Instruction manual

VWR® Vacuum drying oven VDO

EU cat. No: 466-0706 VWR VDO30
466-0707 VWR VDO50
466-0708 VWR VDO100



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Table of contents

1. About this Manual 6

2. Safety 7

2.1 Terms and Symbols Used 7
2.1.1 Terms Used 7
2.1.2 Symbols Used 7
2.2 Product Safety and Dangers 7
2.3 Requirements to be met by Operating Personnel 8
2.4 Responsibility of the Owner 8
2.5 Product Use 9
2.5.1 Intended Use 9
2.5.2 Improper Use 9
2.6 Changes and Alterations 10
2.7 Behaviour in case of Malfunctions and Irregularities 10
2.8 Switching off the Unit in an Emergency 10

3. Construction and Description 11

3.1 Construction 11
3.2 Description of function 12
3.3 Materials 12
3.4 Electrical Equipment 13
3.5 Connections and Interfaces 13
3.5.1 Electrical Connection 13
3.5.2 Communication interfaces 13
3.5.3 Fresh air, inert gas and vacuum connection 14
3.6 Nameplate 15
3.7 Technical data 15
3.8 Ambient Conditions 16
3.9 Scope of Delivery 16

4. Delivery, Transport and Setting Up 17

4.1 Safety 17
4.2 Delivery 17
4.3 Transport 17
4.4 Unpacking 17
4.5 Storage after Delivery 18
4.6 Setting Up 18
4.6.1 Preconditions 18
4.6.2 Installation options 19
4.6.3 Anti-tilt bracket 19
4.6.4 Adjusting the Doors 20

5. Putting into Operation 22

5.1 Putting into Operation for the First Time 22
5.2 Connecting the Unit to the Power Supply 22
5.3 Connecting the vacuum pump 22
5.4 Connecting the Inert Gas 23
5.5 Fresh air supply 23
5.6 Install the Extraction System 23
5.7 Insert Thermoshelves 24
5.8 Switching on Unit 25

6. Operation and Control 26

6.1 Operating Personnel 26
6.2 Opening the Door 26
6.3 Loading the Appliance 26
6.4 Operating the Appliance 27
6.4.1 Controller 27
6.4.2 Basic Operation 28
6.5 Operating Modes 28
6.5.1 Manual Mode 29
6.5.2 Digital Backwards Counter 30
6.6 Monitoring Function 31
6.6.1 Temperature Monitoring 31
6.6.2 Electronic Temperature Monitoring (TWW) 31
6.6.3 Automatic Temperature Monitor (ASF) 32
6.6.4 Adjusting the Temperature Monitoring 32
6.6.5 Pressure Monitoring 33
6.7 Graph 34
6.7.1 Temperature Curve 35
6.7.2 Pressure Curve 35
6.8 Ending Operation 36

7. Malfunctions, Warning and Error Messages 37

7.1 Warning Message of the Monitoring Function 37
7.1.1 Temperature Monitoring 37
7.1.2 Pressure Monitoring 38
7.2 Malfunctions, Operating Problems and Unit Errors 38
7.2.1 Power Failure 39
7.2.2 Set Pressure is not Reached 39

8. Menu Mode 41

8.1 Overview 41
8.2 Basic Operation in Menu Mode Using the Example of Language Selection 41
8.3 Setup 42
8.3.1 Overview 42

8.3.2 IP Address and Subnet Mask 43
8.3.3 Unit 43
8.3.4 Timer Mode 44
8.3.5 Gateway 44
8.4 Date and Time 44
8.5 Calibrate 45
8.5.1 Temperature Calibration 45
8.5.2 Pressure Calibration 46
8.6 Acoustic Signals 48
8.7 Log 49
9. Maintenance and Servicing 50
9.1 Cleaning 50
9.2 Regular Maintenance 50
9.3 Repairs and Service 50
10. Storage, Transport and Disposal 51
10.1 Storage and Transport 51
10.2 Disposal 51
11. Warranty 52
12. Compliance with local laws and regulations 53

1. About this Manual

Purpose and target audience

This manual describes the design, function, transport, operation and maintenance of the product series Vacuum drying oven VDO. 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.

Storage and disclosure

This operating manual belongs with the device and must always be kept in such a way that persons who are to work on the device have access to it. It is the responsibility of the owner to ensure that persons who work or are to work on the device are informed of the location of this operating manual. We recommend that it always be kept in a protected place near the device.

Ensure that the instructions are not damaged by heat or moisture. If the device is resold or transported and set up again in another location, these operating instructions must be included.

Package contents

Description	Quantity
VWR Vacuum Drying Oven	1
Thermoshelf	1
Instruction manual on USB stick	1
Power cord (EU & UK plug)	2

Accessories	
Additional Aluminum Thermoshelf for VDO 30	466-0709
Additional Aluminum Thermoshelf for VDO 50	466-0710
Additional Aluminum Thermoshelf for VDO 100	466-0711
Vacuum connecting hose (3m)	466-0712

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 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 drying oven VDO are used for drying, testing, moisture determination, airtight storage, curing and degassing of substances or materials under vacuum, which are used in accordance with the procedures and specifications described in the operating instructions.

2.5.2 Improper Use

Any other use is improper and may lead to hazards and damage.

The device is not explosion-proof (it does not comply with regulation VBG 24). The device may only be loaded with materials and substances that do not produce toxic or explosive vapours at the set temperature.

Furthermore, only load materials or substances that do not themselves explode or burst and that, under the applied time/temperature conditions, neither ignite nor burn.

Furthermore, only load materials or substances that do not produce vapours which could ignite due to continuous condensation and accumulation of the vapours.

If there is any doubt regarding the material properties, a process validation must be carried out to determine the compatibility of the load with the process used.

2.6 Changes and Alterations

The device must not be modified or altered without authorization. No parts may be added or installed that are not approved by the manufacturer.

Unauthorized modifications or alterations will invalidate the CE conformity of the device and the device must no longer be operated.

The manufacturer shall not be liable for damage, hazards or injuries resulting from unauthorized modifications or alterations or from failure to comply with the regulations in these instructions.

2.7 Behaviour in case of Malfunctions and Irregularities

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.

You can find information on troubleshooting in the chapter Malfunctions, Warning and Error Messages.

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 device.
2. Unplug the mains plug from the power source.

⇨ This disconnects the device from the mains on all poles.

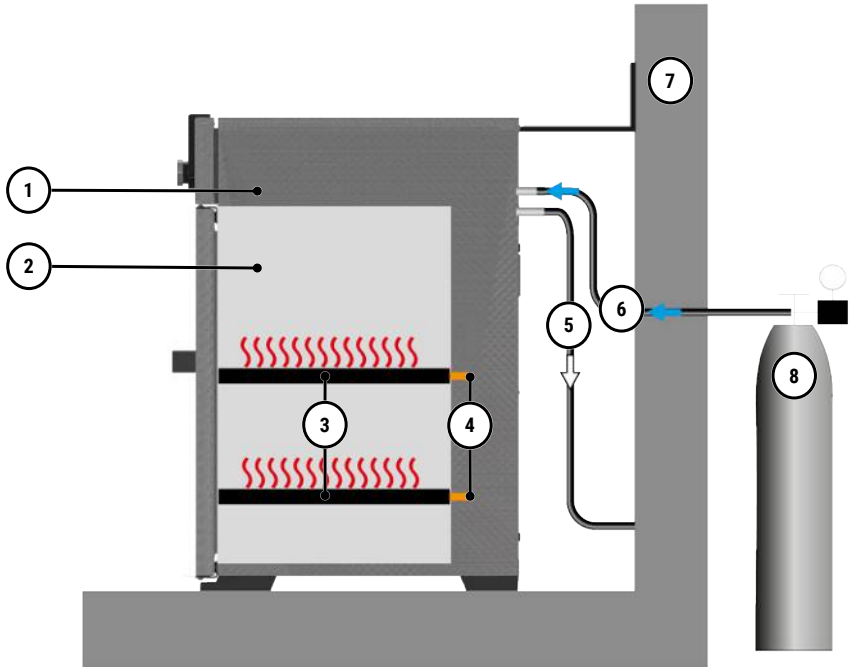
3. Construction and Description

3.1 Construction



1 Controller with capacitive function keys and LCD displays
2 Vacuum drying oven VDO
3 Thermoshelf

3.2 Description of function



1 Vacuum drying oven VDO
2 Working chamber
3 Thermoshelf
4 Contacting the thermal plates
5 Vacuum inlet
6 Integrated gas inlet
7 Wall mounting (anti-tilt)
8 Gas cylinder (optional)

The devices in the VDO ① series can generate negative pressure in the working chamber ② when connected to a suitable vacuum pump. The working chamber is evacuated by the pump via the vacuum inlet on the rear of the device ⑤.

