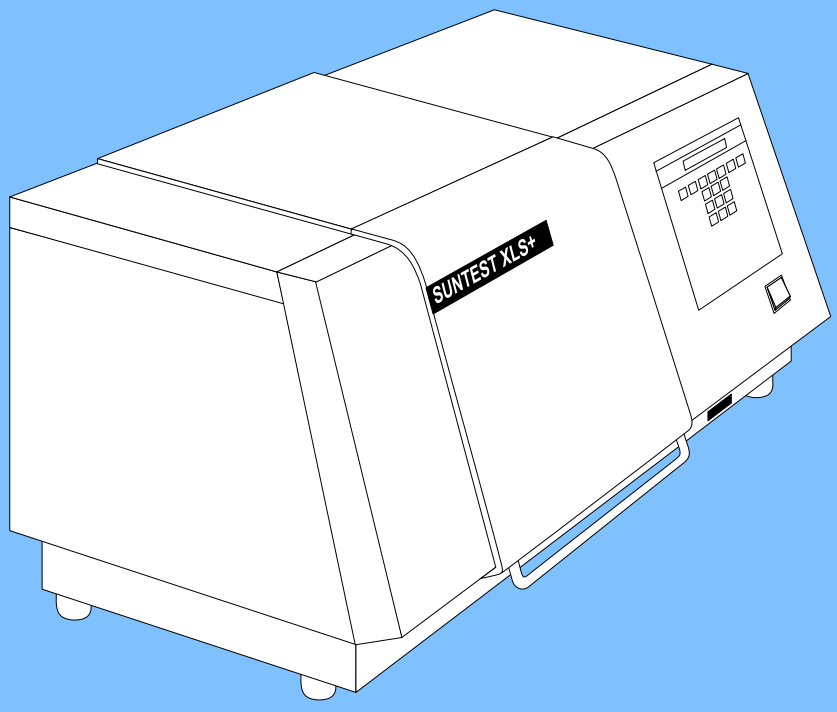
ATLAS
MATERIAL TESTING SOLUTIONS

Operating manual
SUNTEST XLS / XLS+



Content Page

List of graphics Page

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 XLS and SUNTEST XLS+ may be operated only by trained and authorized laboratory personnel.**
- **The equipment should only be cleaned by trained personnel.**

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

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1 Notes for safe operation

Dear User:

- This equipment has been manufactured according to the state-of-the-art and is operationally safe. Nonetheless, there may be some danger from this equipment, especially if it is operated by personnel who are not adequately trained, or if it is used in an improper manner, and not used for its intended purpose.
- For personnel working with or on this equipment, 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 equipment.
- 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 equipment on your own initiative are not permitted.

Please keep this operating manual carefully and accessibly in the vicinity of your equipment, 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.

Edition dated:
November 1999

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 equipment

CAUTION - Carefully follow operating instructions!
warns of possible danger.

Pull out power plug
warns against touching live parts of the equipment.

Do not open! **Do not open!**
warns against opening the gas pressure spring.

CE - Conformance mark

1 Notes for safe operation

1.2 Instructions for safe operation

Please follow the safety instructions in the individual chapters.

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

Unauthorized usage:
- No substances or 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 equipment may 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 radiation 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 sample table is not used, UV-radiation is emitted at the bottom of the equipment and can result in damage to the skin of the face and the retina. The sample table should always be used when the equipment is running !

CAUTION - cuts and gashes:

The optical filters have sharp edges that can result in cut wounds.
Hand-gloves must be worn at all times when working on the radiation unit.

The equipment fulfills the following safety specifications:
- DIN EN 292, Part 1:1991-11, Part 2:1995-06
  Safety of machinery
- DIN EN 61010 Part 1:1994-05
  Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements.
- DIN EN 50178 (VDE0160): 1998-04
  Electronic equipment for use in power installations.
- DIN EN 50082 (VDE 0839) Part 1:1997-11
  Electromagnetic compatibility (EMC), Generic immunity standard. Part 1: Residential, commercial and light industry. 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 equipment contains re-usable materials. Therefore, please do not simply dispose of old equipment at the nearest garbage dump, but ask your city or community administration about the possibilities of recycling.

2 Installation of equipment

2.1 Supply schedule

The weathering equipment is available in two versions, the SUNTEST XLS or SUNTEST XLS+ .

The basic equipment of the SUNTEST XLS consists of:
- Xenon Lamp,
- Optical filter „coated quartz dish",
- UV reflector and light mirror,
- 2 Z-Rails,
- Sample table,
- Sensor for measurement and regulation of the irradiance (E),
- Control panel with rotary switch for stepless adjustment of the irradiance, Xenon lamp operating hour meter and ON/OFF switch of the Xenon lamp.
- ON / OFF switch

SUNTEST XLS+ is equipped with the following:
- Xenon Lamp,
- Optical filter „coated quartz dish“,
- UV-reflector and light mirror,
- Sample table,
- 2 Z-Rails,
- Sensor for measurement and control of the irradiance (E),
- Sensor for measurement and control of the black standard temperature (BST),
- Sensor for measuring the test chamber temperature (CHT),
- Program controller with a display for displaying data and keyboard for data input,
- ON (**I**) / OFF (**O**) switch,
- Serial RS 232-port for connecting to a PC or a printer.

2.2 Packing material

- Impregnated wood palette made of compound wood
- Polyethylene foil (PE)
- Polyethylene foam (PE)
- Corrugated cardboard
- Plastic wrapping ribbon (PP)

2 Installation of equipment

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 equipment 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:

- Lamp cooling 250 m³/h,
- Air conditioner for the test chamber 340 m³/h.

Installation:

- Dimensions of equipment (width x depth x height): 930 mm x 500 mm x 485 mm,
- Weight of equipment approx. 80 kg,
- The equipment must be set up on a sufficiently stable laboratory bench with a non-flammable support underneath and the laboratory bench should be aligned so that it is horizontal.
- Please lift the unit for any displacement to avoid that the rubber feet fall off the fixing screws.

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

to the front	**700 mm**
to the back	**500 mm**
to both sides	**300 mm**
on top	**400 mm.**

3 Description of equipment

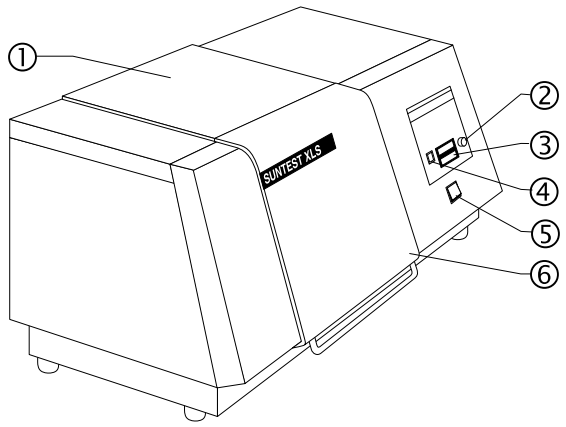
3.1 Description of SUNTEST XLS

SUNTEST XLS facilitates manual running of the testing programs. The irradiance that has been set is controlled at a constant value throughout the test duration.

