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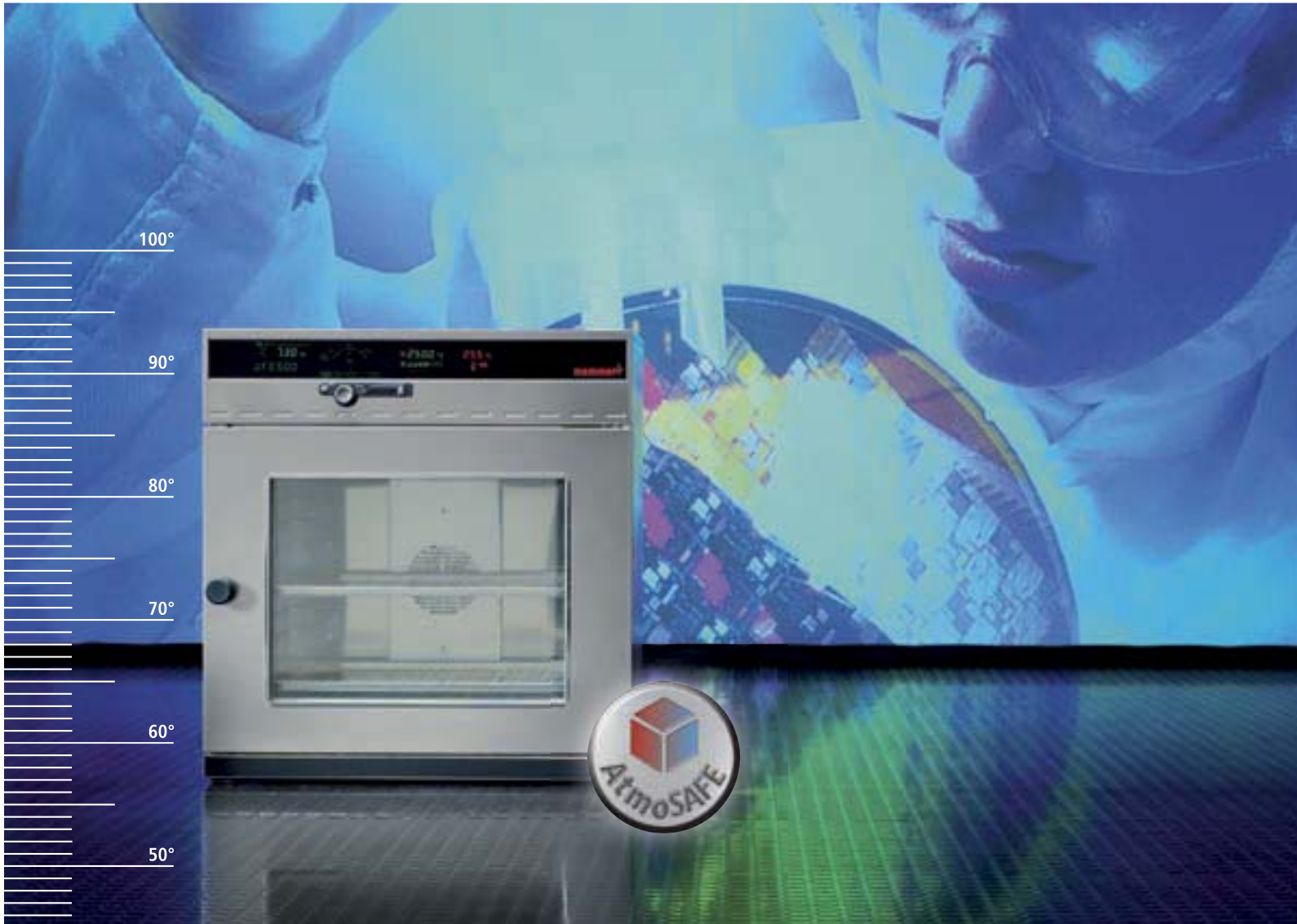
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E-mail: [enquiry@absotecthailand.com](mailto:enquiry@absotecthailand.com)URL: <http://www.absotecthailand.com>URL: <http://www.greeninnotec.com>**memmert**

Experts in Thermostatics

**Ovens UIS**Universal ovens **U** the all-roundersIncubators **I** the gentle onesSterilisers **S** the standardised ones>>>> [www.memmert.com](http://www.memmert.com)

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## Reliable companion into the future

Modern research and development are an ever deeper journey into the microcosmos. The knowledge of the reaction of small and micro-particles and their interaction will produce revolutionary changes in applications and products for medicine and foodstuffs, as well as in electronics, material research and environmental protection.

For a proper understanding of the infinitely large world of organic and inorganic structures there is a need for precise and finely adjustable experimental and test equipment. The variants available on more than sixty Memmert ovens meet all requirements in regard to accuracy, security and performance. Since 1947 we are driving the development of thermal technology, with hundred thousands of our ovens in use world-wide. Welcome to the experts in thermostatics.



From one of the first ovens with rectangular chamber more than 60 years ago, to the Perfect controller Class today – we are always ahead of the times.



## The Memmert world: controlled atmosphere

We set an example in terms of reliability, quality, commitment and innovation.

100% AtmoSAFE is our promise to ensure that all our appliances will have the perfect atmosphere. The absolutely precise control of all parameters, such as temperature, humidity, CO<sub>2</sub>-content or pressure guarantees 100% customer benefit.



# Innovation – for more than 60 years the formula for our success

Quite small or very large? Easy-use basic specification or individually selected adaptation? Standard application or demanding functionality and documentation facilities?

Drying, incubating, warming, testing, sterilising, ageing, burning-in, testing, curing, storing the wide Memmert model range offers a solution for almost any thermostating task. One thing however is common to all Memmert ovens: an unbeatable price-performance ratio. On these pages you can read why!

## Success factor control technology    Success factor heating concept

Irrespective of how unlikely a fault may be, thermal security has the highest priority in the development of Memmert ovens. To mention only one example, even the Basic performance class is already equipped with a high-grade platinum temperature sensor in 4-wire circuit. The other two classes Excellent and Perfect even have two of these independently acting Pt100 sensors. Further safety features are described under Control Technology on pages 14 to 19.

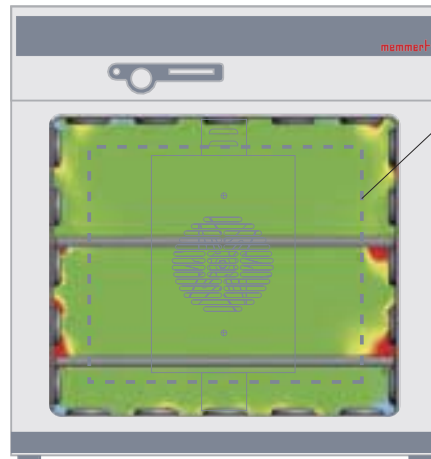
No-one would have the idea to fit the same heating to a wooden hut and to a castle – and that not only for reasons of energy consumption. The heating power of Memmert ovens is adapted to the particular chamber volume and temperature range and optimally controlled electronically.

This guarantees a uniform temperature distribution as well as even and gentle heating of sensitive loads. At the same time any temperature overshoot is avoided. Read more about the unique large-area Memmert all-round heating on pages 12 and 13!

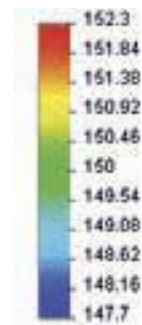
## Success factor standardisation

All Memmert ovens are developed and produced on the principle of standardisation. Your advantage: excellent quality and functionality throughout, with an outstanding price-performance ratio.

State-of-the-art technology permits rapid machine changeover and flexible fitting of special accessories in current production. In spite of extensively fully-automatic production processes there is enough room to meet your individual requirements.



Space of guaranteed temperature uniformity



temperature [°C]

Using the latest simulation software we optimise all important factors to achieve a uniform temperature distribution in the chamber (here: UFE 400 at +150 °C with two shelves  $\pm 1.3$  °C)

## A glance behind the scenes ...



... or how Memmert contributes to the wear and scratch resistance of lenses.

With more than 26 000 employees in thirty-seven countries, the French Essilor Group is the world leader in the manufacture of ophthalmic products. Memmert ovens are used for the surface treatment and thermal curing of lenses.



# Ready for unlimited use!

## Systematic multiplicity of variants

Take three letters and a number – and you have the required model from among more than sixty possible variants!

- **U or I or S:**  
universal ovens U, incubators I and sterilisers S cover three essential application ranges for thermostating technology
- **N or F:**  
with natural convection or forced air circulation by fan there is a choice of two forms of air circulation
- **B or E or P:**  
three performance classes – Basic, Excellent or Perfect – meet in stages all requirements in thermal security, precision and quality control
- **100 to 800:**  
nine model sizes cover the full variety of load materials and quantities.

## Universal ovens U 14 to 749 litre

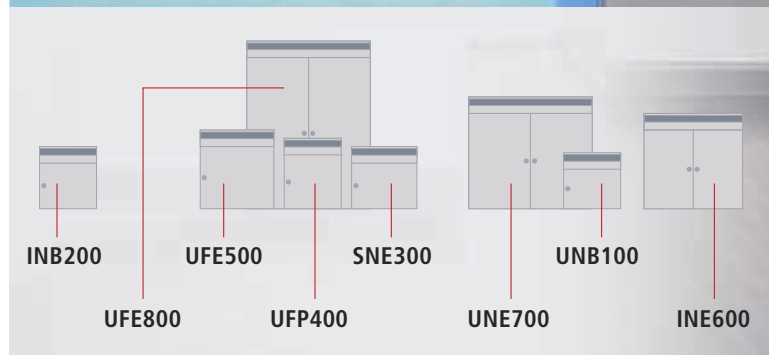
- B: up to +220 °C
- E/P: up to +250 °C  
(up to +300 °C at extra charge)
- N/F: natural convection or forced air circulation

## Incubators I 32 to 749 litre

- B/E/P: up to +70 °C
- N: natural convection
- double doors  
(glass inside, stainless steel outside)
- STERICard for chamber sterilisation  
(Perfect class)

## Sterilisers 14 to 749 litre

- B: up to +220 °C
- E/P: up to 250 °C
- N/F: natural convection or forced circulation
- hot air sterilisation at +160 °C to +180 °C  
and de-pyrogenation at +220 °C



# Protecting mankind and nature

“In the face of immeasurably rich and continuously regenerating nature, man will always remain the wondering child, however far his scientific knowledge may progress, and must always expect new surprises”,

*thus wrote the famous physicist and Nobel Prize winner Max Planck.*

*The obligation to retain this reverence for nature is today more important than ever in research, development and medicine. As it is for us.*









UFE 600

## For each application the right oven

Memmert products in their hundred thousands have been in operation for decades in more than hundred-twenty countries. Knowledge and experience over three generations make us worldwide to one of the leading manufacturers of thermostating equipment.

A large number of quality features are found on all our thermostating ovens, from quite small to extra large ones: practice-oriented design, application-suited programming function, as well as unsurpassed precise, uniform and gentle heating of the chamber load. Even during intensive use these high-grade and sturdy stainless steel units lose neither their good appearance nor their reliability.

### Incubators I – the gentle ones

32 to 749 litre

up to +70 °C

The world of research, medicine, pharmaceuticals and food technology would be unthinkable without Memmert incubators. Organic materials demand particularly gentle heating. For this reason both heating and control are specially optimised for low temperatures up to +70 °C. Overshoots are avoided by running up the temperature within a very narrow control band and holding it accurately at the selected setpoint. In accordance with the Medical Products regulation (Directive 93/42/EC) we recommend the incubators INP for warming irrigation and infusion solutions.

In order to minimise the danger of samples drying out, the large-area all-round heating has been so finely balanced that optimal temperature distribution in the chamber is achieved without forced air circulation and using only natural convection. Double doors – glass inside, stainless steel outside – provide a clear view of the load without any danger of temperature drift.

