memmert

Operating manual

VO

Vacuum Oven VO

www.memmert.com

Table of Contents

1. About this Manual

Purpose and target audience

This manual describes the design, function, transport, operation and maintenance of the product series Vacuum ovens VO. It is intended for use by trained personnel employed by the owner who are tasked with operating and/or maintaining the unit.

If you have been tasked with working on the unit, read this manual carefully before starting work. Familiarise yourself with the safety instructions. Only perform work that is described in this manual. If there is anything you do not understand, or if any information is lacking, ask your line manager or contact the manufacturer. Do not take any course of action on your own initiative.

Versions

The appliances are available in different equipment versions and sizes. If certain features or functions are only available in certain equipment versions, this is indicated at the relevant points in this manual.

The functions described in this manual relate to the most recent firmware version.

Due to the different equipment versions and sizes, the illustrations in this manual may be slightly different to your product. However, the product is identical in terms of its operation and function.

Further applicable documents

In addition to this manual, please observe the following documents:

- Service manual:
  To carry out service and repair work you will require the separate service manual. Manuals can be requested from Memmert International After Sales or downloaded from **www.memmert.com**.
- AtmoCONTROL software manual
  When operating the unit with the MEMMERT AtmoCONTROL PC software you will require the separate manual. You can find the manual for the AtmoCONTROL software in the AtmoCONTROL menu bar under 'Help'

Retaining and passing on this manual

This operating manual belongs to the unit and must always be kept in a location where it can be easily found by those working with the unit. It is the responsibility of the owner to ensure that persons who work on the unit know where this operating manual is. We recommend always storing it in a safe place near the unit.

Ensure that the manual is not damaged by heat or humidity. If the unit is sold or transported and re-installed at another location, this operating manual must be handed over with the unit. The current version of this operating manual is also available in PDF format at **www.memmert.com**.

Address and Customer Service

Manufacturer's address

Memmert GmbH + Co. KG
Äußere Rittersbacher Straße 38 | D-91126 Schwabach | Germany
Tel. +49 9122 925-0
E-mail: **sales@memmert.com**
www.memmert.com

International After Sales

Memmert GmbH + Co. KG
Willi-Memmert-Straße 90-96 | D-91186 Büchenbach | Germany
Tel. +49 9171 9792 911
E-mail: **service@memmert.com**
www.memmert.com
If you have any queries, please always quote the product number on the nameplate.

Shipping address for repairs

Memmert GmbH + Co. KG
Willi-Memmert-Straße 90-96 | D-91186 Büchenbach | Germany
Please contact our customer service before sending appliances for repair or before making returns, otherwise, we have to refuse acceptance of the shipment.

2. Safety

2.1 Terms and Symbols Used

In this manual and on the unit itself, certain recurring terms and symbols are used to warn you of hazards or give you information that is important in order to prevent injury or damage. To avoid accidents and damage, observe and follow these instructions. These terms and symbols are explained below.

2.1.1 Terms Used

⚠ DANGER	Warns of a dangerous situation that will result directly in death or serious (irreversible) injury.
⚠ WARNING	Warns of a dangerous situation that could result in death or serious physical injury.
⚠ CAUTION	Warns of a dangerous situation that could result in moderate or minor physical injury.
NOTICE	Warns of damage to property.

2.1.2 Symbols Used

	Risk of explosion		Do not tilt
	Gases / vapours		Gas bottles
	Danger of electrocution		Hot surfaces
	General warning sign		Tipping hazard
	Disconnect the mains plug		Observe information in separate manual
	Wear gloves		Wear safety shoes

2.2 Product Safety and Dangers

The units described in this manual are technically sophisticated, manufactured using high-quality materials and subject to many hours of testing in the factory. They reflect the state of the art and comply with recognised technical safety regulations. However, there are still risks involved, even when the units are used as intended. These are described below.

⚠ DANGER

Live parts

When covers are removed, live parts are exposed and contact with these parts may result in electric shock. Electric shock can have serious health consequences including death.

- Only authorised persons may carry out electrical installation work.
- Before starting work, disconnect the unit from the power supply.
- Ensure that the unit is fully de-energised.
- Secure the unit to prevent it from being switched on again.

⚠ WARNING

Toxic gases or vapours

Toxic gases or vapours may be produced in certain applications. These can escape from the vacuum pump into the room and injure people nearby.

- The appliance may only be used for such applications if an extraction system is installed on the vacuum pump which reliably keeps toxic gases or vapours away from people.
- Observe the respective national regulations for occupational safety and environmental protection.

⚠ WARNING

Explosion of gas cylinders

Gas cylinders may burst or explode at high temperatures. This can cause serious physical injury and damage to property.

- Keep gas cylinders away from open flames.
- Store gas cylinders below 50 °C and ensure that the location is always well ventilated.
- Prevent water from entering as well as flowing back into the gas cylinders.
- It is essential that you read the safety notes and instructions of the gas supplier.

⚠ WARNING

Hot surfaces

Depending on the operating situation, the unit and the load may be hot. Contact with hot surfaces may have serious health consequences due to burns!

- Allow the unit to cool down.
- Wear heat-resistant protective gloves when carrying out work.
- Check the temperature of surfaces before touching them.

2.3 Requirements to be met by Operating Personnel

The appliance may only be operated and maintained by persons who are of legal age and have been instructed accordingly. It is intended to be operated and maintained by trained personnel employed by the owner.

Repairs may only be performed by qualified electricians. The guidelines in the separate service manual must be observed.

2.4 Responsibility of the Owner

The owner of the unit

- is responsible for the flawless condition of the unit and for operating it in accordance with its intended use;

- is responsible for ensuring that persons who operate or service the unit are qualified to do this, have been instructed accordingly and are familiar with these operating instructions;
- must know the applicable guidelines, requirements and operational safety regulations, and train staff accordingly;
- is responsible for ensuring that unauthorised persons cannot access the unit;
- is responsible for attaching a suction device to the vacuum pump used if toxic gases or vapours may arise as a result of the process;
- is responsible for ensuring that the maintenance plan is adhered to and that maintenance work is properly carried out;
- has to ensure that the unit and its surroundings are kept clean and tidy, for example through corresponding instructions and inspections;
- is responsible for ensuring that personal protective clothing is worn by operating personnel, e.g. work clothes, safety shoes and protective gloves.

2.5 Product Use

2.5.1 Intended Use

Vacuum ovens VO are used for drying, testing, moisture determination, airtight storage, curing and degassing of substances or materials used in the procedures and specifications described in the operating instructions in a vacuum.

2.5.2 Improper Use

Any other use is improper and may result in danger and damage.

The appliance is not explosion-proof (does not comply with the German occupational health and safety regulation VBG 24). Only materials and substances which cannot form any toxic or explosive vapours at the set temperature and which cannot explode, burst or ignite may be put in the appliance.

2.6 Changes and Alterations

Unauthorised changes or alterations must not be made to the appliance. Parts that are not approved by the manufacturer must not be mounted or built in.

Unauthorised changes or alterations result in the CE declaration of conformity losing its validity, and the appliance must no longer be operated.

The manufacturer is not liable for any damage, danger or injuries that emanating from unauthorised changes or alterations, or from non-compliance with the provisions in this manual.

2.7 Behaviour in case of Malfunctions and Irregularities

i	The unit must only be used in a flawless condition. If you, as the operator, notice irregularities, malfunctions or damage, immediately turn off the unit and inform your line manager.
i	You can find information on troubleshooting in the chapter ▸7 Malfunctions, Warning and Error Messages.

See also

Malfunctions, Warning and Error Messages [▸ 42]

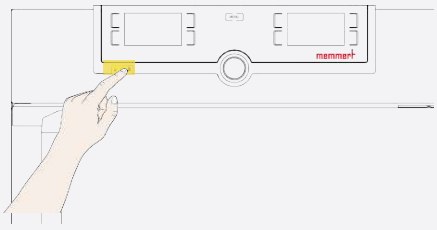
2.8 Switching off the Unit in an Emergency

⚠ WARNING

Hot surfaces

Depending on the operating situation, the unit and the load may be hot. Contact with hot surfaces may have serious health consequences due to burns!

– Allow the unit to cool down.
– Wear heat-resistant protective gloves when carrying out work.
– Check the temperature of surfaces before touching them.



1. Press the main switch on the appliance.
2. Unplug the mains plug from the power source.

⇨ This disconnects the appliance from the power supply at all poles.

3. Construction and Description

3.1 Design

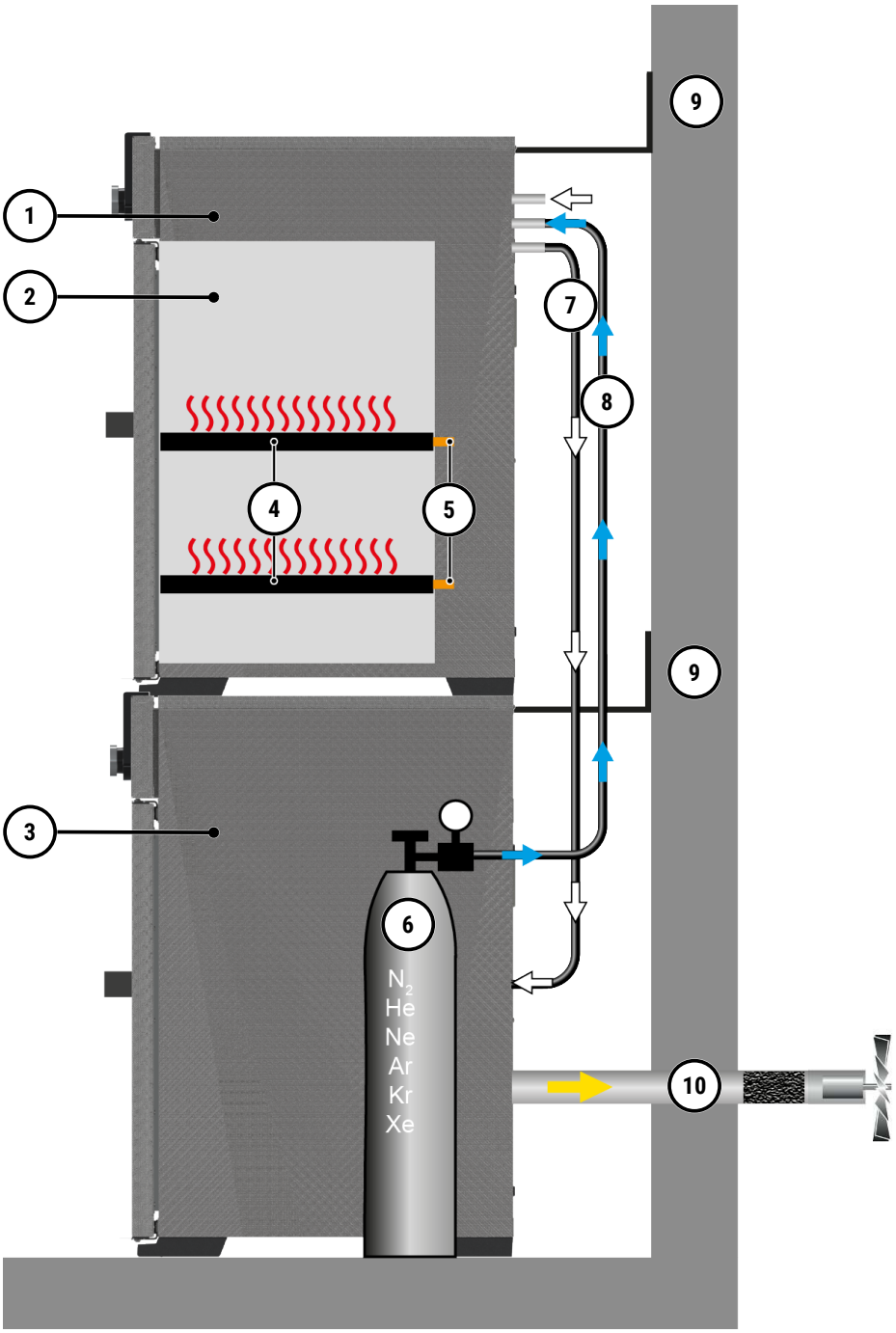
1	ControlCOCKPIT with capacitive function keys and LCD displays	2	Vacuum Oven VO
3	Thermoshelves	4	Pump module main switch
5	Pump module		

3.2 Description of Function

The appliances of the VO series ① can generate a vacuum in the working chamber ② in combination with a Memmert pump module ③ or another suitable vacuum pump. The pump evacuates the working chamber via the vacuum inlet on the back of the appliance ⑦. Optionally, the working chamber can be filled with inert gas via a connection on the rear of the appliance ⑥, ⑧.

For closed-loop temperature control, thermoshelves with electronic contacts are inserted into the tube ④. If the electronic contacts are connected to the connections in the back panel ⑤, the thermoshelves can emit heat through direct contact with the load.

If toxic gases or vapours are likely to be produced in the intended application, they must be safely discharged by the customer via an extraction system and purified if necessary ⑩.



1	VO	2	VO working chamber
3	Vacuum pump	4	Thermoshelves
5	Contacting the thermoshelves in the appliance	6	Gas cylinder (inert gas, optional)
7	Hose connection between VO and vacuum pump	8	Inert gas supply
9	Wall mounting (anti-tilt bracket)	10	External extraction system (required if toxic gases or vapours may be produced as a result of the process)

3.3 Materials

Components	Material
External casing	Stainless steel (Mat. No. 1.4016)
Piping	Stainless steel (Mat. No. 1.4571)

Components	Material
Working chamber	Stainless steel (Mat. No. 1.4404), which stands out through its high stability, optimal hygienic properties and corrosion-resistance to many (but not all) chemical compounds (caution must be exercised for example with chlorine compounds).
Thermoshelves	Aluminium. The heating mat is vulcanised to the underside of the thermoshelf and covered with stainless steel and is made of silicone.
Plug connection between thermoshelf and flange socket in back panel	Ryton R4 (GF PPS plastic) and Peek 450GL30
Seals in solenoid valves and flange sockets	Fluoride rubber FKM/FPM (Viton)
Door seal	Silicone

The chamber load of the appliance must be carefully checked for chemical compatibility with the above materials. A material resistance table can be requested from the manufacturer.

3.4 Electrical Equipment

- Operating voltage and current consumption: See ▸3.6 Nameplate or ▸3.7 Technical Data
- Degree of protection IP 20 acc. to DIN EN 60529
- Protection class I, i.e. operating insulation with PE conductor connection according to EN 61010
- Interference suppression acc. to EN 55011 class B
- Appliance fuse: Fusible link 250 V/15 A quick-blow
- The temperature controller is protected by a miniature fuse 125 mA

See also

Technical Data [▸ 16]
Nameplate [▸ 15]

3.5 Connections and Interfaces

3.5.1 Electrical Connection

This unit is designed for operation on an electrical power system with a maximum system impedance Z_{max} at the point of transfer (service line) of 0.292 Ohm. The operator must ensure that the unit is only operated on an electrical power system that meets these requirements.