Thermal plates with electronic contacts are inserted into the tube for temperature control ③. Once the electronic contacts are connected to the terminals in the rear panel ④, the thermal plates can dissipate heat through direct contact with the load.

If toxic gases or vapours may be produced during the intended application, these must be safely extracted by the customer using an extraction system and, if necessary, cleaned.

3.3 Materials

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

Components	Material
Battery (Controller)	Typ: CR2032 Chemical system: Li-Mn-based battery Weight: 3 g Capacity: 3 V Label: ‘non-rechargeable’

The chamber load of the appliance must be carefully checked for chemical compatibility with the indicated materials.

3.4 Electrical Equipment

- Operating voltage and current consumption: See Nameplate or 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

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 devices that comply with the requirements of IEC 60950-1.

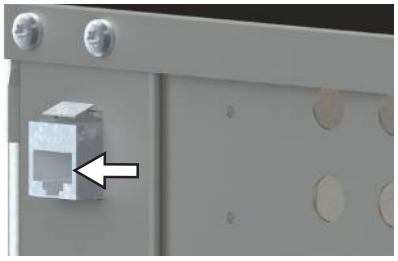
USB interface

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

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

Ethernet interface



The device can be connected to a network via an Ethernet interface.

For identification purposes, each connected device must have a unique IP address. How to set the IP address is described in ▸8.3.2 IP Address and Subnet Mask described.

With an optional USB-Ethernet converter, the device can be connected directly to the USB interface of a PC or laptop. (see ▸3.9 Scope of Delivery).

Switching output for external vacuum pump flush valve and pump control



The 8-pin switch output on the rear right-hand post is used to control a vacuum pump via the Vacuum drying Oven (VDO).

1. Vacuum pump flush valve

   When drying feed materials with a high moisture content, pump performance may decline during prolonged operation due to condensation in the pump heads. The diaphragms can be cleared by briefly flushing the pump heads with fresh air.

   This further improves the efficiency of the drying process. The drying process is therefore faster and more energy-efficient, and the pump is protected.

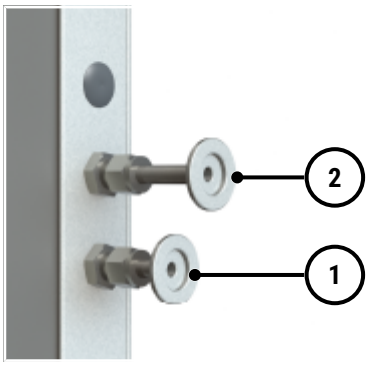
2. Speed control and shutdown of the vacuum pump

   After completion of a drying programme or after a longer operating time without vacuum demand by the controller, the vacuum pump is switched off via the control line. The demand-controlled pump speed regulation saves energy, is low-noise and increases the service life of the vacuum pump by protecting the pump membranes.

See also

- IP Address and Subnet Mask [▸ 43]
- Scope of Delivery [▸ 16]

3.5.3 Fresh air, inert gas and vacuum connection



1 Vacuum pump connection

2 Fresh air - inert gas connection

The connections for introducing fresh air or inert gas (optional) and the connection for the vacuum pump (DN 16 KF) are located on the rear left post.

1. fresh air

   The fresh air connection has two functions. Firstly, the device is ventilated via the connection, thereby adjusting the negative pressure to atmospheric pressure. Secondly, the connection is opened by the device control system for a very short time in order to fine-tune the negative pressure.

2. Inert gas

   By filling the working chamber with inert gas, a protective atmosphere can be created which protects the loaded material from contact with ambient air.

3. Vacuum

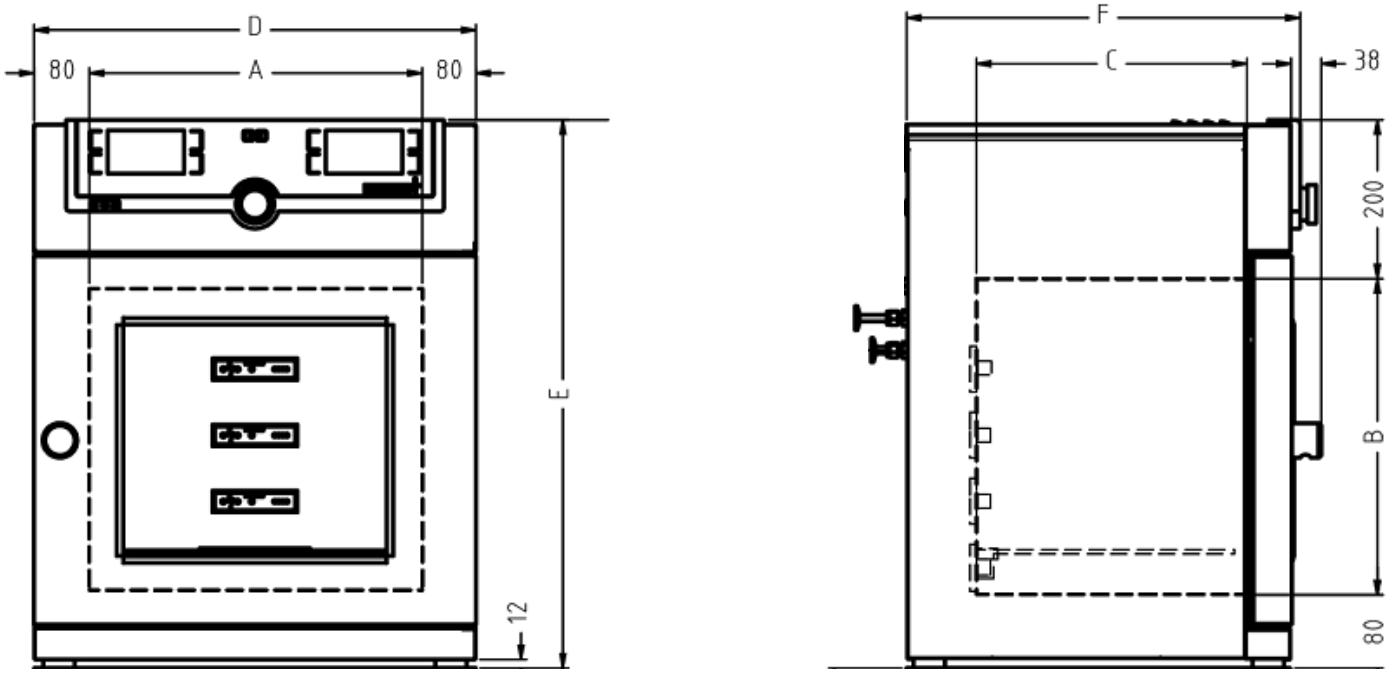
   The vacuum connection is designed as an ISO-KF connection with a size of DN 16. Either the supplied pump module or another suitable external vacuum pump is connected to it. When using an external vacuum pump, please ensure that the pump is suitable for the material being fed and the desired process.

