UNTES®

HEATING VENTILATING AIR CONDITIONING

INSTRUCTIONS FOR USE

TCAEY-THAEY 2110÷4340 WinPACK

TCAEY - Packaged air-cooled water chillers and R410A ecological refrigerant. Series with hermetic Scroll compressors.
THAEY - Packaged heat pumps with air evaporation/condensation and R410A ecological refrigerant. Range with hermetic scroll compressors.

KP8028/A

English

English

UNTES®

HEATING VENTILATING AIR CONDITIONING

CE

Statement of conformity

ÜNTES INC.
located in İstanbul yolu 37.Km Sarayköy Kazan Ankara, hereby states on its own exclusive responsibility that the products in the

TCAEY-THAEY 2110÷4340

are compliant with the essential safety requirements as set forth in Machine Directive 2006/42/CE.

The machine is also compliant with the following directives:

2006/95/CE (Low Voltage)

2004/108/CE (Electromagnetic Compatibility)

Regulation n.327/2011/UE implementing Directive 2009/125/EC ERP

Restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU

English

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ENCLOSED DOCUMENTS

SYMBOLS USED

Symbol	Meaning
	The DANGER sign warns the operator and maintenance personnel about risks that may cause death, physical injury, or immediate or latent illnesses of any kind.
	The DANGER: LIVE COMPONENTS sign warns the operator and maintenance personnel about risks due to the presence of live voltage.
	The DANGER: SHARP EDGES sign warns the operator and maintenance personnel about the presence of potentially dangerous sharp edges.
	The DANGER: HOT SURFACES sign warns the operator and maintenance personnel about the presence of potentially dangerous hot surfaces.
	The DANGER: MOVING PARTS sign warns the operator and maintenance personnel about risks due to the presence of moving parts.
	The IMPORTANT WARNING sign indicates actions or hazards that could damage the unit or its equipment.
	The environmental safeguard sign provides instructions on how to use the machine in an environmentally friendly manner.

REFERENCE STANDARDS

UNI EN ISO 12100	Safety of machinery - General design principles - Risk assessment and reduction of risk.
UNI EN ISO 13857	Safety of machinery - Safety distances to prevent reaching danger zones with upper and lower limbs.
UNI EN 563	Safety of machinery. Temperature of contact surfaces. Ergonomic data to establish limit values for temperatures of hot surfaces.
UNI EN 1050	Safety of machinery. Principles of risk assessment.
UNI 10893	Product technical documentation. User instructions
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
EN 378-2	Refrigeration systems and heat pumps – safety and environmental requirements. Design, construction, testing, installing, marking and documentation
CEI EN 60204-1	Safety of machinery. Electrical equipment of machines. Part 1: General requirements
UNI EN ISO 9614	Determination of sound power levels of noise sources using sound intensity
EN 13133	Electromagnetic compatibility - Generic emission standard Part 1: Residential, commercial and light industry
EN 61000	Electromagnetic compatibility (EMC)

I. SECTION I :: USER

VERSIONS AVAILABLE

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.

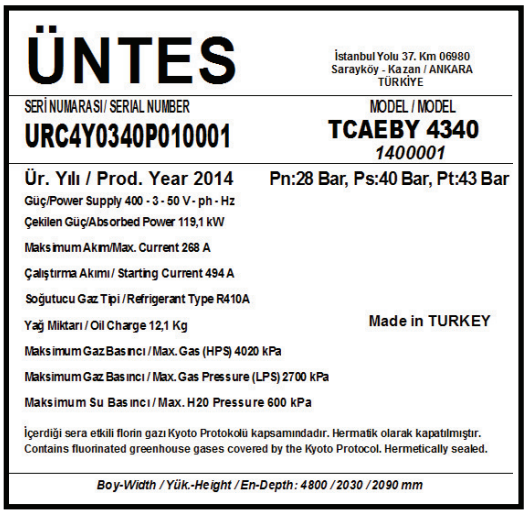
T	Water production unit		
C	Cooling only	**H**	Heat pump
A	Air cooling		
E	Scroll-type hermetic compressors		
B	Basic		
S	Silenced		
T	High efficiency		
Q	Super-silenced		
Y	R410A refrigerant gas		

n° compressors	heating capacity (kW) (*)
2	110
2	120
2	140
2	150
2	170
2	200
2	220
4	240
4	270
4	310
4	340

(*) 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*).

MACHINE IDENTIFICATION

The units feature a serial number plate located on the front side, which includes machine identification data.



DECLARED CONDITIONS OF USE

TCAEBY, TCAETY, TCAESY, and TCAEQY are packaged water chillers with air condensation and axial fans in basic, high efficiency, silenced and super silenced versions respectively.
THAEBY, THAETY, THAESY, and THAEQY are reversible packaged heat pumps on the cooling cycle with air evaporation/condensation and axial fans in basic, high efficiency, silenced and super silenced versions, respectively.

They are intended to be used in air conditioning or industrial process systems where chilled water (TCAEBY, TCAETY, TCAESY, TCAEQY) or chilled and hot water (THAEBY THAETY THAESY THAEQY) is required, not for human consumption.

The machine is designed for indoor installation.

The units comply with the following Directives:

- 2006/42/EC Machinery Directive
- Low voltage Directive 2006/95/EC
- Electromagnetic compatibility Directive 2004/108/EC
- Pressure equipment directive 97/23/EEC (PED)
- Restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU

DANGER!

The machine has been designed and manufactured solely and exclusively to function as an air evaporation heat pump; any other use is strictly PROHIBITED. Installing the machine in an explosive environment is prohibited.

DANGER!

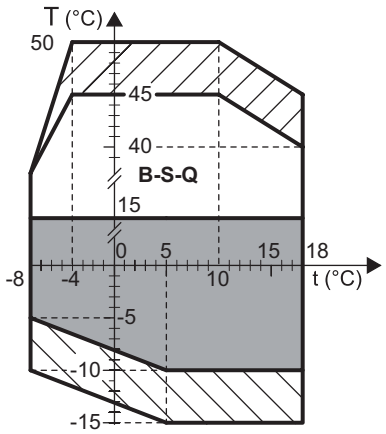
The machine is designed for outdoor installation.
Segregate the unit if installed in areas accessible to persons under 14 years of age.

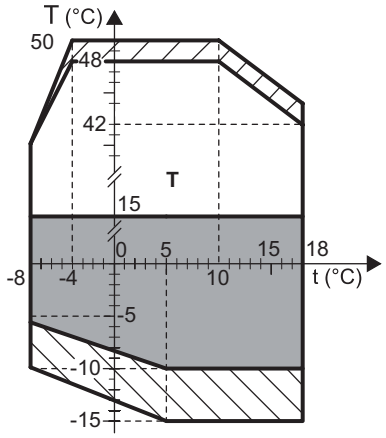
IMPORTANT!

The unit will function correctly only if the instructions for use are scrupulously followed, if the specified clearances are complied with during installation, as well as the use restrictions indicated in this manual.

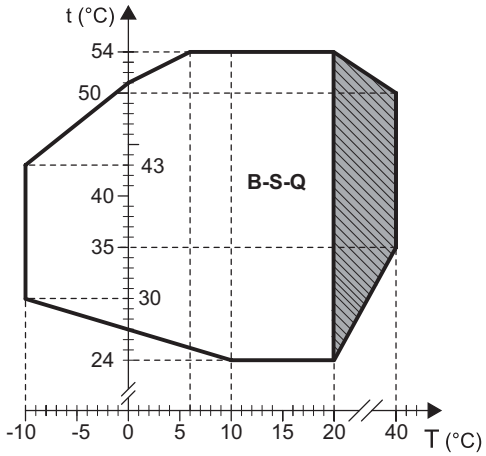
FUNCTIONING LIMITS

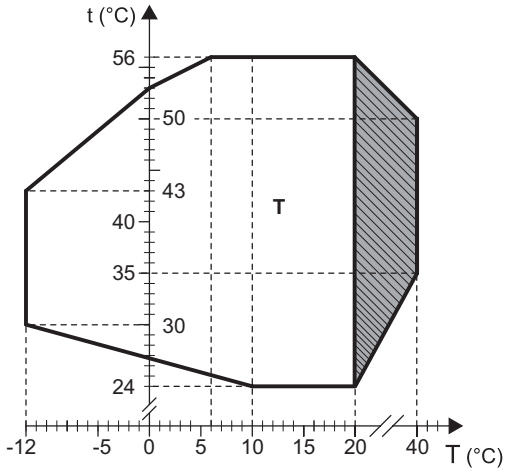
Summer mode





Winter mode





In summer mode:
Maximum water inlet temperature 23°C

- Minimum water pressure 0.5 Barg.
- Maximum water pressure: 10 Barg / 6 Barg with ASP

In winter mode:
Minimum water inlet temperature 20°C.
Maximum water inlet temperature 51°C

N.B.:
For t(°C), < 5°C (accessorio BT) it is COMPULSORY to specify the unit's work temperature when ordering (inlet/outlet glycoled water evaporator) in order to enable its correct parametrisation. Use antifreeze solutions: refer to "*Use of antifreeze solutions*

T (°C)	Outdoor air temperature (D.B.)
t (°C)	Temperature of the water produced
	Standard functioning.
	Summer operation with condensing control FI10 (as per standard in S version)
	Summer operation with condensing control FI15 (as per standard in Q version)
	Functioning with partialised cooling capacity
	Winter mode with FI10 or FI15 condensation control (FI10 standard in version S and FI15 standard in version Q)

Model	2110÷4340	2110÷4340	2110÷4340	2110÷4340
Versions	**B**	**S**	**T**	**Q**
	Tmax = 45°C (1) (2)	Tmax = 42°C (1) (3)	Tmax = 48°C (1) (2)	Tmax = 40°C (1) (3)
	Tmax = 50°C (1) (4)	Tmax = 45°C (1) (2)	Tmax = 50°C (1) (4)	Tmax = 45°C (1) (2)
		Tmax = 50°C (1) (4)		Tmax = 50°C (1) (4)

(1)	Evaporator water temperature (IN/OUT) 12/7 °C
(2)	Maximum outdoor air temperature with unit in standard operation running on full
(3)	Maximum outdoor air temperature with unit in silenced mode
(4)	Maximum outdoor air temperature with unit in partialised cooling capacity

If the water inlet temperature to the condensers is lower than the permitted values, it is recommended to use a three-way modulating valve to guarantee the minimum water temperature required.

Permitted temperature differentials through the heat exchangers

○ Evaporator temperature differential ΔT = 3 ÷ 8°C with “Standard” set-ups. However, consider the minimum and maximum flow rates reported in the tables *“Water flow rate limits”.* The maximum and minimum temperature differentials for “Pump” and “Tank&Pump” set-ups are related to the performance of the pumps, which must always be checked by means of the **ÜNTES INC.** selection software.

Evaporator water flow rate limits

Type of heat exchanger		Plates		Tube and shell (STE accessory)	
Version B-S		**Min**	**Max**	**Min**	**Max**
2110	m^3/h	11	33	12	27
2120	m^3/h	11	33	12	27
2140	m^3/h	11,5	37	12	27
2150	m^3/h	13	43	18	38
2170	m^3/h	14,5	48	18	38
2200	m^3/h	16	54	20	43
2220	m^3/h	18	62	20	43
4240	m^3/h	24	74	28	63
4270	m^3/h	24	74	28	63
4310	m^3/h	26	95	28	63
4340	m^3/h	26	95	36	95

Type of heat exchanger		Plates		Tube and shell (STE accessory)	
Version T-Q		**Min**	**Max**	**Min**	**Max**
2110	m^3/h	11,5	37	12	25
2120	m^3/h	13	43	12	25
2140	m^3/h	14,5	48	18	38
2150	m^3/h	16	54	18	38
2170	m^3/h	18	62	20	43
2200	m^3/h	21	63	20	43
2220	m^3/h	23	64	23	63
4240	m^3/h	26	95	28	63
4270	m^3/h	31	95	28	63
4310	m^3/h	31	95	36	95
4340	m^3/h	37	100	36	95

Recovery water flow rate limits

Type of heat exchanger		RC100	
Versions B-S		**Min**	**Max**
2110	m^3/h	11	33
2120	m^3/h	11	33
2140	m^3/h	11,5	37
2150	m^3/h	13	43
2170	m^3/h	14,5	48
2200	m^3/h	16	54
2220	m^3/h	18	62
4240	m^3/h	24	74
4270	m^3/h	24	74
4310	m^3/h	26	95
4340	m^3/h	26	95

Type of heat exchanger		RC100	
Versions T-Q		**Min**	**Max**
2110	m^3/h	11,5	37
2120	m^3/h	13	43
2140	m^3/h	14,5	48
2150	m^3/h	16	54
2170	m^3/h	18	62
2200	m^3/h	21	63
2220	m^3/h	23	64
4240	m^3/h	26	95
4270	m^3/h	31	95
4310	m^3/h	31	95
4340	m^3/h	37	100

RC100:
- Hot water temperature produced 30÷54°C for versions **B-S** / 30÷56°C for versions **T-Q**;
- The minimum inlet water temperature allowed is equivalent to 20°C.

DS:
- Hot water temperature produced 50÷70°C with 5÷10 K allowed water temperature differential;
  The minimum water inlet temperature allowed is equivalent to 40°C.

WARNINGS REGARDING POTENTIALLY TOXIC SUBSTANCES

DANGER!
Read the following information about the refrigerants employed carefully. Adhere scrupulously to the warnings and first aid procedures indicated below.

Identification of the type of refrigerant fluid used

◦ Difluoromethane (HFC 32) 50% by weight N° CAS: 000075-10-5

◦ Pentafluoroethane (HFC 125) 50% by weight N° CAS: 000354-33-6

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.

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	CH_2F_2	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 index which measures how much a certain mass of greenhouse gas contributes to global warming is the GWP (Global Warming Potential). The standard measure for carbon dioxide (CO2) is GWP=1.
The value of GWP assigned to each refrigerant represents the equivalent amount in kg of CO2 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 layer, 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

SAFEGUARD THE ENVIRONMENT! 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 do not affect 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 cause long-term water contamination.

● Personal protection/exposure control

Use protective clothing and gloves; protect eyes and face.

● Professional R134a exposure limits:

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. The atmospheric concentration must be reduced as far as possible and maintained at this minimum level, below professional exposure limits. The vapours are 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 irritant and toxic decomposition by-products. Do not allow the liquid to come into contact with eyes or skin.

● Procedures in case of accidental refrigerant leakage

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 extent 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.

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 an 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 nebulised 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
Splashes of liquid may cause frostbite.

● Ingestion
While highly improbable, may produce frostbite.

First aid measures

● Inhalation
Move the person away from the source of exposure, 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.

PED CATEGORIES OF PRESSURE COMPONENTS

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

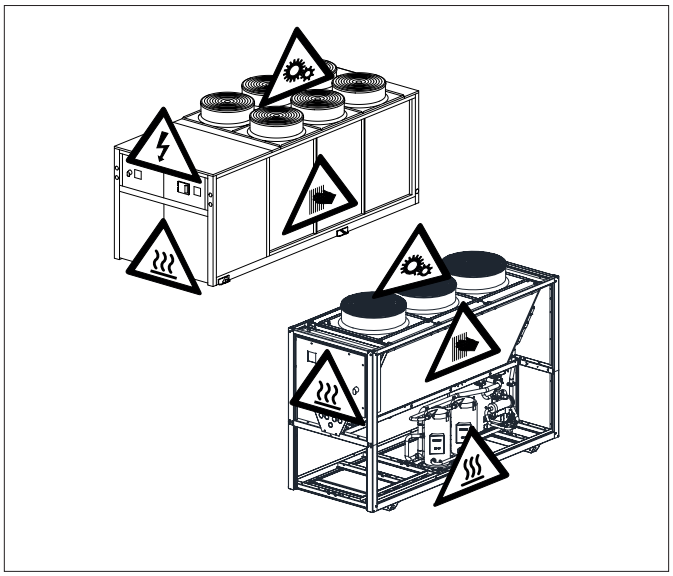
Component	PED category
Compressor	II
safety valve	IV
High pressure switch	IV
Liquid receiver	II
Liquid separator	II
Finned coil/micro-channels	I
Plate evaporator	II

INFORMATION ABOUT RESIDUAL RISKS THAT CANNOT BE ELIMINATED

IMPORTANT!

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

If any risks remain in spite of the provisions adopted, 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 hot surfaces (cooling circuit, compressor heads)
	Indicates the presence of sharp edges on finned coils

DESCRIPTION OF CONTROLS

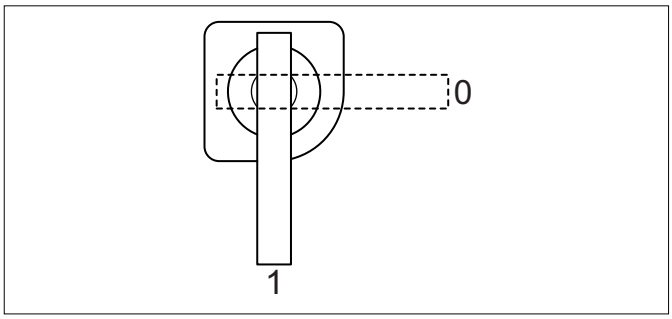
The controls consist of the master switch, circuit breakerand user interface panel.

General switch

DANGER!

When connecting accessories not supplied by ÜNTES INC. the instructions included in the unit's wiring diagrams must be followed precisely.

Manually controlled type "b" mains power supply disconnection device (ref. EN 60204-1§5.3.2).



Circuit breaker switches

- **Automatic compressor protection switch**

This switch allows supplying or isolating the compressor's power circuit.

- **Automatic switch for pump protection;**

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

- **Automatic switch for fan protection (128)**

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

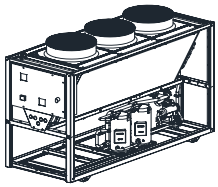
II. SECTION II :: INSTALLATION AND MAINTENANCE

STRUCTURAL FEATURES

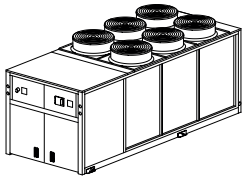
○ Load-bearing structure and panels in galvanised and RAL 9018 painted sheet metal; galvanised steel sheet metal base.
○ The structure consists of two sections:
• technical compartment that houses the compressors, electrical panel and main components of the cooling circuit;
• aeraulic circuit to house the heat exchange coils and motor-driven fans

	SIZES				
	2110÷2220	4240	4270	4310	4340
TCAEBY-TCAESY	▽	▽	▽	■	■
THAEBY-THAESY	▽	■	■	■	■
TCAETY-TCAEQY	▽	■	■	■	■
THAETY-THAEQY	▽	■	■	■	■

▽ V-coiled structure



■ Vertical coiled structure



○ Hermetic, Scroll-type rotary compressors complete with internal circuit breaker protection and crankcase resistance automatically activated when the unit stops (as long as the unit is powered).
○ Adequately insulated, braze-welded plate water side heat exchanger in stainless steel (tube and shell exchanger - STE option).
○ Air side heat exchanger with MCHX micro-channel pipes or copper coil pipes and aluminium fins, as indicated in the following table:

	CIRCUIT 1	CIRCUIT 2			
	2110÷2220	4240	4270	4310	4340
TCAEBY-TCAESY	X	X	X	●	●
THAEBY-THAESY	●	●	●	●	●
TCAETY-TCAEQY	X	●	●	●	●
THAETY-THAEQY	●	●	●	●	●

X MCHX micro-channel coil

● Cu-Al coil

○ External rotor axial motor-driven fans equipped with internal thermal protection and complete with a protection grille set in a single row for 2-compressor units and in a double row for 4-compressor units, (except for chiller models 4240 and 4270 versions B and S).
○ The S-Silenced version has a standard proportional electronic device (FI10) for pressurised and continuous adjustment of the fan rotation speed up to outdoor air temperature of -10°C when operating as a chiller, and up to outdoor air temperature of 40°C when operating as a heat pump.
○ The Q-Super silenced version has a standard electronic proportional device (FI15) for pressurised and continuous adjustment of the fan rotation speed, up to a minimum outdoor air temperature of -15°C when operating as a chiller, and up to a maximum outdoor air temperature of 40°C when operating as a heat pump.
○ Victaulic-type hydraulic connections.
○ Differential pressure switch that protect the unit from any water flow interruptions.
○ Cooling circuits made with annealed copper pipes (EN 12735-1-2) equipped with: dryer filter cartridge, load connections, high pressure side manual reset safety pressure switch, BP and AP pressure transducer, safety valve(s), tap upstream of the filter, liquid indicator, intake line isolation, thermostatic expansion valve (versions B and S) or electronic expansion valve (versions T and Q), cycle inversion and liquid receiver valve, check valve, compressor intake gas separator and solenoid valve on the liquid line (for THAEBY-THAETY-THAESY-THAEQY).
○ Unit with IP24 protection rating.
○ Control with AdaptiveFunction Plus operation.
○ The unit is complete with a charge of R410A refrigerant.

