

Operating Manual



Test and Simulation Equipment

for quality control,
research and production

Safety X-Line

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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:

- Installation of the unit only in explosive areas of zone 1.
- 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.
- 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/EC
 - 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 60079-18:2015
 EN 60079-1:2014 ISO 80079-36:2016-02
 EN 60079-7:2015 ISO 80079-37:2016-02
 EN 60079-11:2012

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 13849-1:2016-6
 EN ISO 12100:2010 EN ISO 13849-2:2013-2
 EN 349:2008-9 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: **X320, X500, X820, X1000 und X1640**

Kennzeichnung: **Ex II 2 G Ex db eb h [ib] ib mb IIB 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!

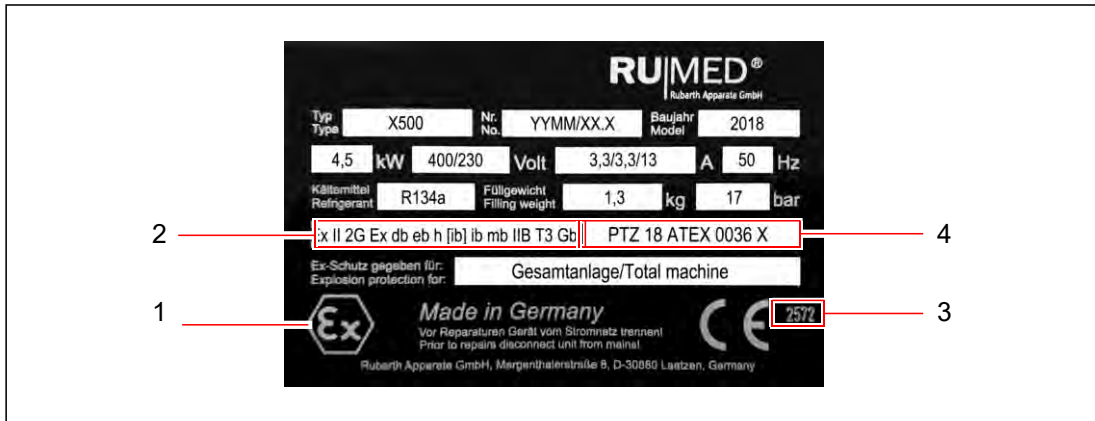
Metal objects, which are placed on or in the unit and which do not consist of stainless steel, might damage the stainless-steel surfaces of the unit due to formation of extraneous rust.

→ 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.
	2G	Zone 1: 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-electrical appliances
	[ib]	Intrinsic safety: associated electrical equipment - Installation in safe area
	ib	Intrinsic safety: Application in zone 1 and zone 2
	mb	Encapsulation: Application in zone 1 and zone 2
	IIB	Suitable for gases of group IIA and IIB
2	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 Description

The test and simulation equipment allows 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 appliances of the X-Line are approved for installation in zone 1 and zone 2.

The supply of the temperature sensors in the test room is executed intrinsically safe. The optimum temperature distribution in space is achieved by installation of the fan wheel and drive motor in the test room. Both have an ex certificate.

In case of a temperature extension to +80 °C, the drive of the test room air circulation is located outside the cabinet, but it has also an ex certificate.

Standard heating is effected with hot gas of the refrigerating system. In case of the option +80 °C, heating is effected by an additional heater with ex certificate in the test room with the type of protection "increased safety".

For separation, the test room is sealed all around to largely avoid a carryover of the explosive atmosphere.

The switch cabinet is located in a pressure-proof housing. 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 electrical 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 and the refrigerating machine are located in a separate volume in the upper part of the test and simulation equipment, and they are executed explosion-proof. During the disconnection due to the opened door, the control continues working. The explosion protection is here ensured by the explosion-proof execution of the temperature controller.

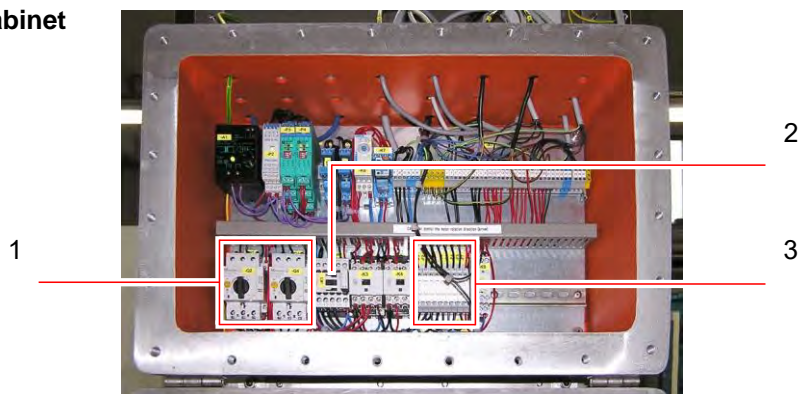
The maximum admissible ambient temperature of the test and simulation equipment is +30 °C. Minimum and maximum test room temperatures are 0 °C/+35 °C (standard execution) or +80 °C (upper temperature extension) and -20 °C (lower temperature extension).

3.3 Overview

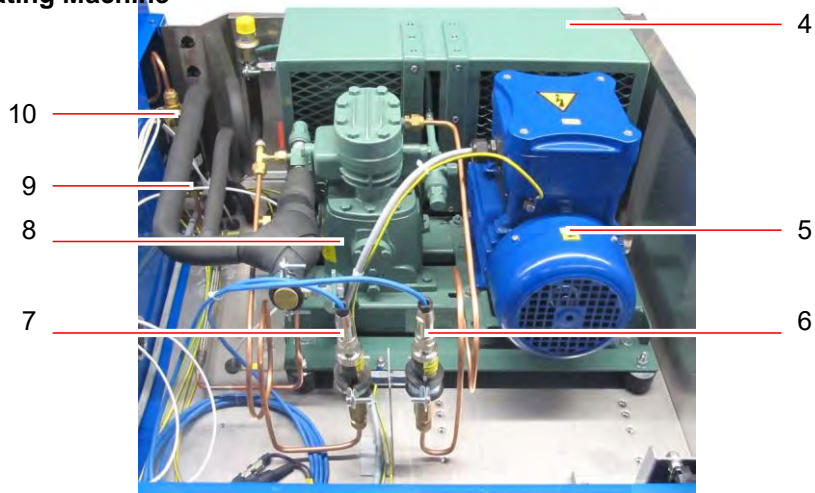


Item	Designation
1	Refrigerating machine
2	Control and display elements
3	Recirculating air cycle (motor at rear side in case of optional extension of the temperature range to +80 °C)
4	Test room
5	Condensate collecting pan (option)
6	Feet, adjustable in height
7	Steering rollers (option)
8	Switch cabinet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