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

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

Figure 1



① Covering hood
② Rotary switch for setting the irradiance
③ Xenon lamp operating hour meter
④ Switch for Xenon lamp
⑤ ON (**I**) / OFF (**O**) switch
⑥ Test chamber door

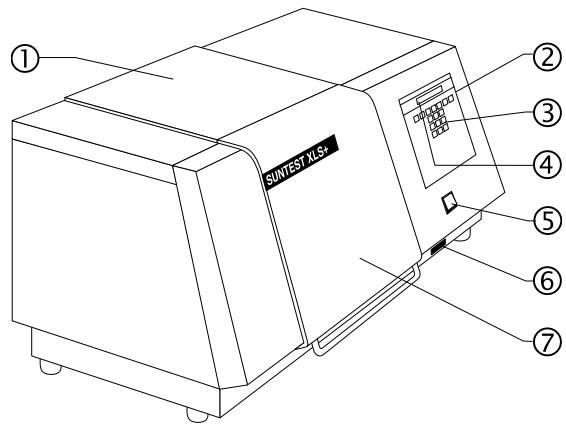
3.2 Description of SUNTEST XLS+

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

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

Front side of the equipment SUNTEST XLS+:
- Control panel ② with
- Numeric keypad ③ and
- Display ④,
- ON (**I**) / OFF (**O**) switch ⑤,
- RS 232 port ⑥ for data transfer to a PC or printer,
- Test chamber door ⑦.

Figure 2



① Covering hood
② Control panel
③ Numeric keypad
④ Display
⑤ ON (**I**) / OFF (**O**) Switch
⑥ RS 232 port for data transfer to a PC
⑦ Test chamber door

3 Description of equipment

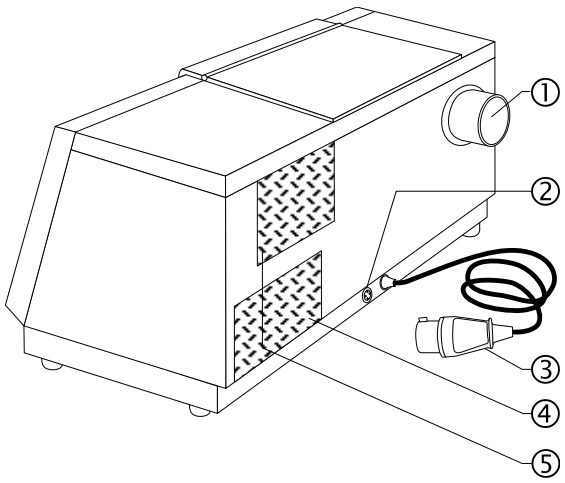
3.3 Components with similar construction SUNTEST XLS / XLS+ Figure 3 / 4

The rear side of the equipment and the test chamber are similar in design in both models.

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

- Air outlet ① of the Xenon lamp cooling,
- Port ② for connecting the optional cooling device / flooding device,
- Power plug with connecting cable ③,
- Air inlet opening ④ of the test chamber,
- Air inlet opening ⑤ for Xenon lamp cooling.

Figure 3

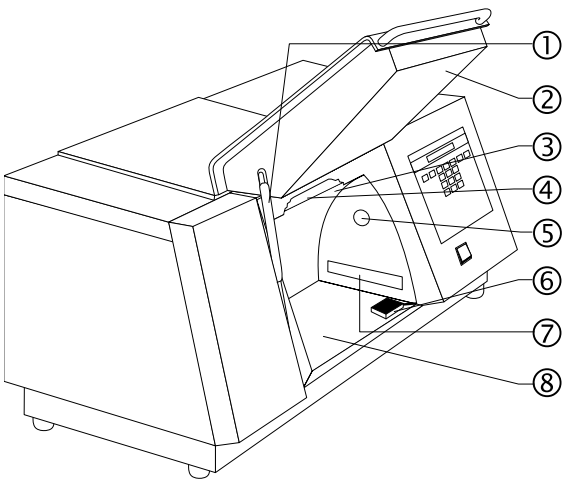


① Air outlet for Xenon lamp cooling
② Port for connecting the optional cooling equipment /flooding equipment
③ Power plug with connecting cable
④ Air inlet opening - test chamber
⑤ Air inlet opening Xenon lamp cooling

Test chamber: **Fig. 4**

- Gas pressure spring ① for easy opening / closing the test chamber door ②.
- The reflector ③ is located in the test chamber, and the Xenon lamp ④ at the top of the test chamber,
- The photo-diode ⑤ measures the irradiance,
- The black standard sensor (BST) ⑥ (only in XLS+) measures the black standard temperature at sample level,
- Air inlet ⑦ for temperature control in the test chamber,
- the sample table ⑧ is used for locating or fixing the specimens.

Figure 4



① Gas pressure spring
② Test chamber door
③ Reflector
④ Xenon lamp
⑤ Photodiode for measurement of the irradiance
⑥ Black standard sensor (BST)
⑦ Air inlet for temperature control in the test chamber
⑧ Sample table

4 Function description

4.1 Radiation and Filtering

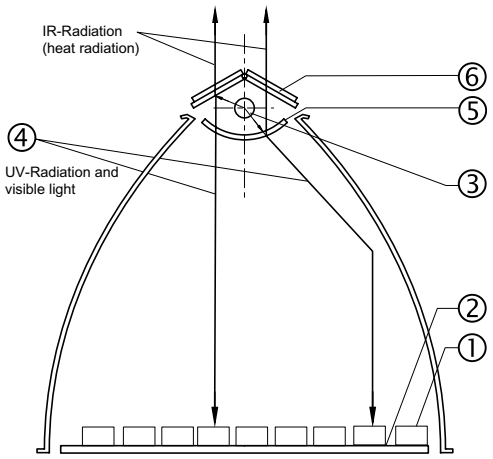
- The specimens ① are placed on the sample table ②. The radiation ④ is generated by the Xenon-Lamp ③. The radiation ④ is filtered through an optical filter "coated quartz dish" ⑤.

Note!

There are optional filters (see Chapter 5, „Accessories') available for various spectral distributions (see chapter. 4.1.3, „Spectral distribution with additional filters").

- The UV-component of the radiation, that is directed upwards, is reflected on the specimens ① by the mirrors ⑥ that are placed above the Xenon lamp ③.
- The components of the non-dangerous IR-radiation (heat radiation) are absorbed by an absorber, and removed out of the equipment via the air circuit of the Xenon lamp.

Figure 5



① Specimens
② Sample table
③ Xenon lamp
④ Radiation
⑤ Optical filter " coated quartz dish"
⑥ Mirror

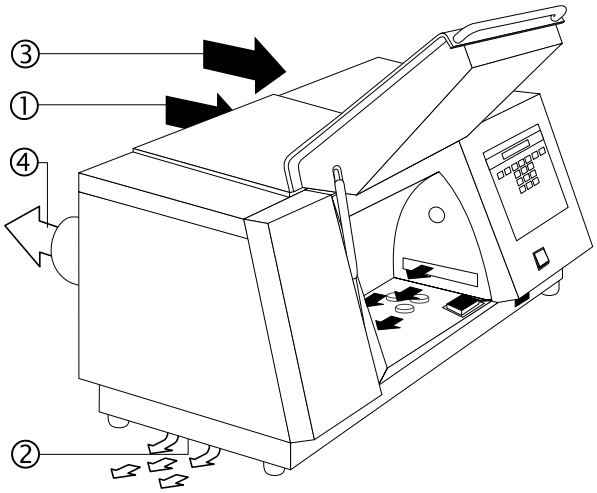
4.2 Ventilation circuits

- The coolant air of the test chamber ① is sucked inward on the rear side of the equipment (see chapter 3.3, „Rear side of equipment") through an air filter, flows through the test chamber and exits at the bottom of the equipment ②.
- The coolant air of the Xenon lamp ③ is drawn in on the rear side of the equipment (see chapter 3.3, "Rear side of equipment") through an air filter, flows through the Xenon lamp compartment and exits again on the exhaust opening on the rear side ④.

NOTE!

During continuous operation, the hot air emitted by the air cooling system results in a continuous change in the labboratory climate.