If necessary, ask your local utility company what the system impedance is. Observe the country-specific regulations when making connections (e.g. in Germany DIN VDE 0100 with earth leakage circuit breaker).

3.5.2 Communication Interfaces

The communication interfaces are intended for appliances which meet the requirements of IEC 60950-1.

Ethernet interface

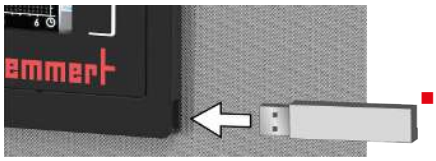
You will find a description of how to transfer programs via Ethernet in the AtmoCONTROL software manual.

The unit can be connected to a network via the Ethernet interface, so that you can transfer programmes created with the AtmoCONTROL software to the unit and export logs.

For identification purposes, each unit connected must have its own unique IP address. A description of how to set the IP address is provided in chapter ▸8.3.2 IP Address and Subnet Mask.

The unit can be directly connected to a computer / laptop using an optional USB to Ethernet converter (see ▸3.10 Scope of Delivery).

USB interface

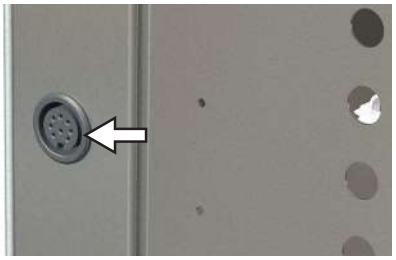


The unit comes with a USB port as standard in accordance with the USB specification. With this you can:

- transfer software stored on a USB storage medium to the unit (see ▸8.6 Programme)
- export logs from the unit to a USB storage medium (see ▸8.8 Log)
- transfer user ID data stored on a USB storage medium to the unit (see ▸8.9 USER ID)

The USB port is located on the right of the ControlCOCKPIT.

Switching output for external vacuum pump purge valve and pump control



The 8-pin switching output on the rear right post is used to control the vacuum pump of the optional pump module (PM) via the vacuum oven (VO). The switching output is downward-compatible with the 3-pole contact of older pump modules. For this purpose, plug the 3-pole cable into the 8-pole contact.

1. Vacuum pump rinsing valve

   When drying feed materials with a high moisture content, the pump capacity may decrease during prolonged operation due to condensation in the pump heads. The diaphragms can be blown free by briefly purging the pump heads with fresh air.

   This improves the efficiency of the drying process. In combination with the optionally available pump modules PM29, PM49 and PM101, this cyclical purging takes place automatically when the pump output decreases. The drying process is thus faster and more energy-saving and this preserves the pump.

2. Speed control and switch-off of the vacuum pump

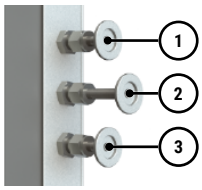
   After completing a drying program or after a long period of operation without a vacuum request from the controller, the vacuum pump installed in the pump module (PM) is switched off via the control line. The demand-controlled pump speed control saves energy, is quiet and increases the service life of the vacuum pump by protecting the pump diaphragms.

See also

- IP Address and Subnet Mask [▸ 47]
- Scope of Delivery [▸ 18]
- Programme [▸ 54]
- Log [▸ 56]
- USER ID [▸ 57]

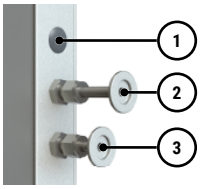
3.5.3 Fresh air, inert gas and vacuum connection

Connections on the back of appliances with Premium module (Option T5)



1	Fresh air connection	2	Intergas connection
3	Vacuum pump connection		

Connections on the back of appliances with Standard module



1	No function (blind plug)	2	Fresh air connection
3	Vacuum pump connection		

At the left rear post are the connections for incoming fresh air or inert gas (optional) and the connection for the vacuum pump (DN 16 KF).

1. Fresh air

   The fresh air connection has two functions. On the one hand, the unit is ventilated via the connection which adjusts negative pressure to atmospheric pressure. On the other hand, the connection is opened by the unit controller for a very short time in order to finely adjust the negative pressure.

2. Inert gas (optional)

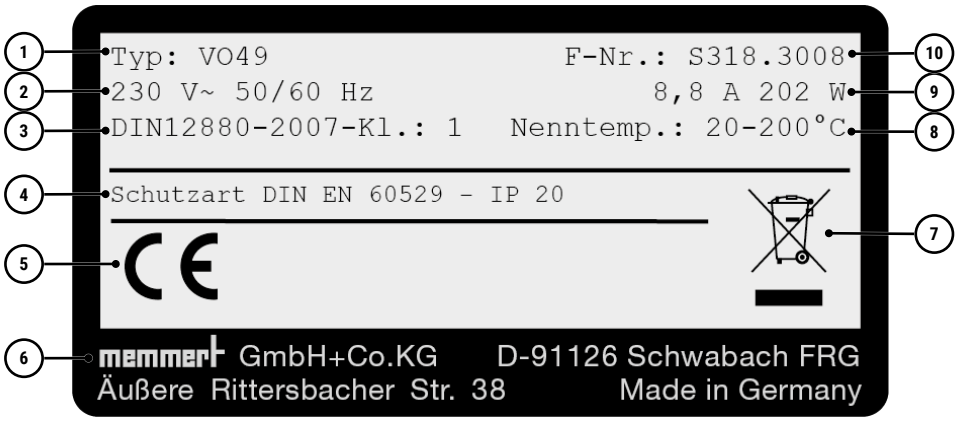
   By pumping inert gas into the working chamber, a protective atmosphere can be created which protects the load from contact with ambient air.

3. Vacuum

   The vacuum connection is designed as an ISO-KF connection of size DN 16. The supplied pump module or another suitable external vacuum pump are connected to it. When using an external vacuum pump, make sure that the pump is suitable for the chamber load and the desired process.

3.6 Nameplate

The nameplate provides information about the appliance model, manufacturer and technical data. It is attached to the top of the appliance, on the right behind the door (see ▶3.1 Design).



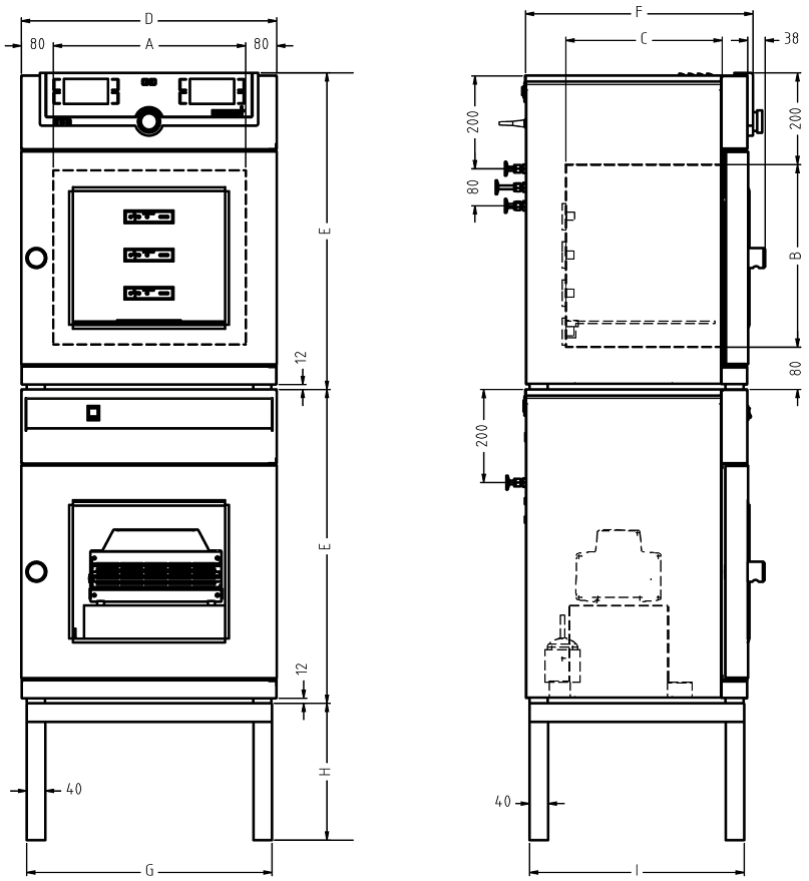
1	Type designation	2	Operating voltage
3	Applicable standard	4	Degree of protection
5	CE conformity	6	Manufacturer's address
7	Information regarding disposal	8	Temperature range
9	Connected loads / power ratings	10	Appliance number

See also

Design [▶ 11]

3.7 Technical Data

Appliance size				29	49	101
Stainless steel interior	Volume		l	29	49	101
	Width	A	mm	385	385	545
	Height	B	mm	305	385	465
	Depth	C	mm	250	330	400
	Max. number of shelves		Pc	1	2	2
	Max. number of shelves with premium module		kg	2	4	4
	Max. loading per appliance		kg	40	60	60
	Max. loading per thermoshelf		kg	20	20	20
Patterned stainless steel housing	Width	D	mm	550	550	710
	Height	E	mm	607	687	767
	Depth	F	mm	400	480	550
Temperature	Operating temperature range		°C	at least 5 above room temperature up to +200		
	Setting temperature range		°C	+20 up to +200		
	Adjustment precision		°C	up to 99.9 °C: 0.1 °C / from 100 °C: 0.5 °C		
Pressure	Pressure setting range		mbar	5 up to 1100		
	Permitted final vacuum		mbar	0.01		
	Maximum leakage rate		bar/h	0.01		
Sub frame	Width	G	mm	529	529	689
	Height	H	mm	450	290	130
	Depth	I	mm	383	463	533
Further data	Power consumption	230 V	W	820	2,020	2,420
	Max. current consumption	230 V	A	3.6	8.8	10.5
Packaging data	Net weight		kg	55	83	110
	Gross weight		kg	76	104	135
	Width		mm	660	660	830
	Height		mm	870	870	1,050
	Depth		mm	590	590	800



3.8 Applied Directives and Standards

3.8.1 Declaration of Conformity

CE

You can download the EC declaration of conformity of the appliance online:

English: **http://www.memmert.com**

German: **http://www.memmert.com**

Based on the standards and guidelines listed below, the products described in this manual carry a CE mark from Memmert:

Low Voltage Directive 2014/35/EU

- EN 61010-1:2010, EN 61010-1:2010/A1:2019/AC:2019-04, EN 61010-1:2010/A1:2019; EN IEC 61010-2-010:2020

EMC-Directive 2014/30/EU

Directive 2014/30/EU with amendments (Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility). Standards complied with:

- EN 61326-1:2013

Directive 2011/65/EU

Directive 2011/65/EU of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

3.8.2 Material Compliance

We confirm that we always draw the attention of our suppliers to the legal restrictions on materials in accordance with our **Company Standard for Material Compliance of Memmert GmbH + Co KG** to ensure they take the original publications by the legislative authority into consideration at all times. The suppliers and deliveries must comply with all material compliance requirements which are relevant or specified in the company standard. By taking this approach, and by making our own observations, we are always able to stay abreast of developments to the best of our knowledge and ability.

In accordance with the REACH regulation and the RoHS guideline, Memmert provides information on the chemical substances in Memmert appliances online at:

www.memmert.com

3.8.2.1 REACH information of Memmert GmbH + Co. KG acc. to Regulation (EG) No. 1907/2006, Art. 33

Based on current knowledge, we confirm that products or sub-products containing substances of very high concern (SVHC in the specified components) in the Candidate List with concentrations higher than 0.1 mass % are installed in the appliances we supply:

Appliance component	Substance in the Candidate List SVHC	CAS No.
Blue housing protection film	Tris(4-nonylphenyl, branched and linear) phosphite	■ 26523-78-4 ■ 3050-88-2 ■ 31631-13-7 ■ 106599-06-8
Seal inserts made of NBR	2,2'-Methylenbis(4-methyl 6-tert-butylphenol)	■ 119-47-1

3.8.2.2 RoHS Information of Memmert GmbH + Co. KG acc. to Directive 2011/65/EU and Delegated Directive 2015/863

We confirm that we comply with the substance restrictions in accordance with 2011/65/EU for the supplied products, accessories and spare parts. With regard to the substance lead, we and/or our suppliers make use of the applications exempted from the restriction for lead stated in appendix III in a credible, trustworthy manner.

3.9 Ambient Conditions

- The unit must only be used in closed rooms and in the ambient conditions listed below:

Ambient temperature	+5 °C to +40 °C
Air humidity	max. 80% non-condensing
Overvoltage category	II
Contamination level	2
Installation altitude a.s.l.	2000 m a.s.l.
Maximum mains voltage fluctuations	AC 230 V (± 10%)

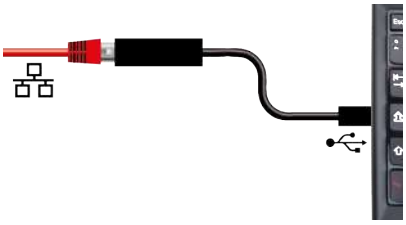
- The unit may not be used in Ex zones. The ambient air must not contain explosive dusts, gases, vapours or gas-air mixtures. The unit is not explosion-proof.
- Heavy dust production or aggressive vapours in the vicinity of the unit could lead to sedimentation in the interior and, as a consequence, could result in short circuits or damage to electrical parts. For this reason, sufficient measures to prevent large accumulations of dust or aggressive vapours should be taken.

3.10 Scope of Delivery

- Mains connection cable
- Anti-tilt bracket
- Thermoshelves (Standard and Premium VO29 1 shelf; Premium VO49 and VO101 2 shelves)

- Two locking hooks per thermoshelf
- USB storage medium with software and AtmoCONTROL manual
- Operating manual
- Calibration certificate

3.11 Optional Accessories



With an Ethernet to USB converter it is possible to connect the Ethernet connection of the appliance to the USB port of a computer/laptop.

4. Delivery, Transport and Setting Up

4.1 Safety

⚠ WARNING

Lifting the appliance only with a lifting device

Without lifting device there is a serious risk of injury!

- The appliance may only be lifted and positioned with a special lifting device.
- This lifting device must be used for lifting and carrying.

