

## 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](http://www.memmert.com)**

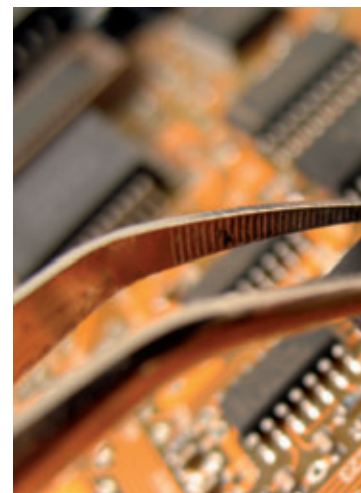




## The high flyer of testing technology!

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. Forty 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  $-42\text{ }^{\circ}\text{C}$  to  $+190\text{ }^{\circ}\text{C}$  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

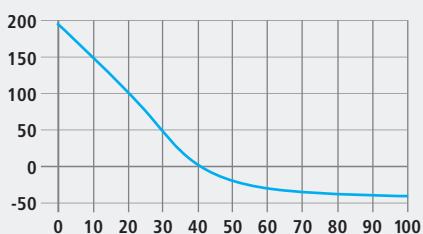




## Economical at high performance

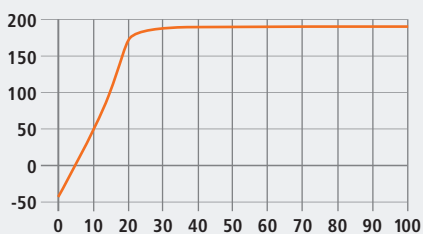
The high level of standardisation and the highly efficient principle of identical parts in our production allow us to have an extensive range of standard features, along with constantly excellent quality and productivity at an outstanding cost/benefit ratio. Thus our CTC and TTC environmental test chambers 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

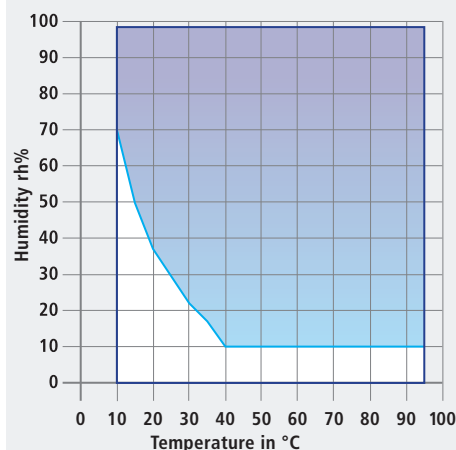
## Reliable and efficient climate technology

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!

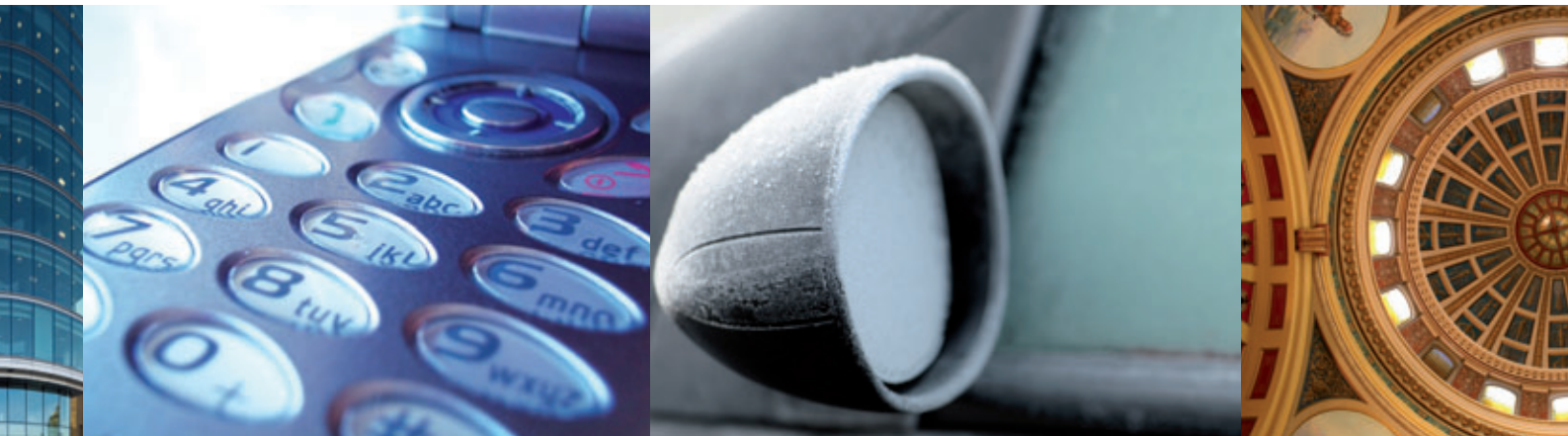
High capacity reserves for cooling and heating guarantee that test standards are tightly maintained. The unsurpassed fittings in terms of programming, storage and documentation make it very easy to operate these efficient and absolutely precise test chambers, and lastingly reduce process times. A special 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 recyclable 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:

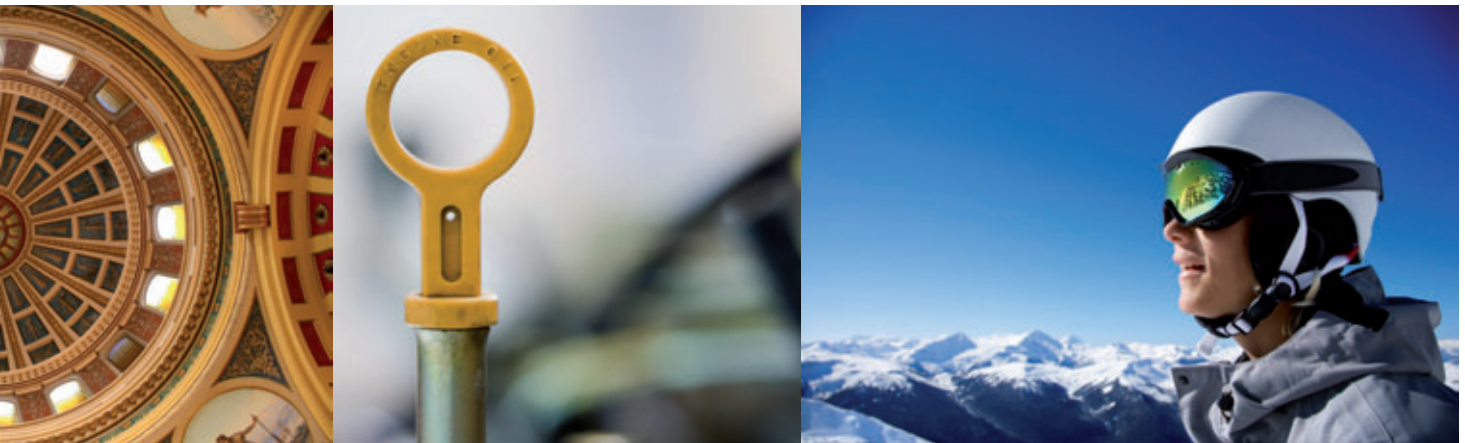
- Clear and easy to clean underglass function display
- Available only from Memmert: the patented push/turn control for intuitive operation of the entire menu
- Heated, multi-layered insulation, double-sealed stainless steel door
- 2 x 25 Watt steam-tight halogen lamps
- Low noise (55 dBA)
- Extremely 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 with more functionality for programming and logging, as well as optionally available for FDA-compliant software (no domain network support)
- Driver for communication with LabVIEW
- 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





### 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 m<sup>3</sup> 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