3.6 Nameplate

The type plate provides information about the appliance model, manufacturer and technical data. The type plate is located on the inside door frame or on the rear of the appliance.

3.7 Technical data

Appliance size				30	50	100
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
	Maximum number of inserts		pc.	1	2	2
	Max. load per device		Kg	40	60	60
	Max. load per thermal plate		Kg	20	20	20
Structural 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 accuracy		°C	up to 99.9 °C: 0.1 °C / from 100 °C: 0.5 °C		
Pressure	Pressure adjustment range		Mbar	5 up to 1100		
	Permissible ultimate vacuum		Mbar	0.01		
	Maximum leakage rate		Bar/h	0.01		
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 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.

3.9 Scope of Delivery

- Mains connection cable
- Anti-tilt bracket
- Thermoshelf
- Two locking hooks per thermoshelf
- Operating manual
- Calibration certificate

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.

⚠ 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 to be stored initially after delivery:

- Observe the storage conditions (see ▸10 Storage and transport).

4.6 Setting Up

⚠ WARNING



Risk of tipping due to the centre of gravity of the device

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

– Always secure the appliance to a wall using the anti-tip device.

– If the spatial situation prevents the appliance from being fixed to a wall, do not put the appliance into operation and do not open the door.

– Please contact customer service.

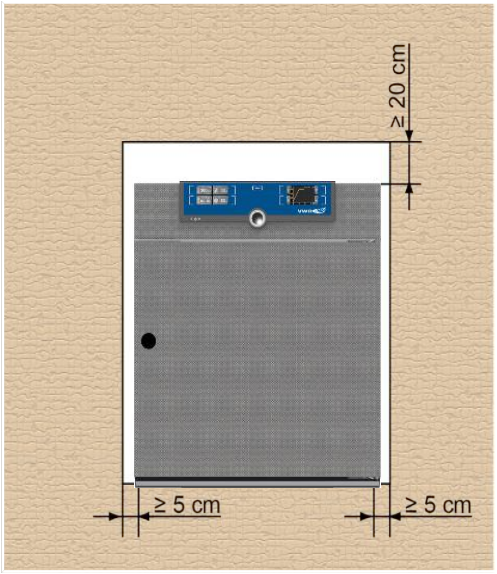
4.6.1 Preconditions

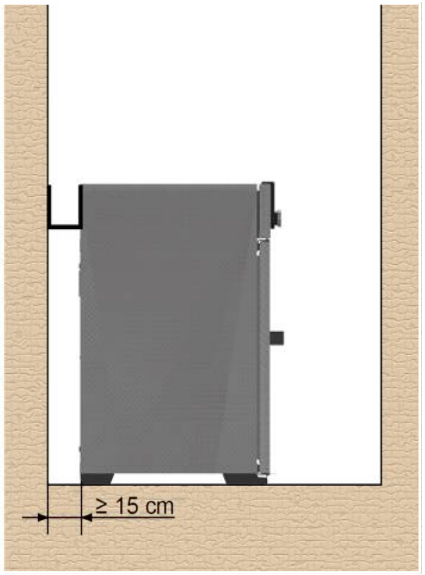
✓ The installation site must be flat and horizontal and must be able to reliably bear the weight of the unit (see Technical Data). Place the unit on a heat-resistant, fireproof and non-flammable surface.

✓ A 230 V power connection must be available at the installation site. The maximum mains voltage fluctuation is ± 10%.

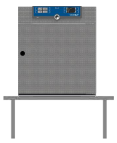
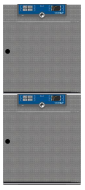
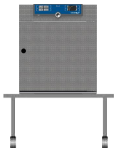
✓ The distance between the wall and the rear panel of the appliance must be at least 15 cm.

✓ 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.



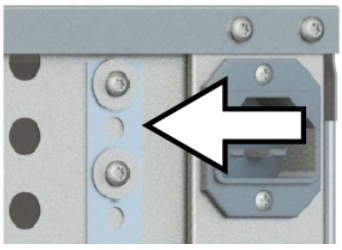


4.6.2 Installation options

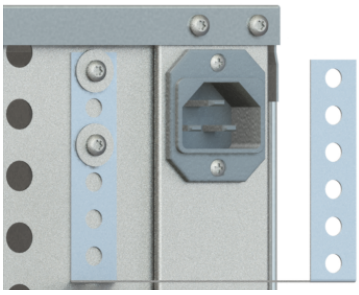
Setting up		Comments
Floor		
Table		Check load capacity beforehand
Stacked		Maximum of one VDO on another product; mounting materials (feet) included
Sub frame		Base frame (without castors)

4.6.3 Anti-tilt bracket

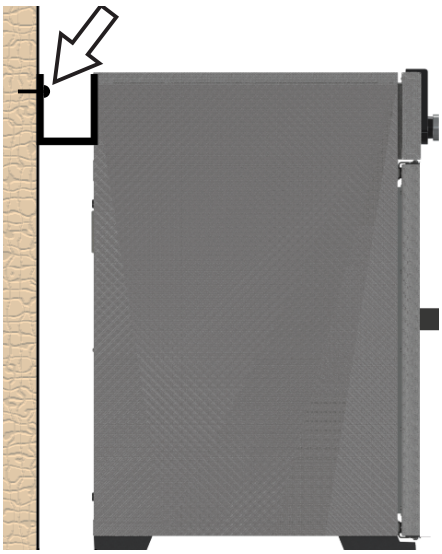
Attach the appliance to the wall with the anti-tipping device:



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



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

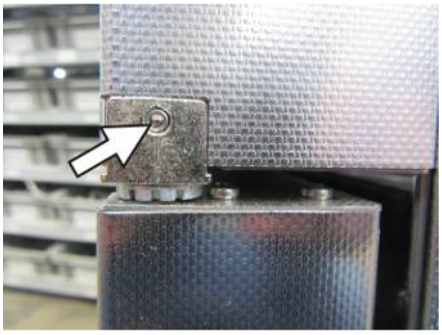


3. Find a suitable wall, drill a hole, use a fitting screw and fix the anti-tilt bracket.

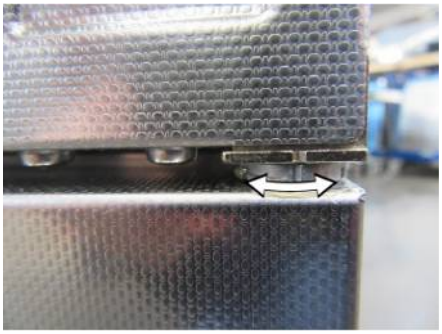
4.6.4 Adjusting the Doors

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

Adjusting the height of the door

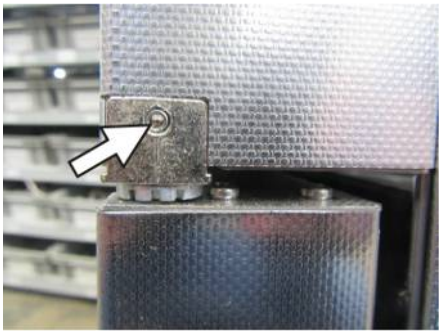


1. Open set screw on the front of the door hinge with an Allen key (size 2).



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 Nameplate and Technical Data).
- Be sure to establish a safe PE conductor connection.

5.2 Connecting the Unit to the Power Supply

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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 Nameplate and Technical Data).

Be sure to establish a safe PE conductor connection.



Route the power cable so that

- no one can trip over it.
- it cannot come into contact with hot parts.
- it is always accessible and within reach and can be unplugged quickly, e.g. in the event of malfunctions or emergencies.