⚠ WARNING

Toxic gases or vapours

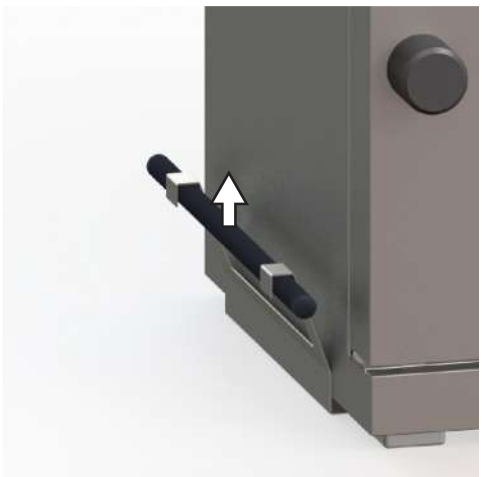
Toxic gases or vapours may be produced in certain applications. These can escape from the vacuum pump into the room and injure people nearby.

- The appliance may only be used for such applications if an extraction system is installed on the vacuum pump which reliably keeps toxic gases or vapours away from people.
- Observe the respective national regulations for occupational safety and environmental protection.

The lifting device can be purchased from the dealer by specifying the order number B04456 (VO29/49) or B04457 (VO101). The dealer can send the device to the customer or assemble the appliance with the device before delivery.

To set up appliances of the sizes VO29 and VO49, at least two persons, for appliances of size VO101, four persons are needed.

To lift the appliance, guide the lifting device under the appliance from both sides and lift the appliance.

29	49	101
		
		

⚠ WARNING

Tipping hazard

There is a risk of tipping when stacking on a pump module.

- Do not move stacked device combinations.

4.2 Delivery

The appliance is supplied packed in cardboard on a wooden palette.

4.3 Transport

The unit can be transported in different ways depending on its size:

- With a forklift truck or pallet truck; move the forks of the truck entirely under the pallet
- Carrying; lift the unit at the designated handle positions

4.4 Unpacking

- Do not unpack the appliance until you reach the installation site.
- Remove the cardboard packaging by pulling it upwards or carefully cutting along an edge or unscrew and remove wooden crate.

Checking for completeness and transport damage

- Check the delivery note to ensure the delivery is complete.
- Check the unit for damage.

  If you notice deviations from the scope of delivery, damage or anything unusual, do not put the unit into operation and inform the haulage company and the manufacturer.

Removing the transportation lock

- Remove the transportation lock. It is located between the door hinge, door and frame and has to be removed after opening the door.

Disposing of packaging material

- Dispose of the packaging material (cardboard, wood, foil) in accordance with the applicable disposal regulations for the respective material in your country.

4.5 Storage after Delivery

If the unit is initially to be stored after delivery:

- Observe storage conditions (see ▸10.1 Storage and Transport)

See also

Storage and Transport [▸ 60]

4.6 Setting Up

⚠ WARNING

Danger of tipping due to the appliance's centre of gravity

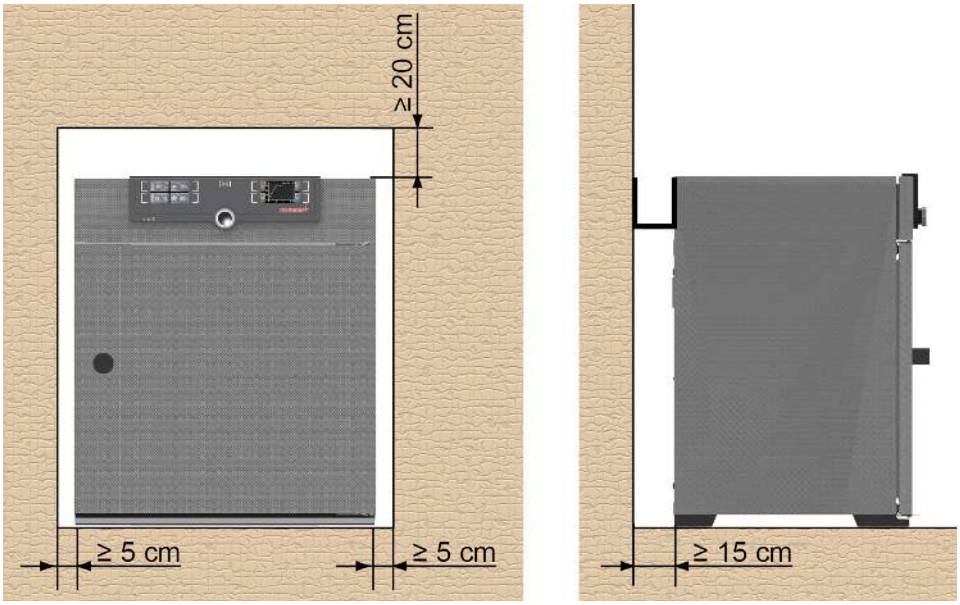
Due to its centre of gravity, the appliance could tip forwards and injure you or someone else.

- Always attach the appliance to a wall with the anti-tilt bracket.
- In case there is not enough space to fasten the appliance to a wall, do not put the appliance into operation and do not open the door.
- Contact Memmert service.

4.6.1 Preconditions

- ✓ The installation site must be flat and horizontal and must be able to reliably bear the weight of the unit (see ▸3.7 Technical Data). Place the unit on a heat-resistant, fireproof and non-flammable surface.
- ✓ A 230 V power connection must be available at the installation site. The maximum mains voltage fluctuation is ± 10%.
- ✓ The distance between the wall and the rear panel of the appliance must be at least 15 cm.
- ✓ The clearance from the ceiling must not be less than 20 cm and the side clearance from walls or nearby appliances must not be less than 5 cm. Sufficient air circulation in the vicinity of the appliance must be guaranteed at all times.

▸ Place the unit in the designated position as shown below.



See also

Technical Data [▸ 16]

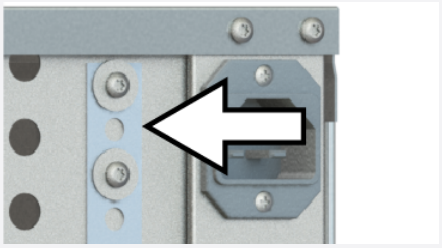
4.6.2 Installation Options

Setting up		Comments
Floor		
Table		Check the load-bearing capacity first
Stacked		maximum one VO on one pump module; mounting material (feet) provided

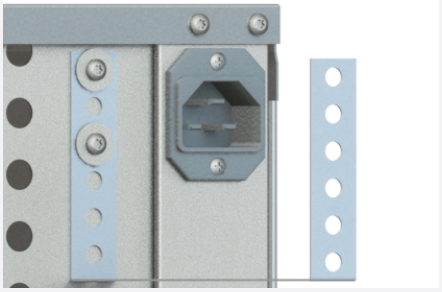
Setting up		Comments
Sub frame		Sub frame (without castors)

4.6.3 Anti-tilt bracket

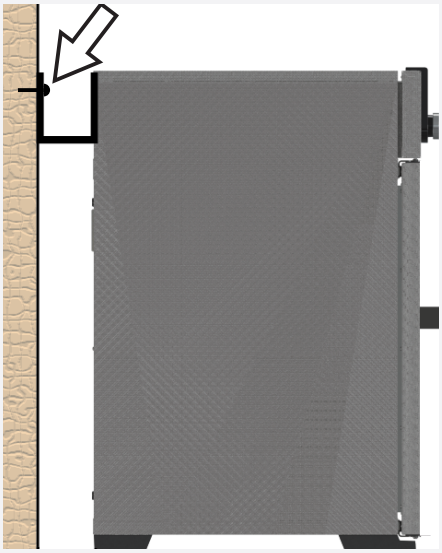
Attach the appliance to the wall with the anti-tipping device:



1. Mount the anti-tilt bracket at the two designated positions on the appliance.



2. Bend the anti-tilt bracket up through 90° twice.



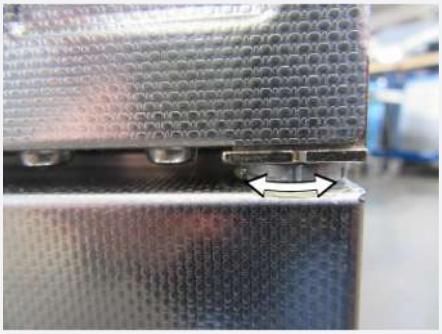
3. Find a suitable wall, drill a hole, insert a plug and screw on the anti-tilt bracket.

4.6.4 Adjusting the Doors

Due to the conditions at the installation site, it may be necessary to adjust the doors.

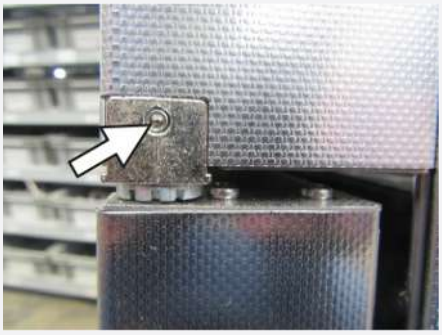
Adjusting the height of the door

1. Open set screw on the front of the door hinge with an Allen key (size 2).



2. Turn the door bearing (eccentric) clockwise or counter-clockwise with a slotted screwdriver as required.

Top hinge		Bottom hinge	
Clockwise	down	Clockwise	down
Counter-clockwise	up	Counter-clockwise	up



3. Adjust the doors.
4. Clamp the set screw again.

Set distance from door to appliance

The distance between door and seal should be chosen so that the door presses against the seal. If the distance between door and seal is too great, the appliance may leak.

1. Loosen the Phillips screw of the locking bolt holder on the lower cross frame with a screwdriver.
2. Move the locking piece inwards or outwards.
3. Fasten the locking piece with the Phillips screwdriver.

5. Putting into Operation

5.1 Putting into Operation for the First Time

⚠ WARNING

Condensation in the electrical components may cause short circuits.

Due to temperature fluctuations during transport, condensation may form inside the unit.

– After transporting or storing the unit in humid conditions, remove it from its packaging and allow it to acclimatise for at least 24 hours in normal ambient conditions.
– Do not connect the unit to the power supply during this time.

NOTICE

When putting the unit into operation for the first time, do not leave it unattended until it has reached a steady state.

– Please observe the national regulations when connecting the unit.
– Observe the connected loads and power ratings (see ▸3.6 Nameplate and ▸3.7 Technical Data).
– Be sure to establish a safe PE conductor connection.

See also

- Nameplate [▸ 15]
- Technical Data [▸ 16]

5.2 Connecting the Unit to the Power Supply

i

Observe the country-specific regulations when making connections (e.g. DIN VDE 0100 with earth leakage circuit breaker, in Germany).

Observe the connected loads and power ratings (see ▸3.6 Nameplate and ▸3.7 Technical Data).

Be sure to establish a safe PE conductor connection.

Route the power cable so that

- nobody can trip over it.
- it cannot come into contact with any hot parts.
- it is easily accessible at all times and the plug can be pulled out quickly in the event of a fault or emergency, for example.

See also

- Nameplate [▸ 15]
- Technical Data [▸ 16]

5.3 Connecting the Pump Module or Vacuum Pump

i

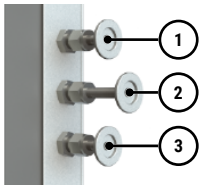
When using an external vacuum pump, make sure that it is suitable for the chamber load and the desired process. The pump must meet the following requirements:

- Suction capability > 30 Nl/min

- Final vacuum ≤ 3 mbar
- chemical-resistant version
- temperature resistant (exhaust gas temperature same as working temperature)

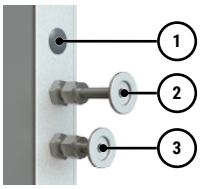
Use the supplied connecting elements and the supplied vacuum hose to make the connection between the appliance and pump module.

Connections on the rear of VO devices with premium module (option T5)



1	Fresh air connection	2	Intergas connection
3	Vacuum pump connection		

Connections on the rear of VO devices without optional accessories



1	No function (blind plug)	2	Fresh air connection
3	Vacuum pump connection		

1. Connect the vacuum connection on the back of the appliance ③ ⑥ to the vacuum pump connection of the pump module or another suitable vacuum pump using the connecting hose.

5.4 Connecting the Inert Gas

This chapter only applies to appliances that are equipped with an inert gas connection. To skip this chapter, continue with ▸5.5 Fresh Air Supply.

⚠ WARNING

Explosion of gas cylinders

Gas cylinders may burst or explode at high temperatures. This can cause serious physical injury and damage to property.

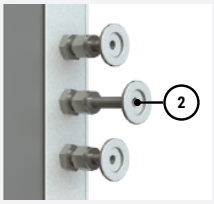
- Keep gas cylinders away from open flames.
- Store gas cylinders below 50 °C and ensure that the location is always well ventilated.
- Prevent water from entering as well as flowing back into the gas cylinders.
- It is essential that you read the safety notes and instructions of the gas supplier.

⚠ CAUTION

When operating with inert gas, the appliance releases small quantities of the gas into the environment.

Breathing in the gases can cause serious health problems.

- Make sure that the room is sufficiently ventilated.



1. Connect an inert gas cylinder (pressure reducer) with a connecting hose with DN16KF connection to the connection on the rear of the appliance ②.
2. Set pressure reducer to between 1.0 and 1.2 bar.

See also

Fresh Air Supply [▶ 27]

5.5 Fresh Air Supply

Compressed air must not be connected to the fresh air connection.

As a rule, no connecting hose should be connected to the fresh air connection.

If only clean air is permitted in the chamber, the fresh air connection can be connected by the customer to a tank with treated air.

5.6 Install the Extraction System

The type of extraction must comply with the relevant national regulations on occupational safety and environmental protection.

1. Push a Norprene hose from the outside through the perforated back into the pump stand.
2. Open the door.
3. Connect the hose to the outlet (pressure side) of the pump (outlet is hose nipple G1/4 for hose ID9).

5.7 Insert Thermoshelves

Thermoshelves can only be operated on levels with a flange socket fitted to the back panel.

The appliance is equipped with mechanical arresting devices to secure the thermoshelves. These can be mounted on the support rails of the thermoshelves as required. This prevents unintentional loosening of the thermoshelves from the flange socket.

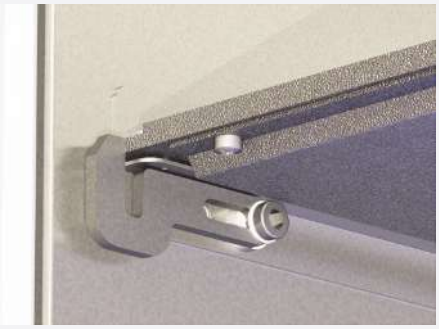
When mounting the securing hooks, a fastening screw on the support rail needs to be loosened, which may cause the rail to come out of the aligned position.

When re-tightening the screw, make sure that the thermoshelf can be inserted smoothly.

