A T L A S – SolarClimatic Test Cabinet SC 1000 MHG

A T L A S - SolarClimatic

Type	**SC 1000 MHG**
Test space volume	approx. 1000 l
Irradiated area	approx. 5600 cm²

♦ TECHNICAL DATA

Characteristic values for temperature tests with radiation

Temperature range	approx. -20 °C to +100 °C
Temperature fluctuation with steady state conditions according to IEC 60068-3-5 depending on the test space temperature	temporal ±1.0 K

Characteristic values for climatic tests with radiation

Temperature range	+15 °C to +80 °C
Temperature fluctuation with steady state conditions according to IEC 60068-3-5 depending on the test space temperature	temporal ≤±0.5 K
Humidity range	10 % to 80 % r. h.
Dew point range	+5 °C to +74 °C
Humidity fluctuation with steady state conditions depending on climatic value	temporal ±3.0 % r. h. to ±5 % r.h.

Characteristic values for the radiation

Kind of radiation	1 x 4.0 KW - metal -halide - lamp
Radiation intensity	800 to 1200 W/m² related to the radiation area, infinitely variable
Regularity	± 5% related to the radiation area
Filter system	outdoor, indoor-glasses can be mounted
Radiation area	approx. 5600 cm^2, in a distance of min. 600 mm from the chamber ceiling
Spectral power distribution	global radiation 280 to 3000 nm, recommended for eiging testings, basis CIE Publ. No. 85 Tab. 4 and DIN 75220 Tab. 1, print 2/4
Radiation modulation	< 1%
Output stability	+/- 1%

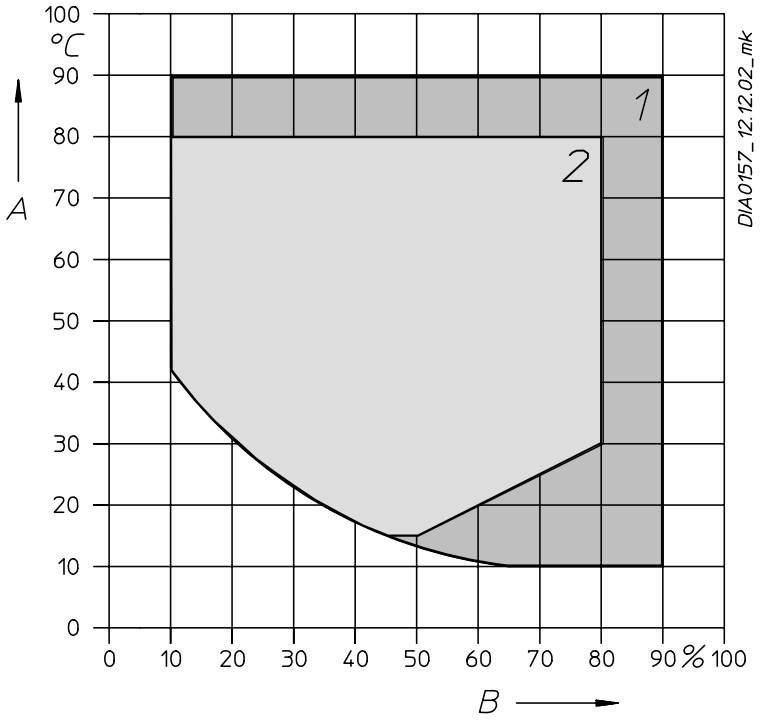
Characteristic values for temperature tests without radiation

Temperature range	approx. -30 °C to +100 °C
transmission aperture	approx. -40 °C to +120 °C (light closed with optional isolation cover)
Temperature fluctuation with steady state conditions according to IEC 60068-3-5 depending on the test space temperature	temporal ±0.1 K to ±0.5 K
Temperature rates of change according to IEC 60068-3-5	heating: approx. 4.0 K/min. cooling: approx. 2.5 K/min.
Calibrated temperature values	+23 °C and +80 °C

Characteristic values for climatic tests without radiation

Temperature range	+10 °C to +90 °C
Temperature fluctuation with steady state conditions according to IEC 60068-3-5 depending on the test space temperature	temporal ±0.1 K to ±0.3 K
Humidity range	10 % to 90 % r. h.
Dew point range	+5 °C to +87 °C
Humidity fluctuation with steady state conditions depending on climatic value	temporal ±1.0 % r.h. to ±3.0 % r. h.
Calibrated climatic values	+23 °C / 50 % r.h. and +90 °C / 50 % r.h.

