memmert
aralab

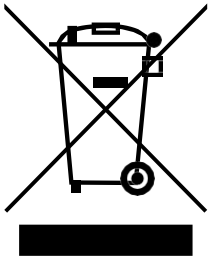
TESTA CT-TT

USER'S MANUAL

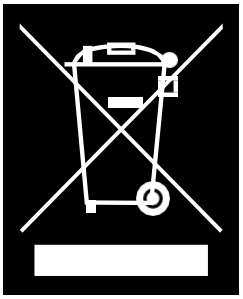
READ AND KEEP THESE INSTRUCTIONS

TRANSLATED MANUAL

REEE DIRECTIVE



Or



A label with a cross on an urban container and a rectangular bar indicates that the product is covered by the directive on waste electrical and electronic equipment (REEE) and as such should not be deleted as municipal waste.

Any product marked with this symbol must be collected separately, in accordance with regulatory guidelines in your area.

The objectives of this programme are to preserve, protect and improve the quality of the environment, protect human health and to use natural resources prudently and rationally.

The specific treatment of REEE is indispensable, in order to avoid dispersion of pollutants in recycled materials or waste stream. This treatment is the most effective means of protecting the customer environment.

The requirements for waste collection, reuse, recycling and recovery vary according to your local regulatory authority.

Contact your local body or authorized representative for information about the applicable regulations on disposal of REEE.

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SECTION 1
GENERAL INFORMATION

1.1 WARRANTY

MEMMERT shall provide supplementary performance for defects in a product within 12 months of transfer of risk by means of rectification or replacement delivery at MEMMERT's discretion. As a rule, we offer a two-year warranty for Co-branding Testa products. Further details can be found in our General Terms and Conditions (GTC).

Implementation of the warranty

A warranty claim must be made in writing by the customer immediately, stating the serial number of the affected device. As part of the warranty service, Memmert does not restore or replace any data or software programs stored in the storage media of the product. Repairs may result in the complete loss of all data stored by the user. The customer is responsible for making a complete backup of all data before sending in the device. The warranty only covers the right to have defects in the device rectified. No further claims can be made. In particular, there is no entitlement to a replacement device for the duration of the repair.

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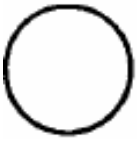
1.2 INTRODUCTION

This manual provides the user knowledge about the characteristics of the equipment, its operation and handling, as well as maintenance procedures.

Warning: On receipt of the equipment, you should check the general condition and ensure that there is no visible damage caused by transport.

	**The proper operation of this equipment is users' responsibility. A full reading of this manual is essential for this to happen.**
	**This symbol indicates chapters and sections of this instruction manual which are particular relevant to safety.**
	**This symbol indicates that hazardous voltages may be present.**
	**This symbol indicates a three-phase alternating current.**
	**This symbol indicates a protective conductor terminal.**
	This symbol indicates power On.
	**This symbol indicates power Off.**

1.3 SAFETY INSTRUCTIONS AND WARNINGS

- To prevent injury or damage to the unit, the appliance should be unpacked and set up by two people.
- In the event that the appliance is damaged on delivery, contact the supplier immediately before connecting to the mains.
- To guarantee safe operation, ensure that the appliance is set up and connected as described in these operating instructions.
- Disconnect the appliance from the mains if any fault occurs. Pull out the plug, switch off or remove the fuse.
- Whenever need to disconnect the equipment from the wall outlet, always pull by the plug, never the cord.
- Any repairs and work on the appliance should only be carried out by the customer service department, as unauthorized work could prove highly dangerous for the user.
- Never remove or handle any guards or safety devices.
- Never allow open flame, ignition, or explosive substance inside the equipment. The same applies to substances that somehow release / evaporate flammable solvents.
- Do not lean or hang on the structure / doors / shelves equipment.
- This appliance is not intended for use by persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given initial supervision or instruction concerning use of the appliance by a person responsible for their safety.

	**Always bear in mind these safety instructions.** **Make sure all users are aware of these safety instructions.**

1.4 SAFETY DEVICES

Given the following unacceptable conditions or abnormalities, the safety devices shut off certain items of equipment in order to prevent their destruction:

- High temperature inside the chamber;
- Low temperature inside the chamber;
- High temperature in the condenser;
- High temperature in the dew point bath;
- Low temperature in the dew point bath;
- Lack of water in the dew point bath;
- High pressure in the cooling system;
- Low pressure in the cooling system;
- High temperature in the cooling circuit of the condenser (if applicable);
- Low temperature in the cooling circuit of the condenser (if applicable);
- High temperature in the condenser (if applicable);
- High temperature in compressor's discharge;
- Low temperature in compressor's suction;
- Excessive consumption of the compressor;
- Excessive consumption in the compressor crankcase heater;
- Excessive consumption of the ventilator;
- Lack of water in the psychrometric sensor tank (if applicable);
- Abnormal conditions in the supply voltage.

SECTION 2
CLIMATIC CHAMBER

2.1 CONTENTS

The climatic chamber is accompanied by the following contents:

- User Manual
- Warranty Certificate
- Certificate of Origin (if applicable)
- Electrical and cooling schemes
- Safety data sheet (refrigerant)
- Certificate of calibration (if applicable)
- Compliance Statement ICH (if applicable)
- Installation Qualification (if applicable)
- Software data acquisition “FitoLog” (if applicable)
- Software Manual “FitoLog” (if applicable)
- Certificate of Software installation “FitoLog” (if applicable)
- Software Qualification “FitoLog” (if applicable)
- Keys
- Caps (if applicable)

2.2 GENERAL DESCRIPTION

The TESTA CT-TT is a climatic chamber which is design to precisely control the environmental conditions, including temperature and humidity.

2.3 PURPOSE AND USE

This chamber was designed and built for climatic tests.
It can run tests that determine the influence of temperature and relative humidity on the characteristics of materials and operational safety of the testing material.

2.4 TECHNICAL CHARACTERISTICS

MODEL	TESTA CT-TT 300	
Test space (litres)[1]	272-299	
Test space dimensions (WxHxD)[2]	634 x 715 (787) x 600	
Overall dimensions (WxHxD)	1009 x 1840 x 1350	
Controllable parameters **E** **EC** **EP** **ECP**	 Temperature Temperature/Humidity Temperature/Humidity Temperature/Humidity	
Temperature range* **TESTA 40** **TESTA 50** **TESTA 75**	 -40°C/+180°C, ±0.2°C -52°C/+180°C, ±0.2°C -75°C/+180°C, ±0.2°C	
Humidity range	10%rH - 98%rH, ±2%rH	
Temp. change rate heating[3] **TESTA 40** **TESTA 50** **TESTA 75**	Standard 5,0°C/min 5,0°C/min 5,0°C/min	Heating boost option - 10, 0°C/min 10, 0°C/min
Temp. change rate cooling[4] **TESTA 40** **TESTA 50** **TESTA 75**	Standard 5,0°C/min 3,0°C/min 3,5°C/min	Cooling boost option - 10, 0°C/min 10, 0°C/min
Temperature sensor **E** **EC** **EP** **ECP**	 PT100 PT100+XB32 Cap. PT100 PT100+XB32 Cap.	
Humidity sensor **E** **EC** **EP** **ECP**	 - XB32 Cap. PT100+PT100 2xPT100+XB32 Cap.	
Heating (Resistor) **TESTA 40** **TESTA 50** **TESTA 75**	Standard 4000W (2x2000W) 4000W (2x2000W) 4000W (2x2000W)	Heating boost option 9000W (3x3000W) 9000W (3x3000W) 9000W (3x3000W)
Refrigeration (Mech.evaporation) **TESTA 40** **TESTA 50** **TESTA 75**	 R449A R449A R449A (option A) - R449A+R23+R290 (option B) - Nitrogen (option C)	
Humidification (Resistor) **E** **EC** **EP** **ECP**	 - 1000W 1000W 1000W	
Dehumidification (Thermostatic bath)	R449A	

Weight **TESTA 40** **TESTA 50** **TESTA 75**	 ≈535 kg ≈535 kg ≈540 kg	
Nominal voltage **TESTA 40** **TESTA 50** **TESTA 75**	 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz	
Nominal current **TESTA 40** **TESTA 50** **TESTA 75**	Standard 16A 16A 32A	Heating/cooling boost 32A 32A 32A
Nominal power (approx.) **TESTA 40** **TESTA 50** **TESTA 75**	Standard 11kW 11kW 22kW	Heating/cooling boost 11kW 22kW 22kW

Indicative values may vary according to customer specifications and have been obtained at a temperature of 25°C, without options, without thermal test specimen and without thermal load.

