UNTES®

HEATING VENTILATING AIR CONDITIONING

INSTRUCTIONS FOR USE

TCAEBY-TCAETY-TCAESY-TCAEQY-THAETY-THAESY 270÷2160

Air-cooled water chillers and heat pumps with axial fans.
Range with hermetic Scroll type compressors and R410A ecological refrigerant.

KP1258/A

English

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KEY TO SYMBOLS

SYMBOL	MEANING
	**GENERIC DANGER!** **The GENERIC DANGER sign warns the operator and maintenance personnel about risks that may cause death, physical injury, or immediate or latent illnesses of any kind.**
	**DANGER: LIVE COMPONENTS!** **The DANGER: LIVE COMPONENTS sign warns the operator and maintenance personnel about risks due to the presence of live voltage.**
	**DANGER: SHARP EDGES!** **The DANGER: SHARP EDGES sign warns the operator and maintenance personnel about the presence of potentially dangerous sharp edges.**
	**DANGER: HOT SURFACES!** **The DANGER: HOT SURFACES sign warns the operator and maintenance personnel about the presence of potentially dangerous hot surfaces.**
	**DANGER: MOVING PARTS!** **The DANGER: MOVING PARTS sign warns the operator and maintenance personnel about risks due to the presence of moving parts.**
	**DANGER: MOVING FANS!** **The DANGER: MOVING FANS sign warns the operator and maintenance personnel about risks due to the presence of moving fans.**
	**IMPORTANT WARNING!** **The IMPORTANT WARNING sign draws attention to actions or hazards that could damage the unit or its equipment.**
	**ENVIRONMENTAL PROTECTION!** **The ENVIRONMENTAL PROTECTION sign provides instructions for using the machine in an eco-friendly manner.**

Reference Standards

UNI EN 292	Sicurezza del macchinario. Concetti fondamentali, principi generali di progettazione.
UNI EN 294	Sicurezza del macchinario. Distanze di sicurezza per impedire il raggiungimento di zone pericolose con gli arti superiori.
UNI EN 563	Sicurezza del macchinario. Temperature delle superfici di contatto. Dati ergonomici per stabilire i valori limiti di temperatura per superfici calde.
UNI EN 1050	Sicurezza del macchinario. Principi per la valutazione del rischio.
UNI 10893	Documentazione tecnica di prodotto. Istruzioni per l'uso.
EN 13133	Brazing. Brazer approval.
EN 12797	Brazing. Destructive tests of brazed joints.
EN 378-1	Refrigeration systems and heat pumps – safety and environmental requirements. Basic requirements, definitions, classification and selection criteria.
PrEN 378-2	Refrigeration systems and heat pumps – safety and environmental requirements. Design, construction, testing, installing, marking and documentation.
CEI EN 60204-1	Sicurezza del macchinario. Equipaggiamento elettrico delle macchine. Parte 1: Regole generali.
CEI EN 60335-2-40	Sicurezza degli apparecchi elettrici d'uso domestico e similare. Parte 2: norme particolari per le pompe di calore elettriche, per i condizionatori d'aria e per i deumidificatori.
UNI EN ISO 3744	Determinazione dei livelli di potenza sonora delle sorgenti di rumore mediante pressione sonora. Metodo tecnico progettuale in un campo essenzialmente libero su un piano riflettente.
EN 50081-1:1992	Electromagnetic compatibility – Generic emission standard Part 1: Residential, commercial and light industry.
EN 61000	Electromagnetic compatibility (EMC).

I.1 SECTION I: USER

I.2 AVAILABLEVERSIONS

The available versions belonging to this product range are listed below. After having identified the unit, you can use the following table to find out about some of the machine's features.

T	Water production unit
C	Cooling only **H** Heat pump
A	Air-cooled
E	Scroll-type hermetic compressors
B	Standard
T	High temperature/efficiency
S	Silenced
Q	Supersilenced
Y	R410A refrigerant fluid

No. compressors	Cooling capacity (kW) (*)
2	70
2	80
2	90
2	100
2	115
2	130
2	145
2	160

(*) The power value used to identify the model is approximate. For the exact value, identify the machine and consult the enclosed documents (*A1 Technical data).*

Potential installations:

Standard:
Installation without pump and without water buffer tank.

Pump:
P1 – Installation with pump.
P2 – Installation with increased static pressure pump.
DP1 – Installation with double pump, including an automatically activated pump in stand-by.
DP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by.

Tank & Pump:
ASP1 – Installation with pump and water buffer tank.
ASP2 – Installation with increased static pressure pump and water buffer tank.
ASDP1 – Installation with double pump, including an automatically activated pump in stand-by and water buffer tank.
ASDP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by and water buffer tank.

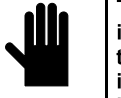
I.3 SPECIFIED CONDITIONS OF USE

TCAEBY-TCAETY-TCAESY-TCAEQY units are packaged air-cooled water chillers with axial fans.
THAETY-THAESY units are packaged evaporation/air-cooled reversible heat-pumps on the refrigerant cycle with axial fans.

They are intended for use in air conditioning systems or industrial processes that require the use of chilled water (TCAEBY-TCAETY-TCAESY-TCAEQY) or chilled and hot water (THAETY-THAESY). Not suitable for drinking water.

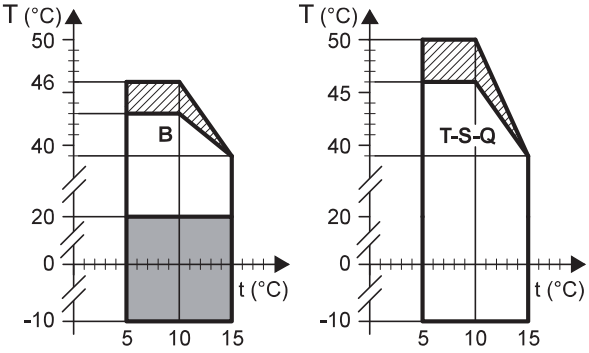
The units are designed for outdoor installation.

The units comply with the following directives:
- 2006/42/CE Machinery Directive;
- Low voltage Directive 2006/95/CE;
- Electromagnetic compatibility directive 2004/108/CE;
- Pressure equipment directive 97/23/EEC (PED);

	**DANGER!** **The machine has been designed and constructed solely and exclusively to function as an air-cooled water chiller or as an air-cooled heat-pump: any other use is expressly PROHIBITED.** **The installation of the machine in an explosive environment is prohibited.**
	**DANGER!** **The machine is designed for outdoor installation. Segregate the unit if installed in areas accessible to persons under 14 years of age.**
	**IMPORTANT!** **The unit will only function correctly if the instructions for use are scrupulously followed, if the specified clearances are complied with during installation and if the operating restrictions indicated in this manual are strictly adhered to.**

I.3.1 OPERATING LIMITS

Summer operation

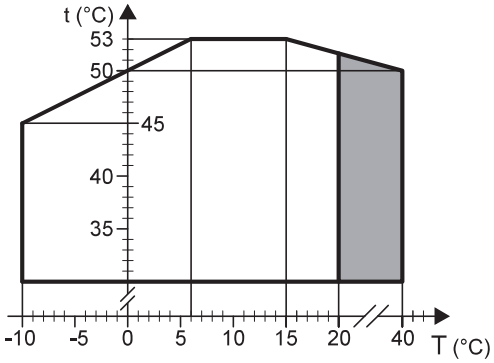


Operation with condensation control
Operation with stepped cooling capacity.

T (°C) = Air temperature (B.S.).
t (°C) = Water temperature

In summer mode:
Maximum inlet water temperature 20°C.

Winter operation



T (°C) = Air temperature (B.S.).
t (°C) = Water temperature

In winter operation:
Minimum water inlet temperature 20°C.
Maximum inlet water temperature 47°C.

Temperature differentials permitted through the exchangers
- Heat differential at the evaporator ΔT = 3 ÷ 8°C (with both compressors on) for machines with "standard" installation.

- Minimum water pressure 0.5 Barg
- Maximum water pressure 6 Barg.
- Maximum water pressure on heat recovery and desuperheater 3 Barg.

N.B.:
For evaporator outlet water at a temperature of under 5°C, please contact the ***ÜNTES*** Inc. pre-sales service before ordering.

Model	270÷2160	
TCAEBY	T_{max} = 43°C (1)(2)	T_{max} = 46°C (1)(4)
TCAETY-THAETY TCAESY-THAESY TCAEQY	T_{max} = 46°C (1)(2)	T_{max} = 50°C (1)(4)
TCAESY-THAESY	T_{max} = 40°C (1)(3)	-
TCAEQY	T_{max} = 37°C (1)(3)	-

(1) Water temperature (IN/OUT) 12/7 °C.
(2) Maximum external air temperature with unit in standard operation running on full and unsilenced.
(3) Maximum external air temperature with unit in silenced mode.
(4) Maximum external air temperature with unit with shuttered cooling capacity.

I.4 WARNINGS REGARDING POTENTIALLY TOXIC SUBSTANCES

DANGER!
Read the ecological information and the following instructions regarding the refrigerant fluids used carefully.

I.4.1.1 Identification of the type of refrigerant fluid used

- Difluoromethane (HFC 32) 50% by weight

CAS No.: 000075-10-5

- Pentafluoroethane (HFC 125) 50% by weight

CAS No.: 000354-33-6

I.4.1.2 Identification of the type of oil used

The lubricant used in the unit is polyester oil; please refer to the indications on the compressor data plate.

DANGER!
For further information regarding the characteristics of the refrigerant and oil used, refer to the safety data sheets available from the refrigerant and oil manufacturers.

I.4.1.3 Main ecological information regarding the types of refrigerant fluids used

- **Persistence, degradation and environmental impact**

Refrigerant	Chemical formula	GWP (over 100 years)
R32	CH_2F_2	550
R125	C_2HF_5	3400

HFC R32 and R125 refrigerants are the single components which mixed at 50% make up R410A. They belong to the hydrofluorocarbons group and are regulated by the Kyoto protocol (1997 and subsequent revisions) being gases that contribute to the greenhouse effect. The measure of how much a given mass of greenhouse gas is estimated to contribute to global warming is the GWP (Global Warming Potential).
The standard measure for carbon dioxide (CO_2) is GWP=1.
The value of GWP assigned to each refrigerant represents the equivalent amount in kg of CO_2 released over a period of 100 years, in order to have the same greenhouse effect of 1kg refrigerant released over the same period of time.
The R410A mixture does not contain elements that are harmful to the ozone, such as chlorine, therefore its ODP (Ozone Depletion Potential) is zero (ODP=0).

Refrigerant	R410A
Components	R32/R125
Composition	50/50
ODP	0
GWP (over 100 years)	2000

ENVIRONMENTAL PROTECTION!
The hydrofluorocarbons contained in the unit cannot be released into the atmosphere as they are gases that contribute to the greenhouse effect.

R32 and R125 are hydrocarbons which decompose rapidly into the lower atmosphere (troposphere). Decomposition by-products are highly dispersible and thus have a very low concentration. They have no influence on photochemical smog (that is, they are not classified among VOC volatile organic compounds, according to the guidelines established by the UNECE agreement).

- **Effects on effluent treatment**

Waste products released into the atmosphere do not produce long-term water contamination.

- **Individual protection/exposure control**

Use protective clothing and gloves; protect eyes and face.

- **Professional exposure limits:**

R410A
HFC 32 TWA 1000 ppm
HFC 125 TWA 1000 ppm

- **Handling**

DANGER!
Users and maintenance personnel must be adequately informed about the risks of handling potentially toxic substances. Failure to observe the aforesaid indications may cause personal injury or damage the unit.

Avoid inhalation of high concentrations of vapour. Atmospheric concentration must be reduced to a minimum and maintained at this minimum level, well beneath professional exposure limits. The vapours is heavier than air, and thus hazardous concentrations may form close to the floor, where overall ventilation may be poor. In this case, ensure adequate ventilation. Avoid contact with naked flames and hot surfaces, which could lead to the formation of irritating and toxic products of decomposition. Do not allow the liquid to come into contact with eyes or skin.

- **Procedure in case of accidental refrigerant escape**

Ensure adequate personal protection (using means of respiratory protection) during clean-up operations. If the conditions are sufficiently safe, isolate the source of leak.
If the amount of the spill is limited, let the material evaporate, as long as adequate ventilation can be ensured. If the spill is considerable, ventilate the area adequately.
Contain the spilt material with sand, soil, or other suitable absorbent material.
Prevent the liquid from entering drains, sewers, underground facilities or manholes, because suffocating vapours may form.

I.4.1.4 Main toxicological information on the type of refrigerant used

- **Inhalation**

A high atmospheric concentration can cause anaesthetic effects with possible loss of consciousness. Prolonged exposure may lead to irregular heartbeat and cause sudden death.
Higher concentrations may cause asphyxia due to the reduced oxygen content in the atmosphere.

- **Contact with skin**

Splashes of nebulized liquid can produce frostbite. Probably not hazardous if absorbed through the skin. Repeated or prolonged contact may remove the skin's natural oils, with consequent dryness, cracking and dermatitis.

- **Contact with eyes**

Splashing liquid may cause frostbite.

- **Ingestion**

While highly improbable, may produce frostbite.

I.4.1.5 First aid measures

- **Inhalation**

Move the person away from the source of exposure area, keep him/her warm and let him/her rest. Administer oxygen if necessary. Attempt artificial respiration if breathing has stopped or shows signs of stopping. In the case of cardiac arrest carry out heart massage and seek immediate medical assistance.

- **Contact with skin**

In case of contact with skin, wash immediately with lukewarm water. Thaw tissue using water. Remove contaminated clothing. Clothing may stick to the skin in case of frostbite. If irritation, swelling or blisters appear, seek medical assistance.

- **Contact with eyes**

Rinse immediately using an eyewash or clean water, keeping eyelids open, for at least ten minutes.
Seek medical assistance.

- **Ingestion**

Do not induce vomiting. If the injured person is conscious, rinse his/her mouth with water and make him/her drink 200-300 ml of water.
Seek immediate medical assistance.

- **Further medical treatment**

Treat symptoms and carry out support therapy as indicated. Do not administer adrenaline or similar sympathomimetic drugs following exposure, due to the risk of cardiac arrhythmia.

I.4.2 PED CATEGORIES OF PRESSURE COMPONENTS

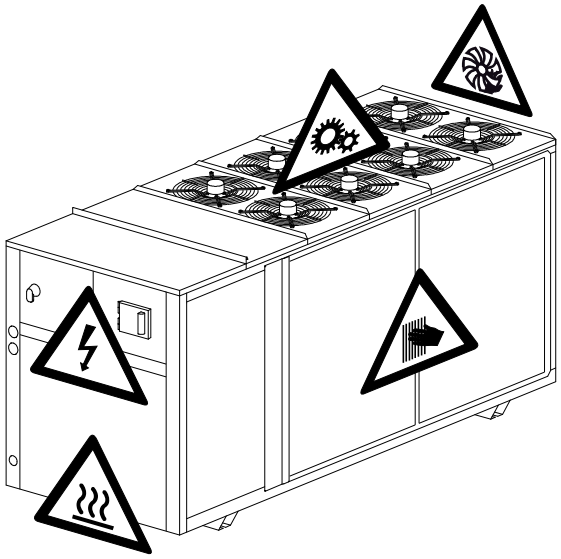
List of PED critical components (Directive 97/23/CE):

Component	PED category
Compressor	II
Safety valve	IV
High pressure switch	IV
Low pressure switch	-
Liquid receiver	II
Liquid separator	II
Finned coil	Art. 3 par. 3
Evaporator	II
Oil separator	-

I.4.3 INFORMATION ON RESIDUAL RISKS AND IRREMOVABLE HAZARDS

IMPORTANT!
Pay the utmost attention to the signs and symbols located on the appliance.

If any risks remain in spite of the provisions adopted, or if there are any potential or hidden risks, these are indicated by adhesive labels attached to the machine in compliance with standard "ISO 3864".



Indicates the presence of live components.

Indicates the presence of moving parts (belts, fans).

Indicates the presence of fans.

Indicates the presence of hot surfaces (refrigeration circuit, compressor heads).

Indicates the presence of sharp edges in correspondence to the finned coils.

I.5 DESCRIPTION OF CONTROLS

The controls consist of the main switch, the automatic switches and the user interface panel located on the appliance.

I.5.1 MAIN SWITCH

Manually controlled type «b» mains power supply disconnecting switch (ref. EN 60204-1 § 5.3.2).

I.5.2 AUTOMATIC SWITCHES

- **Automatic switch for compressor protection**

This switch allows the supply and isolation of the compressor's main power circuit.

- **Automatic switch for pump protection**

The switch makes it possible to supply and cut off power from the pumps.

- **Automatic switch for fan protection**

The switch makes it possible to supply and cut off power from the fans.

II SECTION II: INSTALLATION AND MAINTENANCE

II.1 CONSTRUCTION FEATURES

○ Load-bearing structure and panels in galvanised and painted (RAL 9018) sheet steel; base in galvanised sheet steel.
○ The structure consists of 2 sections:
• sound-proofed technical compartment for housing the compressors, the electrical panel and the main components in the refrigerant circuit.
• aeraulic compartment for housing the heat exchange coils, the plate heat exchangers, the motor-driven fans and the pump assembly accessories (if present).
○ Hermetic, Scroll-type rotary compressors, complete with internal thermal protection and crankcase heater activated automatically when the unit stops (as long as the power supply to the unit is preserved).
○ Adequately insulated, braze-welded plate water side heat exchange in stainless steel.
○ Air side heat exchanger comprised of a coil of copper pipes and aluminium fins.
○ Motor-driven axial fans with external rotor, equipped with internal thermal protection and complete with a single row of protection grilles for version B and a double row for versions T, S and Q.
○ Proportional electronic device for the pressurised and continuous regulation of the fan rotation speed down to an external air temperature of -10°C when operating as a chiller and up to an external air temperature of 40°C when operating as a heat pump (as standard in versions T, S and Q).
○ Victaulic type water connections.
○ Differential pressure switch that protects the unit from any interruptions to the water flow.
○ Single refrigerant circuit made from annealed copper pipe (EN 12735-1-2) complete with: cartridge dryer filter, pressure connections, manual reset safety pressure switch on the high pressure side, automatic reset safety pressure switch on low pressure side, safety valve(s), filter shut-off valves, thermostatic expansion valve (1 for TCAEBY, TCAETY,TCAESY and TCAEQY and 3 for THAETY THAESY) , cycle inversion valve (for THAETY-THAESY), liquid receiver (for THAETY-THAESY) and stop valves (2 for THAETY-THAESY), liquid indicator, compressor aspirated gas separator and solenoid valve on the liquid line (for THAETY-THAESY) and insulation of the aspiration line.
○ Unit with IP24 level of protection.
○ Compatible control, with ***AdaptiveFunction Plus*** function.
○ The unit is complete with the R410A refrigerant charge.
○ Ductable condensation drain (for THAETY-THAESY).