Versions

B	Basic version (TCAEBY-THAEBY).
S	The silenced version is complete with soundproofed compressors and lower speed fans (TCAESY-THAESY). The fan speed is automatically increased when the external temperature increases significantly.
T	The high efficiency versions, with a larger condensing section (TCAETY-THAETY).
Q	Super-silenced version complete with soundproofed compressors, super low fan speed and larger condensing surface (TCAEQY-THAEQY). The fan speed is automatically increased when the external temperature increases significantly.

Available Installations

Standard:
Installation without pump and without water buffer tank

Pump (main circuit):
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.

Pump ("RC100" recovery circuit side):
PR1 – Installation with pump.
PR2 – Installation with increased static pressure pump.
DPR1 – Installation with double pump, including an automatically activated pump in stand-by.
DPR2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by.

In the single pump version, the unit is complete with an flow shut-off tap.
The double pump version is equipped with a non-return flow valve and intake tap for each pump.

Pump (RC100 secondary recovery circuit side, when available)
Tank & Pump (main circuit):
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 storage.
ASDP2 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by and storage.

In addition to that supplied with the
Pump accessory, the unit also includes:
Inertial flow storage tank, bleed valve, water drain valve, expansion tank, safety valve, electrical resistance connection.

ELECTRICAL CONTROL BOARD

○ Electrical panel can be accessed by opening the front panel, in compliance with IEC Standards in force, fitted with opening and closing via specific tool.
○ Complete with:
• electrical cables prepared for 400-3ph-50Hz power supply voltage;
• auxiliary circuit power supply 230V-1ph-50Hz drawn from the main power supply;
• 12V-1ph-50Hz control power supply drawn from the main power supply;
• power supply isolator master switch, complete with safety door locking device;
• automatic circuit breaker protection for compressors and motor-driven fans;
• auxiliary circuit protection fuse;
• compressor power contactor;
• machine remote controls: ON/OFF summer-winter switch;
• machine remote controls: compressor operation light and main lock light.
○ Programmable microprocessor electronic board handled by the keyboard inserted in the machine.
○ This electronic board performs the following functions:
• regulation and control of the unit outlet water temperature settings; of the cycle inversion (THAEBY-THAETY-THAESY-THAEQY); of the safety timers; of the circulation pump; of the system compressor and pump hour-run meter; dei cicli di sbrinamento; of the pressurised defrost cycles; electronic anti-freeze protection that is automatically activated when the unit is off; and of the functions that control the operations of the individual parts making up the unit;
• complete protection of the unit, possible shutdown and display of all the triggered alarms;
• 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 evaporation pressures; 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 (THAEBY-THAETY-THAESY-THAEQY);
• user interface menu;
• automatic pump operating time balance (DP1-DP2, ASDP1-ASDP2 installations);
• automatic activation of standby pump in the event of an alarm (DP1-DP2, ASDP1- ASDP2 installations);
• recovery unit/desuperheater water intake temperature;
• alarm code and description;
• alarms log management (menu protected by manufacturer password).
○ In particular, for every alarm, the following are memorised:
• date and time of intervention;
• in/out water temperature values as soon as the alarm was triggered;
• the evaporation and condensation pressure values at the time of the alarm.
• alarm delay time from the switch-on of the connected device;
• compressor status at the time of the alarm;

○ Advanced functions:
• Hi-Pressure Prevent function with forced partialisation of the cooling capacity with high outdoor temperature (with summer operation);
• prepared for serial connection (SS, FTT10, KBE, KBM, KUSB accessory);
• possibility to have discrete input for dual Set point remote management (DSP);
• possibility of having a discrete input for total recovery management (RC100), the desuperheater (DS) or for the production of domestic hot water by means of a 3-way diverter valve (VDEV). In this case, there is the possibility of using a temperature probe instead of the discrete input. (see specific section for more information);
• possibility to have an analogue input for sliding Set point by means of a 4-20mA remote signal(CS);
• time bands and process parameters management with the possibility of programming weekly/daily operation;
• check-up and verification of the programmed maintenance status;
• computer-assisted machine test;
• self-diagnosis with continuous monitoring of the machine operation status.
○ Set-point regulation via the AdaptiveFunction Plus with two options:
• fixed set-point (Precision option);
• set-point slidinge (Economy options).

SPARE PARTS AND ACCESSORIES

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

Factory Fitted Accessories

P1	Installation with pump
PR1	Installation with a pump on the RC100 recovery circuit
P2	Installation with increased static pressure pump
PR2	Installation with an increased head pump on the RC100 recovery circuit
DP1	Installation with double pump, including an automatically activated pump in stand-by
DPR1	Installation with a double pump, including one automatically activated in standby on the RC100 recovery circuit
DP2	Installation with increased static pressure double pump, including an automatically activated pump in stand-by
DPR2	Installation with increased head double pump, including an automatically activated pump in standby on the RC100 recovery circuit
ASP1	Installation with pump and storage tank
ASDP1	Installation with double pump, including an automatically activated pump in standby and storage tank
ASP2	Installation with an increased head pump and storage tank
ASDP2	Installation with and increased head double pump, including an automatically activated pump in standby and storage tank
STE	Shell and tube evaporator
CAC	Compressor aphonic ear muffs
BCI	Soundproofed compressor box and unit metal sheet finish (check the table)
BCI60	Soundproofed compressor box with high acoustic impedance and unit metal sheet finish (check the table)
INS	Compressor technical compartment soundproofing (check the table)
INS60	Compressor technical compartment soundproofing with high acoustic impedance (check the table)

WinPACK SE	**BCI-BCI60-INS-INS60 ACCESSORIES**		
	2110÷2220	**4240-4270**	**4310÷4340**
TCAEBY	BCI-option	BCI-option	INS-option
TCAESY	BCI standard	BCI standard	INS standard
THAEBY	BCI standard	INS option	INS option
THAESY	BCI standard	INS standard	INS standard

WinPACK HE-A	**BCI-BCI60-INS-INS60 ACCESSORIES**	
	2110÷2220	**4240÷4340**
TCAETY	BCI-BCI60 option	INS-INS60 option
TCAEQY	BCI60 standard	INS60 standard
THAETY	BCI standard-BCI60 option	INS-INS60 option
THAEQY	BCI60 standard	INS60 standard

RS	Cooling circuit intake and flow taps
DS	Desuperheater. Also active during winter operation (THAEY)
RC100	Heat recovery unit with 100% recovery
FI10	Modulating condensation control for continuous operation as chiller up to -10°C of outdoor air temperature (standard versions S)
FI15	Modulating condensation control with fans with EC motor (Brushless) for continuous operation as a chiller up to -15°C outdoor air temperature (standard Q versions)
FIAP	Condensation control with over-pressured fans with EC motor (Brushless) and available static head up to 150 Pa (for for B-T versions)
SFS	Soft Starter compressors
CR	Power factor correction capacitors
EEV	Electronic thermostatic valve (standard supplied in versions T-Q)
FDL	Forced Download Compressors. Compressor switch-off to limit the absorbed current and power (digital input)
FNR	Forced Noise Reduction. Forced reduction of noise (digital input or time band management) - See specific section for more information)
GM	Refrigerant circuit high and low pressure gauges.
RQE	Electrical panel resistance (recommended for low outdoor air temperatures)
RA	Evaporator antifreeze resistor 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)
RAE1-RAR1	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)
RAE2-RAR2	27W antifreeze electric heater for double motor-driven pumps (available for DP1-DP2-DPR1-DPR2-ASDP1-ASDP2 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)
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)
RIS	Integrative electrical resistances and the Antifreeze storage tank (only with Tank&Pump - incompatible with RAS) - See specific section for more information)
LDK	Refrigerant leak detector
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). The EEV accessory may have to be also installed, depending on the required values
BT	Low temperature of water produced
SS	RS485 interface for serial communication with other devices (proprietary protocol; Modbus RTU protocol).
EEM	Energy Meter. Measure and display values of the electrical units - See specific section for more information
EEO	Energy Efficiency Optimizer. Optimising energy efficiency (only B-T versions) - See specific section for more information
FTT10	LON interface for serial communication with other devices (LON protocol).
RPB	Protection coil grilles with accident-prevention function (to use as an alternative to the FMB accessory) (not available with V-coiled models)
FMB	Mechanical filters to protect the coils with leaf-protection function (to use as an alternative to the RPB accessory) (not available with V-coiled models)
RAP	Unit with copper/copper condensation coils (available as an alternative in chillers with traditional Cu-AL coils and heat pumps - refer to the table in “General features”)
BRR	Unit with copper/copper condensation coils (available as an alternative in chillers with traditional Cu-AL coils and heat pumps - refer to the table in “General features”)
IMB	Protective packaging
SAG	Rubber anti-vibration mountings (supplied not installed)
SAM	Spring anti-vibration mountings (supplied not installed)
MCHXE	AL/AL micro-channel coil with E-coating treatment (available in chillers with micro-channel coils)

Accessories supplied separately

KTRD	Thermostat with display
KTR	Remote keypad for control at a distance with LCD display and same functions as the machine connection must be made with a 6-wire telephone cable (maximum distance 50 m) or with KRJ1220/KRJ1230 accessories. For greater distances up to 200 m, use an AWG 20/22 shielded cable (4 wires+shield, not supplied) and the KR200 accessory.
KRJ1220	Connection cables for KTR (20 m length)
KRJ1230	Connection cables for KTR (30 m length)
KR200	KTR remote control Kit (distance between 50 and 200m)
KBE	Ethernet interface for serial communication with other devices (BACnet IP protocol)
KBM	RS485 interface for serial communication with other devices (BACnet MS/TP protocol)
KUSB	RS485/USB serial converter (USB cable supplied)

Description and fitting instructions are supplied with each accessory.

GUIDE TO CHOOSING THE MCXHE ACCESSORY

The aluminium alloys used in MCHX are the best available. However, even the best aluminium alloy needs further protection against corrosion in corrosive environment.

The purpose of this document is to guide our customers in choosing the MXCHE accessory. To do this, attention is required to the classification of different environments in relation to pollution and corrosion of the metal.

Types of installation premises

● Coastal and marine environments
Coastal and marine environments are characterised by the effects of the proximity of the sea. The corrosive environment is mainly caused by the saline sea water and possibly by high humidity. Seal salt can be spread by wind in forms of drops, mist or fog and cause corrosion due to the presence of chlorine, even at several kilometres from the coastline. Marine environments are extremely exposed to chlorine corrosion.

● Industrial environments
Areas with high industrial density are considered industrial environments. Industrial environments may be very different depending on the type of industries present and the levels of emission allowed in that specific area. A large variety/combination of chemical substances may be present. In industrial areas, in general, there is an increase in sulfur, ammonia, chlorides, NOx compounds, metals in air and dust. These substances are known for corroding metals

● Urban environments
Urban environments are highly populated environments. These are normally polluted by emissions produced by traffic and the heating of buildings. The degree of pollution in urban environments greatly depends on the size and traffic of the area

● Rural environments
Rural environments are not normally corrosive environments. However, some types of localised emissions are frequent in rural areas. For example, ammonia from animal urination, fertilisers and diesel exhaust.

● Environment with specific features
The environment with specific features is that near a system within a range of 100 m. This type of environment is that generated by the emissions near factories, traffic, power stations, airports, etc.. The specific environment can be in any of the above types of environments and can be very different from the environment in general. For example, a pig farm in a rural area can create a different environment due to the ammonia emissions from the stables.

Specific environments can be: airports, food processing factories, chemical factories (petrochemical industry, plastics industry), power stations, fuel station, biofuel plants, waste-water treatment plants, animal farms, landfills, etc..

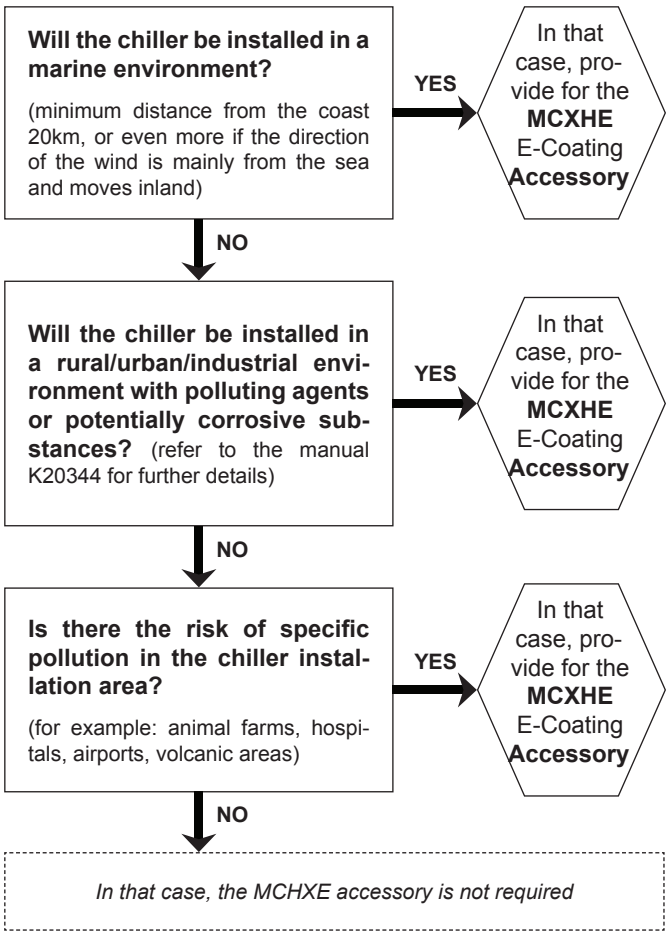
Below is a table of installation sites constituting an environment with specific features:

Installation site	Property	Aggressive substances
Power stations	Combustion products	SOx, NOx, Chloride, Fluoride
Chemical industries	Emissions from industrial processes	Ammonia, Chloride, NOx, SOx
Bio fuels processing plants	Emissions from industrial processes	Ammonia, SOx, NOx
Petrochemical industries	Oils, Fuels, Emissions from processes	Ammonia, Chloride, NOx, SOx
Petrol stations	Fuel, Combustion products	Leaking of fuel, Chlorides, NOx, SOx
Airports	Combustion products	NOx, SOx, Chlorides
Agriculture	Fertilisers, Organic compounds	SOx, NOx, Ammonia
Sea air, Ships, offshore	Sprayed seawater	Chlorides, Sulphides
Heavy industry	Carbon dust	Sulphides, SOx, NOx
Steel mill	Carbon dust	Sulphides, SOx, NOx
Food industry	Fat, Air humidity, Detergents	Chlorine, Acids, SOx, NOx
Waste disposal	Organic particles in the air	Ammonia
Purification plants	Organic particles in the air	Sulphides, Ammonia

● Direct environment
The direct environment is that generated by emissions directly in the place of installation or towards the unit. It may only be immediately near the installation; e.g.: air duct drains, liquids, flues, fuel or chemical product leaks, de-icer chemical products, weeding with chemical products, sewage and manure tanks, grinding or welding metal dust, etc.. The corrosive effects of the direct environment can be hazardous and are often neglected. For example, food factory ventilation drains containing chlorine vapours or acids from cleaning processes.

Recommendations for selection

The following recommendations on when to choose the MCHXE treatment are based on the evaluation of the unit's installation environment.



Protection against corrosion of MCHX

The layer of natural aluminium oxide is very strong/thick and acts as protection against corrosion to the underlying metal. This does not mean that the aluminium is sufficiently protected by the oxide layer for all applications and conditions. This depends on the corrosiveness of the environment.

Electrofin® E-coating

There are different anti-corrosion protective coatings on the market suitable for HVAC components. Many of these have proven to be reliable in the field over a number of years. However, for the MCHX heat exchanger, only certain coating solutions are advisable.

Üntes offers the E-coating treatment solution with the MCHXE accessory.

The Electrofin ® E-Coating is a water-based epoxy polymer coating. The E-coat (PPG Powercron ®) formula is designed to provide an excellent coverage, even in the corners of the fins. The Electrofin ® E-Coating is a UV resistant technology and suitable to protect MCHX from aluminium corrosion with 100% coverage, without solution of continuity. The thickness of the coating layer is 15-30 micron, minimising the loss of performances. The following specifications are ensured:

E-coating technical performances	Reference regulations
Coating thickness: 15-30 micron (ASTM D7091-05)	MIL-C-46168 Resistance to chemical agents – DS2, HCl Gas
Immersion in water: >1000 hours @ 38°C (ASTM D870-02)	MIL-P-53084 (ME)-TACOM Approval
Resistance to humidity: minimum 1000 hours (ASTM D2247-99)	ASTM B117-G85 Saline spray modified (Fog) 2000 hours of test
Heat exchange reduction: <1% (ARI 410)	
pH Range: 3-12	
Storage temperature limits: -40 – 163°C	

The ElectroFin ® E-coating polymeric treatment is resistant to the following chemical agents, at room temperature. This table must be used as general reference guide.

Acetone	Fructose	Ozone
Acetic acid	Petrol	Perchloric acid
Acetates (all)	Glucose	Phenol 85%
Amine (all)	Glycol	Phosgene
Ammonia	Glycol Ether	Phenolphthalein
Ammonium hydroxide	Hydrochloric Acid <10%	Phosphoric Acid
Amino acid	Hydrofluoric Acid (NR)	Potassium Chloride
Benzene	Hydrogen Peroxide <5%	Potassium Hydroxide
Borax	Hydrogen Sulphide	Propyl Alcohol
Boric Acid	Hydrazine	Propylene Glycol
Butyl Alcohol	Hydroxylamine	Salicylic Acid
Butyl Cellosolve®	Iodine	Salt water
Butyric Acid	Isobutyl Alcohol	Sodium Bisulphite
Calcium Chloride	Isopropyl Alcohol	Sodium Chloride
Calcium Hypochlorite	Kerosene	Sodium hypochlorite <5%
Carbon tetrachloride	Lactic Acid	Caustic Soda <10%
Cetyl Alcohol	Lactose	Caustic Soda <10% (NR)
Chlorides (ALL)	Laurylsulfate	Sodium Sulphate
Chlorine Gas	Magnesium	Stearic Acid
Chrome Acid (NR)	Maleic Acid	Sucrose
Citric Acid	Menthol	Sulphuric Acid <25%
Creosote	Methanol	Sulphates (ALL)
Diesel oil	Methylene Chloride	Sulphides (ALL)
Diethanolamin	Methyl Ethyl Ketone	Sulphites (ALL)
Ethyl Acetate	Methyl Isobutyl Ketone	Starch
Ethyl Alcohol	Mustard Gas	Toluene
Ethyl Ether	Naphthol	Triethanolamine
Fatty Acid	Nitric Acid (NR)	Urea
Fluorinated Gas	Oleic Acid	Vinegar
Formaldehyde <27%	Oxalic Acid	Xylene

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 prevent damage by accidental collision.

Packaging components

DANGER!
Do not open or tamper with the packaging before installation. Do not leave the packaging within reach of children.

SAFEGUARD THE ENVIRONMENT
Dispose of the packaging materials in compliance with the national or local legislation in force in your country.

Each unit is supplied complete with:
- installation and use instruction
- Electronic control manual
- wiring diagram
- list of authorised service centres
- warranty document

Lifting and handling instructions

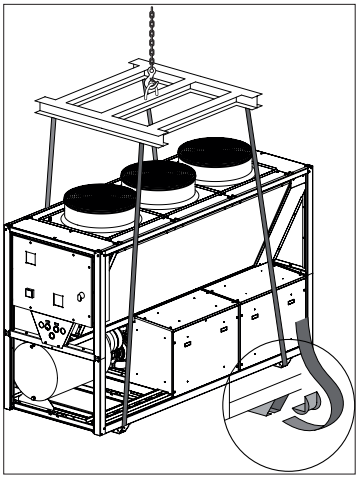
IMPORTANT!
The unit was not designed to be lifted with a forklift truck.