[1] and [2] : Volume with and without floor
[3] and [4] : (acc. IEC 60068-3-5)
*Some models may feature a reduced maximum temperature range, depending on the specific equipment configuration.

MODEL	TESTACAL CT-TT 300
Test space (litres)[1]	272-299
Test space dimensions (WxHxD)[2]	634 x 715 (787) x 600
Overwall dimensions (WxHxD)	1000 x 1830 x 1350
Controllable parameters **E** **EC** **EP** **ECP**	 Temperature Temperature/Humidity Temperature/Humidity Temperature/Humidity
Temperature range* **TESTACAL 50**	 -52°C/+180°C, ±0,2°C
Humidity range	10%rH - 98%rH, ±2%rH
Temp. change rate heating[3] **TESTACAL 50**	Standard 5,0°C/min
Temp. change rate cooling[4] **TESTACAL 50**	Standard 3,0°C/min
Temperature sensor **E** **EC** **EP** **ECP**	 PT100 PT100+XB32 Cap. PT100 PT100+XB32 Cap.
Humidity sensor **E** **EC** **EP** **ECP**	 - XB32 Cap. PT100+PT100 2xPT100+XB32 Cap.
Heating (Resistor) **TESTACAL 50**	Standard 4000W (2x2000W)
Refrigeration **(Mechanical evaporation)** **TESTACAL 50**	 R449A
Humidification (Resistor) **E** **EC** **EP** **ECP**	 - 1000W 1000W 1000W
Dehumidification **(Thermostatic bath)**	R449A
Weight **TESTACAL 50**	≈535 kg
Nominal voltage **TESTACAL 50**	400V±10%, 3/N/PE, 50Hz-60Hz
Nominal current **TESTACAL 50**	Standard 16A
Nominal power (approx.) **TESTACAL 50**	Standard 11kW

[1] and [2] : Volume with and without floor
[3] and [4] : (acc. IEC 60068-3-5)
*Some models may feature a reduced maximum temperature range, depending on the specific equipment configuration.

MODEL	TESTA CT-TT 500	
Test space (litres)[1]	455-504	
Test space dimensions (WxHxD)[2]	700 x 830 (920) x 783	
Overall dimensions (WxHxD)	1059 x 1980 x 1540	
Controllable parameters **E** **EC** **EP** **ECP**	 Temperature Temperature/Humidity Temperature/Humidity Temperature/Humidity	
Temperature range* **TESTA 40** **TESTA 50** **TESTA 75**	 -40°C/+180°C, ±0.2°C -52°C/+180°C, ±0.2°C -75°C/+180°C, ±0.1°C	
Humidity range	10%rH - 98%rH, ±2%rH	
Temp. change rate heating[3] **TESTA 40** **TESTA 50** **TESTA 75**	Standard 5,0°C/min 4,5°C/min 4,5°C/min	Heating boost option - 10, 0°C/min 10, 0°C/min
Temp. change rate cooling[4] **TESTA 40** **TESTA 50** **TESTA 75**	Standard 5,0°C/min 3,0°C/min 3,0°C/min	Cooling boost option - 10, 0°C/min 10, 0°C/min
Temperature sensor **E** **EC** **EP** **ECP**	 PT100 PT100+XB32 Cap. PT100 PT100+XB32 Cap.	
Humidity sensor **E** **EC** **EP** **ECP**	 - XB32 Cap. PT100+PT100 2xPT100+XB32 Cap.	
Heating (Resistor) **TESTA 40** **TESTA 50** **TESTA 75**	Standard 6000W (2x3000W) 4000W (2x2000W) 4000W (2x2000W)	Heating boost option 9000W (3x3000W) 9000W (3x3000W) 9000W (3x3000W)
Refrigeration (Mech.evaporation) **TESTA 40** **TESTA 50** **TESTA 75**	 R449A R449A R449A (option A) - R449A+R23+R290 (option B) - Nitrogen (option C)	
Humidification (Resistor) **E** **EC** **EP** **ECP**	 - 1000W 1000W 1000W	
Dehumidification (Thermostatic bath)	R449A	

Weight **TESTA 40** **TESTA 50** **TESTA 75**	 ≈584 kg ≈584 kg ≈600 kg	
Nominal voltage **TESTA 40** **TESTA 50** **TESTA 75**	 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz	
Nominal current **TESTA 40** **TESTA 50** **TESTA 75**	Standard 20A 16A 20A	Heating/cooling boost 32A 32A 32A
Nominal power (approx.) **TESTA 40** **TESTA 50** **TESTA 75**	Standard 14kW 11kW 14kW	Heating/cooling boost 22kW 22kW 22kW

Indicative values may vary according to customer specifications and have been obtained at a temperature of 25°C, without options, without thermal test specimen and without thermal load.

[1] and [2] : Volume with and without floor
[3] and [4] : (acc. IEC 60068-3-5)
*Some models may feature a reduced maximum temperature range, depending on the specific equipment configuration.

MODEL	TESTA CT-TT 1000	
Test space (litres)[1]	967-1052	
Test space dimensions (WxHxD)[2]	1000 x 919 (1000) x 1052	
Overall dimensions (WxHxD)	1359 x 2010 x 1836 1359 x 2480 x 1836 (TESTA CT SUN)	
Controllable parameters **E** **EC** **EP** **ECP**	 Temperature Temperature/Humidity Temperature/Humidity Temperature/Humidity	
Temperature range* **TESTA 40** **TESTA 50** **TESTA 75**	 -40°C/+180°C, ±0.3°C / -40°C/+90°C, ±0,5°C (only for TESTA CT SUN models) -52°C/+180°C, ±0.3°C / -45°C/+90°C, ±0,5°C (only for TESTA CT SUN models) -75°C/+180°C, ±0.3°C / -75°C/+90°C, ±0,5°C (only for TESTA CT SUN models)	
Humidity range	10%rH - 98%rH, ±2%rH	
Temp. change rate heating[3] **TESTA 40** **TESTA 50** **TESTA 75**	Standard 5,0°C/min 5,0°C/min 4,5°C/min	Heating boost option - 10, 0°C/min 10, 0°C/min
Temp. change rate cooling[4] **TESTA 40** **TESTA 50** **TESTA 75**	Standard 5,0°C/min 4,5°C/min 4,0°C/min	Cooling boost option - 10, 0°C/min 10, 0°C/min
Temperature sensor **E** **EC** **EP** **ECP**	 PT100 PT100+XB32 Cap. PT100 PT100+XB32 Cap.	
Humidity sensor **E** **EC** **EP** **ECP**	 - XB32 Cap. PT100+PT100 2xPT100+XB32 Cap.	
Heating (Resistor) **TESTA 40** **TESTA 50** **TESTA 75**	Standard 8000W (2x3000W+1x2000W) 8000W (2x3000W+1x2000W) 8000W (2x3000W+1x2000W)	Heating boost option 18000W (6x3000W) 18000W (6x3000W) 18000W (6x3000W)
Refrigeration (Mech.evaporation) **TESTA 40** **TESTA 50** **TESTA 75**	 R449A R449A R449A (option A) - R449A+R23+R290 (option B) - Nitrogen (option C)	
Humidification (Resistor) **E** **EC** **EP** **ECP**	 - 1500W 1500W 1500W	Humidify boost option - 3000W
Dehumidification (Thermostatic bath)	R449A	

Weight **TESTA 40** **TESTA 50** **TESTA 75**	 ≈874 kg ≈874 kg ≈910 kg	
Nominal voltage **TESTA 40** **TESTA 50** **TESTA 75**	 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz	
Nominal current **TESTA 40** **TESTA 50** **TESTA 75**	Standard 32A 32A 50A	Heating/cooling boost 32A 50A 63A
Nominal power (approx.) **TESTA 40** **TESTA 50** **TESTA 75**	Standard 22kW 22kW 35kW	Heating/cooling boost 35kW 35kW 44kW

Indicative values may vary according to customer specifications and have been obtained at a temperature of 25°C, without options, without thermal test specimen and without thermal load.

[1] and [2] : Volume with and without floor
[3] and [4] : (acc. IEC 60068-3-5)
*Some models may feature a reduced maximum temperature range, depending on the specific equipment configuration.

