

Operating Manual



Test and Simulation Equipment

for quality control,
research and production

Safety T-Line

Table of Contents

1	Preface.....	7
1.1	Notes to the Document	7
1.1.1	Symbols in the Text	7
1.2	Obligations of the Operator.....	8
2	EC Declaration of Conformity.....	10
3	Information Concerning the Unit.....	11
3.1	Nameplate.....	11
3.2	Delivery Scope	13
3.3	Description	13
3.4	Overview	14
4	Safety.....	16
4.1	Appropriate Application	17
4.2	Inappropriate Application	17
4.3	Zone Classification.....	18
4.4	Explosion Groups.....	18
4.5	Temperature Classes in Explosion Group II	18
4.6	Exemplary Classification of Combustible Gases and Vapours to Explosion Groups and Temperature Classes.....	19
4.7	Warning Signs and Mandatory Signs	20
5	Storage	21
6	Technical Data	22
7	Installation, Set-up, Connection.....	25
7.1	Installation.....	25
7.2	Set-up.....	30
7.2.1	Installation of the Condensate Drain Valves	30
7.2.2	Installation of the Shelves.....	30
7.2.3	Tubular Port.....	32
7.2.4	Adaptation of the Closing Plug to the Tubular Port	32
7.2.5	Connecting the Ion Exchanger (Option)	33
7.2.6	Connecting the Water Canister (Option)	34
7.2.7	Installation of the Condensate Collecting Pan (Option)	37
7.3	Connection	38

8	Control and Display Elements	43
8.1	CONTROL2015 touch	43
8.2	Main Switch	43
9	Switching on, Switching off, Shutdown	44
9.1	Switching on	44
9.2	Switching off	46
9.3	Shutdown	46
10	Control	47
10.1	Basics of the Control	47
10.1.1	General Information Concerning the Operating and Control Unit	47
10.1.2	Entry of Text and Numerical Values	48
10.1.3	Header of the Control Screens	49
10.1.4	Display of Messages and Alarms	49
10.1.5	Setting Date and Time	50
10.2	Main Menu	51
10.2.1	Main Menu - Changing the Display Disposition	52
10.3	Programs	53
10.3.1	Creating a Day Program	54
10.3.2	Creating a Week Program	58
10.3.3	Creating the Process Time Program	62
10.3.4	Creating a Real-Time Program	65
10.3.5	Creating a Program Chain	66
10.3.6	Preview	69
10.3.7	Program Start	70
10.3.8	Program Stop	71
10.4	Recorder	72
10.5	Logbook	74
10.6	Settings	75
10.6.1	User Management	76
10.7	Set-up of the User Management	77
10.8	User Login	79
10.9	User	80
10.10	User Creation	81
10.11	Changing User Rights	83
11	Maintenance	85
11.1	Maintenance Table	85
11.2	Maintenance Tasks	86
11.2.1	Aspiration of the Fan Grill	86
11.2.2	Defrosting the Unit	87

11.2.3	Cleaning the Unit	87
11.2.4	Dismantling and Cleaning the Condensate Drain Valves	88
11.2.5	Changing the Filter at the Ultrasonic Humidifier	90
11.2.6	Checking the Ground Straps and Stopper	90
11.2.7	Checking the Humidifier Function.....	91
11.2.8	Changing the Ion Exchanger Cartridge	92
12	Service.....	93
13	Disposal.....	94

1 Preface

1.1 Notes to the Document

This operating manual is a behaviour guide of the manufacturer for the operator of the unit and all persons being engaged in installation, operation, maintenance and repair.

The photographs in this manual might deviate from the conditions at your unit.

1.1.1 Symbols in the Text

The unit is designed according to the state of the art ensuring operating safety. Nevertheless, dangers might arise due the construction, which cannot be excluded.

The following expressions, which are used in this operating manual, shall indicate dangers when handling the unit or they shall give information for unit handling.

 **DANGER**

Warning of injuries with fatal consequences.

Non-observance of the warning might result in severe health damages including death.

→ The arrow indicates a protective measure you should take to avert the danger.

 **WARNING**

Warning of severe injury.

Non-observance of the warning might result in severe health damages.

→ The arrow indicates a protective measure you should take to avert the danger.

 **CAUTION**

Warning of injury.

Non-observance of the warning might result in minor and moderate health damages.

→ The arrow indicates a protective measure you should take to avert the danger.

NOTE**Warning of property damage.**

Non-observance of the warning might result in considerable damage of the unit or of its environment.

→ The arrow indicates a protective measure you should take to avert the danger.

HINT

Further useful information.

Furthermore, this operating manual contains safety signs according to DIN 4844 and BGV A8 (Implementation of the EC Regulation 2006/42/EC).

1.2 Obligations of the Operator

The unit is designed according to the state of the art ensuring operating safety. Nevertheless, dangers might arise from the unit, or it might be damaged.

Therefore, the operator shall ensure the following:

- Absolutely ensure that there is never a risk of explosion at the installation place.
- Ensure, that only an explosive area of zone 1 within the usual atmospheric conditions can be expected for the test room of the unit due to the stored media (air pressure between 88 and 110 kPA, oxygen content approx. 21 %).
- Only use cables for electrical connection, which can withstand the mechanical, chemical and thermal strains to be expected.
- Ensure, that the condensate drain valves are installed prior to initial start-up.
- Ensure, that the tubular port for the measuring lines is sealed gas-tightly.
- The room space must be sufficient. If explosive gases might escape from the test room, ventilation is required to reliably prevent the formation of an explosive atmosphere.
- When the test room is opened, an ignition of the possibly escaping explosive atmosphere must be prevented.
- The unit must always be equipped with a proper door gasket.
- Only use the unit with a functioning door contact switch.
- If an exhaust pipe is existing, it must be connected to an explosion-proof exhaust system (zone 1), or the exhaust air must be released to the atmosphere. The opening for the exhaust pipe to the atmosphere is surrounded by a spherical ex zone with a diameter of 1 m. The explosive area must be marked correspondingly by the operator.
- Any person, who is engaged in operation, maintenance or repair of the unit, must be informed concerning potential hazardous characteristics of the tested materials and must be instructed concerning preventive measures for danger prevention.
- Any person, who is engaged in installation, operation, maintenance or repair of the unit, must be familiar with the safety devices of the unit and must be informed of the behaviour in case of hazardous incidents.
- Any person, who is engaged in installation, operation, maintenance or repair of the unit, must wear personal protective equipment (safety glasses, tight-fitting protective clothing, safety shoes, safety gloves, respirator mask etc.).

- Any person, who is engaged in installation, operation, maintenance or repair of the unit, must have read and understood the relevant parts of the operating manual.
- The operating manual must always be readily available.
- Only persons shall be allowed to operate the unit, who are familiar with the basic regulations for work safety and accident prevention, who are instructed in handling the unit and who are authorized for the corresponding task.
- All processes, competences and responsibilities in the area of the unit must be unambiguously determined.
- Security-conscious working of the personal must be checked regularly.
- The unit must always be fully functionally.
- All safety devices must be fully functionally.
- The unit and the entire work area must always be clean and tidy.
- Units, which are used for microbiological or bacterial tests etc., shall not be used for storage of food.
- Batches, which have been tested in the unit, must be disposed professionally.
- All maintenance/inspection tasks must be executed according to the scheduled time intervals.
- Modifications, addition or conversion of the unit are not allowed without prior approval of the manufacturer and of the named authority. This applies particularly to temperature limiters, flow controllers, protective motor switches and other safety devices. This applies also to modifications of the software of the programmable control systems.
- Only use original RUMED® spare parts for repair.
- All national laws and regulations, the national safety regulations and laws and the company safety regulations and laws, the Ordinance on Industrial Safety and Health (BetrSichV) etc., which are applicable for the unit, including those, which are not expressly mentioned herein, must be observed.
- Observation of the following standards:
 - ATEX 99/92/EG
 - EN 60079-14
 - EN 60079-17
 - EN 60079-19

In case of doubt or further questions, please address to "Rubarth Apparate GmbH".

2 EC Declaration of Conformity

EU-Konformitätserklärung EG-Konformitätserklärung

Hersteller: **Rubarth Apparate GmbH**
 Anschrift: **Mergenthalerstraße 8
 30880 Laatzen, Deutschland**

Hiermit erklären wir, dass das nachfolgend bezeichnete Produkt in Übereinstimmung mit allen einschlägigen Bestimmungen der untenstehenden Richtlinien entwickelt, gefertigt und in Verkehr gebracht wird. Der untenstehend beschriebene Gegenstand der Erklärung entspricht den einschlägigen Harmonisierungsvorschriften der Union: Richtlinie 2014/34/EU und Richtlinie 2014/30/EU.

Richtlinie 2014/34/EU

Normen:

ATEX-Richtlinie

 EN 60079-0:2012+A11:2013
 EN 60079-1:2014
 EN 60079-7:2015
 EN 60079-11:2012

 EN 60079-18:2015
 ISO 80079-36:2016-02
 ISO 80079-37:2016-02

 Bauartprüfbescheinigung Nr.
 (ATEX)

PTZ 18 ATEX 0036 X

Notifizierte Stelle:

Kennnummer: 2572

Richtlinie 2014/30/EU

Normen:

EMV-Richtlinie (EMC)

 EN 60034-1:2010 + Corrigendum:2010
 EN 61000-6-2:2011
 EN 61000-6-4:2011

Richtlinie 2014/35/EU

Normen:

Niederspannungsrichtlinie

 EN 60204-1
 DGUV Vorschrift 3

Richtlinie 2006/42/EG

Normen:

Maschinenrichtlinie

 EN ISO 13857:2008
 EN ISO 12100:2010
 EN 349:2008-09

 EN ISO 13849-1:2016-6
 EN ISO 13849-2:2013-2
 EN ISO 13850:2016-5

Die technischen Unterlagen nach Anhang VII wurden erstellt. Das Produkt entspricht, nach Aufbau unter Anwendung der zugehörigen Originalbetriebsanleitung, allen relevanten Sicherheits- und Gesundheitsanforderungen aus Anhang I.

 Erzeugnisse: **Ex-Kälte-Wärmeschrank**

Typ: T320, T500, T820, T1000 und T1640

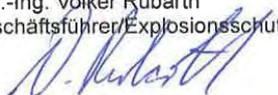
Kennzeichnung: Ex II 2 /-G Ex db eb h [ib] ib mb IIB+H2 T3 Gb

Diese Erklärung bezieht sich nur auf die Maschine in dem Zustand, in dem sie in Verkehr gebracht wurde; vom Endnutzer nachträglich angebrachte Teile die nicht ausdrücklich Zubehör sind und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt. Ferner bezieht sich diese Erklärung nur auf die Maschine wenn sie unter Berücksichtigung der relevanten Herstellerangaben, Aufstellanweisungen und „anerkannten Regeln der Technik“ aufgestellt, betrieben, gewartet und in den dafür vorgesehenen Anwendungen verwendet wird. Die Inbetriebnahme ist so lange untersagt, bis sichergestellt ist, dass die Maschine alle relevanten Bestimmungen der Richtlinie 2006/42/EG entspricht und der Betreiber die Bestimmungen der Richtlinie 1999/92/EG einhält.

Adresse der genannten Personen: siehe Herstelleranschrift

Laatzen, 03.09.2018

 Dipl.-Ing. Volker Rubarth
 Geschäftsführer/Explosionsschutzbeauftragter



3 Information Concerning the Unit

NOTE

Property Damage!

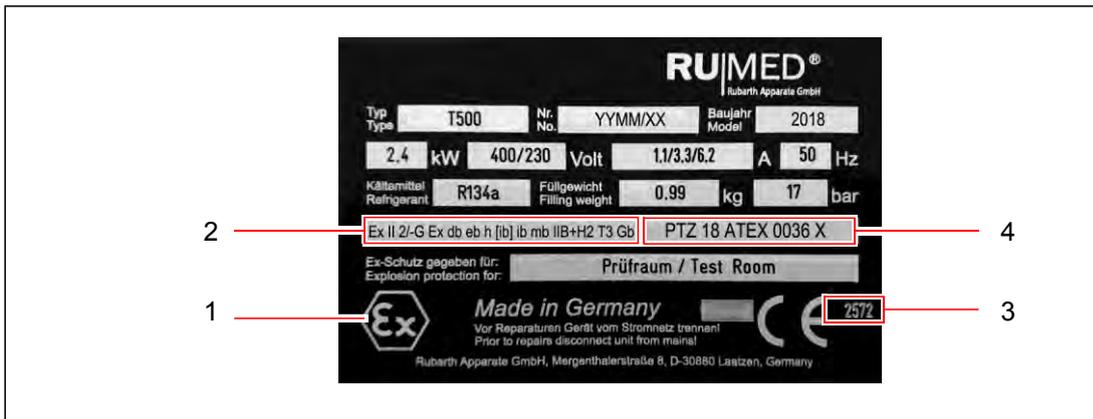
Metal objects, which are placed on or in the unit and which do not consist of stainless steel, might damage the stainless-steel surfaces of the unit due to formation of extraneous rust.

→ Never place metal objects, which do not consist of stainless steel, on or in the unit.

3.1 Nameplate



Ex Marking on the Nameplate



No.	Marking	Explanation
1		Specific safety sign for protection against danger of explosion
2	II	Electrical equipment for all explosive areas, except of potentially explosive atmospheres in underground mines.
	2/-G	Test room: Zone 1; Installation place: Application gases, fogs, vapours
	db	Pressure-proof housing: Application in zone 1 and zone 2
	eb	Increased safety: Application in zone 1 and zone 2
	h	Type of protection of non-electric appliances
	ib	Intrinsic safety: Application in zone 1 and zone 2
	mb	Encapsulation: Application in zone 1 and zone 2
	IIB+H2	Suitable for gases of group IIA and IIB and hydrogen
	T3	Temperature class of the unit
	Gb	Unit protection level EPL according to IEC 60079-0: Zone 1
3	2572	Number of the named authority for manufacturer certificates
4	*** yy ATEX zzzzX	***: Code of the named authority for ATEX certification yy: Year of issue of the certificate zzzz: Approval number X: Special conditions

3.2 Delivery Scope

See packing list on the packaging or on the unit door.



3.3 Description

The test and simulation equipment allow rapid temperature-conditioning, storage of material or tests with material, which occasionally or temporarily might develop an explosive atmosphere. The material is stored in the test room of the test and simulation equipment.

The test room of units of the T-Line is approved for zone 1 (marking 2G). No risk of explosion at the installation place.

The test room is equipped with heating and temperature sensors. The heating is executed in the type of protection "Increased Safety". The supply of the temperature sensors is executed intrinsically safe. Fan wheel and drive motor are located in the test room. Both have an ex certificate. In case of a temperature extension to +80 °C, the drive of the test room ventilation is located outside the cabinet, but it has also an ex certificate. An additional heating with ex certificate is located in the test room.

For separation, the test room is sealed all around to largely avoid a carryover of the explosive atmosphere. When the door is opened, a safety shut-down will be effected by a contact-free door limit switch, which is executed in the type of protection "pressure-proof housing". In succession, the electric circuits of ventilation, heating and cooling will be interrupted. A permanent disconnection is effected, if the adjusted limit temperature of the unit of max. 40 °C or 90 °C is exceeded with an extension of the temperature range to +80 °C.

The control, the control panel and the refrigerating machine are located in a separate volume in the upper part of the test and simulation equipment. During the disconnection due to the opened door, the control at the unit rear continues working. The control panel above the test room door will be disconnected because of potential fogging. The control panel is restarted as soon as the door had been closed.

An optional humidity control is realized by an ultrasonic humidifier, which is installed at the exterior housing. If the air flow into the test room is not sufficient, the pneumatically controlled zone separation valve closes the connection between the installation room (no zone) and the test room (zone 1) and switches the humidifier off.

The explosion protection is realized by the ex-proof design of the humidity sensor and the zone separation valve in front of the humidifier.

