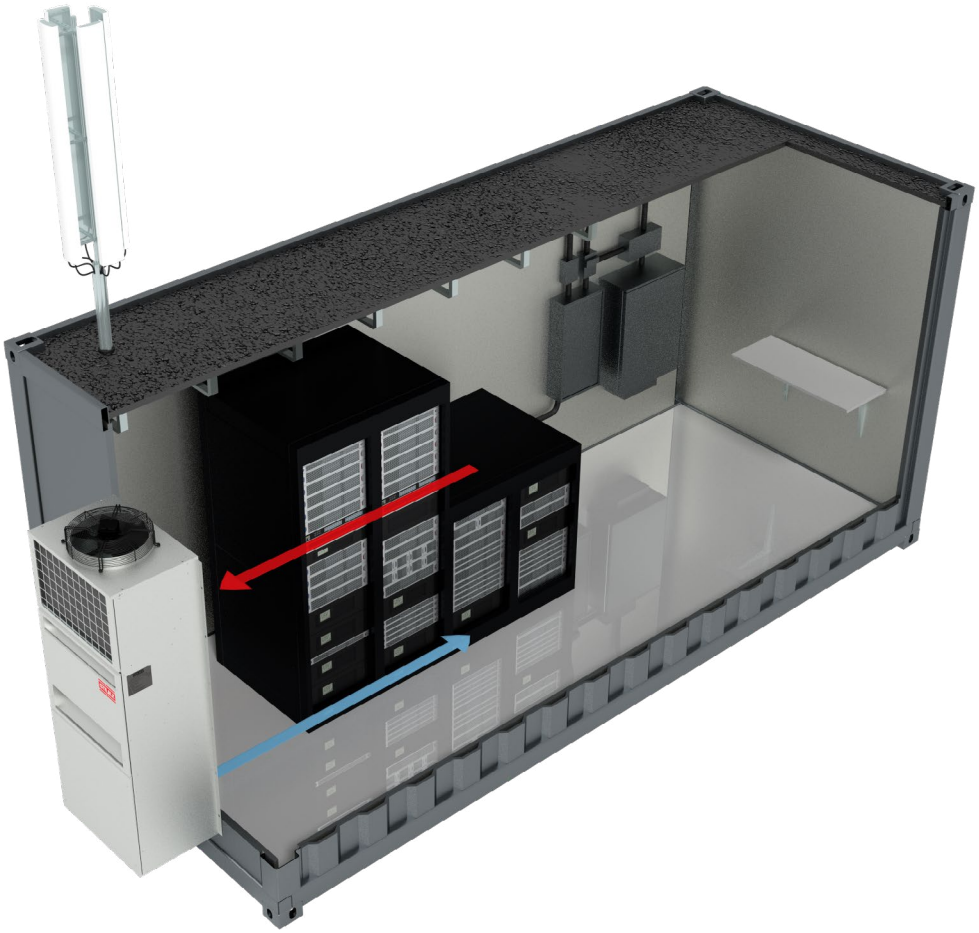
STULZ

CLIMATE. CUSTOMIZED.

Wall-Air Displacement Evolution

Operating instructions
Air Conditioners
230/1/50 - 400/3+N/50

Index 36B
Issue 08.2018



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 Indiaand) 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.

STULZ SpA
Via Evangelista Torricelli n.3
37067 Valeggio sul Mincio VR

Wall-Air Displacement Evolution

Dear customer,

thank you for having chosen Wall-Air Displacement Evolution from STULZ.

It's the result of decades of research and design studies, with a fine search of materials and technologies to obtain an high quality unit.

The CE mark guarantees that the STULZ products satisfy the requirements of the European Machinery Directive for safety.

The level of quality is constantly checked at every stage, from design to production, making the STULZ products synonymous of SAFETY, QUALITY and RELIABILITY.

For general inquiries concerning products by STULZ SpA, please contact our **Aftersales** at:

telephone	0039 045 6331615
fax	0039 045 6331635
e-mail	aftersales@stulz.it

For further information concerning our products and services visit our website :

www.stulz.it

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IMPORTANT

These operating instructions must be read with care and fully complied with prior to installing and using the air conditioning system.

Preserve this manual for the entire working life of the model.

This manual reflects the state of the art at the time the product is marketed. It must not be considered unsuitable merely because it has not been updated following developments in design and manufacturing methods.

STULZ reserves the right to update the product and the relevant manual without having to update products and manuals sold previously except under exceptional circumstances. Contact your local STULZ partner when requesting or receiving any updates of instruction manuals or corrections which are considered to be integral parts of the manual.

Comply with the measures specified in the chapter on Safety directions. For three-phase scroll compressors with on-off control: take care of correct phase sequence after the connection of the main power supply (refer to paragraph 6.3)

1. Safety directions

This manual contains the basic instructions which must be respected during installation, use and maintenance of the unit. Therefore, installer and specialized personnel / user must read and respect these indications before mounting and commissioning the unit.

DANGER

Read carefully the whole information on this manual, with particular attention to the norms marked with the symbol on the left. Failure of conformity to these norms might cause damages to things, people, ambient and the unit itself.

The manufacturer is not responsible for any misuse of air conditioner, as well as for non-authorized modifications and for the inobservance of instructions on this manual.

INFORMATION

This manual must be kept by the customer and made available to the installation, commissioning, use and maintenance personnel.

1.1. Symbols used in this manual

DANGER	RISK OF INJURY FOR OPERATOR AND POSSIBILITY OF DAMAGING THE UNIT
ATTENTION	INFORMATION OR WARNING OF CAUTION IN CARRYING OUT A PROCEDURE
INFORMATION	IMPORTANT INFORMATION

1.2. Labels on the unit

DANGER: MOVING COMPONENTS

DANGER: HIGH VOLTAGE

DANGER: HOT COMPONENTS

1.3. General information

This air conditioning unit has been designed and built for a professional use according to applicable regulations. Please check the complete list of applicable regulations to the attached CE conformity declaration. It has been manufactured with high quality components, tested to certify its reliability and safety (see attached test report), and provided with warranty. These operating instructions include the basic directions that must be complied with during system installation, operation and maintenance. Consequently both the installer and assigned specialized personnel/operators must read and comply with these directions before proceeding with installation and start-up. The instruction manual must always be available at the site where the system is used.

DANGER

- Works have to be carried out by competent staff only.
- Observance of regulations for accident prevention.
- Stay out of danger when lifting and setting off the unit.
- Secure the unit to avoid the risk of overturning.
- Do not climb on or enter the air conditioner.
- Do not remove protection panels. Safety devices may not be bypassed.
- Respect the corresponding EN and IEC standards for the electric connection of the unit and observe the conditions of power supply companies.
- Switch off the voltage from the unit when working on it.

ATTENTION

- Observe the national regulations of the country where the unit will be installed.
- The refrigerant circuit contains refrigerant and refrigerating plant oil: observe professional disposal for maintenance and when setting the unit out of service; read and follow instructions in chapter "10. Uninstalling and disposal of the unit".
- The refrigerant circuit contains refrigerant and refrigerating plant oil: observe professional disposal for maintenance and when setting the unit out of service.
- For transport, installation, either ordinary or extraordinary maintenance, operators and maintenance people must wear individual protection devices (i.e. gloves, glasses, helmet, shoes), according to the indications of safety manager and applicable regulations.
- The unit may only be used to cool according to the Stulz specification.
- Before any maintenance operation, read and follow instructions in the corresponding chapter.

INFORMATION

- The manufacturer is not liable for damages caused by either a misuse or unauthorized modifications of the air conditioner.
- Any special opening tools have to be placed in a visible location nearby the unit.

1.4. Handling refrigerants

According to EN 378, refrigerants are divided in groups, concerning health and safety. Refrigerant R407C, used in all Wall-Air Displacement units belongs to group L1 (non-flammable, non-toxic).

- Adherence to the regulations by law and guide-lines.
- Execution only by competent staff.
- Responsibility for correct disposal of refrigerant and system parts is incumbent on the operator.
- Refrigerants have a narcotic effect when inhaled in high concentrations.
- The room is to be evacuated immediately if high concentrations of refrigerant suddenly occur. The room may only be entered again after adequate ventilation.
- If unavoidable work is required in 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.
- Safety glasses and safety gloves are to be worn.
- Do not eat, drink or smoke at work.
- Liquid refrigerant must not get onto the skin.
- Only use in well ventilated areas.
- Do not inhale refrigerant vapours.
- Warn against intentional misuse.
- Remove refrigerant from the system before performing any welding or brazing works.

- Weld and braze air conditioning systems without refrigerants only in suitably ventilated rooms.
- If the system emits a pungent smell this means that the refrigerant has decomposed due to overheating. Immediately leave the room and return only after it has been suitably ventilated or when wearing a gas mask for acid gases.
- It is absolutely essential to comply with the first aid measures if accidents occur.

1.5. Safety and environmental requirements

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 EC/97/23 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.
It is absolutely essential to comply with the procedure for shutting down the system described in the operating instructions. Before maintenance work, the unit must be switched off at the main switch and a warning sign displayed to prevent unintentional switching-on.
Efficiency of safety devices must be kept during the whole life cycle of the unit. In order to perform this task, please follow the prescription given in Chapter 8.

First aid measures

- If health problems occur during or after handling fluorinated hydrocarbons, a doctor is to be consulted immediately. The doctor is to be informed that the work involved the use of fluorinated hydrocarbons.
- In the case of acute effects, the casualty is to be brought into the fresh air as quickly as possible.
- The casualty must never be left unsupervised.
- If the casualty is not breathing, initiate mouth-to-mouth resuscitation immediately.
- If the casualty is unconscious or very dazed he or she must not be given any liquid.
- Splashes of fluorinated hydrocarbons in the eyes can be removed by an assistant by blowing air or using a fan. Then rinse with water.
- 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 authorized by STULZ are an aid to safety.

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 authorized by STULZ are an aid to safety.

Unacceptable operating methods
The operating safety of the system is only guaranteed when it is used as intended (see this manual, paragraph "3.1. Application limits"). The limit values stipulated in the technical data must not be exceeded under any circumstances.

2. Unit identification

Technical name-plate
This unit can be identified by the name-plate that includes all information regarding its correct use. The name-plate is located in two copies on the external casing of the unit (generally on the right side) and on the cover of the electric box. An example follows (data are purely by way of example):


STULZ

Manufactured by STULZ S.p.A.
Via E. Torricelli 3, 37067
Valeggio sul Mincio (VR)

CE
EAC

CONDIZIONATORE D'ARIA - AIR CONDITIONER
KUHLAGGREGAT - CONDITIONNEUR

MODELLO - MODEL - TYP - MODELE	WDE60HR242C400 7035
SERIE - SERIES - SERIE - SERIE	N° 0000616753
ORDINE - ORDER - BESTELLUNG - COMMANDE	OP: 2160010234
DATA - DATE - DATUM - DATE	20/10/2016
Tensione nominale - Rated voltage - Nennspannung - Tension nominale	400V 3N 50Hz ~
Avviamento/marcia - Starting/run current - Anlaufstrom/Nennstrom - Demarrage/marche	24/5 A
Resa nom. - Cooling cap. - Kaelteleistung - Puissance nominale	6,1 kW (L30L35RH30%)
Potenza Assorbita - Input power - Leistungsaufnahme - Puissance absorbee	1,97 kW (L30L35RH30%)
Potenza assorbita in riscaldamento - Heating power consuption - Verbrauch in heizung - puissance absorbée en chauffage	4,5 Kw
Carica gas - Filling capacity - Fuellmenge - Charge de gaz	1,9 kg
Refrigerante tipo - Refrigerant type - Kaeltemittel - Refrigerant typ	R407C
Grado di Protezione IP - Degree of protection IP - Schutzart IP - Degré de protection IP	IP X4
Peso - Weight - Gewicht - Poids	200 kg
TSS (Max temp. Di stoccaggio - Max Storage temp. - Max Lagertemperatur - Temp. Max d'emmagasinage)	50 °C
TS MAX (Refrigerante - Refrigerant - Kaltemittel - Refrigerant)	85 °C
TS MIN (Refrigerante - Refrigerant - Kaltemittel - Refrigerant)	-10 °C
PS HP (Max pressione ammissibile HP - Max allowable pressure HP - Max zulaessiger Druck HP - Pression max admise HP)	29,5 bar
PS LP (Max pressione ammissibile LP - Max allowable pressure LP - Max zulaessiger Druck LP - Pression max admise LP)	20 bar
CAT PED	I
Modulo di valutazione - Evaluation Module - Bewertungsverfahren - Procédure d'évaluation	A

Contiene gas fluorati ad effetto serra disciplinati dal protocollo di Kyoto - Device containing HFC fluids causing greenhouse effect regulated by kyoto protocol - Das Gerät erhält wie vom Kyoto-Protokoll geregelte Fluorkohlenwasserstoffe Treibhausgasen - Dispositif contenant fluides HFC à effet de serre disciplinés par le protocole de Kyoto

MADE IN ITALY

The name-plate is printed on a plastic surface to ensure long durability of the text even in the toughest ambient conditions.

INFORMATION

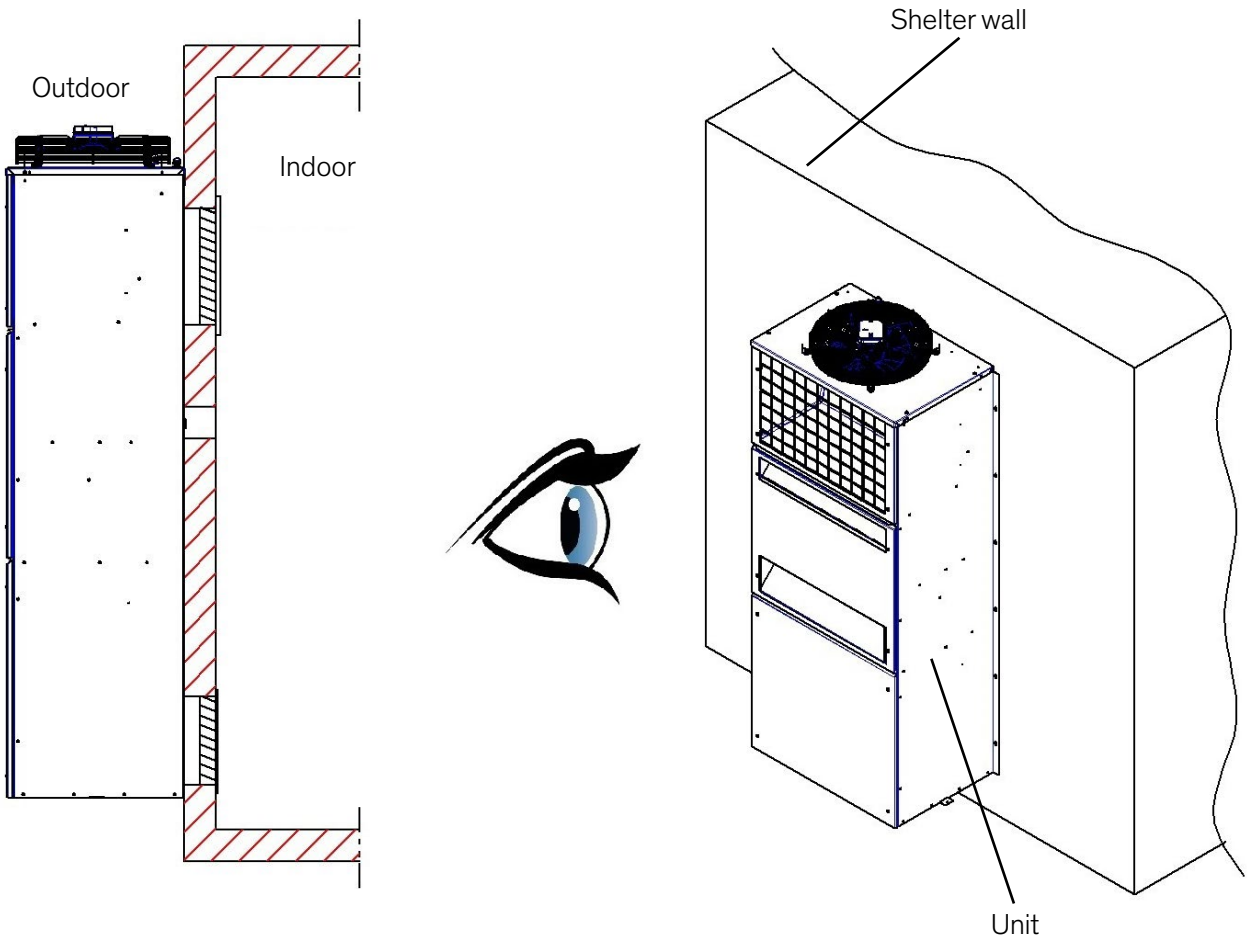
For any assistance or information concerning the unit described in this manual, knowledge of its serial number is essential.

IP protection degree

INFORMATION

IP protection degree is the protection, from the outdoor environment, of the unit when installed in its normal use.

The IP protection degree of STULZ Wall-Air Displacement unit is IPX4 (according to EN 60529, considering the prescriptions of EN 60335), therefore the unit is protected from harmful effects of splashing of water against the enclosure from any direction (see picture below).



Coding

The table summarises the available options for the Wall-Air Displacement family. Some of the options or combinations are not available on all the products in the family.