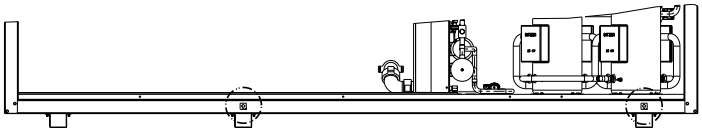
DANGER!
Lifting the unit with the centre of gravity as off-centre could cause sudden and hazardous movements.

DANGER!
Movement of the unit must 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 along the route, in order to prevent the risk of impact, crushing or tipping the lifting and handling device.

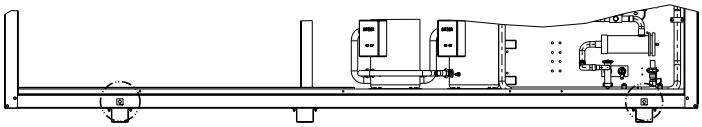
Refer to the following instructions:

V-coiled structure





TCAEBY-TCAESY 4240-4270
THAEBY-THAESY 4240-4270



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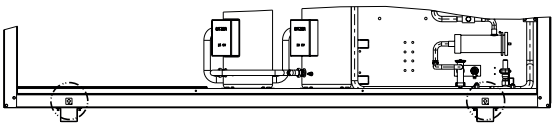
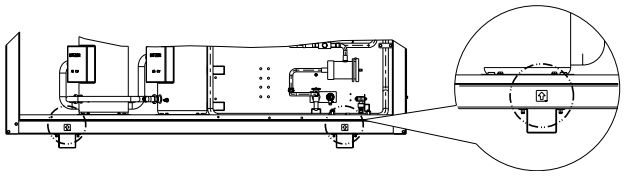
THAEBY-THAESY 2220

TCAETY-TCAEQY 2170-2220
THAETY-THAEQY 2170-2220



TCAEBY-TCAESY 2150-2200
THAEBY-THAESY 2150-2200

TCAETY-TCAEQY 2150-2200
THAETY-THAEQY 2150-2200

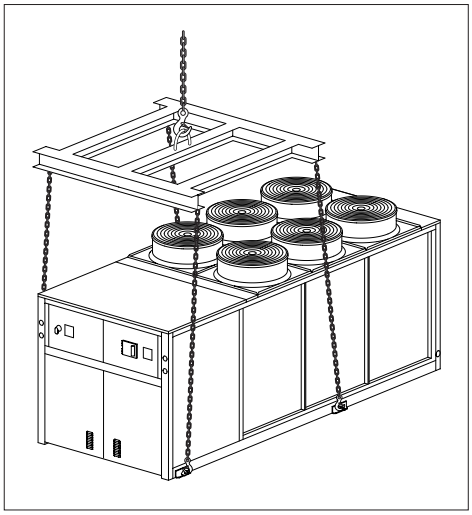


TCAEBY-TCAESY 2110-2140
THAEBY-THAESY 2110-2140

Points for proper positioning of the lifting bands

Pass the straps through the slots in the base of the unit, having first checked their suitability (as regards their strength and state of wear and tear). Pull the straps tight, 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. During lifting and handling, make sure that the unit is horizontal at all times. Lower the unit carefully and fix it into place. Be careful not to interpose body parts one handling in order to eliminate any possible risk of crushing or any other injury if the load drops or shifts suddenly.

Vertical coiled structure



Connect the chains to the relative lifting hooks. 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. Be careful not to interpose body parts one handling in order to eliminate any possible risk of crushing or any other injury if the load drops or shifts suddenly.

Storage conditions

The units cannot be stacked. The temperature limits for storage are -9÷50°C.

INSTALLATION

DANGER! Installation must only be carried out by skilled technicians, qualified for working on air conditioning and refrigeration systems. Incorrect installation could cause the unit to run badly, with a consequent deterioration in performance.

DANGER!

The unit must be installed according to national or local standards 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 protective equipment.

DANGER!

When the outdoor temperature is around zero, the water normally produced during the coil defrosting could form ice and make the flooring near the unit installation area slippery.

If the unit is not secured on the anti-vibration mountings (SAG or SAM), it must be firmly anchored to the floor once it is placed on the ground. The unit cannot be installed on brackets or shelving.

Installation site requirements

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

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.

Clearance and positioning

IMPORTANT!

Before installing the unit, check the noise limits allowed in the place where it will be used.

IMPORTANT!

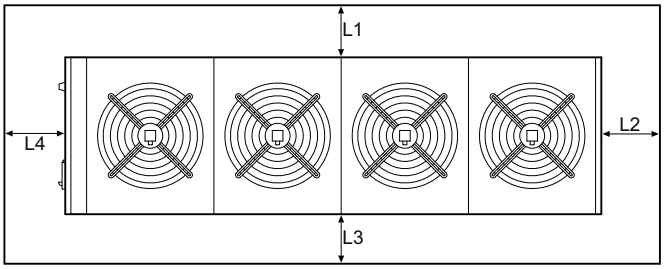
The unit should be positioned to comply with the minimum recommended clearances, bearing in mind the access to water and electrical connections.

IMPORTANT!

If clearance distances are not maintained at installation, it could cause malfunctioning with an increase in absorbed power and a considerable reduction in cooling capacity.

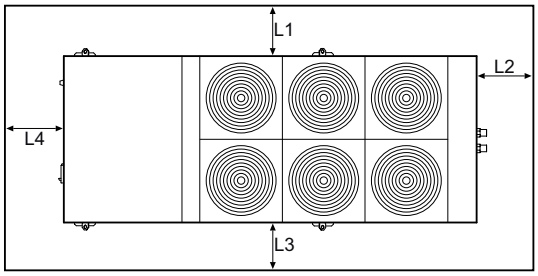
The unit is designed for outdoor installation. The unit should be correctly levelled and positioned on a supporting surface capable of sustaining its full weight. It must not be installed on brackets or shelves.

TCAEBY-TCAESY 2110÷4270 **TCAETY-TCAEQY 2110÷2220**
THAEBY-THAESY 2110÷2220 **THAETY-THAEQY 2110÷2220**



L1	mm	1500
L2	mm	1500
L3	mm	1500
L4	mm	1500

TCAEBY-TCAESY 4310÷4340 **TCAETY-TCAEQY 4240÷4340**
THAEBY-THAESY 4240÷4340 **THAETY-THAEQY 4240÷4340**



L1	mm	2000
L2	mm	2000
L3	mm	2000
L4	mm	1500

Nota bene

L2 is the minimum distance to remove the pumping unit and the relative storage tank. If the accessory is not present, the distance can be reduced. The space above the unit must be free from obstacles. 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.

The minimum gap between the top of the unit and any obstacle above it is 3,5 m. In case multiple units are installed, the minimum space between finned coils must not be less than 2m.

However installed, the coil inlet air temperature (environment air) must remain within the imposed 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:

◦ **SAG/SAM** - 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;

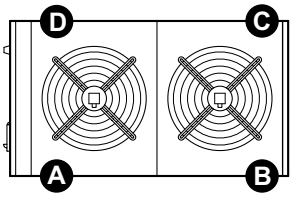
◦ install suitable anti-vibration mountings under the unit to avoid transmitting vibrations to the building structure;

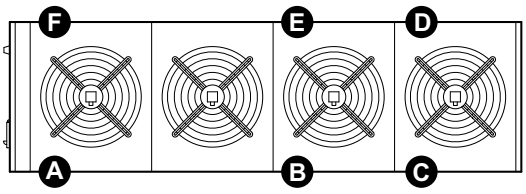
◦ make all water connections using elastic joints; pipes must be firmly supported by solid structures.

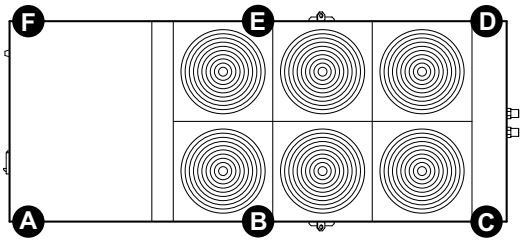
If the pipes are routed through walls or panels, insulate with elastic sleeves. If, after installation and start-up of the unit, structural vibrations are observed in the building which provoke such strong resonance that noise is generated in other parts of the building, refer to a qualified acoustic technician for a complete analysis of the problem.

Dividing the weight

This section of the manual gives indications concerning weight distribution on the unit. Knowing these values is of the utmost importance for dimensioning the surface upon which the unit will be installed. The unit is intended for installation both at ground floor and at the top of buildings. Correct installation and positioning includes levelling the unit on a surface capable of bearing its weight.







TCAEBY-TCAESY 2110÷4270

Weight		2110	2120	2140	2150	2170	2200	2220	4240	4270
(*)	kg	1110	1120	1130	1280	1300	1300	1460	1830	1850
Support										
A	kg	377	405	409	390	396	392	249	96	96
B	kg	311	300	303	401	408	409	305	286	289
C	kg	194	174	176	270	274	277	331	535	542
D	kg	228	241	243	219	223	222	244	527	534
E	kg	-	-	-	-	-	-	195	284	287
F	kg	-	-	-	-	-	-	136	101	101

TCAEBY-TCAESY 4310÷4340

Weight		4310	4340
(*)	kg	2440	2450
Support			
A	kg	589	593
B	kg	409	410
C	kg	222	221
D	kg	230	230
E	kg	409	411
F	kg	580	585

TCAEBY-TCAESY 2110÷4270 with accessory **PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220	4240	4270
(*)	kg	1250	1250	1260	1420	1430	1500	1600	2000	2000
Support										
A	kg	404	406	409	400	403	402	246	123	121
B	kg	327	327	330	421	424	435	314	318	317
C	kg	235	233	236	324	326	358	354	569	570
D	kg	284	284	286	276	277	305	289	556	558
E	kg	-	-	-	-	-	-	233	311	311
F	kg	-	-	-	-	-	-	164	123	122

TCAEBY-TCAESY 4310÷4340 with accessory **PUMP**

Weight		4310	4340
(*)	kg	2685	2700
Support			
A	kg	595	600
B	kg	471	473
C	kg	318	318
D	kg	301	301
E	kg	442	445
F	kg	557	563

TCAEBY-TCAESY 2110÷4270 with accessory **TANK&PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220	4240	4270
(*)	kg	1330	1350	1350	1510	1520	1600	1725	2120	2130
(**)	kg	1630	1650	1650	1810	1820	1900	2300	2680	2680
Support (**)										
A	kg	526	535	535	528	530	533	421	257	255
B	kg	290	296	296	383	386	400	387	390	390
C	kg	300	302	302	381	384	418	277	528	530
D	kg	514	518	518	518	519	549	316	614	616
E	kg	-	-	-	-	-	-	433	507	507
F	kg	-	-	-	-	-	-	466	383	382

TCAEBY-TCAESY 4310÷4340 with accessory **TANK&PUMP**

Weight		4310	4340
(*)	kg	2870	2890
(**)	kg	3580	3590
Support (**)			
A	kg	752	757
B	kg	692	694
C	kg	558	557
D	kg	444	442
E	kg	545	546
F	kg	590	594

(*) Weight of the unit when empty

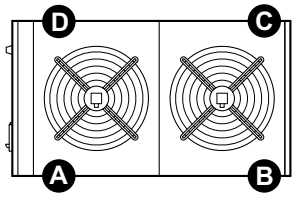
(**) Weight of the units including the water present in the tank

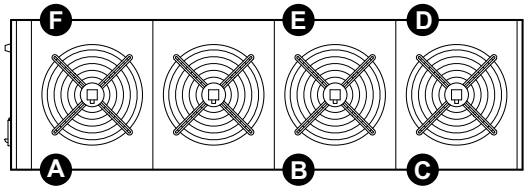
Note: The weight of the TCAEBY unit 2110÷4270 also includes the BCI accessory (standard with TCAESY models), while the weight of the TCAEBY unit 4310÷4340 includes the INS accessory (standard with TCAESY models)

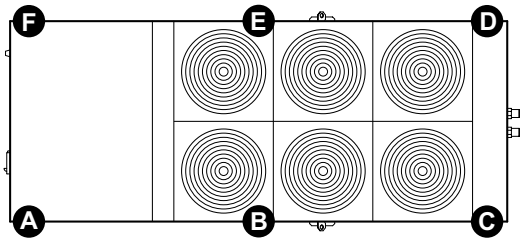
Weight of the accessory BCI = 120 Kg (Mod. 2110÷2220) 160 Kg (Mod. 4240-4270)

Weight of the accessory INS = 40 Kg

Note: Contact Üntes Inc. for the weights of the units with the STE accessory (Shell&Tube Evaporator).







THAEBY-THAESY 2110÷2220

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1250	1310	1320	1470	1480	1565	1730
Support								
A	kg	427	443	446	425	427	445	275
B	kg	346	366	369	470	473	498	353
C	kg	216	231	233	330	333	357	401
D	kg	261	271	272	245	247	265	308
E	kg	-	-	-	-	-	-	237
F	kg	-	-	-	-	-	-	157

THAEBY-THAESY 4240÷4340

Weight		4240	4270	4310	4340
(*)	kg	2415	2500	2620	2635
Support					
A	kg	601	606	635	635
B	kg	403	419	439	442
C	kg	203	226	236	241
D	kg	212	234	245	250
E	kg	404	419	439	442
F	kg	591	596	626	625

THAEBY-THAESY 2110÷2220 with the **PUMP accessory**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1380	1450	1450	1600	1620	1700	1870
Support								
A	kg	427	445	445	432	436	453	270
B	kg	373	396	396	485	492	516	361
C	kg	276	294	294	382	388	411	424
D	kg	304	316	316	301	304	320	355
E	kg	-	-	-	-	-	-	275
F	kg	-	-	-	-	-	-	184

THAEBY-THAESY 4240÷4340 with the **PUMP accessory**

Weight		4240	4270	4310	4340
(*)	kg	2630	2700	2870	2880
Support					
A	kg	609	609	642	640
B	kg	456	469	502	504
C	kg	284	305	334	339
D	kg	272	294	317	322
E	kg	433	447	473	475
F	kg	576	577	603	600

THAEBY-THAESY 2110÷2220 with the **TANK&PUMP accessory**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1465	1530	1540	1700	1710	1800	2000
(**)	kg	1770	1830	1840	2000	2010	2100	2560
Support (**)								
A	kg	553	568	572	563	565	586	444
B	kg	338	357	361	448	453	478	432
C	kg	342	357	359	441	444	469	342
D	kg	537	547	549	547	547	567	378
E	kg	-	-	-	-	-	-	475
F	kg	-	-	-	-	-	-	488

THAEBY-THAESY 4240÷4340 with the **TANK&PUMP accessory**

Weight		4240	4270	4310	4340
(*)	kg	2810	2890	3055	3070
(**)	kg	3520	3600	3760	3780
Support (**)					
A	kg	765	774	798	805
B	kg	676	691	723	726
C	kg	523	539	573	574
D	kg	414	430	459	459
E	kg	535	549	574	577
F	kg	607	616	633	639

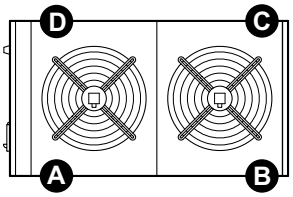
(*) Weight of the unit when empty

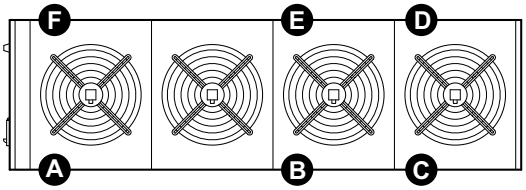
(**) Weight of the units including the water present in the tank

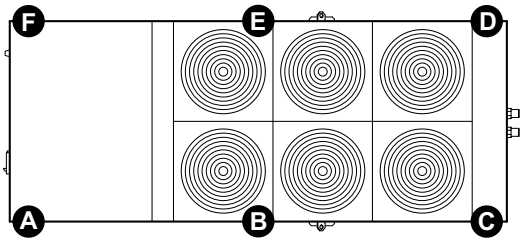
Note: The THAEBY-THAESY 2110÷2220 unit has a standard BCI accessory, while the weight of the THAEBY 4240÷4340 includes the INS accessory (standard with THAESY models)

Weight of the accessory INS = 40 Kg

Note: Contact Üntes Inc. for the weights of the units with the STE accessory (Shell&Tube Evaporator).







TCAETY 2110÷2220

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1090	1100	1110	1130	1280	1300	1320
Support								
A	kg	340	343	345	348	225	226	227
B	kg	348	353	357	365	270	274	277
C	kg	223	226	229	235	294	301	307
D	kg	179	179	180	182	210	216	222
E	kg	-	-	-	-	164	166	170
F	kg	-	-	-	-	117	117	118

TCAETY 4240÷4340

Weight		4240	4270	4310	4340
(*)	kg	2290	2390	2520	2640
Support					
A	kg	569	585	618	641
B	kg	368	386	408	428
C	kg	206	222	233	249
D	kg	216	232	242	258
E	kg	370	388	409	430
F	kg	561	577	610	633

TCAETY 2110÷2220 with accessory **PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1220	1240	1240	1260	1420	1440	1460
Support								
A	kg	348	354	353	356	223	223	224
B	kg	366	373	374	381	279	282	285
C	kg	275	280	280	287	317	324	330
D	kg	231	233	233	235	255	262	268
E	kg	-	-	-	-	201	204	208
F	kg	-	-	-	-	144	145	146

TCAETY 4240÷4340 with accessory **PUMP**

Weight		4240	4270	4310	4340
(*)	kg	2490	2590	2770	2880
Support					
A	kg	573	590	623	644
B	kg	419	437	471	490
C	kg	285	301	331	346
D	kg	274	290	315	330
E	kg	397	414	444	463
F	kg	542	557	587	607

TCAETY 2110÷2220 with accessory **TANK&PUMP**

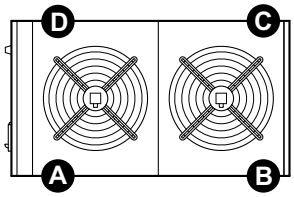
Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1310	1330	1330	1350	1550	1570	1590
(**)	kg	1610	1630	1635	1660	2110	2120	2140
Support (**)								
A	kg	477	482	482	487	394	394	394
B	kg	328	336	338	346	350	352	354
C	kg	332	337	339	347	239	244	249
D	kg	473	475	475	480	282	285	292
E	kg	-	-	-	-	400	401	405
F	kg	-	-	-	-	445	444	446

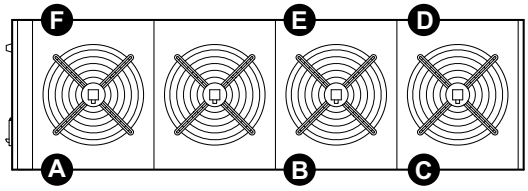
TCAETY 4240÷4340 with accessory **TANK&PUMP**

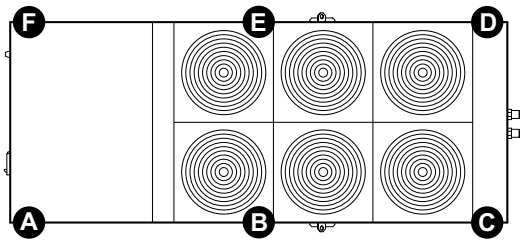
Weight		4240	4270	4310	4340
(*)	kg	2680	2780	2950	3060
(**)	kg	3390	3480	3660	3770
Support (**)					
A	kg	740	753	767	788
B	kg	640	656	693	711
C	kg	517	532	579	595
D	kg	410	425	467	483
E	kg	500	516	547	566
F	kg	583	597	606	627

(*)	Weight of the unit when empty
(**)	Weight of the units including the water present in the tank
	Weight of the accessory BCI = 120 Kg
	Weight of the accessory BCI60 = 160 Kg
	Weight of the accessory INS = 40 Kg
	Weight of the accessory INS60 = 130 Kg

Note: Contact Üntes Inc. for the weights of the units with the STE accessory (Shell&Tube Evaporator).