Figure 6

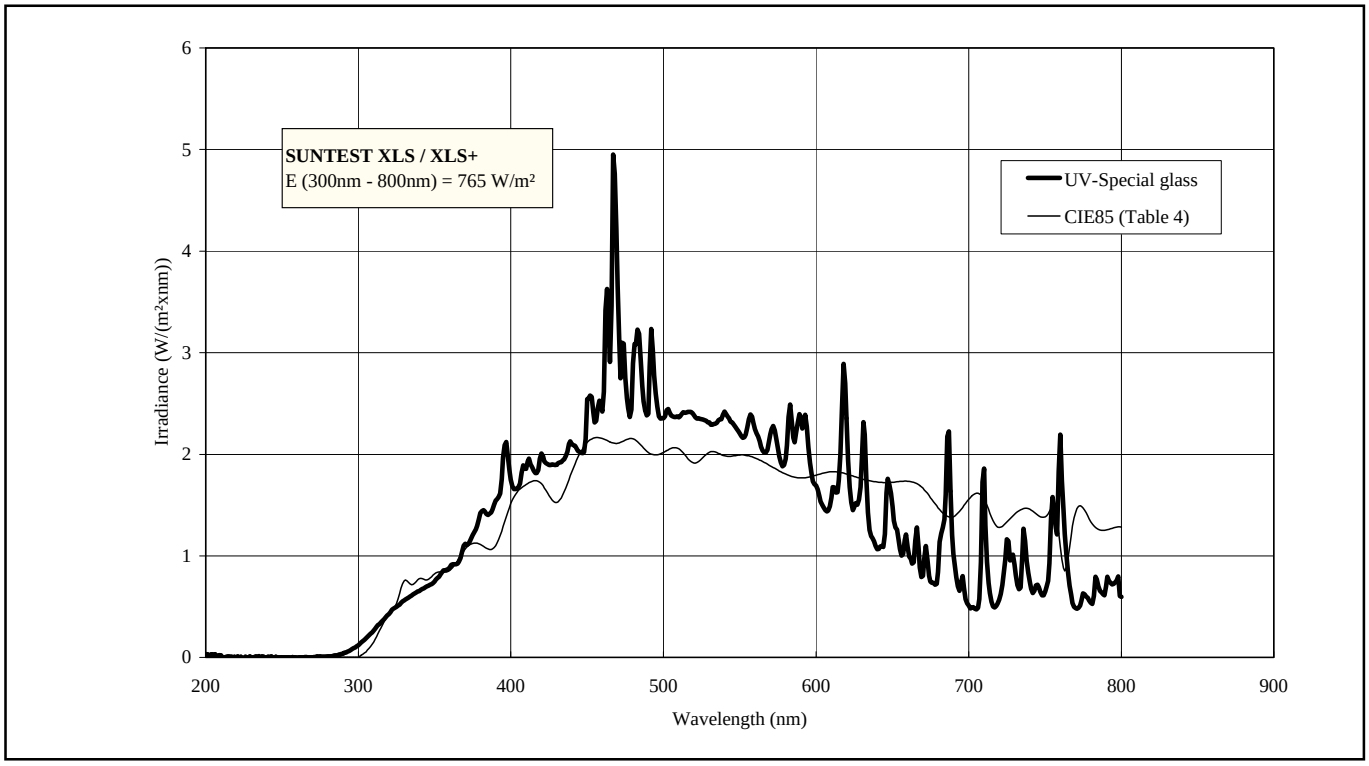


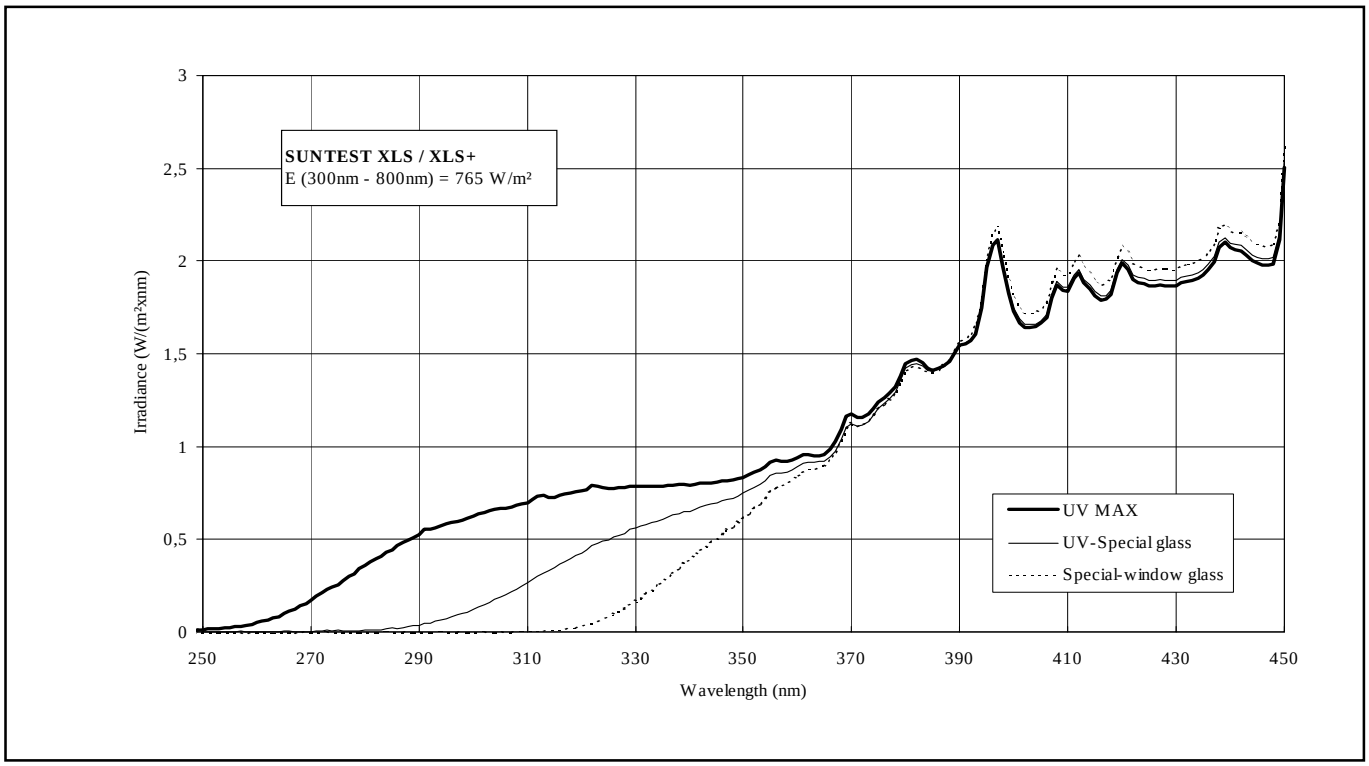
① Cooling air supply (inlet), test chamber
② Cooling air outlet, test chamber, lower side of the device
③ Cooling air supply Xenon lamp
④ Cooling air outlet, Xenon lamp

4 Function description

4.3 Spectral distribution with additional filters

Figure: Spectra





4 Function description

4.4 Sensor system in SUNTEST XLS+

SUNTEST XLS+ has integrated sensors:

- Sensor for measuring and controlling the irradiance (E) in the range 300 - 800nm,
- Sensor for measuring and regulating the black standard temperature (BST) in the range ambient temperature up to about 90°C,
- Sensor for measuring the test chamber temperature (CHT).

Irradiance (E):

- During the testing, the irradiance is measured by a photo-diode ① and controlled electronically to achieve a constant value.