II.1.1 VERSIONS

B – Standard chiller only version (TCAEBY).
T – High temperature/high efficiency version, with larger coil surface (TCAETY-THAETY).
S - Silenced version complete with soundproofed compressors, lower fan speed and larger coil surface (TCAESY-THAESY). The fan speed is automatically increased with the external temperature increases considerably.
Q - Supersilenced version complete with soundproofed compressors, lower fan speed and larger coil surface (TCAEQY). The fan speed is automatically increased if the external temperature increases considerably.

II.1.2 AVAILABLE INSTALLATIONS

Standard:
Installation without pump and without water buffer tank.

Pump:
P1 – Installation with pump.
P2 – Installation with increased static pressure pump.
DP1 – Installation with double pump, including an automatically activated pump in stand-by.
DP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by.

The pump assembly also comes complete with:
expansion tank, safety valve and water side pressure gauge.
In the case of an individual pump, the assembly also comes complete with a delivery shut-off valve.
In the case of a double pump, the assembly also comes complete with a non-return valve and one aspiration valve for each pump.

Tank & Pump:
ASP1 – Installation with pump and water buffer tank.
ASP2 – Installation with increased static pressure pump and water buffer tank.
ASDP1 – Installation with double pump, including an automatically activated pump in stand-by and water buffer tank.
ASDP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by and water buffer tank.

In addition to that supplied with the pump accessory, the assembly also includes:
inertial water buffer tank in delivery (250 l for models 270÷2160 version B, 250 l for models 270÷2100 versions T, S and Q, 450 l for models 2115÷2160 versions T, S and Q), air bleed valve, water drainage valve and electric heater connection.

II.1.3 ELECTRICAL BOARD

○ Electrical board accessible by opening the front panel, conforming with current IEC norms, can be opened and closed with a suitable tool.
○ Complete with:
• electrical wiring arranged for power supply 400-3ph+N-50Hz;
• auxiliary power supply 230V-1ph-50Hz drawn from the main power supply;
• control power supply 12V-1ph-50Hz drawn from the main power supply;
• general isolator, complete with door interlocking isolator;
• automatic thermal overload switch to protect the compressors and the motor-driven fans;
• protection fuse for the auxiliary circuit;
• power contactor for the compressors;
• remote machine controls: remote ON/OFF, summer/winter selector;
• remote machine controls: compressor operating light, general lock light;
○ Programmable electronic board with microprocessor, controlled by the keyboard inserted in the machine.
○ This electronic board performs the following functions:
• regulation and management of the set points for unit outlet water temperature; cycle inversion (THAETY-THAESY); safety timer delays; circulating pump; compressor and system pump hour-run meter; pressurised defrost cycles; electronic anti-freeze protection which cuts in automatically when the machine is switched off; and the functions which control the operation of the individual parts making up the machine;
• complete protection of the unit, automatic emergency shutdown and display of the alarms which have been activated;
• compressor protection phase sequence monitor;
• unit protection against low or high phase power supply voltage;
• display of the programmed set-points on the display; of the water in/out temperatures on the display; of the condensation and condensation/evaporation pressures (THAETY-THAESY); of the electrical voltage values in the three phases of the electrical circuit that powers the unit; of the alarms on the display; of the chiller or heat pump function on the display (THAETY-THAESY);
• user interface menu;
• automatic pump operating time balance (DP1-DP2, ASDP1- ASDP2 installations);
• automatic activation of the pump in standby in the event of an alarm (DP1-DP2, ASDP1- ASDP2 installations);
• display of the heat recovery/desuperheater inlet water temperature;
• alarm code and description;
• alarm history management (menu protected by manufacturer password).
○ The following is memorized for each alarm:
• date and time of intervention (if the KSC accessory is present);
• inlet/outlet water temperatures when the alarm intervened;
• the condensation pressure values at the time of the alarm, if the FI10 accessory is present for TCAEBY models and always for versions T, S and Q.
• alarm delay time from the switch-on of the connected device;
• compressor status at the time of the alarm;

- Advanced functions:
- Hi-Pressure Prevent with forced cooling capacity shuttering for high external temperatures (during summer operation),
- configured for serial connection (KRS485, KFTT10, KRS232 and KUSB accessory);
- possibility to have a digital input for remote management of the double set point (contact ***ÜNTES*** Inc. pre-sales).
- possibility to have an analogue input for the scrolling set-point via a 4-20mA remote signal (contact ***ÜNTES*** Inc. pre-sales);
- configured for management of time bands and operation parameters with the possibility of daily/weekly operating programs (KSC accessory);
- check-up and monitoring of scheduled maintenance status;
- testing of the units assisted by computer;
- self-diagnosis with continuous monitoring of the functioning of the unit.
- Set-point regulation with two options:
- fixed set-point (***Precision*** options);
- scrolling set-point (***Economy*** option).

II.2 ACCESSORIES

IMPORTANT!
Only use original spare parts and accessories. ÜNTES Inc. shall not be held liable for damage caused by tampering or work carried out by unauthorised personnel or malfunctions caused by the use of non-original spare parts or accessories.

II.2.1 FACTORY FITTED ACCESSORIES

P1 – Installation with pump.
P2 – Installation with increased static pressure pump.
DP1 – Installation with double pump, including an automatically activated pump in stand-by.
DP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by.
ASP1 – Installation with pump and water buffer tank.
ASP2 – Installation with increased static pressure pump and water buffer tank.
ASDP1 – Installation with double pump, including an automatically activated pump in stand-by and water buffer tank.
ASDP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by and water buffer tank.
FI10 – Modulated condensation control for continuous operation, as chiller down to an external temperature of -10°C (for TCAEBY models only).
RA – Evaporator antifreeze electric heater to prevent the risk of ice formation inside the exchanger when the machine is switched off (as long as the unit is not disconnected from the power supply)
RDR – Antifreeze electric heater for desuperheater / heat recovery (DS or RC100), to prevent the risk of ice formation inside the recovery exchanger when the machine is switched off (as long is the unit is not disconnected from the power supply).
RAS – 300W antifreeze electric heater for water buffer tank (available for ASP1-ASDP1- ASP2-ASDP2 installations); to prevent the risk of ice formation in the water buffer tank when the machine is switched off (as long as the unit is not disconnected from the power supply).
RAE 1 – 27W antifreeze electric heater for motor-driven pump (available for P1-DP1-ASP1-ASDP1 installations); to prevent the water contained in the pump from freezing when the machine is switched off (as long as the unit is not disconnected from the power supply).
RAE 2 – 27W antifreeze electric heater for double motor-driven pumps (available for P2-DP2-ASP2-ASDP2 installations); to prevent the water contained in the pumps from freezing when the machine is switched off (as long as the unit is not disconnected from the power supply).
DS – Desuperheater.
RC100 – Heat recovery with 100% recovery; the accessory comes complete with condensation control FI10 (as standard in versions T, S and Q) and a differential pressure switch on the recovery exchanger. It is not active as a heat pump during operation.
GM – Refrigerant circuit high and low pressure gauges.
SFS – Soft-start device for reducing the start-up current during the start-up phase (weight 40 Kg).
FTT10 – FTT10 serial interface card for connection to supervision systems (LonWorks® system compliant with Lonmark® 8090-10 protocol with chiller profile).
SS – RS485 serial interface card to create dialogue networks between cards (maximum of 200 units at a maximum distance of 1000 m) and the building automation, external supervision systems or ***ÜNTES*** Inc.supervision systems (protocols supported: proprietary protocol;Modbus® RTU).
CR - Power factor correction capacitors (cosΦ > 0.91).
EEV – Electronic thermostatic valve.
RAP - Unit with copper/pre-painted aluminium coils.
BRR - Unit with copper/copper coils.
RRS - Unit with copper/tin-plated copper coils.
DSP – Double set-point via digital consensus (incompatible with the CS accessory).
CS – Scrolling set point via analogue signal 4-20 mA (incompatible with the DSP accessory). On the basis of the required values, it could be necessary to install the EEV accessory too.
RPB - Coil protection networks with accident prevention function (to be used as an alternative to the FMB accessory).
FMB - Mechanical filters to protect the coils, with leaf protection function (to be used as an alternative to the RPB accessory).

II.2.2 ACCESSORIES SUPPLIED LOOSE

KSA – Rubber anti-vibration mountings.
KSC – Clock card to display date/time and to regulate the machine with daily/weekly start/stop time bands, with the possibility to change the set-points.
KTR – Remote keypad for control at a distance with rear illuminated LCD display (same functions as the one built into the machine).
KISI – CAN bus serial interface (Controller Area Network compatible with evolved hydronic system for integrated comfort management (protocol supported CanOpen®).
KRS232 – RS485/RS232 serial converter for interconnection between RS485 serial network and supervision systems with serial connection to PC via RS232 serial port (RS232 cable provided).
KUSB – RS485/USB serial converter for interconnection between RS485 serial network and supervision systems with serial connection to PC via USB port (USB cable provided).
KMDM – GSM 900-1800 modem kit to be connected to the unit for the management of the parameters and any alarm signals on a remote basis. The kit consists of a GSM modem with relative RS232 card. It is necessary to purchase a SIM data card, not supplied by ***ÜNTES*** Inc.
ÜNTES *Inc*. supervision software for the installation and remote management of the units. The kit consists of a CD-Rom and hardware key.

Description and fitting instructions are supplied with each accessory.

II.3 TRANSPORT - HANDLING AND STORAGE

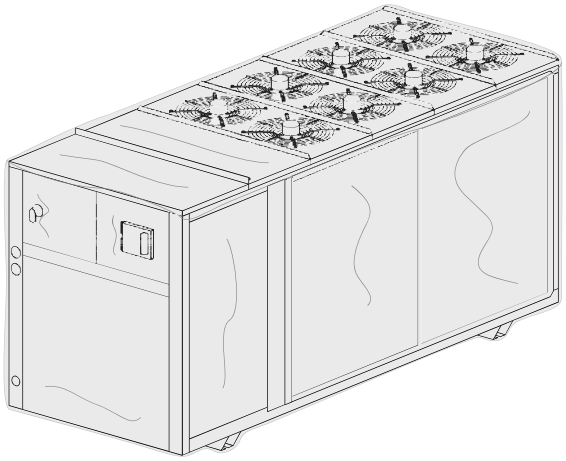
	DANGER! **The unit must be transported and handled by skilled personnel trained to carry out this type of work.**
	IMPORTANT! **Be careful to avoid damage by accidental collision.**

II.3.1 PACKAGING, COMPONENTS

	DANGER! **Do not open or tamper with the packaging before installation. Do not leave the packaging within reach of children.**
	ENVIRONMENTAL PROTECTION **Dispose of the packaging materials in compliance with the national or local legislation in force in your country.**

The units are delivered:

- covered with nylon shrink-wrap (if required).



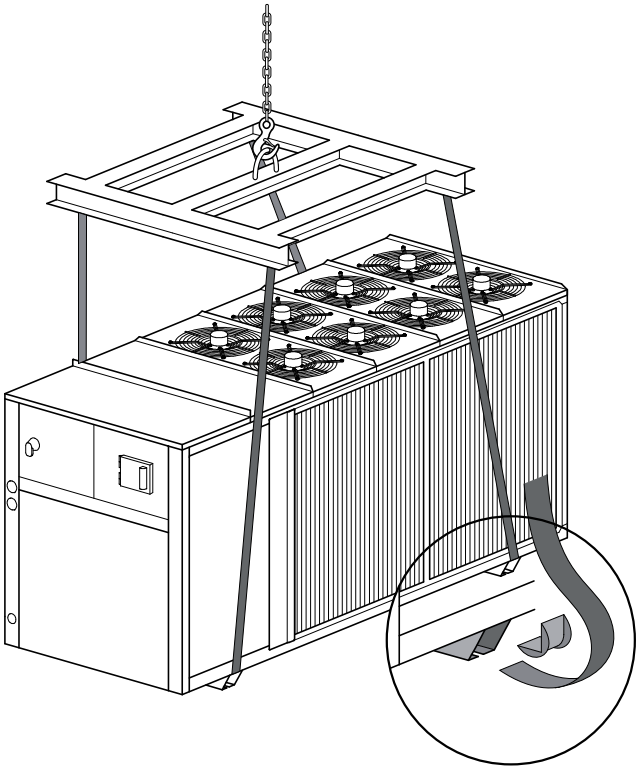
Each unit is supplied complete with:

- Instructions for use;
- Wiring diagram;
- List of authorised service centres;
- Warranty document;
- Safety valve certificates;
- Use and maintenance manual for the pumps, fans and safety valves.

II.3.2 LIFTING AND HANDLING

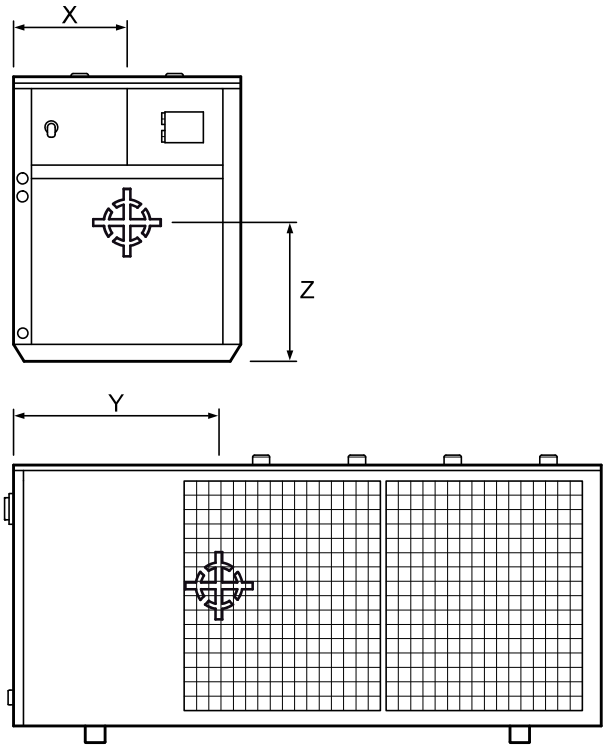
	ATTENTION! **The unit is not designed to be lifted using a forklift truck.**
	DANGER! **Movement of the unit should be performed with care, in order to avoid damage to the external structure and to the internal mechanical and electrical components.** **Also make sure that there are no obstacles or people blocking the route, to avoid the danger of collision or crushing. Make sure that there is no possibility of the lifting-gear overturning.**

Pass the straps through the slots on the base of the unit, having first checked their suitability (their strength and the state of wear and tear). Take the strain on the slings, checking that they remain properly attached to the lifting-hook; lift the unit a few centimetres, then, only after checking the stability of the load, carefully carry the unit to the installation site. Lower the unit carefully and fix it into place. During handling be careful not to trap any parts of the body, in order to eliminate any possible risk of crushing or any other injury if the load drops or shifts suddenly.



II.3.2.1 Handling instructions

	DANGER! **The centre of gravity is off-centre and could cause sudden and hazardous movements. The centre of gravity indicated in the table is approximate. Therefore the unit must be handled carefully so as to avoid damage to the external structure and to the internal mechanical and electrical components.**



