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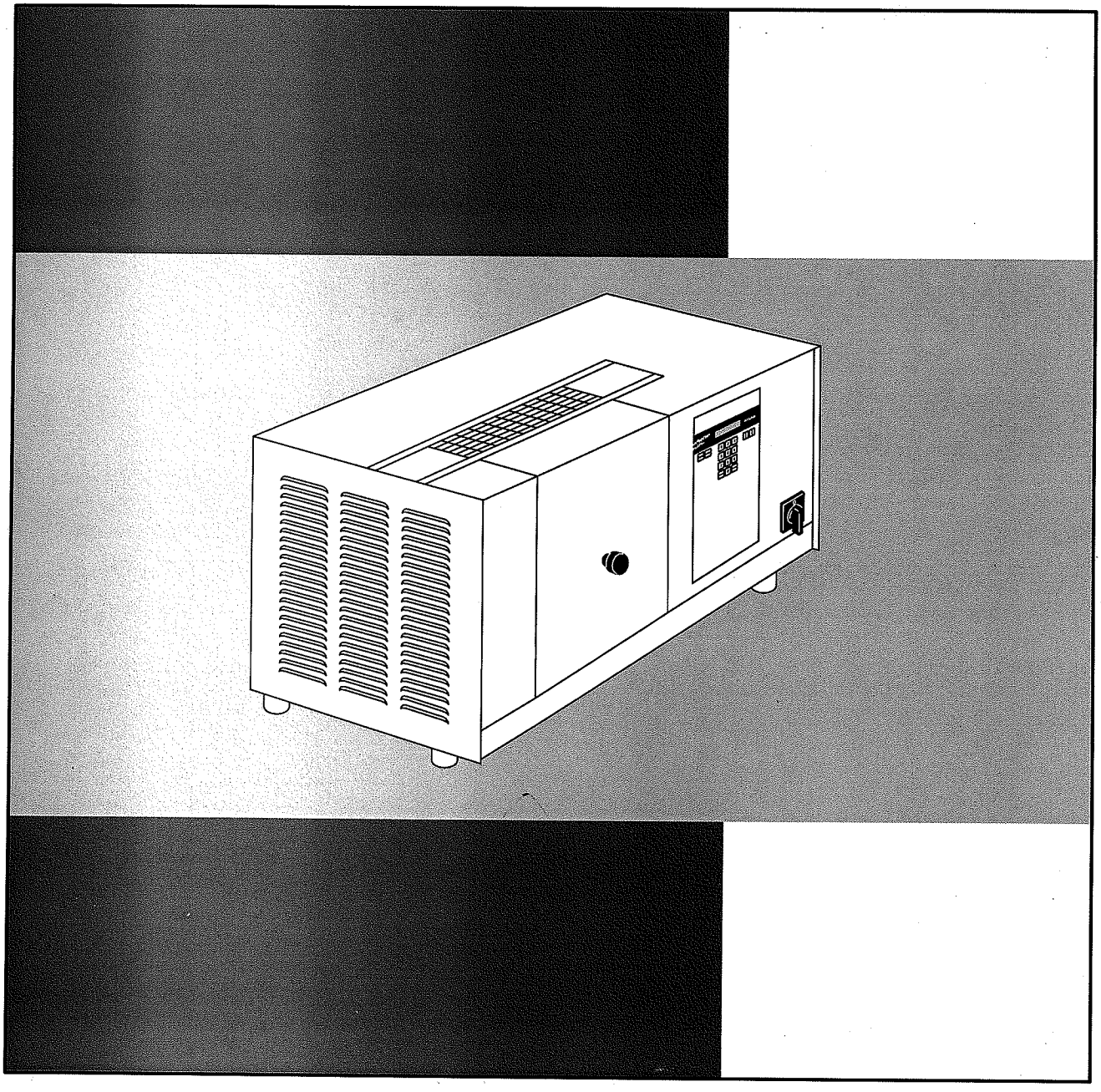
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ATLAS
MATERIAL TESTING SOLUTIONS

SUNTEST CPS / CPS+
Operating Manual



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1 Notes for safe operation

Dear user,

Please note that certain kinds of work must only be carried out by personnel who are suitably qualified:

- **The SUNTEST CPS/CPS+ may be operated only by trained und authorized laboratory personnel,**
- **The unit should only be cleaned by trained personnel.**

- This operating manual describes the SUNTEST CPS and the SUNTEST CPS+ weathering units.
- Please read the Operating Manual carefully before using the SUNTEST CPS/CPS+.
  You will then be able to exploit all the advantages that the device offers and prevent damage.
- If unusual problems occur, that have not been treated in sufficient detail in this operating manual, please contact the supplier for your own safety.

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1 Notes for safe operation

Dear User:

- This unit has been manufactured according to the state-of-the-art and is operationally safe. Nonetheless, there may be some danger from this unit, especially if it is operated by personnel who are not adequately trained, or if it is used in an improper manner, and not for its intended purpose.
- For personnel working with or on this unit, the operating agency must provide written instructions, in an easy-to-understand form, based on these instructions, and make it available in the natural language of the employee (FRG: Accident Prevention Act, UVV VGB 1 § 7, 2).
- Based on these instructions, train the operating and cleaning personnel in the function, operation and maintenance of this unit.
- The contents of this operating manual are subject to change at any time without prior notice.
- The German version of this operating manual is binding in the case of translations in other, foreign languages.
- For reasons of safety, changes or modifications to the unit on your own initiative are not permitted.

Please keep this operating manual carefully and accessibly in the vicinity of your instrument, so that safety instructions and important information can be looked up at any time.

Trade marks:
All the trade marks in the instructions are the exclusive property of the respective manufacturers.

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1 Notes for safe operation

1.1 Explanation of the pictorial signs

Safety symbols will draw your attention to safety-critical operating errors.

Symbols used in the operating manual

WARNING!
Non-compliance with these can result in serious or even fatal injury.

CAUTION!
Non-compliance with these can result in medium to light personal injury or damage to property.

NOTE!
Provides usage tips and useful information.

CE - Conformance mark

Symbols on the unit

Pull mains plug before opening !

Pull out the power plug before opening the device !
Warns you not to touch live parts of the unit when you open the device.

CE - Conformance mark

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1 Notes for safe operation

1.2 Instructions for safe operation

Please also follow the safety instructions in the individual chapters.

Usage as authorized:
- SUNTEST CPS / CPS+ are used for exposure and weathering of material samples.
- The unit is suitable for continuous operation.
- The unit has been tested for electromagnetic compatibility and for installation in an industrial application.

Unauthorized usage:
- No substances of materials that are inflammable or that can explode should be used in the test chamber.
- No substances or materials that may release toxic substances in any form should be used in the test chamber.
- The device must not be used for drying or heating objects or foodstuffs.

Safety instructions for commissioning:

WARNING - Pull out the power plug:
Coming in contact with live parts can result in a possibly fatal electrical shock. When assembling the irradiance system, set the ON (I) / OFF (O) switch to the "OFF (O)" position and pull out the power plug. Secure the power plug from being inserted again.

WARNING - UV radiation being emitted:
If the specimen table is not used, UV radiation is emitted on the lower side of the unit and can result in damage to skin and retina. Always use the specimen table when the unit is running !

WARNING - UV radiation being emitted:
If the mirrors (figure 15) are not used, UV radiation is emitted on the upper side of the unit and can result in damage to skin and retina. Always mount the mirrors.

CAUTION - Danger of cuts and gashes:
The optical filters have sharp edges that may cause cuts and gashes.
Always wear protective gloves when working on the radiation system.

The device fulfills the following safety specifications:
- DIN EN Part 1:1991-11, Part 2:1995-06
  Safety of machinery
- DIN EN 60601 Part 1:1994-05
  Safety regulations for electrically operated measuring, controlling, regulating and laboratory equipment. General requirements.
- DIN EN 50178 (VDE0160): 1998-04
  Electronic equipment for use in power installations
- DIN EN 50082 (VDE 0839) Part 2:1997-11
  Electromagnetic compatibility, Professional Basic Norm, immunity from distortion. Part 1: Residential areas, business and industrial areas as well as small industries. Part 2: Industrial area.

Disposal:
- Please dispose of the packing materials according to the applicable disposal guidelines. There is a list given in chapter 2.2, "Packing Material".
- Xenon lamps are special waste and may be sent to ATLAS MTT B.V. for disposal.
- Old units contain re-usable materials. Therefore, please do not simply dispose of old units at the nearest garbage dump, but ask your city or community administration for the possibilities of recycling.

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2 Installation of unit

2.1 Supply schedule

The weathering unit is available in two versions: SUNTEST CPS or SUNTEST CPS+.