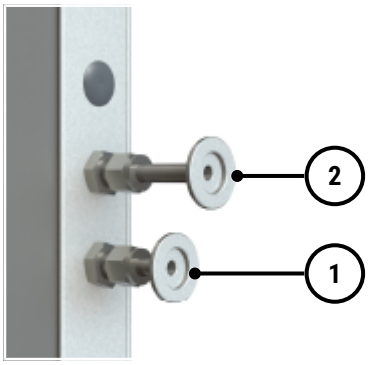
5.3 Connecting the vacuum pump

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)

Connections on the rear panel



1 Vacuum pump connection

2 Fresh air - inert gas connection

1. Connect the vacuum connection on the rear of the device to the vacuum pump using a connecting hose.

5.4 Connecting the Inert Gas

⚠ 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.

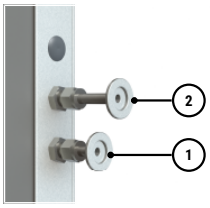
⚠ CAUTION



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 the inert gas cylinder (pressure reducer) to the connection on the rear of the device ② using a connecting hose with a DN16KF connection.
2. Set the pressure reducer to 1.0 to 1.2 bar.

5.5 Fresh air supply

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.

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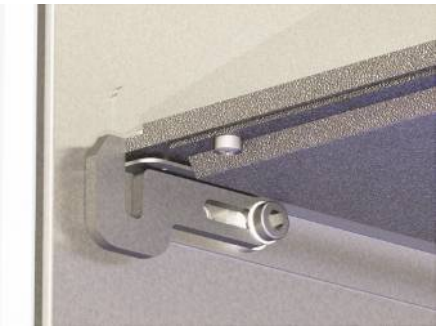
When mounting the securing hooks, a fastening screw on the support rail needs to be loosened, which may cause the rail to come out of the aligned position.

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



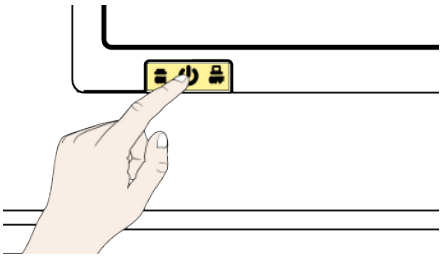
1. Slide in the thermoshelf until it makes contact with the back panel.
2. Turn the locking hook up and press the retaining hook back against the thermoshelf.
3. Fasten Allen screws on both sides using an Allen key size 3.

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 [▸ 41]
- Warning Message of the Monitoring Function [▸ 37]

6. Operation and Control

6.1 Operating Personnel

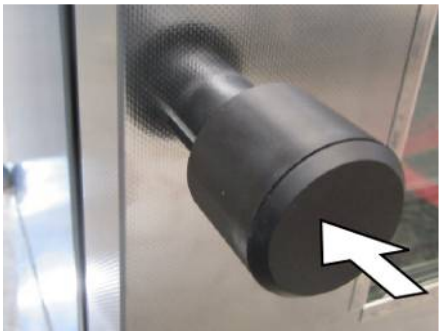
The appliance may only be operated by persons who are of legal age and have been instructed accordingly. Personnel who are to be trained, instructed or who are undergoing general training may only work with the appliance under constant supervision of an experienced person.

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

Certain applications may produce toxic gases or vapours. These may escape into the room. This may cause injury to people in the vicinity.

– The device may only be used for such applications if an extraction system is attached to the vacuum pump that 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.

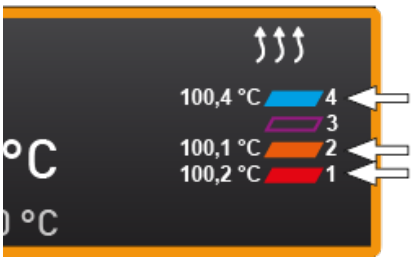
– Check the chamber load for chemical compatibility with the materials of the appliance (see ▸3.3 Materials).

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.

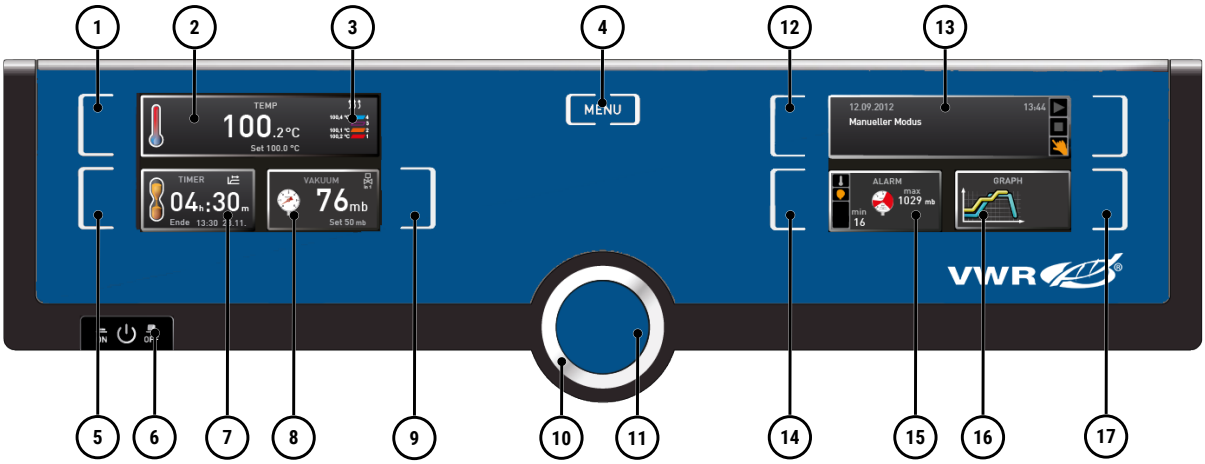
- Before starting operation, check whether the thermoshelves are inserted and contacted.
- If not, insert the required thermoshelves and check the contact on the Controller temperature display (see ▸5.7 Insert Thermoshelves).
- When loading, pay attention to the maximum permissible weight of 20 kg per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

See also

- Materials [▸ 12]
- Insert Thermoshelves [▸ 24]

6.4 Operating the Appliance

6.4.1 Controller



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:

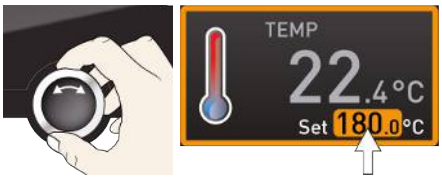


Activate the desired parameter (e.g. temperature):

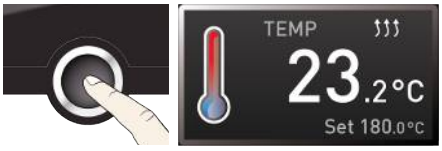
1. To do so, press the activation key to the left or right of the respective display.

⇨ 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.



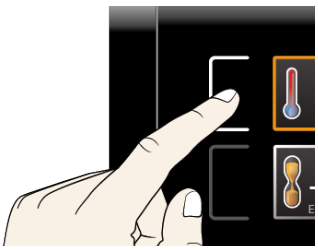
3. Save the set value by pressing the confirmation key.

⇨ 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.

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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 Controller.

- See ▸6.5.1 Manual Mode

Timer mode

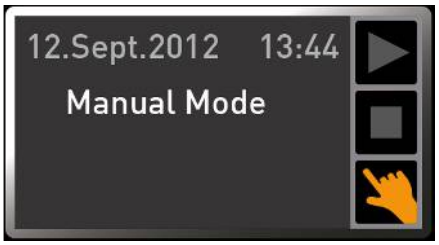
Operation with digital backwards counter with target time setting, adjustable from 1 minute to 99 days (Timer): The appliance runs at the values set until the set time has elapsed.

