



Operational manual for refrigeration units and heat pumps

Air-cooled devices
AAC, EAC, SAC, ERC, AAP, ASP, ARP



Water cooled devices
EWC, AWP
Device with remote condenser
ERC, ARP



Obsah

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1. INTRODUCTION

This manual is intended for qualified operators and contains information on the standard functions and operation of cooling devices and heat pumps. Detailed information for controlling the refrigeration unit is given in the ACS (ALPENTA Control System) Control System Manual.

In addition to this user manual, the delivery of each device includes: ACS control system manual, technical data sheet, electrical diagram, dimensional drawing, device nameplate, EU declaration of conformity. If necessary, the decisive information is in the documents with the serial number of the device (e.g. dimensional drawing with attachment points for transport).

Before proceeding with installations and putting the unit into operation, it is necessary to familiarize yourself with the information provided in this manual. Improper installation can cause very serious injuries – electric shock, refrigerant leakage, fire etc. or cause damage to unit and property.

Installation work, commissioning and regular maintenance of the refrigeration unit must be carried out by qualified and trained personnel. All actions must be performed in full compliance with local laws and regulations.

1.1. Basic description of the device

The device, depending on the model, is intended for cooling or heating water (possibly a mixture of glycol) or works as a condensing unit for a remote evaporator. The devices are primarily intended for powering the air conditioning systems of commercial and industrial buildings as well as for industrial applications. Working parameters are defined when ordering the device and subsequently confirmed in the Card of technological parameters of the device.

The function of the refrigeration unit is based on the heat transfer of condensation and evaporation in the cooling circuit, which is divided into a high-pressure and a low-pressure part. The main functional parts of the device:

- Compressor that ensures that the pressure of the evaporated refrigerant is increased to the condensation pressure;
- Condenser cooled by air or forced water flow (EWC, AWP devices), in which gas is condensed at high pressure and thus condensation heat is dissipated. The water flow for the water-cooled units is provided by pumps, which can be fully built into the unit housing. It is necessary to connect a separate condenser to ERC and ARP devices and thus close the cooling circuit;
- Expansion valve that reduces the refrigerant pressure from condensation pressure back to evaporative pressure;
- Evaporator in which a liquid refrigerant evaporates at low pressure and cools water. In devices manufactured in the condensing unit version, the evaporator is installed separately and connected with a refrigerant pipe.

All refrigeration units are fully assembled at the factory and tested before shipment – chillers filled with refrigerant are tested in operation, condensing units and chillers with separate evaporator or condenser are subjected to a computer simulation test.

Temperature limits

Standard design – The setting of the required water temperature depends on the type of liquid used, the minimum adjustable value for water is 5°C (more details in the ACS Control System Manual). Air-cooled devices can operate in a low-temperature design down to -30°C.

External control

Each device can be externally controlled:

- on/off contact and equipped with a contact for alarm signal
- master system: via RS485 – ModBUS or via Ethernet – ModBUS TCP/IP, BacNET, web interface
- ALPENTA mobile application – IOS/Android operating system

Devices in the condensing unit (CU) version have control inputs for switching individual levels of the required power (2 inputs for each circuit) or with a 0-10V signal.

Alpenta Control System (ACS)

Control system ensures data collection and maximum operational efficiency:

- Cooling/heating performance control based on measured parameters.
- Limitation of cooling/heating capacity in situations leading to operation at the limit of technological possibilities.
- The alarm system protects the device from damage caused by operation outside the technological limits.

Wiring

Control panel, components and wiring manufactured in accordance with EN 60204-1 standard. One main power supply connection point, protection class IP 54, phase sequence protection and optionally heated control cabinet. Main on/off switch installed on the front panel, numbered and marked electrical wires to facilitate maintenance and service.

Control unit

Main microprocessor controller configured during factory test for fast commissioning. Intuitive user interface with three levels of access – user (password 1111), advanced user and factory configuration. RS485 and Ethernet serial communication

port, microSD memory card slot. Optional HMI LCD or TFT touch panel with protective cover or supplied for remote installation.

Compressors

The compressors are installed on anti-vibration pads, optionally equipped with soundproof housings. Electronic discharge temperature monitoring and integrated thermal motor overload protection. Check valve on the discharge. Measuring compressor operating time and number of starts helps optimize switching sequence and service diagnostics.

Water Heat Exchanger

Stainless steel plate brazed heat exchanger or tube heat exchanger, externally insulated with rubber insulation. Water hydraulic connection grooved Victaulic, threaded or flanged. 3-step freeze protection via pressure or flow switch, NTC water temperature sensor and low refrigerant pressure sensor (on selected configurations, standard for chillers ordered for medium: water).

Heat recovery

Partial (desuperheater) or full heat recovery from the compressor discharge for liquid heating by means of plate heat exchangers.

Refrigerant circuit

Soldering of refrigerant circuits with a protective atmosphere is carried out by certified personnel. Before being charged with refrigerant, each unit refrigeration circuit is subjected to a pressure test, a leak test (with an inert gas with hydrogen admixture) and then vacuumed. As standard, the refrigeration circuit is equipped with a hermetic or demountable type of filter-dehydrator, an electronic expansion valve, a sight glass with a humidity indicator, a low-pressure switch, a high-pressure switch with manual reset, a compressor discharge temperature sensor, a high-pressure and optionally low-pressure sensor, safety valves according to the requirements of EN 378-2. Depending on the version, the device is also equipped with a suction temperature sensor, a four-way valve, check valves, a collector and a liquid separator.

Hydraulic circuit

The standard components of the hydraulic circuit of liquid chillers and heat pumps consist of NTC temperature sensors, water inlet and outlet, pressure or flow switch. The circuit can be optionally equipped with a pump, a reserve pump, check valves, shut-off valves, a diaphragm expansion vessel with a maintenance shut-off valve, a safety valve, a vent valve, a dirt filter and a drain valve.

Construction

Unit housing made of galvanised sheet steel, painted with polyester powder paint (RAL 7035 as standard, other colours optional). Optional rubber or spring-loaded mounts limit the transmission of vibrations to the foundation structure.

1.2. Model series

Device Type Label Legend:

1	EWC	Model range: AAC,EAC,SAC AAP,ASP EWC AWP ERC ARP	air-cooled devices in versions – liquid chiller, heat pump, condensing unit air-cooled unit for refrigerants of class A2L, A3 in versions – liquid chiller, heat pump, condensing unit water-cooled liquid chillers and heat pumps water-cooled liquid chillers and heat pumps for A2L, A3 class refrigerants device with a separate condenser in the version – liquid chiller, heat pump unit with a separate condenser for refrigerants of class A2L, A3 in the version – liquid chiller, heat pump
2	1	Unit model size	
3	20	Nominal size: Compressor rated power [kW]	
4	C	Unit version: C – cooling; CH – Reversible Heat Pump;	
5	2PPP	2P – compressor unit specification (2 – number of compressors/control stages, P – compressor type); P – evaporator type (P – brazed plate, S – Shell&Tube); P – condenser type (P – soldered plate, S – Shell&Tube);	
6	P	P – integrated pumps; CU – version without evaporator – condensing unit	
7	ACF	ACF configuration code	

EWC	1	-	20	C	-	2PPP	-	P	-	ACF
1	2		3	4		5		6		7

The devices are manufactured in a version with refrigerants:

Class A1 refrigerants					
Model range	Refrigerant	Fluid group (PED)	PS (bar)	TS (°C)	Safety class (ISO 817:2014)
AAC, EAC, SAC, EWC, ERC	R410A	2	45	120	A1
	R134A	2	30	120	A1
	R404A	2	30	120	A1
	R513A	2	30	120	A1
	R448A	2	30	120	A1
	R449A	2	30	120	A1
Refrigerants A2L, A3					
Model range	Refrigerant	Fluid group (PED)	PS (bar)	TS (°C)	Safety class (ISO 817:2014)
AAP, ASP, AWP, ARP	R290	1	32	120	A3
	R32	1	45	120	A2L
	R454B	1	45	120	A2L
	R1234ze	1	28	120	A2L
	R454C	1	35	120	A2L

1.3. Legislation & Safety

ALPENTA s.r.o. has introduced and applies a quality system for the design and production of refrigeration unit according to ISO 9001:2015. The design and manufacture of the unit are certified according to Directive 2014/68/EU. Basic European directives and standards related to ensuring the functionality and safety of refrigeration unit:

- Machine Directive (MD) 2006/42/EC
- Electromagnetic Compatibility Directive (EMC) 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU
- Pressure Units Directive (PED) 2014/68/EU
- EU regulation fluorinated greenhouse gases 2024/573
- European standard for Refrigerating systems EN378 1–4

V tomto dokumentu jsou použity následující typy informačních upozornění:

INFORMATION
Notice of important technical information
! NOTICE !
Notice of important safety information
!!! SAFETY WARNINGS!!!
Strong warning of potential danger

Specialized service

The unit must be installed and connected to the electrical/hydraulic network by specialized and qualified persons. Maintenance and servicing should only be entrusted to companies that specialize in servicing refrigeration unit. Simple maintenance of the unit without opening the covers and without interfering with the system can be carried out by trained operators. All other operations must be performed by qualified personnel. Service of cooling systems can pose a real risk of injury (especially high voltage and high pressure).