TCAEQY 2110÷2220

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1250	1260	1270	1290	1440	1460	1480
Support								
A	kg	380	383	385	388	245	246	247
B	kg	388	393	397	405	300	304	307
C	kg	263	266	269	275	324	331	337
D	kg	219	219	220	222	240	246	252
E	kg	-	-	-	-	194	196	200
F	kg	-	-	-	-	137	137	138

TCAEQY 4240÷4340

Weight		4240	4270	4310	4340
(*)	kg	2420	2520	2650	2770
Support					
A	kg	599	615	648	671
B	kg	403	421	443	463
C	kg	206	222	233	249
D	kg	216	232	242	258
E	kg	405	423	444	465
F	kg	591	607	640	663

TCAEQY 2110÷2220 with accessory **PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1380	1400	1400	1420	1580	1600	1620
Support								
A	kg	388	394	393	396	243	243	244
B	kg	406	413	414	421	309	312	315
C	kg	315	320	320	327	347	354	360
D	kg	271	273	273	275	285	292	298
E	kg	-	-	-	-	231	234	238
F	kg	-	-	-	-	164	165	166

TCAEQY 4240÷4340 with accessory **PUMP**

Weight		4240	4270	4310	4340
(*)	kg	2620	2720	2900	3010
Support					
A	kg	603	620	653	674
B	kg	454	472	506	525
C	kg	285	301	331	346
D	kg	274	290	315	330
E	kg	432	449	479	498
F	kg	572	587	617	637

TCAEQY 2110÷2220 with accessory **TANK&PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1470	1490	1490	1510	1710	1730	1750
(**)	kg	1770	1790	1795	1820	2270	2280	2300
Support (**)								
A	kg	517	522	522	527	414	414	414
B	kg	368	376	378	386	380	382	384
C	kg	372	377	379	387	269	274	279
D	kg	513	515	515	520	312	315	322
E	kg	-	-	-	-	430	431	435
F	kg	-	-	-	-	465	464	466

TCAEQY 4240÷4340 with accessory **TANK&PUMP**

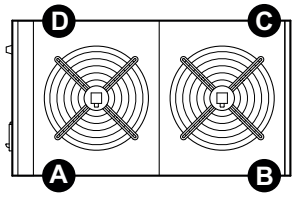
Weight		4240	4270	4310	4340
(*)	kg	2810	2910	3080	3190
(**)	kg	3520	3610	3790	3900
Support (**)					
A	kg	770	783	797	818
B	kg	675	691	728	746
C	kg	517	532	579	595
D	kg	410	425	467	483
E	kg	535	551	582	601
F	kg	613	627	636	657

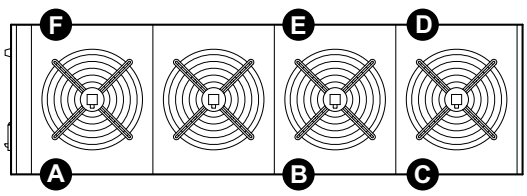
(*) Weight of the unit when empty

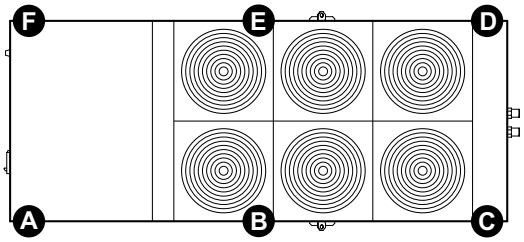
(**) Weight of the units including the water present in the tank

Note: The TCAEQY 2110÷2220 unit has a standard BCI60 accessory, while the TCAEQY 4240÷4340 unit has a standard INS60 accessory.

Note: Contact Üntes Inc. for the weights of the units with the STE accessory (Shell&Tube Evaporator).







THAETY 2110÷2220

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1380	1410	1420	1500	1670	1690	1780
Support								
A	kg	400	407	410	428	273	211	284
B	kg	445	451	454	477	338	292	357
C	kg	310	316	319	341	383	363	408
D	kg	225	236	237	254	293	349	318
E	kg	-	-	-	-	225	276	244
F	kg	-	-	-	-	158	199	169

THAETY 4240÷4340

Weight		4240	4270	4310	4340
(*)	kg	2470	2570	2720	2840
Support					
A	kg	616	632	672	695
B	kg	399	416	441	462
C	kg	220	237	247	263
D	kg	230	246	256	272
E	kg	400	417	442	463
F	kg	606	622	662	685

THAETY 2110÷2220 with accessory **PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1520	1550	1560	1640	1810	1830	1920
Support								
A	kg	412	417	419	437	268	268	279
B	kg	458	471	475	496	346	350	364
C	kg	361	371	374	396	406	414	431
D	kg	289	290	292	311	340	347	366
E	kg	-	-	-	-	264	266	283
F	kg	-	-	-	-	186	185	198

THAETY 4240÷4340 with accessory **PUMP**

Weight		4240	4270	4310	4340
(*)	kg	2670	2770	2970	3080
Support					
A	kg	620	636	676	697
B	kg	450	467	505	523
C	kg	300	316	346	360
D	kg	288	305	330	345
E	kg	427	444	476	496
F	kg	586	602	638	659

THAETY 2110÷2220 with accessory **TANK&PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1610	1520	1525	1610	1820	1840	1940
(**)	kg	1910	1940	1945	2030	2510	2520	2610
Support (**)								
A	kg	541	547	548	567	443	442	453
B	kg	418	432	435	457	418	420	435
C	kg	417	428	429	452	326	332	349
D	kg	533	534	534	554	365	371	388
E	kg	-	-	-	-	466	466	482
F	kg	-	-	-	-	492	489	502

THAETY 4240÷4340 with accessory **TANK&PUMP**

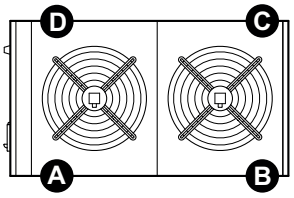
Weight		4240	4270	4310	4340
(*)	kg	2870	2970	3150	3270
(**)	kg	3570	3670	3860	3970
Support (**)					
A	kg	786	801	820	841
B	kg	671	688	726	745
C	kg	533	549	596	610
D	kg	425	442	483	498
E	kg	529	547	580	599
F	kg	626	643	656	678

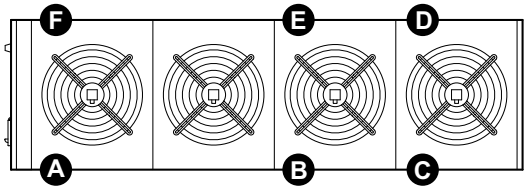
(*)	Weight of the unit when empty
(**)	Weight of the units including the water present in the tank

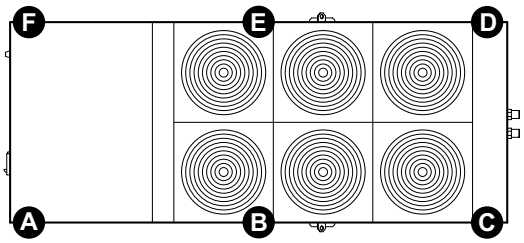
Note: In the THAETY 2110÷2220 units the BCI accessory is standards

Weight of the accessory BCI = 120 Kg
Weight of the accessory BCI60 = 160 Kg
Weight of the accessory INS = 40 Kg
Weight of the accessory INS60 = 130 Kg

Note: Contact Üntes Inc. for the weights of the units with the STE accessory (Shell&Tube Evaporator).







THAEQY 2110÷2220

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1420	1450	1460	1540	1710	1730	1820
Support								
A	kg	410	417	420	438	273	211	284
B	kg	455	461	464	487	348	302	367
C	kg	320	326	329	351	393	373	418
D	kg	235	246	247	264	303	359	328
E	kg	-	-	-	-	235	286	254
F	kg	-	-	-	-	158	199	169

THAEQY 4240÷4340

Weight		4240	4270	4310	4340
(*)	kg	2600	2700	2850	2970
Support					
A	kg	646	662	702	725
B	kg	434	451	476	497
C	kg	220	237	247	263
D	kg	230	246	256	272
E	kg	435	452	477	498
F	kg	636	652	692	715

THAEQY 2110÷2220 with accessory **PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1560	1590	1600	1680	1850	1870	1960
Support								
A	kg	422	427	429	447	268	268	279
B	kg	468	481	485	506	356	360	374
C	kg	371	381	384	406	416	424	441
D	kg	299	300	302	321	350	357	376
E	kg	-	-	-	-	274	276	293
F	kg	-	-	-	-	186	185	198

THAEQY 4240÷4340 with accessory **PUMP**

Weight		4240	4270	4310	4340
(*)	kg	2800	2900	3100	3210
Support					
A	kg	650	666	706	727
B	kg	485	502	540	558
C	kg	300	316	346	360
D	kg	288	305	330	345
E	kg	462	479	511	531
F	kg	616	632	668	689

THAEQY 2110÷2220 with accessory **TANK&PUMP**

Weight		2110	2120	2140	2150	2170	2200	2220
(*)	kg	1650	1680	1685	1770	1980	2000	2100
(**)	kg	1950	1980	1985	2070	2550	2560	2650
Support (**)								
A	kg	551	557	558	577	443	442	453
B	kg	428	442	445	467	428	430	445
C	kg	427	438	439	462	336	342	359
D	kg	543	544	544	564	375	381	398
E	kg	-	-	-	-	476	476	492
F	kg	-	-	-	-	492	489	502

THAEQY 4240÷4340 with accessory **TANK&PUMP**

Weight		4240	4270	4310	4340
(*)	kg	3000	3100	3280	3400
(**)	kg	3700	3800	3990	4100
Support (**)					
A	kg	816	831	850	871
B	kg	706	723	761	780
C	kg	533	549	596	610
D	kg	425	442	483	498
E	kg	564	582	615	634
F	kg	656	673	686	708

(*) Weight of the unit when empty

(**) Weight of the units including the water present in the tank

Note: The THAEQY 2110÷2220 unit has a standard BCI60 accessory, while the THAEQY 4240÷4340 unit has a standard INS60 accessory.

Note: Contact Üntes Inc. for the weights of the units with the STE accessory (Shell&Tube Evaporator).

WATER CONNECTIONS

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 from time to time.

- The unit is designed for outdoor installation.
- The unit is provided with Victaulic type hydraulic connections on the water inlet and outlet of the air conditioning system.
- The unit should 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 mounts upon request (SAG/SAM).
- 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.
- The water flow through the heat exchanger must respect the MAXIMUM/MINIMUM values indicated in the *"Operating limits"* section.
- Correct installation and positioning includes 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 size of the expansion tank must be calculated by the installer depending on the system. In the case of models without a pump, the pump must be installed with a flow 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.

Installation and management of utility pump outside of unit

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 user pump operation must be subordinated to the machine operation; the microprocessor controller runs the control and management of the pump according to the following logic: upon the machine ignition command, the first device to start in the system is the pump, which has priority over the rest of the system. 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. After this time, the definitive consent to start the machine is given. The pump keeps on working all the time the unit is in operation, 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
See also section attachment **“hydraulic circuits”**.

Minimum hydraulic circuit contents

For proper unit operation, a minimum amount of water must be ensured in the hydraulic 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 storage tank, and install an additional tank if necessary. However, it is always recommended to use a storage tank with greater system water content in process applications to guarantee high system thermal inertia.

The minimum water content of the circuit is 2 l/kW

Example:

THAETY 4340 QT = **353** kW

If the unit envisages control with the AdaptativeFunction Plus function, the minimum system content must have:

QT (kW) x 2 l/kW = **353** kW x 2 l/kW = **706** l

Model TCAEY B-S		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Hydraulic technical data												
Expansion tank capacity	l	12	12	12	12	12	12	24	24	24	24	24
Expansion tank pre-load	barg	2	2	2	2	2	2	2	2	2	2	2
Expansion vessel maximum pressure	barg	10	10	10	10	10	10	10	10	10	10	10
safety valve	barg	6	6	6	6	6	6	6	6	6	6	6
Water contents												
Plate heat exchangers	l	7	7	8	9	10	11,5	13,5	20,5	20,5	26,5	26,5
Tube and shell heat exchangers (STE accessory)	l	36	36	36	50	50	51	51	70	70	70	88
Tank water content (ASP1/ASP2)	l	300	300	300	300	300	300	550	550	550	700	700

Model THAEY B-S		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Hydraulic technical data												
Expansion tank capacity	l	12	12	12	12	12	12	24	24	24	24	24
Expansion tank pre-load	barg	2	2	2	2	2	2	2	2	2	2	2
Expansion vessel maximum pressure	barg	10	10	10	10	10	10	10	10	10	10	10
safety valve	barg	6	6	6	6	6	6	6	6	6	6	6
Water contents												
Plate heat exchangers	l	7	7	8	9	10	11,5	13,5	20,5	20,5	26,5	26,5
Tube and shell heat exchangers (STE accessory)	l	61	61	61	63	63	94	94	117	117	117	143
Tank water content (ASP1/ASP2)	l	300	300	300	300	300	300	550	700	700	700	700

Model TCAEY T-Q		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Hydraulic technical data												
Expansion tank capacity	l	12	12	12	12	24	24	24	24	24	24	24
Expansion tank pre-load	barg	2	2	2	2	2	2	2	2	2	2	2
Expansion vessel maximum pressure	barg	10	10	10	10	10	10	10	10	10	10	10
safety valve	barg	6	6	6	6	6	6	6	6	6	6	6
Water contents												
Plate heat exchangers	l	8	9	10	11,5	13,5	15	17,5	26,5	32	32	39
Tube and shell heat exchangers (STE accessory)	l	41	41	50	50	51	51	70	70	70	88	88
Tank water content (ASP1/ASP2)	l	300	300	300	300	550	550	550	700	700	700	700

Model THAEY T-Q		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Hydraulic technical data												
Expansion tank capacity	l	12	12	12	12	24	24	24	24	24	24	24
Expansion tank pre-load	barg	2	2	2	2	2	2	2	2	2	2	2
Expansion vessel maximum pressure	barg	10	10	10	10	10	10	10	10	10	10	10
safety valve	barg	6	6	6	6	6	6	6	6	6	6	6
Water contents												
Plate heat exchangers	l	8	9	10	11,5	13,5	15	17,5	26,5	32	32	39
Tube and shell heat exchangers (STE accessory)	l	58	58	63	63	94	94	117	117	117	143	143
Tank water content (ASP1/ASP2)	l	300	300	300	300	550	550	550	700	700	700	700

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 heat-exchanger from freezing by tripping the antifreeze alarm which stops the machine if the temperature of probe fitted on the heat-exchanger reaches the set point value.

IMPORTANT!

When the unit is out of service, drain all the water 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.

- 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 functioning 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 air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.
- For different functioning conditions, the same coefficients can be used as their variations are negligible.
- The resistance of the water side primary and secondary heat exchanger (RA accessory), the storage tank (RAS accessory) and the electric pump unit (RAE-RAR accessory), prevents undesired effects due to freezing during the operating breaks in winter (provided the unit remains powered).

Table "H"

Design air temperature in °C	2	0	-3	-6	-10	-15	-20
% glycol in weight	10	15	20	25	30	35	40
Freezing temperature °C	-5	-7	-10	-13	-16	-20	-25
fc G	1.025	1.039	1.054	1.072	1.093	1.116	1.140
fc Δpw	1.085	1.128	1.191	1.255	1.319	1.383	1.468
fc QF	0.975	0.967	0.963	0.956	0.948	0.944	0.937
fc P	0.993	0.991	0.990	0.988	0.986	0.983	0.981

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

Use of anti-freeze solutions with the BT accessory

The table provides the percentage of ethylene/propylene glycol to be used in units with the BT accessory, according to the temperature of the chilled water produced. Use the ÜNTES *UpToDate* Software for unit performance.

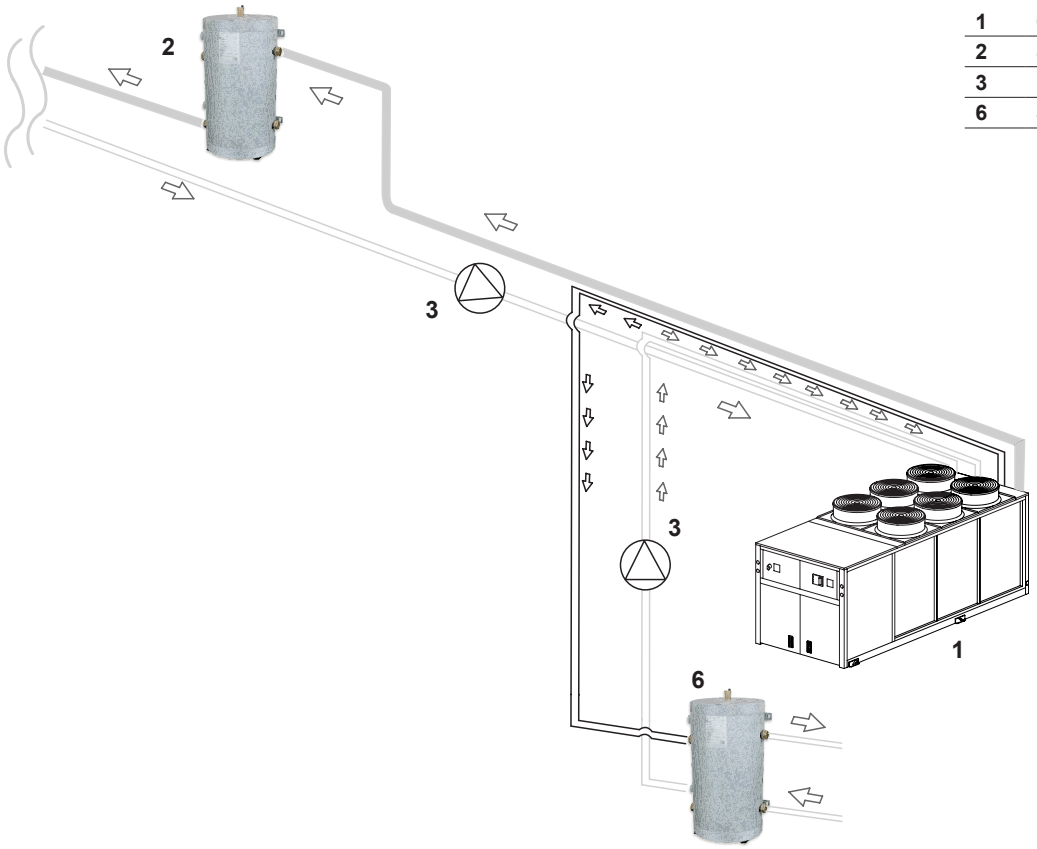
Evaporator glycol water outlet temperature	Minimum % glycol in weight	Minimum % glycol in weight
From -7,1°C a -8°C	33	34
From -6,1°C to -7°C	32	33
From -5,1°C to -6°C	30	32
From -4,1°C to -5°C	28	30
From -3,1°C to -4°C	26	28
From -2,1°C to -3°C	24	26
From -1,1°C to -2°C	22	24
From -0,1°C to -1°C	20	22
From 0,9°C a 0°C	20	20
From 1,9°C to 1°C	18	18
From 2,9°C a 2°C	15	15
From 3,9°C to 3°C	12	12
From 4,9°C to 4°C	10	10

Applications for partial (DS) and total (RC100) recovery and DHW production

Overview
Condensation heat in a chiller is usually disposed of in the air; it can be recovered intelligently by means of heat recovery, which may be partial (DS) or total (RC100). With summer operation, a reduced value equivalent to the desuperheating of gas is recovered in the first phase, while the second phase recovers all the condensation heat that would otherwise be lost.

In the case of a reversible heat pump, partial recovery (DS) and total recovery (RC100) can also run in winter mode. In the former case, the partial recovery (DS) deducts a rate from the heat production in the main heat exchanger, whereas, in the latter case of total recovery, the heat production is an alternative to that of the main heat exchanger.

Below is indicative information. The provided diagrams are not complete and are used only to provide guidelines that allow a better use of the unit.



1	Chiller or Heat pump
2	System user side storage tank
3	Pump
6	System recovery side storage tank

1. Chiller or heat pump set-up with DS or RC100

Chiller

With this type of system, the main hydraulic circuit of the chiller is connected to the user and produces cold water for air conditioning. The unit can be set-up as a pump or pump and storage tank as alternative to the traditional solution seen installed in the system. The desuperheater (DS), with which the machine can be supplied, will be connected by means of a technical water storage tank and external pump for DHW or to the system to produce hot water for the post-heating coils of the CTA or other applications. RC100 total recovery, as an alternative to DS, can be used in the same applications, however, the amount of heat produced is significantly higher and, at the same time, the heat level of the water produced is lower.

