memmert
Experts in Thermostatics

Climatic Test Chambers CTC / TTC

Standardised temperature and climate testing for the quality assurance of form and function

Rapid heating up and cooling down in a temperature range from –42 °C to +190 °C

Active humidification and dehumidification for control range between 10% and 98% relative humidity

100% AtmoSAFE

Regulated turbo-ventilation

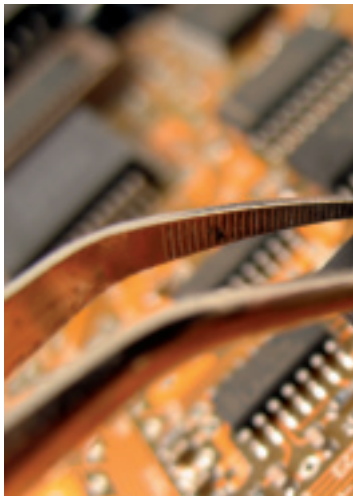
Fast humidity recovery time

>>>> www.memmert.com

The high flyer of testing technology!

100% AtmoSAFE: In our CTC and TTC environmental test chambers we simulate the perfect atmosphere for climate and temperature tests, specifically in accordance with DIN EN 60068-2-1, 2-2, 2-3 and 2-30. Fourty ramps that can be configured directly on the device, an active humidification and dehumidification from 10 to 98% rh and a precise temperature control from –42 °C to +190 °C provide an almost unlimited flexibility for controlled material and function tests, as well as for ageing tests.

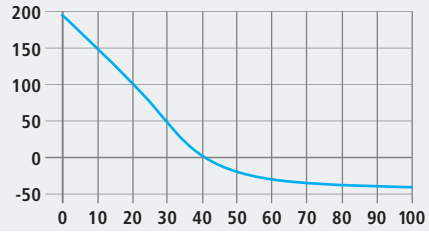
2 appliance variations with 256 litres chamber volume:
Climatic test chamber CTC 256 with humidity control
Temperature test chamber TTC 256



Economical at high performance

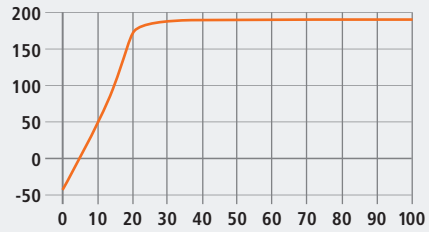
The high level of standardisation and the highly efficient principle of identical parts in our production allow us to have an extensive range of standard features, along with constantly excellent quality and productivity at an outstanding cost/benefit ratio.
Thus our CTC and TTC environmental test chambers cool down from +180 °C to –40 °C in only 80 minutes, for example, and heat back up again from –40 °C to +180 °C in only 20 minutes. But our high-flyers in test engineering prove to be extremely cost-efficient not only in their procurement costs, but also in their running costs.

Cooling down speed CTC / TTC 256



+180°C to –40°C in 80 minutes*

Heating up speed CTC / TTC 256



–40 to +180°C in 20 minutes*

*to 98% of setpoint

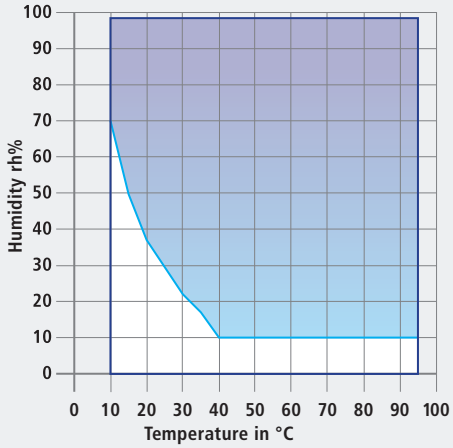
Reliable and efficient climate technology