Installation Location

The installation site provided by the operator must comply with the accident prevention regulations for machinery (EN 294:1992 – Safety of Machinery) – Safe distances to prevent reach of hazardous places. This requirement also applies to the operation, maintenance and service of the unit.

INFORMATION

Each device is equipped with a main/safety electrical switch, which can be used to safely disconnect the device from the power supply. tension.

When operating the device, use protective unit – gloves, goggles, etc.

!!! SAFETY WARNINGS!!!

Installation, commissioning, and maintenance of refrigeration unit are dangerous operations. The basic hazards that may occur when operating unit (EN ISO 12100 - Safety of machinery) are listed below.



High pressure is used in the system – there is a risk – jetting operating media or flying objects



Electrical system components are live



There are parts with hot surfaces in the device



Sharp edges – especially air exchangers have sharp fins

Units with R290 refrigerant

Hydrocarbons are highly flammable and must be handled with care. To ensure safety, the application of hydrocarbons follows various international, regional, and national standards and regulations. Hydrocarbons can only pose an explosion hazard if the concentration is between the lower and upper flammability limits. The main safety standards for flammable refrigerants are IEC 60335-2-40, IEC 60335-2-89, ISO 5149 and EN378. If safety standards are followed, the concentration of leaked refrigerant will not rise above LFL, where ignition sources could ignite them, even in extreme situations. Most hydrocarbons are non-toxic, with the main safety risk coming from their flammability, although gaseous hydrocarbons are heavier than air and displace air in the lungs. Installation and maintenance should only be carried out by authorized persons certified for the installation and maintenance of refrigeration systems containing flammable refrigerants.

1.4. Warranty Terms and Conditions

Standard Warranty Terms and Conditions

ALPENTA refrigeration Units and its accessories are provided by ALPENTA s.r.o. with a standard warranty period of 18 months from the date of commissioning, but not longer than 24 months from the date of issue of the invoice.

Scope of Warranty

The warranty covers demonstrable defects in materials or functional defects that make it impossible to operate the device as intended. ALPENTA undertakes to replace or repair defective parts of the units free of charge at its own discretion.

Conditions for granting the warranty

The defect must be reported in writing within 7 days of its occurrence. Complaints about the completeness of the delivery must be reported on the day of receipt of the consignment. Commissioning and maintenance must be carried out by a qualified service organization and confirmed by service protocols (model in the appendix to the Operating Instructions for ALPENTA refrigeration unit).

Compliance with the agreed payment terms by the buyer. The warranty performance does not entitle the buyer to postpone or change the payment terms.

Warranty does not cover

Consumables (filters, fuses, refrigerant, oil etc.) that are subject to wear and tear or refill/replacement during regular maintenance or commissioning.

Defects arising during handling, commissioning or operation as a result of a procedure inconsistent with the information provided in the unit documentation, applicable regulations or generally accepted principles of operation of refrigeration unit. Damage and malfunctions resulting from force majeure or modification of the device without the written consent of the manufacturer's authorized representative.

The warranty does not include

Costs of transporting the unit – lifting and handling, as well as the costs of dismantling and reassembling the unit in the event of its replacement and commissioning.

Direct or indirect third-party damages and claims for compensation arising from a defect in the device.

Extended Warranty

ALPENTA offers the possibility of arranging an extended warranty for a total period of up to 60 months from the moment of issuing the invoice. The extended warranty can be concluded at the time of ordering the product, stating the required total length of the warranty in the months from the moment the invoice is issued – i.e. alternatively 36, 48 or 60 months.

Rozsah záruky

The warranty covers demonstrable defects in materials or functional defects that make it impossible to operate the device as intended. ALPENTA undertakes to supply new or repair defective parts of the unit at its own discretion. The extended warranty starts on the day of the end of the standard warranty, i.e. the 25th month from the date of sale stated on the invoice.

Conditions for granting the warranty

The defect must be reported in writing within 7 days of its occurrence. A condition for granting the warranty is the signing and subsequent performance of a service contract with an authorized ALPENTA partner for the entire duration of the extended warranty. Commissioning and maintenance must be carried out by a qualified service organization and confirmed by service protocols (model in the appendix to the Operating Instructions for ALPENTA refrigeration unit).

Compliance with the agreed payment terms by the buyer for the products or services provided. The warranty performance does not entitle the buyer to postpone or change the payment terms.

Warranty does not cover

Consumables (filters, fuses, refrigerant, oil, etc.) that are subject to wear and tear or refill/replacement during regular maintenance or commissioning.

Defects resulting from improper handling, commissioning or operation inconsistent with the information provided in the unit documentation, applicable regulations or generally accepted principles of operation of refrigeration unit.

Damage and malfunctions resulting from force majeure or modification of the device without the written consent of the manufacturer's authorized representative.

Warranty does not include

Transport costs – lifting and handling as well as the costs of dismantling and reassembling parts supplied free of charge under warranty.

Direct or indirect third-party damages and claims for compensation arising from a defect in the device.

1.5. Device Identification

The basic identification, technical and safety parameters are stated on the nameplate placed visibly on the external frame of the device. The basic data and explanations are below:

MODEL	Device model name
SERIAL NO.	Device Manufacturing Identification Number
MANUFACT. YEAR	Year of manufacture of the device
Electrical supply	Parameters of the electrical supply network
Max. Absorbed Current	Maximum permissible electric current
Max. Starting Current	Maximum peak current
Net weight	Weight of the device without packaging and refrigerated media
R410a	Type of refrigerant
GWP	Global warming potential of used refrigerant
Cx	Amount of refrigerant charge in each circuit
Max. pressure water side	Maximum water pressure
IP X4	Ingress Protection
PS HP / LP	Maximum allowable pressure high pressure / low pressure side
TS HP / LP (Min. / Max.)	Lowest / Highest allowed temperature high pressure / low pressure side



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Czech Republic



MODEL	0
SERIAL NO.	0
MANUFACT. YEAR	2022

Electrical Supply

400V/3/N/PE/50Hz

Max. Absorbed Current

A

Max. Starting Current

A

Net Weight

0

kg

Contains HFC gases covered by the Kyoto Protocol.

R410A (PED GROUP 2) GWP = 2088

C1		kg	C3		kg
C2		kg	C4		kg

Max. pressure water side.	6 bar	IP X4
PS (HP / LP) bar	45 / 29	
TS (HP / LP) °C	Min. -30 / -30	
	Max. 120 / 50	

2. COLLECTION, HANDLING AND STORAGE

2.1. Device reception

When transporting the device, it may be damaged by strong impact or vibration, so the device must be inspected and, if damage is found, photo documentation must be made to agree on the next steps. In case of more serious damage, it is necessary to carry out a technical inspection by an authorized partner ALPENTA s.r.o.

! NOTICE !

The refrigeration unit must be visually inspected upon delivery before it is unloaded from the transport vehicle. If loose or damaged parts are detected, it is necessary to contact the supplier immediately to agree on the next steps.

Immediately after unloading, check the identification data of the unit indicated on the nameplate (Chap. Identification of the device) and completeness of the adopted documentation:

Delivery of each device includes: a drawing with dimensions for transport attachment, an electrical diagram, a production plate of the device, and an operating manual. From the point of view of technical specification, the superior documents are documents with the designation of the serial number of the device (e.g. dimensional drawing with attachment points for transport).

