

STULZ the natural choice

Operating instructions

Release 04.2021

Prodigy IROW DX

High density air conditioner
230/1/50-60



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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.

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.



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.









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



An informative document on the REACH Regulation is available. Please view it on web site <https://www.stulz.it/it/azienda/media/informazioni-general/>

Symbols on this manual:

SYMBOLS ON THIS MANUAL			LABELS ON THE UNIT	
	DANGER	RISK OF INJURY FOR OPERATOR AND POSSIBILITY OF DAMAGING THE UNIT		DANGER: MOVING COMPONENTS
	ATTENTION	INFORMATION OR WARNING OF CAUTION IN CARRYING OUT A PROCEDURE		DANGER: HOT COMPONENTS
	INFORMATION	IMPORTANT INFORMATION		DANGER: HIGH VOLTAGE

1.1 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.



- **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 to the unit when working on it**



- **Observe the national regulations of the country where the unit will be installed**
- **The refrigerant circuit of DX units 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. Only for CW units, cooling water additives have an acidic effect on skin and eyes. Wear safety glasses and safety gloves**
- **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.**



- **The manufacturer is not liable for damages caused by either a misuse or unauthorized modifications of the air conditioner**

1.2 Handling refrigerants (DX units)

According to EN 378, refrigerants are divided in groups, concerning health and safety: R410A 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
- Refrigerants containing FCs contribute to the global warming and with this to climate changes. The FCs must therefore be disposed of in accordance with the regulations, i.e. only by companies specially qualified and licensed as recognised disposal companies for refrigerants

1.3 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 7.

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.

Unacceptable operating methods

The operating safety of the system is only guaranteed when it is used as intended (see this manual, paragraphs 3.1 and 3.2). The limit values stipulated in the technical data must not be exceeded under any circumstances.

1.4 Residual risk

During transport and installation

Area	Danger	Risk	Preventive measures
Under the unit	Defective lifting system of the unit that causes its fall.	Contusions, traumas	Keep away from dangerous area during handling of the unit.
Near the unit	Accidental collision with damages to the refrigerant circuit and leakage of refrigerant.	Burns, forming of acid vapours	Keep away from dangerous area during handling of the unit. Wear PPE.
Near the unit	Unstable or unsuitable support of the unit which causes its overturn.	Contusions, traumas	Be sure that the unit has adequate support in relation with its weight, it's stable and levelled. Wear PPE.
Electrical box	Supply cables under voltage.	Electrocution	Check that the power supply of the electrical box has been insulated. Remain electrically insulated from the ground. Wear PPE.
Near the unit	Fire where the unit is installed	Fire, explosion	Be sure that the installation site is reserved to qualified personnel

During start-up and operation

Area	Danger	Risk	Preventive measures
Near the unit	Launch of tools and various hardware (screws, nuts, washers, etc.) that can accidentally fall on the fans blades.	Contusions, traumas	In the installation phase, be sure to remove tools and other installation materials. Wear PPE.
Near the unit	Aspiration and following expulsion from the fans of objects, dusts and substances present on the installation site.	Contusions, traumas, inhalation of dusts	Clean installation area. Wear PPE.
In contact with the unit	Electrical connection against regulations and missing ground connection.	Electrocution	Remain electrically insulated from the ground. Wear PPE.
Near the refrigerant pipes	Condensation on refrigerant pipes if not insulated	Electrocution, slipping	Insulate the pipes. Wear PPE.
Near the unit and the refrigerant pipes	Shut-off valves closed after maintenance; fire; high pressure switch defectives with consequent explosive break of refrigerant circuit.	Burns, forming of acid vapours in presence of flames	Open shut-off valves of the refrigerant circuit. Wear PPE.
Near the unit (Electrical box, supply cables)	Short circuit; wrong dimensioning of the cables or of the general breaker.	Electrocution, burns, forming of acid vapours	Check the fixing of cables in the terminals: select adequately supply cables and main switch. Wear PPE.
Near the unit	Fire where the unit is installed	Fire, explosion	Be sure that the installation site is reserved to qualified personnel

During maintenance

Area	Danger	Risk	Preventive measures
Near the unit and the refrigerant pipes	Leakages in the refrigerant circuit; high pressure switch defective; fire. Consequent explosive break of refrigerant circuit.	Burns, forming of acid vapours in presence of flames	Open shut-off valves of the refrigerant circuit. Wear PPE.
Hot components of the unit accessible from outside (refrigerant lines)	Contact with hot surfaces.	Burns	Avoid contact. Wear PPE.
Sharp components of the unit accessible from outside (condensers, edges of the unit)	Contact with cutting surface.	Cuts, abrasions, Contusions	Wear PPE.
Electrical box	Powered line even if the switch of the machine is on OFF.	Electrocution	Check the insulation of the power supply from the electrical panel. Be sure that the main switch will not reactivated during maintenance.
Operation of the fans during maintenance	Contact with moving surfaces.	Cuts, abrasions, Contusions	maintenance and wait the stop of the moving parts. Wear PPE.

Internal hot components (compressor, condenser, refrigerant lines)	Contact with hot surfaces.	Burns	Wear PPE.
Near the unit	Fire where the unit is installed	Fire, explosion	Be sure that the installation site is reserved to qualified personnel

During disinstallation

Area	Danger	Risk	Preventive measures
Near the unit	Leakages in the refrigerant circuit; the system of refrigerant recovery is defective. Consequent explosive rupture of the refrigerant circuit.	Burns, forming of acid vapours in presence of flames	Wear PPE.
Near the unit	Leakages of oil during recovery.	Contact of the oil with skin or eyes	Wear PPE.
Near the refrigerant fittings	Disconnecting the pipes still under pressure.	Burns, forming of acid vapours in presence of flames	Recovery of gas before disconnecting the pipes. Wear PPE.
Electrical box	Powered line even if the switch of the machine is on OFF.	Electrocution	Check the insulation of the power supply from the electrical panel. Be sure that the main switch will not re-activated during maintenance.
Near the unit	Fire where the unit is installed	Fire, explosion	Be sure that the installation site is reserved to qualified personnel

2. Unit identification

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 unit: generally on one of the sides) and on the panel that closes the electric box.

The label also includes, in addition to the manufacturer's identification data and to the trademarks of the product, the following details:

The technical data label is printed on a plastic surface to ensure long durability of the text even in the toughest room conditions.






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

Nominal conditions:

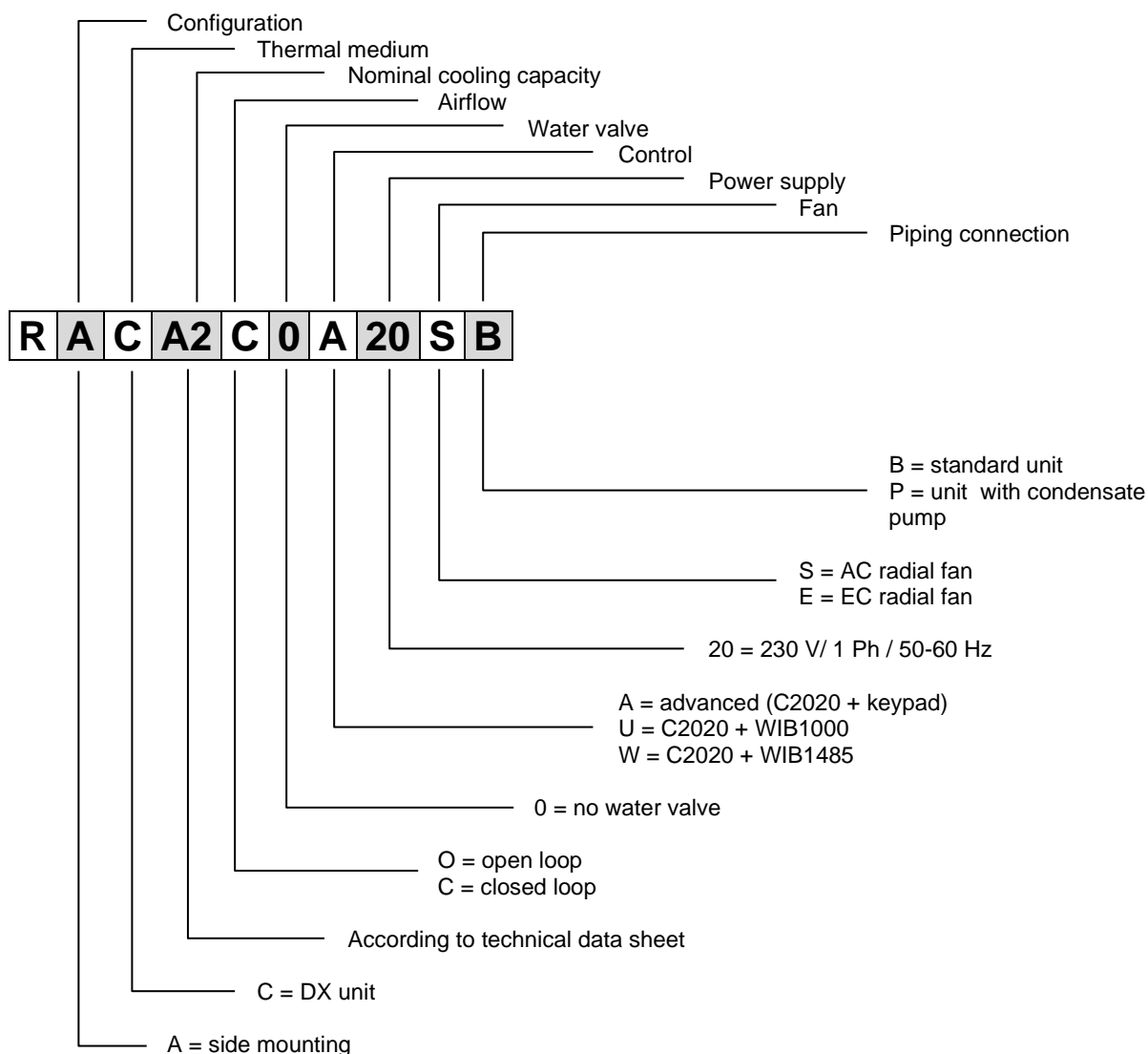
return air – temperature 35°C

return air – relative humidity 25%

external air – temperature 35°C

		 
CONDIZIONATORE D'ARIA - AIR CONDITIONER KUHLAGGREGAT - CONDITIONNEUR		
MODELLO - MODEL - TYP - MODELE	RACA2C0A20S0 7021	
SERIE - SERIES - SERIE - SERIE	N°	
ORDINE - ORDER - BESTELLUNG - COMMANDE	OP:	
DATA - DATE - DATUM - DATE	16/09/2016	
Tensione nominale - Rated voltage - Nennspannung - Tension nominale	230V 1 50/60Hz ~	
Avviamento/marcia - Starting/run current - Anlaufstrom/Nennstrom - Demarrage/marche	5,5 A	
Resa nom. - Cooling cap. - Kaelteleistung- Puissance nominale	22,3 kW ()	
Potenza Assorbita - Input power - Leistungsaufnahme - Puissance absorbee	1,25 kW ()	
Potenza assorbita in riscaldamento - Heating power consupcion - Verbrauch in heizung - puissance absorbee en chauffage	Kw	
Carica gas - Filling capacity - Fuellmenge - Charge de gaz	kg	
Refrigerante tipo - Refrigerant type - Kaeltemittel - Refrigerant ty	R410A	
Grado di Protezione IP - Degree of protection IP - Schutzart IP - Degré de protection IP	IP X0	
Peso - Weight - Gewicht - Poids	120 kg	
TSS (Max temp. Di stoccaggio - Max Storage temp. - Max Lagertemperatur - Temp. Max d'emmagasinage)	45 °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)	41,5 bar	
PS LP (Max pressione ammissibile LP - Max allowable pressure LP - Max zulaessiger Druck LP - Pression max admise LP)	15,9 bar	
CAT PED	3.3	
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		
Ermeticamente sigillato - hermetically sealed		
Hermetische Verschluss - Scellé Hermetiquement		
MADE IN ITALY		

Coding



Special models are indicated by a Z in the penultimate digit of the code, followed by a progressive number of 3 digits that indicates the special versions. Therefore, the 11th and 12th digits of the code lose their original meaning.

Customized models are indicated by two additional digits at the end of the code.

3. Components and operating principle

3.1 Intended and non-intended use

Intended use

STULZ Prodigy iRow conditioners are designed to cool rooms containing technological equipment, sheltered from weather. Use these conditioners to eliminate the problems caused by high temperatures, dirt and humidity in the room subject to climate control and in which the conditioners are to be installed.

As well, STULZ Prodigy iRow 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. These units are designed to be housed in a closed metallic frame for protection. This frame is between two racks (open loop) or beside one rack (closed loop), with front and back panels (not included in this product). Allowed installation positions are shown in this manual.

Main functions of air treatment are: filtration, cooling, dehumidification (with a special function), condensate pumping (with optional condensate pump).

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.



iRow DX air conditioners cannot work as heat pumps

3.2 Application limits

Operation limits		
Return air temperature	Min	25 °C
	Max	45 °C
Return air humidity	Min	6,5 °C dew point
	Max	60% r.h. and 15 °C dew point
Nominal power supply		230 V / 1 / 50 - 60 Hz
Voltage tolerance		± 10%
Frequency tolerance		± 2%
Storage limits		
Temperature	Min	-10 °C
	Max	45 °C
Humidity	Max	90%

3.3 Component layout

STULZ Prodigy iRow units are installed between two server racks in open loop configuration. They take air from a hot aisle of the room, cool and deliver it to a cold aisle, where it is sucked in by the server rack fans.

