



robatherm ATEX unit.

Main operating instructions.

the air handling company

March 2024

English translation of the original German operating instructions

Air handling units for potentially explosive atmospheres | Type TI-50

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Subject to change.

For reasons of better readability, we will use gender-neutral language forms. All references to persons apply equally to all genders.

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General remarks

Information about these instructions

How to use these instructions

These instructions will facilitate safe and efficient use of the AHU.



All persons working on the AHU must thoroughly read and understand these instructions before starting any kind of work.

Safe working is dependent on adhering to all safety information and instructions.

Safekeeping of the instructions

These instructions are part of the AHU and must be kept accessible for all persons working on the AHU in the immediate vicinity of the AHU at all times.

Accident prevention regulations

In addition to the information in these instructions, the local accident prevention and national occupational health and safety regulations apply.

Further information

The instructions describe all the available options. Whether and which options are available in the AHU depends on the options selected and the country for which the AHU is intended. The illustrations serve as an example and may differ.

The instructions consist of several parts and have the following structure:



Fig. 1: Parts of the instructions

Main operating instructions

- Transport and unloading
- Installation and assembly
- Commissioning
- Operation and faults
- Maintenance and cleaning
- Disabling and disposal

Explanation of symbols

Safety information

DANGER



This combination of symbol and signal word refers to an immediately dangerous situation, which, if not avoided, will lead to serious injuries, including death.

WARNING



This combination of symbol and signal word refers to a potentially dangerous situation, which, if not avoided, may lead to serious injuries, including death.

CAUTION



This combination of symbol and signal word refers to a potentially dangerous situation, which, if not avoided, may lead to negligible or slight injuries.

NOTE



This combination of symbol and signal word refers to a potentially dangerous situation, which, if not avoided, may lead to material damage.

Tips and additional information

TIP


















This combination of symbol and signal word denotes useful tips and additional information.

Safety symbols

Warning signs

The following warning signs indicate specific hazards. Failure to observe safety information marked in this way may result in death or serious injury due to the particular hazard.

	General warning signs
	Warning of explosive atmospheres
	Warning of explosive substances
	Warning of obstacles on the floor
	Warning of danger of falling
	Warning of biohazard
	Warning of low temperature
	Warning of electrical voltage
	Warning of suspended loads
	Warning of toxic substances
	Warning of hot surface
	Warning of automatic start-up
	Warning of flammable substances
	Warning of sharp object
	Warning of hand injuries






	Warning of oxidising substances
	Warning of falling objects
	Warning of toppling objects
	Warning of loud noises
	Warning of suffocation

Table 1: Warning signs

Mandatory action signs

	Observe instructions.
	Use ear protectors.
	Use safety goggles.
	Use safety footwear.
	Use electrostatically dissipative safety footwear.
	Use protective gloves.
	Use protective clothing.
	Use electrostatically dissipative protective clothing.
	Use respiratory protection.
	Unlock/disconnect from power prior to maintenance or repair.



Use electrostatically dissipative tools.

Table 2: Mandatory signs

Prohibition signs



No smoking



Do not touch



Do not extinguish with water



No heavy load



No climbing



Do not walk or stand here



Do not alter the state of the switch

Table 3: Prohibition signs

Other symbols and markings



Designation of components in the image

(A), (B),
(C), ...

Referencing of components in the text



Listing without a defined sequence

1., 2.,
3., ...

Action steps with a defined sequence



Result of the action

Table 4: Other symbols and markings

Security

Intended use

Definition of the scope of application

robatherm AHUs must be used exclusively for transporting air and/or for air treatment, with any other use expressly ruled out. This includes the following functions:

- Air treatment: A process in which the condition of air is changed with respect to one or more of the following: Temperature, humidity, dust content, bacteria content, gas content, and water content.
- Filtering: Removal of particles from the airflow.
- Heating: Transfer of heat from one body or medium to another.
- Cooling: Removal of sensible and/or latent heat.
- Dehumidifying: Controlled reduction of water vapor content of the air.

Transporting the air is specified using a characteristic value:

- Airflow: Conveyed air within set balance limits (e.g., air ducts).

The AHUs are suitable for conveying explosive atmospheres. They are therefore subject to the requirements of the ATEX Directive 2014/34/EU.

For ATEX units, a distinction must be made between the ATEX requirements in the AHU (AHU can convey an explosive atmosphere) and the ATEX requirements next to the AHU (AHU is installed in an explosive atmosphere). The explosion protection target complied with by the ATEX unit in and next to the AHU is documented on the technical data sheet and on the AHU nameplate.

Explanation of ATEX labelling


Directive share			Standards share				
Explosion protection labelling	Subgroup	Equipment category		Type of protection	Gas group	Temperature class	EPL
	II	2G 3G	Ex	h	IIA IIB	T1 T2 T3 T4	Gb Gc

Table 5: Labelling structure



Explosion protection labelling

Subgroup

II Use in mining is excluded.

Equipment category

2G Category 2 with potentially explosive gas atmosphere
Explosive atmosphere occurs occasionally.

3G Category 3 with potentially explosive gas atmosphere
Potentially explosive atmosphere only occurs rarely and temporarily.

Ignition protection type in accordance with DIN EN ISO 80079-37

Ex h Construction safety (mechanical explosion protection)

Gas group (explosion group)

IIA/IIB

Temperature class (maximum surface temperature to occur)

T1 450 °C

T2 300 °C

T3 200 °C

T4 135 °C

EPL (Equipment Protection Level)

Gb Safety in normal operation and in the event of faults

Gc Extended equipment protection level
AHUs do not create effective ignition sources during normal operation.

Foreseeable misuse

WARNING



Danger from misuse

Serious personal injury or even death and damage to property can be caused by misuse of the AHUs.

AHUs are not smoke extraction units and must not be used for smoke extraction.

AHUs must not be used in areas that require a higher explosion protection target than that specified in the technical data sheet and on the AHU nameplate.

The roof of AHUs is not designed to support additional roof loads. AHUs are not intended as a support structure for other trades (ventilation ducts, maintenance platforms, cable trays, etc.). AHUs must not be installed directly on top of each other without a suitable support structure or additional equipment provided on site (see operating instructions "Installation and assembly", "Roof rack frame" section).

AHUs must not be used for fall protection (e.g. fastening guardrails to the casing, fastening the fall protection to transport lugs or transport loops).

AHUs must not be used for building functions.

Combination units (two airflows combined in one unit) must not be used to treat and convey airflows that are hazardous to health.

AHUs are not suitable for applications with aggressive media.

AHUs are only suitable for stationary use.

AHUs are not intended for use in general engineering processes.

The application limits of ATEX units must be observed (see chapter "Nameplate", page 44, see chapter "Intended use", page 10, and see technical data sheet).

The AHUs labelled in accordance with the European ATEX Directive 2014/34/EU may only be operated within these application limits. Use in a non-authorized area of application with regard to

- subgroup,
- equipment protection level (EPL),
- equipment category,
- explosion group or
- temperature class

is not permitted.

In this context, the permitted temperature range of the conveyed medium must also be observed:

-20 °C T_{amb} +40 °C

ATEX units must not be used in the vicinity of

- strong electromagnetic fields,
- high frequency sources (e.g. transmitter systems),
- strong light sources (e.g. laser beams),
- ionising radiation sources (e.g. x-ray tubes) or
- ultrasound sources (e.g. ultrasonic echo testers)

.

