

# Technical Description ClimeECO C4-600



ClimeEco C/600/40/3 01.1E/11.2021

Illustration is similar, contains additional equipment

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## Highlights at a glance.

- **Functional all-rounder for climatic performance, function and aging tests in manufacturing, storage, transport and use.**
- **Economic equipment appropriate for common testing norms**
- **Web-based 7“ color touch screen with simple menu-driven user interface**
- **Intelligent airflow for high accuracy at various loads, air-cooled refrigeration system**
- **Specimen protection against condensation and over-tempering**
- **Fault diagnosis system for maintenance and repair, 1 year of warranty**
- **Uncomplicated quoting process and fast delivery due to standard design without modifications**

**ClimeEco C4-600 without window**  
**ClimeEco C4-600 with window**

**Ordering code: 67611949**  
**Ordering code: 67611950**

## Standards.

### Low temperature test

- IEC 60068-2-1, Test A
- ISO 16750-4, Low temperature
- MIL-STD-810 G, Meth. 502.5
- JESD22-A119

### High temperature tests

- IEC 60068-2-2, Test B
- ISO 16750-4, High temperature
- MIL-STD-202 G, Meth. 108A
- MIL-STD-810 G, Meth. 501.5
- MIL-STD-883 J, Meth. 1008.2
- JESD22-A103D

### Alternating temperature test

- IEC 60068-2-14, Test Nb
- ISO 16750-4, Temp. steps
- ISO 16750-4, Temp. Cycling

### Constant climate test

- IEC 60068-2-67
- IEC 60068-2-78
- ISO 16750-4, Damp heat steady
- MIL-STD-202 G, Meth. 103B

### Alternating climate test

- IEC 60068-2-30, Test Db, Var.2

**We reserve the right to make any technical changes without prior notice.**

The temperature values specified in the standards (severity levels) are limited by the highest and lowest test space temperature. The choice of the appropriate test system depends on the temperature change rates during alternating tests. The requirements are met if the test system capacity is large enough to compensate for the influence of the specimen and its heat dissipation in the relevant capacity range. Please contact us to test the feasibility with your test specimen.

The reference point for test values and tolerance specifications is the middle of the test space. Verifying documentation for individual test values is optionally available at additional cost.

**Your standard is not listed? Contact us!**

## Performance data.

### Temperature tests.

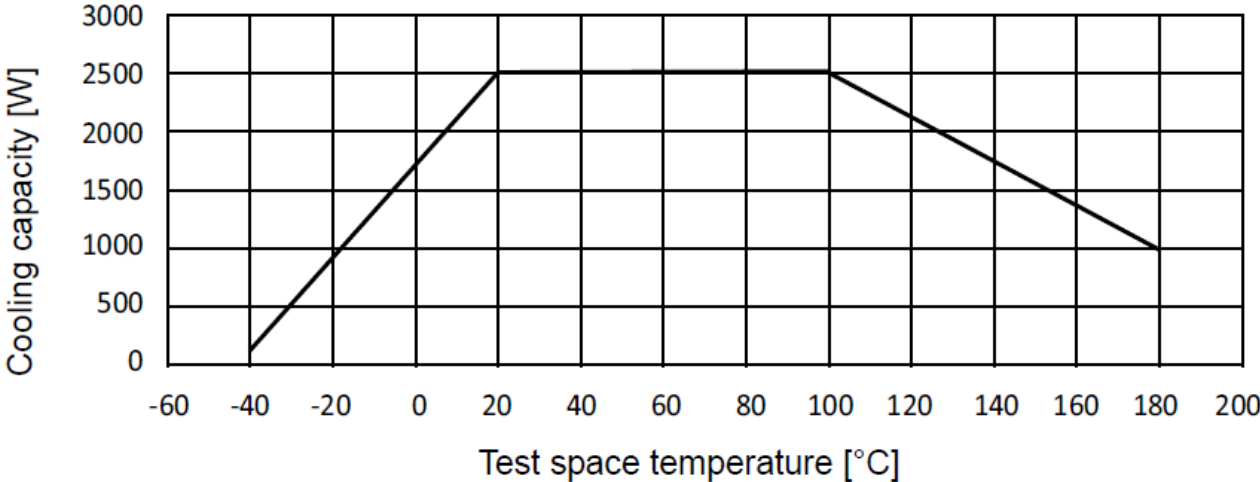
Temperature range	-40 °C to +180 °C
Average temperature rate of change according to IEC 60068-3-5	Heating: 4.0 K/min Cooling: 3.0 K/min
Temperature deviation (according to IEC 60068-3-5)	
In time	±0.1 K to ±0.5 K
In space	±0.5 K to ±2.0 K
Heat compensation at +20 °C	2500 W
-20 °C	875 W
Temperature calibration values are measured at	+23 °C and +80 °C