The basic unit of SUNTEST CPS consists of:
- Xenon lamp,
- Optical filter "coated quartz filter segment",
- UV mirror and light mirror,
- Specimen table,
- Sensor for measuring and regulating irradiance (E),
- Control panel with rotary switch for infinite adjustment of irradiance, Xenon lamp operating hour meter and switch for igniting the Xenon lamp.
- ON (I) / OFF (O) switch.

SUNTEST CPS+ is equipped with the following:
- Xenon lamp,
- Optical filter "coated quartz filter segment",
- UV mirror and light mirror,
- Specimen table,
- Sensor for measurement and control of irradiance (E),
- Sensor for measurement and control of the black standard temperature (BST),
- Sensor for measuring the test chamber temperature (TCT),
- Program controller with a display for displaying data and keyboard for data input,
- ON (**I**) / OFF (**O**) switch,
- Serial RS 232-port for connection to a PC.

2.2 Packing material

- Polyethylene foam (PE)
- Corrugated cardboard

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2 Installation of unit

2.3 Location requirements

Climatic conditions required for the place of installation:

- During continuous operation, the hot air emitted by the air-cooling system results in a constantly changing climate in the room. Therefore, the SUNTEST unit should only be installed in air-conditioned, sufficiently ventilated places of installation.
- The places of installation must be kept free of dust.
- The room temperature must be maintained between 18°C and 25°C.
- The max. relative humidity should be 70%.

The requirement for coolant air is as follows:

- 120 m³/h for lamp cooling and cooling of the test chamber.

2.4 Installation

Installation SUNTEST CPS / CPS+:

- Dimensions of unit (width x depth x height): 780 mm x 350 mm x 350 mm,
- Weight of unit approx. 30 kg,
- The unit must be set up on a sufficiently stable laboratory bench with a non-flammable support underneath; the laboratory bench should be aligned so that it is horizontal.

⚠ Caution - Overheating of the unit:
Blocking of the air inlet and air outlets can result in overheating and damage to the unit!
When installing the unit, the following minimum distances to the neighboring walls or objects must be maintained:

to the front:	700 mm
to the back:	500 mm
to the top:	350 mm
to both sides:	300 mm

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3 Description of unit

3.1 Description of SUNTEST CPS

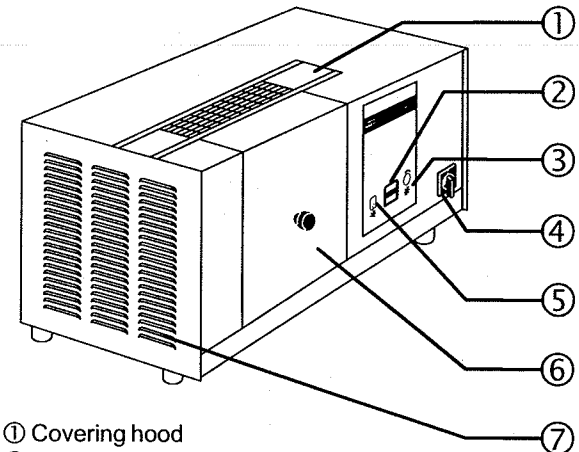
SUNTEST CPS facilitates manual setting of the testing programs. The irradiance that has been set is regulated at a constant value throughout the test duration.

Upper side of the unit:
- Covering hood ① of the assembly compartment for the lamp and filtering system.

Front side of the unit:
- Rotary switch ③ for setting the irradiance,
- Xenon lamp operating hour meter ②,
- Switch ⑤ for igniting the Xenon lamp,
- ON (**I**) / OFF (**O**) switch ④,
- Test chamber door ⑥.

Left side of SUNTEST CPS:
- Air outlet ⑦ of the lamp cooling and the temperature control of the test chamber.

Figure 1



① Covering hood
②Xenon lamp operating hour meter
③ Rotary switch for setting the irradiance
④ ON (**I**) / OFF (**O**) switch
⑤ Switch for igniting the Xenon lamp
⑥ Test chamber door
⑦ Air outlet of the lamp cooling and temperature control of the test chamber

3.2 Description of SUNTEST CPS+

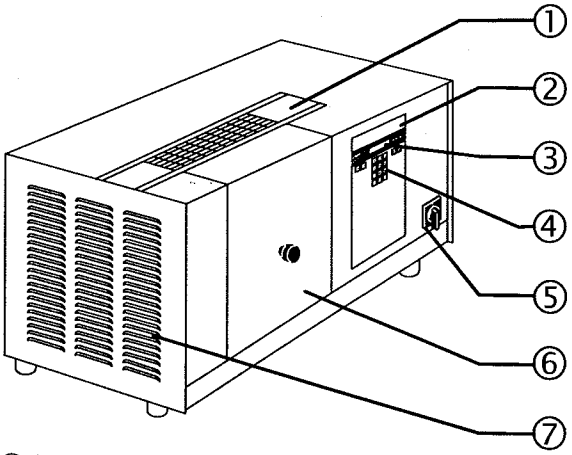
SUNTEST CPS+ is equipped with a microprocessor-based controller for measurement and regulation and works with software-controlled testing programs.

Upper side of the unit:
- Covering hood ① of the assembly compartment for the lamp and filtering system.

Front side of SUNTEST CPS+:
- Program controller ② with
- Numeric keypad ④ and
- Display ③,
- ON (**I**) / OFF (**O**) switch ⑤,
- Test chamber door ⑥.

Left side of SUNTEST CPS+:
- Air outlet ⑦ of the lamp cooling and the temperature regulation of the test chamber.

Figure 2



① Covering hood
② Program controller
③ Display
④ Numerical keyboard
⑤ ON (**I**) / OFF (**O**) switch
⑥ Test chamber door
⑦ Air outlet of the lamp cooling and temperature control of the test chamber

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3 Description of unit

3.3 Components with similar construction SUNTEST CPS / CPS+ Figures 3 / 4

The rear sides of the units and the test chambers are similar in design in both models.

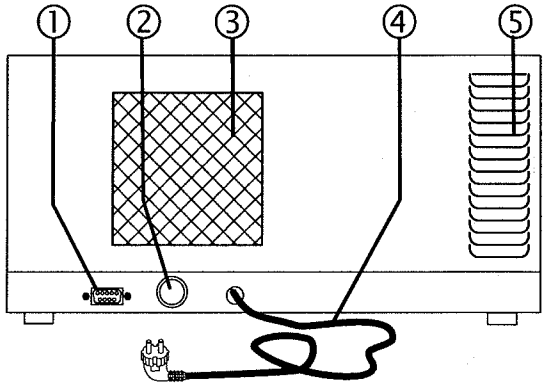
Rear side of the unit: **Fig. 3**

- Air inlet opening ③ for the Xenon lamp cooling and the temperature regulation of the test chamber,
- Port ② for connecting the optional cooling device or immersion device (only SUNTEST CPS+),
- RS 232 port for data transfer to a PC (only SUNTEST CPS+),
- Power plug with connecting cable ④,
- Air outlet ⑤ of the lamp cooling and the temperature regulation of the test chamber.

Test chamber: **Fig. 4**

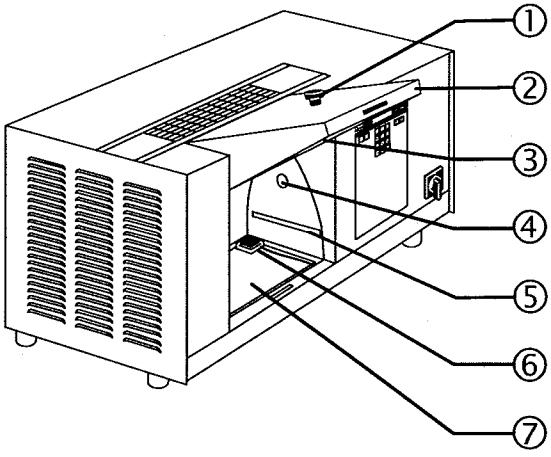
- Door lock switch ① for opening / closing the test chamber door ②.
- The reflector ③ is located in the test chamber and in the test chamber door. The Xenon lamp is located in the roof of the test chamber.
- The photodiode ④ measures the irradiance E,
- The black standard sensor (BST sensor) ⑥ (only in CPS+) measures the black standard temperature at the specimen level.
- Air inlet ⑤ for temperature control in the test chamber.
- The specimen table ⑦ is used for positioning the specimens.