Model		X	Y	Z
TCAEBY 270	mm	605	990	705
TCAEBY 270 P1 / P2 – DP1 / DP2	mm	620	1135	670
TCAEBY 270 ASP1 / ASP2 – ASDP1 / ASDP2	mm	630	1200	685
TCAEBY 280	mm	605	1010	705
TCAEBY 280 P1 / P2 – DP1 / DP2	mm	620	1150	675
TCAEBY 280 ASP1 / ASP2 – ASDP1 / ASDP2	mm	630	1210	685
TCAEBY 290	mm	600	885	690
TCAEBY 290 P1 / P2 – DP1 / DP2	mm	620	1055	660
TCAEBY 290 ASP1 / ASP2 – ASDP1 / ASDP2	mm	625	1095	675
TCAEBY 2100	mm	610	1015	700
TCAEBY 2100 P1 / P2 – DP1 / DP2	mm	620	1225	670
TCAEBY 2100 ASP1 / ASP2 – ASDP1 / ASDP2	mm	630	1285	685
TCAEBY 2115	mm	625	1030	735
TCAEBY 2115 P1 / P2 – DP1 / DP2	mm	625	1225	735
TCAEBY 2115 ASP1 / ASP2 – ASDP1 / ASDP2	mm	640	1270	715
TCAEBY 2130	mm	620	1015	730
TCAEBY 2130 P1 / P2 – DP1 / DP2	mm	630	1210	700
TCAEBY 2130 ASP1 / ASP2 – ASDP1 / ASDP2	mm	640	1260	715
TCAEBY 2145	mm	625	1025	730
TCAEBY 2145 P1 / P2 – DP1 / DP2	mm	635	1210	700
TCAEBY 2145 ASP1 / ASP2 – ASDP1 / ASDP2	mm	640	1265	710
TCAEBY 2160	mm	620	1090	755
TCAEBY 2160 P1 / P2 – DP1 / DP2	mm	630	1285	710
TCAEBY 2160 ASP1 / ASP2 – ASDP1 / ASDP2	mm	635	1360	735
TCAETY – TCAESY – TCAEQY 270	mm	605	1170	705
TCAETY – TCAESY – TCAEQY 270 P1 / P2 – DP1 / DP2	mm	620	1355	675
TCAETY – TCAESY – TCAEQY 270 ASP1 / ASP2 – ASDP1 / ASDP2	mm	630	1445	685
TCAETY – TCAESY – TCAEQY 280	mm	605	1180	710
TCAETY – TCAESY – TCAEQY 280 P1 / P2 – DP1 / DP2	mm	620	1360	675
TCAETY – TCAESY – TCAEQY 280 ASP1 / ASP2 – ASDP1 / ASDP2	mm	630	1450	690
TCAETY – TCAESY – TCAEQY 290	mm	600	1035	690
TCAETY – TCAESY – TCAEQY 290 P1 / P2 – DP1 / DP2	mm	620	1250	665
TCAETY – TCAESY – TCAEQY 290 ASP1 / ASP2 – ASDP1 / ASDP2	mm	625	1305	680
TCAETY – TCAESY – TCAEQY 2100	mm	610	1040	700
TCAETY – TCAESY – TCAEQY 2100 P1 / P2 – DP1 / DP2	mm	620	1240	670
TCAETY – TCAESY – TCAEQY 2100 ASP1 / ASP2 – ASDP1 / ASDP2	mm	630	1295	685
TCAETY – TCAESY – TCAEQY 2115	mm	750	1080	820
TCAETY – TCAESY – TCAEQY 2115 P1 / P2 – DP1 / DP2	mm	760	1250	775
TCAETY – TCAESY – TCAEQY 2115 ASP1 / ASP2 – ASDP1 / ASDP2	mm	780	1345	785
TCAETY – TCAESY – TCAEQY 2130	mm	745	1095	820
TCAETY – TCAESY – TCAEQY 2130 P1 / P2 – DP1 / DP2	mm	760	1260	785
TCAETY – TCAESY – TCAEQY 2130 ASP1 / ASP2 – ASDP1 / ASDP2	mm	775	1345	785
TCAETY – TCAESY – TCAEQY 2145	mm	765	1060	860
TCAETY – TCAESY – TCAEQY 2145 P1 / P2 – DP1 / DP2	mm	775	1225	820
TCAETY – TCAESY – TCAEQY 2145 ASP1 / ASP2 – ASDP1 / ASDP2	mm	790	1310	815
TCAETY – TCAESY – TCAEQY 2160	mm	760	1080	855
TCAETY – TCAESY – TCAEQY 2160 P1 / P2 – DP1 / DP2	mm	770	1235	815
TCAETY – TCAESY – TCAEQY 2160 ASP1 / ASP2 – ASDP1 / ASDP2	mm	785	1315	815
THAETY – THAESY 270	mm	615	1170	695
THAETY – THAESY 270 P1 / P2 – DP1 / DP2	mm	630	1340	670
THAETY – THAESY 270 ASP1 / ASP2 – ASDP1 / ASDP2	mm	640	1430	680
THAETY – THAESY 280	mm	615	1180	700
THAETY – THAESY 280 P1 / P2 – DP1 / DP2	mm	630	1350	670
THAETY – THAESY 280 ASP1 / ASP2 – ASDP1 / ASDP2	mm	640	1435	680
THAETY – THAESY 290	mm	615	1045	685
THAETY – THAESY 290 P1 / P2 – DP1 / DP2	mm	625	1245	655
THAETY – THAESY 290 ASP1 / ASP2 – ASDP1 / ASDP2	mm	635	1300	675
THAETY – THAESY 2100	mm	615	1050	690
THAETY – THAESY 2100 P1 / P2 – DP1 / DP2	mm	630	1240	665
THAETY – THAESY 2100 ASP1 / ASP2 – ASDP1 / ASDP2	mm	635	1290	678
THAETY – THAESY 2115	mm	755	1070	810
THAETY – THAESY 2115 P1 / P2 – DP1 / DP2	mm	770	1245	775
THAETY – THAESY 2115 ASP1 / ASP2 – ASDP1 / ASDP2	mm	785	1330	780
THAETY – THAESY 2130	mm	750	1090	810
THAETY – THAESY 2130 P1 / P2 – DP1 / DP2	mm	765	1255	775
THAETY – THAESY 2130 ASP1 / ASP2 – ASDP1 / ASDP2	mm	775	1335	780
THAETY – THAESY 2145	mm	770	1055	840
THAETY – THAESY 2145 P1 / P2 – DP1 / DP2	mm	780	1220	805
THAETY – THAESY 2145 ASP1 / ASP2 – ASDP1 / ASDP2	mm	790	1300	805
THAETY – THAESY 2160	mm	765	1080	840
THAETY – THAESY 2160 P1 / P2 – DP1 / DP2	mm	775	1230	805
THAETY – THAESY 2160 ASP1 / ASP2 – ASDP1 / ASDP2	mm	785	1305	805

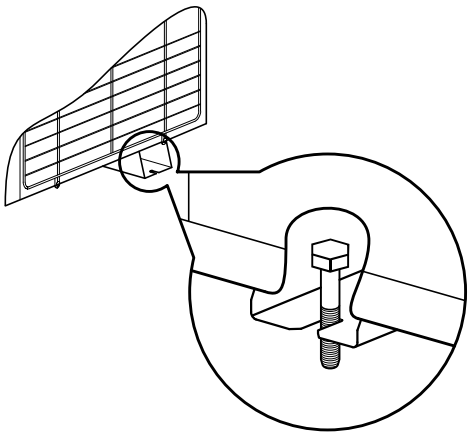
II.3.3 STORAGE CONDITIONS

The units cannot be stacked. The temperature limits for storage are -9°÷45°C.

II.4 INSTALLATION INSTRUCTIONS

	DANGER! **Installation must only be carried out by skilled technicians, qualified to work on air conditioning and cooling systems. Incorrect installation could cause the unit to run badly, with a consequent noticeable deterioration in performance.**
	DANGER! **The unit must be installed according to national or local rules in force at the time of installation.**
	DANGER! **The machine is designed for outdoor installation. Segregate the unit if installed in areas accessible to persons under 14 years of age.**
	DANGER! **Some internal parts of the unit may cause cuts. Use suitable personal protection gear.**
	DANGER! **When the outdoor temperature is around zero, the water normally produced during the defrosting of the coils could form ice and make the flooring near the installation area slippery.**

If the unit is not fixed to anti-vibration supports (KSA), once it has been set on the ground, it must be solidly bolted down to the floor using M16 metric threaded bolts. Slots are provided in the base for this purpose. The unit may not be installed on brackets or shelves.



II.4.1 INSTALLATION SITE REQUIREMENTS

The installation site should be chosen in accordance with that set out in the EN 378-1 standard and in keeping with the requirements of the EN 378-3 standard. When selecting the installation site, risks posed by accidental refrigerant leakage from the unit should also be taken into consideration.

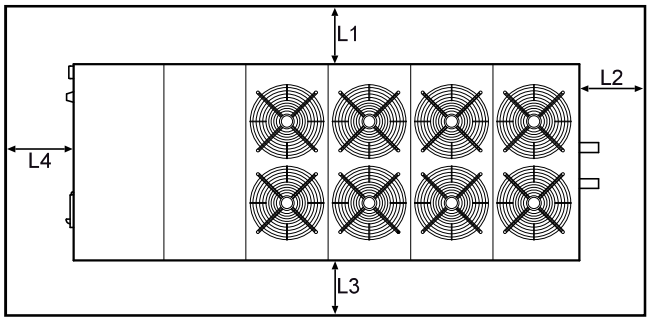
II.4.1.1 Outdoor installation

Machines designed for outdoor installation must be positioned so as to avoid any refrigerant gas leakage entering the building and posing a hazard to people's health.
If the unit is installed on terraces or building roofs, adequate safety measures must be taken in order to ensure that any gas leaks cannot enter the building through ventilation systems, doors or similar openings.
In the event that the unit is installed inside a walled-in structure (usually for aesthetic reasons), these structures must be suitably ventilated in order to prevent the formation of dangerous concentrations of refrigerant gas.

II.4.2 CLEARANCES AND POSITIONING

	IMPORTANT! **Before installing the unit, check the noise limits permissible in the place in which it will be used.**
	IMPORTANT! **The unit should be positioned to comply with the minimum recommended clearances, bearing in mind the access to water and electrical connections.**

The unit is designed for outdoor installation. The unit should be correctly levelled and positioned on a supporting surface capable of sustaining its full weight. It must not be installed on brackets or shelves.



Model		270÷2100	2115÷2160
L1	mm	1500	2000
L2	mm	2000	2000
L3	mm	1500	2000
L4	mm	1000	1500

N.B.:
L2 is the minimum distance for the removal of the pump assembly and the relative water buffer tank. If the accessory is not present, the distance can be reduced.
The space over the unit must be free from any possible obstacle. If the unit is completely surrounded by walls, the distances specified are still valid, provided that at least two adjacent walls are not higher than the unit itself.
There must be a minimum gap of at least 3.5 m between the top of the unit and any obstacles above it.
If more than one unit is installed, the minimum distance between the finned coils should be at least 2 m.
However it is installed, the coil inlet air temperature (ambient air) must remain within the set limits.

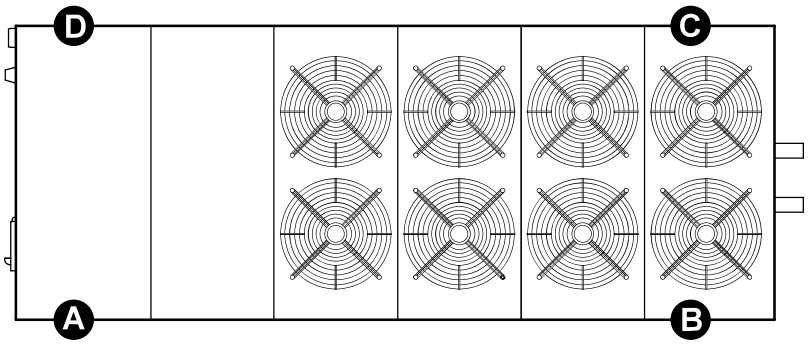
	IMPORTANT! **Incorrect positioning or installation of the unit may amplify noise levels and vibrations generated during operation.**

The following accessories are available to reduce noise and vibration:
KSA - Anti-vibration mountings.
When installing the unit, bear the following in mind:

- non-soundproofed reflecting walls near the unit may increase the total sound pressure level reading near the appliance by as much as 3 dB(A) for every surface;
- install suitable anti-vibration mountings under the unit to avoid transmitting vibrations to the building structure;
- make all water connections using elastic joints. Pipes must be firmly supported by solid structures. If the pipes are routed through walls or panels, insulate with elastic sleeves. If, after installation and start-up of the unit, structural vibrations are observed in the building which provoke such strong resonance that noise is generated in other parts of the building, consult a qualified acoustic technician for a complete analysis of the problem.

II.4.3 WEIGHT OF MODELS

TCAEBY – TCAETY – TCAESY – TCAEQY



TCAEBY

Model		Total weight	Support			
			A	B	C	D
270	kg	685	185	158	159	183
280	kg	725	190	173	173	189
290	kg	870	231	150	201	288
2100	kg	945	292	184	184	285
2115	kg	1020	321	208	195	296
2130	kg	1040	330	206	196	308
2145	kg	1100	347	223	210	320
2160	kg	1160	337	260	247	316

TCAETY-TCAESY-TCAEQY

Model		Total weight	Support			
			A	B	C	D
270	kg	745	201	172	172	200
280	kg	765	205	178	178	204
290	kg	910	275	180	182	273
2100	kg	980	298	196	196	290
2115	kg	1130	314	243	253	320
2130	kg	1195	324	261	275	335
2145	kg	1225	289	328	322	286
2160	kg	1290	363	282	286	359

TCAEBY with **PUMP** accessory

Model		Total weight	Support			
			A	B	C	D
270	kg	827	193	234	220	180
280	kg	865	198	248	234	185
290	kg	1013	260	261	248	244
2100	kg	1092	290	275	259	268
2115	kg	1163	311	293	274	285
2130	kg	1189	327	299	272	291
2145	kg	1261	348	320	288	305
2160	kg	1318	330	360	332	296

TCAETY-TCAESY-TCAEQY with **PUMP** accessory

Model		Total weight	Support			
			A	B	C	D
270	kg	885	206	249	237	193
280	kg	905	210	256	243	196
290	kg	1054	272	270	257	255
2100	kg	1127	295	288	271	273
2115	kg	1283	305	338	335	305
2130	kg	1345	315	358	356	316
2145	kg	1384	347	363	346	328
2160	kg	1450	357	382	368	343

TCAEBY with **TANK&PUMP** accessory

Model		Total weight		Support			
		(*)	(**)	A	B	C	D
270	kg	925	1165	244	394	338	189
280	kg	963	1203	208	377	385	233
290	kg	1112	1352	317	414	361	260
2100	kg	1185	1426	332	441	385	268
2115	kg	1257	1497	361	464	394	278
2130	kg	1282	1522	370	464	397	291
2145	kg	1354	1594	390	485	414	305
2160	kg	1411	1651	347	553	482	269

TCAETY-TCAESY-TCAEQY with **TANK&PUMP** accessory

Model		Total weight		Support			
		(*)	(**)	A	B	C	D
270	kg	983	1224	243	424	370	187
280	kg	1003	1244	246	432	377	189
290	kg	1153	1393	316	436	384	257
2100	kg	1219	1459	337	453	396	273
2115	kg	1406	1846	356	639	561	290
2130	kg	1470	1910	366	657	582	305
2145	kg	1513	1953	399	662	574	318
2160	kg	1580	2020	409	682	596	333

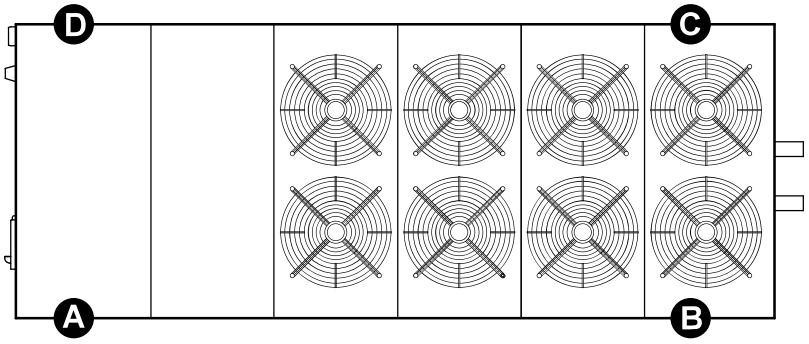
(*) Weight of the unit when empty.

(**) The weight and its distribution over the support points includes the water contained in the water buffer tank.

(*) Weight of the unit when empty.

(**) The weight and its distribution over the support points includes the water contained in the water buffer tank.

THAETY – THAESY



THAETY-THAESY

Model		Total weight	Support			
			A	B	C	D
270	kg	810	224	191	183	212
280	kg	830	228	198	189	215
290	kg	975	298	198	194	285
2100	kg	1045	220	216	207	302
2115	kg	1215	343	261	268	343
2130	kg	1285	354	281	291	359
2145	kg	1315	383	283	280	369
2160	kg	1390	394	305	306	385

THAETY-THAESY with **PUMP** accessory

Model		Total weight	Support			
			A	B	C	D
270	kg	953	230	270	248	205
280	kg	971	232	277	255	207
290	kg	1118	294	289	268	267
2100	kg	1191	317	308	282	284
2115	kg	1366	331	363	352	320
2130	kg	1438	343	382	375	338
2145	kg	1476	374	386	366	350
2160	kg	1550	385	407	391	367

THAETY-THAESY with **TANK&PUMP** accessory

Model		Total weight		Support			
		(*)	(**)	A	B	C	D
270	q	1050	1290	266	444	382	198
280	kg	1068	1307	268	451	388	200
290	kg	1218	1458	338	456	395	269
2100	kg	1284	1523	360	472	407	284
2115	kg	1490	1930	382	661	578	309
2130	kg	1562	2003	393	681	602	327
2145	kg	1605	2045	426	686	593	340
2160	kg	1680	2120	437	707	619	357

(*) Weight of the unit when empty.

(**) The weight and its distribution over the support points include the water contained in the water buffer tank.

Weight of the DS and RC100 accessories for models: TCAEBY-TCAETY-TCAESY-TCAEQY-THAETY-THAESY

Model		Weight of the **DS** accessory
270	kg	33
280	kg	33
290	kg	33
2100	kg	37
2115	kg	42
2130	kg	39
2145	kg	42
2160	kg	45

Model		Weight of the **RC100** accessory
270	kg	78
280	kg	84
290	kg	84
2100	kg	90
2115	kg	94
2130	kg	100
2145	kg	110
2160	kg	120

N.B.:
To obtain the total weight of the units with the RC100 and DS accessories, add the weight of the accessory to the weight of the machine.