MODEL	TESTA CT-TT 1500	
Test space (litres)[1]	1411 - 1550	
Test space dimensions (WxHxD)[2]	1000 x 910 (1000) x 1550	
Overall dimensions (WxHxD)	1359 x 2050 x 2336	
Controllable parameters **E** **EC** **EP** **ECP**	 Temperature Temperature/Humidity Temperature/Humidity Temperature/Humidity	
Temperature range* **TESTA 50** **TESTA 75**	 -52°C/+180°C, ±0.2°C -75°C/+180°C, ±0.2°C	
Humidity range	10%rH - 98%rH, ±2%rH	
Temp. change rate heating[3] **TESTA 50** **TESTA 75**	Standard 4,0°C/min 4.5°C/min	Heating boost option - 10, 0°C/min
Temp. change rate cooling[4] **TESTA 50** **TESTA 75**	Standard 4,0°C/min 3.5°C/min	Cooling boost option - 10, 0°C/min
Temperature sensor **E** **EC** **EP** **ECP**	 PT100 PT100+XB32 Cap. PT100 PT100+XB32 Cap.	
Humidity sensor **E** **EC** **EP** **ECP**	 - XB32 Cap. PT100+PT100 2xPT100+XB32 Cap.	
Heating (Resistor) **TESTA 50** **TESTA 75**	Standard 8000W (2x3000W+1x2000W) 8000W (2x3000W+1x2000W)	Heating boost option 18000W (6x3000W) 18000W (6x3000W)
Refrigeration (Mech. evaporation) **TESTA 50** **TESTA 75**	 R449A R449A (option A) - R449A+R23+R290 (option B) - Nitrogen (option C)	
Humidification (Resistor) **E** **EC** **EP** **ECP**	 - 1500W 1500W 1500W	Humidify boost option - 3000W
Dehumidification (Thermostatic bath)	R449A	
Weight **TESTA 50** **TESTA 75**	 - 960≈ kg	
Nominal voltage **TESTA 50** **TESTA 75**	 400V±10%, 3/N/PE, 50Hz-60Hz 400V±10%, 3/N/PE, 50Hz-60Hz	

Nominal current **TESTA 50** **TESTA 75**	Standard 32A 50A	Heating/cooling boost 50A 63A
Nominal power (approx.) **TESTA 50** **TESTA 75**	Standard 22kW 35kW	Heating/cooling boost 35kW 44kW

Indicative values may vary according to customer specifications and have been obtained at a temperature of 25°C, without options, without thermal test specimen and without thermal load.

[1] and [2] : Volume with and without floor
[3] and [4] : (acc. IEC 60068-3-5)
*Some models may feature a reduced maximum temperature range, depending on the specific equipment configuration.

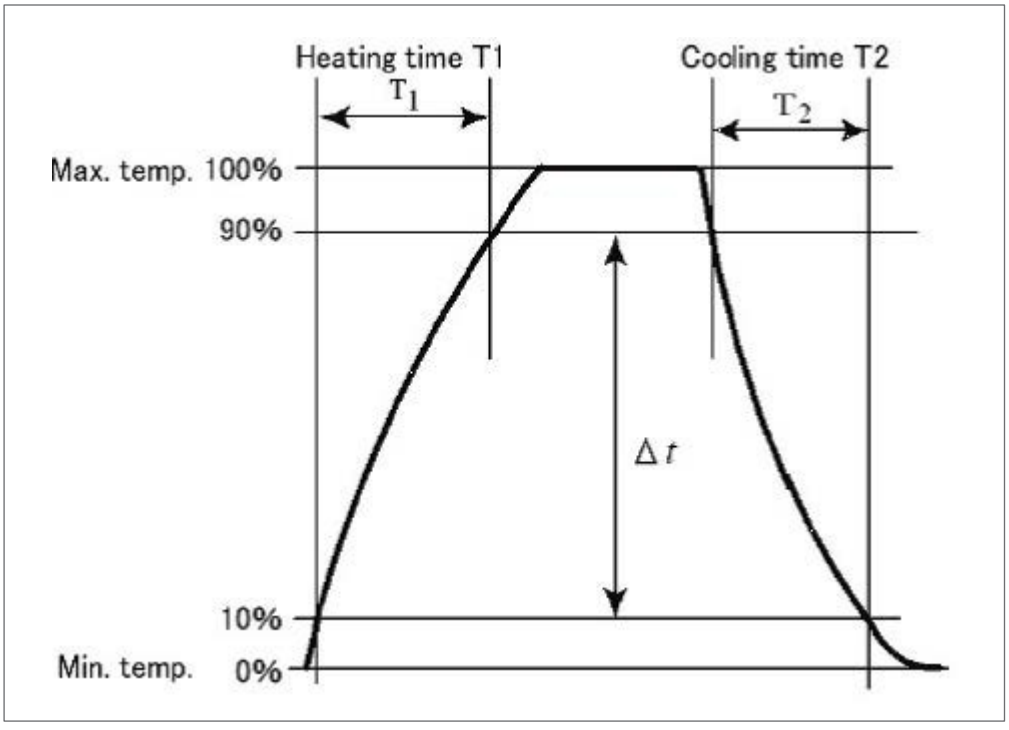
MODEL	TESTA CT-TT 2000	
Test space (litres)[1]	2200	
Test space dimensions (WxHxD)[2]	1300 x 1080 x 1570	
Overall dimensions (WxHxD)	1650 x 2160 x 2380	
Controllable parameters **E** **EC** **EP** **ECP**	 Temperature Temperature/Humidity Temperature/Humidity Temperature/Humidity	
Temperature range* **TESTA 50** **TESTA 60**	 -52°C/+180°C, ±0.2°C -60°C/+180°C, ±0.2°C	
Humidity range	10%rH - 98%rH, ±2%rH	
Temp. change rate heating[3] **TESTA 50** **TESTA 60**	Standard ---°C/min ---°C/min	Heating boost option 4,0°C/min 7,0°C/min
Temp. change rate cooling[4] **TESTA 50** **TESTA 60**	Standard 7,0°C/min 7,0°C/min	Cooling boost option ---°C/min ---°C/min
Temperature sensor **E** **EC** **EP** **ECP**	 PT100 PT100+XB32 Cap. PT100 PT100+XB32 Cap.	
Humidity sensor **E** **EC** **EP** **ECP**	 - XB32 Cap. PT100+PT100 2xPT100+XB32 Cap.	
Heating (Resistor) **TESTA 50** **TESTA 60**	Standard ---W ---W	Heating boost option 18000W (6x3000W) 18000W (6x3000W)
Refrigeration (Mech. evaporation) **TESTA 60**	 R449A (option A) - R449A+R23+R290 (option B) - Nitrogen (option C)	
Humidification (Resistor) **E** **EC** **EP** **ECP**	 - 2000W 2000W 2000W	Humidify boost option - 3000W 3000W 3000W
Dehumidification (Thermostatic bath)	R449A	
Weight **TESTA 50** **TESTA 60**	 1300 ≈ kg 1500 ≈ kg	
Nominal voltage **TESTA 50** **TESTA 60**	 400V±10%, 3/N/PE, 50Hz-60Hz	

Nominal current **TESTA 50** **TESTA 60**	Standard ---A ---A	Heating/cooling boost 32A 50A
Nominal power (approx.) **TESTA 50** **TESTA 60**	Standard ---kW	Heating/cooling boost 17kW 35kW

[1] and [2] : Volume with and without floor
[3] and [4] : (acc. IEC 60068-3-5)
*Some models may feature a reduced maximum temperature range, depending on the specific equipment configuration.