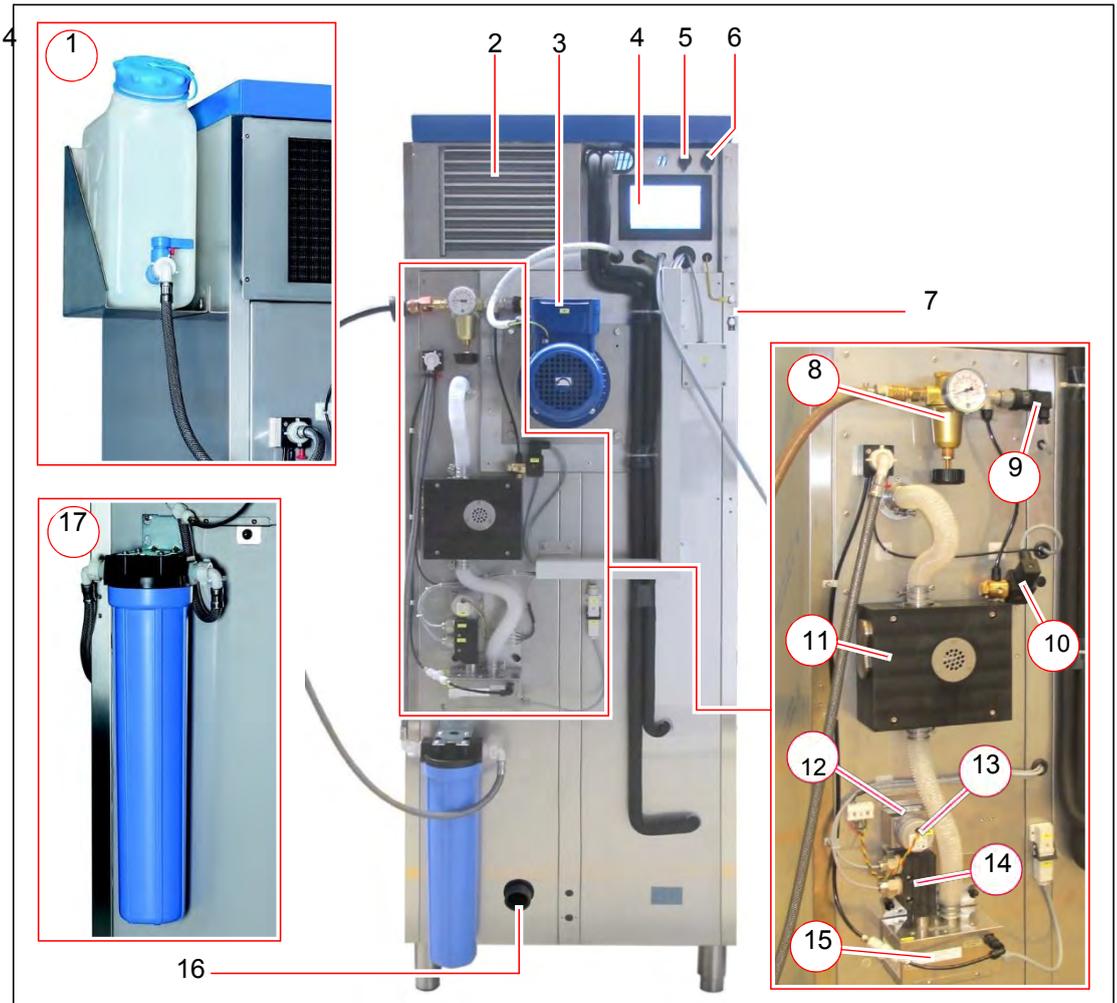
The maximum admissible ambient temperature of the test and simulation equipment is +30 °C.

Minimum and maximum test room temperature are 0 °C/+35 °C (standard execution) or +80 °C (upper temperature extension) and -30 °C (lower temperature extension).

3.4 Overview



Item	Designation
1	Refrigerating machine
2	Display of the control – CONTROL2015 touch
3	Recirculating air cycle (motor at rear side in case of optional extension of the temperature range to +80 °C)
4	Test room
5	Condensate collecting pan (option)
6	Feet, adjustable in height
7	Steering rollers (option)
8	Tubular port
9	Door contact switch
10	Main Switch



Item	Designation	Option
1	Water supply with water canister	Water canister
2	Fan grill refrigerating machine	
3	Motor recirculating air cycle	Extension of the temperature range to +80 °C
4	Display of the control – CONTROL2015 touch	
5	Ethernet connection	
6	USB Connection	
7	Equipotential bonding	
8	Pressure controller with pressure gauge	Ultrasonic humidification
9	Compressed air sensor	Ultrasonic humidification
10	Solenoid valve	Ultrasonic humidification
11	Zone separation valve	Ultrasonic humidification
12	Filter	Ultrasonic humidification
13	Fan	Ultrasonic humidification
14	Double flow sensor	Ultrasonic humidification
15	Ultrasonic humidification with water connection 3/4"	Ultrasonic humidification
16	Exhaust	Ultrasonic humidification
17	Water supply with ion exchanger	Ion exchanger

4 Safety

The operator is responsible for the safe use of the unit. The following must be observed:

- Observation of the general, national safety regulations and the company safety regulations.
- Inside the unit only an explosive area of zone 1 within the usual atmospheric conditions is allowed due to the stored media (air pressure between 88 and 110 kPA, oxygen content approx. 21 %).
- Equipment with exhaust pipe: The exhaust pipe must be connected to an explosion-proof exhaust system (zone 1), or the exhaust air must be released to the atmosphere. The opening for the exhaust pipe to the atmosphere is surrounded by a spherical ex zone with a diameter of 1 m. The explosive area must be marked correspondingly.
- The room space for installation of the unit must be sufficient. If explosive gases might escape from the test room, ventilation is required to reliably prevent the formation of an explosive atmosphere.
- When the test room is opened, an ignition of the possibly escaping explosive atmosphere must be prevented.
- The unit must always be equipped with a proper door gasket.
- Only use the unit with a functioning door contact switch.
- Ensure, that the condensate drain valves are installed.
- Ensure, that the tubular port for the measuring lines is sealed gas-tightly.
- Installation of the unit in explosive areas is not allowed.
- Application is only allowed, if the unit is in faultless condition.
- All warnings and safety instructions at the unit must be observed.
- All safety measures, which possibly might result from the specimen, must be observed.
- Potential danger resulting from the specimen must be observed.

4.1 Appropriate Application

The ex-proof appliance of the Safety T-Line is exclusively allowed to be used for storage and tests of material of the temperature classes T1, T2, T3 of the explosion groups IIA, IIB +H₂ (hydrogen).

Use of the ex-proof appliance of the Safety T-Line in explosive areas is not allowed.

Any other application is considered as misuse.

4.2 Inappropriate Application

The unit shall exclusively be used for the tasks mentioned in chapter 4.1.

Any other application or use beyond this purpose is considered as misuse. Rubarth Apparate GmbH is not liable for body injury and/or property damage resulting from improper use of the unit.

The following is regarded as improper use:

- Installation of the unit in explosive areas.
- Use of specimen, which are leaving dust in the unit.
- Use of specimen being corrosive.
- Use of specimen dissipating heat (for instance by chemical reaction).
- Supply of external energy to the specimen in the test room.
(This energy supply cannot be switched-off automatically by the control in case of a hazardous incident).
- Modification of the electrical components of the unit.
- Installation of non-original spare parts. Otherwise, the ATEX approval will be void!

4.3 Zone Classification

Installation of the unit in explosive areas is not allowed. The test room is approved for zone 1 (marking 2G).

4.4 Explosion Groups

The appliance is approved for explosion group II.

Explosion Group I	Explosion Group II
 Electrical equipment for potentially explosive atmospheres in underground mines, such as mining: pulverised coal, methane gas	 Electrical equipment for all explosive areas, except of potentially explosive atmospheres in underground mines, such as the chemical industry: dyestuffs

4.5 Temperature Classes in Explosion Group II

The appliance is approved for the temperature classes T1, T2 and T3 of the explosion groups IIA, IIB +H₂ (hydrogen).

Temperature Class	Maximum Admissible Surface Temperature of Equipment	Ignition Temperature of the Combustible Substances
 T 1	450 °C	>450 °C
 T 2	300 °C	>300 °C ≤ 450 °C
 T 3	200 °C	>200 °C ≤ 300 °C
 T 4	135 °C	>135 °C ≤ 200 °C
 T 5	100 °C	>100 °C ≤ 135 °C
 T 6	85 °C	>85 °C ≤ 100 °C

4.6 Exemplary Classification of Combustible Gases and Vapours to Explosion Groups and Temperature Classes

The appliance is approved for the temperature classes T1, T2 and T3 of the explosion groups IIA, IIB +H₂ (hydrogen).

Explosion Group	Temperature Class					
	T1 (450 °C)	T2 (300 °C)	T3 (200 °C)	T4 (135 °C)	T5 (100 °C)	T6 (85 °C)
	✓	✓	✓	X	X	X
✓ IIA	Acetone (540 °C) Ethane (515 °C) Propane (470 °C) Toluene (535 °C)	Cyclohexanone (430 °C) i-Amyl Acetate (380 °C) n-Butane (365 °C) n-Butyl Alcohol (340 °C)	Petrol (220 °C-300 °C) Diesel (220 °C-300 °C) Fuel Oil (220 °C-300 °C) n-Hexane (240 °C)	Acetaldehyde (140 °C)		
✓ IIB	City Gas (560 °C)	Ethyl Alcohol (425 °C) Ethylene (425 °C) Ethylene Oxide (440 °C)	Hydrogen Sulphide (270 °C)		Ethyl Ether (180 °C)	
X IIC	Hydrogen H2 (560 °C)	Acetylene (305 °C)				Carbon Disulphide (95 °C)

4.7 Warning Signs and Mandatory Signs

Dangerous areas at the unit are marked with warning signs according to DIN 4844 and BGV A8.

Mandatory signs at the unit indicate necessary actions to be taken.

Warning signs, mandatory signs and other information signs at the unit must always be clearly legible. Illegible or damaged warning signs must be replaced immediately.

The following warning signs, mandatory signs and information signs are attached to the unit.

Symbol	Meaning	Example
	Warning of dangerous electrical voltage	<ul style="list-style-type: none"> Cover Switch Cabinet
	Warning of hot surfaces	<ul style="list-style-type: none"> Switchboard above the test room door (with optional extension of the temperature range to +80 °C)
	Warning of low temperature/cold	<ul style="list-style-type: none"> Switchboard above the test room door (with optional extension of the temperature range to -20 °C)
	Do not drive underneath with lift truck	<ul style="list-style-type: none"> Switchboard above test room door with option "Condensate collecting pan" or "Heated condensate collecting pan"
	Withdraw mains plug	<ul style="list-style-type: none"> Cover of switch cabinet
	Wear eye protection	<ul style="list-style-type: none"> Test room door (with UV lighting)
	Maximum load of the shelves	<ul style="list-style-type: none"> Test room shelf single frame
	Maximum load of the shelves	<ul style="list-style-type: none"> Test room shelf double frame (option)

5 Storage

NOTE

Property Damage!

Metal objects, which are placed on or in the unit and which do not consist of stainless steel, might damage the stainless-steel surfaces of the unit due to formation of extraneous rust.

→ Never place metal objects, which do not consist of stainless steel, on or in the unit.

Observe the following for storage of the unit:

- Always store the unit in a closed building.
- Protect the unit from humidity.
- Storage temperature from +10 °C to +30 °C
- No direct sun radiation.
- No condensation.
- Low-dust environment.

6 Technical Data

The technical data of your unit can be drawn from the nameplate. See page 11. Test room

explosion-proof  II 2/-G Ex db eb h [ib] ib mb IIB+H₂ T3 Gb

Type	T 320	T 500	T 820
Test room			
Volume	320 l	500 l	820 l
Standard min. temperature	0 °C	0 °C	0 °C
Standard max. temperature	+35 °C	+35 °C	+35 °C
Temperature deviation in time	±0,5 °C	±0,5 °C	±0,5 °C
Height	990 mm	1500 mm	1500 mm
Width	610 mm	610 mm	610 mm
Depth	585 mm	585 mm	935 mm
Number of shelves (standard delivery scope)	3	4	4
Maximum load per shelf	25 kg	25 kg	25 kg
Unit			
Height	1600 mm	2105 mm	2105 mm
Width	760 mm	760 mm	760 mm
Depth	900 mm	900 mm	1250 mm
Electric connection	400 V/230 V/ 50 Hz	400 V/230 V/ 50 Hz	400 V/230 V/ 50 Hz

Options

Type	T 320	T 500	T 820
Additional shelf (max. 25 kg)	T0320-01	T0500-01	T0820-01
Additional shelf, reinforced (max. 50 kg per shelf)	T0320-02	T0500-02	T0820-02
Glazed door, unheated	T0320-03	T0500-03	T0820-03
Extension of the temperature range to -20 °C	T0320-04	T0500-04	T0820-04
Extension of the temperature range to +80 °C	-	T0500-05	T0820-05
Speed of temperature change 1 °C/min (0 °C to +35 °C)	T0320-06	T0500-06	T0820-06
Speed of temperature change 1 °C/min (-20 °C to +80 °C)	T0320-07	T0500-07	T0820-07
Evaporation humidification + dehumidification	T0320-20	T0500-20	T0820-20

Type	T 1000	T 1640
Test room		
Volume	1000 l	1640 l
Standard min. temperature	0 °C	0 °C
Standard max. temperature	+35 °C	+35 °C
Temperature deviation in time	±0,5 °C	±0,5 °C
Height	1500 mm	1500 mm
Width	2 × 610 mm	2 × 610 mm
Depth	585 mm	935 mm
Number of shelves (standard delivery scope)	8	8
Maximum load per shelf	25 kg	25 kg
Unit		
Height	2105 mm	2105 mm
Width	1520 mm	1520 mm
Depth	900 mm	1250 mm
Electric connection	400 V/230 V/ 50 Hz	400 V/230 V/ 50 Hz

Options

Type	T 1000	T 1640
Additional shelf (max. 25 kg)	T1000-01	T1640-01
Additional shelf, reinforced (max. 50 kg per shelf)	T1000-02	T1640-02
Glazed door, unheated	T1000-03	T1640-03
Extension of the temperature range to -20 °C	T1000-04	T1640-04
Extension of the temperature range to +80 °C	T1000-05	T1640-05
Speed of temperature change 1 °C/min (0 °C to +35 °C)	T1000-06	T1640-06
Speed of temperature change 1 °C/min (-20 °C to +80 °C)	T1000-07	T1640-07
Evaporation humidification + dehumidification	T1000-20	T1640-20

Refrigerant R 134a	
ODP Ozone Depletion Potential	0
GWP (Global Warming Potential: Effect of a greenhouse gas on the climate, grossed up to a period of 100 years)	1430

Refrigerant R 452a	
ODP Ozone Depletion Potential	0
GWP (Global Warming Potential: Effect of a greenhouse gas on the climate, grossed up to a period of 100 years)	2140

7 Installation, Set-up, Connection

NOTE

Property Damage!

Metal objects, which are placed on or in the unit and which do not consist of stainless steel, might damage the stainless-steel surfaces of the unit due to formation of extraneous rust.

→ Never place metal objects, which do not consist of stainless steel, on or in the unit.

Attachment parts should be installed at the installation place!

If required due to space constraints, the humidification must be removed before moving the unit to the installation place.

7.1 Installation

Observe the following for installation of the test and simulation equipment:

- No direct sun radiation.
- Radiators or other sources of heat should not be located nearby.
- Ambient temperature < +30 °C.
- Distance of the unit rear to the wall: minimum 10 cm.
- The floor must be level and horizontal.
- In case of units with steering rollers:
 - Turn the steering rollers to the front.
 - Lock the brake.

Transporting the equipment:

CAUTION
Risk of injury due to dropping equipment!

The centre of gravity of the equipment is very high due to the refrigerating machine at the top.

- Avoid tilting of the equipment.
- Consider the high centre of gravity when moving the equipment.

NOTE
Property Damage!

When tilting the test and simulation equipment during transport, oil might flow from the refrigerating machine into the evaporator, which results in damage of the latter during operation.

- After transport, the equipment should be switched-on only after four hours in upright position.

1. Empty the unit, if required.
Only move the empty unit!
2. Loosen all connections (cables, Ethernet connection, mains plug, equipotential bonding etc.), if required.

NOTE
Property Damage of the Condensate Collecting Pans!

When lifting the test and simulation equipment by means of a lift truck, the condensate collecting pans, which are installed below the unit, might be damaged.

- If required, remove the condensate collecting pans below the unit prior to transport.


NOTE
Property Damage of the Condensate Drain Valves!

When lifting the unit by means of a lift truck, the condensate drain valves below the unit might be damaged.

- Check the position of the condensate drain valves prior to driving the lift truck underneath the unit.
- Lift the unit without damaging the condensate drain valves.



NOTE

Cushion your lift truck to prevent damage of the unit surface.

3. Lift the unit by means of a lift truck and move it to the installation place.



Levelling the unit:**NOTE****The test and simulation equipment might tilt!**

Units with steering rollers might tilt forward, when the steering rollers are positioned to inside and the door is open!

- Turn the steering rollers to the front.
- Do not lean on the opened door.

NOTE**Property Damage of the Condensate Collecting Pans!**

When lifting the test and simulation equipment by means of a lift truck, the condensate collecting pans, which are installed below the unit, might be damaged.

- If required, remove the condensate collecting pans below the unit.