Humidity diagram



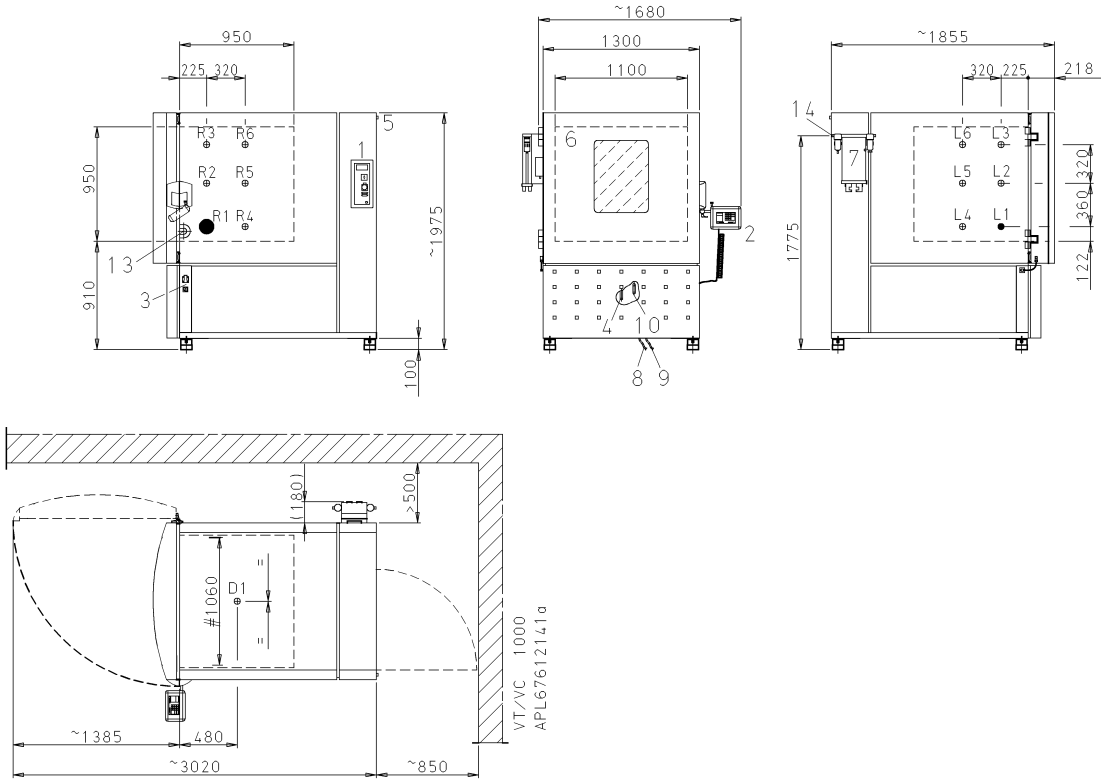
A Test space temperature in °C
B Relativ humidity in % r.h.

1 Range without radiation
2 Range with radiation

Data for installation and operation

Dimensions	Test space	Cabinet (required space)
	1385 mm wide	1100 mm wide
	1850 mm deep	950 mm deep
	2550 mm high*	950 mm high

(* incl. radiation module)



- Entry port installed in basic version
  R1: NW 125 mm
  L1: NW 50 mm
  R2... additional installation positions r. h. side(option)
drain
  L2.... additional installation positions l. h. side (option)
3.5 m

1) Main switch panel
2) Operator device >touch panel<
3) Connector panel
4) Connection for overflow and condensate

5) Electrical connection, cable length approx.