Figure 3



① RS 232 port
② Port for connecting the optional cooling/immersion device
③ Air inlet opening for lamp cooling and temperature regulation of the test chamber
④ Power plug with connecting cable
⑤ Air outlet of the lamp cooling and the temperature regulation of the test chamber

Figure 4



① Door lock switch
② Test chamber door
③ Reflector
④ Photodiode for measuring irradiance
⑤ Air inlet for temperature regulation in the testing chamber
⑥ Black standard sensor (BST sensor)
⑦ Specimen table

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4 Description of functions

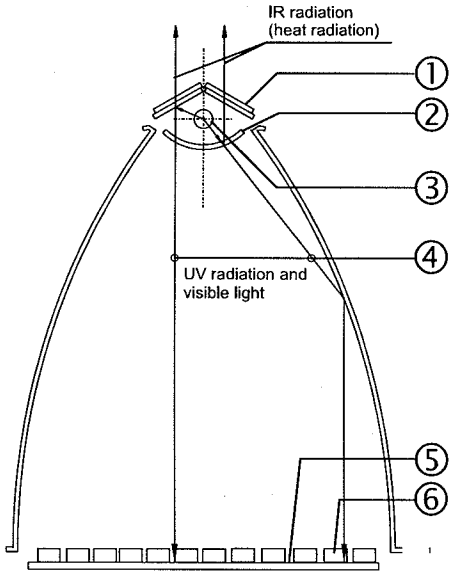
4.1 Radiation and Filtering

- The specimens ⑥ are placed on the specimen table ⑤. Radiation ④ is generated with a Xenon lamp ③ and filtered through an optical filter "coated quartz filter segment" ②.

NOTE:
There are optional optical filters (see Chapter 5 "Accessories") available for various spectral distributions (see chapter. 4.3, "Spectral distribution with additional filters").

- The UV component of the radiation that is directed upwards is reflected on the specimens ⑥ by the mirrors ① placed above the Xenon lamp ③.
- The components of the non-dangerous IR radiation (heat radiation) might penetrate through the mirrors. The remaining heat is removed out of the unit via the air circuit of the Xenon lamp.

Figure 5



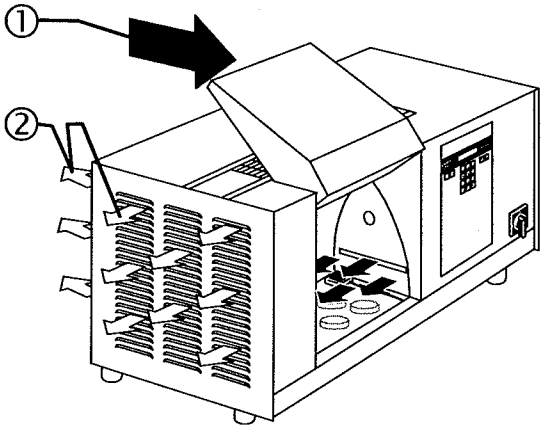
① Mirrors (UV and light mirrors)
② Optical filter "coated quartz filter segment"
③ Xenon lamp
④ Radiation
⑤ Specimen table
⑥ Specimens

4.2 Ventilation circuits

- The coolant air of the Xenon lamp and the test chamber ① is aspirated on the rear side of the unit (see chapter 3.3, "Rear side of unit") through an air filter, flows through the test chamber and the assembly compartment of the irradiance unit and exits through the exhaust openings ② at the left and the rear side of the unit (see chapter 3.3, "Rear side of unit").

NOTE:
During continuous operation, the hot air emitted by the air cooling system results in a continuous change in the climate inside the chamber.

Figure 6



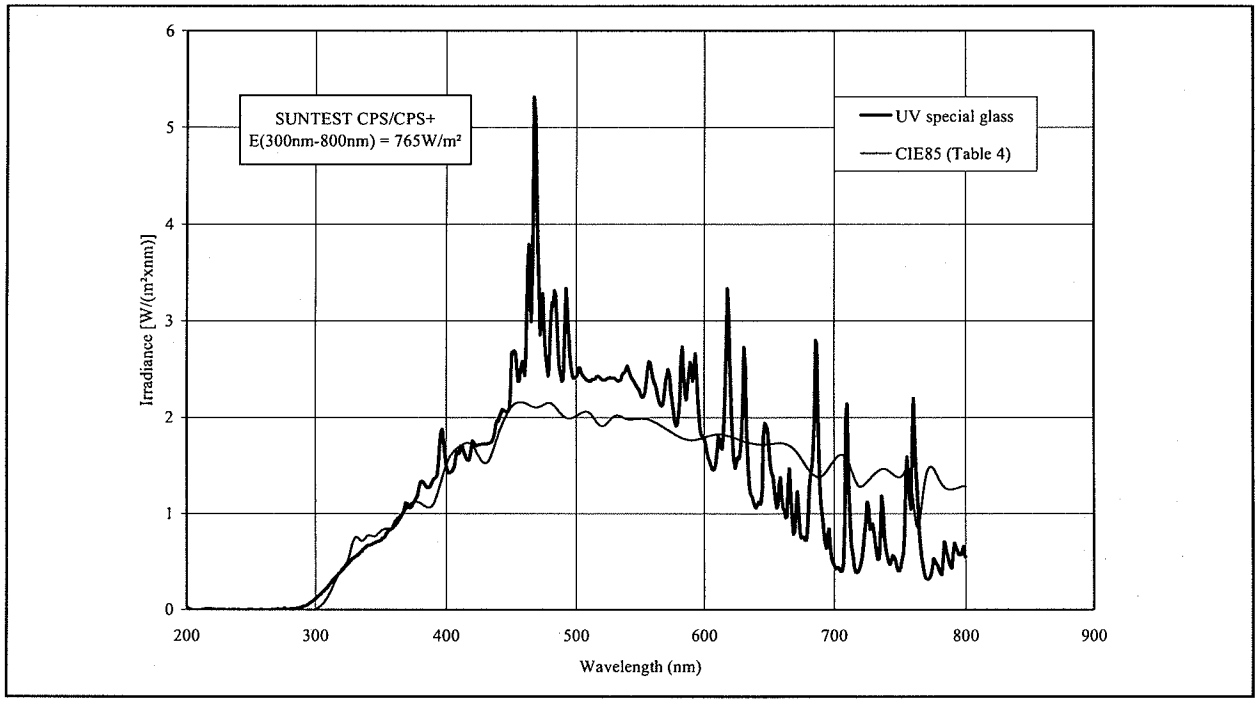
① Coolant air supply Xenon lamp and regulation of test chamber temperature
② Coolant air outlet Xenon lamp and regulation of test chamber temperature

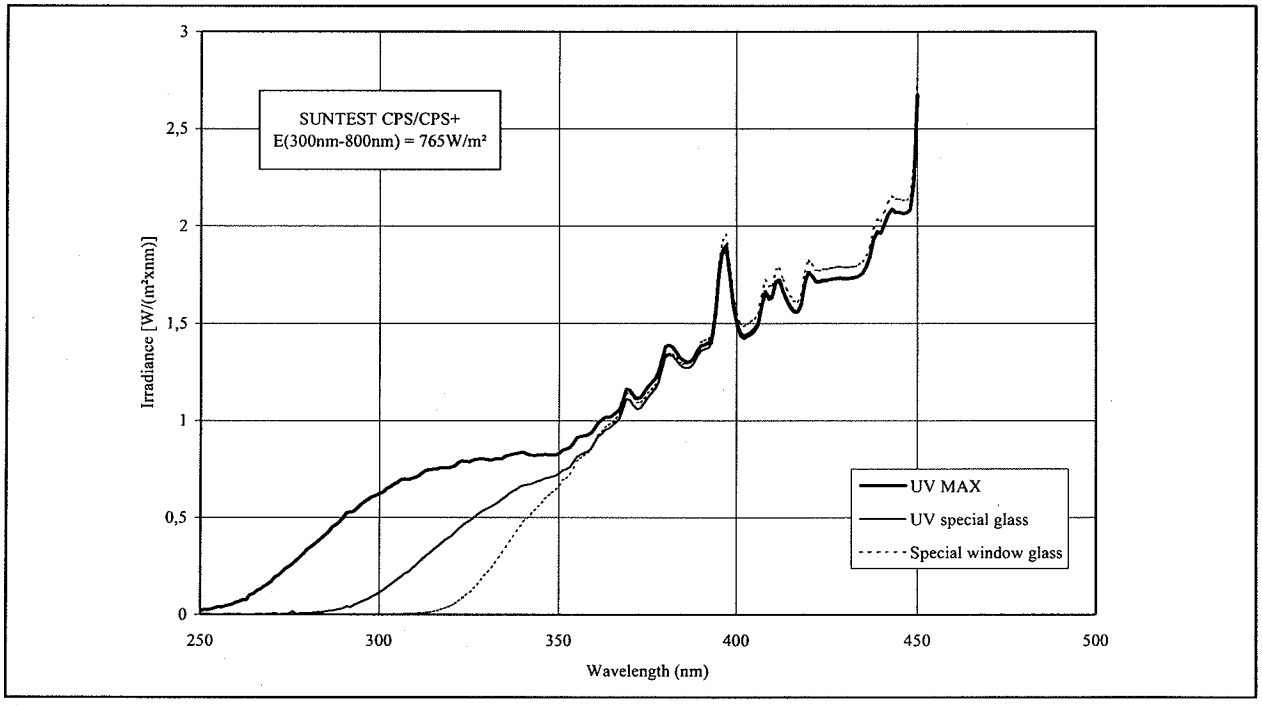
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4 Description of functions

4.3 Spectral distribution with additional filters

Figures: Spectra





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4 Description of functions

4.4 Sensor system in SUNTEST CPS+

SUNTEST CPS+ has integrated sensors:

- Sensor for measuring the global irradiance (E) in the range of 300 - 800 nm and for regulation in the range of 250 -765 W/m²,
- Sensor for measuring and regulating the black standard temperature (BST) up to about 100 °C,
- Sensor for measuring the test chamber temperature (TCT).