In closed loop configuration the air conditioners are beside the rack to which they are dedicated. Therefore, they take air from the discharge of the rack and, after cooling, they deliver it to the rack intake.

In both configurations, air suction and delivery are frontal and can be redirected with a deflector or a plenum (not part of the supplied product).

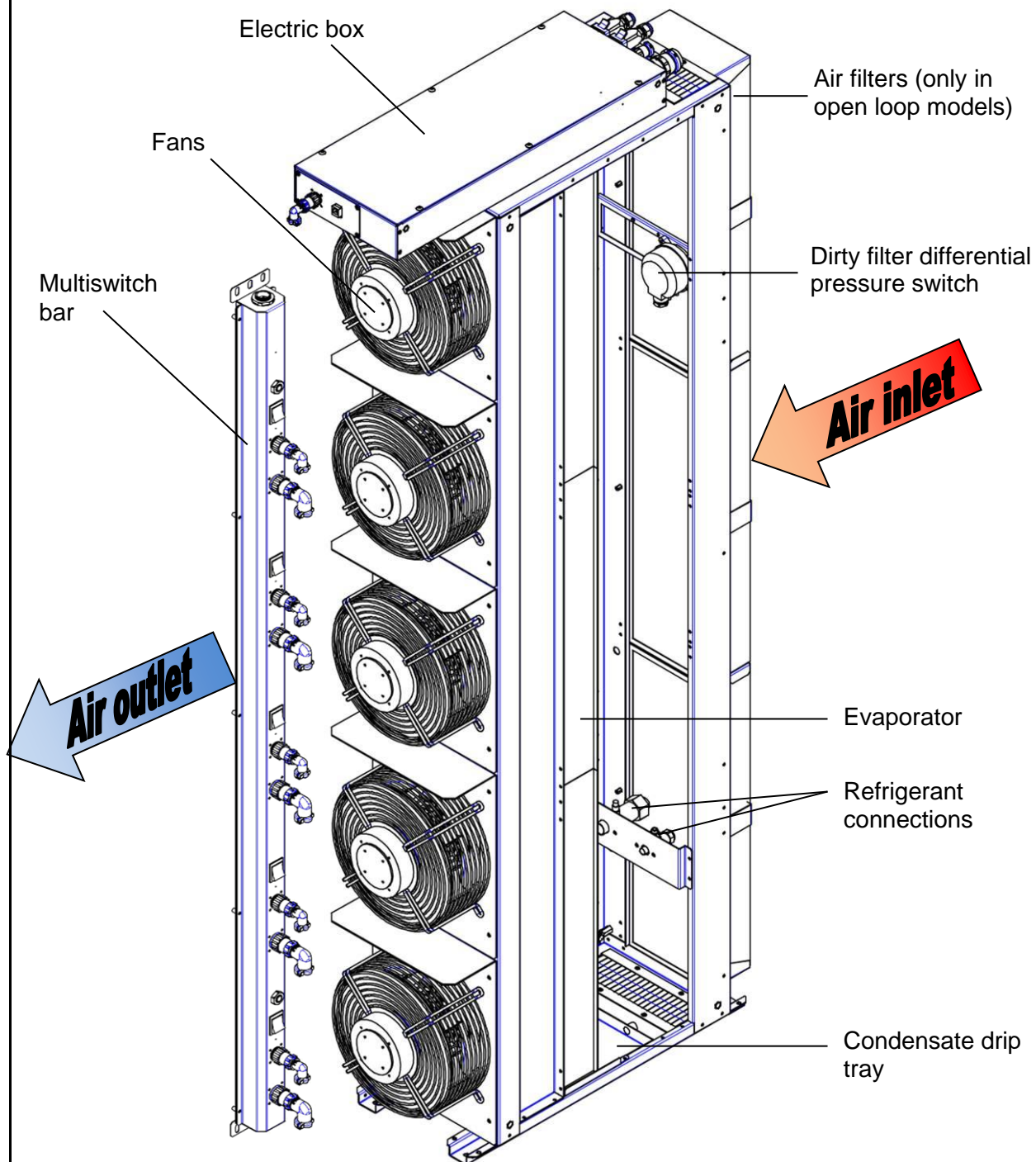
According to the air flow through the air conditioner, the following components can be seen:

- Air filter (only in open loop configuration)
- Piping with refrigerant connections
- Cooling heat exchanger with condensate tray underneath
- Radial fans

Openings for passage of refrigerant pipes are placed both on the base and on the top panel of the unit, and must be used according to the requirements of the room.

The electric box is separated from the air conditioner and designed to be fixed to the rack metallic frame above the air conditioning unit. It is closed by a protective cover.

A columnar metal bar with button switches for each fan is supplied loose, to be integrated in the frame containing the air conditioner.



3.4 Working modes

Cooling

Air is sucked in by the radial fans, is filtered (only in open loop units) and then it is cooled passing through the evaporator. After treatment, air is delivered through the frontal opening. Cooling capacity is modulated by the external motor-condensing unit, which is equipped with an inverter-driven compressor.



iRow DX units are designed to be connected only to the motor-condensing units of Mitsubishi Heavy Industries indicated in technical data sheets at the end of this manual

Air flow is controlled by C2020 with a modulation of fan speed, according to the temperature measured by the return air probes.

Dehumidification

According to the signal of humidity inside the room, supplied by the humidity sensor, the air conditioner electronic controller C2020 reduces fan speed. Consequent air flow reduction causes a higher temperature difference between inlet and outlet air, helping condensation of humidity in the heat exchanger.

Hot spot mode

Enabled by an external thermostat connected to a digital input of C2020, fans rotate at maximum speed, unless dehumidification is required.

Emergency

When a fan is blocked, temperature control is in emergency mode. The remaining fans work at maximum speed, unless dehumidification is required.

3.5 Mechanical components

Structure

These units are made of self-supporting galvanized sheet metal parts that offer good corrosion resistance (suitable only for non-corrosive and non-saline environments). Electric box and fan switch bar are powder coated with protective paint. Internal metal parts are used to strengthen the unit and direct air flow. This system is designed for an easy inspection of the unit.

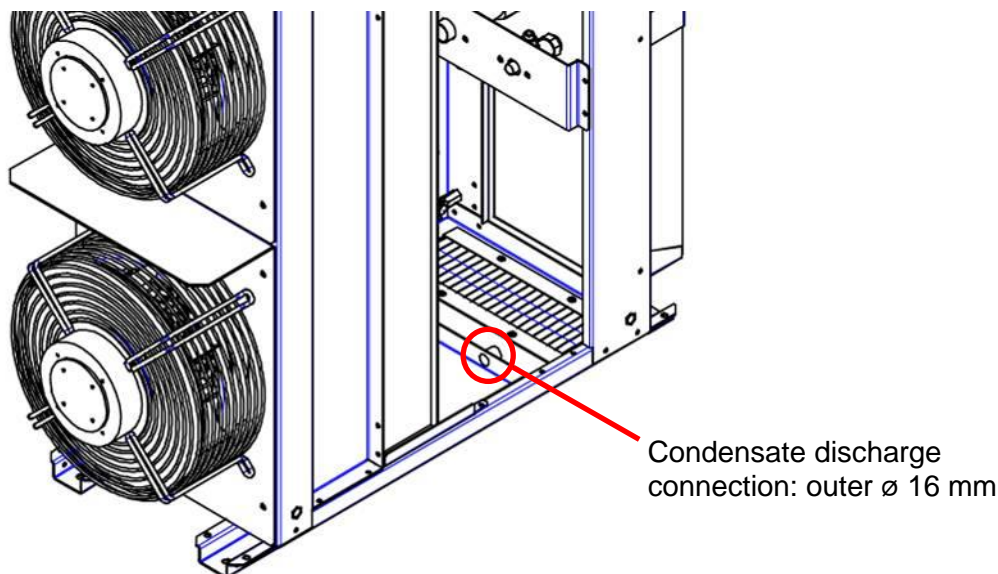
Inner components are accessible by removing the outer panels and doors of the rack where the air conditioner is mounted.

Air filter (only in open loop version)

Air filter is installed on open loop units to filter air from the hot aisle before it enters the evaporator, preventing dirty particles from obstructing the exchanger. It belongs to efficiency class ePM10 50% (EU3/ EN779). Its zig-zag shape with 100 mm height implies a wide filtering surface, reducing pressure losses and frequency of maintenance.

Condensate water tray

Made of aluminium sheet, it is placed below the heat exchanger to collect water condensing on its surface during cooling mode. It is provided with a connector with 16 mm outer diameter for water drain. The connector is on the rear side of the condensate tray, as shown in the picture below.



3.6 Refrigerant circuit components

The unit basically consists of an open refrigerant circuit (the motor-condensing unit is remote) composed of an evaporator and refrigerant cocks. Prodigy DX units must be connected to a remote motor-condensing unit in order to complete this circuit and achieve cooling function.



iRow DX units are designed to be connected only to the motor-condensing units of Mitsubishi Heavy Industries indicated in technical data sheets at the end of this manual. For any information regarding motor-condensing units, please consult manufacturer manuals.

The system operates as follows:

The compressor brings the refrigerant to a higher temperature and pressure. The hot gas passing through the condenser is cooled and liquefied, releasing heat to outer air. The refrigerant fluid, pushed through the thermal expansion valve, loses pressure and prepares for evaporation. Evaporation takes place in the evaporator where the refrigerant absorbs the heat of inner hot air and as a consequence cools down this air. Circuit components are connected together by copper pipes that are welded to guarantee an excellent seal.

Refrigerant

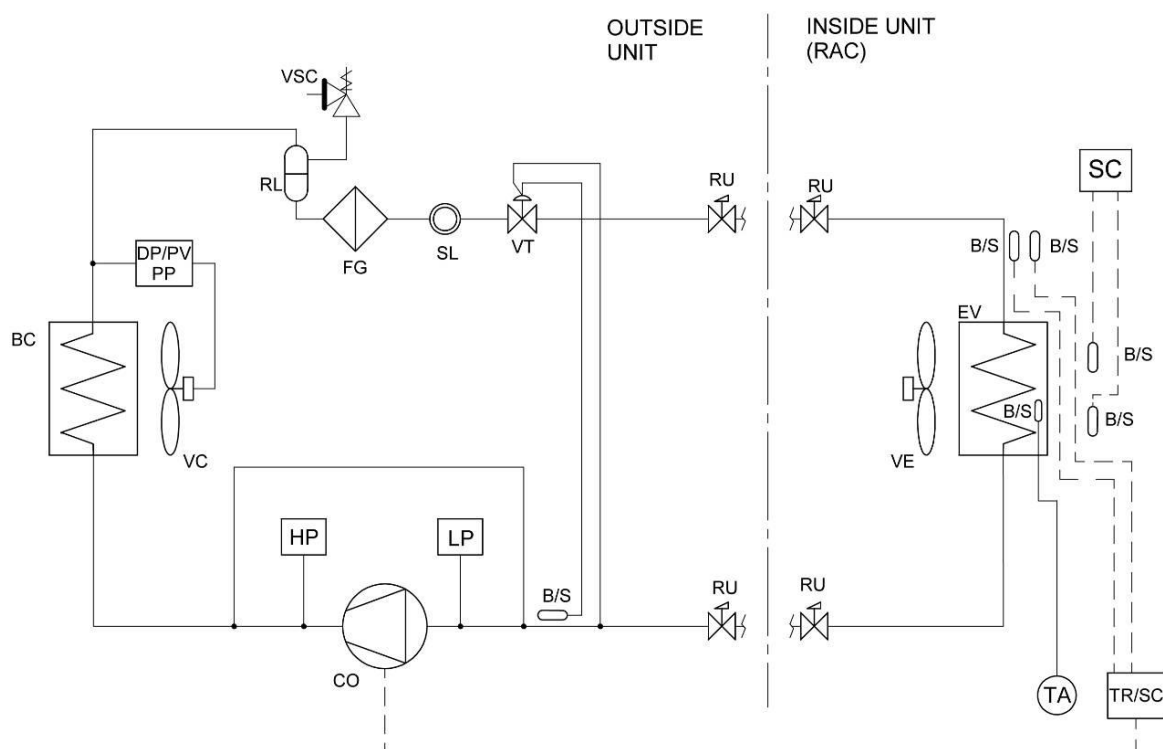
The units employ R410A (HFC) refrigerant.

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-corrosive and non-saline environments only). Surface has hydrophilic treatment.

Refrigerant cocks (RU)

They are positioned on the rear side of the unit. Liquid pipe connector (from the external unit to the RAC) is 1/2" SAE, while gas pipe connector (from the RAC to the external unit) is 3/4" SAE. Both cocks are provided with a refrigerant charge connector with 5/16" SAE.



Legend

B/S	Probe	HP	High pressure switch	SL	Liquid detector
BC	Condenser	LP	Low pressure switch	TA	Antifreeze thermostat
CO	Compressor	RL	Liquid receiver	TR/SC	Keypad
DP	Pressure transducer	RU	Refrigerant cocks	VC	Condenser fan
EV	Evaporator	PP	Partialization pressure switch	VE	Evaporator fan
FG	Gas filter	PV	Fan partialization	VSC	Safety valve
		SC	Board	VT	Thermostatic valve

3.7 Motors

Fans

AC fans are radial, with backward curved blades made of plastic. Rotor is painted with epoxy black RAL9011, mounted on ball bearings and dynamically balanced according to VDI2060. Protection degree IP44. Insulation class F.