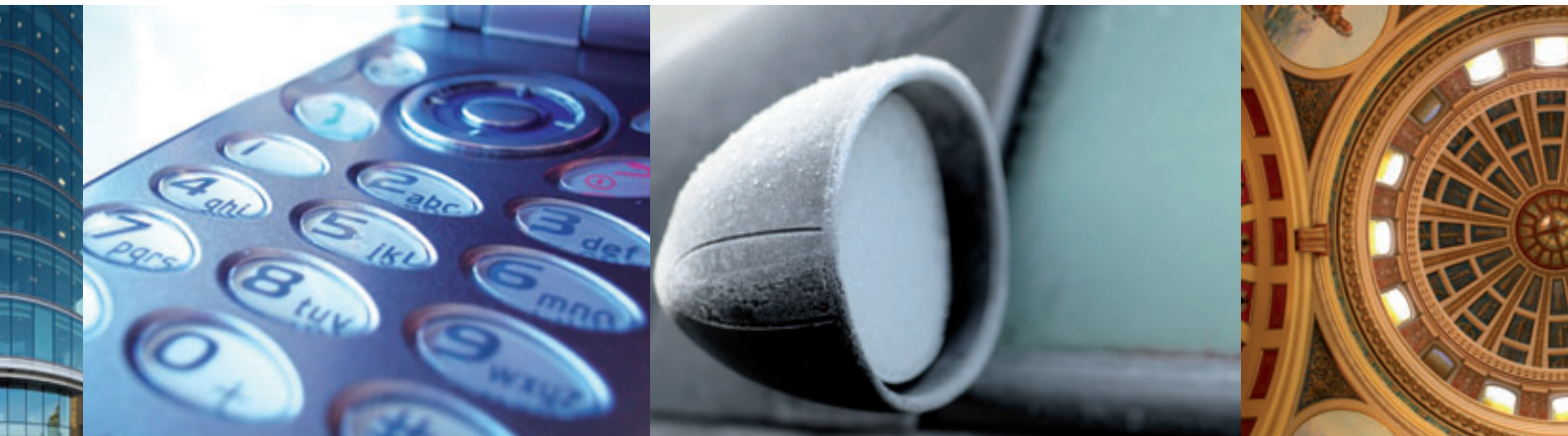
### Your standard features: more safety

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







### Timer module

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

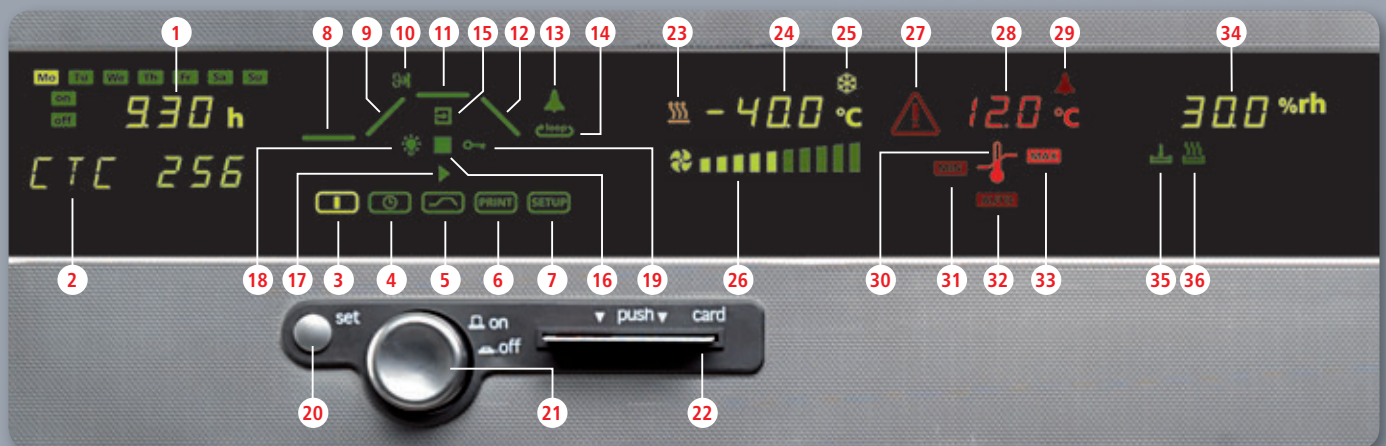
### Temperature module

- 23 Heating
  - 24 Setpoint/actual temperature
  - 25 Cooling (active)
  - 26 Fan speed
- Temperature adjustment:  
– 42 °C up to +190 °C  
(without humidity)  
+10 °C up to +95 °C (with humidity)  
only CTC
  - Variation (time):  $\pm 0.2 - 0.5$  K  
Uniformity (spatial):  $\pm 0.5 - 2$  K

