

STULZ

CLIMATE. CUSTOMIZED.



CyberLab

Original instructions

**Precision Air Conditioning Units
400V/50Hz/3Ph/N/PE**

Index G17F
Issue 2.2018



ABOUT STULZ

Since it was founded in 1947, the STULZ company has evolved into one of the world's leading system suppliers of air-conditioning technology.

Since 1974 the group has seen continual international expansion of its air conditioning technology business, specialising in A/C for data centres and telecommunications installations.

STULZ has seven production plants (Germany, Italy, the USA, 2 in China, Brazil and India) and seventeen subsidiaries (in France, Italy, Great Britain, Belgium, Brazil, the Netherlands, New Zealand, Mexico, Austria, Poland, Spain, Singapore, China, India, South Africa, Australia and the USA).

The company also co-operates with sales and service partners in over 130 other countries, and therefore boasts an international network of air-conditioning specialists.

Editor

**STULZ GmbH
Holsteiner Chaussee 283
22457 Hamburg**

CyberLab – Intelligent solution for laboratories, archives and museums

Dear customer,

we are pleased that you have decided for the Cyberlab from STULZ.
Cyberlab is a precision air conditioning unit, which has been developed especially for applications with a low or no heat load, applications however for which temperature and humidity need to be kept precisely constant.

For general inquiries our hotline is available
at **+49 40 5585-5000**
Our service hours are weekdays from 7am – 4pm.

For further information concerning our
products and services visit our website :
www.stulz.com






Contents

1. Safety	6
1.1 Marking.....	6
1.2 Safety instructions.....	6
1.3 Handling refrigerants.....	6
1.4 Duties of the operator.....	7
2. Transport / Storage	8
2.1 Delivery of units.....	8
2.2 Transport.....	8
2.3 Storage.....	9
3. Description	10
3.1 Type code.....	10
3.2 Intended use.....	11
3.3 Function of the A/C unit.....	11
3.4 Control.....	13
4. Technical Data	14
4.1 Application limits.....	14
4.2 Technical Data.....	15
4.3 Dimensional drawings.....	16
5. Installation	17
5.1 Selection of the installation site.....	17
5.2 Positioning the unit.....	18
5.3 Connection of the piping.....	20
5.3.1 Refrigerant piping.....	20
5.3.1.1 Design.....	20
5.3.1.2 Position of the refrigerant connections.....	20
5.3.1.3 Strength pressure test.....	21
5.3.2 Condensate drain connection.....	22
5.4 Electrical connection.....	24
5.5 Reheat.....	26
6. Commissioning	27
6.1 Filling the refrigerant circuit.....	27
6.2 Control of the electrical box.....	30
7. Maintenance	40
7.1 Safety instructions.....	40
7.2 Maintenance intervals.....	40
7.3 Refrigerant circuit.....	42
7.4 Air circuit.....	44
7.5 Unit housing.....	45
8. Malfunction	46
9. Dismantling and disposal	47
10. Contents of the CE Declaration of Conformity	48
11. Options	49
11.1 Option external humidifier.....	49

Subject to technical modifications.

1. Safety

1.1 Marking

 DANGER	threatening danger, grievous bodily harm and death
 WARNING	dangerous situation, grievous bodily injury
 CAUTION	dangerous situation, light bodily injury
 NOTICE	material damage, important information and application notice
 ESD NOTE	risk of damaging electronical components

1.2 Safety instructions

These operating instructions contain basic information which is to be complied with for installation, operation and maintenance. They must therefore be read and complied with by the fitter and the responsible trained staff/operators before assembly and commissioning. They must be permanently available at the place where the system is used.

DANGER

- Works have to be carried out by competent staff only.
- Safety devices may not be bypassed.

1.3 Handling refrigerants

- Get qualified refrigeration technicians to carry out the work.
- Safety glasses and safety gloves are to be worn.
- Liquid refrigerant must not get onto the skin (risk of burns).
- Only use in well ventilated areas.
- Do not inhale refrigerant vapours.
- Refrigerants have a narcotic effect when inhaled in high concentrations.
- The room is to be evacuated immediately if high concentrations of refrigerant suddenly occur.
- If unavoidable work is required in the presence of a high concentration of refrigerant, breathing apparatus must be worn. This does not mean simple filter masks. Comply with breathing protection data sheet.
- Do not eat, drink or smoke at work.
- Warning against intentional misuse.

- It is absolutely essential to comply with the first aid measures if accidents occur.
- Refrigerants containing FCs contribute to the global warming and with this to climate changes. The FCs must therefore be disposed of in accordance with the regulations, i.e. only by companies specially qualified and licensed as recognised disposal companies for refrigerants.
- Responsibility for correct disposal of refrigerant and system parts is incumbent on the operator.

1.4 Duties of the operator

The following requirements relate to the operation of refrigerating plants within the European Community.

- The used components must correspond to the pressure equipment guide-line 2014/68/EU and EN 378 part 1-4.
- Independent of the design, the equipment and inspection before the delivery, also the operator of such plants has duties according to EN 378 and national regulations.

This concerns the installation, the operation and the repeated inspection:

- Installation: according to EN 378
- Operation: Determination of emergency measures (accidents, malfunctions)
Creation of an abbreviated instruction and notification (template page)
 - a. A unit protocol must be kept.
 - b. To be stored in the proximity of the unit
 - c. Access for competent staff in case of repairs and repeated inspection must be ensured.
- Repeated inspection: according to EN 378
The operator is responsible for the execution.

The operator must ensure that all maintenance, inspection and assembly work is carried out by authorised and qualified specialist staff who have made an in-depth study of the operating instructions.

Independent conversion and manufacture of replacement parts

The system may only be converted or modified after consultation with STULZ. Original replacement parts and replacement parts/accessories authorised by STULZ are an aid to safety.

2. Transport / Storage

2.1 Delivery of units

Stulz A/C units are mounted on pallets and packed several times in plastic film.

NOTICE

The refrigerant circuit is filled with nitrogen with overpressure to atmosphere.

Construction of protective covering:

(from inside to outside)

1. Neopolene cushioning
2. Shrink film
3. Additional board in container shipments

The following information can be found on the packing:

- | | |
|-----------------------------|--------------------------------------|
| 1) Stulz logo | also upon request |
| 2) Stulz order number | 6) Gross weight |
| 3) Type of unit | 7) Net weight |
| 4) Packing piece - contents | 8) Dimensions |
| 5) Warning symbols | 9) Customer order number |
| | 10) Additional customer requirements |

NOTICE

When delivery is accepted, check the unit against the delivery note for completeness and for external damage and record it on the consignment note in the presence of the freight forwarder.

- The delivery note can be found on the A/C unit when delivered.
- The shipment is made ex works, in case of shipment damages, please assert your claim towards the carrier.
- Hidden damage is to be reported in writing within 6 days of delivery.

2.2 Transport

DANGER

Mortal danger by crushing

A defective lifting device can lead to the uncontrolled fall of the A/C unit.
Do not stay under suspended loads!

The Stulz A/C units can be moved by lifting devices with belts or ropes.

- fix the belts or ropes at the pallet,
- protect the upper unit edges by wooden laths or metal brackets in such a way that they could not be caved in.

i NOTICE**Risk of distorting the frame**

Never move the unit on rollers and never transport it on a fork lift without pallet.

You can move the unit still packaged on the pallet with a fork lift.

- take care that the centre of gravity is within the fork surface.
- take care that the unit is in an upright position at the transport.

2.3 Storage

If you put the unit into intermediate storage before the installation, the following measures have to be carried out to protect the unit from damage and corrosion:

- the storage point must not be exposed to direct sunlight. Observe the storage conditions in the chapter "Application limits".
- store the unit packaged to avoid the risk of corrosion.
- make sure that the water connections are provided with protective hoods.

3. Description

3.1 Type code

The type code represents the unit variant of your A/C unit and can be found on the rating plate. The rating plate is located in the door in front of the electrical compartment.

		Typenschild/type plate plaque d'appareil		
	Lieferant manufacturer vendeur	STULZ GmbH Hamburg Holsteiner Chaussee 283, D-22457 Hamburg		
Unit type	Typ type type	ASU 211 AL	Versorgungsspannung supply voltage tension de service	400 V ± 10% 50 Hz ± 1%
internal part no.	Artikel-Nr. Item-no. numéro d'article	B99403	Kältemittel refrigerant refrigerant	R410A
Order number + alternative	Kommission/Alt commission/alt commission/alt	0530111234/01	Max. Betriebsdruck max. operation pressure pression de fonction max.	40 bar
Serial no.	Baujahr model modele	2018	Max. Füllgewicht max. filling charge charge max. de rempliss.	--- kg
	S. Nr. s.-no. no. serie	 1234567890	Made in Germany	

Explanation

Product range Energy index Airflow direction Output of unit in kW Number of refrigeration circuits

A	S	U	21	1	AL
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Unit variants

A = CyberAir S = Standard U = Upflow Cooling system:
A = air-cooled L = laboratory unit with speed controlled compressor

Page code

EN/02.2018/G17F	
Date of issue month/year	Index number

Language: Manufacturing base:
DE = German G = Germany
EN = English C = China
I = Italy

3.2 Intended use

This A/C unit is used to control room temperature and air humidity within the application limits stated in chapter 4.1. The A/C unit is designed for indoor installation. The A/C unit complies with the hygienic requirements according to VDI6022. The unit is also designed for zero-load operation. Any use beyond this is not deemed to be use as intended.

3.3 Function of the A/C unit

The A/C unit is exclusively operated by the controller in the front panel and the main switch (operable from outside the unit) in the electric box.

In the air inlet a temperature/humidity sensor is located which provides the measured values for the temperature/humidity control. Cooling is achieved by compressor operation in the refrigerant circuit.

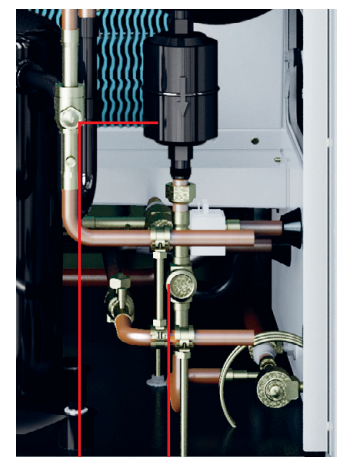
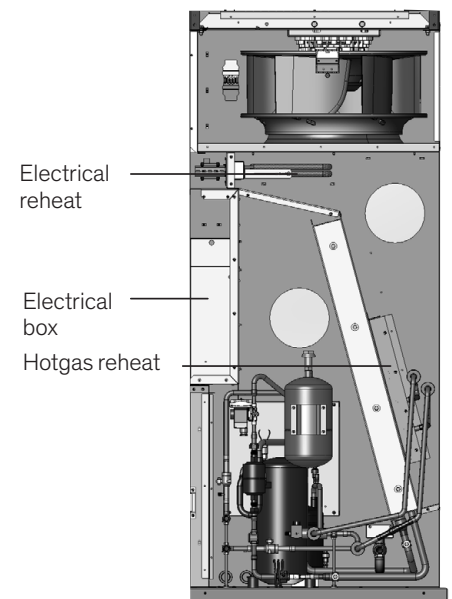
The unit has an incorporated electric reheat and a hotgas reheat, to precisely control the temperature in case of a small thermal load.

To achieve a dehumidification, the electronic expansion valve is partially closed in the first step. The reduction of the refrigerant mass flow makes the evaporation temperature drop, which lets the surface temperature in a part of the evaporator fall below the dew point of the air. This causes dehumidification.

For a bigger dehumidification, the fan speed is reduced. With a constant cooling capacity, the temperature of the air which flows through the heat exchanger coil, passes below the dew point. The moisture contained in the air condenses on the heat exchanger gathers in the condensate pan and is carried away by the drain.

An external humidifier can optionally be connected and is powered and controlled by a power and control line coming from the CyberLab unit.

The A/C unit control is effected by the on board I/O controller. The operational conception is designed such as to allow to control up to 19 units from one unit. These units can be installed separately with a maximum control line length of 1000 m.



Composition of the A/C unit

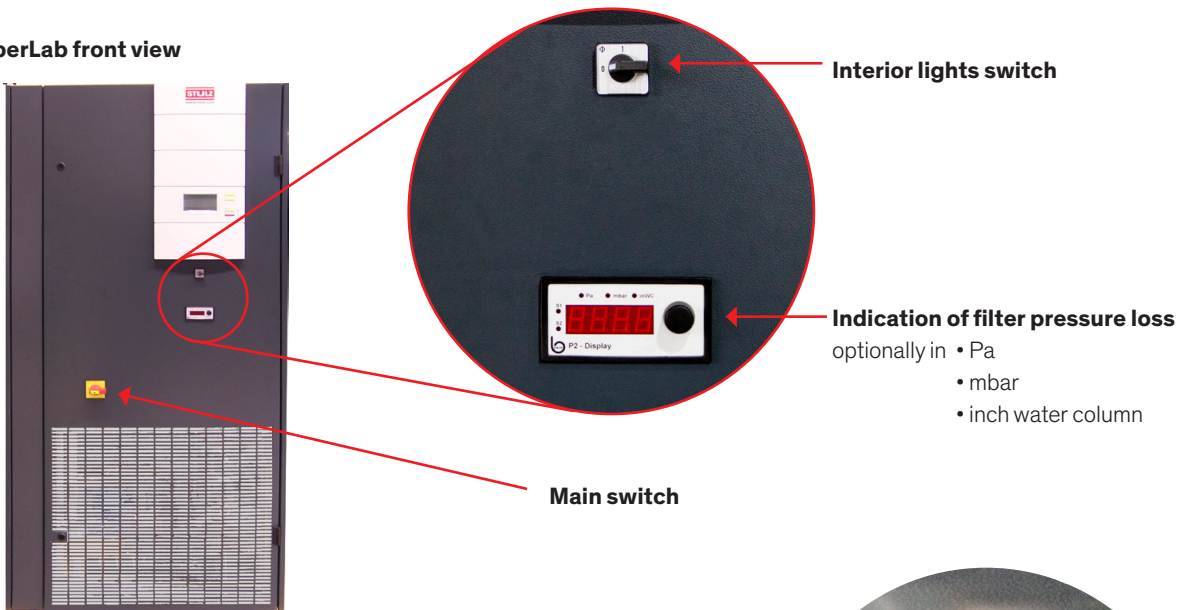
This A/C unit has the following facilities that allow maintenance without opening the A/C unit.