Optional EC (electronic commutation) fans are radial, with backward curved blades made of galvanised sheet steel. Rotor is also made of galvanised sheet steel, mounted on ball bearings and dynamically balanced according to DIN ISO1940, quality level G6.3. Protection degree IP44. Insulation class B.

3.8 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.

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.

Fan switches - circuit breakers

Double-pole main switches are placed on the multi-switch bar which is separated from unit frame. They disconnect main power supply of all electric circuits downstream. According to the directions on Chapter 5, one additional disconnecting switch must be always installed on main power supply lines upstream the motor-condensing unit, in order to cut power supply before any maintenance on the unit.

Fan speed controller (with AC fans)

This electronic module receives a PWM signal from C2020 controller and transforms it in a change of effective voltage through a phase-cut system. Protection degree is IP20.

Expansion tachometric board (with more than 3 EC fans)

This expansion board receives the three V1 – V2 – V3 signals 0÷12 V from C2020 and duplicate them to control speed of 3 couples of fans. This board receives a tachometric signal as a feedback from each single fan to check whether it runs.

Temperature probes

Two PTC probes are connected to analogue inputs of C2020 controller, in order to measure return air temperature. They are placed behind air intake opening, higher and lower parts.

Four NTC probes measure temperature of return air, inlet and outlet of evaporator. They are connected directly to analogue inputs of Mitsubishi controller. Measured parameters are used to control external motor-condensing unit.

Humidity sensor

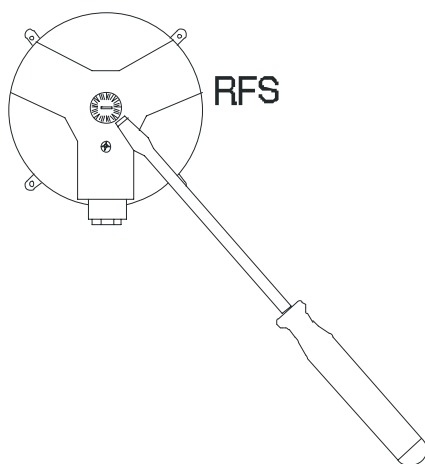
Placed behind air intake opening, it sends a humidity analogue signal ($4 \div 20$ mA) to C2020 controller, in order to enable dehumidification mode. Measured range of humidity $15 \div 90\%$. Protection degree IP54.

Electronic board of motor-condensing unit

It is placed inside the electric box of the RAC indoor unit and communicates cooling set point and working status with C2020 through XY protocol. According to the measured parameters it controls working of motor-condensing unit, adjusting compressor and condenser fan speed. For a detailed description of its functions, please consult manual of Mitsubishi motor-condensing units.

RFS dirty filter pressure switch (only in open loop models)

RFS gives a dirty filter signal (only with open loop units), shown both on the display and on a voltage-free contact. It indicates when it is necessary to clean or replace the air filter.



Range : 20 – 200 Pa

Differential pressure: 10 Pa \pm 15%

P1 : High pressure connection

P2 : Low pressure connection

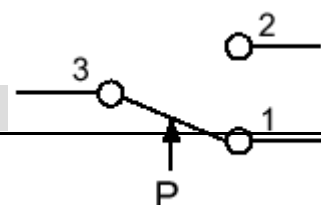
Adjustment:

Use a screwdriver on the central screw to adjust the differential pressure to the desired value at which the dirty filter signal trips.

Technical characteristics:

Power supply:	1,0 (0,4) A; 250 Vac - 0,1 A; 24 Vdc
Operating temperature:	-20/+85°C
Maximum pressure:	10 kPa
Casing:	PA 6.6
Protection:	IP00
Diaphragm:	Silicone
Pressure connection:	Ø 6 pipe

Connection :



Contact 3-1 opens when the differential pressure exceeds the pre-set value. At the same time contact 3-2 closes. The signal is transmitted through this contact.

C2020 electronic controller

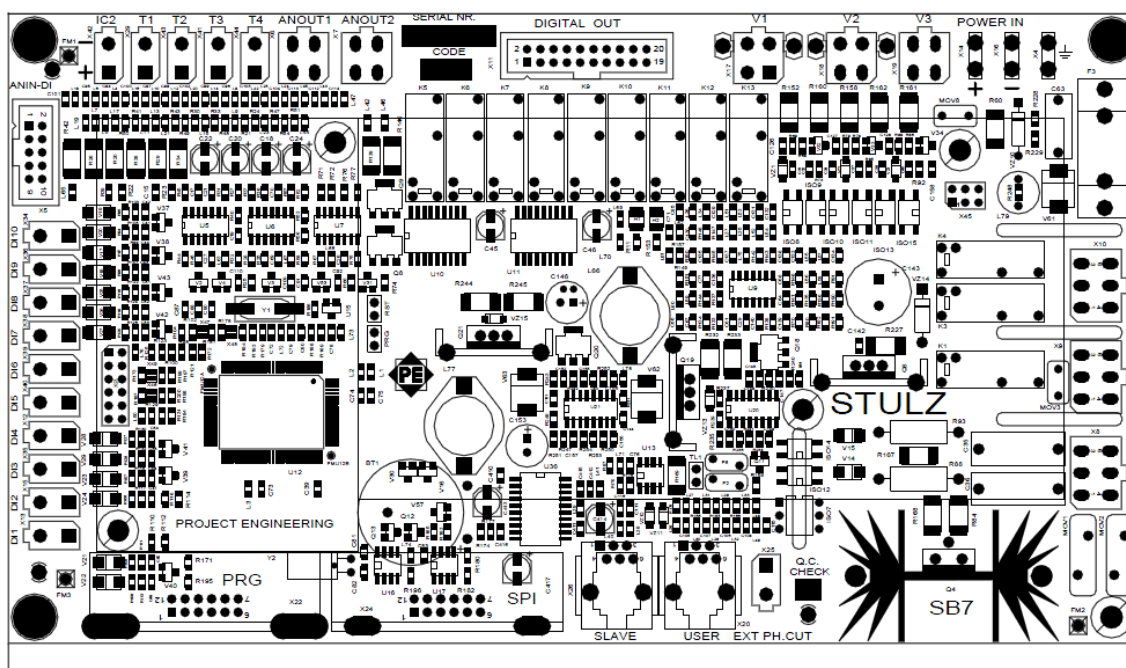
This electronic microprocessor card is equipped with a set of terminals to connect the card to the devices it controls (fans...). The operating software and the file containing the operating parameters are written in the EEPROM so that they remain stored even when there is a cut-off in the power supply.

The C2020 card is housed inside the electric box and can only control one unit.

A keypad can be connected to the C2020 card to display information regarding operating conditions, the state of the unit and any alarm. As standard, the keypad for Prodigy iROW is supplied loose, to be mounted on the rack frame. The keypad is provided with 4 m cable for connection to the USER socket in the e-box.

C2020 is connected to the controller of external motor-condensing unit, to exchange data for unit control. Connection is made through a XY interface mounted on PRG port of C2020.

The C2020 card can also be connected to a remote monitoring / supervision system using a serial line and ordering the necessary options. Serial line for sequencing / telemonitoring is available on the SLAVE port. For more detail about telemonitoring, please check the corresponding paragraph.



Refer to the wiring diagram given in part 2 of the manual, which is specific for each unit, when assigning the C2020 inputs / outputs.

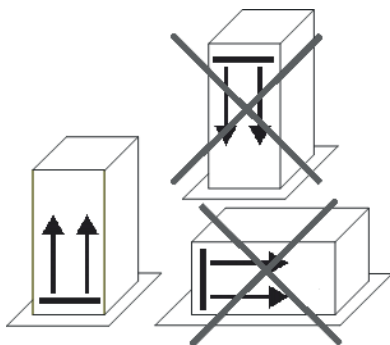
4. Unpacking and inspection

INSPECTION

STULZ products are delivered ex-works. All units have been individually inspected in all their components and been carefully packaged before of 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 reception.
- Check that there aren't any external damages. In case, note them on the shipping document in the presence of deliverer.
- Hidden damages, 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.



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.

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

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.

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. Lifting devices with ropes can be used, securing ropes to the pallet and protecting upper edges of the units with wooden or metallic angles.

As an alternative, when the unit is still packed with pallet, a forklift can be used, taking care that the centre of gravity is inside fork area.

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.



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 included in the packing of the unit;
- 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 3.2

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.

Components inside the packing:

- RAC cooling module
- electric box
- multi-switch bar
- keypad of C2020 with connection cable, packed in a carton box (code ACTKPDC1010)
- accessories which might be included in the packing



Use original packing to ship the air conditioner to any other destination.

If packing disposal is necessary, we remind to dispose different materials suitably.

5. Installation

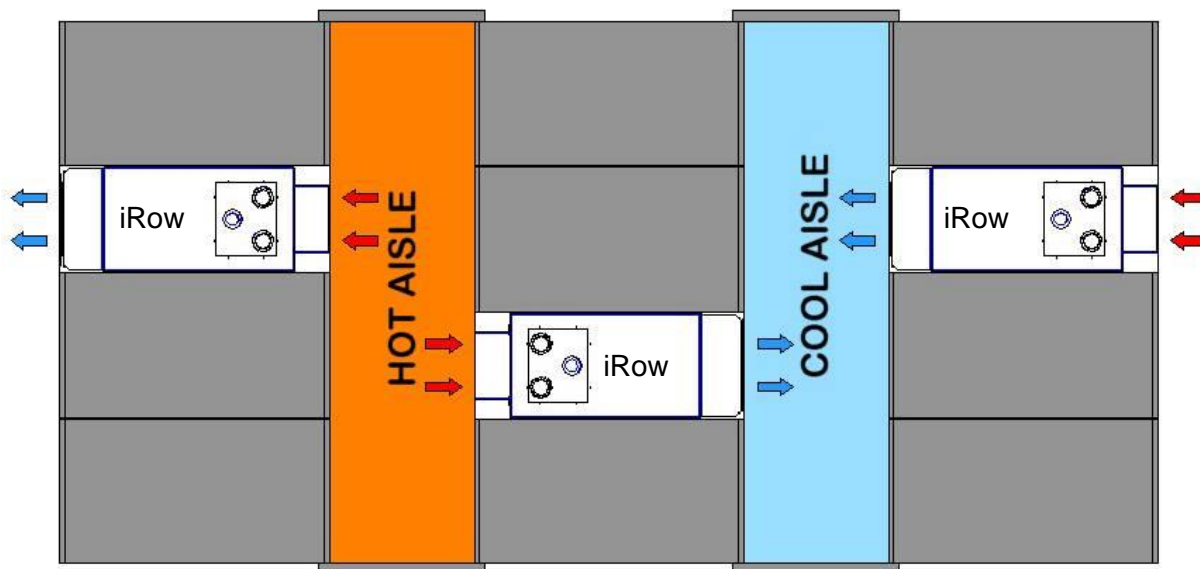
5.1 Positioning the internal unit



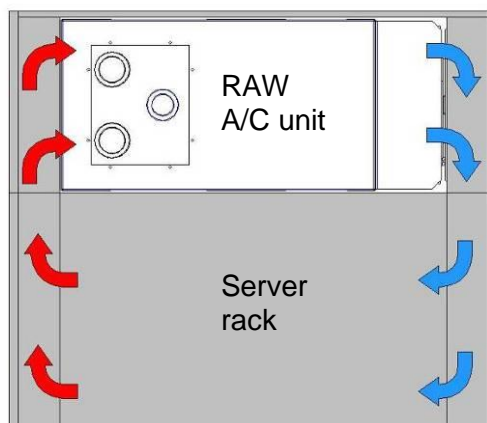
To position external unit, please follow the instructions on the corresponding manual.

iRow air conditioners are not provided with either lateral or top or door panels. Therefore, they must be installed inside a frame with suitable protection.

In open loop version they must be installed between two server racks. Installation at an end of a row is not recommended because there is a mix of hot and cold air. Furthermore it is recommended to install them near the racks with highest heat load.



In closed loop version they must be installed beside a rack. A closed air circuit must be created between the rack and the unit, installing suitable plenums.



Furthermore, check that:

- there's room enough for an easy installation and maintenance of the unit: please check dimensional drawings, with particular attention to the accessibility of refrigerant connections and wiring. There must be a free space of 1 m from both front and back sides of the unit for installation and maintenance;
- air circulates correctly, both inside and outside the frame, avoiding any short circuit, re-circulation or by-pass;
- more in detail, check that air suction and discharge are correctly separated inside the frame. Separate air suction from discharge placing sealing material (gaskets) suitably;
- in open loop version, avoid to place two units such as their air supplies are one in front of the other;
- avoid any obstacle to the air flow;
- any measure (i.e. deflectors) to separate hot and cold aisles increases the efficiency of the system, so it is highly recommended;
- units are installed on flat and perfectly horizontal bases so that they will operate correctly and that condensate will drain properly.

Fix the unit into the rack frame with suitable devices (screws, brackets, metal tongues). The position of fixing points is in the following drawings.

Then, fix the multi-switch bar to the rack frame. The multi-switch bar is provided with two metal tongues on its top and lower parts. Each tongue has three fixing holes, as shown in the drawings on the next pages.

The electric box is supplied loose on the top of the unit. It is provided with 4 lateral inserts for fixation to the rack frame.