For special applications Memmert offers cooled incubators, CO<sub>2</sub> incubators, as well as humidity chambers. Please ask for separate leaflets!

### Universal ovens U – the all-rounders

14 to 749 litre

up to +220 °C (B), up to +250 °C (E+P),  
up to +300 °C (E+P, extra charge)

The universal units among the ovens cover a range of applications, ideally in temperature ranges from +50 °C. No need for any compromise! With nine model sizes, combined with three controller classes and either natural convection or forced air circulation, there is a thermostating unit combining the latest technology with a high functionality and optimal operating convenience not only for industry but also for science and research.

Model-makers warm up plasticine, developers age computer chips, civil engineers test bitumen. The list of applications of our universal ovens could be extended over many pages.

For each application the precise control technology provides a maximum of security and reliability. In complex test series on highly sensitive materials and with minimal tolerances, this is where the combined action of control, heating and ventilation shows its full effect.

Read more about the Memmert heating and ventilating system on pages 12 and 13, and on control technology from page 14!



INP 500

## Sterilisers S – the standardised ones

14 to 749 litre

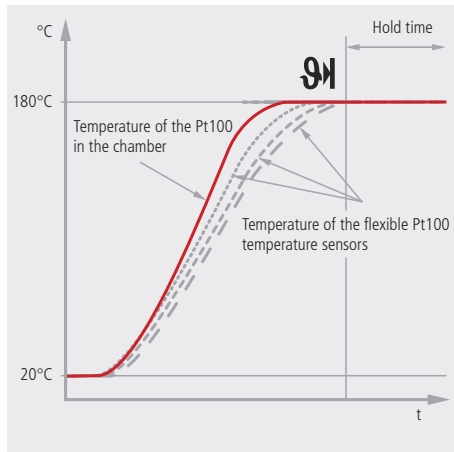
up to +220 °C (B), up to +250 °C (E/P)

Medicine has to protect and retain life. It is not sufficient to disinfect containers and instruments. A specially convenient feature is the setpoint-dependent programme continuation which ensures that the sterilisation time is accurately maintained (see diagram below, Class E and P only) and even highly resistant micro-organisms are killed completely. Irrespective of the sterilisation load and the chamber volume, this function guarantees the user absolutely reliable sterilisation.

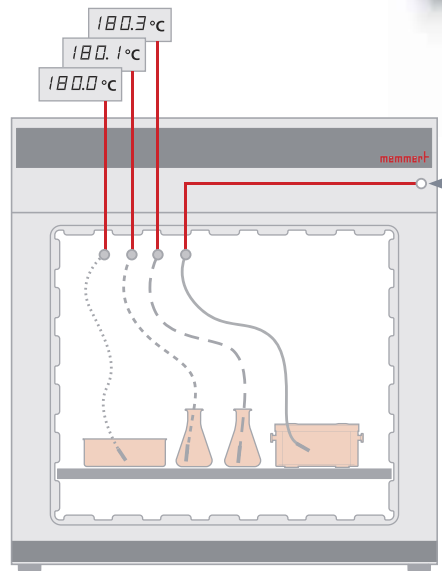
The Memmert hot air sterilisers S conform to all national and international standards and specifications for medical products and are also suitable without restriction for the special application of depyrogenation at +220 °C. In combination with the User-ID-Card, the process-controlled electromagnetic door lock (options, extra charge) on the Perfect class represents the ultimate in regard to security.



SFE 800



When Setpoint Wait is selected, the Hold time only starts when at all measurement points the set temperature has been reached within a narrow tolerance band



4-pin socket for recording the temperatures with an external instrument

### Setpoint-Wait function

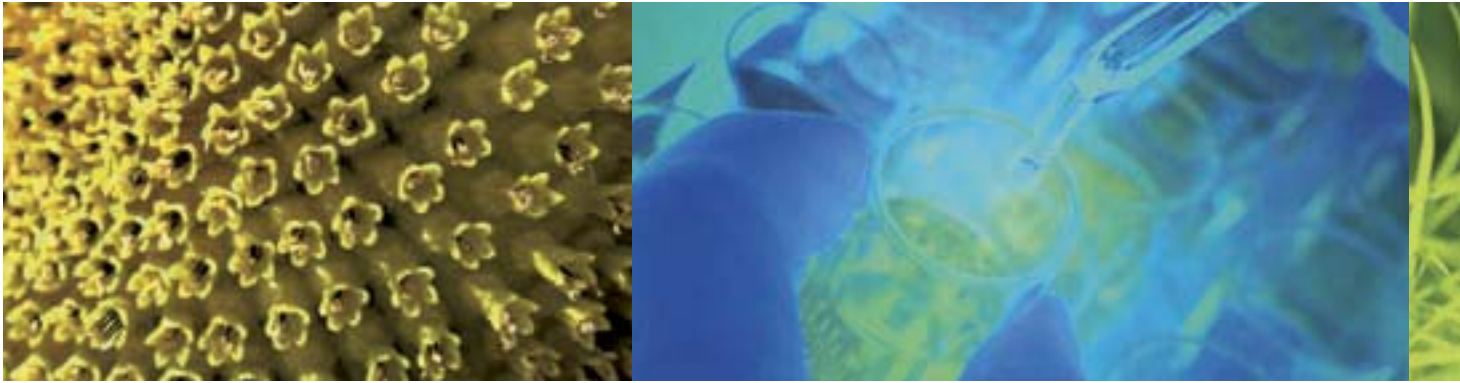
Exactly timed temperature control helps to save life (e.g. in sterilisation). For this reason the Setpoint Wait function on Class E and P ensures that the programme continues only after the setpoint has been reached.

When measuring using the additional, freely positioned Pt100 sensors (option Class P only) the reaching of the set temperature in the load is decisive for the continuation of the programme. This also ensures absolutely reliable depyrogenation. Up to three measurements can be indicated directly on the oven or a measurement can be output to an external instrument.

## A glance behind the scenes ...

... or why Memmert can claim to have played a minute part in an important pioneering achievement.

*In December 1967 the South-African surgeon Christiaan Barnard successfully performed an operation which no man had previously survived: the transplantation of a human heart. Dr. Barnard was supported by a large team of assistants, as well as technical equipment which was state-of-the-art at the time. Right among all the equipment at the Groote Schuur hospital in Capetown was a Memmert oven – thousands of miles away from the Company headquarters in South Germany and 20 years after the production of the first Memmert hot air steriliser.*



## Each little detail brings measurable advantages

**Good design is identified not only through high-grade materials and clear shape. Equally important are criteria such as ergonomics, long life and operating convenience. Excellent design also achieves the ultimate goal: it combines many small functional details into an overall result.**

### Convenience made for you!

A uniform concept for all ovens:

- Clear, easy-to-clean underglass functional display for visualising all process parameters
- Unique to Memmert: the patented push/turn control for the intuitive operation of the entire menu
- Chamber easy to clean, no inaccessible spaces and corners
- Strong, fully insulated stainless steel door (inner face thermally decoupled from the external body)
- When both hands are full: convenient closing of the door by pressing on the door handle with the elbow
- Calibration and appropriate adjustment directly on the oven of Class E and P.

### Stainless steel – the noble material

Memmert ovens can be found in the microbiology laboratory just as much as in material testing for industrial manufacture. Wherever they are, they demonstrate the superiority of high-grade stainless steel over painted sheet steel which soon tends to corrode during extended use. The structured stainless steel of the outer case (back panel in zinc-plated sheet steel) has for many years been the unmistakable mark and expression of the Memmert's holistic quality philosophy. Functional design in its most beautiful form: scratch-resistant, sturdy and durable.

The chamber interior is made entirely from high-grade and fully recyclable stainless steel Mat.Ref. 1.4301 (ASTM 304). Specially smooth and hygienic surfaces simplify cleaning without leaving any residue.

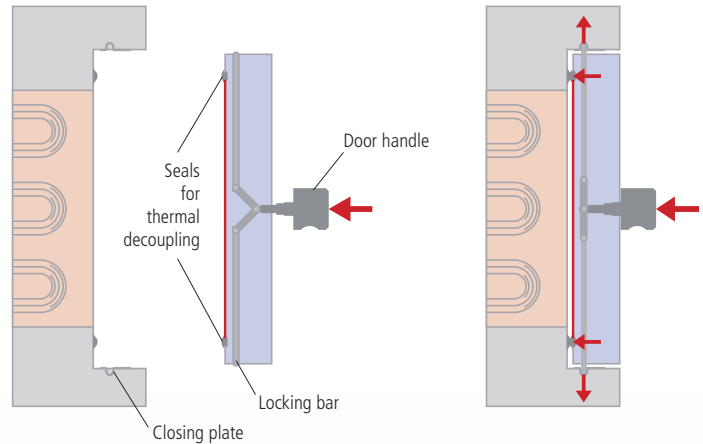




## These doors are completely tight

Many small features of Memmert ovens help to avoid the time-consuming and energy-wasting readjustment of the temperature. A good example for smart design is the ingenious door construction on all ovens.

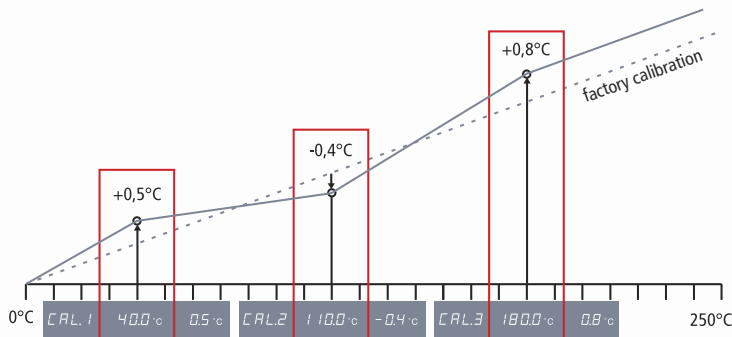
As the door is closed it is barred at the top and bottom and at the same time pressed against the oven body. The hot internal faces of the door are thermally decoupled by seals against the outside.



## Simple navigation through the latest technology

On all Memmert ovens the push/turn control forms the simple centrepiece for menu navigation and operation. On the highest class controllers it is possible to preset on the oven, among others, temperature setpoints, fan speed, air flap setting, over- and undertemperature protection, ON and OFF times, week-days, multi-week running times and up to 40 temperature ramps.

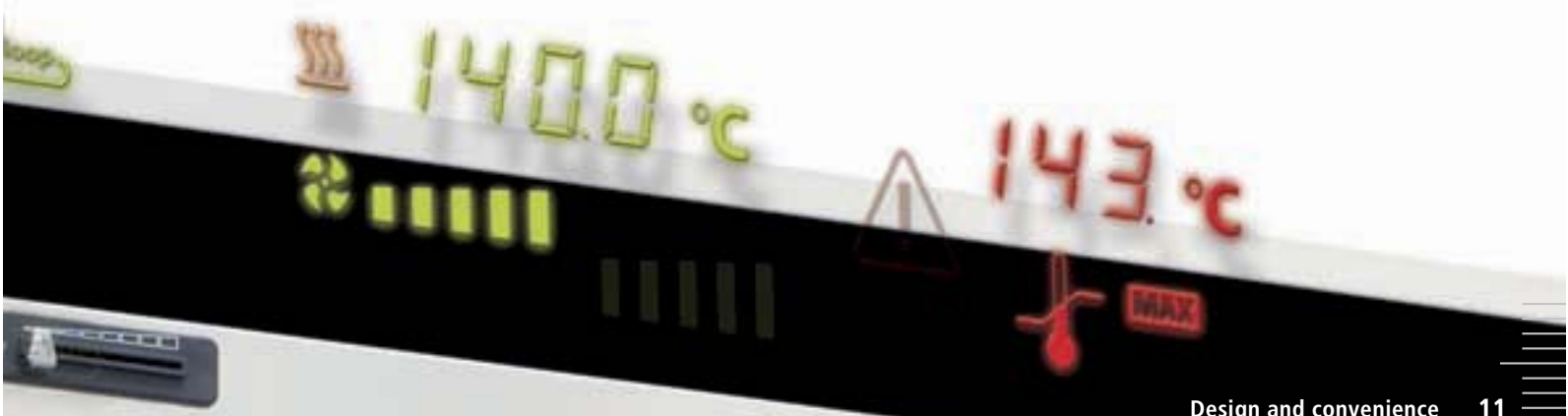
The underglass functional display shows at all times and at a glance the entire programme: temperature, operating mode, heating, ventilation and air flap status, time and alarm signals.