AHUs may only be installed in certain locations (see operating instructions "Installation and assembly", section "Installation site requirements").

General risk sources

General hazards

WARNING



Risk of explosion due to the use of components with inadequate ignition protection

Using parts without adequate ignition protection may cause static charging of the AHU, for example. The discharge and the resulting sparks may cause an explosion.

- Use parts in the AHU that are at least compliant with the ATEX requirements for the inside of the AHU.
- Use parts on the outside of the AHU or next to the AHU that at least fulfil the ATEX requirements next to the AHU.
- When assembling parts, only use cable glands, reducers and dummy plugs with the appropriate ATEX approval.

WARNING



Risk of death by being trapped in the AHU

When working in the AHU, there is a risk of death due to being trapped in the AHU.

- Work in teams of two at a minimum.
- For doors with lever locks with key cylinders, remove the key and carry it with you.
- Before closing the door, make sure that there are no people inside the AHU.

WARNING



Danger to life from falling!

A falling height of more than 1 m constitutes a fall hazard.

- For falling heights of 1 m or more, a railing is recommended.
- From falling heights of 3 m, fall protection can be implemented using anchor points.

WARNING



Risk of death due to excessive snow load

Excessive snow load on the casing may cause damage to the AHU and roof failure. As a result, there is a risk of death if the device is stepped on.

- Determine clearing height by calculating the snow load.
- Clear the casing roof of snow or ice before reaching the determined clearing height.

CAUTION**Risk of cutting due to sharp edges**

There is a risk of being cut by the sharp edges when touching the metal edges.

- Wear personal protective equipment (cut-resistant gloves and long-sleeved clothing).

CAUTION**Physical injury due to forced posture**

If there is no leg/foot room, the working height is too low or too high and the freedom of movement is restricted, there is a risk of forced posture.

- Modify tasks to allow for posture change.
- Move at least once an hour for about 5 minutes.

Chemical hazard due to operating fluids

WARNING



Harm to health from frost protection agent

Frost protection agent contains propylene or ethylene glycol. Frost protection agent may contain toxic and environmentally hazardous substances.

- Prevent contact with skin and eyes. If it comes into contact with skin and eyes, rinse with plenty of water.
- Do not swallow.
- Make sure the danger zone is well ventilated.
- Wear personal protective equipment (for temporary exposure (<30 minutes) gloves made of nitrile rubber and safety goggles).
- Observe the manufacturer's safety data sheet.

WARNING



Harm to health from lubricants

Lubricants such as greases and oils contain toxic substances.

- Prevent contact with skin and eyes. If it comes into contact with skin and eyes, rinse with water.
- Wear personal protective equipment (gloves and safety goggles).
- Observe the manufacturer's safety data sheet.

The operator's responsibility

Operator

The operator is the person who operates the AHU for commercial or economic purposes themselves or cedes it to a third party for use/application and who bears the legal product liability for the protection of the user, the staff, or third parties during operation.

HVAC installer

The installer of a ventilation system is both the person who installs, extends, modifies or maintains a ventilation system and the person who although has not installed, extended, modified or maintained it, has checked the work carried out as an expert and assumes responsibility for its proper execution.

Operator's obligations

The operator must:

- Know and implement the occupational health and safety regulations applicable at the installation site.
- identify, by carrying out a hazard assessment, any hazards which are due to the working conditions at the installation site.
- Safety instructions for the operation of the AHU. The operator must regularly check whether the safety instructions comply with the current status of the regulations.
- Clearly regulate and define the responsibilities for installation and assembly, commissioning, operation, troubleshooting, maintenance, cleaning, and disabling.
- Ensure that the staff responsible have read and understood the instructions.
- Instruct and inform personnel about hazards at regular intervals. For better tracking, the performance of training must be recorded. The record must contain the following minimum details:
 - Date of training
 - Type of training
 - Name of instructor
 - Name of trainee
 - Signature of trainee
- Provide personnel with the necessary personal protective equipment.
- Ensure that the maintenance intervals specified in these operating instructions are adhered to. The specified maintenance intervals refer to normal use (by normally polluted air inspired by VDI 6022). If the air is more polluted, the maintenance intervals must be shortened accordingly.
- Keep the AHU in perfect condition.
- Check the AHU daily for proper function or damage.
- Check all safety devices regularly for proper functioning and completeness.
- Comply with the fire safety regulations in force at the installation site. The operator must integrate the AHU into the fire protection concept of the building and define individual rules of conduct in case of fire.
- In the case of AHUs with refrigeration technology, fulfill the specific requirements in accordance with Section 14 of the German Operational Safety Ordinance (BetrSichV) prior to operation, as the refrigeration technology within the meaning of the BetrSichV requires monitoring.

- Document changes to the plant (e.g., retrofits, conversion measures, scheduled maintenance work, ...)

An AHU for use in or for conveying potentially explosive atmospheres cannot ensure complete and necessary explosion protection on its own. The protection concept must always take into account the entire ventilation system and other conditions. The area definition is carried out by the HVAC installer or operator as part of the overall concept.

The overall responsibility for correct assembly, proper use, maintenance and repair always lies with the HVAC installer or operator of the entire ventilation system.

In the case of ATEX units, the HVAC installer or operator must ensure compliance with the European ATEX Directive 2014/34/EU. The operator must also comply with the requirements of European Directive 1999/92/EC. The following obligations are to be mentioned, for example.

The HVAC installer or operator must do the following:

- Implement technical and/or organisational measures to prevent potentially explosive atmospheres, to avert the ignition of potentially explosive atmospheres or to reduce the effects of an explosion.
- Prepare an explosion protection document.
- Inform the responsible personnel and/or their representatives of all measures taken to protect their safety and health at work.
- Define the necessary precautions to ensure that personnel who may be at risk from potentially explosive atmospheres receive appropriate training.
- Ensure that work equipment for use in areas where explosive atmospheres may occur complies with the minimum requirements of the Directive.
- Take the protective measures for staff specified on site in the explosion protection document before commencing work.

Hygienic requirement

The operator must:

- Observe the standards and regulations applicable at the installation site with regard to hygienic requirements .
- Conduct hygiene training for the staff at regular intervals based on the standards and regulations applicable at the installation site. Recommendations of VDI 6022 must be observed.

Personnel qualification

AHUs may only be installed, connected, maintained, repaired, and accessed by persons with appropriate qualifications.

→ Operator

The operator has technical training with technical understanding to carry out checks and adjustments on the AHU, as well as to commission specialist companies to carry out maintenance and to monitor this. The operator has been instructed by a competent person in the use of the AHU and performs work independently in accordance with documents and instructions, observing the relevant regulations and safety provisions. The operator can avoid possible hazards due to improper behavior on the basis of the instruction.

→ Qualified person in accordance with pressure equipment regulation

The qualified person in accordance with pressure equipment regulation has technical training and is qualified in accordance with Pressure Equipment Directive 2014/68/EU. The qualified person in accordance with pressure equipment regulation is trained for the specific task area in which he/she works and knows the relevant standards and regulations. The qualified person in accordance with pressure equipment regulation has in-depth knowledge and skills in safe handling when testing pressure vessels and pipelines. Based on their professional training, knowledge and experience, registered gas installers are able to carry out work on pressure vessels and pipelines and independently recognize and avoid potential hazards.