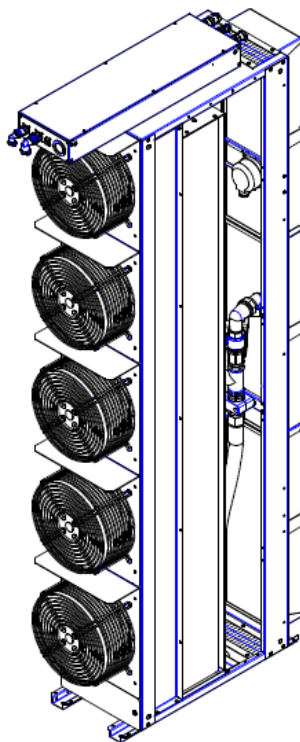
The electric box leaning on the unit is provided with external fast connections, so that it can be unplugged and removed to ease unit insertion.



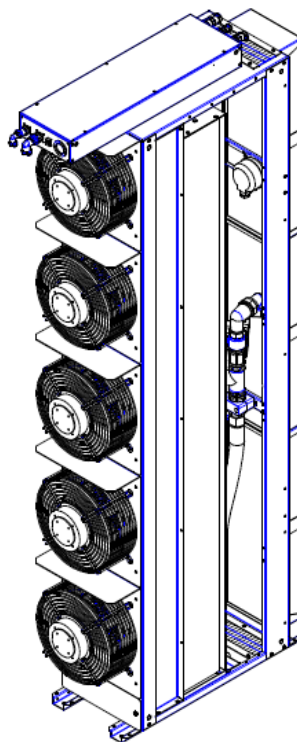
Before inserting the unit into the rack, please observe position of condensate water discharge and refrigerant pipe passages in the following drawings.

Overview of possible unit configurations with electrical box on the top

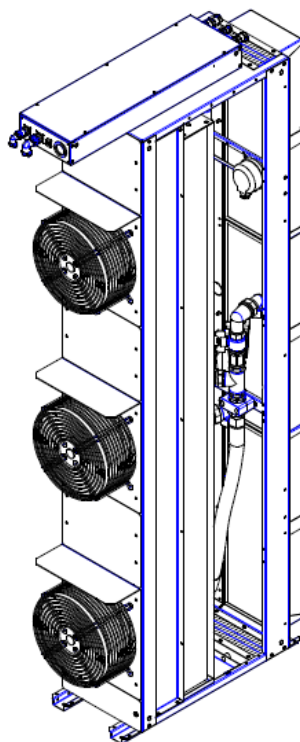
5 AC-FAN



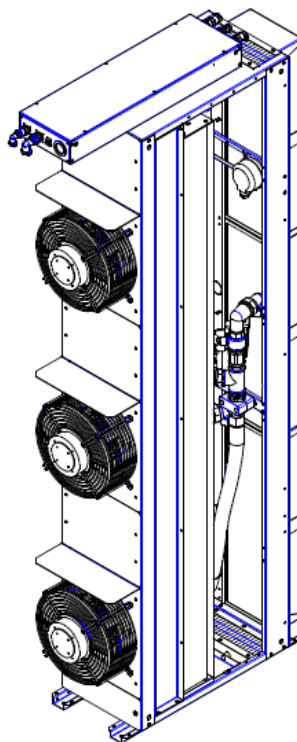
5 EC-FAN



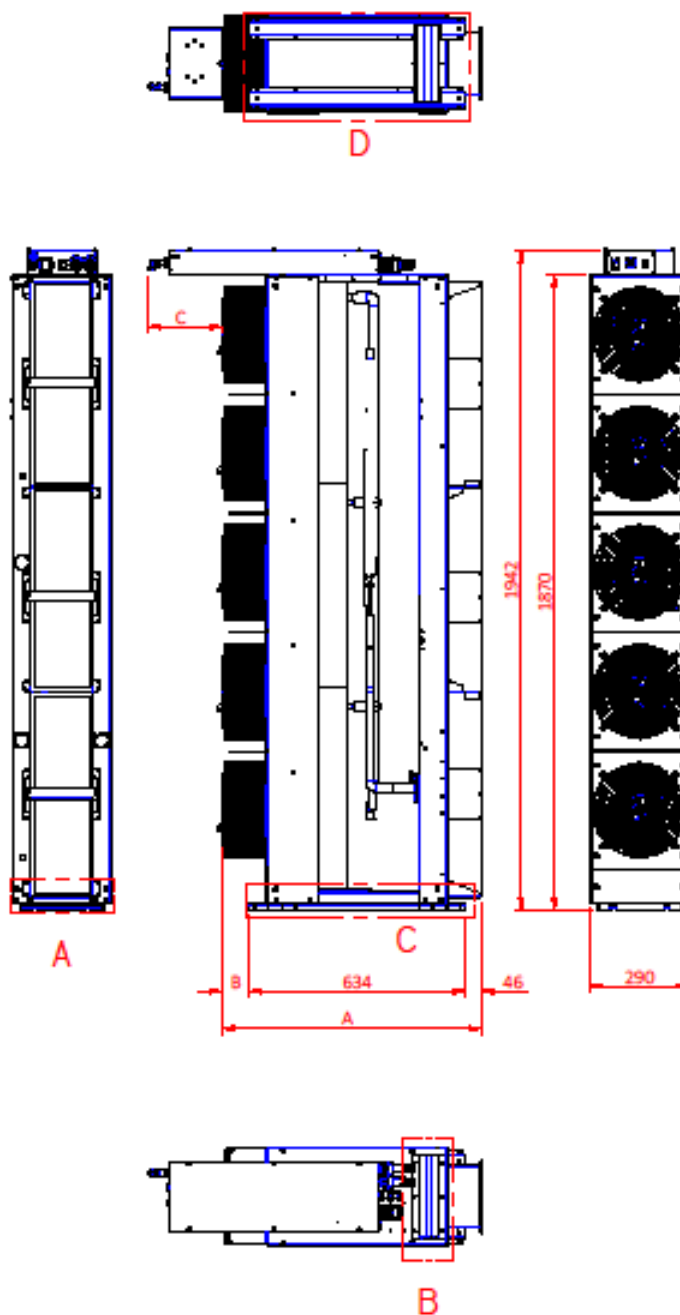
3 AC-FAN



3 EC-FAN

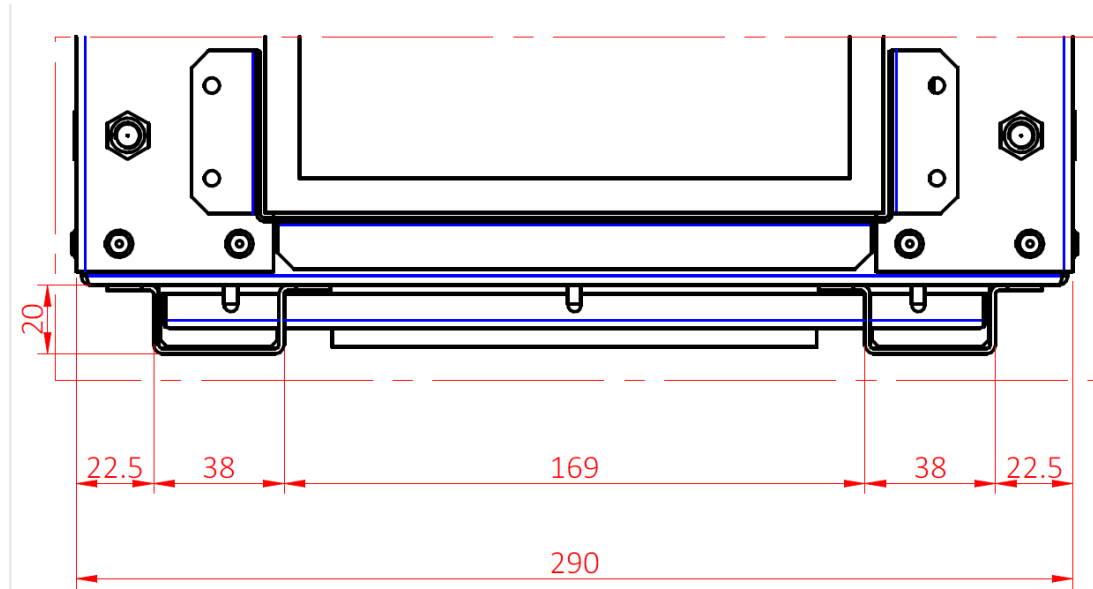


General dimensions and position of e-box

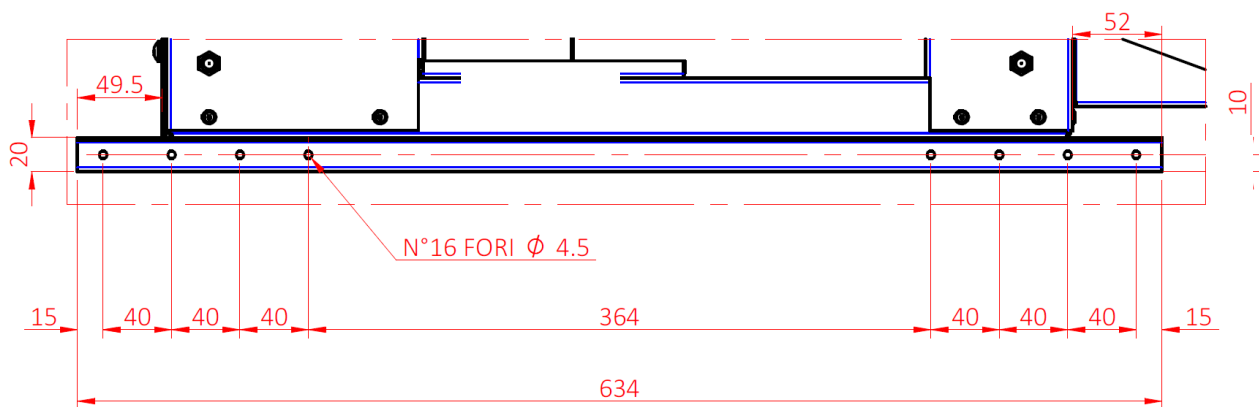


RAC		A	B	C	D
Open loop	AC fans	761	81	216	783
	EC fans	753	73	238	799
Closed loop	AC fans	663	81	216	783
	EC fans	655	73	238	799

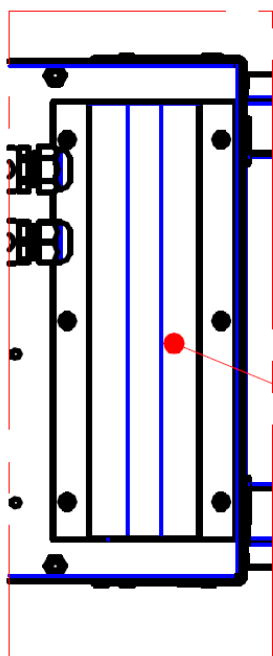
Detail 1



Detail 2 (position of fixing points on lateral-bottom frame)