Mount the locking hook

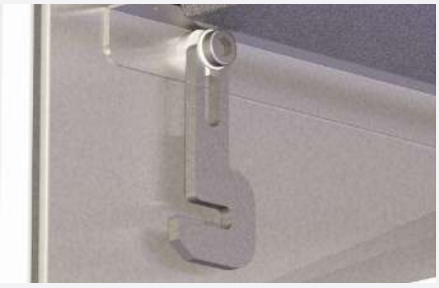
1. Remove thermoshelf.
2. Release front screws on left and right.
3. Attach retaining hooks and tighten slightly.
4. Check if thermoshelf can be inserted smoothly.

Secure thermoshelf



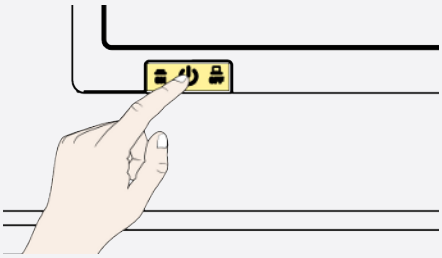
1. Slide in the thermoshelf until it makes contact with the back panel.
2. Turn the locking hook up and press the retaining hook back against the thermoshelf.
3. Fasten Allen screws on both sides using an Allen key size 3.

Remove thermoshelf



1. Loosen Allen screw with Allen key size 3 on both sides.
2. Turn the retaining hook down.
3. Pull the thermoshelf out of the flange socket.

5.8 Switching on Unit



1. Switch on the extraction system, if installed.
2. Switch on the pump module or the vacuum pump.
3. Switch on the appliance by pressing the main switch on the front of the appliance.

⇨ The starting process is shown by three animated white dots ●●● (see ▸7.1 Warning Message of the Monitoring Function).

See also

- Basic Operation in Menu Mode Using the Example of Language Selection [▸ 45]
- Warning Message of the Monitoring Function [▸ 42]

6. Operation and Control

6.1 Operating Personnel

The appliance may only be operated by persons who are of legal age and have been instructed accordingly. Personnel who are to be trained, instructed or who are undergoing general training may only work with the appliance under constant supervision of an experienced person.

6.2 Opening the Door

The door can only be opened at atmospheric pressure.

1. Open the door by pulling out the door knob.

2. Close the door.
3. Lock the door by pressing the door knob in.

6.3 Loading the Appliance

⚠ WARNING

Toxic gases or vapours

Toxic gases or vapours may be produced in certain applications. These can escape from the pump module into the room and injure people nearby.

– The appliance may only be used for such applications if an extraction system is installed on the pump module which reliably keeps toxic gases or vapours away from people.

NOTICE

Chemical compatibility of the chamber load

Chemical incompatibility may result in damage to the appliance.

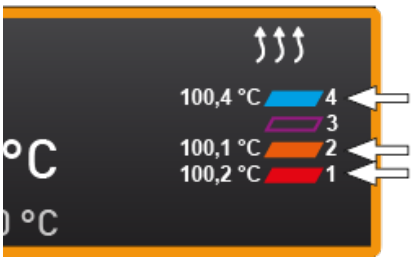
– Check the chamber load for chemical compatibility with the materials of the appliance (see ▸3.3 Materials).

NOTICE

Damage to the chamber load

A vacuum may build up in the working chamber of the appliance. Fragile chamber loads can be damaged by the negative pressure.

– Make sure that the chamber load material will not be damaged by negative pressure.



The chamber load is heated in vacuum operation exclusively by direct contact with the inserted thermoshelves.

- Before starting operation, check whether the thermoshelves are inserted and contacted.
- If not, insert the required thermoshelves and check the contact on the ControlCOCKPIT temperature display (see ▸5.7 Insert Thermoshelves).
- When loading, pay attention to the maximum permissible weight of 20 kg per shelf level.

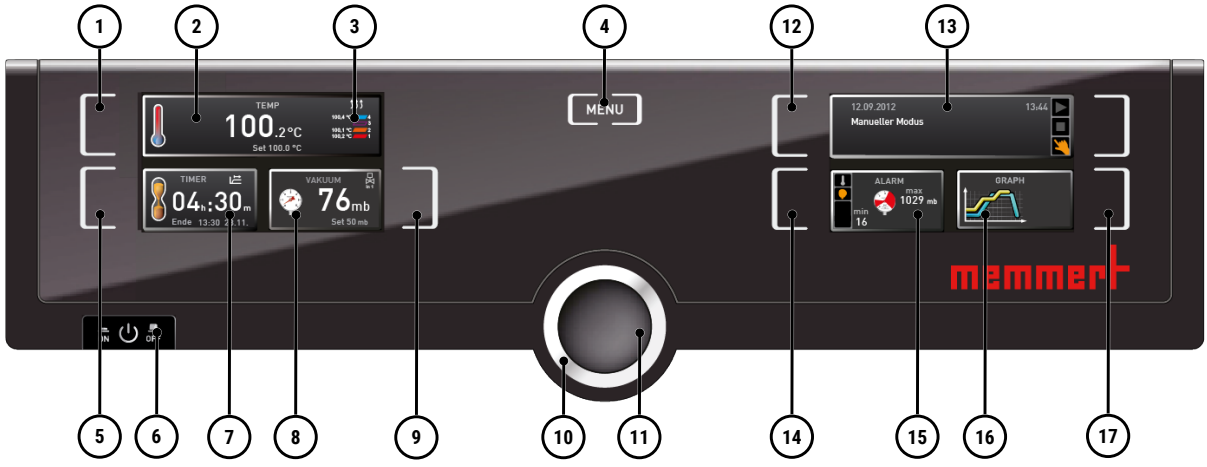
See also

- Materials [▸ 12]
- Insert Thermoshelves [▸ 27]

6.4 Operating the Appliance

6.4.1 ControlCOCKPIT

In manual operation, the desired parameters are entered at the ControlCOCKPIT on the front of the appliance. You can also make basic settings here (**menu mode**). Warning messages are also displayed, e.g. if the temperature is exceeded. In programme mode, the parameters defined, the programme description, the programme segment currently active and remaining programme runtime are displayed.

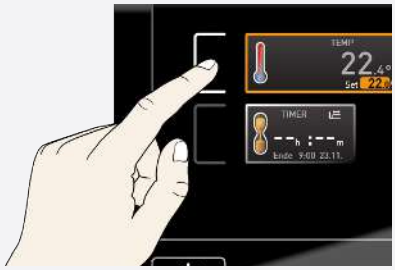


1	Activation key for temperature setpoint input	2	Setpoint and actual temperature display
3	Display of actual temperature and contact of the individual thermoshelves	4	Switch to menu mode
5	Activation key for digital backwards counter with target time setting, adjustable from 1 minute to 99 days	6	Main switch
7	Display of digital backwards counter with target time setting, adjustable from 1 minute to 99 days	8	Setpoint and actual pressure display
9	Activation key for target pressure setting	10	Turn control for setpoint adjustment
11	Confirmation key (applies setting made with the turn control)	12	Activation key operating mode
13	Status display	14	Activation key for setting the temperature and pressure monitoring

15	Display of temperature and pressure monitoring	16	Graphic representation
17	Activation key for graphic representation		

6.4.2 Basic Operation

In general, all settings are made as follows:

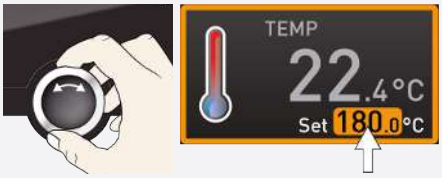


Activate the desired parameter (e.g. temperature):

1. To do so, press the activation key to the left or right of the respective display.

⇨ The activated display is outlined in colour, the other displays are dimmed.

⇨ The setpoint value (Set) is highlighted in colour.



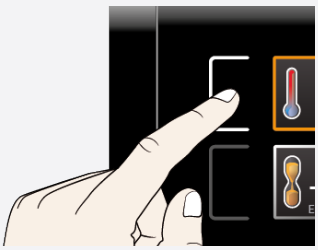
2. You can adjust the setpoint (e.g. to 180 °C) by turning the turn control anti-clockwise or clockwise.

3. Save the set value by pressing the confirmation key.

⇨ The display returns to normal and the appliance starts controlling with reference to the defined setpoint value.

⇨ Additional parameters and functions can be set accordingly.

If no new values are entered or confirmed for approx. 30 seconds, the appliance automatically restores the former values.



If you want to discard the settings:

4. Press the activation key on the left or right of the display that you want to exit.

⇨ The appliance restores the former values.

⇨ Only the settings that you have saved by pressing the confirmation key will be applied.

6.5 Operating Modes

Manual mode

The appliance runs continuously with the values set at the ControlCOCKPIT.

- See ▸6.5.1 Manual Mode

Timer mode

Operation with digital backwards counter with target time setting, adjustable from 1 minute to 99 days (Timer): The appliance runs at the values set until the set time has elapsed.

- See ▸6.5.2 Digital Backwards Counter

Programme Mode

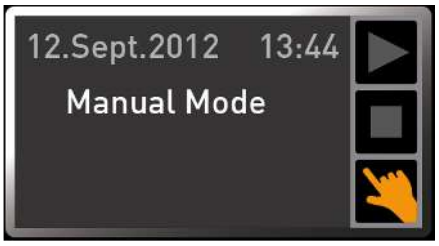
The appliance automatically runs programme sequences which have been defined using AtmoCONTROL software at a computer / laptop and then transferred to the appliance from a USB stick or via Ethernet.

- See ▸6.5.3 Programme Mode

Remote control mode

Via remote control

- See ▸8.3.6 Remote Control



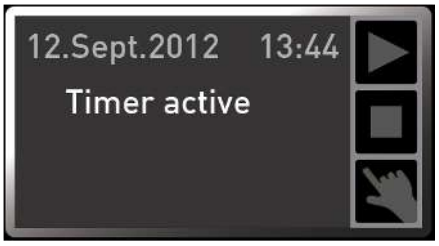
The status display shows the current operating mode or operating state of the appliance. The current operating state is indicated by colour and text display:

▶ Appliance is in programme mode

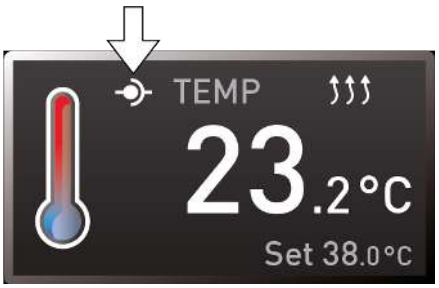
■ Programme stopped

Appliance is in manual mode

The example on the right shows the appliance in manual mode, as indicated by the coloured hand symbol.



When the appliance is in timer mode, Timer active is displayed.



When the appliance is in remote control mode, the ⊙ symbol appears in the temperature display.

See also

- Manual Mode [▸ 32]
- Digital Backwards Counter [▸ 33]
- Programme Mode [▸ 34]
- Remote Control [▸ 49]

6.5.1 Manual Mode

In this operating mode, the appliance runs continuously with the values set on the ControlCOCKPIT.

As described in chapter ▸6.4.2 Basic Operation, you can set the following parameters after pressing the corresponding activation key (in any sequence):

Temperature

The display on the right shows the temperatures of the individual thermoshelves and whether they are in contact. Thermoshelf 3 is not in contact in the example on the right.

Heating operation is indicated by the ⦚ symbol.

You can display the temperature in °C or °F.

The setting range depends on the appliance (see ▸3.6 Nameplate and ▸3.7 Technical Data).

Pressure

The display In1/In2 top right (arrowed, only for Premium VO49 and 101) indicates which gas connection is currently active:

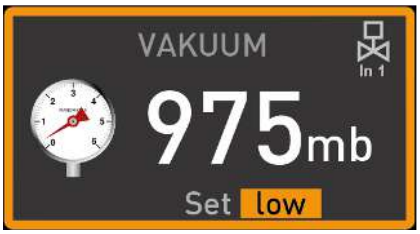
- In1 is displayed when fresh air is open.
- In2 is displayed when inert gas is open.
- No icon is displayed if no contact is open.

Which gas connection should be active can be set in menu mode

(see ▸8.3.4 Gas Inlet).

If a pressure range is set above 1100 mbar, the message **open** appears.

- The old actual value is retained when the confirmation key is pressed.
- This function is intended for removing the chamber load, i.e. for generating atmospheric pressure.



If a pressure range is set below 5 mbar, the message **low** appears.

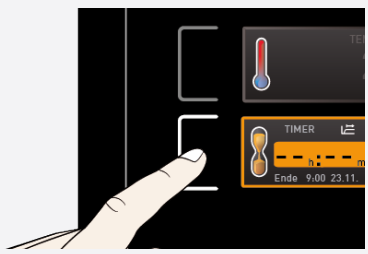
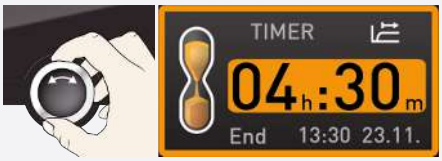
- The old actual value is retained when the confirmation key is pressed.
- In Low operation, the vacuum pump operates at maximum output and there is no pressure control.
- The achieved pressure depends only on the ultimate attainable vacuum of the pump.

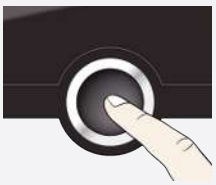
The setting range depends on the appliance (see ▸3.6 Nameplate and ▸3.7 Technical Data).

See also

- Basic Operation [▸ 31]
- Nameplate [▸ 15]
- Technical Data [▸ 16]
- Gas Inlet [▸ 48]

6.5.2 Digital Backwards Counter

i	In timer mode, you can adjust the time the appliance runs at the set value. The appliance has to be in manual operating mode for this. Up to a duration of 23 hours 59 minutes, the time is displayed in hh:mm (hours:minutes) format. For 24 hours and more, the format dd:hh (days:hours) is used. The maximum duration is 99 days and 00 hours.
	1. Press the activation key to the left of the timer display. ⇨ The timer display is activated.
	2. Turn the turn control until the desired duration is displayed. ⇨ The anticipated end time is shown beneath, in smaller digits.



3. Press the confirmation key to confirm.
   ⇨ The display now shows the remaining time in large digits and the anticipated end time in smaller digits beneath.
   ⇨ The status display shows “Timer active”.

4. Now, as described in ▸6.4.2 Basic Operation, set the individual reference values to be used by the appliance during operation.
   ⇨ The change takes effect immediately.

The set values can be changed at any time while the timer runs down.

In **Setup**, you can choose if the timer should run setpoint-dependent or not, in other words, whether the timer should not start until a tolerance band around the setpoint temperature is reached or if it should start right after activation.

The symbol on the timer display indicates that the timer is setpoint-dependent.

Once the timer has elapsed, the display shows 00h:00m.

- All functions are switched off.
- In addition, an alarm sounds, and can be turned off by pressing the confirmation key.

5. To switch off the timer, press the activation key again to display the timer.
6. Turn the turn control to reduce the runtime until --:-- is displayed.
7. Press the confirmation key to apply the setting.