II.5 WATER CONNECTIONS

II.5.1 CONNECTION TO THE SYSTEM

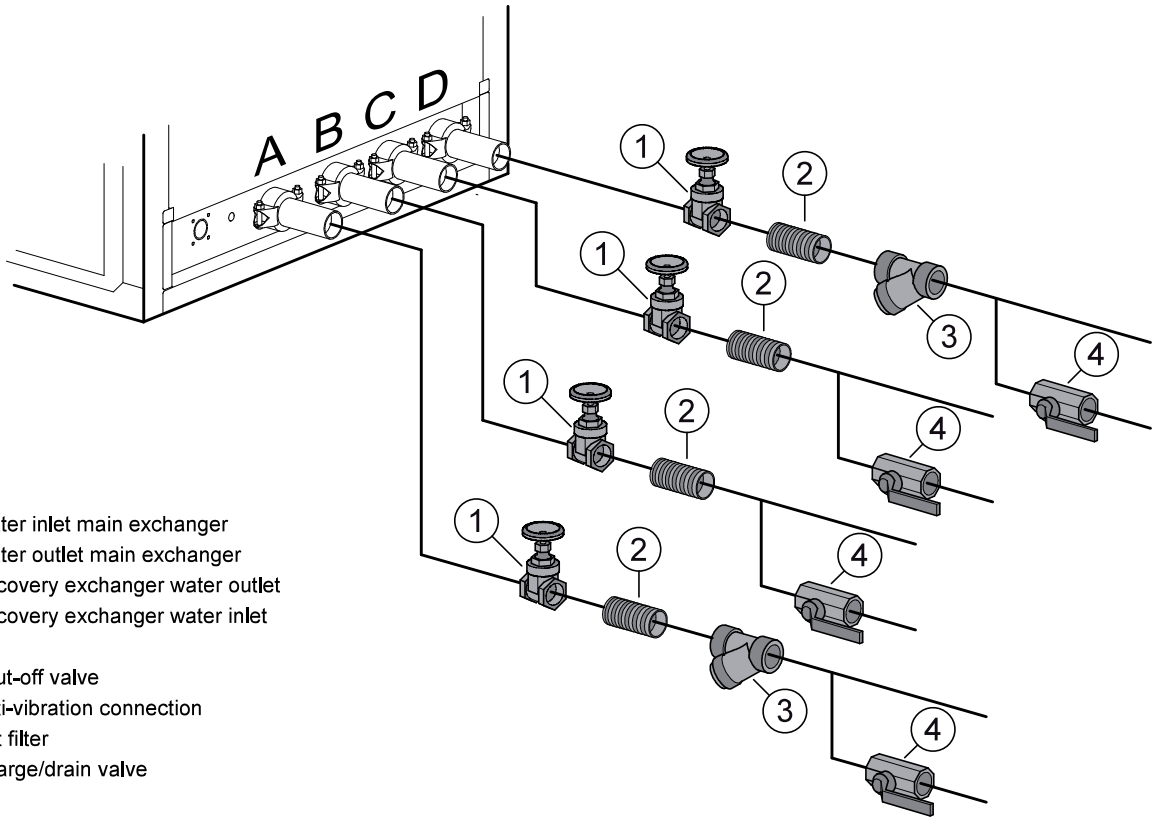
	IMPORTANT! **The layout of the water system and connection of the system to the unit must be carried out in conformity with local and national rules in force.**
	IMPORTANT! **We recommend installing isolating valves that isolate the unit from the rest of the system. Mesh filters with a square section (longest side = 0.8 mm), of a suitable size and pressure drop for the system, must be installed. Clean the filter periodically.**

○ The unit is designed for outdoor installation.
○ The unit is fitted with Victaulic type water connections on the air conditioning system water inlet and outlet and on the recovery/desuperheater inlets and outlets. It is also fitted with carbon steel fittings for welding.
○ The unit must be positioned to comply with the minimum recommended clearances, bearing in mind the access to water and electrical connections.
○ The unit can be equipped with anti-vibration mountings on request (KSA).
○ Shut-off valves must be installed that isolate the unit from the rest of the system. Elastic connection joints and system/machine drain taps also need to be fitted.
○ A metal mesh filter (with a square mesh measure no more than 0.8 mm), of a suitable size and with suitable pressure drops, must be fitted on unit return pipes.
○ The water flow through the heat-exchanger should not fall below a value corresponding to a temperature differential of 8°C (with both compressors on).
○ Correct installation and positioning include levelling the unit on a surface capable of bearing its weight.
○ During long periods of inactivity, it is advisable to drain the water from the system.
○ It is possible to avoid draining the water by adding ethylene glycol to the water circuit (see "*Use of antifreeze solutions*").
○ The expansion tank is sized on the basis of the water content of the individual machine. Any additional expansion tank should be sized by the installer on the basis of the system. In the case of models without a pump, the pump must be installed with the pump delivery towards the machine water inlet.
○ It is advisable to install an air bleed valve.
○ Once the connections to the unit are made, check that none of the pipes leak, and bleed the air from the system.

II.5.1.1 Installing and managing the unit's external user pump

The circulation pump to be installed in the main water circuit should be selected to overcome any pressure drops, at nominal rates of water flow, both in the exchanger and in the entire water system.
The operation of the user pump must be subordinated to the operation of the unit; the microprocessor controller checks the operation of the pump according to the following logic:
when the start-up command is given, the first device to start is the pump, which has priority over all the other devices. During the start-up phase, the minimum water flow differential pressure switch fitted on the unit is temporarily excluded, for a preset period, in order to avoid oscillations caused by air bubbles or turbulence in the water circuit. Once the starting phase is over, final enablement is given to the machine to start up; 60 seconds from the pump starting, the fans cut in (during this phase the antifreeze alarm is bypassed); after a further 60 seconds the compressors start up (allowing for the safety timer delay). The pump continues to work throughout the operation of the unit, and it shuts down only at the switch-off command. After switch-off, the pump will continue to operate for a pre-set time before finally stopping, in order to disperse the residual heat in the water exchanger.

II.5.2 INSTALLATION



A Water inlet main exchanger
B Water outlet main exchanger
C Recovery exchanger water outlet
D Recovery exchanger water inlet

1 Shut-off valve
2 Anti-vibration connection
3 Net filter
4 Charge/drain valve

II.5.3 PROTECTING THE UNIT FROM FROST

IMPORTANT!
If the mains switch is opened, it cuts off the electricity supply to the storage tank plate exchanger heater, the antifreeze heater of the storage tank and the pump (RAA and RAE accessories) and the compressor crankcase heater. The switch should only be disconnected for cleaning, maintenance or repair of the machine.

When the unit is running, the control board protects the water-side heat exchanger from freezing by making the antifreeze alarm cut in, stopping the machine if the temperature of the sensor fitted on the heat exchanger reaches the set point value.

IMPORTANT!
When the unit is out of service, drain all the water contents from the circuit.

If the draining operation is felt to be too much trouble, ethylene glycol may be mixed with the water in suitable proportions in order to guarantee protection from freezing.

IMPORTANT!
Mixing the water with glycol modifies the performance of the unit.

○ The use of ethylene glycol is recommended if you do not wish to drain the water from the hydraulic system during the winter stoppage, or if the unit has to supply chilled water at temperatures lower than 5°C The addition of glycol changes the physical properties of the water and consequently the performance of the unit. The proper percentage of glycol to be added to the system can be obtained from the most demanding operating conditions from those shown below.
○ Table "H" shows the multipliers which allow the changes in performance of the units to be determined in proportion to the required percentage of ethylene glycol.
• The multipliers refer to the following conditions: condenser inlet water temperature 35°C; chilled water outlet temperature 7°C; temperature differential at evaporator and condenser 5°C.
• For different operating conditions, the same coefficients can be used as their variations are negligible.
○ The electric heater for the water side heat exchanger (RA accessory), the water buffer tank (RAS accessory), the motor-driven pump assembly (RAE accessory) and the desuperheater or heat recovery (RDR accessory) prevents ice formation during winter breaks (as long as the unit is not disconnected from the power supply).

Attention:
Over 20% glycol, check the pump absorption limits (in versions P1-P2, DP1-DP2, ASP1-ASP2, ASDP1-ASDP2).

Table "H"

glycol in weight	10 %	15 %	20 %	25 %	30 %
Freezing temperature °C	-5	-7	-10	-13	-16
fc QF	0,991	0,987	0,982	0,978	0,974
fc P	0,996	0,995	0,993	0,991	0,989
fc Δpw	1,053	1,105	1,184	1,237	1,316
fc G	1,008	1,028	1,051	1,074	1,100

fc QF = Cooling capacity correction factor.
fc P = Correction factor for the absorbed electrical current.
fc Δpw = Correction factor of the pressure drops in the evaporator.
fc G = Correction factor of the glycol water flow to the evaporator.

II.5.4 HEAT RECOVERY SYSTEM

II.5.4.1 Operation

To recover the heat from the compressor and thus produce hot water, the differential pressure switch PD must give its consent to the electronic board; to achieve this result, the circulating pump P must be active and the water must circulate normally through the recovery exchanger.
The electronic board also checks the recovery unit and/or desuperheater (ST8) outlet temperature so as to guarantee maximum outlet temperature.

II.5.4.2 Installation precautions

DANGER!
The heat recovery / desuperheater is in direct line with the compressor; the internal temperature of the recovery exchanger, if faulty, may reach 120°C at 2 bar pressure. This could lead to the formation of steam from overheated water.

Units fitted with a permanent recovery unit or desuperheater in series with the compressor must be used in compliance with the regulations set out by Ministerial Decree 1/12/1975 "Safety regulations for appliances containing hot pressurized fluids" and by its technical application specifications (collections R and H). This law is only valid in Italy. For installation in other countries, please abide by the local laws in force.

II.5.5 MINIMUM CONTENTS OF WATER CIRCUIT

In order for the units to operate properly, minimum water contents must be guaranteed in the water system. The minimum water content is determined on the basis of the unit's nominal cooling capacity (or heating capacity in the case of heat pumps) (table A *Technical Data*), multiplied by the coefficient expressed in l/kW.
If the minimum content in the system is below the minimum value indicated or calculated, it is advisable to select the TANK&PUMP accessory complete with inertial water buffer tank, and install an additional tank if necessary. However, in process applications it is always advisable to use a water buffer tank or a greater system water content to guarantee higher system thermal inertia.

The minimum circuit water content is 2 l/kW

Example:
THAETY 2115 QT = 122.0 kW

If the unit envisages control iDRHOSS compatible with the ***AdaptativeFunction Plus*** function, the minimum system content must be:

Qf (kW) x 2 l/kW = 122.0 kW x 2 l/kW = 244.0 l.

II.5.6 WATER DATA

Models			270	280	290	2100	2115	2130	2145	2160
	Safety valve	barg	6	6	6	6	6	6	6	6
TCAEBY	Exchanger water contents	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
	Tank water content ASP1	l	250	250	250	250	250	250	250	250
	Tank water content ASP2	l	250	250	250	250	250	250	250	250
TCAETY TCAESY TCAEQY	Exchanger water contents	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
	Tank water content ASP1	l	250	250	250	250	450	450	450	450
	Tank water content ASP2	l	250	250	250	250	450	450	450	450
THAESY THAETY	Exchanger water contents	l	6,9	8,4	8,4	9,9	11,1	12,6	14,9	17,4
	Tank water content ASP1	l	250	250	250	250	450	450	450	450
	Tank water content ASP2	l	250	250	250	250	450	450	450	450

II.5.6.1 Expansion tank technical data

Model		TCAEBY							
		270	280	290	2100	2115	2130	2145	2160
Capacity	l	12	12	12	12	12	12	12	12
Pre-charging	barg	2	2	2	2	2	2	2	2
Maximum expansion tank pressure	barg	6	6	6	6	6	6	6	6

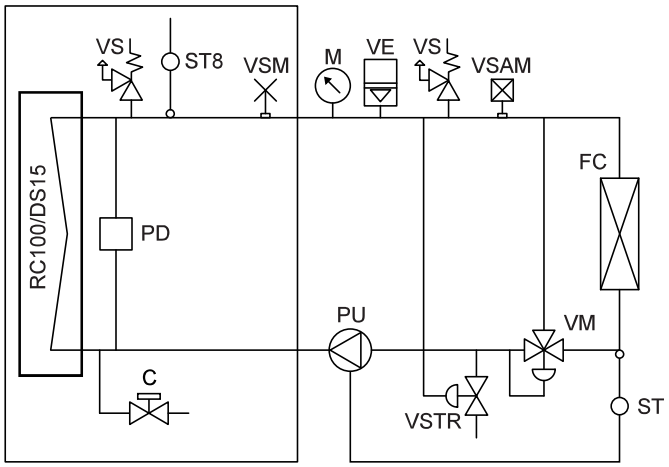
Model		TCAETY-THAETY-TCAESY-THAESY-TCAEQY							
		270	280	290	2100	2115	2130	2145	2160
Capacity	l	12	12	12	12	24	24	24	24
Pre-charging	barg	2	2	2	2	2	2	2	2
Maximum expansion tank pressure	barg	6	6	6	6	6	6	6	6

II.5.7 SUGGESTIONS FOR INSTALLATION

IMPORTANT!
The type of system described below could lead to lime scale forming in the water/refrigerant heat exchanger. We therefore recommend taking suitable steps to limit this phenomenon.
When operating as a heat pump, it is advisable to drain the recovery circuit.

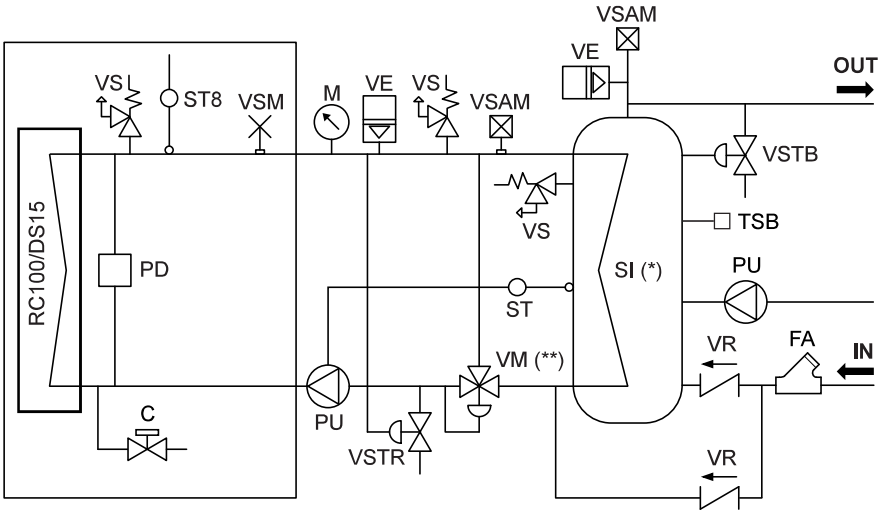
Particular attention should be paid to the system operating pressure, which should not exceed the values recorded on the plaque for the individual components and should be such as to prevent the water contained in the recovery unit from boiling.
The continuous circulation of water through the recovery unit or the desuperheater must be guaranteed by means of mixing units.

Closed circuit system (for heating for example)



RC100 – Recovery unit
DS – Desuperheater
M – Pressure gauge
VS – Safety valve
VE – Expansion tank
VSTB – Hot water boiler heat drain valve
VSTR – Recovery heat drain valve
VSM – Manual air bleed valve
VSAM – Automatic / Manual air bleed valve
TSB – Hot water boiler safety thermostat
VR – Non-return valve
VM – Three-way mixer valve
P – Circulating pump
PD – RC100/DS consensus differential pressure switch
FC – Fan coil
UT – Upon use
RI – From the water supply
ST – Temperature sensor
SI – Intermediate exchanger
ST8 – RC100/DS outlet temperature probe
VSAC – Water safety valve
C – Water charge/drain valve
ST – Temperature sensor
FA – Water filter

Open circuit system (for hot water for example)



(*): in the case of hot water for washing purposes, an intermediate exchanger (BL) should be installed for reasons of hygiene. For the same reason, it is important not to forget to periodically raise the water temperature in the tank in order to disinfect against bacteria such as Legionella Pneumophila.

(**): it is advisable to use a three-way mixer valve to guarantee the minimum recovery (RC100) or desuperheater (DS) inlet temperature.

II.6 ELECTRICAL CONNECTIONS

	**DANGER!** **Always install a general automatic switch in a protected area near the appliance with a characteristic delayed curve, sufficient capacity and breaking power. There should be a minimum distance of 3 mm between the contacts.** **Earth connection is compulsory by law and it safeguards the user while the machine is in use.**
	**DANGER!** **Electrical connection of the unit must be carried out by skilled personnel and in compliance with the current regulations of the country where the unit is installed. Non-compliant electrical connections relieve *ÜNTES* Inc. of all liability for damage to property and personal injury.** **In making the electrical connections to the board, cables must be routed so that they do not touch the hot parts of the machine (compressor, flow pipe and liquid line). Protect the wires from any foam.**
	**IMPORTANT!** **For electrical connections to the unit and the accessories, follow the supplied wiring diagrams.**

The safety door interlock automatically prevents electric power being fed to the unit if the cover panel over the electrical panel is opened.

After opening the front panel of the unit, feed the supply cables through the appropriate cable clamps in the external panelling and then through the ducts at the base of the electric board.
The electrical power supplied by the single-phase or three-phase line, must be taken to the main isolator switch.
The supply cable must be of the flexible type, with PVC sheathing of no lighter than H05RN-F: for the section, refer to the table below or the wiring diagram.

Model		Line section	PE section	Remote control section
270	mm²	25	16	1,5
280	mm²	25	16	1,5
290	mm²	25	16	1,5
2100	mm²	35	16	1,5
2115	mm²	35	16	1,5
2130	mm²	35	16	1,5
2145	mm²	50	25	1,5
2160	mm²	70	35	1,5

The earth conductor must be longer than the other conductors in order to ensure that in the event of the cable clamping device becoming slack, it will be the last to come under strain.

II.6.1.1 Remote management through connections prepared by the installer

The connections between board and switch or remote light must be made with screened cable consisting of 2 twisted 0.5 mm² wires and the screening. The screening must be connected to the earth screw on the panel (on one side only). The maximum permitted distance is 30 m.

SCR Remote control selector (control with clean contact);

SEI Summer/Winter selector (control with clean contact);

LBG General lock light (230 V AC);

LFC1 Compressor 1 operating light (230 V AC);

LFC2 Compressor 2 operating light (230 V AC);

- **Remote ON/OFF enablement (SCR)**

	**IMPORTANT!** **When the unit is switched OFF using the remote control selector, the message *OFF by digital input* appears on the control panel display on the machine.**

Remove the **ID8** terminal bridge on the electronic board and connect the wires coming from the remote control ON/OFF selector (selector to be installed by the installer).

ATTENTION	Open contact:	the unit is OFF.
	Closed contact:	the unit is ON.

- **Remote summer/winter enablement on THAEY**

Connect the wires coming from the remote summer/winter selector on the **ID7** terminal present on the electronic board.
Now modify parameter **Rem. Summer/Winter.**

ATTENTION	Open contact:	heating cycle.
	Closed contact:	cooling cycle.

- **LBG – LCF1 – LCF2 remote control**

To remotely control the two signals, connect the two lamps according to the instructions provided in the wiring diagram supplied with the machine.

II.6.1.2 Remote management using accessories supplied separately

It is possible to remote control the entire machine by linking a second keyboard to the one built into the machine (KTR accessory).
To select the remote control system, consult paragraph *II.3*. The use and installation of the remote control systems are described in the *Instruction Sheets* provided with the same.

II.7 START-UP INSTRUCTIONS

	**IMPORTANT!** **Machine commissioning or the first start up (where provided for) must be carried out by skilled personnel from workshops authorised by *ÜNTES* Inc., qualified to work on this type of products.**
	**IMPORTANT!** **The use and maintenance manuals for the pumps, fans and safety valves are enclosed with this manual and should be read throughout.**
	**DANGER!** **Before starting up, make sure that the installation and electrical connections conform with the instructions in the wiring diagram. Also make sure that there are no unauthorised persons in the vicinity of the machine during the above operations.**
	**DANGER!** **The units are equipped with safety valves located inside the technical and coil compartments. When they cut in, they cause a loud noise and violent refrigerant and oil leaks. Do not approach the safety valve cut-in pressure value. Safety valves can be ducted away in accordance with the recommendations of the valve manufacturers.**

II.7.1 CONFIGURATION

Safety component calibration settings

Pressure switch	Cut-in	Reset
high pressure	40.2 bar	28.1 bar - Manual
low pressure	2 bar	3.3 bar – Automatic
water differential	80 mbar	105 mbar - Automatic
High pressure safety valve	41.7 bar	-

The liquid receivers are equipped with bleed/safety valves calibrated at 43 barg (further bleed/safety valves can be installed depending on the circuit requirements). A bleed/safety valve calibrated at 27 Barg. is provided either in the gas separator or on the suction line.