A digital display for the filter pressure loss and an on/off switch for the interior lights are installed in the front door. The interior light illuminates the front and back of the heat exchanger and can be positioned freely on ferromagnetic metal surfaces.

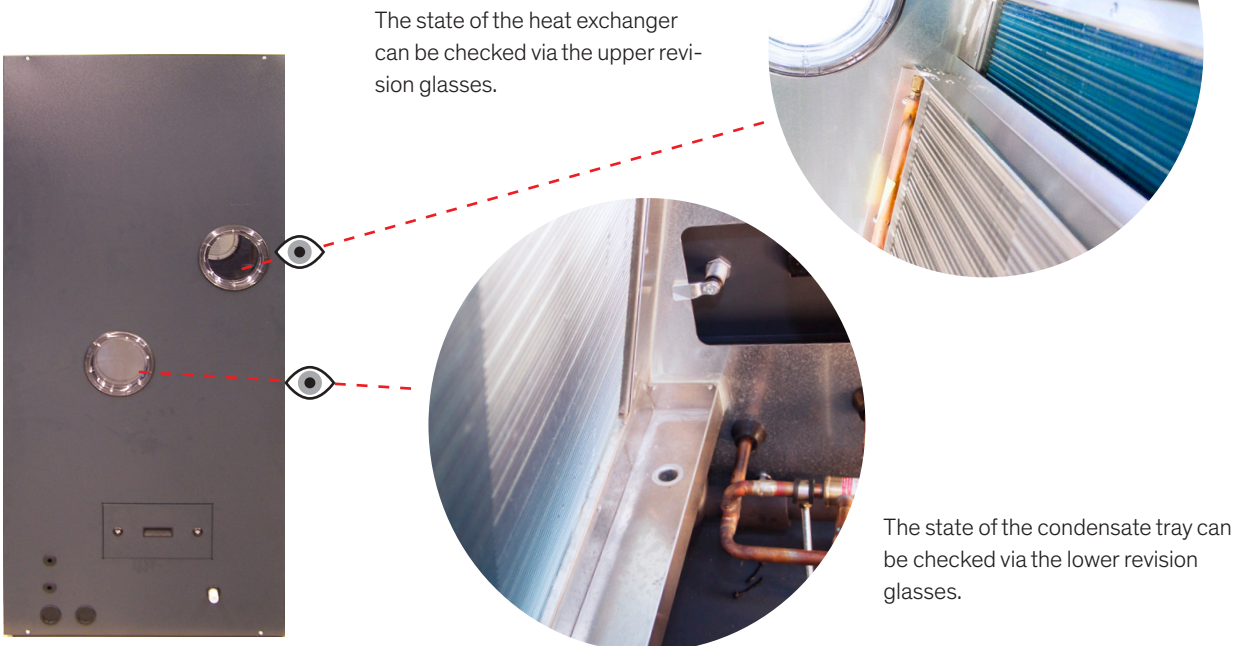
Revision glasses, through which the state of pollution in the interior of the air conditioning unit can be checked are integrated in the side panels. The filter position and the state of the condensate tray can be checked as well.

A service flap in the right side panel allows the cleaning of the condensate tray.

CyberLab front view



Lateral revision glasses and service flap



3.4 Control

Temperature control

The temperature is controlled by three components:

1. speed-controlled compressor (EC compressor)
2. electrical reheat
3. hotgas reheat

The speed-controlled compressor is continuously in operation as soon as the A/C unit is switched on. In case the thermal room load is too low in relation to the cooling capacity, the electrical reheat is switched on.

The electrical reheat as well as the EC compressor are controlled by a PID control.

As soon as the electrical reheat and the EC compressor run simultaneously, the setpoint spread is active. The setpoint spread is 0,1 K for each component. With an active setpoint spread and a setpoint of e.g. 24°C the compressor is controlled to achieve 24,1°C and the electrical reheat to achieve 23,9°C.

The hotgas reheat is switched on and off by a start temperature and a hysteresis. If the start temperature is achieved and if a dehumidification request exists, the hotgas reheat is switched on.

Humidity control

The humidity is controlled by three components:

1. electronical expansion valve
2. speed-controlled compressor (EC compressor)
3. optional external humidifier

If the humidity is smaller than the setpoint humidity, the air is humidified by the optional external humidifier.

If the humidity is bigger than the setpoint humidity, the air is dehumidified by the electronical expansion valve and by the EC compressor. You can set whether dehumidification is controlled according to the relative humidity or to the dew point.

For the EC compressor a minimum speed for dehumidification can be set.

Control accuracy

The control accuracy ($\pm 0,5 \text{ K} / \pm 3 \% \text{ r.h.}$) depends on:

- the positioning of the A/C unit
- the size of the room to be conditioned
- the thermal load
- the air volume flow
- the stability of room conditions
- humidity control at minimal load

We recommend to only operate one active CyberLab unit per room. Several CyberLab units can be installed in the room, but only one of these units may be in operation at a time. This can be achieved by the failure dependent change-over of the sequencing function (no time dependent sequencing).

A supply air sensor is available as an option and is delivered loose.

4. Technical Data

4.1 Application limits

Admissible return air conditions:

Temperature: Lower limit: 18 °C
 Upper limit: 35 °C
 Humidity: Lower limit: 5 °C dew point
 Upper limit: 40 % r. h. at 30 °C and
 70 % r. h. at 14 °C

Outdoor ambient conditions:

lower limit: -10°C, depending on selected option down to
 -45°C
 upper limit: depending on selected condenser

Storage conditions:

Temperature [°C]: -20 - +42
 Humidity [% rel. h.]: 5 - 95
 Atmosphere pressure [kPa]: 70 - 110

Max. length of piping between A/C unit and air-cooled condenser:

30 m equivalent

Max. level difference condenser—A/C unit:

10 m (condenser above the A/C unit)
 5 m (condenser below the A/C unit)

Voltage:

400V/50Hz/3Ph/N/PE

Voltage tolerancy:

+/- 10 % (not for permanent operation)

Frequency tolerancy: +/- 1 %

The following voltages are also available for this A/C unit series: 380V/60Hz/3Ph/N/PE

Other voltages on request.

Voltage/frequency tolerances as for 400V/50Hz/3Ph/N/PE.

The cooling capacity, air flow, water flow, pressure loss, sound pressure level and valve sizes change with a voltage different from the standard voltage (400V/50Hz/3Ph/N/PE). In this case, see the technical data by the help of the „Stulz Select“ planning tool.

The unit design, the external dimensions, the weight, the

position and size of the supply connections are independent of the supply voltage and can be found in this manual.

Requirements for UPS systems:

(in case of permanent operation of the EC fans with a UPS system)

- the output voltage of the UPS system must be grounded neutral (wye).
- the voltage distortions must be within the limits stated below and no inadmissibly high DC voltage portions may exist.
- all-pole sinus filters must be provided at the UPS system output.

transient peak over-voltage phase to ground:

max. 4 kV (1,2/50µs wave form; Z= 12 Ohms in acc. to ANSI)

transient peak over-voltage phase to phase:

max. 2 kV (1,2/50µs wave form; Z=2 Ohms in acc. to ANSI)

ripple voltage phase to ground:

$dV/dt < 1V/\mu s$ ($\approx 1000V/ms$)
 voltage harmonics: THD(V) < 8%

The warranty is invalidated for any possible damage or malfunction that may occur during or in consequence of operation outside the application ranges.

Setting of the pressure switch:

HP switch		R410A
releases at	bar	36,0
manual reset possible at	bar	29,0
Safety valve	bar	40

4.2 Technical Data

DX-cooling cap. R410A 24 °C/45% r. h.	total sensible	kW	20,1 20,1
Airflow		m ³ /h	6000
max. external pressure		Pa	450
Return air filter class			M5
Sound pressure level		dBA	57,0
Electrical reheat capacity		kW	9
Control accuracy - temperature		K	± 0,5
Control accuracy - humidity		% r.h.	± 3
Weight		kg	430

Design conditions

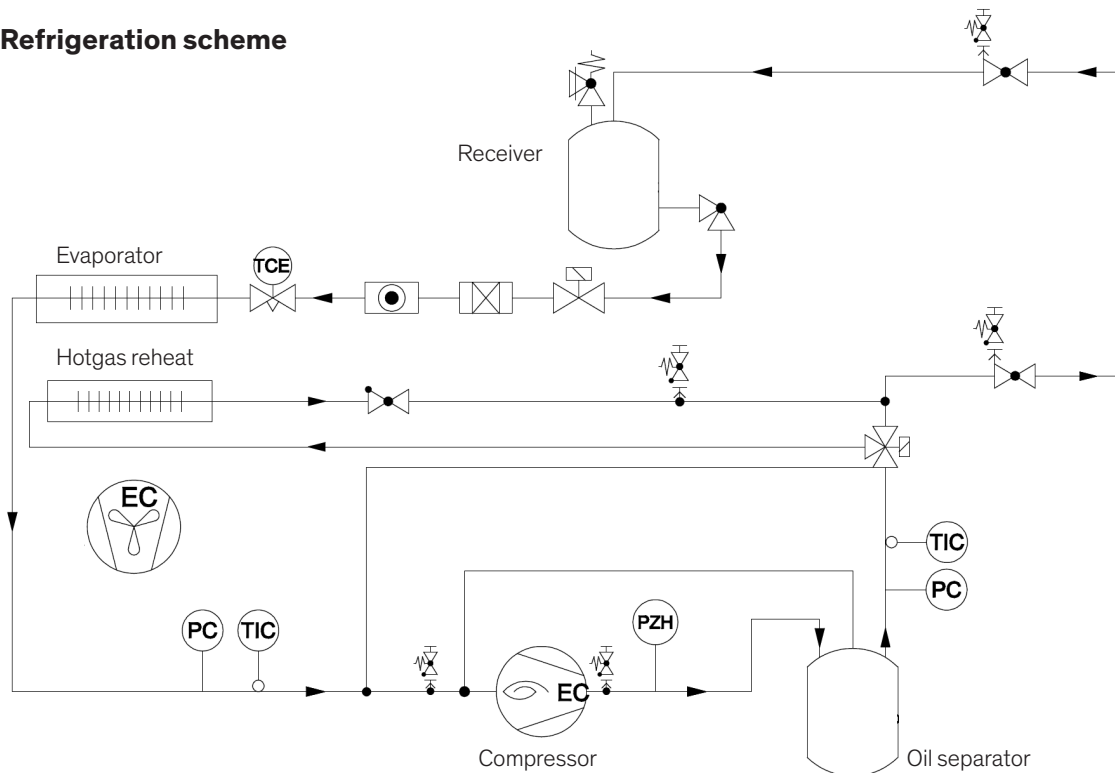
Electrical connection: 400V/50Hz/3Ph/N/PE
with an external static pressure: 50 Pa

The sound pressure levels are valid at a height of 1 m and distance of 2 m in front of the unit under free field conditions and with nominal data. The values take into account the effects of all installation and design parts contained in the standard unit. The values for upflow units assume an installed discharge duct.

The units contain a nitrogen filling with overpressure.

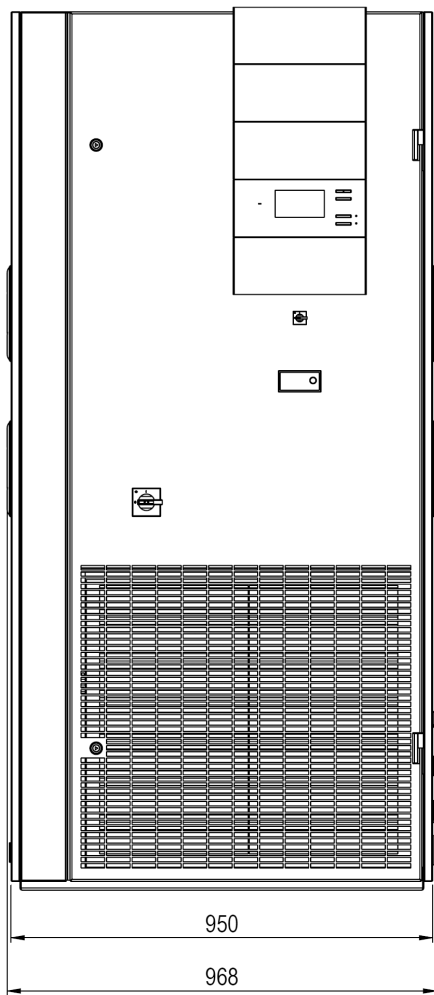
For electrical data, (compressor and fan power consumption) see e-data sheet.
The electrical power consumption of the fans must be added to the room load.

Refrigeration scheme

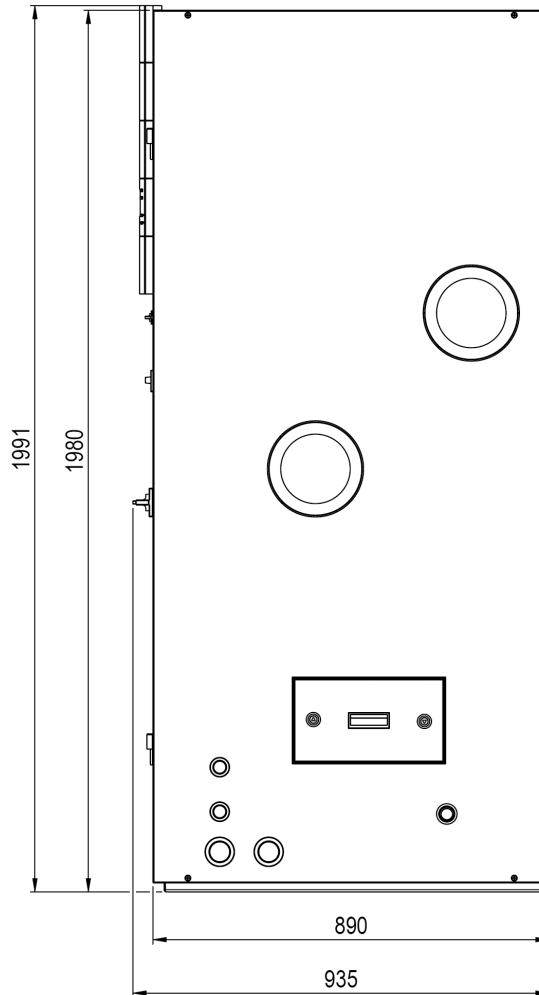


4.3 Dimensional drawings

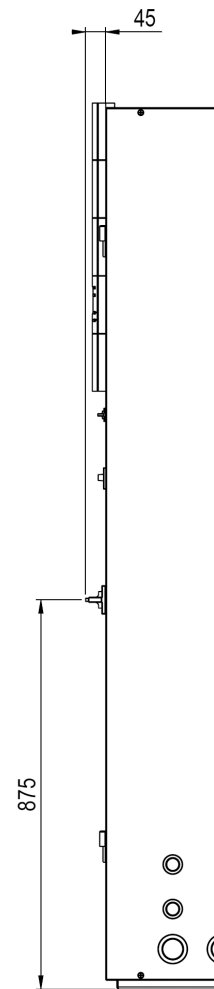
Front view



Side view



Projecting main switch



5. Installation

5.1 Selection of the installation site

The A/C unit is designed for the inside installation on a level base. The A/C unit is not appropriate for operation in office rooms or other rooms sensitive to noise.