25) Radiation unit (not described)
27) Isolation cover (option)

\# Distance between shelf supports

Weight	total approx. 775 kg net
Sound pressure level the front	approx. 62 dB(A) measured 1 m distance from at free field measurement
EMC Test (electromagnetic compatibility)	according to EN 50 081-1, 1993
Interference immunity	according to EN 50 082-2, 1996
Electrical connection 50Hz conductor fully black	nominal voltage 3/N/PE AC 400V ± 10% nominal power approx. 18 kW nominal current approx. 32,5 A (neutral loaded) connector Cekon 64 A connecting cable approx. 3.5 m fuse protection provided by the customer 64 A, slow blow
Note:	in combination with option “controlling of standard temperature” the connection will be changing to fixed instead of plug.
Humidification water and psychrometer water	demineralized water, pH-value 6-7 conductivity max.20 Microsiemens/cm integrated supply tank approx. 20 l
Drain for condensate and cleaning water	hose connecting sleeve NW 12 mm
Operating conditions	ambient temperature +10 °C to +35 °C max. rel. air humidity 75 % r. h.
heat emission	A sufficient ventilation to compensate the has to be guaranteed on site.
Installation conditions normal temperature	The equipment is designed for installation in rooms. The max. permissible ambient for storage and installation is +55 °C.

Design

Radiation unit	• radiation module with metal-halide-lamp • lamp manual adjustable in height • thermo-isolating glass • electronic starter and receiver
Filters systems	outdoor filter, for indoor testing the test cabinet is equipped with a special guide rail, which is mounted below the lamp. A window glass (optional accessory) can be then positioned in this rail.
Test space	polished stainless steel - grade 1.4301 max. load of test space floor 150 kg,
Shelf	1 shelf made of stainless steel, work space with moulded shelf supports, max. load for each shelf: 50 kg, a maximum of 11 shelves is possible max. total load 100 kg
Door	hinged on the left hand side, one-hand operation, lockable
Entry ports	1 entry port ∅ 50 mm installed on l. h. side (pos. 1) 1 entry port ∅ 125 mm installed on r. h. side (pos. 2)
Refrigeration unit	• low-noise (silent) refrigeration unit • air-cooled • continuously variable power adjustment by electronic monitoring and control system • hermetically sealed refrigeration cycle
Refrigerant	• R 404 A • chloride-free refrigerant • The ozone depletion potential is zero (ODP = 0,00)
Condensation protection specimens via	can be switched on to avoid condensation on test by dehumidifying during heating phase. This is achieved separate dehumidifying coil
Climatic system	• water bath with temperature control • aerosol-free humidification and dehumidification • psychrometric humidity measuring system with continuously wetted, self-cleaning wet-bulb sensor • integrated supply tank for humidification water with level indication • automatic water replenishment for connection to

customer	demineralized water supply • level indication with low water alarm • water depletion protection
Fresh air equipment	to reduce test specimens emission, additional switchable in a temperature range from +15 °C to +80 °C stage 1 = 1.5 m³/h stage 2 = 5.0 m³/h
Cleaning device for humidifier bath	for highly loaded test space atmosphere, via solenoid valve, draining of the humidifier bath at intervals
Finish	resistant powder coating colour: RAL 9002, grey-white
Installation	feet separately adjustable in height
Control	microprocessor control and monitoring system **SIMCON/32** • 32 bit technology • graphical representation of set point and actual value • digital display of set point and actual value of temperature in °C and relative humidity in % relative humidity • digital input of temperature in °C and humidity in % relative humidity • integrated programme generator • programme memory • manual and automatic operation • fault diagnostic system • radiation ON/OFF via digital channel • digital input in % intensity
Control terminal	**Touch control panel** • graphics LCD-display • display with ¼ VGA resolution • display with backlighting • operation by touching function symbols • graphics symbols for programming functions • graphical representation of the current test values • menu-guided, clear text display, trend function • easy programming of individual test programmes • storage of individual programmes, which can be activated at any time. • programme storage for 100 programmes with total 1000 sections, 250 loops and 9999 cycles • software support for up to 32 digital switching channels