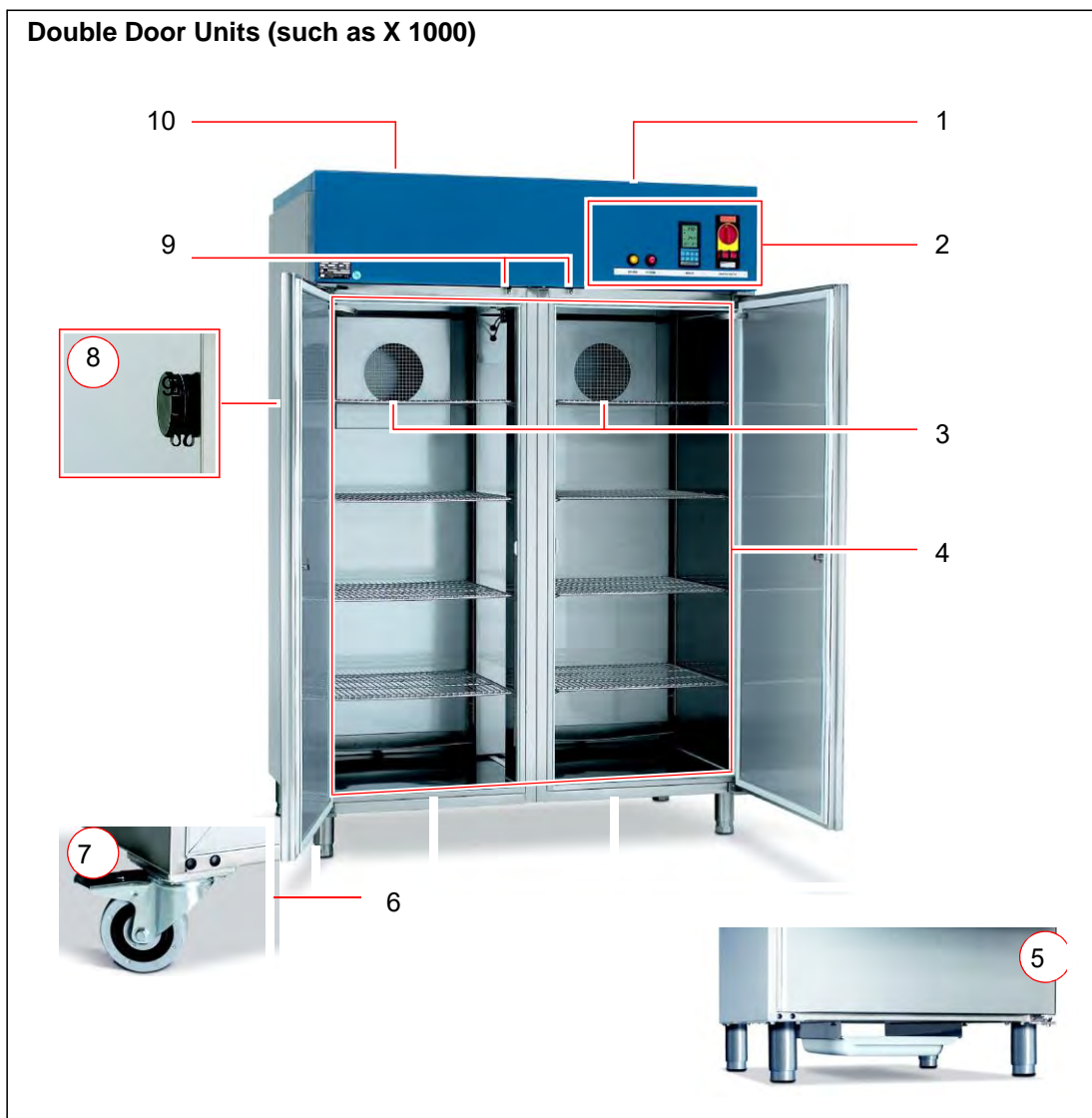
**Switch Cabinet
(Rear)**



Refrigerating Machine

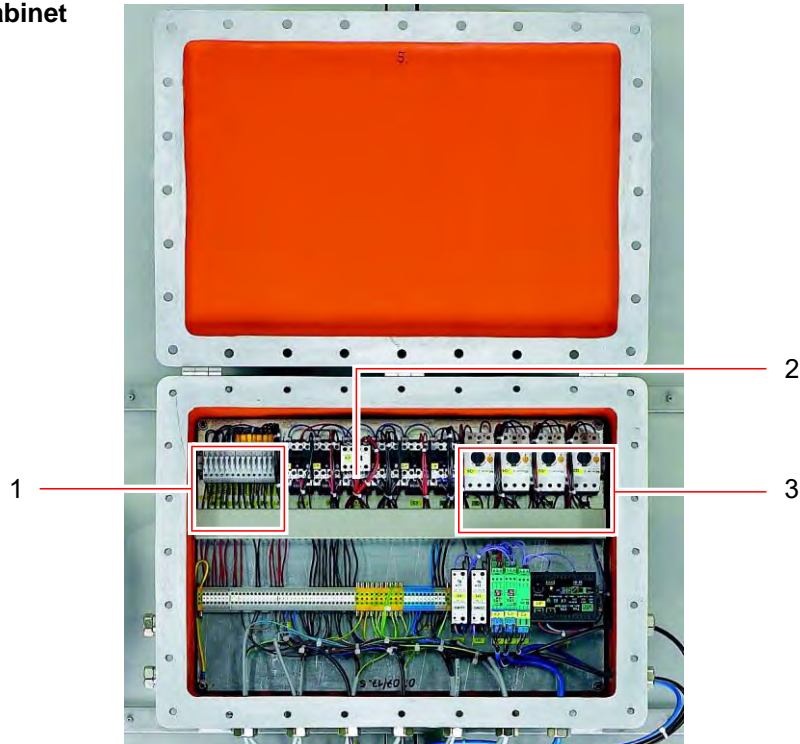


Item	Designation
1	Protective motor switch (refrigerating machine and recirculating air fan)
2	Residual current circuit breaker (in case of optional extension of the temperature range to +80 °C)
3	Fuses
4	Belt protective cover
5	Drive motor refrigerating machine
6	Pressure transmitter high pressure
7	Pressure transmitter low pressure
8	Chiller
9	Inspection glass oil
10	Inspection glass refrigerant

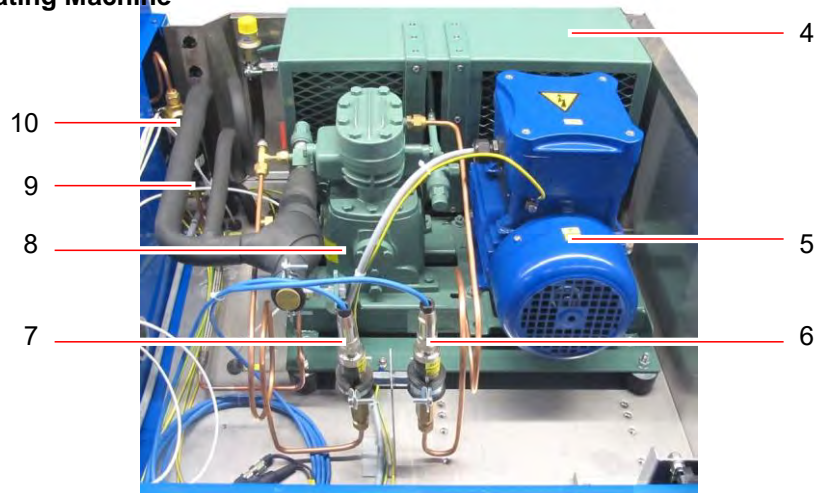


Item	Designation
1	Refrigerating machine
2	Control and display elements
3	Recirculating air cycle (motor at rear side in case of optional extension of the temperature range to +80 °C)
4	Test room
5	Condensate collecting pan (option)
6	Feet, adjustable in height
7	Steering rollers (option)
8	Tubular port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

Switch Cabinet



Refrigerating Machine



Item	Designation
1	Fuses
2	Residual current circuit breaker (in case of optional extension of the temperature range to +80 °C)
3	Protective motor switch (refrigerating machine and recirculating air fan)
4	Belt protective cover
5	Drive motor refrigerating machine
6	Pressure transmitter high pressure
7	Pressure transmitter low pressure
8	Chiller
9	Inspection glass oil
10	Inspection glass refrigerant

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.
- 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 is only allowed in explosive areas of zone 1.
- 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 X-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 and IIB.

Use of the ex-proof appliance of the Safety X-Line in explosive areas is exclusively allowed in areas of zone 1 and zone 2.

The test room is approved for zone 1 and zone 2.

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:

- 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

The unit is approved for zone 1 and zone 2. The test room is approved for zone 1 (marking 2G).

Explosion Zone, Gases, Vapours and Fogs (EN 60 079-10)	Unit Category	A dangerous, potentially explosive atmosphere is produced ...	No effective ignition source ...
 Zone 0	1G	Permanently or long-term (>1000 hours/year)	During trouble-free operation, just as in case of rare or frequent malfunctions
 Zone 1	2G	occasionally (10-1000 hours/year)	During trouble-free operation and in case of frequent malfunctions
 Zone 2	3G	only rarely and only short-term (<10 hours/year)	During trouble-free operation







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 and IIB.

Temperature Class	Maximum Admissible Surface Temp. of the 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 and IIB.

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 the test room door For option "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)

Symbol	Meaning	Example
	Warning of electrostatic charge	<ul style="list-style-type: none"> Cable ducts rear

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 9.

Entire unit explosion-proof  II 2G Ex db eb h [ib] ib mb IIB T3 Gb

Type	X 320	X 500	X 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
Electrical connection	400 V/230 V/ 50 Hz	400 V/230 V/ 50 Hz	400 V/230 V/ 50 Hz

Options

Type	X 320	X 500	X 820
Additional shelf (max. 25 kg)	X0320-01	X0500-01	X0820-01
Additional shelf, reinforced (max. 50 kg per shelf)	X0320-02	X0500-02	X0820-02
Glazed door, unheated	X0320-03	X0500-03	X0820-03
Extension of the temperature range to -20 °C	X0320-04	X0500-04	X0820-04
Extension of the temperature range to +80 °C	-	X0500-05	X0820-05
Speed of temperature change 1 °C/min (0 °C to +35 °C)	X0320-06	X0500-06	X0820-06
Speed of temperature change 1 °C/min (-20 °C to +80 °C)	X0320-07	X0500-07	X0820-07
Evaporation humidification + dehumidification	X0320-20	X0500-20	X0820-20

Type	X 1000	X 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
Electrical connection	400 V/230 V/ 50 Hz	400 V/230 V/ 50 Hz

Options

Type	X 1000	X 1640
Additional shelf (max. 25 kg)	X1000-01	X1640-01
Additional shelf, reinforced (max. 50 kg per shelf)	X1000-02	X1640-02
Glazed door, unheated	X1000-03	X1640-03
Extension of the temperature range to -20 °C	X1000-04	X1640-04
Extension of the temperature range to +80 °C	X1000-05	X1640-05
Speed of temperature change 1 °C/min (0 °C to +35 °C)	X1000-06	X1640-06
Speed of temperature change 1 °C/min (-20 °C to +80 °C)	X1000-07	X1640-07
Evaporation humidification + dehumidification	X1000-20	X1640-20

Dimensions sheets of the units are included in the chapter "Technical Annex":

- Single door units, see page 68.
- Double door units, see page 69.

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.

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.
- Unit dimensions (see page 68 and see page 69)
- 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 cable, 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 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.

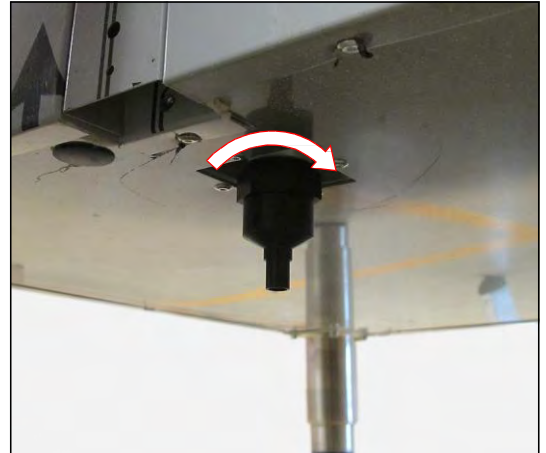
- Observe, that the gap between the upper edge of the door and the switchboard is even, particularly in case of double-door units.



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 X 320, X 500, X 820
 2 Pieces at X 1000, X 1640



7.2.2 Installation of the Shelves

How to install the shelves:

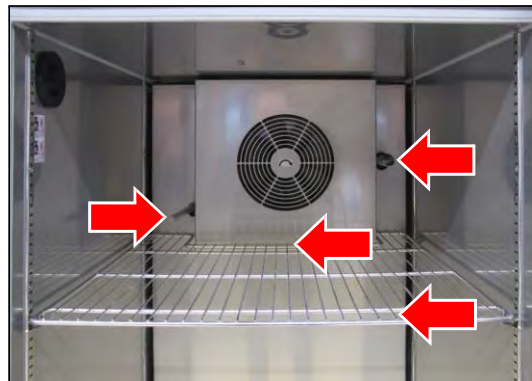
1. Withdraw shelves and mounting clips from the test room.
2. Determine the position of the shelves.
3. Insert the upper hook of the mounting clip into the fastening rail.



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.