⚠ DANGER

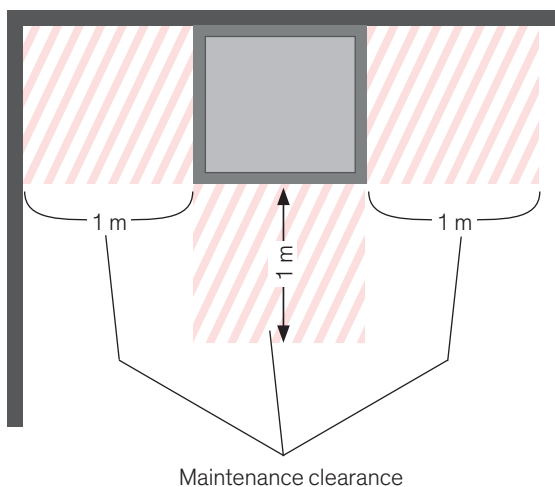
Risk of explosion

The unit may not be operated in an explosive atmosphere!

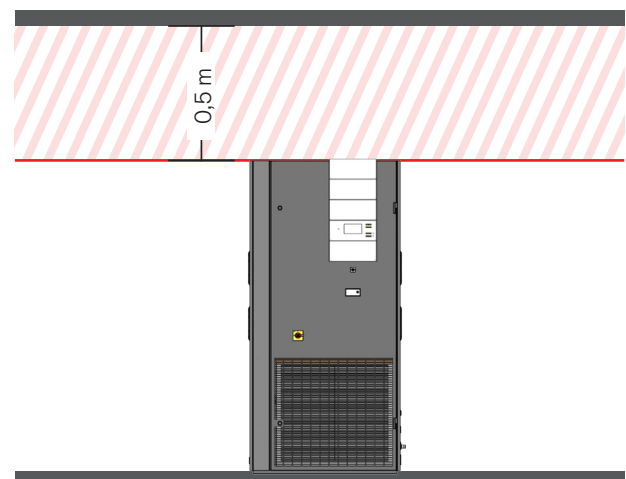
- children, unauthorized persons and animals may not have access to the installation site of the A/C unit.
- check that the installation site is appropriate for the unit weight, which you can read in the technical data.
- take into account the necessary clearances for the maintenance and the air flow.

Vibrations emanate from the A/C unit due to compressor operation. To avoid such vibrations, we recommend installing the unit on a vibration absorbing base, as it is realized in case of a positioning on a raised floor socket e.g. by Mafund strips.

The A/C unit must be accessible laterally and from the front.



Air outlet area for Upflow units without duct connection



5.2 Positioning the unit

You will need two mounting aids as shown below.

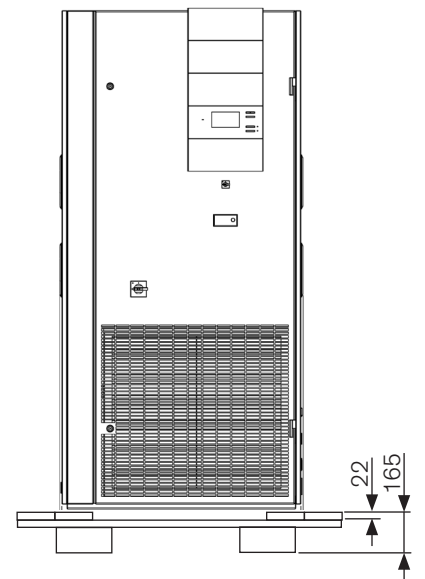
WARNING

Risk of crushing limbs

A defective lifting device can lead to the uncontrolled fall of the A/C unit.
Do not stay under suspended loads! Wear safety boots.

Transport with a fork lift

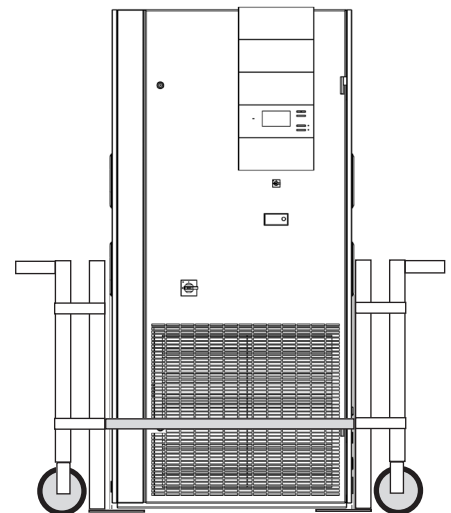
- transport the unit on the pallet as close as possible to the installation site.
- keep at hand mounting aids at the left and right unit side.
- lift the units with a fork lift by 50mm.
- remove the pallet.
- put the mounting aids at the left and right unit side.
- drop the unit.
- lift the support surface of the mounting aids at a sufficient height so that the weight of the unit lies on the mounting aids. Secure the mounting aids by belts around the unit.
- take away the fork lift from under the unit.
- drive the unit by the mounting aids to the installation site.
- drop the unit, loosen the belts and pull away the mounting aids.



Pallet height



Mounting aids



Chiller transport with mounting aids

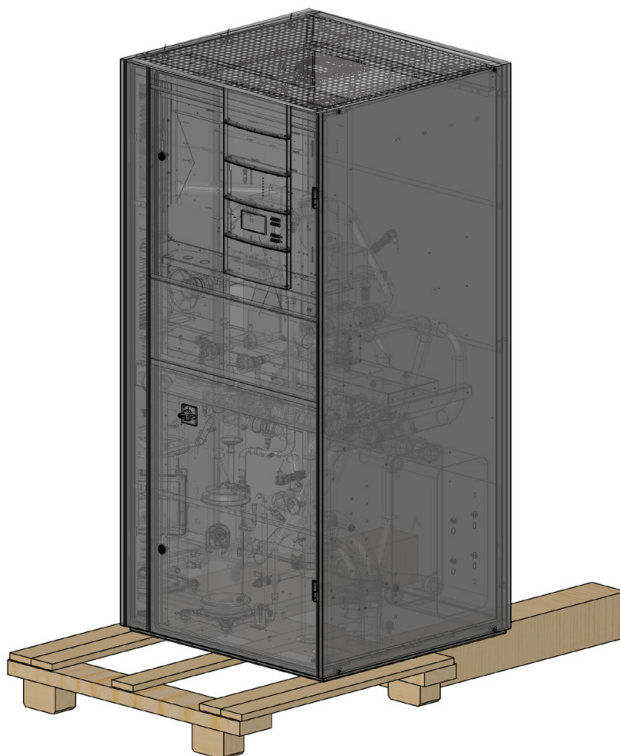
Transport without fork lift

You will need two scantlings of at least 1 m length and a height of 150-160mm.

⚠ WARNING**Risk of crushing by tipping of the unit**

Select starting point for pushing not higher than 1 m. Do not stay behind the unit. Wear safety boots.

- lay the scantlings flush against the pallet and secure them against slipping.
- push the unit on the scantlings by two persons.
- put the mounting aids at the left and right unit side.
- lift the support surface of the mounting aids at a sufficient height so that the weight of the unit lies on the mounting aids. Secure the mounting aids by belts around the unit.
- take away the scantlings from under the unit.
- drive the unit by the mounting aids to the installation site.
- drop the unit, loosen the belts and pull away the mounting aids.

**i NOTICE**

Place the male triangular wrench in a visible location in the immediate vicinity of the A/C unit.

5.3 Connection of the piping

5.3.1 Refrigerant piping

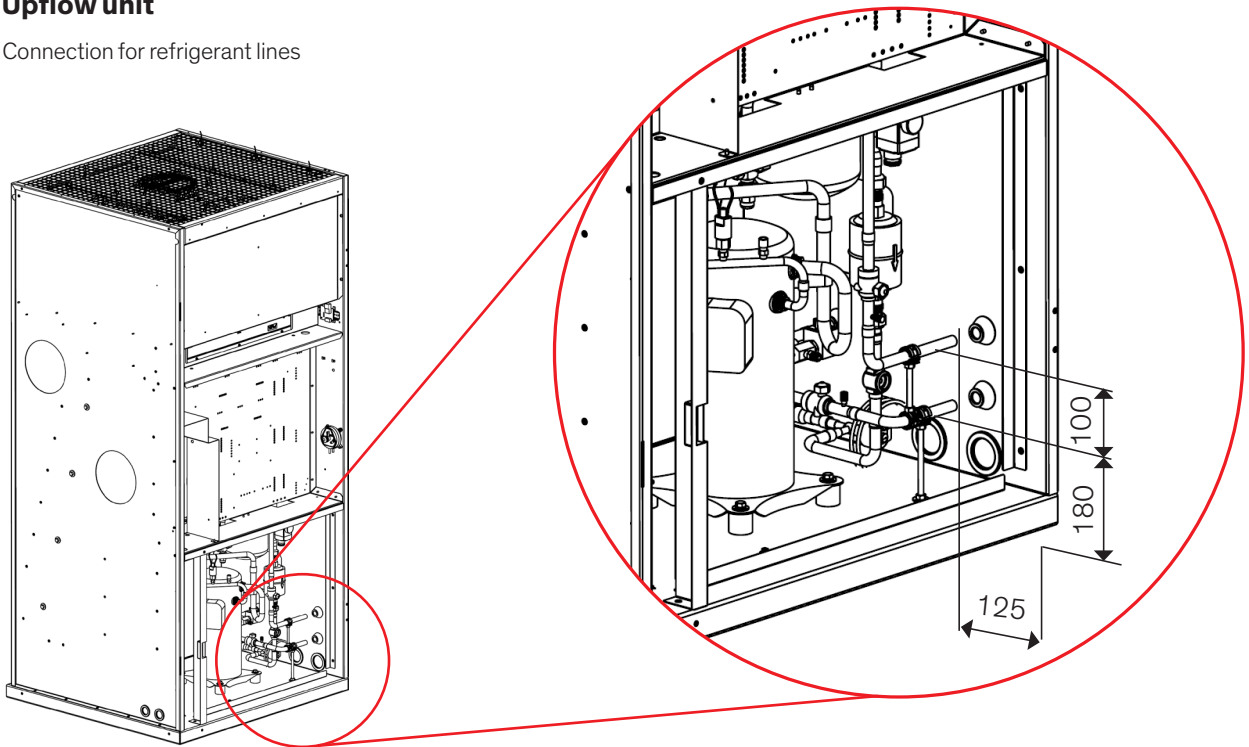
5.3.1.1 Design

To design the piping between the chiller and the condenser follow the instructions in chapter "2. Refrigerant piping" of document "General-DX". This document is available in the e-Stulz area and in the StulzSelect.

5.3.1.2 Position of the refrigerant connections

Upflow unit

Connection for refrigerant lines



Refrigerant line connection diameters

Pressure line	16 mm
Liquid line	16 mm

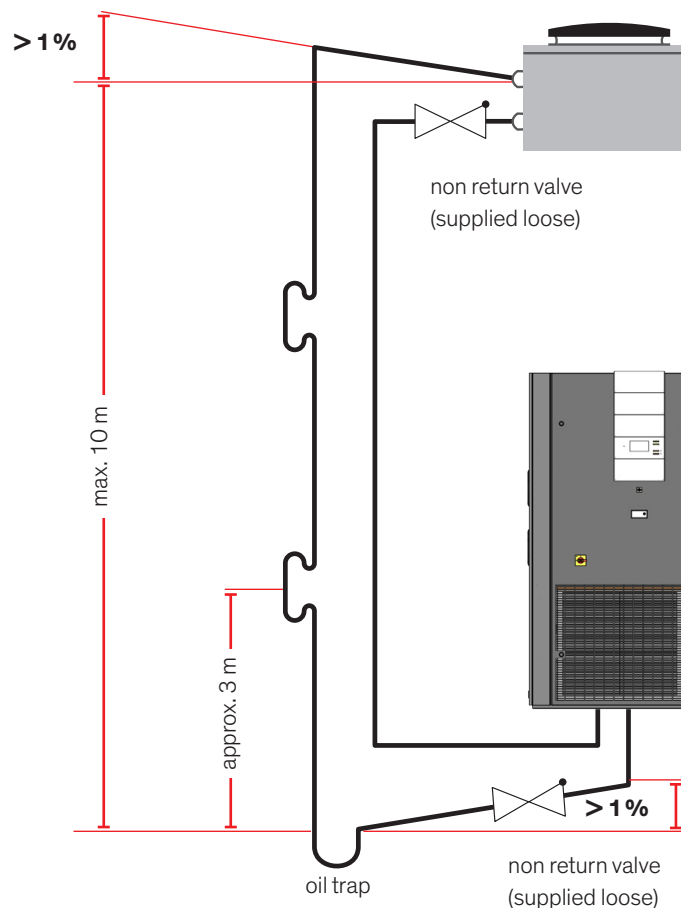
The refrigerant connections are located near the compressor and are labelled by the inscriptions „pressure pipe“ and „liquid pipe“. The lines to be connected have to be soldered.

For the connection of the external pipework note the pipe entrance area shown on top of the page.

The units contain an oil separator which is installed at the hot gas side of the compressor and serves to recuperate oil in all operating states. The separated oil is injected on the suction side of the compressor. For the hot gas line and the liquid line each a non return valve is supplied loose with the A/C unit. For the liquid line we recommend to install the non return valve near the condenser, this avoids the return flow of refrigerant in to the condenser and a possible low pressure error at the unit start. For the hot gas line we recommend to install the non return valve as close as possible to the A/C unit. The non return valve avoids the return flow of liquid refrigerant from the condenser when the A/C unit is not in operation.