2.2. Transportation

The basic dimensions and transport openings and mounts are shown in the drawing supplied with the device. The weight of the device is indicated on the nameplate. Observe the following rules:

- Use appropriate unloading/lifting unit, lifting belts (with the load capacity of the total weight of the unit for each belt) and other unit.
- When lifting, check the correct position of the center of gravity of the device.
- Hold the device in a horizontal position. Avoid excessive rotation and tilting of the device.
- Only unit up to a maximum total length of 3.5 m can be transported with a forklift. The lifting device (fork) must be at least the same length as the width of the device itself. Longitudinal holes for the forks of the pallet truck are located in the devices.
- The unit must be lifted by crane in accordance with the supplied dimensional drawing – a crane with an appropriate number of spreader bars and hitch attachment points, which are located on the frame of the unit (the principle diagram of lifting is shown on the next page).
- After installing the unit at the installation site, remove the protective film and marked fasteners for transportation.

!!! SAFETY WARNINGS !!

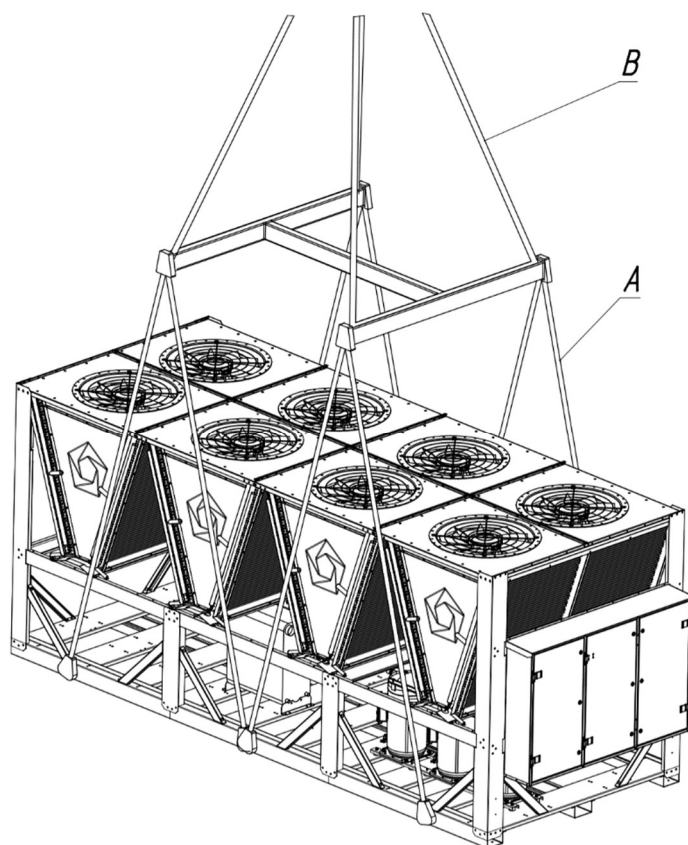
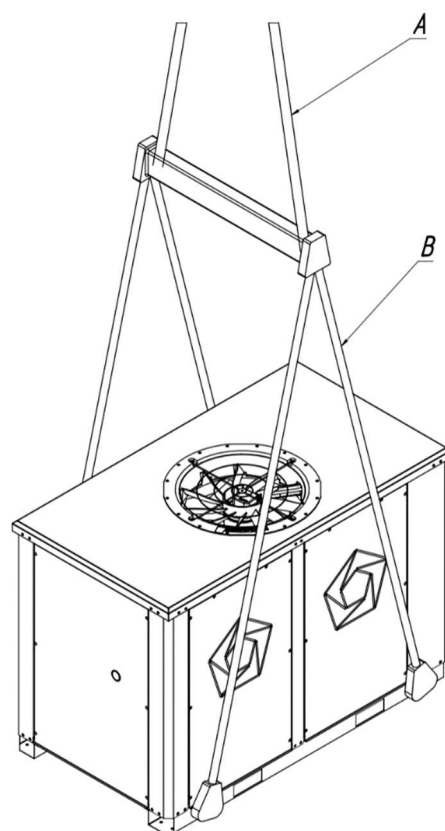
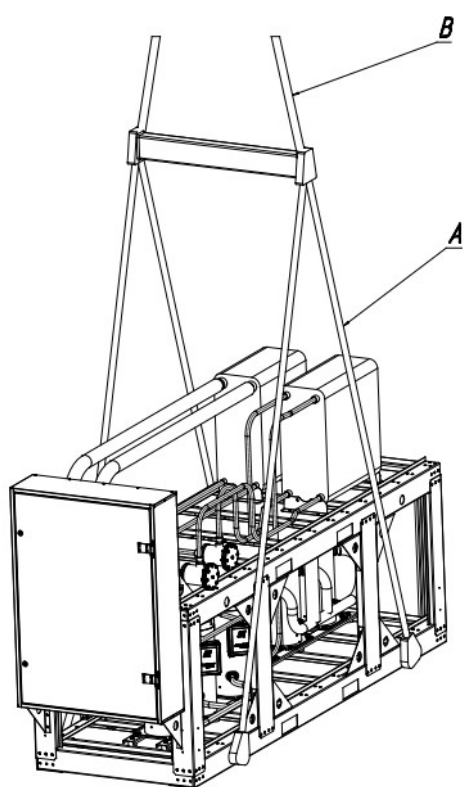
It must be ensured that no persons are under the suspended load during crane transport. There is a risk of loose parts falling.

Improper transport handling may damage the device:

- When falling to the ground even from a low height
- Damage caused by belts and chains – without the use of spacers
- When lifting by unsuitable structural elements
- In case of a sudden jerk of the lifting device
- Lifting the device at an angle – overloading the suspension points

The warranty does not cover this type of damage. In the event of the above-mentioned event, it is necessary to contact an authorized ALPENTA partner to carry out a technical inspection of the unit.

The following figure shows the principle suspension scheme for the vertical transport of unit lifted by a crane at the hinge points on the system frame. For standard suspension devices, the maximum angle between the hitch belts of the device (marking A) is 60° and between the hitch chains (marking B) of the crane is 45°.



2.3. Storage

If the device will be stored before installation, it is necessary to follow several rules to protect it from damage. Storage temperature conditions should range from -25°C to +45°C at a maximum relative humidity of 95%. At high temperatures (above 50 °C), refrigerant may leak through the safety valves.

! NOTICE !

Before storing in winter, when temperatures can drop below 0 °C, check the absence of water in the hydraulic circuit and loosen the drain valves and plugs. Parts of the hydraulic circuit and consequently the cooling circuit could be damaged by freezing the water.

Long-term storage – more than 3 months from delivery

1. Do not remove the protective elements, but replace the foil with another solid material – a tarpaulin
2. Protect the device from external damage – mechanical, thermal, open flames, or damage by animals (e.g. rodents))
3. Protect the unit from dust (e.g. from construction work)
4. Check for the absence of water in the hydraulic section (see previous CAUTION)

INFORMATION

In the event that the storage period exceeds 10 months, it is necessary to carry out a complete inspection of the unit by an authorized ALPENTA partner before proceeding with the installation.

3. INSTALLATION AND PREPARATION FOR COMMISSIONING

All work specified in these instructions (assembly, electrical wiring, commissioning, maintenance, operation, etc.) must only be carried out by trained personnel who comply with the procedures specified herein and the relevant local regulations. Skilled workers are persons authorized by the manufacturer of the unit or persons who have qualifications, experience and practical knowledge of:

- Technical standards and norms in the field of refrigeration technology.
- Work safety regulations and accident prevention regulations.
- Laws and regulations regarding environmental protection (the device may contain F-gases).
- Design, parameters and function of the device.

INFORMATION

Workers performing service activities for refrigeration unit must be certified – the certification obligation is set out in Regulation (EU) 2024/573 of the European Parliament and of the Council (PDF, 2 MB) on fluorinated greenhouse gases.

!!! SAFETY WARNINGS !!

If, despite observing the safety regulations, a hazardous situation has occurred, the device must be immediately disconnected from the power supply. The mains cord must be marked and secured against improper switching on.