### Climate tests.

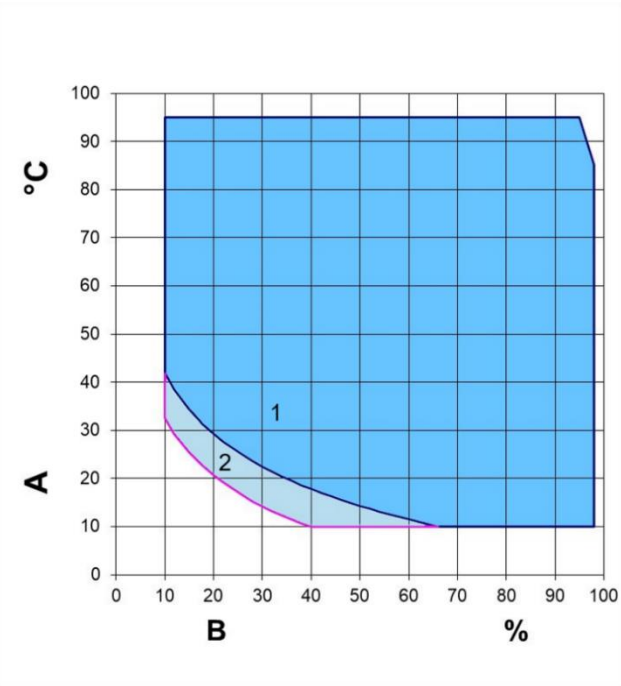
Humidity range	10 % r.H to 98% r.H
Climatic Mode	+10 °C to +95 °C
Dew point range	-3 °C to +92 °C
Temperature deviation according to IEC 60068-3-5	
In time	±0.1 K to ±0.3 K
In space	±0.5 K to ±1.0 K
Humidity deviation in time	±1 % r.H to ±3 % r.H.
Humidity water consumption	Max. 2l/24h
Heat compensation	400 W
Temperature calibration values are measured at <sup>1</sup>	+23 °C 50 % r.H and +95 °C 50 % r.H

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**Heat compensation.**



**Humidity diagram.**



A: Test space temperature  
 B: Relative humidity

1: Standard climate range for continuous operation.  
 2: The standard climate range for discontinuous operation only (dew points ranging from +4 °C to -3 °C).

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## Technical Data.

### Dimensions and weights.

Test space volume	600 l
Test space dimensions, H x W x D	950 mm x 800 mm x 800 mm
Exterior housing dimensions, H x W x D	2060 mm x 1090 mm x 1849 mm
Required transportation clearance, H x W x D	2225 mm x 1220 mm x 1864 mm
Window (heated) <sup>(option)</sup> , H x W	600 mm x 450 mm
Weight	approx. 660 kg net