See also

Basic Operation [▸ 31]

6.5.3 Programme Mode

NOTICE

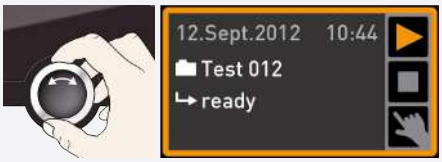
A description of how to create and save programmes can be found in the separate AtmoCONTROL software manual.

In this operating mode, programmes saved in the appliance can be started with different combinations of individual parameters with offset timings which the appliance then automatically processes in sequence.

These programmes are not created directly at the appliance but externally at a computer / laptop using the AtmoCONTROL software then transferred to the appliance using the provided USB storage medium or via Ethernet.

Starting a programme

1. Press the activation key to the right of the status display.
   ⇨ The current operating state is highlighted automatically, in this example **manual mode** (✋).

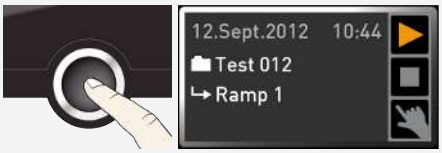


2. Turn the turn control until the ▶ start symbol is highlighted.
   ⇨ The currently available programme is displayed.

i

Only the programme currently selected in the menu and shown in the display can be used.

If you want to run another programme, you need to activate it in the menu first (description in 8 Menu Mode).



3. To start the programme, press the confirmation key.
   ⇨ The programme is executed.

The display shows:

- the programme name
- the name of the first programme segment
- the current cycle (in case of loops)

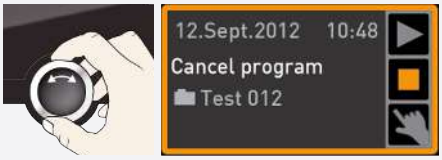
i

You cannot change any parameters at the appliance while a programme is running. However, you can still use the displays **ALARM** and **GRAPH**.

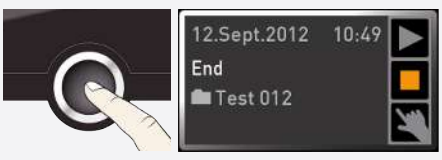
Cancelling a programme

You can cancel an active programme at any time:

1. Press the activation key to the right of the status display.
   ⇨ The status display is automatically highlighted.



2. Turn the turn control until the stop symbol ■ is highlighted.

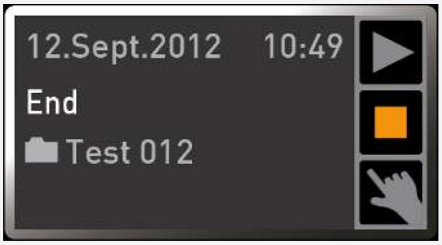


3. Press the confirmation key to confirm.
   ⇨ The programme is cancelled.

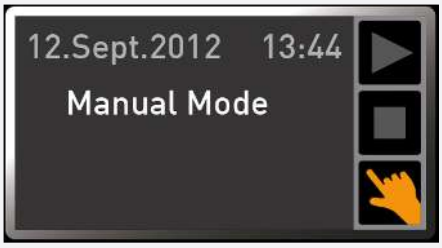
i

A cancelled programme cannot be resumed at the point it was cancelled. It must be restarted from the beginning.

End of programme



The **End** display appears once the programme has finished normally.



You can now

- restart the programme as described,
- select another programme to run in menu mode (see ▸8.6 Programme) and run it as described,
- return to manual mode. To do so, reactivate it by pressing the activation key next to the status display, then turn the turn control until the hand symbol is highlighted in colour and press the confirmation key.

See also

- Menu Mode [▸ 45]
- Programme [▸ 54]

6.6 Monitoring Function

6.6.1 Temperature Monitoring

The appliance is equipped with multiple overtemperature protection in accordance with DIN 12880. This is designed to prevent damage to the chamber load and/or appliance in case of a malfunction:

- electronic temperature monitoring (TWW)
- automatic temperature monitor (ASF)
- mechanical temperature limiter (TB)

The electronic temperature monitoring measures the monitoring temperature via a separate Pt100 temperature sensor in the chamber. Temperature monitoring settings are made via the **ALARM** display. The settings made apply to all operating modes.

If temperature monitoring has been triggered, this is indicated by the temperature display: the actual temperature is highlighted in red and a warning symbol ⚠ is shown. The type of temperature monitoring that has been triggered is shown beneath the temperature (see ▸ 7 Malfunctions, Warning and Error Messages).

The individual monitoring functions will be presented in more detail first, followed by a description of how to set the temperature monitoring.

If the acoustic signal has been activated at Alarm in menu mode (▸8.7 Acoustic Signals, which is indicated by the speaker symbol 🔊), the alarm will be accompanied by an intermittent acoustic signal.

The acoustic alarm can be temporarily switched off by pressing the confirmation key until the next alarm event occurs.

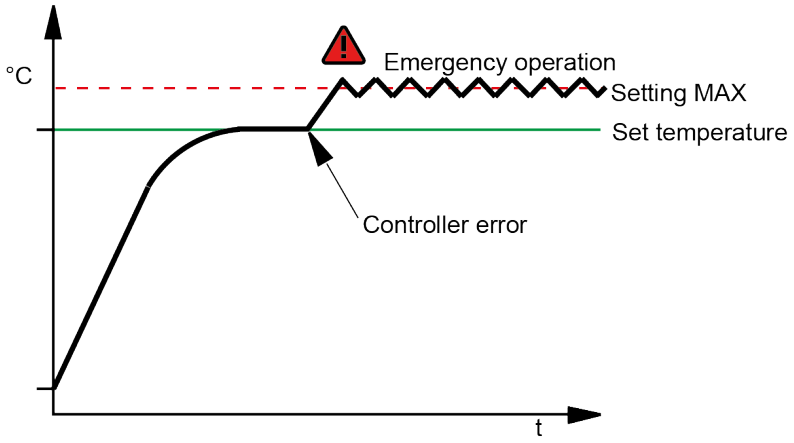
See also

Malfunctions, Warning and Error Messages [▶ 42]
Acoustic Signals [▶ 55]

6.6.2 Electronic Temperature Monitoring (TWW)

The manually set min and max monitoring temperature of the electronic overtemperature protection is monitored by an temperature selector switch (TWW) protection class 3.1 acc. to DIN 12880 (or temperature selector switch (TWW) protection class 3.1 for UIS appliances).

If the manually set max monitoring temperature is exceeded, the TWW takes over the closed-loop temperature control and begins to regulate with reference to the monitoring temperature.



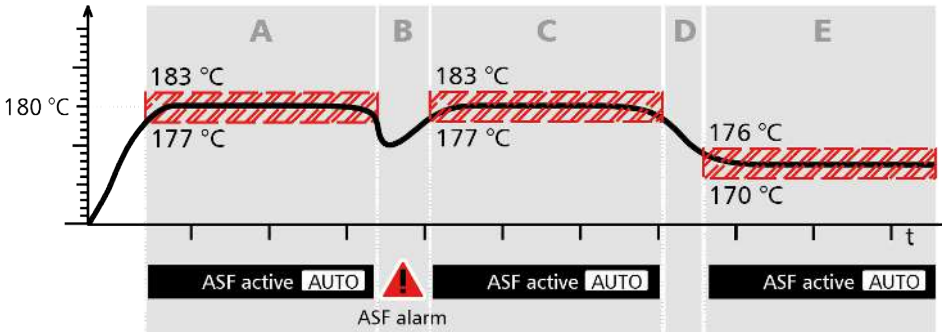
6.6.3 Automatic Temperature Monitor (ASF)

ASF is a monitoring device that automatically follows the set temperature setpoint within an adjustable tolerance band.

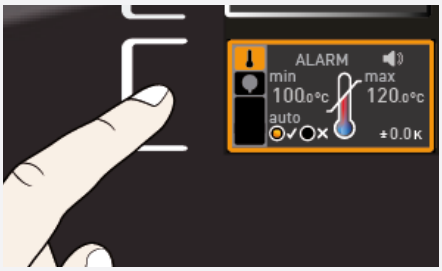
The ASF – if switched on – is automatically activated as soon as the actual temperature value reaches 50% of the set tolerance band of the setpoint for the first time (section A).

When the temperature leaves the set tolerance band around the setpoint – e.g. if the door is opened during operation (section B) – the alarm is triggered. The ASF alarm is automatically deactivated as soon as 50% of the set tolerance band of the setpoint has been reached again (section C).

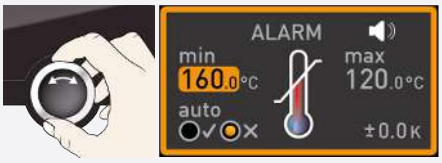
If the temperature setpoint is altered, the ASF is automatically disabled temporarily (section D), until it is once again within the tolerance range of the new temperature setpoint (section E).



6.6.4 Adjusting the Temperature Monitoring



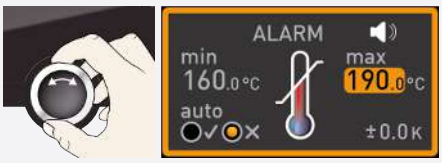
1. Press the activation key to the left of the **ALARM** display.
   ⇨ The temperature monitoring setting is automatically activated 🌡.



2. By turning the turn control, adjust the desired lower alarm limit.

The lower alarm limit cannot be higher than the upper alarm limit. If no undertemperature protection is required, set the lowest temperature.

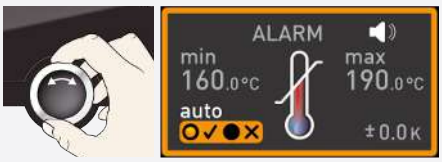
3. Press the confirmation key to confirm.
   ⇨ The **max** display (overtemperature protection) is activated.



4. By turning the turn control, adjust the desired upper alarm limit.

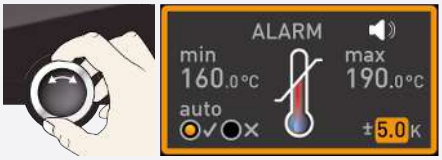
The monitoring temperature must be set sufficiently high above the maximum setpoint temperature. We recommend 5 to 10 K.

5. Press the confirmation key to apply the setting for the upper alarm limit.
   ⇨ The setting of the automatic temperature monitor (ASF) is automatically activated (**auto**).



6. With the turn control select ON (✓) or OFF (✕).

7. Press the confirmation key to confirm.
   ⇨ The ASF tolerance band setting is activated.



8. With the turn control, select the required tolerance band.

We recommend a tolerance band of 5 to 10 K.

9. Press the confirmation key to confirm.
⇨ Temperature monitoring is now active.

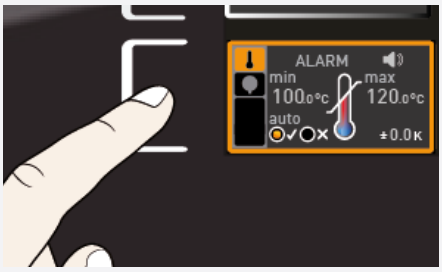
In menu mode you can set, whether an alarm should be accompanied by an acoustic signal (see ▸8.7 Acoustic Signals).

See also

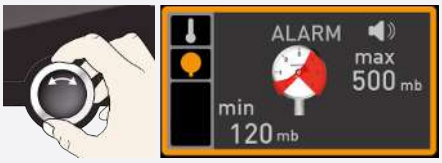
Acoustic Signals [▸ 55]

6.6.5 Pressure Monitoring

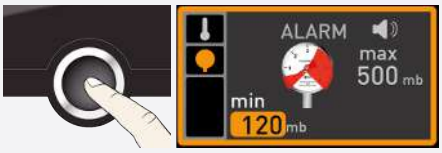
If the pressure monitoring was triggered, this is indicated by the pressure display: with the actual pressure on a red background accompanied by a warning symbol ⚠. If the acoustic signal has been activated in Menu mode to accompany an alarm (▸8.7 Acoustic Signals, as indicated by the speaker symbol 🔊), the alarm with be accompanied by an intermittent acoustic signal. Information on what to do if this happens can be found in chapter ▸ 7 Malfunctions, Warning and Error Messages.



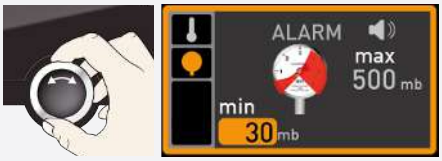
1. Press the activation key to the left of the **ALARM** display.
⇨ The temperature monitoring setting is automatically activated.



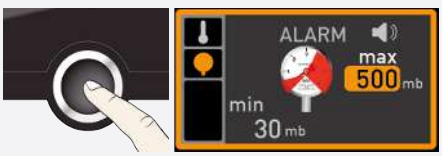
2. Turn the turn control until the pressure setting is highlighted.



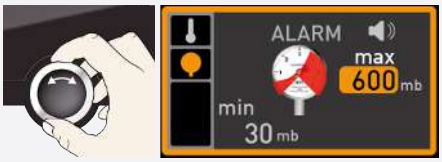
3. Confirm the selection by pressing the confirmation key.
⇨ The lower alarm limit is automatically highlighted.



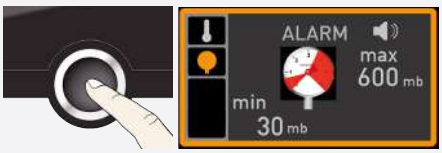
4. By turning the turn control, set the required lower alarm limit, 30 mbar in the example on the left.



5. Confirm the selection by pressing the confirmation key.
⇨ The upper alarm limit is automatically highlighted.



6. By turning the turn control, set the required upper alarm limit, 600 mbar in the example on the right.



7. Press the confirmation key to confirm.
8. Press the activation key on the side to exit the **ALARM** display.

⇨ Pressure monitoring is now active and triggers as soon as the pressure falls below 30 mbar or exceeds 600 mbar.

See also

- Acoustic Signals [▶ 55]
- Malfunctions, Warning and Error Messages [▶ 42]

6.7 Graph

The **GRAPH** display provides an overview of the chronological sequence of the set values and the actual values as a curve.

- Press the activation key again to close the graphic display.

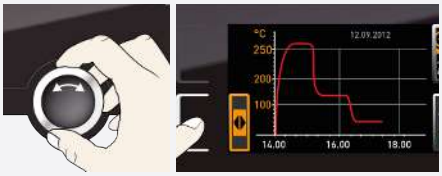
6.7.1 Temperature Curve

1. Press the activation key to the right of the **GRAPH** display.

⇨ The display is enlarged and the temperature curve is displayed.