DANGER!
The safety valve on the high pressure side is calibrated at 41.7 bar. It could cut in (just as the other valves of the circuit) if the calibration value is reached during the refrigerant charging operations, leading to a burst that could cause scalding.

Configuration parameters	Standard setting
Summer working temperature set point	7°C
Winter working temperature set point (THAETY THAESY)	45°C
Working temperature differential	2°C
Antifreeze temperature set point	1.5°C
Antifreeze temperature differential	2°C
Water low pressure switch exclusion time upon start-up	120"
Water differential pressure switch exclusion time upon start-up	15"
Circulation pump switch off time delay	15"
Minimum time between two consecutive compressor start-ups	360"

The units are tested in the factory, where they are also calibrated and the default parameter settings are put in. These guarantee that the appliances run correctly in rated working conditions. The machine configuration is carried out in the factory and should never be altered.

IMPORTANT!
If a unit is used for the production of chilled water, check the adjustment of the thermostatic valve.

II.7.2 UNIT START-UP AND STARTUP AFTER PROLONGED SHUTDOWN

DANGER!
Always use the switch to isolate the unit from the mains before carrying out any maintenance work, even if it is for inspection purposes only. Make sure that no one accidentally supplies power to the machine, lock the mains switch in the OFF position.

Before starting the unit, perform the following checks:

○ The electricity power supply must comply with the specifications on the data plate and/or the wiring diagram and it must fall within the following limits:

- variation of the power supply frequency. ±2 Hz.
- variation of the power supply voltage: ±10% of the nominal voltage;
- imbalance between the supply phases: <2%.

○ the electrical power supply system must be able to supply adequate current and be suitably sized to handle the load;

○ open the electric panel and make sure the terminals of the power supply and of the contactors are tight (they may have come loose during transport, which could lead to malfunctions);

Electrical connections must be made in compliance with the local installation standards in force in the place where the unit is installed, and with the instructions in the wiring diagram provided with the unit.

II.7.3 START-UP PROCEDURE

	IMPORTANT! **The unit's first start-up must be carried out by skilled technicians only, qualified to work on air conditioning and refrigerant units.**
	IMPORTANT! **A few hours before starting up the unit (at least 12), supply power to the machine in order to power the electrical heaters designed to heat up the compressor crankcase. Each time the unit starts up the crankcase heaters switch off automatically.**

	DANGER! **By removing the protection panel from the coil/fan compartments the unit electrical supply is completely interrupted. Be careful of any possible rotation of the fan blades caused by traction or inertia.**

Once the unit installation and connection operations have been completed, the unit can be started up for the first time.
For a correct first start-up of the unit carefully follow the diagrams provided in the following paragraphs.

II.7.3.1 General unit conditions

START

Have the technical clearance distances indicated in the manual been respected?
- NO → Restore the indicated technical spaces.
- YES ↓

Are the finned coils free from obstructions?
- NO → Clean the finned coils.
- YES ↓

Are the fan grilles free from obstructions?
- NO → Remove the obstructions.
- YES ↓

Is the unit damaged due to transport/installation?
- YES → **Danger!** Do not start the unit! Restore the unit!
- NO ↓

The general conditions of the unit are compliant!

II.7.3.2 Checking the compressor oil level

START

Is the oil level sufficient?
- NO → Top up as necessary
- YES ↓

Was pre-heating activated at least 24 hours before start-up?
- NO → Activate pre-heating and wait 24 hours.
- YES ↓

The compressor is ready for startup!

II.7.3.3 Checking the water connections

START

Have the water connections been made to a professional standard?
- NO → Bring the connections up to standard.
- YES ↓

Is the water input/output direction correct?
- NO → Correct the input/output direction.
- YES ↓

Are the circuits full of water and have the pipes been bled of any air residue?
- NO → Fill the circuits and/or bleed the air.
- YES ↓

Does the water flow conform to what is stated in the user manual?
- NO → Correct the water flow.
- YES ↓

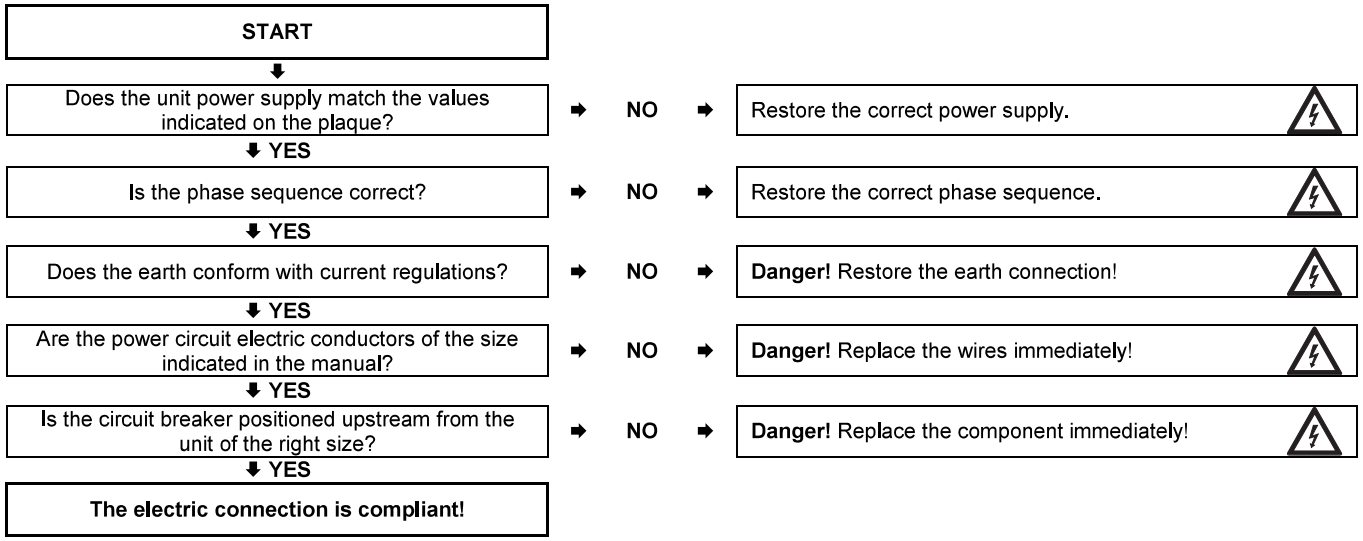
Do the pumps turn in the right direction?
- NO → Correct the rotation direction.
- YES ↓

Are the flow meters (if installed) active and correctly connected?
- NO → Repair or replace the component.
- YES ↓

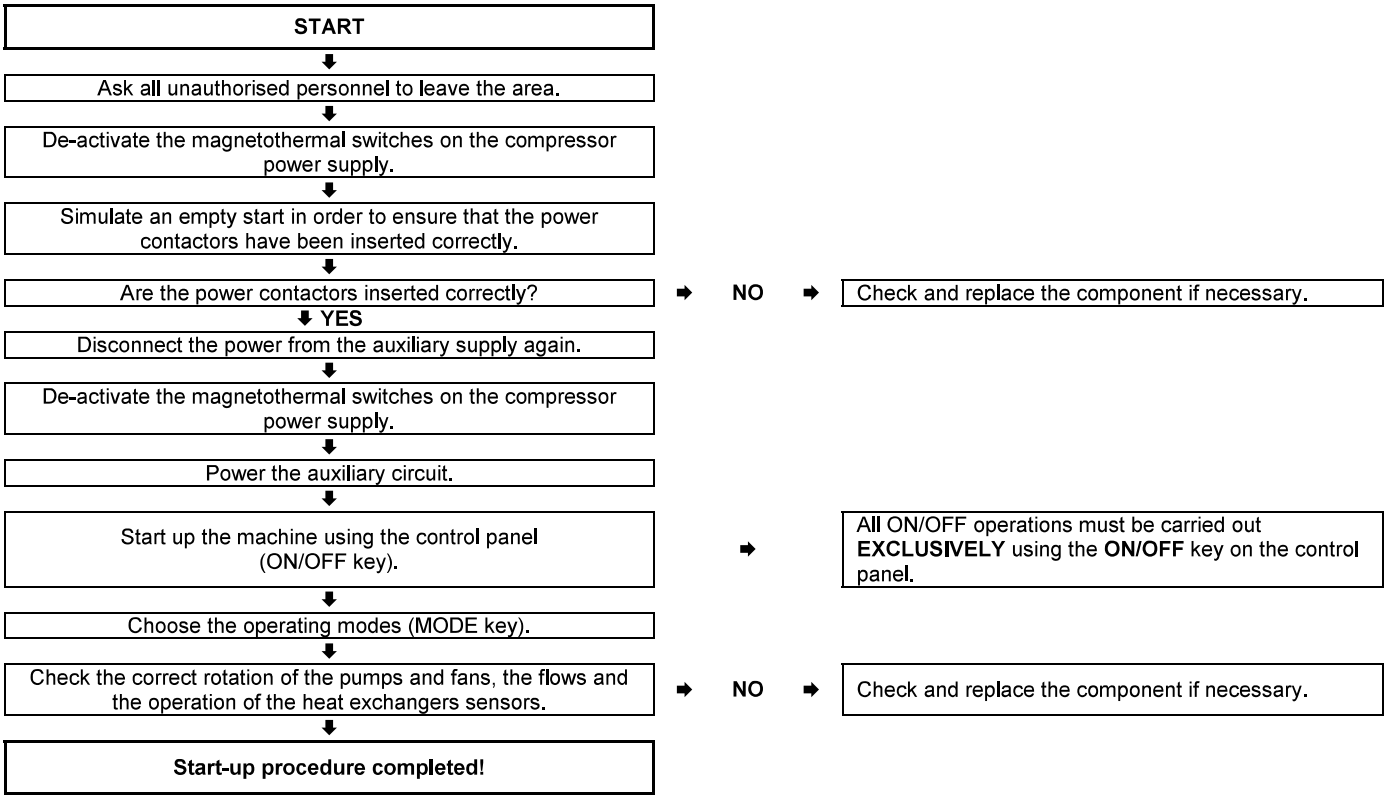
Are the water filters placed upstream from the heat exchanger and recovery unit in good working order and correctly installed?
- NO → Repair or replace the component.
- YES ↓

The water connections are compliant!

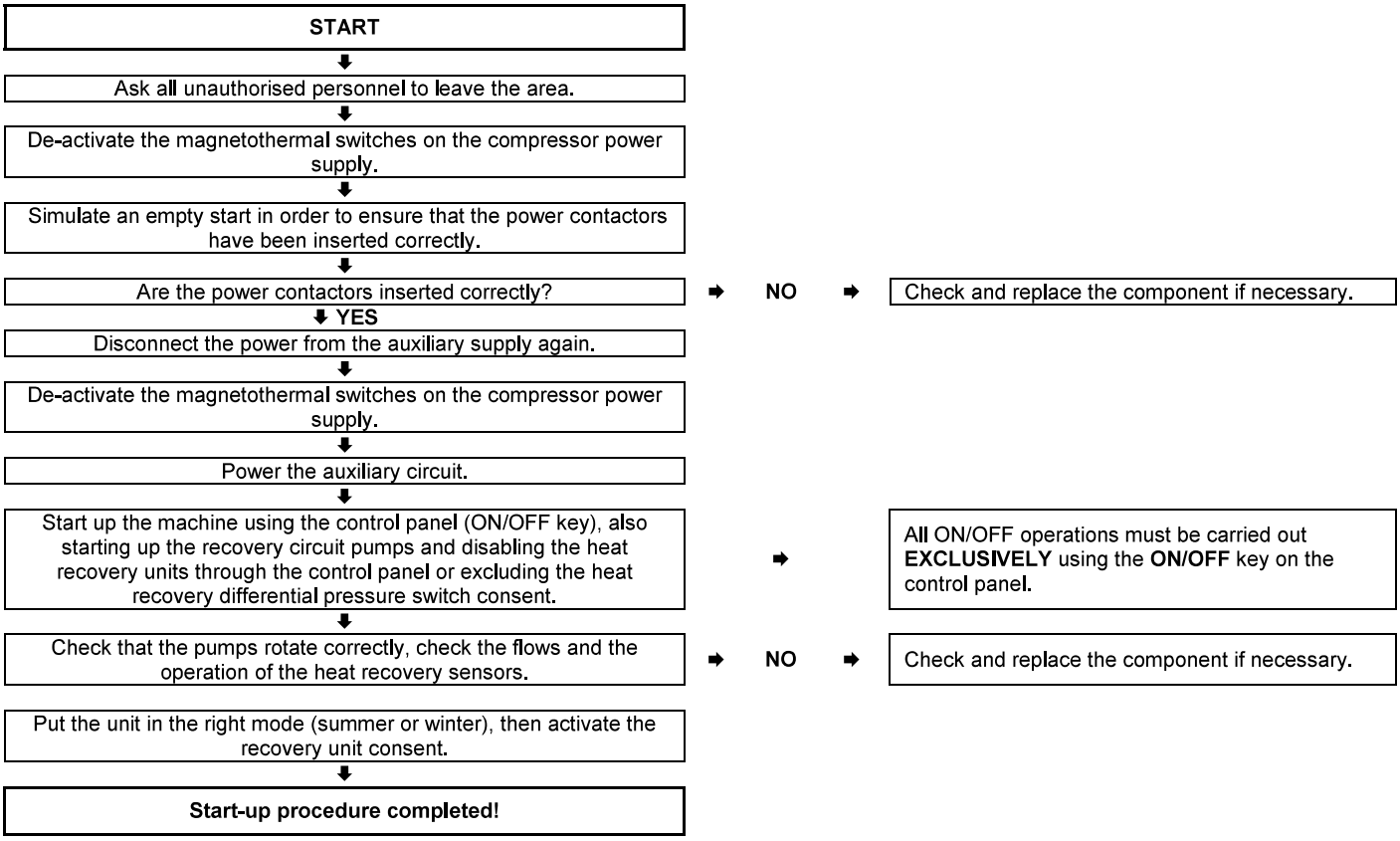
II.7.3.4 Checking the electrical connections



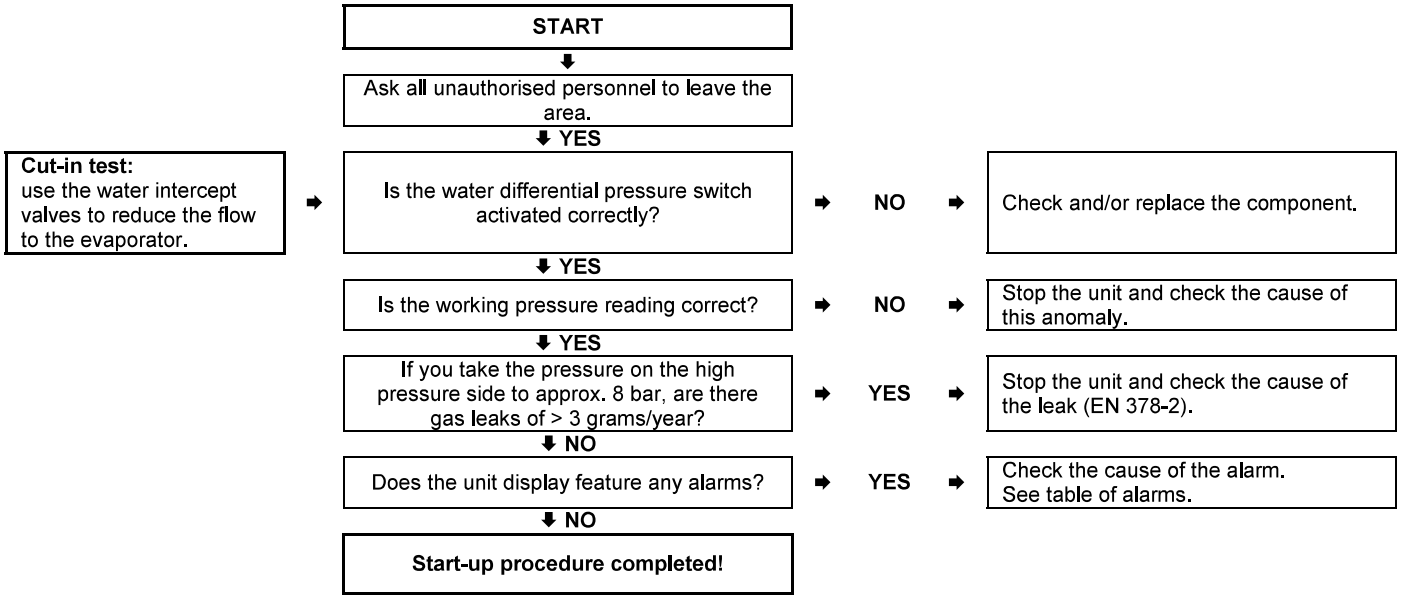
II.7.3.5 First start-up (Standard Unit)



II.7.3.6 First start-up (Unit with recovery)



II.7.3.7 Checks to be made while the machine is running



II.7.4 END-OF-DAY AND PROLONGED SHUTDOWN

The unit can be shut down at the end of the day by pressing the ON/OFF key situated on the user interface panel. In this way power is maintained to the compressor crankcase electric heaters and any antifreeze devices.

IMPORTANT!
Failure to use the unit during the winter period may cause the water contained in the system to freeze.

When the machine is out of use for long periods of time, it is necessary to disconnect it from the mains by opening the mains switch.
All the water contained in the circuit must be drained in good time.
Carry out this operation ensuring that the water circuit is completely emptied in all its parts and the pump and any internal and external siphons are drained.
During installation, consider mixing the water in the circuit with the correct proportion of ethylene glycol to guarantee protection against freezing (see *Protecting the unit from frost*).

II.8 MAINTENANCE INSTRUCTIONS

DANGER!
Maintenance operations, even if for inspection purposes only, must be carried out by skilled technicians, qualified for working on air conditioning and refrigerant products. Use suitable personal protection (gloves, eye protection etc).

DANGER!
By removing the protection panel from the coil/fan compartments the unit electrical supply is completely interrupted. Be careful of any possible rotation of the fan blades caused by traction or inertia.