Irradiance (E):

- During testing, irradiance is measured by a photodiode ① and regulated electronically to achieve a constant value.

Black Standard Temperature (BST)

- During testing the black standard sensor (BST sensor) ② continuously measures the temperature.
- The black standard temperature (BST) is regulated via the speed of the test chamber ventilator.

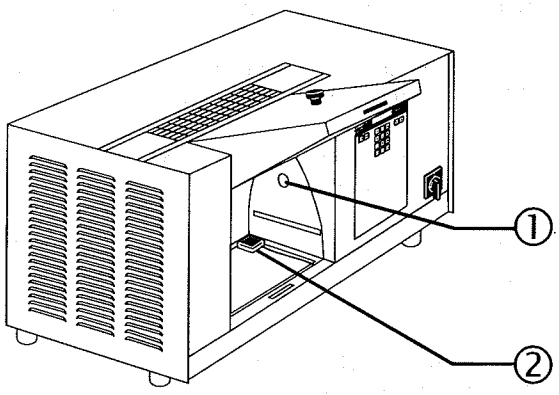
Test chamber temperature (TCT):

- The test chamber temperature (TCT) is measured by a temperature sensor in the exhaust air flow of the test chamber.
- The test chamber temperature cannot be controlled and is indicated in the display unit of the program controller.

Measurement data:

- The measurement data can be transferred, with the testing program running, via the RS 232-port at the rear side of the unit to a PC or a printer with a serial interface.

Figure 7



① Photodiode for measuring irradiance
② Black standard sensor (BST sensor)

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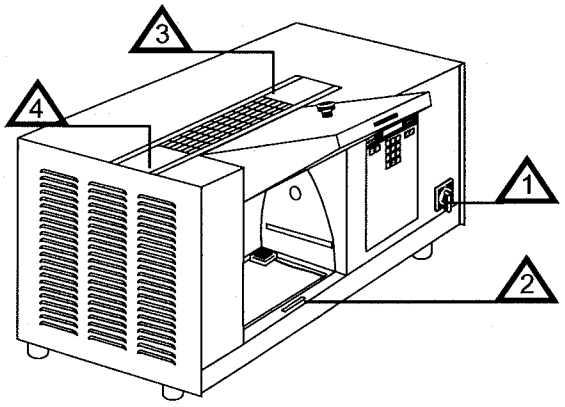
4 Description of functions

4.5 Safety devices

There are safety and protection devices that increase the operational and functional safety of the unit:

- To switch off the unit in an emergency, set the ON (**I**) / OFF (**0**) switch ① to position "OFF (**0**)".
- A door switch switches off the unit when the test chamber door ② is opened.
- A safety switch interrupts the power supply when the covering hood ③ of the assembly compartment is removed.
- A temperature safety device ④ switches off the unit if there is a danger of the Xenon lamp getting overheated because of insufficient cooling.

Figure 8



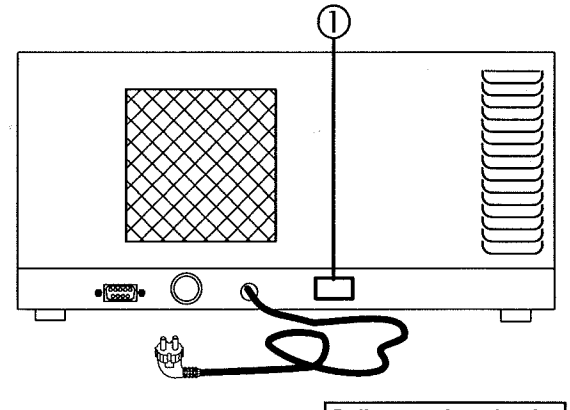
① ON (**I**) / OFF (**O**) switch
② Door switch for test chamber door
③ Safety switch for lamp replacement
④ Temperature safety device

4.6 Safety markings

Please check whether the safety markings mentioned below have been put on the unit.
If any of the safety markings is absent, please inform your supplier.

- The safety marking "Pull out power plug before opening the device!" ① on the rear side of the unit warns you not to touch live parts of the unit when you open the device.

Figure 9



① Pull out mains plug

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5 Accessories

Item	Accessories	Description	Ident no.:
1	**Sensors:**		
1.1	XenoCal UV sensor	Measurement of irradiance Measurement range 300 - 400 nm	5500 7270
1.2	XenoCal global sensor	Measurement and calibration of irradiance Measurement range 300 - 800 nm	5500 7271
1.3	Adapter table for XenoCal sensors	Holding plate for insertion of the XenoCal sensor in the testing chamber	5507 7745
1.4	Black standard sensor (BST sensor)	Measurement of the black standard temperature (BST)	5500 1490
1.5	White standard sensor (WST sensor)	Measurement of the white standard temperature (WST)	5500 1491
1.6	Sensor WST set	Measurement of the white standard temperature (WST), separate readout device is necessary	5507 7906
1.7	Adapter table for BST and WST or Radialux sensors	Holding plate for inserting the SST and WST or Radialux sensors in the testing chamber	5605 2825
1.8	XENOVIEW, serial 9-pole	Software package for transferring the test parameters to a PC	5507 6813
1.9	XENOVIEW, serial 25-pole	Software package for transferring the test parameters to a PC	5507 6812
2	**Filters:**		
2.1	UV special glass	In addition to the coated quartz disk for working with wavelengths greater than 290 nm	5605 2371
2.2	Special window glass	In addition to the coated quartz disk for working with wavelengths greater than 310 nm	5605 2372
2.3	Solar standard	Filter according to COLIPA and DIN 67501	5607 7759
2.4	Solar ID65	Filter for light exposure according to the ICH guideline (only in combination with 5605 2372)	5607 7769
2.5	Uncoated quartz disk	Instead of the coated quartz disk for higher black standard temperatures	5605 2373
3	**Testing table**		
3.1	Water-cooled testing table (contact cooling)	For light exposure of temperature-sensitive materials	5605 2389
4	**Covering sheets**		
4.1	Set of covering sheets	Covering sheets for direct visual comparison of the weathered and unweathered test areas	5606 0361

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5 Accessories

Item	Accessories	Description	Ident no.:
5	**Flooding device:**		
5.1	Flooding device, flooding tube and insertion plate for CPS+	For cyclic wetting of specimens	5607 6397
5.2	Specimen fastening for flooding device		5600 2141
6	**Cooling assembly SunCool:**		
6.1	Cooling assembly SunCool 230 V; 50 Hz	SunCool for reducing the temperature in the testing chamber in the range of 12 °C - 16 °C	5607 7854
6.2	Connection set (right) for SunCool 230 V; 50 Hz	Connection stubs for connecting SunCool / SUNTEST (installation to the right of SUNTEST)	5607 7885
6.3	Connection set (bottom) for SunCool 230 V; 50 Hz	Connection stubs for connecting SunCool / SUNTEST (installation below SUNTEST)	5607 7886
6.4	Ventilation baffle plate 230 V; 50 Hz	For guided removal of the hot exhaust air of the cooling assembly (520 cm^3 / h)	5607 7903
6.5	Cooling assembly SunCool 115 V; 60 Hz	SunCool for reducing the testing chamber temperature in the range of 8 °C - 12 °C	5607 7855
6.6	Connection set (right) for SunCool 115 V; 60 Hz	Connection stubs for connecting SunCool / SUNTEST (installation to the right of SUNTEST)	5607 8009
6.7	Connection set (bottom) for SunCool 115 V; 60 Hz	Connection stubs for connecting SunCool / SUNTEST (installation below SUNTEST)	5607 8010
6.8	Ventilation baffle plate 115 V; 60 Hz	For guided removal of the hot exhaust air of the cooling assembly (520 m^3 / h)	5607 7935
6.9	Trolley for cooling device	For installation below SUNTEST	5607 7857
6.10	Aluminium shelf with 4 boards	For installation below SUNTEST	5607 7856
6.11	Set of insulation pads	For preventing condensate water on the surface of the SUNTEST equipment	5607 7904