Black Standard Temperature (BST)

- During the testing, temperature measurements are taken continuously by the black standard-sensor (BST) ②.
- The black standard temperature (BST) is controlled via the speed of the test chamber ventilator.

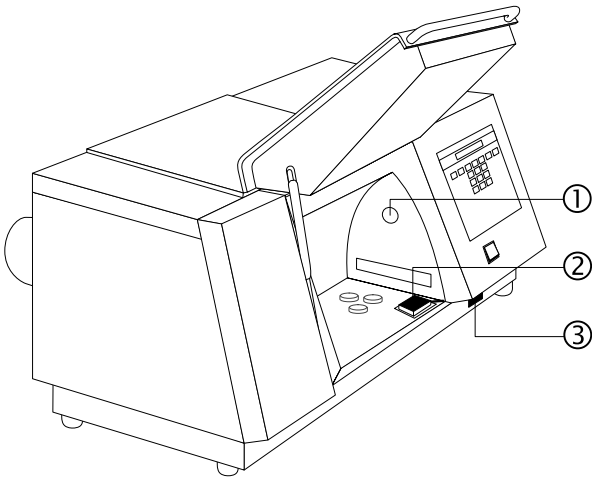
Test chamber temperature (CHT):

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

Measurement data:

- The measured data can be transferred, with the testing program running, via the RS 232-port ③ to a PC or a printer with a serial interface.

Figure 7



① Photodiode for measurement of the irradiance
② Black standard-Sensor (SST)
③ RS 232 port for data transfer

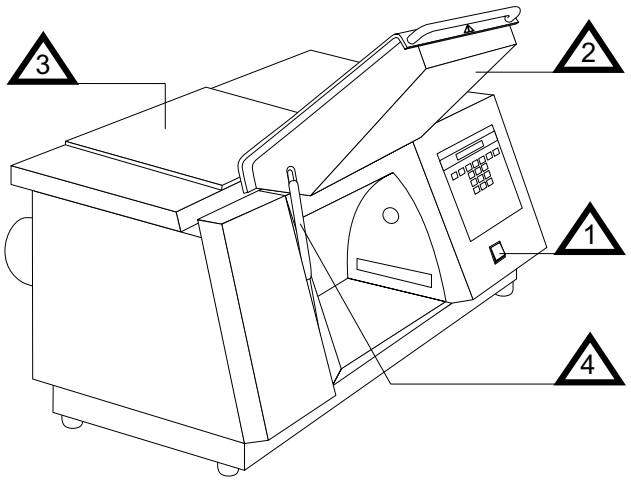
4 Function description

4.5 Safety devices

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

- To switch off the equipment in an emergency, set the ON (**I**) / OFF (**0**) switch ① to position “OFF (**0**)”.
- A door switch switches off the equipment when the test chamber door ② is opened.
- A safety switch interrupts the power supply when the covering hood ③ is pushed back.
- The gas-pressure spring ④ on the door of the test chamber stabilizes the door in its open position.
- A temperature safety device switches off the equipment if there is a danger of the Xenon lamp getting overheated because of insufficient cooling.

Figure 8



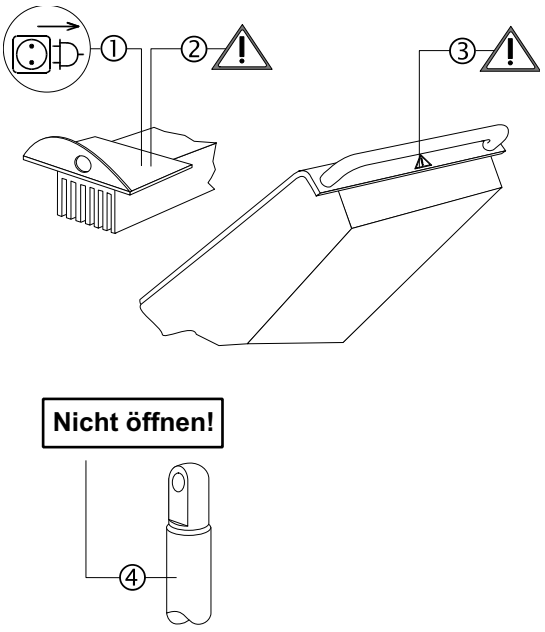
① ON (**I**) / OFF (**O**) switch
② Door switch for test chamber door
③ Safety switch for covering hood
④ Gas- pressure spring

4.6 Safety markings

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

- The safety notice “Pull out power plug” ① on the absorber provides a warning about touching live parts of the equipment.
- The safety notice “Warning of danger" ② on the absorber warns about touching the radiation system when it is hot and about sharp edges on the optical filter and reflecting mirror.
- The safety notice “Warning of danger” ③ on the door of the test chamber warns of a possible danger of fingers getting caught in the door of the test chamber if the door is closed abruptly, and of touching hot specimens.
  So also, there is a warning about the dangers of the UV-radiation being emitted if the sample table is not fitted.
- The notice “Do not open!” ④ on the gas pressure spring warns about opening the gas pressure spring, which is under high tension.

Figure 9



① Pull out the plug
② Warning of danger
③ Warning of danger
④ Do not open

5 Accessories

Item	Accessories	Description	Ident no.:
1	**Sensors:**		
1.1	XenoCal UV sensor	Measurement and calibration of the irradiance; measurement range 300 - 400 mm	5500 7270
1.2	XenoCal Global sensor	Measurement and calibration of the irradiance; measurement range 300 - 800 mm	5500 7271
1.3	Adapter for XenoCal sensors	Holding plate for insertion of the XenoCal sensor in the testing chamber	5607 7895
1.4	Black standard sensor (BST)	Measurement of the black standard temperature (BST)	5600 1490
1.5	White standard sensor (WST)	Measurement of the white standard temperature (WST) with digital display	5600 1491
1.6	White standard sensor (WST)	Measurement of the white standard temperature (WST), (separate readout device required)	5607 7906
1.7	Adapter for SST and WST sensor	Holding plate for inserting the BST and WST sensors in the test chamber	5607 7928
1.8	XENOVIEW, serial 9-pole	Software package for transferring the test parameters to a PC	5607 6813
1.9	XENOVIEW, serial 25-pole	Software package for transferring the test parameters to a PC	5607 6812
2	**Filter:**		
2.1	UV special glass	In addition to the coated quartz dish for working with wave lengths greater than 290 mm	5605 2371
2.2	Special window glass	In addition to the coated quartz dish for working with wavelengths greater than 310 mm	5605 2372
2.3	Solar standard	Filter according to COLIPA and DIN 67501	5607 7759
2.4	Solar ID65	Filter for illuminating according to the ICH Guideline	5607 7769
2.5	Uncoated quartz disk	Instead of the coated quartz dish for higher black standard temperatures	5605 2373
3	**Testing table**		
3.1	Water-cooled sample table	For illuminating temperature-sensitive materials	5607 8013
4	**Covering sheet**		
4.1	Set of covering sheets	Covering sheets for direct visual comparison of the weathered and unweathered test areas	5607 7980