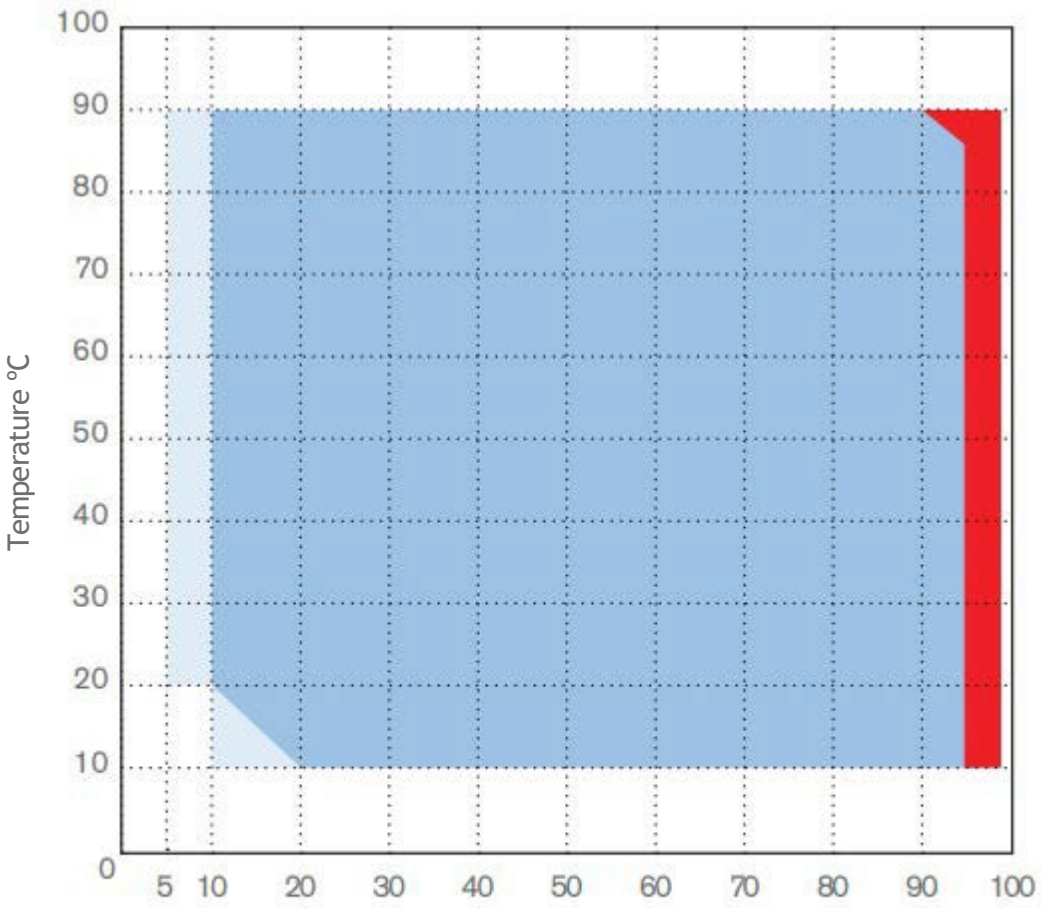
Note:
To characterize the performance of this chamber temperature changes, the results are presented in accordance with the requirements of IEC 60068 part. 3-5.

IEC 60068-3-5 Specification:



2.5 CLIMATOGRAM

Climatic range versus temperature:

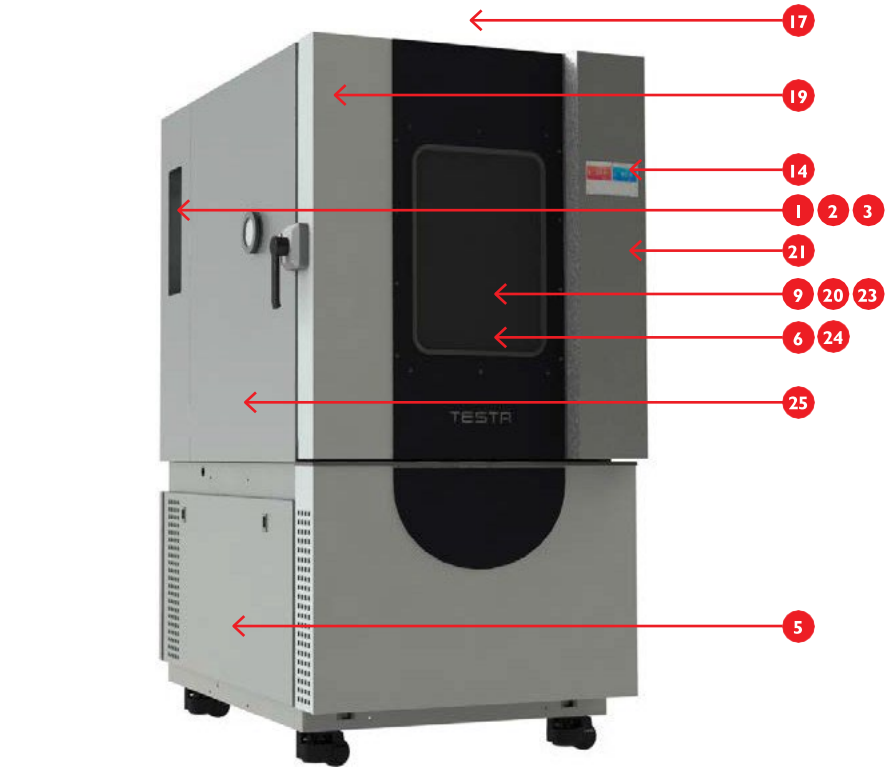


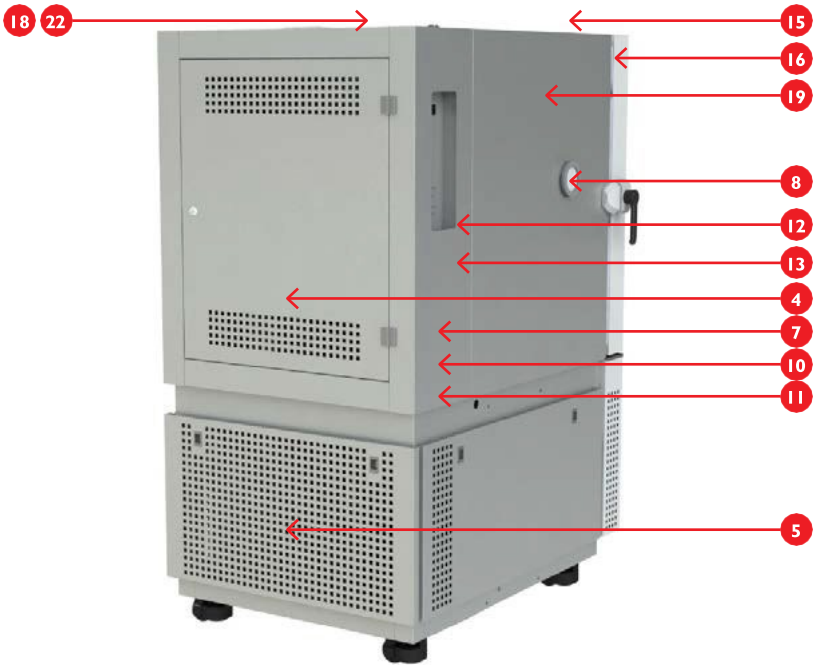
Standard climatic range 10%-98%rH

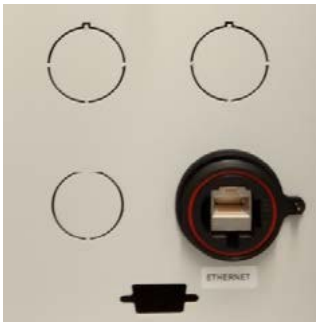
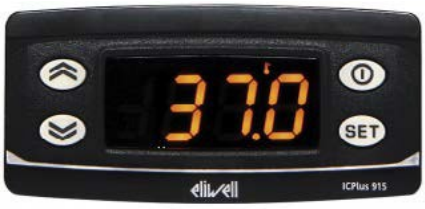
Climatic range with upgraded drying capacity (please consult Memmert)

Climatic range suitable for psychrometric sensor >95%rH

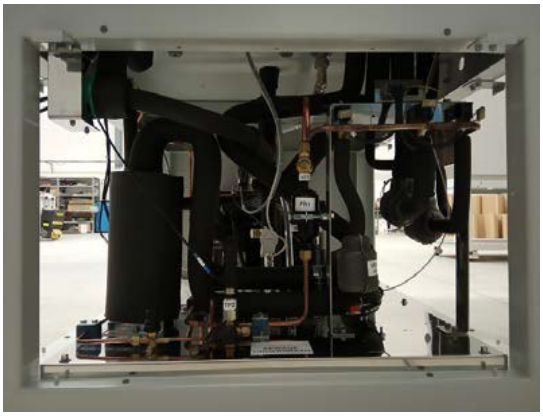
2.6 SYSTEM STRUCTURE





1. Main switch Allows turning the equipment on and off.	
2. RJ45 connector Allows connecting the equipment to a supervisor computer for data acquisition.	
3. Safety thermostat Allows configuration of security temperature (maximum and minimum).	
4. Powerhouse **The control units and electrical equipment are in the powerhouse.**	

5. Machinery compartment
All the mechanical components involving cool generation are in this compartment.



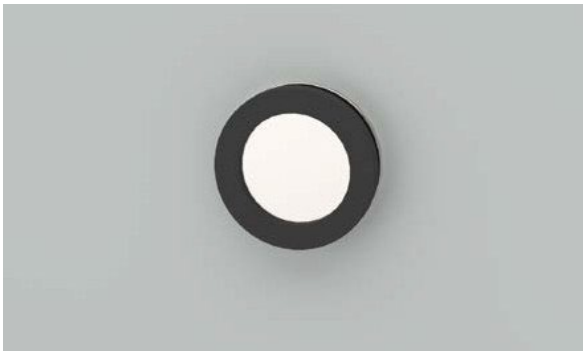
6. Test chamber
The test chamber is steel made. The access is made thru the front door. The door can be locked if necessary.