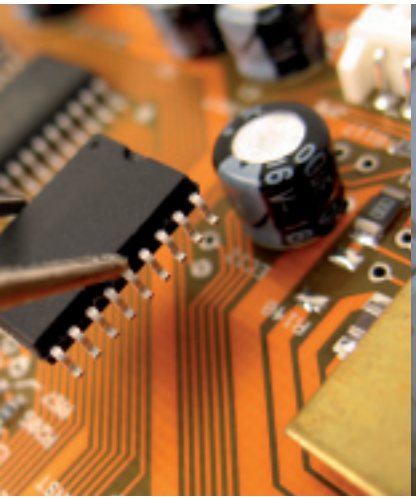
The components of our climate system are of the highest quality and interact perfectly for a quick, precise and energy-saving change in temperature. The 3-layer insulation system for the chamber, derived from aerospace engineering applications, impresses with an excellent K-value. This prevents the moisture penetration of the insulation material, which permanently ensures the insulating capacity.
The electronically controlled injection of refrigerant (chlorine-free, ozone-neutral R 404 A) guarantees an optimal cooling capacity throughout the entire temperature range, and thanks to the automatic defrosting system, the CTC and TTC test chambers run in continuous operation without interruption. The stainless steel evaporator stands out with a long and corrosion-free product life, the twin-compressor, regulated according to the output, saves valuable energy and the temperature-dependent adjustable-speed condenser fan ensures a low noise level in partial load operation.

Active humidification and dehumidification (CTC only)

The electronically controlled active humidification and dehumidification guarantees a precise and quick regulation of humidity between 10 and 98% rh in all situations, while the set temperature in the chamber is constantly maintained. The required setpoint temperatures and humidity can be adhered to with precision, even in regions with a high ambient temperature and extremely high or low humidity. The 2-stage hot steam generator with a separate water preheater copes with large amounts of water and ensures that the set humidity is quickly reached.

Adjustment range of temperature and relative humidity rh%





The reliable hardness test for form and function!

High capacity reserves for cooling and heating guarantee that test standards are tightly maintained. The unsurpassed fittings in terms of programming, storage and documentation make it very easy to operate these efficient and absolutely precise test chambers, and lastingly reduce process times. A special bonus: pre-programmed chip cards enable rapid and manipulation-proof access to common test standards.

Corrosion-resistant and hygienic stainless steel

We profess our uncompromising faith in stainless steel. Apart from essential components in climate technology, working chamber, evaporator and also the casing are made of this high-quality material. No corrosion, even after many years of use in practice under extreme climatic conditions.

Chamber exclusively made of high-grade, completely recycable stainless steel 1.4301 (ASTM 304). Residue-free cleaning due to very smooth and hygienic surfaces.

Comfort for highest quality

Over 60 years of customer orientation forms the basis for maximum comfort:

- Clear and easy to clean underglass function display
- Available only from Memmert: the patented push/turn control for intuitive operation of the entire menu
- Heated, multi-layered insulation, double-sealed stainless steel door
- 2 x 25 Watt steam-tight halogen lamps
- Low noise (55 dBA)
- Extremely service-friendly refrigeration system
- MEMoryCard XL for programming and logging up to 40 ramps for temperature and humidity (for CTC)
- Water supply from two 10-litre tanks (for distilled water) with automatic switching to full tanks (for CTC)
- Large usable chamber space with low floor space requirement
- Mobile due to standard castors and appliance width that fits through laboratory doors
- 80 mm entry port in right side wall made of silicone (closable)

Your safety check: extensive documentation

The CTC and TTC environmental test chambers are GLP- and GMP-compliant. The basic fittings for reliable quality assurance:

- "Celsius" standard software for programming and logging, as well as optionally available (extra charge) for FDA-compliant software
- Internal ring memory for seamless, manipulation-proof long-term documentation of temperature, humidity, operating mode and status messages (approx. 3 months)
- Parallel printer interface for printouts of temperature control processes (USB printer via converter possible)
- USB interface for programming and storage, optional Ethernet at extra charge

Your navigation system: flexible programming

A must for the exact simulation of environmental conditions in research and development: various set values of temperature and humidity can be combined on up to 40 time ramps via the menu, and to an unlimited amount via the "Celsius" standard software. The SPWT function guarantees that the programme is only continued after reaching the exact temperature and humidity set values.