→ Qualified person in explosion protection

A person qualified in explosion protection in accordance with the German Ordinance on Industrial Safety and Health carries out testing activities in potentially explosive atmospheres and fulfils the requirements listed in the Ordinance. This person must regularly take part in appropriate training courses. This person has knowledge of explosion protection, both mechanical (DIN EN ISO 80079 series of standards, in particular parts 36 and 37) and electrical (DIN EN 60079 series of standards, in particular parts 0 and 14).

→ Professional driver

The professional driver has a valid driver's license for the motor vehicle according to Directive 2003/59/EC with entry of code number 95 in the driver's license. Professional drivers are trained for the specific task area in which they work and know the relevant standards and regulations. The professional driver has in-depth knowledge of transport and load securing. The professional driver is able to carry out transport work on the basis of professional training, knowledge and experience and to recognize and avoid possible dangers independently.

→ Qualified electrician

The qualified electrician is trained for the specific task area in which he/she works and knows the relevant standards and regulations. Based on their professional training, knowledge and experience, qualified electricians can perform work on electrical systems and independently recognize and avoid potential hazards.

→ Qualified electrician in explosion protection

The qualified explosion protection electrician is a qualified electrician trained in explosion protection. In addition to the knowledge of a qualified electrician, this person also has the knowledge of someone instructed in explosion protection.

→ Waste disposal and recycling company and waste and recycling specialist

The management and supervisory staff of the waste disposal and recycling company in accordance with Waste Directive 2006/12/EC have in-depth knowledge and skills in the safe handling of waste collection, transport and disposal. The specialist for recycling and waste management is trained for the specific area of responsibility in which he or she works and knows the relevant standards and regulations. Based on their professional training, knowledge and experience, the specialist for recycling and waste management can carry out work in the field of waste collection, transport and disposal and independently recognize and avoid possible hazards.

→ Hygiene specialist

The hygiene specialist has completed a hygiene training in accordance with VDI 6022 for category A AHUs. Hygiene specialists are trained for the specific task area in which they work and know the relevant standards and regulations. The hygiene specialist has in-depth knowledge and skills in the safe handling of AHUs during hygiene inspections. Based on their professional training, knowledge, and experience, the hygiene specialist can perform demanding activities on AHUs, such as planning, installation, scheduled maintenance, monitoring, and hygiene inspection on AHUs, and independently identify and avoid potential hazards.

→ Crane operator

Crane operators are trained for the specific task area in which they work and know the relevant standards and regulations. Based on a theoretical and practical examination, the crane operator has in-depth knowledge of load suspension devices and lifting equipment as well as of estimating, slinging, setting down and storing loads. The crane operator is able to carry out transport work on the basis of professional training, knowledge and experience and to recognize and avoid possible dangers independently.

→ Mechanic

The mechanic is trained for the specific task area in which he is working and knows the relevant standards and regulations. The mechanic has in-depth knowledge and skills in the area of installation, commissioning, and maintenance of AHUs. Based on their professional training, knowledge and experience, the mechanic can carry out assembly, commissioning and maintenance work and independently recognize and avoid possible hazards.

→ Cleaning specialist

The cleaning specialist has been instructed by a hygiene specialist for the specific task area in which he works. Based on their instruction, the cleaning specialist is able to perform the tasks assigned to them and avoid possible hazards due to improper behavior. Cleaning specialists have been trained to carry out simple operational activities on AHUs, such as changing filters, scheduled maintenance, cleaning, servicing, assembly, and hygiene checks.

→ Forklift driver

Forklift drivers are trained for the specific task area in which they work and know the relevant standards and regulations. Based on a theoretical and practical examination, the forklift driver has in-depth knowledge of industrial trucks as well as of estimating, lifting, transporting, setting down and storing loads. The forklift driver is able to perform transport work based on professional training, knowledge and experience, and to recognize and avoid possible hazards independently.

→ Person trained in explosion protection

Persons trained in explosion protection are informed about the prevailing explosion hazards and the protective measures taken. An instructed person has knowledge of the areas where there is a risk of explosion and how this hazard occurs. The person is instructed in the safe execution of work in potentially explosive atmospheres and knows the existing labelling of the potentially explosive areas and their meaning. This includes knowing which work equipment may be used in these areas and which personal protective equipment must be worn.

Safety labels

There are safety signs on the AHU. The safety signs are affixed in the immediate vicinity of the danger zone concerned.

Warning signs

On the AHU there are the following warning signs:

Even when main switch is switched off under voltage



Fig. 2: Warning sign "Main switch turned off"

In a control cabinet marked in this way, the following parts remain live when the main switch is switched off and can lead to injuries from electric current: electrical conductors and terminals upstream of the main switch, switch cabinet lamps, surge arresters including their connected cores, cables and terminals.

- Do not touch live parts.
- Work on the switch cabinet may only be carried out by a qualified electrician.

Main or service switch inside



Fig. 3: Warning sign "Main or service switch"

A main or service switch is located behind a door or control cabinet inner door marked in this way on weatherproof devices.

Before commissioning the AHU, check contact screws for tight fit



Fig. 4: Warning sign "Check contact screws"

In a control cabinet marked in this way, the contact screws must be checked for tightness before commissioning the AHU.

Open only when the fan is at a standstill and the circuit is interrupted

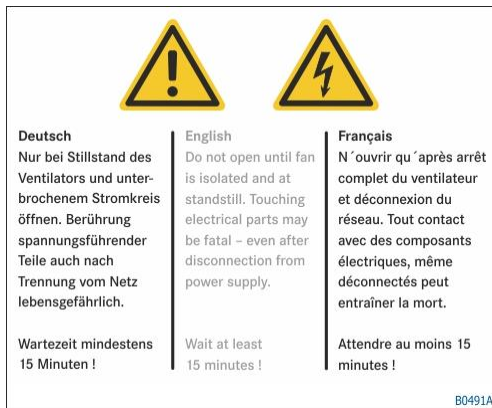


Fig. 5: Warning sign "Fan standstill"

Behind a door marked in this way there is a fan which continues to rotate even after it has been switched off.

- Wait for the fan to stop.
- Behind a door marked in this way, electrical conductors and terminals upstream of the service switch are still live even when the service switch is switched off and can cause life-threatening injuries due to electric current.
- Do not touch live parts.

Risk of explosion from explosive atmosphere

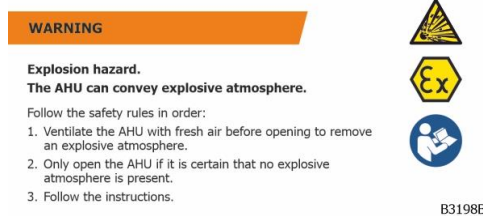


Fig. 6: Warning sign: "risk of explosion from explosive atmosphere"

There is a risk of explosion in the area of an AHU labelled as such, as the AHU can convey a potentially explosive atmosphere.

- Purge the AHU with fresh air before opening to remove any potentially explosive atmosphere.
- Only open the AHU if it is certain that there is no potentially explosive atmosphere.
- Follow the instructions in the operating instructions.