3.1. Location

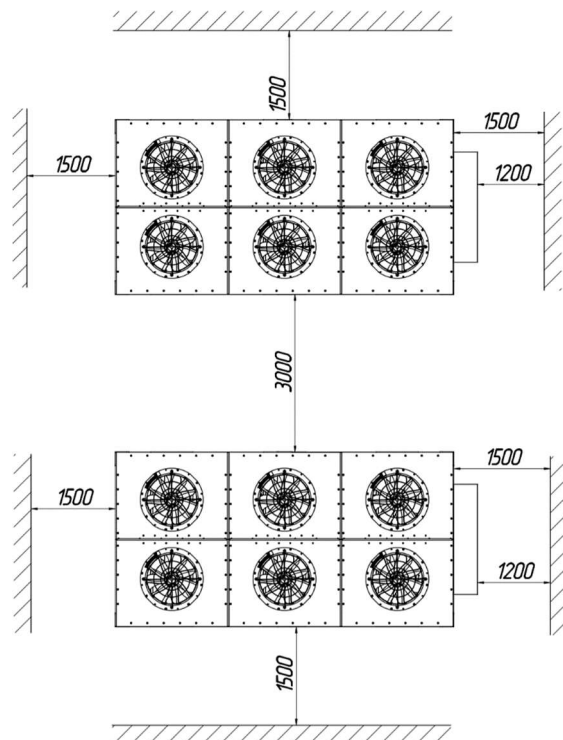
For the proper operation of the device, as well as its easy operation, maintenance and repair, it is necessary to provide access from each side. The minimum clearance distances are also specified in the dimensional drawing, which is part of the documentation supplied with the device. By optimizing the location of the unit, it is possible to achieve better energy efficiency as well as reduce maintenance costs (e.g. by reducing dust or pollination).

Basic rules for free space around the device:

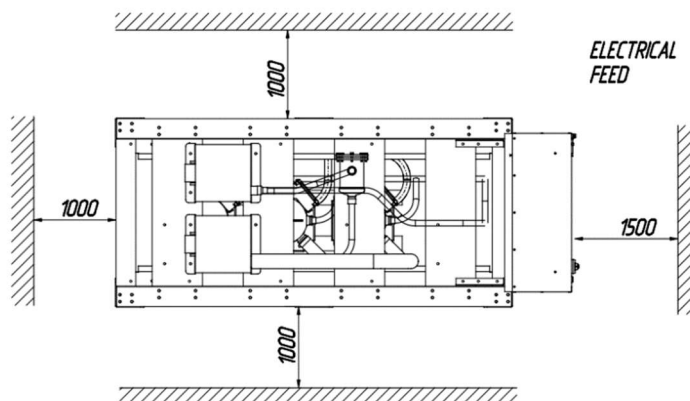
1. Air-cooled devices – space should be left around the perimeter of each device for air flow to the condenser (heat pump evaporator):
 - A minimum clearance next to the condenser of 1500mm is required to ensure airflow.
 - A minimum free space (e.g. from the control cabinet) of 1200 mm is required to ensure operation.
 - The minimum distance between the condensers of two devices placed next to each other is 3000 mm.
2. Other unit – a minimum free space of 1000 mm is required to ensure operation (from the electrical switchboard 1500 mm).

With regard to the correct functioning of the air-cooled device (air condenser) and, similarly, in the case of the function of the heat pump (air evaporator), the following recommendations must be followed:

- The fan directs the air vertically – into the free space. Air circulation must be prevented, the hot air that flows through the fans out of the device should not be drawn back into the system and routed through the condenser.

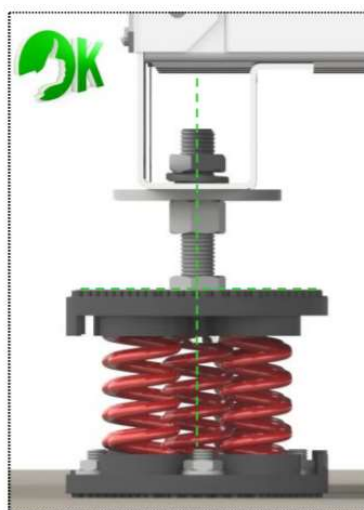


- For the proper operation of the condensers, the device should not be installed in places with an increased occurrence of dust or heavy pollination (e.g. under trees).
- Do not install refrigeration unit near heat sources – hot air must be avoided from being drawn in by the device. Air with a temperature higher than the ambient temperature causes a decrease in the efficiency of the device and, in extreme cases, can cause the high-pressure protection of the cooling circuit to be switched on.
- Do not install ducts or mufflers at the air inlet or outlet. Changes to the structure are not permitted. For these types of installations, the corresponding models of refrigeration unit are.



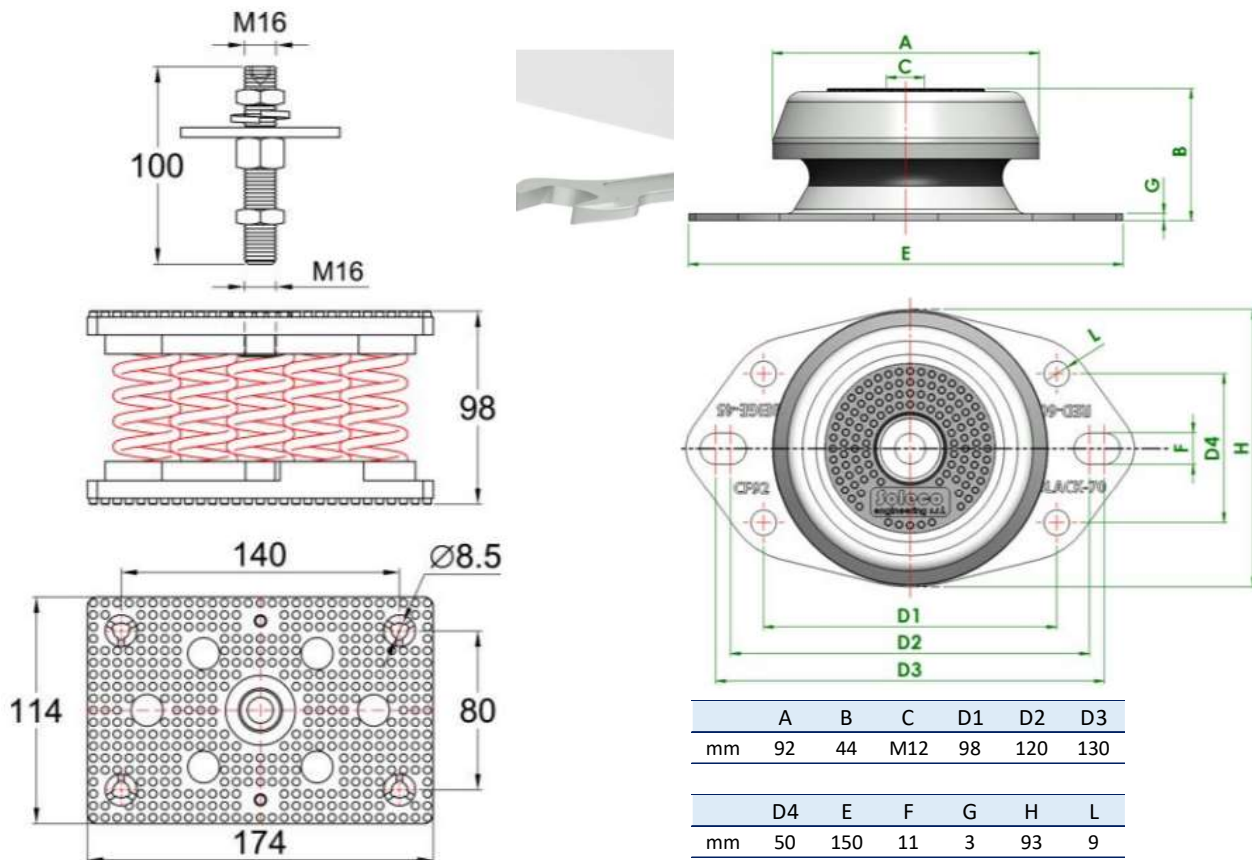
Other general recommendations for the location of refrigeration unit:

- It is necessary to prevent the transmission of vibrations to the connected pipe networks. The external hydraulic circuit must be routed in part by means of hoses or with the use of vibration compensators.
- In the case of installation in confined spaces, contact the manufacturer for instructions on choosing an installation location.
- If the device is freely accessible for the movement of people or animals, it is necessary to install protective grilles to protect the device from damage.
- The device must be installed on a horizontal surface with a maximum slope of 1.5 mm/m. The foundation structure according to the approved project documentation must be solid, able to bear the weight of the unit and prevent the accumulation of water.
- The unit, which is located within the building structure, must be placed on rubber or spring silent blocks supplied together with the unit or by a professional installation company according to the type specified in the project documentation.
- When the device is installed, it is first necessary to place the device with loose screws of spring silent blocks into pre-prepared dimensions (holes) in the base frame. The final axis of the silent block must be in a perpendicular position without tilting. The following illustrations illustrate the procedure.