Three freely selected calibration temperatures CAL1 to CAL3, adjustable directly on Class E and P units

## Fine adjustment à la carte

The utmost precision of control where it is required! Many heating processes, especially in medicine or pharmaceuticals, demand maximum precision over the entire temperature range with defined chamber loads. Ovens of Class E and P offer the facility to adjust the control by means of up to three freely selected measuring points and in this way to adapt it accurately to the special application.



# Perfect energy performance by Memmert

Temperature control is the heart of every oven – you might think. Memmert presents a different approach. All essential components such as control, heating and ventilation are seen as a unit and are further developed in-house. It is only through the ideal interplay of technology that the material in the chamber can be heated gently and yet speedily and uniformly.

The use of large-area all-round heating ensures particularly gentle thermal treatment. By distributing the heating power over a large number of heating elements it is barely subject to wear and has therefore an extremely long life.

## At a glance

The unbeatable advantages of the Memmert heating and ventilating system:

- The heating elements are protected and yet are close to the chamber load
- No corrosion or deposits on the heating elements
- The direct contact between heating ribs and sliding shelves ensures excellent heat transfer and therefore improved temperature distribution
- The positioning of the heating elements around the chamber leads to optimal temperature uniformity, even with large chamber loads
- The excellent thermal conductivity of the aluminium thermostating jacket mounted on the outside of the chamber interior additionally optimises temperature uniformity and heat accumulation (e.g. during a power failure)

## Without imitation: the heating concept

Very extensive manufacturing expertise and outstanding material know-how are behind the unique Memmert heating system which has been improved over decades. The working chambers in stainless steel with hairpin-shaped ribs are deep-drawn on fully automatic manufacturing plants. The ribs serve for accommodating the heating elements behind the four inner walls of the chamber thus being well protected from any damage.

This decentralised arrangement of the heating ensures uniform temperature distribution inside the chamber even with reduced chamber air circulation due to large chamber loads, or with the fan-driven air circulation switched off.

## Heating and control, a strong team

Full power ahead! Not with Memmert. Apart from an increased energy consumption, the consequences of temperature overshoots might be fatal for sensitive loads. The strict requirements of quality assurance demand a form of control which is accurately adapted to different chamber volumes, chamber loads and temperature ranges. To reach the setpoint rapidly and directly and yet heat uniformly and gently – in combination our technology concepts for heating and control as developed in-house are unbeatable.

A glance behind the scenes ...

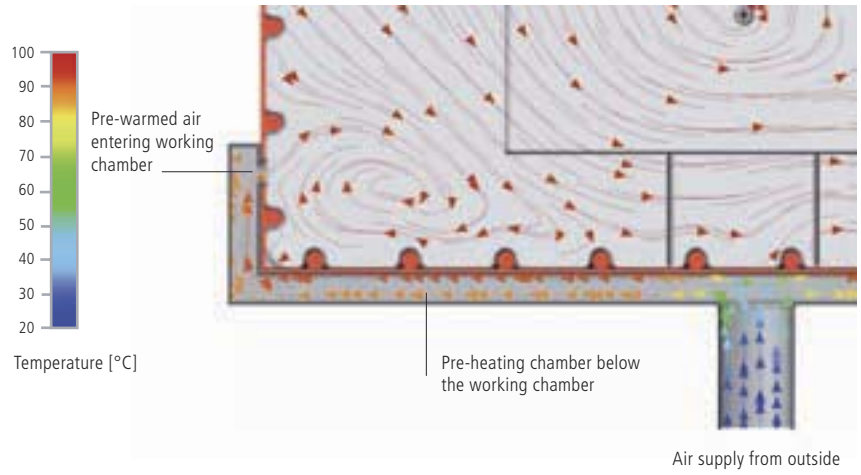
LEONI

... or how Memmert contributes to the development of safety components for the motorcar.

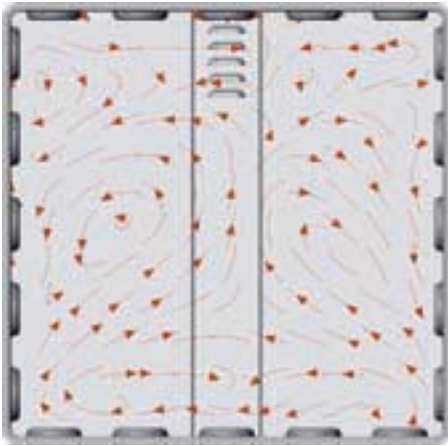
*Leoni AG, a company with its head office in Nuremberg, Germany, is a worldwide supplier of wire, cable, and on-board systems. Cable are aged for many months in Memmert ovens in order to simulate long-term material changes under real conditions.*

## Fresh air is pre-warmed

Temperature drift? Not with Memmert! On all Memmert ovens the fresh air is heated in a pre-warming chamber and continuously added to the air inside the chamber.



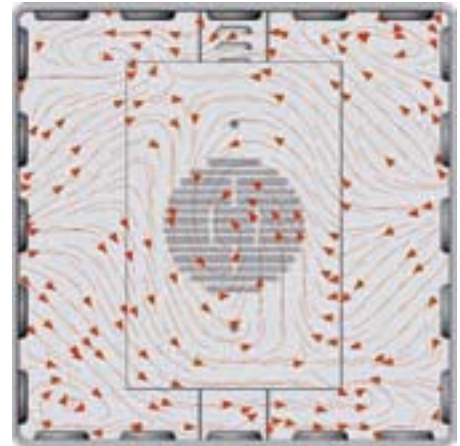
Air supply from outside



Air flow with natural convection

## Ventilation, the third element

A carefully designed ventilation concept supplements the technology package in Memmert ovens. For optimal temperature distribution inside the chamber we offer for universal ovens and sterilisers a fan-driven air circulation which can be controlled in 10% steps on Class E and P ovens as well as switched off. Your advantage? The proper adjustment of the air circulation avoids undesirable air movements, especially when drying powder, sand, grain or cosmetics. The fan speed can be reduced in the process as the dryness of the material increases.



Air flow with forced air circulation by fan





# Modern control technology in three performance classes

To be close to the user, to seek continuous interchange – that too is one of the secrets of our success. Only in this way can we perfectly adapt operation, functionality and security of our three performance classes to your requirements, and it is for the same reason that we develop and manufacture all controllers in-house.

## Three stages – innumerable applications

The controller is the switching centre in the Memmert oven. Every single one, without exception, passes a thorough test procedure before installation, and in addition is calibrated before the oven is shipped. Zero error and hundred percent customer satisfaction – development and production have to meet high standards in the optimisation of our three controller classes.

**Basic** Reliable and precise for standard applications

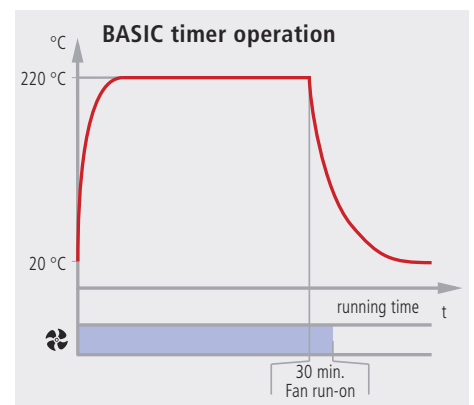
**Excellent** Application multiplicity par excellence

**Perfect** In regard to convenience and documentation

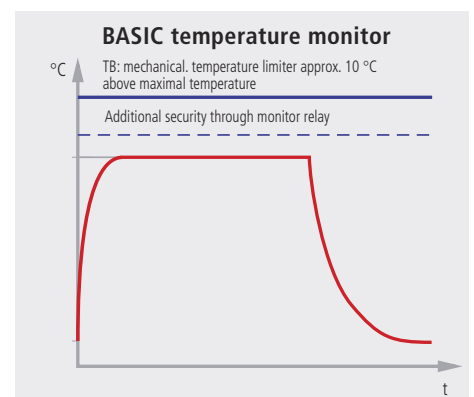
## A high standard right from the start

Modern technology maintains the temperature in the green range.

- Double temperature monitor, with relay switch-off when the setpoint has been exceeded by a defined amount, as well as mechanical temperature limiter TB to switch off the oven heating above the maximal temperature
- For optimal and long-term transmission of the temperature signal: a platinum temperature sensor Pt100 (Class A) in high-grade 4-wire circuit



Fan runs on for 30 minutes: shorter cooling-down times, no hot spots, more security



Double security through monitor relay and mechanical temperature limiter TB



## Basic – reliable and precise for standard applications

- Manually adjustable air flap for fresh air supply
- Visual alarm on overtemperature
- Simultaneous indication of residual operating time and temperature

In this controller class the functionality is concentrated on thermal accuracy and security. High-grade components and materials are also standard for this class. Basic is ideal for drying or warming of less sensitive materials at a single pre-selected setpoint.



Control panel Basic

### Timer module

- 1 Time indication (here residual running time)

### Operation mode

- 2 Normal operation
- 3 Timer operation (active)  
Programming a hold time up to 99:59 hours
- 4 SET key
- 5 Push/turn control
- 6 Air flap

### Temperature module

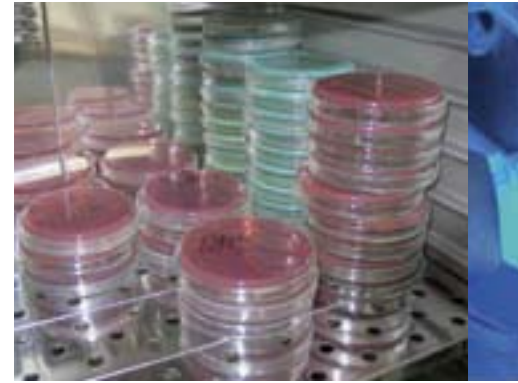
- 7 Heating indicator
  - 8 Setpoint/actual temperature
- temperature range:  
without fan 5 °C above ambient,  
with fan 10 °C  
up to +220 °C (U/S)  
up to +70 °C (I)
  - Temperature variation (time):  
≤ ±0,5 °C at 150 °C (U/S)  
≤ ±0,2 °C at 37 °C (I)

### Monitor module

- 9 Visual alarm on overtemperature and other error messages

# Excellent – application multiplicity par excellence

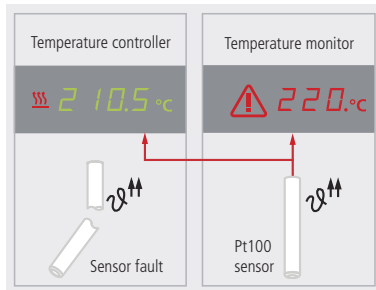
Recommended for applications which make high demands on thermal security, the Excellent Class offers a wide range of programming and documentation facilities.