Risk of explosion from electrostatic discharge



Fig. 7: Warning sign: "risk of explosion from electrostatic discharge"

There is a risk of explosion in the area of an AHU labelled as such, as cleaning the AHU with a dry cloth may cause static charging or an absence of or incorrectly connected equipotential bonding may cause static charging of components. The discharge and the resulting sparks may cause an explosion.

- Only clean the AHU with a damp cloth.
- Connect all equipotential bonding cables provided ex works and secure them to prevent them from loosening.
- Follow the instructions in the operating instructions.

Personal protective equipment

During the various operations, the personal protective equipment required by each section must be worn. Personal protective equipment is used to protect health. Working without personal protective equipment can lead to injuries.

When working in potentially explosive atmospheres, it is essential to prevent electrostatic charges and the generation of electrical and mechanical sparks.

Description of personal protective equipment



Depending on the execution, protective clothing protects against:

- Dusts,
- Weathering (a water vapor permeability as high as possible with simultaneous wind tightness) or
- Mechanical hazards (prevents snagging on plant parts due to tight-fitting arm and leg cuffs, no outside pockets or concealed buttons).



Electrostatically dissipative protective clothing safeguards against

- electrostatic charges and
- sparking



Depending on the execution, respiratory protection protects the respiratory tract from:

- Gases,
- Dusts,
- Viruses, bacteria, or fungi.



Hearing protection protects hearing from noise and prevents hearing damage.



Protective goggles protect the eyes from

- parts flying around and
- Liquid splashes.



Depending on the execution, protective gloves protect the hands from

- sharp edges,
- Liquids,
- hot or cold surfaces.



Safety shoes are used to protect the feet from crushing and falling parts. Safety shoes provide a good grip on different surfaces.



Electrostatically dissipative safety footwear safeguards against

- electrostatic charges and
- sparking.

Tool complying with EN 1127-1 Annex A

When working in potentially explosive atmospheres, it is essential to prevent electrostatic charges and the generation of electrical and mechanical sparks.



Only suitable tools complying with EN 1127-1 Annex A may be used.

Safety devices

Main switch of the AHU

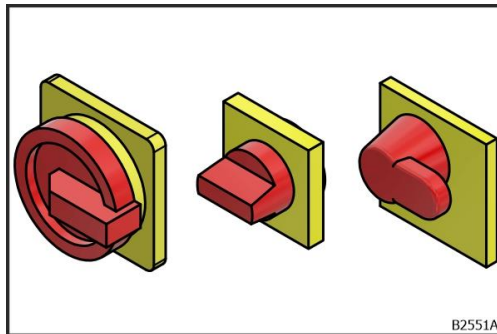


Fig. 8: Main switch position O

The main switch interrupts power and voltage supply to the AHU in position O. Electrical conductors, terminals, and equipment (e.g., switch cabinet lamp, surge arresters) upstream of the main switch remain live.

The main switch can be secured with a lock to prevent it from being switched on again (see chapter "Securing against restart", page 37).

To perform work on the AHU, wait for all moving parts (e.g., fan, rotary heat exchanger, motor, belt drive) to come to a standstill.

Service switch

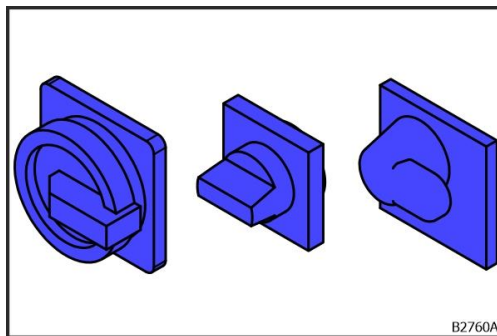
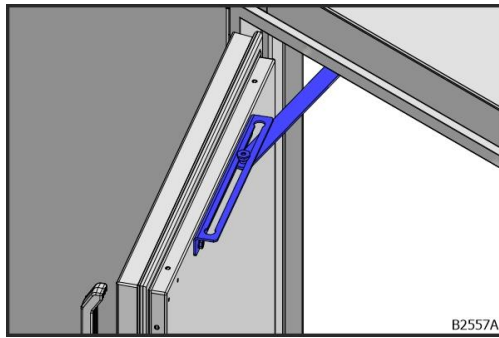


Fig. 9: Service switch

The service switch interrupts power and voltage supply to a component in position O. Electrical conductors and terminals upstream of the service switch remain live.

The service switch can be secured with a lock to prevent it from being switched on again. To perform work on the component, wait for all moving parts (e.g., fan, rotary heat exchanger, motor, belt drive) to come to a standstill.

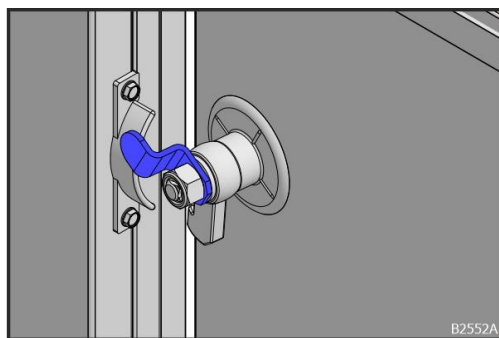
Locking pin



The locking pin is attached to doors of weatherproof units. The door leaf is locked in the open position by the locking pin. This prevents the door from opening or slamming shut due to wind or pressure differences in the AHU. If the locking pin cannot be fitted due to lack of space, the door must be secured against opening and slamming shut by suitable means.

Fig. 10: Locking pin

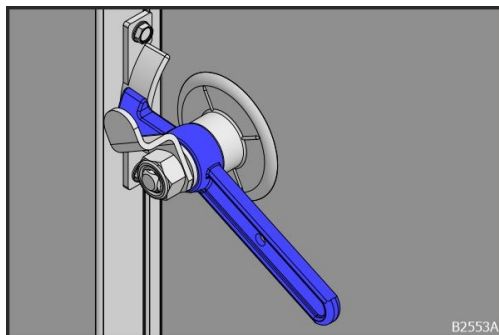
Retaining mechanism on doors in the overpressure area



A retaining mechanism is fitted on the inside of all doors on the discharge side. The retaining mechanism prevents the door from swinging open in an uncontrolled manner when it is opened.

Fig. 11: Retaining mechanism

Emergency lever lock



For walk-in AHUs (enclosures with clearance > 1.6 m), the doors are equipped with an emergency lever lock. The emergency lever lock can be used to open the door from the inside.

Fig. 12: Locking cam catch with emergency lever lock

Lever lock with key cylinder, lever lock with key size 10 / double-bit 3 or external lock with key size 10 / double-bit 3

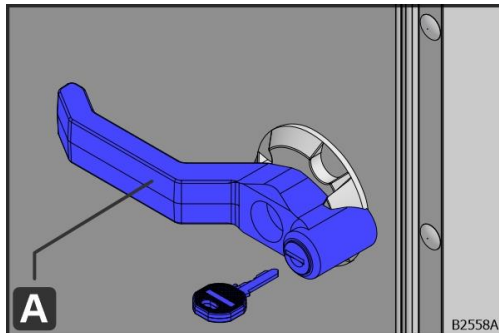


Fig. 13: Lever lock with key cylinder

A lever lock with key cylinder (A), a lever lock with key size 10 / double-bit 3 (B), or an external lock with key size 10 / double-bit 3 (C) is fitted to doors with access to hazardous areas (e.g., fan).