WDE	60	H	R	2	42	C	0	00	-1Z

- Product family: WDE = mono-block unit, external installation, displacement supply
- Nominal cooling capacity: According to the technical data sheet
- Operating method:
  - 0 = cooling only
  - F = cooling + free cooling
  - H = cooling + free cooling + emergency ventilation 48VDC
- Type of control system:
  - R = electronic board C2020
  - P = customer's external PLC (requires a special code)
  - U = C2020 + WIB1000
  - W = C2020 + WIB1485
- Application:
  - 2 = standard unit
  - L = winter kit
  - T = protective treatment of heat exchangers (TREATW)
  - A = winter kit + protective treatment of heat exchangers
- Main power supply:
  - 00 = 230V / 1Ph / 50Hz
  - 42 = 400V / 3Ph + N / 50Hz
- Compressor - refrigerant:
  - 2 = reciprocating compressor + R407C
  - B = scroll compressor + R134a
  - C = scroll / rotary(1) compressor + R407C
- Heating:
  - 0 = no heating
  - 2 = 1.5 kW
  - 3 = 3.0 kW
  - 4 = 4.5 kW
  - Z = special model(2)
- Combination of options
- Colour

INFORMATION

(1) rotary compressor is used on single-phase model of WDE40 with R407C.

(2) special models are identified with a Z in the third to last digit of the code. The digits following the Z lose their original meaning and act as the progressive number for special versions.

2.1. Intended and non-intended use

Intended use
STULZ Wall-Air Displacement conditioners are designed to be installed on the external wall of rooms / shelters for telecommunication equipment, suitably protected from weather, whose internal side is not accessible to the general public (see EN 60335-2-40, paragraph 3.119). Use these conditioners to eliminate the problems caused by high temperatures, dirt and humidity in the room subject to climate control. Main functions of air treatment are: filtration, cooling, free cooling with external air, dehumidification (with a specific function available only with accessory ACTRHC1) and heating (with optional heating resistances).
As well, STULZ Wall-Air Displacement conditioners cannot be used outside safety limits specified on the name-plate. Conditioners must not be transported or used in positions that differ from those for which they were designed.
STULZ is not responsible for any malfunctions caused by failure to comply with these instructions. The operator bears the entire risk.

Non-intended use
Air conditioner cannot be installed on movable, vibrating, oscillating, tilted (non-levelled) parts.

Generally, air conditioner cannot be installed in the following areas:
- With strong heat radiation
- With strong magnetic fields
- With free flames
- With fire risk
- With inflammable products
- With explosive atmosphere
- With saline atmosphere
- With aggressive atmosphere

For any doubt, please consult the manufacturer.

3. Technical data and drawings

3.1. Application limits

Operation limits		
Return air temperature	Min	+20 °C
	Max	+40 °C
Return air humidity	Min	5,5 °C dew point
	Max	60% r.h. and 15 °C dew point
Outdoor temperature	Min	-20 °C
	Max	+50 °C
Nominal power supply		400 V / 3 ph +N / 50 Hz
Voltage tolerance		± 10%
Frequency tolerance		± 2%
Storage limits		
Temperature	Min	-20 °C
	Max	+50 °C
Humidity	Max	90%

INFORMATION

Other limits not specified in this table can be found in the rest of this manual.

3.2. Technical data

NOTES ON TECHNICAL DATA:

* Inclusive of power absorbed by evaporator fans. External temperature 35°C / Internal temperature 30°C / Internal relative humidity 30%

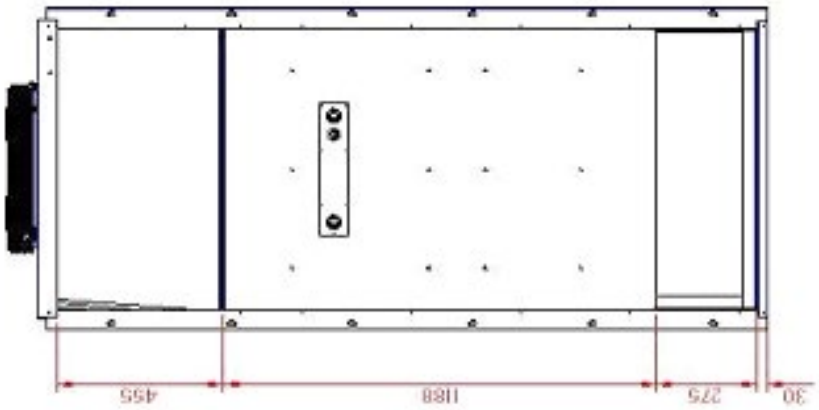
** Sound pressure level at 2 m obtained from the measured sound power according to the EN ISO 9614-2 on normal condition of use and nominal operating condition.

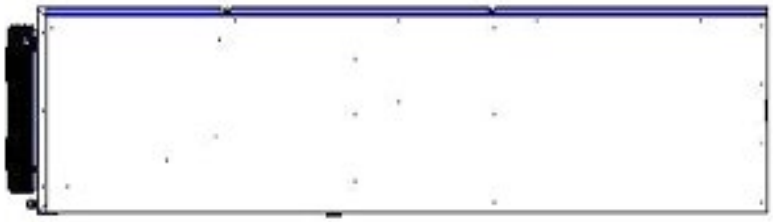
Model		WDE40		WDE60		WDE80	
Total cooling capacity*	kW	4,6	4,6	6,1		8	
Sensible cooling capacity	kW	4,6	4,6	6,1		8	
Refrigerant		R407C		R407C		R407C	
Refrigerant charge	kg	1,85	2,1	1,9		1,9	
EER index (with evap. fan in direct current)*	W/W	2,6	3,9	3,3		3,1	
EER index (with evap. fan in alternating current)*	W/W	2,5	3,7	3,3		3,1	
Outside operating limit temperatures min/max	°C	-20 / +50		-20 / +50		-20 / +50	
Inside operating limit temperatures min/max	°C	+20 / +40		+20 / +40		+20 / +40	
External sound pressure level**	db(A)	50		51		52	
Duty cicle	%	100		100		100	
Weight	kg	170		200		210	
Height (including condenser fan)	mm	2085		2085		2085	
Width	mm	879		879		879	
Depth	mm	565		565		565	
Condenser fan							
Q.ty / Type		1/axial		1/axial		1/axial	
Air flow	m^3/h	1600		2100		3000	
Evaporator fan							
Q.ty / Type		1/radial		1/radial		1/radial	
Air flow in cooling mode	m^3/h	1100		1700		2700	
Air flow in free cooling mode	m^3/h	900		1300		1800	
Electric data							
Nominal voltage	V AC	400	230	400	230	400	230
Tolerance on voltage		±10%	±10%	±10%	±10%	±10%	±10%
Phases	ph	3+N	1	3+N	1	3+N	1
Frequency	Hz	50		50		50	
Tolerance on frequency		±2%		±2%		±2%	
Auxiliary voltage	V AC	24		24		24	
Compressor							
Power consumption*	kW	1,7	1,1	1,7		2,2	
Operating current (OA)*	A	3,9	5,4	3,1	8,7	4,0	10,5
Maximum operating current (FLA)	A	5,4	6,7	4,2	11,4	5,1	14,8
Locked rotor current (LRA)	A	22	33	24	47	32	61
Condenser fan							
Nominal voltage	V AC	230		230		230	
Phases	ph	1		1		1	
Power consumption*	kW	0,05		0,10		0,13	
Operating current (OA)*	A	0,23		0,47		0,63	
Maximum operating current (FLA)	A	1,2		1,2		1,2	
Evaporator fan in direct current							
Nominal voltage	V DC	48		48		48	
Tolerance on DC voltage	V DC	36÷57		36÷57		36÷57	
Power consumption*	kW	0,04		0,07		0,21	
Operating current at 48V (OA)*	A	1,1		1,4		4,4	
Maximum operating current (FLA)	A	2,9		12,7		12,7	
Evaporator fan in alternating current							
Nominal voltage / phases	V AC/ph	230/1		230/1		230/1	
Power consumption*	kW	0,11		0,06		0,24	
Operating current (OA)*	A	0,9		0,44		1,49	
Maximum operating current (FLA)	A	1,3		3,1		3,1	

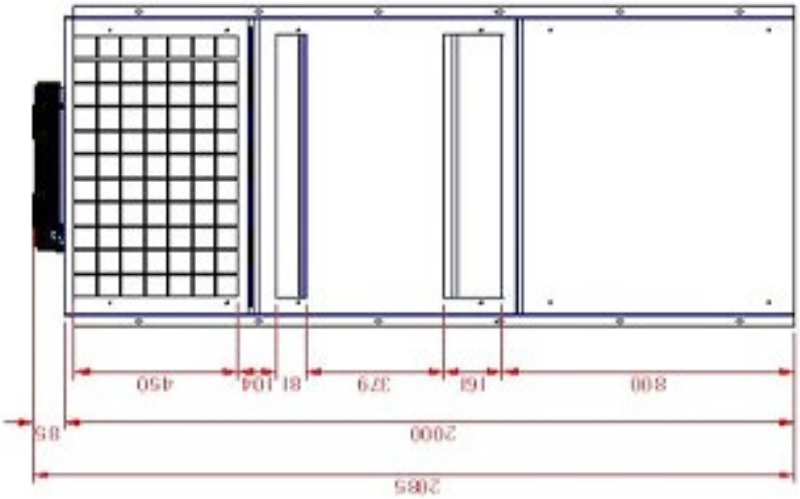
Model		WDEA0		WDEA2		WDEA4		WDEA6	
Total cooling capacity*	kW	10,0		11,8		13,6		15,5	
Sensible cooling capacity	kW	10,0		11,8		13,6		15,5	
Refrigerant		R407C		R407C		R407C		R407C	
Refrigerant charge	kg	4,3		3,95		3,9		3,85	
EER index (with evap. fan in direct current)*	W/W	3,5		3,7		3,2		3,1	
EER index (with evap. fan in alternating current)*	W/W	3,5		3,6		3,2		3,0	
Outside operating limittemperatures min/max	°C	-20 / +50		-20 / +50		-20 / +50		-20 / +50	
Inside operating limit temperatures min/max	°C	+20 / +40		+20 / +40		+20 / +40		+20 / +40	
External sound pressure level**	db(A)	53		54		58		60	
Duty cicle	%	100		100		100		100	
Weight	kg	240		240		250		250	
Height (including condenser fan)	mm	2226		2226		2226		2226	
Width	mm	992		992		992		992	
Depth	mm	730		730		730		730	
Condenser fan									
Q.ty / Type		1/axial		1/axial		1/axial		1/axial	
Air flow	m^3/h	4100		5300		6100		6500	
Evaporator fan									
Q.ty / Type		1/radial		1/radial		2/radial		2/radial	
Air flow in cooling mode	m^3/h	2400		2800		3600		3600	
Air flow in free cooling mode	m^3/h	2500		2500		3000		3000	
Electric data									
Nominal voltage	V AC	400	230	400	230	400	230	400	230
Tolerance on voltage		±10%	±10%	±10%	±10%	±10%	±10%	±10%	±10%
Phases	ph	3+N	1	3+N	1	3+N	1	3+N	1
Frequency	Hz	50		50		50		50	
Tolerance on frequency		±2%		±2%		±2%		±2%	
Auxiliary voltage	V AC	24		24		24		24	
Compressor									
Power consumption*	kW	2,4		2,5		3,3		4,1	
Operating current (OA)*	A	4,2	10,8	5,0	12,6	6,3	17,0	8,0	20,3
Maximum operating current (FLA)	A	6,3	17,3	7	23,1	10	23,5	11	30
Locked rotor current (LRA)	A	40	76	46	100	50	114	59	150
Condenser fan									
Nominal voltage	V AC	230		230		230		230	
Phases	ph	1		1		1		1	
Power consumption*	kW	0,26		0,45		0,50		0,60	
Operating current (OA)*	A	1,1		2,0		2,4		2,8	
Maximum operating current (FLA)	A	1,2		3,0		3,0		3,0	
Evaporator fan in direct current									
Nominal voltage	V DC	48		48		48		48	
Tolerance on DC voltage	V DC	36÷57		36÷57		36÷57		36÷57	
Power consumption*	kW	0,16		0,23		0,36		0,36	
Operating current at 48V (OA)*	A	3,3		4,9		2 × 3,8		2 × 3,8	
Maximum operating current (FLA)	A	12,7		12,7		2 × 7,3		2 × 7,3	
Evaporator fan in alternating current									
Nominal voltage / phases	V AC/ph	230/1		230/1		230/1		230/1	
Power consumption*	kW	0,20		0,30		0,46		0,46	
Operating current (OA)*	A	1,2		1,8		2 × 1,3		2 × 1,3	
Maximum operating current (FLA)	A	3,1		3,1		2 × 3,1		2 × 3,1	