**NOTE****Property Damage of the Condensate Drain Valves!**

When lifting the unit by means of a lift truck, the condensate drain valves below the unit might be damaged.

- Check the position of the condensate drain valves prior to driving the lift truck underneath the unit.
- Lift the unit without damaging the condensate drain valves.

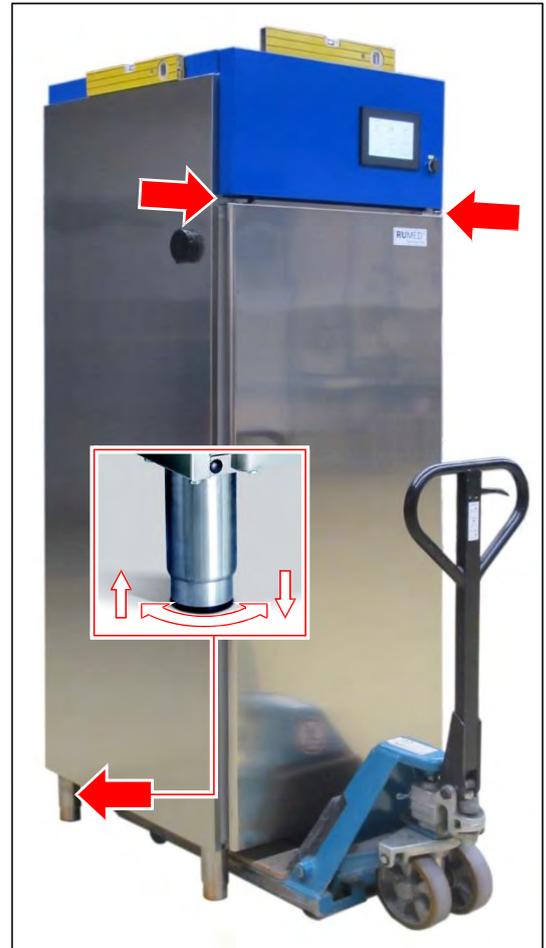
1. Check the levelling in both directions using a spirit level.
2. Lift the unit by means of a lift truck and adjust the continuously adjustable feet.
3. Lower the unit and check the levelling using a spirit level.
4. Repeat the procedure until the levelling is correct.

NOTE

Door limit switches do not work!

The function of the door limit switches is not ensured, if the unit is not levelled correctly.

- Observe, that the gap between the upper edge of the door and the switchboard is even, particularly in case of double-door units.



7.2 Set-up

7.2.1 Installation of the Condensate Drain Valves

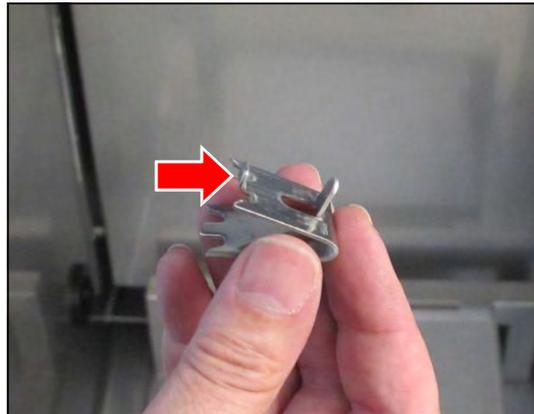
1. Screw the condensate drain valves from the unit rear to the condensate drain sockets below the unit.
1 Piece at T 320, T 500, T 820
2 Pieces at T 1000, T 1640



7.2.2 Installation of the Shelves

How to install the shelves:

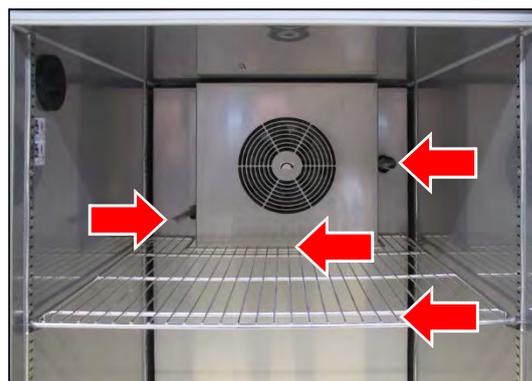
1. Withdraw shelves and mounting clips from the test room.
2. Determine the position of the shelves.
3. Insert the upper hook of the mounting clip into the fastening rail.



4. Press the mounting clip together from below and insert also the lower part into the fastening rail.
5. Fasten the fastening clips in the fastening rails in the same height. Numbers facilitate the positioning of the fastening clips in the same height.



6. Remove the protective cushions from the shelves.
7. Insert the shelves into the fastening clips. Double wire ahead. Insert the shelf with recesses in front of the fan. Do not damage the humidity sensor and the humidity blow-in pipe.



Pegs at the fastening clips prevent the shelves from dropping when withdrawing them.

For removal, the shelf must be lifted.

The carrying capacity of the shelves (single frame) is a maximum of 25 kg surface load.



The carrying capacity of the reinforced shelves (double frame) is a maximum of 50 kg surface load.



7.2.3 Tubular port

The tubular port can be used to lead cables, measuring lines, hoses, tubes etc. into the test room.

The opening must permanently be sealed gas-tightly to prevent, that explosive gases might escape from the test room.

Use the closing plug.
 See page 32.



7.2.4 Adaptation of the Closing Plug to the Tubular Port

For gas-tight leading of the cables, tubes etc. in different sizes through the tubular port into the test room, the closing plug must be adapted.

Adaptation of the closing plug is possible in the range of 4 mm to 23 mm.

How to adapt the closing plug:

1. Loosen the four Allen screws from the closing plug.
2. Withdraw the closing plug from the tubular port.



3. Open the closing plug.



4. Remove the rubber pads from both sides of the closing plug according to the required aperture diameter.
5. Insert the cable between the two sides of the closing plug.
6. Insert the closing plug into the tubular port.
7. Tighten the four Allen screws. The closing plug will be compressed, and the tubular port is sealed.

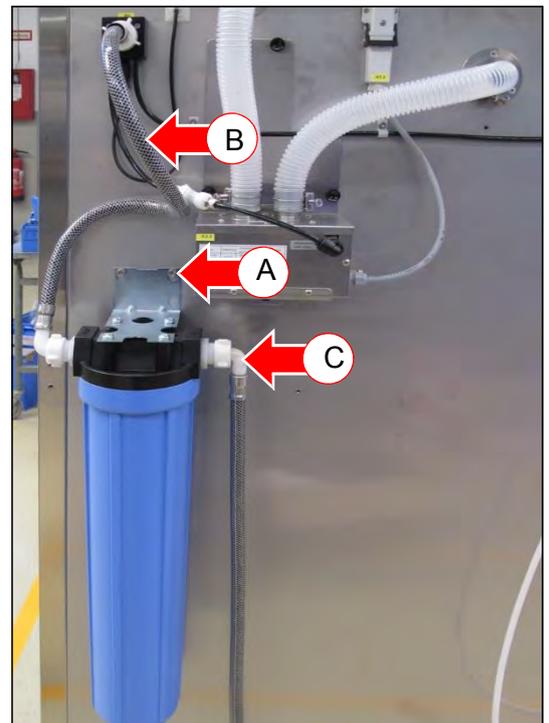


7.2.5 Connecting the Ion Exchanger (Option)

If only drinking water is available on site for humidification, an ion exchanger must be interconnected.

How to connect the ion exchanger:

1. Install the ion exchanger using two screws at the corresponding place (A).
2. Make the hose connection between the ion exchanger and the test and simulation unit using the provided short hose (B).
3. Make the external water connection to the customer's drinking water connection using the provided hose, 2 m (C). Connection dimension: 3/4" external thread
Drinking water connection: max. 5 bar, with stop valve.



7.2.6 Connecting the Water Canister (Option)

⚠ DANGER

Warning of dangerous electrical voltage!

When filling the canister, water might flow through the cover into the switch cabinet.

- Ensure, that no water arrives at the cover and flows into the electric system when filling the canister.

NOTE

Property Damage of the Unit!

If a water canister, which is placed on the unit, leaks, water will flow into electric system of the unit resulting in property damage.

- Never place a water canister on the unit.
- Always put the water canister in the provided holder.

NOTE

Property Damage of the Humidification!

Always use demineralized water for the humidification. Otherwise, it might be damaged.

- Only supply demineralized water to the humidifier with a conductivity of <math>< 5 \mu\text{S}/\text{cm}</math>.

NOTE

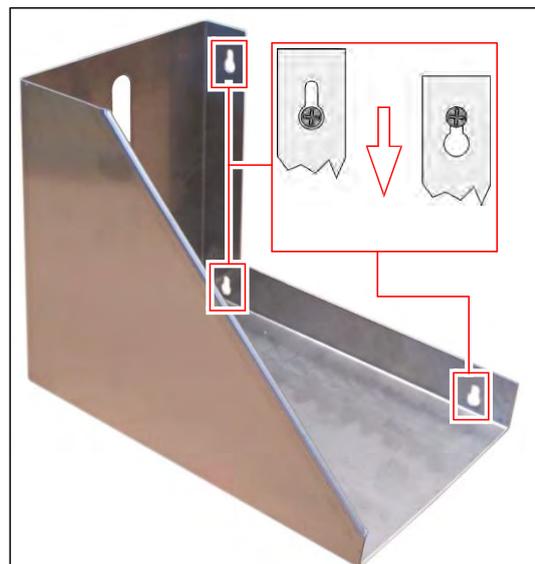
Property Damage of the Humidification!

If the humidifier is not supplied with demineralized water for a longer period, the solenoid valve of the humidifier will be damaged.

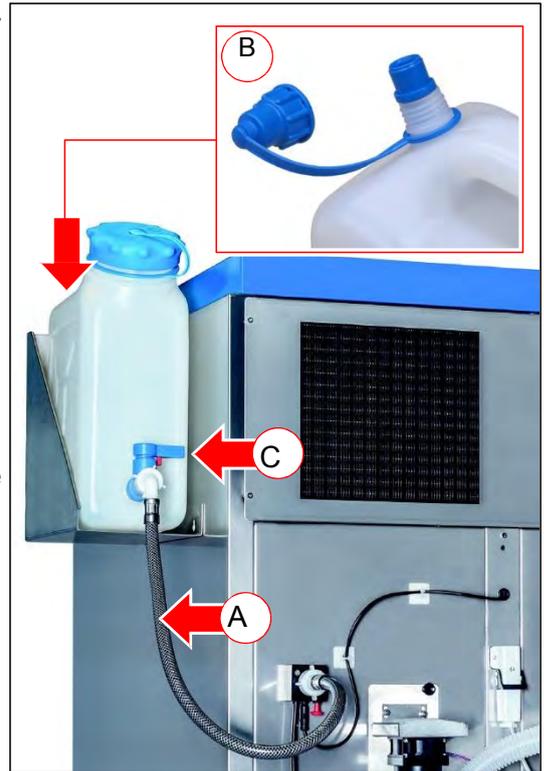
- Regularly check the level of the water canister and refill demineralized water, if required.

How to connect the water canister:

1. Slightly loosen the pre-assembled screws for the holder of the water canister in the upper area of the right side panel.
2. Insert the holder of the water canister.

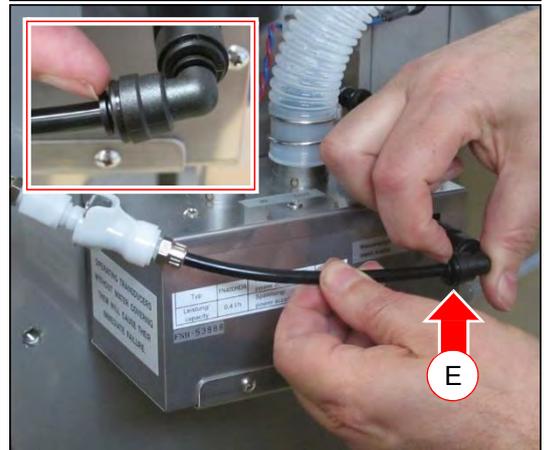
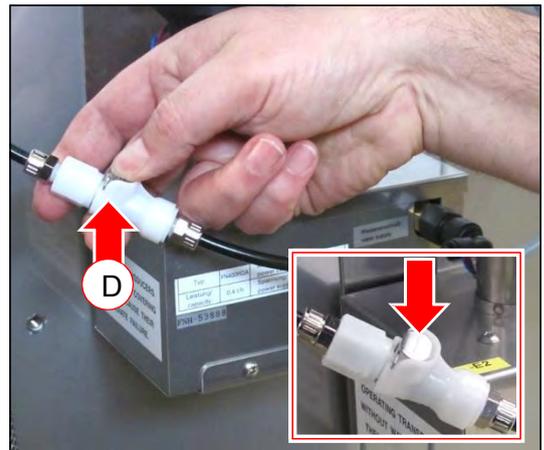


3. Screw the stop valve on the water canister.
Check, if the seat of the gasket is correct.
4. Rinse the water canister several times with demineralized water with a conductivity of <math><5 \mu\text{S}/\text{cm}</math>.
5. Fill demineralized water with a conductivity of <math><5 \mu\text{S}/\text{cm}</math> into the water canister.
6. Place the water canister into the holder with the water cock directed to the rear.
7. Make the hose connection (A) between the water canister and the test and simulation equipment. Do not kink the hose connection!
8. Open the ventilation (B) at the canister.
9. Open the water cock (C) at the canister and check the water flow.



If the water does not flow out of the canister, the system must be bled:

10. Make a water collecting tray available.
11. Open the self-locking coupling (D) of the water connection by pressing the key.
12. Withdraw the hose from the connecting piece by pressing the retaining ring (E) at the humidifier.



13. Place the hose end into the collecting tray.
14. Close the coupling.
The engagement of the coupling must be audible.
 - The system will be bled.
15. If water escapes when opening the self-locking coupling, stop the flow.



16. Reconnect the hose.
Push the hose into the connecting piece as far as possible.
After that, withdraw it slightly in order to position the retaining ring to the front.
17. Close the coupling.
The engagement of the coupling must be audible.



7.2.7 Installation of the Condensate Collecting Pan (Option)

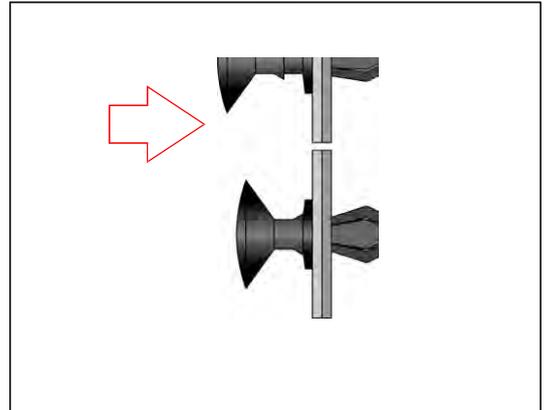
How to install a condensate collecting pan:

HINT

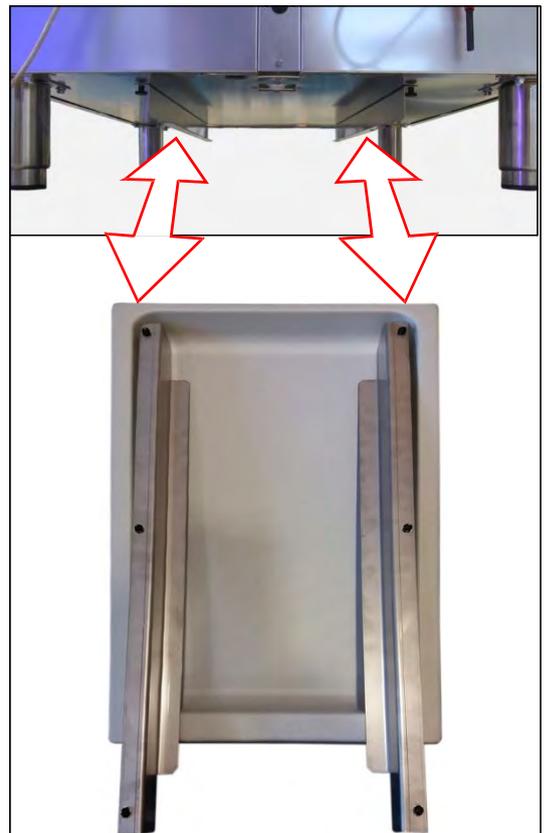
Install the condensate collecting pan at the final installation place and after levelling of the unit. After the installation, the unit cannot be lifted anymore with a lift truck. Otherwise, the rails for the condensate collecting pan would be damaged.



1. Fasten the rails by pressing the six clips below the test and simulation cabinet.



2. Move the condensate collecting pan with the moulded recess to the front on the rails underneath the unit to the limit stop.