The door lever with shooting cylinder (A) can only be operated with a suitable key. The lever lock with key size 10 / double-bit 3 (B) and the external lock with key size 10 / double-bit 3 (C) can be operated with a hexagon socket (nominal width SW10) or a double-bit key (DB3, also called control cabinet key). The external lock with key size 10 / double-bit 3 (C) can only be operated from the outside.

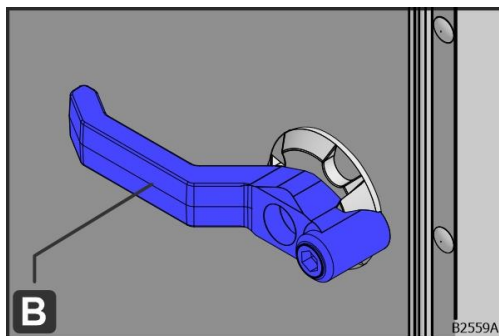


Fig. 14: Lever lock with key size 10 / double-bit 3

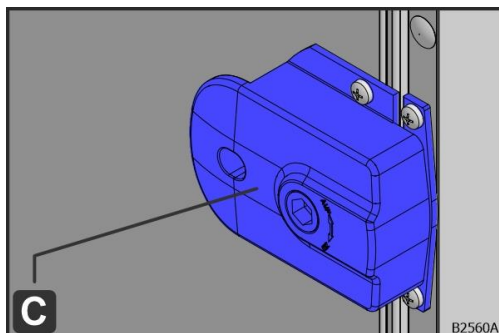


Fig. 15: External lock with key size 10 / double-bit 3

Protective grate by the fan

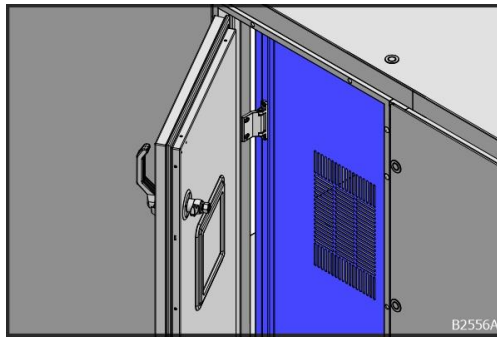


Fig. 16: Protective grate

The protective grate is installed on the fan in the overpressure and underpressure areas if the door can be opened without tools or the fan does not have any other mechanical protection against contact.

Inlet protection grate at the fan

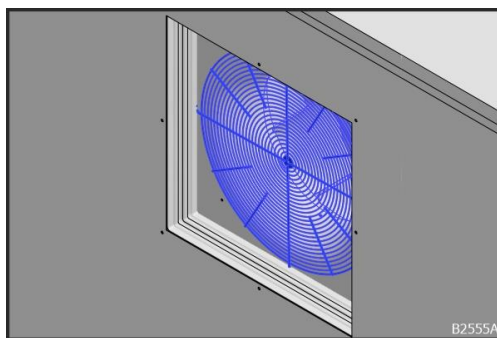


Fig. 17: Inlet protection grate

An inlet protection grate is fitted in the underpressure area between the fan and refrigeration technology if they are not separated by any other component. The inlet protection grate facilitates work on the refrigeration technology where the fan must be in operation. The inlet protection grate prevents injuries caused by unintentional contact with the components of the fan when working on the refrigeration technology.

The inlet protection grate protects the fan from flying parts.

Downstream grid

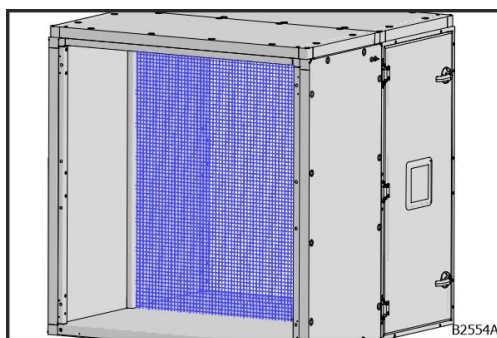
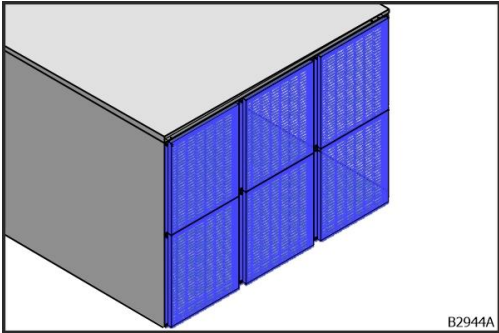


Fig. 18: Downstream grid

A downstream grid is fitted in the overpressure area between the fan and refrigeration technology if they are not separated by any other component. The downstream grid facilitates work on the refrigeration technology where the fan must be in operation. The downstream grid prevents injuries caused by unintentional contact with the components of the fan when working on the refrigeration technology.

The downstream grid protects the downstream component or duct from flying parts.

Touch protection grid



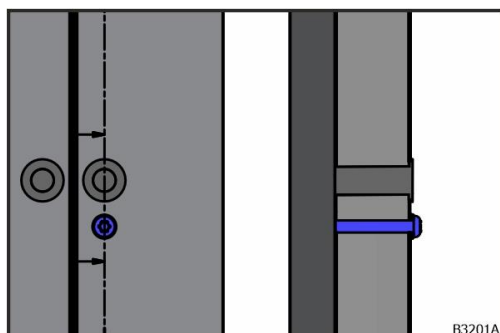
A contact protection grate is fitted to the air openings at the start or end of the unit if these are not fitted with unit connections, weatherproof devices, or similar. The touch guard prevents injuries caused by accidental contact with components at the start or end of the device.

Fig. 19: Touch protection grid

Equipotential bonding

According to DIN EN ISO 80079-36, all conductive parts of an AHU must be arranged in a way that makes the occurrence of a dangerous potential difference between these parts unlikely. If there is a potential for insulated metal parts to become charged and thus act as an ignition source, earthing connections are provided.

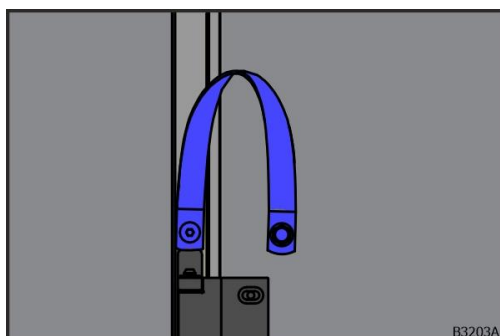
These types of conductive connections are established using earthing screws with anti-loosening protection, equipotential bonding conductors and flat ribbon grounding.



Panel:

All conductive parts of the panel are connected to the equipotential bonding of the AHU by means of an earthing screw with a contact disc to prevent loosening.

Fig. 20: earthing screw in the panel



Inspection doors:

These are connected to the equipotential bonding of the AHU by means of a flat ribbon grounding for the external and internal sheets. All screws have toothed lock washers to prevent loosening.

