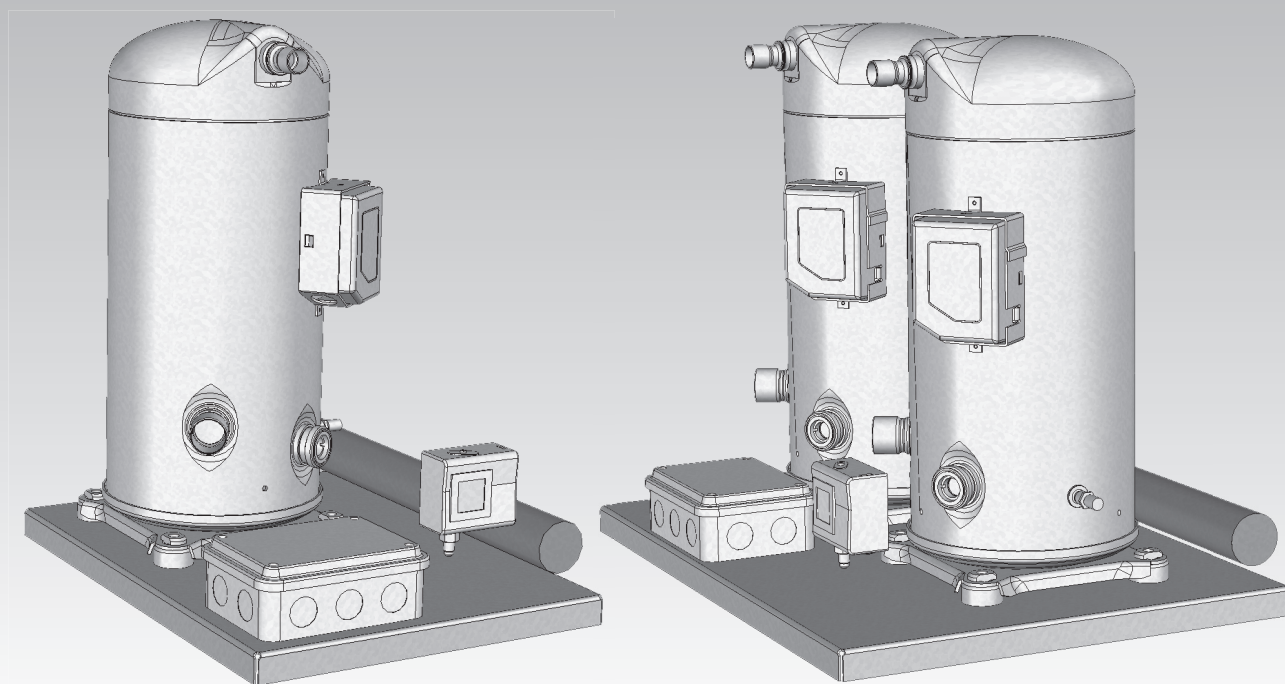


REMAK



Compressor Units

for AeroMaster XP and AeroMaster Cirrus

Obsah

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Safety Precautions



Warnings

Any servicing or repairs of the unit may only be performed by a trained and authorised technician possessing the appropriate certificate for equipment servicing. Still, heightened care and general safety precautions must be observed.

Coolant

The cooling device contains pressurised coolant. Unauthorised persons are forbidden to tamper with the cooling circuit. If necessary, the coolant needs to be drained during the repair. It is forbidden to release it into the atmosphere.

Electrical Wiring

The user must not tamper with the electrical wiring of the unit, otherwise, there is a risk of electric shock and damage to the unit.

Moving Parts

All moving parts which could cause an accident are covered by guard covers. It is forbidden to remove any guard cover during operation.



Warning

Always use protective goggles and gloves when working on the unit.