7.3 Connection

Without option extension of the temperature range to +80 °C:

1. Connect the mains plug to an individually protected (16 A) Schuko socket being duly earthed.
(230 V, 50 Hz; country-specific deviations are possible).
Observe the electrical data on the nameplate (position of the nameplate, see page 11).

HINT

Use an individually protected circuit (16 A) for each unit.

With option extension of the temperature range to +80 °C:

- Kind of current (three-phase current) and voltage at the place of installation must coincide with the data on the nameplate of the appliance. See page 11.
1. Establish the equipotential bonding (ground connection on the rear, top right).

Cross-section of the Mains Cable	Cross-section of the Earth Conductor
Less than or equal to 16 mm ²	Cross-section identical
Between 16 mm ² and 35 mm ²	16 mm ²



2. Connect the CEE plug to an individually protected CEE socket being duly earthed.
(230 V/400 V)
Observe the electrical data on the nameplate (position of the nameplate, see page 11).
3. After connection, check the correct direction of rotation of the motors by means of the arrows. If required, exchange the two phases.

HINT

The direction of rotation can be seen best when the motor runs down, immediately after switching off.

For option humidity:

1. Water Connection

If a supply with demineralized water exists:

Connect the external water connection directly to the stop valve.

Conductivity: <5 µS/cm.

Pressure: 1-3 bar.

Check the tightness!

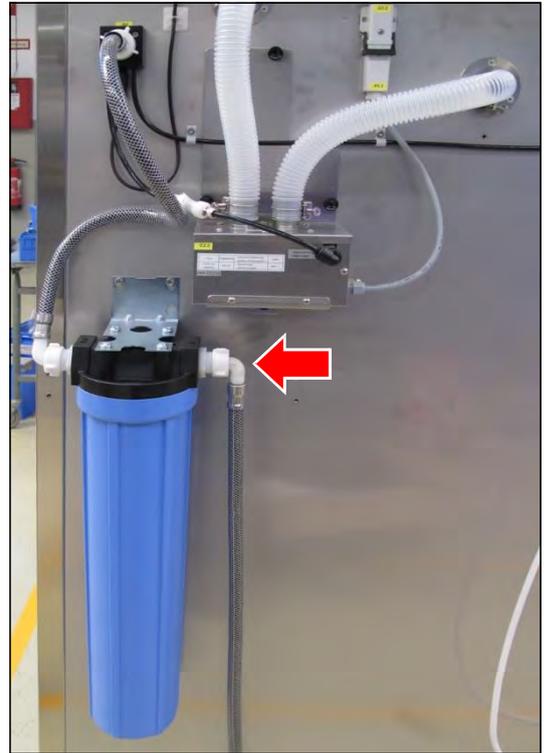
Unit with Ion Exchanger:

Connect the external water connection to the drinking water connection of the customer using the provided hose 2 m.

Connection dimension: 3/4"

External thread drinking water connection: max. 5 bar, with stop valve.

Check the tightness!



When using a water canister: See page 34.

Unit with Ultrasonic Humidification:

1. Establish the compressed air connection (quick-lock coupling NW 7.2; locking on both sides)

Connect the compressed air supply to the pressure controller at the unit rear using the quick-lock coupling.

The compressed air supply must be lockable (to be provided by the customer).

NOTE

Compressed air must always be available during operation.



⚠ DANGER
Warning of Danger of Explosion!

Explosive gas might escape from the exhaust.

- Either connect the exhaust to an explosion-proof exhaust system (zone 1)
- or release it to the atmosphere. The opening for the exhaust pipe to the atmosphere is surrounded by a spherical ex zone 1 with a diameter of 1 m. Mark the explosive area correspondingly.
- Only use conductive hoses.
- Earth the hoses.



2. Connect a conductive vent hose and fasten it by means of a hose clamp. (External diameter of the connection: 60 mm).
3. Earth the vent hose.

HINT

If the exhaust is released to the atmosphere, it must be checked, if the volume flow is sufficient.

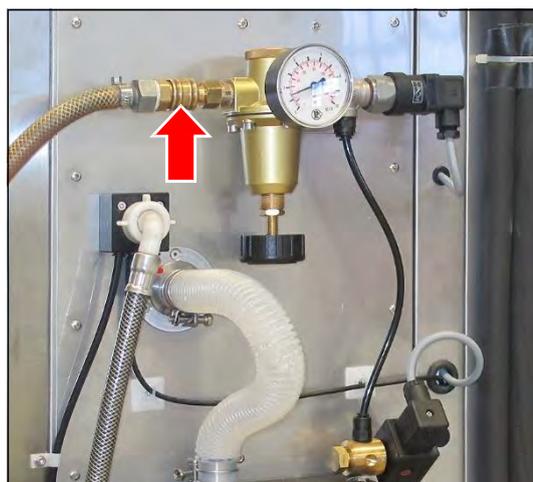
In case of any questions, please refer to the Rubarth service department. See page 93.

HINT

The volume flow of the exhaust or of a required blower should not exceed the triple or quadruple volume of the interior space.

In case of any questions, please refer to the Rubarth service department. See page 93.

4. Checking the Pressure Setting
(The pressure controller had been factory-adjusted to 2.0 to 2.5 bars. Check it for start-up and if required.)
 - A. Lock the compressed air of the customer.
 - B. Loosen the quick-lock coupling.



- C. Withdraw the hose of the solenoid valve from the connecting piece by pressing the retaining ring.
- D. Connect the quick-lock coupling.
- E. Open the compressed air of the customer.
- F. Check the pressure at the pressure gauge.
- G. Adapt it, if required.
 + : Increase the pressure
 - : Reduce the pressure
- H. Lock the compressed air of the customer.
- I. Connect the hose to the solenoid valve.
 Push the hose into the connecting piece as far as possible.
 After that, withdraw it slightly in order to position the retaining ring to the front.
- J. Open the compressed air of the customer.

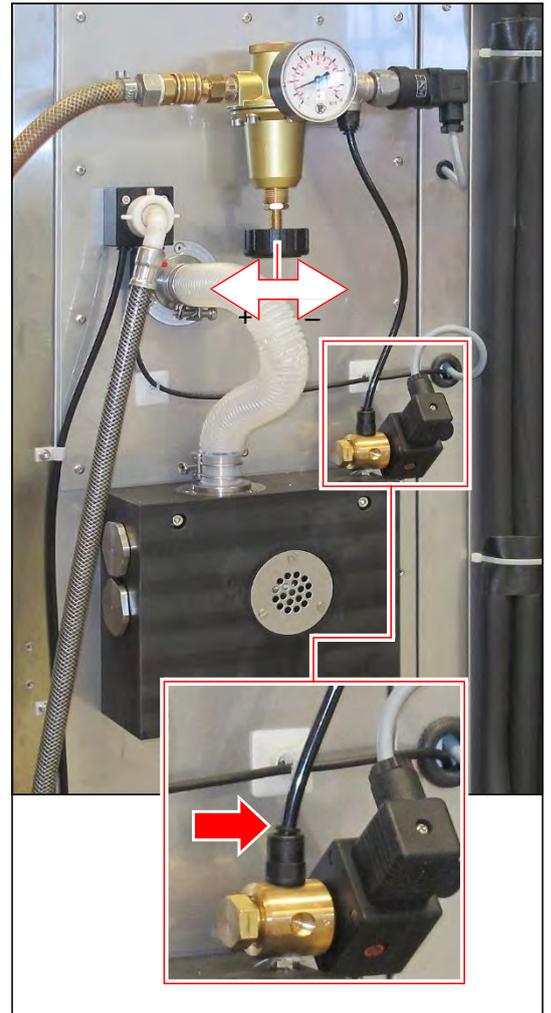
HINT

Change the pressure setting as described herein.

Setting the pressure without consumption of compressed air results in indication errors at the pressure gauge, since the existing pressure cannot be reduced.

Unit with technical ventilation:

1. Screw both hose fittings into the ventilation opening at the unit. (Rear side and upper right lateral panel)
2. Connect a conductive vent hose and fasten it by means of a hose clamp. (External diameter of the connection: 60 mm).
3. Earth the vent hose.



⚠ DANGER

Warning of Danger of Explosion!

Explosive gas might escape from the exhaust.

- Either connect the exhaust to an explosion-proof exhaust system (zone 1)
- or release it to the atmosphere. The opening for the exhaust pipe to the atmosphere is surrounded by a spherical ex zone 1 with a diameter of 1 m. Mark the explosive area correspondingly.
- Only use conductive hoses.
- Earth the hoses.

4. Connect a conductive vent hose and fasten it by means of a hose clamp. (External diameter of the connection: 60 mm).

5. Earth the vent hose.

HINT

If the exhaust is released to the atmosphere, it must be checked, if the volume flow is sufficient.

In case of any questions, please refer to the Rubarth service department. See page 93.

HINT

The volume flow of the exhaust or of a required blower must be adapted to the volume flow of the ventilation.

In case of any questions, please refer to the Rubarth service department. See page 93.



8 Control and Display Elements

8.1 Control – CONTROL2015 touch

The unit is equipped with two displays, arranged on the front side and on the rear side of the unit. The operation of the unit is exclusively effected by means of the display on the front side.

For reasons of explosion protection, the display on the front side will be switched off, as soon as the test room door is opened. The display on the rear side, which will not be switched off, is provided to ensure continued data recording of the control. When the test room door is closed, the display on the front side will start again. This takes some seconds.

7" Colour Touchscreen Display

All entries and programming are effected via touchscreen.

The display shows messages and failures, and documentation functions are made available by means of the integrated recorder and the logbook.

Information concerning operation, see *page 47*.



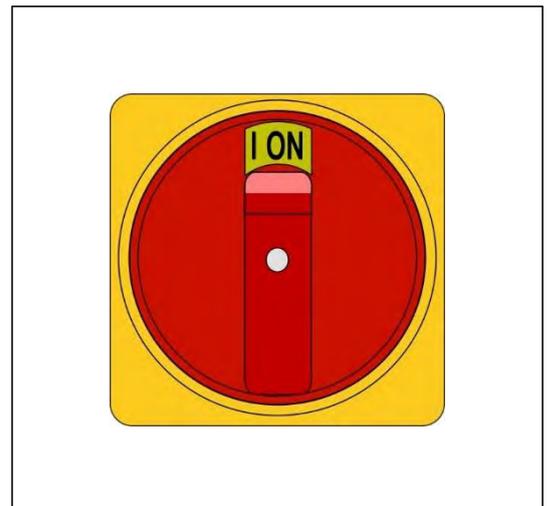
8.2 Main Switch

The supply voltage of the unit will be switched on and switched off by means of the main switch.

- Position O (OFF) - Supply voltage is switched off.
- Position I (ON) - Supply voltage is switched on.

HINT

In switched-off position, the main switch can be protected against unintentional restart by means of a padlock.



9 Switching on, Switching off, Shutdown

NOTE

Property Damage!

If the test and simulation unit is switched-on and plastic packing material is in the test room, it might melt during a heating process, thus damaging the test room.

→ Empty the test room prior to switching on!

Without option extension of the temperature range to +80 °C:

- Kind of current (alternating current) and voltage at the place of installation must coincide with the data on the nameplate of the appliance. *See page 11.*
- Connection is to be made via an individually protected (16 A) Schuko socket being duly earthed.

With option extension of the temperature range to +80 °C:

- Kind of current (three-phase current) and voltage at the place of installation must coincide with the data on the nameplate of the appliance. *See page 11.*
- Connection is to be made via an individually protected CEE socket being duly earthed.

9.1 Switching on

NOTE

Property Damage!

When tilting the test and simulation equipment during transport, oil might flow from the refrigerating machine into the evaporator, which results in damage of the latter during operation.

→ After transport, the equipment should be switched-on only after four hours in upright position.

NOTE

Property Damage!

If the unit is switched-on and there is no water in the humidifier, it will be damaged.

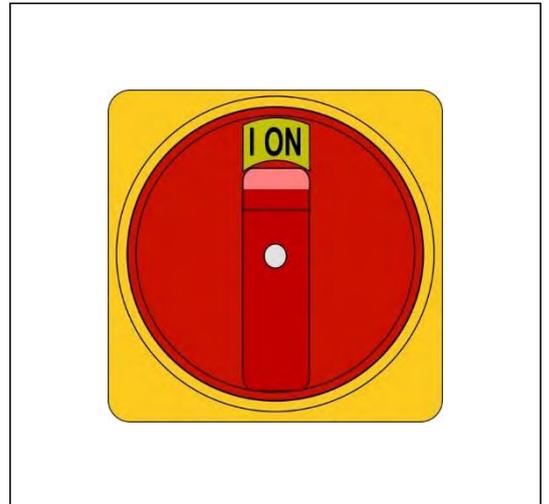
→ The unit should only be switched-on, when the humidifier is filled with water.

1. Ensure, that the condensate drain valves have been installed. *See page 30.*
2. For option humidity:
Ensure, that the humidifier is filled with water and ensure the continuous supply with demineralized water.

3. Ensure, that the tubular port is sealed gas-tightly.
 If the tubular port is used, the opening must be closed with a gas-tight closing plug. *See page 32.*



4. Connect the test and simulation equipment to an individually protected Schuko socket or CEE socket being duly earthed.
5. If required, remove the padlock from the main switch.
6. Use the main switch to switch the unit on.



The control boots up. The blue LED on the right below the touchscreen lights up for a short moment.

This process might take some seconds. The

RUMED logo is displayed.

The blue LED will extinguish.

The control screen "Main Menu" is displayed. *See page 51.*

7. Check time and date (see header of the control screens) and set them, if required. *See page 50.*

HINT

Setting of date and time is imperatively required. Otherwise, the recorder records, the logbook entries, the messages and the alarms will be sorted in the wrong chronological order.

Information concerning login and creation of programs, *see page 47 ff.*

9.2 Switching off

1. Switch the control off.
2. Use the main switch to switch the unit off.
3. Withdraw the mains plug from the socket.

9.3 Shutdown

NOTE

Property Damage!

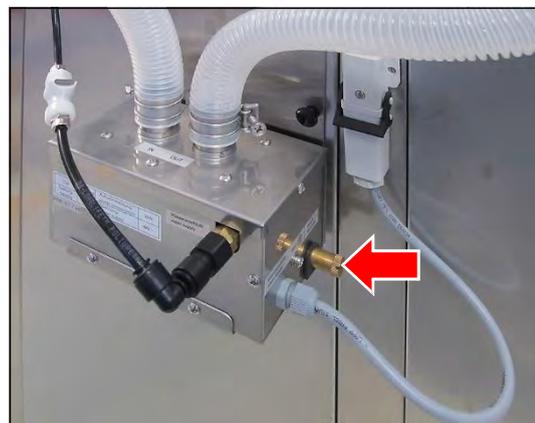
Metal objects, which are placed on or in the unit and which do not consist of stainless steel, might damage the stainless-steel surfaces of the unit due to formation of extraneous rust.

→ Never place metal objects, which do not consist of stainless steel, on or in the unit.

If the unit shall be switched-off or shut down for a longer period, the residual humidity must be removed from the unit.

How to remove the residual humidity from the unit:

1. Remove the specimen.
2. Heat the unit up to maximum temperature.
3. Keep the temperature for one hour.
If required, remove the ice from the condensate collecting pan in the rear lower area of the test room from time to time to accelerate the drying.
4. Open the door for approx. 2 min.
5. Check the test room for humidity, particularly the condensate collecting pan.
6. If required, heat again up and open the door until the test room is dry.
7. Use the main switch to switch the unit off.
8. Cleaning the unit, *see page 87*.
9. Leave the door slightly open. For option humidity:
10. If existing: Empty and clean the water canister.
11. If existing: Empty the ion exchanger.
12. Empty the humidifier.
 - A. Hold the collecting vessel below the drain screw.
 - B. Open the drain screw anticlockwise.
 - C. Let the water drain off.
 - D. Close the drain screw.
13. Empty the hoses.



10 Control

10.1 Basics of the Control

In delivery state of the unit and when the control is switched-on, a user "log-in" is logged in. This user has full authorization for changes and settings of the control.

The user management of the unit allows to assign different authorizations to different users. Further details concerning the set-up of the user management, see page 77.

10.1.1 General Information Concerning the Operating and Control Unit

The unit is controlled by means of the operating and control unit CONTROL2015 *touch*. All required settings can be made by means of the operating and control unit.

All entries are made by contacting the touchscreen with a fingertip or an input pen, which is appropriate for touch-sensitive user interfaces.