Heat pump with partial recovery (DS) - 2-Pipe+DHW system

Should the unit be a reversible heat pump, summer operation is the same as the aforementioned situation of the chiller. Instead, with winter operation, the user has DHW produced from the heat pump. If the unit is equipped with a DS desuperheater, this can be also active in winter mode. However, in this case, this value is deducted from the portion of heat from the hot water produced from the main heat exchanger.

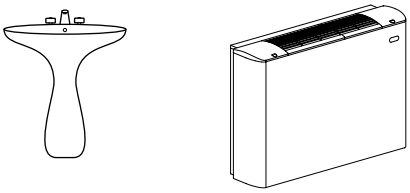
Heat pump with total recovery (RC100) - 2-Pipe+DHW system

If the unit is a reversible heat pump fitted with total recovery (RC100), the behaviour is identical to a Polyvalent 2-pipe unit with specific application in 2-pipe+DHW systems. If the system has 4-pipes, refer to the ranges of the EXP polyvalent units.
The air conditioning and the production of domestic hot water in a 2-pipe system is a typical application in hotels, hospitals, gyms and hospitality structures in general.

The 2-pipe+DHW systems provide summer mode with the production of chilled water and/or simultaneous or separate production of hot water from the heat recovery unit. In winter, however, the demand is for hot water production from the main heat exchanger and alternatively (assigning appropriate priority) from the recovery exchanger.

The unit can run in two modes:
- **AUTOMATIC**: the system allows total recovery of the condensation heat and/or the production of chilled water (summer season)
- **SELECT**: this allows the production of hot water to the recovery heat exchanger or from the main one (winter season)

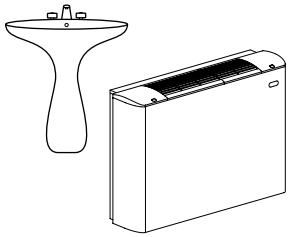
Summer season "AUTOMATIC"



Domestic
Hot water

Air Conditioning
Cold water

Winter season "SELECT"



Domestic or Air Conditioning
Hot water

Competitive advantages

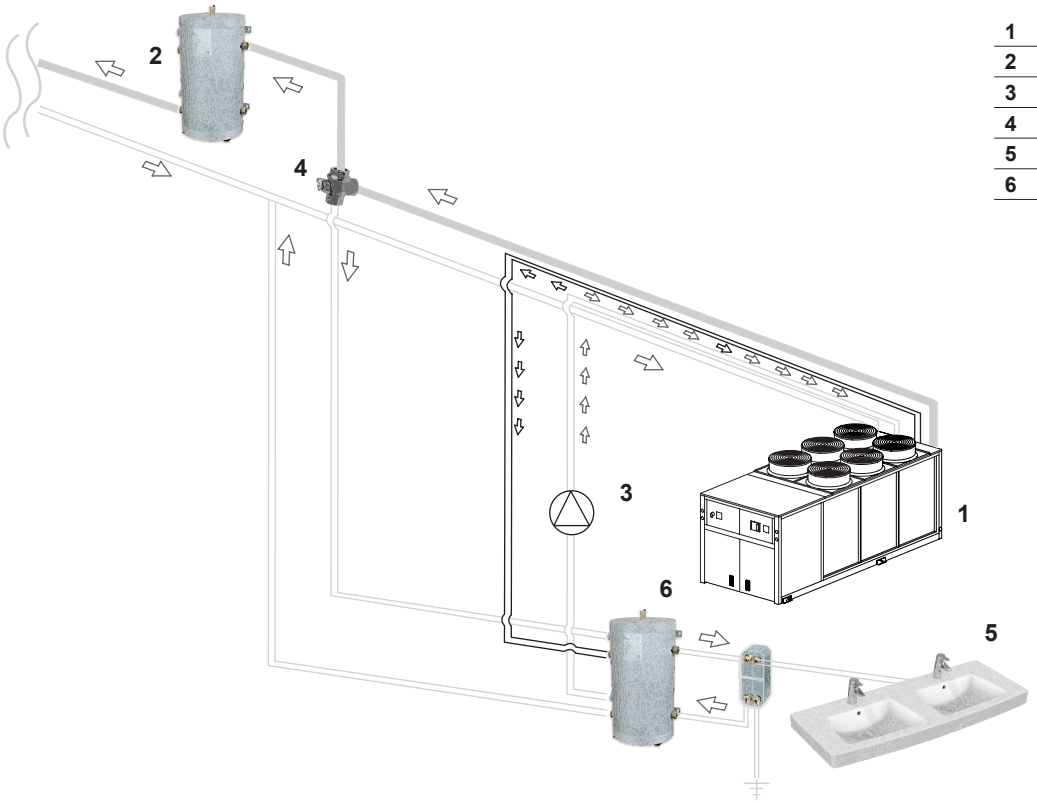
The heat pump unit with total recovery, defined as 2-pipe Polyvalent, fulfils the simultaneous or separate request for hot and cold water with one single unit, thereby optimising energy consumption and simplifying management in the 2-pipe+DHW systems.
- Its natural application and as a valid alternative in all conventional systems that require a chiller or heat pump with the use or integration of a boiler.
- The advantages are due to a single unit being used, the economic saving due to the high COP (operating with heat recovery in summer mode), the non-use of combustible products that are harmful to the ozone so as to be defined as an ecological polyvalent unit.
- Fourth generation polyvalent versatile heat pump, which unlike other polyvalent units meets the typical demand in 2-pipe systems with a single unit and in a completely flexible way.
- It is therefore offered on the market as the unit that guarantees fundamental aspects such as EFFICIENCY, RELIABILITY AND VERSATILITY.

1.1 Activation and deactivation of DS and RC100

The units set up with DS desuperheater or total recovery RC100 can activate the thermal recovery by means of an external digital input (e.g. the KTRD accessory).

Moreover, the criterion to stop the thermal recovery can be established from the panel:
- for digital contact: if the consensus is interrupted, the thermal recovery stops as well. This mode meets the requirement to carry out a temperature control system of the storage tank connected to the recovery;
- for maximum return temperature: the said limit is set from the panel on the machine or from the remote keyboard (KTR accessory). The recovery keeps operating until the return temperature is lower than the configured set point. This mode is suitable for maximising the use of the thermal recovery.

2. Set-up of a 3-way heat pump (VEDEV) and domestic hot water production (DHW) and possibly a desuperheater (DS) at the same time



1	Heat pump
2	System user side storage tank
3	Pump
4	3-way valve (VDEV)
5	User-DHW
6	System recovery side storage tank

With this type of system, the main circuit of the heat pump produces DHW (winter season) or DCW (summer season) for the user. The unit can be set-up as a pump or pump and storage tank as alternative to the traditional solution seen installed in the system. For the production of DHW by using the heat pump, use a technical water storage tank, which cannot be used directly for human consumption, and combine it to a DHW producer/intermediate heat exchanger.

Should a 3-way valve system (VDEV) be envisaged , it can manage production of hot water to the DHW circuit in both the summer and winter seasons. In fact, the valve enables water flow deviation from the system to the technical water storage tank for the system to produce DHW for domestic use.

The desuperheater, with which the machine can be fitted, must be connected to the same technical water storage tank for the DHW production system , and is able to keep the heat storage tank level high. This way, the system allows maximum service continuity to the DHW and system, regardless of the operation mode (summer or winter).

2.1 Priority management and domestic hot water DHW request (3-way switch-over valve VDEV and activation of any DS)

How to manage the DHW request:

- by means of the discrete input: the request is assigned by a thermostat (e.g. via a KTRD accessory). When the thermostat closes, the unit understands that there is a DHW request and, once the conditions have been verified, the procedure is activated to meet the DHW requirements;
- by means of a temperature probe in the storage tank: a temperature probe is placed inside the storage tank, which is directly connected to the unit's board. The required set point can be configured from the panel together with the relative activation differential. In this case, the probe must be accurately positioned and the maximum distance allowed respected due to the type of probes used.

Type of probe:

description	type of probe	features	β (25/85)
NTC150	NTC HT150	50kΩ@25°C	3977 (±1%)
NTC	NTC	10kΩ@25°C	3435 (±1%)

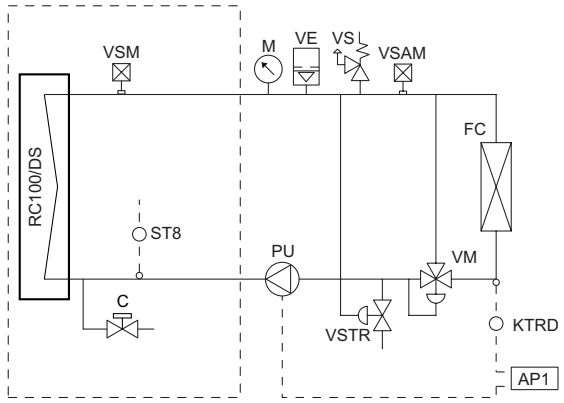
System suggestions

IMPORTANT!

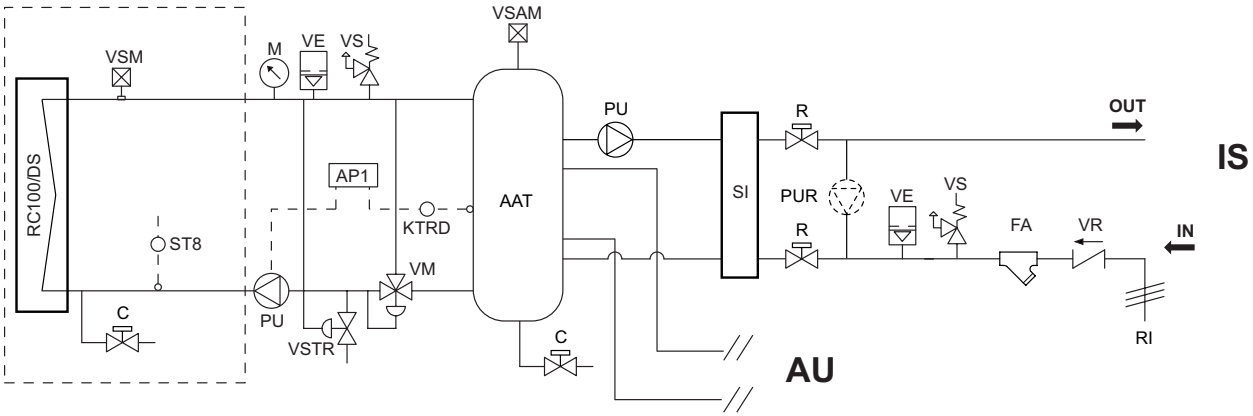
The type of system described below could lead to lime scale forming in the water/refrigerant heat exchanger. We therefore recommend taking suitable steps to limit this phenomenon. When operating as a heat pump, it is advisable to drain the recovery circuit.

Pay particular attention to the operating pressure of the system that must not exceed the plate values on the individual components and must be such to avoid the boiling of the water contained in the recovery unit.
Also ensure, through mixing units, the continuous circulation of water through the heat recovery unit or desuperheater.

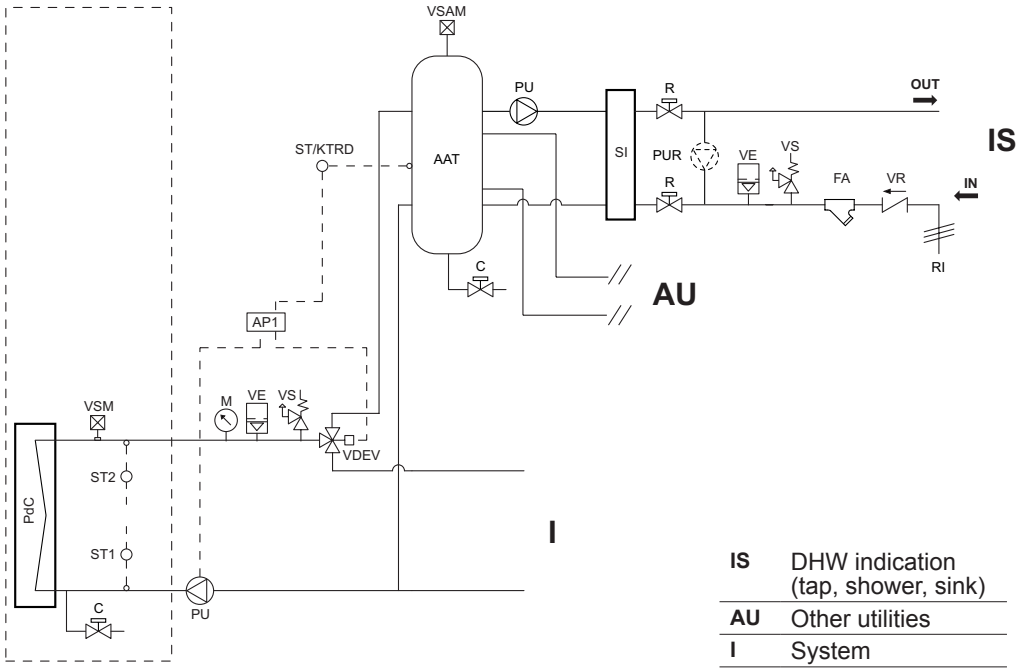
Closed circuit system (for heating, for example)



Open circuit system (for hot water, for example)

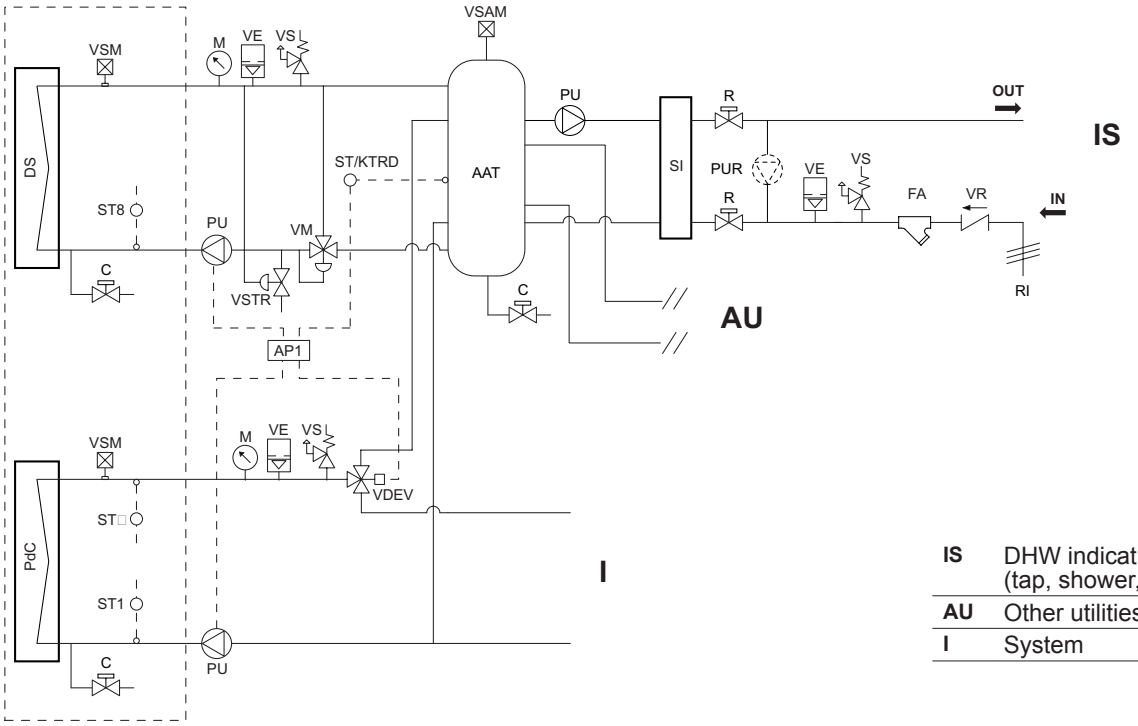


Open circuit system and simultaneous presence of 3-way diverter valve VDEV (for example for domestic hot water)



IS	DHW indication (tap, shower, sink)
AU	Other utilities
I	System

Open circuit system and simultaneous presence of 3-way diverter valve VDEV and DS desuperheater (for example for domestic hot water)



IS	DHW indication (tap, shower, sink)
AU	Other utilities
I	System

PdC	Reversible heat pump unit
RC100	Recovery unit
DS	Desuperheater
M	Manometer
VS	safety valve
VE	Expansion vessel
VSTR	Recovery heat drain valve
VMS	Manual air bleed valve
VSAM	Automatic/manual air bleed valve
AP1	Unit board
VR	Check Valve
VM	3-way mixing valve
PU	Circulation pump
VDEV	3-way diverter valve
R	Cock

PUR	Recirculation loop circulation pump
FC	Fan coil/utility
UT	For use
RI	From the water mains
ST	Temperature probe
YES	Intermediate heat exchanger
ST8	RC100/DS inlet temperature probe
AAT	Technical water storage tank
C	Water drain/charge cock
ST	Temperature probe
KTRD	Thermostat with display (accessory)
FA	Water filter
ST1	Main heat exchanger inlet temperature probe
ST2	Main heat exchanger outlet temperature probe

NOTA BENE: for the unit to operate properly, activation of the DC/RC100 recovery pump must be controlled by means of a specific discrete output provided in the board on the unit.

The minimum temperature of the water input to the recovery unit RC100 is equal to 20°C.
The minimum temperature of the water input to the recovery unit DS is equal to 40°C.

FNR accessory - Forced Noise Reduction

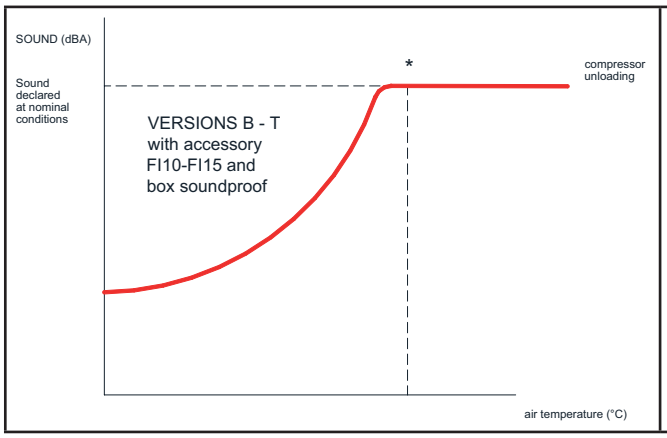
The FNR accessory allows a variable acoustic layout of the unit, managing the silence in chiller mode according to the specific user needs. The accessory is available for TCAEBY-TCAETY chillers and for THAEBY-THAETY reversible heat pumps, adequately fitted with some accessories described in the table below.

WinPACK SE range of heat pumps and chillers	Mandatory ACCESSORY	Mandatory ACCESSORY for soundproofing compressors	Mandatory ACCESSORY to adjust the fan speed
TCAEBY 2110÷4270	FNR	BCI	FI10 or FI15
TCAEBY 4310÷4340	FNR	INS	FI10 or FI15
THAEBY 2110÷2220	FNR	-	FI10 or FI15
THAEBY 4240÷4340	FNR	INS	FI10 or FI15

WinPACK HE-A range of heat pumps and chillers	Mandatory ACCESSORY	Mandatory ACCESSORY for soundproofing compressors	Mandatory ACCESSORY to adjust the fan speed
TCAETY 2110÷2220	FNR	BCI60	FI15
TCAETY 4240÷4340	FNR	INS60	FI15
THAETY 2110÷2220	FNR	BCI60	FI15
THAETY 4240÷4340	FNR	INS60	FI15

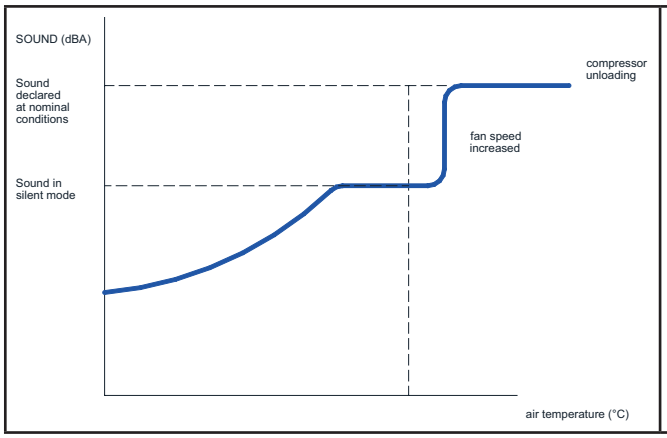
The silence of the unit is managed according to 3 modes that can be selected by actuating the control panel on the machine, using digital inputs and/or programming time bands.