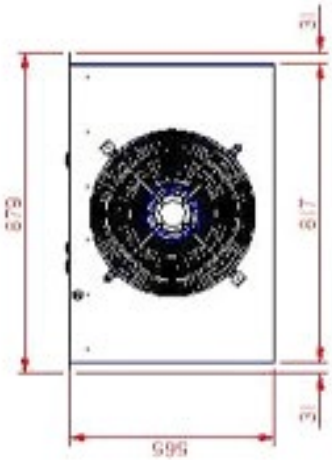
3.3. Drawings

Overall dimensions WDE 40-60-80

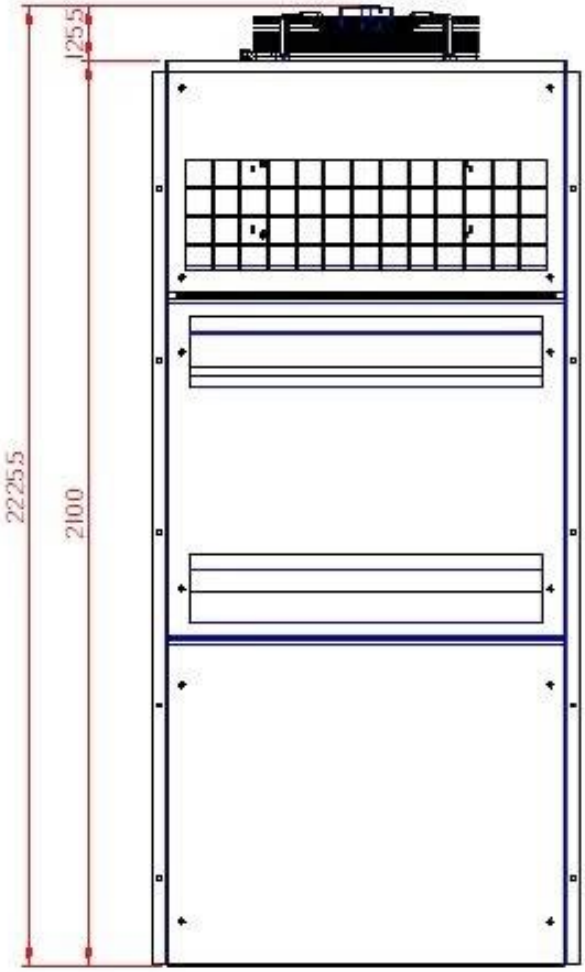


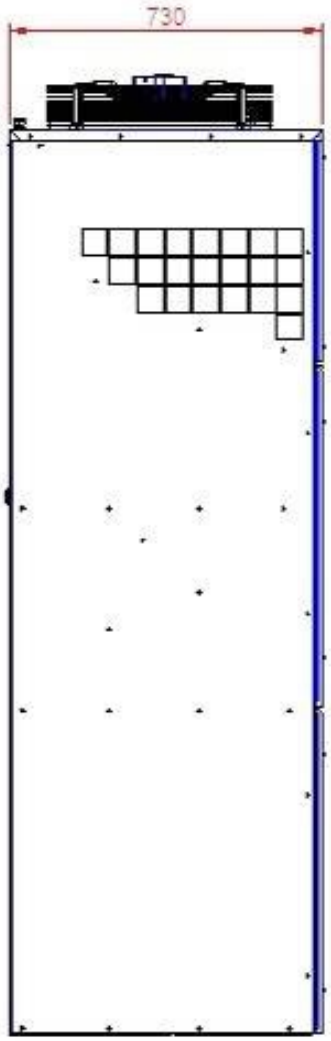


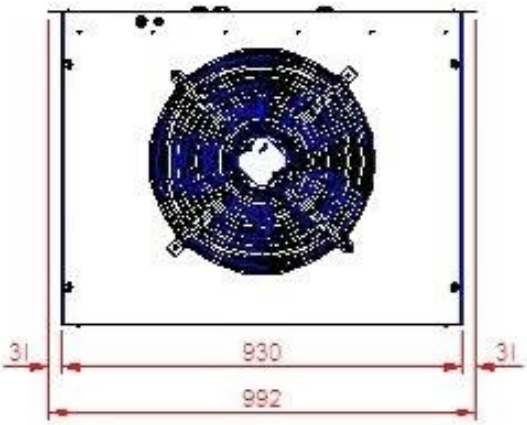




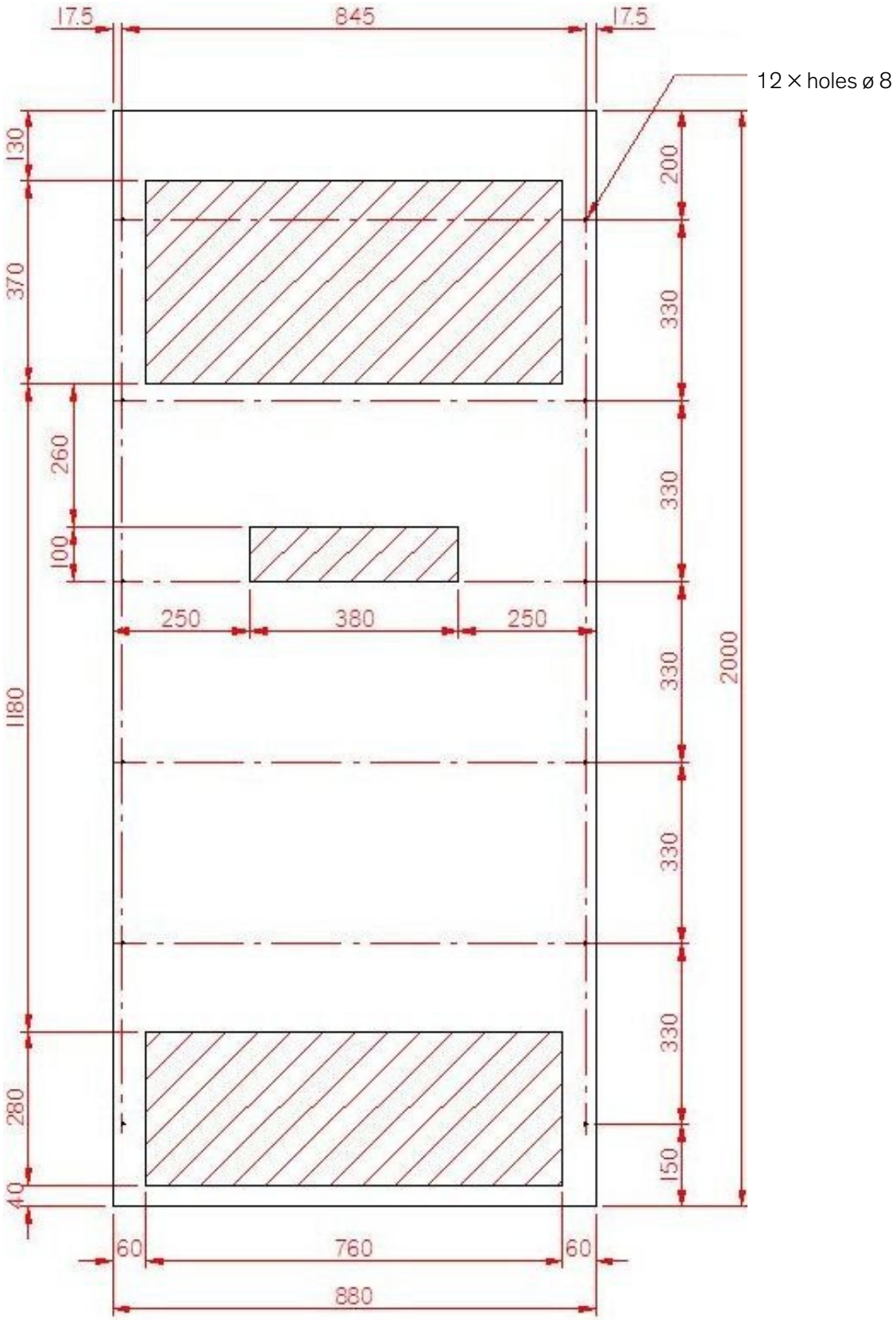
Overall dimensions WDE A0-A2-A4-A6



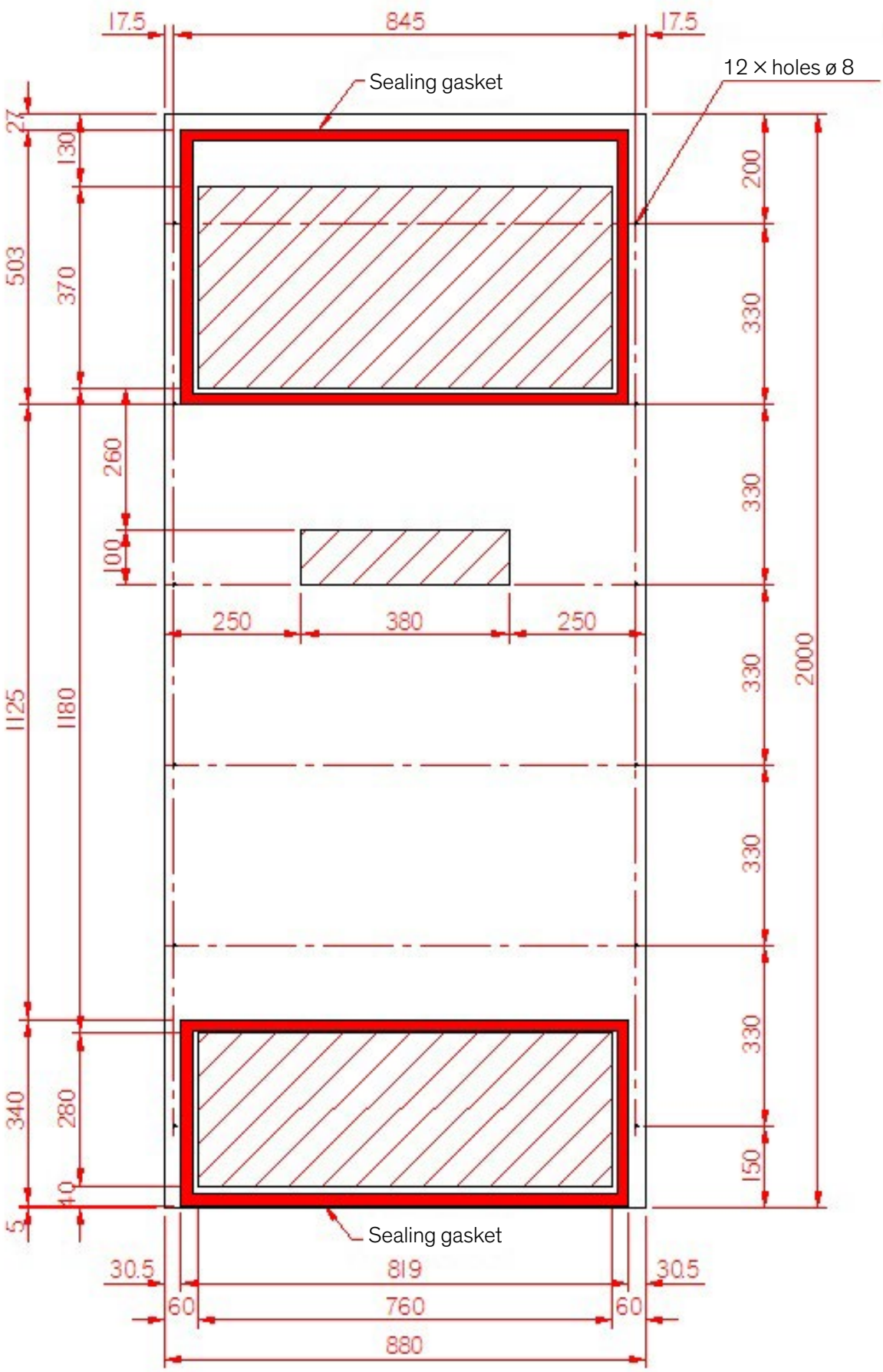




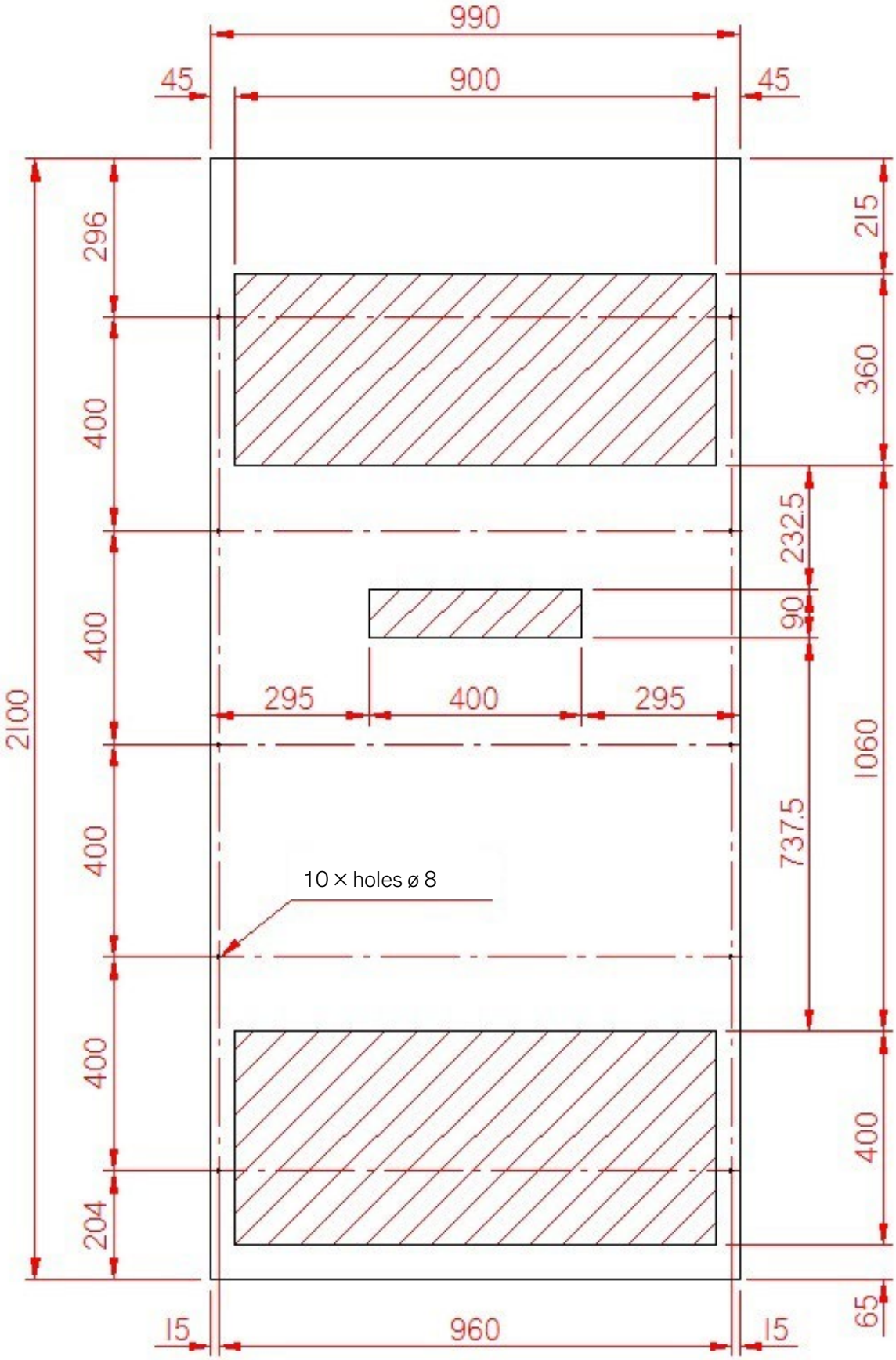
Cut-out WDE 40-60-80 (according to grilles dimension)



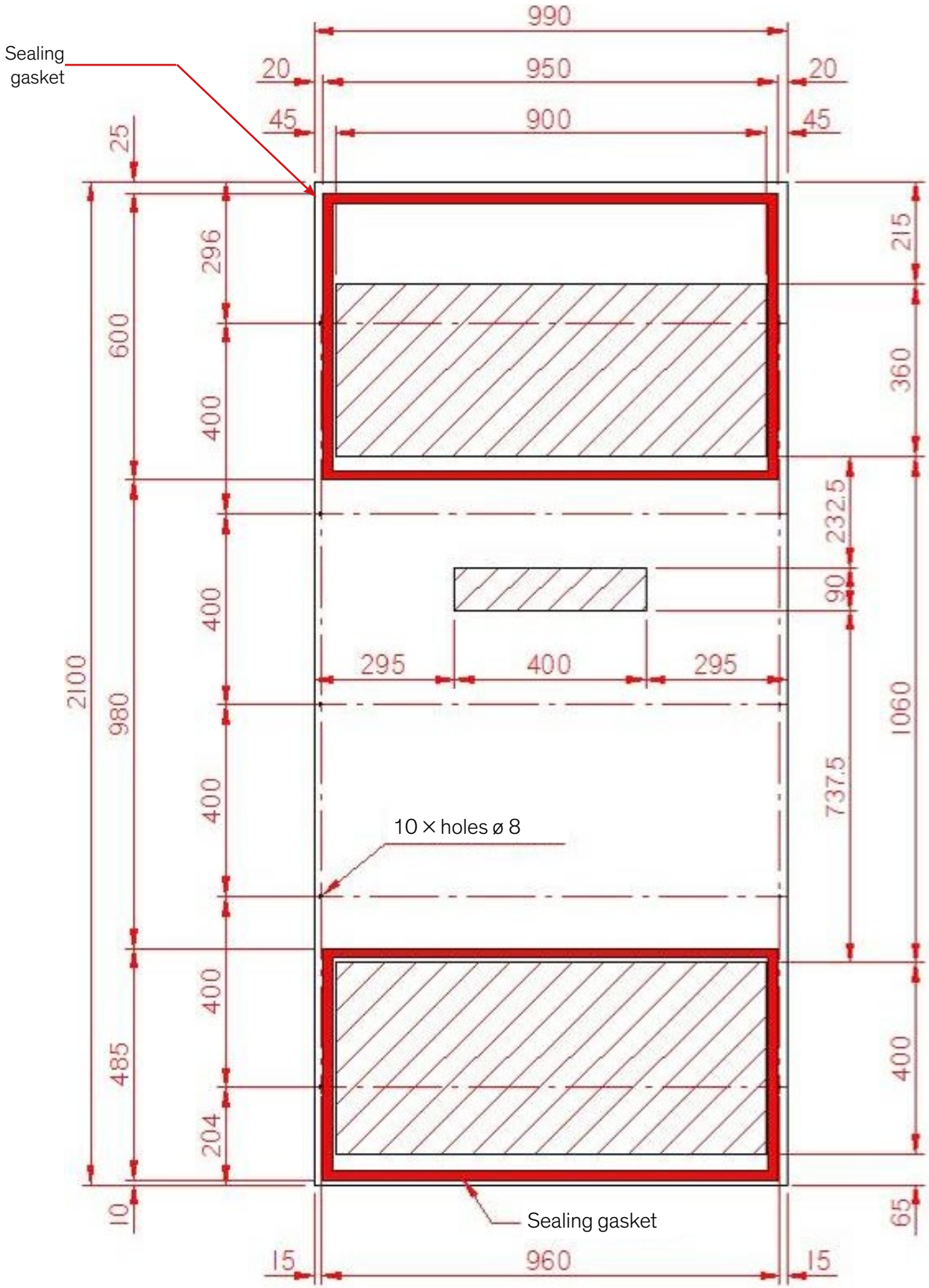
Position of sealing gasket WDE 40-60-80



Cut-out WDE A0-A2-A4-A6 (according to grilles dimension)

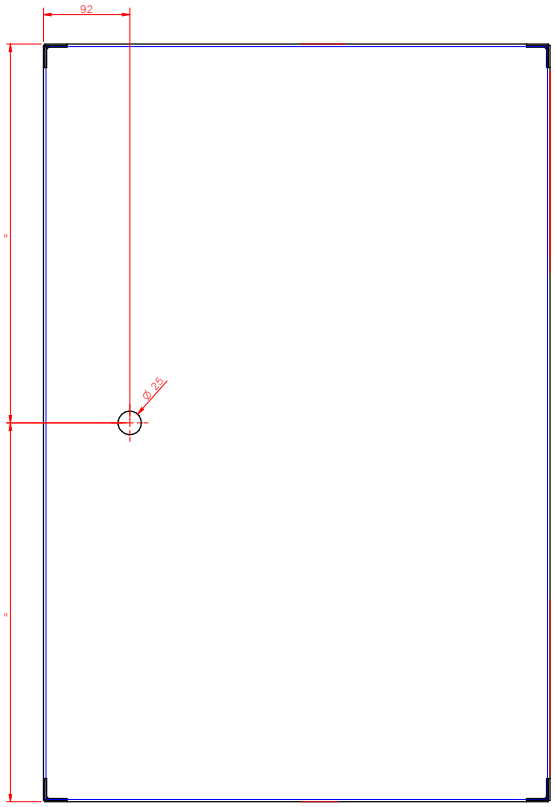


Position of sealing gasket WDE A0-A2-A4-A6

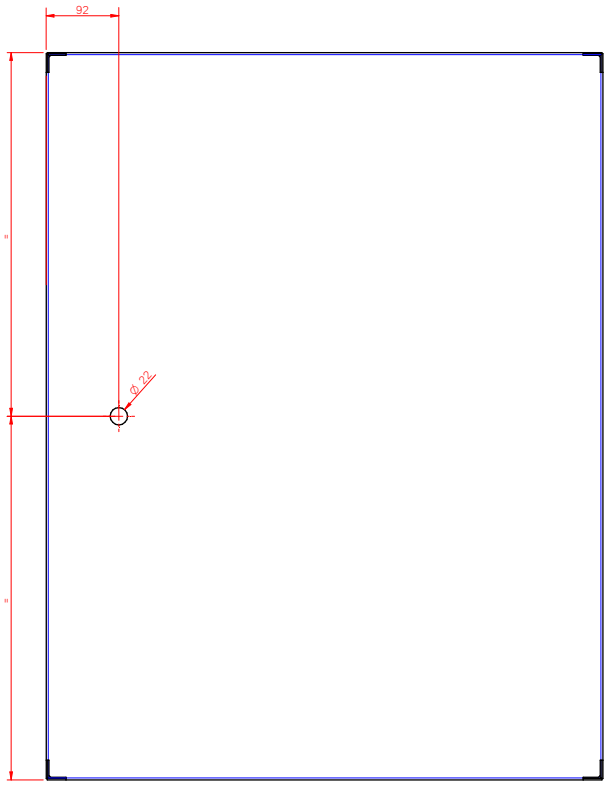


Position of condensate discharge on the base of the unit

WDE 40-60-80



WDE A0-A2-A4-A6



4. Components and operating principle

4.1. Component layout

The internal air return is located in the upper part of rear panel of the unit. Air is taken in by the radial fan located at the bottom of the unit immediately over the supply air opening. Then, after crossing the treatment filter in the centre of the unit, air is blown onto the evaporator and leaves from the opening in the lower front panel. The compressor is fixed on the unit base in front of the evaporator. The conditioner is controlled by the electronic board in the electric box, located behind the middle front panel and closed by a protective cover.
The through holes for the power cables and the electronic board input / output signal cables are located on the rear panel of the unit, between return and supply openings of internal air.
The condensate drainage pipe exits from a hole on the unit base, see its position at paragraph 3.3.