NOTE

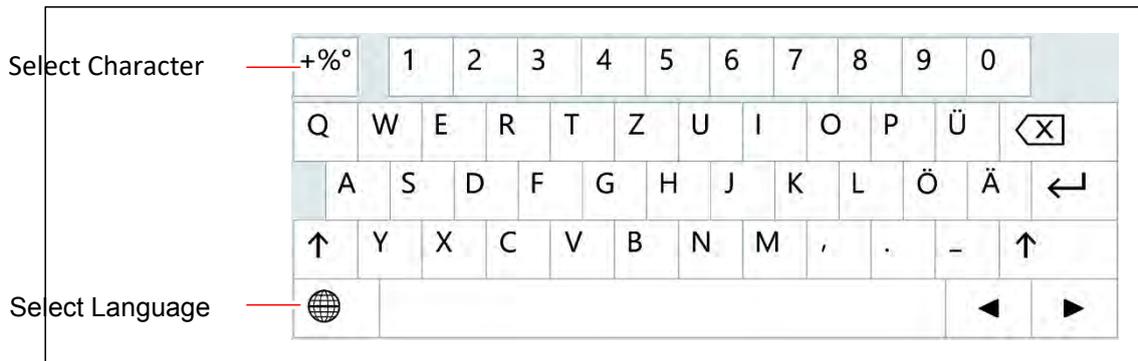
Property Damage of the Touchscreen!

If pointed, sharp or acid-covered objects are used for the touchscreen, irreparable damage of the surface might result.

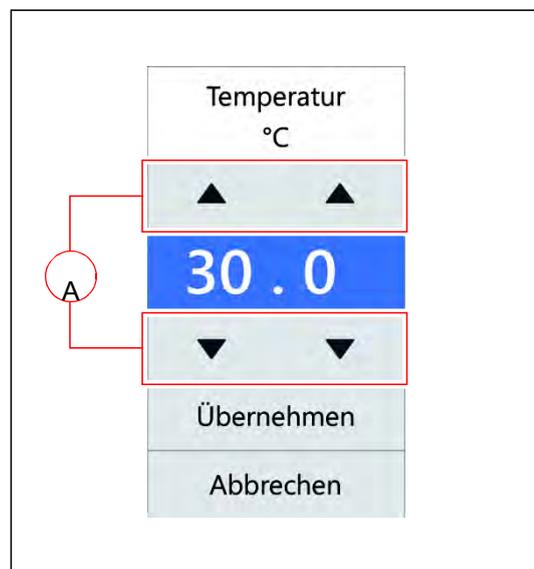
- ➔ Always use your fingers or a suitable input pen for the touchscreen.
- ➔ Protective films for the touchscreen are available. The film prevents scratches and soiling of the screen. A protective film should always be glued on the screen.

10.1.2 Entry of Text and Numerical Values

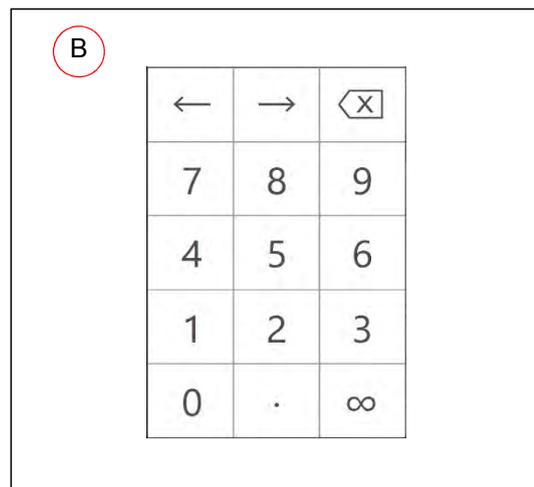
According to requirement, the corresponding screen keyboard for the entry of text or numerical values is displayed.



- For entries, such as parameter values, text etc., a screen keyboard will be displayed after touching the corresponding input field.
- Parameter values can be changed by means of the arrow keys (A) or via a numeric keypad (B) after touching the parameter value.
- When the entry is finished, and the button ENTER or ACKNOWLEDGE had been touched, the screen keypad will disappear.

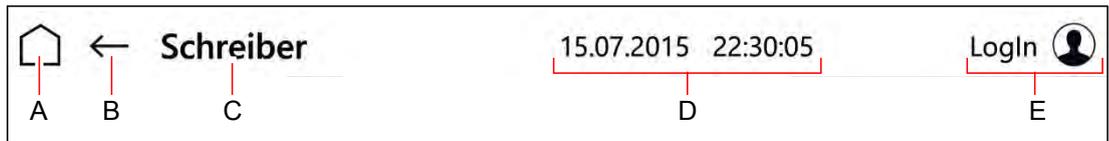


- Entries beyond a defined plausibility range will not be accepted by the control.



10.1.3 Header of the control screens

The header is identical in many control screens.



Item	Description	Description
A	Control screen MAIN MENU is displayed	See page 51
B	Previous control screen is displayed	
C	<ul style="list-style-type: none"> Name of the present control screen or Display of messages and alarms 	
D	Display of current date and time	
E	<ul style="list-style-type: none"> Button: Control screen USER LOGIN is displayed or Display: Logged-in user is displayed or Horn is switched-on or switched-off 	See page 79

10.1.4 Display of Messages and Alarms

Messages and alarms are displayed in the header of the control screens.

Messages

Messages and alarms are displayed in the header of the control screens.

When touching the button, the control screen "Logbook" will be displayed. See page 74.



Alarms

Alarms are displayed in red in the header of the control screens.



When touching the button, a pop-up window with detailed information will be displayed.

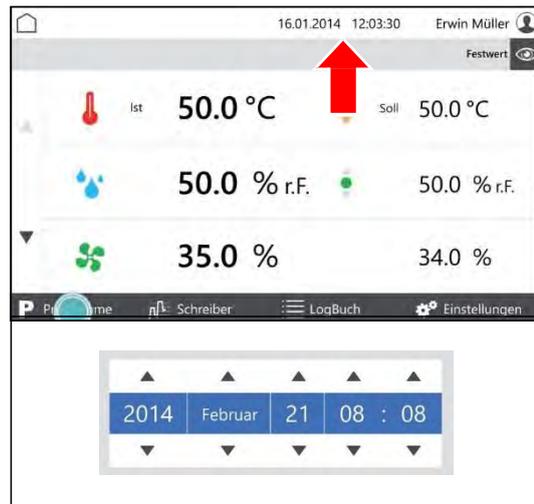
Alarm messages will disappear, as soon as the values are again within the alarm limits.

The audible alarm can be switched-off by touching the button "Horn off", provided it is allowed by the user rights.



10.1.5 Setting Date and Time

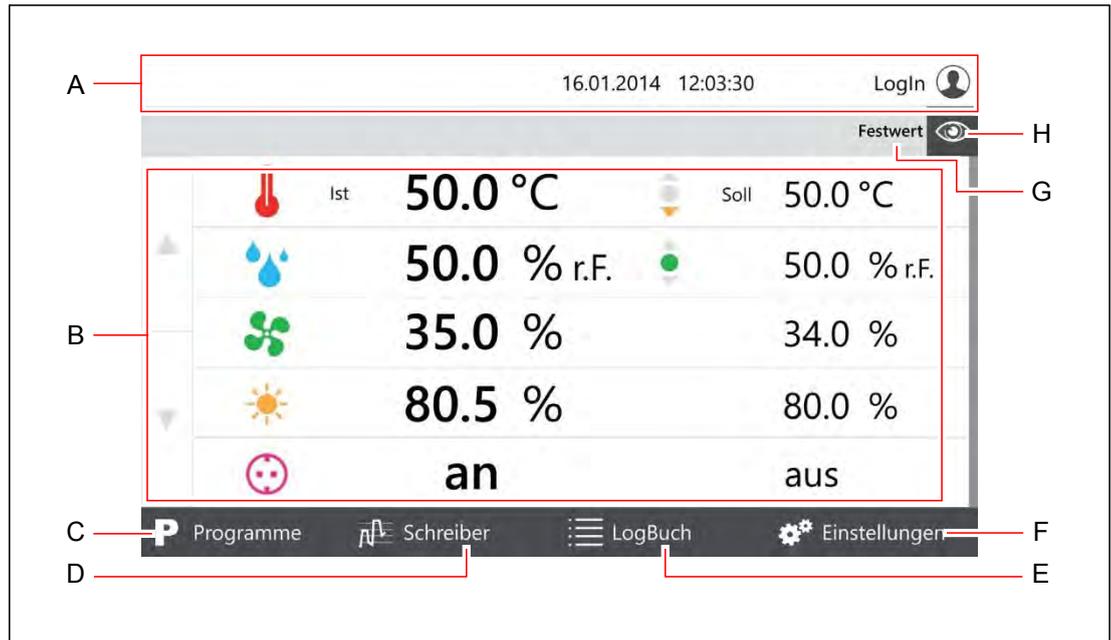
1. Switch on the unit, *see page 44*.
 - Control screen "Main Menu" is displayed.
2. Touch date and time in the header.
 - A pop-up window for entry of the date is displayed.
3. Enter the current date and time.
4. Acknowledge the entry.



HINT

Setting of date and time is imperatively required. Otherwise, the recorder records, the logbook entries, the messages and the alarms will be sorted in the wrong chronological order.

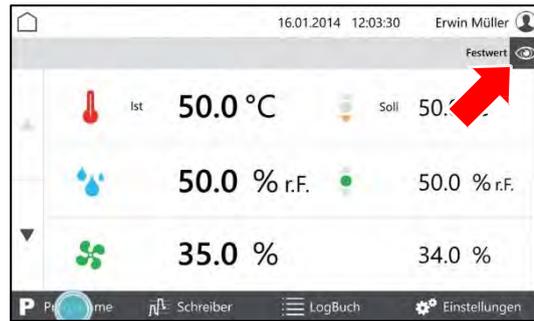
10.2 Main Menu



Item	Description	Description
A	Header of the control screens	See page 49
B	Overview of the adjustable parameters. <ul style="list-style-type: none"> • Touch to change a parameter value. • Arrow keys to call further parameters 	
C	Control screen "Programs" is displayed.	See page 53
D	Control screen "Recorder" is displayed.	See page 72
E	Control screen "Logbook" is displayed.	See page 74
F	Control screen "Settings" is displayed.	See page 75
G	Setpoint or program name. <ul style="list-style-type: none"> • Setpoint: The test and simulation unit operates with fixed parameter values: 	
H	Changing the display disposition	See page 52

10.2.1 Main Menu - Changing the Display Disposition

When touching the eye symbol in a control screen, a pull-down menu is displayed.

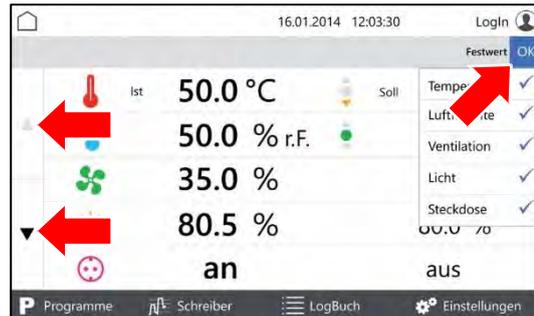


In the pull-down menu, tick the parameters, which shall be displayed on the first page and acknowledge by touching OK.

At least two and a maximum of five parameters can be displayed on the first page.

Further parameters might be displayed on the following pages.

The arrow keys on the left screen margin are used to call further pages.



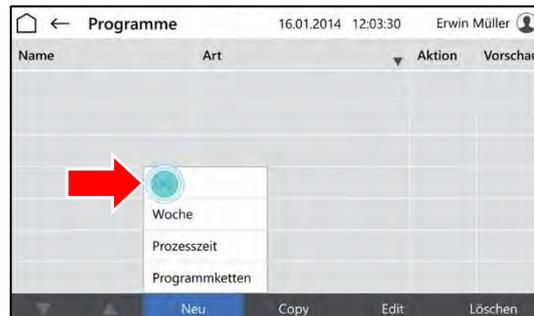
10.3 Programs



Item	Description
A	Header of the control screens <i>See page 49</i>
B	Overview of the entered programs with <ul style="list-style-type: none"> • Name of the program • Type of the program <ul style="list-style-type: none"> ○ Day Program ○ Week Program ○ Process time ○ Program chain • Action <ul style="list-style-type: none"> ○ Start (triangle) ○ Stop (square) • Preview <i>See page 69</i>
C	Arrow keys for scrolling the program list.
D	Selection of the program to be created. <ul style="list-style-type: none"> ○ Day Program ○ Week Program ○ Process time ○ Program chain (linking of existing programs for longer test periods)
E	Copy a marked program.
F	Edit a marked program.
G	Delete a marked program.

10.3.1 Creating a Day Program

1. Switch on the unit, *see page 44.*
 - Control screen "Main Menu" is displayed.
2. Touch the button PROGRAMS.
 - Control screen "Programs" is displayed.
3. Touch the button NEW.
 - List of program types is displayed.
4. Touch the button DAY PROGRAM.
 - Control screen "Name Day Program" is displayed.
5. Enter the program name.
 - Use only alphanumerical characters (no special characters)!
 - The program name is also the file name. So, the restrictions for the name are identical.
6. Touch the button SAVE.
 - Control screen "Day Program" is displayed.
7. Touch the button ADD PARAMETER.



- List of programmable parameters is displayed.
- Mark the parameters, which shall be used in the program.

HINT

Parameter temperature is always active.

- Touch the button OK.

- Programmable parameters are displayed.

- If desired, tick the checkbox PROTECTION.

HINT

With activated user management, a protected program can only be modified by the creator.

- Touch the parameter, which shall be set.

- Control screen "Edit Day Program" is displayed.

- Enter the time at which the parameter shall be achieved.

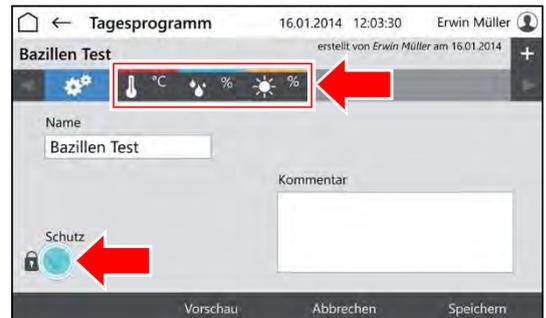
- Enter the parameter value for the time.

HINT

Touch the day time or the parameter to change the entry.

HINT

If the option multi-channel light control is used and the light levels shall be dimmed differently, the weakest luminous intensity must be set for the highest level and the further luminous intensities must be set downwards increasingly.



14. Touch the button INSERT ROW to insert a new program row.

- The new program row is always inserted below the row, which had been marked when touching INSERT ROW.
- The new program row always contains the parameter values of the previous row.
- Edit the parameter values after touching.
- The time can only be changed in time intervals between the previous and the following program row.



HINT

If the time of a program row shall be changed and also all following program rows shall be changed similarly:

- A. Touch the button MOVE TIMES.
- B. Change the time.
- C. Touch the button ACKNOWLEDGE.

The time values will be changed.

If the data for all parameters had been entered and the program is complete:

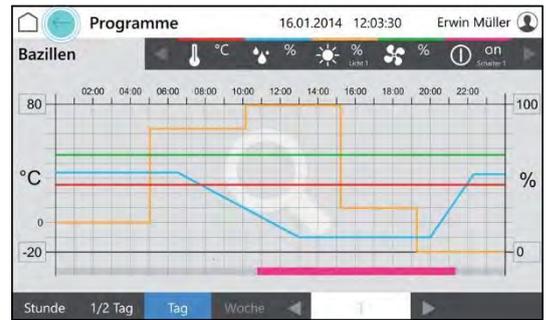
15. Touch the button SAVE and again the button SAVE in the pop-up window.



16. Touch the button PREVIEW to check the created program.

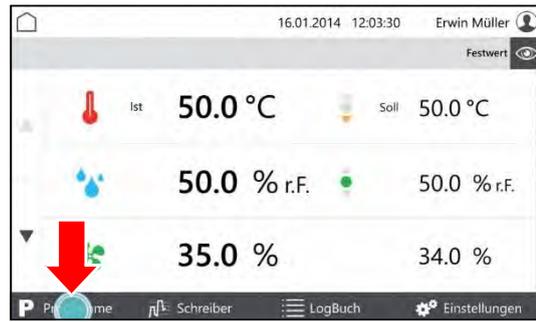


- Control screen "Preview" is displayed.
17. Check the time values and parameter values.