Fig. 21: flat ribbon grounding (external)

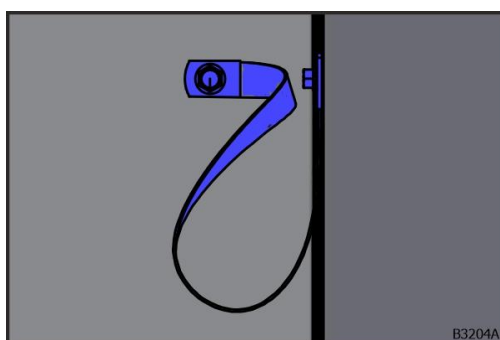
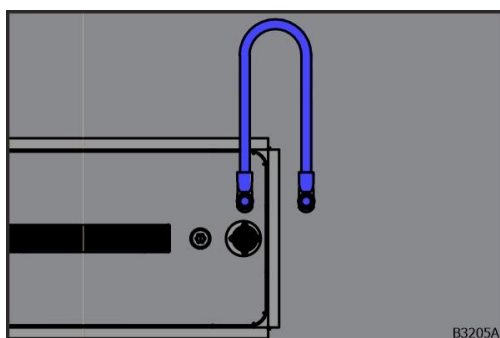


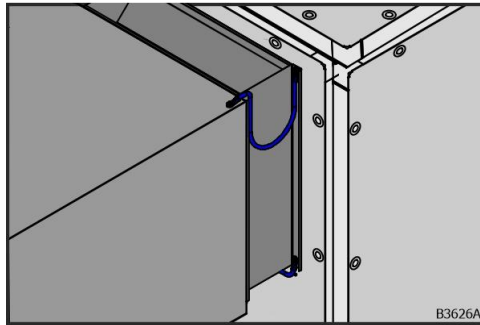
Fig. 22: flat ribbon grounding (internal)



Minipanel:

A combined through bolt with an equipotential bonding conductor connects all conductive metal parts of the minipanel to the equipotential bonding of the AHU. All screws are fitted with toothed lock washers or a contact disc to prevent them from loosening.

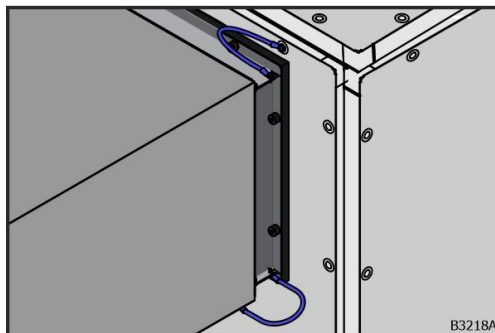
Fig. 23: equipotential bonding conductor on the minipanel



Flexible connection:

The flexible connection is connected to the equipotential bonding of the AHU by means of an equipotential bonding conductor for the panel and on-site duct. All screws have toothed lock washers to prevent loosening.

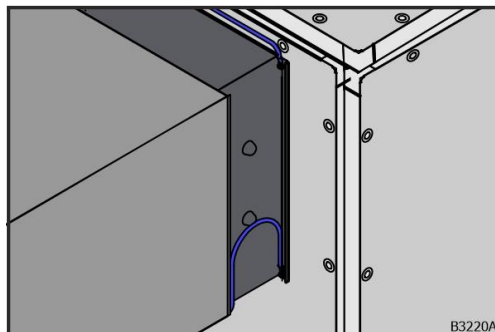
Fig. 24: equipotential bonding conductor on the flexible connection



Sound-insulated connection:

The sound-insulated connection is connected to the equipotential bonding of the AHU by means of an equipotential bonding conductor for each panel and on-site duct. All screws have toothed lock washers to prevent loosening.

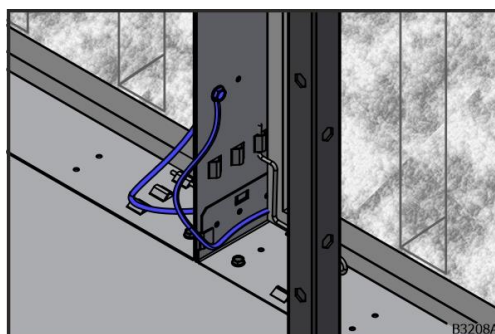
Fig. 25: equipotential bonding conductor on the sound-insulated connection



Damper:

The damper is connected to the equipotential bonding of the AHU by means of an equipotential bonding conductor for each panel and on-site duct. All screws have toothed lock washers to prevent loosening.

Fig. 26: equipotential bonding conductor on the damper



Filter wall:

Each filter frame is connected to the equipotential bonding of the AHU by means of an equipotential bonding conductor for the filter mounting frame. All screws have toothed lock washers to prevent loosening.

Fig. 27: equipotential bonding conductor on the filter wall

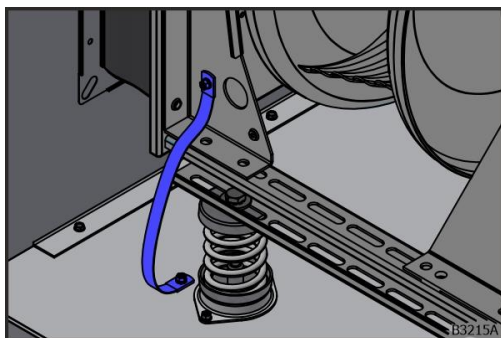


Fig. 28: flat ribbon grounding of fan to the unit floor

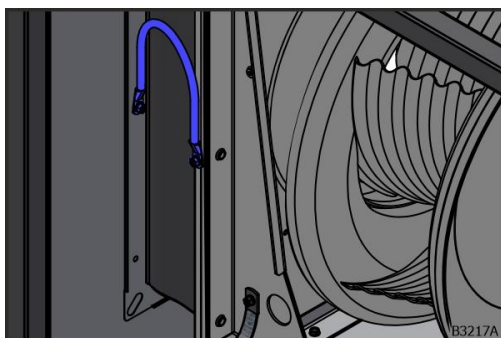


Fig. 29: equipotential bonding conductor on the fan's flexible connection

Fans:

The supporting structure of the fan is connected to the equipotential bonding of the AHU by means of an equipotential bonding conductor for the flexible connection and a flat ribbon grounding for the unit floor. All screws have toothed lock washers to prevent loosening.

To prevent ignition hazards due to electrostatic charging, all electrically non-conductive connection points must be bypassed with equipotential bonding, e.g. insulated frame, flexible connections, and vibration insulators. All metallic parts of the AHU must be included in the local equipotential bonding measure.

No equipotential bonding conductor needs to be installed for components (e.g. heating coils, cooling coils, plate coils, splitters) that are already securely connected to the unit frame on account of their installation. The connection with the AHU equipotential bonding is to be checked regularly.



The AHU must be earthed on the base frame in accordance with the state of the art (foundation earth electrode). The ATEX unit has a borehole in the base frame for connecting the AHU to the local equipotential bonding system. This borehole is labelled with a PE sticker. All conductive metal parts of the AHU are connected to this base frame. This allows potential differences to be equalised. All connections must be secured to prevent them from loosening.

Securing against restart

Secure the AHU against being switched on again

WARNING



Danger to life due to uncontrolled or unauthorized restarting

Uncontrolled or unauthorized restarting can result in serious injury or death.

- Before switching on again, make sure that there are no people in the AHU.
- Before switching on again, make sure that there are no loose objects (e.g., tools) in the AHU.
- Before switching on again, make sure that all doors are closed.

WARNING



Risk of electric shock

When the main switch is switched off, the following parts are still live and can cause injury from electric current: electrical conductors and terminals upstream of the main switch, switch cabinet lamps, surge arresters including their connected wires, cables and terminals.