### Monitor module

- 27 Visual alarm
- 28 Alarm limit  
(heating switch-off temperature)
- 29 Sounder on alarm
- 30 Temperature limiter
- 31 Low alarm limit
- 32 Automatic alarm limit (ASF)
- 33 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 User-ID-Card
- 20 Set key
- 21 Push/turn control
- 22 Chip card reader for MEMoryCard  
and optional User-ID-Card

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

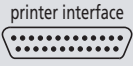
### Humidity module

- 34 Setpoint/actual humidity
  - 35 Water level in storage tank
  - 36 Steam generation
- Humidity range: 10 – 98% rh
  - Variation (time)  $\pm 1.5\%$  rh max.

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

to DIN 12 880: 2007-05

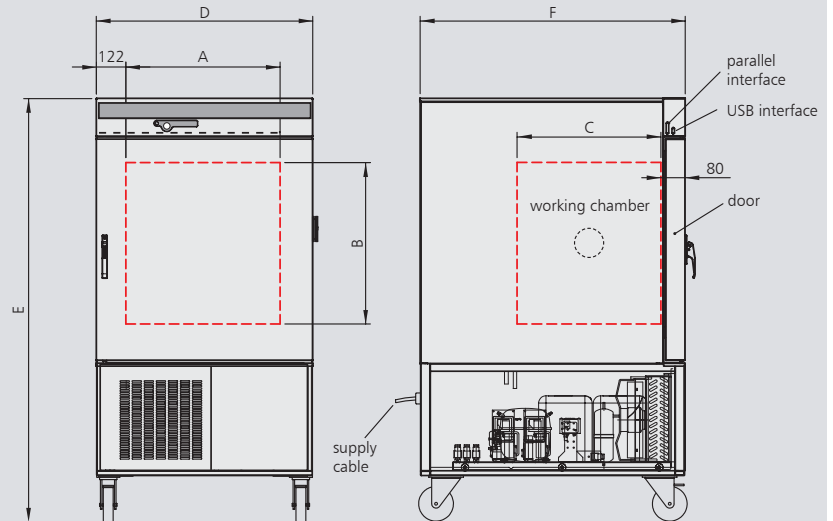
**Interfaces:**



**Option:**



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		<input type="checkbox"/>	<input type="checkbox"/>
	Lockable castors for ease of transport		<input type="checkbox"/>	<input type="checkbox"/>
	Entry port, right, 80 mm with plug		<input type="checkbox"/>	<input type="checkbox"/>
Temperature	Electronic microprocessor temperature controller with Pt100 and auto-diagnostic system		<input type="checkbox"/>	<input type="checkbox"/>
	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:		+10 up to +95 °C	–
	Temperature range without humidity control:		–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 (+190°C to 0°C)		6 K / minute	6 K / minute
	Average cooling down speed (acc. to IEC 60068-3-5)		4 K / minute	4 K / minute
	Heating up time from –40°C up to +180°C <sup>1)</sup>		20 minutes	20 minutes
	Cooling down time from +180°C to –40°C <sup>1)</sup>		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		<input type="checkbox"/>	–
	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		<input type="checkbox"/>	–
	Telescopic slide for each 2 x 10 l tanks for distilled water as well as 2 x 10 l tanks as condensate collector <sup>2)</sup>		<input type="checkbox"/>	–
	Automatic water tank change-over with alarm for continuous operation		<input type="checkbox"/>	–
Monitor	Microprocessor temperature monitor acting as overtemperature protection, with Pt100 incorporating fault diagnostics with visual and acoustic alarm		<input type="checkbox"/>	<input type="checkbox"/>
	Digital over- and undertemperature monitor (protection class 3.3)		<input type="checkbox"/>	<input type="checkbox"/>
	Temperature monitoring band automatically linked to the setpoint (ASF)		<input type="checkbox"/>	<input type="checkbox"/>
	Monitor relay for reliable heating cut-off in case of fault		<input type="checkbox"/>	<input type="checkbox"/>
	Mechanical temperature limiter (TB)		<input type="checkbox"/>	<input type="checkbox"/>
Acoustic and optical alarm	Over- and undertemperature		<input type="checkbox"/>	<input type="checkbox"/>
	Door-open		<input type="checkbox"/>	<input type="checkbox"/>
	Over- / under humidity		<input type="checkbox"/>	–
	Empty water tank		<input type="checkbox"/>	–