	• password protection • inspection system (maintenance system), giving information about combined working hours, number of switching events of a particular component and its failures • digital input of temperature, rel. humidity and % intensity • display of working hours of radiation unit
Centronics interface	for graphical documentation for HP Deskjet Color and Epson printer
Interface RS 232	for connection of the laptop control unit or for communication with customer's computer
Test specimen protection	• independent adjustable temperature limiter t_{min} / t_{max} according to EN 60 519-2 1993, thermal safety class 2 individually adjustable fixed values, movable sensor in test space, • adjustable software temperature limiter min. / max., individually adjustable fixed values
Protection of test specimens	safety switch especially for heat emitting test specimens connection onto potential-free changeover contact, max. load 24 V, 0.5 A
Fault message radiation module	if radiation module gives fault message the test cabinet error message is activ and gives message
Temperature safety device	safety temperature limiter (STB) for protection of the test cabinet against overheating
Digital customer I/O	• 4 digital outputs for switching of customers' equipment via potential-free contacts, load max. 24 V-DC; 0.5 A • 4 digital inputs for feedback from customers equipment, load max. 24 V-DC, approx. 30 mA The insulation voltage for inputs against earth is 1000 V-DC
Socket	European socket 220 - 230 V, max. 2 A, for connection of a measuring or registration device
Protection class	climatic test cabinet: IP 22 electrical compartment: IP 54 control terminal: IP 54 radiation module: IP 20

Notes and definitions

The temperature and humidity accuracy mentioned is measured in the centre of the test space.
This is with stabilised conditions, without test specimens and without heat load and without optional accessories in the test space.

The factory calibration of the temperature and humidity values will be done by traceable author-ized national standards. The calibration is documented with a certificate.

All figures are average values, which have been obtained at an ambient temperature of +25 °C
and a nominal voltage of 400 V/50 Hz, without test specimens, without heat load and without optional accessories.

The noise measurement and sound level statements are according to DIN 45 635, Part 1, Accuracy class 2.

The EMC Test (electromagnetic compatibility) and the statements regarding interference are according to EN 50 081-1. The interference immunity is according to EN 50 082-2.

All figures to the radiation are valid at +23 °C test space temperature resp. +23 °C / 50 %r.h. test space climate and with new lamp (up to 50 hours burning time).

♦ CABINET DESCRIPTION

The test cabinets of series SolarClimatic provides you with a sophisticated testing system produced by applying highly innovative production technology. Numerous significant features
support your tests in compliance with defined standards or in accordance with your specific demands. The modular and service-friendly design and the use of environmental-friendly refrigerants with no ozone depleting potential ensures that our systems have a long service life.

Compact Housing

The individual components are installed in a space-saving manner, so that they are easily accessible. The housing is made of galvanised steel sheet. An extremely wear resistant surface is achieved thanks to the environment-friendly powder coating. Attention has also been paid to good environmental use of the insulation material for the inner container. The insulating layer, consisting purely of mineral fibres, guarantees high heat insulation.

Simple Handling

The door of the test cabinet can be operated very easily using a single-handed closure mechanism. Practical arrangement of the supply connections ensures easy installation of the cabinet. Electrical and water connections can be simply connected. The integral water tank is positioned at the front of the cabinet and is easily accessible. The cabinet can be levelled using the height-adjustment on the feet.

Test Space

The rigid test space made of stainless steel is welded vapour-tight. It is easy to clean thanks to polished metal finish and rounded corners. Pressed guides are provided for supporting the shelves.

Exact Test Climate

A single central suction fan with a high air output guides the test space air over a large area heat exchanger. The air-cooled cooling compressor supplies the appropriate refrigerant into the expansion valve.

The humidification and dehumidification system is based on the controlled temperature water bath method. Depending on the temperature of the water bath, either humidity condenses into the bath or water vapour evaporates into the test space. By exact and drift-free climatic control

very low humidity fluctuations are achieved. The aerosol-free humidification system in combination with the carefully sealed test space guarantees a very economical and reliable operation, even at high temperature and humidity values.

Accurate Measuring System

The measuring sensors for temperature and humidity are located in the supply air into the test space. The measured climatic values correspond to the test space climate. Humidity measurement is performed in accordance with the internationally recognised psychrometric measuring principle. With the improved, continuously wetted and self-cleaning wet-bulb sensor the lifetime of the psychrometric sensor will be increased enormously.

The humidity is set and displayed in % relative humidity by means of a humidity computer. The measuring sensors are installed at the front to permit simple maintenance of the humidity sensor even when the test space is filled. Exact and trouble free function even during long term tests is guaranteed thanks to an automatic water supply to the psychrometric measuring sensor.