DANGER!
Always use the mains switch to isolate the unit from the mains before carrying out any maintenance work on the unit, even if it is for inspection purposes only. Make sure that no one accidentally supplies power to the machine, lock the mains switch in the OFF position.

DANGER!
In the case of cooling or fan circuit component breakage or a drop in the refrigerant fluid charge, the upper part of the compressor casing and the discharge line may reach temperatures as high as 180°C for brief periods of time.

In order to guarantee that the unit runs regularly and efficiently, it is necessary to schedule an overall inspection at regular intervals to prevent malfunctions which could damage the main machine components.

II.8.1.1 Ordinary maintenance to be carried out by the system maintenance technician

Component/part	Frequency of maintenance	Replacement frequency
Heat exchange coil	Variable depending on where the unit is installed	Non-applicable
Whole unit	6 months	Non-applicable

II.8.1.2 Ordinary maintenance to be performed by qualified personnel

Component/part	Frequency of maintenance	Replacement frequency
Electrical system	6 months	Non-applicable
Check earthing connection	6 months	Non-applicable
Check power consumption	6 months	Non-applicable
Check refrigerant fluid charge	12 months	Non-applicable
Check absence of refrigerant leakage	6 months	Non-applicable
Bleed any air from the water system	6 months	Non-applicable
Water system draining	12 months	Non-applicable
Pump	5000 hours	Non-applicable
Compressor	3000 hours	Non-applicable

II.8.2 ORDINARY MAINTENANCE

II.8.2.1 Inspection - Cleaning of finned coils

The following operations should be carried out while the unit is switched off and taking care not to damage the fins during cleaning:

- remove any foreign bodies from the condensing coils which may block the passage of air, such as: leaves, paper, debris, and so on;
- clean off the dust with a jet of compressed air;
- wash and brush, gently, with water and gentle brushing;
- dry with a jet of compressed air.
- Keep condensation drain pipes free from any obstructions for THAESY-THAETY.

II.8.2.2 Inspection of the whole unit

Clean the unit thoroughly and check the status of the machine. Any points where corrosion is starting need to be touched up with protective paint.

II.8.2.3 Inspection of the electric circuit

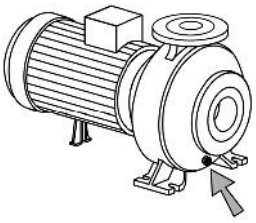
- **Check earthing system**: with the unit switched off and disconnected from the power supply check the status of the earthing system.
- **Check and inspect electrical connections**: with the unit switched off and disconnected from the power supply check the status and seal of the wiring to the terminals.
- **Check power consumption**: using a clip-on meter assess the power consumption value and compare the reading with the values shown in the table on Technical data.

II.8.2.4 Inspection of the refrigerant circuit

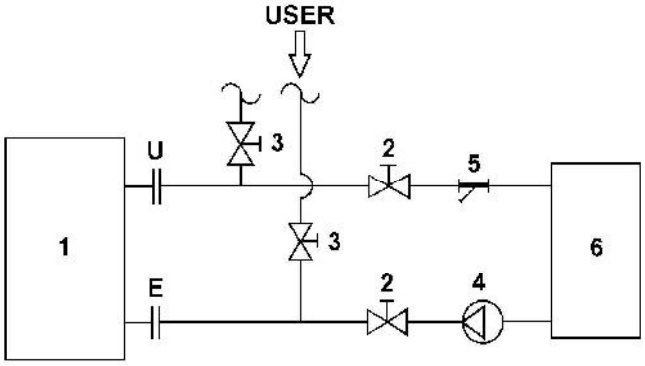
- **Check refrigerant charge**: With the unit switched off, fit one pressure gauge on the pressure connection on the outlet side and another one on the pressure connection on the inlet side. Start up the unit and check both pressure readings once they have stabilised.
- **Check there are no refrigerant leaks**: With the unit switched off, check the refrigerant circuit using a suitable leak detector taking extra care in the connection points and close to the charge connections.
- **Compressor inspection:** every 3000 working hours of the compressor, the electronic board shows an alarm while the unit continues to operate. This is a warning that the compressor requires inspection. With the unit switched off check the status of the connections, the electrical wiring and the rubber anti-vibration mountings. With the unit switched on check that there are no abnormal vibrations or noise levels in the compressors that require special maintenance.

II.8.2.5 Inspection of the water circuit

- **Check the water differential pressure switch**: with the unit running normally, slowly close the isolating valve on the unit water inlet pipe. When this check is performed, if the isolating valve is completely closed without the differential pressure switch cutting in, switch off the unit immediately by pressing the ON/OFF key on the control panel and replace the component.
- **Bleeding air from the chilled water system**: by using the bleed valves situated both inside and outside the unit bleed the air trapped inside the water circuit. Always check pressure of the water system and pressurize with top-up water if necessary.
- **Draining the water system:** with the unit switched off if it should be necessary to empty the unit, use the cut-off valves on the water inlet and outlet pipes. In models with storage tanks (ASP1-ASP2-ASDP1-ASDP2) besides the cut-off valves, also use the drain near the water fittings. In models with pumps, besides the cut-off valves, also use the drain on the pump.



- **Pump inspection:** every 5000 working hours of the pump, the electronic board shows an alarm while the unit continues to operate. This is a warning that the pump requires inspection. The inspection consists of the external cleaning of the pump and a check of its overall conditions.
- **Cleaning the water heat exchangers:** plate exchangers are not subject to any particular risk of fouling in rated running conditions. The working temperatures of the unit, the speed of the water in the pipes and the suitable finish of the heat exchanging surface reduce fouling of the exchangers to a minimum. Any incrustation of the exchanger may be detected by measuring the pressure-drop between the inlet and outlet pipes, using a differential pressure gauge, and comparing the results with the pressure-drop specified in the tables in the appendix. Any sludge that may form in the water circuit or any silt that cannot be trapped by the filter, as well as extremely hard water conditions or high concentrations of any antifreeze solution used, may clog the exchangers and undermine their heat exchanging efficiency. In this case it is necessary to wash the exchangers with suitable chemical detergents. If necessary provide already existing circuits with adequate charge and discharge connections, or taking action as shown in Fig. Use a tank containing weak acid: 5% phosphoric acid, or if the exchangers have to be cleaned often: 5% oxalic acid. The liquid detergent must circulate around the exchanger at a flow rate at least 1.5 times higher than the rated working flow rate. The first detergent cycle cleans up the worst of the dirt. After the first cycle, carry out another cycle with clean detergent to complete the operation. Before starting up the system again, rinse abundantly with water to get rid of any traces of acid and bleed any air from the system; if necessary start up the service pump.



1. TCAEBY-TCAETY-TCAESY-TCAEQY-THAESY-THAETY;
2. Auxiliary cock;
3. Interception shutter;
4. Wash pump;
5. Filter;
6. Acid tank.

II.8.3 SPECIAL MAINTENANCE

II.8.3.1 Instructions for the repair and replacement of components

Follow the instructions below to replace a component of the unit's refrigerant circuit:

- Always refer to the wiring diagrams enclosed with the appliance when replacing electrically powered components. Always take care to clearly label each wire before disconnecting, in order to avoid making mistakes later when re-connecting.
- When the machine is started up again, always go through the recommended start-up procedure.

II.8.3.2 Instructions on how to drain the refrigerant circuit

In order to drain the refrigerant circuit completely by means of homologated devices drain the refrigerant from both the high and low-pressure sides and in the liquid line. Use the charge connections in every section of the refrigerant circuit. In order to drain the refrigerant fluid completely all the circuit lines must be drained. The fluid should not be discharged into the atmosphere, as it causes pollution. It must be stored in suitable cylinders and delivered to a company authorised for the collection.

II.8.3.3 Eliminating circuit humidity

If during the operation of the machine there is evidence of humidity in the refrigerant circuit, it is essential to drain the circuit completely of refrigerant and eliminate the cause of the problem. To eliminate all the humidity the operator must dry out the circuit by evacuating it to 70 Pa, and then proceed to recharge it with the gas charge indicated in the plate located on the unit.

II.8.3.4 Replacing the filter drier

To replace the filter drier, drain and eliminate humidity from the refrigerant circuit by also draining the fluid dissolved in oil.
Once the filter has been replaced, evacuate the circuit again to eliminate any traces of non-condensable gases which may have entered the system during replacement. It is advisable to check that there are no gas leaks before restarting the machine for normal working.

II.8.3.5 Top-up / replacement of refrigerant charge

The units are factory-tested with the gas charge necessary for correct operation. The amount of gas inside each circuit is shown on the serial no. plate.
In cases where the R410A charge needs to be restored, drain and evacuate the circuit by eliminating any traces of non-condensable gases with humidity. After any maintenance operations on the refrigerant circuit and before restoring the gas charge, wash the system thoroughly.
Then restore the exact amount of new oil and refrigerant shown on the serial no. plate. The refrigerant piped from a cylinder in the liquid phase, so as not to alter its composition (R32/R125).
Once this operation has been completed repeat the start-up procedure of the unit and monitor its working conditions for at least 24 hours.
In case of particulat conditions - for example in the event of a drop in the level of refrigerant - when it is advisable to opt for a topping-up of the fluid, a slight degradation of the unit performance will have to be taken into account. In all cases the topping-up must be carried out in the low pressure section of the machine before the evaporator, using the appropriate pressure sockets. Make sure that the refrigerant is introduced only in the liquid phase.

II.8.3.6 Check and restore the compressor's oil charge

With the unit switched off, the oil level in the compressors must partially cover the sight-glass on the level matching tube. The level is not always constant as it depends on the ambient temperature and the percentage of refrigerant in oil.
With the unit on and in nominal conditions the oil level must be clearly visible through the sight-glass on the level matching tube and must be flat without any ripples.
An additional topping-up of the oil can be carried out after pumping-out the compressors, using the pressure connection on the compressor inlet. For information on the amount and type of oil refer to the label on the compressor or contact a *ÜNTES* service centre.

II.8.3.7 Compressor operation

Scroll compressors are equipped with internal thermal protection.
Once the thermal protection has been activated, normal operation is automatically resumed when the windings temperature drops below the pre-set safety value (this can take from a few minutes to several hours).

II.8.3.8 Operation of working, antifreeze and pressure probes

Temperature probes ST1, ST2, ST4 are inserted within a socket in contact with a conductive paste and sealed from the outside with silicon.

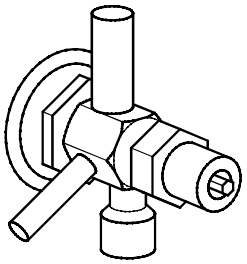
- Probe ST1 is placed at the entrance of the heat exchanger and measures the temperature of the return water from the system;
- Probe ST2 is placed at the exit of the evaporator and acts as an operational and antifreeze probe in units with no water buffer tank and only as an antifreeze probe in units with water buffer tank;
- Probe ST4 is placed at the exit of the water buffer tank and acts as an operational probe in the units with water buffer tank;
- Probe ST8 is placed at the exit of the recovery heat exchanger and measures the temperature of the outlet water from the recovery system.

Always check that both the wires are firmly welded to the connector and that this is properly inserted in the housing on the electronic board (see the electrical wiring diagram provided). In order to check the efficiency of the probe use a precision thermometer immersed with the probe in a container full of water at a certain temperature after having removed the probe from the socket taking care to avoid damaging it in the process. The probe must be carefully repositioned by placing some conductive paste in the socket, inserting the probe and re-sealing the external part with silicon to avoid unscrewing. If the antifreeze alarm is activated this must be reset through the control panel. The unit starts up again only when the water temperature exceeds the triggering difference.
The pressure probe (BP1) is screwed onto a connection situated on the high pressure pipe (standard on models TCAETY-TCAESY-TCAEQY-THAETY-THAESY). Check that the connectors on the board and on the probe are inserted. Check efficiency of the probe by comparing the display reading with the reading of the pressure indicated by a gauge connected to the high pressure pipe.

II.8.3.9 Operation of thermostatic valve (VTE/VTI)

The thermostatic expansion valve is calibrated to maintain the gas superheated by at least 6°C, to avoid any liquid being sucked into the compressor.
If the superheating setting needs to be changed, adjust the valve as follows:

- turn in an anticlockwise direction to reduce superheating;
- turn in a clockwise direction to increase superheating.



Remove the screw cap on the side of the valve and then turn the adjustment screw using a screwdriver. By increasing or decreasing the amount of refrigerant, the superheating temperature value is either decreased or increased. The temperature and pressure inside the evaporator remains more or less the same, regardless of changes to the thermal load.
After any adjustments to the valve it is advisable to allow a few minutes to elapse to give the system the chance to re-stabilise.

II.8.3.10 Operation of high pressure switch (PA)

After the high pressure switch has been activated, it needs to be reset manually by firmly pressing the black button on the pressure switch itself. Then reset the alarm at the control panel. Refer to the Troubleshooting section to identify the problem and carry out the necessary maintenance.

II.8.3.11 Operation of low pressure switch (PB)

After the low pressure switch has been activated, the alarm must be reset at the control panel; the pressure switch is reset automatically, but only when the suction pressure reaches the set differential value. Refer to the Troubleshooting section to identify the problem and carry out the necessary maintenance.

II.9 DISMANTLING THE UNIT - DISPOSAL OF HARMFUL COMPONENTS/SUBSTANCES

ENVIRONMENTAL PROTECTION
Dispose of the packaging materials in compliance with the national or local legislation in force in your country. Do not leave the packaging within reach of children.

It is advisable that the dismantling of the unit is performed by a company authorised to collect obsolete products and machinery.
The unit as a whole is composed of materials which can be treated as SRM (secondary raw materials) and the following conditions must be observed:

- the oil contained in the compressor must be removed. It must be recovered and consigned to an authorised waste oil collection firm;
- refrigerant gas may not be discharged into the atmosphere. It should instead be recovered by means of homologated devices, stored in suitable cylinders and delivered to a company authorised for the collection;
- the filter drier and electronic components are to be considered special waste and as such they must be delivered to a company authorised for the collection;
- The expanded polyurethane insulation to the water exchangers must be removed and processed as urban-type waste.

II.10 CHECK-LIST

Problem	Recommended action
1 – THE CIRCULATION PUMP DOES NOT START (IF CONNECTED): water differential pressure switch alarm	
Lack of voltage to the pump unit:	check electrical connections.
No signal from control board.	check, call in authorised service engineer.
Pump blocked:	check and clear as necessary.
Pump motor malfunction.	repair or replace pump.
Working set-point reached	check
2 - THE COMPRESSOR DOES NOT START	
Microprocessor board alarm:	identify alarm and take appropriate action.
Absence of voltage, isolator switch open:	close isolator switch.
Automatic overload switches activated:	reset the switches; check unit on start-up.
No request for cooling/heating with user system set point correct:	check and if necessary wait for cooling/heating) request.
Working set point too high in cooling mode (too low in heating or heat recovery mode):	check and if necessary readjust set-point.
Defective contactors:	replace contactor.
Compressor electric motor failure:	check for short circuit.
Head of the compressor very hot, internal thermal protection activated	Wait an hour at leat for cooling
3 –THE COMPRESSOR DOES NOT START BUT YOU CAN HEAR A BUZZING NOISE	
Incorrect power supply voltage:	check voltage, investigate causes.
Defective contactors:	replace contactor.
Mechanical problems in the compressor:	replace compressor
4 – THE COMPRESSOR RUNS INTERMITTENTLY: low pressure switch alarm	
Faulty low pressure switch:	check operation of pressure switch.
Insufficient refrigerant charge.	1 identify and eliminate any leaks; 2 restore correct charge.
Refrigerant line filter clogged (appears frosted):	replace filter.
Irregular operation of the expansion valve:	check calibration, adjust superheating, replace if necessary.
5 – THE COMPRESSOR STOPS: high pressure switch alarm	
Faulty high pressure switch:	check operation of pressure switch.
Insufficient cooling air in coils (in cooling mode):	check fans, check clearances around unit and possible coil obstructions.
Excessive ambient temperature:	check unit operating limits.
Insufficient water circulation on the plate exchanger (in heating or heat recovery mode):	check and adjust if necessary.
High water temperature (in heating or heat recovery mode)	check unit operating limits.
Air in the water system (in heating or heat recovery mode):	bleed the water system.
Excessive refrigerant charge.	drain the excess.
6 – EXCESSIVE COMPRESSOR NOISE - EXCESSIVE VIBRATIONS	
Compressor is pumping liquid, excessive increase in refrigerant fluid in crankcase.	1 check operation of the expansion valve. 2 adjust superheating. 3 replace the expansion valve if necessary.
Mechanical problems in the compressor:	overhaul compressor.
Unit running at the limit of specified conditions of use.	check capacities according to stated limits.
7 - COMPRESSOR RUNS CONTINUOUSLY	
Excessive thermal load.	check the system dimensioning, leaks and insulation of the rooms concerned.
Working set point too low in cooling mode (too high in heating or heat recovery mode):	check setting and reset.
Poor ventilation to the coils (in cooling mode):	check fans, check clearances around unit and possible coil obstructions.
Insufficient water circulation on the plate exchanger (in heating or heat recovery mode):	check and adjust as necessary.
Presence of air in the chilled/hot water system and/or heat recovery system.	bleed the system.
Insufficient refrigerant charge.	1 identify and eliminate any leaks; 2 restore correct charge.
Refrigerant line filter clogged (appears frosted):	replace filter.
Control board faulty:	check by substitution.
Irregular operation of the expansion valve:	check calibration, adjust, replace if necessary.
Irregular working of the contactors:	check operation.