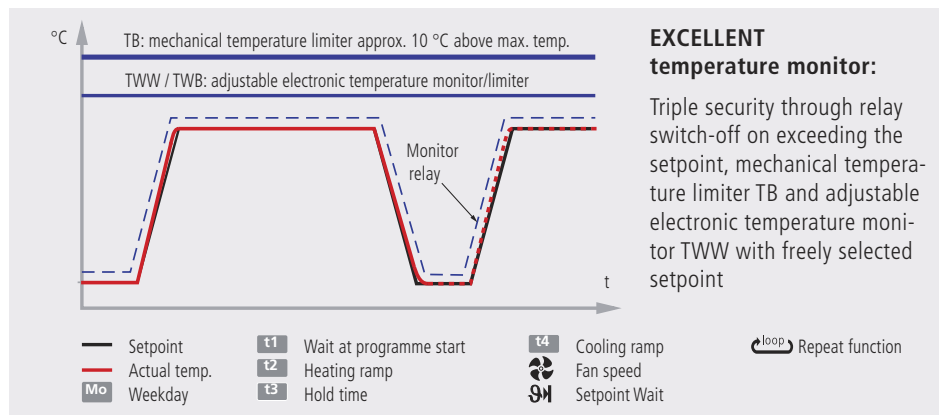
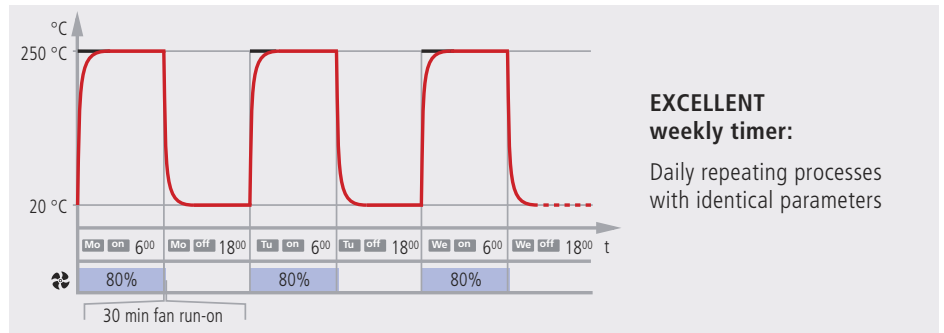
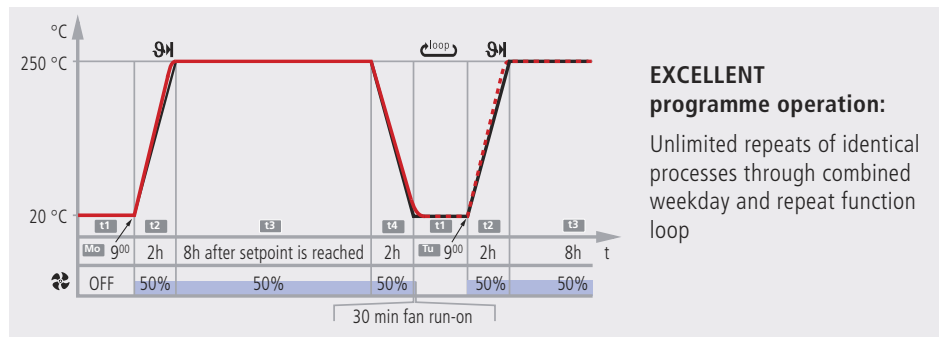
## Convenience and precision? Excellent!

User-friendly and manifold:

- Multifunctional fuzzy-supported control for exact setting and maintenance of the setpoint temperature
- 2 high-grade platinum temperature sensors Pt100 in 4-wire circuit for long-term stability of temperature signal transmission, with mutual monitoring and function transfer on sensor fault in order to maintain the set temperature



- Setpoint Wait: the next programme step starts only after the setpoint required is reached
- Calibration facility for temperature directly on the controller (see diagram page 11)
- Optional (extra charge): Pt100 sensors flexibly positioned inside the chamber, for external temperature recording
- Manually adjustable air flap for fresh air supply
- Fan speed adjustable in 10% steps and shut-off



## Triple is better!

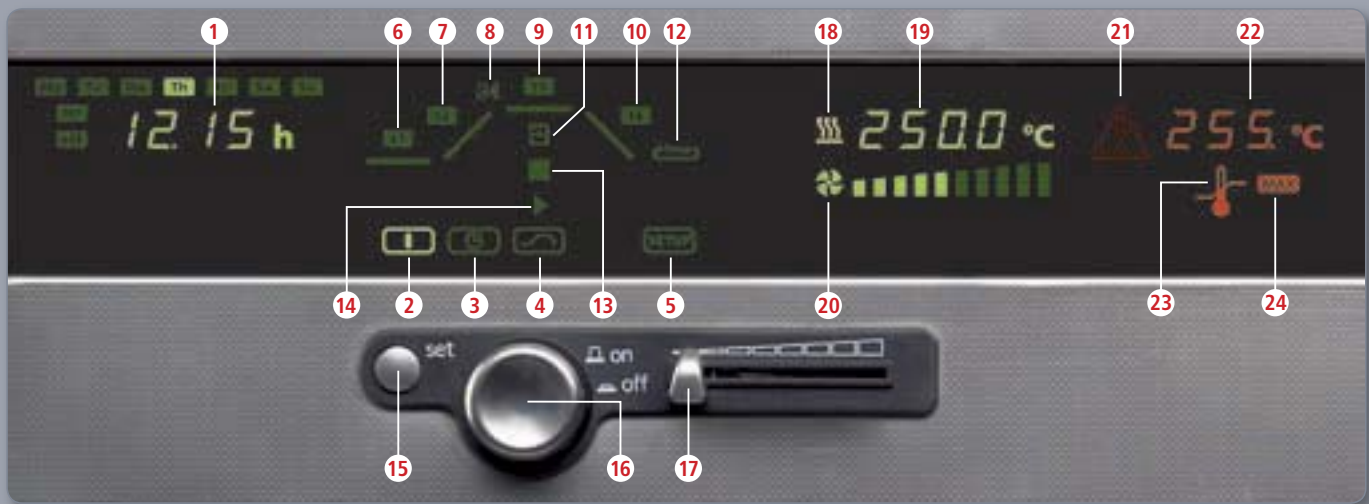
Technology for thermal security:

- Integrated auto-diagnostic system with visual fault indication
- Triple protection for sensitive loads (see diagram temperature monitor): the setpoint of the adjustable electronic temperature monitor TWW can be freely selected to suit the application and material
- Heating switched off and visual fault indication on overtemperature

## Lost data? Impossible!

The basic outfit for professional quality assurance:

- “Celsius” standard software for programming and documentation
- Internal flash memory for gap-free long-term documentation (approx. 6 months) protected against manipulation
- RS232 interface for programming and storage of temperature processes; USB option at extra charge



Control panel Excellent

### Timer module

- 1 Time display (here real-time)

### Operating mode

- 2 Normal operation (active)
- 3 Weekly timer\*
- 4 Ramp timer (relative-time programme)
- 5 Configuration
- 6 Wait (at programme start)
- 7 Heating ramp
- 8 Setpoint Wait – programme continues when setpoint is reached
- 9 Hold ramp
- 10 Cooling ramp
- 11 Edit (ramp timer)
- 12 Repeat function

- 13 Stop (ramp timer)

- 14 Start (ramp timer)
- 15 SET key
- 16 Push/turn control
- 17 Air flap

### Temperature module

- 18 Heat function indication
- 19 Setpoint/actual temperature
- 20 Fan speed in 10% steps

- Temperature range:
  - without fan 5 °C above ambient,
  - with fan 10 °C
  - up to +250 °C (**U/S**)
  - up to +300 °C (**U** extra charge)
  - up to +70 °C (**I**)
- Temperature variation (time):
  - ±0,25 °C at 150 °C (**U/S**)
  - ±0,05 °C at 37 °C (**I**)

### Monitor module

- 21 Visual alarm (on overtemperature and other error messages)
- 22 Alarm limit (heating switch-off temperature)
- 23 Temperature monitor
- 24 High alarm limit

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



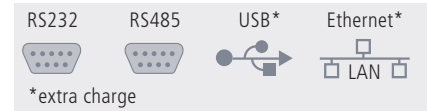
## Documentation: for controlled quality

The easy-use specification for professional quality control:

- "Celsius" standard software for programming and documentation, also (option at extra charge) FDA-conforming software
- Internal flash memory for continuous (approx. 6 months) documentation protected against manipulation
- MEMoryCard XL for programming up to 40 temperature ramps as well as for documenting the temperature profiles
- Parallel printer interface / USB (extra charge) via converter



- Alternative interfaces for programming, storage and documentation available



# Perfect – in regard to convenience and documentation

In thermal security and operating convenience this most advanced Memmert controller class is perfect without any compromise. Complex thermal processes are programmed with ease and can be repeated indefinitely if required, using the MEMoryCard. A multi-functional fuzzy-supported PID process controller with permanent power adaptation and integrated auto-diagnostic system ensures perfect and absolutely reliable heating.

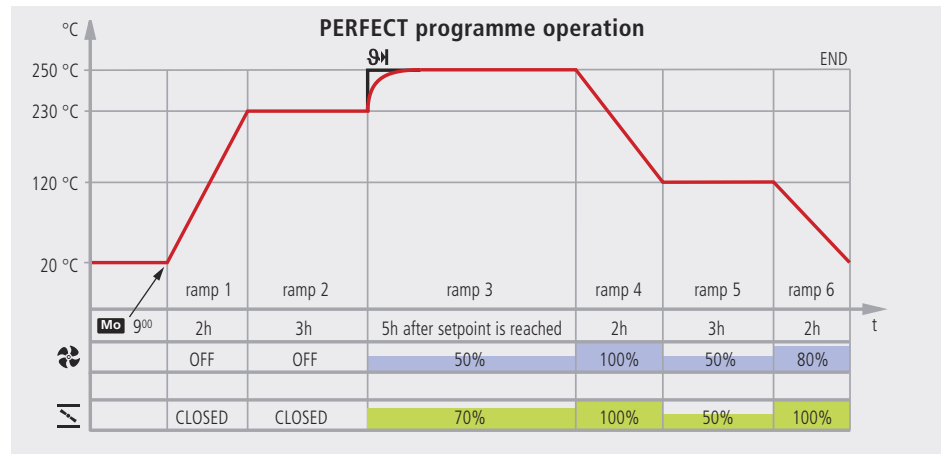
## Security: of course!

Still more functions for zero error:

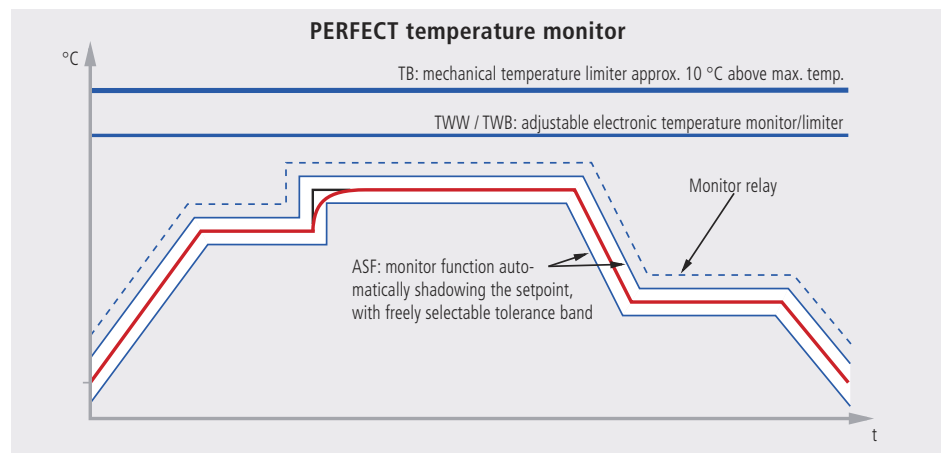
- Protection against operation by unauthorised persons: optional oven-related personal User-ID-Card (extra charge)
- Multiple temperature monitor with relay switch-off on defined exceeding of the setpoint, mechanical temperature limiter TB, and electronic adjustable temperature monitor TWW
- Unique security feature "Automatic Safety Function" ASF: integral over- and under-temperature monitor which automatically shadows the setpoint within a freely selectable tolerance band
- Integrated auto-diagnostic system with visual and audible error indication
- Visual and audible signal on over/undertemperature