### Technical data for installation.

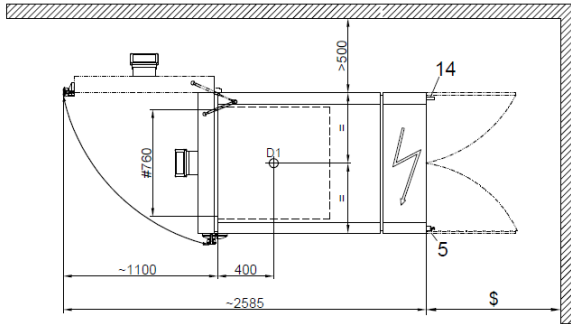
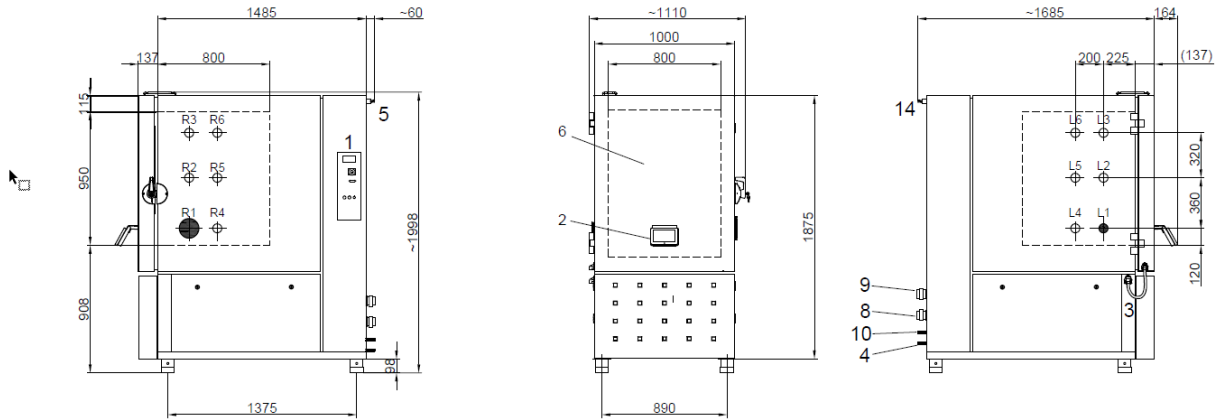
Operating conditions	Ambient temperature: +10 °C to +35 °C; max. rel. air humidity 75 % r. H.
Sound pressure level	Approx. 62 dB(A) according to DIN 45 635, part 1, accuracy class 2
Humidification water (C-models only)	Fully demineralized water, pH value of 6-7, conductivity max. 20µS/cm
Drain for condensate and cleaning water	Di = 12 mm hose connection, back-pressure free for condensation water

#### Electrical:

Nominal voltage	3/N/PE AC 400V ±10% 50Hz
Nominal power	8.2 kW
Nominal current	15.7 A
Connection cable	Approx. 3 m
Fuse protection	25 A slow
Protection class	IP 20

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# Installation drawing.



- 1 Master switch panel
- 2 7" control unit
- 3 Connector panel
- 4 Connection for overflow/ condensate drain
- 5 Electrical connection, cable length approx. 3.5 m
- 6 Door with window (option)
- 8 Cooling water supply (option)
- 9 Cooling water return (option)
- 10 Connection for demineralised water
- 14 Compressed air connection (option)

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## Our basic equipment.

Casing	Zinc-coated steel powder-coated colour: RAL 9002, grey-white
Door	One-hand operation, lockable, hinged on the left hand side
Test space	Polished stainless steel - grade 1.4301 max. load of test space floor 80 kg (surface load), a maximum of 11 shelves is possible, max. load for each shelf: 40 kg (surface load), max. total load 80 kg, total load shelf and test space floor is max. 160 kg
Insertion shelf	1 insertion shelf made of stainless steel a maximum of 11 shelves is possible max. load for each shelf 40 kg (surface load) max. total load 80 kg
Entry port	2 Entry port $\varnothing$ 50 mm l. h. side, $\varnothing$ 125 mm r. h. side Option: R2..n, L2..n, D1 in ceiling
Refrigeration unit <sup>1</sup>	Air-cooled refrigeration system with
Refrigerant <sup>2</sup>	Chloride-free refrigerant R449A R449A, GWP: 1397, filling quantity: 4 kg CO <sub>2</sub> equivalent: 5.6 t

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<sup>1</sup> The product contains fluorinated greenhouse gases.