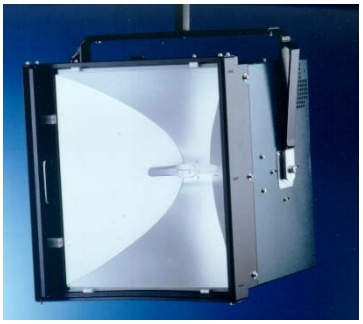
Condensation Protection

The condensation protection (dehumidification during the heating phase) comprises of a special dehumidifying coil that dehumidifies the test space during the heating phase, after testing at low temperatures. This minimizes condensation forming on test specimens.

Radiation System (MHG)

The radiation system is consisting of the radiation unit and the supply unit (power supply).

The Radiation Unit

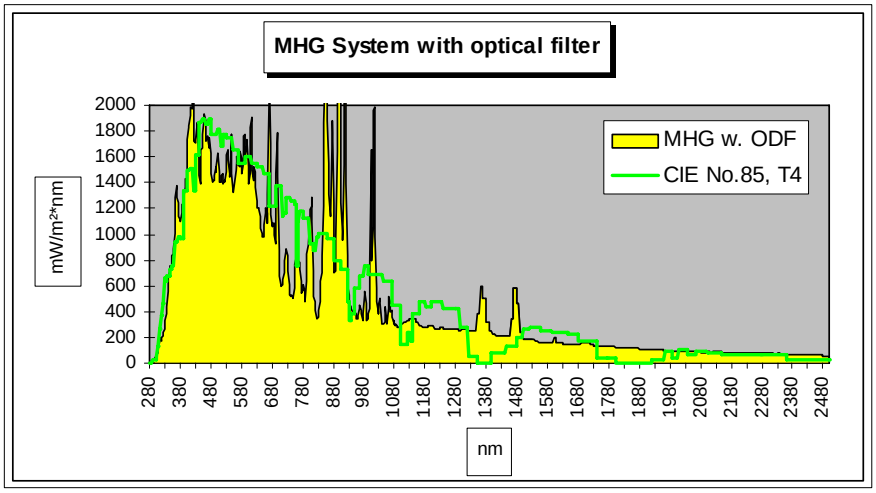


The **SolarConstant** radiation unit is equipped with a **MHG** lamp of **4.000W**, a reflector system and an igniter.

The radiation units will be installed on top of the climatic chamber. Radiation into the test chamber is made through filter glass (two layer glazing).

The spectral distribution of the system is based on the requirements for the "Total Radiation", as shown in the CIE Publ. No. 85 Tab.4. The spectral power distribution is in accordance to the percentages shown for the different spectral ranges in DIN 75220, Tab.1., the so-called “Outdoor Spectrum“.
To meet the requirement of the DIN 75220 "Indoor-Spectrum" (Test behind window glass), two measures can be taken.

1. The "Indoor-Filter" (4mm window glass) will be direct adapted to the radiation unit.
2. Large window glass segments will be placed into the path of rays inside the test chamber.



The Supply Unit

The electronic power supply, **EPS-Modul 2500/4000**, is used to control the operation of the MHG lamp.

The **EPS-Modul** offers a **Stabilised power output**, a **Low modulation (<+/-1%) of the radiation**, an **Intensity control** from 50% to 110% and an **extended lamp life**.

Variation of the electrical power to control the irradiance will always result into a change of the spectral power distribution, as the various fillings of the lamp react differently. A reduced electrical power will cause an increase of the UV and an decrease of the IR portion.
If the application of the system is ageing test on material and components, the electrical power control needs to be limited to a range of max. 80%–110% (requirements spectral power distribution acc. to DIN 75220). When thermal solar load tests are performed, the full control range can be used.

Microprocessor-supported Control SIMCON/32

The electrical control devices are easily accessible in a swivel compartment. The design complies with regulations VDE 0100 and DIN EN 60204-1. The entire electrical compartment complies with Protection Class IP 54. The main switch is located towards the rear on the right-
hand side of the cabinet.