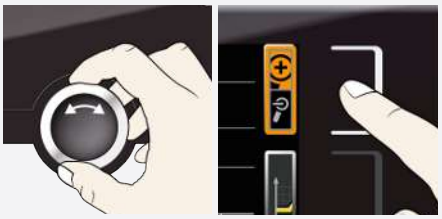
The colours correspond to those of the thermoshelf symbols in the temperature display.

The red curve shows, for example, the temperature curve of thermoshelf 1.



2. To change the time range to display press the activation key next to the ◁▷ arrow symbols.

⇨ The time range to display can now be displaced by turning the turn control.

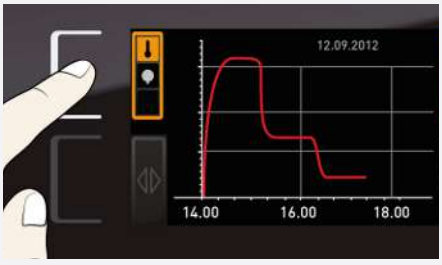


To zoom in or out in the graph:

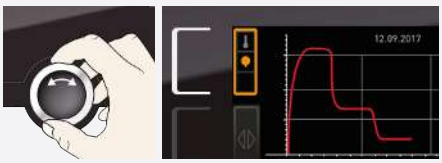
3. Press the activation key next to the magnifying glass symbol.
4. With the turn control, select if you want to zoom in or out (+/−).
5. and confirm your selection by pressing the confirmation key.

⇨ To close the graphic display, press the activation key again.

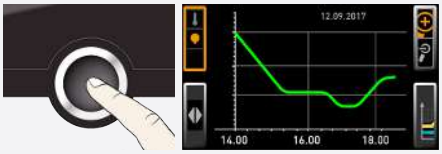
6.7.2 Pressure Curve



1. Activate this graphic display as described above.
2. Press the activation key next to the parameter selection.



3. Select the pressure symbol with the turn control.



4. Press the confirmation key to confirm.
   ⇨ The pressure curve is now displayed in green.

You can also displace and zoom in/out of the display as described above.

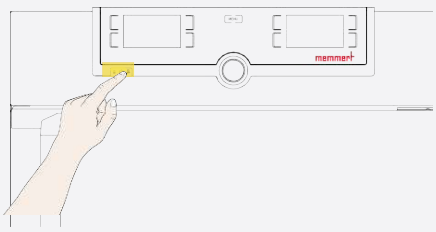
6.8 Ending Operation

⚠ WARNING

Hot surfaces

Depending on the operating situation, the unit and the load may be hot. Contact with hot surfaces may have serious health consequences due to burns!

- Allow the unit to cool down.
- Wear heat-resistant protective gloves when carrying out work.
- Check the temperature of surfaces before touching them.



1. Switch off the active unit functions (reset setpoint values).
2. Switch off the pump module or the vacuum pump.
3. Remove the chamber load.
4. Switch off the unit at the main switch.

7. Malfunctions, Warning and Error Messages

⚠ DANGER

Risk of electric shock from unauthorised troubleshooting

Errors requiring intervention inside the unit may only be rectified by qualified electricians.

– Follow the measures listed in the event of a malfunction.
– Contact Memmert International After Sales.

Do not try to rectify appliance errors yourself; instead you should contact Memmert International After Sales or an authorised customer service point.

In case of enquiries, please always state the model and appliance number on the nameplate (see ▸3.6 Nameplate).

See also

Nameplate [▸ 15]

7.1 Warning Message of the Monitoring Function

If the acoustic signal has been activated at Alarm in menu mode (▸8.7 Acoustic Signals, which is indicated by the speaker symbol), the alarm will be accompanied by an intermittent acoustic signal.

The acoustic alarm can be temporarily switched off by pressing the confirmation key until the next alarm event occurs.

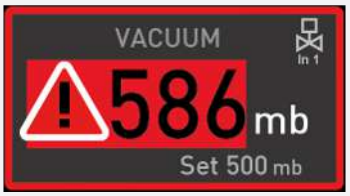
See also

Acoustic Signals [▸ 55]

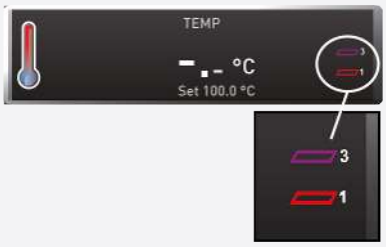
7.1.1 Temperature Monitoring

Description	Cause	Action
Temperature alarm and **ASF** is displayed 	Automatic temperature monitor (ASF) has triggered.	■ Check that the door is closed ■ Close door ■ Increase ASF tolerance band ■ If the alarm persists: Notify customer service
Temperature alarm and **TWW** is displayed 	Temperature selector switch (TWW) has taken over the heating control.	■ Increase the difference between the monitoring temperature and the set point temperature – i.e. either increase the max. value of the temperature monitoring or reduce the set point temperature ■ If the alarm persists: Notify customer service
Temperature alarm and **TB** is displayed 	Mechanical temperature limiter (TB) has switched off the heating permanently.	■ Switch off the appliance and allow it to cool down ■ Contact customer service and have the fault rectified (e.g. replace the temperature sensor)

7.1.2 Pressure Monitoring

Error description	Cause	Remedy
Pressure alarm and **MaxAL** are displayed 	Upper pressure limit value exceeded.	■ Vacuum pump has too little power ■ Hose may be leaking or kinked, clean, check
Pressure alarm and **MinAL** are displayed 	Pressure has fallen below lower limit.	■ Speed control damaged or intake valve is not closing correctly ■ Notify customer service

7.2 Malfunctions, Operating Problems and Unit Errors

Error description	Cause of errors	Rectifying errors
Displays are dark 	External power supply was interrupted.	■ Check the power supply
	Miniature fuse, appliance fuse or power module faulty.	■ Notify customer service
Displays do not activate 	Appliance locked by USER ID.	■ Unlock with USER ID
	Appliance is in programme, timer or remote control mode (“Write” or “Write + Alarm” mode).	■ Wait for the programme or timer to end or switch off the remote control
Appearance of displays suddenly changes	Appliance is in the “wrong” mode.	■ Press the **MENU** key to switch to the operating or menu mode
Door cannot be opened	Negative pressure in appliance	■ Set the atmospheric pressure
Thermoshelf symbols remain empty, although shelf has been inserted 	■ Thermoshelf not recognised ■ Temperature sensor in the thermoshelf faulty	■ Check that the thermoshelf is correctly positioned ■ Clean contacts on the appliance and on the thermoshelf ■ Notify customer service
Error message **E-7** in the pressure display 	Pressure measurement sensor faulty. Pressure regulation is not possible.	■ Notify customer service

Error description	Cause of errors	Rectifying errors
Start animation after switching on appears in a colour other than white ●●●●.	Cyan ●●●●: not enough storage space on the SD card.	■ Notify customer service
	Red ●●●●: System files could not be loaded.	
	Orange ●●●●: The fonts and images could not be loaded.	

7.2.1 Power Failure

⚠ WARNING

Hot surfaces

Depending on the operation performed, the surfaces in the chamber and the chamber load may still be very hot after a power failure. Additionally, depending on the duration of the power failure, the appliance might heat up again after the power supply has been restored. Touching these surfaces can cause burns.

– Wear heat-resistant protective gloves or wait until the appliance cools down first.

In case of a power failure, the unit operates as follows:

In manual mode

After the power supply has been restored, operation is continued with the parameters set. The time and duration of the power failure are documented in the log memory.

In timer or programme mode

In case of an interruption of the power supply of less than 60 minutes, the current programme is continued from the point at which it was interrupted. For longer interruptions of the power supply, all appliance functions are switched off.

After the power supply has been restored, the timer always starts again.

In remote control mode

The previous values are restored. If a programme has been initiated via remote control, it is continued.

NOTICE

Please refer to the operating manual for the vacuum pump used in the event of a power failure.

It may need to be turned back on.

7.2.2 Set Pressure is not Reached

If the appliance fails to reach the set pressure specified in the controller, this may be due, among other things, to a lack of vacuum power being supplied to the appliance. Make sure that the vacuum supply lines are

- free of kinks.
- tight.
- firmly screwed in place.
- free from contamination.

8. Menu Mode

In menu mode, you can make basic settings, load programmes and export protocols, as well as adjust the appliance.

Before changing the menu settings, read the description of the respective functions on the following pages to avoid possible damage to the appliance and/or chamber load.

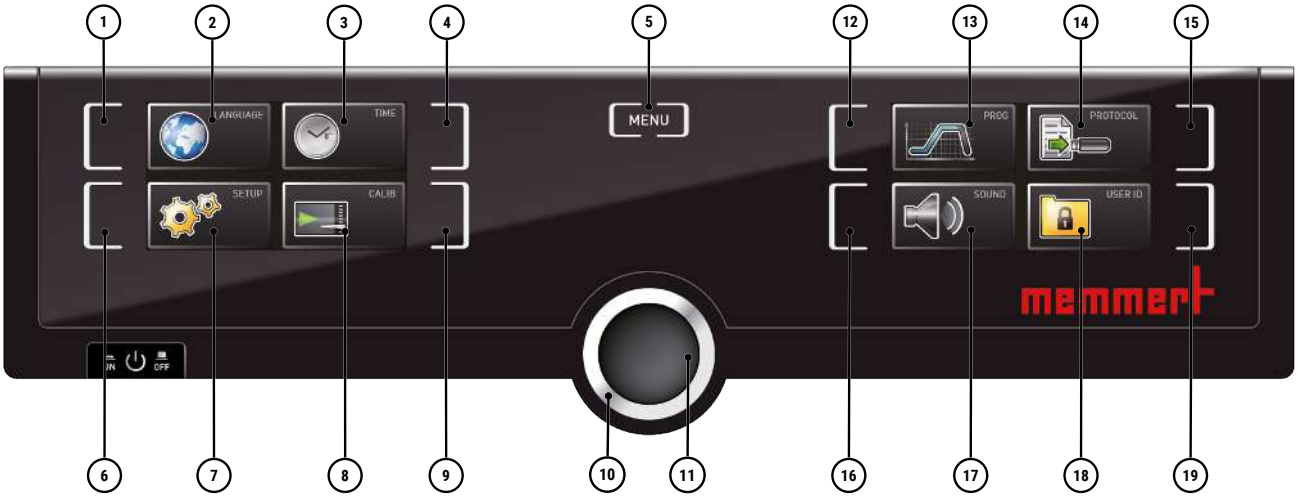
- To enter Menu mode, press the **MENU** key.

⇨ The appliance then returns to operating mode. Only changes applied by pressing the confirmation key are saved.

⇨ To exit the menu mode at any time, press the **MENU** key again.

8.1 Overview

Press the **MENU** key to toggle between displays in Menu mode:

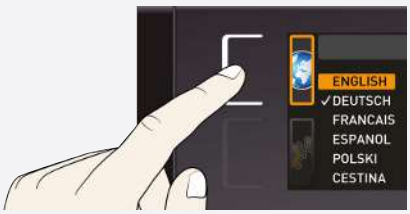


1	Language selection activation key	2	Language selection display
3	Date and time display	4	Date and time setting activation key
5	Exit menu mode and return to the operating mode	6	Setup activation key (basic appliance settings)
7	Setup display (basic appliance settings)	8	Adjustment display
9	Adjustment activation key	10	Turn control for adjustment
11	Confirmation key (applies setting made with the turn control)	12	Programme setup activation key
13	Programme setup display	14	Protocol display
15	Protocol activation key	16	Acoustic signal adjustment activation key
17	Acoustic signal adjustment display	18	User ID display
19	User ID display activation key		

8.2 Basic Operation in Menu Mode Using the Example of Language Selection

In general, all settings in Menu mode are made in the same way as operating mode: Activate the respective display, use the turn control for setting and press the confirmation key to apply the change.

A more detailed description of what you need to do is provided below, using the example of language selection. All other settings can be made accordingly. The possible settings are described below.

	If no new values are entered or confirmed for approx. 30 seconds, the appliance automatically restores the former values.
	Activate the desired setting (in this example the language): 1. To do so, press the activation key to the left or right of the respective display. ⇨ The activated display is enlarged.
	2. If you want to discard the settings or exit the dialogue, press the activation key again. ⇨ The appliance returns to the menu overview. ⇨ Only the settings that you have saved by pressing the confirmation key will be applied.
	3. Select the desired new setting, e.g. Spanish (**ESPANOL**) using the turn control.
	4. Save the setting by pressing the confirmation key.
	5. To return to the menu overview, press the activation key again.
 	You can now ■ activate another menu function by pressing the corresponding activation key or ■ return to the operating mode by pressing the **MENU** key.

8.3 Setup

8.3.1 Overview

In the **SETUP** display, you can set the following parameters:

- the IP address and subnet mask of the appliance's Ethernet interface (for connection to a network)
- The units of the temperature display (°C or °F, see ▸8.3.3 Unit)
- of the gas connection that should be active (1 or 2, only for VO49 Premium and VO101 Premium appliances)
- The mode of operation of the digital backwards counter with target time setting (Timer Mode,
  see ▸6.5.2 Digital Backwards Counter)
- Remote control (see ▸8.3.6 Remote Control)

- Gateway (see ▸8.3.7 Gateway)

If the Setup menu contains more entries than can be displayed, this is indicated by the display “1/2”. This means that there is a second “page” of entries.

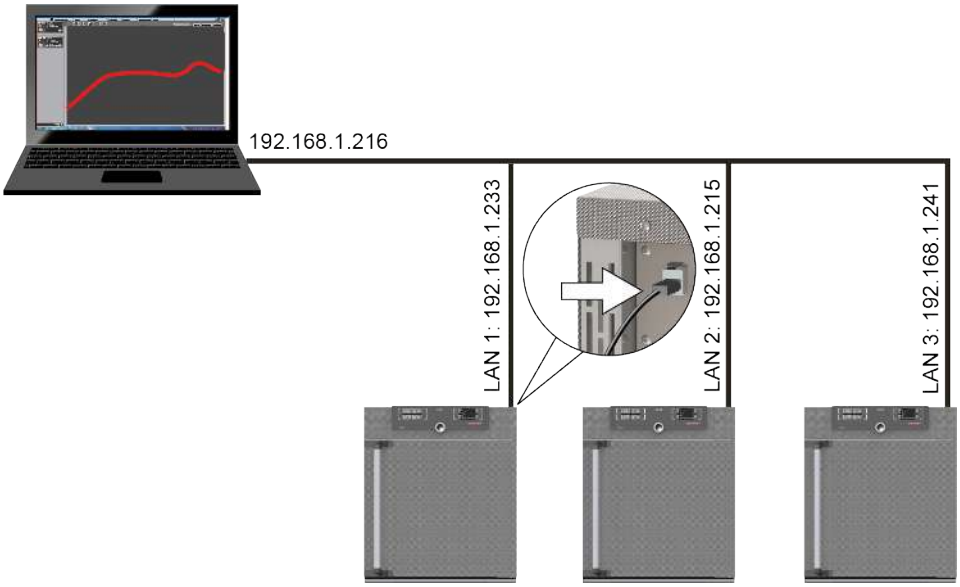
To display the hidden entries, use the turn control to scroll beyond the lowest entry. The page display then changes to “2/2”.