- See ▸6.5.2 Digital Backwards Counter

Remote control mode

Via remote control

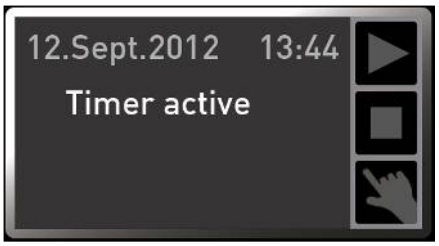
- See Remote Control



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 [▶ 29]
- Digital Backwards Counter [▶ 30]

6.5.1 Manual Mode

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

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



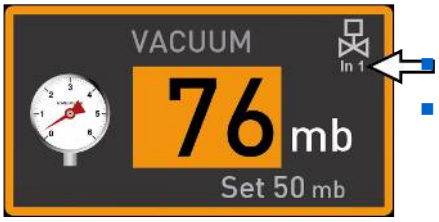
The display on the right shows the temperatures of the individual thermoshelves and whether they are in contact. Thermoshelf 3 is not in contact in the example on the right.

Heating operation is indicated by the symbol.

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

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

Pressure



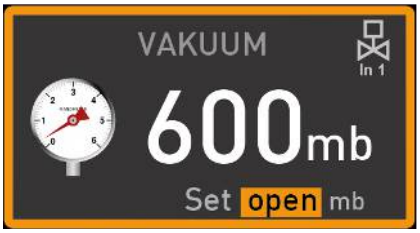
The In1 display at the top right indicates which gas connection is currently active:

In1 is displayed when fresh air is open.

- No icon is displayed if no contact is open.

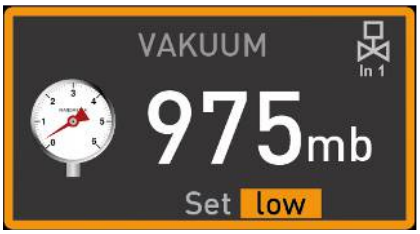
Which gas connection should be active can be set in menu mode.

(see Gas Inlet).



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

- The old actual value is retained when the confirmation button is pressed.
- The function is intended for removing feed material, i.e. for generating atmospheric pressure.



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

- The old actual value remains unchanged when the actuation button is pressed.
- In low mode, the vacuum pump operates at maximum capacity and there is no pressure control.
- The pressure achieved depends solely on the achievable ultimate vacuum of the pump.

The adjustment range depends on the device. (see Nameplate and Technical Data).

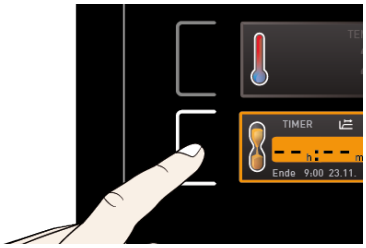
See also

Basic Operation [▶ 28]

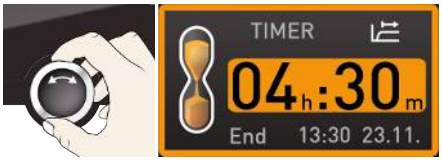
6.5.2 Digital Backwards Counter

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”.

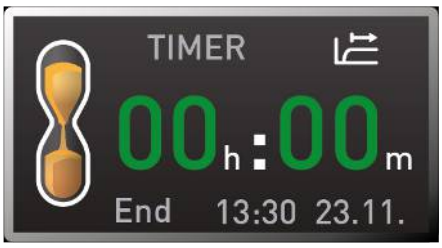


4. Now, as described in ▶6.4.2 Basic Operation, set the individual reference values to be used by the appliance during operation.
   ⇨ The change takes effect immediately.

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 [▶ 28]

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)



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 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 (▶8.6 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.

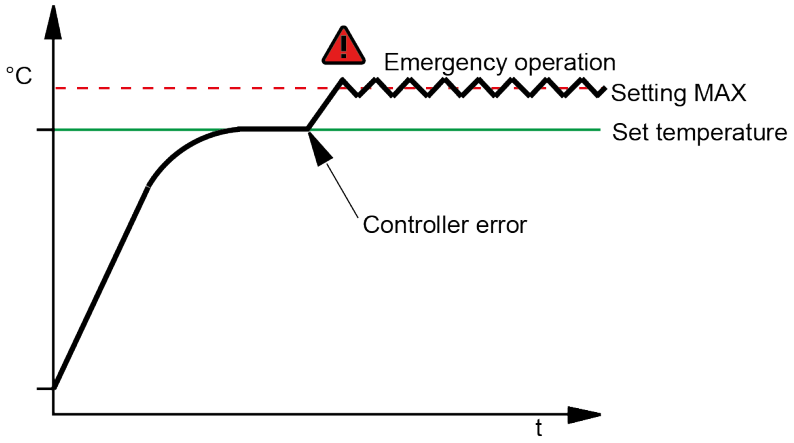
See also

Acoustic Signals [▶ 48]

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.



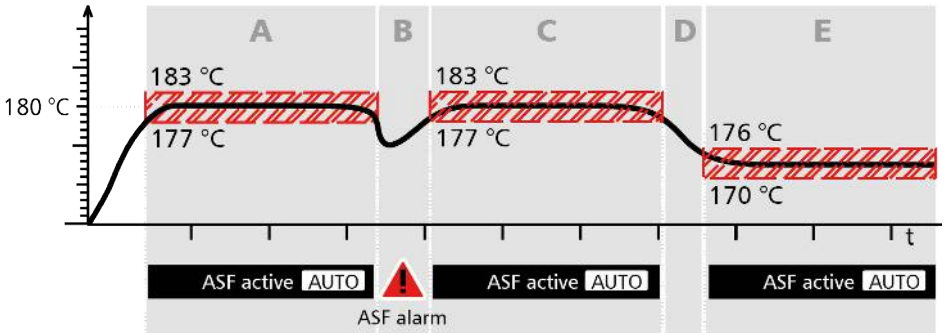
6.6.3 Automatic Temperature Monitor (ASF)

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

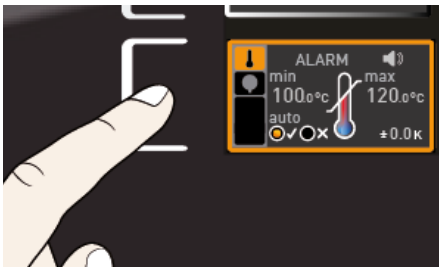
The ASF – if switched on – is automatically activated as soon as the actual temperature value reaches 50% of the set tolerance band of the setpoint for the first time (section A).

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 🌡.

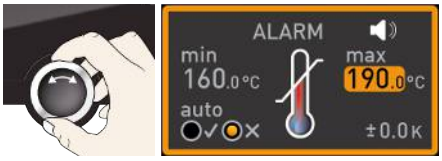


2. By turning the turn control, adjust the desired lower alarm limit.

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



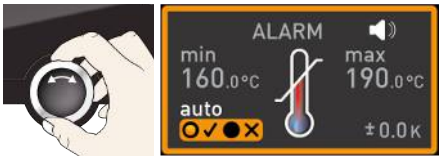
3. Press the confirmation key to confirm.
   ⇨ The **max** display (overtemperature protection) is activated.



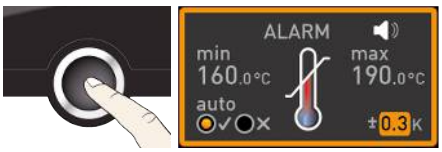
4. By turning the turn control, adjust the desired upper alarm limit.



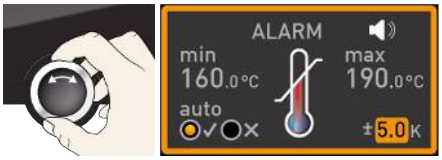
5. Press the confirmation key to apply the setting for the upper alarm limit.
   ⇨ The setting of the automatic temperature monitor (ASF) is automatically activated (**auto**).