Guarantee Conditions

- This product is subject to the Guarantee Conditions. The guarantee for this product shall be valid for 12 months from the date of purchase, unless otherwise agreed in the sales contract.
- Any claim must be filed directly with the company's Service Department by submitting a properly filled-in claim.
- The Guarantee Conditions shall only be applicable if the product is operated in accordance with the Technical Conditions and for the intended purpose.
- The guarantee shall become void if the product has not been properly, provably (written logs) or regularly maintained and serviced in accordance with the manufacturer's instructions.
- Guarantee repairs can only be performed by an authorised and qualified subject.

The manufacturer provides no guarantee for:

- Damage to the product incurred during transport from the manufacturer to the place of delivery
- Damage to the product caused by improper operation and/or tampering with the product
- Damage to the product caused by improper use of the product
- Damage to the product caused by neglected maintenance
- Damage to the product caused by line voltage fluctuation
- Damage to the product caused by force majeure (fire, water or lightning strike)
- Indirect damage, e.g. goods depreciation or loss of profit caused by cooling device failure, even if the claim has been accepted.

Unit description

Intended Use

Compressor cooling units are intended for use in air-handling units. They can be delivered in single-, double- or even three-compressor versions. The unit assembly includes the necessary safety and control elements as well as a separate distribution board. This assembly can be delivered including a suitably dimensioned injection valve.

Unit's Main Components

- Unit frame
- Cooling compressor(s)
- High-pressure safety pressostat
- Low-pressure safety pressostat
- Coolant header
- Filter-dehydrator and sight glass
- Interconnecting piping and shut-off valves
- Terminal box + cabling
- Separate distribution board (protection and control)
- Expansion valve (mechanical/electronic)

Design

Construction

Mechanically, it is a construction subassembly situated on a steel base.

The cooling circuit utilizes direct vaporization of environmentally-friendly coolant in a hermetically sealed coolant circuit. Heat is dissipated from the cooled room when the coolant is passing through the evaporator. Correct coolant metering into the evaporator is ensured by an expansion valve. The expansion valve keeps the fixed setting of the evaporated coolant overheating within the given working range.

Cooling capacity is controlled by switching the compressor using an external ON/OFF signal. If a double-compressor arrangement is used, 0/50/100 % output control can be achieved by switching the compressors in sequence. If an electronic controller is used, switching of the compressors is then controlled depending on the number of operating hours. If a "Digital" compressor or compressor with an inverter is used, the cooling capacity will then be controlled within a given range steplessly. Heat from the cooled room is dissipated using a suitably dimensioned evaporator. If the room needs to be cooled to temperatures close to or below 0 °C, it is necessary to ensure regular melting of frost deposits on the evaporator to avoid the entire system's efficiency being reduced.

Condensation heat is dissipated by a condenser. To ensure proper operation of the entire cooling circuit, it is necessary to keep a certain value of condensation pressure. This is especially important when a mechanical injection valve is used.

Setting the condensation pressure value properly can influence the power consumption and efficiency of the cooling device. The compressor cooling unit is fitted with the necessary control and protection equipment for the cooling circuit.

The unit's cooling capacity is given by the size of the compressor used and also by the coolant type.

Distribution Board

- A separate distribution board serves for power and control of the unit. The distribution board is designed to be used in areas without explosion hazard (BNV).
- The distribution board includes the main switch + terminals for remote ON/OFF control. With a double-compressor arrangement, the output can be controlled on two levels using two logic inputs or steplessly using the analogue signal (digital or inverter version).
- The frequency of switching of the compressors, respectively the minimum operating time, is limited by the built-in timer.
- The main power switch is used to safely disconnect the entire equipment from the power supply, e.g. for maintenance purposes. When the main switch is ON the unit is still energized. The equipment is switched ON by the remote control contact.
- Possible failure statuses of the cooling unit are transferred using a non-voltage contact.