7. Sensors
The sensors used for temperature and relative humidity measurement are behind the air circulation grill.

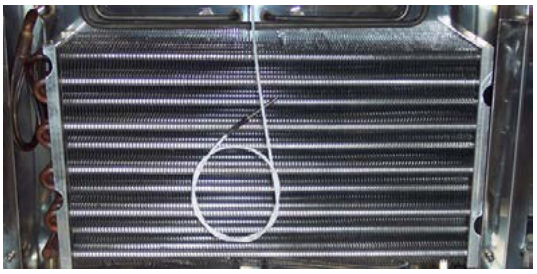
1. Air temperature sensor
2. Thermostat sensor
3. Temperature mobile sensor

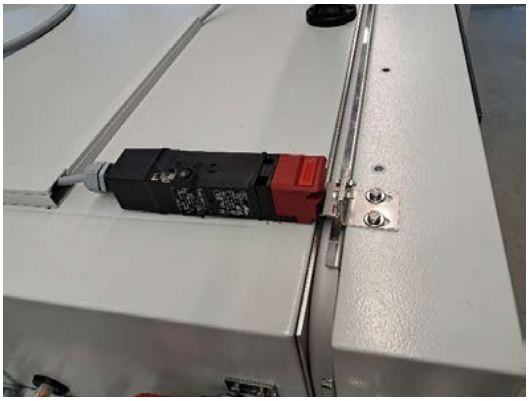
If the equipment is equipped with psychrometric sensor (5), it is located beneath the air circulation grill.

8. Entry points
The entry points located in the side of the equipment allow placing probes within the test chamber.



9. Enlightenment
Allows the lighting in the test chamber.

10. Evaporator Allows cooling the air inside the test chamber, and it is located behind the air circulation grill.	
11. Dew point bath Allows humidifying and drying the air inside the test chamber, and it is located behind the air circulation grill.	
12. Heater Allows to heat the air inside the test chamber and it is located behind the air circulation grill.	 
13. Ventilation Allows an uniform distribution of temperature and humidity conditions inside the test chamber.	

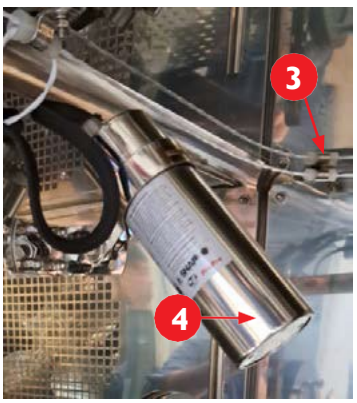
14. Controller - HMI Allows climate control regulation, alarm definitions, real-time display of process variables, implementation of programs, etc.	
15. Electric door lock (optional) This device allows to open or close the door using an electric safety lock. If the door is open, the chamber is in “chamber off” mode. It must be closed for the safety lock to be activated.	
16. Manual lock (optional) Manual locks are two units properly adjusted to ensure a more uniform sealing of the door and to prevent the door from moving in an explosion/ increase of pressure inside the chamber.	
17. Signaling tower (optional) The signaling device has three lights (red, yellow, and green) and one buzzer. These lights allow to signal the status of the chamber. The red light and buzzer, warns that the chamber is in alarm (e.g., High/Low Temperature; Fire Alarm), the yellow light means “Chamber On” mode and the green light “Chamber Off” mode.	

18. Pressure balance valve
This valve is designed for balancing pressure via the passage of air through it, between the inside and outside of the climatic chamber.

19. Fire detection system (optional)
The fire detection system (**1**) is a safety device that reacts to the fire indicator, such as heat, and send a signal to the extinguishing system. Under normal circumstances only the green Power On indicator will be lit, none of the outputs will be operated and the internal buzzer will be silent. When the battery (**2**) is installed, the system remains enabled for up to 311 hours of autonomy.

Disconnecting the fire detection circuit wiring or any other system wiring will activate the yellow fault indicator and internal buzzer on the front panel. The buzzer may be silenced by pressing the Buzzer Silence button.

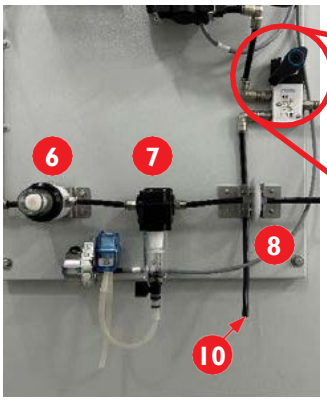
After activating the fire detection system via the linear heat detection cable (LHD) (**3**), the red Fire indicator will light up, and the fire will be extinguished by the discharge of Condensed Aerosol Generator (**4**) in the protected area. The internal buzzer will sound, and the Fault indicator will illuminate indicating that the Condensed Aerosol Generators have fired and need replacing.



Obs:
The sensing cable (LHD) is formed from a pair of twisted steel conductors each with temperature sensitive insulation and then an overall Fluoropolymer outer sleeve. When the temperature sensitive insulation reaches (240°C) it's predetermined alarm temperature the two conductors short together providing the digital or switched signal.

Activation by CO

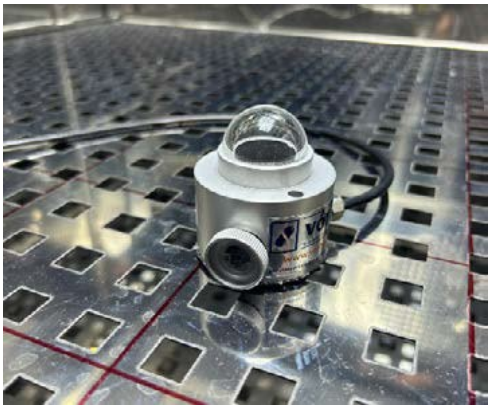
The EUCAR system includes a CO gas sensor (5) to detect fires due to low oxygen combustion, and this signal is transmitted to the chamber control.
This CO sensor has an integrated pump and relay head. The signals are fault signals, Alarm 1 at 150 ppm and Alarm 2 at 300 ppm. The sensor has a maximum CO reading limit of 2800 ppm.
It has a particulate filter (6) which, depending on its condition and time of use, should be replaced every 6 months (the filter has a transparent glass for evaluation), it has a coalescing filter (7) which is drained by a peristaltic pump.
It also has a water and particle collector (8), which acts as a “police filter”, the condition of which should be assessed by looking at the colour locally.
There is a valve (9) which must be in position 1-2 for correct operation. When calibrating the CO sensor, it must be set to position 2-3. A cap (10) must be fitted to prevent drainage from the correct circuit.

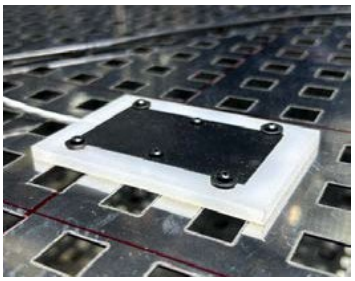


Carbon monoxide (CO) is a colourless, odourless and highly toxic gas that is difficult to detect without the use of specialised devices.

20. Window´s polycarbonate protection (optional)

The polycarbonate protection on the window provides impact resistance, in case the glass window can’t handle it.

21. Emergency stop button (optional) When the emergency stop button is activated, the chamber switches off all actuators and goes to “Chamber Off” state. It is located on right side of chamber’s door.	
22. Solar radiation (CT SUN) (optional) This full-spectrum lamp complies with DIN 75220. The solar simulation utilizes a single lamp with a power rating of 2500W, equipped with an Osram HMI 2500 bulb. The lamp housing is crafted from anodized aluminium, and the mounting components are made of stainless steel. The lamp comes with a specialized bracket for securing the lamp to the chamber ceiling. The lamp is installed in an aperture within the chamber ceiling.	
Electronic power supply The lamps in our system are powered by electronic power supplies, specifically designed for use in solar simulation systems. These power supplies are equipped with a constant regulation function to stabilize the output power. The selected irradiance power is consistently regulated through the adjustment of lamp voltage and lamp current.	
ACCESSORIES – OPTIONAL SENSORS **Pyranometer** For the measuring of the irradiation power one pyranometer of the type Kipp & Zonen CM4 (spectral range: 300-2800nm and maximum radiation: 4000W/m2). The pyranometer CM4 is high temperature resistant (+150°C) and can be placed on the test vehicle during the whole test duration for closed loop regulation. The pyranometer can be connected to a connection box inside the chamber. A data amplifier will be delivered together with the sensor.	