Digital control is via a modern microprocessor with 32-bit technology. With this computing performance the SIMCON/32 meets the high demands of process and control technology as well as those of microelectronics and information technology.

The standard control terminal is ergonomically positioned. Current temperature and humidity values are graphically displayed. The terminal provides access at all times to all operating functions. Help texts are available for easy operation

More complex programmes can be easily installed with the optionally available laptop control unit and the SIMPATI software (both available as optional accessories). After being read into the main memory these programmes can be initialised without any extra programming effort. With optional interfaces networking of several systems is possible.

Touch Control Panel

Removable touch control panel is easy to use with clear graphics display, function symbols and graphics symbols.

The display with ¼ VGA resolution (320 x 240 pixel) has backlighting and is therefore easily seen. Simply touch the required function symbol to operate the cabinet.

It offers complete access at all times to all operating functions, a graphical representation of the current test values and help text for the current operating function. Touch the terminal to switch between the three modes.

Individual test programmes are particularly easy to create.

Time-consuming acquisition of programming knowledge is not necessary. All functions such as jumps, ramps, loops etc. are displayed as graphics symbols and are adopted by the test cycle when touched. Thus you can easily create, save and retrieve extensive test programmes including the programming of test specimen activation.

The removable control terminal is ergonomically positioned to allow easy operation of the test cabinet.

Protection class of the control terminal: IP 54

The control terminal is arranged on the right-hand side of the cabinet.

Built-in Safety

The control monitors the system functions and gives necessary signals.

- Over temperature in the test space (according to EN 60 519-2 class 1, 1995)
- Over temperature in the test space, adjustable (according to EN 60 519-2 class 2, 1995)
- Under temperature in the test space, adjustable (according to EN 60 519-2 class 2, 1995)
- Over temperature for humidity water bath
- Excess pressure and over temperature in the refrigeration circuit
- Switching-off of test specimen via a potential-free contact

Test Specimen Protection

The test cabinet is equipped with an independent upper and lower temperature limiter (adjustable temperature limiter) according to EN 60 519-2 class 2, 1995. The threshold

temperature
t_{min} and t_{max} have a digital setting. Alarm message will be acoustical. This test specimen protection hardware is independent from the included programmable software temperature limiter.

Environment-friendly Materials

The refrigerant used R 404 A is CFC-free and is leading in ecological terms. Systems equipped with R 404 A meet with the latest standards. The ozone depleting potential is reduced to zero. The cabinets are prepared for the safe disposal of refrigerant and compressor oils by our service engineers. The insulation material is an asbestos-free mineral fibre applied by a special process. This avoids environmental pollution using a CFC-foamed polyurethane insulation. The resistant powder coating does not release any harmful substances into the environment.

Maintenance and Service

In the event of a fault, our service network with trained technicians and spare part supply is available throughout the world. Training, commissioning and maintenance are possible by our specialists. If required, we can offer a maintenance and service contract.

♦ BASIC EQUIPMENT

Basic Equipment

Basic unit type **ATLAS SC 1000 MHG**

- Touch control panel
- Micro-processor monitoring and control unit SIMCON/32
- Digital customer I/O, potential-free 24 V, 4 freely disposable inputs/outputs
- Independent adjustable temperature limiter t_{min} / t_{max}
- Adjustable software temperature limiter min./max.
- Humidity input and display in % rel. humidity
- Centronics printer interface
- Serial interface RS 232
- Potential-free contact for switching-off of test specimens
- European socket

- Calibration of 2 temperature values and 2 climate values

- Air-cooled refrigeration unit
- Condensation protection (dehumidification during heating phase)
- Aerosol-free humidification and dehumidification
- Psychrometric humidity measuring system
- Water supply tank for humidification water with level indication
- Automatic water replenishment with low water alarm

- Fresh air equipment
- Cleaning device for humidifier bath

- 1 Entry port, NW 50 mm, left-hand side
- 1 Entry port, NW 125 mm, right-hand side
- 1 Shelf made of stainless steel

- radiation unit with 1 x 4.0 kW metal-halogenid-lamps
- filter system outdoor
- set value of intensity in % intensity
- fault diagnostic system for radiation unit
- display of working hours of radiation unit

- 1 Set of operating instructions