- When the device is mounted on rubber silent blocks, the screws can be pre-tightened in the base frame of the device and then placed together with the device in the final position on the base frame and then attached. The following illustrations illustrate the procedure.

The dimensions of standard spring and rubber silent blocks are shown in the next picture:



The location of the device also affects the sound pressure level around the device. If the device is installed close to the acoustically hard walls of the building, the sound pressure values at a distance of 10 m will be higher than the nominal values specified in the technical parameters card of the unit (regardless of the maintenance of the sound power level L_w of the refrigeration unit).

3.2. Hydraulic part

The hydraulic part of the refrigeration unit (except for the CU version – condensing unit) always consists of the evaporator water circuit together with temperature sensors and a flow switch, other unit is optional when ordering the device.

Flow (differential pressure) switch provides protection against pressure/flow loss in the event of a pump failure or a significant reduction in flow through an obstruction in the pipeline. In the case of using a speed-controlled pump, the minimum flow level is defined at commissioning, especially with regard to the function of the flow sensor and, additionally, the heat transfer efficiency in the heat exchanger.

INFORMATION

The standard configuration of the control system (ACS) is set up so that the system checks the open contact of the flow sensor before starting the evaporator pump. (if necessary – external control of pumps without the possibility of cooperation with the signal from ACS, the function can be turned off in the advanced settings, but this procedure is not recommended).

Filling the hydraulic fluid chiller/heat pump system

In order to protect against freezing and for the proper functioning of the refrigeration unit, the system (individual parts) must be well vented during commissioning. To properly vent the system, it is necessary to install automatic or manual vent valves at the highest points of the pipe.

The expansion vessel also includes a service valve allowing manual venting and disconnection of the vessel from the vessel air pressure control system – usually around 1.5 bar.

! NOTICE !

The minimum amount of water in the system, including the evaporator, should correspond to the amount of water that flows through the system in 2 minutes. If the system does not meet this condition, it is necessary to install a storage tank of the appropriate volume in the system.

Insufficient water in the system can affect:

- Correctness of the function of safety elements – risk of damage to the device
- Faster wear and tear of the unit due to the risk of cavitation on the pumps as well as frequent switching on and off of the refrigerant circuit
- Cooling capacity due to irregular operation

System shutdown in winter

Units using water as a cooled medium must be protected against frost damage to parts of the hydraulic circuit when outside temperatures drop below 4 °C. If the unit is equipped with resistance heating of the heat exchanger, it is necessary to check the presence of an electrical supply during the entire shutdown at low temperatures.

! NOTICE !

Before shutting down the unit in winter, when temperatures may drop below 4 °C, check the absence of water in the hydraulic circuit and loosen the drain valves and plugs and partially fill the system with antifreeze. Devices with a freecooling function should be completely flushed with antifreeze liquid.

External part of the hydraulic circuit

The connection of the pipe network to the unit, its setup and installation must comply with current legal regulations, technical requirements and requirements for maximum safety. Furthermore, following the instructions below will prevent damage to the device:

- Avoid unnecessary pressure losses, ensure diameter sizing and circuit structure.
- Connecting pipe must be fixed to a separate supporting structure so that it does not load the joints.
- Connect compensators to the device to prevent noise and vibration.
- Install shut-off and drain valves on the outside of the unit to shut down and drain the system for maintenance and service.
- Install the drain valve at the lowest points of the water circuit and the vent valve at the highest points of the circuit. Install a Y-strainer filter at the inlet of the device to prevent efficiency losses, possible freezing and damage to the evaporator.
- Mount a thermometer and pressure gauge on the inlet and outlet of each heat exchanger for quick inspection and maintenance.
- Insulation of the hydraulic line must be carried out to prevent condensation and thus loss of performance. Pipe insulation is carried out only after checking the complete system under pressure.

Refrigerated medium

The quality and purity of the cooled medium play a crucial role in the trouble-free and energy-efficient operation of the refrigeration system.

! NOTICE !

A water Y-strainer filter must be installed at the inlet of the liquid into the evaporator (water condenser, recovery) to remove impurities before entering the exchanger. Install a cleaning filter with a length of at least 1,000 mm in front of the heat exchanger. The filter should have holes no larger than 1.5 mm for models with a plate heat exchanger or 3.0 mm for a tube heat exchanger.

INFORMATION

Flushing of the piping system after its completion is recommended to be carried out by bypassing the cooling unit. To extend the service life of the components, we recommend the use of antifreeze additives, so-called corrosion inhibitors.

In case of using glycol mixtures:

- The freezing point of the glycol must be lower than the minimum evaporation temperature.
- The concentration of the mixture should not be higher than the calculated one indicated on the nameplate, otherwise the cooling capacity of the system will be reduced.
- Check the pH value of the mixture, which should be approximately between 9.5 – 8.
- Check the pH value regularly (during maintenance).

! NOTICE !

It is inadmissible to discharge a mixture of water and glycol into the sewer. Mixture Must be collected in a special container and disposed of in accordance with waste management provisions.

3.3. Electrical part

The documentation for the device also includes an electrical wiring diagram and the ACS System manual, which is used to control all functions of the refrigeration unit.

The voltage and frequency of the mains must correspond to the values on the nameplate of the device. The supply voltage should not exceed the values indicated on the circuit diagram for a short period of time, which is +/- 5% for voltage; +/- 1% for frequency, unless otherwise stated. The supply wires must be adequately fused and dimensioned to the electrical performance characteristics indicated on the nameplate and the electrical specification supplied in the wiring diagram. The protective bonding conductor that connects the protective conductor, the earthing supply and the conductive parts to each other must comply with EN 60204-1. The conductor cable must have a cross-section of at least 10 mm².

! NOTICE !

It is not permissible to mechanically load the supply terminals of the electrical switchboard.

!!! SAFETY WARNINGS!!!

Electrical connections must be made by qualified personnel in accordance with local applicable regulations. There is a risk of electric shock.

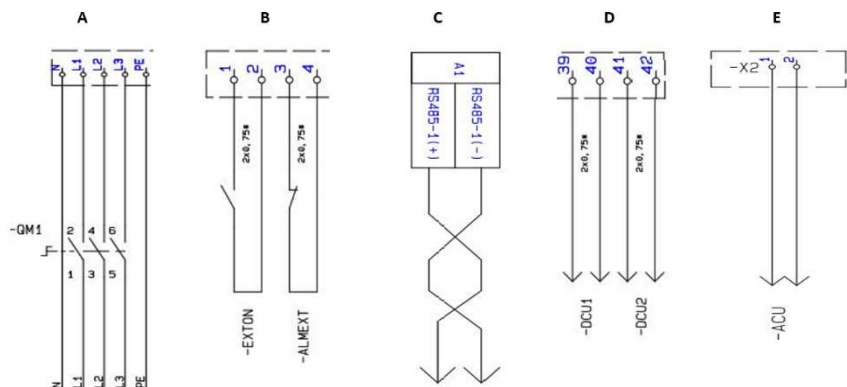
Before connecting the device or servicing electrical parts, make sure the main/safety switch is in the OFF position.

! NOTICE !

The operator of the system must ensure that the power supply is equipped with an isolator, e.g. a main mains switch with the appropriate contact capacity, and that the power supply is equipped with a separate fuse device and an emergency stop switch. (all dimensioned according to the relevant approved project documentation of the electrical installation).