<sup>2</sup> (EU) directive no. 517/2014 specifies an obligation for stationary refrigeration and air conditioning units with a CO<sub>2</sub> equivalent of 5 to 50 t to be checked for leaks at least annually and an equipment logbook to be kept; units with a leak detection system must be checked every 24 months. We can carry out these tasks for you in our capacity as an expert partner. We would be glad to advise you on installing a leak detection system.

## Regulation and control (SIMPAC®)

### WEBSeason®

Web based measuring and control system with I/O unit and WEBSeason®-software  
Operating/programming and monitoring unit with 18 cm (7") web panel



Control	Highly efficient 32 bit control and monitoring system <b>SIMPAC®</b>
Program memory	Max. 100 programs
Program controller	Start parameters for programs: immediately, delayed, real time, pause
PID Controller	Special control algorithms defined according to test tasks
Segments	Max. 100 per Programm
Loops	250 (nested)
Programm cycles	Max. 9999
Passwort protection	Two levels to prevent accidental settings
Limit value monitoring system	For temperature and humidity
Diagnostic system	For information on operating times and possible operating failures
TCP/IP Ethernet interface	Connection with customer's computer (e.g. Notebook-operating panel or SIMPATI) or for 3 <sup>rd</sup> party networking for communication via software package SIMPATI
Connection to building control	Profibus or Interbus via Gateway, other additional systems upon request
Customer protocols	SimServ (to control the temperature test chamber via the ethernet interface)



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## Technical Details.

### Construction

The climate test cabinets by WVC are supplied ready for connection. Compact design means a minimum of space is required. Five test cabinets with a volume from 190 to 1540 l are available. All cabinets are designed to be free-standing in one location. The machine section incorporating the refrigeration unit, the water storage tank and the water pump is located below the test chamber. The swing-out switch cabinet is located on the rear of the cabinet. The operating elements and the main switch are located on the right side of the cabinet.

### Exterior Housing

The exterior housing of the unit is made from lightweight corrosion-resistant, selfsupporting, galvanized sheet-steel and lacquered in two colors (RAL 7016 anthracite and RAL 9002 grey-white). The environmental-friendly insulation between test chamber and exterior housing guarantees best insulation values and thus lowest possible operating costs.

### Test Chamber

The test chamber consists of a stainless-steel container and is welded vapor-tight. The test chamber is easy to clean thanks to special welding, smooth surfaces, rounded edges and shelf supports. The rear test chamber wall incorporates an air duct with built-in humidifier tub (C-models), built-in heat exchanger, electric heaters and a recirculating air fan. Air guidance via baffle plates in the test chamber floor and ceiling produces optimum ambient air and temperature distribution.

### Test Chamber Door

The test chamber is completely sealed by a door that is hinged on the left. The door opens fully for easy access and is equipped with high quality insulation. An optimum seal is guaranteed by special profile seals and a selftightening locking mechanism which is operable with one hand.

### Access Ports

All cabinets have two access ports (approx. 50 and 125 mm diameter) made of low thermal conductivity material. The ports are in the left and right side walls and can be used for measuring and control wires, other supply connections or accessories. If not required, these ports are closed with rubber plugs supplied as standard.

### Temperature and Humidity Conditioning

The large axial fan with exterior drive motor draws the air out of the space. This recirculating air then passes a fin-type heat exchanger, which cools the air, if necessary. The special design of the refrigerating system avoids unintended condensation precipitation at the heat exchanger during climatic operation and guarantees highest temperature and humidity constancies in time. An electrical heater, installed in front of the heat exchanger in air direction, is heating-up the recirculating air. An innovative humidification system allows a high relative humidity even with a heat load (C-models).