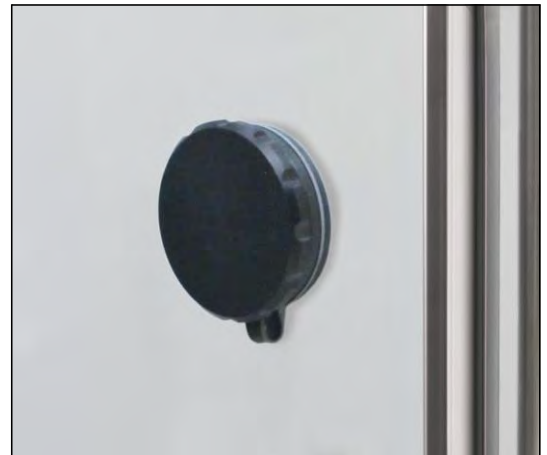


7.2.3 Tubular Port

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 29.



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.



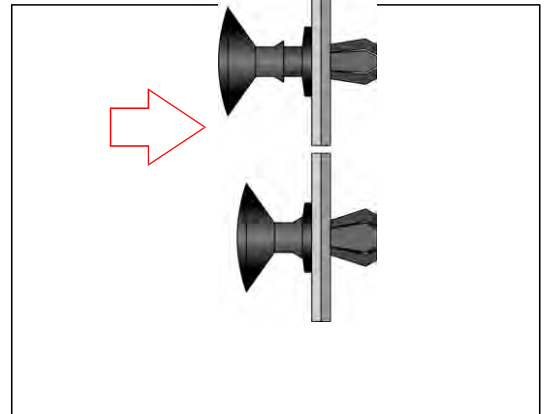
7.2.5 Installation of the Condensate Collecting Pan (Option)

How to install a condensate collecting pan:

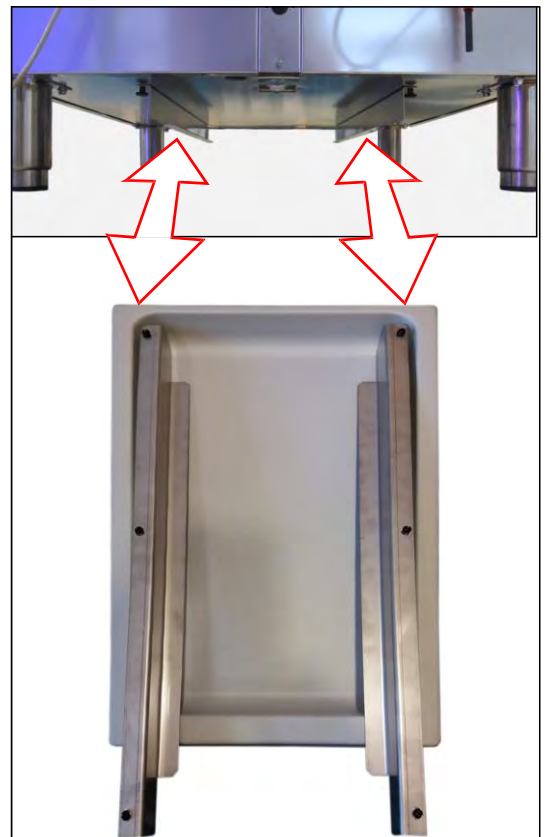
HINT

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



DANGER

Danger to life due to electrical current!

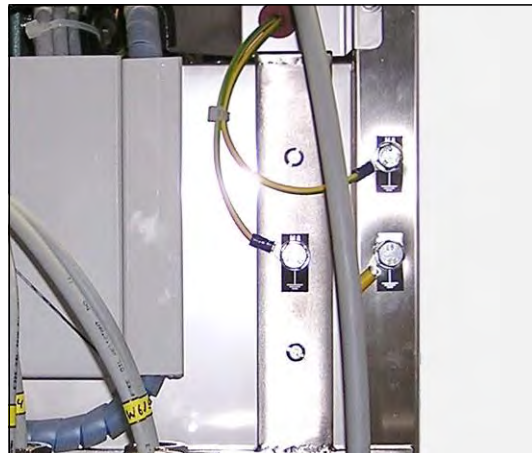
The unit is operated with three-phase current.

- Installation of the electrical system is only allowed to be performed by skilled and authorized expert electricians for explosion protection.
- The unit must be de-energized and must be protected from unintentional restart, see *page 35*.

The following must be observed for electrical connection:

- Only use cables, which can withstand the mechanical, chemical and thermal strains to be expected.
 - Use appropriate cable platforms/cable ducts to produce safe cable connections between the unit and the connection point.
 - Observe the minimum bending radius of the cables for laying.
 - 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 9*.
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 unit to the energy supply.
The pre-installed connection cable is prepared for a clockwise rotating field as follows:
Core 1: L1
Core 2: L2
Core 3: L3
Core 4: N
Earth: PE

HINT

Since the conditions can be different for each operator, we can only give hints for the connection of the energy supply.

The dimensions of the cable passages are indicated on the terminal box. Observe the instructions for the type of thread for installation.

If gland followers shall be used for cable passage, choose them according to the type of the system and of the cable. The gland follower must be tightened until the limit stop, to ensure that the sealing washers can exert the required pressure:

- to avoid a transmission of the mechanical strains to the terminals,
- to ensure the mechanical protection (degree of protection IP) of the terminal box.

For Ex d terminal boxes, the cable inputs must be executed with Ex d devices, which are certified according to the standards EN 60079-0, EN 60079-1. Furthermore, they must have the protection class IP55 or IP65.

For Ex de terminal boxes, Ex e glands must be used, which are certified according to the standards EN 60079-0, EN 60079-07. Furthermore, they must have the protection class IP55 or IP65.

The choice of the terminals and of the cable must be based on the maximum operating temperature, which is determined for the cable and which is indicated on an eventually existing label (if the maximum operating temperature exceeds 70 °C).

Only use seals, which have been delivered by the manufacturer.

Cable inputs, which are left unused, must be closed with marked cable closures.

The connections must be executed with cable inputs, which correspond to the standard 60079-14 (glands or conduits).

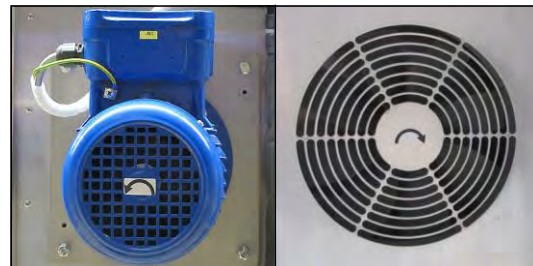
The cable input must be executed in such a way, that the specific characteristics of the protection class will not be changed and that the instructions in the standards are observed:

- EN 60079-1 for components with pressure-proof housing "d" (as explosion protection).
- EN 60079-7 for explosion-proof components with increased safety "e".

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.



8 Control and Display Elements

8.1 Temperature Controller

All entries and programming are effected at the temperature controller.
Information concerning operation can be found in the chapter Control. See *page 40*.



8.2 Main Switch

The supply voltage of the unit is 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.

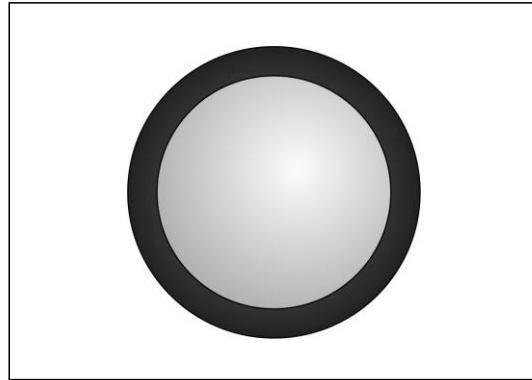
HINT

In switched-off position, the lock can be pushed upwards and the main switch can be protected against unintentional restart by means of up to three padlocks.



8.3 Pilot Lamp Operation

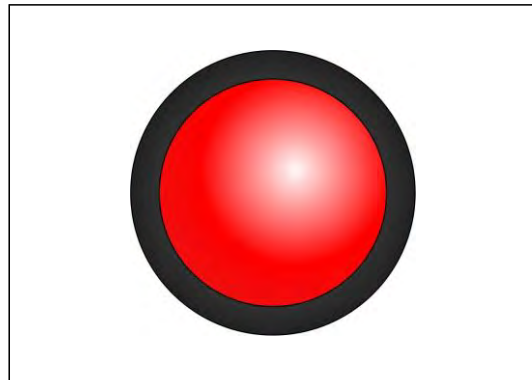
Lights up when the unit is connected to the energy supply and when it is switched-on.



8.4 Pilot Lamp Failure

Lights up

- shortly, when the unit is switched on and while the safety chain is checked.
- permanently, in case of a failure.



9 Switching on, Switching off, Shutdown



DANGER

Danger to life due to electrical current!

The unit is operated with three-phase current.

- Installation of the electrical system is only allowed to be performed by skilled and authorized expert electricians.
- The unit must be de-energized and must be protected from unintentional restart. See *page 35*.

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!

- 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 9*.

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.

1. Ensure, that the condensate drain valves have been installed. See page 27.
2. 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 29.



3. If required, remove the padlock from the main switch and push the lock downwards.
4. Use the main switch to switch the unit on.
The safety chain will be checked, The pilot lamp *Failure* will be lighting.
If there is no failure, the pilot lamp *Failure* extinguishes after a few seconds and the pilot lamp *Operation* will be lighting.
The temperature controller boots up.
5. Information concerning operation can be found in the chapter Control. See page 40.



9.2 Switching off

1. Use the main switch to switch the unit off.

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.