5 Accessories

Item	Accessories	Description	Ident no.:
5	**Flooding device:**		
5.1	Flooding device with undercarriage, flooding tub and insertion plate	For cyclic wetting of specimens	5607 7932
5.2	Specimen fastening for flooding device		5607 7977
6	**Cooling assembly SunCool**		
6.1	Cooling assembly SunCool 230V 50 Hz	SunCool for reducing the temperature in the test chamber by 12ºC - 16ºC	5607 7978
6.2	Connection set (right-hand) for SunCool 230V, 50 Hz	Connection stubs for connecting SunCool / SUNTEST (installation to the right of SUNTEST)	5607 7981
6.3	Connection set (bottom) for SunCool 230 V, 50 Hz	Connection stubs for connecting SunCool / SUNTEST (installation below SUNTEST)	5607 7982
6.4	Ventilation baffle plate 230V 50 Hz	For guided removal of the hot exhaust air of the cooling assembly (520 cm³/h)	5607 7985
6.5	Cooling assembly SunCool 115 V; 60 Hz	SunCool for reducing the testing chamber temperature by 12ºC - 16ºC	5607 7979
6.6	Connection set (right-hand) for SunCool 115 V, 60 Hz	Connection stubs for connecting SunCool / SUNTEST (installation to the right of SUNTEST)	5607 8014
6.7	Connection set (bottom) for SunCool 115 V, 60 Hz	Connection stubs for connecting SunCool / SUNTEST (installation below SUNTEST)	5607 8015
6.8	Ventilation baffle plate (bottom) 115 V, 60 Hz	For guided removal of the hot exhaust air of the cooling assembly (520 m^3/h)	5607 7986
6.9	Trolley for cooling device	In case of installation below SUNTEST	5607 7857
6.10	Set of insulation pads	For preventing condensate water on the surface of the SUNTEST equipment	5607 7983

6 Commissioning

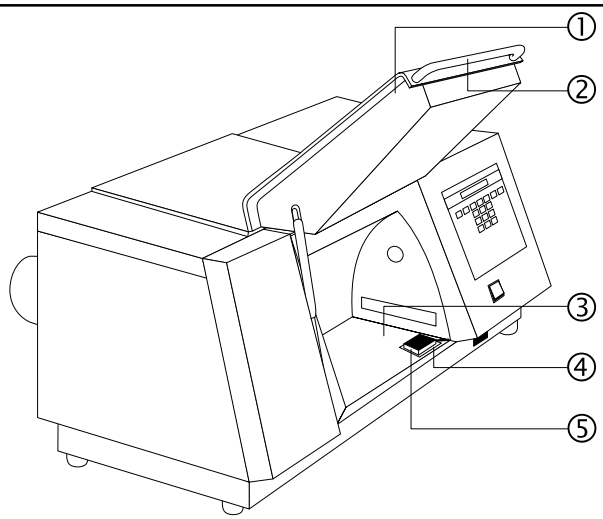
6.1 Mount the sample table

WARNING - UV-radiation being emitted:

If the sample table is not used, UV-radiation is emitted on the lower side of the equipment and can result in damage to the skin and the retina.
The sample table should always be used when the equipment is running!

1. Open the sample table door ① with the handle ②.
2. Mount the sample table ③ in such a way that the sensor receptacle ④ for the black standard sensor is at the test chamber door ①.
3. Insert the black standard sensor ⑤ in the sensor locator ④.

Figure 10



① Test chamber door
② Handle
③ Sample table
④ Sensor receptacle for the black standard sensor
⑤ Black standard sensor

6 Commissioning

6.2 Assemble the radiation system

Before the equipment can be commissioned, the sample table and the radiation system must be assembled

6.2.1 Components of the radiation system

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

The radiation unit consists of:
① Optical filter “coated quartz dish” (optional: uncoated quartz dish),
② Optional optical additional filters (see chapter 5, “Accessories’),
③ the Z-Rail,
④ Xenon lamp,
⑤ UV mirror (transparent), pre-mounted, with
⑥ Light mirror (mirror coating).

NOTE!

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

6.2.2 Open the assembly compartment

WARNING - Pull out the power plug:

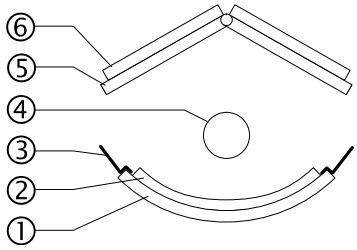
Coming in contact with live parts may result in a fatal electrical shock.
When installing the radiation systems, set the ON (I) / OFF (O) switch to the “OFF (O)” position and pull out the power plug. Secure the power plug from being re-inserted.

1. Set the ON (**I**) / OFF (**0**) switch to the “OFF (**0**)” position. Pull the plug out of the socket. Secure it against re-insertion.
2. Loosen the safety screw ① with a cross-slotted screwdriver.
3. Push down the covering hood ② towards the back till the assembly compartment ③ is freely accessible (arrow 1).
4. Remove the absorber ④ from the assembly compartment ③ on the two retaining side plates and place them on the housing cover (arrow 2). Do not dismantle the securing cable on the absorber.

CAUTION - Danger of burning:

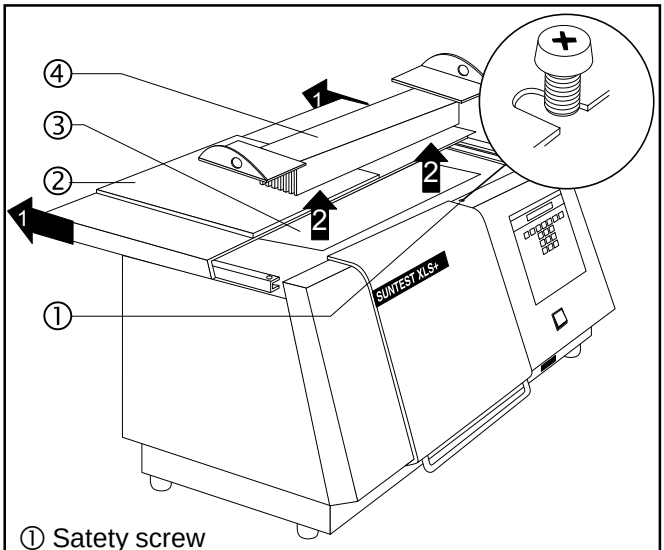
For cooling the hot specimens and the specimen supports, the fan continues to run even after the equipment has been switched off.
Open the test chamber only after the fan is automatically switched off.

Figure 11



① Optical filter "coated quartz dish"
② Optional additional filter
③ Z-Rail
④ Xenon lamp
⑤ UV mirror (transparent)
⑥ Light mirror (mirror coating)

Figure 12



① Satety screw
② Covering hood
③ Assembly compartment
④ Absorber

6 Commissioning

6.2.3 Installation of the optical filter

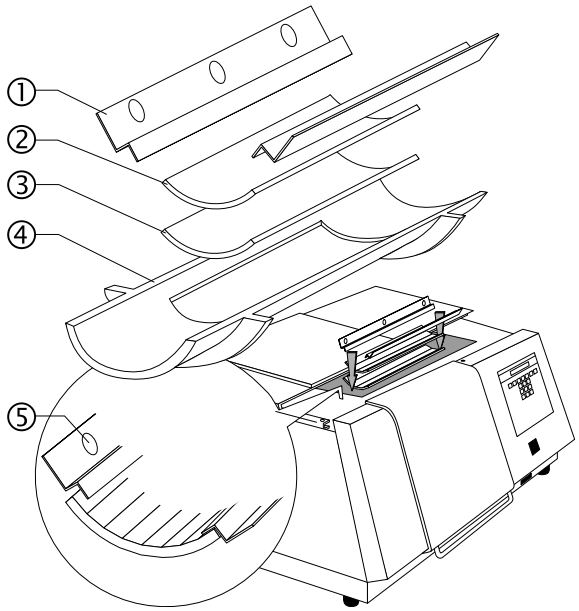
Clean the optical filter before assembling with a soft leather cloth / brush. Carefully wipe the optional filter „UV-special glass“ with a starch-free cloth that is moistened with 20% citric acid solution.

⚠ CAUTION - Danger of cuts and gashes:
The optical filters have sharp edges that can cause cuts and gashes.
Hand-gloves should be worn whenever working on the radiation unit.