### Legend:

- Setpoint
- Act. temp.
- Mo Weekday
- SM Setpoint Wait
- Fan speed
- Air flap opening
- Automatic alarm limit (Automatic Safety Function)



Perfect multi-functionality during ramp operation: temperature (can also be programmed depending on setpoint), fan speed and air flap position can be selected for each segment

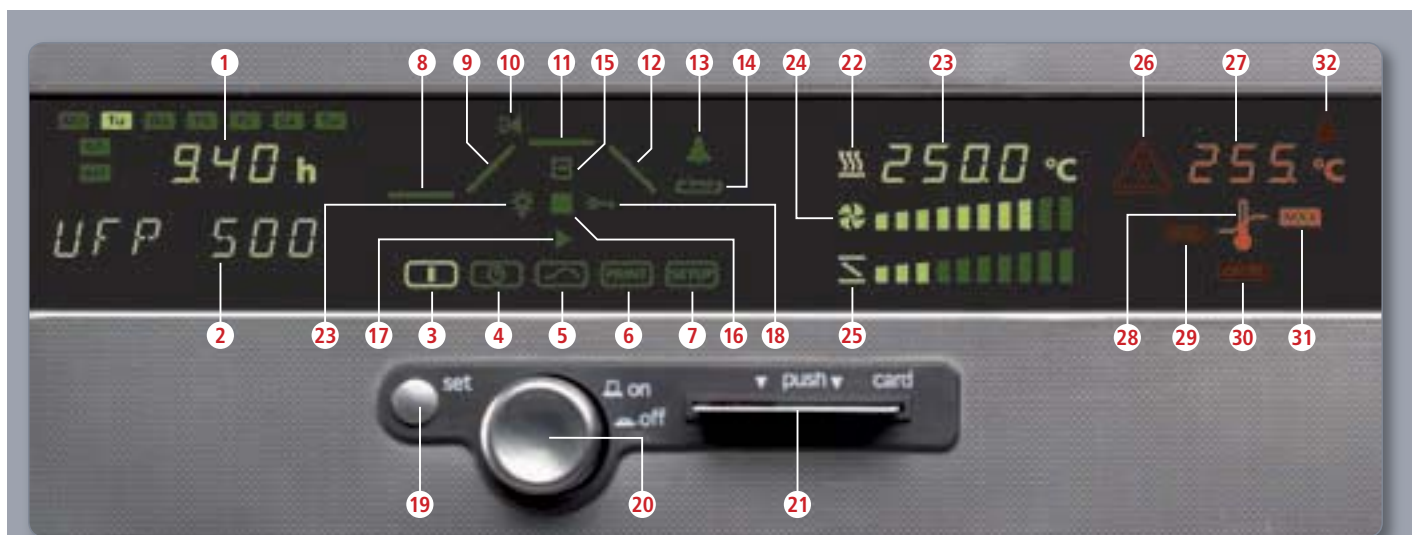


The perfect Memmert monitoring system guarantees multiple security for chamber load, oven and the environment

## Precision: for controlled processes

Technical features for fault-free processes:

- Multifunctional fuzzy-supported control for accurately setting and maintaining the setpoint temperature
- The controller regulates individual heating groups to achieve optimum temperature uniformity
- 2 high-grade platinum temperature sensors Pt100 in 4-wire circuit (for long-term stability of measurement signal transmission) with mutual monitoring and function transfer at equal working temperature (see diagram page 16 left)
- Setpoint Wait: the next programme step starts only after the setpoint required is reached
- Fan speed can be controlled in 10% steps and switched-off
- Air flap opening can be adjusted in 10% steps
- Calibration facility for temperature directly on the controller (see diagram page 11)
- Option (extra charge): Pt100 sensors positioned flexibly inside the chamber or in the load, for temperature documentation through flash memory
- Manual zone-dependent heating power adjustment available in setup



### Control panel Perfect

#### Timer module

- 1 Time display (here real-time)
- 2 Text messages

#### Operating mode

- 3 Normal operation (active)
- 4 Weekly timer\*
- 5 Ramp timer (relative-time programme)
- 6 Printer
- 7 Configuration
- 8 Wait (at programme start)  
Hold (during programme run)
- 9 Heating ramp
- 10 Setpoint Wait – programme continues when setpoint is reached
- 11 Hold ramp

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

- 12 Cooling ramp
- 13 Sounder after ramp timer end
- 14 Repeat function
- 15 Edit (ramp timer)
- 16 Stop (ramp timer)
- 17 Start (ramp timer)
- 18 Data manipulation prevented by optional User-ID-Card (extra charge)
- 19 SET key
- 20 Push/turn control
- 21 Chip card reader for MEMoryCard and optional (extra charge) User-ID-Card

#### Temperature module

- 22 Heat function indication
- 23 Setpoint/actual temp.
- 24 Fan speed
- 25 Air flap opening

- Temperature range:  
without fan 5 °C above ambient, with fan 10 °C  
up to +250 °C (U/S)  
up to +300 °C (U extra charge)  
up to +70 °C (I)
- Temperature variation (time):  
±0,25 °C at 150 °C (U/S)  
±0,05 °C at 37 °C (I)

#### Monitor module

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

Audible and visual alarm on over/undertemperature and other error messages

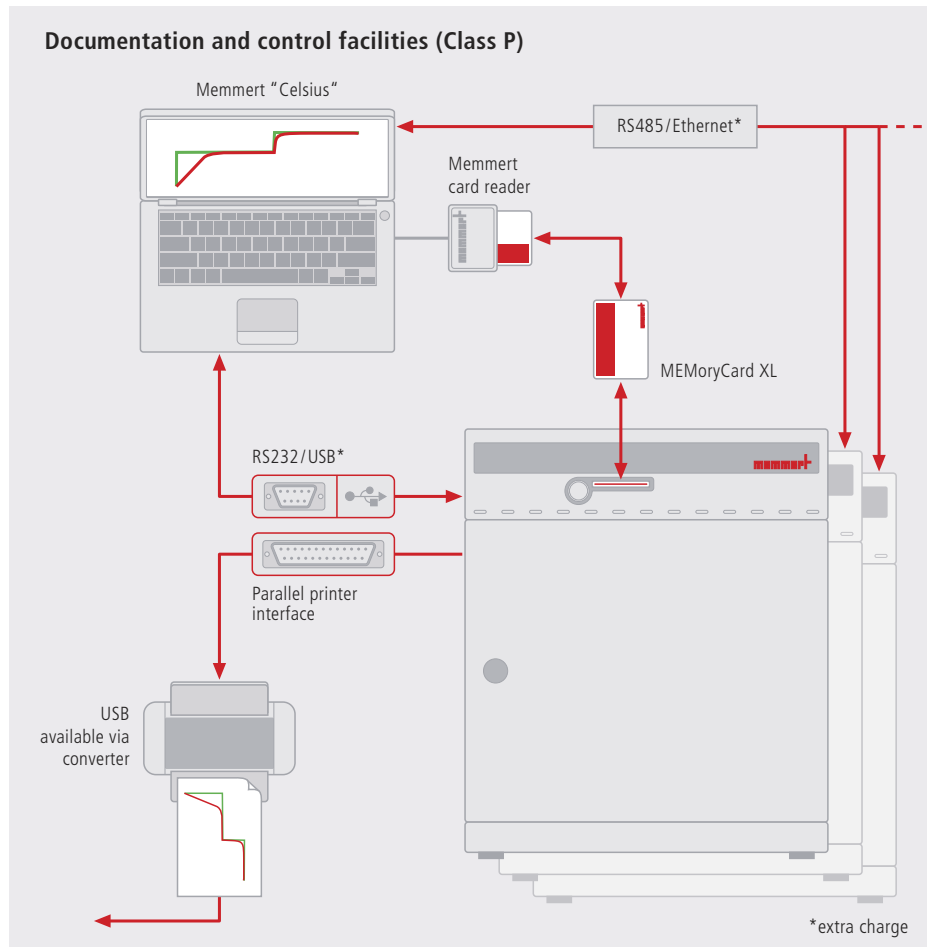
# Programming and documentation for controlled quality

Documentation storage, software and RS232 interface are already standard on Class E. Memmert appliances conform in their specification to the requirements of GMP/GLP as demanded e.g. in medicine, pharmaceuticals and the food industry. Internal long-term log memory, "Celsius" remote control and documentation software, interfaces for programming, storage and printing of thermal processes and a MEMoryCard for programming and documentation are included in all ovens with the highest controller class Perfect.

## "Celsius" for remote programming and reading of the log memory

All models Class E and P include as standard a serial computer interface RS232 as well as the operating software "Celsius". Quality assurance with excellent operating convenience:

- Graphic and numerical programming of temperature profiles with an unrestricted number of ramps
- Ramp-dependent programming of fan speed and air flap setting (depending on oven type)
- With RS232, control of up to eight ovens; optional USB at extra charge
- On Class P with optional RS485, control of up to 16 ovens; Ethernet incl. Software "Ethernet Edition" (option at extra charge)
- Any combination of Memmert units with serial interface since 1996
- Selection of four languages: English, Spanish, French, German
- Storage and printing of thermal processes with the corresponding process data (in accordance with Good Laboratory Practice GLP and Good Manufacturing Practice GMP)



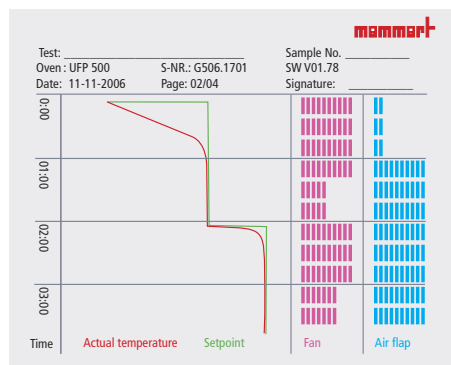
## Parallel printer interface for local documentation

Class P ovens have a parallel printer interface for direct connection of a PLC3-compatible ink jet printer

- Graphic print of the internal logging files over a selected time span (see diagram below)
- Numerical print of the currently programmed thermal process
- Logging files in the controller are retained, therefore no data loss on printer outage
- Converter cable (parallel to USB) for connection of printers with USB interface as accessory (extra charge)

## Flash memory for up to 6 months data documentation

The ovens Class E and P incorporate a 1042 kB flash ring memory. It stores all adjustable parameters such as e.g. temperature, air flap, fan, temperature monitor, as well as the measured actual temperatures and error states, every minute over a period of up to 6 months (in 24 h operation) with exact identification of test time and date.



Flash ring memory:  
print data directly from oven without PC



## A look behind the scenes ...

**DELPHI**  
Innovation for the Real World

... or how Memmert supports the supply industry in the development of more robust and age-resistant plastics.

*Customers from all over the world have their products put through their paces at Delphi, Poland. For several thousand hours, products are tested in Memmert ovens, cable harnesses and plug connections must prove their resistance to ageing just as much as plastic materials for child seats.*

### Documentation software according to FDA guidance on 21 CFR Part 11

The FDA edition of the "Celsius" software is available on all models of Class P at extra charge. Within a closed system it meets the following regulations and requirements for the electronic generation and storage of production and quality assurance documents (Electronic Records):

- User administration in user groups through the administrator
- User and administrator of Electronic Records are uniquely identified and authentic
- User-related access protection for individual system functions
- Storage of profile and logging files in a file format protected against manipulation
- All changes are documented long-term over the archiving period
- Log-on and log-off processes as well as changes of raw data are programmed with anti-manipulation protection with the aid of an audit trail (time stamp, signature and type of change of Electronic Record)
- The electronic signature indivisibly linked to the Electronic Record ensures that the responsible originator is uniquely identified
- Complete integration into the Windows NT, Windows 2000 and XP Professional security system (authorisation administration, user and password administration)
- Facility for exporting data of the audit trail in generally readable HTML
- Facility for data access by inspectors of the supervisory authorities

### MEMoryCard XL

More time for essentials! The oven can store on the MEMoryCard a temperature profile file with up to 40 ramps which can then be repeated indefinitely. During the programme run the actual values are automatically stored on the card and can be visualised and archived in a data processing system via the oven interface or through an external card reader.