Subject to technical modifications  
All performance data are typical  
average values for standard appliances

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)	<input type="checkbox"/>	<input type="checkbox"/>
	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 <sup>2)</sup> : unlimited number of ramps	<input type="checkbox"/>	<input type="checkbox"/>
Air Circulation	High-performance air fan, speed adjustable in 10% steps with monitoring function of fan speed and automatic speed adjustment	<input type="checkbox"/>	<input type="checkbox"/>
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	<input type="checkbox"/>	<input type="checkbox"/>
	Parallel printer interface for printing logging files, suitable for all PCL3-compatible ink jet printers (USB available via converter, see accessories)	<input type="checkbox"/>	<input type="checkbox"/>
	„Celsius“ <sup>2)</sup> software for control and documentation of temperature and relative humidity	<input type="checkbox"/>	<input type="checkbox"/>
Setup	Calibration (no separate PC required), <u>temperature</u> : 3-point calibration on controller	<input type="checkbox"/>	<input type="checkbox"/>
	Calibration (no separate PC required), <u>humidity</u> : 2-point calibration at 20% and 90%	<input type="checkbox"/>	–
	Setting of language for dialogue and display D / UK / E / F / I	<input type="checkbox"/>	<input type="checkbox"/>
Refrigeration	High-performance twin compressor (refrigerant R404A) with adjustable speed condenser fan and electronically controlled refrigerant injection	<input type="checkbox"/>	<input type="checkbox"/>
	Large-area stainless steel evaporator	<input type="checkbox"/>	<input type="checkbox"/>
Lighting	Halogen interior lighting 2 x 25 W	<input type="checkbox"/>	<input type="checkbox"/>
Further data	Electrical load	V / Hz	400 3ph N 50 Hz
	Electrical supply	approx. W	7000
	Net weight / Gross weight	approx. kg	297 / 420
Standard accessories	Additional stainless steel grid	number	1
	Grid width	approx. mm	640
	Grid depth	approx. mm	576
	Works calibration certificate (test point chamber centre at – 20 °C and +160 °C)	<input type="checkbox"/>	<input type="checkbox"/>
	Works calibration certificate (test point chamber centre at +30 °C and 60% rH)	<input type="checkbox"/>	–
Standard version	<b>Climatic test chamber CTC / Temperature test chamber TTC</b>	<b>CTC 256</b>	<b>TTC 256</b>
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 6980 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-configured, and lateral swinging arm	W9	W9
	Flexible Pt100 <sup>1)</sup> 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 <u>one</u> freely selectable humidity and temperature value <sup>3)</sup> 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“ <sup>4)+5)</sup> – 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 <sup>4)+5)</sup>	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  
All performance data are typical  
average values for standard appliances

- Special equipment requires 20% payment in advance of apparatus price
- MEMMERT „Celsius“ software has been tested for Windows 7, Vista and XP

- Additional temperature and humidity values as option
- Requires Windows 2000 Professional or XP Professional
- No domain network support

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

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Hot air sterilisers  
**Ovens**



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Compressor-cooled incubators  
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**Water and oil baths**



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