1. Unit operation with standard logic (B-T version) but with better "soundproofing"



(*) Performance and noise declared at the nominal operating conditions (water in/out 12/7°C and air temperature 35°C)

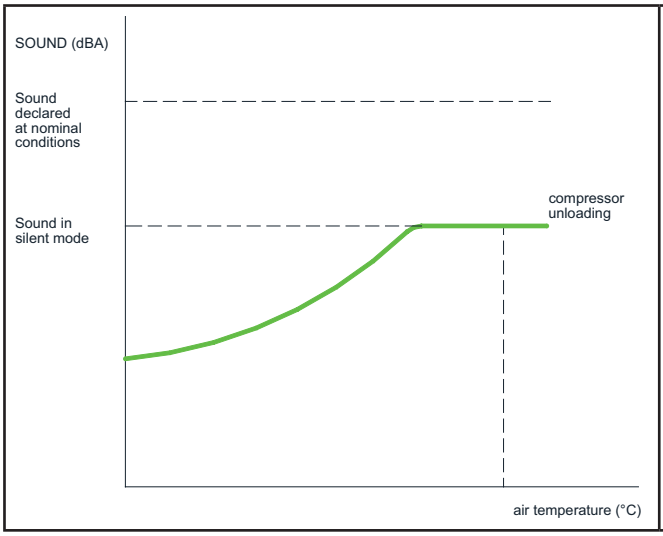
2. Request to reduce noise at certain times of the day, night, etc. maintaining the "guaranteed supplied power" priority



The TCAEBY-THAEBY units work in silence with performance and operating limits of TCAESY-THAESY, respectively. For outdoor air temperatures exceeding the operating limits (refer to the section of the operating limits for more details), the units lose silence and guarantee the functions of the respective TCAEBY-THAEBY

Units TCAETY-THAETY work in super-silenced mode with the performance and operating limits of the respective TCAEQY-THAEQY. For outdoor air temperatures exceeding the operating limits (refer to the section of the operating limits for more details), the units lose silence and guarantee the functions of the respective TCAETY-THAETY.

1. Request to reduce noise at certain times of the day, night, etc. maintaining the "guaranteed max noise" priority



Units TCAEBY-THAEBY work in the silenced mode with the performance and operating limits (refer to the section of the operating limits for more details) of the respective TCAESY-THAESY, guaranteeing silence throughout their working range

Units TCAETY-THAETY work in the super-silenced mode with the performance and operating limits (refer to the section of the operating limits for more details) of the respective TCAEQY-THAEQY, guaranteeing silence throughout their working range

EEM accessory - Energy Meter

The EEM accessory allows certain unit features, such as those below, to be measured and displayed:

- Power supply voltage and instantaneous current consumption of the unit
- Instantaneous electric power consumed by the unit
- Instantaneous power factor of the unit
- Electricity consumption (kWh)

If the unit is connected via a serial network to a BMS or external supervisory system, the trends of the measured parameters can be stored and the operating status of the unit itself checked.

Attention: in order to use the EEM accessory, the unit must be powered with 400V-**3ph + N** - 50Hz

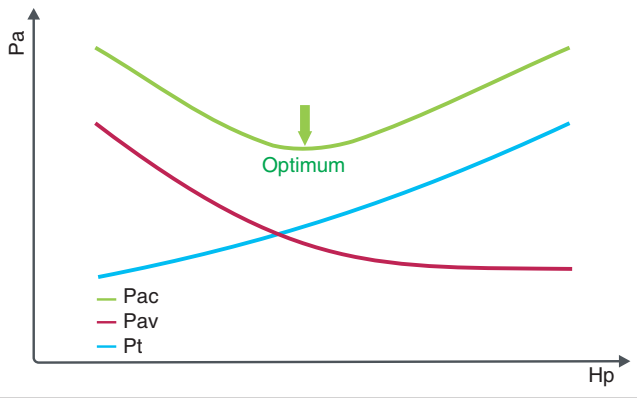
FDL accessory - Forced download compressors

The FDL accessory (forced reduction of the power consumed by the unit) allows power consumption to be restricted according to the utility requirements. The function, which can be set from the unit display, can be enabled via a digital signal, using time bands or as an input in the case of a serial connection with an external BMS via Modbus.

In the presence of the EEM accessory, which allows the power consumed to be instantaneously measured, a specific maximum consumed power value can be set and any utility requirement complied with.

EEO accessory – Energy Efficiency Optimizer

The EEO accessory allows the unit efficiency to be optimised by acting on the electrical absorption, thereby minimising consumption. The EEO accessory identifies the optimal point that minimises the total absorbed power (compressors+fans) of the unit by actuating the fan rotation speed. It is particularly effective in the partial load operation, a situation which arises for most of the useful life of the chiller. The energy efficiency index ESEER therefore, increases up to 5%.



Pac - Compressor consumed power

Pav - Fan consumed power

Pt - Total power consumed

Pa - Consumed power

Hp - Condensation pressure

The EEO accessory is available for chillers and heat pumps fitted with the condensation control accessory, with the EEM accessory (energy efficiency meter) and EEV (electronic expansion valve) according to the following table:

WinPACK SE range of heat pumps and chillers	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory
TCAEBY 2110÷4340 THAEBY 2110÷4340	EEO	EEM	EEV	FI10 or FI15

WinPACK SE range of heat pumps and chillers	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory
TCAESY 2110÷4340 THAESY 2110÷4340	EEO	EEM	EEV	-

WinPACK HE-A range of heat pumps and chillers	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory
TCAETY 2110÷4340 THAETY 2110÷4340	EEO	EEM	-	FI10 or FI15

WinPACK HE-A range of heat pumps and chillers	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory	ACCESSORY Mandatory
TCAEQY 2110÷4340 THAEQY 2110÷4340	EEO	EEM	-	-

RIS accessory - Additional storage tank resistances

The RIS accessory consists of adequately sized integrative resistances applied in the storage tank and an antifreeze resistance.

The control logic, implemented by Üntes, involves the activation of the resistances by means of an outdoor air temperature value and according to the hot water set-point set in two STEPS described below in the table.

Primarily, if the air T is between -5 and -1°C, the first step is initiated, whereas, if the air T is between -1 and -10°C, the second step is initiated. The resistances continue to work until the set hot water set-point is reached or if the defrost function is activated (to guarantee environmental comfort).

Note: the user is responsible for the supply to the electric resistances, by means of electrical wiring in the Electrical panel (IP55) outside the resistances.

WinPACK SE range	THAEBY-THAESY	
RANGE	STEP 1	STEP 2
2110-2120-2140	12 Kw	36 Kw
2150-2170-2200	24 Kw	48 Kw
2220	24 Kw	54 Kw
4240-4270-4310-4340	30 Kw	60 Kw

WinPACK HE-A range	THAETY-THAEQY	
RANGE	STEP 1	STEP 2
2110-2120-2140	12 Kw	36 Kw
2150	24 Kw	48 Kw
2170-2200-2220	24 Kw	54 Kw
4240-4270-4310-4340	30 Kw	60 Kw

VPF accessory – Variable primary Flow

The energy used for the cooling unit to work is an important component in the system costs, and reducing the unit consumption, especially with partial load, is sometimes compromised by the pump unit operating constantly. The larger the size of the pumps used to maintain the proper flow of water in the pipes the more this effect is noticed.

A solution that compensates for the problem of the energy absorbed by the pump units is using pumps driven by inverter technology, able to modulate the flow rate G and reduce power consumption. This is how the systems with constant primary flow and secondary decoupled variable flow exist.

The introduction of the VPF system simplifies the systems, using a single primary variable flow circuit, in which inverter controlled pumps are installed as the only pumps in the system; this solution generates complications related to the calibration, sizing of the venting section and system setting, which burden the client and indirectly could affect the reliability of the machine.

The solution proposed by Üntes combines the simplification of the VPF system, the reliability of the system solution with primary-**secondary variable flow** circuits and the additional energy and cost savings derived from managing **the primary with variable flow** where energy saving depends on the variation in flow rate ΔPa=f(ΔG).

The water content in the primary circuit is very important as it stabilises system operation, the water temperature to the system and the reliability of the cooling unit in time. The chiller is managed with Adaptive function plus logic enabled in Economy; it is set up to be connected to an external inertial buffer tank with a recommended minimum content of 5 l/kw.

The cooling unit is fitted with primary side pumps with inverter adjustment and there is also the possibility of setting it up with system side pumps, with inverter control, directly on the unit or alternatively, to control them if the client makes a different choice.

In addition to significant energy savings, the solution with VPF technology by ÜNTES also allows the design of the system's hydraulic circuit to be simpli- fied and the operating costs to be decreased.

The Üntes solution offered for variable flow systems is innovative for several reasons:

1. Stable flow rate modulation required by the system with guaranteed reliability for the chiller installed (even with system flow rate oscillation). The flow rate can be modulated up to 20% by using pumps with an EC-type of motor.

2. Simplified system calibration and probe positioning that controls the system side pumps, a known element of complexity in traditional VPF systems. The probe is already installed in the machine, however, it can be installed remotely at a specific point of the system at the discretion of the installer.

3. Simplified design of the solutions to be applied to the terminals (balancing the number of 3-way and 2-way valves with adequate sizing of the venting section)

4. Maximising the efficiency of the cooling unit in each operating condition for the flow rate to be modulated on the system side following the route of the load, as well as on the primary side, thereby minimising the pumping energy required for it to operate correctly.

5. Possibility of simplified and reliable management of several units in parallel (the known problems related to flow variations in traditional VPF systems when the cooling units are connected/switched off are avoided)

Below is a basic diagram of the VPF solution by ÜNTES being used in the case of a single chiller

P/DP= single or double pump controlled by a variable frequency inverter (pumps installed and controlled with a 0-10V signal)

PI/DPI= single or double pump, controlled by a variable frequency inverter to service the system. The adjustment is implemented with flow rate modulation and can be supplied installed in the chiller (if possible). The pumps can be supplied by the user (with separate supply) and in this case, Üntes is in charge of their management via the analogue signal 0-10V.

TANK= tank outside the machine (is possible according to the model and configuration of the chiller)

V2=2-way adjustment valve

V3=2-way adjustment valve

∆**P=** differential pressure transducer

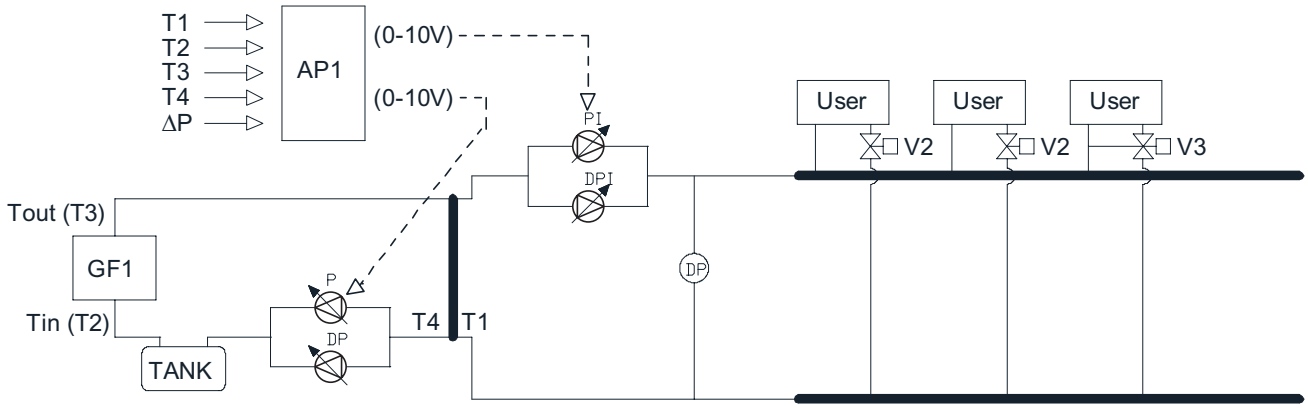
AP1=chiller controller

NOTES on the installation:

1. If a cooling unit with VPF technology is installed, an external tank must be installed to guarantee minimum water content of 5 l/kw on the primary side. At least 20% of the flow must be guaranteed on the system side by installing a minimum number of terminals fitted with 3-way valves V3

2. The probe to determine the ΔP pressure differential is installed in the chiller. The installer can set the probe remotely in the most appropriate point in the system. In the case of system side pumps outside the cooling unit, the probe must be positioned properly downstream of the pump unit

3. If several units are installed in hydraulic parallel, a shut-off valve must be installed for each unit. The system side pumps will be external to the cooling units and will be controlled by Üntes



ELECTRICAL CONNECTIONS

DANGER!
Install a general automatic switch with characteristic delayed curve, of adequate capacity and interruption power, in a protected area near the unit (the device must be able to interrupt the presumed short circuit current, whose value should be determined on the basis of the system characteristics). Earth connection is compulsory by law to ensure user safety while the machine is in use.

DANGER!
The electrical connection of the unit must be carried out by qualified personnel, in compliance with the regulations applicable in the country where the unit is installed.Non-conforming electrical connections releases Üntes Inc. from liability concerning damage to objects and persons. 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 burrs.

DANGER!
Check the tightness of the screws that secure the conductors to the electrical components on the board (vibrations during handling and transport could have caused them to come loose).

IMPORTANT!
For the electrical connections of the unit and accessories, refer to the relative wiring diagram.

Check the voltage and mains frequency, which should be within the limit of 400-3-50 ± 6%. Check the phase unbalance: it must be less than 2%.

Example:
L1-L2 = 388V, L2-L3 = 379V, L3-L1 = 377V
Average of values measured = (388+379+377) / 3 = 381V
Maximum deviation from the average = 388-381 = 7V
Unbalance = (7 / 381) x 100 = 1,83 % (acceptable as it is within the envisaged limit).

DANGER!
Operation outside the limits could affect correct machine operation.

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 power supply cables through the 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 power supply cable must be flexible with a polychloroprene sheath not lighter than H05RN-F: for the section, refer to the following table or wiring diagram.

Models		Line Section	PE section	Commands and controls section
2110	mm²	1 x 25	1 x 16	1,5
2120	mm²	1 x 35	1 x 16	1,5
2140	mm²	1 x 35	1 x 16	1,5
2150	mm²	1 x 50	1 x 25	1,5
2170	mm²	1 x 50	1 x 25	1,5
2200	mm²	1 x 70	1 x 35	1,5
2220	mm²	1 x 70	1 x 35	1,5
4240	mm²	1 x 95	1 x 50	1,5
4270	mm²	1 x 95	1 x 50	1,5
4310	mm²	1 x 120	1 x 70	1,5
4340	mm²	1 x 120	1 x 70	1,5

The earth conductor must be longer than the other conductors in order to ensure that if the cable fastening device should become loose, it will be the last to be stretched.

Remote management through connections prepared by the installer

The connections between board and switch or remote light must be made with shielded cable (make sure the shield is continuous throughout the length of the cable) consisting of 2 twisted 0.5 mm² wires and the shield. The shield must be connected to the earth screw on the panel (on one side only). The maximum distance allowed is 30 m.
Lay the cables far from the power cables or cables with a different voltage and cables that emit electromagnetic disturbance. Do not lay the cables close to equipment that could create electromagnetic interference.

SCR	Remote control selector (control with clean contact)
SEI	Summer/winter selector (control with potential free contact)
LBG	Machine general lock light (230 Vac)
LFC1	Circuit 1 functioning light (230 Vac);
LFC2	Circuit 2 functioning light (230 Vac);
DSP	Double set-point connector (DSP accessory) (control with clean contact)
CS	4÷20 mA analogue signal for setting the scrolling set-point (CS accessory) (*).

Remote ON/OFF enabling (SCR)

IMPORTANT!
When the unit is switched OFF using the remote control selector switch, 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:	Unit OFF
	Closed contact:	Unit ON

Remote summer/winter enabling on THAEY

Connect the wires coming from the remote summer/winter selector to the ID7 terminal on the electronic board. Then modify the Rem parameter. 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.

Double set-point management

The DSP accessory can be used to connect a selector in order to switch between two set-points.

ATTENTION	Open contact:	Double Set-point
	Closed contact:	Set-point

Remote management using accessories supplied loose

It is possible to remote control the entire machine by linking a second keyboard to the one built into the machine (KTR accessory). Use and installation of the remote control systems are described in the Instruction Sheets provided with the same.

Instructions for start-up

Configuration parameters	Standard settings
Summer working temperature set point	7°C
Winter working temperature set point	45°C
Antifreeze temperature set point	3°C
Antifreeze temperature differential	2°C
Low pressure exclusion time upon start-up/in function	60”/10”
Press. exclusion time water differential on start-up/in operation	15”/3”
Pump switch-off delay time Anticipation timepump ignition	30” 60”
Minimum time between 2 consecutive compressor start-ups of these	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 low temperature water, check the adjustment of the thermostatic valve.

Start-up procedure

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 supplies power to the machine accidentally; lock the master switch in zero 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 required in section "Electrical connections" :
- the electrical 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.

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 resistances designed to heat up the compressor crankcase. Each time the unit starts up the crankcase resistances switch off automatically.

DANGER!
By removing the protection panel from the coil/fan compartment, 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.

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 or micro channels free from obstructions → **NO** → Clean the finned coils/ micro channels

↓ **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

↓ **NO**

The general conditions of the unit are compliant

Checking 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 compressors are ready to start

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 inlet/outlet direction correct? ➡ **NO** Correct the inlet/outlet 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 rate

⬇ **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 evaporator and recovery unit in good working order and correctly installed? ➡ **NO** Repair or replace the component

⬇ **YES**

The water connections are compliant

Electrical connections

START

Does the unit power supply match the values indicated on the plate? ➡ **NO** Restore the correct power supply

⬇ **YES**

Is the phase sequence correct? ➡ **NO** Restore the correct phase sequence

⬇ **YES**

Does the earth conform with current regulations? ➡ **NO** ⚠ **Danger!** Restore the earth connection!

⬇ **YES**

Are the power circuit electric conductors of the size indicated in the manual? ➡ **NO** ⚠ **Danger!** Replace the cables immediately!