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.

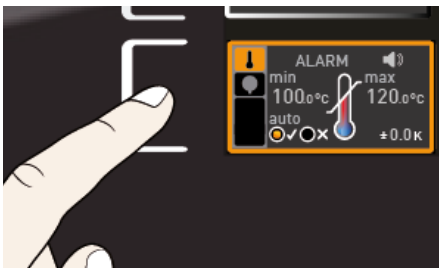
In menu mode you can set, whether an alarm should be accompanied by an acoustic signal (see ▸8.6 Acoustic Signals).

See also

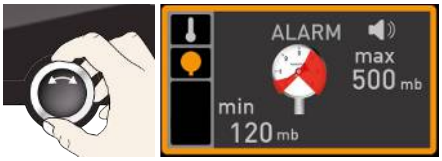
Acoustic Signals [▸ 48]

6.6.5 Pressure Monitoring

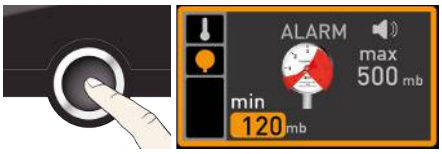
If the pressure monitoring was triggered, this is indicated by the pressure display: with the actual pressure on a red background accompanied by a warning symbol ⚠. If the acoustic signal has been activated in Menu mode to accompany an alarm (▸8.6 Acoustic Signals, as indicated by the speaker symbol 🔊), the alarm with be accompanied by an intermittent acoustic signal. Information on what to do if this happens can be found in chapter Malfunctions, Warning and Error Messages.



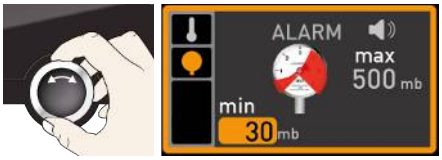
1. Press the activation key to the left of the **ALARM** display.
   ⇨ The temperature monitoring setting is automatically activated.



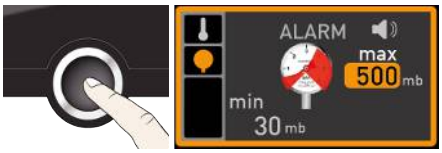
2. Turn the turn control until the pressure setting is highlighted.



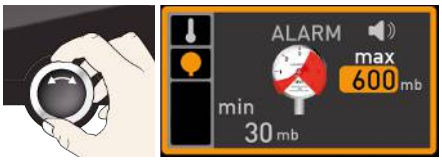
3. Confirm the selection by pressing the confirmation key.
   ⇨ The lower alarm limit is automatically highlighted.



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 [▸ 48]

6.7 Graph

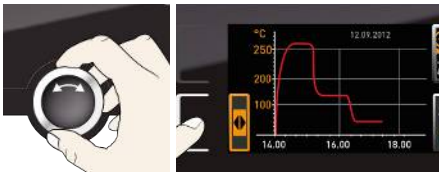
The **GRAPH** display provides an overview of the chronological sequence of the set values and the actual values as a curve.

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

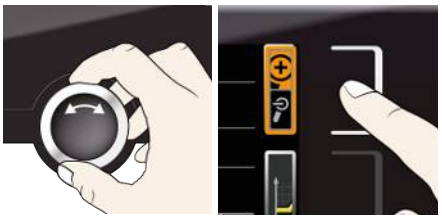
6.7.1 Temperature Curve



1. Press the activation key to the right of the **GRAPH** display.
   ⇨ The display is enlarged and the temperature curve is displayed.



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:

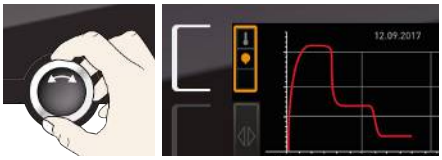
3. Press the activation key next to the magnifying glass symbol.
4. With the turn control, select if you want to zoom in or out (+/−).
5. and confirm your selection by pressing the confirmation key.

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

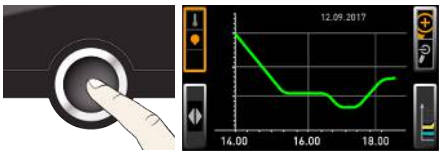
6.7.2 Pressure Curve



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.

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

6.8 Ending Operation

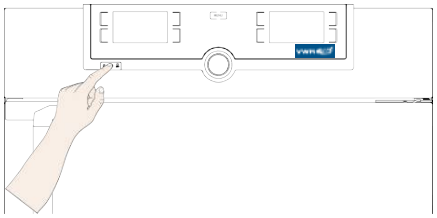
⚠ WARNING



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. Remove the chamber load.
3. Switch off the unit at the main switch.

7. Malfunctions, Warning and Error Messages

⚠ DANGER



Risk of electric shock when attempting to rectify faults yourself

Faults that require intervention inside the device may only be repaired by qualified electricians.

– Follow the steps listed in the event of a malfunction.

Do not attempt to repair equipment faults yourself; instead, contact the manufacturer or an authorised customer service centre.

When enquiring, always state the model and device number on the type plate (see Nameplate).

7.1 Warning Message of the Monitoring Function

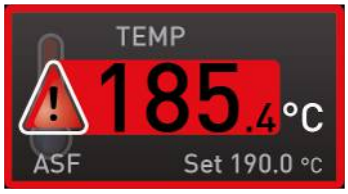
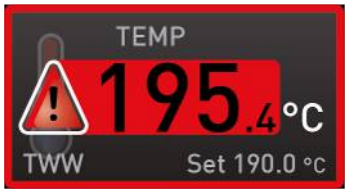
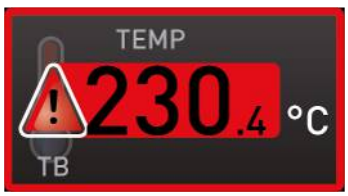
If the acoustic signal has been activated at Alarm in menu mode (▶8.6 Acoustic Signals, which is indicated by the speaker symbol), the alarm will be accompanied by an intermittent acoustic signal.

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

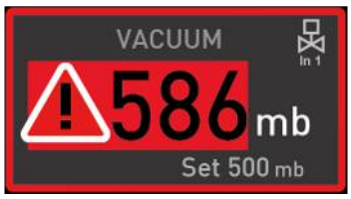
See also

Acoustic Signals [▶ 48]

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
Appearance of displays suddenly changes	Appliance is in the “wrong” mode.	■ Press the **MENU** key to switch to the operating or menu mode
Displays flicker or show brief disturbances	The display may be disrupted under certain external circumstances due to electromagnetic interference. This interference does not affect the device functions.	■ The device can continue to be operated. ■ If the fault occurs frequently, contact customer service.
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
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.	
Advertisements are dark	External power supply interrupted.	■ Check the power supply

Error description	Cause of errors	Rectifying errors
	Fine fuse, device protection fuse or power unit defective.	■ Contact customer service
Advertisements cannot be activated	Device locked by USER ID.	■ Unlock with USER ID
	The device is in programme, timer or remote control mode (mode "Write" or "Write + Alarm").	■ Wait for the programme or timer to finish, or switch off the remote control.

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.

