1 Packaging

Please keep the original packaging. You will need this packaging in case of storing the SUBLICON® or shipping to JEVATEC.

10.2 Shelving

The SUBLICON® 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.

10.3 Waste Disposal

Regarding waste disposal the branch specific and local waste disposal and environment protection regulation for systems and electronics components are valid. In case of return JEVATEC will execute the professional resource separation and disposal.



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EU Declaration of Conformity

We, the JEVATEC GmbH, hereby declare that the products specified and listed below which we have placed on the market, comply with the applicable EU Council Directives. This declaration becomes invalid if modifications are made to the product without agreement with us. Compliance with the EMC Directives requires that the components are installed within a system or machine in a manner adapted to the EMC requirements.

Product designation

Power supply for Titanium Sublimation Pumps

Type designation

SUBLICON®

The products comply with the following European Council Directives:

- 2014/35/EU (EU Low Voltage Directive, EU Office Journal, L 96/357 of 26-February-2014)
- 2014/30/EU (EU Directive EMC, EU Office Journal, L 96/79 of 29-March-2014)
- 2011/65/EU (EU Directive RoHS, EU Office Journal, L 174/88 of 1-July-2011)
- 2012/19/EU (EU Directive WEEE, EU Office Journal L 197/30 of 24-July-2012)

Applied harmonised, international/national standards and specifications:

- EN 61010-1 (2011) (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1 (2013) (EMC requirements for electrical equipment for measurement, control and laboratory use; Electromagnetic Immunity industrial sector; Electromagnetic Interference domestic home sector class B)

Jena 1-March-2017

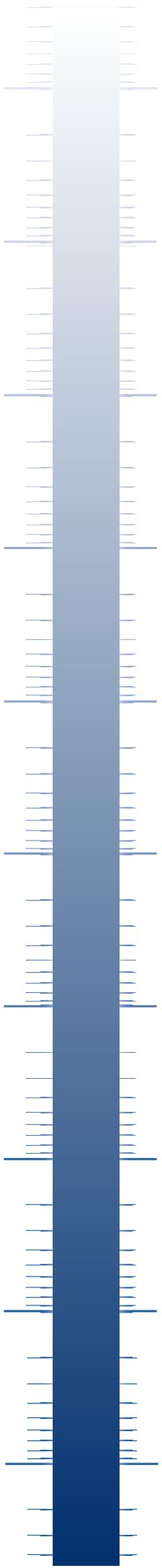
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