Detailed information about individual inputs/outputs and configuration of the control unit is given in the ACS Control System Manual. The figure shows the basic parts of the external electrical wiring of refrigeration devices. Detailed information and a wiring diagram are supplied with the device.

- A – Power connection – power supply from mains 400/3/N/PE, 50Hz
- B – External control – ExtOn signal for remote start, AlmExt signal for information about the alarm state of the refrigeration unit (can be configured in the ACS system)
- C – ModBUS – connection for ModBUS communication via RS485, optional Ethernet
- D – DCU – digital switching of cooling capacity for CU versions – condensing unit
- E – ACU – analog cooling capacity control for CU versions – condensing unit



3.4. Refrigerant circuit

As standard, the refrigeration unit can have 1 to 3 cooling circuits with 1 to 9 compressors.

Soldering of refrigerant circuits with a protective atmosphere is carried out by certified personnel. Before being charged with refrigerant, each refrigerant circuit of the unit is subjected to a pressure test, a leak test, and then vacuumed. Each chiller unit is subjected to a complete functional test or functionality test using computer simulation (CU condensing unit or chiller with remote evaporator).

The refrigerant circuit is equipped with:

- hermetic or replaceable cartridge type filter-drier,
- electromagnetic valve, (CU version – included)
- thermostatic or optional electronic expansion valve, (CU version – included)
- sight glass with humidity indicator, (CU version – included)
- low-pressure switch,
- high-pressure switch with manual reset,
- temperature sensor on the compressor discharge,

- high-pressure and optional low-pressure sensor,
- shut-off valve before entering the condenser,
- safety valves for pressure relief according to EN 378-2 requirements and suction pipe insulation.

Depending on the version, the device is also equipped with a suction temperature sensor, a four-way valve, check valves, a collector and a liquid separator.

As part of the preparation for commissioning, it is necessary to check whether the device has not been damaged or if there has been a refrigerant leak:

- Visual completeness and potential occurrence of unwanted mechanical damage to the elements of the refrigeration circuit
- Potential refrigerant / oil leakage – visually and with a leak detector
- Tightening of screw connections, especially the oil line, manometer nuts and service valves
- The refrigerant pressure in the idle state of the device must correspond to the ambient air temperature on the high-pressure side - the pressure can be checked on the device's manometers (optional equipment), by connecting a service manometer or on the control unit

4. COMMISSIONING

4.1. Pre-commissioning inspection

Before proceeding with the commissioning of the unit, it is necessary to carry out an inspection of the unit and the associated installation. The basic control activities are listed in the Protocol of the Pre-Commissioning Inspection (appendix).

Check that the minimum distances are maintained for the proper operation of the unit and the availability of the necessary space for maintenance.

Determine if the device has been damaged or subsequently modified without the manufacturer's authorization, for example by improper installation of cable strips or ducting (e.g., they may obstruct service access or airflow etc.). In the vicinity of the heat exchangers and the refrigerant pipe, there must be no screws or other sharp objects that could cause mechanical damage due to vibrations.

! NOTICE !

Before switching on the device for the first time or after a long shutdown, the oil filling of the compressor must be warmed up. The cartridge is heated by heating cables at least 12 hours before switching on. To start heating, turn the on/off switch to the ON position, so the crankcase heating function is automatically active.

4.2. Commissioning

The commissioning of the system can be followed by a prior inspection of the entire system (Chap. Pre-commissioning inspection). The downstream cooled/heated system must transmit at least 60% of the plant's power. In the case of reversible heat pumps, it is possible to put the unit into operation in both modes during the transitional period, otherwise the commissioning process must be completed under suitable conditions.

A detailed description of operating sequences, parameters and alarm messages is given in the ACS Control System Manual. During commissioning, it is possible to use:

- variable Speed Fans and Pumps Test Modes
- possibility of manual shutdown of selected compressors during commissioning
- temporary setting of setpoint water temperatures to speed up/slow down the operating sequence
- temporary switching off of the flow control before starting the system (e.g. when external pump control)

Commissioning protocol

The commissioning protocol should include data on the operating parameters at first start-up, identification of the unit, confirmation of qualified service and confirmation of the commissioning customer – a sample is provided in the annex.

A completed Commissioning Protocol (or a similar document) is a condition for warranty performance in the event of a device complaint.

Operator training

Operators of the refrigeration unit must be trained during commissioning, which is finalized by signing the Commissioning Protocol (annex).

As part of the operator training, the future operator will get acquainted with:

- Safety rules for refrigeration unit operators
- Basic tasks of user operation and weekly inspections (Chap.)
- Basic Operating Sequence
- Temperature and pressure protection elements
- Basics of wiring and safety elements
- Operation of the control unit and setting of basic parameters
- Alarm states and possibilities of their solution
- Documentation for the refrigeration unit – Operating instructions for the device and the ACS control system, Electrical diagram
- Obligation to keep operational documentation and protocols (Annex)

5. OPERATION AND MAINTENANCE

5.1. Principles of operational safety

Before carrying out any service work, it is necessary to familiarize yourself with the safety regulations and precautions.

The operator must always be equipped with personal protective unit that is appropriate for the work to be performed. Personal aids generally include, but are not limited to: safety goggles, gloves, headgear or helmet, protective work shoes. Other protective unit needs to be selected after a risk analysis has been carried out in the appropriate area, depending on the type of work to be performed.



Risk of fatal injury. Disconnect the device from the power supply before opening the electrical panel or removing the protection panels. When the main switch is disconnected, the supply contacts L1, L2 and L3 remain energized.



Risk of burns, pipes can reach high temperatures



Risk of freezer burn. Do not remove any part of the refrigerant circuit piping before depressurizing the system



Wear safety goggles and rubber gloves when handling refrigerants.



Risk of suffocation. When working with refrigerant gases, ventilate the space. Smoking is strictly prohibited.



It is forbidden to discharge refrigerant into the environment. It must be captured in bottles and reused or returned to a specialist company.



Risk of injury. If maintenance of the fan is necessary, do not allow body parts or clothing to get into the moving parts.



Flocking devices. It is forbidden to switch off or interfere with the operation of safety devices such as flow switches, pressure sensors, safety valves, etc.



Changes to the software or to the electrical system may only be made in consultation with the manufacturer. Any changes to the wiring must be made according to the wiring diagram.

5.2. Traffic

Operator's Liability

The operator of the refrigeration unit is obliged to provide qualified operators familiar with the characteristics of the installed unit. From the point of view of basic information about the unit, it is a thorough acquaintance with the manuals for the unit (especially this manual and the ACS Control System Manual) and the operator is also obliged to keep the documentation necessary for the operation of the unit:

1. Pre-commissioning inspection protocol, Commissioning protocol (template in annex)
2. Refrigeration unit inspection book (see CAUTION below)
3. Service book or Service Maintenance Protocols (sample attached) – records of maintenance and service interventions (contains the date, description of the operation, with measured parameters if necessary, and confirmation from a qualified service organization)

In the event that the operator discovers unusual operating conditions or a defect in the unit, it is recommended to contact an authorized ALPENTA partner to agree on the next steps.

! NOTICE !

According to Regulation (EU) 2024/573 of the European Parliament and of the Council on fluorinated greenhouse gases: The operator of a plant that contains F-gases in the amount of more than 5 tons of CO₂ equivalent (or more than 1 kg of HFO) is legally obliged to ensure regular leak checks. Inspections may only be carried out by certified persons holding a category I certificate (EU Implementing Regulation 2015/2067).

5.3. Troubleshooting

In order to solve a failure of the cooling unit, it is necessary to know the information provided in the technical documentation of the unit – Operating Instructions for the Units, Instructions for the ACS Control System. In addition, appropriate qualifications for the operation and operation of refrigeration unit are required, which are described in more detail in the introduction to this manual. Warranty repairs are carried out only by an authorized ALPENTA service or other service organization with the consent of an authorized ALPENTA partner

It is always necessary to approach the solution of a fault condition with caution, especially with regard to finding out the real cause of the failure, not only removing its consequences. Failure to determine the real cause of the malfunction can lead to an escalation of consequences and further to greater damage to the unit. The cause of the malfunction often depends on many factors, which can only be evaluated by a qualified workshop familiar with the interaction of the various functions of the device. This manual is not an exhaustive source of information on refrigeration unit failures. Alarm states reported by the ACS control system on the display of the control unit - for these alarm states is the ACS Control System Manual.