10.3.2 Creating a Week Program

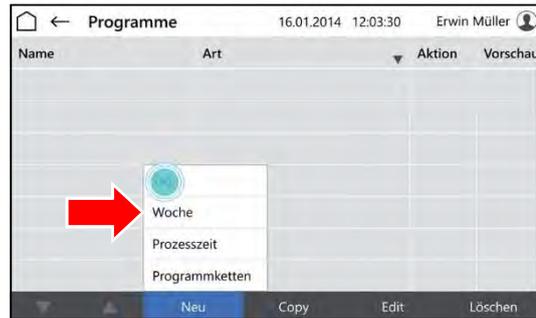
1. Switch-on the unit, see page 44.
 - Control screen "Main Menu" is displayed.
2. Touch the button PROGRAMS.



- Control screen "Programs" is displayed.
3. Touch the button NEW.



- List of program types is displayed.
4. Touch the button WEEK PROGRAM.



- Control screen "Name Week Program" is displayed.
5. Enter the program name. Use only alphanumerical characters (no special characters)! The program name is also the file name. So, the restrictions for the name are identical.



6. Touch the button SAVE.
 - Control screen "Week Program" is displayed.
7. Touch the button ADD PARAMETER.



- List of programmable parameters is displayed.
8. Mark the parameters, which shall be used in the program.

HINT

Parameter temperature is always active.

9. Touch the button OK.

- Programmable parameters are displayed.

10. If desired, tick the checkbox PROTECTION.

HINT

With activated user management, a protected program can only be modified by the creator.

11. Touch the parameter, which shall be set.

- Control screen "Edit Week Program" is displayed.

12. Enter the day on which the parameter value shall be achieved.

13. Enter the time at which the parameter shall be achieved.

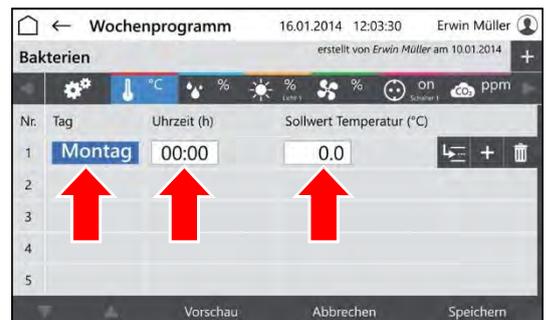
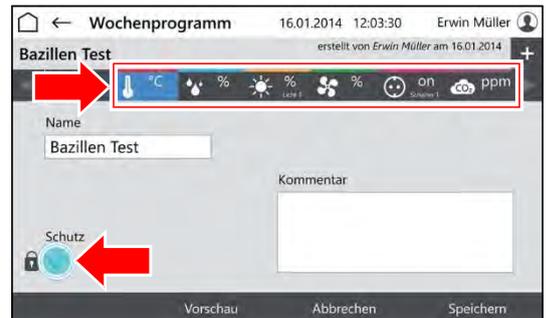
14. Enter the parameter value for the day and the day time.

HINT

Touch the day time or the parameter to change the entry.

HINT

If the option multi-channel light control is used and the light levels shall be dimmed differently, the weakest luminous intensity must be set for the highest level and the further luminous intensities must be set downwards increasingly.



15. Touch the button INSERT ROW to insert a new program row.

- The new program row is always inserted below the row, which had been marked when touching INSERT ROW.
- The new program row always contains the parameter values of the previous row.
- Edit the parameter values after touching.
- The time can only be changed in time intervals between the previous and the following program row.



HINT

If the time of a program row shall be changed and also all following program rows shall be changed similarly:

- A. Touch the button MOVE TIMES.
- B. Change the time.
- C. Touch the button ACKNOWLEDGE.

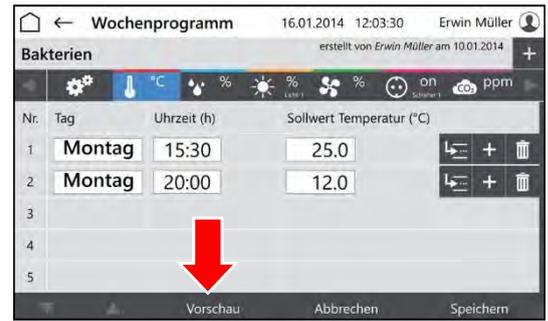
The time values will be changed.

If the data for all parameters had been entered and the program is complete:

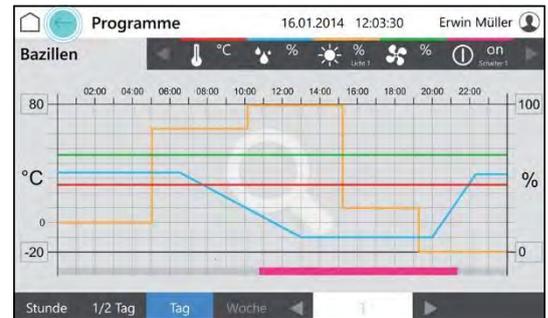
16. Touch the button SAVE and again the button SAVE in the pop-up window.



17. Touch the button PREVIEW to check the created program.

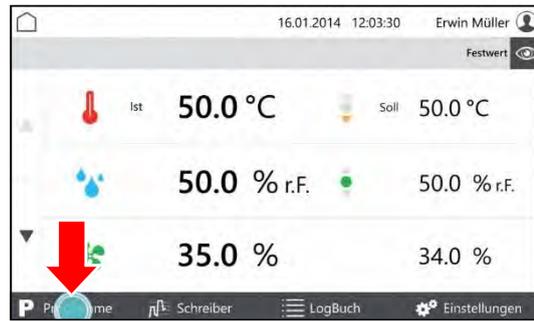


- Control screen "Preview" is displayed.
18. Check the time values and parameter values.



10.3.3 Creating the Process Time Program

1. Switch on the unit, *see page 44.*
 - Control screen "Main Menu" is displayed.
2. Touch the button PROGRAMS.
 - Control screen "Programs" is displayed.
3. Touch the button NEW.
 - List of program types is displayed.
4. Touch the button PROCESS TIME.
 - Control screen "Name Process Time" is displayed.
5. Enter the program name.
 Use only alphanumerical characters (no special characters)!
 The program name is also the file name.
 So, the restrictions for the name are identical.
6. Touch the button SAVE.
 - Control screen "Process Time" is displayed.
7. Touch the button ADD PARAMETER.



- List of programmable parameters is displayed.
8. Mark the parameters, which shall be used in the program.

HINT

Parameter temperature is always active.

9. Touch the button OK.

- Programmable parameters are displayed.

10. If desired, tick the checkbox PROTECTION.

HINT

With activated user management, a protected program can only be modified by the creator.

11. Define the number of cycles (A).

12. Define the behaviour of the control after the end of the process time (B).

13. Switch on or off the end signal (C).

14. Touch the parameter, which shall be set (D).

- Control screen "Edit Process Time" is displayed.

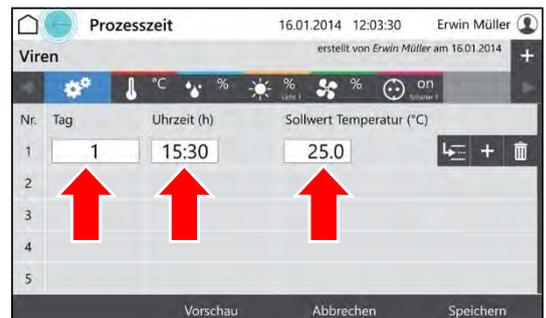
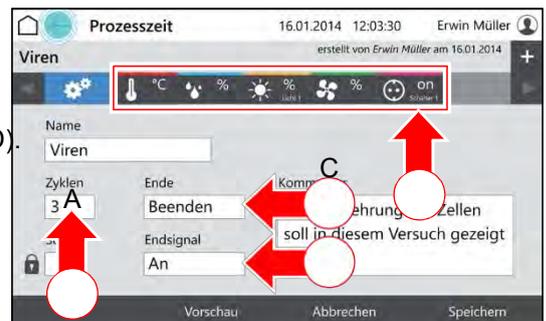
15. Enter the day on which the parameter value shall be achieved.

16. Enter the time at which the parameter shall be achieved.

17. Enter the parameter value for the day and the day time.

HINT

Touch the day time or the parameter to change the entry.



18. Touch the button INSERT ROW to insert a new program row.

- The new program row is always inserted below the row, which had been marked when touching INSERT ROW.
- The new program row always contains the parameter values of the previous row.
- Edit the parameter values after touching.
- The time can only be changed in time intervals between the previous and the following program row.



HINT

If the time of a program row shall be changed and also all following program rows shall be changed similarly:

- A. Touch the button MOVE TIMES.
- B. Change the time.
- C. Touch the button ACKNOWLEDGE.

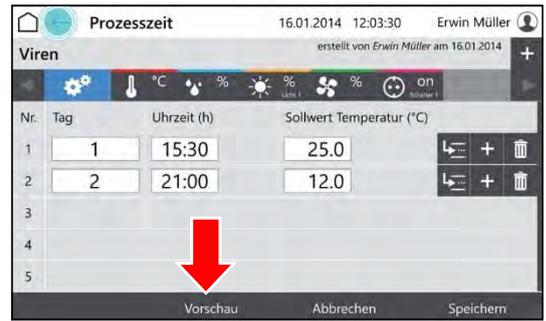
The time values will be changed.

If the data for all parameters had been entered and the program is complete:

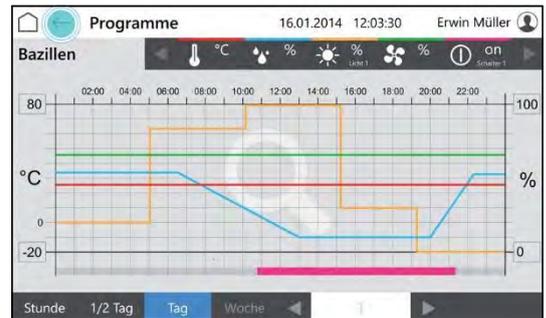
19. Touch the button SAVE and again the button SAVE in the pop-up window.



20. Touch the button PREVIEW to check the created program.



- Control screen "Preview" is displayed.
21. Check the time values and parameter values.



10.3.4 Creating a Real-Time Program

1. Creating a process time program, see page 62.
2. Start the program, see page 70 and define a start time.

10.3.5 Creating a Program Chain

A program chain executes a series of programs (day program, week program, process time) in a defined manner.

The corresponding programs for the program chain must have been already created.

- Creating a day program, *see page 54.*
- Creating a week program, *see page 58.*
- Creating a process time, *see page 62.*

1. Switch on the unit, *see page 44.*

- Control screen "Main Menu" is displayed.

2. Touch the button PROGRAMS.



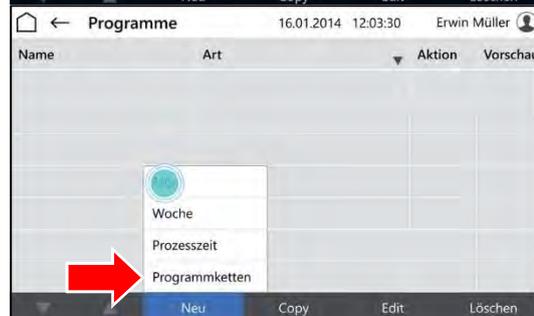
- Control screen "Programs" is displayed.

3. Touch the button NEW.



- List of program types is displayed.

4. Touch the button PROCESS CHAIN.



- Control screen "Name Process Chain" is displayed.
- Enter the program name.
 - Touch the button SAVE.



- If desired, tick the checkbox PROTECTION.

HINT

A protected program can only be modified by the creator.



- Define the number of cycles (A).
- Define the behaviour of the control after the end of the process time (B).
- Switch on or off the end signal (C).
- Touch the chain symbol (D).



- Control screen "Edit Program Chain" is displayed.
- Touch the field "Program" in the first row.



- Control screen "Select Program" is displayed.

13. Touch the desired program.

14. Touch the button ACKNOWLEDGE.



- Control screen "Edit Program Chain" is displayed.

15. Enter the number of repetitions of the program.



16. Touch the button INSERT ROW to insert a new program row and to add a further program to the program chain.

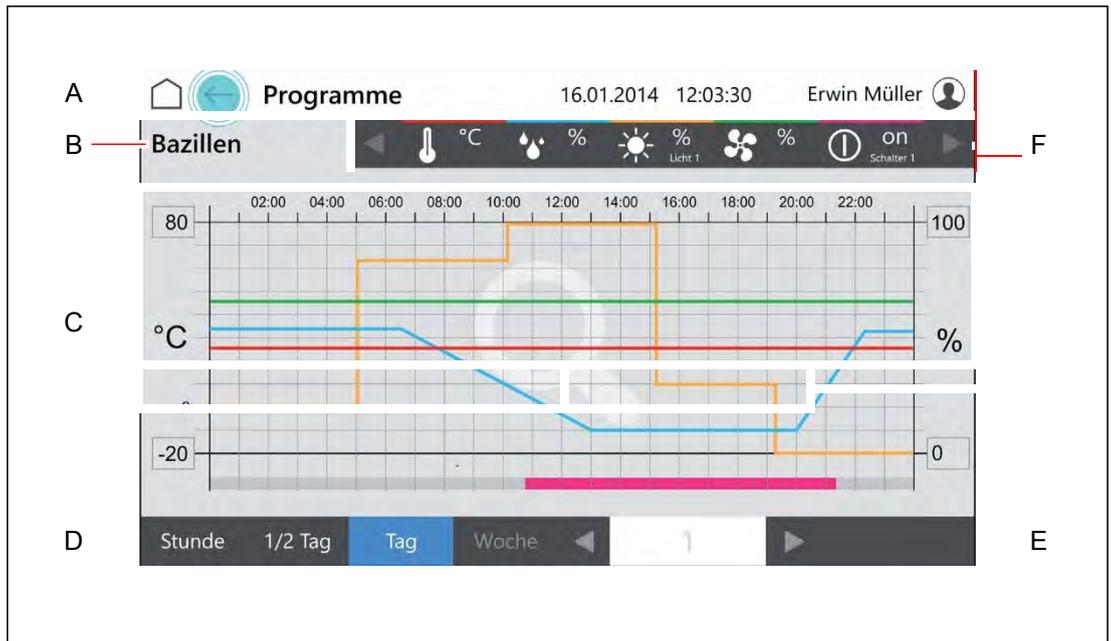


If the program is complete:

17. Touch the button SAVE and again the button SAVE in the pop-up window.



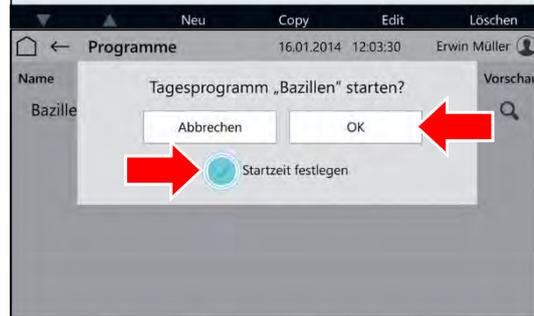
10.3.6 Preview



Item	Description
A	Header of the control screens <i>See page 49</i>
B	Program name
C	Overview of the parameter settings of the program for a selected period.
D	Selection of the overview period
E	Scrolls forward or scrolls back for selected period (hour, ½ day etc.).
F	Parameter with colour coding in the overview. <ul style="list-style-type: none"> • Touching the parameter shows or hides the parameter in the overview. <ul style="list-style-type: none"> - Hidden parameters are represented in grey. • Arrow keys to call further parameters.

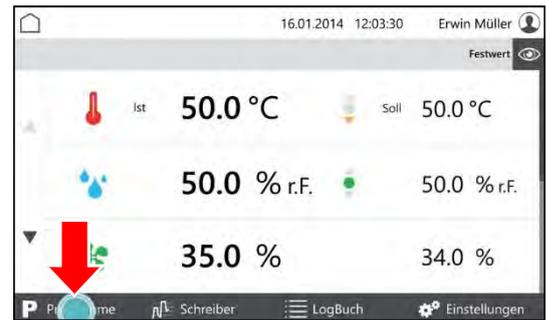
10.3.7 Program Start

1. Switch on the unit, *see page 44*.
 - Control screen "Main Menu" is displayed.
2. Touch the button PROGRAMS.
 - Control screen "Programs" is displayed.
3. Touch the ▶ button (START).
 - Pop-up window is displayed.
4. Touch the button OK to start the program immediately or tick the checkbox DEFINE START TIME to start the program later.
 - Pop-up window will be extended by the date entry.
5. Enter the start time.
6. Touch the button OK.