Safeguarding your process: 100% precision

Technical perfection for error-free test procedures that can be replicated:

- Reduced cooling down and heating up times as well as homogenous temperature distribution through powerful heating and cooling system
- High-performance, adjustable-speed air circulation up to 1,200 m³ per hour, adjustable from 10 to 100%
- High-quality and maintenance-free capacitive humidity sensor for high measurement precision and long-term stability
- Multifunctional, fuzzy-supported control
- Calibration option for temperature and humidity directly on the controller

Your standard features: more safety

Approved functions for zero error:

- Integrated self-diagnosis system with optical and acoustic error message
- Multiple temperature monitoring
- Unique Memmert ASF (Automatic Safety Function): integrated over-and under-temperature monitoring automatically follows the set value at freely selectable tolerance band
- Two high-grade platinum temperature sensors Pt 100 in a 4-wire circuit with mutual sensor monitoring and function control at equal working temperature
- Acoustic and visual warning signal if temperature or humidity limits are crossed, and if water container is empty
- Protection from operation by unauthorised persons: optional, chamber-linked personal User-ID-Card (extra charge)

Timer module

1 Time indication (here, real time)
2 Text messages

Temperature module

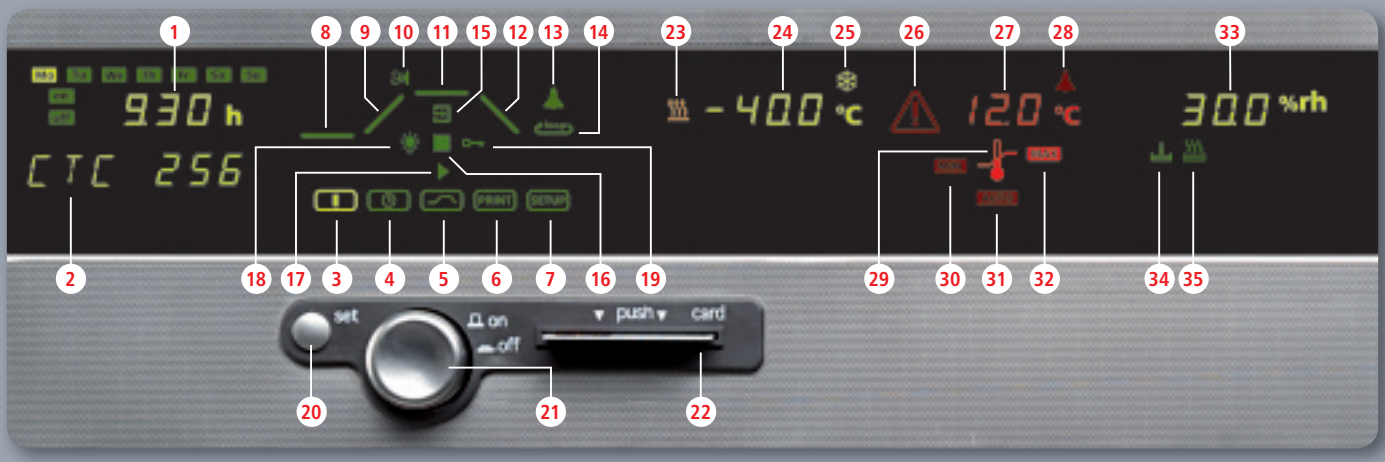
23 Heating
24 Setpoint/actual temperature
25 Cooling (active)

- Temperature adjustment:
  – 42 °C up to +190 °C
  (without humidity)
  +10 °C up to +95 °C (with humidity)
  only CTC
- Variation (time): ± 0.2 – 0.5 K
  Uniformity (spatial): ± 0.5 – 2 K