⬇ **YES**

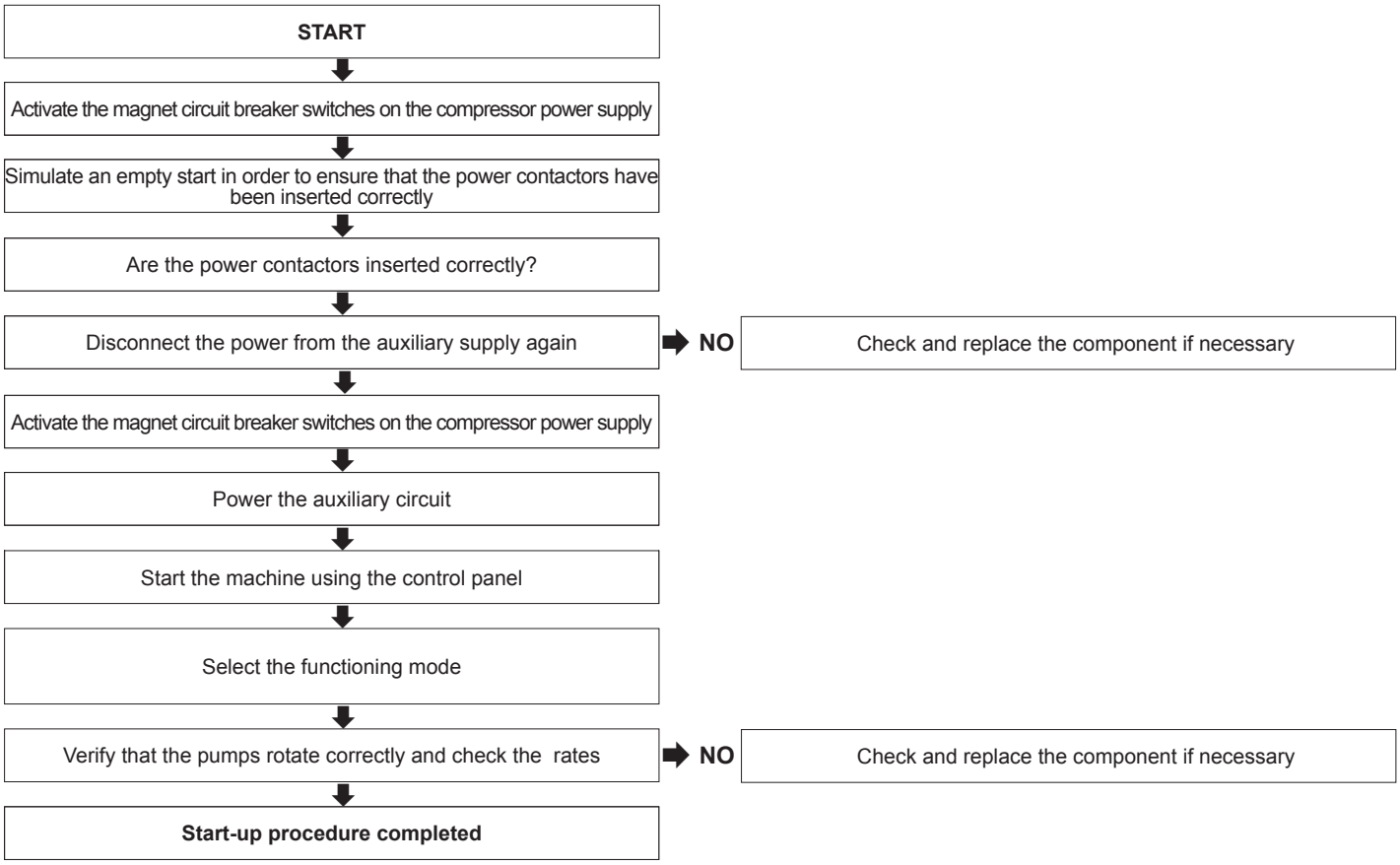
Is the circuit breaker positioned upstream from the unit of the right size? ➡ **NO** ⚠ **Danger!** Replace the component immediately!

⬇ **YES**

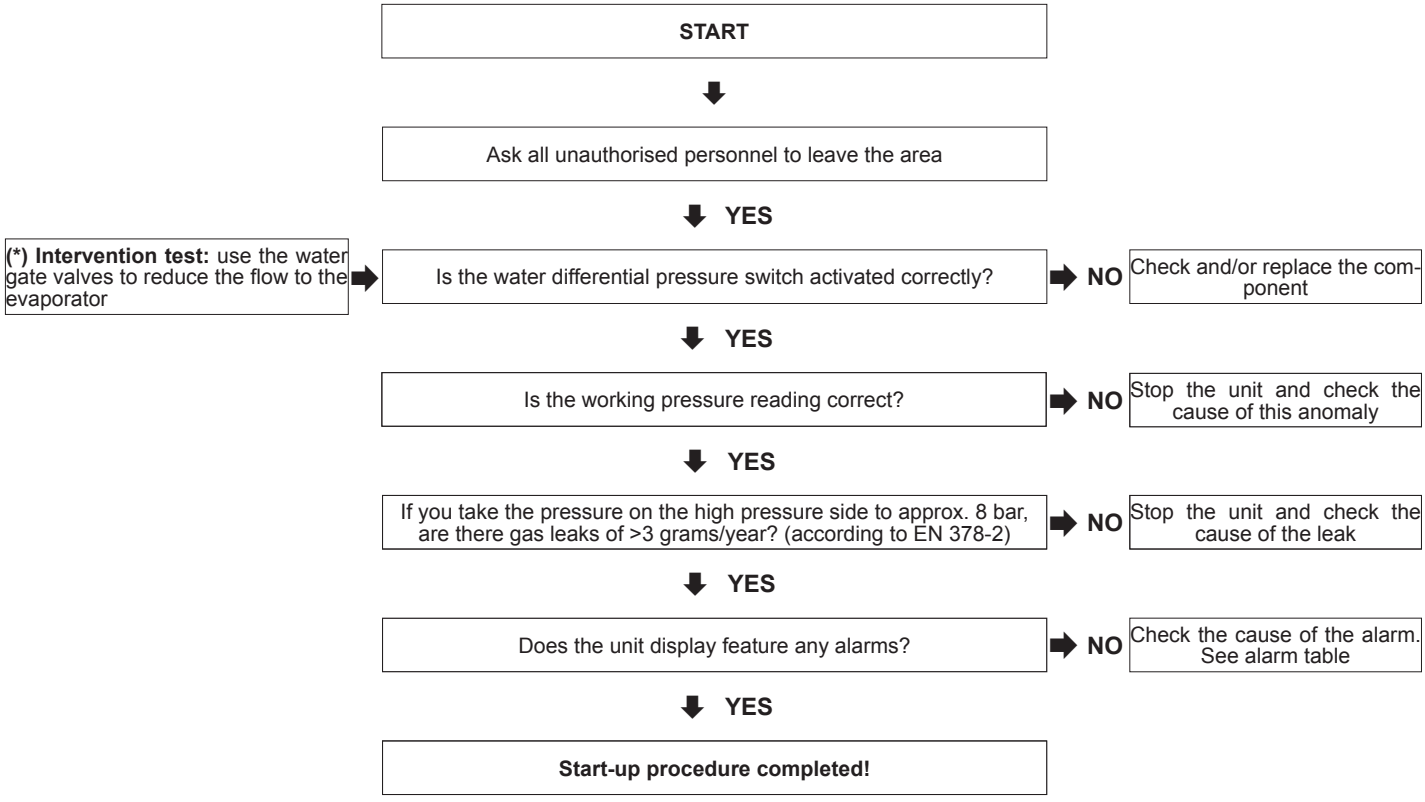
The electric connection is compliant

Commissioning

When the previously listed inspections have had a positive result, the machine may be commissioned.



Checks to be made while the unit is running



Instructions for fine tuning and general regulation

Calibration of safety and control devices

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 devices which monitor safety of the unit are the following:

- High pressure switch (PA)
- Water differential pressure switch
- High pressure safety valve
- Low pressure transducer (generates the low pressure alarm)

Safety component calibration settings	Intervention	Reset
High pressure switch (PA)	42 bar	33 bar manual
Water differential	80 mbar	105 mbar automatic
High pressure safety valve	43 bar	-

DANGER!

The safety valve on the high pressure side is calibrated at 41.7 bar. It can intervene if the calibration value is reached while the refrigerant is being filled, causing a burst that could cause burns (just like the other valves of the circuit).

Operation of components

Compressor functioning

Scroll compressors are equipped with internal circuit breaker protection. Once the inner circuit breaker has tripped, 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).

Operation of work, antifreeze and pressure probes

Temperature probes are inserted inside a socket in contact with conductive paste and externally sealed with silicon:

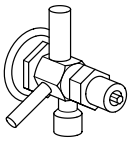
- One is placed at the entrance of the heat exchanger and measures the temperature of the return water from the system;
- The other is placed at the exit of the evaporator and acts as an operational and antifreeze probe in units with no water buffer tank and only as an anti-freeze probe in units with water buffer tank.

Always check that both wires are firmly welded to the connector and that this is properly inserted in the housing on the electronic board (see 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 paying attention to not damage 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 triggered, this must be reset through the control panel. The unit starts up again only when the water temperature exceeds the triggering difference.

Thermostatic valve operation



The thermostatic expansion valve is calibrated to maintain the gas superheated by at least 5°C, to prevent the compressor from sucking liquid.

If the superheating setting must be changed, adjust the valve as follows:

- rotate anticlockwise to reduce overheating;
- rotate clockwise to increase overheating.

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, we recommend waiting a few minutes to allow the system to re-stabilise.

Electronic thermostatic valve functioning

The electronic thermostatic expansion valve is calibrated to maintain the gas sufficiently superheated, to avoid any liquid being sucked into the compressor. The operator is not called upon to perform calibration since the control software of the valve monitors these operations automatically.

Functioning of PA: high pressure switch

After the pressure switch has been triggered, it must be reset manually by pressing the black button on the pressure switch itself completely and reset the alarm from the control panel. Refer to the Troubleshooting section to detect the problem and carry out the necessary maintenance.

MAINTENANCE

IMPORTANT!

Maintenance is reserved exclusively for skilled personnel from workshops authorised by ÜNTES INC., qualified to operate on this type of products. Pay close attention to the danger signs on the unit. Use the personal protective equipment foreseen by current laws. Pay the utmost attention to the symbols located on the unit. Use EXCLUSIVELY original ÜNTES INC. spare parts.

DANGER!

Always act on the general automatic switch protecting the system before carrying out any maintenance work, even if it is purely for inspection purposes. Make sure that no one supplies power to the machine accidentally; lock the master switch in zero position.

DANGER!

Pay attention to high temperatures near the compressor heads and the supply pipes of the refrigeration circuit.

Routine maintenance

Control	Frequency	Notes
General cleaning and checking unit	Every 6 months, the unit must undergo general washing and its status must be checked	Any points where corrosion is starting need to be touched up with protective paint.
Finned coils	Variable depending on where the unit is installed.	The coils must be kept clear from any obstructions. If needed, they must be washed with detergents and water. Brush the fins gently to keep them from being damaged. Always use the personal protective equipment foreseen by law (goggles, earmuffs, etc.).
MCHX coils	At least every 6 months	
MCHXE coils	At least every 6 months	
Fans	Variable depending on where the unit is installed.	The fan grilles must be kept clear from any obstructions.
Compressor: oil check	Every 6 months	The lubricating oil level in the compressor can be checked by means of the sight-glass.
Exchangers	Every 12 months	Any incrustation of the exchanger may be detected by measuring the pressure-drop between the inlet and outlet pipes, using a differential pressure gauge.
Water filter	Every 6 months	It is mandatory to install a mesh filter on the unit's inlet water piping. This filter must be cleaned from time to time.

General cleaning and checking unit

Every six months, the unit should be cleaned using a moist cloth.

Every six months it is also good practice to check the general conditions of the unit. In particular, make sure there is no corrosion on the unit structure. Any corrosion must be treated with protective paints in order to prevent possible damage.

Cleaning of Finned Coils

DANGER!

Pay attention to the edges of the coil

The coils must be washed and brushed gently with water and soap. Remove any foreign bodies from the condensing coils which may block the passage of air, such as: leaves, paper, debris, etc.

Replace the coils should it not be possible to clean them.

Failure to clean the coils increases load losses and therefore reduces overall performance of the unit in terms of its flow arte.

To better protect the coils, we recommend assembly of the RPB (coil protection nets) or FMB (metal filters) accessories.

Cleaning of MCHX micro-channel finned coils

DANGER!

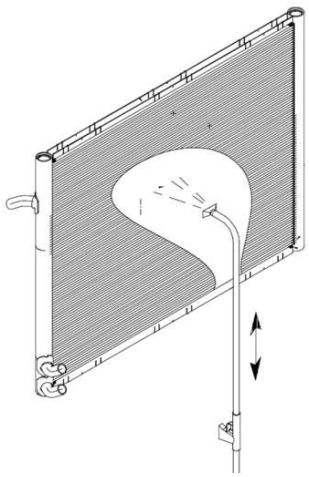
Damage due to high pressure!

When steam- or high-pressure cleaning:

- Keep minimum distance of 400 mm.
- Always clean against air flow direction if possible.

In order to prevent warping and damage of fins:

- Always align cleaning jet at right angles with fins of condenser.
- Brush exclusively in longitudinal direction of fins.
- Test the suitability of all cleaning methods in a small spot first.



In order to guarantee an unobstructed airflow:

- Clean condenser regularly.

In order to enable an economical and reliable operation:

- Remove leaves, paper, dust, pollen etc. from condenser.

Note

Cleaning intervals depend on the location.

- Always clean against air flow direction if possible.
- Remove dry dust and dirt or normal soiling with:
  - soft brush or hand broom
  - compressed air (3 to 5 bar)
  - industrial vacuum cleaner
  - hosepipe (water, 3 to 5 bar)

- Remove coarse or stubborn dirt with:
  - high pressure cleaner (max. pressure 50 bar; minimum distance 400 mm; fan nozzle)
  - steam cleaner (max. pressure 50 bar; minimum distance 400 mm; fan nozzle)
  - Use neutral cleaning agent if necessary.
  - Make sure that cleaning agent has no aggressive or corrosive properties which affect aluminium or the rest of the unit.
  - Make sure that no residue of the cleaning agent is left on the condenser after the cleaning.

Micro-channel coil with E-coating treatment (MCHXE accessory)

Procedures for Cleaning ElectroFin® Coated Coils

The following cleaning procedures are recommended as part of the routine maintenance activities for ElectroFin® Coated Coils. Documented routine cleaning of ElectroFin® coated coils is required to maintain warranty coverage.

IMPORTANT!

Prior to cleaning the unit, turn off and lock out the main power switch to the unit and open all access panels.

Remove Surface Loaded Fibers

Surface loaded fibers or dirt should be removed prior to water rinse to prevent further restriction of airflow. If unable to back wash the side of the coil opposite that of the coils entering air side, then surface loaded fibers or dirt should be removed with a vacuum cleaner. If a vacuum cleaner is not available, a soft non-metallic bristle brush may be used. In either case, the tool should be applied in the direction of the fins.
Coil surfaces can be easily damaged (fin edges bent over) if the tool is applied across the fins.

NOTE: Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers and dirt into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

Periodic Clean Water Rinse

A monthly clean water rinse is recommended for coils that are applied in coastal or industrial environments to help to remove chlorides, dirt and debris. It is very important when rinsing, to water temperature is less than 54° C and pressure is than 62 barg to avoid damaging the fin edges. An elevated water temperature (not to exceed 54° C) will reduce surface tension, increasing the ability to remove chlorides and dirt.

Routine Quarterly Cleaning of ElectroFin® Coated Coil Surfaces

Quarterly cleaning is essential to extend the life of an ElectroFin® coated coil and is required to maintain warranty coverage. Coil cleaning shall be part of the unit's regularly scheduled maintenance procedures. Failure to clean an ElectroFin® coated coil will void the warranty and may result in reduced efficiency and durability in the environment.
For routine quarterly cleaning, first clean the coil with the below approved coil cleaner (see approved products list under Recommended Coil Cleaners section). After cleaning the coils with the approved cleaning agent, use the approved chloride remover (under the Recommended Chloride Remover section) to remove soluble salts and revitalize the unit.

Recommended Coil Cleaner

The following cleaning agent, assuming it is used in accordance with the manufacturer's directions on the container for proper mixing and cleaning, has been approved for use on ElectroFin® e-coat coils to remove mold, mildew, dust, soot, greasy residue, lint and other particulate:

Product	Reseller	Part Number
Enviro-Coil Concentrate	HYDRO-BALANCE CORPORATION TELEPHONE: 800 527-5166 FAX: 972 394-6755 P.O. Box 730 Prosper, Texas 75078	H-EC01
Enviro-Coil Concentrate	Home Depot Supply	H-EC01

Recommended Chloride Remover

CHLOR*RID International, Inc PO Box 908 Chandler, Arizona 85244 Bus:(800) 422-3217 Bus Fax: (480) 821-0364

CHLOR*RID DTS™ should be used to remove soluble salts from the ElectroFin® coated coil, but the directions must be followed closely. This product is not intended for use as a degreaser. Any grease or oil film should first be removed with the approved cleaning agent.

1. Remove Barrier - Soluble salts adhere themselves to the substrate. For the effective use of this product, the product must be able to come in contact with the salts. These salts may be beneath any soils, grease or dirt; therefore, these barriers must be removed prior to application of this product. As in all surface preparation, the best work yields the best results.
2. Apply CHLOR*RID DTS - Apply CHLOR*RID DTS directly onto the substrate. Sufficient product must be applied uniformly across the substrate to thoroughly wet out surface, with no areas missed. This may be accomplished by use of a pump-up sprayer or conventional spray gun. The method does not matter, as long as the entire area to be cleaned is wetted. After the substrate has been thoroughly wetted, the salts will be soluble and is now only necessary to rinse them off.
3. Rinse - It is highly recommended that a hose be used, as a pressure washer will damage the fins. The water to be used for the rinse is recommended to be of potable quality, though a lesser quality of water may be used if a small amount of CHLOR*RID DTS is added. Check with CHLOR*RID International, Inc. for recommendations on lesser quality rinse water.

CAUTION:
Harsh Chemical and Acid Cleaners

Harsh chemicals, household bleach or acid cleaners should not be used to clean outdoor or indoor ElectroFin® coated coils. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion and attack the ElectroFin® coating. If there is dirt below the surface of the coil, use the recommended coil cleaners as described above.

CAUTION:
High Velocity Water or Compressed Air

High velocity water from a pressure washer or compressed air should only be used at a very low pressure to prevent fin and/or coil damages. The force of the water or air jet may bend the fin edges and increase airside pressure drop. Reduced unit performance or nuisance unit shutdowns may occur.

Cleaning fans

DANGER!

Pay attention to the fans. Do not remove the protective grids for any reason whatsoever!

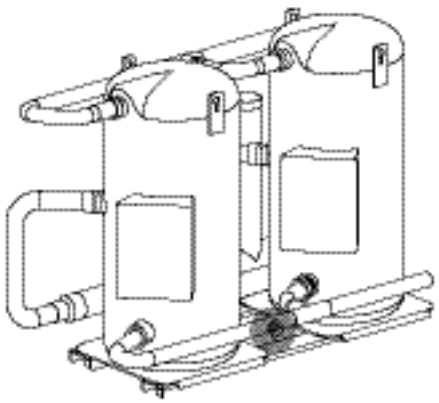
Check the fan grilles making sure they are not obstructed by any objects and/or filth. The latter, besides drastically reducing the overall performance of the unit, in some cases causes the fans to break.

Checking compressor oil level

IMPORTANT!

Do not use the unit is the oil level in the compressor is low.

The lubricating oil level in the compressor can be checked by means of the sight-glass. The oil level in the sight-glass can be inspected while the compressor is running. At times a small amount of oil could migrate towards the refrigeration circuit causing slight level fluctuations; they can therefore be considered normal.
Level fluctuations are also possible when capacity control is activated; in any event, the oil level must always be visible through the sight-glass. The presence of foam when the unit starts is normal. A prolonged and excessive presence of foam during operation, on the other hand, means that the refrigerant has not dissolved in the oil.



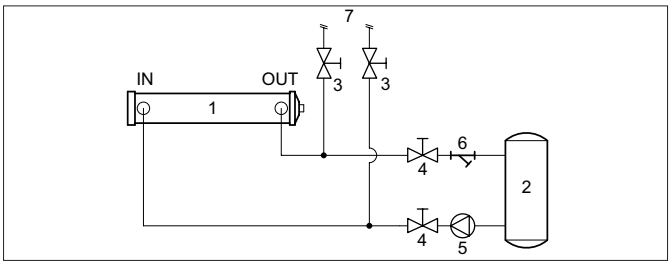
Inspecting and washing the tube and shell heat exchangers (STE accessory)

IMPORTANT!

The acids used for washing the heat exchangers are toxic. Use suitable personal protective equipment.

Tube and shell heat exchangers are not subject to 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. 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 heat exchanger with suitable chemical detergents. Provide already existing systems with adequate charge and discharge connections. 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 (without exceeding the maximum admitted flow: see "Operating limits").

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	evaporator
2	acid solution tank
3	cut-off gate valve
4	auxiliary cock
5	wash pump
6	auxiliary filter
7	user

Special maintenance

These are all those repairs or replacements which allow the unit to keep on working in standard conditions. The spare parts must be identical to the previous ones.

IMPORTANT!

Maintenance is reserved exclusively for skilled personnel from workshops authorised by ÜNTES INC. , qualified to operate on this type of products. Pay close attention to the danger signs on the unit. Use the personal protective equipment foreseen by current laws. Pay the utmost attention to the symbols located on the unit. Use EXCLUSIVELY original ÜNTES INC. spare parts.