Measures to take with hot gas pipes if the condenser is positioned higher than the A/C unit:

- Ascending pipes must have oil traps every 3 m (see drawing).
- Install an oil trap at the end of horizontal gas pipes whenever the following pipe is an ascending pipe (see drawing).



5.3.1.3 Strength pressure test

The compressor has been strength-tested in the factory. It is not necessary for the customer to strength- or leak-test the compressor again.

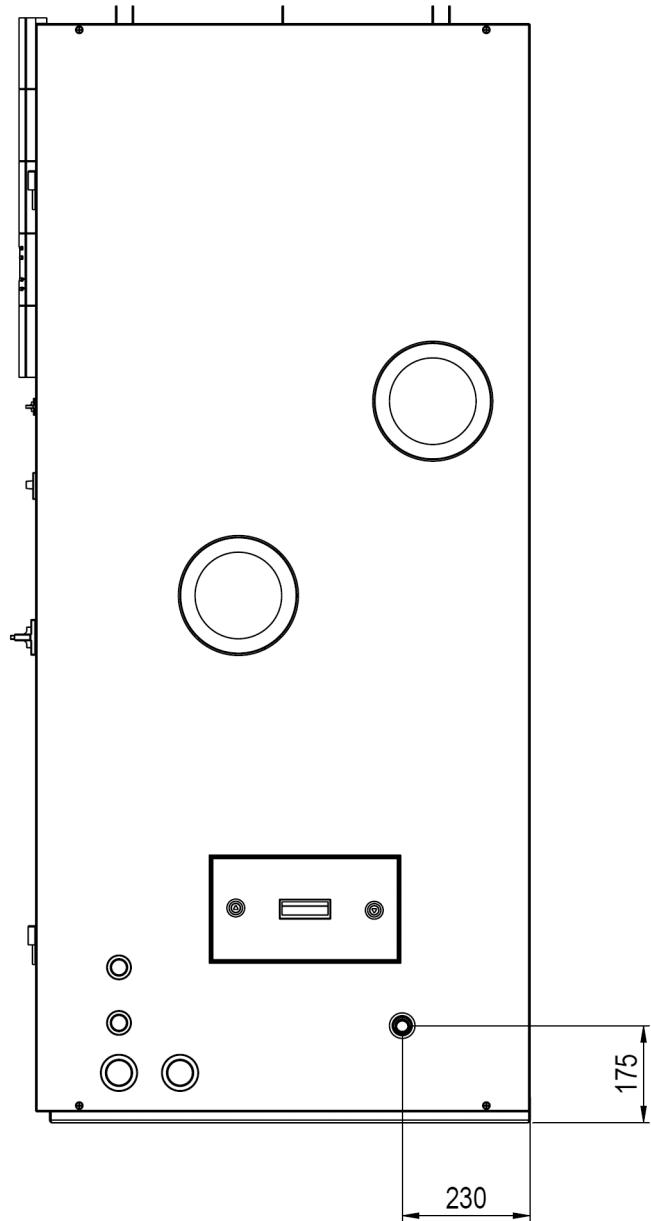
i NOTICE

Screwed pipe joints can loosen by long transportation distances.

Before final commissioning, check all screwed pipe joints in the refrigerant circuit on tightness and retighten if necessary.

5.3.2 Condensate drain connection

In upflow units the syphon is already installed and exits in the middle section, right bottom.



Upflow unit, view of the right side

Syphon installation

Ensure that there is a sufficient height difference between the fan pan and the upper bow of the syphon or the highest part of the drain tube, in order to avoid a water column in the drain syphon caused by the pressure in the suction area of the A/C unit, which prevents the draining of the condensate water

Example:

Static pressure in the suction area: -300 Pa

$$h = p / (\rho \cdot g)$$

$$h = -300 \text{ Pa} / (1000 \text{ kg/m}^3 \cdot 10 \text{ m/s}^2)$$

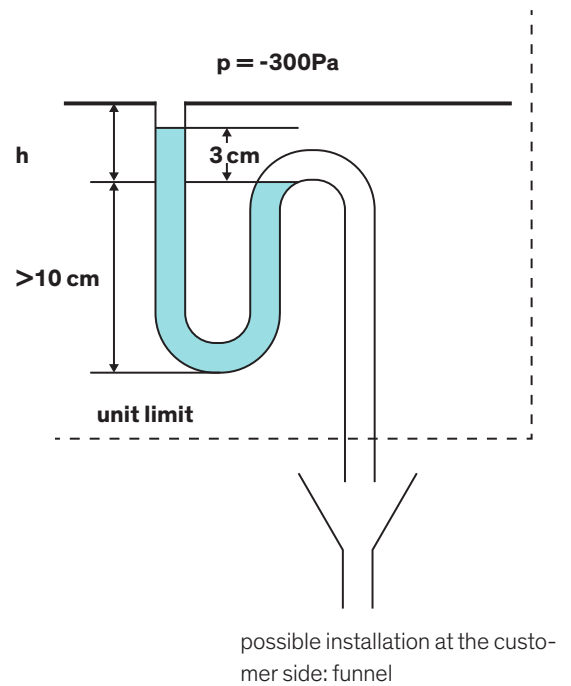
$$h = -3 \text{ cm}$$

If the height h is smaller than 3 cm with a pressure of 300 Pa in the suction area, a water column remains in the drain, the water does not drain off and fills the fan pan. This water can be drawn dropwise in the fan or can drop out of the unit through the panels if the pan is full.

Connect the condensate water drains to the local waste water system.

i INFORMATION

Comply with the regulations of the local water supply authority.



5.4 Electrical connection

The power supply system on site and the pre-fuse must be designed for the total current of the unit (see e-data sheet).

Make sure that the power supply corresponds to the indications on the rating plate and that the tolerances according to the „Application limits“ are not exceeded.

The asymmetry of phase between the conductors may amount to 2% maximally.

To determine the asymmetry of phase measure the voltage difference between the phase conductors (L1-L2, L2-L3, L1-L3) and calculate the average value of the measured voltages. With a voltage supply of 400V, the maximum deviation to the average value of the voltages may not exceed 8 V.

⚠ DANGER

Mortal danger by electric hazard

Ensure that the power supply at the connection cable is de-energized.
The electric cables are only to be connected by an authorized specialist.

i NOTICE

Make sure that the phase rotation is correct, the rotating field must turn right! Otherwise a three phase control device (optional) triggers an alarm.
An inverse rotating field would damage the compressor.

i NOTICE

For use of leakage-current (FI) circuit breakers, take into account the EN 50178 5.2.11.2 .
Only type B pulse-current FI circuit breakers are permitted. FI circuit breakers do not provide protection against bodily harm during operation of the unit or frequency converters.

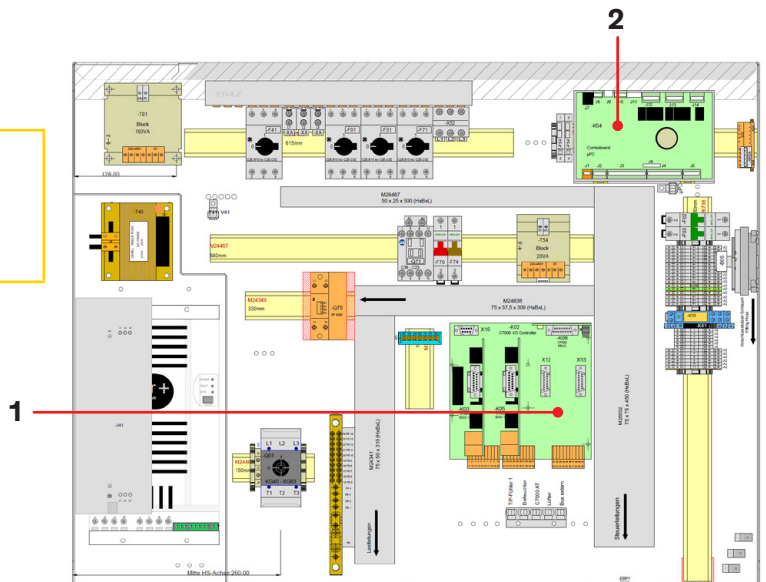
- establish an effective earthing to the chiller unit frame.
- open the unit door, on which the main switch is located.
- check that the feedthrough openings in the unit are provided with rubber grommets. If the rubber grommets are lacking, the cable insulation can be damaged.

⚡ ESD NOTE

Do not touch electrical components, without taking care of protective ESD measures.

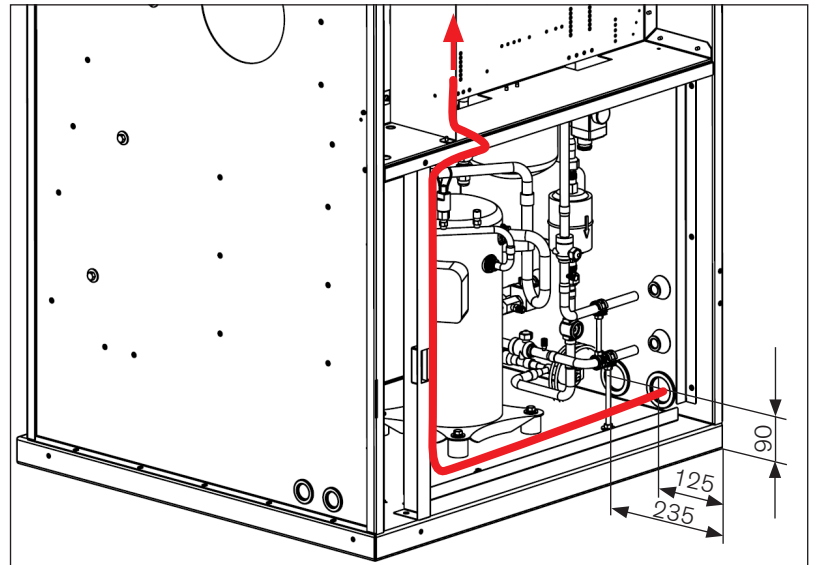
Electronical components:

- C7000 IO controller (1)
- µPC circuit board



Connection of the power supply cable

- route the power supply cable in the unit as shown in the following illustrations and fix it at the unit frame.
- route the electric cable into the electrical box from below and connect the PE conductor at the PE rail, the neutral conductor at the neutral terminal and the three phases to the main switch, in accordance with the wiring diagram (part of the unit documents).
- secure these cables by the pull relief screw.



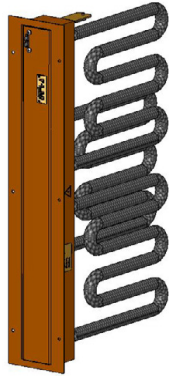
Insertion for the power supply cable

5.5 Reheat

An electrical reheat and a hotgas reheat are installed complete and integrated in the function and method of operation of the A/C unit.

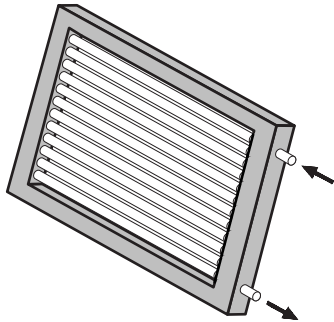
Description

Electrical reheat



The reheat is connected in accordance with the electric diagram. It is controlled and monitored by the controller. The values for switching on and off are adjusted in the „operate/components/heating“ menu on the controller. Refer to the operating instructions C7000.

Hotgas reheat



The hotgas reheat is integrated in the refrigerant circuit in accordance with the refrigerant diagram in the appendix. The refrigerant supply is controlled via an electrically-actuated 3-way solenoid valve. The solenoid valve is controlled via the controller. The control parameters are adjusted in the „operate/components/heating“ menu on the controller. Refer to the operating instructions C7000.

Installation

The reheats are installed and connected in the A/C unit.

Commissioning

The reheats are controlled and monitored by the controller of your A/C unit. No further measures are required for commissioning.

Operation

The reheat is controlled and monitored by the controller. No further measures are required for operation.

Maintenance

Clean the reheat annually from contaminations and check it for damage. The electrical reheat is located above the electrical box and is accessible after opening the unit front door. Remove six screws and pull out the electrical reheat towards the front.

To clean the hotgas reheat the rear wall must be removed.

Malfunction causes

Alarm: Reheat defect

All reheat alarms are received by the controller and can be requested according to the equipment.

C7000-control system:	no display (display only externally)
C7000 advanced terminal:	indication on the display

6. Commissioning

The entire air conditioning system (duct systems, damper, air filter) must be tested and approved before use. In the acceptance record, the hygienic requirements must be met and documented according to VDI 6022. The acceptance record must be available at any time to ensure compliance with the hygienic requirements.

Operation - Hygienic notes according VDI 6022

- The air conditioning unit was manufactured in accordance with the guidelines of the hygiene regulation VDI 6022. To meet these requirements during operation of the air conditioning unit it must be ensured that it is operated by trained staff and that inspection and maintenance work is carried out in the intervals listed in the chapter „Maintenance“.
- The operation of the system is permitted only with an air filter. To comply with EN779 the air filter must correspond to at least filter class F7.

6.1 Filling the refrigerant circuit

- Turn the main switch to the ON position.
- Switch on the control-circuit fuses.
- Do not switch on the power switches.

C7000AT:

- Select the Config menu.
- Enter the password.
- Go to menu „Components/Manual oper./Cooling/Valves“.
- Change the parameter in the column „EN“ line „EEV 1“ from „0“ to „1“.
- Set the parameter in the column „Value“ of the same line to 100%.

C7000IOC:

- Enter the command:
„eev 1 hand 1“ and
„eev 1 handon 100“.

The expansion valve is now completely open.

Before the system is filled with refrigerant, it must be clean and dry inside.

- First evacuate the part of the refrigerant circuit, which is outside the chiller unit to aspirate humidity which is possibly present in the external pipelines.
- Switch off the vacuum pump.

i NOTICE

Risk of bearing malfunction

Do not subject the compressor to dry air.

The refrigerant circuit is filled with nitrogen with overpressure.

- Open the stop valves.
- Carry out a tightness test.
- Top up nitrogen for this until a pressure of 24 bar is reached in the system.
- Evacuate the refrigerant circuit by the Schrader valves after the tightness has been confirmed.
- Apart from the volumes of the external piping and the volume of the condenser, take also into account the following volumes to estimate the necessary refrigerant charge:

Components		
Evaporator	dm3	8,1
Liquid receiver	dm3	5

! WARNING

Risk of injury by burns in case of contact with refrigerant.

In case of a defective filling line refrigerant can be discharged under high pressure. Wear safety glasses and gloves.