☞ NOTE!
The holding frame ④, in which the optical filters are placed is located in the assembly compartment.

1. Wear protective hand-gloves.
2. First, place the optical filter “coated quartz dish” or the optional “uncoated quartz dish” ③ in the holding frame ④.
3. Then, place the optional optical filter ② (see chapter 5, “Accessories’).
4. Insert the Z-Rail ① into the assembly compartment, with the holes ⑤ facing towards the back of the unit.
5. Position the Z-Rail on top of the lower optical filter, ensuring a tight and flush fit against the housing wall.

Figure 13



① Z-Rail 2x
② Coated / optionally uncoated quartz dish
③ Holding frame
④ Optional filter
⑤ Z-Rail Holes 3x

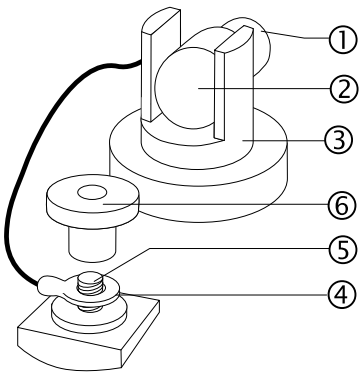
6.2.4 Installation of the Xenon lamp

Before installation, the Xenon lamp should first 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 sokket ② in the mounting ③.
2. Place the cable lug ④ on the threaded pin ⑤ and tighten it with the help of the knurled nut ⑥.

Figure 14



① Xenon Lamp
② Lamp socket
③ Mounting
④ Cable lug
⑤ Threaded pin
⑥ Knurled nut

6 Commissioning

6.2.5 Installation of the reflector mirror

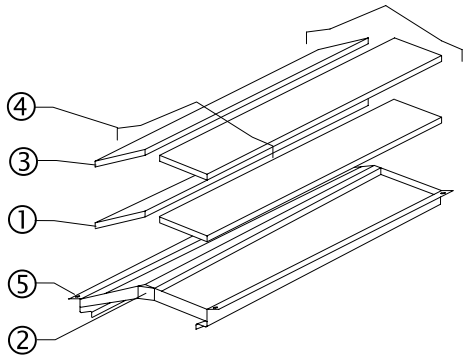
NOTE!

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

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

1. First, place the transparent UV mirror ① in the holding mounting ②.
2. Then, fit the light mirror ③.
3. Fix the mirrors by inserting the two retaining clips ④ in the holes ⑤.
4. Insert the holding rack ② in the radiation compartment.

Figure 15

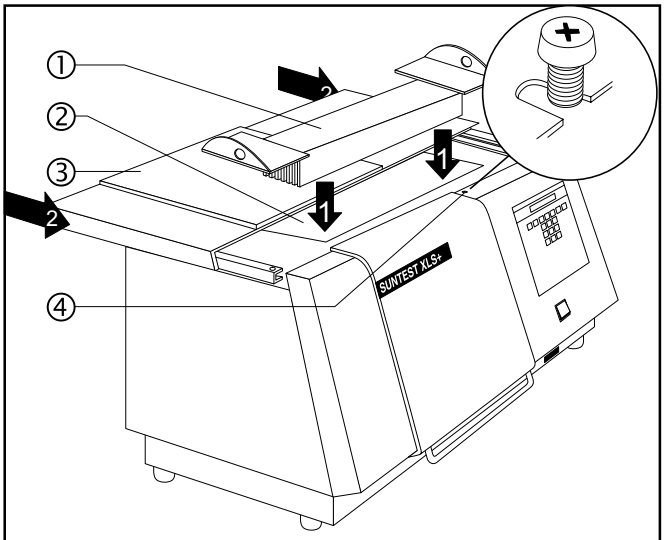


① UV mirror (transparent)
② Holding rack
③ Light mirror (mirror coating)
④ Retaining clips
⑤ Holes for the retaining clips

6.2.6 Close the assembly compartment

1. Place the absorber ① at the two holding shackles in the assembly compartment ② (arrow 1).
2. Hold the covering hood ③ on the outer sides and close it (arrow 2).
3. Tighten the safety screw ④ with a cross-slotted screwdriver.
4. Check for correct, sealed seating of the covering hood ③.

Figure 16



① Absorber
② Assembly compartment
③ Covering hood
④ Safety screw

6 Commissioning

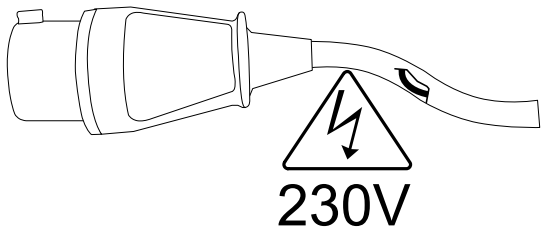
6.3 Connect to the power supply

WARNING - Electrical shocks:
Coming in contact with live parts can result in a fatal electrical 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 equipment electrically, and immediately inform the service agent.

The Suntest equipment has a single-phase power supply
through a 32A-power plug with the following parameters: 200V - 240V ± 10% at 50 / 60Hz. The supply network must be secured (fuse settings) for 32A.

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 equipment.
2. Check the fuse setting of the supply with 32A. A supply system that is not equipped with the correct fuses can result in an electrical shock in case of failure.
3. Insert the power plug in a socket that is properly earthed and equipped with the correct fuses.

Figure 17



7 Operation and Shutdown

7.1 Setting the equipment conditions

⚠ WARNING - Pull out the power plug: 

Coming in contact with live parts can result in a fatal electrical shock.
When setting the equipment conditions, 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 out the power plug from the power socket. Secure the power plug from being inserted into the socket again.
2. Use the sample table as described in chapter 6 "Commissioning".
3. Insert the optical filter, the Xenon lamp and the reflecting mirror as described in chapter 6 "Commissioning".

7.2 Standard-Testing procedure

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

1. Center the specimens ① in the test chamber. Thin or very light specimens ① can be fixed by optionally placing additional cover sheets (see chapter 5, "Accessories').

NOTE!

To be able to reproduce and compare tests, the BST sensor must always be placed in the sensor receptacle of the sample table.

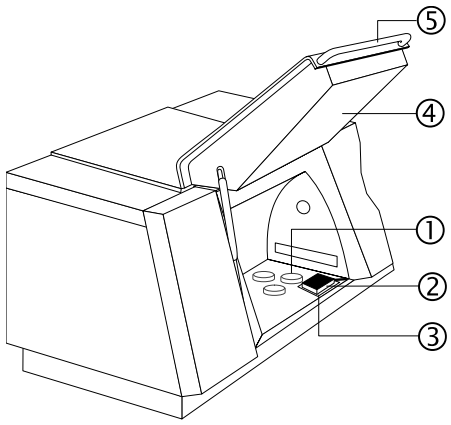
2. Insert the black standard-sensor ② (BST) in the sensor receptacle ③.

⚠ CAUTION - Danger of injury:

The test chamber may close suddenly because of its own weight. Open and close the test chamber door only using the handle. For complete closing, press the door slightly.

3. Close the test chamber door ④ with handle ⑤.

Figure 18



① Specimens
② Black standard-sensor (BST)
③ Sensor receptacle for the black standard sensor
④ Test chamber door
⑤ Handle

7.3 Testing procedure with optional equipment

The possibilities of use of the SUNTEST XLS / XLS+ can be enhanced with various accessories (see chapter 5, „Accessories").

- **For temperature-sensitive materials:**
  Water-cooled sample table with a hose connection to tap water supply.
- **Cover plates:**
  For a direct visual comparison between illuminated and non-illuminated specimen surfaces.
- **Cooling device SunCool:**
  To reduce the test chamber temperature by 12-16° C.
- **Flooding device:**
  For cyclic wetting of specimens.