Monitor module

26 Visual alarm
27 Alarm limit
(heating switch-off temperature)
28 Sounder on alarm
29 Temperature limiter
30 Low alarm limit
31 Automatic alarm limit (ASF)
32 High alarm limit

Acoustic and visual alarm on temperature and humidity out of limit and on other errors



Control panel CTC

Operating mode

3 Normal operation (active)
4 Week timer*
5 Ramp timer
(Relative time programme)
6 Printer
7 Configuration
8 Wait (at programme start)
Hold (during programme)
9 Heating ramp
10 Setpoint Wait – programme continues when set value is reached
11 Hold ramp
12 Cooling down ramp
13 Sounder at ramp timer end
14 Repeat function
15 Edit (ramp timer)
16 Stop (ramp timer)
17 Start (ramp timer)
18 Lighting
19 Data manipulation prevented through optional (extra charge) User-ID-Card
20 Set key
21 Push/turn control
22 Chip card reader for MEMoryCard and optional (extra charge) User-ID-Card

*Weekly timer, programmable with one ON and OFF time per weekday; additional group function (e.g. Mo – Fr)

Humidity module

33 Setpoint/actual humidity
34 Water level in storage tank
35 Steam generation

- Humidity range: 10 – 98% rh
- Variation (time) ± 1.5% rh max.

Technical data, models and accessories for climate test chamber CTC and temperature test chamber TTC

to DIN 12 880: 2007-05

Interfaces:

USB

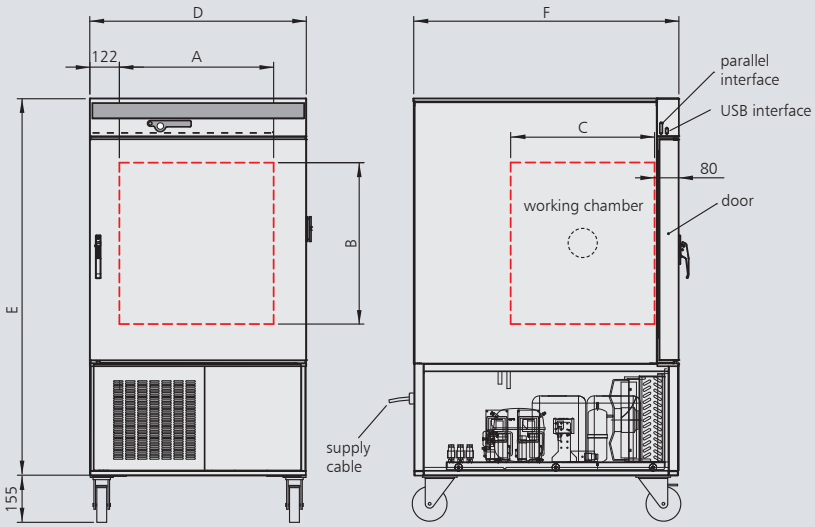
printer interface

Option (extra cost):

Ethernet LAN

CE

Dimensions of
climatic test chambers CTC/TTC
(see table below)