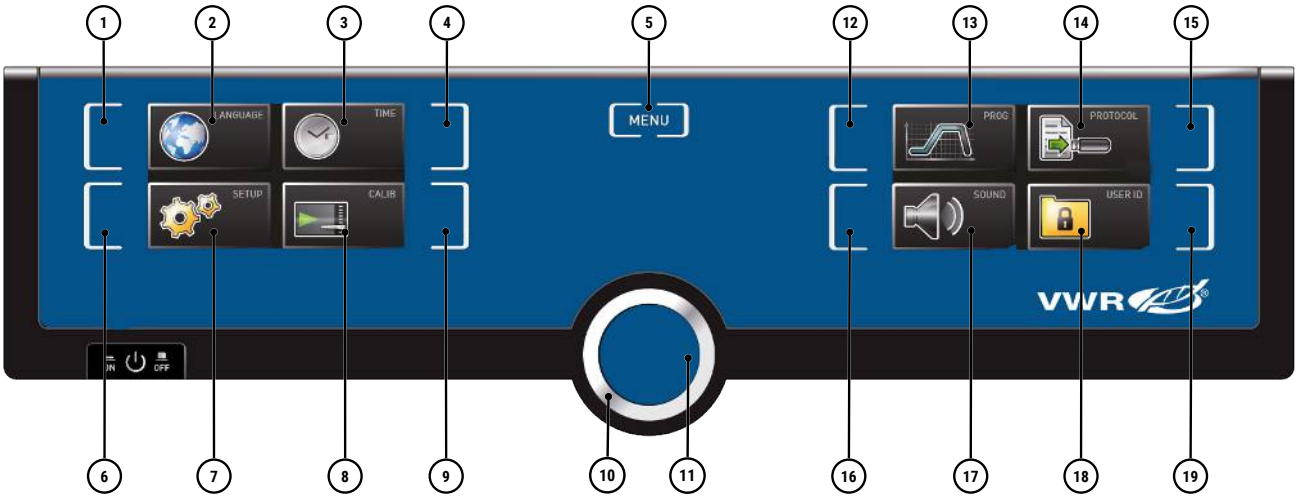
Before changing the menu settings, read the description of the respective functions on the following pages to avoid possible damage to the appliance and/or chamber load.



- ▸ 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.

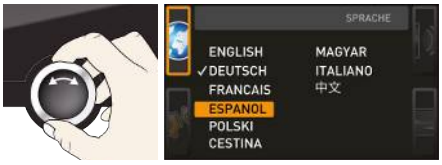


Activate the desired setting (in this example the language):

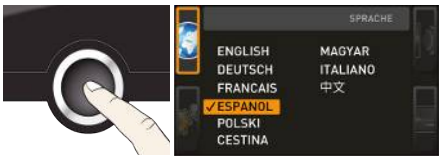
1. To do so, press the activation key to the left or right of the respective display.
   ⇨ The activated display is enlarged.



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)
- 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 Remote Control)
- Gateway (see ▸8.3.5 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.

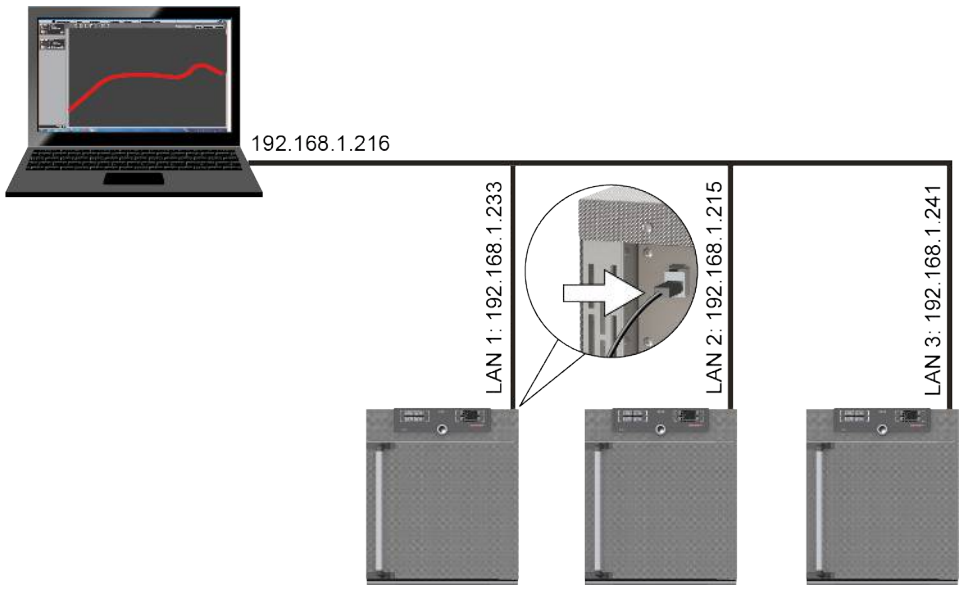
To display the hidden entries, use the turn control to scroll beyond the lowest entry. The page display then changes to “2/2”.

See also

- Unit [▶ 43]
- Digital Backwards Counter [▶ 30]
- Gateway [▶ 44]

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 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 [▸ 30]

8.3.5 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 [▸ 43]

8.4 Date and Time

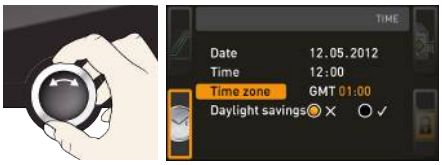
In the **TIME** display, you can set date and time, time zone and summer time. Changes can only be made in manual operating mode.

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.



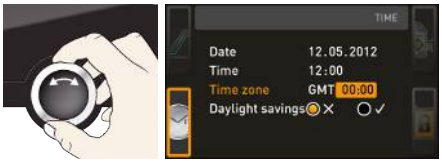
1. Press the activation key to the right of the **TIME** display.
   ⇨ The display is enlarged and the first adjustment option (**Date**) automatically highlighted.



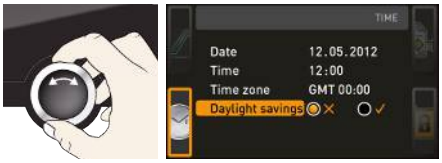
2. Turn the turn control until **Time zone** is highlighted.



3. Confirm the selection by pressing the confirmation key.



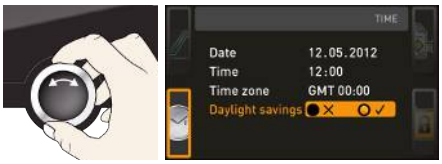
4. Set the time zone of the installation site with the turn control (e.g. 00:00 for Great Britain, 01:00 for France, Spain or Germany).
5. Confirm the selection by pressing the confirmation key.



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

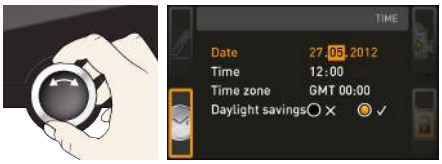


7. Confirm the selection by pressing the confirmation key.
   ⇨ The adjustment options are highlighted.



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:

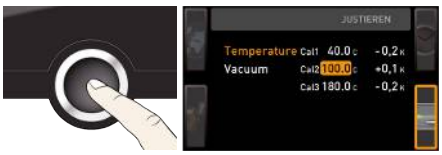
- Cal1 Temperature calibration at low temperature
- Cal2 Temperature calibration at medium temperature
- Cal3 Temperature calibration at high temperature

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

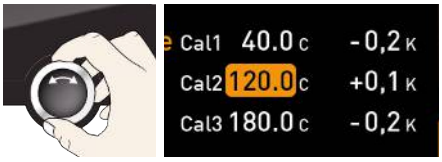
Example: Temperature deviation should be corrected



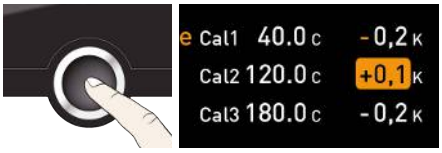
1. Press the activation key to the right of the **CALIB** display.
   ⇨ The display is enlarged and the temperature adjustment option is automatically highlighted.



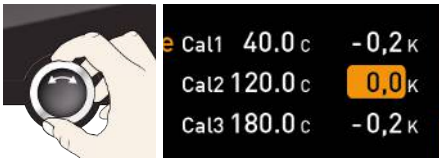
2. Press the confirmation key repeatedly, until the calibration temperature Cal2 is highlighted.