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6 Commissioning

6.1 Mounting of specimen table

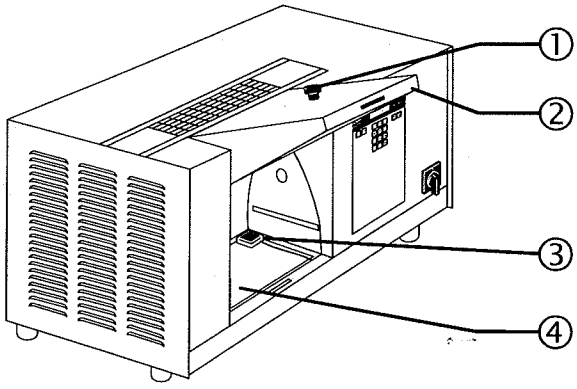
⚠ WARNING - UV radiation being emitted:
If the specimen table is not used, UV radiation is emitted on the lower side of the unit and can result in damage to skin and retina.
Always use the specimen table when the unit is running!

1. Use handle ① to open the test chamber door ②.
2. Mount the specimen table ④.

☞ NOTE:
For reproduction and comparison of testings, the BST sensor should always be placed at the same location of the specimen table.

3. Place the black standard sensor ③ on the specimen table ④.

Figure 10



① Handle
② Test chamber door
③ Black standard sensor
④ Testing table

6.2 Assembling the radiation system

The specimen table and the radiation system need to be assembled before the unit can be commissioned.

⚠ CAUTION - Danger of burns:
For cooling the hot radiation system, the fan continues to run even after the unit has been switched off.
Open the test chamber only after the fan has automatically switched off.

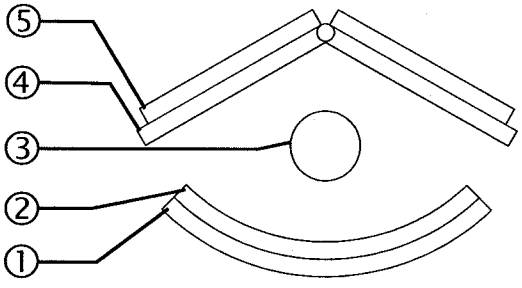
6.2.1 Components of the irradiance system

The radiation system is packed separately. Please check the components for damage before assembly. Damaged parts must not be installed.

The radiation system consists of:
① the optical filter "coated quartz filter segment" (optional: uncoated quartz filter segment),
② the optional optical additional filters (see chapter 5, "Accessories"),
③ the Xenon lamp
④ the UV mirror (transparent), pre-mounted, with
⑤ the light mirror (mirror coating).

☞ NOTE:
When assembling the optical filter, put the quartz filter segment (coated or optionally uncoated) and then the selected optional additional filter in place.

Figure 11



① Optical filter "coated quartz filter segment"
② Optional optical additional filter
③ Xenon lamp,
④ UV mirror (transparent)
⑤ Light reflector (mirror coating)

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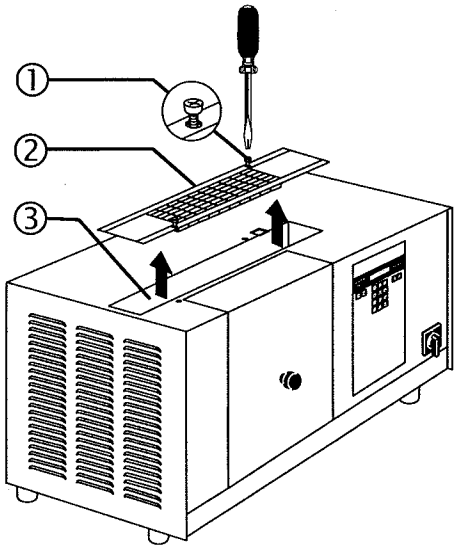
6 Commissioning

6.2.2 Opening of assembly compartment

WARNING - Pull out the power plug:
Coming in contact with live parts can result in a possibly fatal electrical shock.
When installing the irradiance system, set the ON (I) / OFF (O) switch to the "OFF (O)" position and pull out the power plug.
Secure the power plug from being inserted again.

1. Set the ON (**I**) / OFF (**0**) switch to the "OFF (**0**)" position. Pull the plug out of the socket. Secure it against being inserted again.
2. Loosen the two recessed head screws ① with a screwdriver.
3. Remove the covering hood ② of the irradiance system upwards and put it aside.
4. The assembly compartment ③ is now freely accessible.

Figure 12



① Recessed head screws 2x
② Covering hood of the radiation system
③ Assembly compartment

6.2.3 Installation of optical filters

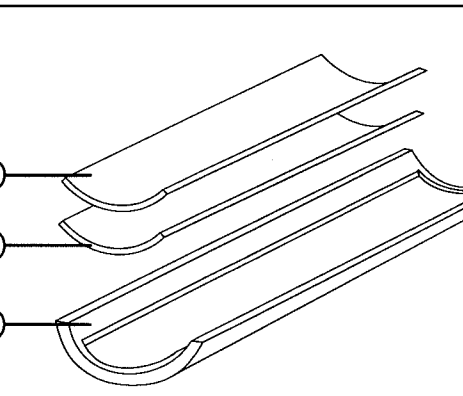
Clean the optical filters before assembling with a soft leather cloth / brush. Carefully wipe the optional filter "UV special glass" with a starch-free cloth that is moistened with 20 % citric acid solution.

CAUTION - Danger of cuts and gashes:
The optical filters have sharp edges that may cause cuts and gashes.
Always wear protective gloves when working on the radiation system.

NOTE:
The holding frame in which the optical filters are placed is located in the assembly compartment.

1. Put on protective gloves.
2. First place the optical filter "coated quartz filter segment" or the optional "uncoated quartz filter segment" ① in the holding frame ② in the assembly compartment.
3. Then position the optional optical filters ③ (see chapter 5, "Accessories").

Figure 13



① Coated / optional uncoated quartz filter segment
② Holding frame in the assembly compartment
③ Optional additional filter

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6 Commissioning

6.2.4 Installation of the Xenon lamp

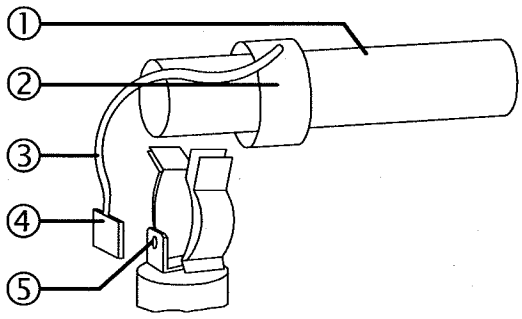
Before installation, the Xenon lamp should be cleaned with a starch-free cloth that is moistened with a small amount of spirit.

NOTE!

The lamp holder is located in the assembly compartment.

1. Carefully press the Xenon lamp ① at the lamp sokkets ② into the mounting ⑤.
2. Insert the flat connector ③ into the plug-in contact ④.

Figure 14



① Xenon lamp
② Lamp socket 2x
③ Flat connector 2x
④ Plug-in contact 2x
⑤ Mounting 2x

6.2.5 Installation of the mirrors

WARNING - UV radiation being emitted:

If the mirrors (figure 15) are not used, UV radiation is emitted on the upper side of the unit and can result in damage to skin and retina. Always mount the mirrors.

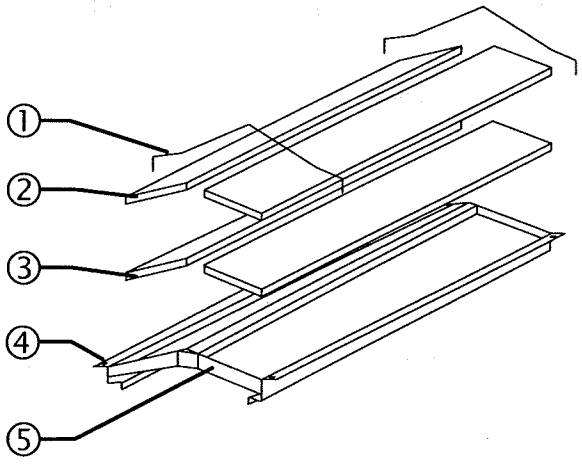
NOTE!