10.3.8 Program Stop

1. Touch the button PROGRAM in the control screen "Main Menu".

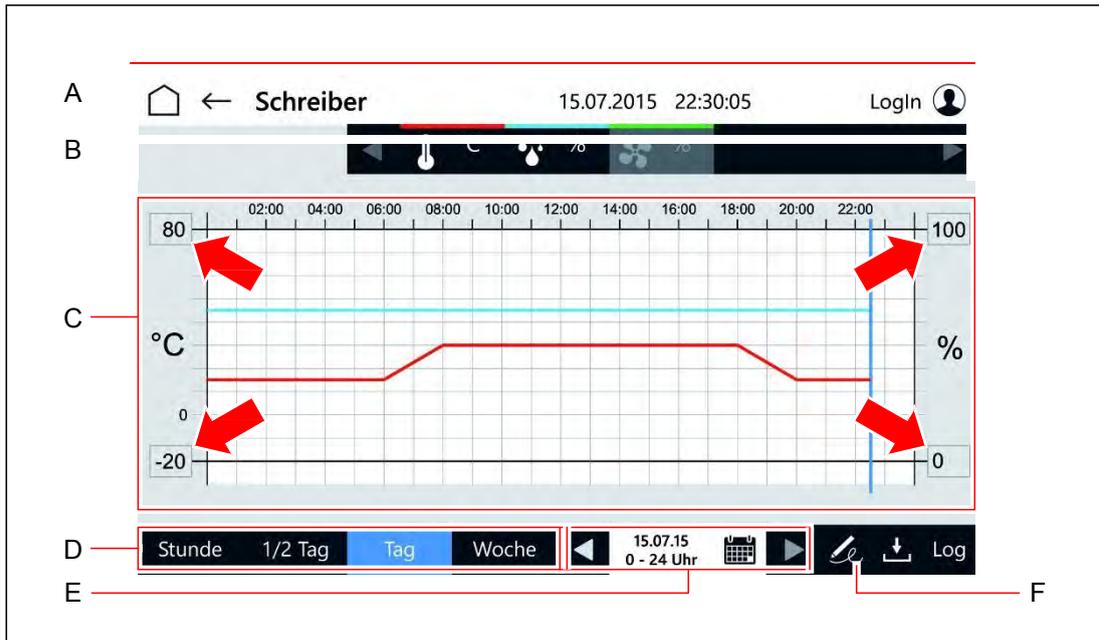


- Control screen "Programs" is displayed.
2. Touch the button (STOP) in the row of the executed program.
- The program will be stopped.



- Pop-up window is displayed.
3. Touch the button STOP to stop the program immediately.

10.4 Recorder



Item	Description
A	Header of the control screens <i>See page 49</i>
B	Parameter with colour coding in the overview. <ul style="list-style-type: none"> Touching the parameter shows or hides the parameter in the overview. Hidden parameters are represented in grey. Arrow keys to call further parameters.
C	Overview of the actual values of the parameter in the selected period. <ul style="list-style-type: none"> Touch the maximum or minimum parameter value at the axis to adapt the displayed interval. Touch the diagram to zoom. The time data on which the test room door had been opened are shown by a corresponding symbol on the bottom of the
D	Selection of the overview period
E	<ul style="list-style-type: none"> Display of the overview period Arrow keys: Scrolls forward or scrolls back for selected period (hour, ½ day etc.). Calendar symbol: Control screen "Selection Recorder Display" is displayed. <i>See page 73</i>
F	Creating a signature <ul style="list-style-type: none"> A user with the corresponding user rights can assign a signature to a period. The period depends on the selection of the overview period (D) and starts with the beginning of the selected period (such as calendar week) or from the end of the last period, which had been signed, until the current time. The signed period is marked with a signature symbol and a blue dashed line at the bottom of the overview area (C).

Selection Recorder Display



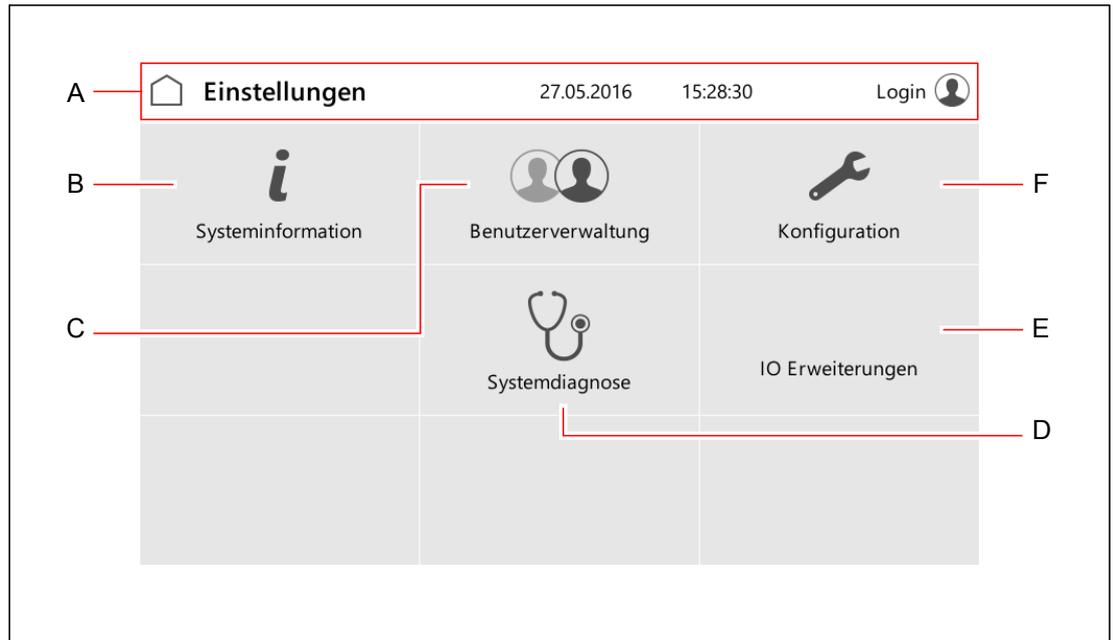
Item	Description
A	Header of the control screens <i>See page 49</i>
B	Calendar overview for selection of the overview period for the recorder. <ul style="list-style-type: none"> Light blue: selected days Grey: Days without recorder data
C	Selection of the overview period
D	<ul style="list-style-type: none"> Display of the overview period Arrow keys: Scrolls forward or scrolls back for selected period (hour, ½ day etc.).
E	Creating a signature <ul style="list-style-type: none"> A user with the corresponding user rights can assign a signature to a period. The period depends on the selection of the overview period (D) and starts with the beginning of the selected period (such as calendar week) or from the end of the last period, which had been signed, until the current time.

10.5 Logbook



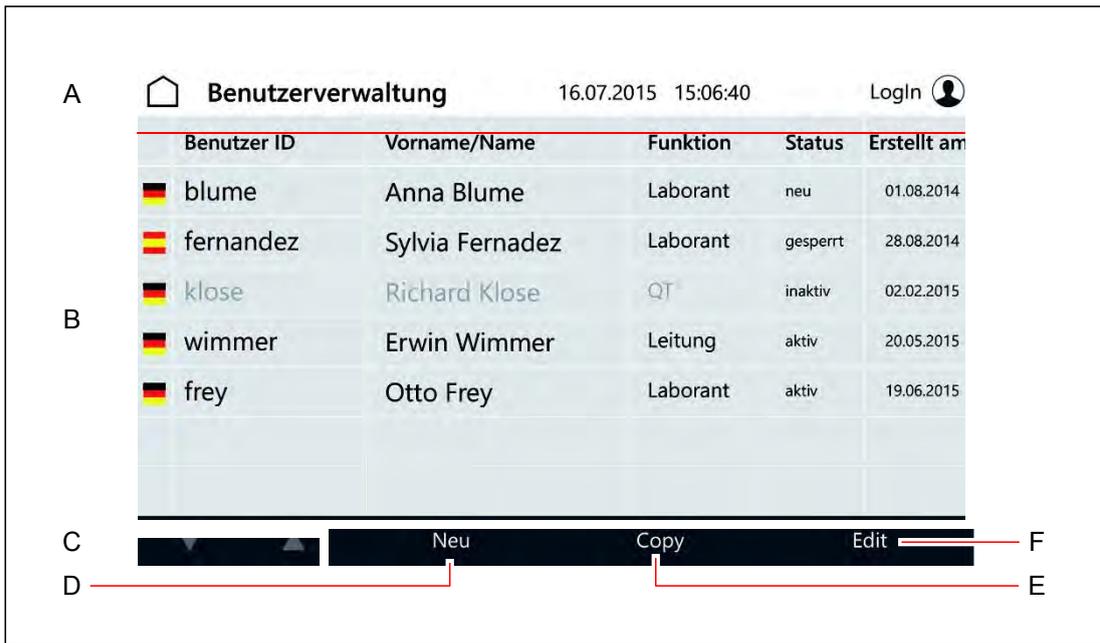
Item	Description
A	Header of the control screens <i>See page 49</i>
B	Overview of the messages in a selected period with <ul style="list-style-type: none"> • Date • Message or comment text <ul style="list-style-type: none"> – Comments can be displayed completely or reduced by touching the preceding triangle. • Message type <ul style="list-style-type: none"> – The overview can be filtered according to message type by touching the filter symbol.
C	Arrow keys for scrolling the message overview.
D	Selection of the start point of the interval with messages to be displayed.
E	Selection of the end point of the interval with messages to be displayed.
F	Entry field for comments is opened. <ul style="list-style-type: none"> • Only available with the corresponding user rights. • Write the comments completely, clearly and correct. After saving, they cannot be changed anymore. • Write the comments in the language, which is understood by all employees.

10.6 Settings



Item	Description	Description
A	Header of the control screens	See page 49
B	Control screen "System Information" is displayed.	
C	Control screen "User Management" is displayed.	See page 76
D	Control screen "System Diagnostics" is displayed. <ul style="list-style-type: none"> Only for service personnel. 	
E	Control screen "I/O Extensions" is displayed. <ul style="list-style-type: none"> Only for service personnel. 	
F	Control screen "Configuration" is displayed. <ul style="list-style-type: none"> Only for service personnel. 	

10.6.1 User Management



Item	Description
A	Header of the control screens <i>See page 49</i>
B	Overview of the existing users with: <ul style="list-style-type: none"> • Language (visualization is displayed in the corresponding language of the user) • User ID • Name • Function (free input) • Status <ul style="list-style-type: none"> – new – blocked – active – inactive • Creation date
C	Arrow keys for scrolling the user overview.
D	Creating a new user. <i>See page 81</i>
E	Copy a marked user. <ul style="list-style-type: none"> • Users with identical or similar settings and rights can be created quickly.
F	Edit the marked user. <ul style="list-style-type: none"> • Adapt the settings and rights of the user.

10.7 Set-up of the User Management

HINT

Be aware, that activation of the user management results in storage of personal data. Consult your data protection supervisor and include the appliance in the list of processing activities.

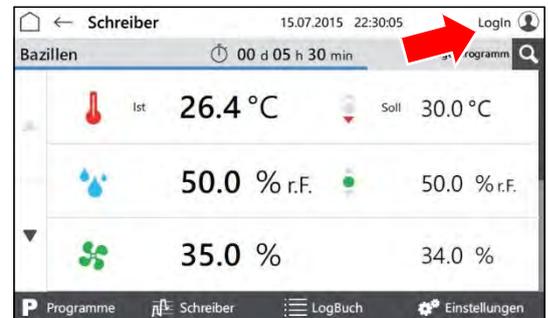
HINT

For the set-up of the user management, a coherent concept concerning the users and their rights is required, which should be made before.

If a user had been created, it cannot be deleted anymore!

If you need help in the set-up of the user management, please address to Rubarth Apparate GmbH.

1. Ask Rubarth Apparate GmbH for the user name and the corresponding password being required for the set-up of the user management.
2. Switch on the unit, see page 44.
3. Touch the button LOGIN.



- Control screen "User Login" is displayed.
4. Touch the button LOG-IN NAME.



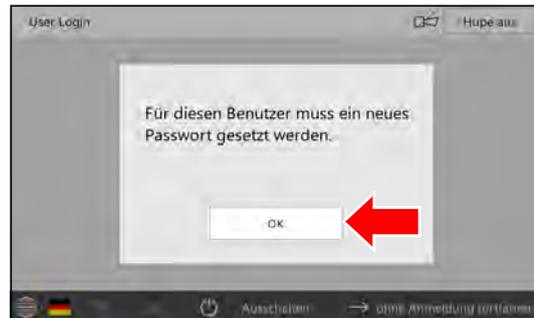
- Entry screen for the user is displayed.
5. Enter the user, which had been stated by Rubarth Apparate GmbH.
 6. Touch the button CONTINUE.



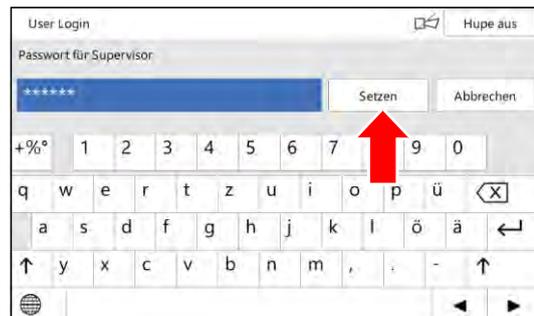
- Entry screen for the password is displayed.
7. Enter the password, which had been stated by Rubarth Apparate GmbH.
 8. Touch the button LOGIN.



- The information concerning the password modification is displayed.
9. Touch the button OK.



- Entry screen for the new password is displayed.
10. Enter the new password.
 11. Touch the button SET.
 12. Repeat the entered password.



- Confirmation is displayed.
13. Touch the button OK.

The set-up is finished and user accounts can be defined.

HINT

The system administrator and the users are responsible for the administration of their entered passwords!

HINT

After that, all rights for modifications and settings of the user "Login" must be cancelled, which only shall be executed by the logged-in users.

It is recommended to retain the right to switch off the horn.

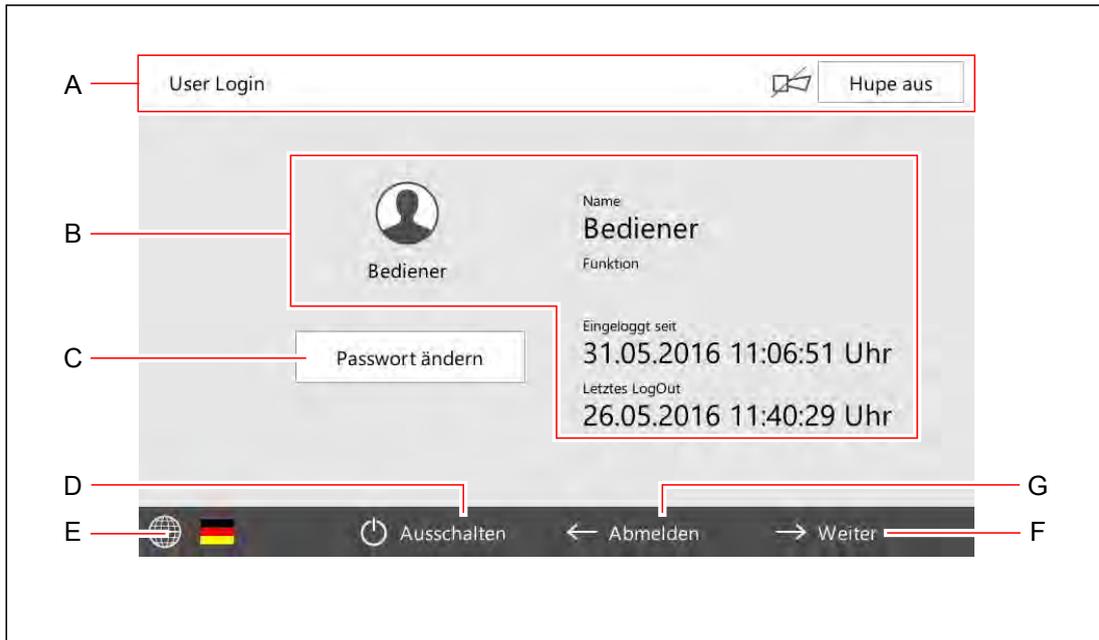


10.8 User Login



Item	Description	Description
A	Header of the control screens	See page 49
B	The existing users are displayed and can be selected. <ul style="list-style-type: none"> Control screen "User LOGIN" for entry of the password is displayed. After entry of the password, the control screen "User" is displayed. Disabled users are shown greyed and have the symbol of a lock. 	See page 80
C	Log in with user ID and password.	
D	Control is switched-off.	
E	Language is changed.	
F	The button is only available for particular configurations, assignment of rights and operating state.	

10.9 User



Item	Description	Description
A	Header of the control screens	See page 49
B	Information concerning the logged-in user.	
C	Change password of the user being currently logged-in.	
D	Control is switched-off.	
E	Language is changed.	
F	Control screen "Main Menu" is displayed.	See page 51
G	User log-off. • Control screen "User Login" is displayed.	See page 79

10.10 User Creation

HINT

If the new user shall get identical or similar settings and rights as an existing user, call the control screen "User Management" and copy the existing user (touch the button COPY). The user will be saved with new user ID.