### User-ID-Card

Each User-ID-Card (extra charge) is unique and linked through 128-bit encryption to the oven serial number and an individual personal identification number, thus preventing undesirable manipulation on the controller by third persons. Every use of a User-ID-Card is documented in the internal flash memory. Parameters can be altered only after inserting the User-ID-Card into the card reader. When an oven is used by several persons it is of course possible for every user to obtain his own User-ID-Card.

### STERICard

Incubators of Perfect class INP are supplied with a STERICard. It guarantees reliable and fully automatic sterilisation of the chamber in four hours at 160°C. For safety reason this function can only be started through the STERICard and serves not for sterilising the load but exclusively for sterilising the chamber interior. During the sterilising process the menu operation on the oven is blocked so that there is no possibility of inadvertently changing the programme.

### Fit for TQM and user audits

Oven qualification within the framework of quality management or validation processes is in a large number of organisations an essential prerequisite in the choice of a supplier. In addition to the works calibration certificate which is supplied as standard for the Excellent and Perfect class, Memmert supplies on demand the necessary IQ and OQ documentation to support user certification (extra charge).





## Glossary

**Actual temperature:** actually measured temperature as reached so far

**Ageing:** to accelerate the ageing process by thermal treatment

**ASF:** Automatic Safety Function – automatically the setpoint shadowing monitoring band

**Cooling time (cooling ramp):** The time required until the chamber temperature has cooled down from the hold ramp temperature to ambient temperature or where appropriate to a higher removal temperature. The cooling time can be shortened by opening the air flap to its maximum extent, if desired. The cooling process can be intentionally lengthened by suitably programming the controller (Note: ovens series UIS do not have a cooling unit)

**Ethernet:** standardised interface for cable networks

**FDA:** Food and Drug Administration - USA body which among others lays down strict regulations for the programming and documentation of thermal processes

**Fuzzy-supported PID process controller:** control system with simultaneous proportional, integral and differential action and which additionally takes into account non-linear components. This controller type is capable of adapting automatically to varying effects such as changes in fan speed, air flap position, or the amount of load, and to counteract directly any deviation

**GLP:** Good Laboratory Practice (EU directive and FDA rules for documentation in the laboratory)

**GMP:** Good Manufacturing Practice (EU guidelines and various FDA directives for pharmaceuticals manufacturers)

**Heating-up time:** time required until the actual temperature is continuously maintained at the setpoint within a small tolerance

**IQ Installation Qualification:** documented proof that the specification of a product meets the actual requirements with regard to identity, installation, conformity to guidelines and documentation. It is performed after the product is supplied and in parallel with the installation

**Load:** material, product, container with material or similar which is placed inside the oven (the quantity affects the heating-up time)

**Monitor relay:** electromechanical safety device to switch off the heating at a fixed distance of 10 °C (Series U/S) or 3 °C (Series I) above the setpoint if the electronic heating control fails.

**MPG:** Law on medical products

**OQ Operation Qualification:** documented proof that, after installation and/or calibration, the prescribed specification has been maintained within a representative working range (e.g. temperature range)

**Overshoot:** undesirable rise of the actual temperature above the setpoint

**PQ Process Qualification:** documented proof that a product or process meets the expectations under manufacturing conditions which correspond to the specification and the required quality assurance parameters

**Pt100 in 4-wire circuit:** platinum temperature sensor in 4-wire circuit ensures stable long-term transmission of measurement signals

**Ramp:** constantly rising, holding or falling temperature

**RS232:** interface for serial data transmission over short distances

**RS485:** interface for serial data transmission (over longer distances, bus-capability)

**Setpoint:** currently set and desired value

**Setpoint Wait:** the next ramp starts only when the temperature setpoint required has been reached

**TB:** temperature limiter, thermal safety class 1 (DIN 12 880:2007-05) for permanently switching off the heating when the maximum permitted oven temperature is exceeded by approx. 10 °C

**Temperature profile:** usually a temperature sequence consisting of one or several ramps

**Temperature uniformity:** temperature variation in space, i.e. the maximum temperature difference between two or more measuring points inside the oven chamber at a particular time

**Temperature variation:** in time, i.e. the maximum temperature difference at a previously selected measuring point inside the oven chamber at different times

**TQM:** total quality management

**TWB:** adjustable temperature limiter, thermal safety class 2 (DIN 12 880:2007-05): switches off the heating permanently when a pre-selected monitoring temperature has been exceeded

**TWW:** adjustable temperature monitor, thermal safety class 3.1 (DIN 12 880:2007-05): the thermal process is continued at the pre-selected monitor temperature

**USB:** universal serial bus, standardised PC interface

**Validation:** proof that the processes, equipment, materials, work procedures or system actually lead to the expected results

**VDE test mark:** safety mark issued by the VDE test institute

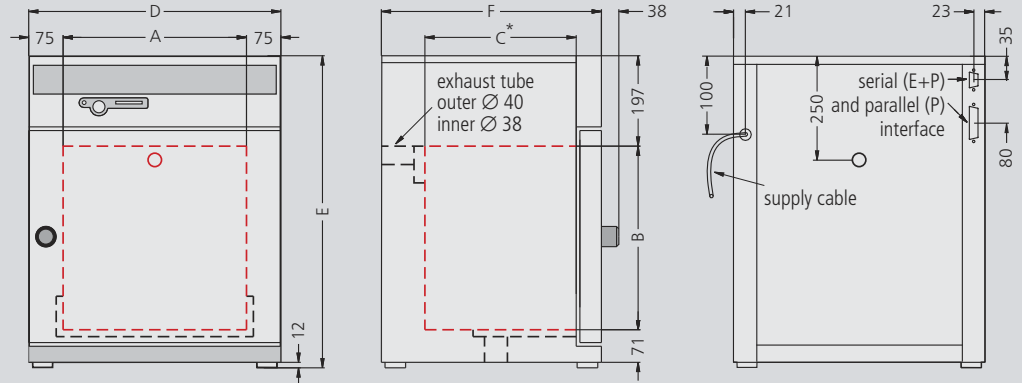
## Technical data, models and accessories for Ovens (Universal Ovens, Incubators, Sterilisers)

according to DIN 12880: 2007-05, 50 011,  
58 947, EN 61010-1 (IEC 61010-1),  
61010-2-010 and 61010-1-043



Note:  
Size 600-800 with two-leaf doors

Dimensions of Ovens  
(see table below)



\* on models with fan depth is reduced through air duct in the middle of back wall up to size 600: 30 mm; size 700/800: 45 mm

Model sizes				100	200	300	400	500	550	600	700	800
Stainless steel interior, mat. 1.4301 (ASTM 304), deep-drawn	Volume	approx. l		14	32	39	53	108	153	256	416	749
	Width (see sketches above)	(A)	mm	320	400	480	400	560	480	800	1040	1040
	Height (see sketches above)	(B)	mm	240	320	320	400	480	640	640	800	1200
	Depth (see sketches above)	(C)	mm	175	250	250	330	400	500	500	500	600
	Provision for sliding stainless steel shelves or wire grid shelves	number		2	3	3	4	5	7	7	9	14
	Max. loading per perforated stainless steel shelf (basic equipment)	kg		30	30	30	30	30	30	30	30	30
	Max. total loading of chamber (basic equipment)	kg		30	30	30	90	60	60	80	100	160
Stainless steel exterior (rear zinc-plated steel)	Width	(D)	mm	470	550	630	550	710	630	950	1190	1190
	Height (size 800 with castors)	(E)	mm	520	600	600	680	760	920	920	1080	1620
	Depth (without door handle, door handle 38 mm)	(F)	mm	325	400	400	480	550	650	650	650	750
Further data	Electrical load (during heating)	series U/S series I	approx. W approx. W	600	1100	1200	1400	2000	2200	2400	4000	4800
	Electrical supply 230 V (±10%), 50/60 Hz (other voltages to special order)	series U/S series I	V	230	230	230	230	230	230	230	400 3ph N	400 3ph N
	Net weight		approx. kg	20	28	30	35	50	82	87	121	170
	Gross weight in Triwall carton		ca. kg	25	34	38	42	63	114	105	145	230
	Packed dimensions (carton)	width	approx. cm	58	67	75	67	82	75	110	134	132
		height	approx. cm	62	70	70	78	97	114	114	131	184
depth		approx. cm	44	54	54	63	67	84	84	85	91	
Standard accessories	Stainless steel grids	number		1	1	1	2	2	2	2	2	2
	Wire grid shelf width (shelves to order)	approx. mm		317	397	477	397	557	477	797	1037	1037
	Wire grid shelf depth	approx. mm		160	235	235	290	360	460	460	450	550

Models	Universal Ovens (series U)	Incubators (series I)	Sterilisers (series S)	100	200	300	400	500	550	600	700	800
Basic (Class B)	UNB natural air circulation			UNB 100	UNB 200	UNB 300	UNB 400	UNB 500				
	UFB enforced air circulation						UFB 400	UFB 500				
		INB natural air circulation			INB 200	INB 300	INB 400	INB 500				
			SNB natural air circulation	SNB 100	SNB 200	SNB 300	SNB 400					
			SFB enforced air circulation				SFB 400	SFB 500				
Excellent (Class E)	UNE natural air circulation				UNE 200	UNE 300	UNE 400	UNE 500	UNE 550	UNE 600	UNE 700	UNE 800
	UFE enforced air circulation						UFE 400	UFE 500	UFE 550	UFE 600	UFE 700	UFE 800
		INE natural air circulation			INE 200	INE 300	INE 400	INE 500	INE 550	INE 600	INE 700	INE 800
			SNE natural air circulation		SNE 200	SNE 300	SNE 400					
			SFE enforced air circulation				SFE 400	SFE 500	SFE 550	SFE 600	SFE 700	SFE 800
Perfect (Class P)	UNP natural air circulation				UNP 200	UNP 300	UNP 400	UNP 500	UNP 550	UNP 600	UNP 700	UNP 800
	UFP enforced air circulation						UFP 400	UFP 500	UFP 550	UFP 600	UFP 700	UFP 800
		INP natural air circulation			INP 200	INP 300	INP 400	INP 500	INP 550	INP 600	INP 700	INP 800
			SFP enforced air circulation				SFP 400	SFP 500	SFP 550	SFP 600	SFP 700	SFP 800