Unit's Frame – Surface Finish

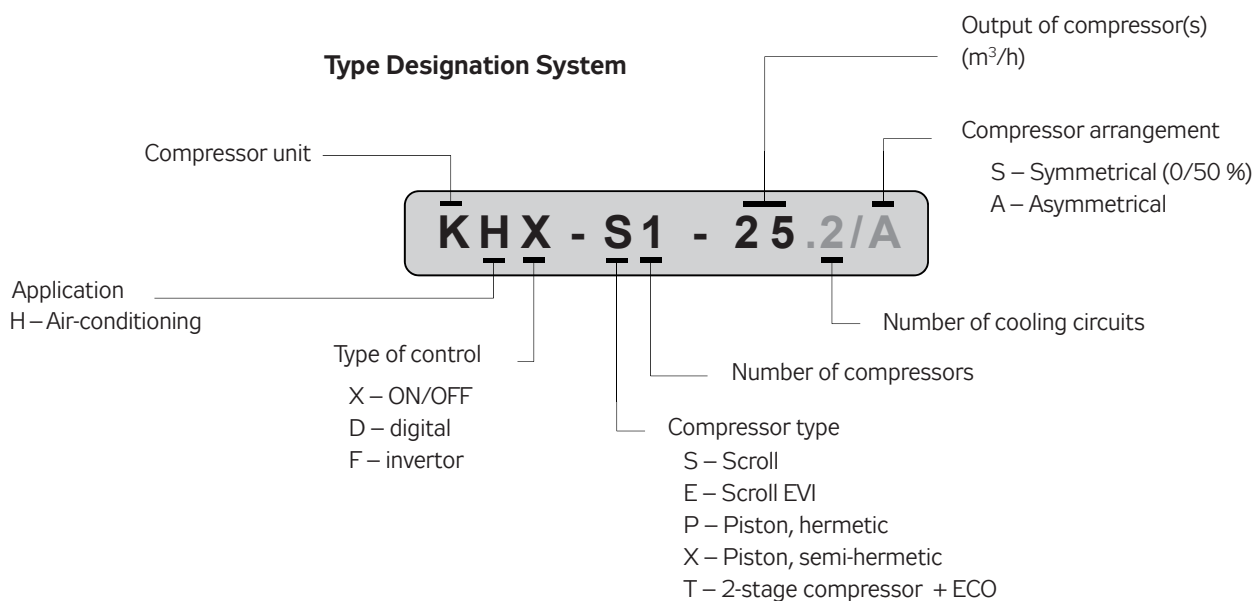
The unit's frame is made of sheet steel. The surface finish complies with common anticorrosion requirements for outdoor environments.

Thermal Insulation

Thermal insulation is used to avoid heat losses, surface condensation or ice build-up on the cold parts. This insulation must be vapour-proof to avoid water steam condensation collecting under the insulation.