7 Operation and shutdown

7.4 Operation of SUNTEST XLS

The SUNTEST XLS has a sensor for measuring the irradiance in the range from 300 - 800nm. The irradiance in the equipment is controlled to a constant value.
An actual-value measurement is possible by using the optional sensors for measuring the irradiance (see chapter 5, "Accessories").

1. Set the irradiance on the rotary switch ①. The irradiance can be infinitely set between 250 - 765 W/m².

NOTE!

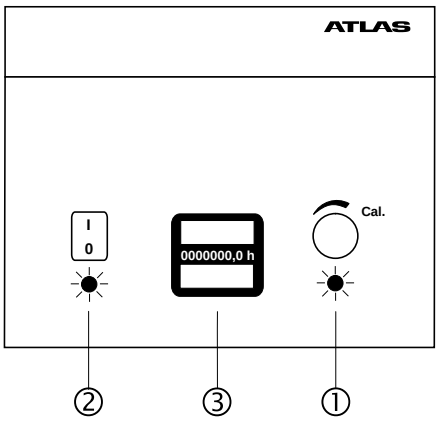
The optional sensors „Radialux" and „XenoCal" can be used to measure and display the irradiance and the radiant exposure.

2. Set the ON(**I**) / OFF(**0**) switch ② to the "ON (**I**)" position. The Xenon lamp now gets switched on. The duration for which the Xenon lamp has been on is displayed in the Xenon lamp operating hour meter ③.

NOTE!

The Xenon lamp should be replaced after every 1500 operating hours.

Figure 19



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

7.5 Operation of the SUNTEST XLS+ Program Controller

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

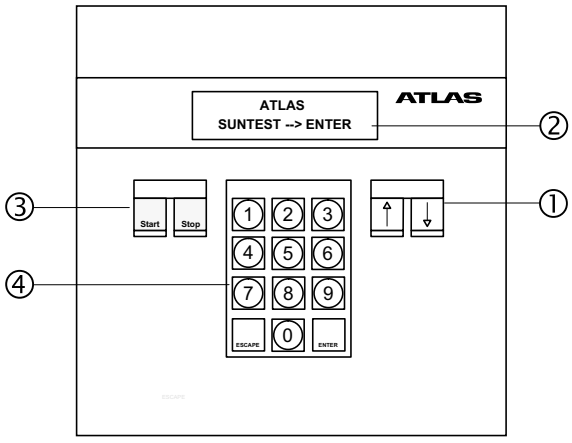
The program controller provides:
- six test programs,
- with six test cycles each.

The end of the program can be selected optionally, according to the criteria:
- Testing time (time),
- Radiant exposure (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 the lamp and equipment,
- Displaying the current testing parameters in a target/ actual comparison,
- Displaying the test chamber temperature (actual value).

Figure 20



① Cursor keys for parameter input
② Two-line display for operator guidance
③ Start key, Stop key
④ Keypad for inputting the program

7 Operation and shutdown

7.6 Data transfer

The SUNTEST XLS+ 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 XLS+ to the PC or a serial printer:

1. Connect the connection cable to a free serial port (Com I, Com 2 etc.) of the PC

☞ **NOTE:**
Note the pin configuration of the serial connection cable for 9-pole or 25-pole plugs.

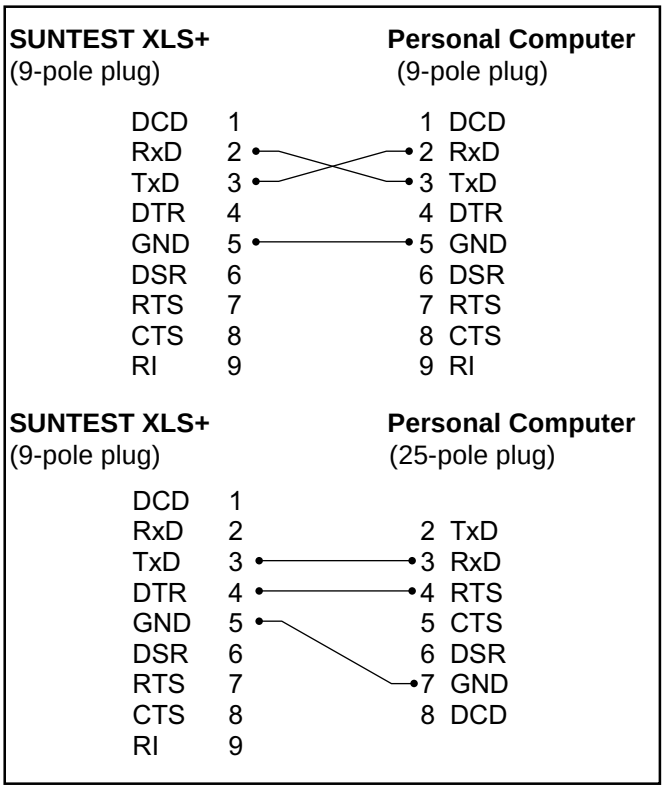
2. Connect the remaining free plug of the connection cable to the RS 232 port of the SUNTEST XLS+.
3. Before starting the program, there is a prompt whether the data transfer should be started.

7.7 Shutting down

⚠ **CAUTION - Danger of burning:**
For cooling the hot specimens and the specimen supports, the fan continues to run even after the equipment has been switched off.
Open the test chamber only after the fan is automatically switched off.
When replacing specimens, wear protective hand-gloves.

1. After the fan is switched off automatically, set the ON (**I**) / OFF (**0**) switch to the “OFF (**0**)” position.
2. Wear protective hand-gloves.
3. Open the test chamber door using the handle and remove the specimens from the specimen room.
4. If required, take additional optional accessories from the test chamber.
5. Clean the equipment according to chapter 9.1, “Cleaning”.
6. In case of longer pauses in operation, pull out the power plug as well.

Figure 21



Printer configuration:
8 bit
Baudrate 9600
No parity
1 stop bit

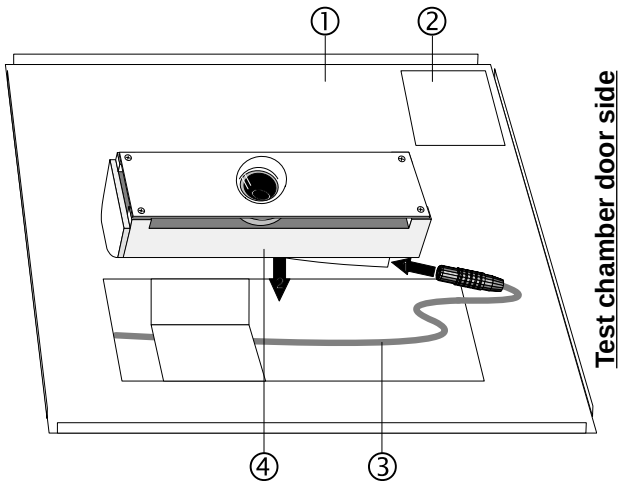
8 Calibration

8.1 Calibration of the irradiance with the XenoCal Global-Sensor

The equipment should be calibrated before and after every test.
The optional XenoCal Global Sensor and an adapter for the XenoCal sensor (see chapter 5 “Accessories”) are necessary for the calibration.

1. Mount the adapter table ① for the XenoCal Global-Sensor instead of the sample table in the test chamber.
   Mount the adapter table ① in such a way that the sensor receptacle for the black standard sensor ② is at rightfront side of the test chamber.
2. Insert the connector cable ③ in the XenoCal Global sensor ④ 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 XLS+, start the calibration program and input the irradiance at which the calibration is to be done.
5 After about 30 minutes, input 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 taken into account during every subsequent test.