Model sizes				CTC 256	TTC 256
Stainless steel interior	Volume		approx. l	256	256
	Width (see sketches above)	(A)	mm	640	640
	Height (see sketches above)	(B)	mm	670	670
	Depth (less 30 mm for air duct in the middle of back wall)	(C)	mm	597	597
	Support ribs for stainless steel grids		number	6	6
Textured stainless steel exterior (rear zinc-plated steel)	Width (plus 20 mm for silicone plug and 5 mm for interfaces)	(D)	mm	898	898
	Height	(E)	mm	1730	1730
	Depth (without door handle, depth of door handle 50 mm)	(F)	mm	1100	1100
	Fully insulated heated stainless steel door			☐	☐
	Lockable castors for ease of transport			☐	☐
	Entry port, right, 80 mm with plug			☐	☐
Temperature	Electronic microprocessor temperature controller with Pt100 and auto-diagnostic system			☐	☐
	Temperature sensors Pt100 Class A in 4-wire circuit for uninterrupted operation on failure of one Pt100 with warning indication			double	double
	Temperature range with humidity control: Temperature range without humidity control:			+10 up to +95 °C – 42 up to +190 °C	– – 42 up to +190 °C
	Average heating up speed (acc. to IEC 60068-3-5)			10 K / minute	10 K / minute
	Average cooling down speed (acc. to IEC 60068-3-5)			6 K / minute	6 K / minute
	Heating up time from –40°C up to +180°C[1)]			20 minutes	20 minutes
	Cooling down time from +180°C to –40°C[1)]			80 minutes	80 minutes
	Temperature variation in time (to DIN 12 880:2007-05) (setpoint dependent)			± 0.2 … 0,5 K	± 0.2 … 0,5 K
	Temperature uniformity in chamber (setpoint dependent)			± 0.5 … 2 K	± 0.5 … 2 K
Humidity	Capacitive humidity sensor			☐	–
	Active microprocessor control for humidifying and dehumidifying (10–98% rh) incl. digital indication and auto-diagnostic system ensures rapid reaching of set humidity and very short recovery times; humidity supply with distilled water by self-priming pump			☐	–
	Telescopic slide for each 2 x 10 l tanks for distilled water as well as 2 x 10 l tanks as condensate collector[2)]			☐	–
	Automatic water tank change-over with alarm for continuous operation			☐	–
Monitor	Microprocessor temperature monitor acting as overtemperature protection, with Pt100 incorporating fault diagnostics with visual and acoustic alarm			☐	☐
	Digital over- and undertemperature monitor (protection class 3.3)			☐	☐
	Temperature monitoring band automatically linked to the setpoint (ASF)			☐	☐
	Monitor relay for reliable heating cut-off in case of fault			☐	☐
	Mechanical temperature limiter (TB)			☐	☐
Acoustic and optical alarm	Over- and undertemperature			☐	☐
	Door-open			☐	☐
	Over- / under humidity			☐	–
	Empty water tank			☐	–

Subject to technical modifications

1) To 98% of setpoint value
2) TTC with only 1 x 10 l tank as condensate collector