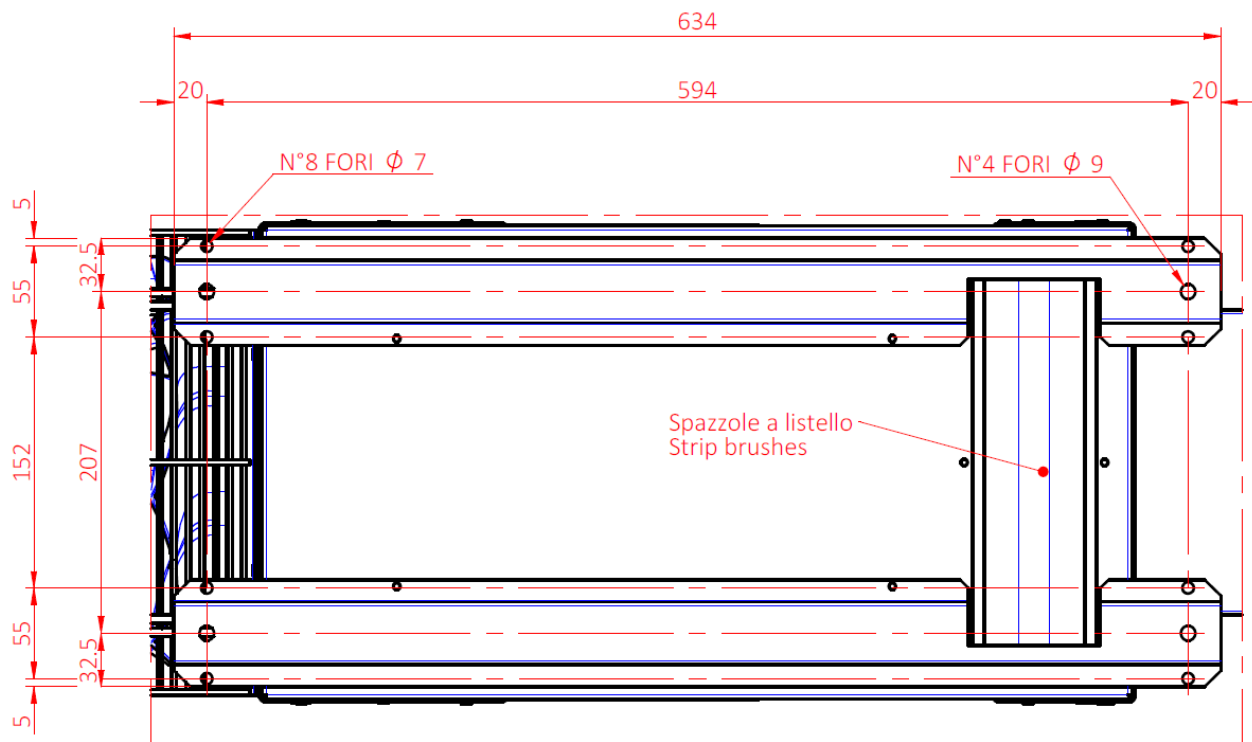


Detail 3

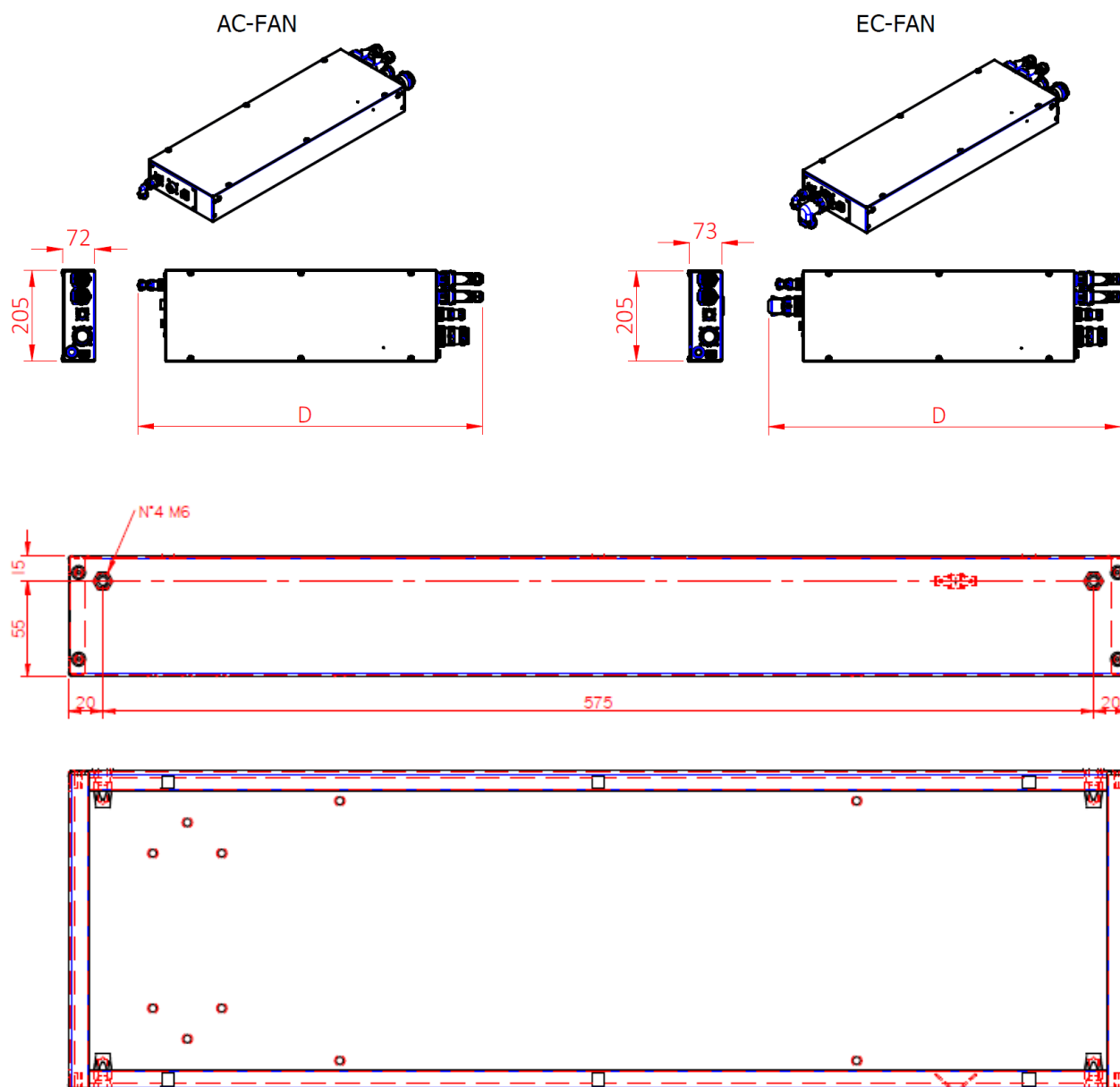


Spazzole a listello
Strip brushes

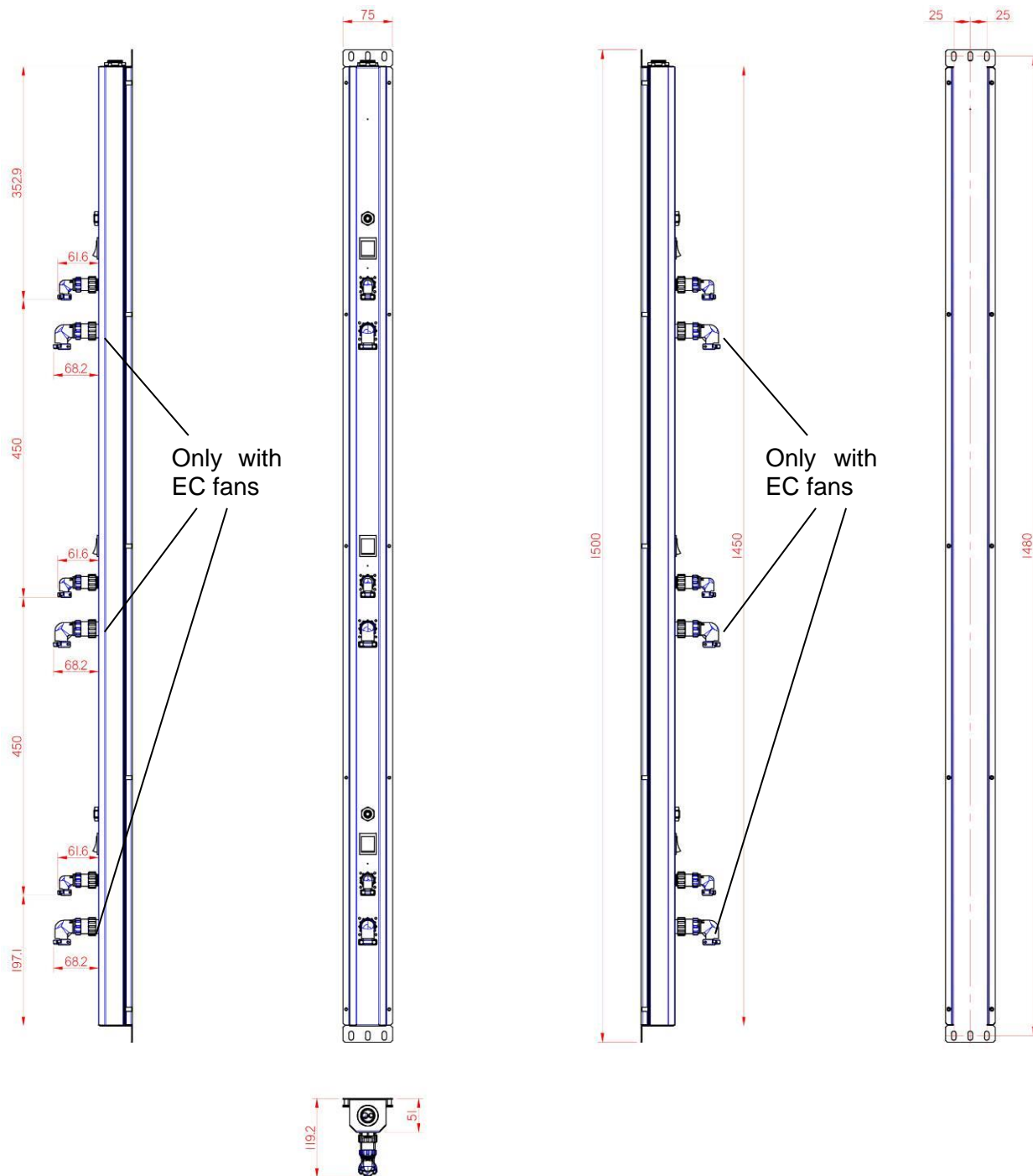
Detail 4 (position of fixing points on bottom side)



Dimensions of e-box



Dimensions of multi-switch bar (3 fans)



5.2 Refrigerant circuit connection

iRow DX units must be connected to a remote motor-condensing unit in order to complete the refrigerant circuit and achieve cooling function.



iRow DX units are designed to be connected only to the motor-condensing units of Mitsubishi Heavy Industries indicated in technical data sheets at the end of this manual. For any information about motor-condensing units, please consult manufacturer manuals.

As a consequence copper pipes for the two liquid and gas lines must be suitably installed and connected to the conditioner and to the remote motor-condensing unit.



Work on refrigerant circuits must only be done by qualified personnel or by the STULZ service department.

Making the refrigerant connection includes the following phases (described below):

1. Selecting and laying the pipes.
2. Closing the circuit and testing the seal.
3. Creating a vacuum.
4. Opening the circuit and, when necessary, charging additional refrigerant.

RAC unit is charged with a mix of nitrogen and a small quantity of R410A. This mix must be discharged before step 3. Cocks of RAC unit must be opened between step 2 and step 3.



Motor-condensing unit is pre-charged with refrigerant R410A. Do not open its operation valves before step 4.

Selecting the gas and liquid lines

- Trace the shortest path between the unit and the remote condenser except when this path requires an excessive number of pipe elbows. Select the path with the shortest equivalent length.
- Determine what fittings are necessary on the pipes between internal and external units.
- Use the following table to convert pressure losses in fittings into equivalent pipe lengths and add these lengths to the real length of the pipe.
- Select the liquid and gas pipe diameters following the indications on the manual of motor-condensing external unit.

Gas pipe diameter (mm - in)	12.7 - 1/2"	15.88 - 5/8"	19.05 - 3/4"	22.22 - 7/8"	25.4 - 1"	28.58 - 9/8"
Equivalent bend length	0.20	0.25	0.30	0.35	0.40	0.45

Respect maximum allowed one-way pipe equivalent length between iRow DX and external motor-condensing unit. This value is indicated on the manual of the external unit.



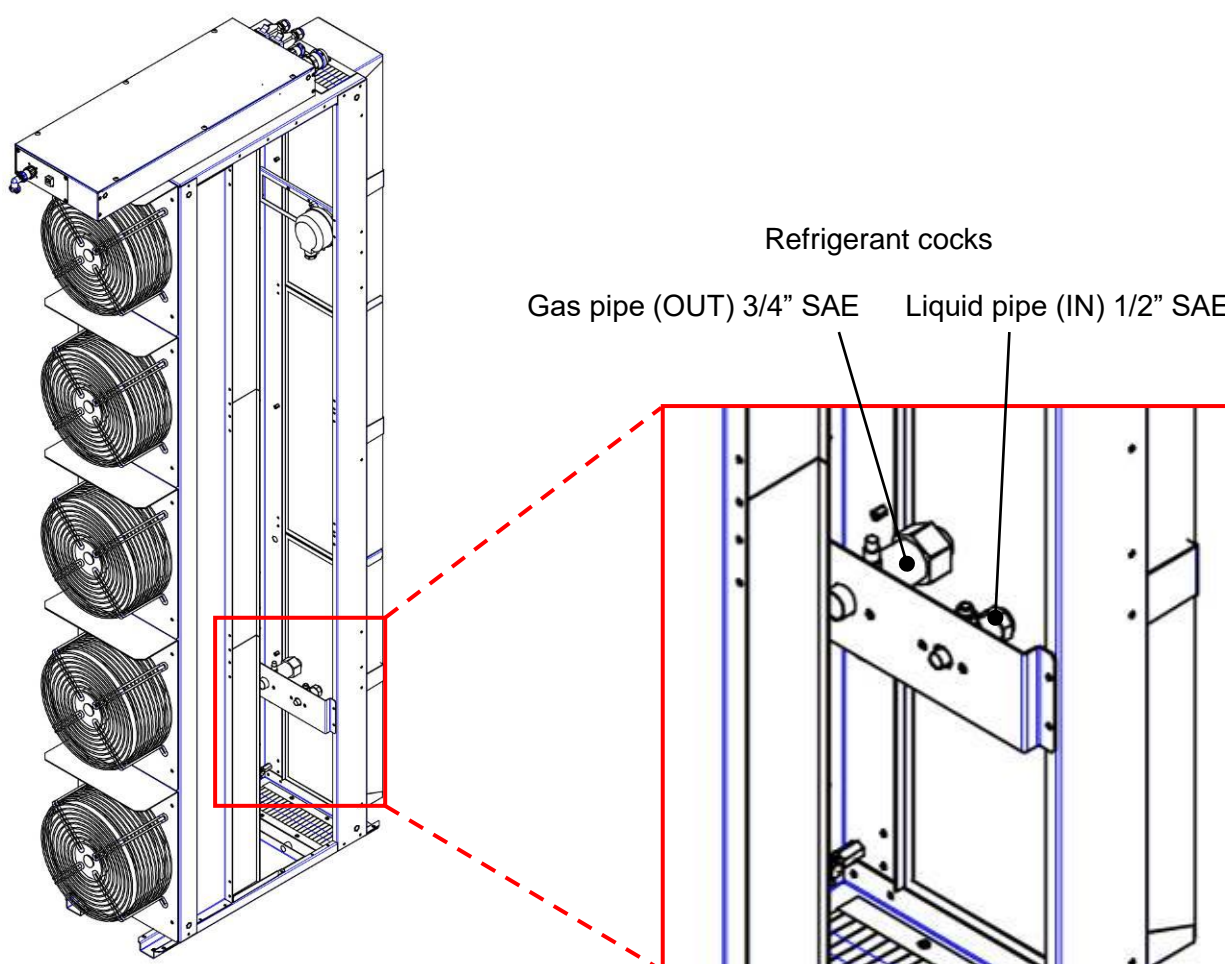
Respect maximum elevation difference between indoor and outdoor units. This value is indicated on the manual of the external unit.