CUV5 Total UV Radiometer CUV5 is a general-purpose instrument measuring the total UV radiation from natural sunlight for applications in meteorology and outdoor material testing (spectral range: 280-400nm and maximum UVA/UVB irradiance: 400W/m2). The high-quality dome and diffuser provide optimized directional response. A specially designed optical filter provides sensitivity to combined UVA and UVB irradiance. The photodiode generates a voltage output linearly proportional to the UV intensity.	
BST Black Standard Temperature For measurement of the temperature 1 x temperature sensor in black body. With the black body sensors, the temperature (°C) of the test vehicle surface can be measured. The temperature sensor is equipped with a temperature resistant connection cable with 10 m length.	
23. Door equipped with rubber gloves (optional) This door has two entry points and the possibility of wearing gloves so that the user can access the inside and handle the objects to be tested. The gloves are rubberised, reusable and also resistant to chemical products. The gloves comply with EN 388, levels 3-1-2-1; EN 374.	

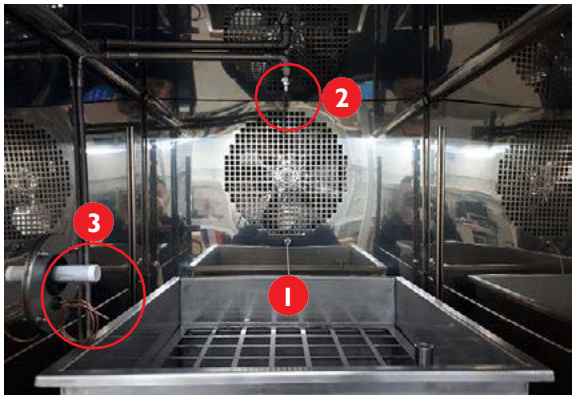
	**Remove gloves from the door when using the chamber at temperatures above 60°C.** **Danger of burns to hands and gloves, which can cause severe injuries!**

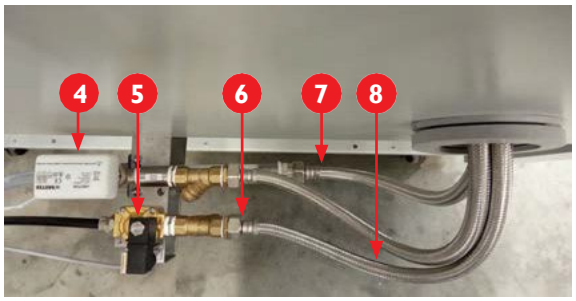
24. Ice-thaw, rainfall simulation and CO_2 carbonation systems (optional)

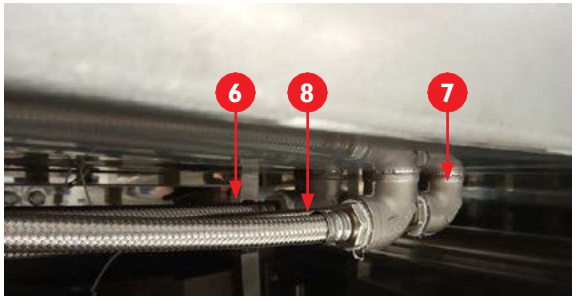
The chamber is equipped with three distinct (optional) systems designed to meet the specific requirements of each test: an ice-thaw tank, rainfall simulation system, and a CO_2 carbonation system..

The ice-thaw system consists of a stainless steel tank (**1**) and allows for water filling and draining cycles in a reservoir designed for ice-thaw testing.

- The tank filling process is fully user-controlled. Thus, it is necessary to time and set the activation duration of the **Water Tank Inlet Event** to ensure proper tank filling based on the specific requirements of each sample under testing;
- The tank draining process is also managed by the user through the activation of the **Water Tank Drain Event**;
- This tank is equipped with a safety overflow outlet to protect the chamber and/or the samples under testing in the event of an accidental filling failure;
- The internal grids serve as support bases for the materials under testing – they are not height-adjustable.
- Connect an 8 mm tubing to the quick-connect fitting. The activation of the solenoid valve (5) will ensure the tank is filled.
- Water discharge from the tank is carried out through the ½" sleeve fitting, following the activation of the motorized valve (4).







4. Tank drain valve
5. Tank filling valve
6. Tank water outlet pipe to drain
7. Tank water outlet pipe for overflow
8. Tank water inlet pipe

The tank feet are made of rubber and can withstand temperatures in the range of -50°C to +70°C.

Rain simulation system (2) it consists of a piping system and at least one water spray nozzle positioned near the ceiling of the chamber.

- The activation of the solenoid valve through the Rain Event ensures a flow rate specified by the manufacturer of **0.8 L/min at 3 bar pressure** per spray nozzle, or **0.45 L/min at 3 bar pressure**, depending on the area to be covered in the test environment defined by the client. The available flow rate depends exclusively on the pre-installed configuration and can be adjusted by the operator through the pressure. The recommended pressure is 2 to 3 bar.
- The rain system is controlled by the Rain Event to simulate rainfall. Once the rain simulation process is complete, the Water Purge[1] Event is automatically activated, injecting air into the piping to purge any remaining water and prevent freezing inside the spray nozzle. This event can also be manually activated.

9. Compressed air inlet

10. Water inlet

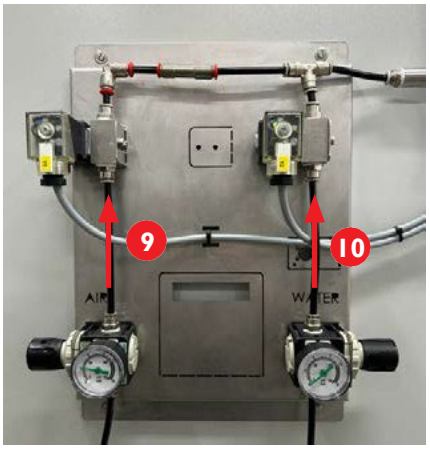
11. Water outlet to the sewer

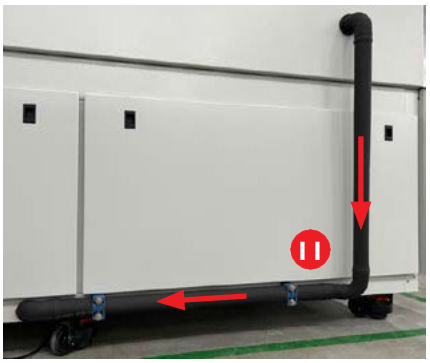
Note: In specific cases where an additional drain is required.

Ventilation inside the chamber must be at least 50% when the Rain Event is active to prevent water from entering the conditioning tunnel (hot/cold), i.e., the evaporator zone.

The CO_2 carbonation system (3) consists of a CO_2 sensor and a copper capillary for injecting CO_2 into the chamber. The chamber controller monitors and regulates the CO_2 addition to a user-defined value within the range of 0 to 20% CO_2.

- Connect the appropriate tubing to the threaded union next to the solenoid valve (12).





1 With a duration of 60 seconds.

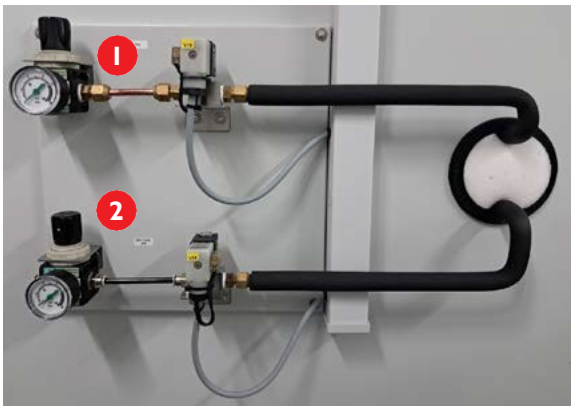
25. Nitrogen gas (GN_2) and compressed air system (optional)

By triggering the specific event in the programmable control events, GN_2 is injected into the chamber. This can be done at full power, or by activating the "Dry power" event, where it switches on/off as needed.

Once the chamber is set to "Chamber Off," compressed air is activated for 3 minutes to extract the nitrogen from inside the chamber.