Performance Classes		Basic	Excellent	Perfect
Operation	Main switch push/turn control for switching on/off resp. (in combination with SET button) setting of parameters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Function signal for standby/heating/error/operating mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Visualisation / digital display of all temperature and time settings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Visualisation / digital display of all weekday, speed, ramp segment and setup settings	–	<input type="checkbox"/>	<input type="checkbox"/>
	Menu guidance via 8-digit alphanumerical display	–	–	<input type="checkbox"/>
Temperature	Electronic microprocessor temperature controller with auto-diagnostic system	<input type="checkbox"/>	–	–
	Electronic multifunction temperature controller with Fuzzy-Logic and auto-diagnostic system	–	<input type="checkbox"/>	<input type="checkbox"/>
	One temperature sensor Pt100 Class A in 4-wire circuit with warning indication on failure	<input type="checkbox"/>	–	–
	Two temperature sensors Pt100 Class A in 4-wire circuit for uninterrupted operation on failure of one Pt100 with warning indication	–	<input type="checkbox"/>	<input type="checkbox"/>
	Temperature setting range	series U/S from +20 °C up to +220 °C	from +20 °C up to +250 °C (U: option up to +300 °C)	from +20 °C up to +250 °C (U: option up to +300 °C)
		series I from +20 °C up to +70 °C	from +20 °C up to +70 °C	from +20 °C up to +70 °C
	Indication accuracy	series U/S 0,5 °C series I 0,5 °C	0,1 °C / 0,5 °C <sup>1)</sup> 0,1 °C	0,1 °C 0,1 °C
	Setting accuracy	series U/S 0,5 °C series I 0,5 °C	0,5 °C 0,1 °C	0,1 °C / 0,5 °C <sup>1)</sup> 0,1 °C
	Temperature variation (time) (to DIN 12880)	series U/S at 150 °C ≤ ± 0,5 °C series I at 37 °C ≤ ± 0,2 °C	≤ ± 0,25 °C ≤ ± 0,05 °C	≤ ± 0,25 °C ≤ ± 0,05 °C
	Temperature uniformity in chamber (to DIN 12880)	series U/S at 150 °C ≤ ± 2,7 °C series I at 37 °C ≤ ± 0,6 °C	≤ ± 2,2 °C ≤ ± 0,6 °C	≤ ± 2,2 °C ≤ ± 0,6 °C
	Works calibration certificate for one temperature (chamber centre), series U/S: 160 °C; series I: 37 °C	–	<input type="checkbox"/>	<input type="checkbox"/>
Monitor	Mechanical temperature limiter (TB) for permanent heating switch-off on exceeding the maximum <u>permitted oven temperature</u> by approx. 10 °C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Heating switch-off at a fixed margin of 10 °C (Series U/S) or 3 °C (Series I) <u>above setpoint</u> on failure of electronic heating control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Microprocessor temperature monitor acting as <u>overtemperature protection</u> , with Pt100 incorporating fault diagnostics	–	<input type="checkbox"/>	–
	Microprocessor temperature monitor acting as <u>overtemperature protection and undertemperature alarm</u> , with Pt100 incorporating fault diagnostics	–	–	<input type="checkbox"/>
	Temperature monitoring band automatically linked to the setpoint (ASF)	–	–	<input type="checkbox"/>
	Visual / acoustic alarm	<input type="checkbox"/> / –	<input type="checkbox"/> / –	<input type="checkbox"/> / <input type="checkbox"/>
Air Circulation	Air flap for admixture of fresh air, manually adjustable	<input type="checkbox"/>	<input type="checkbox"/>	–
	Air flap for admixture of fresh air, segmentspecific adjustable by servomotor	–	–	<input type="checkbox"/>
	Fan speed adjustable (for Class P segmentspecific) 0-100% in 10%-steps (for UF/SF)	–	<input type="checkbox"/>	<input type="checkbox"/>
Timer-functions	Real-time/weekly programmer with group function (e.g. Monday-Friday)	–	<input type="checkbox"/>	<input type="checkbox"/>
	Integral digital switch off-timer (1 min. up to 99 h 59 min.) to switch off heating after preset operating time	<input type="checkbox"/>	–	–
	Timer with residual running time: max. 4 ramps (each 1 min. up to 999 h) programmable through controller: delayed on, heating up, hold or hold set-temperature-dependent and defined cooling down; programming via PC and free-of-charge software: unlimited number of ramps	–	<input type="checkbox"/>	–
	Timer with residual running time: max. 40 ramps (each 1 min. up to 999 h) for temperature, air flap opening and fan speed (for UF/SF) programmable through controller or MEMoryCard XL; programming via PC and free-of-charge software: unlimited number of ramps	–	–	<input type="checkbox"/>
	Chip card control: entering settings and temperature documentation up to 40 ramps, 1 chip card MEMoryCard XL with 32 kB memory capacity	–	–	<input type="checkbox"/>
	Sterilisation of incubator-interior by additional chip card (STERICard) with fixed cycle of 4 h/160 °C (series I)	–	–	<input type="checkbox"/>
	Repeat function (Loop: 1-99 times / endless)	–	<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. 6 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"/>
	“Celsius” <sup>2)</sup> software for control and documentation of temperature, air flap opening (Class P) and fan speed (for UF/SF)	–	<input type="checkbox"/>	<input type="checkbox"/>
Setup	Calibration (no separate PC required), Temperature: 3-point calibration on controller	–	<input type="checkbox"/>	<input type="checkbox"/>
	Setting of language for dialogue and display D / UK / E / F / I	–	–	<input type="checkbox"/>

Subject to technical modifications

1) 0,1 °C up to 99,9 °C; 0,5 °C above 100 °C  
2) MEMMERT-Software “Celsius” has been tested for Windows NT 4, 2000, XP and Vista

standard model, basic specification  
– not available

Special Equipment and Accessories	Classes			Model sizes								
	B	E	P	100	200	300	400	500	550	600	700	800
Temperature range 300 °C for Universal Ovens (not available for ovens with glass door; alternative solution: Order-No. B1)		•	•	–	A0	A0	A0	A0	A0	A0	A0	A0
Adjustable temperature limiter <sup>1)</sup> , protection Class 2, instead of adjustable temperature controller, protection Class 3.1		•	•	–	A5	A5	A5	A5	A5	A5	A5	A5
Full-sight glass door <sup>2)+3)</sup> (triple insulating glass) for series UN/UF (extra)		•	•	–	B0	B0	B0	B0	B0	B0	B0	B0
Stainless steel doors with glass windows (can be used up to 300 °C), pair of doors with triple insulating glass windows window cut-out W x H mm		•	•	–	–	–	–	–	–	B1 350 x 230	B1 430 x 230	B1 430 x 230
Door with lock (safety lock) (standard on size 700 + 800 sterilisers)		•	•	–	B6	B6	B6	B6	B6	B6	B6	B6
Door hinged on the left <sup>4)</sup>		•	•	–	B8	B8	B8	B8	B8	–	–	–
Perforated stainless steel shelf, non-tipping	•	•	•	E0(x)	E0(x)	E0(x)	E0(x)	E0(x)	E0(x)	E0(x)	E0(x)	E0(x)
Stainless steel tray (non-perforated) 15 mm rim, non-tipping (may affect the temperature distribution)	•	•	•	E2(x)	E2(x)	E2(x)	E2(x)	E2(x)	E2(x)	E2(x)	E2(x)	E2(x)
Stainless steel grid <sup>3)</sup>	•	•	•	E3(x)	E3(x)	E3(x)	E3(x)	E3(x)	E3(x)	E3(x)	E3(x)	E3(x)
Bottom drip tray	•	•	•	E8(x)	E8(x)	E8(x)	E8(x)	E8(x)	E8(x)	E8(x)	E8(x)	E8(x)
Entry port <sup>3)+4)</sup> (standard position centre/centre or centre top), for introducing connections at the side can be closed by flap, 23 mm clear diameter			•	–	F0 F1 F2 F3	F0 F1 F2 F3	F0 F1 F2 F3	F0 F1 F2 F3	F0 F1 F2 F3	F0 F1 F2 F3	F0 F1 F2 F3	F0 F1 F2 F3
Other port <sup>3)+4)</sup> (23 mm diameter) in special positions (please state location)			•	–	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)	F4(x) F5(x) F6(x)
Other port <sup>3)+4)</sup> (38 mm diameter) at the back (please state location)			•	–	F7(x)	F7(x)	F7(x)	F7(x)	F7(x)	F7(x)	F7(x)	F7(x)
Wall bracket <sup>3)</sup> (tubular frame for wall mounting)	•	•	•	G0	G0	G0	G0	G0	G0	G0	G0	–
Stacking version <sup>3)</sup> for 2 ovens of equal size (bottom oven modification)	•	•	•	G3	G3	G3	G3	G3	G3	G3	G3	–
Subframe with height adjustment (height: size 500-600: 622 mm, size 700: 572 mm) <sup>3)+5)</sup>	•	•	•	–	–	–	–	G5	G5	G5	G5	–
Subframe with castors (height: size 500-600: 622 mm, size 700: 572 mm) <sup>3)</sup>	•	•	•	–	–	–	–	G6	G6	G6	G6	–
Temperature profile write/read unit for programming via PC, for writing to and reading from the chip card, up to 40 ramps			•	–	V3	V3	V3	V3	V3	V3	V3	V3
Additional chip card, blank, formatted (32 kB MEMORYCard XL for a maximum of 40 ramps)			•	–	V4	V4	V4	V4	V4	V4	V4	V4
STERICard (additional or as replacement) for automatic incubator chamber sterilisation cycle (not for sterilising the load!)			•	–	V9	V9	V9	V9	V9	V9	V9	V9
Oven-linked authorisation card (User-ID-Card) <sup>6)</sup> prevents undesired manipulation by unauthorised third parties			•	–	V1	V1	V1	V1	V1	V1	V1	V1
Computer interface RS485 <sup>1)</sup> (for networking a max. of 16 ovens) instead of RS232			•	–	V2	V2	V2	V2	V2	V2	V2	V2
Interface USB instead of RS232		•	•	–	W3	W3	W3	W3	W3	W3	W3	W3
Interface USB connection cable for computer		•	•	–	W7	W7	W7	W7	W7	W7	W7	W7
Interface Ethernet instead of RS232 inclusive software "Celsius Ethernet-Edition"			•	–	W4	W4	W4	W4	W4	W4	W4	W4
Parallel/USB converter cable with integrated power supply unit to connect HP printers with USB interface to MEMMERT units. Compatible with USB 1.1 and USB 2.0			•	–	W1	W1	W1	W1	W1	W1	W1	W1
Documentation package consisting of parallel USB converter cable including PLC3-compatible HP colour inkjet printer with USB interface (HP Deskjet 5940 or successor) for direct connection of printer to Memmert unit			•	–	W2	W2	W2	W2	W2	W2	W2	W2
Connection cable for computer interface RS232 according to DIN 12 900-1		•	•	–	V6	V6	V6	V6	V6	V6	V6	V6
Flexible Pt100 <sup>4)</sup> for positioning in chamber or in load with socket according to NAMUR NE 28 for external temperature recording (load temperature)		•	•	–	H4	H4	H4	H4	H4	H4	H4	H4
Potential-free contact (24 V/2 A) with socket to NAMUR NE 28 for external monitoring (indicates when setpoint is reached)			•	–	H5	H5	H5	H5	H5	H5	H5	H5
Potential-free contact (24 V/2 A) with socket to NAMUR NE 28 for combined fault message (e.g. supply failure, sensor fault, fuse)			•	–	H6	H6	H6	H6	H6	H6	H6	H6
Floating triple contact, for signal generation, controlled by programme segment (using PC), for a total of 3 freely selected functions to be activated (e.g. activation of acoustic and visual signals, exhaust motors, fans, stirrers etc.)			•	–	H7	H7	H7	H7	H7	H7	H7	H7
Additional Pt100 <sup>4)</sup> temperature sensor, positioned flexibly in chamber or load, for local temperature measurement (up to 3 additional sensors are possible). The measured temperature can, if required, be indicated on the multifunction display, recorded in the integral ring store, and can be documented via the "Celsius" software or on an attached printer.			•	–	H8(x)	H8(x)	H8(x)	H8(x)	H8(x)	H8(x)	H8(x)	H8(x)
Interior lighting <sup>4)</sup> (up to size 600: 15 W, 700/800: 2 x 15 W)		•	•	–	R0	R0	R0	R0	R0	R0	R0	R0
Plug-in tube extension <sup>3)</sup> straight (l 88 mm, outer diameter 40 mm, inner diameter 38 mm) for exhaust air ducting (if necessary for connection to extraction system by hose)	•	•	•	G7	G7	G7	G7	G7	G7	G7	G7	G7
Plug-in tube extension <sup>3)</sup> angled for exhaust air ducting	•	•	•	G8	G8	G8	G8	G8	G8	G8	G8	G8
Works calibration certificate (U/S) at three temperatures: 100 °C, 160 °C, 220 °C		•	•	–	Z2	Z2	Z2	Z2	Z2	Z2	Z2	Z2
Works calibration certificate (I) for models at three temperatures: 37 °C, 52 °C, 70 °C		•	•	–	Z4	Z4	Z4	Z4	Z4	Z4	Z4	Z4
IQ check list with works test data for oven as support for validation by customer		•	•	–	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1
OQ check list including one <sup>7)</sup> free-selectable temperature distribution survey to DIN 12880: 2007-05 (size 200/300: 9 measuring points, size 400-800: 27 measuring points) with works test data for oven as support for validation by customer		•	•	–	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2
Software conforming to FDA "Celsius FDA-Edition" <sup>8)</sup> (extra cost)			•	–	Q3	Q3	Q3	Q3	Q3	Q3	Q3	Q3