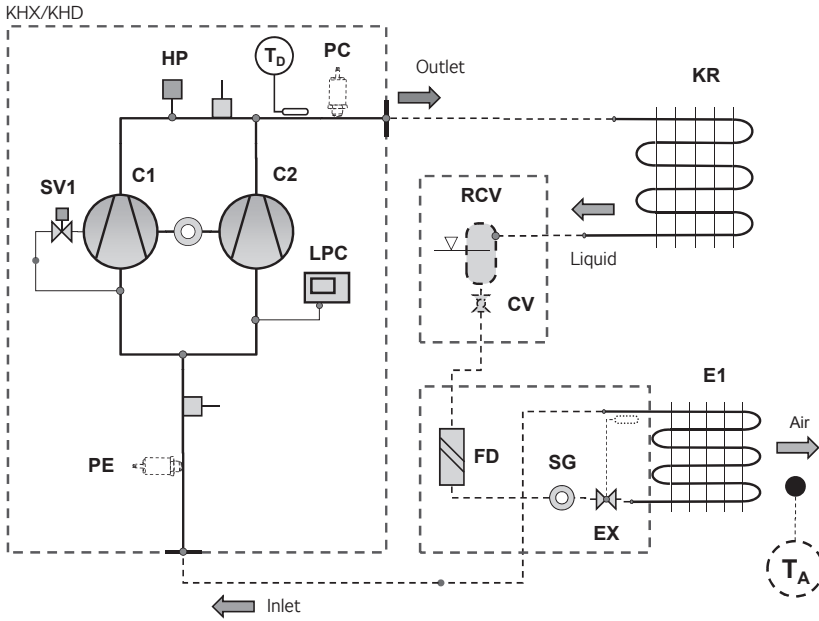
Technical Parameters

The unit is designed to be integrated into the cooling circuit. The output parameters, coolant type and environmental requirements are given in the technical specifications.



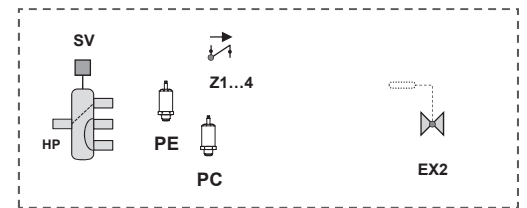
Compressor Units

Wiring Diagram

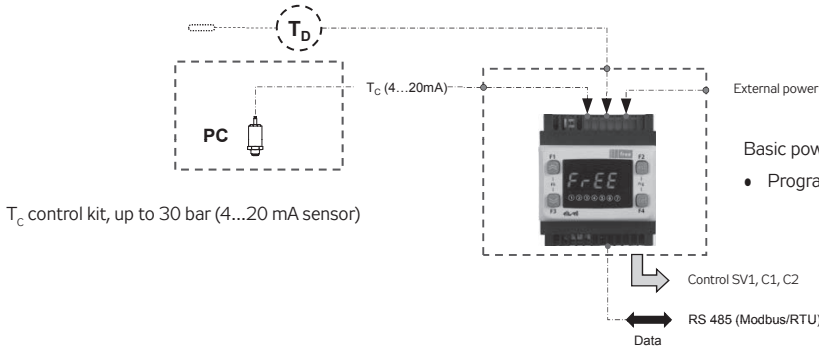


(Optional) Distribution Board electric components:

- Unit's remote start ON/OFF
- PLC unit power control using external signal: 0...10 V / 4...20 mA
- Signal for reversed operation – Cooling/Heating
- T_c control (0...10 V), output for power element or frequency inverter of condenser fans
- Automatic power restriction according to T_E limit or simultaneously according to T_E and T_C
- Potential-free reporting contact „Power restriction activated“ according to T_E and T_C
- Analogue output (2) 0...10 V „Power restriction level“ according to T_E and T_C
- Remote state signalling (Fault/OK)
- Data transmission using RS 485 (Modbus RTU)
- Visual fault notification (HP/komp, LPC low inlet pressure)



Kit for reversed operation, Cooling/Heating – KHD only
changeover Cooling/Heating
changeover Cooling/Heating

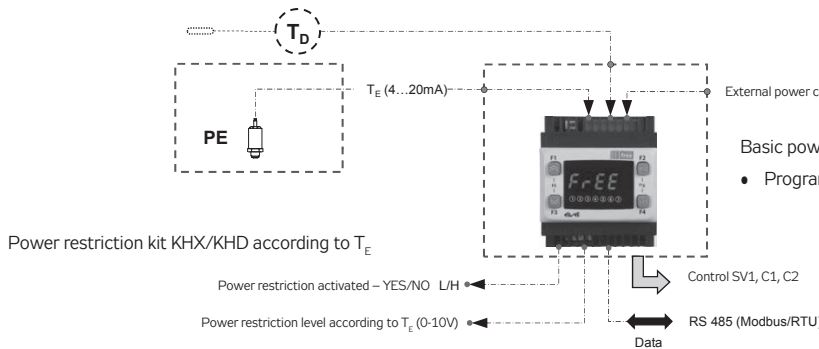
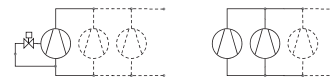