### Psychrometric Humidity Measuring (C-models only)

The humidity of the test space air is measured according to the internationally valid psychrometric measuring principle with two resistance thermometers Pt 100 as per

DIN IEC 751. Dry and wet bulb sensors are arranged next to each other in the recirculating air flow. Depending on the climate the material of the wet bulb sensor is humidified. The life time is increased considerably due to a self-cleaning mechanism!

#### **Protection System against Condensation**

The protection system consists of a dehumidifying evaporator which prevents condensation forming on the specimens as they heat-up after tests at low temperatures.

The protection system's operating range is -40 to +60 °C.

The protection system against condensation is activated by a digital switch channel. It is possible to switch on the protection system manually or to integrate it into a program.

#### **Dew Point Extension from +4 °C to -3 °C (C-models only)**

In this working range the humidity constancy in time is  $< \pm 5\%$  r.H. The extended working range can be operated at intervals. The max. operation time without defrosting is approx. 24 hrs.

#### **Specimen Protection**

In addition to the programmable limit value monitoring system of the SIMPAC, the climate test cabinet is equipped with a high and low temperature limit controller which can be adjusted digitally (specimen protection with separate sensor) according to EN 60519-2 (1993). The signal is indicated visually and acoustically. A potential-free contact to switch off power supplies is available to the customer.

#### **Permanently Memorized Overheating Safety Thermostat**

A steady state overheating safety thermostat is installed that automatically switches off the heater if the test chamber's maximum temperature range is exceeded.

#### **Power Supply**

Each functional circuit is equipped with its own safety device, which, in the event of trouble, turns off the affected circuit or the entire cabinet. The nature of the trouble is visually displayed. Wiring and electrics are governed by the latest technology and strictly conform to safety regulations for electrical installations and materials, as well as to relevant VDE regulations. The test cabinets are standard-wise equipped with a lockable main switch according to VDE.

## General Statements.

In the constant effort to improve our product, we reserve the right to make construction or design changes without prior notice or obligation.

Please note that for installation of the climate test cabinet (for components which jut out, such as: hinges, locks, etc.) the clearance requirements indicated in the technical data must be observed.

The performance data indicated were determined with empty test space and refer to an appliance without additional ports or devices, which represent a thermal load with an ambient temperature of max. +25 °C and with water-cooled refrigeration units (option) to a water temperature of approx. +28 °C.

The cabinet is designed to be installed in normal rooms. The max. admissible ambient temperature for storage and installation is +55 °C (+131 °F).

The admissible ambient temperature for operation of the cabinet is between +10 °C and +35 °C (+50 °F and +95 °F).

Performance data cannot be guaranteed in ambient conditions other than those stated.

Accuracy rates are proven in the test space center, in steady state, without specimens, without radiation and without additional equipment in the test space. The cooling down rate stated refers to the temperature range without controlled humidity.

In case of outgassing or pollution caused by the specimen we recommend regular maintenance of the measuring system. Please keep in mind that outgassing of specimens and connection lines might cause corrosion of components. Corrosive gasses might escape among others from chip boards, cardboard boxes and bandaging materials.

If outgassing is to be expected, we recommend an optional ventilation of the test space with a purge air volume. If outgassing or pollution is expected, we also recommend a regular maintenance of the measuring system.

Measures to be taken regarding a necessary combination with other units have to be approved by the local supervising authorities. The relevant costs are not included in our quotation.

Please note that the sealing material and cable insulation used in our test units and systems contains silicone. If this is a problem for you, please contact us.

The concept and design of the test units and systems are in accordance with the relative safety requirements and regulations of the EC-standards directive for machinery 2006/42/EG, EMC Directive 2014/30/EG and the EC Directive for Pressurized Equipment 2014/68/EG 97/23/EG. The above regulations are adhered to when modifications or extensions are performed on site. The EMC test and the data on the noise emission are in accordance with EN 61 000-3 and EN 61 000-6-2.