4.2. Operating method

Cooling
The shelter air is taken in by the radial fan, filtered and then cooled as it crosses the evaporator. Treated air is then returned to the shelter through the supply air opening. The compressor operates in order to cool the air.

Free cooling (optional)
A damper equipped with servomotor, which directs internal and external air flows, is located in the central part of the conditioner. External air is taken in through an opening near the damper while the internal air is discharged by overpressure through an opening located above. This damper is proportionally controlled by a modulating signal from the C2020 controller. Its position can be adjusted from 0 to 100% of fresh air, to regulate free cooling capacity.

Mixed mode (optional)
When the temperature of the external air is low enough to enable the free cooling mode, but the effect of this operating mode is not sufficient to keep the internal temperature within the required range, the compressor is switched on while the free cooling damper remains open. In this way, the evaporator cools the external air rather than the internal re-circulating air, combining the benefits of the free cooling and the cooling modes.

Emergency ventilation (optional)
When there is a power failure, part of the unit (evaporator fans, control components and the free cooling damper motor) is powered by an emergency 48VDC power supply. In this way, continuous circulation of air inside the shelter is always assured. This circulation of air is combined with free cooling when the conditions required to enable this mode are satisfied.

INFORMATION

Units with direct current emergency ventilation always require an external direct current power line even when mains power is present.

Heating (optional)
With the heating elements option, the units include an electric heating element. When the temperature is low, the heating coil turns on (compressor off) and the free cooling damper is in complete re-circulation position, in order to heat internal air. This mode is controlled by the C2020 controller.

Dehumidification (with ACTRHC1 accessory)
According to the signal of humidity inside the room, supplied by the optional humidity probe ACTRHC1, the air conditioner electronic controller C2020 reduces evaporator fan speed. Consequent air flow reduction causes a higher temperature difference between inlet and outlet air, helping condensation of humidity in it.

4.3. Mechanical components

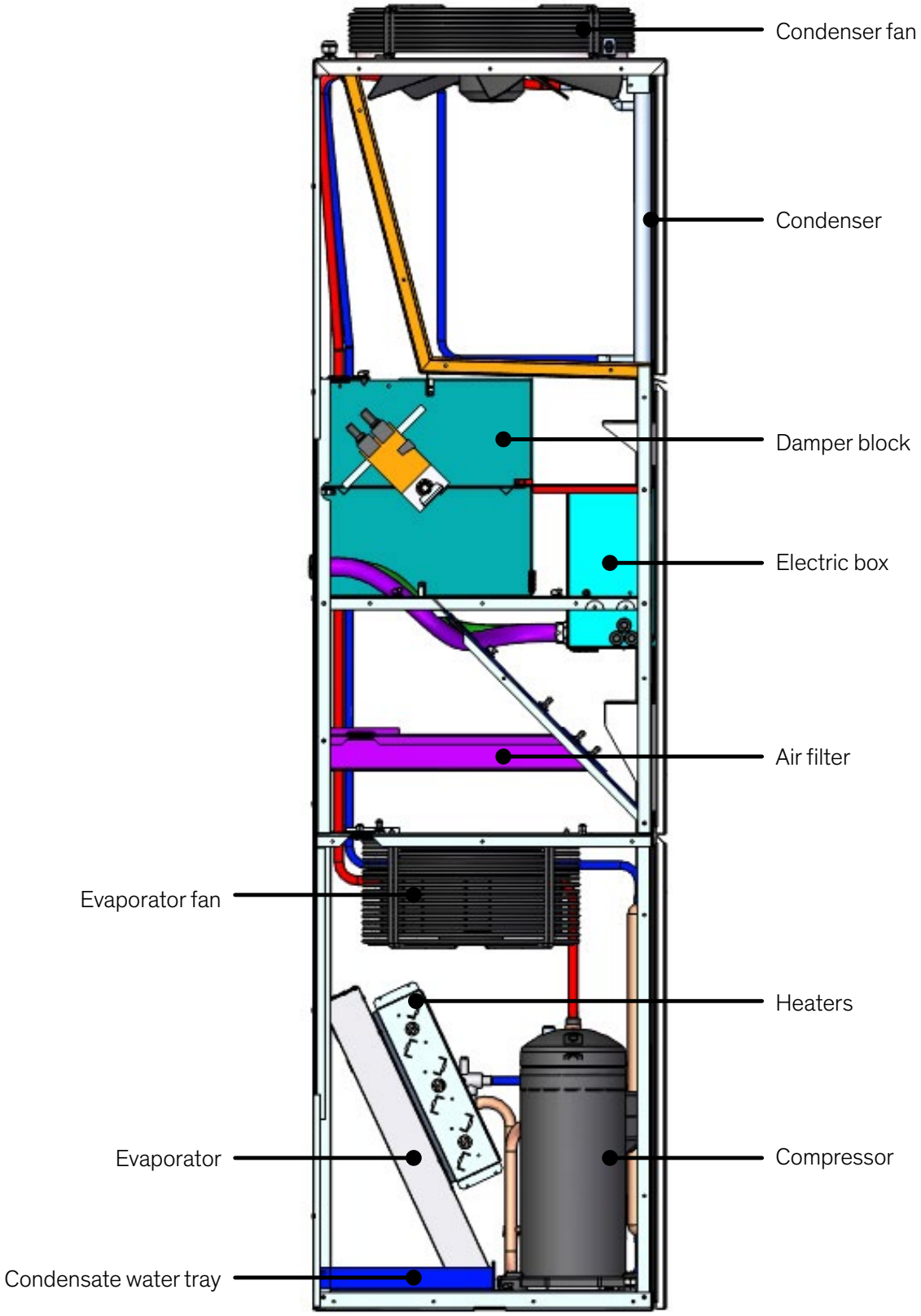
Structure
These machines are built using self-supporting panels made of painted galvanised sheet metal to guarantee good corrosion resistance (not suitable for corrosive and saline environments). They make the machine easy to inspect and, at the same time, offer adequate protection to its internal components. The external panels are internally lined with a 3 mm layer of sound-absorbing material. The internal components of the unit can be accessed by simply removing the cladding panels. This is done by undoing their fastening screws.

Air filter
Belonging to class G4, it is designed to prevent large dirt particles present in the environment from obstructing airflow through the evaporator. Its zigzag shape with 50 mm height implies a wide filtering surface, reducing pressure losses and frequency of maintenance.

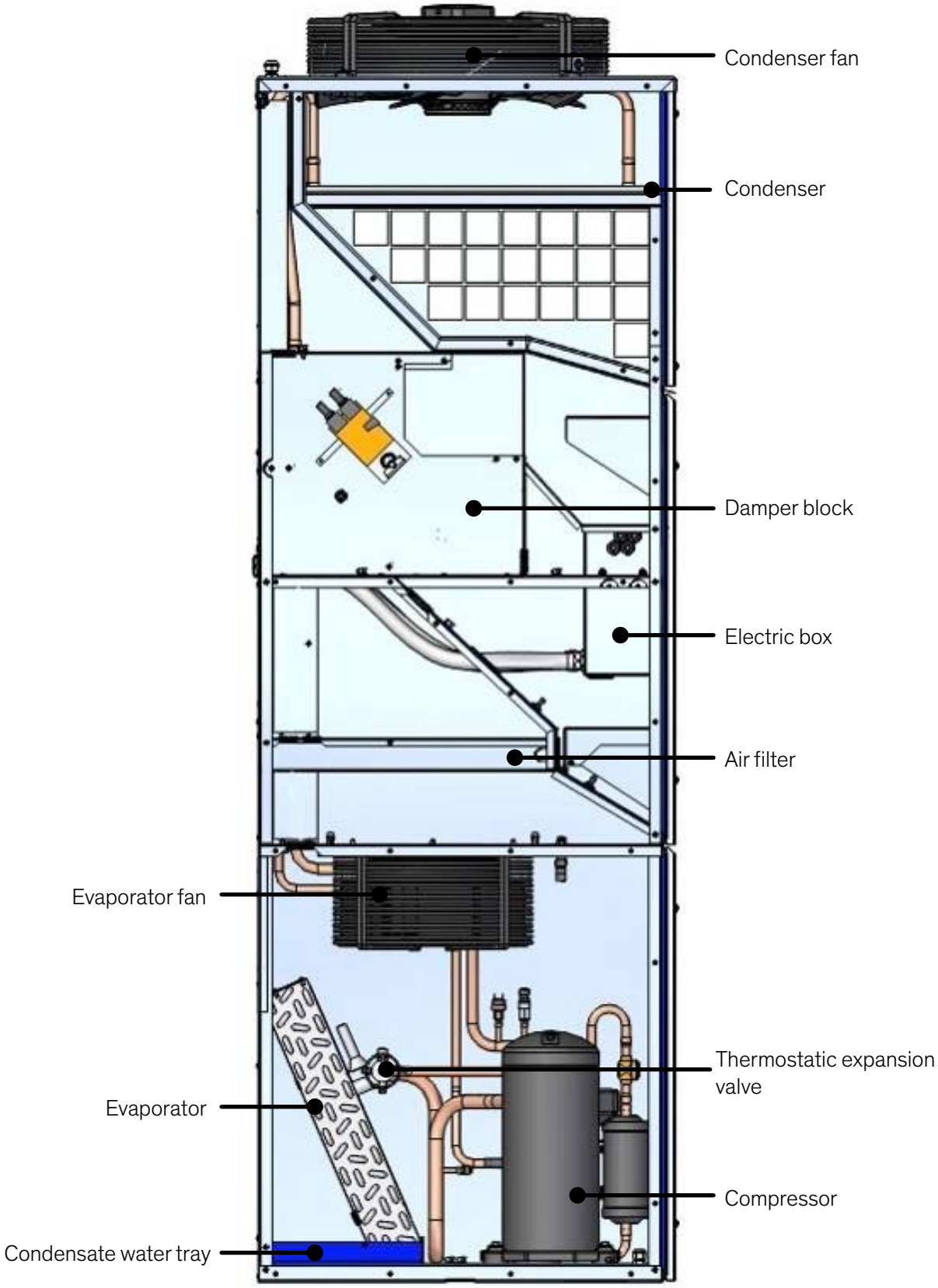
Free cooling air pre-filter
It is mounted on the middle frontal panel just behind the free cooling intake opening. Made of acrylic material it belongs to efficiency class G2.

Condensate water tray
It's located under the evaporator to collect the moisture from the internal air which condenses on the surface of the heat exchanger during cooling. It is fitted with a union for external drainage.

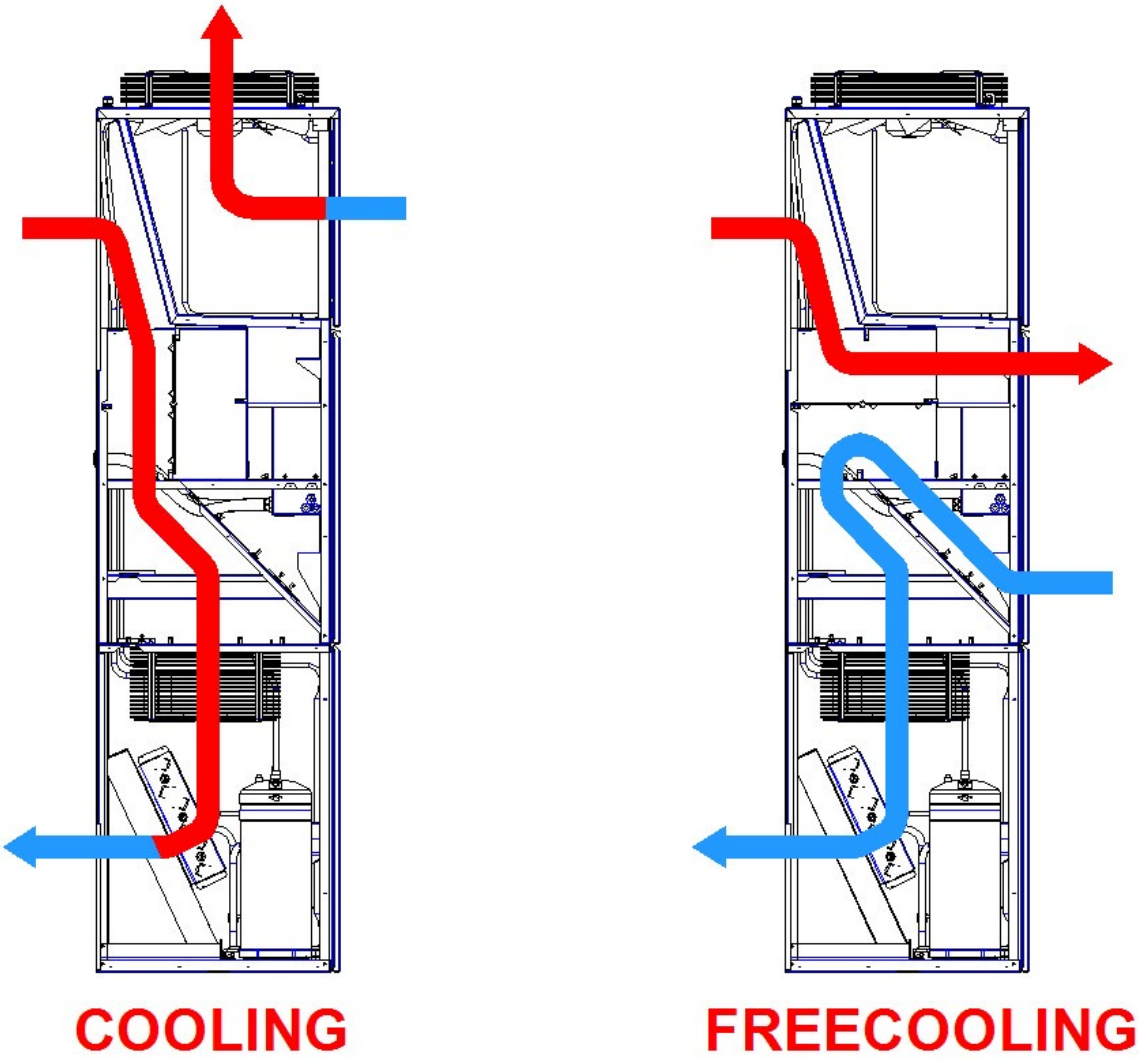
Free cooling damper
This damper, fitted in units featuring the free cooling option, consists of a metal baffle powered by a servomotor for directing inside and outside air flows. The damper body is made of galvanised sheet metal.



WDE size 1 (40-60-80)



WDE size 2 (A0-A2-A4-A6)



Air flow diagram (example of size 1)

4.4. Cooling components

The unit comprises a hermetic cooling circuit consisting of a compressor, condenser, refrigerant filter, thermostatic valve and evaporator. The air inside the shelter is cooled without coming into contact with the external air in cooling mode.

The system works as follows: the compressor compresses the refrigerant gas bringing it to a high pressure and temperature. The hot gas, by going through the condenser, is cooled and liquefied thus releasing heat to the air in the environment. Pushed through the thermal expansion valve, the liquid refrigerant loses pressure, which makes it prone to evaporation. This takes place in the evaporator, where the refrigerant absorbs the heat of the warm air from the shelter, which is therefore cooled.

The circuit components are connected together by copper piping, appropriately welded to ensure a greater seal. Schrader service valves are fitted internally on the compressor intake and return lines.

Refrigerant
The refrigerant that is used is R407C (HFC). Optional: R134a (HFC).