- Put the refrigerant bottle on a scale.
- Note the weight before the filling.
- Connect the refrigerant bottle via a pressure measuring station to the refrigerant circuit.

i NOTICE

Take care that you add refrigerant in a liquid state.

The refrigerant is a multi-component blend. The ratio of the refrigerant components changes if one of the compounds passes over into the gaseous phase.

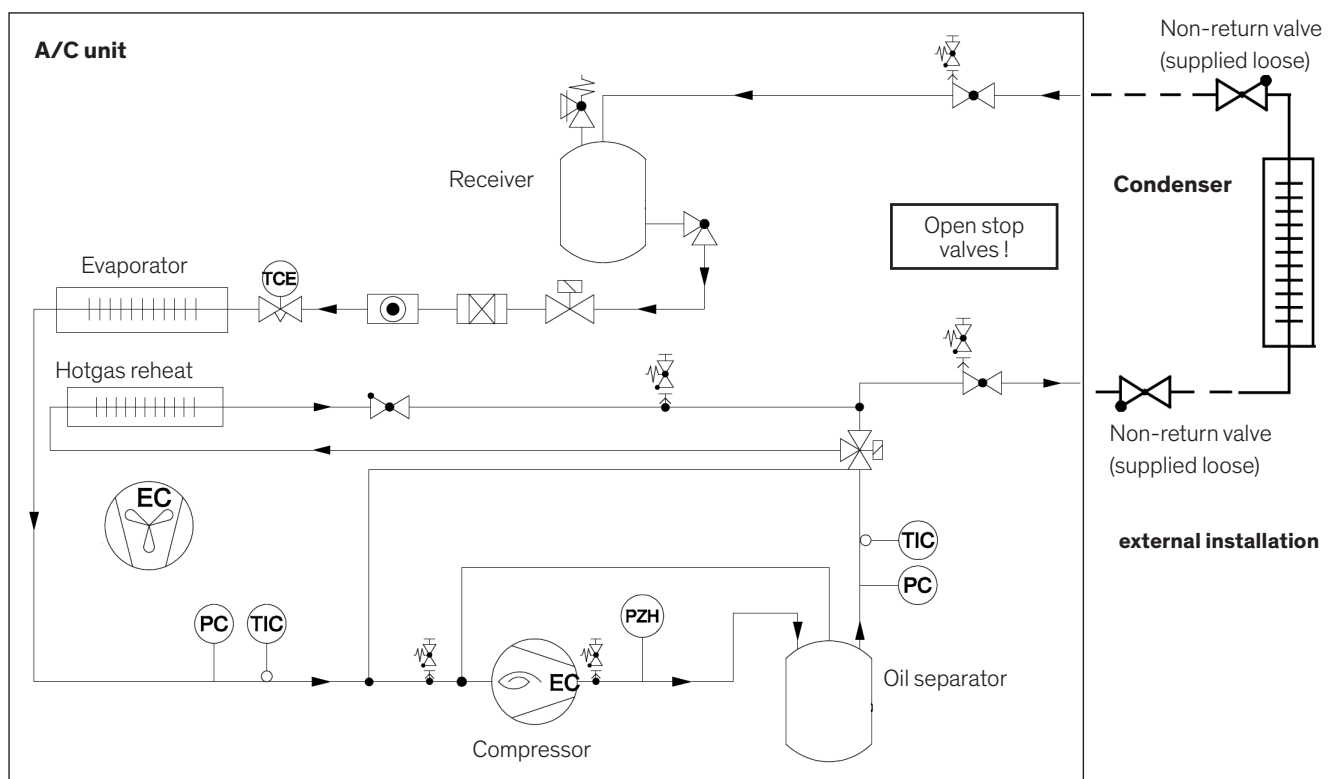
- Charge the refrigerant circuit with liquid refrigerant on both the high and low pressure sides simultaneously to ensure that a positive refrigerant pressure is present in the compressor before it runs.
- Fill the majority of the charge in the high pressure side of the system to prevent bearing washout during first-time start.
- Start the compressor by pressing the I/O button of the C7000 controller if you have filled up 70% of the precalculated refrigerant charge. In some cases, this must be decided by the installer according to the ambient conditions on site.

i NOTICE

A too high pre-filling can cause that liquid refrigerant gets in the compressor and the compressor is damaged.

A too low pre-filling leads to the triggering of the LP alarm and shut-down of the compressor.

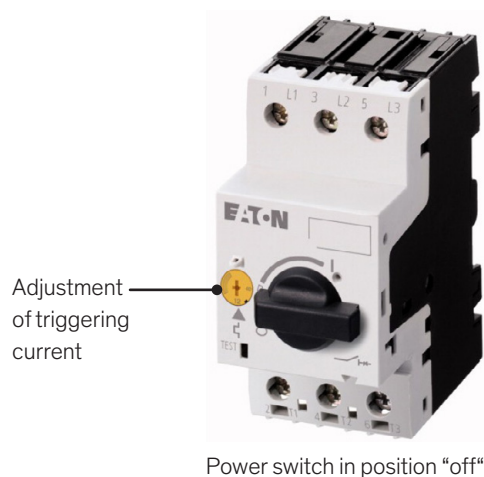
- Continue the filling while the compressor is running.
- Stop the filling once you see only small bubbles in the sight glass.
- Note the weight of the refrigerant bottle and determine the quantity of charged refrigerant. This is helpful for later inspections and exchange of the refrigerant charge.

**Oil charge****i NOTICE**

The A/C unit is prefilled with 0.6 l oil. Further addition of oil damages the compressor.

6.2 Control of the electrical box

- make sure that the master switch is off and the unit is de-energized.
- open the electrical box door using the key provided.
- check whether all power switches and control-circuit fuses in the electrical section of the unit are switched off.
- retighten all screw connections in the electric box.
- verify the smooth function of the contactors.

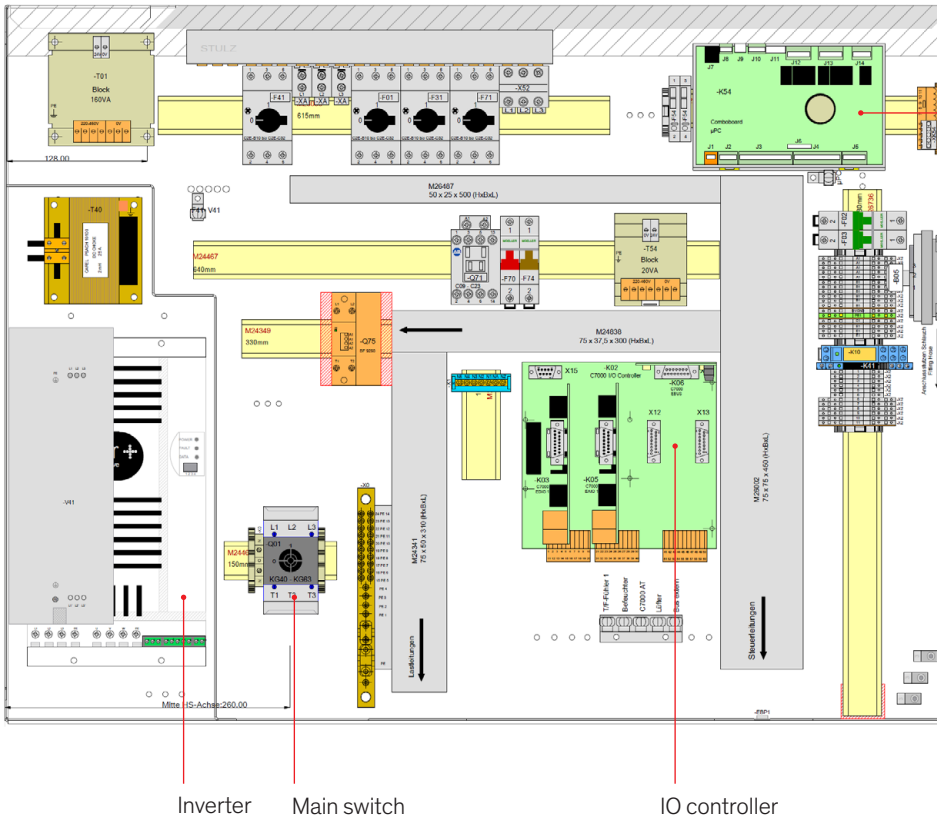


- check the settings of the power switches according to electrical data sheet (part of the unit documents).
- switch on the control-circuit fuses and the power switch of the fan and the compressor.
- close all doors of the unit.
- switch on the power supply for the A/C unit.
- switch on the A/C unit at the master switch.

The controller is now supplied with power, so you can use it for adjustments.

- make sure that the air-cooled condenser is operating.

Electrical box

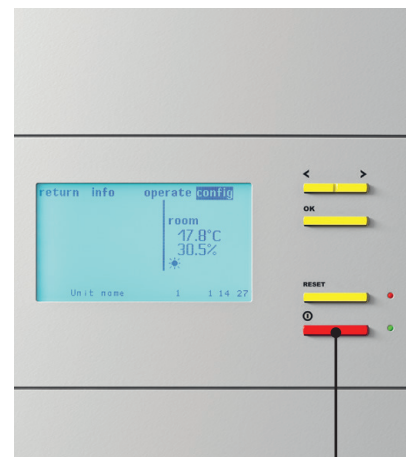


µPC-board for the control of inverter and electron. expansion valve in the first refrigerant circuit

- open the electrical box door with the main switch switched on.
- connect a notebook at the service port X15 on the C7000IOC board, to carry out possible configurations (setting the setpoint).
- shut the electrical box door.

A/C unit with optional C7000Advanced Terminal:

- familiarize yourself with the operation of the C7000 controller. To do this, there is a separate manual.
- adjust the temperature setpoint at the controller.



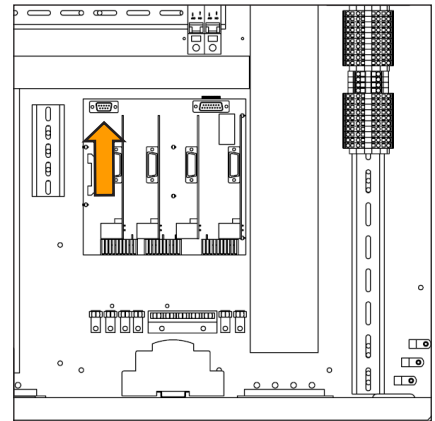
Controller C7000Advanced Terminal, Start/stop-key

CAUTION

Risk of bruising limbs

Through air intake limbs can be clamped at the slamming of doors. The doors represent a protective device. During operation the doors may not be opened and the rear panels may not be removed.

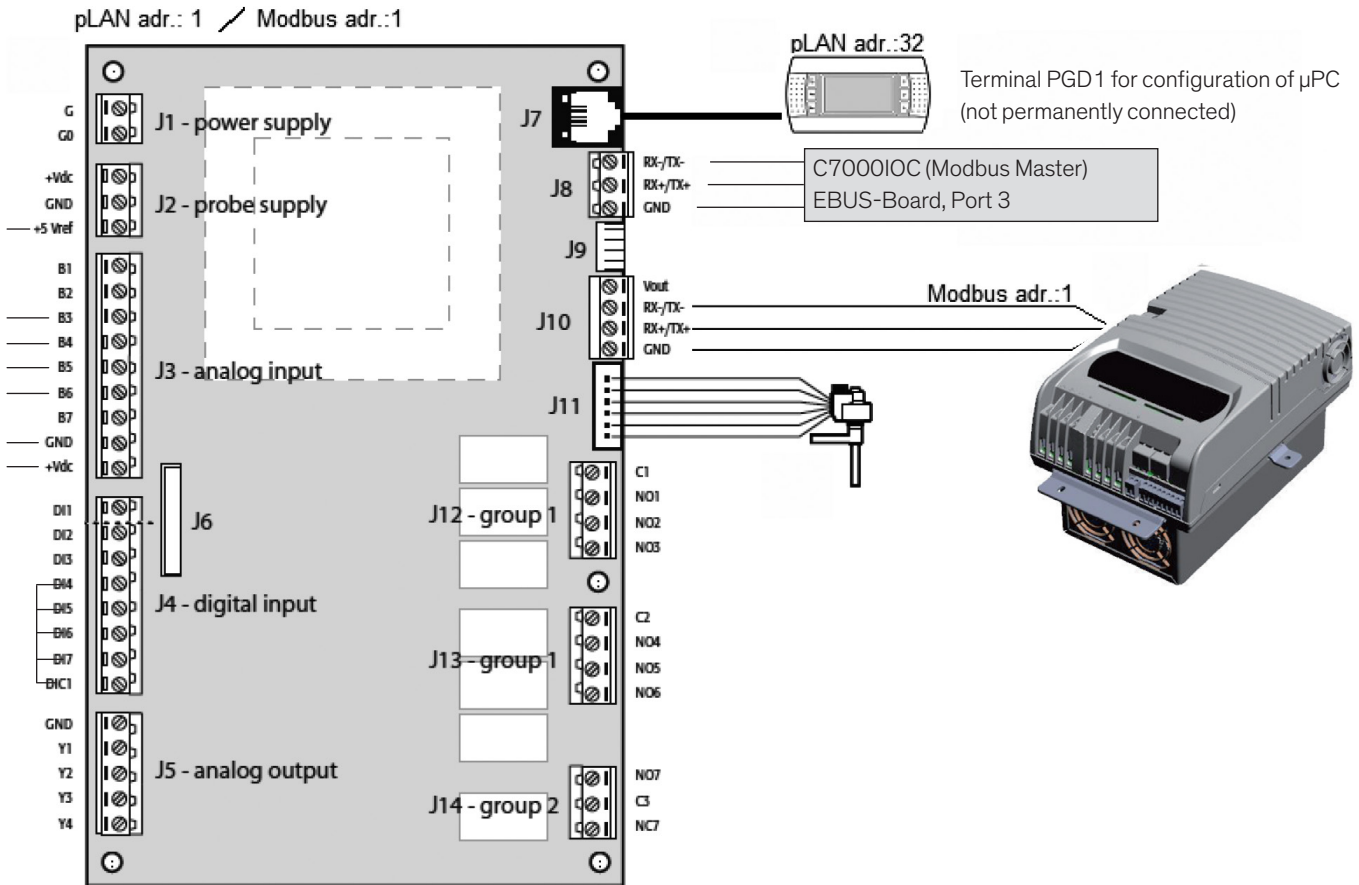
- Start the unit by pressing the Start/Stop-key on the C7000AT controller or by typing the command “state start” on the notebook.
- Check after 20 minutes operation, whether bubbles are visible in the sight glass of the liquid line. If this is the case, refrigerant might have escaped by a leak.
Check the circuit on leaks, eliminate these and top up the circuit with refrigerant in regard of the chapter „Maintenance“.
- Check the current consumption of the compressor and the fan comparing it with the values of the e-data sheet.