Subject to technical modifications

1) special equipment at no extra cost  
2) affects temperature distribution.  
3) Not available for 300 °C ovens

4) of 20% of the complete price is required  
5) height variable; minimum height specified  
6) when (re)ordering please specify serial number

– not available  
• accessories available in this performance class  
(x) Please specify quantity required after the

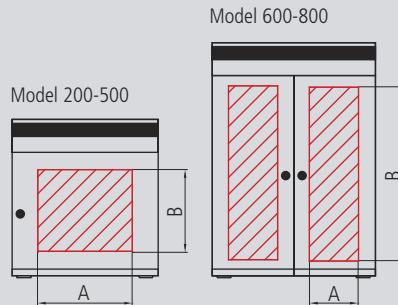
Special Equipment and Accessories	Classes			Model sizes								
	B	E	P	100	200	300	400	500	550	600	700	800
Reinforced chamber <sup>1)+2)</sup> (includes replacement of 2 standard grids by 2 reinforced shelves) max. loading in kg			•	–	–	–	–	K1 175	K1 175	K1 300	K1 300	K1 300
Perforated stainless steel shelf, non-tipping, reinforced <sup>1)</sup> for heavy loads (involves reinforced chamber) max. loading in kg			•	–	–	–	–	E1(x) 35	E1(x) 35	E1(x) 60	E1(x) 60	E1(x) 60
Flush-fit unit <sup>3)</sup> (stainless steel frame covering gap between oven and wall opening)		•	•	–	G1	G1	G1	G1	G1	G1	G1	G1 <sup>4)</sup>
Fresh-air filter <sup>1)</sup> – filtration efficiency 80% – for UF/SF and additional subframe (for sizes 400-700) overall height in mm		•	•	–	–	–	R8 810	R8 890	R8 1050	R8 1050	R8 1210	R8 1620
Interior nearly gastight (UN/IN) <sup>1)</sup>		•	•	–	–	–	K2	K2	K2	–	–	–
Ditto <sup>1)</sup> , with possibility for gas inlet/outlet through two tubes with ball valves		•	•	–	–	–	K3	K3	K3	K3	–	–
Process-dependent electromagnetic door lock <sup>1)</sup>			•	–	D4	D4	D4	D4	D4	D4	D4	D4

### Technical data and dimensions about ovens and accessories<sup>5)</sup>

#### Full-sight glass door B0

for UNE/UFE/UNP/UFP

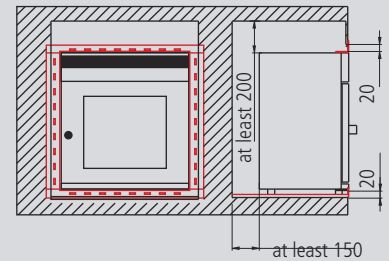
Model 200	A = 330	B = 210
Model 300	A = 410	B = 210
Model 400	A = 330	B = 290
Model 500	A = 490	B = 370
Model 550	A = 410	B = 530
Model 600	A = 254	B = 530
Model 700	A = 374	B = 690
Model 800	A = 374	B = 1090



#### Flush-fit unit G1

for Model 200-800

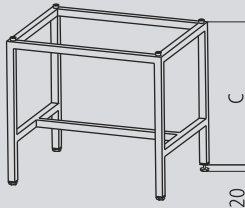
The national fire safety regulations for the immediate surroundings have to be observed (F90 in Germany; exact dimensions on request)



#### Subframe with height adjustment G5

for Model 500-700  
height adjustment of 20 mm

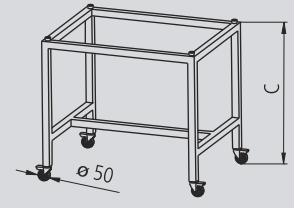
Model 500	C = 622
Model 550	C = 622
Model 600	C = 622
Model 700	C = 572



#### Subframe with castors G6

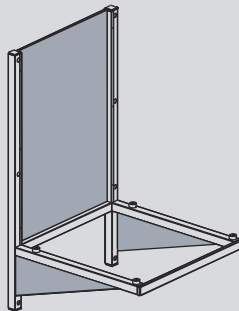
for Model 500-700  
movable with four lockable castors ESD (electrostatic discharge) available on request

Model 500	C = 622
Model 550	C = 622
Model 600	C = 622
Model 700	C = 572



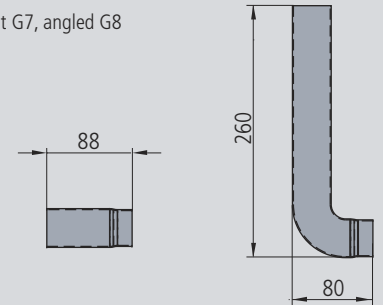
#### Wall bracket G0

for Model 100-700



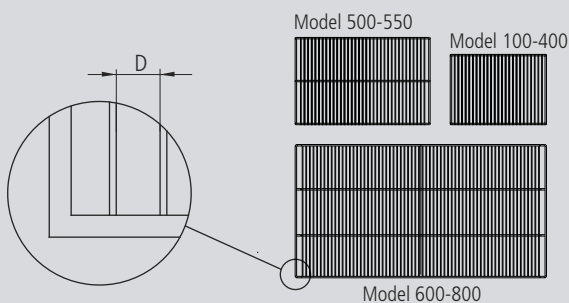
#### Plug-in tube extension straight G7, angled G8

for exhaust air ducting  
outer diameter 40 mm  
inner diameter 38 mm



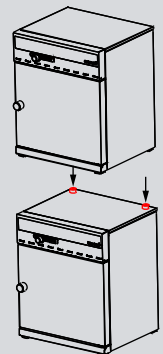
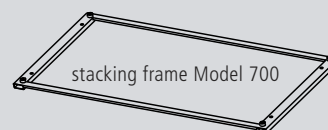
#### Stainless steel grid E3(x)

Model 100-800 D = 12



#### Stacking version G3

for Model 100-700  
Model 700 requires a stacking frame



Subject to technical modifications

- 1) for special equipment an advance payment of 20% of the complete price is required
- 2) increase of total height:  
size 500-700 by 20 mm, size 800 by 45 mm

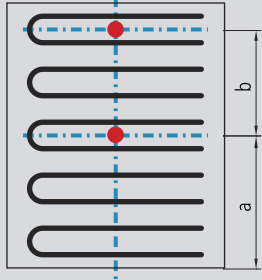
- 3) see sketch below
- 4) technical clarification necessary
- 5) all dimensions in mm

- not available
- accessories available in this performance class

**Entry ports at the side<sup>1)</sup>** (only E- and P-Ovens) Diameter 23 mm

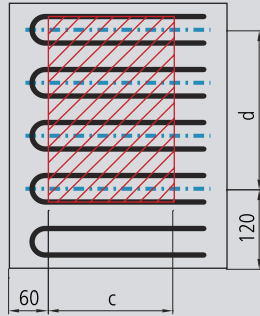
**Standard ports F0, F1, F2, F3**

Model 200-800

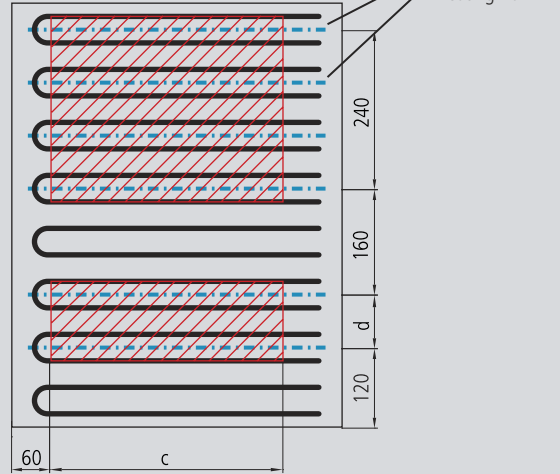


**Side port facilities F4(x), F5(x)**

Model 100-500



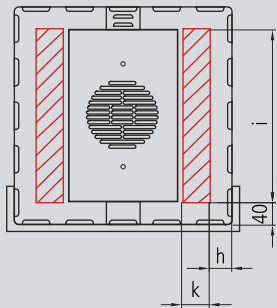
Model 550-800



**Port facilities in back panel<sup>1)</sup>** (only E- and P-Ovens) Diameter 23 mm and 38 mm alternatively 38 mm

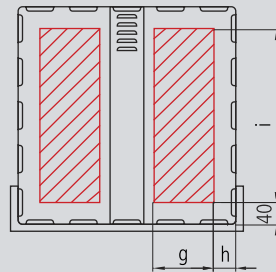
**with fan F6(x), F7(x)**

Model 400-800

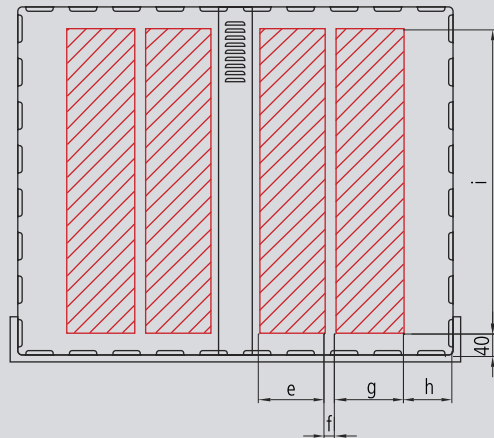


**without fan F6(x), F7(x)**

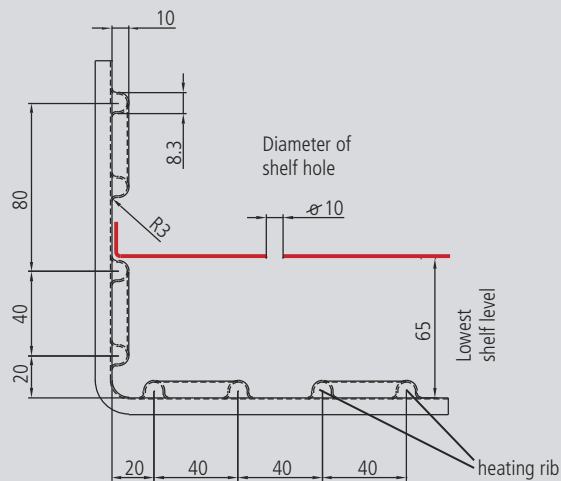
Model 200-550



Model 600-800



**Detail of working chamber with heating ribs**



Sizes	100	200	300	400	500	550	600	700	800
a	-	200	200	200	280	360	360	440	600
b	-	80	80	160	160	240	240	320	560
c	25	120	120	190	250	350	350	350	440
d	80	160	160	240	320	80	80	240	640
e	-	-	-	-	-	-	120	120	120
f	-	-	-	-	-	-	20	20	55
g	-	110	150	110	190	150	125	245	210
h	-	40	40	40	40	40	90	90	90
i	-	240	240	320	400	560	560	720	1120
k	-	-	-	50	130	90	125	245	210

- Standard port
- Area for port
- · - · - · Hairpin centre
- · - · - · Port centre

If all shelf levels must remain usable the ports in the side panels must be positioned within the hairpins.

# OUR PROGRAMME



Universal ovens  
Incubators  
Hot air sterilisers  
**Ovens**



**Vacuum ovens**



Peltier-cooled incubators  
Compressor-cooled incubators  
**Cooled incubators**



**CO<sub>2</sub> incubators**



**Humidity chambers**



**Constant climate chambers**



**Water and oil baths**



*Malaysia - Thailand*

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technical modifications. Dimensions are subject to  
confirmation.