The underlying causes of breakdowns can be divided into three groups:

- Defects in the structural, mechanical or hydraulic system – these defects can usually be rectified by a qualified user himself.
- Electrical defects – a qualified electrician with the appropriate authorization can repair these defects
- Defects in the refrigeration circuit – this type of defect can only be corrected by a professional refrigeration service

Whenever the refrigerant circuit is tampered with, a qualified service organization should carry out:

- replacing the drier filter or its replaceable cartridge
- appropriate pressure tests with inert gas
- appropriate leak tests
- Recommissioning the device in accordance with the procedure described earlier in this guide Measuring the Parameters of the Operation of the Units
- fill in the Protocol of Inspection before Commissioning, the Protocol of Commissioning (template in the annex)

Selected basic fault states are listed in the following table.

5.4. Maintenance

Regular service inspections

The service intervals and procedures given are based on experience and may be changed depending on the complexity of the installation. In some cases, it is necessary to shorten service intervals (e.g. during continuous operation of the unit, difficult dust or climatic conditions etc.).

Basic service maintenance is described in the Preventive Maintenance Protocol (Appendix). Service activities are divided according to the planned period into Weekly Inspections, Quarterly Service Maintenance and Annual Service Maintenance.

Weekly inspections can be carried out by trained operators of the operator. Quarterly and annual inspections must be carried out by a qualified service centre with the completion of a protocol (attachment or similar form or service book of the device).

5.5. Product Lifespan and Disposal

Lifespan of refrigeration unit

The device is designed so that its minimum service life exceeds 12 years without the need for major modifications. Assuming proper operation and regular maintenance, the unit should work for 15 to 20 years. In addition to the operation, the service life of the unit is fundamentally influenced by the method of operation – working parameters and environmental demands, the dynamics of changes in the heat load (stable load prolongs the service life), etc.

The resulting service life of the unit depends not only on the manufacturer, but also on the installation project, the method of operation and compliance with the principles of proper operation and maintenance.

Disposal

Chladicí zařízení je vyrobeno z kovových, plastových a elektronických součástí. Všechny části zařízení se musí likvidovat podle platných lokálních zákonů, případně v souladu se směnicí 2012/19/EU (WEEE) (Směrnice EU – Odpadní elektrická a elektronická zařízení). Při ukončení provozu je doporučeno zohlednit možnou modernizaci, opětovné použití, demontáž a recyklaci zařízení.

! UPOZORNĚNÍ !

The refrigerants collected are considered hazardous waste, and therefore this activity must be entrusted to a professional organization authorized to work with refrigeration systems, and in accordance with the laws in force in the country where the dismantling takes place. The release of refrigerant gases into the environment must be prevented by using suitable pressure vessels for the transport of compressed gases.

Part of the device	Manifestations of the disorder	Possible causes
Cooling circuit - high pressure	switching of the high-pressure switch /HPS/; Frequent switching of high-pressure limitation /HPL/	very high air/water temperature compared to design value
		dirty condenser
		failure of the condenser fan/pump or its electrical connection
		non-condensable gases in the condenser
		closed valve on the high pressure side
		refrigerant overflow
		malfunction or incorrect setting of the high pressure sensor (HPT)
Refrigerant circuit – low pressure	switching of the low-pressure switch /LPS/; Partial switching of low-pressure limitation /LPL /	failure of the high pressure switch (HPS) or its cable connection
		very low air temperature compared to the design value (very adverse weather conditions)
		blockage in the liquid line – valve failure (solenoid, expansion), clogged filter dehydrator
		lack of refrigerant, leaking cooling circuit
		dirty evaporator or clogged water filter, low water flow
		very low temperature or low water flow compared to the design value
		low pressure sensor (LPT) failure or incorrect setting
Refrigerant circuit	Noise and vibration	malfunction of the low pressure switch (LPS) or its cable connection
		the weight distribution of the unit on the base frame or its position is not optimal
		damage to the fan or dirt on the impeller
		failure of the mechanical parts of the compressor, the clicking sound of the compressor check valve when switching off may not mean a failure
		liquid in the suction or wrong direction of rotation of the compressor
		loose compressor mounting screws
Refrigerant circuit	Switching of thermal protection or discharge temperature protection	insufficient vibration compensation or incorrect location of pipe attachment
		lack of oil in the compressor
		failure of mechanical parts of the compressor
		electromechanical failure of the compressor motor, uneven phase load
hydraulic system	noise and vibration; Insufficient performance	see Hypertension
		small amount or presence of air in the cooled medium
		setting the working point of the pump outside the characteristic
		failure of the mechanical parts of the pump
		the presence of impurities in the hydraulic circuit
		incorrect setting or failure of the pump frequency converter
		check valve mechanical failure

Alpenta reserves the right to change the technical information as part of the product upgrade without prior notice.

ALPENTA s.r.o., Piletická 486, Hradec Králové, Česká republika.

www.alpenta.com

6. ATTACHMENTS

- 6.1. Declaration of Conformity
- 6.2. Pre-commissioning inspection protocol
- 6.3. Commissioning protocol
- 6.4. Service Maintenance Protocol



DECLARATION OF CONFORMITY



ALPENTA

ALPENTA s.r.o.

Piletická 486, Hradec Králové 503 41, Czech Republic

Declares under its responsibility, that the following unit:

Model:	AAC, EAC, SAC, EWC, ERC, AAP, ASP, AWP, ARP
Serial number:	<i>refer to unit nameplate</i>

Is manufactured in conformity with the provisions of the following Directives:

Machine Directive (MD)	2006/42/EC
Electromagnetic Compatibility Directive (EMC)	2014/30/EU
Low Voltage Directive (LVD)	2014/35/EU
Pressure Equipment Directive (PED)	2014/68/EU
EcoDesign Directive	2009/125/EC

With reference to the following standards:

- EN 60204-1:2006+A1:2009 Safety of machinery.
- EN 61000-6-2:2005 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments.
- EN 61000-6-4:2007+A1:2011 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments.
- EN 60335-1 Household and similar electrical appliances. Safety General requirements
- EN 60335-2-40 Household and similar electrical appliances – Safety - Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
- EN 60335-2-89 Household and similar electrical appliances - Safety - Part 2-89: Particular requirements for commercial refrigerating appliances and icemakers with an incorporated or remote refrigerant unit or motor-compressor
- EN 378-1+A1, EN 378-2, EN 378-4+A1 Refrigerating systems and heat pumps - Safety and environmental requirements.
- EN 13136:2007 Methods for calculation pressure relief devices.
- EN 14825:2022 Testing and rating at part load conditions and calculation of seasonal performance

Certificate of conformity based on full quality assurance, Module H1: 1945/23/PED/H1 was issued by Notified Body: 1735 TUV Austria Czech spol. s r.o., Zelený pruh 1560/99, 140 02, Praha, Czech Republic.

Description and conformity assessment of the assembly components:

Condenser/Evaporator (Air)	A category I	Compressor	A/A2 category II
Condenser/Evaporator (Water)	B+D category IV	Receiver	D1 category III
Ekonomizer	B+D category II	Safety Valve	B+D category IV
Desuperheater	B+D category II	Pressure switch	B+D category I

This declaration relates to the machinery in the state in which it was manufactured and placed on the market excluding components or changes which are added by the final user.

The signatory of this document was authorized to compile the technical file, to enter commitments on behalf of the manufacturer.


Ing. Petr Navrátil
General Manager
Lipovka, Czech Republic
22.9.2024
ALPENTA s.r.o.
Piletická 486
503 41 HRADEC KRÁLOVÉ
IČO: 078 59 511 DIČ: CZ07859511

Original Declaration of Conformity: CEREF240922EN

PRE-COMMISSIONING INSPECTION PROTOCOL



Note: The Protocol shall be completed by a qualified person before accession to commissioning. The certificate of readiness for operation of the equipment demonstrates the readiness of the installation according to the technical documentation of the equipment. In case of uncertainty, it is recommended to contact an ALPENTA authorised partner.