☐ Standard equipment
– Not available

Model sizes			CTC 256	TTC 256
Timer functions	Real-time/weekly programmer with group function (e.g. Monday – Friday)		☐	☐
	Timer with residual running time: max. 40 ramps (each 1 min. up to 999 h) programmable through controller or MEMoryCard XL; programming via PC and free-of-charge software[2]: unlimited number of ramps		☐	☐
Air Circulation	High-performance air fan, speed adjustable in 10% steps with monitoring function of fan speed and automatic speed adjustment		☐	☐
Documentation	Internal log memory 1024 kB as ring memory for all setpoints, actual values, errors, settings with real-time and date; capacity approx. 3 months at 1 min. intervals		☐	☐
	Parallel printer interface for printing logging files, suitable for all PCL3-compatible ink jet printers (USB available via converter, see accessories)		☐	☐
	„Celsius"[2] software for control and documentation of temperature and relative humidity		☐	☐
Setup	Calibration (no separate PC required), temperature: 3-point calibration on controller		☐	☐
	Calibration (no separate PC required), humidity: 2-point calibration at 20% and 90%		☐	–
	Setting of language for dialogue and display D / UK / E / F / I		☐	☐
Refrigeration	High-performance twin compressor (refrigerant R404A) with adjustable speed condenser fan and electronically controlled refrigerant injection		☐	☐
	Large-area stainless steel evaporator		☐	☐
Lighting	Halogen interior lighting 2 x 25 W		☐	☐
Further data	Electrical load	V / Hz	400 3ph N 50 Hz	400 3ph N 50 Hz
	Electrical supply	approx. W	7000	7000
	Net weight / Gross weight	approx. kg	340 / 420	340 / 420
Standard accessories	Additional stainless steel grid	number	1	1
	Grid width	approx. mm	640	640
	Grid depth	approx. mm	576	576
	Works calibration certificate (test point chamber centre at – 20 °C and +160 °C)		☐	☐
	Works calibration certificate (test point chamber centre at +30 °C and 60% rH)		☐	–
Standard version	**Climatic test chamber CTC / Temperature test chamber TTC**		**CTC 256**	**TTC 256**
Prices for accessories and additional equipment	Full-sight glass door (5-layer insulating glazing), heated		B0	B0
	Additional stainless steel grid		E3(x)	E3(x)
	Temperature profile write/read unit for programming via PC with USB interface for writing to and reading from the chip card, up to 40 ramps		V3	V3
	Additional chip card, blank, formatted (32 kB MEMoryCard XL for a maximum of 40 ramps)		V4	V4
	Additional chip card, pre-programmed for common test standards		V7	V7
	Oven-linked authorisation card (User-ID-Card) prevents undesired manipulation by unauthorised third parties		V1	V1
	Computer interface RS485 (for networking a max. of 16 ovens) instead of USB		V2	V2
	RS232 interface instead of USB		W6	W6
	Connection cable for computer interface RS232 according to DIN 12 900-1		V6	V6
	Interface Ethernet instead of USB incl. software "Celsius Ethernet-Edition"		W4	W4
	Parallel/USB converter cable with integrated power supply unit to connect PCL3-compatible HP printers with USB interface to MEMMERT units.		W1	W1
	Documentation package consisting of parallel USB converter cable including PCL3- compatible HP colour inkjet printer with USB interface (HP Deskjet 6940 or successor) for direct connection of printer to Memmert unit		W2	W2
	USB connection cable for computer interface		W7	W7
	External control and logging package consisting of mini-Notebook and Software "Celsius", pre-configurated, and lateral swinging arm		W9	W9
	Flexible Pt100[1] for positioning in working chamber or in load with socket, 4-pin, according to NAMUR NE 28, for external temperature recording (load temperature)		H4	H4
	Potential-free contact (24 V/2 A) with socket, 3-pin, according to NAMUR NE 28, for external monitoring (indication setpoint reached)		H5	H5
	Potential-free contact for combination error message (e.g. supply failure, sensor fault, fuse)		H6	H6
	Ditto, triple, for signal generation, controlled by programme segment (using PC) for a total of 3 freely selected functions to be activated (e.g. external acoustic and visual signals, shakers, stirrers, etc)		H7	H7
	Works calibration certificate for one temperature and humidity according to customer specification		Z4	Z4
	IQ check list with works test data for chamber as support for validation by customer		Q1	Q1
	OQ-check list with works test data for one freely selectable humidity and temperature value[3] incl. temperature distribution survey for 27 measuring points to DIN 12880-2007:05 as support for validation by customer		Q2	Q2
	Software „Celsius FDA Edition"[4] – meets the requirements for the use of electronically stored data sets and electronic signatures as laid down in Regulation 21 CFR Part 11 of the US Food and Drug Administration (FDA)		Q3	Q3
	Integration of additional units (up to max. 16 units) into an already existent FDA-software licence		Q4	Q4
	Start-up of CTC and TTC chambers and brief training (only D, A, CH) through Memmert service. Requirement: chambers are at their final location and all installations at customer site are available (only applies in connection with orders and payments for new units)		K9	K9

Subject to technical modifications

1) Special equipment requires 20% payment in advance of apparatus price
2) MEMMERT "Celsius" software has been tested for Windows NT 4, 2000, XP and Vista
3) Additional temperature and humidity values at extra cost for each additional value
4) Requires Windows 2000 Professional or XP Professional

☐ Standard equipment
– Not available
(x) Please specify quantity required after the order number

OUR PROGRAMME

Universal ovens
Incubators
Hot air sterilisers
Ovens

Vacuum ovens

Peltier-cooled incubators
Compressor-cooled incubators
Cooled incubators

CO_2 incubators

Humidity chambers

Constant climate chambers

Climatic test chambers

Water- and oilbaths

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Some of the illustrations in this publication include special accessories. We reserve the right of technical modifications. Dimensions are subject to confirmation.

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