For any additional information regarding pipework (material, size, piping work, insulation), please follow strictly manual of outdoor motor-condensing which will be connected to the iRow DX internal unit.

Closing the circuit and testing the seal

1. Connect the pipes to the motor-condensing unit. Follow the instructions in the manual of outdoor unit.
2. Connect the pipes to the cocks on the air conditioner. For pipe passage, use openings with strip brushes, which are located both on the base and on the top of the unit. Pipe connections are oriented downwards. On both size, diameter of liquid pipe connector is 1/2" and gas pipe connector is 3/4" (see drawing below).



3. It is absolutely necessary to check system seal after connecting all the pipes to the system. For this operation please refer to manual of outdoor motor-condensing unit. This operation must be done with cocks of both RAC and motor-condensing unit closed.
4. Discharge the mix of refrigerant and nitrogen from RAC unit.

Vacuum creation

After checking the pipe seal, open the cocks of RAC unit. Create vacuum, following the instructions in the manual of outdoor motor-condensing unit.

Opening the circuit and charging additional refrigerant

Open the operation valves (refrigerant cocks) of outdoor motor-condensing unit. The motor-condensing unit is pre-charged with R410A for pipes up to a certain length. This length depends on the model of motor-condensing unit. With pipe lengths exceeding this limit for pre-charge, an additional refrigerant charge is necessary. Refer to manual of motor-condensing unit to know limit for pre-charge, quantity of refrigerant to be added and charge procedure

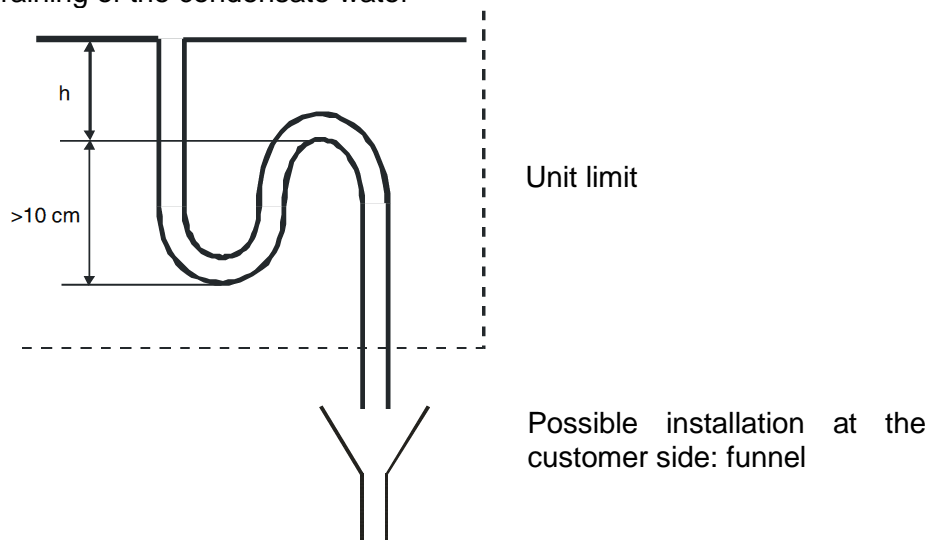
5.3 Condensate discharge: siphon installation

Condensate drain connector is placed on the rear side of the drain pan, under the evaporator. Connection of condensate pipe has a diameter of 16 mm for all models. Condensate pipe must be provided by the installer and has to be routed outside the unit through the same opening on its base used also for pipes and electric cables.

Make a siphon according to the following instruction:

Siphon installation

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



Connect the condensate water drains to the local waste water system. Ensure a 2% gradient towards water drain.



Comply with the regulations of the local water supply authority.

5.4 Electric connections

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 an omnipolar isolating switch with magneto-thermal protection upstream the motor-condensing unit. This switch is necessary to permit maintenance on the machine with total absence of electricity and to protect the electrical components downstream against overcurrent and short circuits. Switch size must be determined according to the maximum absorbed current of the whole system (motor-condensing unit + RAC unit), as well as according applicable directives and standards.

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)

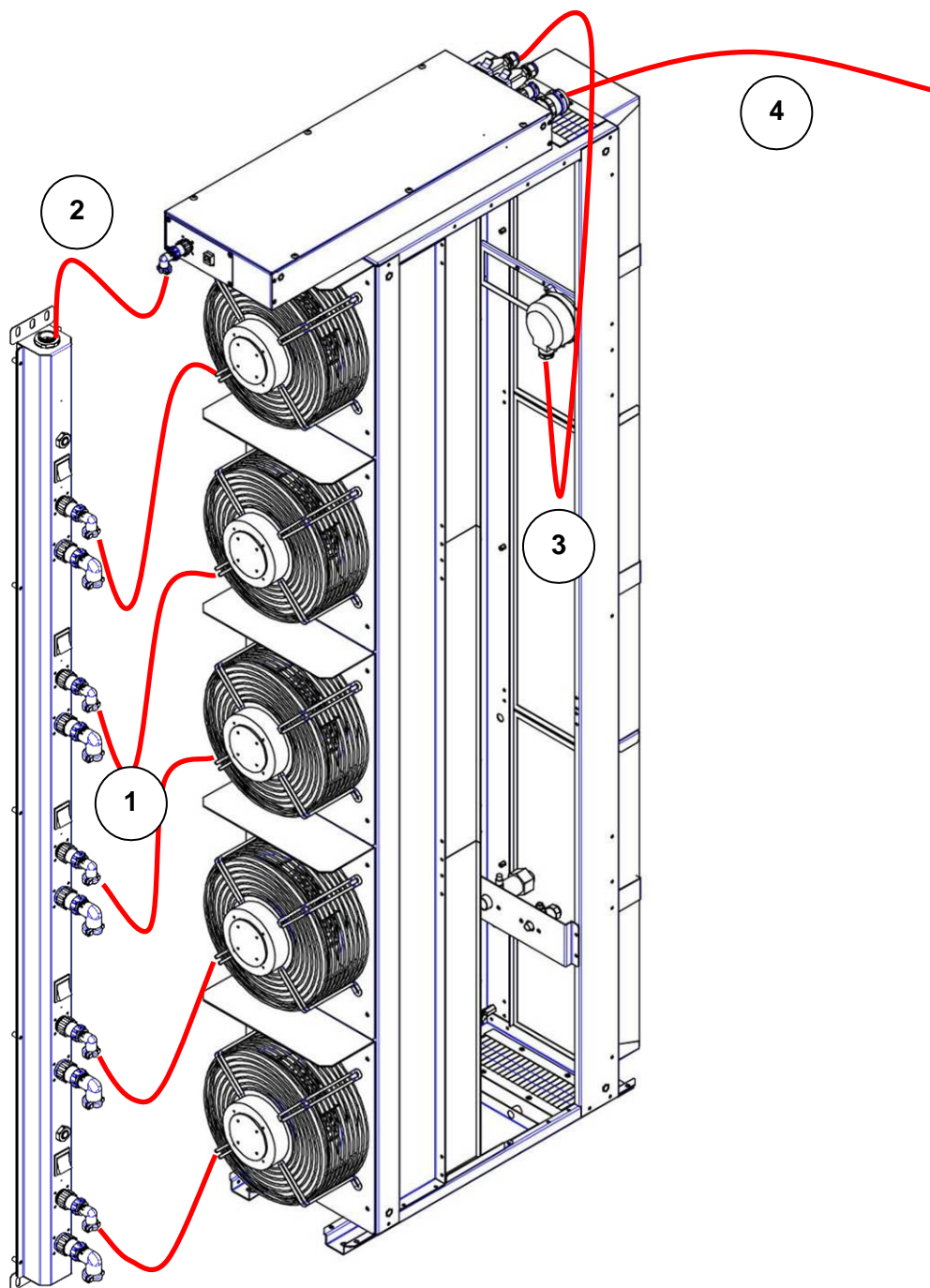
National mechanical and electric systems regulations

- Check power supply voltage and frequency.
- Check that these values are compatible with those of the unit (shown in its name-plate).
- Cut off the main power supply before working on the unit.
- RAC units receive power supply from the outdoor motor-condensing unit. Before connecting RAC unit to the outdoor unit, complete the electric installation of RAC unit.

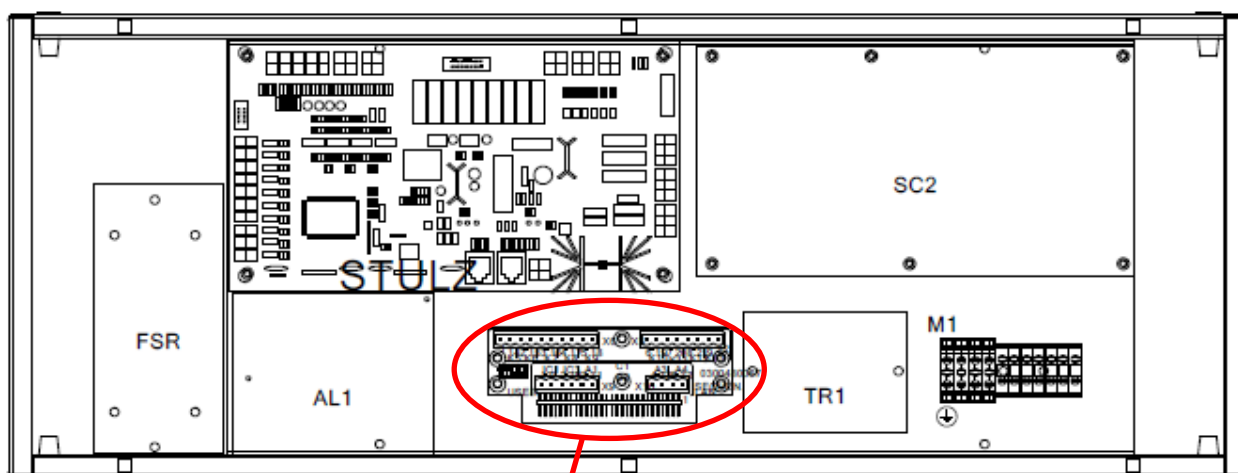
RAC units are composed of 3 different parts: cooling module; electric box; multi-switch bar. These 3 parts have to be electrically connected together, according to the wiring diagram, as shown in the following drawing.

- Step 1: connect the multi-switch bar to the cooling module. Cooling module is provided with power supply cables close to each fan. With EC fans a second cable for signals is present. Each cable ends with a connector which has to be screwed to the corresponding connector on the multi-switch bar.
- Step 2: connect the multi-switch bar to the electric box. Multi-switch bar is provided with a power supply cable. With EC fans a second cable for signals is present. Each cable ends with a connector which has to be screwed to the corresponding connector on the frontal part of electric box: X3 is the connector for power supply and X12 is the connector for signals.
- Step 3: connect the components on the rear side of cooling module (such as humidity sensor, dirty filter pressure switch, etc...) to the connectors on the rear part of electrical box, according to the wiring diagram. Components are already provided with necessary cables.

- Step 4: wire power supply cables from the outdoor motor-condensing unit to X1 and X2 connectors on the rear part of the electrical box. Follow the interconnection diagram at the end of the wiring diagram of RAC unit, as well as the instructions on the manual of the motor-condensing unit.



- C2020 controller has up to nine voltage-free digital outputs available for alarm signals. Alarms managed by C2020 controller can be addressed to these outputs in different ways. Standard alarm configuration can be checked in wiring diagram. Alarm contacts are available on a screw-type interface inside the electric box. Connection diagram is shown in wiring diagram.



Screw connector for alarms

- Section of power supply cables must be selected in accordance to their length and the power 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.



Electric installation is completed when outdoor motor-condensing unit is connected to main power supply. This operation must be done according to the manual of motor-condensing unit.

Failure to comply with these points can cause damage or malfunctions to components and immediately invalidates guarantee coverage.



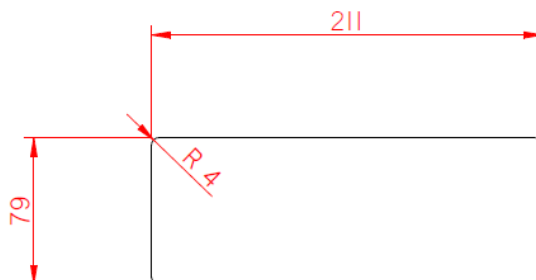
For use of leakage-current (FI) circuit breakers, EN 50178 5.2.11.2 must be taken into account. Only type B pulse-current FI circuit breakers are permitted. FI circuit breakers do not provide protection against bodily harm during operation of the unit or frequency converters.



In case of units at 60 Hz, it's necessary to set the parameter C.4.4.1.1=1 (60Hz), using 'Service' password 111.

Installation of the display

The display of C2020 can be installed on the front door of the containing frame. To this purpose the front door must be provided with an opening for positioning the display. Dimensions are shown in the following picture.



Remove the plastic support and install the display on the front door.

Then, using the 4m long cable supplied with it, connect the display to the USER connector located on the front side of the e-box.