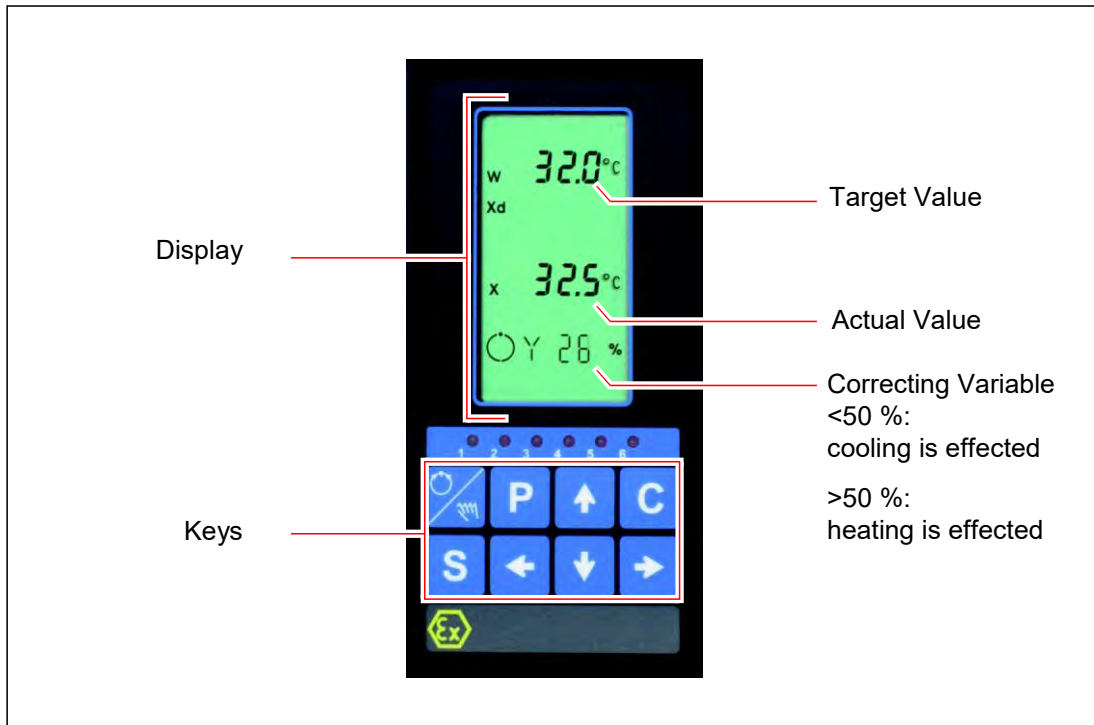
If the unit shall be switched-off or shut down for a longer period, the residual humidity must be removed from the unit.

How to remove the residual humidity from the unit:

1. Remove the specimen.
2. 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. Use the main switch to switch the unit off.
9. Cleaning the unit, *see page 51*.
10. Leave the door slightly open.

10 Control

The unit is controlled by an explosion-proof temperature controller. All required settings can be made at the temperature controller.



10.1 Keys and Their Functions



Key Manual/Automatic

- Switches between manual and automatic operation. The factory-adjustment of the unit is automatic operation. This setting cannot be changed.



Programming key

- Switches to the programming mode.
- The key must be pressed for approx. 1 second.
- The display shows the device number in the upper area and the software version in the middle area for a short moment.



Arrow keys UP and DOWN

- During automatic mode, direct setting of the target value
- During manual mode, direct setting of the correcting variable
- During programming mode, selection of the programming level



Arrow key RIGHT

- During programming mode, selection of the programming level or parameter.
- Selection of the digit of parameter values to be changed.



Arrow key LEFT

- Selection of the digit to be changed.



Key DELETE

- Quit the programming level without any saving.



Key SAVE

- Saves the sub-item.

HINT

The modification will not be considered by the controller, yet. For this, final saving is required (see below).



Final Saving

- Programming key and key SAVE must be pressed simultaneously to finally save all settings.
- Press the keys simultaneously for approx. 1 second.
- The display disappears for approx. 2 seconds. After that, the new settings are considered.

10.2 Single Setpoint Control



Set the desired target value using the keys UP and DOWN. During automatic operation, the controller will go to the adjusted target value.

10.3 Program Control (Option)

If the controller is equipped with the option "Program Control", selection of a temperature profile is possible.

10.3.1 Program Selection



Press the arrow key RIGHT 1x

- Display: "user" / "P1" / "Sta"



Press the arrow key RIGHT 1x

- Display: "P1" is flashing



Use the arrow keys UP and DOWN to select the desired program (P1 to P3)



Press the key SAVE 1x

- The selected program is saved
- Display: Base Menu (Target/Actual Value)



Final Saving

10.3.2 Program Start



Press the arrow key RIGHT 1x

- Display: "user" / "P1" / "Sta"



Press the arrow key UP 1x

- Display: "user" / "P1" / "init"



Press the arrow key RIGHT 1x

- Display: "no" is flashing



Press the arrow key UP 1x

- Display: "YES" is flashing



Press the key SAVE 1x

- Saves the parameter value
- Display: Base Menu (Target/Actual Value)
- "W" on the left of the target value will be flashing

10.3.3 Program Stop (Pause)



Press the arrow key RIGHT 1x

- Display: "user" / "no" / "Stp"



Press the arrow key RIGHT 1x

- Display: "no" is flashing



Press the arrow key UP 1x

- Display: "YES" is flashing



Press the key SAVE 1x

- Saves the parameter value
- Display: Base Menu (Target/Actual Value)
- "W" on the left of the target value is not flashing



Final Saving

10.3.4 Program Reset (Program restart at program begin)



Press the arrow key RIGHT 1x

- Display: "user" / "no" / "Sta"



Press the arrow key UP 1x

- Display: "user" / "no" / "RST"



Press the arrow key RIGHT 1x

- Display: "no" is flashing



Press the arrow key UP 1x

- Display: "YES" is flashing



Press the key SAVE 1x

- Saves the parameter value
- Display: Base Menu (Target/Actual Value)
- "W" on the left of the target value is not flashing



Final Saving

10.3.5 Program Input or Modification



Press the programming key for at least 1 second

- Display: "PArA"



Press the arrow key DOWN 1x

- Display: "ProG"



Press the arrow key RIGHT 1x

- Display: "P1" / "init"



Press the arrow key UP 6x

- Display: "Pr-1"



Press the arrow key RIGHT 1x

- Display: "S - O" / "init"



Press the arrow key UP to the next parameter to be modified

- Display: "W - 0" ... "W - 17" ...



Press the arrow key RIGHT 1x

- Display: "Parameter Value" is flashing



Move to the digit to be changed using the arrow keys LEFT / RIGHT

- Display: The digit to be changed is flashing



Set the desired value using the keys UP / DOWN and press the key



SAVE 1 x

- Saves the parameter value



Press the arrow key UP until the next parameter to be modified is reached

Display: "W - 0" ... "W - 17" ...



Press the arrow key RIGHT 1x

- Display: "Parameter Value" is flashing



Move to the digit to be changed using the arrow keys LEFT / RIGHT

- Display: The digit to be changed is flashing



Set the desired value using the keys UP / DOWN and press the



key SAVE 1 x

- Saves the parameter value

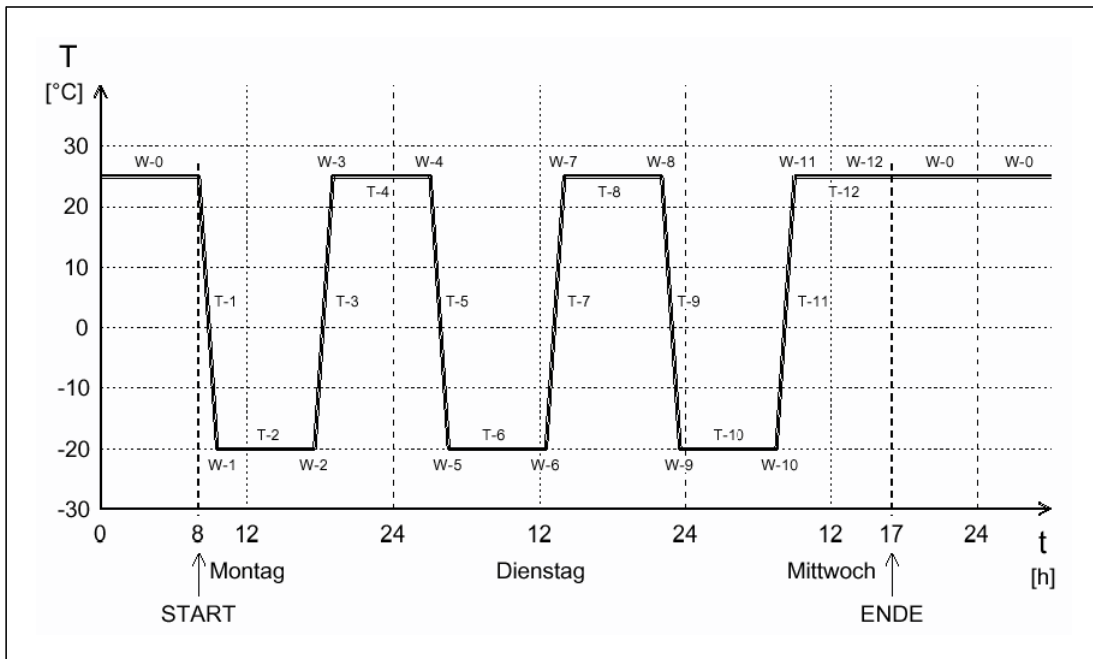
Continue the procedure until all desired parameters are set



Press the programming key and the key SAVE simultaneously

- Saves all the settings
- Press the keys simultaneously for approx. 1 second
- The display disappears for approx. 2 seconds. After that, the new settings are considered.
- Display: Base Menu (Target/Actual Value)

10.3.6 Sample Program



Start Target Value: 25 °C

Start: Monday, 8 o'clock

- Program Profile:
- Cooling to -20 °C in 90 minutes
 - Keep -20 °C for 480 minutes
 - Heating to +25 °C in 90 minutes
 - Keep +25 °C for 480 minutes
 - The cycle is executed 3 times
 - Program end

Pressing the key SAVE 1x saves the parameter value

Display: Base Menu (Target/Actual Value) "W" on the left of the target value is not flashing

10.3.7 Parameter Table for Sample Program

Parameters	Parameter Value	Parameters	Parameter Value
W - 0	+25 °C	W - 7	+25 °C
D - 1	0000	D - 8	0000
T - 1	90 min	T - 8	480 min
W - 1	-20 °C	W - 8	+25 °C
D - 2	0000	D - 9	0000
T - 2	480 min	T - 9	90 min
W - 2	-20 °C	W - 9	-20 °C
D - 3	0000	D - 10	0000
T - 3	90 min	T - 10	480 min
W - 3	+25 °C	W - 10	-20 °C
D - 4	0000	D - 11	0000
T - 4	480 min	T - 11	90 min
W - 4	+25 °C	W - 11	+25 °C
D - 5	0000	D - 12	0000
T - 5	90 min	T - 12	480 min
W - 5	-20 °C	W - 12	+25 °C
D - 6	0000	D - 13	0000
T - 6	480 min	T - 13	End
W - 6	-20 °C		
D - 7	0000		
T - 7	90 min		

Parameter Explanation:

- W: Target value of a segment
- D: Digital outputs 1-4 (the digital outputs are not assigned)
- T: Duration of a segment

11 Maintenance



DANGER

Danger to life due to electrical current!