The mirrors are pre-mounted. When cleaning or replacing, install the mirrors in the sequence described.

Clean the mirrors with a soft leather cloth or a brush before installation.

1. First, place the transparent UV mirrors ③ in the support ⑤.
2. Then position the light mirror ②.
3. Fix the mirrors in the holes ④ by inserting the two retaining clips ①.
4. Insert the mirror support ⑤ with components fitted into the radiation compartment.

Figure 15



① Retaining clip
② Light mirror (mirror coating)
③ UV mirror (transparent)
④ Holes for retaining clips
⑤ Mirror support

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6 Commissioning

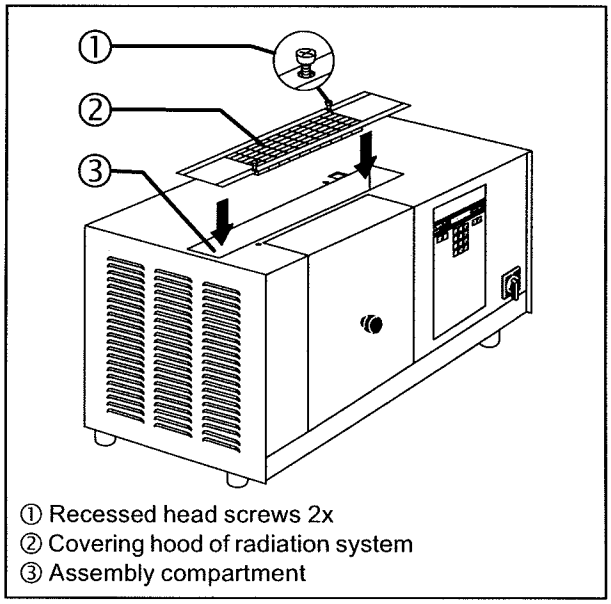
6.2.6 Closing the assembly compartment

NOTE:

The covering hood ② of the radiation system, when built in, operates a safety switch. The safety switch interrupts power supply when the covering hood of the assembly compartment is lifted.

1. Place covering hood ② of the radiation unit on the assembly compartment ③.
2. Tighten the two recessed head screws ① with a screwdriver.
3. Check the covering hood ② of the radiation system for tight fitting.

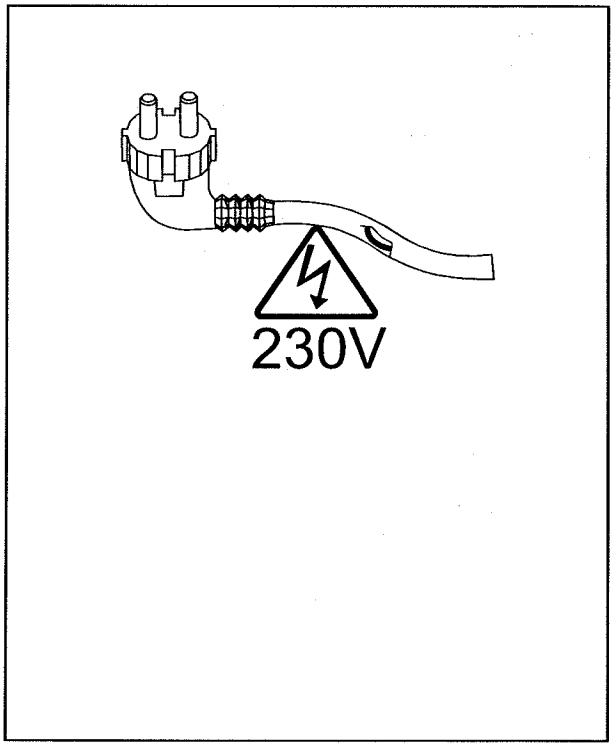
Figure 16



① Recessed head screws 2x
② Covering hood of radiation system
③ Assembly compartment

6.3 Connection to power supply

Figure 17



WARNING - Electric shocks:

Coming in contact with live parts can result in a possibly fatal electric shock.
Check the power plug and the supply cable for damage before connecting them.
If the power cable or the power plug is damaged, do not connect the unit, and immediately inform the service agent.

The Suntest unit has a single-phase power supply through a 16A-power plug with the following parameters:
200V - 240 V ± 10 % at 50 / 60 Hz. The supply network must be secured (fuse settings) for 16A.
Only operate SUNTEST CPS+ and the immersion / cooling device SunCool in separately fused (16A) circuits. We recommend g.f.c.i. protection (DIN VDE 0100 part 720).

Procedure:

1. Check the supply voltage of the power supply network. The supply voltage must be the same as that specified on the type label of the unit.
2. Check whether the supply is secured for 16 A. If not, fuse the system accordingly. A supply system that is not equipped with the correct fuses may cause electric shock in the case of failure. Insert the power plug in a socket that is properly grounded and equipped with the correct fuses.

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7 Operation and Shutdown

7.1 Configuration of unit

WARNING - Pull out the power plug:
Coming in contact with live parts can result in a fatal electrical shock.
For the configuration of the unit, set the ON (I) / OFF (0) switch to the "OFF (0)" position and pull out the power plug. Secure the power plug against being inserted again.

1. Set the ON (**I**) / OFF (**0**) switch to the "OFF (**0**)" position. Pull the power plug out of the power socket. Secure the power plug against being inserted again.
2. Use the specimen table as described in chapter 6 "Commissioning".
3. Insert the optical filter, the Xenon lamp and the mirrors as described in chapter 6 "Commissioning".

7.2 Standard testing procedure

After mounting the irradiance system, the unit is ready for operation. For a standardized testing procedure, please proceed as follows:

1. Center the specimens ③ in the test chamber. Thin or very light specimens ③ can be fixed by using optional additional cover masks (see chapter 5, "Accessories").

NOTE!

To be able to reproduce and compare tests, the BST sensor must always be placed at the same location of the specimen table.

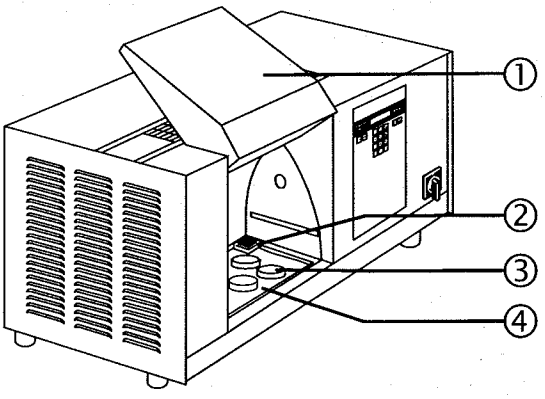
2. Place the black standard sensor ② (BST sensor) on the specimen table ④.
3. Use the handle to close the test chamber door ①.

7.3 Testing procedure with optional unit

Various accessories are available to enhance the capacities of SUNTEST CPS / CPS+ (see chapter 5, "Accessories").

- **For temperature-sensitive materials:**
  Watercooled specimen table with water hose for connection to the water drains.
- **Cover masks:**
  For a direct visual comparison between exposed and non-exposed specimen surfaces.
- **Cooling assembly SunCool:**
  For reducing the test chamber temperature in the range of 8 °C - 12 °C in the SUNTEST CPS+ and 12 °C - 16 °C in the SUNTEST CPS.
- **Immersion device:**
  For cyclic wetting of specimens.

Figure 18



① Test chamber door
② Black standard sensor (BST sensor)
③ Specimens
④ Specimen table

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7 Operation and Shutdown

7.4 Operation of SUNTEST CPS

The SUNTEST CPS has a sensor for measuring irradiance in the range of 300 - 800 nm. Irradiance in the unit is regulated to a constant value.
It is possible to measure the actual value by using the optional sensors for measuring irradiance (see chapter 5, "Accessories").

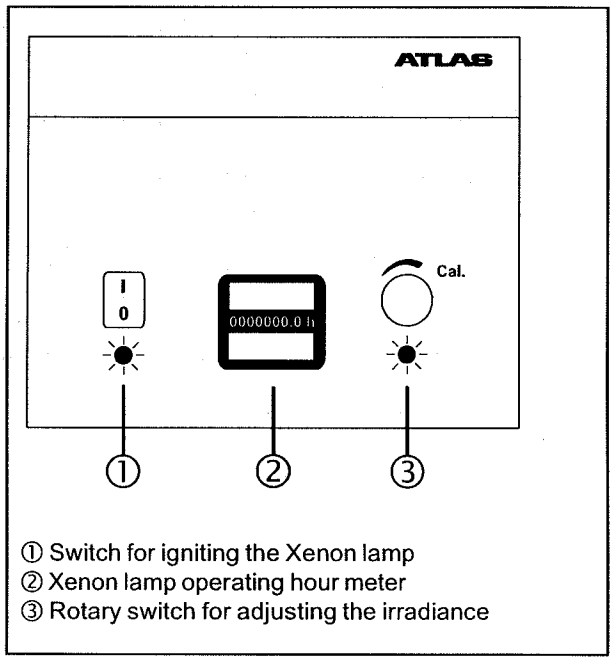
1. Use the rotary switch ③ to adjust the irradiance. Irradiance can be infinitely adjusted in the range of 250 - 765 W/m².