1. Switch on the unit, see page 44.
2. Touch the button LOGIN.



3. Log-in as user with the corresponding rights.



- Control screen "User" is displayed.
4. Touch the button CONTINUE.



- Control screen "Main Menu" is displayed.
5. Touch the button SETTINGS.



- Control screen "Settings" is displayed:
- Touch the button USER MANAGEMENT.



- Control screen "User Management" is displayed.
- Touch the button NEW.

HINT

If the new user shall get identical or similar settings and rights as an existing user, mark it and touch the button COPY.



- Control screen "Edit User" is displayed.
- Enter the user data.
 - Change to the screen "User Rights".



- Control screen "User Rights" is displayed.
- Tick the checkbox for the user rights to be selected or deselected.
 - Touch the button SAVE.
- The new user is entered.



10.11 Changing User Rights

1. Switch on the unit, see page 44.
2. Touch the button LOGIN.



3. Log-in as user with the corresponding rights.



- Control screen "User" is displayed.
4. Touch the button CONTINUE.



- Control screen "Main Menu" is displayed.
5. Touch the button SETTINGS.



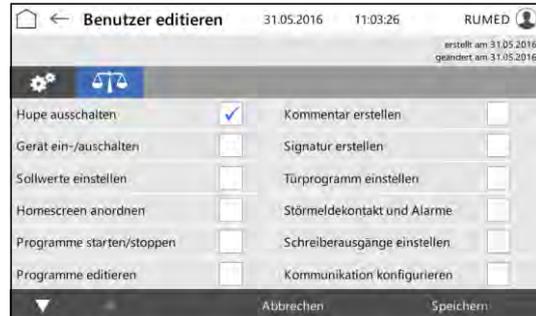
- Control screen "Settings" is displayed:
6. Touch the button USER MANAGEMENT.



- Control screen "User Management" is displayed.
- 7. Mark the user whose rights shall be changed.
- 8. Touch the button EDIT.

- Control screen "Edit User" is displayed.
- 9. Change to the screen "User Rights".

- Control screen "User Rights" is displayed.
- 10. Tick the checkbox for the user rights to be selected or deselected.
- 11. Touch the button SAVE.
- The user rights are changed.



11 Maintenance

 **DANGER**

Danger to life due to electrical current!

The unit with the extension of the temperature range to +80 °C is operated with three-phase current.

- De-energize the unit completely and protect it from unintentional restart prior to any work at electrical components. *See page 43.*
- If the power supply is required for the work, the atmosphere at the unit must be checked and supervised permanently for explosion proofness by authorized specialists prior and during the work.

 **DANGER**

Danger to life due to electrical current!

The unit without extension of the temperature range to +80 °C is operated with 230 V, 50 Hz.

- De-energize the unit completely and protect it from unintentional restart prior to any work at electrical components.

NOTE

Property Damage!

Metal objects, which are placed on or in the unit and which do not consist of stainless steel, might damage the stainless-steel surfaces of the unit due to formation of extraneous rust.

- Never place metal objects, which do not consist of stainless steel, on or in the unit.

11.1 Maintenance Table

No.	Maintenance Task	Interval	Remark
1	Refill the water canister.	As required, at least once a week.	Rinse occasionally.
2	Changing the Ion Exchanger Cartridge	If conductivity <20 µS/cm.	<i>See page 92</i>
3	Cleaning and maintenance of the ultrasonic humidifier.	Every 6 months	Only by service personnel. Operational check after cleaning. <i>See page 91.</i>
4	Defrosting the Unit	As required	Never use sharp objects for removal of ice. <i>See page 87.</i>
5	Cleaning the Unit	As required	<i>See page 87</i>
6	Empty and clean the condensate collecting pan.	As required, at least once a week.	

No.	Maintenance Task	Interval	Remark
7	Aspiration of the fan grill	As required, at least every 6 months.	See page 86
8	Changing the filter at the ultrasonic humidifier	As required	See page 90
9	Clean the water canister	As required	
10	Check the door gasket.	Once a year.	Door gasket must be undamaged and sit perfectly.
11	Dismantling and Cleaning the Condensate Drain Valves	Once a year.	See page 88
12	Check the ground straps and the	Once a year.	See page 90

11.2 Maintenance Tasks

11.2.1 Aspiration of the fan grill

CAUTION

Risk of injury at the fan grill!
 When cleaning the fan grill take care to avoid cutting your hands at the sharp-edged lamellae.
 → Wear safety gloves when cleaning the lamellae with the hands.

NOTE

Property Damage of the Fan Grill!
 When aspirating the fan grill, the lamellae might be damaged.
 → Never press the vacuum cleaner nozzle against the lamellae.



1. Aspirate the fan grill using a vacuum cleaner or clean it by hand using a smooth brush.

11.2.2 Defrosting the Unit

NOTE

Damage of the Unit!

If sharp objects are used for removal of ice, the unit might be damaged.

→ Never use sharp objects for removal of ice.

1. Remove the specimen.
2. Switch the humidity off.
3. Heat the unit up to maximum temperature.
4. Keep the temperature for one hour.
If required, remove the ice from the condensate collecting pan in the rear lower area of the test room from time to time to accelerate the drying.
5. Open the door for approx. 2 min.
6. Check the test room for humidity, particularly the condensate collecting pan.
7. If required, heat again up and open the door until the test room is dry.
8. Clean the unit after defrosting. *See page 87.*
9. Set the temperature controller to the desired temperature.

11.2.3 Cleaning the Unit



WARNING

Warning of hot surfaces!

Risk of burning when cleaning the test room of units with extension of the temperature range to +80 °C.

→ Ensure that the test room temperature is below 30 °C prior to cleaning.

NOTE

Damage of the Unit!

Never use steel wool to clean the unit. Otherwise the stainless-steel surface is damaged, which results in corrosion.

- Never use steel wool to clean the unit.
- Stubborn soiling can be removed with a cleaning fleece.
Carefully check the suitability of the cleaning fleece.

HINT

Use demineralized water for cleaning to avoid dry stains.

HINT

Polished stainless-steel surfaces must always be cleaned in direction of the polishing.

1. Remove the specimen and the shelves.
2. Clean the shelves and the surfaces in the test room and the outer surfaces of the unit using a damp antistatic cloth.

Removal of Extraneous Rust

- Insignificant, surficial stains:
Remove them with commercial mild cleansing milk or polishing agent (containing calcium carbonate with additional surface-active substances).
Household cleaning agents for stainless steel on basis of citric acid are also suitable.



WARNING

Risk of injury by etching material!

Risk of injury when using etching material!

- Observe the manufacturers specifications and the regulations for industrial safety and environmental protection.
- Wear protective clothing.

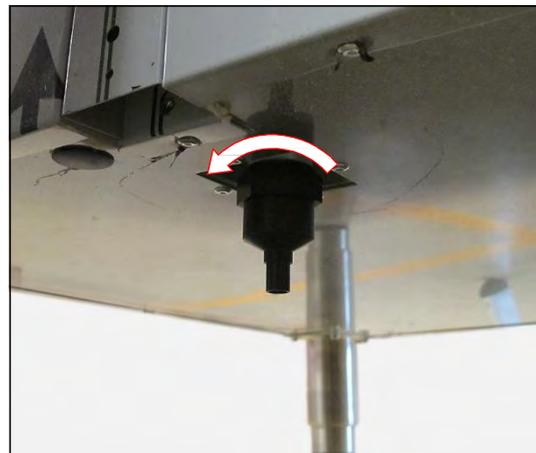
- Moderate rust-like soiling:
Use phosphoric acid cleaners for removal. Proceed carefully to avoid undesirable changes of the surface.
If small tramp iron particles have already penetrated the surface, they can also be removed by means of diluted nitric acid.

11.2.4 Dismantling and Cleaning the Condensate Drain Valves

Condensate drain valves must be dismantled and cleaned once a year. If required, replace the floating ball.

Observe the correct seat of the O-ring when assembling the condensate drain valve.

1. Unscrew the condensate drain valve below the unit.



2. Unscrew the condensate drain valve.



3. Clean the ball of the condensate drain valve or replace it, if required.
4. Insert the cleaned or new ball.

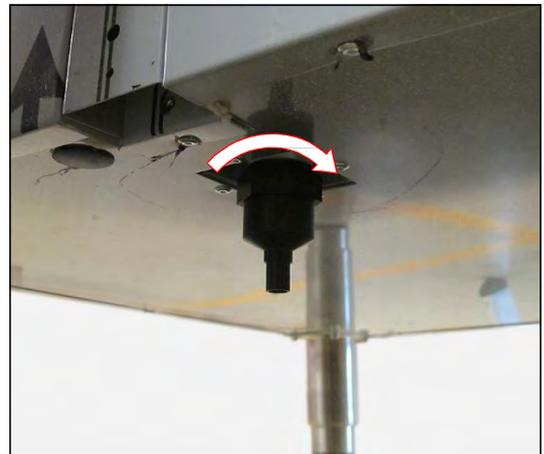


5. Screw the condensate drain valve together.
6. Check the function of the condensate drain valve:
 - Fill water into the condensate drain valve.
 - The ball must float.
 - The water is drained until the ball drops and closes the drain.



7. Insert the condensate drain valve below the unit and tighten the screws.

The maintenance of the condensate drain valve is finished.



11.2.5 Changing the filter at the ultrasonic humidifier

If the filter at the ultrasonic humidifier is extremely soiled, it must be replaced.

1. Remove the soiled filter.
2. Insert the new filter.



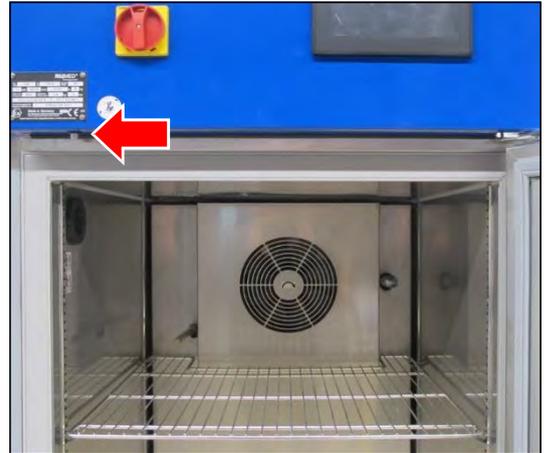
11.2.6 Checking the ground straps and the stopper

1. Check the ground straps on the inside and outside of the door for correct seat and soundness.
2. Check the stopper on the outside of the door for correct seat and soundness.



11.2.7 Checking the humidifier function

1. Bridge the door limit switch by means of a magnet.
(The magnet at the door can be removed and used for bridging.)



2. Open the door.
The door limit switch should not open and activate the door program!
Fog must escape in intervals from the humidity blow-in pipe next to the fan.



HINT
Units with two doors (T 1000 and T 1640) are equipped with two humidifiers. The function of both humidifiers must be checked.

HINT
This check of the humidifier function might generate an alarm message "Low humidity" at the control.
The horn must be switched-off and a comment must be entered into the logbook.

If no fog is produced:

3. Close the door after having executed the check.
4. Check the water supply and clean the humidifier, if required.
Cleaning of the humidifier should be performed only by authorized service personnel of Rubarth Apparate GmbH.
5. Repeat the check.

11.2.8 Changing the Ion Exchanger Cartridge

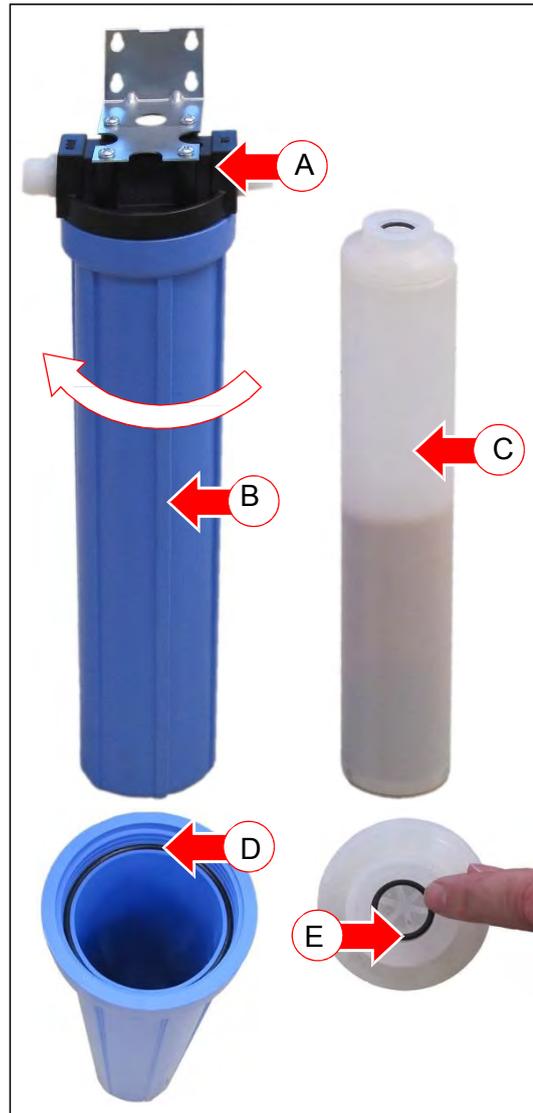
1. Close the water supply.
2. Make a water collecting tray available.
3. Release pressure, for instance by loosening the hose at the inlet of the ion exchanger. Collect the water in the collecting tray.
4. Remove the blue sleeve of the ion exchanger (B). Use tool (F), if required. When unscrewing the blue sleeve of the ion exchanger by hand, hold the sleeve in the lower area and turn it.
5. Check, if the seal (E) at the old ion exchanger cartridge is still present, or if it is still on the shaft of the black support (A). Remove it from there.
6. Empty the residual water from the sleeve of the ion exchanger.
7. Check the seal (D).
8. Check the gasket (E) at the new ion exchanger cartridge (C).
9. Insert the ion exchanger cartridge into the sleeve of the ion exchanger.
10. Fasten it.

HINT

Spare cartridges must always be stored in the original packaging in a dark, cool and dry place for no longer than 12 months.

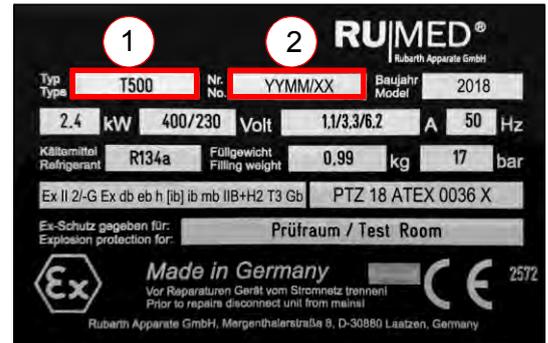
HINT

Use the corresponding tool (F) to loosen the blue sleeve of the ion exchanger. Push the tool from below as far as possible upwards above the sleeve of the ion exchanger and loosen the sleeve of the ion exchanger.



12 Service

In case of a service enquiry by means of our questionnaire (www.rumed.de/serviceanfrage/), please enter always the unit type (1) and the serial number (2) into the enquiry form. These details are indicated on the nameplate of your unit. See page 11.



HINT

Fault diagnosis is facilitated, if you send us

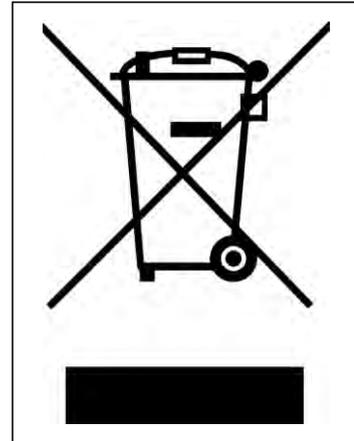
- an error description, which is as detailed as possible, including photographs,
- the logbook file and the alarm messages,
- the recorder records with the corresponding time interval before and after the error.

13 Disposal

Please observe the country-specific laws and regulations for disposal of the unit.

Particularly observe the following for disposal of the unit:

- Refrigerants, fluorescent lamps, oil and storage batteries must be disposed properly.
- Component parts of the unit must be cleaned and must be collected separately as metal scrap and electronic scrap.
- Possibly decontaminated and disinfected metallic components must be disposed as scrap metal.
- Possibly decontaminated and disinfected electrical components must be disposed as electronic scrap.
- For vendor parts, the disposal instructions of the corresponding manufacturer are valid.



HINT

On the customer's request and after thorough cleaning by the customer, all components can be removed, transported and disposed properly by the technicians of Rubarth Apparate GmbH with invoicing of the expenses.

Imprint

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