The unit 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 35.*
- 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.

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	Defrosting the unit	As required	Never use sharp objects for removal of ice. <i>See page 51.</i>
2	Cleaning the unit	As required	<i>See page 51</i>
3	Empty and clean the condensate collecting pan.	As required, at least once a week.	
4	Aspiration of the fan grill	As required, at least every 6 months.	<i>See page 49</i>
5	Checking the door gasket	Once a year.	Door gasket must be undamaged and sit perfectly.
6	Checking the oil level	Once a year	Check the oil level in the inspection glass on the rear side. <i>See page 53.</i>
7	Checking the belt tension	Once a year	<i>See page 56</i>
8	Checking the high pressure switch	Once a year	<i>See page 55</i>
9	Dismantling and cleaning the condensate drain valves	Once a year	<i>See page 63</i>
10	Checking the ground straps and the	Once a year	<i>See page 65</i>
11	Changing the Oil	Every three years or 10,000 operating hours	<i>See page 53.</i>

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 Working at the Switch Cabinet



DANGER

Warning of danger of explosion!

The electrical components in the switch cabinet are not explosion-proof.

- De-energize the unit completely and protect it from unintentional restart prior to any work at the switch cabinet. See page 35.



DANGER

Danger to life due to electrical current!

The unit is operated with three-phase current.

- De-energize the unit completely and protect it from unintentional restart prior to any work at the switch cabinet. See page 35.



WARNING

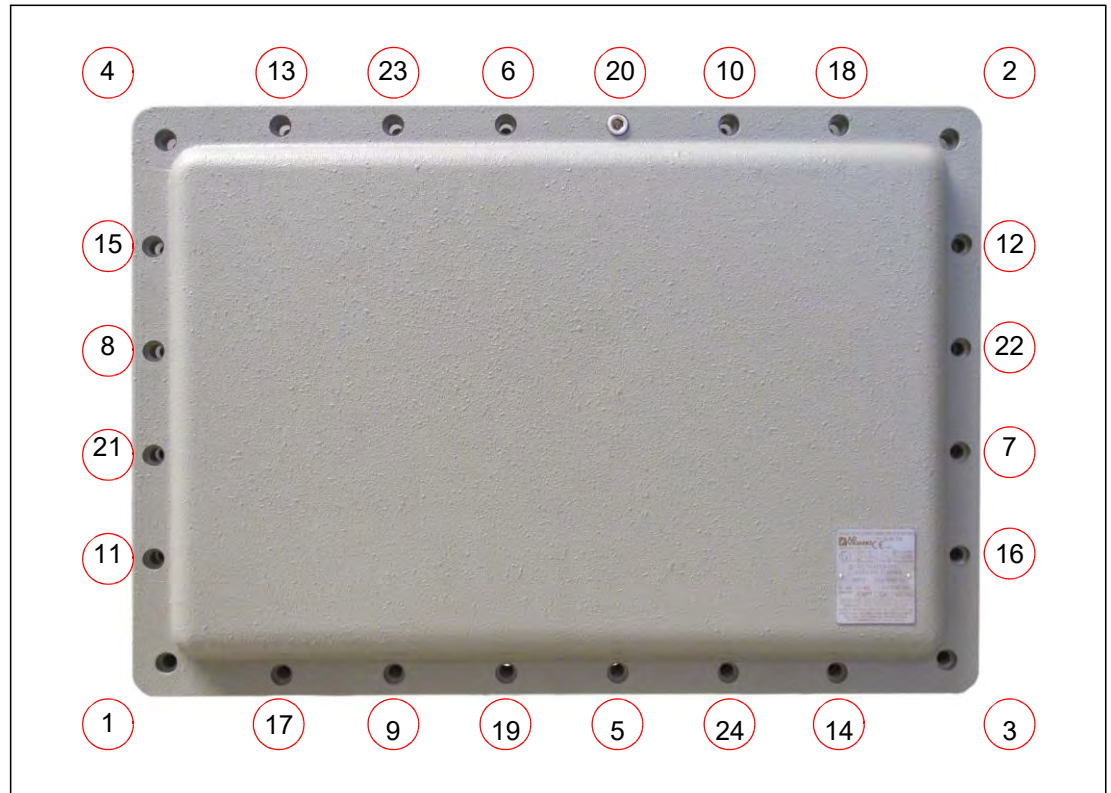
Crushing Hazard!

Units with the switch cabinet installed at the top: risk of crushing when closing the lid.

- Lower the lid carefully on wooden wedges on the sealing surface. Carefully remove the wooden wedges.

Observe the following when working at the switch cabinet:

- Protect the lid from moving prior to opening the switch cabinet!
- Take care to not damaging the sealing surfaces of the switch cabinet when lifting the lid. Use appropriate tools, such as wooden wedges (no metallic, sharp-edged tools).
- Observe that the sealing surfaces of the switch cabinet must be undamaged and free from corrosion.
- Observe that the sealing surfaces of the switch cabinet must be free from grease and lubricants.
- Lower the lid carefully on wooden wedges on the sealing surface. Carefully remove the wooden wedges.
- Fasten the lid using all the screws.
Insert the screws and hand-tighten them firstly.
After that, tighten them in the shown order using a torque wrench. Torque: 14 Nm



11.2.3 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 51.*
9. Set the temperature controller to the desired temperature.

11.2.4 Cleaning the Unit



DANGER

Warning of Danger of Explosion!

When cleaning the unit in explosive atmospheres, there is the risk of explosion by electrostatic charge.

→ Clean the unit only with damp antistatic clothes.



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.

11.2.5 Checking the Oil Level

NOTE

Damage at the refrigerating machine or the valves!

Depending on the operating state, oil might be contained temporarily in the cooling circuit. This might result in machine damages, if oil is improperly refilled.

→ Only refrigeration engineers are allowed to refill oil.

NOTE

Damage at the refrigerating machine!

Oil being not approved or mixed oil might result in damages of the refrigerating machine.

→ Only use oil, which is approved by the manufacturer.

→ Never mix oil.

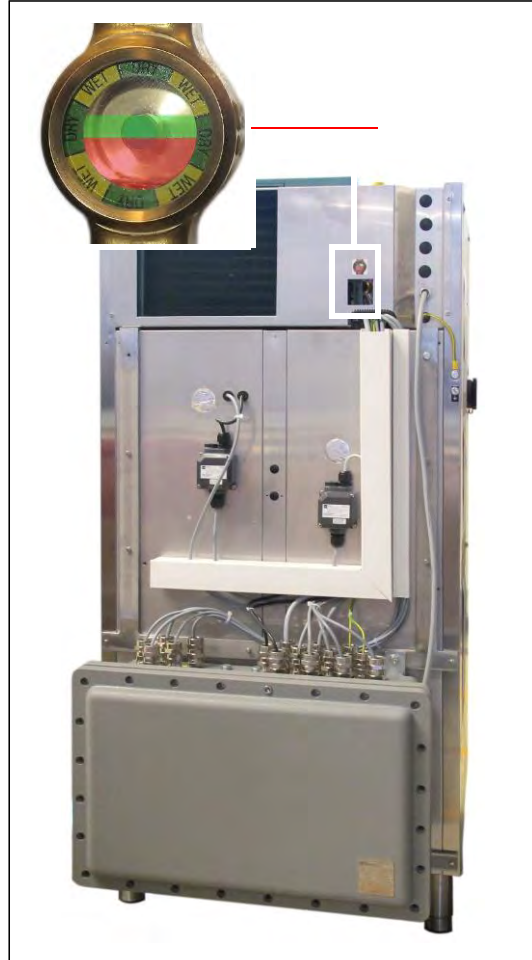
→ Only refrigeration engineers are allowed to refill oil.

HINT

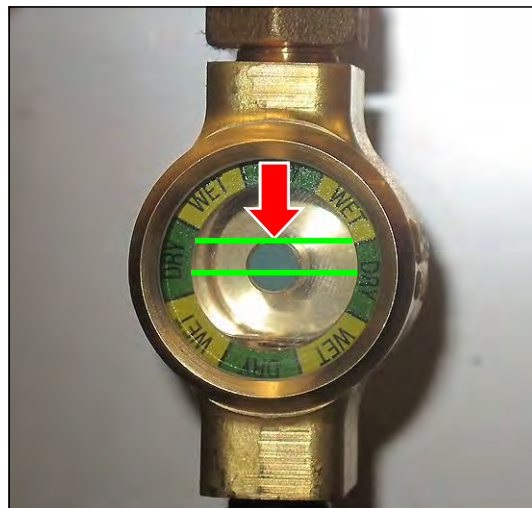
It is advisable to check the oil level together with the high pressure switch (see page 55), since the two maintenance measures effect first heating and then cooling of the unit.

1. Set the target value at the temperature controller to maximum temperature.
2. Wait, until the maximum temperature is reached.
3. Set the target value to minimum temperature.
(Refrigerating machine is running continuously and is not switched off.)
4. Wait, until the minimum temperature is reached.

5. Use a torch to look through the inspection glass on the unit's rear. The inspection glass is marked with the shown label.



6. Check the oil level. The oil level should be within the upper 2/3 of the indicator point. If the oil level is below it, a refrigeration engineer must refill oil.