See also

- Unit [▸ 48]
- Digital Backwards Counter [▸ 33]
- Remote Control [▸ 49]
- Gateway [▸ 49]

8.3.2 IP Address and Subnet Mask

If you want to operate one or more appliances in a network, each appliance must have its own unique IP address for identification. By default, each appliance is delivered with the IP address 192.168.100.100.



1. Activate the **SETUP** display.
   ⇨ The **IP address** entry is automatically highlighted.

2. Confirm the selection by pressing the confirmation key.
   ⇨ The first three digits of the IP address are automatically highlighted.

3. With the turn control, set the new number, e.g. 255.

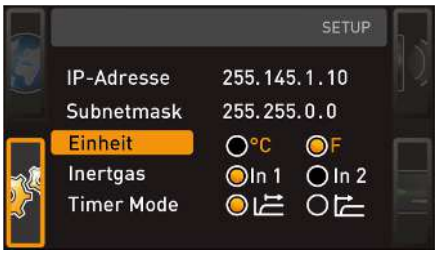
4. Confirm the selection by pressing the confirmation key.
   ⇨ The next three digits of the IP address are automatically marked.
   ⇨ They can now also be set according to the description above.

5. After setting the last three digits, confirm the new IP address by pressing the confirmation key.

⇨ The overview is displayed once again.

⇨ The subnet mask can be set in the same way.

8.3.3 Unit



Here, you can choose whether the temperature is displayed in °C or °F.

8.3.4 Gas Inlet

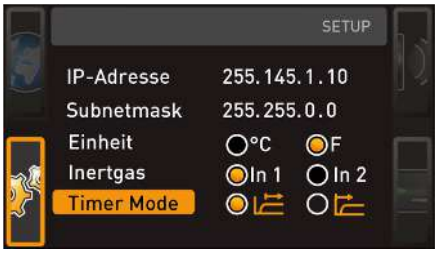
Only for VO49 Premium and VO101 Premium appliances:

Here you can set which of the two gas connections should be active (see ▸3.5 Connections and Interfaces and ▸5.3 Connecting the Pump Module or Vacuum Pump).

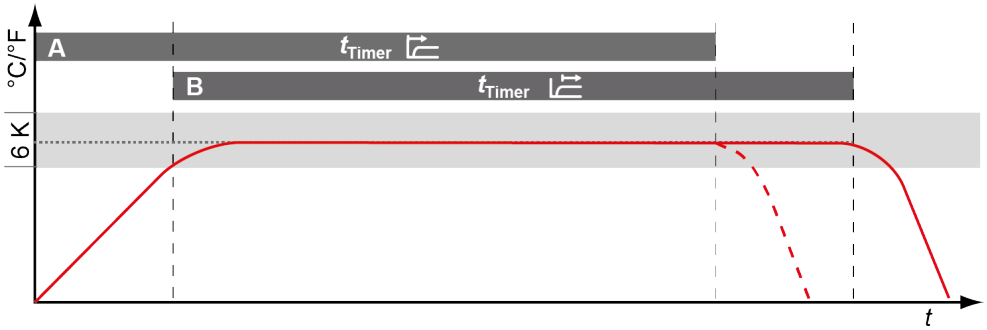
See also

- Connections and Interfaces [▸ 13]
- Connecting the Pump Module or Vacuum Pump [▸ 25]

8.3.5 Timer Mode



Here, you can choose whether the digital backwards counter with target time setting (see ▸6.5.2 Digital Backwards Counter) should be setpoint-dependent or not – in other words, whether the timer should not start until a tolerance band around the setpoint temperature is reached Ⓑ or if it should start right after activation Ⓐ.



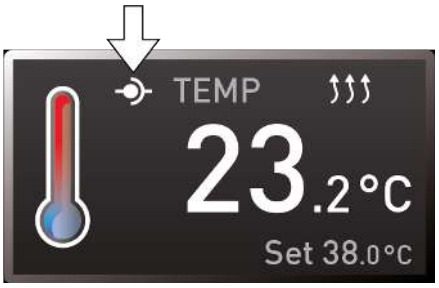
See also

- Digital Backwards Counter [▸ 33]

8.3.6 Remote Control

Under the Remote control setup entry, you can set whether the appliance should be controlled via remote control and if so, in which mode. These adjustment options are available:

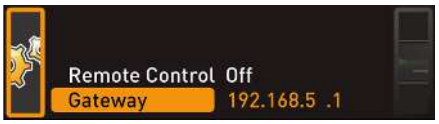
- Off
- Read Only
- Write + Read
- Write + Alarm



When the appliance is in remote control mode, the ⊙ symbol appears in the temperature display. In the settings **Write + Read** and **Write + Alarm**, the appliance cannot be controlled at the ControlCOCKPIT until the remote control has been switched off (**Off** setting) or set to Read Only.

To use the remote control function, programming skills and special libraries are required.

8.3.7 Gateway



The Gateway setup entry is used to connect two networks with different protocols. The gateway is set the same way as the IP address
(see ▶8.3.2 IP Address and Subnet Mask).

See also

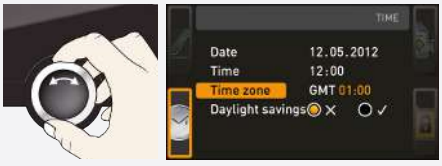
IP Address and Subnet Mask [▶ 47]

8.4 Date and Time

In the **TIME** display, you can set date and time, time zone and summer time. Changes can only be made in manual operating mode.

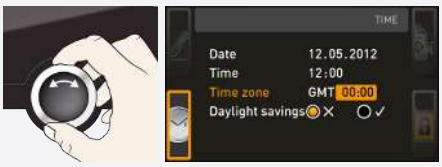
i Always set the time zone (and summer time yes/no) before you set the date and time. Avoid changing the set time after that since this can lead to gaps or overlapping when recording measured values. If you still need to change the time, you should not run a programme immediately before or after doing so.

1. Press the activation key to the right of the **TIME** display.
   ⇨ The display is enlarged and the first adjustment option (**Date**) automatically highlighted.



2. Turn the turn control until **Time zone** is highlighted.

3. Confirm the selection by pressing the confirmation key.



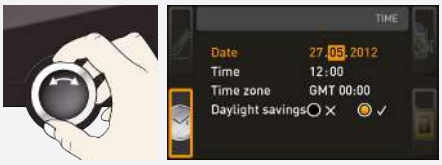
4. Set the time zone of the installation site with the turn control (e.g. 00:00 for Great Britain, 01:00 for France, Spain or Germany).
5. Confirm the selection by pressing the confirmation key.

6. With the turn control, select the **Summertime** entry.

7. Confirm the selection by pressing the confirmation key.
   ⇨ The adjustment options are highlighted.

8. Set summertime to off (✕) or on (✓) with the turn control – in this case on (✓).
9. Save the setting by pressing the confirmation key.

The changeover between summer and winter time does not take place automatically. For this reason, please remember to adjust the setting at the start and end of the summer time.



10. Set the date (day, month year) and time (hours, minutes).
11. Confirm the setting by pressing the confirmation key.

8.5 Calibrate

NOTICE

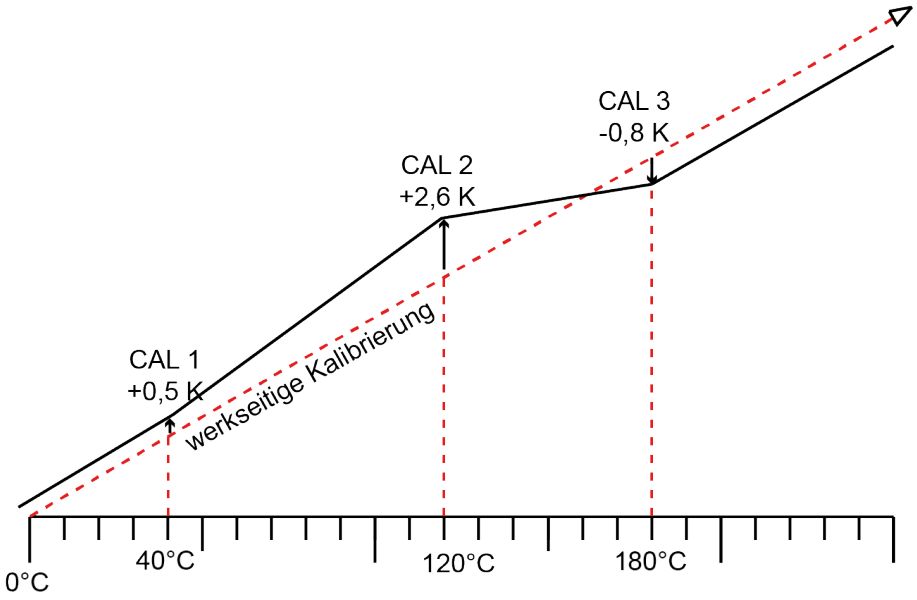
To guarantee problem-free closed-loop control, we recommend calibrating the appliance once a year.

8.5.1 Temperature Calibration

The appliances are temperature calibrated and adjusted at the factory. If readjustment is necessary – for example due to the influence of the chamber load – the appliance can be calibrated for the specific customer using three possible calibration temperatures:

- Cal1 Temperature calibration at low temperature
- Cal2 Temperature calibration at medium temperature
- Cal3 Temperature calibration at high temperature

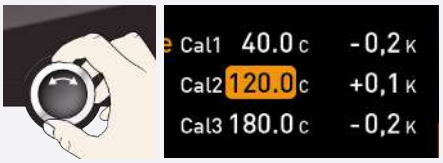
For temperature calibration, you will need a calibrated reference instrument.



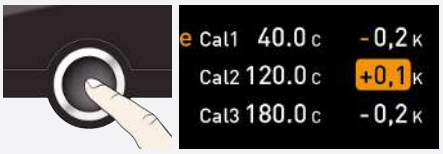
Example: Temperature deviation should be corrected

1. Press the activation key to the right of the **CALIB** display.
   ⇨ The display is enlarged and the temperature adjustment option is automatically highlighted.

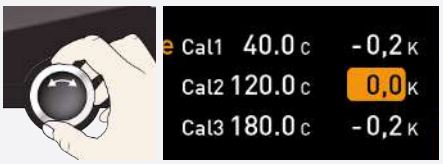
2. Press the confirmation key repeatedly, until the calibration temperature Cal2 is highlighted.



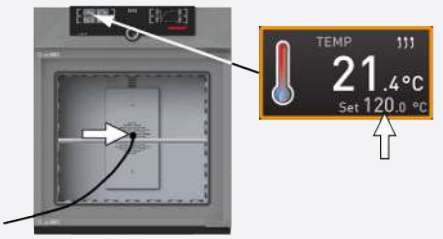
3. With the turn control, set the calibration temperature Cal2 to the specified temperature.



4. Save the setting by pressing the confirmation key.
   ⇨ The corresponding calibration correction value is automatically highlighted.

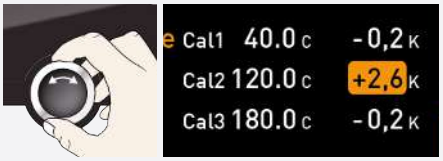


5. Set the calibration correction value to 0.0 K.
6. Save the setting by pressing the confirmation key.

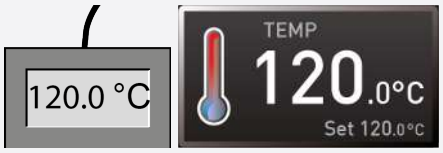


7. Position the sensor of a calibrated reference instrument centrally in the working chamber of the appliance.
8. Close the door.
9. In manual mode, adjust the setpoint temperature.

10. Wait until the appliance reaches and displays the setpoint temperature.
    - The reference instrument will display the corresponding deviation.



11. In the **SETUP**, adjust the calibration correction value Cal2 to the deviation temperature (actual value measured minus setpoint value).
12. Save the setting by pressing the confirmation key.



13. Compare the temperature measured by the reference measurement instrument with the temperature displayed on the appliance.

⇨ After the calibration procedure, the temperature measured by the reference instrument should now also be the setpoint temperature.

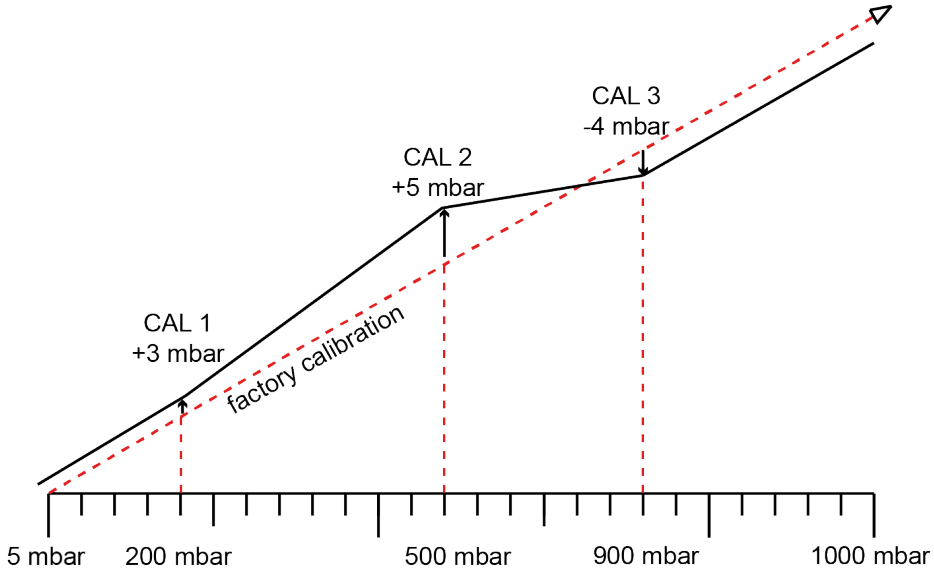
With Cal1, a further calibration temperature below Cal2, and with Cal3 a temperature above, can be programmed in the same manner. The minimum difference between the Cal values is 20 K.

If all calibration correction values are set to 0.0 K, the factory calibration settings are restored.

8.5.2 Pressure Calibration

The pressure can also be calibrated using three selectable calibration points. The minimum distance between the calibration points is 20 mbar. The setting range is ±20 mbar.

For pressure adjustment, you will need a calibrated reference pressure gauge.