Compressor (CO)
A reciprocating compressor is used for the WDE40 model with 400V/3Ph+N/50Hz power supply. WDE40 with 230V/1Ph/50Hz power supply is provided with a rotary compressor. Scroll compressors are used for all the other models.
Compressors are basically composed of an electric motor and a mechanical section which is powered by this motor for pumping the refrigerant gas.
In reciprocating compressors the pumping unit consists of a piston which slides inside a cylinder and which generates, depending on its phase, compression and aspiration.
In rotary compressors, the pumping unit consists of a rotor with sliding blades, inside a stator. As the rotor turns, compression is obtained with space reduction between rotor, blades and stator.
In scroll compressors the pumping unit consists of two spirals positioned one inside the other. One spiral is fixed while the other performs orbital motion which aspirates and compresses the gas.

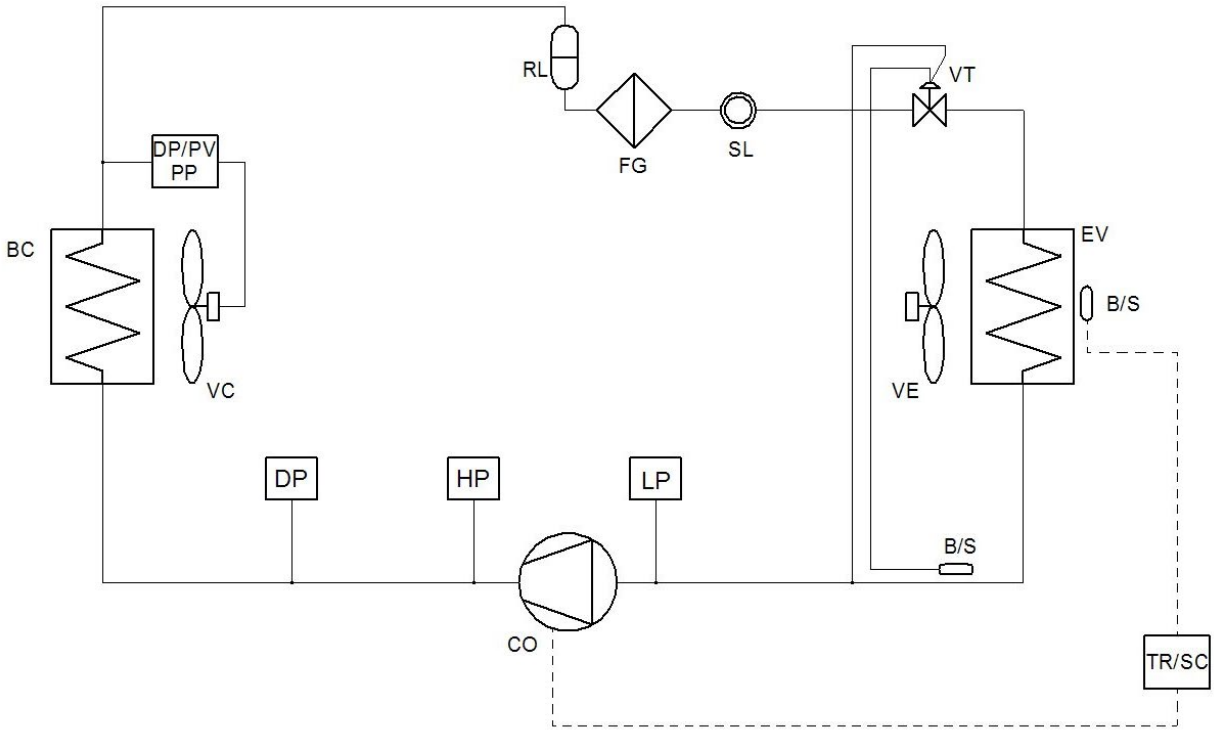
Condenser (BC)
This part allows the release of the heat of the coolant gas in the environment. It's a microchannel type, completely made of aluminium, with copper connections to the external piping. It's not suitable for acid and salt environments and it cannot be exposed to metal dust projections. For optimal protection against salt spray, see option "Protective treatment on condenser and evaporator – TREATW".

Liquid receiver (RL)
The liquid receiver, positioned between the condenser and the drying filter, keeps the subcooling level of the refrigerant at a constant level and ensures maximum efficiency over varying operating conditions.

Filter dryer (FG)
This is a mixed mechanical/chemical filter that separates out all particles of humidity from the refrigerant that passes through it.

Thermostatic valve (VT)
The thermostatic expansion valve keeps the superheating at a constant value, adapting coolant evaporation pressure to the real thermal load. This component is factory set during testing and must not be tampered with.

Evaporator (EV)
This component is where heat from inner air passes to the refrigerant gas. It is a heat exchanger with copper pipes and aluminium fins (designed for use in non-acid and non-saline environments only). Surface has hydrophilic treatment. For optimal protection against salt spray, see option "Protective treatment on condenser and evaporator – TREATW".



SL = Sight glass

TR/SC = Regulation device, electronic board

DP/PV = Fan modulation with pressure transducer

4.5. Motors

Compressor

Electric motor positioned inside the compressor. It is mounted on vibration dampers to reduce vibrations.

Fans

	Evaporator fan	Condenser fan
Type	Radial with backward curved blades	Axial
Rotor	Coated metal – Aluminium	Coated metal
Insulation class	B	B - F
Protection class	I	I
Motor protection	IP20 – IP42	IP44 – IP54

Evaporator fans in both DC and AC version are EC (electronic commutation) type, except DC fans of WDE40.

Free cooling damper servomotor

Electric servomotor with built-in travel stop switch and overload protection.
Protection degree: IP54 Protection class: III

4.6. Control, monitoring and safety components

All unit components are factory adjusted and generally do not require further adjustment. If, for special reasons, it becomes necessary to change the adjustment settings of the automatic devices these changes must only be performed by specialists who are experts on the product and only after informing the STULZ engineering division department.
STULZ conditioners come with a set of devices designed to ensure proper operation. Tripping by any one of these automatic safety devices is a sign of a malfunction and it is absolutely necessary to eliminate the cause.

⚠ DANGER

It is forbidden to electrically by-pass the safety devices. Doing so, in addition to being dangerous, also immediately invalidates guarantee coverage for the product.

Isolate the system from electric mains before performing any repair or maintenance work.

Work on the units must only be done by qualified and authorized experts.

High pressure switch (HP)
This stops compressor operation whenever pressure inside the refrigerant circuit exceeds 29.5 bar. When pressure returns below 24.5 bar, alarm signal from high pressure switch is disabled.

Low pressure switch (LP)
This stops compressor operation when the pressure inside the refrigeration circuit drops below 0.4 bar When pressure returns above 1.5 bar, alarm signal from low pressure switch is disabled.

Contactors
These control the motors by operating with auxiliary voltage. They comply with IEC947-4-1 standards.

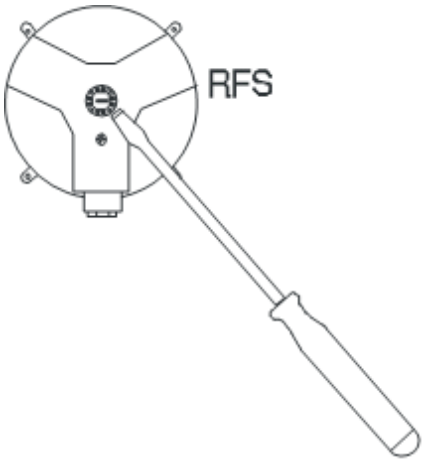
Automatic circuit breakers
These protect against overcurrents and short circuits. They have adjustable thermo-magnetic tripping devices.

Temperature probes
Three PTC temperature probes are connected to analogue inputs of C2020 electronic controller, in order to measure following parameters:
- intake of internal air temperature;
- surface temperature of evaporator (for antifreeze purpose);
- intake of external air temperature.

Pressure transducer (DP)
A pressure transducer with signal 4÷20 mA measures the condensing pressure and is connected to an analogue input of C2020. Value of condensing pressure is used by C2020 to adjust condenser fan speed according to the variable outdoor conditions.

Mechanical safety thermostat of heating elements (if present)
This protects the heating elements by cutting off the power supply in case of excessive surface temperature of the heating elements. The thermostat is adjusted to 90°C.

Dirty filter alarm device RFS
This gives a dirty filter signal, shown both on the display and on a voltage-free contact. It indicates when it is necessary to clean or replace the air filter.



	RFS
Range	50 ÷ 500 Pa
Pressure differential	20 Pa ± 15%

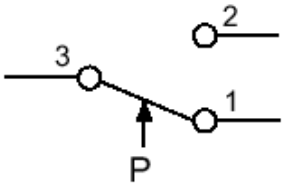
P1 : Connection of the high pressure
P2 : Connection of the low pressure

Adjustment:
Using a screwdriver, you can adjust the desired differential pressure, over which the filter control triggers, at the central screw.

Technical features:

Power supply:	1.5 (0.4) A; 250 Vac - 0.1 A; 24 Vac
Humidity:	0...50% rel. h., non condensing
Operating temperature:	-20/+85°C
Max. pressure:	50 mbar
Contacts:	Micro switch with contacts of AgCdO (on/off)
Housing:	Plastic
Protection:	IP54
Protection class:	I
Diaphragm:	Silicone
Pressure connection:	Ø 6 tube

Wiring:

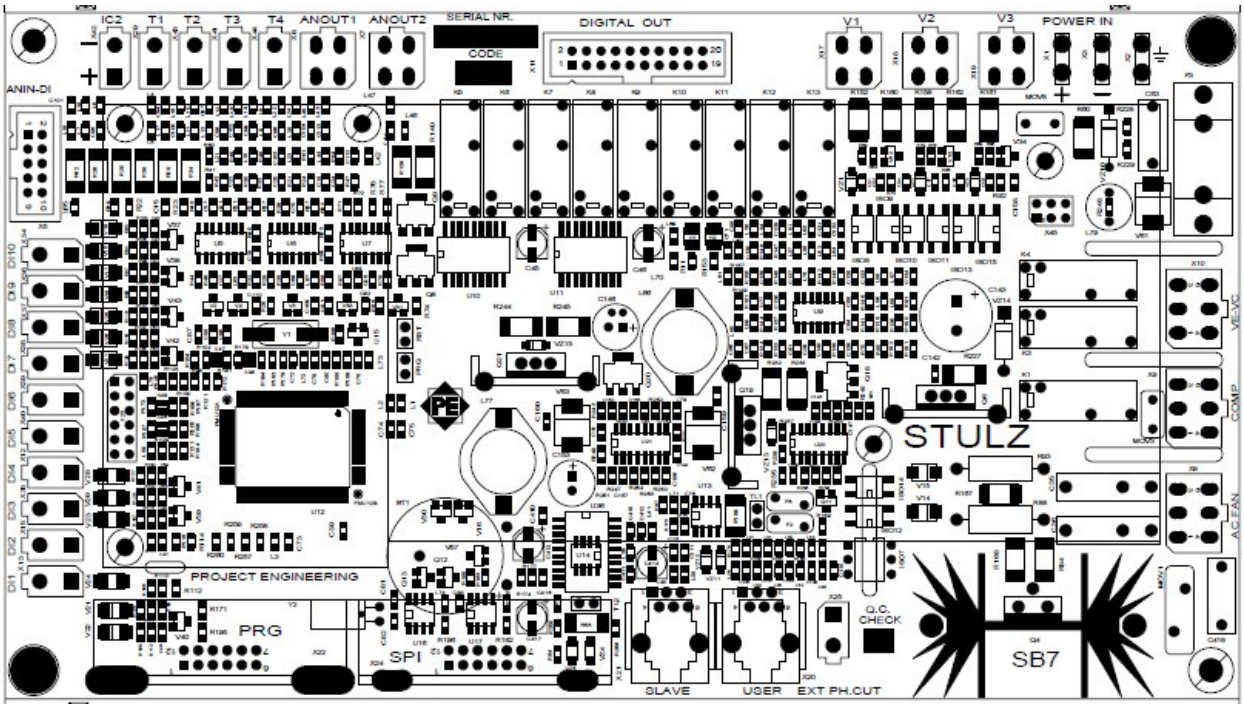


Contact 3-1 opens, when the differential pressure increases to the adjusted value. Simultaneously contact 3-2 closes, the signal is transmitted by this contact.

C2020 I/O controller

This microprocessor-based electronic board is equipped with a set of terminals which are necessary to connect the board to the controlled devices (e.g. valves, compressors, fans). Software with working logic and parameter settings are written in the EEPROM so that they remain permanently stored even in case of power failure.
C2020 controller is housed inside the electric box and can control only one air conditioner. C2020 controllers on different units (up to 5) can be connected in a LAN for the facility of data transfer (e.g. for sequencing).
A keypad can be connected to C2020 to display information about working conditions, state of the air conditioner and alarms. Ordering accessory ACTKPDC1010H, the keypad is supplied in wall-mounted version (not inside the unit), housed in a separate plastic box. When two or more units are linked in a sequencing LAN, with only one keypad connected to the master controller, it is possible to display data of all units. Only one unit at a time can be displayed, selecting it via the keypad itself.

The C2020 controller can also be connected to a remote monitoring / supervision system with a RS485 serial line and ordering the necessary serial interface ACTSERC1010 (cable not supplied).



INFORMATION

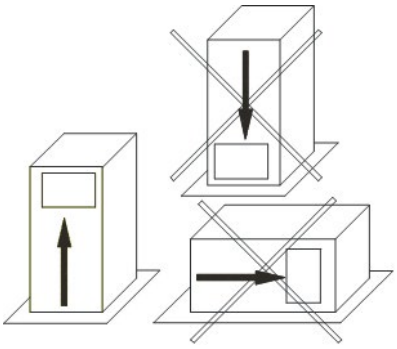
For controller input / output assignation, please refer to the electric diagram on part 2 manual, specific for each unit.

5. Unpacking and inspection

INSPECTION

STULZ products are delivered ex-works. All units have been individually inspected in all their components and been carefully packaged before the delivery.
Immediately inspect the unit upon receipt of the goods.

- Make sure that it has been transported in the correct position. Note any unsuitable shipping conditions on the shipping document.
- Check that no components are missing, that are presents on shipping document and the integrity of the conditioner at the moment of the receiving.
- Check that there aren't any external damages. In case of damages, note them on the shipping document in the presence of deliverer.
- Hidden damage, that are verified after removal the packing, must always be notified to the shipper by registered letter within 8 days of receipt of the goods.



INFORMATION

With ex-works delivery conditions, carrier is the sole responsible for any damage caused during transport. STULZ is not responsible for damages to the goods caused by the carrier, but it will do everything in its power to assist clients on those situations.

If delivery conditions are not ex-works, in case of damage, please follow instructions either on transport document or on www.stulz.it web site.

This product cannot be returned without prior approval of STULZ. For any assistance, please consult your local STULZ partner.

ATTENTION

Risk of personal injuries during materials handling.

Material handling and unpacking must be done only by trained personnel with suitable individual protection devices (i.e. gloves, glasses, helmet, shoes).

LIFTING AND TRANSPORT

DANGER

Risk of downfall of heavy units.

Capacity of lifting device must be appropriate for the weight of air conditioner.

Load must be balanced to avoid tilting.

Avoid offhanded or rough manoeuvres.

Don't lay other objects upon the air conditioner.

ATTENTION

Risk of top collision with building structure

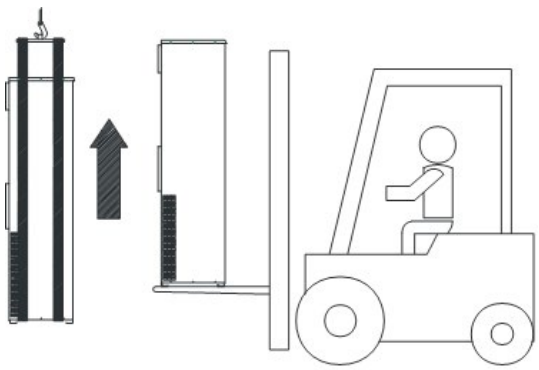
Check unit dimensions (height in particular) and building clearances. Make sure that there is space enough for a correct movement of the unit, especially regarding doorway height.

Risk of unit deformation

Don't move the unit on rolls, or with forklift after removing the pallet, to avoid any structural deformation.