Device model:

Service organization - signature, stamp

Serial number:

Date:

Operator:

Responsible person:

Signature:

Area of control Part to be checked	The equipment is capable of operating		
	YES	NOT	Note

Total control

Location and minimum distances			
Construction undamaged, threaded joints checked, free rotation of fans			
Settlement on the base frame verified			
Equipment supplied with operation manual for the equipment and control software system			

Cooling circuit

Remote evaporator/condenser connected, correct piping dimensions and possible oil return traps installed			
Oil level in compressors			
Carter heating started at least 12 hours before start			
Visual inspection of refrigerant leak / filled basic refrigerant charge			
Check the refrigerant pressure in the stopped circuit			
Opening of shut-off valves			

Hydraulic circuit (not related to condensing units)

Piping system connected, leak tested, removed air			
Expansion vessel tested and put into operation			
Glycol mixture check (% , pH)			
Min. system volume and commissioning thermal load (min. 60 %)			
Strainer filter installed and checked			
Direction of rotation and function of pumps			
Circuit water flow set			
Flow switch tested			

Wiring

Check clamps tightening			
Main power supply with protection and main switch			
Power supply checked and basic electrical measurements			
Correct dimension of the power cord and grounding			
ACS parameters settings matches with th documentation			

COMMISSIONING PROTOCOL



Note: The report shall be completed by a person qualified to put the refrigeration equipment into operation. An integral part of commissioning is the inspection and completion of the protocol: THE PRE-COMMISSIONING INSPECTION PROTOCOL. The operator confirms with his signature that: The equipment was delivered and put into operation without functional defects. These values were measured at full load. The operation of the equipment has been instructed and trained. In case of uncertainty, it is recommended to contact an ALPENTA authorised partner.

Device model:

Service organization - signature, stamp:

Serial number:

Date:

Operator:

Responsible person:

Signature:

ALPENTA Control System (ACS) settings

Software version

Note: Only parameters for the corresponding device configuration are filled in. For multi-circuits, the values are separated by a slash in the order of (C1/C2/C3). CNF, ADV parameter values can be checked in read only mode without a password. Access to SET values is protected by the password "1111" (not related to setpoint settings).

CNF	
CnfComHtg	
CnfComQC1	
CnfComQC2	
CnfComQC3	
CnfCon	
CnfDsT	
CnfFan	
CnfLogPer	
CnfLPS	
CnfLPT	
CnfPumCon	
CnfPumEva	
CnfRef	
CnfScT	
CnfSolCtr	
CnfTst	
CnfUnt	
CnfWtr	

ADV	
APRDif	
ComDelOn	
EvaFloTst	
EWOTAlm	
EWITHtgMin	
HPAlm	
HPL	
HPRSpRec	
LPRSp	
LPS	
LPSHys	
OATClg	
OATHtg	
OATMax	
SnsHPTMax	
SnsHPTMin	
SnsLPTMax	
SnsLPTMin	

SET	
LPLDel	
LPLHPMin	
LPLHtg	
LPLHys	
Con3WMin	
Con3WSp	
DefPer	
FanMax	
FanTstCx	
HPRHysCor	
HPRSp1	
HPRSp2	
HPRSpCx	
FcWITOATDifOff	
FcWITOATDifOn	
Rec3WMin	
Rec3WSp	
CorCWIT	
CorCWOT	
CorDsTCx	
CorEWIT	
CorEWOT	
CorFcWIT	
CorHPTCx	
CorLPTCx	
CorOAT	
CorRWIT	
CorScTCx	

SET (Setpoint)	
CWOTSp	
CWITSp	
EWITHtgSp	
EWITSp	
EWOTHtgSp	
EWOTSp	
RWITSp	

SET	
ComCxMod	
SolDelOff	
EvaAPRMin	
LBpDel	
LBpOff	
LBpOn	
LPL	
LPLAlmDel	

Device working parameters

Note: Only parameters for the corresponding device configuration are filled in. For multi-circuits, the values are separated by a slash in the order of (C1/C2/C3). In the case of a difference between values from device sensors (ACS) and service sensors, the values of the meters are written in parentheses - e.g.: 12.2 (12.5).

Ambient air temperature	[°C]		
-------------------------	------	--	--

Hydraulic circuit

EWIT	[°C]		CWOT	[°C]	
EWOT	[°C]		RWIT	[°C]	
CWIT	[°C]		RWOT	[°C]	

Evaporator hydraulic circuit

Cooled Medium Type			
Glycol content of the mixture	[%]		
Water flow	[l/s]		
Pressure drop	[kPa]		
Expansion vessel pressure	[kPa]		
Pump 1	[A]	/	/
Pump 2	[A]	/	/

Condenser hydraulic circuit

Cooled Medium Type			
Glycol content of the mixture	[%]		
Water flow	[l/s]		
Pressure drop	[kPa]		
Expansion vessel pressure	[kPa]		
Pump 1	[A]	/	/
Pump 2	[A]	/	/

Cooling circuit

Refrigerant replenishment C1	[kg]		Oil replenishment C1	[kg]	
Refrigerant replenishment C2	[kg]		Oil replenishment C2	[kg]	
Refrigerant replenishment C3	[kg]		Oil replenishment C3	[kg]	
Refrigerant replenishment C4	[kg]		Oil replenishment C4	[kg]	

Cooling circuit C1

Compressor C11	[A]	/	/
Compressor C12	[A]	/	/
Compressor C13	[A]	/	/
LPT	[Bar]		
HPT	[Bar]		
DsT / ScT	[°C / °C]	/	
Superheat	[°C]		

Cooling circuit C2

Compressor C21	[A]	/	/
Compressor C22	[A]	/	/
Compressor C23	[A]	/	/
LPT	[Bar]		
HPT	[Bar]		
DsT / ScT	[°C / °C]	/	
Superheat	[°C]		

Cooling circuit C3

Compressor C31	[A]	/	/
C32 compressor	[A]	/	/
C33 compressor	[A]	/	/
LPT	[Bar]		
HPT	[Bar]		
DsT / ScT	[°C]	/	
Superheat	[°C]		

Cooling circuit C4

Compressor C41	[A]	/	/
Compressor C42	[A]	/	/
Compressor C43	[A]	/	/
LPT	[Bar]		
HPT	[Bar]		
DsT / ScT	[°C]	/	
Superheat	[°C]		

PREVENTIVE MAINTENANCE PROTOCOL



Note: The report shall be completed by a qualified person when carrying out regular maintenance. 1. Step - choice of inspection period - weekly visual inspection (W) (formal registration is recommended, not required), quarterly service maintenance (Q), annual service maintenance (Y). 2. Step - marking the tasks performed (A) / non-performed tasks (N). Additional information or measured values shall be written in the note. In case of uncertainty, it is recommended to contact an ALPENTA authorised partner.

Device model: _____

Serial number: _____

Date: _____

Operator: _____

Responsible person: _____

Signature: _____

Service organization - signature, stamp: _____

Control period	W	Q	Y	Record of the check performed		
Part to be checked				Plan	A / N	Note

Total control

Visual inspection of the equipment - state of thermal insulation, mechanical damage, etc.	W		
Cleaned of coarse impurities	Q		
Check ACS alarm log	W		
Inspection and treatment of the device structure	Y		

Cooling circuit

Visual inspection of leakage (oil leak)	W		
Leak detector check	Q		
Check the sight glass and filter drier	Q		
Oil acid test (pH 5.2 - 6.8)	Y		
Check the function of safety and limitation functions	Y		
Condenser inspection - straightening and cleaning of fins	Y		
Check the fixing and fan rotation	Y		
Check the crankcase heating function	Q		
Check compressor discharge temperature, vibration and sound	Q		

Hydraulic circuit (not related to condensing units)

Visual inspection of leakage	W		
Control of the amount of water in the circuit (check of the condition of the replenishment system)	Q		
Glycol mixture check (% , pH 8 - 9.5)	Y		
Check the strainer filter	Y		
Check the function of the flow switch	Y		
Vibration control and joint tightening	Q		

Electrical part

Inspection and cleaning of the switchboard	Q		
Check clamp tightening	Y		
Visual inspection of electrical parts (overheating check)	Q		
Electrical measurement of compressors and pumps	Y		
Check the measured values of temperature sensors	Y		