T_c control kit, up to 30 bar (4...20 mA sensor)

External power control KHX/KHD (e.g. according to T_D) 0...10V/4...20 mA

Basic power control kit KHX/KHD (1+...) using external signal 0...10 V/4...20mA

- Program 9SET000369

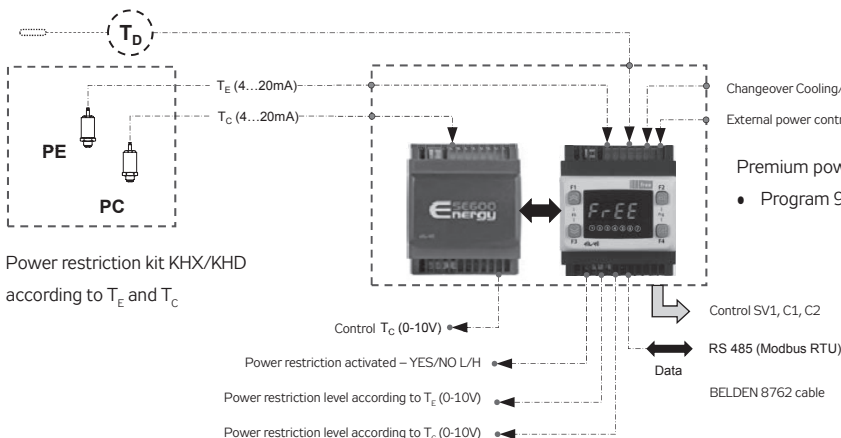
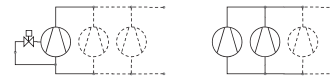


Power restriction kit KHX/KHD according to T_E

External power control KHX/KHD (e.g. according to T_D) 0...10V/4...20 mA

Basic power control kit KHX/KHD (1+...) using external signal 0...10 V/4...20mA

- Program 9SET000369



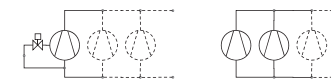
Power restriction kit KHX/KHD according to T_E and T_C

Changeover Cooling/Heating, L/H

External power control KHX/KHD (e.g. according to T_D) 0...10V/4...20 mA

Premium power control kit KHX/KHD (1+...) using external signal 0...10 V

- Program 9SET000369



or + changeover kit

Unit Installation and Operation

Installation

Filling with coolant and first commissioning must always be performed by a qualified technician. The manufacturer does not guarantee proper operation of the device if the heat-exchanging surfaces and coolant distribution piping are not properly dimensioned or installed (in case they are not delivered by REMAK).



Warning

Before starting the unit, always check the proper connection order of the phases of the main power supply. Improper connection of phases can result in permanent damage to the scroll cooling compressor. Check the proper direction of rotation using pressure gauges on the compressor intake and discharge sides. Pressure on the intake side must decrease and pressure on the discharge side must increase.

Operation

The unit's operation is fully automated and does not require any operator interference during operation. The unit's operation is remotely controlled depending on the type of control used.

Signalling

The unit's status is visually indicated by indicators on the control panel. The following statuses are indicated on the distribution board's front panel>

1. O.K. – green indicator, failure-free operation
2. Unit failure – red indicator (associated failure)



Warning

The unit can only be operated by an authorised and properly trained person. Any unqualified unit adjustments, changes to settings of the valves or changes to settings of parameters of the instruments are forbidden. Any servicing or repairs of the cooling device can only be performed by a trained technician possessing the appropriate certificate for servicing this kind of equipment.

Maintenance and Service

Operational Maintenance and Logs

It is advisable to perform regular visual checks for leaks. If any signs of leakage are found, the unit must not be operated and professional servicing must be ensured.