5.5 Telemonitoring

Telemonitoring net is via SLAVE serial port on RJ-12 connector. Units have to be linked each other in a serial RS485 net using pin-to-pin phone cables of the following type: data cable 2CP AWG24 with modular phone plug 6/4.

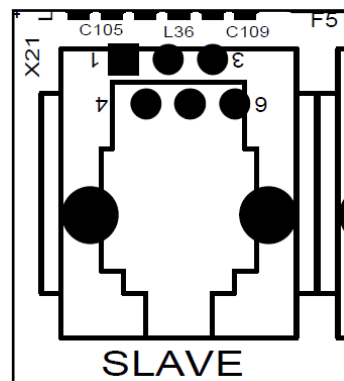
A shielded cable is highly recommended when its length exceeds 10 m.

A line doubler is necessary to connect two cables to the same C2020 controller. Both phone cable and line doubler are available as accessories (ACTSEQC10 / ACTSPLITTER).

The same cable is used to connect the last C2020 controller in the net to the BMS.

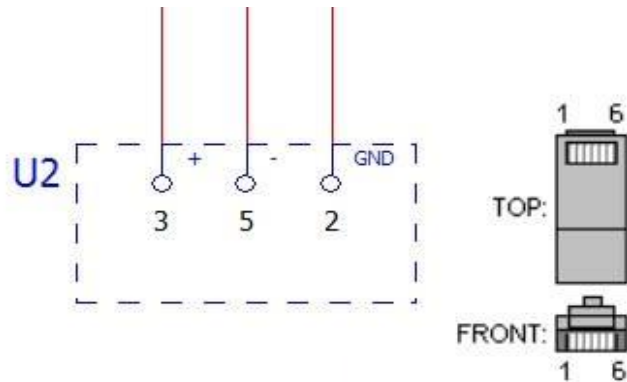
RS485 pins of SLAVE connector are configured as follows:

RX+/TX+	pin 2
RX-/TX-	pin 3
Ref	pin 4



Wires on the ACTSEQC10 cable are configured as follows:

RX+/TX+ pin 3
 RX-/TX- pin 5
 Ref pin 2



Once C2020 controllers are connected together:

- Set the communication protocol on C2020 controllers with parameter **C.4.3.1.2.1** (Function of serial bus SLAVE). The same communication protocol must be set on every C2020 in the same serial line.
- Give each C2020 an address in the monitoring line with parameter **C.4.3.1.2.2** (Address of serial bus SLAVE). This address must be different from either any C2020 or other electronic devices connected in the same serial line.
- Reset C2020 controllers to put modifications above into effect. Reset is done interrupting for some seconds power supply to the controller.

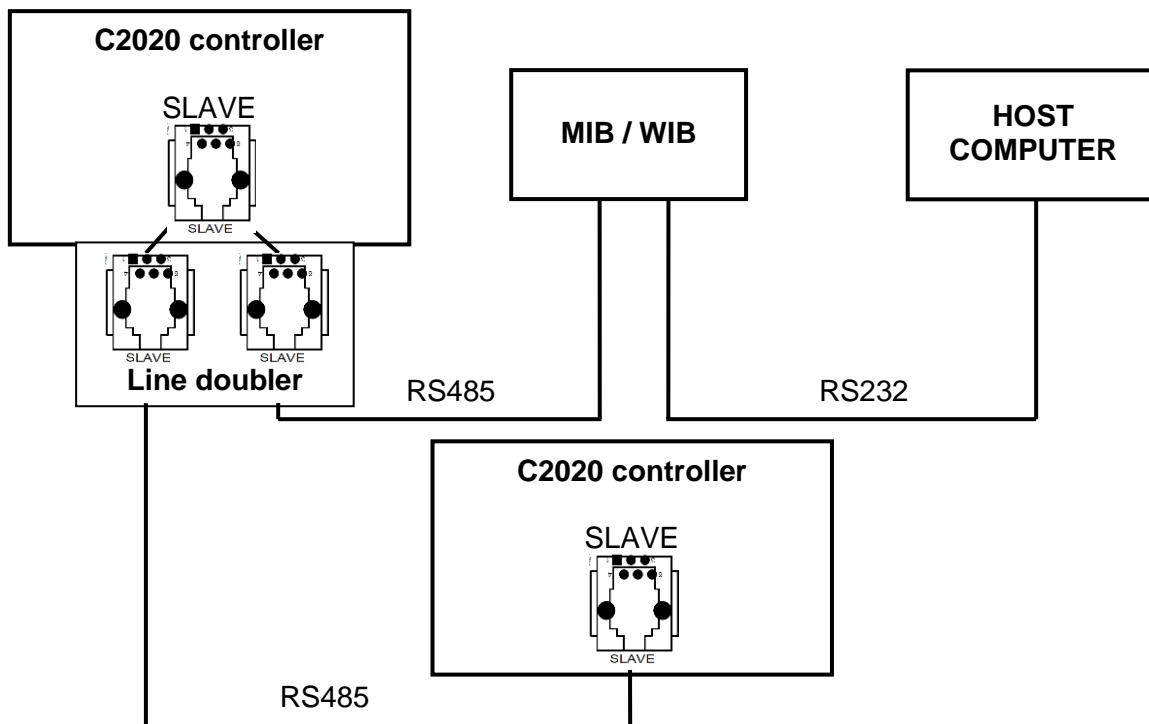
PEMS PROTOCOL (PE)

Set parameter **C.4.3.1.2.1** to PEMS. The baudrate is 9600 kbit/s.

STULZ PROTOCOL

Set parameter **C.4.3.1.2.1** to STULZ. The baudrate is 9600 kbit/s.

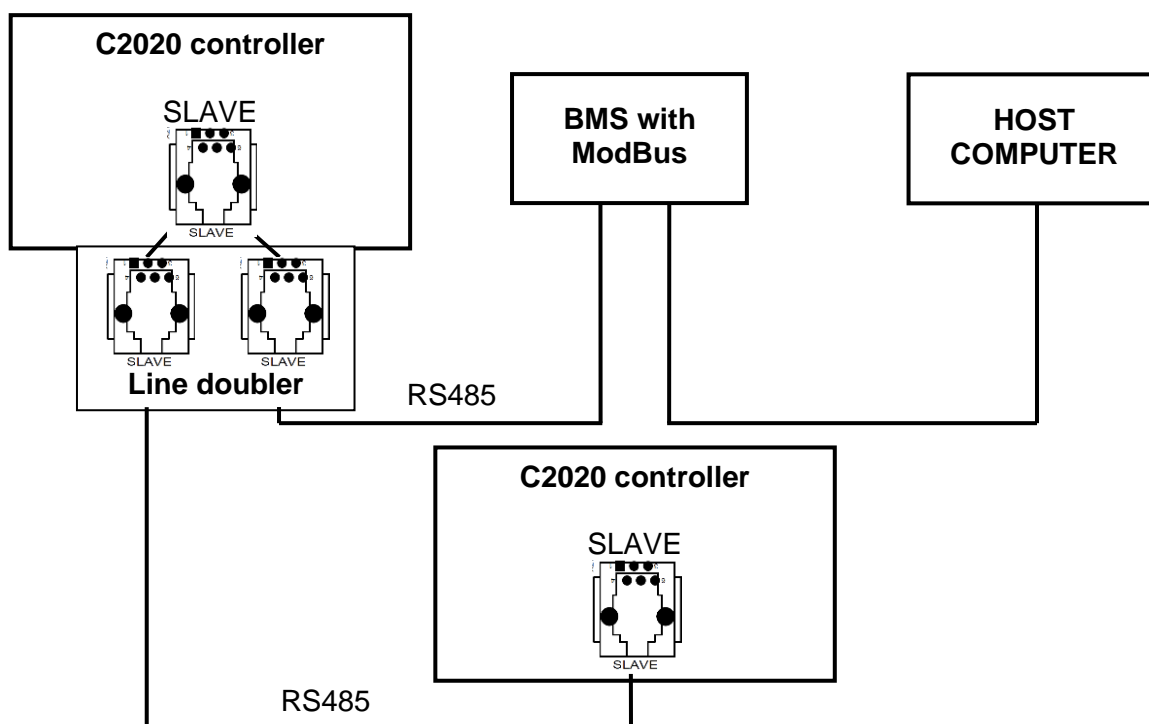
In the system (see figure below) there is a gateway (MIB / WIB) which manages the communication according to the STULZ protocol specifications.



MODBUS RTU PROTOCOL

Set parameter **C.4.3.1.2.1** either to MODBUS_STULZ or to MODBUS
The baudrate is 9600 kbit/s.

Two different data point lists for ModBus are available. If **C.4.3.1.2.1** is set to MODBUS_STULZ, data point list of ModBus is compatible with the one of STULZ GmbH controllers (C7000...). This is useful when the air conditioner has to be linked in the same telemonitoring net together with controllers from STULZ GmbH. If **C.4.3.1.2.1** is set to MODBUS, data point list is not compatible with STULZ GmbH controllers, but it includes more specific parameters for Prodigy units. In the system (see figure below), a BMS accepting ModBus manages the communication.



6. Start-up

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



Additional start-up instructions might be present on the manual of motor-condensing unit. These instructions must be followed for a correct start-up procedure.

- 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.
- Use the main switch to turn the air climate control system on.
- Activate the control fuses one after another and the power switches for the fan and the compressor.
- Check the supply voltage on all phases on both the internal unit and the external motor-condensing unit.
- At this point the electronic card is powered and the single components of the system can be activated to check for proper operation. The fundamental procedures to follow during installation are described in the following paragraph. Other guidelines are found in the manual for the C2020 electronic card.

- Set the desired supply air temperature on the conditioner display.
- Start the climate control system by pressing the ON-OFF push-button on the display.
- Check the current absorbed by the fans and other optional components, comparing these values with those indicated in technical data sheet at the end of this manual.
- Check the current absorbed by the external motor-condensing unit, comparing these values with those indicated in its technical data sheet.
- When the system is operating at normal capacity: 1) check that there are no alarms; 2) check that the fans work properly; 3) check, with the unit operating, that power supply voltages remain inside the values indicated on the technical data label for the unit; 4) check that the unit operates according to the logic described in the following chapter.
- The PCB of the remote motor-condensing unit installed inside the e-box is provided with DIP switch SW6 which must be configured according to the model of external MHI unit connected to RAC, as follows:

	SW6-1	SW6-2	SW6-3	SW6-4
SRC40ZIX-S	ON	ON	OFF	OFF
FDC71VN	ON	OFF	OFF	ON
FDC100VN	ON	ON	OFF	ON
FDC125VN	OFF	OFF	ON	ON
FDC200VS	OFF	ON	ON	ON

- It's mandatory to set the maximum required frequency, as function of the external MHI unit connected to RAC. For more information please refer to the table below.

	Max. required frequency	Set parameter B.2.1.1.17 (Service password 111)
SRC40ZIX-S	65 rps	50%
FDC71VN	88 rps	67%
FDC100VN	90 rps	69%
FDC125VN	105 rps	80%
FDC200VS	100 rps	77%



In manual control, the condenser fan setting is bypassed.



When the unit passes from manual control to automatic control, it's necessary to turn off the external MHI unit for at least three minutes.



In case of communication error between RAC unit and external MHI unit, the alarm appears after 4 minutes from the power on of the unit.

Shutdown

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



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.

7. Maintenance

7.1 Safety instructions



This chapter refers only to the maintenance of the indoor unit. Maintenance of outdoor motor-condensing unit must be made according to indications in the corresponding manual.

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 nameplate and take any other precaution in order to guarantee optimal safety.

Maintenance operations must be made by authorized and skilled personnel.

Safety procedures

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 in 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.

7.2 Preventive maintenance program

Interval	Operation
<u>Every 3 months</u>	<ul style="list-style-type: none"> • AIR FILTERS (only in open loop models): check the condition of the filters and replace them if necessary (dirty filter alarm). When you decide to replace the filter, the new filter must have a filter element with the same thickness and density as the original filter. Sets of spare filters can be ordered from the STULZ service department. • HEAT EXCHANGERS: check that the heat exchangers are efficient and not clogged or dirty. • CONDENSATE DRAIN: check that the condensate drain system is perfectly clean and efficient.
<u>Every 6 months</u>	<ul style="list-style-type: none"> • REFRIGERANT CHARGE: oscillations in circuit pipes and components can cause loss of refrigerant. Check that the system is properly filled. If it is not filled then search for the leak (check, in particular, joints to the compressor, to connection fittings on the inside unit and those to the motor-condensing unit) and then refill the system.
<u>Every year</u>	<ul style="list-style-type: none"> • FANS: check that fans do not show signs of overheating or abnormal vibrations and that they are free to rotate. • 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 card operates and perform a test of alarm signals. • MECHANICAL PARTS: clean the inner components of the system.



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 intended life and efficiency of the unit and also invalidates guarantee coverage. If the unit works in particularly dirty environment, like an ambient with conductive dust, it's necessary to increase maintenance frequency. Product intended life time is variable and dependent on the application (eg. On/Off cycling due to load variability, annual working hours, cleaning of exchange fluids, operating temperatures, etc.).

7.3 Air circuit

Heat exchanger

Heat exchanger consists of copper tubes with aluminium fins. Particles of internal and external air passing through the filter might nest between the fins, reducing heat transmission efficiency and increasing air flow resistance. The latter shows when the fan current increases.

For cleaning, proceed as follows: blow compressed air through the heat exchanger in the direction opposite the direction of air flow during normal operation.