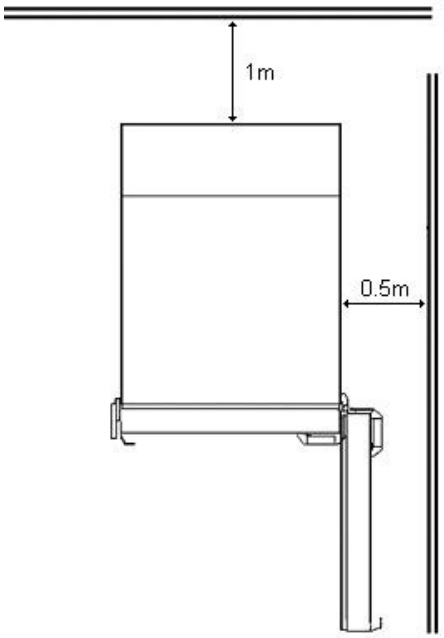
1. GN2 inlet
2. Compressed air inlet

- Maximum pressure: 7 bar



2.7 INSTALLATION

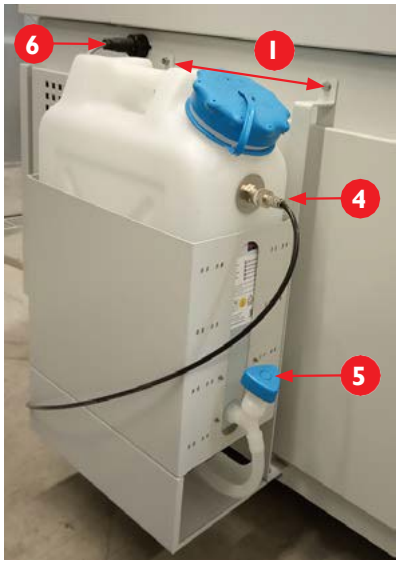
1. The equipment must be installed in a clean and well-ventilated area, with an ambient temperature above 10°C and below 26°C, and relative humidity levels between 30% and 60%. However, the chambers also operate reliably in relative humidity conditions ranging from 0% to 90%, if the saturation point is not reached.
2. Avoid placing the unit in direct sunlight or near any heat source.
3. Check that there is a minimum distance between equipment and wall/ceiling or other equipment's.

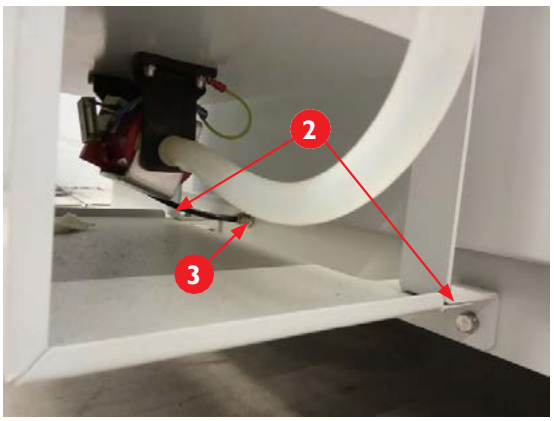


4. Check that the floor is properly leveled (because of the humidification system). If necessary, the wheels have a leveling system.

5. If there is no free water point available for the humidification circuit or, if necessary a water buffer, you can use an external water supply container with pump located on the side of the equipment. This container must be fixed with screws at the top (**1**) and bottom (**2**). Connect

the camozzi tube (**3**) to the chamber.





6. Connect a salt-free water point (demineralised or distilled), with an admission pressure of 2 to 5 bar, and up to 50µS conductivity (micro Siemens) to the container water inlet (4). In case of just one water point it is required to connect to a water treatment system.

7. Open the tap (5) for supply water to the pressure pump. To control the pump's activation and receive the status of the float switch (security level), connect the jack (6) to the chamber.

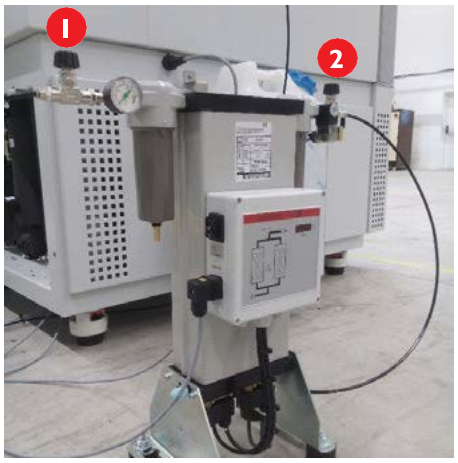
8. Connect the output of sewage to the sewer system of the building. This should be at ground level and be at least Ø 50 mm. The flow is by gravity as such, from the output of the chamber to the sewage system, and the connection must have a slope of at least 15° downward. Equipment drains will be of ½" for hose connection.

9. If the equipment has a water-cooled condenser, booth inlet and outlet must be connected to a cooling water circuit. The technical characteristics of the circuit should be as follows:

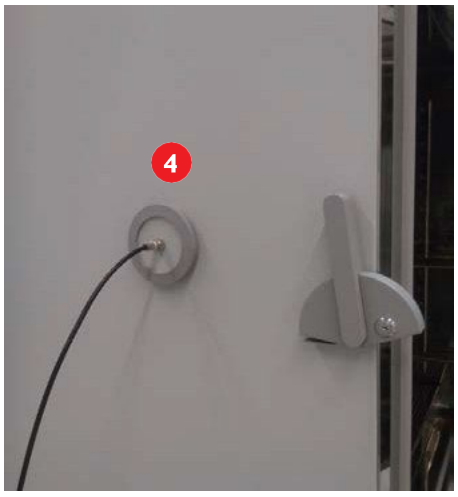
- Intake pressure – 3 to 5 bar;
- Water entry and exit pipe: 1" or 28 mm;
- Maximum temperature of water entry: +23 °C;
- Minimum temperature of water entry: +16 °C;
- Recommended temperature of water entry: +18 °C.

10. If the chamber has an adsorption dryer (activated by Events: Air Dryer - Max Power or Air Dryer – Dry Power) with compressor as an air supplier, this functionality/equipment should be installed as shown in the image below (consult the operating instructions, of the adsorption dryer, for more detailed information).
1. Air inlet
2. Dry air outlet

- Minimum pressure: 5 bar
- Maximum pressure: 16 bar
- Recommended air flow: 15 m3/h (7 bar at 35°C)

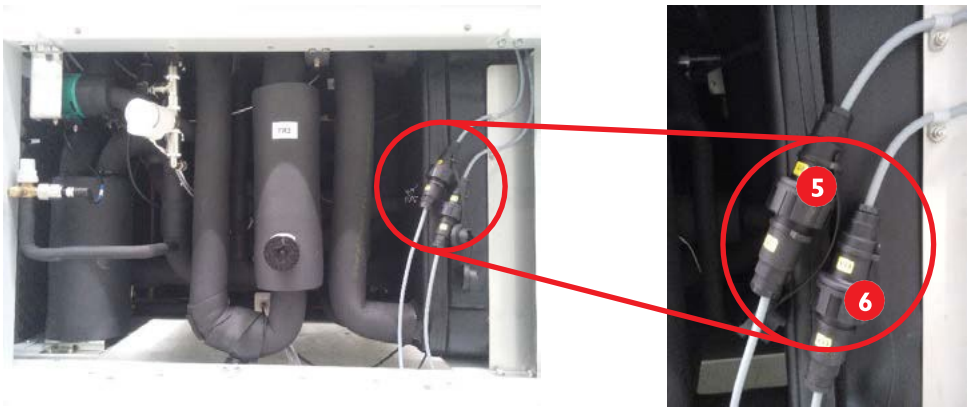


3 - Dry Air Injection (Option A)



4 - Dry Air Injection (Option B)

Power connection of the Adsorption Dryer (‘5’- jack connector U2) and solenoid valve actuator for dry air injection inside of the chamber (‘6’ - jack connector V13).



11. Connect the Nitrogen inlet located on top of the equipment (if applicable).

	**Careful, very cold liquid nitrogen. Do not touch.** **Gloves, face shield and protective clothing are always required to handle liquid nitrogen.**

	**Always consider all safety instructions regarding the use of nitrogen.**

12. If you have the software “FitoLog”, connect the ethernet cable to the existing RJ45 connector, for data acquisition in the computer.

13. Check the characteristics of the existing power supply. These should match the information printed on the card placed on the equipment.

14. Connect the equipment to power network. The plug will be different according to the temperature range of the equipment:

1. CEE 3 pole / 16A
2. CEE 5 pole / 16A
3. CEE 5 pole / 32A
4. CEE 5 pole / 63A

	**The equipment should have a differential protection of 300mA in the electrical switchboard of the building.**

	**Never use any kind of power extensions with other equipment's (risk of overheating and short circuit).**

2.8 CONNECTING THE EQUIPMENT

After installation, turn the power switch, located on the side of the equipment, to the "I" position. The display lights up, indicating that the controller is ready to be programmed.