8 - INSUFFICIENT OIL LEVEL	
Leak in the refrigerant circuit:	1 check, identify and eliminate leak. 2 restore the correct charge of refrigerant and oil.
The crankcase heater is off:	check and replace if necessary.
Unit running under irregular conditions compared to the operating limits:	check unit dimensioning.
9 - CRANKCASE HEATER DOES NOT WORK (WITH COMPRESSOR OFF)	
Lack of electrical power supply:	check connections
The crankcase heater is off:	check and replace if necessary.
10 - HIGH DELIVERY PRESSURE IN RATED CONDITIONS	
Insufficient cooling air flow to the coils (in cooling mode):	check operation of fans, check clearances around unit and possible coil obstructions.
Insufficient water circulation in the heat exchanger (in heating or heat recovery mode):	check and adjust as necessary.
Presence of air in the water system (in heating or heat recovery mode):	bleed the system.
Excessive refrigerant charge:	drain the excess.
11 - LOW DELIVERY PRESSURE IN RATED CONDITIONS	
Insufficient refrigerant charge.	1 identify and eliminate any leaks; 2 restore correct charge.
Presence of air in the water system (in cooling mode):	bleed the system.
Insufficient water flow to the evaporator (in cooling mode):	check water system and adjust as necessary.
Mechanical problems in the compressor:	overhaul compressor.
Excessive thermal load (in heating or heat recovery mode):	check system sizing, leaks and insulation.
Irregular working of fan speed regulator (in cooling mode):	check setting and adjust if necessary.
12 - HIGH INTAKE PRESSURE IN RATED CONDITIONS	
Excessive thermal load (in cooling mode):	check system sizing, leaks and insulation.
High ambient temperature (in heating or heat recovery mode):	check unit operating limits.
Irregular operation of the expansion valve:	check operation, clean nozzle, adjust superheating, replace if necessary.
Mechanical problems in the compressor:	overhaul compressor.
Irregular working of fan speed regulator (in heating or heat recovery mode):	check setting and adjust if necessary.
13 - LOW INTAKE PRESSURE IN RATED CONDITIONS	
Insufficient refrigerant charge:	1 restore correct charge. 2 identify and eliminate any leaks;
Heat exchanger damaged (in cooling mode):	1 check. 2 replace
Finned coil dirty (in heating or heat recovery mode):	1 check. 2 carry out cleaning procedure.
Irregular operation of the expansion valve:	1 check operation. 2 clean the nozzle. 3 adjust superheating. 4 replace expansion valve if necessary.
Insufficient ventilation of evaporating coils (in heating or heat recovery mode):	1 check. 2 check clearances around unit and possible coil obstructions.
Presence of air in the water system (in cooling mode):	bleed the system.
Insufficient water flow (in cooling mode):	check and adjust if necessary.
14 - ONE OF THE FANS DOES NOT WORK OR STARTS AND STOPS	
Switch or contactor faulty, break in the auxiliary circuit:	check and replace if necessary.
Thermal protection activated:	check for short-circuits, replace the motor.
Non-functioning condensation control:	1 check card operation and replace if necessary 2 check pressure transducer
15 - THE UNIT DOES NOT CARRY OUT DEFROSTING (COILS ICED) in winter mode	
4-way valve damaged:	check and replace if necessary.
Pressure transducer faulty:	check and replace if necessary.

A1 TECHNICAL DATA

TCAEBY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	67,5	75,3	83,0	96,0	110,5	120,5	138,5	155,0
E.E.R. (3rd step, 100%)		2,65	2,69	2,56	2,69	2,72	2,64	2,66	2,61
E.E.R. (2nd step)		3,44	3,59	3,41	3,36	3,28	3,34	3,33	3,26
E.E.R. (1st step)		3,58	-	3,71	3,74	3,36	-	3,50	-
E.S.E.E.R.		3,96	3,95	3,92	4,01	4,06	3,96	3,94	3,87
Sound pressure (3rd step, 100%) (***)	dB(A)	60	60	60	62	68	68	68	69
Sound power level (3rd step 100%) (****)	dB(A)	82	82	82	84	90	90	90	91
Sound power level (2nd step) (****)	dB(A)	81	79	81	83	88	87	88	88
Sound power level (1st step) (****)	dB(A)	76	-	76	78	83	-	83	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	2x0.69	2x0.69	2x0.69	3x0.69	2x2.00	2x2.00	2x2.00	3x2.00
Fan nominal air flow	m³/h	20800	20400	20200	30600	41200	41000	40000	58800
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	11,6	12,9	14,5	16,5	19,0	20,7	23,8	26,6
Nominal pressure drops, water side heat exchanger (*)	kPa	40	35	41	44	41	47	46	48
Residual static pressure P1 (*)	kPa	139	137	125	116	110	97	148	131
Residual static pressure P2 (*)	kPa	260	255	255	244	236	223	278	259
Residual static pressure ASP1 (*)	kPa	137	133	124	114	108	94	144	126
Residual static pressure ASP2 (*)	kPa	257	252	253	242	234	219	274	254
Tank water content (ASP1/ASP2)	l	250	250	250	250	250	250	250	250
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See compressor plate				
Electrical data									
Absorbed power (*) (●)	kW	25,5	28,0	32,4	35,7	40,6	45,6	52,1	59,4
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz				400 – 3+N – 50				
Auxiliary power supply	V-ph-Hz				230 – 1+N – 50				
Control power supply	V-ph-Hz				24 – 1 – 50				
Nominal current (■)	A	47,0	52,3	55,4	64,1	71,9	80,3	89,7	103,1
Maximum current (■)	A	58,0	62,5	66,5	76,0	88,0	97,0	110,0	117,0
Start-up current (■)	A	201,0	205,5	255,5	304,0	316,0	324,0	362,0	380,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,3/8,1	5,3/8,1
Dimensions									
Width (L)	mm	2650	2650	2650	3150	3150	3150	3150	3450
Height (H)	mm	1700	1700	1700	1700	1730	1730	1730	1730
Depth (P)	mm	1210	1210	1210	1210	1210	1210	1210	1210
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

(*) In the following conditions: condenser input air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

(***) Sound pressure level in dB(A), measured at a distance of 5 m from the unit, with a directionality factor of 2. The noise measurement refers to the units without pump.

Note:
With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.

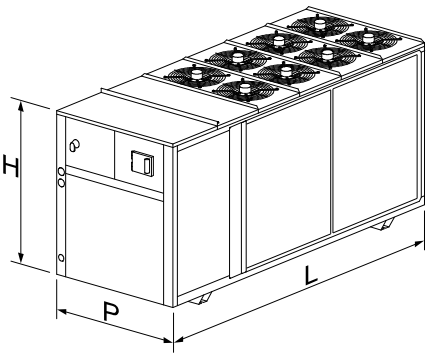
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

(■) Current value, excluding the current absorbed by the pump.

Note:
With the SFS accessory, the start-up current is reduced by 25%.

(●) Power absorbed by the unit without motor-driven pump.

N.B.:
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



TCAETY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	70,3	79,5	88,0	101,2	114,5	126,0	143,0	161,0
E.E.R. (3rd step, 100%)		2,98	2,99	2,90	2,90	2,93	2,91	2,90	2,90
E.E.R. (2nd step)		3,87	3,83	3,72	3,58	3,57	3,64	3,49	3,63
E.E.R. (1st step)		4,03	-	4,03	3,97	3,66	-	3,63	-
E.S.E.E.R.		4,32	4,37	4,35	4,32	4,37	4,31	4,29	4,26
Sound pressure (3rd step, 100%) (***)	dB(A)	55	56	56	57	60	60	62	62
Sound power level (3rd step 100%) (****)	dB(A)	76	77	77	78	84	84	85	85
Sound power level (2nd step) (****)	dB(A)	75	74	76	72	83	81	84	82
Sound power level (1st step) (****)	dB(A)	70	-	71	72	78	-	79	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.69	4x0.69	6x0.69	6x0.69
Fan nominal air flow	m³/h	22800	28400	28400	31500	40800	39800	56700	54300
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	12,1	13,6	15,1	17,4	19,6	21,6	24,5	27,6
Nominal pressure drops, water side heat exchanger (*)	kPa	42	37	45	47	42	51	49	51
Residual static pressure P1 (*)	kPa	134	129	119	110	106	90	141	122
Residual static pressure P2 (*)	kPa	254	247	248	238	232	214	270	249
Residual static pressure ASP1 (*)	kPa	131	125	117	108	103	86	136	117
Residual static pressure ASP2 (*)	kPa	251	243	246	236	229	211	266	244
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge		See serial No. plate							
Polyester oil charge		See compressor plate							
Electrical data									
Absorbed power (*) (●)	kW	23,6	26,6	30,3	34,9	39,1	43,3	49,3	55,5
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz	400 – 3+N – 50							
Auxiliary power supply	V-ph-Hz	230 – 1+N – 50							
Control power supply	V-ph-Hz	24 – 1 – 50							
Nominal current (■)	A	43,5	49,7	51,8	62,7	69,4	76,3	84,9	96,5
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

(*) In the following conditions: condenser input air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

(***) Sound pressure level in dB(A), measured at a distance of 5 m from the unit, with a directionality factor of 2. The noise measurement refers to the units without pump.

Note:
With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.

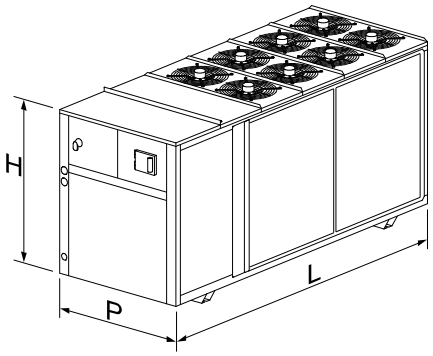
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

(■) Current value, excluding the current absorbed by the pump.

Note:
With the SFS accessory, the start-up current is reduced by 25%.

(●) Power absorbed by the unit without motor-driven pump.

N.B.:
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



TCAESY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	70,3	79,5	88,0	101,2	108,0	119,0	136,0	151,0
E.E.R. (3rd step, 100%)		2,98	2,99	2,90	2,90	2,67	2,67	2,63	2,60
E.E.R. (2nd step)		3,87	3,83	3,72	3,58	3,47	3,56	3,33	3,51
E.E.R. (1st step)		4,03	-	4,03	3,97	3,61	-	3,55	-
E.S.E.E.R.		4,32	4,37	4,35	4,32	3,98	3,95	3,95	3,90
Sound pressure (3rd step, 100%) (***)	dB(A)	53	54	54	55	57	57	58	58
Sound power level (3rd step 100%) (****)	dB(A)	74	75	75	76	81	81	82	82
Sound power level (2nd step) (****)	dB(A)	73	72	74	75	80	78	81	79
Sound power level (1st step) (****)	dB(A)	68	-	69	70	75	-	76	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.48	4x0.48	6x0.48	6x0.48
Fan nominal air flow	m³/h	22800	28400	28400	31500	32200	31600	45000	42000
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	12,1	13,6	15,1	17,4	18,5	20,4	23,3	25,9
Nominal pressure drops, water side heat exchanger (*)	kPa	42	37	45	47	40	47	46	47
Residual static pressure P1 (*)	kPa	134	129	119	110	113	98	150	136
Residual static pressure P2 (*)	kPa	254	247	248	238	240	223	279	264
Residual static pressure ASP1 (*)	kPa	131	125	117	108	110	95	146	131
Residual static pressure ASP2 (*)	kPa	251	243	246	236	237	220	276	259
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See compressor plate				
Electrical data									
Absorbed power (*) (●)	kW	23,6	26,6	30,3	34,9	40,4	44,6	51,7	58,1
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz				400 – 3+N – 50				
Auxiliary power supply	V-ph-Hz				230 – 1+N – 50				
Control power supply	V-ph-Hz				24 – 1 – 50				
Nominal current (■)	A	43,5	49,7	51,8	62,7	71,6	78,5	89,0	101,0
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

(*) In the following conditions: condenser input air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

(***) Sound pressure level in dB(A), measured at a distance of 5 m from the unit, with a directionality factor of 2. The noise measurement refers to the units without pump.

Note:
With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.

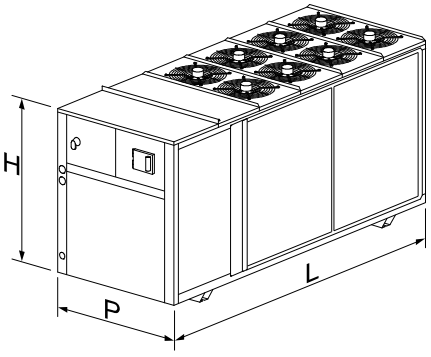
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

(■) Current value, excluding the current absorbed by the pump.

Note:
With the SFS accessory, the start-up current is reduced by 25%.

(●) Power absorbed by the unit without motor-driven pump.

N.B.:
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



TCAEQY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	67,0	75,0	82,5	95,0	101,0	108,0	125,0	138,0
E.E.R. (3rd step, 100%)		2,70	2,85	2,62	2,73	2,34	2,30	2,32	2,20
E.E.R. (2nd step)		3,65	3,80	3,49	3,46	3,30	3,38	3,18	3,28
E.E.R. (1st step)		3,86	-	3,85	4,01	3,55	-	3,52	-
E.S.E.E.R.		3,92	4,16	3,93	4,07	3,49	3,40	3,48	3,30
Sound pressure (3rd step, 100%) (***)	dB(A)	51	52	52	53	54	54	55	55
Sound power level (3rd step 100%) (****)	dB(A)	72	73	73	74	78	78	79	79
Sound power level (2nd step) (****)	dB(A)	71	71	72	73	77	75	78	76
Sound power level (1st step) (****)	dB(A)	67	-	68	68	72	-	73	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.09	8x0.09	8x0.09	10x0.09	4x0.34	4x0.34	6x0.34	6x0.34
Fan nominal air flow	m³/h	19200	24000	24000	26500	23200	22800	32400	30300
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	11,5	12,9	14,2	16,3	17,3	18,5	21,4	23,7
Nominal pressure drops, water side heat exchanger (*)	kPa	40	36	43	44	35	41	41	41
Residual static pressure P1 (*)	kPa	140	136	123	116	122	111	164	154
Residual static pressure P2 (*)	kPa	260	254	253	244	249	238	295	283
Residual static pressure ASP1 (*)	kPa	137	132	122	114	120	109	160	149
Residual static pressure ASP2 (*)	kPa	257	251	252	242	247	236	291	279
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See compressor plate				
Electrical data									
Absorbed power (*) (●)	kW	24,8	26,3	31,5	34,8	43,2	47,0	53,9	62,7
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz				400 – 3+N – 50				
Auxiliary power supply	V-ph-Hz				230 – 1+N – 50				
Control power supply	V-ph-Hz				24 – 1 – 50				
Nominal current (■)	A	45,7	49,2	53,9	62,5	76,6	82,4	92,5	109,1
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

(*) In the following conditions: condenser input air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

(***) Sound pressure level in dB(A), measured at a distance of 5 m from the unit, with a directionality factor of 2. The noise measurement refers to the units without pump.

Note:
With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.

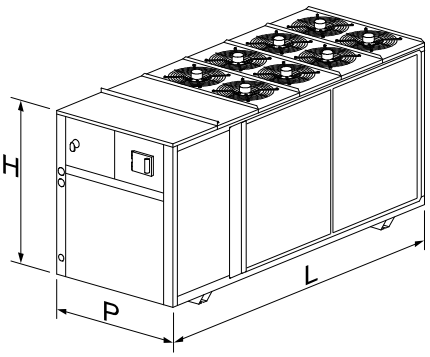
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

(■) Current value, excluding the current absorbed by the pump.

Note:
With the SFS accessory, the start-up current is reduced by 25%.

(●) Power absorbed by the unit without motor-driven pump.

N.B.:
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



THAETY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	69,4	77,7	85,2	99,3	111,0	123,8	141,3	159,8
E.E.R. (3rd step, 100%)		2,92	2,93	2,84	2,85	2,87	2,85	2,84	2,84
E.E.R. (2nd step)		3,74	3,76	3,64	3,48	3,50	3,56	3,42	3,55
E.E.R. (1st step)		3,95	-	3,89	3,85	3,59	-	3,55	-
E.S.E.E.R.		4,19	4,24	4,22	4,19	4,24	4,18	4,16	4,14
Nominal heating capacity (**)	kW	79,0	86,0	96,0	111,0	122,0	139,0	157,0	175,0
C.O.P.		3,36	3,44	3,29	3,34	3,21	3,31	3,22	3,21
Sound pressure (3rd step, 100%) (***)	dB(A)	55	56	56	57	60	60	62	62
Sound power level (3rd step 100%) (****)	dB(A)	76	77	77	78	84	84	85	85
Sound power level (2nd step) (****)	dB(A)	75	74	76	77	83	81	84	82
Sound power level (1st step) (****)	dB(A)	70	-	71	72	78	-	79	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.69	4x0.69	6x0.69	6x0.69
Fan nominal air flow	m³/h	22800	28400	28400	31500	40800	39800	56700	54300
Water side heat exchanger water content	l	6,9	8,4	8,4	9,9	11,1	12,6	14,9	17,4
Water side exchanger nominal water flow (*)	m³/h	11,9	13,3	14,6	17,0	19,0	21,2	24,2	27,4
Nominal pressure drops, water side heat exchanger (*)	kPa	25	22	26	26	26	27	27	28
Nominal pressure drops, water side heat exchanger (**)	kPa	32	27	33	33	33	34	34	34
Residual static pressure P1 (*)	kPa	153	147	139	132	124	115	164	146
Residual static pressure P2 (*)	kPa	273	265	268	260	251	239	294	274
Residual static pressure ASP1 (*)	kPa	150	143	137	130	122	112	160	141
Residual static pressure ASP2 (*)	kPa	270	261	267	258	248	236	289	268
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge		See serial No. plate							
Polyester oil charge		See compressor plate							
Electrical data									
Absorbed power in summer operation (*) (●)	kW	23,8	26,5	30,0	34,9	38,7	43,4	49,7	56,2
Absorbed power in winter operation (**) (●)	kW	23,5	25,0	29,2	33,2	38,0	42,0	48,8	54,5
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz	400 – 3+N – 50							
Auxiliary power supply	V-ph-Hz	230 – 1+N – 50							
Control power supply	V-ph-Hz	24 – 1 – 50							
Nominal current in summer operation (*) (■)	A	43,8	49,6	51,2	62,0	68,9	76,4	85,6	97,7
Nominal current in winter operation (**) (■)	A	43,3	46,7	49,9	59,7	67,4	74,0	84,0	95,7
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

(*) In the following conditions: condenser input air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

(**) In the following conditions: evaporator inlet air temperature 7°C D.B., 6°C W.B.; hot water temperature 45°C; temperature differential at the condenser 5°C.

(***) Sound pressure level in dB(A), measured at a distance of 5 m from the unit, with a directionality factor of 2. The noise measurement refers to the units without pump.

Note:
With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.

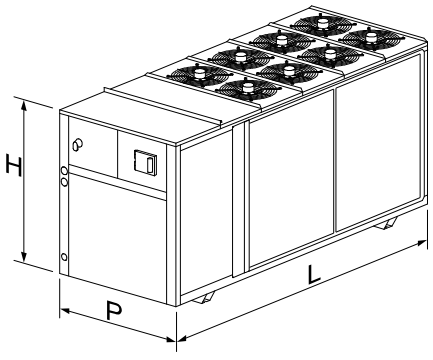
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

(■) Current value, excluding the current absorbed by the pump.