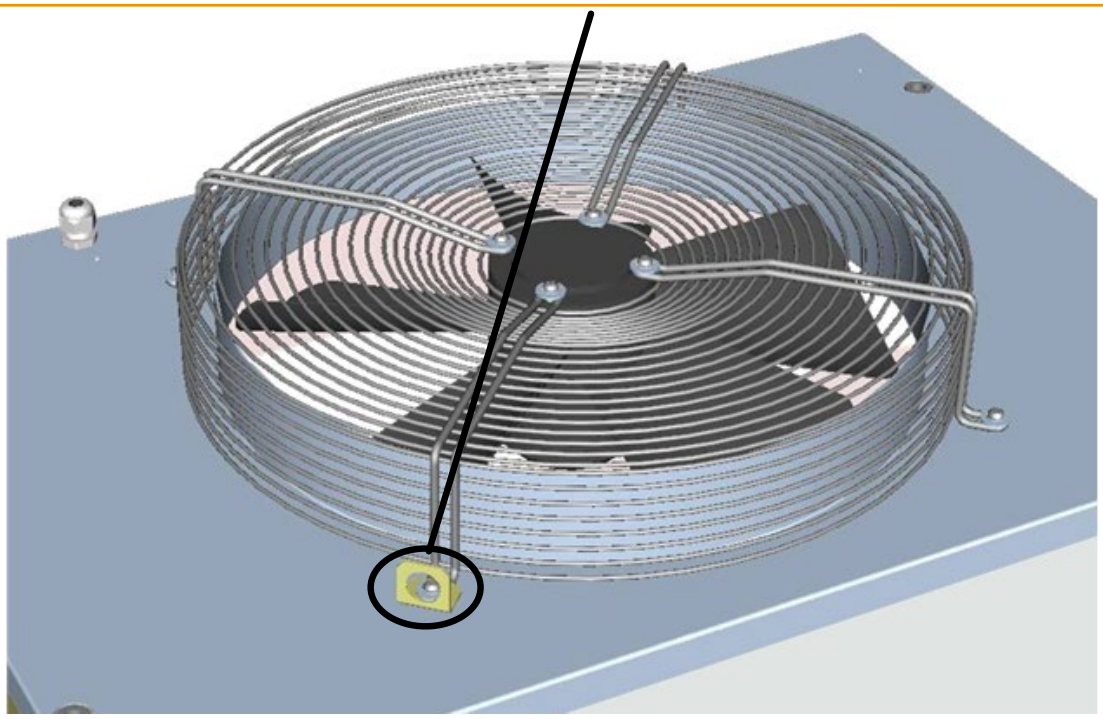
Air conditioner must be lift without tilting or laying it on its sides (see drawing above), in safety, using appropriate equipment. Handling of the unit can be done in the following ways:

- Lifting devices with ropes: secure ropes to the pallet and protect upper edges of the units with wooden or metallic angles. As an alternative to fix the ropes, the unit is provided with 4 × M8 eyebolt connections on its top (eyebolts are not provided).
- Forklift: when the unit is still packed with pallet, a forklift can be used, taking care that the centre of gravity is inside fork area.



DANGER

Do not fix lifting ropes to the metal eyebolts near condenser fan.



STORAGE

Except differently agreed, standard packing of air conditioners is composed of:
- Pallet under the unit, fixed to its lower frame;
- Protective film around the surface (except bottom side in contact with the pallet);
- Air bag on the upper part.

INFORMATION

Standard packing doesn't protect air conditioner from rain and bad weather.

Standard packing is not suitable for seafreight.

Standard packing is not suitable for airfreight.

Following information can be found on packing:
- STULZ logo;
- Unit code;
- Accessories put in the packing;
- Warning symbols.

If unit is stored before installation, comply with following instructions:
- Don't expose to direct solar radiation;
- Store the unit with its original packing.

Ambient conditions for storage are in paragraph "3.1. Application limits".

REMOVAL OF PACKING

- Remove packing without damaging air conditioner: remove top air bag and external film.
- Recover any document or component inside the packing.
- Keep original packing (pallet and protections) for future shipments.

ATTENTION

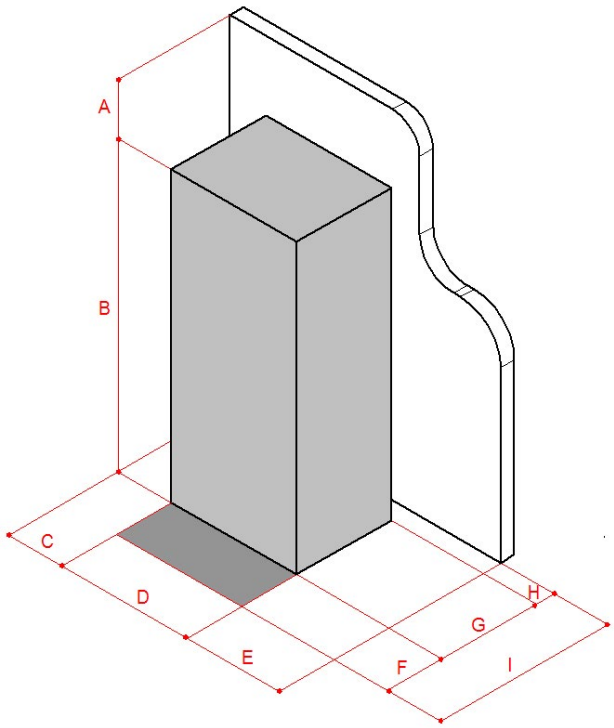
Use original packing to ship the air conditioner to any other destination.
If packing disposal is necessary, we remind to dispose different materials suitably.

6. Installation

Installation and intervention on air conditioners might imply risks, as they are pressurized systems in the presence of electric components. Thus, installation and maintenance are reserved only to personnel skilled and qualified in the installation and maintenance of cooling plants

6.1. Positioning the unit

WDE units must be installed on the external wall of the shelter / room to be conditioned. Check that there is enough room for easy application, installation and servicing, both inside and outside the shelter. Always observe the minimum spaces indicated in the following drawing.



Dimensions (mm)									
WDE MODEL	A	B	C	D	E	F	G	H	I
40 – 60 - 80	1000	2085	0	879	0	800	565	0	1365
A0 – A2 – A4 – A6	1000	2226	500	992	500	800	730	0	1530

DANGER

Do not obstruct circulation of air being sucked into or expelled from the air conditioner.

Avoid short circuits of air on both the internal (evaporator) side and the external (condenser) side.

Short circuits on the evaporator side cause:
- The reduction of the unit efficiency;
- A bad distribution of air inside the shelter;
- At worst, the intervention of anti-freeze protection which stops compressor.

It is important also to prevent hot air expelled by the condenser fan from being even partially sucked back in. This would cause continuous stoppages, commanded by the pressure switches, with:

- Reduction of efficiency;
- Increase of electricity consumption;
- Bad control of internal temperature.

Check also that:
- The wall where the unit is installed can support its weight;
- The inside of the shelter is clean;
- The conditioner is not in the proximity of heat sources or warm air flows;
- The structure is watertight;
- If installed on a door, make sure the hinges can withstand the weight of the unit. Make sure that the electric cable is not torn or damaged when the door is closed;
- If the depth of the cooling unit prevents the door from opening completely, arrange a stopper for such a door.

6.2. Mechanical installation

DANGER

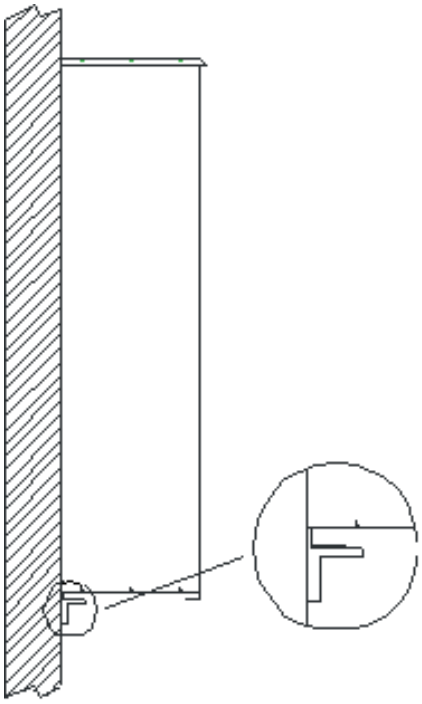
Before starting work, disconnect the power supply. Prior to drilling holes or making cuts, make sure that holes, screws, cables, etc. do not interfere with the equipment which has already been installed.

1. Make openings for evaporator air circuit and cable passage according to the cut-out drawings at paragraph "3.3. Drawings".
2. Once cut-out openings have been made, suitably insulate them against water infiltration (rain).
3. Glue the adhesive gasket around the edges of the unit openings. The adhesive gasket consists of ethylene propylene, open-cell type, 3 mm thick and 10 mm wide.

ATTENTION

Unit openings are larger than cut-out on the wall. Therefore the adhesive gasket must be applied around the opening of the unit, not on the wall. Position of sealing gasket compared to cut-out drawing is shown at paragraph "3.3. Drawings"

4. We recommend to provide the shelter with a support bar for the air conditioner (not supplied with the unit). This bar has two main functions: it decreases the mechanical stress on the wall and it is a reference for a correct position of the unit on the wall. Set the conditioner on the support bar.
5. Lean the unit against the wall so that the openings on the rear panel of the unit correspond to the openings cut on the wall. Then, fix the unit to the wall through its lateral brackets via suitable screws.
6. When also the electric installation is completed, put the return and supply grilles / diffuser (accessories) in place.



6.3. Electric connections

⚠ DANGER

It is absolutely necessary, before making any connections, to check the supply voltage with a tester. The voltage that is measured must correspond with the voltage indicated on the unit label.

The installer must install, upstream from the unit, an isolating switch with fuse and capacity as specified on the label in order to permit maintenance on the machine with total absence of electricity.

The ON-OFF key on the C2020 keypad (if present) is only used to put the unit on stand-by. It must not be considered to be a safety component permitting maintenance on the unit. Maintenance must only be carried out after having isolated the power supply to the unit (see previous note).

All electric connections and wiring must be done exclusively by authorized technical personnel. The system must be equipped with an efficient ground connection.

The electric connection to the climate-control system must comply with the following regulations:
Machine safety directive (2006/42/CE)
Low voltage directive (2006/95/CE)
Electromagnetic compatibility directive (2004/108/CE)
National mechanical and electric systems regulations

- Check power supply voltage and frequency.
- Check that these values are compatible with those of the unit (shown in its name-plate).
- Cut off every power supply line before working on the unit.
- Section of power supply cables must be selected in accordance to their length, kind of power supply and the current absorbed by the unit, as prescribed by current regulations. These cables must comply with currently applicable standards. In any case we recommend using shielded cables unless the installer carries out, at his expense, tests that demonstrate that shielding is not necessary.
- Check that the power cables are installed at an adequate distance from alarm, communication and monitoring cables.
- On the main power supply line, install a disconnect switch (in overvoltage category III), please refer to the electric diagram on part 2 manual. Size of main switch must be determined according to the maximum current consumption of the components (standard + options). Current absorption data are in the technical data sheets.
- Do the same on emergency 48VDC power supply line, if present.
- Verify carefully the polarities of DC power supply, according to the wiring diagram.
- For 3-phase scroll compressors: take care of correct phase sequence after the connection of the main power supply. The sequence is important for the correct sense of rotation of the 3-phase scroll compressor. A loud noise coming from the compressor means it is turning in the wrong direction. If this continues for a few hours, it will overheat and irreparably damage the compressor. Correct compressor operation can be easily checked by measuring the temperature at the condenser outlet. If this temperature is noticeably higher than the external temperature, the compressors is working correctly. Otherwise, the compressor is turning in the wrong direction and the phase sequence must be changed.

⚠ DANGER

The inobservance of these points can provoke damages or malfunction of components and warranty shall become forthwith void.

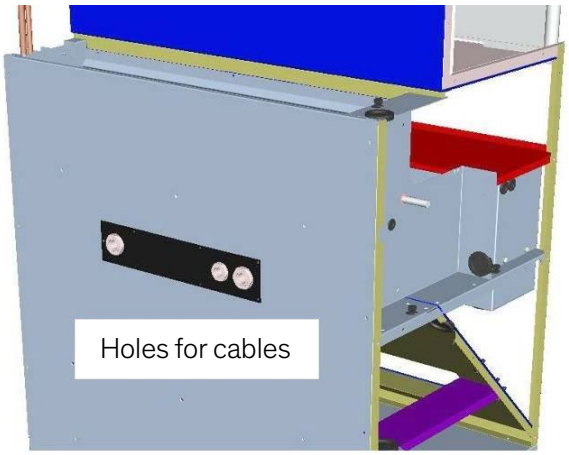
For use of leakage-current (FI) circuit breakers, EN 50178 5.2.11.2 must be taken into account. Only type B pulse-current FI circuit breakers are permitted. FI circuit breakers do not provide protection against bodily harm during operation of the unit or frequency converters.

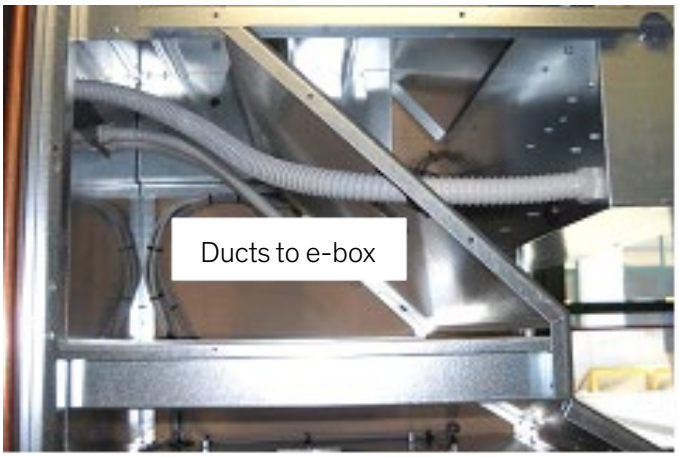
- Main and emergency 48 VDC power supply lines (if present), must be connected to the power terminal board inside the electric box. To reach this position, insert the cables in the holes on the rear panel of the unit, behind the internal air return opening. Opening on the left is for main power supply cables, while one of the two openings on the right is for DC power supply. These openings are ducted directly to the electrical box, as shown in the following drawing.
- Digital outputs (alarms), analogue inputs (humidity probes) and digital inputs (customer's external devices) can be connected to C2020 controller via screw terminals inside the electrical box. Terminals are named C1 (outputs from C2020) and C2 (inputs to C2020). Opening for passage of signal cables is near the one for DC power supply. Cable is directly guided to the electrical box.

⚠ ATTENTION

All the devices connected to the digital outputs and analogic inputs of the controller, must be connected to a SELV type power source (voltage limit 42Vdc/ac). The digital inputs of the controller must be connected to voltage-free contacts.

Please refer to use and maintenance manual part 2 for more information.





Route of cables inside WDE unit

7. Start-up

ATTENTION

Before you first start up the system install and connect it as described in the "Installation" chapter.

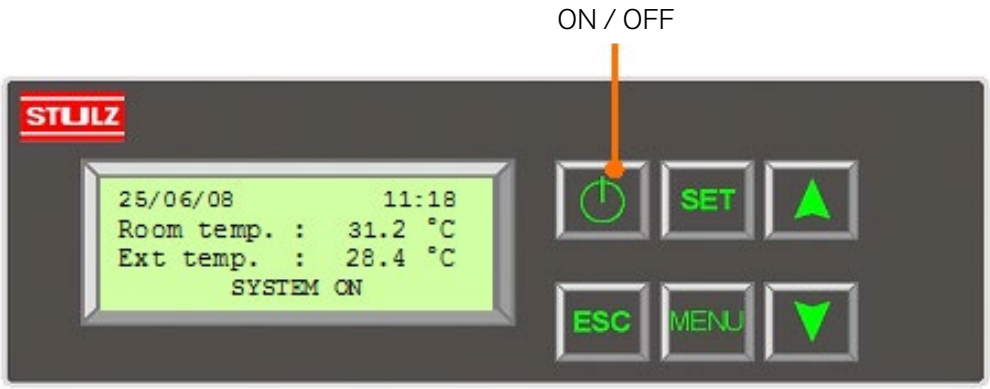
DANGER

Never run the machine if you have discovered leakage of the coolant fluid. If traces of oil are present on the unit, which point to a loss of coolant, on the inside or the outside, then the equipment must be thoroughly checked before starting the unit. If necessary, please contact your local STULZ service partner.

INFORMATION

Two keypads are available: ACTKPDC1010H is a 4×20 display and is necessary for the start-up of the units. Only this keypad allows full access to all parameters. All operations described in the chapter "7. Start-up" require the use of ACTKPDC1010H. ACTUKPD is a keypad with 3-digit display for user functions, such as set points setting, alarm display and reset, counters display..

- Make sure the main switch is turned off and that the system is isolated from power mains.
- Check that all power switches in the electric system have been turned off.
- Check that the main electric supply cable and the terminals, including the PE terminals, are correctly hooked up.
- Check that contactors are free to move.
- Switch on the conditioner with the general switch.
- Enable the control fuses one by one and the fan and compressor power switches.
- Check the supply voltage on all phases and on the direct current circuit.
- Pre-heat the compressor sump for 3-4 hours when first starting up the system or when re-starting it after a long down time if the conditioner has been inactive in rooms with temperatures lower than 0°C.
- At this point the electronic board is powered and the single components of the system can be activated to check for proper operation.
- Set the desired return air temperature (parameter S01) on the conditioner display.
- Start the climate control system by pressing the ON-OFF push-button on the display.



- After about 20 minutes of operation check the liquid and humidity passage window for air bubbles in the liquid pipe. If there are bubbles this may have been caused by a leak and loss of refrigerant. Check the circuit for leaks. Repair all leaks and refill the circuit with R407C refrigerant as described in paragraph "8.4. Refrigerant circuit".

- Check the current that is absorbed by the compressor, fans and other optional components, comparing these values with those indicated in technical specifications.
- Check the direction of rotation of the compressor, as indicated in the previous chapter (electric installation section). If it is incorrect, invert the wires.
- When the system is operating at normal capacity: 1) check that there are no alarms; 2) check that the air discharged from the condenser flows correctly without being drawn into the cooling unit; 3) check that the fans work properly; 4) check, with the unit operating, that power supply voltages remain inside the values indicated on the technical data label for the unit; 5) check that the unit operates according to the set logic.

Shutdown

To shut the unit down, disconnect it from all its power supplies using the related isolating switches.

⚠ DANGER

The ON-OFF key on the C2020 display (if present) is only used to put the unit on stand-by. It must not be thought to be a safety component to turn the unit off prior to performing maintenance.