- Do not touch live parts.
- Work on the switch cabinet may only be carried out by a qualified electrician.

Requirements:

- The AHU must be shut down in a controlled manner.
- The AHU must be in a safe condition (e.g., fans stopped, cold pump-out is complete, components have cooled to a non-critical temperature).

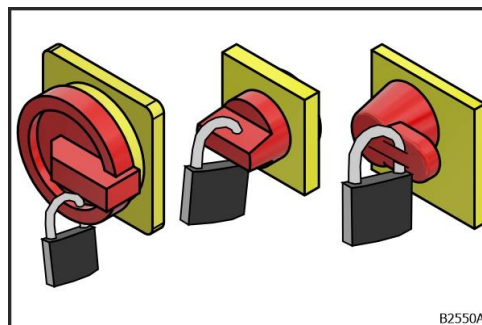


Fig. 30: Secure main switch

1. Turn the main switch to position "0".
→ The power and voltage supply is interrupted.
2. Secure the main switch with a lock.
3. Remove the key.
4. Attach the sign indicating work on the AHU to the main switch.
→ The AHU is secured against unauthorized or uncontrolled restart.

What to do in case of danger

What to do in case of fire

CAUTION



Damage to health due to toxic substances in the event of a fire

Toxic substances may form in the event of a fire.

- Use self-contained respiratory protection.

CAUTION



Risk of injury from pressure tanks or piping in the event of a fire

In the event of a fire, pressure tanks or pipes may burst due to the effects of fire or thermal radiation.

- Leave the danger zone.

robatherm AHUs are not smoke extraction units and must not be used for smoke extraction.

The AHU must be shut down in a controlled manner in the event of a fire by opening the "release central fire alarm system" contact.

Fire protection

WARNING



Fire hazard due to transfer of fire

Fire can spread through the building by transfer between the extract air and the supply air (e.g., via the HRS or the recirculation air).

- Install appropriate precautions to prevent the transmission of fire (e.g., fire dampers) on site.

WARNING



Fire hazard due to combustible parts

There is a fire risk due to transporting burning parts into the supply air duct.

- A downstream grid (in accordance with DIN EN 1886, AHU directive 01 or LüAR) or a suitable component must prevent combustible parts (e.g., from filters, droplet eliminators, contact humidifiers) from being transported into the supply air duct.
- Such a grid (e.g., downstream grid) must be explicitly ordered from robatherm in advance or provided by the customer.

Lightning protection for weatherproof devices

The installation site must have a suitable lightning protection system in accordance with country-specific regulations. Creating and implementing a lightning protection concept is the responsibility of an authorized specialist company.

The external lightning protection must not be installed on the AHU. When routing cables of the air handling unit, the separation distances required on-site between the cables and the external lightning protection and other hazardous lines must be maintained.

When retrofitting AHUs or upgrading existing AHUs, lightning and surge protection measures on or in the building and the existing facilities may need to be retrofitted.

In Germany, AHUs and control cabinets must be installed at least in lightning protection zone LPZ 0B (see DIN VDE 0100-443:2016-10 and DIN VDE 0100-534:2016-10). Control cabinets with complete I&C destined for Germany are equipped with a type 2 surge arrester for TN networks. For AHUs with partial I&C, overvoltage protection is included in the customer's scope of services.

No surge arrester is installed for all AHUs with destinations outside Germany.

What to do in case of leaks

Frost protection agent (Antifrogen L)

Frost protection agent contains propylene or ethylene glycol. Frost protection agent may contain toxic and environmentally hazardous substances.

Personal protection

- Avoid contact with skin and eyes.
- Leave the danger zone.
- Ensure good air exchange in the danger zone.
- Wear personal protective equipment (long-term exposure: gloves made of impermeable butyl rubber; for short-term exposure (splash protection): gloves made of nitrile rubber and safety goggles; respiratory protection in the case of insufficient extraction or longer exposure: wear a full-face mask in accordance with DIN EN 136 with filter A (organic gases and vapours) in accordance with DIN EN 141).
- Comply with the safety data sheet of the manufacturer.

Environmental protection

- Do not allow it to enter waterways or waste water system.
- Absorb with inert liquid-binding material (e.g., sand, silica gel, acid binder, universal binder, sawdust). May be landfilled or incinerated in accordance with local regulations.
- Must be disposed of by a waste disposal and recycling company.
- In case of contamination of waterways inform the relevant authorities.
- Comply with the safety data sheet of the manufacturer.

Frost protection agent (Antifrogen N)

Frost protection agent contains propylene or ethylene glycol. Frost protection agent may contain toxic and environmentally hazardous substances.

Personal protection

- Avoid contact with skin and eyes.
- Leave the danger zone.
- Ensure good air exchange in the danger zone.
- Wear personal protective equipment (long-term exposure: gloves made of impermeable butyl rubber; short-term exposure (splash protection): gloves made of nitrile rubber; respiratory protection in the case of insufficient extraction or longer exposure: full-face mask in accordance with DIN EN 136 filter A (organic gases and vapours) in accordance with DIN EN 141; protective clothing, eye protection depending on the hazard: frame goggles with side protection or cage goggles and, if necessary, visor, full face visor).
- Comply with the safety data sheet of the manufacturer.

Environmental protection

- Do not allow it to enter waterways or waste water system.
- Absorb with inert liquid-binding material (e.g., sand, silica gel, acid binder, universal binder, sawdust). May be landfilled or incinerated in accordance with local regulations.
- Must be disposed of by a waste disposal and recycling company.
- In case of contamination of waterways inform the relevant authorities.
- Comply with the safety data sheet of the manufacturer.

Lubricants

Lubricants such as greases and oils contain toxic substances.

Personal protection

- Wear personal protective equipment (gloves and safety goggles).
- Avoid contact with lubricants.
- Comply with the safety data sheet of the manufacturer.

Environmental protection

- Do not let it enter the environment.
- Absorb with inert liquid-binding material (e.g., sand, silica gel, acid binder, universal binder, sawdust). May be landfilled or incinerated in accordance with local regulations.
- Must be disposed of by a waste disposal and recycling company.
- Comply with the safety data sheet of the manufacturer.

Environmental protection

NOTE



Risk to the environment due to incorrect handling of environmentally hazardous substances.

Improper handling of environmentally hazardous substances can cause damage to the environment. Incorrect disposal of environmentally hazardous substances can endanger the environment.

- Observe the instructions in the operating manual.
- Environmentally hazardous substances must be disposed of by a waste disposal and recycling company.
- In case of leakage of environmentally hazardous substances, take appropriate measures (see chapter "What to do in case of leaks", page 41) and inform competent authorities.

Frost protection agent (Antifrogen L)

Frost protection agent contains propylene or ethylene glycol. Frost protection agent may contain toxic and environmentally hazardous substances.

Behavior in case of leaks for environmental protection see chapter "What to do in case of leaks", page 41.

Frost protection agent (Antifrogen N)

Frost protection agent contains propylene or ethylene glycol. Frost protection agent may contain toxic and environmentally hazardous substances.

Behavior in case of leaks for environmental protection see chapter "What to do in case of leaks", page 41.

Lubricants

Lubricants such as greases and oils contain toxic substances.

Behavior in case of leaks for environmental protection see chapter "What to do in case of leaks", page 41.