Depending on the ambient relative humidity, water steam condensation or ice build-up can happen on some metal parts. This will not hinder the unit's operation. However, it is advisable to thermally insulate such spots.

Regular checks by the user are performed as needed; however, at least every 3 months.

The user is obliged to maintain updated written logs on checks and operation of the cooling unit in accordance with the EN378 standard – Operating Diary – see the example.

The regular check especially includes visual check for connection leakage, vibrations, noisiness, contamination and corrosion. The integrity of the insulation must also be checked; any damage to the insulation needs to be immediately removed by repairing the insulation.

For a list of recommended checks performed by the user, refer to the Operating Diary.

Pressure tanks and safety valves, if used, are subject to regular checks by an authorised person at intervals in accordance with ČSN690012, respectively, in accordance with Directive PED97/23/EC.

Preventive Maintenance

Preventive maintenance can only be performed by an authorised provider. The inspection intervals are based on the coolant charge volumes. Preventive maintenance of the cooling device is performed once a year and includes in particular checks of the cooling equipment's operation, coolant charge and a leakage test. Furthermore, a check of the protection element settings in accordance with ČSN EN 378-4 must be performed.

Preventive maintenance also includes removing any failure recorded in the Operating Diary and the written log on the performed preventive maintenance, including the name of the person performing the maintenance and a contact to the servicing company.

Maintenance and Service



Warning

Before any handling or performing any servicing on the electrical equipment of the unit, the power supply must be disconnected using the main switch on the corresponding distribution board.



Warning

The cooling circuit is filled with coolant falling in the category of greenhouse gases (F-gases). These gases must be handled in accordance with European Parliament and Council Directive 842/2006 on F-gases (Section 3, Article 6) and Act of the Czech Republic 483/2008 Sb. on air conservation.

The user of the unit is **obliged** to maintain logs containing the following:

- Volume and type of coolant used during unit installation
- Results of performed preventive checks, especially the results of leakage tests
- Volume of added or drained coolant when performing maintenance or during unit operation or liquidation

The logs must include identification of the personnel or company who performed the maintenance or servicing. Any checks or intervention into the circuit may only be performed by personnel certified by the Ministry of Health of the Czech Republic. On request, the user must submit the logs to the appropriate control authority. The frequency of checks is determined by the volume of coolant:

- | | |
|----------------|--------------|
| ■ up to 30 kg | Once a year |
| ■ up to 300 kg | Twice a year |

If a leak is found, it must be removed immediately. Repeated leakage tests of the circuit must be performed in one month from the repair to verify the repair's efficiency.

This obligation does not apply for circuits containing up to 3kg of coolant and circuits containing up to 6kg of coolant declared as hermetically sealed. Coolant volume and type are indicated on the unit's type plate.

Appendix - Operating Diary

Unit type:	Serial number:
Trained person (operator): 1. ... 2. ...	Date of commissioning:
	Note: Recommended check period 1 every 2 months

List of Recommended Checks - Operational Maintenance

1. Visual check for leakage, oil leakage...
2. Check mechanical parts and tightness of screw connections.
3. Check the compressor for noisiness and vibrations (during operation).
4. Check the heat exchanging surfaces for cleanliness.
5. Check the insulation for integrity.
6. Make logs if the unit was out of operation for a significant period (record the length of time out of operation).

OPERATIONAL AND PREVENTIVE MAINTENANCE LOGS			
No.	Date:	Description in accordance with above-mentioned recommendations	Signature
1			
2			
3			
4			
5			
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7			
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9			
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The Guarantee Conditions shall only be applicable if the unit is operated in accordance with the Technical Conditions and for the intended purpose. The guarantee shall become void if the unit was not properly, provably (written logs) or regularly maintained and serviced in accordance with the manufacturer's instructions. Guarantee repairs can only be performed by an authorised and qualified subject. Results of regular tests and details about the performed servicing must be included in the Operating Diary.



Further, applicable national regulations and directives must be observed.

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