Service port X15 in the e-box.

µPC electronic board

This electronic board is connected to the C7000 via RS485 line to exchange data. The µPC controls the compressor speed acting on the inverter. It receives also signals from pressure transducers and NTC temperature probes to check whether compressor works within the admitted range and to control the electronic expansion valve according to the superheating temperature.



Digital input	Assignment of block J4
ID1	-
ID2	-
ID3	-
ID4	Compressor start/stop (with ramp)
ID5	Compressor start/stop (without ramp)
ID6	Alarm reset
ID7	Serial or pLAN/Modbus commutation

Analog input	Assignment of block J3
B1 (NTC)	-
B2 (NTC)	-
B3 (NTC)	Suction gas temperature
B4 (NTC)	Hot gas temperature
B5 (4-20mA)	Condensation pressure
B6 (0-5V)	Evaporation pressure
B7 (0-5V)	not used

Dig output	Assignment of blocks J12, J13, J14
NO1	not used
NO2	not used
NO3	not used
NO4	not used
NO5	not used
NO6	not used
NO7	not used

Ana output	Assignment of block J5
Y1 (0-10V)	"out of operation range" position signal (not used)
Y2 (0-10V)	Compressor speed (not used)
Y3 (0-10V)	Expansion valve opening (not used)

Operation of the terminal PGD1



The PGD1 is operated by 6 keys:



displays the list of active alarms.

Prg

with this key you enter the configuration menu (M01, M02 etc.)

ESC

with this key you come to the precedent view



scroll up in a list or increase the value in the display.



scroll down in a list or reduce the value in the display.



ENTER key for access to the selected sub menu, to the modification mode or for confirmation of the adjusted value.

After the software update with the Smartkey (description available in the e-Stulz area) some settings must be adapted. For this the connection from the C7000IOC to the μ PC must be removed.

- De-energize the μ PC.
- Open terminal ID7, remove the 0V voltage.
- Pull the connector of the ModBus® connection from J8.
- Push the telephone connector of the PGD1 on to block J7.
- Switch on the μ PC.

```
Initialization
DEFAULT INSTALLATION
Erase permanent memory
and install global
default value.
Please wait...
```

```
Warning
INITIALIZATION DONE
switch-off unit
to confirm data
```

After the μ PC is powered, the PGD1 terminal executes an initialization which lasts approximately 30 seconds. After this the μ PC must be switched off and on again to correctly complete the procedure.

```
WIZARD Wz01
Control mode via:
Modbus (serial 0/1)
```

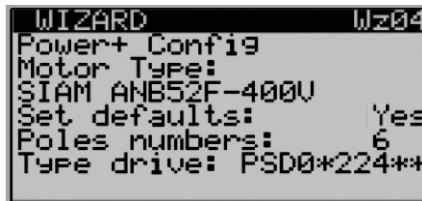
After the restart, a program for quick configuration is started, which is called Wizard, displaying eight windows from Wz01 to Wz08. In Wz01 the control mode must be set. The μ PC is controlled by a ModBus® connection to the C7000. First the setting "Analog input (B7)" appears. Press ENTER key, adjust "Modbus (serial 0/1)" with the arrow keys, confirm by the ENTER key. With "down arrow" key (press 2 times) to Wz03.

NOTE

To navigate among the different windows by the arrow keys, the cursor must be in the left top corner.



Here the BMS settings must be selected. The serial Modbus address of the µPC is set on 001 as standard and has not to be changed. In the C7000IOC however, the command "icc 1 id 1" must be entered to enable a communication. The baudrate must be set on 9600.



Here the used compressor must be adjusted. The compressor type can be seen on the type plate of the compressor.

- SIAM ANB33-400V or SIAM ANB66-400V
- SIAM ANB42-400V or SIAM ANB78-400V
- SIAM ANB52-400V

(Set default: Yes) By this setting the inverter is initialized suitably to the compressor. It is compellingly required to select "Yes". Following, the data is written in the inverter.

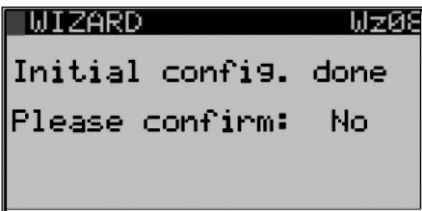


The program verifies the compatibility of compressor and inverter, displays the result of the verification in Wz04a and requires the confirmation for writing the default setting.

Write default: Yes

After the confirmation with the ENTER key, the display shows "Wait default install", then the value for "Write default" switches back to "No".

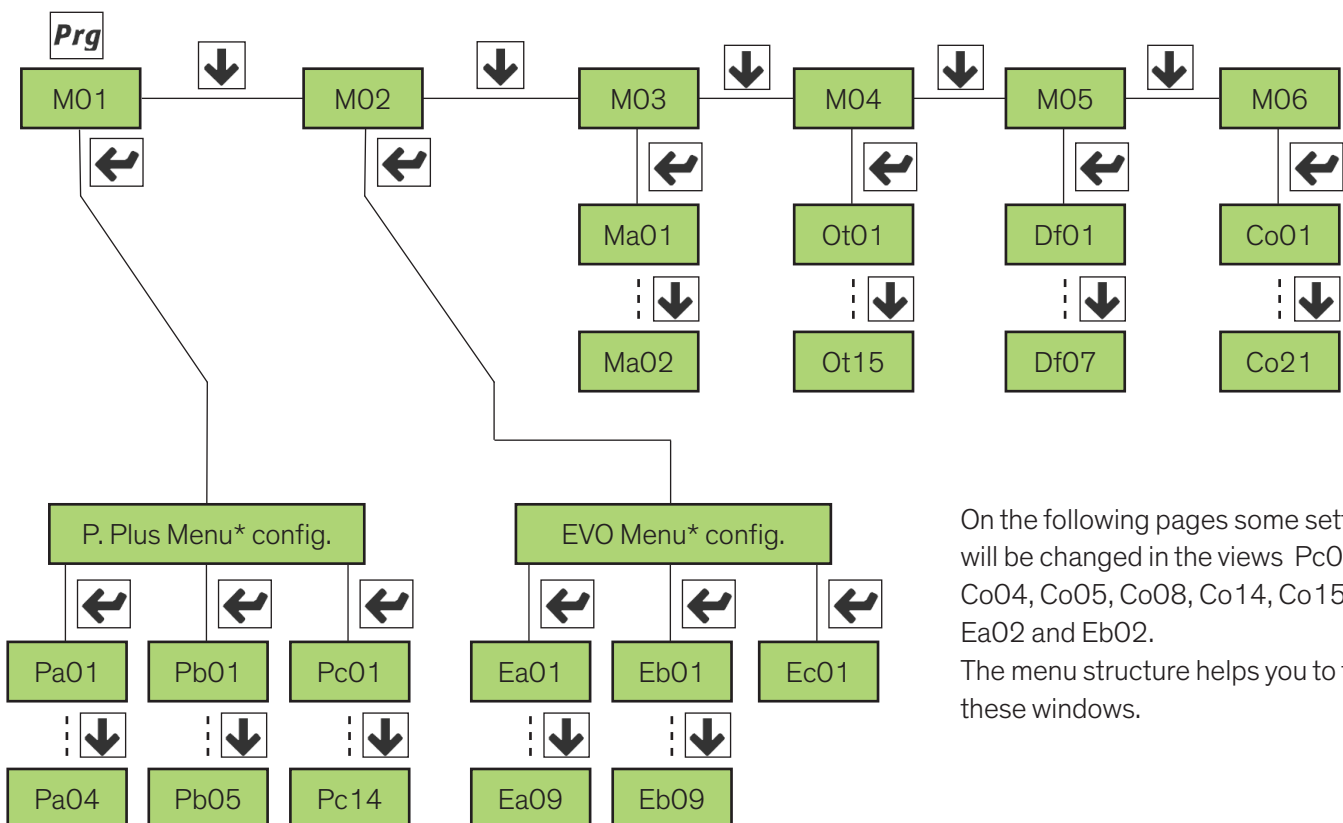
By ESC you get back to view Wz04.



Scroll to view Wz08 with the "down arrow" key.

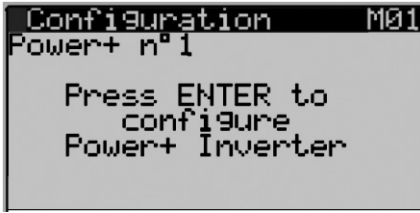
Confirm the configuration with "Yes".

Menu structure

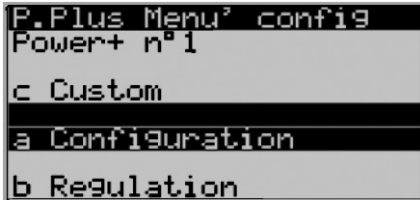


On the following pages some settings will be changed in the views Pc09, Co04, Co05, Co08, Co14, Co15, Ea02 and Eb02.

The menu structure helps you to find these windows.

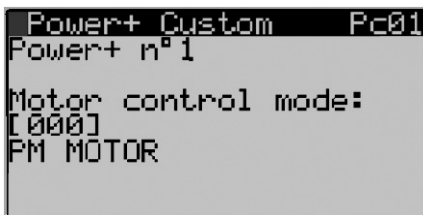


By the PRG-key you get to view M01, the first window in the main menu branch. With the Enter key you proceed to the next menu.



The selection **a. Configuration** gives you the possibility to set the compressor type, (as in Wz04) and it leads you to further three menus in which special settings can be made.

Select now **c. Custom**.



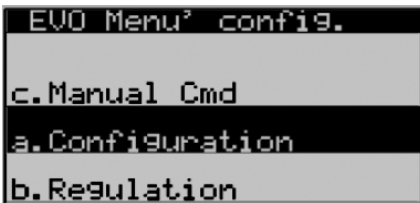
Pc01 appears. Scroll down to Pc09.



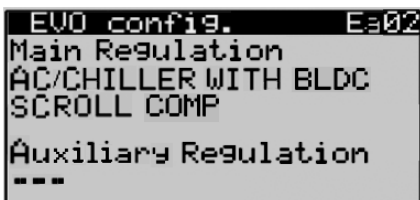
Adjust the starting current depending on the installed compressor.

SIAM ANB33-400V	55,0%
SIAM ANB42-400V	55,0%
SIAM ANB52-400V	75,0%

Go back to M01, using ESC or faster with Prg.

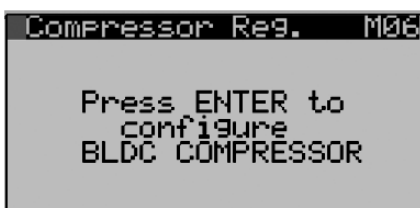


Now you must modify two settings for the expansion valve. By the windows **M02, EVO Menu' config.** and selecting the menu item "**a. Configuration**" you first get to **Ea01** and then to view **Ea02**.



Here the main regulation must be set on "AC/CHILLER WITH BLDC SCROLL COMP".

By the menu **EVO Menu' config.** and selecting the menu item "**b. Regulation**" you first get to **Eb01** and then to view **Eb02** (no picture). In **Eb02** set the valve opening at start-up on 75%.



Now select **M06**.

BLDC means "Brushless direct current"

```
Compressor reg. Co04
Pressure Limits
Max Discharge
  Pressure: 43.5bar
Min. Suction
  Pressure: 0.2bar
Min. Suction Compr
  Start Delay 000s
```

View Co04

Set the limit value for minimum suction pressure on 3,0 bar.

Set the delay for low pressure alarm (Min. Suction Compr Start Delay on 180s).

```
Compressor reg. Co05
Start-up Pressure
differential control
Max pressure differ.
admitted: 009.0bar
```

View Co05

Here you adjust the admitted maximum pressure difference between hot gas and suction gas to allow the compressor start. A higher pressure difference would overcharge the inverter with reference to the current and leads to an alarm message.

Set 7,0 bar.

```
Compressor reg. Co08
Start-up failure
control
Pressure difference
min.variation: 0.3bar
Control period: 10s
```

View Co08

Set the control period on 30 seconds. This means the following: If 30 seconds after the compressor start, the hot gas pressure is less than the adjusted 0,3 bar higher than the value before the start, the compressor will be stopped and the alarm message „Start failure alarm“ will appear.

The alarm will be automatically reset 5 times and the compressor will be restarted 30 seconds after the stop. After the fifth failed attempt the alarm „Compressor start failure - Check motor wiring“ is displayed and there is no other start attempt.

```
Compressor reg. Co14
Envelope control
in zone 1c
Evaporat.limits: 12.0°C
Maximum admitted
speed: 090rpm
```

In the **view C014** the operation range of the compressor (Zone 1c) can be extended.

Set the maximum admitted speed on 120 rpm.

```
Compressor reg. Co15
Envelope control
Low ratio management
by EEV closing: No
by compr. speed up: No
```

In **view Co15** you can adjust, how the control with a low pressure ratio shall function.

1. by closing the expansion valve.
2. by increasing the compressor speed.

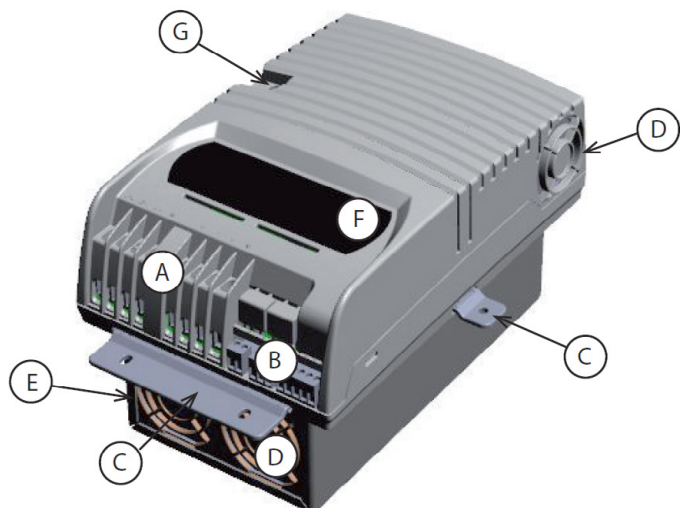
Set both parameters to "Yes".