Technical data

Technical data sheet and technical drawing

The technical data sheet and the technical drawing are provided before delivery. It is recommended to add these documents to the operating instructions.

Nameplate

The rating plate of the component is attached to the component door. If the component does not have a door, the rating plate is attached to the panel. The nameplate contains the following data:

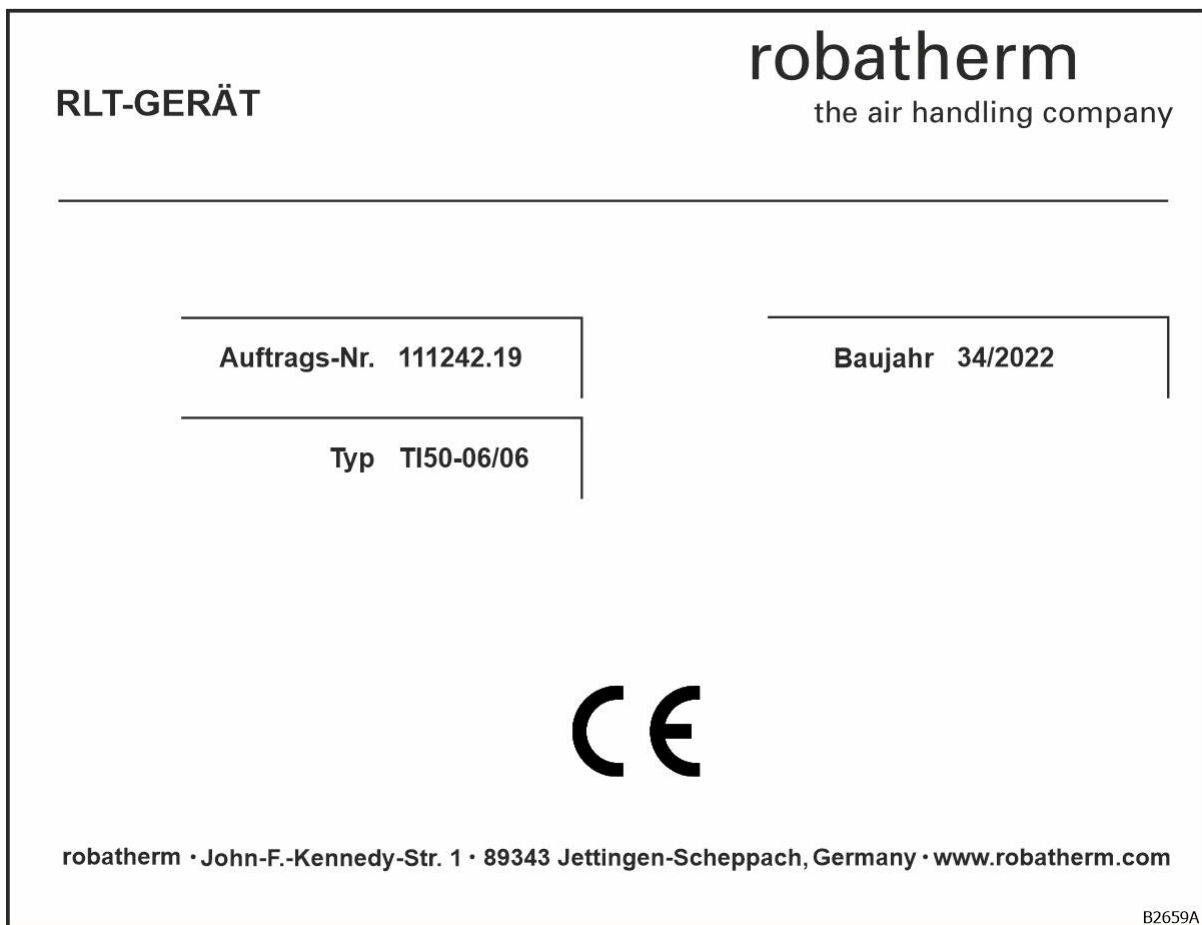




Fig. 31: sample nameplate for the AHU

VENTILATOR ZULUFT		robatherm the air handling company	
Auftrags-Nr. 111242.19		Baujahr 34/2022	
Typ TI50-06/06		Luftvolumenstrom 1640 m ³ /h	
Externer Druck 600 Pa		Gesamtdruck 1139 Pa	
Betriebsdrehzahl 3265 1/min		Max. Drehzahl 3850 1/min	
Motorleistung 1,4 kW		Motordrehzahl 3400 1/min	
Spannung 400 V		Netzfrequenz 50 Hz	
Stromaufnahme 3,5 A			

B2657A

Fig. 32: sample nameplate for a fan

Auftrags-Nr. 112669.3	Baujahr 22/2023
Typ TI50-06/12	Luftvolumenstrom 3800 m ³ /h
Zone Innen  II 3G Ex h IIB T2 Gc	
Zone Außen Keine Anforderung	
Zulassungsnummer  2004 EPS 23 ATEX 2 194 X	

**Das Gerät kann explosionsfähige Atmosphäre fördern!
Nur durch Fachpersonal mit geeigneten Arbeitsmitteln zu öffnen!
Öffnen nur bei Stillstand des Ventilators!**

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B3206B

Fig. 33: sample nameplate for ATEX units

Set-up and function

The arrangement of the individual components of the customised AHU is documented in the technical drawing.

Functional principle of the AHU and components

General functional principle

The AHU comprises a casing in which the individual components are located. AHUs are used to convey air and for air treatment. Air treatment can include the following functions:

- Filtering
- Heating
- Cooling

Functional principle of components

Housing



The casing is used to accommodate the components of an AHU. The casing protects the components and airflow from external influences.

Filter unit



The filter component is used to clean the air. In addition to removing dust particles, this also refers to the elimination of aerosols (e.g. viruses, bacteria, fungi) and reducing certain harmful gases (e.g. gas filtration). Outdoor air is filtered to provide an appropriate supply air quality. Filtering the extract air often serves to protect the AHU.

Silencers



Silencers reduce noise generated by the components (e.g. fan, refrigeration technology) and minimise sound transmission into the ducts.

Fan



The fan conveys the air through the AHU and the duct and provides the required pressure boost.

HRS

HRS systems reduce the energy consumption of the AHU by transferring energy in the form of heat from one airflow to another airflow. The same principle can also be used for cold recovery in cooling applications.

Plate coil



The airflows are separated from each other by thin, parallel plates. This allows heat to be transferred.

Run around coils heat recovery system



The heat is transferred from one airflow to another airflow by means of a coil on an intermediate heat transfer medium.

Heating coil



Heating coils are made up of finned tubes. The tubes contain a heat transfer medium whose heat is transferred to the airflow via the fins.

Cooling coil



Cooling coils are made up of finned tubes. The tubes contain a heat transfer medium which extracts heat from the airflow via the fins.

Damper

The casing cross-section or parts of it can be closed or the cross-section reduced with a damper.

Droplet eliminator

The droplet eliminator is used to collect and drain condensed air. The droplet eliminator protects the following components from entrained water droplets.

Weatherproof hood

The weatherproof hood prevents direct ingress of rain, snow and entrained parts (e.g. leaves).

Weatherproof louvre

The weatherproof louvre prevents direct ingress of rain, snow and entrained parts (e.g. leaves). The weatherproof louvre has a compact design.

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