8. Maintenance

8.1. Safety instructions

Installation and intervention on air conditioners must be made in full compliance with specific national regulations for accident prevention, with particular reference on electric and refrigerant equipment. Failure to comply with these regulations might be dangerous to people and environment. Before any intervention on the unit, refer to instructions on this manual, check data on the name-plate and take any other precaution in order to guarantee optimal safety.
Maintenance operations must be made by authorized and skilled personnel.

Safety procedures

⚠ DANGER

Cut off the power supply to the unit before making any maintenance operation. A “DO NOT SWITCH ON” warning sign must be clearly visible. ON-OFF key on C2020 display (if present) is only used to put the unit is stand-by. It must not be considered as a safety device to switch off the unit before maintenance.

Live electric components have to be switched to de-energized and checked to ensure that they are in the de-energized state.

Some verifications must be effected with the unit in operation (measuring current, pressures, temperatures). In such a case, the unit must only be switched on at the master switch after all mechanical connections have been carried out. The unit must be switched off immediately after the measuring procedure.

The electric box might be hot.

Very little routine maintenance is necessary to keep the unit in reliable operating order and protect its moving parts. This maintenance, however, must be performed at the prescribed maintenance intervals. Failure to perform due maintenance both decreases the working life and efficiency of the unit and also invalidates guarantee coverage.

8.2. Preventive maintenance schedule

Interval	Operation
Every month	• CONDENSATE DRAIN: check that the condensate drain system is perfectly clean and efficient. • HEAT EXCHANGERS: check that the heat exchangers are efficient and not clogged or dirty. • AIR FILTERS: check the condition of the filters and replace them if necessary (dirty filter alarm). • FANS: check that fans do not show signs of overheating or abnormal vibrations and that they are free to rotate.
Every 6 months	• REFRIGERANT CIRCUIT: sight glass. • REFRIGERANT CHARGE: check that the system is properly filled. If it is not filled then search for the leak (check joints in particular), repair it and refill the system. • FREE COOLING DAMPER (when present): check tightness of fixation of air deflector to the shaft.
Every year	• SAFETY DEVICES OF REFRIGERANT CIRCUIT: high pressure switch. • COMPRESSOR: check the oil level from the indicator on the compressor. • ELECTRIC CIRCUIT: check that electric connections are tight, that switches, remote control switches and isolating switches are operating and in good condition. Also check that the control board operates and perform a test of alarm signals. • MECHANICAL PARTS: clean the inner components of the system.

⚠ ATTENTION

If air conditioner works in particularly dirty environment or if experience shows that a more frequent maintenance is needed, this must be made as necessary.

8.3. Air circuit

Heat exchangers

Blow compressed air through the heat exchanger in the opposite direction to that of the air flow during normal operation. Please take care to avoid contamination of the aluminium surface with reactive dust, chemical elements, other metal particles and ions.

⚠ ATTENTION

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

Fans

The bearings of the fans are lifetime lubricated and do not need maintenance. Check the operation current. An increased operation current indicates either a higher air resistance by a clogged pre-filter or a winding short circuit in the fan motor. Fans are automatically controlled with variable speed. To make measurements at nominal speed, use manual control.

Air filters

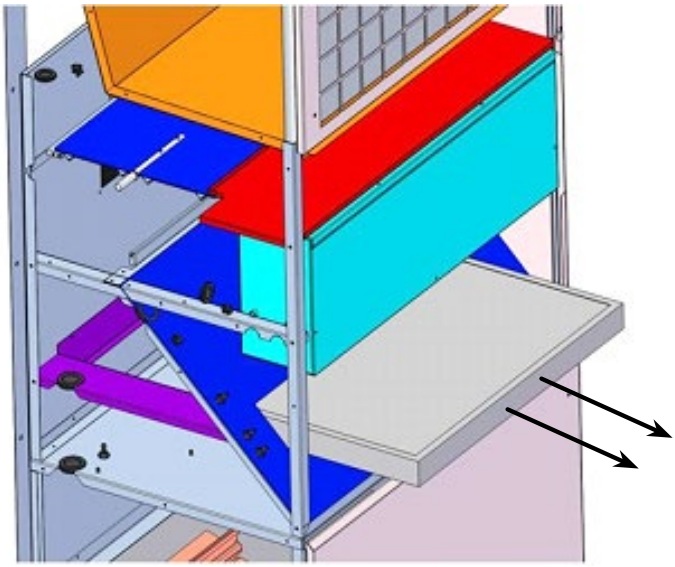
A differential pressure switch monitors air intake filter. As soon as pressure loss exceeds an adjustable value, a dirty filter alarm is enabled by the electronic controller. In this case, filter replacement is necessary.

To pull it out, proceed as follows:

- Open the middle front panel. The air filter is below the free cooling damper block, behind a securing plate screwed to the air conditioner frame and covered with thermal insulating material.
- Loosen the screws of this securing plate and remove it.
- Extract the air filter.

ATTENTION

Spare filters must have filtering medium with the same thickness and density as the original one. A set of spare filters can be ordered to your local STULZ service partner.



Air filter extraction

8.4. Refrigerant circuit

High pressure switch

High pressure switch is a safety device, therefore its correct intervention must be verified regularly. To do this, simulate a pressure increase. If the high pressure switch intervenes at a higher pressure than 32.4 bar (original intervention value +10%), it must be immediately replaced with a new switch with the same intervention point.

Refrigerant charge

An insufficient charge causes the formation of bubbles in the sight glass or in extreme cases the stop of compressor due to protection against low pressure. 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.

ATTENTION

When refrigerant charge is more than 3kg, control of refrigerant leakages is obligatory, according to European Regulation 517/2014 (F-gas). Certified personnel and companies (according to Reg. 303/2008) provides regular leak testing (according to Reg. 1516/2007 and Reg. 1497/2007) and maintain records of maintenance activities in a dedicated log book.

If a leak is detected:
- Let out the refrigerant in a collecting device down to a pressure of 1 bara;
- Connect a vacuum pump via a pressure gauge station on the high and low pressure side;
- Extract the refrigerant by the vacuum pump (not by the compressor!) to approx. 0 bara;
- Dispose the refrigerant according to the national regulations;
- Fill the circuit with nitrogen to 1 bara;
- Repair the leak;
- The circuit has to be run dry by several (at least 3×) fillings and extractions of nitrogen. When necessary change the filter dryer;
- Fill with R407C.

⚠ ATTENTION

R407C must be charged in a liquid state.

After filling check the HP switch. 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.

Sight glass and filter dryer
Bubbles in the sight glass indicate that the charge is insufficient or that the filter dryer is clogged. A pollution of the filter dryer, whose origin task is to clear the refrigerant from impurities and humidity, can be detected by a temperature difference upstream and downstream the filter dryer.
With too much humidity in the circuit, the expansion valve can freeze. In addition to this the POE oil in the compressor, which comes in touch with the refrigerant, takes up humidity and loses its ability to lubricate. In this case the refrigerant must be completely evacuated and recharged according to the above described evacuation instruction.

Compressor
In the compressor there is a polyester (POE) 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 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 POE oil and water results in the formation of acid. Owing to hyper acidity, corrosive processes take place inside the compressor. The oil level can be checked by looking at the sight glass of the compressor.

⚠ DANGER

In case of topping up, use always the type of oil indicated on the technical data plate on the compressor.

8.5. General appliance cleaning procedures

The metal casing of the unit can be cleaned using a detergent liquid as long as this liquid is compatible with: PVC, polyethylene, silicone and polyester coating.

⚠ ATTENTION

Use of an unsuitable detergent might cause damage to the unit.

Do not use either acid or caustic substances or solvents like benzine to clean any part of the unit.

Use a vacuum cleaner to remove dust. Inner parts must be cleaned with a liquid detergent and air at a pressure not higher than 4 bar and with the unit suitably connected to ground. Check also that water pipes are firm: vibrations might cause leakages. Finally, check pipe insulation.

9. Troubleshooting

Problem	Possible cause	Possible solution
The controller and the rest of the unit don't work	Main power supply missing	Restore power supply
	Main switch (optional) open	Close main switch
	DC power supply to the controller is missing	Check voltage on power supply cables. Repair the broken cable or restore the missing connection
	DC power supply not available on site (necessary for units with DC emergency ventilation)	Install a suitable external power supply module to transform AC into DC power supply for the DC components (controller, fan, free cooling damper servomotor)
	Controller faulty	Contact Stulz service
Controller is working, but the rest of the unit is not working	Faults blocking the unit	Look for alarms on the display. Contact Stulz service
	Controller faulty	Contact Stulz service
Controller is working but display is not working	Cable between controller and display disconnected	Reconnect cable
	Cable between controller and display broken	Replace cable
	Display faulty	Contact Stulz service
Alarm: high / max temperature	Cooling capacity lower than heat load	Reduce heat load or increase number of units
	Bad positioning of remote temperature probe (accessory ACTRAS)	Check and reposition probes
	Wrong calibration of return air temperature probe	Check with a reference thermometer. Contact Stulz service for calibration
	Low air flow	Check and replace air filter (see also dirty filter alarm)
	Insufficient cold air circulation in the site	Check unit and racks layout
	Low refrigerant charge	Contact Stulz service
	Compressor faulty	Look for alarms on the display. Contact Stulz service
	Anomalous condensing pressure	Check condenser efficiency. Contact Stulz service
Alarm: low temperature	Too cold in the room	Improve thermal insulation of the room / unit or add external stand-alone heaters
	Electric heaters faulty	Contact Stulz service
Alarm: antifreeze	Cold air recirculation	Remove obstacles near cold air supply. Verify that unit external panels are correctly closed
	Insufficient evaporator air flow	Check that evaporator fan is free to move
	Wrong calibration of evaporator temperature probe	Check with a reference thermometer. Contact Stulz service for calibration
Alarm: high humidity (if humidity probe is present)	Humidity infiltration from outside	Check passage of air from the outdoor
	Wrong calibration of humidity probe	Check with a reference hygrometer. Contact Stulz service for calibration
Alarm: high pressure	Condenser air recirculation	Remove obstacles near the condenser air discharge. Verify that unit external panels are correctly closed
	Insufficient condenser air flow	Check that condenser fan is free to move Clean condenser and air openings
	Wrong calibration of condenser temperature probe	Check with a reference thermometer. Contact Stulz service for calibration
	High pressure switch defective	Contact Stulz service
	External temperature higher than max limit	Change unit model
Alarm: low pressure	Refrigerant leakages	Contact Stulz service
	Low pressure switch defective	Contact Stulz service
	Obstruction of refrigerant filter	Contact Stulz service

Alarm: dirty filter	Air filter is clogged	Replace the filter
	Clogged filter pressure switch faulty	Contact Stulz service
	Wrong setting of clogged filter pressure switch	Contact Stulz service
	Pipes to the clogged filter pressure switch clogged or bended	Clean and re-position plastic pipes
Alarm: air flow (evaporator fans without tachometric signal)	Evaporator fan broken	Contact Stulz service
	Fan cables disconnected	Contact Stulz service
	Air flow pressure switch faulty	Contact Stulz service
	Wrong setting of air flow switch	Contact Stulz service
	Pipes to the air flow switch clogged or bended	Clean and re-position plastic pipes
Alarm: evaporator fan x blocked (evaporator fans with tachometric signal)	Evaporator fan broken	Contact Stulz service
	Fan cables disconnected	Contact Stulz service
	Wrong configuration of number of fans on C2020	Contact Stulz service
Alarm: component x thermic	Anomalous absorbed current by component x	Contact Stulz service
	Defective protection	Contact Stulz service
Alarm: LAN failure	Missing LAN cable	Connect units in LAN with a suitable cable
	LAN cable is not pin-to-pin	Replace it with a pin-to-pin cable
	Wrong setting of sequencing jumpers	Contact Stulz service
	Wrong setting of sequencing parameters	Contact Stulz service
	Sequencing part of C2020 controller is damaged	Contact Stulz service

10. Uninstalling and disposal of the unit

This unit must be uninstalled by specialized and authorized persons.

⚠ ATTENTION

This unit contains refrigerant and a small quantity of lubricant (ester) inside its compressor. These substances are dangerous for the environment and must not be dispersed in it. Refrigerants containing fluorocarbons contribute to global warming and consequently to climate changes. They must be disposed of in accordance with disposal standards or they must be delivered to firms qualified as specialized waste disposal firms.

⚠ DANGER

Cut off power supply. 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.

Move the unit as described in paragraph “lifting and transport”, with a lifting device of suitable capacity.

The following are the instructions for proper disposal of the unit during the various phases of its life. For further clarification or additional information, please contact info@stulz.it.

INFORMATION

To ensure proper and safe disposal activities, operator must equip themselves with the necessary PPE including: anti-cut gloves, oil resistant gloves, heat resistant gloves, safety footwear, safety eye-wear against liquid and gas splashes.
The context in which the unit is located may require the use of additional PPE, thus it is mandatory to inquire with the relevant staff of the area before starting operation.

Once the materials have been separated as shown below, they should be assigned EWC codes and then sent for disposal in accordance with the national legislation.
Disposal related to the unit purchased occurs in three stages:

1. Disposal of packaging

The packaging of the unit must be disposed of ensuring separation of the following materials:
- Paper and Cardboard
- Wood Packing–Packing materials are not chemically treated unless they are declared to be "fumigate"
- Plastic pallets- high- density polyethylene HDPE
- Plastic Film– polyethylene PE
- Polystyrene –expanded polystyrene EPS 6

2. Disposal of substances during maintenance operations

- During the life cycle of the unit, if it becomes necessary to drain the cooling system, the refrigerant must be recovered. This operation must be performed by qualified personnel in accordance with UE Regulation 517/2014. The types of gases used are shown in the following table.
- If the compressor oil needs to be replaced, it must be disposed of according to the instructions below.
- The air filters should be disposed of depending on the substances they contain from the environment in which the units operate
- The gas filters must be disposed of as contaminated materials from the oils of the type shown below

3. Disposal at the end of life of the unit

The unit must be disposed of ensuring separation of the following materials:
- Refrigerant - The refrigerant must therefore be recovered before dismantling the unit. The types of refrigerants used are the following:

Code	CAS number
R-407C	75-10-5 / 354-33-6 / 811-97-2
R-134a	811-97-2

- Metals
- Copper pipes– may contain traces of oil
- Insulation and sound-absorbing materials
- Electric and electronic components
- Cables and wiring
- Oil content within the compressors–is polyester based (POE). Refer to the label on the compressor.
- Plastic Parts - Plastic parts that are important in terms of weight are the following:

Identified Substance	CAS Number
acrylonitrile butadiene styrene terpolymer	9003-56-9
polystyrene homopolymer	9003-53-6
polycarbonatefrom bisphenol A	103598-77-2

11. Options

INFORMATION

On all WDE40-60-80 models some options do not fit all together. Maximum three of the following four options can be ordered on the same unit:
- RSC heating resistance
- SWT / SWM main switch
- SOFTT / SOFTM softstart
- PSCR (phase sequencing control) and/or VCC (voltage control relay)

11.1. Protective treatment on condenser and evaporator – TREATW

It's a protective treatment on condenser and evaporator surface in order to protect them against corrosion by salt spray. This option consists of epoxy treatment on the evaporator surface and cataphoresis treatment on condenser surface. This treatment reduces efficiency of the heat exchanger.

11.2. Stainless steel casing – PAKIN

With this option, external panel and fixing flanges of the units are made of stainless steel AISI 304 sheet. As standard, with stainless steel casing, units are painted like the units with zinc plated sheet casing.

11.3. Seaworthy case packaging - SEAPACK

Wooden packaging with special treatment suitable for sea freight.

11.4. Refrigerant R134a

With standard R407C the upper limit of external temperature is +50°C. With R134a, units can work up at higher temperatures, although also the operating temperature limit of the condenser fans has to be verified as a special model may be required, depending on maximum outdoor working temperature. Since with R134a, compressors have a lower efficiency than with R407C, with this option a bigger compressor is installed to achieve roughly the same total cooling capacity as with standard R407C refrigerant. In the following pages the technical data sheets of units with R134a.

NOTES ON TECHNICAL DATA:

* Inclusive of power absorbed by evaporator fans. External temperature 35°C / Internal temperature 30°C / Internal relative humidity 30%

** Sound pressure level at 2 m obtained from the measured sound power according to the EN ISO 9614-2 on normal condition of use and nominal operating condition.