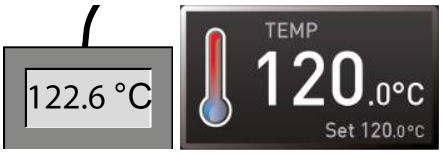
3. With the turn control, set the calibration temperature Cal2 to the specified temperature.



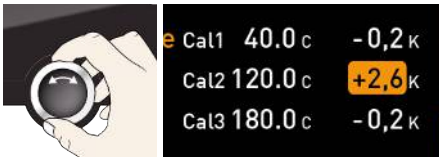
4. Save the setting by pressing the confirmation key.
   ⇨ The corresponding calibration correction value is automatically highlighted.



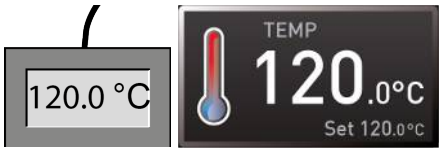
5. Set the calibration correction value to 0.0 K.
6. Save the setting by pressing the confirmation key.
7. Position the sensor of a calibrated reference instrument centrally in the working chamber of the appliance.
8. Close the door.
9. In manual mode, adjust the setpoint temperature.



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.

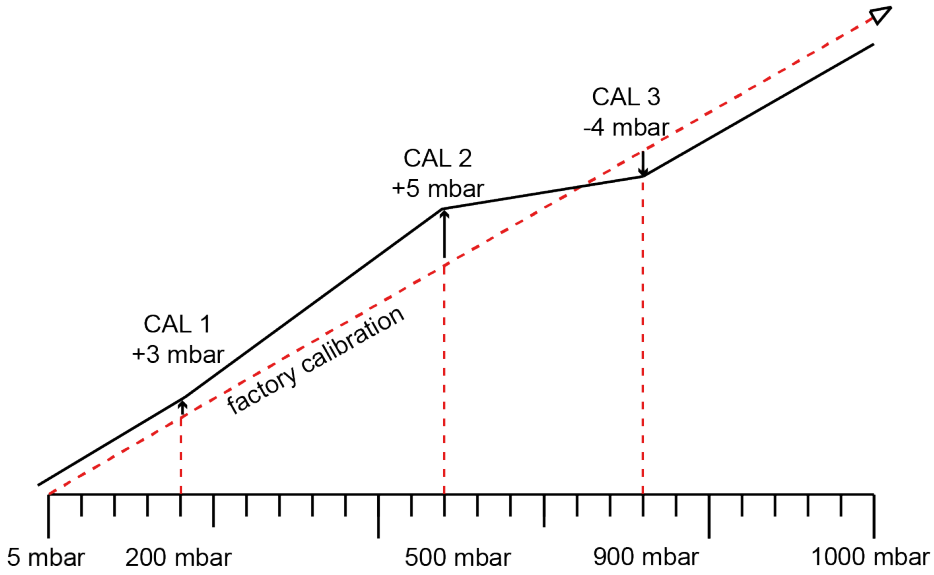
With Cal1, a further calibration temperature below Cal2, and with Cal3 a temperature above, can be programmed in the same manner. The minimum difference between the Cal values is 20 K.

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.



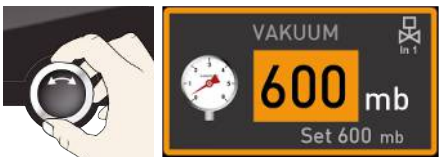
5. With the turn control, set the calibration point **Cal2** to 600 mbar.



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



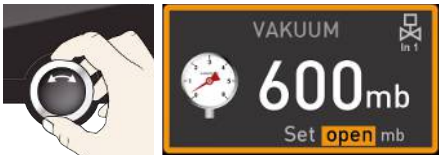
7. Set the calibration correction value to 0.0 mbar.
8. Confirm the selection by pressing the confirmation key.



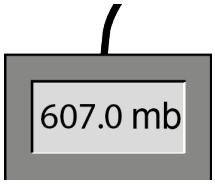
9. In manual mode, set and activate the set pressure to 600 mbar.
10. Confirm the selection by pressing the confirmation key.



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]

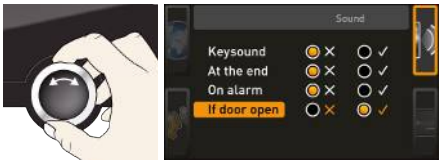
8.6 Acoustic Signals

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.

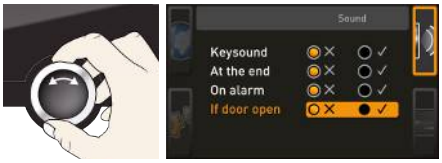


If you want to edit another list entry:

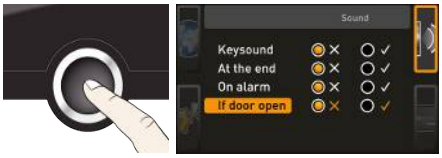
- Turn the turn control until the respective entry – e.g. **if the door is open** (special configuration) – is highlighted in colour.



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.

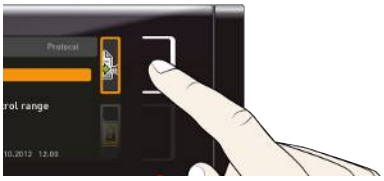
i

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

8.7 Log

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.

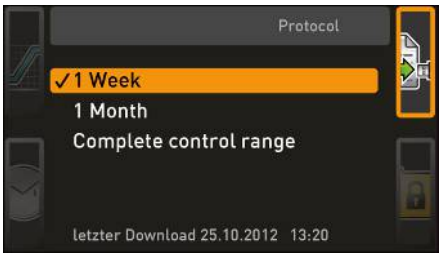
1. Connect the USB storage medium to the port on the right of the Controller.



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.

i

You can export the log data for different periods to a USB storage medium via the USB interface, or export the data via Ethernet.

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

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

Plastic parts

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

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 [▸ 45]

9.3 Repairs and Service

Maintenance and service work may only be carried out by the manufacturer and qualified service providers.

Technical service

Web Resources

Visit the VWR website at **www.vwr.com** for:

- Complete technical service contact information
- Access to the VWR Online Catalogue, and information about accessories and related products
- Additional product information and special offers

Contact us For information or technical assistance contact your local VWR representative or visit. **www.vwr.com**.

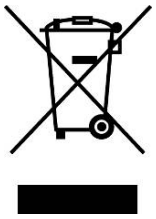
10. Storage, Transport and Disposal

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



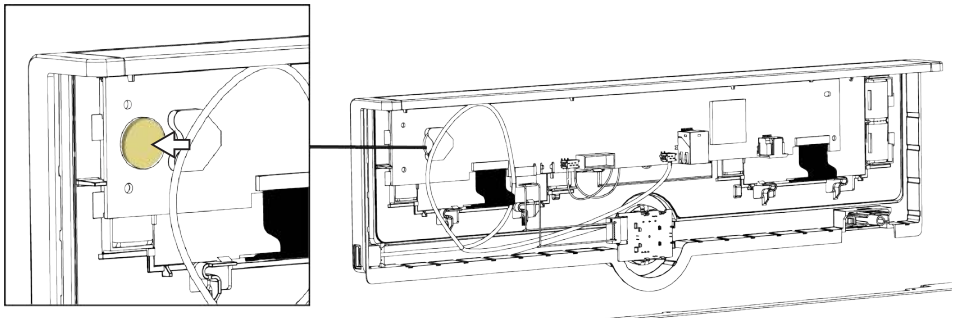
This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

There is a lithium battery in the Controller 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.

11. Warranty

VWR warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

12. Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, unless any refusal is due to a defect of the product.

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