The configuration is now finished.

- De-energize the μ PC.
- Pull the telephone connector of the PGD1 from block J7.
- Re-establish the 0V connection to terminal ID7.
- Put the connector of the ModBus® connection onto J8.
- Switch on again the μ PC.

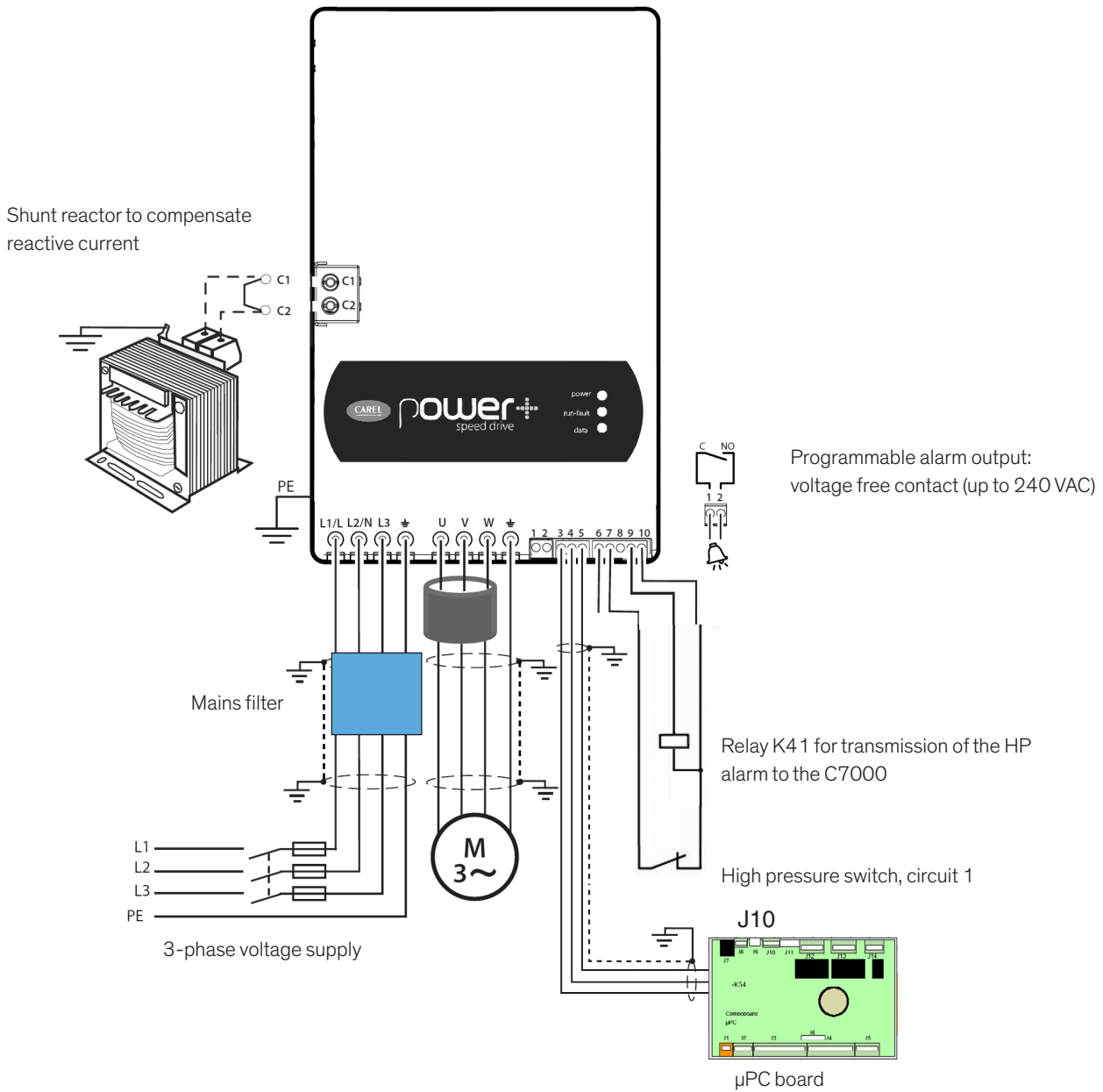
Inverter (EC compressor driver)

According to a signal from the μ PC controller, the inverter modulates the rotation speed of compressor, in order to adjust cooling capacity to the actual thermal load.



Reference	Description
A	Terminal block for power lines
B	Terminal block for control lines
C	Fastening bracket
D	Cooling fan
E	PE connection
F	Operating status LEDs
G	Terminals for connecting a shunt reactor

Inverter connections



Terminal	Assignment	Use
3	0V	
4	RX+/TX+	RS485/ModBus® connection
5	RX-/TX-	
6	PTC input	not used
7	24VDC	auxiliary voltage
8	0V	
9	STOa	input for HP alarm
10	STOb	
1, 2	Relay output	not used

7. Maintenance

7.1 Safety instructions

All maintenance work has to be carried out under strict compliance with the country-specific accident prevention regulations. In particular we refer to the accident prevention regulations for electrical installations, refrigerating machines and equipment. Non-compliance with the safety instructions can endanger people and the environment.

Maintenance work must only be carried out on the units by authorized and qualified specialist staff.

Procedure instructions

- carry out work on the system only when it is shut down.
- switch off the A/C unit at the controller and at the master switch.
- display a „DO NOT SWITCH ON“ warning sign.
- switch off power conducting cables to the unit and secure them against being switched on again.
- check to ensure that they are in the de-energized state.

7.2 Maintenance intervals

Component	Maintenance interval		
	quarterly	half-yearly	yearly
Refrigerant circuit			
Refrigerant charge		X	
HP switch			X
Sight glass		X	
Compressor			X
Expansion valve		X	
Air circuit			
Heat exchanger			X
Fan			X
Air filter	X		
Unit housing			
Electrical box			X
Unit interior			X

System control to ensure the hygienic requirements

The air conditioning system must be checked in the specified intervals according to table 1 to ensure the hygienic requirements.

Table 1: check list

No.	Task	Eventual measure	Required interval in calendar months					
			1	3	6	12	24	hyg. control
1 Housing								
1.1	Check on fouling at the air intake and outlet, damage and corrosion	Cleaning and repair				X		
2 Air filter								
2.1	Check on contamination and damage	Exchange the corresponding filters		X				
2.2	Check of differential pressure	Filtertausch	X					
2.3	Inspection of the hygienic state							X
3 Fan section								
3.1	Check on fouling, damage and corrosion	Cleaning and repair			X			
3.2	Cleaning the air conducting fan parts, as well as the condensate drain					X		
4 Heat exchanger								
4.1	Check on fouling, damage and corrosion	Cleaning and repair		X				
4.2	Check of fouling, corrosion and function of the condensate tray			X				
4.3	Check of fouling and function of the siphon			X				
4.4	Inspection of the hygienic state							X

7.3 Refrigerant circuit

Refrigerant charge - Quantity and Purity

Quantity

An insufficient charge causes the formation of bubbles in the sight glass or in extreme cases the triggering of the LP-switch. An operation with an insufficient refrigerant quantity over a longer period leads to a reduction of cooling capacity and to high superheating temperatures, which have a disadvantageous effect on the compressor lifetime.

If a leak is detected:

- pump down the refrigerant of a refrigerant circuit resp. a closed off section in a suitable pressure vessel (recycling bottle) down to a pressure of 0 bar_{rel}.
- dispose of the refrigerant according to the national regulations.
- repair the leak.
- check the tightness of the refrigerant circuit resp. the closed off section with nitrogen.
- the circuit has to be run dry by several fillings and extractings with high-quality nitrogen.
- change the filter drier cartridge.
evacuate the refrigerant circuit resp. the closed off section by a vacuum pump.
- fill the refrigerant circuit with the refrigerant named on the type plate.

An overfilling of the circuit makes the condensation pressure rise and by that, the power consumption of the compressor. In the extreme the HP-switch triggers.

After repairing a leak, check the refrigeration circuit on tightness within one month.

The following information must be recorded by the operator in writing:

- quantity and type of the used refrigerant
- refilled refrigerant quantity
- recycled refrigerant quantity
- companies or persons which have carried out maintenance
- dates and results of inspections

Purity

Bubbles in the sight glass indicate that the charge is insufficient or that the filter drier is clogged.

A pollution of the filter drier, whose essential task is to clear the refrigerant from impurities and humidity, can be detected by a temperature difference upstream and downstream the filter drier.

- Compare the colour indicator in the centre of the sight glass with the outer ring scale.

Green → ok.

Yellow → humidity critical.



Sight glass

With too much humidity in the circuit, the expansion valve can freeze. In addition to this, the ester oil in the compressor, which gets in touch with the refrigerant, takes up humidity and loses its ability to lubricate.

- Take an oil sample, determine the humidity content and exchange the oil in case of excessive humidity content.
- In this case evacuate the refrigerant completely and recharge it according to the above described evacuation instruction.

Compressor

In the compressor there is an ester oil charge, which does not have to be renewed under normal operation conditions and holds out for the unit's lifetime. However, it is possible that the ester oil, as it reacts hygroscopically, has taken up humidity of the air after repeated recharging of the refrigerant circuit due to repair works. The interaction between ester oil and water results in the formation of acid. Owing to a hyperacidity, corrosive processes take place inside the compressor.

NOTICE

For units with a speed controlled compressor it is not allowed to recharge oil in case of refilling a refrigeration circuit after a leakage. In such cases exchange the compressor.

This is a requirement of the compressor manufacturer. The EC compressor has no oil sight glass. Operating with incorrect quantity of oil will in case of overfilling and lack of oil cause a function failure.

Expansion valve

The refrigerant circuit is equipped with a electronic expansion valve, which controls the superheating in the evaporator. The superheating is adjusted to 7 K at the factory and may not be modified. The expansion valve can freeze, if the humidity in the system is excessive.

DANGER

Do not thaw by soldering flame, danger of explosion !

Thaw with moist warm cloth. Check the sight glass.

7.4 Air circuit

Heat exchanger

The heat exchanger consists of copper tubes with aluminium fins. If leaks occur, they should be searched for at the heat exchanger. Beyond that, the heat exchanger is exposed to the air pollution, the particles of which settle at the fins and reduce the heat transmission the same as raise the air resistance.

NOTICE

Do not distort the fins while cleaning, this also increases the air resistance.

- clean the heat exchanger by pressurized air by blowing it opposite to the normal air flow direction along the fins.

WARNING

Risk of injury by burns and rotation

The electronics housing can get hot.

The fan has an operation delay after the unit is stopped !

Fan

The bearings of the fans are lifetime lubricated and do not need maintenance. Check the operation current. An increased operation current indicates a winding short circuit in the fan motor.

Air filter

A filter monitor controls the state of the filter. As soon as the pressure loss exceeds an adjustable value, a filter alarm via the controller is released. The controller can be configured such as to compensate the pressure loss by a higher fan speed, however you should not wait too long for exchanging the filter.

The filters can be accessed by the front doors, depending on the cabinet size the number of filter elements varies. The clogged filter elements can not be cleaned with pressurized air, as the filter structure would be destroyed otherwise.

When you re-install the filter elements after the exchange, take care that the side with the coloured mark (dirt side) is turned away from the heat exchanger.

7.5 Unit housing

DANGER

Mortal danger by electric hazard

When the master switch is switched on and the controller is stopped, the power contactors are live, even if the components are not operating.

At the fan contactor, dangerous voltages occur. Do not open the unit within the first 5 minutes after disconnection of all phases.

Electrical box

- check the connection terminals for tight fixation when the unit is installed and once again after an operation time of 30 days.

Unit interior

Clean pipes simplify the search for leaks.

- clean the unit's inside with a vacuum cleaner.

Vibrations of pipes and circuit components can result in leaks.

- check the pipes for a tight seat.
- The usual maintenance consists of a visual inspection of the A/C unit, the regular exchange of air filters and the cleaning of the heat exchanger.
- For health reasons, the wearing of protective equipment such as respiratory protection, rubber gloves, etc. is recommended during the maintenance.

Cleaning the unit interior

- After opening the front door or rear panel of the air conditioner remove dirt with a suitable vacuum cleaner. Wipe remaining dirt with a cloth, if necessary take a scraping sample of the contamination.
- Check the condensate tray and the siphon on cleanliness and functionality.

Disinfection in case of contamination

- In case of contamination clean all parts with a disinfectant. Disinfectants must have an effective range AB according to the Robert Koch Institute (for example, Incidin Perfect from Ecolab).
- Remove contaminated insulations from tubes and all sealing gaskets and replace these by new ones.
- When working with disinfectants respect measures relating to explosion protection.

Important note to the electric cabinet

- The cabinet and all associated components are designed for the application of „circulation cooling“ and are arranged in the rear area. Therefore you can assume in case of contamination that this has been caused by the return air.
- The electric cabinet and all its components must be removed and disinfected in a hermetically sealed room using fumigation, by, for example, a fumigation generator with the disinfectant DIOSOL from DIOP.
- The decontamination may only be carried out by qualified personnel and the use of appropriate means of disinfection and devices.
- The manufacturer cannot accept any responsibility for damage to property and injury to persons caused by failure to comply with the information in this document.

8. Malfunction

Alarm message	Cause for alarm	Cause	Elimination
Compressor # error	High pressure switch has triggered	1. Condenser coil soiled.	Clean condenser.
	or	2. Electric connection of high pressure switch loose. Cable defective. 3. Overfilling of refrigerant circuit 4. Condenser fan defective. 5. Trigger point adjusted too low. (with option: adjustable HP-switch) 6. Outside temperature too high	Check connection and cable. Discharge and dispose refrigerant. Check function. Check setting of high pressure switch. Install bigger condenser. Press red release button at HP switch after elimination of error.
	Compressor power interruptor has triggered.	1. Compressor motor defective. 2. Feeding voltage too low.	Check compressor motor on voltage continuity and current consumption. Check alimentation under load.
Airflow failure	Differential pressure for airflow switch has triggered.	1. Fan motor defective. Fan speed too low.	Check fan motor on voltage continuity and current consumption. Check if fan is mechanically blocked.
		2. Air filter extremely clogged.	Check air filter.
		3. Hoses to the airflow monitor dirty or kinked.	Clean hoses and check whether they are kinked.
Sensor # error	The tolerance to the average value adjustable in the controller has been exceeded.	1. Big difference of measured values in selected zone.	Check room on Hotspots or chilled air zones, moist zones.
		2. sensor defective.	Check measured value with an external measuring instrument.
Sensor # defective	The measured voltage/current is outside the range defined in the controller.	1. electrical connection defective.	Check connections.
		2. sensor cable defective.	Check cable on continuity.
		3. sensor defective.	Check measured value with external thermometer, hygrosat, pressure gauge.