Model		WDE40		WDE60		WDE80	
Total cooling capacity*	kW	4,5		6,4		7,7	
Sensible cooling capacity	kW	4,5		6,4		7,7	
Refrigerant		R134A		R134A		R134A	
Refrigerant charge	kg	1,8		2,1		1,9	
EER index (with evap. fan in direct current)*	W/W	2,9		3,1		2,9	
EER index (with evap. fan in alternating current)*	W/W	2,8		3,1		2,8	
Outside operating limit temperatures min/max	°C	-20 / +55		-20 / +55		-20 / +55	
Inside operating limit temperatures min/max	°C	+20 / +40		+20 / +40		+20 / +40	
External sound pressure level**	db(A)	50		51		52	
Duty cicle	%	100		100		100	
Weight	kg	170		200		210	
Height (including condenser fan)	mm	2085		2085		2085	
Width	mm	879		879		879	
Depth	mm	565		565		565	
Condenser fan							
Q.ty / Type		1/axial		1/axial		1/axial	
Air flow	m^3/h	1600		2100		3000	
Evaporator fan							
Q.ty / Type		1/radial		1/radial		1/radial	
Air flow in cooling mode	m^3/h	1100		1700		2700	
Air flow in free cooling mode	m^3/h	900		1300		1800	
Electric data							
Nominal voltage	V AC	400	230	400	230	400	230
Tolerance on voltage		±10%	±10%	±10%	±10%	±10%	±10%
Phases	ph	3+N	1	3+N	1	3+N	1
Frequency	Hz	50		50		50	
Tolerance on frequency		±2%		±2%		±2%	
Auxiliary voltage	V AC	24		24		24	
Compressor							
Power consumption*	kW	1,4		1,8		2,3	
Operating current (OA)*	A	2,95	6,86	3,4	7,8	3,8	10,8
Maximum operating current (FLA)	A	5,1	14,8	5,6	17,3	7	23,1
Locked rotor current (LRA)	A	32	61	40	76	46	100
Condenser fan							
Nominal voltage	V AC	230		230		230	
Phases	ph	1		1		1	
Power consumption*	kW	0,05		0,10		0,13	
Operating current (OA)*	A	0,23		0,47		0,63	
Maximum operating current (FLA)	A	1,2		1,2		1,2	
Evaporator fan in direct current							
Nominal voltage	V DC	48		48		48	
Tolerance on DC voltage	V DC	36÷57		36÷57		36÷57	
Power consumption*	kW	0,04		0,07		0,21	
Operating current at 48V (OA)*	A	1,1		1,4		4,4	
Maximum operating current (FLA)	A	2,9		12,7		12,7	
Evaporator fan in alternating current							
Nominal voltage / phases	V AC/ph	230/1		230/1		230/1	
Power consumption*	kW	0,11		0,06		0,24	
Operating current (OA)*	A	0,9		0,44		1,49	
Maximum operating current (FLA)	A	1,3		3,1		3,1	

Model		WDEA0		WDEA2	WDEA4	WDEA6
Total cooling capacity*	kW	9,7		11,7	13,6	14,6
Sensible cooling capacity	kW	9,7		11,7	13,6	14,6
Refrigerant		R134A		R134A	R134A	R134A
Refrigerant charge	kg	4,2		4	4	4,1
EER index (with evap. fan in direct current)*	W/W	3,2		3,1	2,9	2,9
EER index (with evap. fan in alternating current)*	W/W	3,2		3,0	2,8	2,8
Outside operating limittemperatures min/max	°C	-20 / +55		-20 / +55	-20 / +55	-20 / +55
Inside operating limit temperatures min/max	°C	+20 / +40		+20 / +40	+20 / +40	+20 / +40
External sound pressure level**	db(A)	53		54	58	60
Duty cicle	%	100		100	100	100
Weight	kg	240		240	250	250
Height (including condenser fan)	mm	2226		2226	2226	2226
Width	mm	992		992	992	992
Depth	mm	730		730	730	730
Condenser fan						
Q.ty / Type		1/axial		1/axial	1/axial	1/axial
Air flow	m^3/h	4100		5300	6100	6500
Evaporator fan						
Q.ty / Type		1/radial		1/radial	2/radial	2/radial
Air flow in cooling mode	m^3/h	2400		2800	3600	3600
Air flow in free cooling mode	m^3/h	2500		2500	3000	3000
Electric data						
Nominal voltage	V AC	400	230	400	400	400
Tolerance on voltage		±10%	±10%	±10%	±10%	±10%
Phases	ph	3+N	1	3+N	3+N	3+N
Frequency	Hz	50		50	50	50
Tolerance on frequency		±2%		±2%	±2%	±2%
Auxiliary voltage	V AC	24		24	24	24
Compressor						
Power consumption*	kW	2,6		3,1	3,8	4,1
Operating current (OA)*	A	4,65	14,5	6,1	6,6	8,6
Maximum operating current (FLA)	A	10	23,5	11	13,5	15
Locked rotor current (LRA)	A	50	114	65,5	74,0	101,0
Condenser fan						
Nominal voltage	V AC	230		230	230	230
Phases	ph	1		1	1	1
Power consumption*	kW	0,26		0,45	0,54	0,60
Operating current (OA)*	A	1,1		2,0	2,4	2,6
Maximum operating current (FLA)	A	1,2		3,0	3,0	3,0
Evaporator fan in direct current						
Nominal voltage	V DC	48		48	48	48
Tolerance on DC voltage	V DC	36÷57		36÷57	36÷57	36÷57
Power consumption*	kW	0,16		0,23	0,36	0,36
Operating current at 48V (OA)*	A	3,3		4,9	2 × 3,8	2 × 3,8
Maximum operating current (FLA)	A	12,7		12,7	2 × 7,3	2 × 7,3
Evaporator fan in alternating current						
Nominal voltage / phases	V AC/ph	230/1		230/1	230/1	230/1
Power consumption*	kW	0,20		0,30	0,46	0,46
Operating current (OA)*	A	1,2		1,8	2 × 1,3	2 × 1,3
Maximum operating current (FLA)	A	3,1		3,1	2 × 3,1	2 × 3,1

11.5. Electric reheat – RSC

This option is used to heat internal air. Electric heaters are made of aluminium and include a safety thermostat. Heaters are controlled directly by C2020. Heaters are divided in single-phase modules, each with 1,5 kW heating capacity and 6,52 A current absorption at nominal voltage. The distribution of modules on the three lines of power supply is shown on the wiring diagram of the unit. Heating resistance doesn't require any specific maintenance operations but the periodic check of their fixation to supports and their cleanliness. This check has to be done together with the general check of the unit.

11.6. Crankcase heater for compressor – CRA

This heating resistance, installed around compressor carter, operates when compressor is OFF, to keep lubricating oil warm. This function assures constant lubricating performance of oil at the compressor start. It is necessary only when outdoor temperature might go below -20°C.

11.7. Kit for low external temperatures – WINTER KIT

When minimum outdoor temperature is below -25°C and cooling function is still required, units must be provided with this option. With this kit, minimum outdoor working temperature is -40°C. The kit is installed in factory and is composed of:

- condenser fan with special bearings for low temperature
- heating resistance on electrical box
- heating resistance on free cooling damper (when present)
- pressure transducer on condenser
- condenser shut system
- crankcase heater (so there is no need to order it separately).

INFORMATION

It's possible to install Winter kit option only in the units with refrigerant R407C.

11.8. Main switch - SWT/SWM

This is located on the electric box and is used to disconnect main power supply to the unit. When switched off, it interrupts power supply to the unit circuits from it downstream. This switch can be provided by the installer as well, or it can be requested ordering this option. SWT is the version for 3-phase main power supply, SWM the version for single-phase main power supply. Main switch doesn't disconnect DC voltage, if present.

DANGER

ATTENTION: In case of main switch, the power supply cables between the connection terminals of the customer and the main switch are always under voltage also if the main switch is open. The supply cables are identified with the symbol below (high voltage).

11.9. WIB1000 / WIB1485

The WIB1000 / WIB1485 is a single-point Ethernet interface and it's used for the SNMP supervision, web monitoring and OnBoard communication. It's also possible to update the firmware and the parameters list through an USB key, formatted as FAT32.
When present, WIB1000 / WIB1485 is soldered directly on the SPI connector of the mother board. WIB1000 is the option without the serial interface 485, while WIB1485 is the option with serial interface 485.

11.10. Voltage Monitoring – VCC

The voltage control relay, is an additional device which stops the power supply to prevent faults if the voltage not in rated tolerance. The relays monitors according to the respective setting an voltage whether it exceeds or falls below a specified value or is within a certain range (window monitoring)
The relay installed in the electrical box has a display and can be parametrized with three keys.
The display shows the present value and a symbol that indicates whether the relay is set to monitor whether the voltage exceeds or falls below a specified value or whether it is set to window monitoring. The setting range for the upper and lower threshold values extends from 17 V to 275 V.
Reset function: Auto- or manual reset selectable.

ATTENTION

Setting of this component is made in factory and must not be altered.

11.11. Monitoring of phase sequence and phase loss (for 3-phase scroll compressors) – PSCR

Protection relay for phase sequence and phase loss installed in the electrical box. In case of incorrect phase sequence or phase loss, the relay automatically switch off the compressor to protect them from damage . Automatic reset when failure is no longer present. LED indication for power on and fault.

11.12. Soft start for three-phase compressor – SOFTT

DANGER

Hazardous voltage: will cause death or serious injury. Disconnect power before working on equipment.

ATTENTION

Setting of this component is made in factory and shown in the wiring diagram. Before altering it, contact STULZ service.

INFORMATION

With SOFTT option, the working limit of the unit is 45°C external temperature.

The soft start is installed inside the e-box on the supply line to the compressor. Its purpose is the reduction of compressor starting current. This can be obtained in two ways:

- Soft start is the most common method of starting. The initial torque setting is DIP switch selectable as a percentage of the locked rotor torque (LRT), ranging from 15…65% of full value. The starting time is customer set, ranging from 2…15 seconds.
- Current limit start is used when a limitation of the maximum starting current is necessary. This is DIP switch selectable and can be adjusted from 150…450% of full load amps. The current limit starting time is customer set, ranging from 2…15 seconds.
- Other operation modes of this device are kick start and soft stop, but these must be disabled for the control of the air conditioner.

Additional features:

- Motor overload: The overload is DIP switch selectable. The overload trip class is selectable for OFF or a 10, 15, or 20 protection. A current transformer (CT) monitors each phase. The motor's full load current rating is set by a potentiometer. The overload reset option can be operated either manually or automatically.
- Fault indication: this device monitors both the pre-start and running modes. A single LED is used to display both RUN/ON and FAULT indication. If the controller senses a fault, it shuts down the motor and the LED displays the appropriate fault condition. The controller monitors the following conditions:
  - Overload
  - Over-temperature
  - Phase reversal
  - Phase loss / Open load
  - Phase imbalance
  - Shorted SCR

  Any fault condition will cause the auxiliary contacts to change state and the hold-in circuit to release. All faults can be cleared by either pressing the reset button or by removing control power. Overload and over-temperature are time-based conditions that may require waiting for some additional cooling time, before reset is possible.

Control terminal description

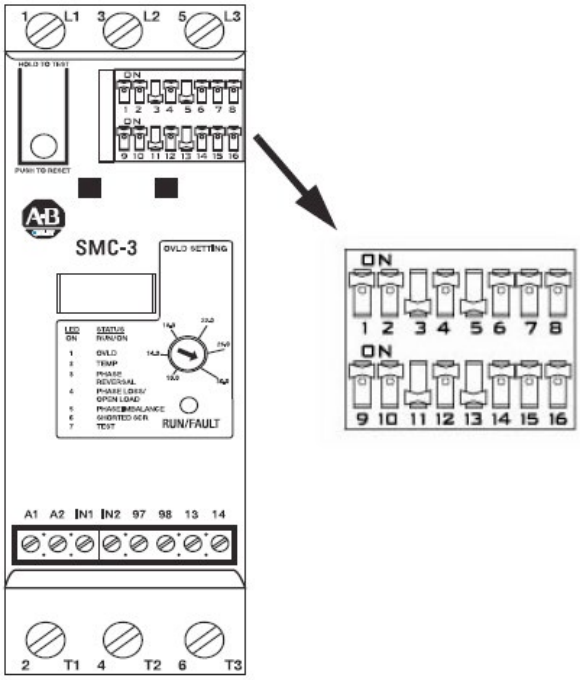
The device contains eight control terminals on the front of the controller. These control terminals are described below.

Terminal number	Description	Terminal number	Description
A1	Control power input	97	N.O. relay - aux. contact for fault indication
A2	Control power common	98	N.O. relay - aux. contact for fault indication
IN1	Start input	13	N.O. auxiliary relay #1 (normal/up-to-speed)
IN2	Stop input	14	N.O. auxiliary relay #1 (normal/up-to-speed)

Auxiliary contacts

Two hard contacts are provided as standard. These contacts are finger safe. The first contact is for fault indication. The auxiliary relay #1 is programmable via dipswitch #14, for normal/up-to-speed indication. A side-mounted additional auxiliary relay #2 can be added as an accessory and programmed via dipswitch #15 for normal/up-to-speed indication.

DIP switch configuration



Position number	Description
1	Start time
2	Start time
3	Start mode (current limit or soft start)
4	Current limit start setting (when selected) or Soft start initial torque setting (when selected)
5	Current limit start setting (when selected) or Soft start initial torque setting (when selected)
6	Soft stop
7	Soft stop
8	Not used
9	Kick start
10	Kick start
11	Overload class selection
12	Overload class selection
13	Overload reset
14	Auxiliary relay #1 (normal or up-to-speed)
15	Optional auxiliary relay #2 (normal or up-to-speed)
16	Phase rotation check

Start time			Current limit start setting (when selected)		
DIP switch number			DIP switch number		
1	2	Time [S]	4	5	Current limit % FLA
OFF	OFF	2	OFF	OFF	150 %
ON	OFF	5	ON	OFF	250 %
OFF	ON	10	OFF	ON	350 %
ON	ON	15	ON	ON	450 %

Start time (current limit or soft start)		Soft start initial torque setting (when selected)		
DIP switch number		DIP switch number		
3		4	5	Initial torque % LRT
OFF	Current limit	OFF	OFF	15 %
ON	Soft start	ON	OFF	25 %
		OFF	ON	35 %
		ON	ON	65 %

Overload class selection		
DIP switch number		
11	12	Trip class
OFF	OFF	OFF
ON	OFF	10
OFF	ON	15
ON	ON	20

Overload reset		Auxiliary relay #1	
DIP switch number		DIP switch number	
13	Reset	14	Setting
OFF	Current limit	OFF	Normal
ON	Soft start	ON	Up-to-speed

Optional auxiliary relay #2		Phase rotation check	
DIP switch number		DIP switch number	
15	Setting	16	Setting
OFF	Normal	OFF	Enabled
ON	Up-to-speed	ON	Disabled

11.13. Soft start for single-phase compressor – SOFTM

DANGER

Hazardous voltage: will cause death or serious injury. Disconnect power before working on equipment.

ATTENTION

Setting of this component is made in factory and shown in the wiring diagram. Before altering it, contact STULZ service.

INFORMATION

SOFTM option is not available for WDE40 with single phase power supply and refrigerant R407C.
The Soft Start option is available for single phase power supply units up to WDEA0, in the units with refrigerant R134a.

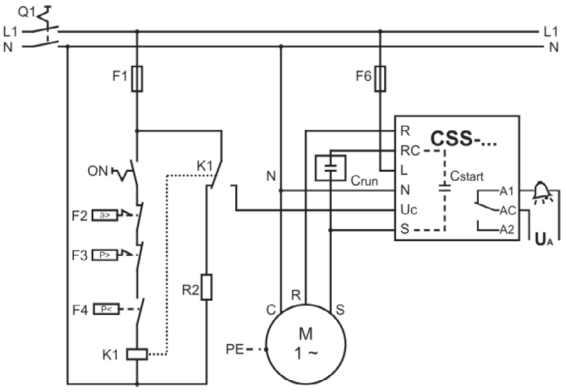
The other options available with SOFTM are the crankcase heater (CRA), main switch (SWx), voltage control device (VCC) and electrical reheat (RSC). Please note that it's necessary to choose between option SWx or options VCC + RSC, together with Soft Start.

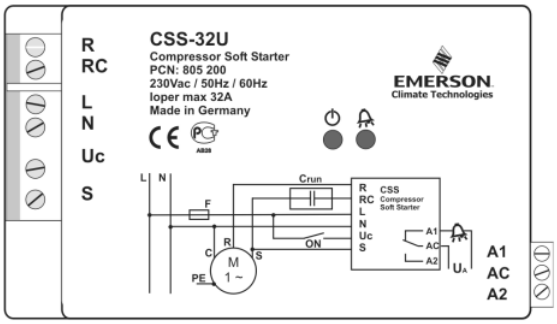
To verify the availability of SOFTM option with 230V/1ph/60Hz power supply, please contact your local partner STULZ.

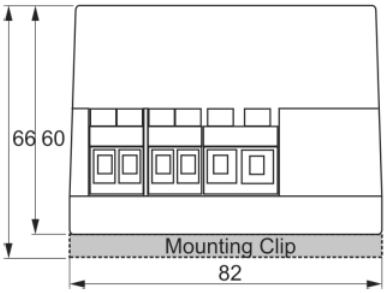
With SOFTM option, the working limit of the unit is 45°C external temperature.

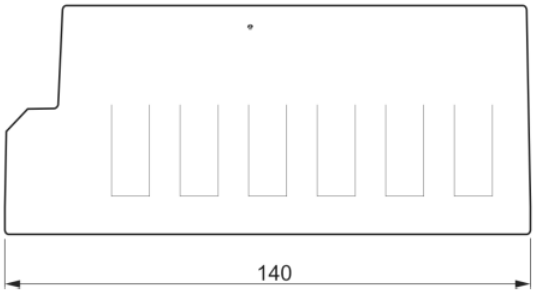
The soft start is installed inside the e-box on the supply line to the compressor. Its purpose is the reduction of compressor starting current and torque.

Technical data	
Power supply	230 V AC +10% / -15% / 50/60Hz
Nominal operating current	25A / 32A max. / AC-53a; AC-58a
Protection class according to IEC 529	IP 20









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