Figure 22



① Adapter table for XenoCal Global-Sensor
② Sensor receptacle for the black standard sensor
③ Connector cable
④ XenoCal Global-Sensor

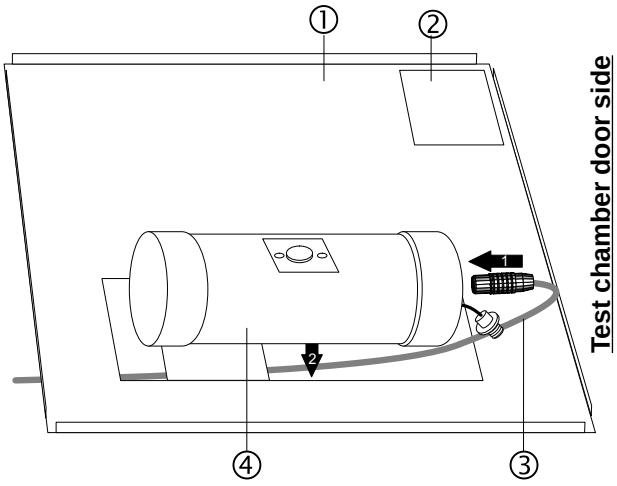
8 Calibration

8.2 Calibration of the irradiance with the Radialux Global Sensor

The equipment should be calibrated before and after every test.
An adapter for the Radialux sensor (see chapter 5 “ Accessories’) is required for calibrating the irradiance.

1 . Mount the adapter table ① for the Radialux Global Sensor instead of the sample table in the test chamber.
Mount the adapter table ① in such a way that the sensor receptacle for the black standard sensor ② is at the right front side of the test chamber.
2. Insert the connector cable ③ in the Radialux-Global-Sensor ④ 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 XLS+, start the calibration program and input the irradiance at which the calibration is to be done.
5. After about 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 into the SUNTEST controller and confirm with “ENTER”.
6. After the automatic cooling period runs out, the calibration factor calculated by the software is indicated in the display unit and automatically taken into account at the time of every subsequent test.

Figure 23



① Adapter for Radialux Global sensor
② Sensor receptacle for the black standard sensor
③ Connector cable
④ Radialux Global sensor

Pos.	Filter	Correction factor
1	Filter A	1,00
2	Filter B	0,96
3	Filter C	0,92
4	Filter D	1,12
5	Filter E	1,10
6	Filter F	1,08
7	Filter G	0,90
8	Filter H	0,96

8 Calibration

8.3 Calibration of the black standard-temperature

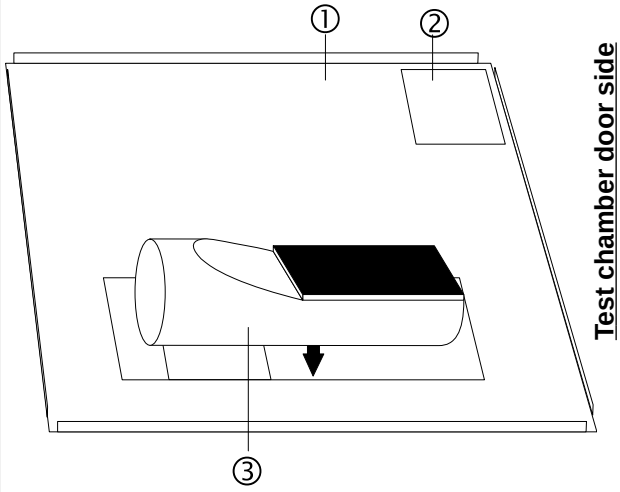
The equipment should be calibrated before and after every test.
An optional black standard thermometer and a corresponding adapter (see chapter 5 “Accessories”) are necessary for calibrating the black standard temperature.

1. Use the adapter table ① for the black standard thermometer instead of the sample table in the test chamber.
   Mount the adapter table ① in such a way that the sensor receptacle for the black standard sensor ② is at the right front side of the test chamber.
2. The external black standard thermometer ③ should be so placed that the black surface points upwards, i.e. towards the Xenon lamp.
3. In the SUNTEST XLS+, start the calibration program and input the desired black standard temperature value at the desired irradiance value (which normally corresponds to the target irradiance value resulting from the previous irradiance calibration).

CAUTION - Danger of getting burnt:
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 hand-gloves!

4. If required, wear protective hand-gloves.
5. After about 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. The temperature value that is read is input to the SUNTEST controller and confirmed with “ENTER”.
7. The calibration factor calculated by the software is indicated on the SUNTEST-display and on pressing “ENTER” again, automatically taken into account for every subsequent test.

Figure 24



① Adapter for black standard thermometer
② Sensor receptacle for the black standard sensor
③ Black standard thermometer

9 Cleaning / Consumables

9.1 Cleaning

WARNING - Pull out the power plug: 

Coming in contact with live parts can result in a fatal electrical 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 equipment 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 half-year. The radiation unit must be dismantled in the opposite sequence to that described in chapter 6.2, "Assemble the radiation 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:
- In the cold state, clean the Xenon lamp with a starch-free cloth that is moistened with a little spirit.

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

9.1.4 Air Filter

CAUTION - Damage to the equipment:

The reflector and the radiation system are dust-sensitive. Unfiltered cooling air will adversely affect the functioning of the equipment.
The air filters must be cleaned half-yearly.
The air filters must always be installed during operation.

Procedure:
- Remove the filter mat from the filter opening on the rear side of the equipment.
- 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 catalog no., see chapter 9.2, "Spare parts").
- Let the filter mat dry and insert it in the filter opening again with the soft layer on the outside.

9 Cleaning / Consumables

9.2 Consumables / Spare parts

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

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

Item	Description	Lifetime	Ident no.
1	XENON lamp NXE 2201	1,500 hours	56077798
2	Air filter at rear side of equipment (2 pcs.)	upon request	50053191
3	Optical filters:		
	Uncoated quartz glass	10,000 hours	56052373
	Coated quartz glass	25,000 hours	56052388
	Special UV glass (Suprax)	15,000 hours	56052371
	Window glass	4,000 hours	56052372
	Solar ID 65	4,000 hours	56077769
	Solar Standard	25,000 hours	56077759

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
- Function (Technical Data)
- Electrical system (BRD: UVV VGB 4)
- Safety devices of the equipment

If protective devices have been dismantled or disabled for
the sake of maintenance work, the equipment may be started again only after the protective devices have been installed again and their function has been checked.

☞ **NOTE - Guarantee:**

The manufacturer guarantees the safety and proper functioning of the equipment 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 equipment, consisting of a maintenance service, measurement and calibration service that ensures the efficiency and process safety of the equipment.

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.

11 Technical data

SUNTEST XLS / XLS+

Power supply:

Supply voltage:	200-240 V ± 10%, 50/60 Hz
Supply connection:	CEE (32A, 3 pol., 6h) (1, N, PE)
Amperage:	20,5 A
Fuse rating:	32 A
Power consumption:	max. 3.1 KW
Nominal rating of Xenon-lamp:	2.2 kVA

Cooling requirement:

Lamp cooling:	250 m³/h
Air conditioner:	340 m³/h

Dimensions and weight:

Dimensions in mm: (width x depth x height)	930 x 500 x 485
Sample table:	330 x 330 mm
Specimen surface area:	about 1000 cm²
Weight:	about 80 kg

Noise emission:

Noise level:	< 75 dB(A)

Ambient conditions:

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

ATLAS MATERIAL TESTING SOLUTIONS

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