Depending on the option configured in the controller further alarm messages exist.

stands for a number in case of several components of the same kind.

For A/C units with EC compressor exist further alarm messages, which are explained in the C7000 Service manual.

9. Dismantling and disposal

The A/C unit may only be dismantled by qualified specialists.

- switch off the A/C unit at the controller and at the master switch.
- switch off power conducting cables to the unit and secure them against being switched on again.
- disconnect the A/C unit from the de-energized network.
- dispose of the refrigerant in the unit in accordance with the disposal and safety regulations applicable on site.

CAUTION

The refrigerant may not be discharged into the atmosphere, but must be returned to the manufacturer, if it is not reused.

The ester oil in the compressor must also be disposed of. As it contains dissolved refrigerant, it can not be disposed of like usual oils, but must be returned to the oil manufacturer.

- disconnect the depressurized refrigerant pipes from the external system.
- move the unit, as described in the chapter „transport“, with a lifting device of sufficient load-carrying capacity.
- dispose of the A/C unit in accordance with the disposal and safety regulations applicable on site.

We recommend a recycling company for this. The unit basically contains the raw materials aluminium (heat exchanger), copper (pipelines, wiring), and iron (panelling).

10. Contents of the CE Declaration of Conformity

The undersigned

**STULZ GmbH
Klimatechnik
Holsteiner Chaussee 283
22457 Hamburg**



hereby confirms that the units listed below, in the version marketed by us, fulfil the requirements of the harmonised EC directives and EC safety standards listed below.

In the case of a modification of the equipment not co-ordinated with us this declaration loses its validity.

Air conditioning unit

**Cyber Air ... AL
ASU 211 AL**

EC-Directives

EC machinery directive 2006/42/EC
EC directive for low voltage 2014/35/EU
EC EMC directive 2014/30/EU
RoHS directive 2011/65/EU
EC pressure equipment directive 2014/68/EU

National regulation

BGR 500 chapter 2.35
BGV A3

Harmonised EN

EN 378 -1, -2, -3, -4
EN ISO 12100
EN ISO 13857
EN 60204 -1
EN 61000-6-2
EN 61000-6-4

11. Options

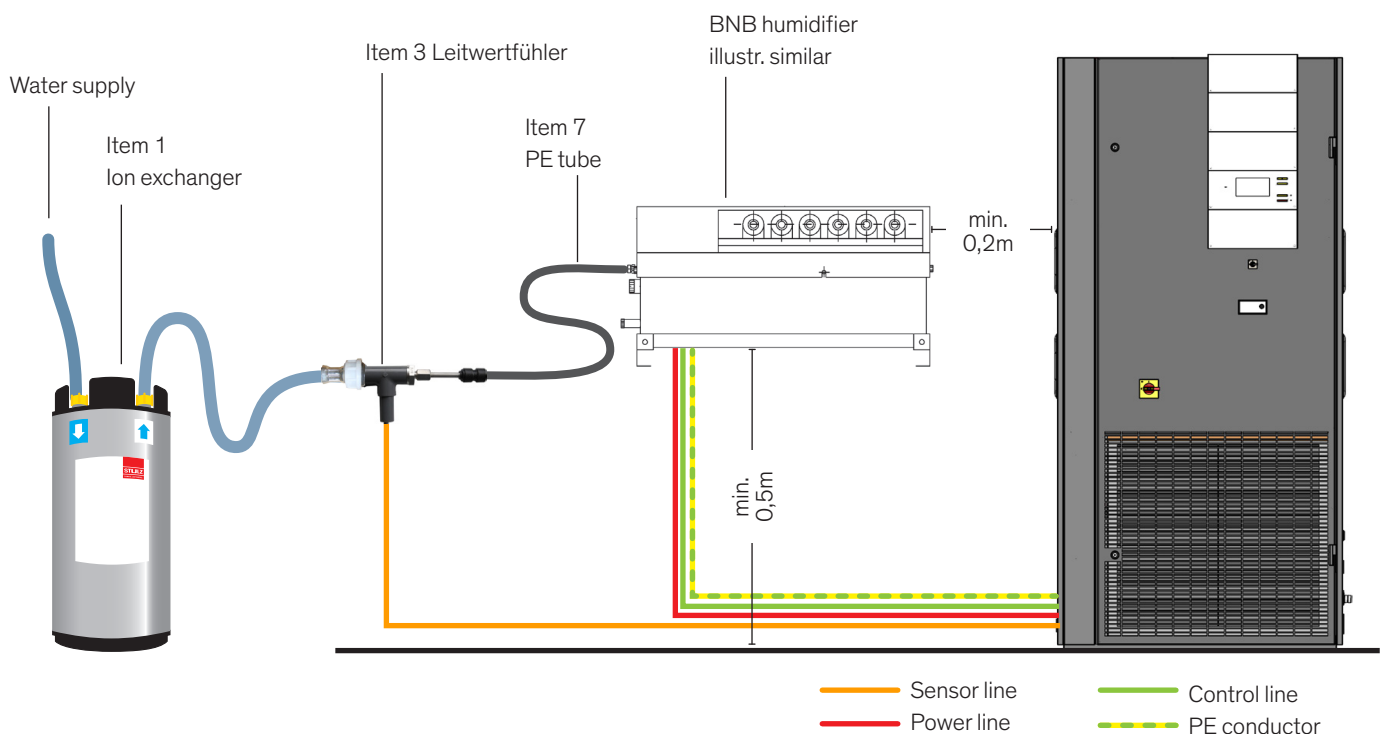
11.1 Option external humidifier

The following parts are delivered with the external humidifier:

Item	Designation	Part nr.
1	Ion exchanger SD2800	M88754
2	2× hose 3/4"-connection DN10 1.5m	M88755
3	Conductivity sensor	L80709
4	Stainless steel pipe 0.1m 6×1mm	L11200
5	Straight connector 6-6mm	M54412
6	Connector for PE tube with internal thread 1/4"	M35369
7	PE tube 5m 6×4mm	M03777
8	BNB 5000 A or BNB 8000 A	

Water connection of the external humidifier

The following installation diagram supports the instructions for the assembly.



- Install the BNB according to the Technical manual for STULZ UltraSonic humidifier BNB, (subsequently named briefly BNB manual) pages 36 - 38.

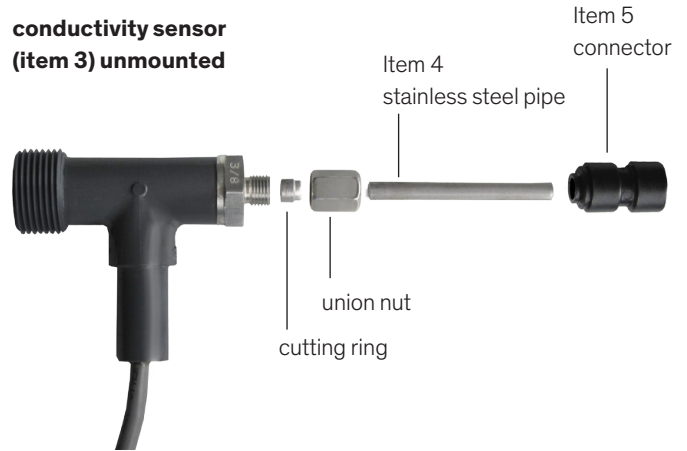
The BNB manual is included with the A/C unit upon delivery and is available as pdf document in the e-Stulz area, section humidifier.

The BNB must have a minimum distance of 0.5m to the floor and 0.2m to the CyberLab unit. The length of the electrical supply cables allow an installation in max. 0.6m height for the BNB 5000A (humidifier bottom line). This height decreases with larger distance to the CyberLab unit.

The installation diagram on pages 23 and 35, as well as the chapter 6 of the BNB manual are not applicable.

- The conductivity sensor is equipped with a 2.9 long cable. Conduct the cable through the opening marked on the next page and connect it according to the wiring diagram in the E-box.
- Look for a place where you can fix the conductivity sensor, without that the cable is under mechanical tension.
- Loosen the union nut on the conductivity sensor, remove the cutting ring and put it on the stainless steel pipe (item 4).
- Slide the nut over the stainless steel pipe and the cutting ring and screw the nut onto the thread of the conductivity sensor.
- Plug the connector (item 5) on the free end of the stainless steel pipe.
- Screw the connector with internal thread (item 6) on the connection for demineralized drinking water at the BNB according to page 43, BNB manual.
- Plug the PE tube (item 7) into the connector (item 5) and conduct it to the water supply of the BNB.
- Shorten the PE tube if necessary and put the free end into the connector (item 6) at the water connection of the BNB.
- Attach the conductivity sensor.
- Position the ion exchanger (item 1) in the vicinity of the conductivity sensor and connect the water outlet of the ion exchanger and the conductivity sensor by the 1.5 m long hose (item 2).
- Connect the water inlet of the ion exchanger and the water supply (water tap) by the second hose.
- Connect the overflow pipe and resp. the waste water pipe at the BNB humidifier according to the instructions on pages 40-41 and 44-46 of the BNB manual.

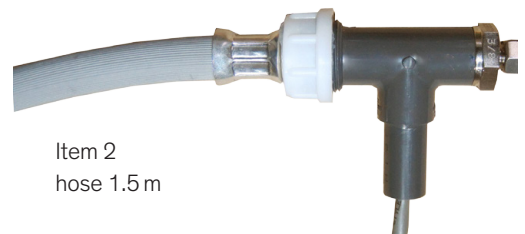
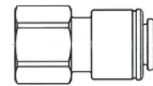
conductivity sensor (item 3) unmounted



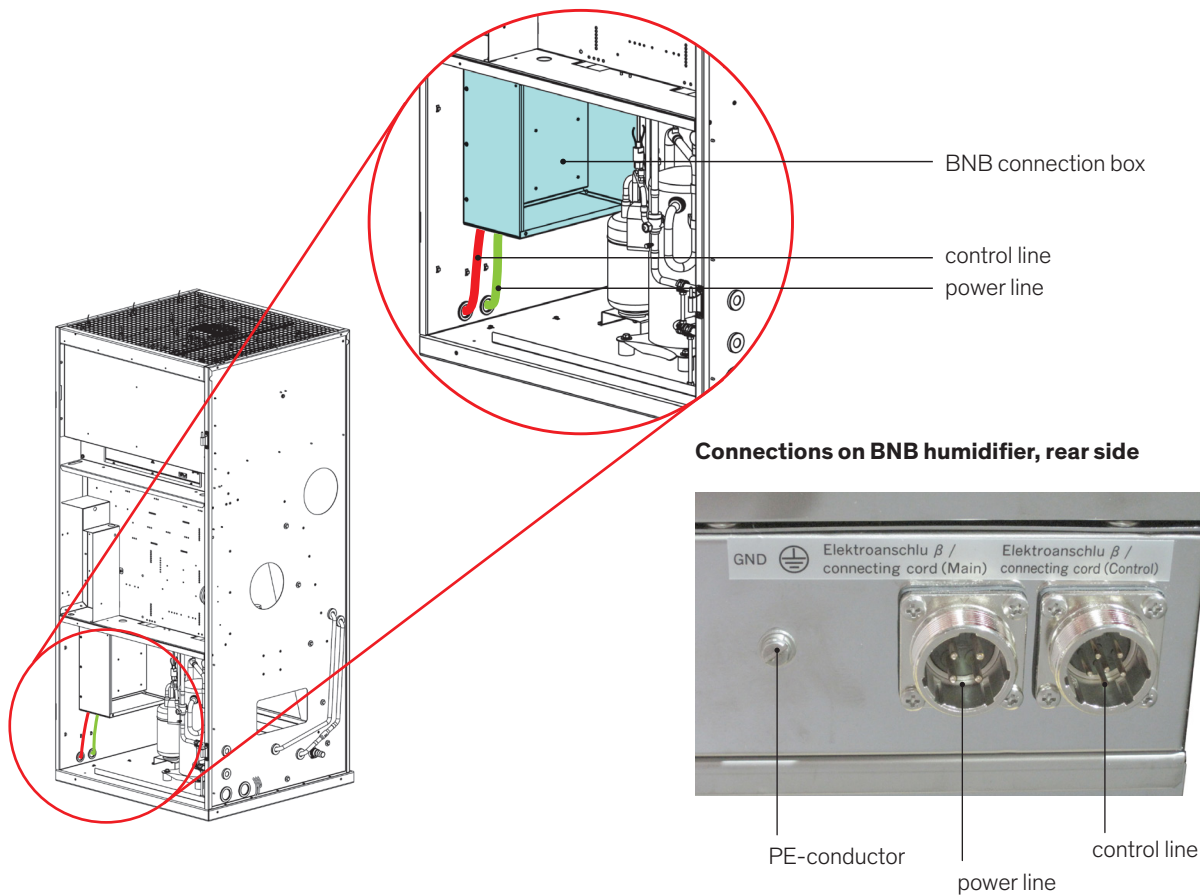
conductivity sensor mounted



Item 6 connector with internal thread



Item 2 hose 1.5m



Connections on BNB humidifier, rear side

Electrical connection of the external humidifier

The control line and the power line of the external BNB type humidifier are 2 m long and lie reeled up in the CyberLab unit.

- Route the control line and the power line through the openings shown below into the CyberLab unit and connect the lines in the BNB connection box according to the wiring diagram. The other end of the cables is fitted with a plug, which you must insert on the connectors at the rear side of the BNB.

A PE line lies reeled up in the lower section of the CyberLab unit.

- Route the PE line through the openings shown below out of the CyberLab unit and connect the line at the external humidifier according to the wiring diagram.

Respect the warning notices in the BNB manual on page 49 and 50. All warning notices, which concern the control cabinet as well as the pages 51, 52 and 56 are not applicable. If you want to extend the cables, observe the information in chapter 7.5.2 of the BNB manual.

Commissioning

To do this, read the pages 57-60 of the BNB manual.

Operation

To do this, read the pages 61-62 of the BNB manual. The pages 63-70 are not applicable. The humidifier is controlled by the humidifier menu of the C7000 controller.



STULZ Top Service – More than just quick emergency assistance



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For general inquiries about our products and services, our hotline is available at +49 40 5585-5000. Our service hours are weekdays from 7 am – 4 pm.

Or directly contact our representative in your area:

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