11.2.6 Checking the High Pressure Switch

HINT

It is advisable to check the oil level together with the high pressure switch (see page 53), since the two maintenance measures effect first heating and then cooling of the unit.

1. Set the target value at the temperature controller to maximum temperature.
2. Wait, until the maximum temperature is reached.
3. Set the target value at the temperature controller to minimum temperature.
4. Cover the fan grill with a fitting piece of paperboard.
The size of the paperboard must fit to the fan grill. It is not sufficient to place the paperboard on the unit's outer panel, since extraneous air might be sucked in through the lateral gap.
- The unit is switched off by the high pressure switch after approx. 5 minutes.
- The pilot lamp *Failure* will be lighting.
5. After the safety shut-down, remove the paperboard.
6. Use the main switch to switch the unit off.



Approx. 5 minutes after the safety shut-down the unit can be restarted

In the event of low ambient temperatures, the high pressure switch might not be switching.

If the safety shut-down has not been effected after 10 minutes, the unit must be shut down, and it must be checked by a technician of the refrigerating service.

11.2.7 Changing the Oil

NOTE

Damage at the refrigerating machine!

Oil being not approved or mixed oil might result in damages of the refrigerating machine.

- Only use oil, which is approved by the manufacturer.
- Never mix oil.
- Only refrigeration engineers are allowed to refill oil.

Replace the oil according to the manufacturer's instructions. At the same time, also clean the oil filters and magnet plugs.

11.2.8 Checking the Belt Tension

NOTE

Bearing damage!

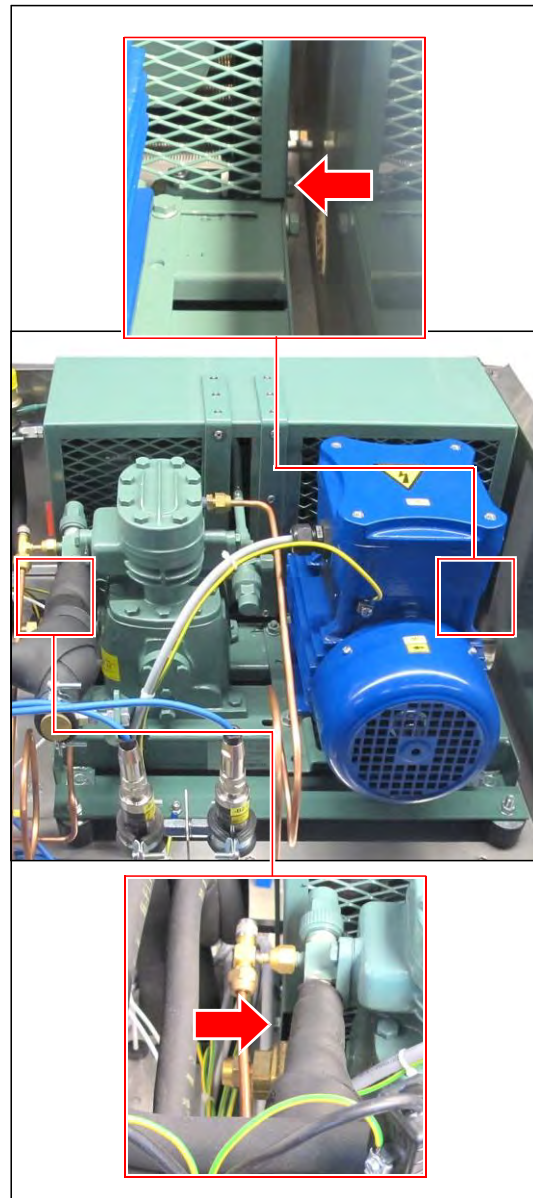
Excessive belt tension might cause damage of the bearings.

→ The recommended setting values for belt tension should never be exceeded.

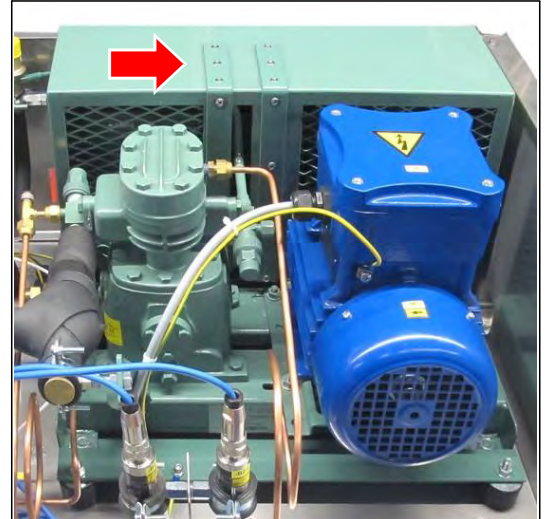
HINT

Use a long open-ended spanner to loosen the belt protective cover (Length: 450 mm). SW: 13).

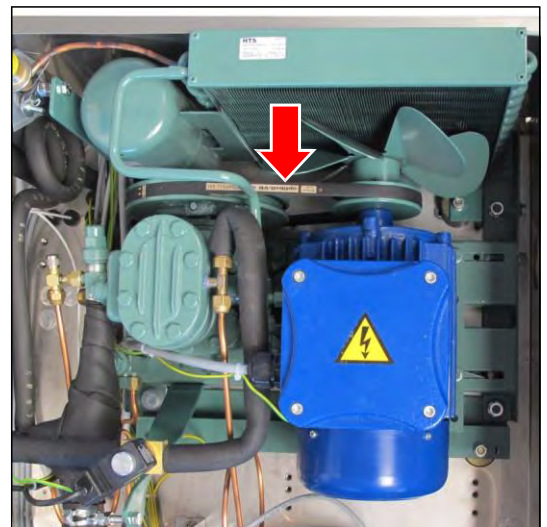
1. Switch the unit off and protect the main switch from unintentional restarting by means of a padlock.
2. Remove the unit cover.
3. Loosen the screw on the left and on the right side of the belt protective cover.



4. Remove the belt protective cover.



5. Check the belt for wear. If the running surface of the belt shows cracks or if it is porous, the belt must be replaced. See page 59.



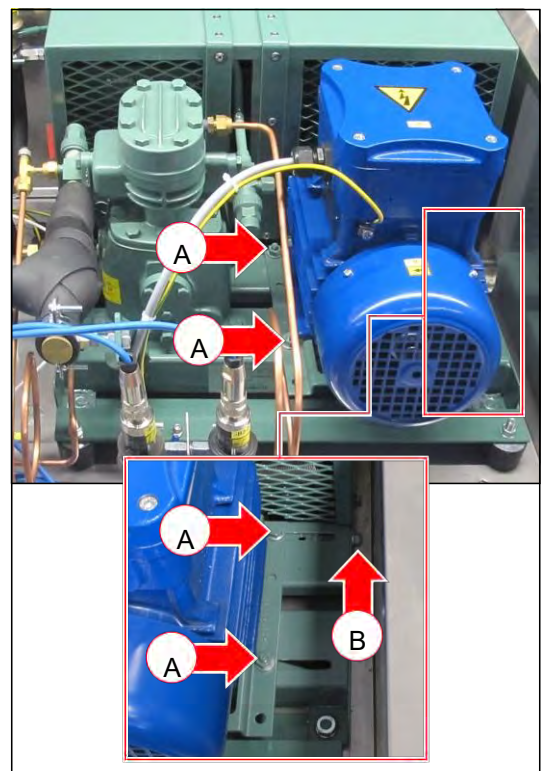
6. Press on the middle of the free length of the belt. It should be possible to press the belt by approx. 1 cm downwards.

7. Retighten or relieve the tension of the belt by loosening the four screws (A) at the motor carriage.

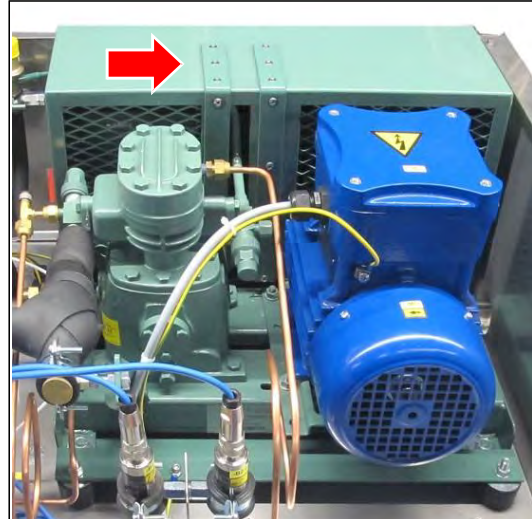
8. Tighten the spindle screw (B), to tighten the belt. Loosen the spindle screw (B) to relieve the belt tension.

9. Tighten the four screws (A) at the motor carriage.

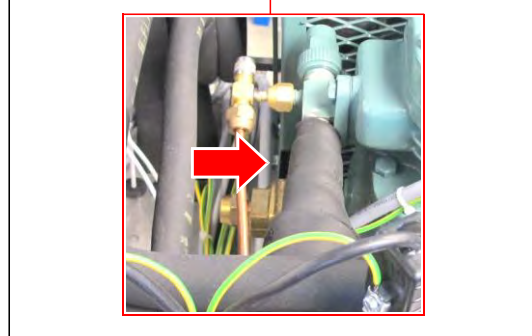
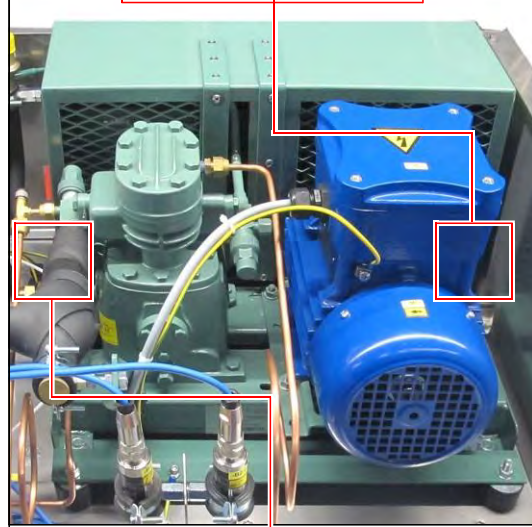
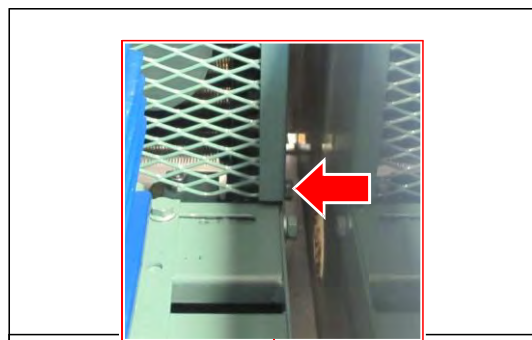
10. Check the belt tension again and retighten, if required.