Attention: Each time the equipment is turned on, after a long period of inoperable time, it should stay in "**Chamber OFF**" for at least 4 hours to heat up the compressor's oil (see section "Controller – Status Board", for more information).

Controlling of climatic conditions can be:

- Manual with fixed values.
- Automatic (includes segments, repetition numbers, ramp calculations, etc.).

The types of operation are further described in the programming and operation of the controller.

Warning: The equipment is already pre-programmed from factory with tested security parameters. Carefully read the section on the programming and operation of the controller before changing any parameter.

	**The installation conditions should be strictly complied with before connecting the equipment for the first time.**

2.9 DISCONNECTING THE EQUIPMENT

Turn the power switch, located on the side of the equipment, to the “0” position. The display turns off.

Consider the following:

- Do not leave testing material inside the equipment.
- At the end of each test the equipment must be “Chamber OFF”. The power switch should only be turned off if the next test will not be in the next 10 days.
- If the equipment is turned off for a long period of time, disconnect it from the mains.
- Whenever possible do a cleanup or maintenance to the equipment.

Attention: The test material and the inside of the equipment may still be too hot/cold, after the previous test.

SECTION 3
SAFETY THERMOSTAT

The safety thermostat for maximum and minimum temperature is located on the side of the equipment and ensures, in case of failure, to stop the chamber and activates a sound alarm, thus avoiding a possible overheating or an under cooling inside the chamber and of the material tested.
The maximum temperature thermostat (SP2) must adjust to a temperature well above the maximum programmed of the controller, while the minimum temperature thermostat (SP1) must adjust to a temperature well below the minimum programmed into the controller.

Example:

- Maximum temperature of the programmer: +80°C.
  The safety thermostat of maximum temperature should be adjusted to +90°C.
- Minimum temperature of the programmer: -30°C.
  The safety thermostat of minimum temperature should be adjusted to -40°C.

To change the parameters you:

- Press key set;
- Select “SP1” or “SP2” through keys ↑↓;
- Press key set;
- Select the chosen temperature value through keys ↑↓;
- Press key set;
- Press key  to return to the previous menu.

SECTION 4
ANOMALIES

Cause	Solution
Equipment totally turned off	• Check connections to electricity grid. • Check if main switch is in “I” position. • Check if safety switches of equipment’s board need to be reset.
Visual alarms on the display	Consult alarm chapters of Controller’s section.
Equipment does not meet some functions	Check Controller’s program

If it is still not possible to eliminate the anomaly with the measures mentioned above, please contact our technical services (contacts available on the last page of this manual).

SECTION 5
MAINTENANCE

5.1 GENERAL DATA

Regular care and maintenance are key factors for the smooth operation and life of the equipment. Next, we will present some maintenance work that does not replace professional maintenance which is carried out by our technical support services.

	**All maintenance must be carried out with the chamber turned off. The main switch must be set to "0" and the power cord must be disconnected from the electrical outlet.**

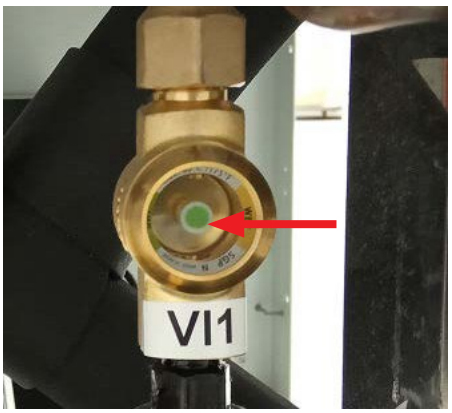
5.2 BASIC MAINTENANCE

After each test:

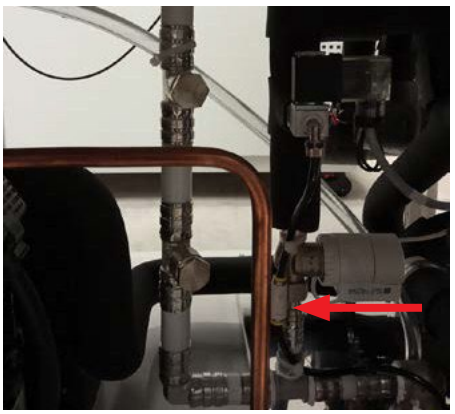
- Control and clean door seal;
- Check the proper functioning of sewage;
- Control and clean inside the equipment;
- Check if shown temperature matches the programmed one;
- Check if relative humidity matches the programmed one.
- Twice per year:
- Check wiring conditions (replace it if necessary);
- Check sewage hoses conditions (replace it if necessary);
- Check feeding tube for demineralized water conditions (replace it if necessary);

- Check if levelled;
- Check, with the help of a calibrated hygrometer inside the chamber, if process variables values are correct. Checking must be done in three different temperature and humidity points (ex: -40°C, 23°C and 100°C for temperature and 30%, 50% and 90% for humidity);
- Check if water outflow is done rapidly;
- Check if recirculation of air ventilator works correctly;

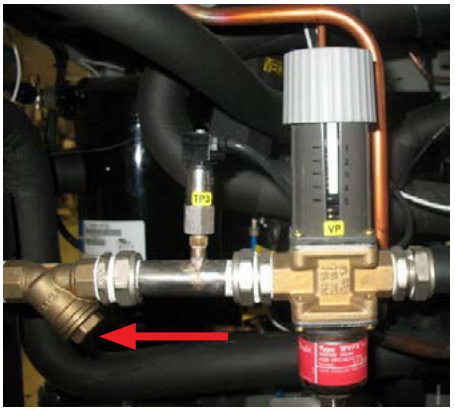
- Check if the cooling fan inside the electrical compartment works properly;
- Check if there's any safety thermal that requires to be rearmed;
- Check if there's water signs inside machinery compartment;
- Check if the refrigeration gas indicator is still green;



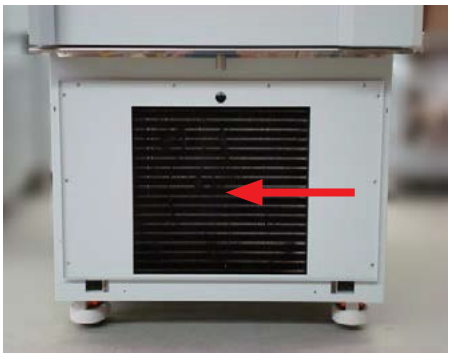
- Clean the dew point bath recirculation filter;
- Clean the inlet demineralized water filter;



- Clean the filter of recirculating cooling water (if applicable).



- Vacuum condenser if there's dust accumulation (if applicable);



Every year:

- Control general condition of equipment (interior and exterior);
- Control tightness of door (check seal and lock);
- Check for corrosion signs;
- Check if shown temperature is correct (calibration);
- Check if shown relative humidity is correct (calibration);
- Check equipment performances;
- Check grip of motors, ventilators, heaters, etc;
- Run security tests (test maximum and minimum temperature alarms of controller and security thermostat).

If necessary:

- Renew demineralized cylinder.

5.3 CONSUMABLES

Denomination	Order Reference
H2O demineralizer (16LT)	Ask to Memmert (Eucar accessory)
Wet bulb wick	Ask to Memmert (Eucar accessory)
Condensed aerosol generator	Ask to Memmert (Eucar accessory)
Linear heat detection 240°C	Ask to Memmert (Eucar accessory)
Filters for particle filtration	Ask to Memmert (Eucar accessory)
Filters for coalescence application	Ask to Memmert (Eucar accessory)
Upper part of Duran glass filter	Ask to Memmert (Eucar accessory)

5.4 CLEANING

To avoid corrosion inside the chamber, dirt accumulation must be checked and if necessary be cleaned.

It must be always assured the no water gets in the ventilation grill, or in between electrical components.

Attention: Do not use abrasive materials, concentrated cleaning agents, acids, or chemical solvents since it damages surfaces and can cause corrosion.

5.5 MAINTENANCE BY OUR TECHNICAL SERVICES

To ensure a smooth operation of the equipment, it's necessary a complete maintenance and annual verification of all safety devices. These tasks are performed by our technical support services.

Memmert advises an annual maintenance contract, followed by a specific protocol and later temperature calibration by an accredit laboratory.

5.6 TECHNICAL ASSISTANCE

Your total and permanent satisfaction is a main concern to Memmert.

Memmert has all the knowledge and required materials to sustain your equipment in perfect conditions.

If you have any questions or need assistance regarding warranty or technical assistance we recommend you contact us by e-mail, or fill in the form in our web page.

In case of problems, please contact the nearest official representative or the manufacturer. For expedited processing always provide the following data:

- Product model and serial number;
- Controller version;
- Software version (if applicable);
- Problem description.

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