NOTE!
The optional sensors „Radialux" and „XenoCal" can be used to measure and display irradiance and radiation.

2. Set the ON(**I**) / OFF(**0**) switch ① to the "ON (**I**)" position. The Xenon lamp is ignited. The duration for which the Xenon lamp has been on is displayed in the Xenon lamp operating hour meter ②.

NOTE!
Replace the Xenon lamp every 1500 operating hours.

Figure19



① Switch for igniting the Xenon lamp
② Xenon lamp operating hour meter
③ Rotary switch for adjusting the irradiance

7.5 Operation of SUNTEST CPS+ program controller

The program controller controls and monitors the-process of the test programs. The settings are called via the menu guidance on the control panel. The menu guidance is described in the accompany-ing software documentation.

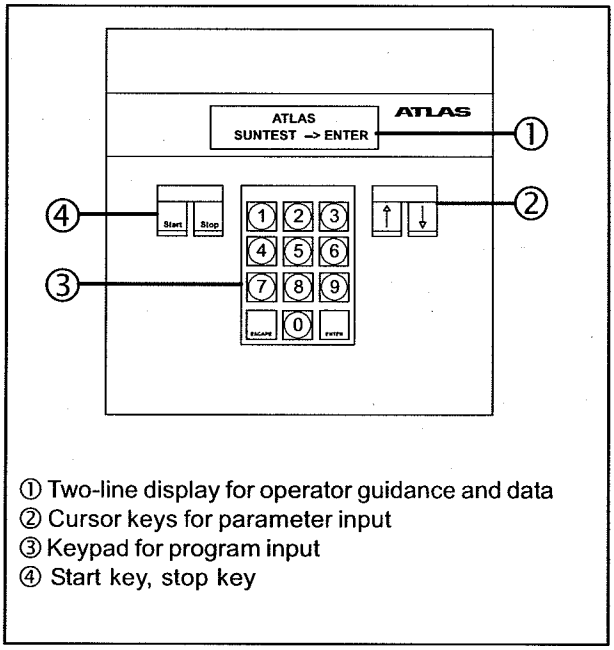
The program controller provides:
- six test programs,
- with six test cycles each.

The end of the program can be selected optionally, according to the criteria:
- Testing time (time),
- Irradiance (dose).

Additional program functions are:
- Programming the light and dark phases,
- Inputting the irradiance,
- Inputting the black standard temperature

The display functions are:
- Displaying the age of lamp and unit,
- Displaying the current testing parameters in a target/ actual comparison,
- Displaying the actual value of the test chamber temperature.

Figure 20



① Two-line display for operator guidance and data
② Cursor keys for parameter input
③ Keypad for program input
④ Start key, stop key

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7 Operation and Shutdown

7.6 Data transfer to a PC

The SUNTEST CPS+ has an RS 232 port for transferring the test data to a PC or a serial printer.

The data transfer to a PC or to a printer is carried out with the optional program XENOVIEW and facilitates the transfer of test data during a running test program.
The test data can be edited and exported to any common text processor or spreadsheet program.

A serial connection cable is required to connect the SUNTEST CPS+ to the PC or a serial printer:

1. Connect the connection cable to a free serial port (Com1, Com2 etc.) of the PC

NOTE:
Figure 21 shows a typical pin configuration in a PC. Please refer to the documentation of your PC for other pin configurations.

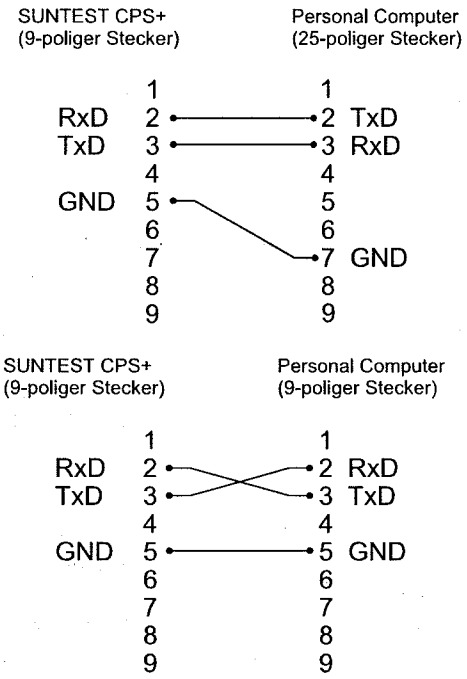
2. Connect the remaining free plug of the connection cable to the RS 232 port of the SUNTEST CPS+.
3. Before starting the program, there is a prompt whether the data transfer should be started.

7.7 Shutdown

CAUTION - Danger of burns:
For cooling the hot specimens and the specimen holders, the fan continues to run even after the unit has been switched off.
Open the test chamber only after the fan has automatically switched off.
When replacing specimens, wear protective gloves.

1. After the fan is switched off automatically, set the ON (**I**) / OFF (**0**) switch to the "OFF (**0**)" position.
2. Put on protective gloves.
3. Open the test chamber door using the handle and remove the specimens from the test chamber.
4. If required, remove additional optional accessories from the test chamber.
5. Clean the unit according to chapter 9.1, "Cleaning".
6. During longer interruptions of operation pull out the power plug as well.

Figure 21



Printer configuration:
8 bit
Baud rate 2400
No parity
1 stop bit

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8 Calibration

8.1 Calibration of irradiance with the XenoCal Global Sensor

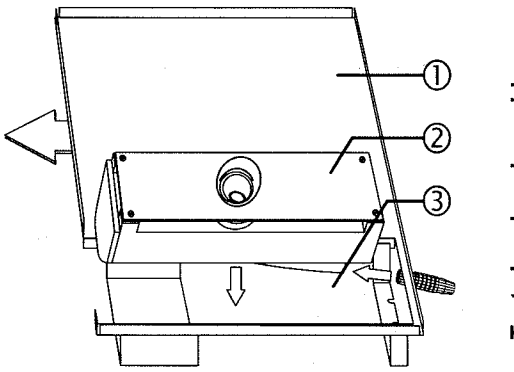
NOTE:

Calibrate the unit before and after each test. The optional XenoCal Global Sensor and an adapter table for the XenoCal sensor (see chapter 5 "Accessories") are necessary for calibration.

The XenoCal Global Sensor can be used to calibrate and adjust global irradiance in the SUNTEST CPS / CPS+ in a wavelength range of 300nm to 800nm.
This adjustment is possible for all filtrations. In order to minimize the systematic error, which is caused by different spectral energy distributions, filter correcting factors are stored in the program control of the SUNTEST CPS+, which will automatically be used.

1. Mount the adapter table ① for the XenoCal Global Sensor instead of the specimen table in the test chamber. The arrow points towards the back panel of the test chamber.
2. Insert the connector cable ③ in the XenoCal Global sensor ② and guide the connector cable ③ below the adapter table ① to the PC.
3. Start the program XenoSoft and ONLINE measurement.
4. In the Suntest CPS+, start the calibration program and input the irradiance at which calibration is to be done.
5. After approx. 30 minutes, enter the actual irradiance value displayed in the XenoSoft to the corresponding field in the display unit and confirm with "ENTER".
6. At the end of the automatic cooling period, the calibration factor calculated by the software is indicated in the display unit and automatically used in every subsequent test.

Abbildung 22



① Adapter table for XenoCal Global Sensor
② XenoCal Global Sensor
③ Connector cable

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8 Calibration

8.2 Calibration of irradiance with the Radialux Global Sensor

NOTE:

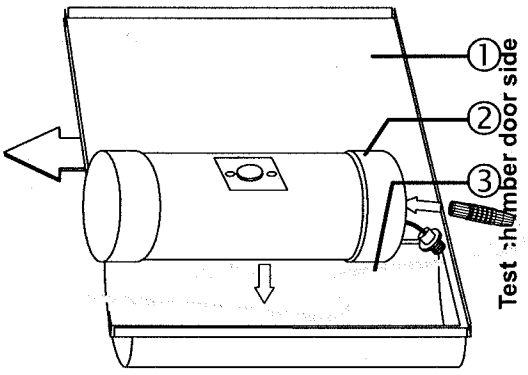
Calibrate the unit before and after each test. An adapter table for the Radialux sensor (see chapter 5 "Accessories") is required for calibrating irradiance.