11. When the belt tension is correct:
Apply the belt protective cover.



12. Tighten the screw on the left and on the right side of the belt protective cover.
13. Install the unit cover.



11.2.9 Changing the Belt

NOTE

Bearing damage!

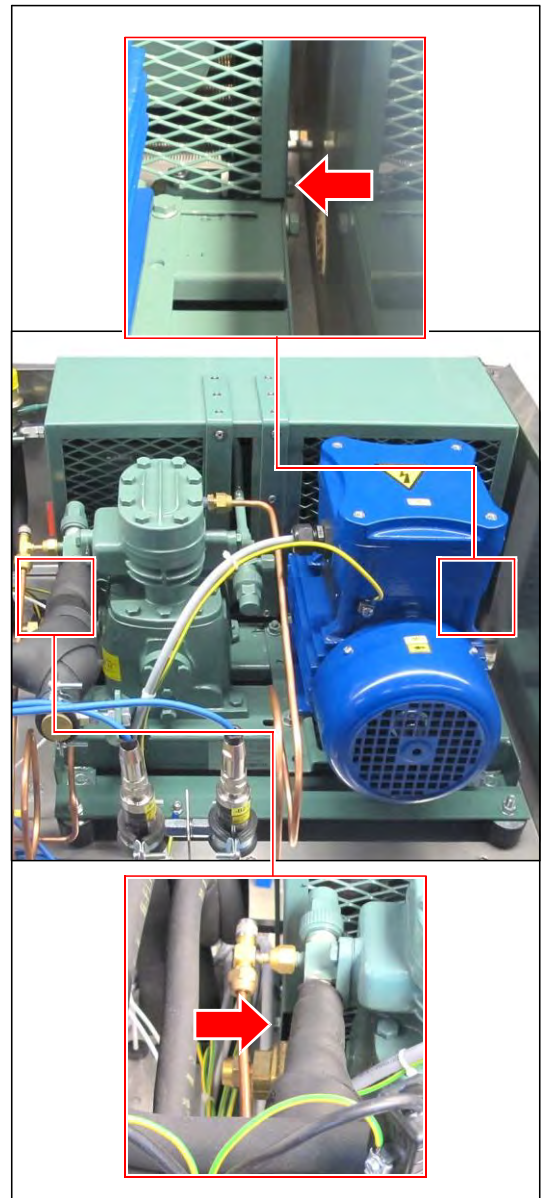
Excessive belt tension might cause damage of the bearings.

→ The recommended setting values for belt tension should never be exceeded.

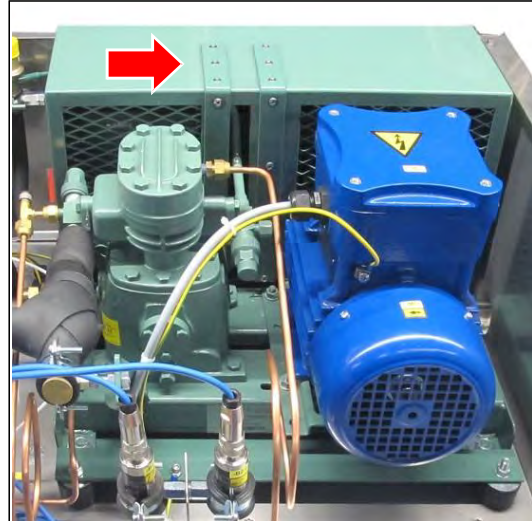
HINT

Use a long open-ended spanner to loosen the belt protective cover (Length: 450 mm). SW: 13).

1. Switch the unit off and protect the main switch from unintentional restarting by means of a padlock.
2. Remove the unit cover.
3. Loosen the screw on the left and on the right side of the belt protective cover.



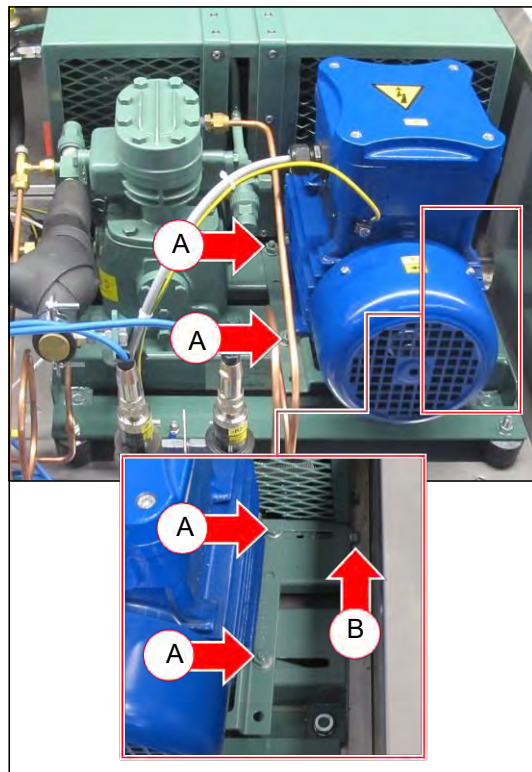
4. Remove the belt protective cover.



5. Loosen the four screws (A) at the motor carriage.
6. Loosen spindle screw (B) and push the motor completely to the left.

NOTE

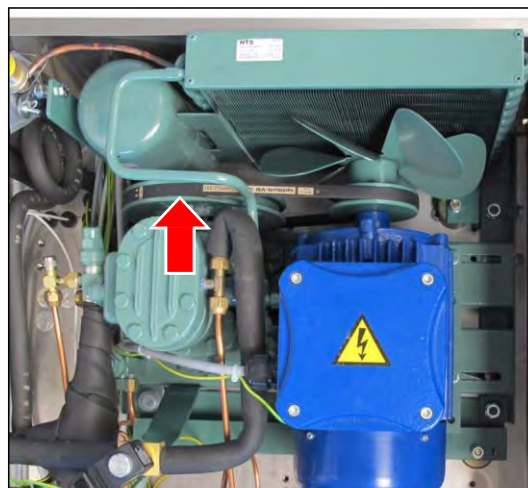
Never loosen further screws to enlarge the gap between the fan wheel and the cooling fins



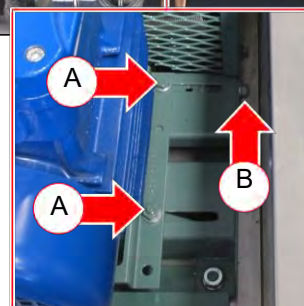
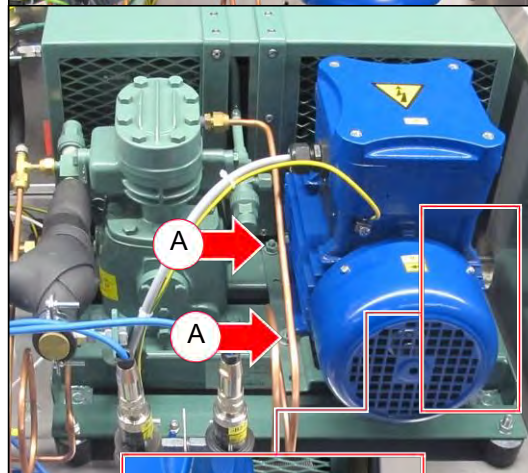
7. Push the belt from the large disk.
8. Push the belt through the gap between the fan wheel and the cooling fins end remove it.



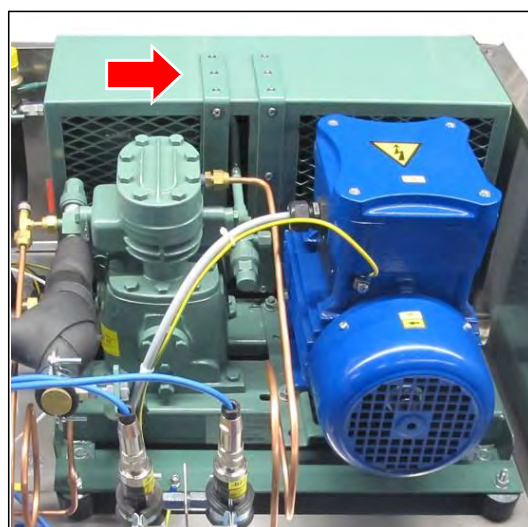
9. Push the new belt over the fan wheel and place it on the small disk.
10. Push the belt on the large disk.



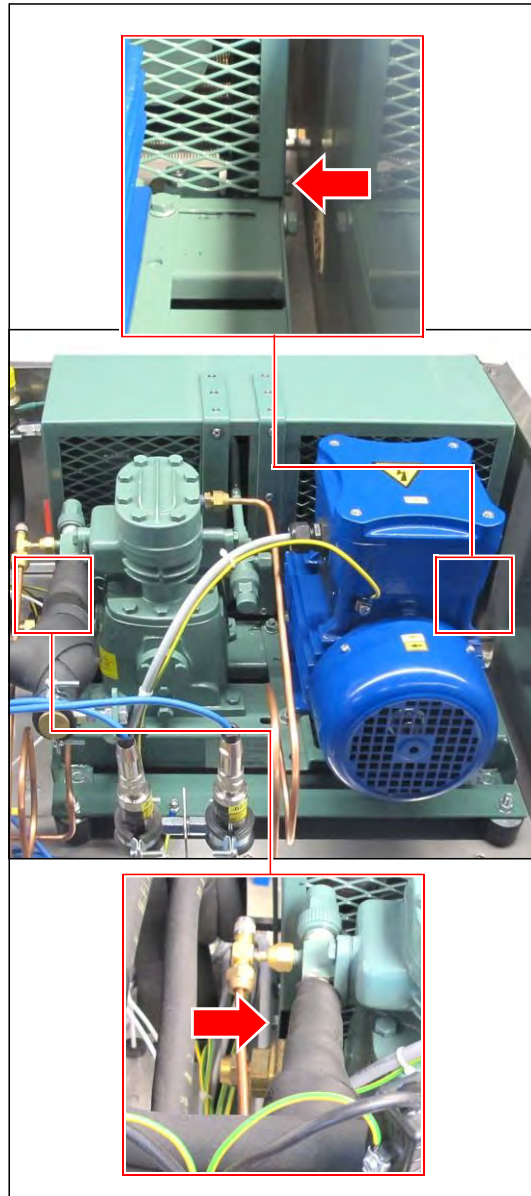
11. Push the motor to the right and tighten the belt by means of the spindle screw (B).
12. Check the belt tension. See page 56.
13. Tighten the four screws (A) at the motor carriage.