Note:
With the SFS accessory, the start-up current is reduced by 25%.

(●) Power absorbed by the unit without motor-driven pump.

N.B.:
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



THAESY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	69,4	77,7	85,2	99,3	107,2	118,5	135,6	150,2
E.E.R. (3rd step, 100%)		2,92	2,93	2,84	2,85	2,61	2,62	2,58	2,55
E.E.R. (2nd step)		3,74	3,76	3,64	3,48	3,39	3,49	3,27	3,45
E.E.R. (1st step)		3,95	-	3,89	3,85	3,52	-	3,49	-
E.S.E.E.R.		4,19	4,24	4,22	4,19	3,86	3,83	3,83	3,78
Nominal heating capacity (**)	kW	79,0	86,0	96,0	111,0	120,0	135,0	154,0	170,0
C.O.P.		3,36	3,44	3,29	3,34	3,22	3,31	3,25	3,21
Sound pressure (3rd step, 100%) (***)	dB(A)	53	54	54	55	57	57	58	58
Sound power level (3rd step 100%) (****)	dB(A)	74	75	75	76	81	81	82	82
Sound power level (2nd step) (****)	dB(A)	73	72	74	75	80	78	81	79
Sound power level (1st step) (****)	dB(A)	68	-	69	70	75	-	76	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.48	4x0.48	6x0.48	6x0.48
Fan nominal air flow	m³/h	22800	28400	28400	31500	32200	31600	45000	42000
Water side heat exchanger water content	l	6,9	8,4	8,4	9,9	11,1	12,6	14,9	17,4
Water side exchanger nominal water flow (*)	m³/h	11,9	13,3	14,6	17,0	18,4	20,3	23,3	25,8
Nominal pressure drops, water side heat exchanger (*)	kPa	25	22	26	26	25	25	25	25
Nominal pressure drops, water side heat exchanger (**)		32	27	33	33	32	33	33	32
Residual static pressure P1 (*)	kPa	153	147	139	132	128	120	171	158
Residual static pressure P2 (*)	kPa	273	265	268	260	255	246	301	286
Residual static pressure ASP1 (*)	kPa	150	143	137	130	126	117	167	153
Residual static pressure ASP2 (*)	kPa	270	261	267	258	253	243	297	281
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See compressor plate				
Electrical data									
Absorbed power in summer operation (*) (●)	kW	23,8	26,5	30,0	34,9	41,0	45,3	52,6	58,9
Absorbed power in winter operation (**) (●)		23,5	25,0	29,2	33,2	37,3	40,8	47,4	53,0
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz				400 – 3+N – 50				
Auxiliary power supply	V-ph-Hz				230 – 1+N – 50				
Control power supply	V-ph-Hz				24 – 1 – 50				
Nominal current in summer operation (*) (■)	A	43,9	49,6	51,3	62,7	72,7	79,7	90,6	102,6
Nominal current in winter operation (**) (■)	A	43,4	46,7	50,0	59,6	66,2	71,8	81,4	92,4
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Starting current	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

(*) In the following conditions: condenser input air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

(**) In the following conditions: evaporator inlet air temperature 7°C D.B., 6°C W.B.; hot water temperature 45°C; temperature differential at the condenser 5°C.

(***) Sound pressure level in dB(A), measured at a distance of 5 m from the unit, with a directionality factor of 2. The noise measurement refers to the units without pump.

Note:
With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.

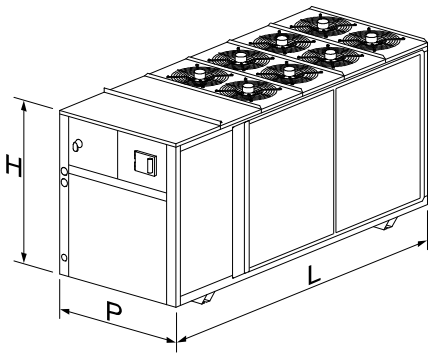
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

(■) Current value, excluding the current absorbed by the pump.

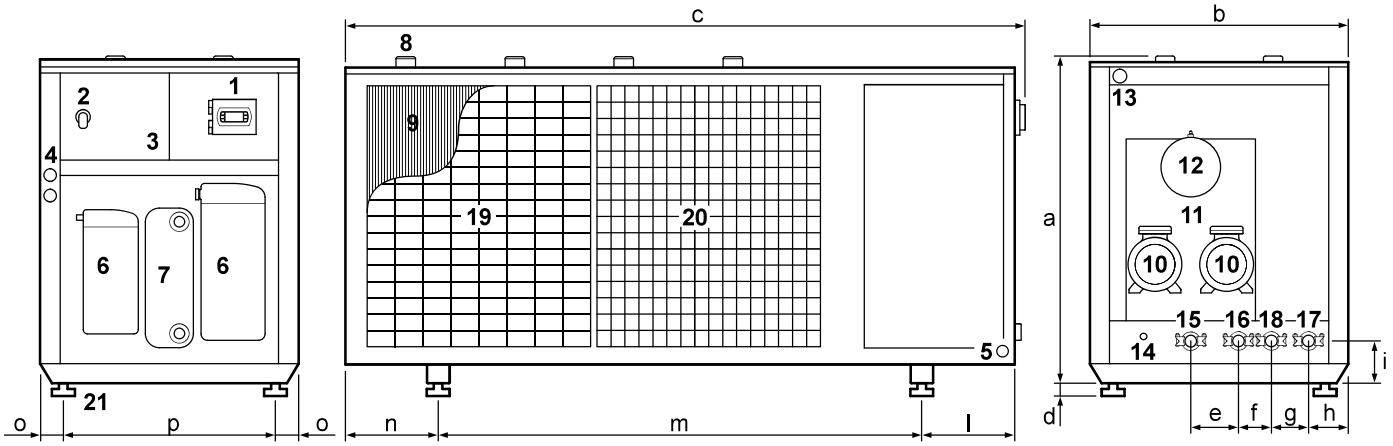
Note:
With the SFS accessory, the start-up current is reduced by 25%.

(●) Power absorbed by the unit without motor-driven pump.

N.B.:
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



A2 DIMENSIONS AND FOOTPRINTS



1. Control panel;
2. Isolator;
3. Electrical board;
4. Refrigerant circuit pressure gauges (GM accessory);
5. Power supply inlet;
6. Compressor;
7. Evaporator;
8. Fan;
9. Finned coil;
10. Motor-driven pump (P1/P2 – ASP1/ASP2);
11. Water buffer tank (ASP1/ASP2 – ASDP1/ASDP2);
12. Expansion tank (ASP1/ASP2 – ASDP1/ASDP2);
13. System water pressure gauge (ASP1/ASP2 – ASDP1/ASDP2);
14. System water drain (ASP1/ASP2 – ASDP1/ASDP2);
15. Main exchanger water inlet;
16. Main exchanger water outlet;
17. Recovery exchanger water inlet (RC100/DS accessory);
18. Recovery exchanger water outlet (RC100/DS accessory);
19. Coil protection mesh (RPB accessory);
20. Metal filter (FMB accessory);
21. Anti-vibration support (KSA accessory).

TCAEBY

Model		270	280	290	2100	2115	2130	2145	2160
a	mm	1700	1700	1700	1700	1730	1730	1730	1730
b	mm	1210	1210	1210	1210	1210	1210	1210	1210
c	mm	2650	2650	2650	3150	3150	3150	3150	3450
d	mm	75÷100	75÷100	75÷100	75÷100	75÷100	75÷100	75÷100	75÷100
e	mm	200	200	200	200	200	200	200	200
f	mm	172	172	172	172	172	172	172	172
g	mm	172	172	172	172	172	172	172	172
h	mm	190	190	190	190	190	190	190	190
i	mm	206	206	206	206	206	206	206	206
l	mm	200	200	200	200	200	200	200	130
m	mm	1700	1700	1700	2100	2100	2100	2100	2200
n	mm	700	700	700	800	800	800	800	1070
o	mm	82	82	82	82	82	82	82	82
p	mm	1046	1046	1046	1046	1046	1046	1046	1046

Model		270	280	290	2100	2115	2130	2145	2160
Exchanger inlet/outlet connections	Ø	2”	2”	2”	2”	2”	2”	2”	2”
DS/RC100 inlet/outlet connections	Ø	2”	2”	2”	2”	2”	2”	2”	2”

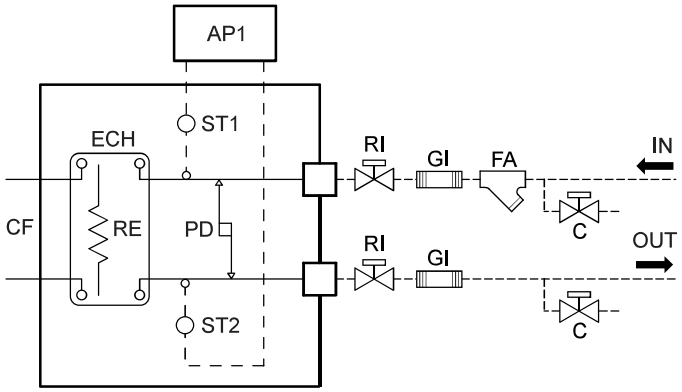
TCAETY-TCAESY-TCAEQY-THAESY-THAETY

Model		270	280	290	2100	2115	2130	2145	2160
a	mm	1520	1520	1520	1520	2000	2000	2000	2000
b	mm	1210	1210	1210	1210	1520	1520	1520	1520
c	mm	3150	3150	3150	3150	3250	3250	3250	3250
d	mm	75÷100	75÷100	75÷100	75÷100	75÷100	75÷100	75÷100	75÷100
e	mm	200	200	200	200	310	310	310	310
f	mm	172	172	172	172	200	200	200	200
g	mm	172	172	172	172	200	200	200	200
h	mm	190	190	190	190	200	200	200	200
i	mm	206	206	206	206	206	206	206	206
l	mm	200	200	200	200	200	200	200	200
m	mm	2100	2100	2100	2100	2000	2000	2000	2000
n	mm	800	800	800	800	1000	1000	1000	1000
o	mm	82	82	82	82	80	80	80	80
p	mm	1046	1046	1046	1046	1360	1360	1360	1360

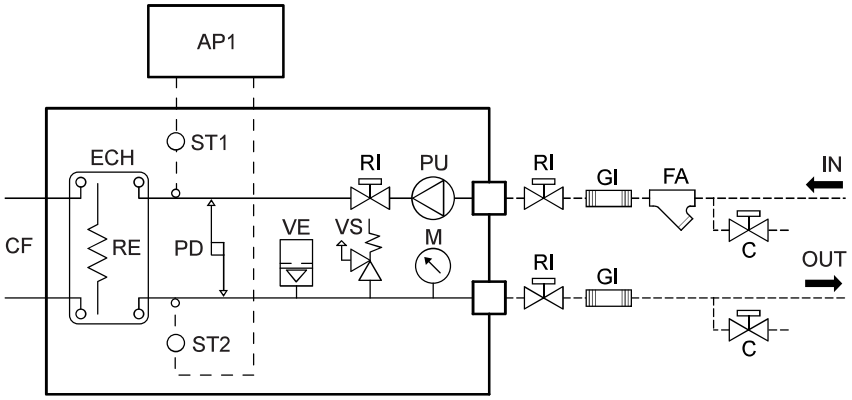
Model		270	280	290	2100	2115	2130	2145	2160
Exchanger inlet/outlet connections	Ø	2”	2”	2”	2”	2”	2”	2”	2”
DS/RC100 inlet/outlet connections	Ø	2”	2”	2”	2”	2”	2”	2”	2”

A3 WATER CIRCUIT

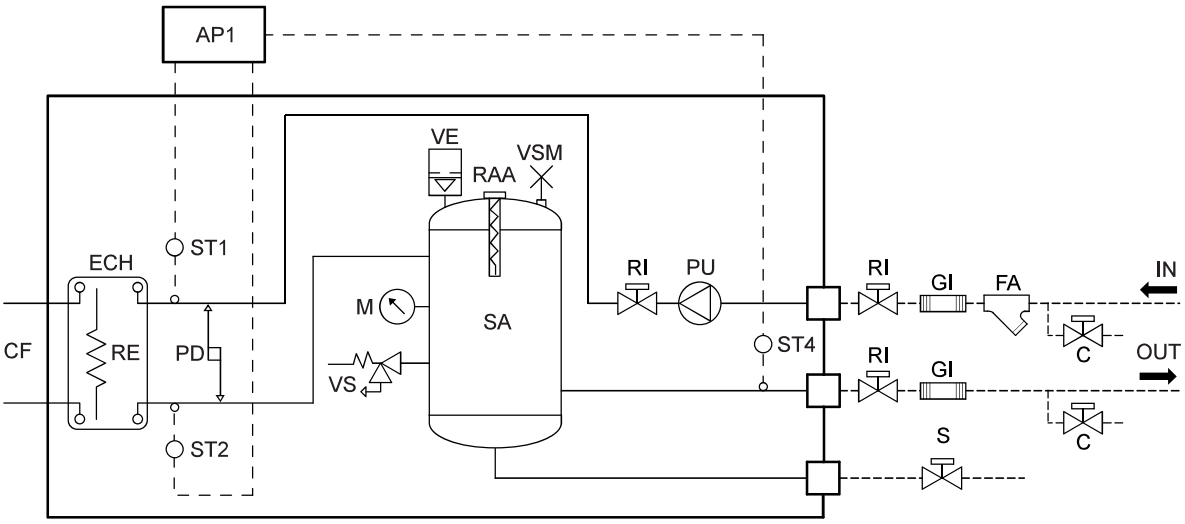
Standard



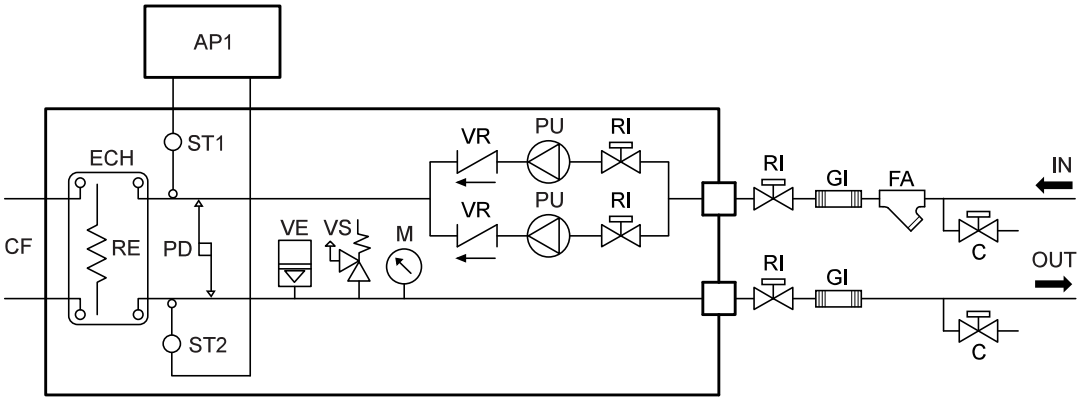
P1 – P2



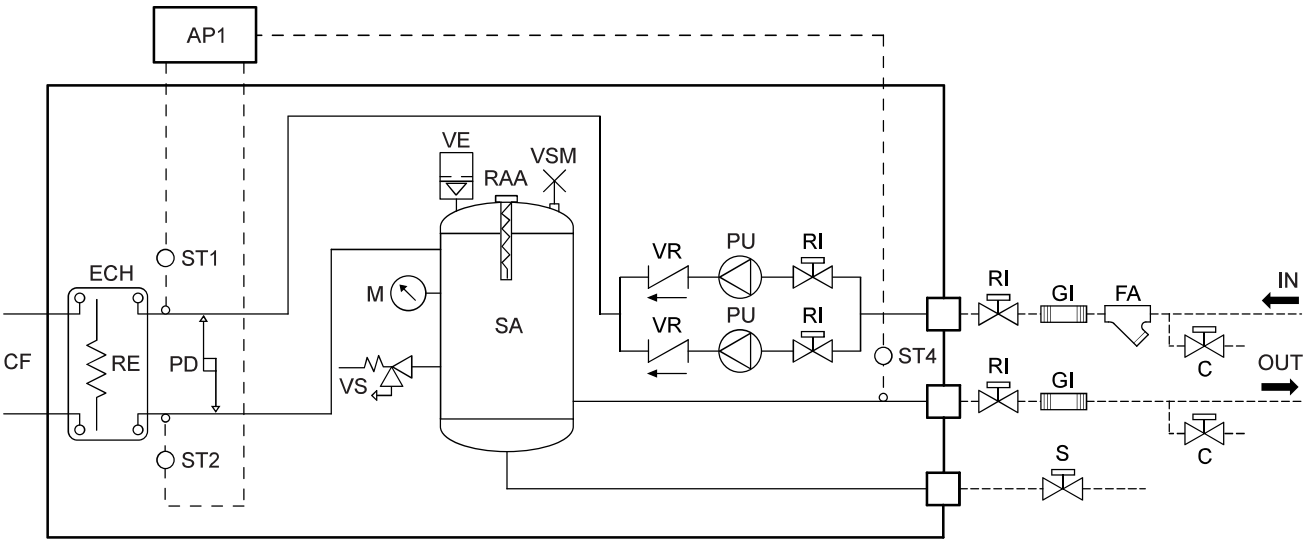
ASP1 – ASP2



DP1 – DP2



ASDP1 – ASDP2



CF	Refrigerant circuit
ECH	Plate evaporator
RE	Evaporator antifreeze electric heater
PD	Water differential pressure switch
VSM	Manual bleed valve
VS	Safety valve
AP1	Electronic control
ST1	Primary inlet temperature gauge
ST2	Primary outlet temperature gauge - working and antifreeze for Standard and Pump installations - antifreeze for Tank & Pump installations
ST4	Water buffer tank outlet temperature gauge (working)
VE	Expansion tank
RAA	Water buffer tank electric heater (accessory)
FA	Mesh filter (installed by the installer)
SA	Water buffer tank
M	Pressure gauge
PU	Pump
VR	Check valve
S	Water drain
C	Charge/drain valve
RI	Shut-off valve
GI	Anti-vibration connection
- - - -	Connections to be made by the installer

NOTE

NOTE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