A calibration and/or adjustment of the SUNTEST CPS / CPS+ is also possible with the Radialux Global Sensor. However, compared to the XenoCal Global Sensor, measurement is a little bit more complicated since the correcting factors, which are a combination of filter correction and temperature correction, must be manually calculated.

The temperature in the test chamber during calibration should not exceed 45 °C.

1. Mount the adapter table ① for the Radialux Global Sensor instead of the specimen table in the test chamber. The arrow points towards the back panel of the test chamber.
2. Insert the connector cable ③ in the Radialux Global Sensor ② and guide the connector cable ③ below the adapter table ① to the evaluation unit.
3. Set the evaluation unit to Global Irradiance Measurement.
4. In the Suntest CPS+, start the calibration program and input the irradiance at which the calibration is to be done.
5. After approx. 30 minutes, multiply the actual irradiance indicated in the display unit by the filter-dependent correction factors specified in the table.
   Enter the calculated value after the automatic program restart (and after the end of the automatic cooling period) in the SUNTEST controller and confirm with "ENTER".
6. At the end of the automatic cooling period, the calibration factor calculated by the software is indicated in the display unit and automatically used for every subsequent test.

Figure 23



① Adapter table for Radialux Global Sensor
② Radialux Global Sensor
③ Connector cable

Pos.	Filtering	Correction factor
1	Filtering A	0.86
2	Filtering B	0.86
3	Filtering C	0.82
4	Filtering D	1.05
5	Filtering E	1.04
6	Filtering F	1.01
7	Filtering G	0.81
8	Filtering H	0.89

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8 Calibration

8.3 Calibration of the black standard temperature

NOTE:

Calibrate the unit before and after every test. An optional black standard thermometer and a corresponding adapter (see chapter 5 "Accessories") are necessary for calibrating the black standard temperature.

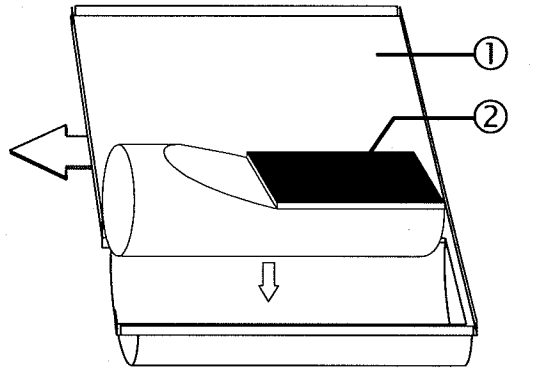
1. Use the adapter table ① for the black standard thermometer instead of the specimen table in the test chamber. The arrow points towards the back panel of the test chamber.
2. The external black standard thermometer ③ should be placed in such a way that the black surface points upwards, i.e. towards the Xenon lamp.
3. In the SUNTEST CPS+, start the calibration program and enter the desired black standard temperature value at the desired irradiance value.

CAUTION - Danger of burns:

The black standard thermometer can be very hot after a measurement has been taken.
When reading or removing the black standard thermometer from the test chamber, it may be necessary to wear protective gloves!

4. If required, put on protective gloves.
5. After approx. 60 minutes, interrupt the program with "STOP", turn the black standard thermometer around and immediately read the temperature in the display of the black standard thermometer.
6. Enter the read-off temperature value (after the automatic cooling period) in the SUNTEST controller and confirm with "ENTER".
7. The calibration factor calculated by the software is indicated in the SUNTEST display and, after confirmation by "ENTER", automatically used in each subsequent test.

Figure 24



① Adapter table for black standard thermometer
② Black standard thermometer

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9 Cleaning / Consumables

9.1 Cleaning

WARNING - Pull out the power plug:
Coming in contact with live parts can result in a fatal electric shock. For all cleaning work, set the ON (I) / OFF (0) switch to the "OFF (0)" position and pull out the power plug. Secure the power plug against getting inserted again.

9.1.1 Outer surfaces and operating elements

Wipe the unit with a mild soap solution (washing agent) and a soft cloth.

9.1.2 Reflector

To ensure uniform illumination of the test chamber, the reflector has to be kept clean.

CAUTION - Damage to the reflector:
The reflecting coating of the test chamber walls is sensitive to scratches.
Do not use any solvents, or any rough or hard cleaning agents for cleaning the reflector.

Procedure:
- Wipe the reflector with a soft cloth that has been moistened with the usual commercially available washing agents and rub dry till it is free from streaks.

9.1.3 Radiation system

The components of the radiation system must be cleaned at least every six months. The irradiance system must be disassembled in the opposite sequence to that described in chapter 6.2, "Assembling the irradiance system".

Optical filters:
- Clean the optical filters with a soft leather cloth or brush before installing them.
- Carefully wipe the optional filter "UV special glass" with a starchless cloth that has been moistened with 20 % citric acid solution.

Xenon lamp:
- Clean the cold Xenon lamp with a starch-free cloth that is moistened with some spirit.

Mirrors:
- Clean the mirrors, before mounting, with a soft leather cloth or a brush.

9.1.4 Air filter

CAUTION - Damage to the unit:
The reflector and the radiation system are sensitive to dust. Unfiltered cooling air will adversely affect the functioning of the unit.
The air filters must be cleaned every six months.
The air filters must always be installed during operation.

Procedure:
- Remove the filter mat from the filter opening on the rear side of the unit.
- Beat the dirty filter mat or wash it with lukewarm water and some mild soap solution (washing liquid).
  If the filter mat is particularly dirty, replace it (for ident. no., see chapter 9.2, "Spare parts").
- Let the filter mat dry and re-insert it in the filter opening with the soft layer on the outside.

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9 Cleaning / Consumables

9.2 Consumables / Spare parts

⚠ WARNING - approved spare parts:
The safety and the reliability of the unit are only ensured if the spare parts mentioned and defined below are used. Using other parts carries hidden risks and must be avoided in all cases.

☞ NOTE - Consumables / spare parts:
Here, you can find consumables / spare parts that can be replaced by the user.

Table 9-2d: Defined spare parts

Pos.	Description	Life	Ident no.	Chapter
1	XENON lamp NXE 1500B	1500 hours	5600 1794	6.2.4
2	Optical filter			
	Uncoated quartz filter segment	10000 hours	5605 2373	6.2
	Coated quartz filter segment	25000 hours	5605 2388	6.2
	UV special glass	15000 hours	5605 2371	6.2
	Special window glass	4000 hours	5605 2372	6.2
	Solar ID65	4000 hours	5607 7769	6.2
	Solar Standard	25000 hours	5607 7759	6.2
	Mirror support with mirrors	25000 hours	5605 2390	6.2
3	Air filter at the rear side of the unit (10 each)	as required	5605 0689	9.1.4

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10 Maintenance

10.1 Maintenance and care

At least once a year, it is necessary to ensure that the following systems are in proper condition:

- Mechanical system
- Functions (Technical Data)
- Electrical system (FRG: UVV VGB 4)
- Safety devices of the unit

If protective devices have been dismantled or disabled for maintenance work, do not restart the unit before the protective devices have been reinstalled and their proper functioning has been checked.

☞ **NOTE - Guarantee:**

The manufacturer guarantees the safety and proper functioning of the unit only provided that:

- the maintenance intervals are adhered to
- all maintenance work is carried out by trained and suitably qualified personnel,
- only original spare parts are used.

ATLAS provides a customized service package for this unit, consisting of a maintenance, measurement and calibration service, that ensures the efficiency and process safety of the unit.

10.2 Commissioning

☞ **NOTES - Spare parts:**

We will provide a complete list of spare parts as well as other documentation on request to suitably trained and qualified personnel.

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11 Technical Data

SUNTEST CPS / CPS+

Power supply:

Supply voltage:	200-240 V ± 10 %, 50/60 Hz
Supply connection:	CEE (16A, 3-pole, 6h) (1, N, PE)
Amperage:	max. 14.5 A
Fuse rating:	16 A
Power consumption:	max. 2.1 kVA
Nominal rating of Xenon lamp	max. 1.5 KW

Cooling requirements:

Lamp cooling	150 m³/h
Air conditioner	min. 60 m³/h, max. 150 m³/h

Dimensions and weight:

Dimensions in cm: (width x depth x height)	78 x 35 x 35
Specimen table:	28 x 20 cm
Specimen surface area:	approx. 500 cm²
Weight:	approx. 30 kg

Noise emission:

Noise level:	max. 70 dB (A)

Ambient conditions:

Room temperature:	18 °C to 25 °C
Relative humidity:	approx. 70 %
Air pressure:	700 - 1060 hPa

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