14. Apply the belt protective cover.



15. Tighten the screw on the left and on the right side of the belt protective cover.
16. Install the unit cover.

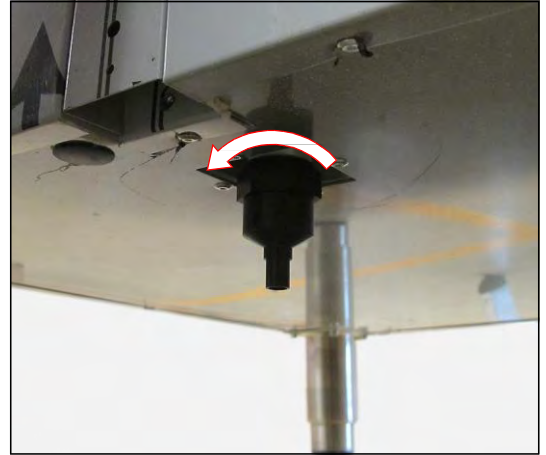


11.2.10 Dismantling and Cleaning the Condensate Drain Valves

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.



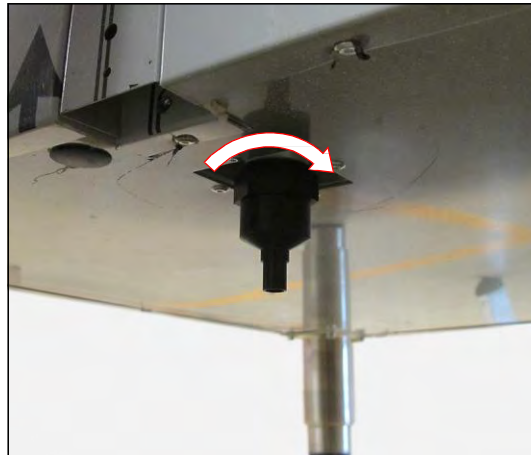
3. Clean the ball of the condensate drain valve or replace it, if required.

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.



11.2.11 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.





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 9.

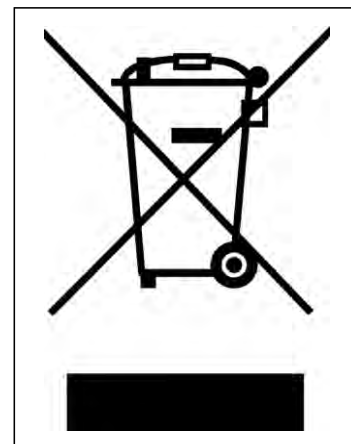
1		2		RUMED® Rubarth Apparate GmbH	
Typ Type	X500	Nr. No.	YYMM/XX.X	Baujahr Model	2018
4,5 kW	400/230	Volt	3,3/3,3/13	A	50 Hz
Kältemittel Refrigerant	R134a	Füllgewicht Filling weight	1,3 kg	17	bar
Ex II 2G Ex db eb h [ib] mb IIB T3 Gb				PTZ 18 ATEX 0036 X	
Ex-Schutz gegeben für: Explosion protection for:				Gesamtanlage/Total machine	
		Made in Germany <small>Vor Reparaturen Gerät vom Stromnetz trennen! Prior to repairs disconnect unit from mains!</small>			
<small>Rubarth Apparate GmbH, Morgenheimerstraße 8, D-30880 Laatzen, Germany</small>					

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.



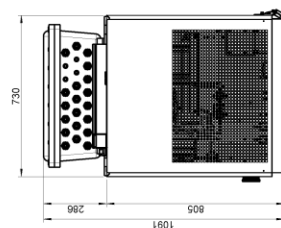
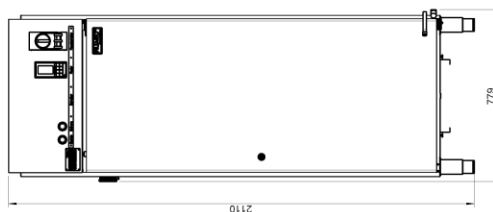
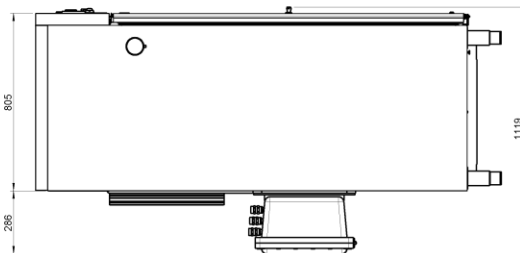
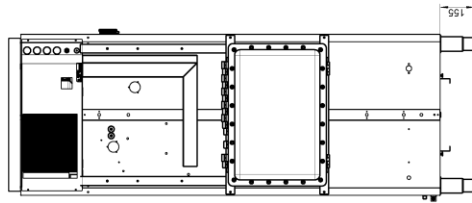
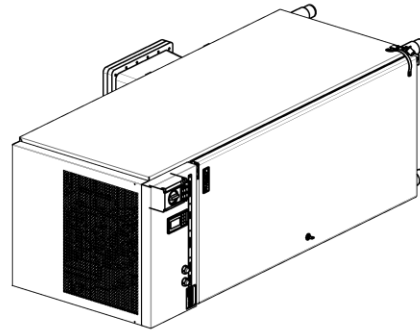
HINT

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.

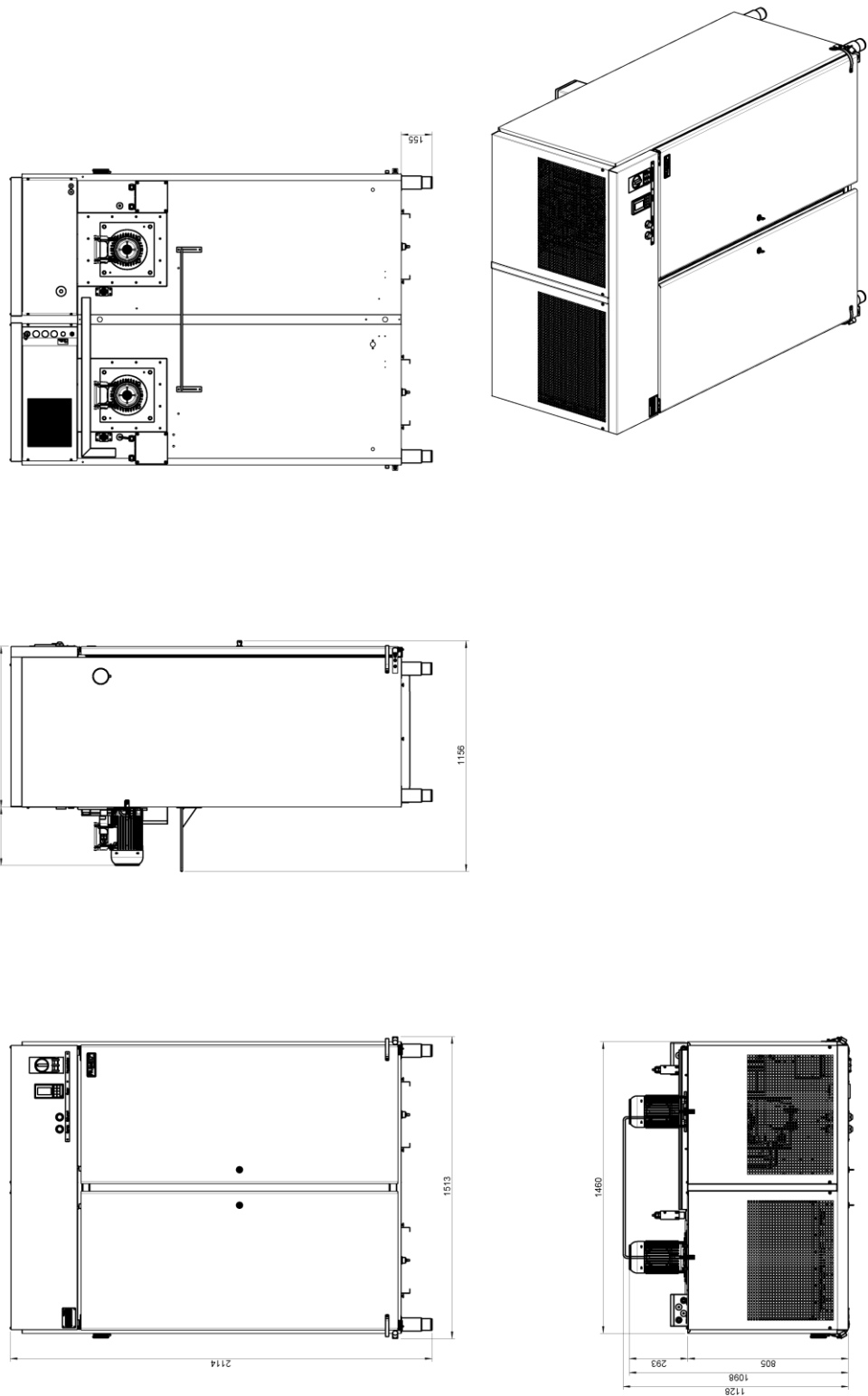
14 Technical Annex

14.1 Technical Plans

14.1.1 X 500



14.1.2 X 1000



Imprint

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