Example: Pressure at 600 mbar is to be calibrated

1. Connect the calibrated pressure gauge to the VO fresh air connection (see ▸ 3.5 Connections and Interfaces) via ISO-KF connection size DN 16.
2. Activate the adjustment setting. To do so, press the activation key on the right of the **CALIB** display.
   ⇨ The display is enlarged.

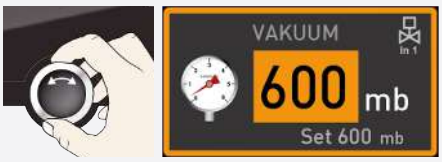
3. Turn the turn control until **Vacuum** is highlighted.

4. Press the confirmation key repeatedly, until the calibration point **Cal2** is highlighted.

5. With the turn control, set the calibration point **Cal2** to 600 mbar.

6. Confirm the setting by pressing the confirmation key.
   ⇨ The corresponding calibration correction value is automatically highlighted.

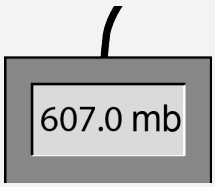
7. Set the calibration correction value to 0.0 mbar.
8. Confirm the selection by pressing the confirmation key.



9. In manual mode, set and activate the set pressure to 600 mbar.
10. Confirm the selection by pressing the confirmation key.

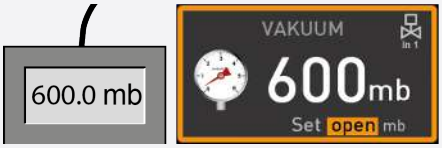
11. Wait until the set pressure is reached and 600 mbar is displayed.

12. Turn the turn control as far as possible to the right until **Set open** is displayed.



13. Read off the pressure at the reference instrument.

14. In SETUP, adjust the calibration correction value Cal2 to +7 mbar (actual value measured minus setpoint value).
15. Confirm the setting by pressing the confirmation key.



16. Compare the pressure value measured by the reference instrument with the pressure displayed on the appliance.

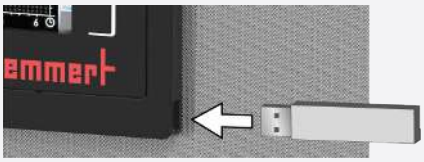
⇨ After the calibration procedure, the pressure measured by the reference instrument should now also be 600 mbar.

See also

Connections and Interfaces [▶ 13]

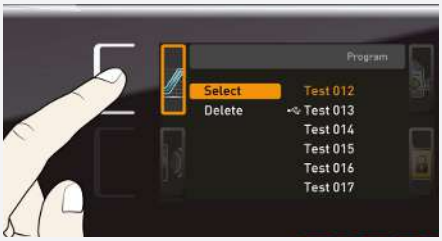
8.6 Programme

In the **Programme** display, programmes created using the AtmoCONTROL software can be transferred to the appliance and saved on a USB storage medium. Here, you can also select the programme you wish to run (see ▶6.5.3 Programme Mode) and delete programmes.

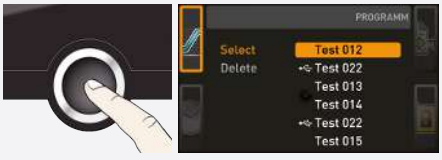


1. Insert the USB storage medium on the right side of the ControlCOCKPIT.

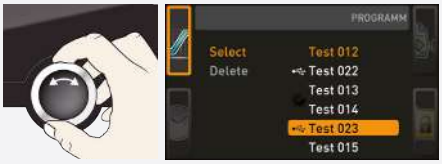
⇨ You can now use one of the programmes saved on the USB storage medium.



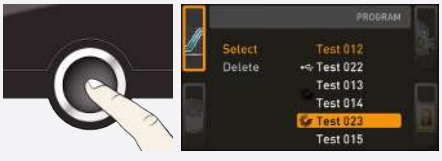
2. Press the activation key on the left of the **Prog** display.
   ⇨ The display is enlarged and the Select entry is automatically highlighted.
   ⇨ The programmes available for activation are shown on the right.
   ⇨ The programme currently available for use – in this example **Test 012** – is highlighted in orange.



3. Press the confirmation key to access the Select function.
   ⇨ All available programmes are displayed, including the ones saved on the USB data storage medium (identified by the USB symbol •⇢).
   ⇨ The programme currently available for use is highlighted in orange.

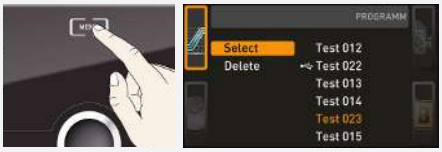


4. With the turn control, select the programme you want to use.



5. Confirm the selection by pressing the confirmation key.
   ⇨ The programme is now loaded, as indicated by the progress display.

As soon as the programme is ready, **Select** is highlighted once again.



To start the programme:

6. Return to the operating mode by pressing the **MENU** key again.
7. Start the programme as described in ▸6.5.3 Programme Mode.

You can now remove the USB storage medium.

To delete a programme:

8. select the programme to be deleted the same way you can select a programme for activation.
9. Select **Delete** with the turn control.

See also

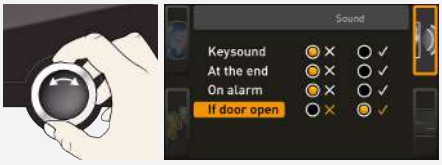
Programme Mode [▸ 34]

8.7 Acoustic Signals

In the **SOUND** display, you can define whether or not the appliance should emit acoustic signals and, if yes, for which events:

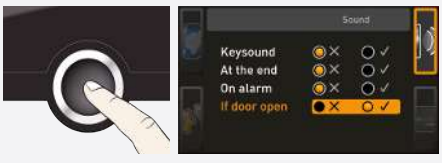
- on the press of a key
- at the end of a programme
- in the event of an alarm
- if the door is open

1. Press the activation key to the left of the **SOUND** display.
   ⇨ The display is enlarged.
   ⇨ The first category (in this case **Keysound**) is automatically highlighted.
   ⇨ The current settings are shown on the right.

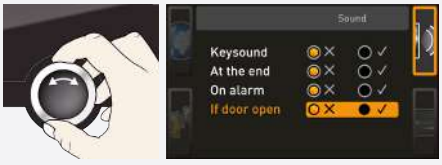


If you want to edit another list entry:

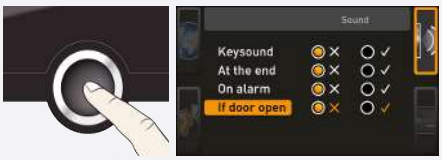
- Turn the turn control until the respective entry – e.g. **if the door is open** (special configuration) – is highlighted in colour.



2. Confirm the selection by pressing the confirmation key.
   ⇨ The adjustment options are automatically highlighted.



3. With the turn control, select the desired setting – in this example OFF (✕).



4. Save the setting by pressing the confirmation key.

If an acoustic signal sounds, it can be turned off by pressing the confirmation key.

8.8 Log

NOTICE

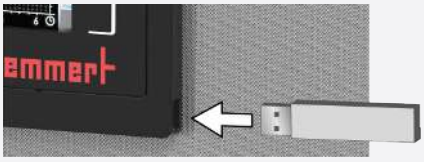
The supplied manual for AtmoCONTROL describes how

- to import exported log data into AtmoCONTROL,
- exported log data can be processed further in AtmoCONTROL,
- log data can be read out via Ethernet.

The appliance continually logs all relevant measured values, settings and error messages at 1-minute intervals. The internal log memory is a continuous memory type. The log function cannot be switched off and is always active. The measured data are stored in the appliance, safe from manipulation. If the power supply is interrupted, the time of the power failure and when the power was restored are stored in the appliance.

You can export the log data for different periods to a USB storage medium via the USB interface, or export the data via Ethernet and reimport it in the AtmoCONTROL software for graphic display, print-out or storage.

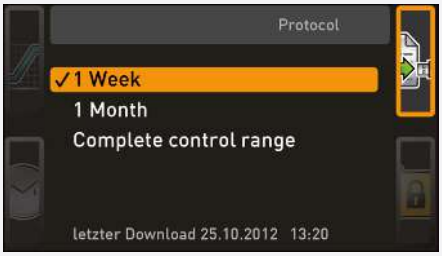
The log memory of the appliance is not modified or deleted by reading it out.



1. Connect the USB storage medium to the port on the right of the ControlCOCKPIT.

2. Press the activation key on the right side of the **Log** display.
   ⇨ The display is enlarged and the period **This Month** automatically highlighted.
3. To select another log period, use the turn control.

4. Apply the selection by pressing the confirmation key.
   ⇨ The transfer starts
   ⇨ and the status bar indicates the progress.



As soon as the transfer is complete, a check mark appears in front of the period selected.

- The USB storage medium can now be removed.

8.9 USER ID

8.9.1 Description

With the USER ID function, you can lock the settings of individual (e.g. temperature) or all parameters, so that they cannot be changed at the appliance by accident or by unauthorised persons.

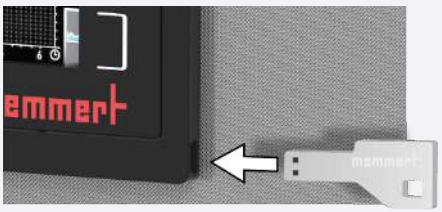
You can also lock adjustment options in Menu mode (e.g. adjustment of date and time settings).

- If adjustment options are locked, this is indicated by the lock symbol in the respective display.

USER ID data is entered in the AtmoCONTROL software and saved on the USB storage medium. The USB storage medium is thus acting as a key: Parameters can only be locked or unlocked if it is inserted.

A description of how to create a USER ID in AtmoCONTROL is provided in the separate AtmoCONTROL manual.

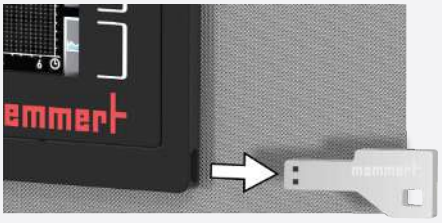
8.9.2 USER ID Activation and Deactivation



1. Insert the USB storage medium with the USER ID data into the USB port on the right of the ControlCOCKPIT.

2. Press the activation key on the right side of the **USER-ID** display.
   ⇨ The display is enlarged and the entry **Activate** automatically highlighted.

3. Confirm the activation by pressing the confirmation key.
   ⇨ The new USER ID data are transferred from the USB storage medium and activated.
   ⇨ As soon as activation is complete, a check mark appears in front of the corresponding entry.



4. Remove the USB storage medium.
   ⇨ Locked parameters are indicated by the lock symbol on the respective display.

To unlock the appliance,

- insert the USB storage medium,
- activate the **USER ID** display
- and select the **Deactivate** entry.

9. Maintenance and Servicing

⚠ DANGER

Live parts

When covers are removed, live parts are exposed and contact with these parts may result in electric shock. Electric shock can have serious health consequences including death.

- Only authorised persons may carry out electrical installation work.
- Before starting work, disconnect the unit from the power supply.
- Ensure that the unit is fully de-energised.
- Secure the unit to prevent it from being switched on again.

⚠ CAUTION

Danger of cuts due to sharp edges

Touching sharp edges on the unit may result in cuts.

- Wear protective gloves during all work.
- Be careful when handling sheet metal parts.

9.1 Cleaning

Interior and metal surfaces

Regular cleaning of the easy-to-clean bath prevents build up of material residues that could impair the appearance and functionality of the stainless steel chamber over time.

The metal surfaces of the waterbath can be cleaned with normal stainless steel cleaning agents. Make sure that no rusty objects come into contact with the interior or with the stainless steel housing. Rust deposits can lead to an infection of the stainless steel. If rust spots appear on the surface of the interior due to impurities, the affected area must be immediately cleaned and polished.

Plastic parts

Do not clean plastic parts of the waterbath with caustic or solvent-based cleaning agents.

Glass surfaces

Glass surfaces can be cleaned with a commercially available glass cleaner.

9.2 Regular Maintenance

Once a year, grease the moving parts of the doors (hinges and lock) with thin silicone grease and check that the hinge screws are not loose.

To guarantee perfect closed-loop control, we recommend calibrating the appliance once a year (see ▸8.5 Calibrate).

See also

Calibrate [▸ 50]

9.3 Repairs and Service

Repairs and service work may only be carried out by specialist Memmert personnel and qualified service providers.

NOTICE

Repairs and service work are described in a separate service manual.

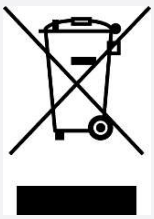
10. Storage, Transport and Disposal

10.1 Storage and Transport

The appliance may only be stored and transported under the following conditions:

- in a dry enclosed, dust-free room
- disconnected from the power supply

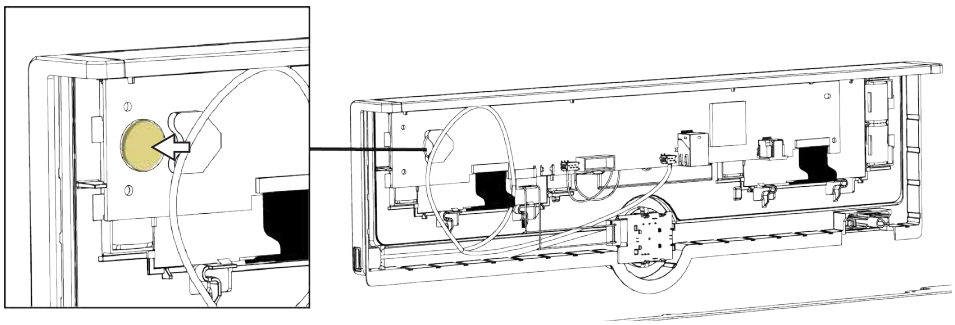
10.2 Disposal



This product is subject to Directive 2012/19/EC on Waste Electrical and Electronic Equipment (WEEE) of the European Parliament and EU Council of Ministers. This unit was placed on the market after 13 August 2005 in countries which have already integrated this Directive into their national laws. It must not be disposed of as normal household waste. For disposal, please contact your dealer or the manufacturer. Any units that are infected, infectious or contaminated with materials hazardous to health are excluded from return. Please also observe all other regulations applicable in this context.

Before disposing of the appliance, please render the door locking mechanism unusable, for example to prevent playing children playing with the appliance and being locked inside.

There is a lithium battery in the ControlCOCKPIT of the appliance. Remove it and dispose of it in accordance with the regulations in your country.



Note for Germany:

- The appliance may not be left at public or municipal collection points.

Notes

Vacuum Oven VO

Operating manual
D39374 Effective 11/2023
English

Memmert GmbH + Co. KG | Äußere Rittersbacher Straße 38 | 91126 Schwabach | Germany
Tel. +49 9122 925-0 | E-mail: **sales@memmert.com** | **www.memmert.com**
facebook.com/memmert.family | **instagram.com/memmert.family**