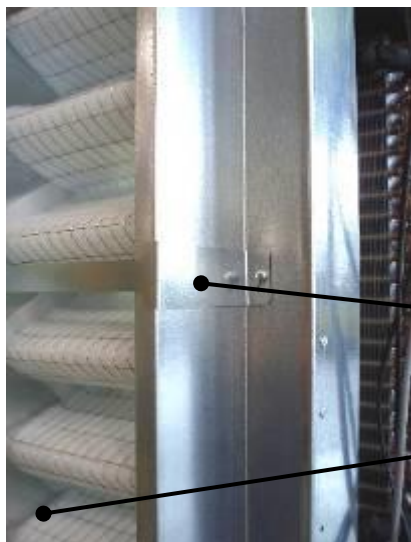
Do not distort the fins while cleaning, this also increases the air resistance.

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.

Fan is automatically controlled with variable speed. To make measurements at nominal speed, use manual control.

Air filters (only in open loop units)

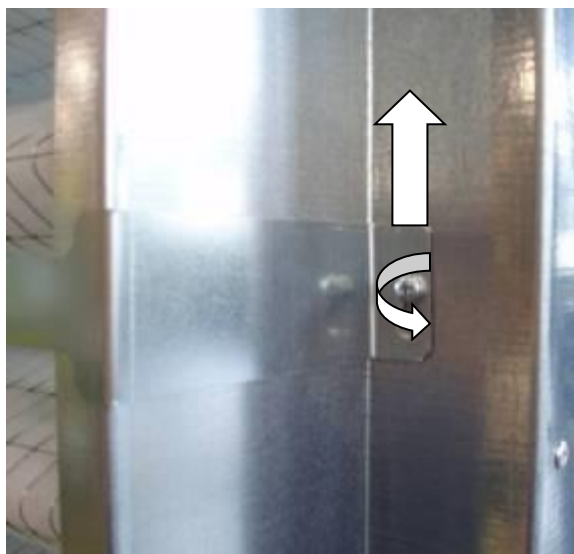


A differential pressure switch monitors air intake filters. As soon as pressure loss exceeds an adjustable value, a dirty filter alarm is enabled by the electronic controller. Additionally, it is possible to enable dirty filter alarm also with a timer on fan working hours.

When dirty filter alarm is present, filter replacement is necessary. To pull it out, proceed as follows:

RAW open loop units have 3 filters. Each filter is fixed to the unit rear frame with a retaining bracket.

Filter



Loosen the fixing screws at the sides of the brackets. Push the bracket up and extract it. Then the filter can be removed.



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.

7.4 Refrigerant circuit

Refrigerant charge

An operation with an insufficient refrigerant quantity over a longer period leads to a reduction of cooling capacity and to high superheating temperatures, which have a disadvantageous effect on the compressor lifetime.

If a leak is detected:

- extract the remaining refrigerant and dispose it according to the national regulations
- repair the leak and test circuit sealing
- re-fill with R410A following the instructions in the manual of outdoor motor-condensing unit



To check components of refrigerant circuit in the outdoor motor-condensing unit (compressor, thermostatic valve, etc.) follow the instructions in the respective manual.

7.5 General appliance cleaning procedures

Never use caustic or acid substances to clean any part of the conditioner. 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: eventual vibrations might cause leakages. Finally, check pipe insulation.

8. Troubleshooting

PROBLEM	CAUSE	POSSIBLE SOLUTION
The controller and the rest of the unit don't work	Main power supply missing	Restore power supply
	Main switch open	Close main switch
	Power supply to the controller is missing	Check voltage on power supply cables. Repair the broken cable or restore the missing connection
	Faulty controller	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
	Faulty controller	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
	Faulty display	Contact Stulz service
Alarm: high / max temperature	Cooling capacity lower than heat load	Reduce heat load or increase number of units
	Wrong calibration of temperature probes	Check with a reference thermometer and re-calibrate
	Low air flow	Check and replace air filter, when present (see also dirty filter alarm)
	Insufficient cold air circulation in the site	Check unit and racks layout
	Low refrigerant charge	Contact Stulz service
	Motor-condensing unit faulty	Look for alarms on the display. Check troubleshooting section on the manual of motor-condensing unit. Contact Stulz service
	Anomalous condensing pressure	Check condenser efficiency.

PROBLEM	CAUSE	POSSIBLE SOLUTION
		Contact Stulz service
Alarm: Level (if condensate pump is present)	Condensate pump is broken	Contact Stulz service
	Condensate discharge system obstructed	Check and clean condensate water tray and pipes
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 and re-calibrate
Alarm: Fan x blocked	Fan x disconnected	Check and re-connect all wires between fan and controller
	Fan x broken	Contact Stulz service
	Wrong configuration of C2020 I/O	Contact Stulz service
Alarm: Dirty filter	Air filter is clogged	Replace the filter
	Air filter pressure switch faulty	Replace the differential pressure switch
	Pipes to the dirty filter pressure switch clogged or bended	Clean and re-position plastic pipes
Alarm: XY unit mm s - Exx	Alarm in the outdoor unit	Check alarm Exx in the troubleshooting section on the manual of motor-condensing unit. Contact Stulz service
Alarm: XY com. Error - Exx	Communication with the outdoor unit failed for 3 times	Check the kind of error. Contact Stulz service

9. Uninstalling and disposal of the unit



This unit contains refrigerant gas and a small quantity of lubricants (esters) in the compressor. These components are pollutants for the environment and must not be dispersed.



Disassembling operations on this unit must only be done by experts.

Before starting to dismantle the unit check that it has been disconnected from electric power supply.

This unit must be disassembled by authorised organisations.

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.



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 EC Regulation 842/2006. 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.
- 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:

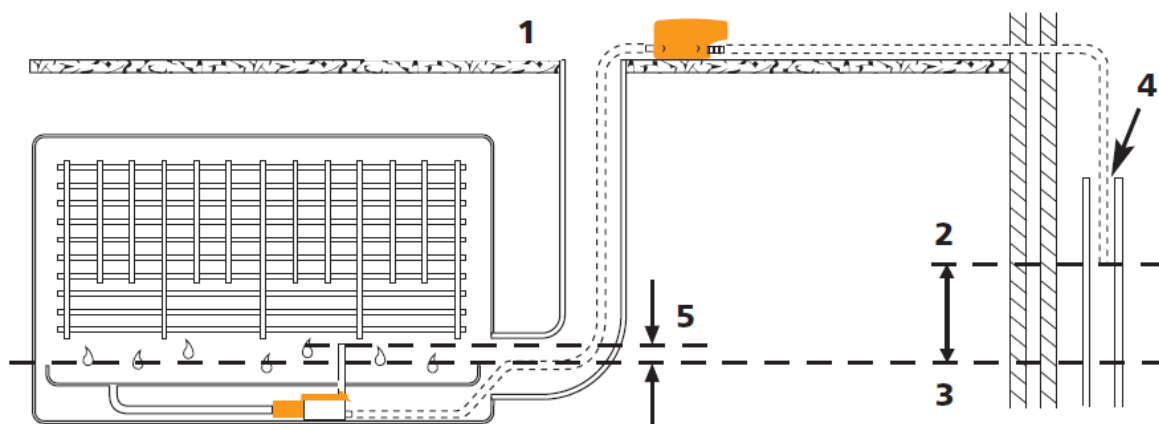
Identified Substance	CAS Number
Acrylonitrile butadiene styrene terpolymer	9003-56-9
Polystyrene homopolymer	9003-53-6
Polycarbonatefrom bisphenol A	103598-77-2

10. Accessories / options

10.1 Condensate pump installed inside the unit – CONDPUMP

A pump is installed inside the unit when condensate evacuation by gravity is not possible. The pump receives power supply from the e-box and sends a water level digital signal to C2020 controller.

1. Use the pump within the following operating limits: maximum head 10 m. With 10 m head, and no suction lift water flow is 4.5 l/h.
2. Carry out the discharge pipe in PVC with 6x9 mm diameter provided with the pump from one of the openings used for water and refrigerant pipes. Channel discharge tube to an appropriate drain, avoiding restrictions.
3. Always ensure the reservoir is sitting flat and horizontal.
4. Test pump operation by pouring water into evaporator tray. **CHECK FOR LEAKS.**
5. **Preventing siphoning:** cut discharge tube (2) above water level (3) of evaporator tray and direct end into large pipe (4), allowing air break.



1	False ceiling
2	End of discharge pipe
3	Water level in drain tray
4	Air break
5	Top of breather pipe

Maintenance

6. This pump, like all mechanical equipment, requires maintenance.
7. Every six months the reservoir should be removed, taking care to clean the filter, float and reservoir thoroughly prior to reassembly. We recommend this is done in the Spring and the Autumn, using an anti-bacterial wash.
8. Take great care to replace the float with the magnet facing upwards.
9. Additional inline filters are available if required.

Troubleshooting

Fault: Pump runs all the time

1. Is float positioned with the magnet uppermost?
2. Is the reservoir lid (sensor) located firmly onto the reservoir, with the float located inside the reservoir, around the sensor column?
3. Is there sludge inside the reservoir, preventing float from resting on the bottom? (This may occur if pump has been in operation for some time without cleaning. Clean using an anti-bacterial wash.)

Please note:

10. After installation and during operation, if you notice air in the pipe between the reservoir and the pump, you have a siphoning problem. Follow advice in 'Preventing Siphoning'.
11. The pump will only switch off when the float is at the bottom of the reservoir.

Fault: Pump stops and starts and makes a loud noise.

1. The water is siphoning back through the pump. Follow advice in 'Preventing Siphoning'.

Fault: Pump runs but does not pump any water.

1. Are there any air-leaks in the pipe running to the pump?
2. Check that reservoir, filter and inlet tube are free of sludge and debris.

Fault: Pump isn't operating at all.

1. Is power reaching the pump? Is it correctly wired? Is the voltage correct?
2. Is pump very hot? A thermal cut-out may have been activated to protect pump. This will automatically reset once pump has cooled down.

10.2 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 a 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.

10.3 External frame

For the open loop units, it's possible to order an external carpentry that contains the unit. In the following table there are the available measures.

Frame 1000 x 300 x 42U
Frame 1000 x 300 x 45U
Frame 1000 x 300 x 47U
Frame 1200 x 300 x 42U
Frame 1200 x 300 x 45U
Frame 1200 x 300 x 47U

11. Appendix: technical data

Notes on technical data sheets:

- For technical data of Mitsubishi external motor-condensing unit, check corresponding manual.
- Cooling capacities are calculated at the following conditions: internal return air temperature = 35°C / internal return air humidity = 30% / external air temperature = 35°C. Cooling capacities are preliminary data, subjected to updates.

MODEL		Open loop - RAC80O0A20	Closed loop - RAC80C0A20		
Power supply	V/ph/Hz	230/1/50-60			
Air flow	m ³ /h	2600	2800		
FAN					
AC fan version					
Number of fans		3			
Fan motor max (each)	W	250			
	A	1,10			
EC fan version					
Number of fans		3			
Fan motor max (each)	W	170			
	A	1,4			
EVAPORATOR COIL					
Type		Copper pipe / Aluminium fin			
Face area	m ²	0,40			
AIR FILTER					
Quantity and shape		3 zig-zag	-		
Size	mm	600x180	-		
Depth	mm	100	-		
Efficiency		ePM10 50%	-		
PHYSICAL DATA					
Cooling module					
Weight	kg	77			
Height	mm	1870			
Width	mm	290			
Depth with AC fans	mm	750	702		
Depth with EC fans	mm	770	722		
Multi-switch bar					
Weight	kg	3			
Height	mm	1500			
Width	mm	75			
Depth	mm	120			
Electrical box					
Weight	kg	5			
Height	mm	73			
Width	mm	235			
Depth with AC fans	mm	785			
Depth with EC fans	mm	800			
COOLING CAPACITIES	with	SRC40ZIX-S	FDC71VN	SRC40ZIX-S	FDC71VN
Total cooling capacity	kW	4,4	8,0	4,5	8,4
Sensible cooling capacity	kW	4,4	7,0	4,5	7,4

MODEL		Open loop - RACA2O0A20			Closed loop - RACA2C0A20		
Power supply	V/ph/Hz	230/1/50-60					
Air flow	m³/h	3800			4400		
FAN							
AC fan version							
Number of fans		5					
Fan motor max (each)	W	250					
	A	1,10					
EC fan version							
Number of fans		5					
Fan motor max (each)	W	170					
	A	1,4					
EVAPORATOR COIL							
Type		Copper pipe / Aluminium fin					
Face area	m²	0,40					
AIR FILTER							
Quantity and shape		3 zig-zag			-		
Size	mm	600x180			-		
Depth	mm	100			-		
Efficiency		ePM10 50%			-		
PHYSICAL DATA							
Cooling module							
Weight	kg	83					
Height	mm	1870					
Width	mm	290					
Depth with AC fans	mm	750			702		
Depth with EC fans	mm	770			722		
Multi-switch bar							
Weight	kg	3					
Height	mm	1500					
Width	mm	75					
Depth	mm	120					
Electrical box							
Weight	kg	5					
Height	mm	73					
Width	mm	235					
Depth with AC fans	mm	785					
Depth with EC fans	mm	800					
COOLING CAPACITIES	with	FDC100VN	FDC125VN	FDC200VS	FDC100VN	FDC125VN	FDC200VS
Total cooling capacity	kW	10,3	12,8	21,2	11,2	14,0	22,3
Sensible cooling capacity	kW	10,3	12,8	18,8	11,2	14,0	19,7