Control	Frequency	Notes
Electrical system	Every 6 months	Besides checking the various electrical devices, the electrical insulation of all the cables and their correct tightening on the terminal boards must be verified, paying special attention to the earth connections.
Check the power consumption of the unit	Every 6 months	
Check electrical control board contactors	Every 6 months	This operation must be carried out by skilled personnel of authorised ÜNTES workshops, qualified to operate on this type of products.
Fans	Every 6 months	Make sure the motors and fan blades are clean and that there are no abnormal vibrations.
Electric motor of fans	Every 6 months	The motor must be kept clean with no traces of dust, filth, oil or other impurities. These could cause it to overheat due to low heat dissipation The bearings are usually watertight with permanent lubrication and sized in order to last approximately 20.000 hours in standard operational and environmental conditions.
Checking gas charge and humidity in circuit (with unit running at full capacity)	Every 6 months	It is mandatory to install a mesh filter on the unit's inlet water piping. This filter must be cleaned from time to time.
Check that there are no gas leaks	Every 6 months	
Check the functioning of the maximum and minimum pressure switches	Every 6 months	This operation must be carried out by skilled personnel of authorised ÜNTES INC. workshops, qualified to operate on this type of products.
Bleeding air from the chilled water system	Every 6 months	
Draining the water system (if necessary)	Every 12 months	If the unit is idle during winter months, it must be emptied. In alternative, a glycol mixture can be used according to the information provided in this manual.

Top-up / Replacement of Refrigerant Charge

The units are factory-tested with the gas charge necessary for correct operation. The amount of gas inside the circuit is shown directly on the serial no. plate. Should the R410A need to be topped-up, drain and evacuate the circuit, eliminating traces of non-condensable gases with any humidity. After maintenance, the gas charge must be restored after the cooling circuit has undergone maintenance and been accurately clean.
Subsequently, restore the exact amount of new refrigerant indicated in the serial number plate. The refrigerant must be piped from loading cylinders in liquid phase in order to ensure the correct proportions (R32/R125)Once the filling operation is complete, start up the unit and monitor its work conditions for at least 24 hours. If, for any particular reason, such as a refrigerant leak, you wish to simply top-up the refrigerant, bear in mind that there may be a slight drop in unit performance. In all cases the top-up must be carried out in the low pressure section of the machine before the evaporator, using the pressure sockets. Make sure that the refrigerant is introduced only in the liquid phase.

Restoring compressor oil level

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 the oil. With the unit on and in nominal conditions the oil level should be clearly visible through the sight-glass and must be flat without any ripples. An additional oil top-up can be carried out after evacuating the compressors, using the pressure connection on the intake. For information on the amount and type of oil, refer to the label on the compressor or contact a ÜNTES service centre.

Repairing and replacing components

- 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.
- After maintenance has been performed on the unit, the liquid-humidity indicator (LUE) must be under control. After at least 12 hours of running, the refrigeration circuit of the unit must be perfectly "dry", with the LUE green, Otherwise, the filter cartridge needs to be replaced.

Replacing of dryer filter cartridges

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

Instructions on how to drain the cooling circuit

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

Eliminating Circuit Humidity

If during the operation of the machine there is evidence of humidity in the refrigerant circuits, it is essential to drain the circuit completely of refrigerant and eliminate the cause of the problem. To remove 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.

DISMANTLING THE UNIT

SAFEGUARD THE ENVIRONMENT

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 considered as secondary raw materials and the following conditions must be complied with:

- the compressor oil must be removed, recovered and delivered to a facility authorized to collect waste oil;
- 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 (electrolytic condensers) are considered special waste, and must be delivered to a body authorized to collect such items;
- the expanded polyurethane rubber insulation of the water exchanger and the sound-absorbent sponge lining the bodywork must be removed and processed as urban waste.

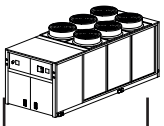
TROUBLESHOOTING

PROBLEM	RECOMMENDED ACTION
The circulation pump does not start (if connected)	
Lack of voltage to the pump unit:	check electrical connections and auxiliary fuses.
No signal from control board:	check, call in authorised service engineer.
Pump blocked:	check and clear as necessary.
Pump motor malfunction:	overhaul or replace pump.
Working set-point reached:	check
The compressor does not start	
Microprocessor board alarm:	identify triggered alarm.
Absence of voltage, isolator switch open:	close isolator switch.
Compressor circuit breaker tripped:	check the electrical circuits and the motor windings, identify possible short circuits; check for mains overloads and loose connections.
Circuit breakers tripped due to overload:	restore fuses; check unit on start-up.
No request for cooling with user system set point correct:	check and if necessary wait for cooling request.
Working set point too high:	check calibration and reset.
Defective contactors:	replace or repair.
Compressor electric motor failure:	check short circuit.
The compressor does not start but you can hear a buzzing noise	
Incorrect power supply voltage:	check voltage, investigate causes.
Compressor contactor malfunction:	replace.
Mechanical problems in the compressor:	repair/replace compressor.
The compressor runs intermittently	
Insufficient refrigerant charge:	restore correct level, find and eliminate leakage.
Refrigerant line filter clogged (appears frosted):	clean the filter body and replace cartridge.
Irregular operation of the expansion valve:	check correct functioning and replace if necessary.
The compressor stops	
Malfunctioning of high pressure switch:	check calibration and operation.
Insufficient cooling air in coils (cooling mode):	check fans, check clearances around unit and possible coil obstructions.
Excessive ambient temperature:	check unit operation limits.
Excessive refrigerant charge:	drain that in excess, recovering the refrigerant.
Insufficient water circulation on the plate exchanger (in heating or heat recovery mode):	check and adjust as necessary.
High water temperature (in heating or heat recovery mode)	check unit operation limits.
Presence of air in the water system (in heating or heat recovery mode):	bleed the water system.
Excessive compressor noise - Excessive vibrations	
Compressor is pumping liquid, excessive increase in refrigerant fluid in crankcase:	check correct operation of the expansion valve, replace if necessary.
Mechanical problems in the compressor:	overhaul the compressor, replace if necessary.
Unit running at the limit of conditions for use:	check according to stated limits.

PROBLEM	RECOMMENDED ACTION
Compressor runs continuously	
Excessive thermal load:	check system sizing and insulation.
Working set point too low:	check calibration and reset.
Insufficient refrigerant charge:	restore correct level, find and eliminate leakage.
Filter obstructed (appears frosted):	replace.
Control board faulty:	replace board and check it.
Irregular operation of the expansion valve:	replace.
Irregular working of the contactors:	check operation.
Low oil level	
Leak in the refrigerant circuit:	check, identify and eliminate leak; restore correct oil and refrigerant charge.
The crankcase resistance is off:	check and replace if necessary.
Unit running is anomalous conditions:	check unit dimensioning.
The crankcase resistance does not work (with compressor off)	
Lack of electrical power supply:	check connections and auxiliary fuses.
The crankcase resistance is off:	check and replace if necessary.
High delivery pressure in nominal conditions	
Insufficient cooling air in coils:	check fans, check clearances around unit and possible coil obstructions.
Excessive refrigerant charge:	drain the excess.
Irregular working of fan speed regulator (if mounted):	check calibration and adjust as necessary.
Low delivery pressure in nominal conditions	
Insufficient refrigerant charge:	restore correct level, find and eliminate leakage.
Presence of air in the water system:	bleed the system.
Insufficient water flow rate:	check and adjust as necessary.
Mechanical problems in the compressor:	overhaul compressor.
Irregular working of fan speed regulator (if mounted):	check calibration and adjust as necessary.
High intake pressure in nominal conditions	
Excessive thermal load:	check system sizing, leaks and insulation.
Irregular operation of the expansion valve:	check operation, and replace if necessary.
Mechanical problems in the compressor:	overhaul compressor.
Low intake pressure in nominal conditions	
Insufficient refrigerant charge:	restore correct level, find and eliminate leakage.
Dirty/damaged heat exchanger:	verify, proceed with washing if dirty.
Filter partially clogged:	replace cartridges, clean filter body.
Irregular operation of the expansion valve:	check operation, and replace if necessary.
Presence of air in the water system:	bleed the system.
Insufficient water flow rate:	check and adjust as necessary.
Insufficient evaporation coil ventilation	
Irregular working of fan speed regulator (if mounted):	check calibration and adjust as necessary.

PROBLEM	RECOMMENDED ACTION
FAN: IT DOES NOT START, IT SWITCHES ON AND OFF	
Switch or contactor faulty, break in the auxiliary circuit:	check and replace if necessary.
Circuit breaker protection activated:	check for short-circuits, replace the motor.
Condensation control not working:	1 check functioning of board and replace if necessary.
	2 check pressure transducer.
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.

TECHNICAL DATA



Model TCAEBY SE		2110	2120	2140	2150	2170	2200	2220	4240	4270	4310	4340
Nominal cooling capacity (*)	kW	107	115	128	148	166	189	213	230	257	301	330
EER		2,86	2,85	2,85	2,86	2,86	2,85	2,85	2,84	2,84	2,85	2,8
ESEER +		4,62	4,63	4,66	4,52	4,61	4,75	4,57	4,80	4,84	4,70	4,69
Nominal cooling capacity (*) (°) EN 14511:2013	kW	106,5	114,4	127,4	147,3	165,2	188,1	212,1	229,2	256	299,9	328,6
EER (*) (°) EN 14511:2013		2,81	2,79	2,8	2,81	2,81	2,8	2,8	2,8	2,8	2,81	2,76
ESEER EN 14511:2013		3,91	3,94	3,96	3,85	3,93	4,00	3,87	4,07	4,11	3,98	3,98
Sound pressure (***) (*)	dB(A)	55	56	56	57	58	58	59	60	60	60	61
Sound power (****) (*)	dB(A)	87	88	88	89	90	90	91	92	92	92	93
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2 x1,8	2 x1,8	2 x1,8	3 x1,8	3 x1,8	3 x1,8	4 x1,8	4 x1,8	4 x1,8	6 x1,8	6 x1,8
Fan nominal air flow	m³/h	39600	39600	39600	59600	59600	59600	79200	79200	79200	104800	104800
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	18,4	19,8	22	25,4	28,5	32,5	36,6	39,5	44,2	51,8	56,7
Water side heat exchanger nominal pressure drops (*)	kPa	39	44	44	48	48	47	47	36	43	42	49
Residual head P1 (*)	kPa	128	120	115	162	153	139	118	139	124	135	114
Residual head P2 (*)	kPa	192	184	178	222	211	195	172	181	167	201	175
Residual head ASP1 (*)	kPa	127	118	113	159	149	133	111	131	115	130	107
Residual head ASP2 (*)	kPa	191	182	176	218	207	190	165	173	157	195	168
Tank water content (ASP1/ASP2)	l	300	300	300	300	300	300	550	550	550	700	700
Nominal heating capacity RC100 (±)	kW	140	151	168	193	217	248	279	302	338	393	434
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	24,1/67	26/76	28,9/76	33,2/82	37,3/83	42,6/82	48/81	51,9/63	58,1/75	67,6/72	74,6/85
Nominal heating capacity DS (±)	kW	28	29	33	38	43	49	55	59	67	78	85
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,4/7	2,5/8	2,8/7	3,3/8	3,7/7	4,2/9	4,7/8	5,1/13	5,8/12	6,7/13	7,3/12
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power (*) (●)	kW	37,4	40,4	44,9	51,7	58	66,3	74,7	81	90,5	105,6	117,9
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Nominal current (■)	A	62	67	75	86	96	110	124	135	150	175	196
Maximum current (■)	A	86	96	104	121	134	149	168	192	208	242	268
Starting current (■)	A	248	266	266	347	360	375	390	362	370	468	494
Starting current with SFS (■)	A	164	182	182	232	245	252	270	278	286	366	379
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2440	2440	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	1350	1350	2090	2090
Length (c)	mm	2650	2650	2650	3600	3600	3600	4550	4550	4550	4800	4800
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1"¼ vic	1"¼ vic	2" vic	2" vic
Weight	Kg	990	1000	1010	1160	1180	1180	1340	1670	1690	2400	2410

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

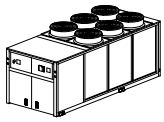
(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). NB. With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.



Model TCAETY HE-A		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	111	122	139	157	176	201	224	242	277	310	346
EER		3,19	3,15	3,18	3,16	3,15	3,16	3,15	3,14	3,14	3,14	3,14
ESEER +		5,02	5,09	4,96	4,98	5,04	4,89	4,95	5,10	5,06	5,00	5,03
Nominal cooling capacity (*) (°) EN 14511:2013	kW	110,5	121,5	138,4	156,4	175,4	200,3	223,2	241,3	276,3	309,1	345
EER (*) (°) EN 14511:2013		3,13	3,1	3,13	3,11	3,1	3,11	3,1	3,1	3,11	3,1	3,1
ESEER EN 14511:2013		4,28	4,32	4,13	4,22	4,28	4,18	4,21	4,30	4,28	4,25	4,23
Sound pressure (***) (*)	dB(A)	55	56	57	57	58	59	59	58	60	60	62
Sound power (****) (*)	dB(A)	87	88	89	89	90	91	91	90	92	92	94
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2 x1,8	2 x1,8	3 x1,8	3 x1,8	3 x1,8	4 x1,8	4 x1,8	4 x1,8	6 x1,8	6 x1,8	8 x1,8
Fan nominal air flow	m³/h	41600	41600	59600	59600	62000	79200	79200	78000	104800	109800	132200
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	19,1	21	23,9	27	30,3	34,6	38,5	41,6	47,6	53,3	59,5
Water side heat exchanger nominal pressure drops (*)	kPa	34	32	35	34	33	35	35	28	26	34	31
Residual head P1 (*)	kPa	132	130	120	173	163	143	123	133	119	140	118
Residual head P2 (*)	kPa	196	194	183	232	220	198	176	176	163	204	176
Residual head ASP1 (*)	kPa	130	128	117	169	158	137	116	129	114	133	110
Residual head ASP2 (*)	kPa	194	191	180	228	216	192	169	172	158	197	168
Tank water content (ASP1/ASP2)	l	300	300	300	300	550	550	550	700	700	700	700
Nominal heating capacity RC100 (±)	kW	141	156	176	200	225	256	286	310	352	395	439
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	24,2/56	26,8/53	30,3/57	34,4/56	38,7/54	44/57	49,2/58	53,3/46	60,5/43	67,9/56	75,5/50
Nominal heating capacity DS (±)	kW	28	30	34	39	44	50	56	60	69	78	86
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,4/6	2,6/7	2,9/7	3,4/7	3,8/7	4,3/9	4,8/8	5,2/14	5,9/12	6,7/13	7,4/12
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power (*) (●)	kW	34,8	38,7	43,7	49,7	55,9	63,6	71,1	77,1	88,2	98,7	110,2
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Nominal current (■)	A	58	64	73	83	93	106	118	128	147	164	183
Maximum current (■)	A	86	96	108	121	134	153	168	192	208	242	268
Starting current (■)	A	248	266	270	347	360	379	390	362	378	468	502
Starting current with SFS (■)	A	164	182	186	232	245	256	270	278	294	366	387
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2030	2030	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	2090	2090	2090	2090
Length (c)	mm	3600	3600	3600	3600	4550	4550	4550	4800	4800	5300	5300
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	2" vic	2" vic	2" vic	2" vic
Weight	Kg	1090	1100	1110	1130	1280	1300	1320	2290	2390	2520	2640

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

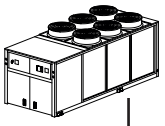
(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). NB. With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.



Model TCAESY SE		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	103	111	123	143	160	184	206	225	251	292	321
EER		2,77	2,72	2,7	2,76	2,75	2,7	2,74	2,71	2,7	2,71	2,65
ESEER +		4,77	4,79	4,71	4,73	4,74	4,79	4,70	4,83	4,83	4,81	4,75
Nominal cooling capacity (*) (°) EN 14511:2013	kW	102,5	110,4	122,4	142,3	159,2	183,2	205,1	224,2	250,1	291	319,7
EER (*) (°) EN 14511:2013		2,72	2,67	2,65	2,71	2,7	2,66	2,7	2,68	2,66	2,68	2,61
ESEER EN 14511:2013		4,03	4,04	4,02	4,01	4,01	4,03	3,96	4,11	4,11	4,06	4,02
Sound pressure (***) (*)	dB(A)	49	50	50	51	52	52	53	54	54	56	57
Sound power (****) (*)	dB(A)	81	82	82	83	84	84	85	86	86	88	89
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2x1,2	2x1,2	2x1,2	3x1,2	3x1,2	3x1,2	4x1,2	4x1,2	4x1,2	6x1,2	6x1,2
Fan nominal air flow	m³/h	31000	31000	31000	46500	46500	46500	62000	62000	62000	81600	81600
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	17,7	19,1	21,1	24,6	27,5	31,6	35,4	38,7	43,2	50,2	55,2
Water side heat exchanger nominal pressure drops (*)	kPa	37	42	41	45	46	44	45	34	40	40	46
Residual head P1 (*)	kPa	131	124	120	168	158	147	125	144	130	143	125
Residual head P2 (*)	kPa	196	188	184	227	217	204	180	185	172	210	188
Residual head ASP1 (*)	kPa	130	122	118	164	154	142	119	136	121	137	118
Residual head ASP2 (*)	kPa	194	186	182	224	213	199	174	178	164	204	182
Tank water content (ASP1/ASP2)	l	300	300	300	300	300	300	550	550	550	700	700
Nominal heating capacity RC100 (±)	kW	140	151	168	193	217	248	279	302	338	393	434
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	24,1/67	26/76	28,9/76	33,2/82	37,3/83	42,6/82	48/81	51,9/63	58,1/75	67,6/72	74,6/85
Nominal heating capacity DS (±)	kW	26	29	32	37	41	49	53	59	65	76	84
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,2/6	2,5/8	2,8/6	3,2/7	3,5/6	4,2/9	4,6/7	5,1/13	5,6/11	6,5/12	7,2/11
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power (*) (●)	kW	37,2	40,8	45,6	51,8	58,2	68,1	75,2	83	93	107,7	121,1
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Nominal current (■)	A	62	68	76	86	97	113	125	138	154	179	201
Maximum current (■)	A	86	96	104	121	134	149	168	192	208	242	268
Starting current (■)	A	248	266	266	347	360	375	390	362	370	468	494
Starting current with SFS (■)	A	164	182	182	232	245	252	270	278	286	366	379
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2440	2440	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	1350	1350	2090	2090
Length (c)	mm	2650	2650	2650	3600	3600	3600	4550	4550	4550	4800	4800
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1"¼ vic	1"¼ vic	2" vic	2" vic
Weight	Kg	1110	1120	1130	1280	1300	1300	1460	1830	1850	2440	2450

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). NB. With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.

Model TCAEQY HE-A		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	101	109	127	141	156	182	200	219	252	281	319
EER		2,77	2,63	2,73	2,68	2,63	2,67	2,64	2,59	2,71	2,65	2,65
ESEER +		4,98	4,84	4,81	4,87	4,72	4,82	4,79	4,90	4,96	4,97	4,85
Nominal cooling capacity (*) (°) EN 14511:2013	kW	100,6	108,6	126,5	140,5	155,5	181,4	199,4	218,4	251,4	280,2	318,2
EER (*) (°) EN 14511:2013		2,73	2,6	2,69	2,65	2,6	2,64	2,61	2,57	2,68	2,62	2,63
ESEER EN 14511:2013		4,29	4,12	4,09	4,15	4,02	4,12	4,05	4,19	4,22	4,21	4,14
Sound pressure (***) (*)	dB(A)	47	47	48	48	49	50	50	51	53	53	54
Sound power (****) (*)	dB(A)	79	79	80	80	81	82	82	83	85	85	86
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2x0,6	2x0,6	3x0,6	3x0,6	3x0,6	4x0,6	4x0,6	4x0,6	6x0,6	6x0,6	8x0,6
Fan nominal air flow	m³/h	23000	23000	33000	33000	34500	44000	44000	44600	60000	62600	75600
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	17,4	18,7	21,8	24,2	26,8	31,3	34,4	37,7	43,3	48,3	54,8
Water side heat exchanger nominal pressure drops (*)	kPa	28	26	29	28	27	29	29	23	23	28	26
Residual head P1 (*)	kPa	141	140	130	187	180	161	147	148	134	159	141
Residual head P2 (*)	kPa	205	204	194	247	239	218	203	189	177	227	204
Residual head ASP1 (*)	kPa	139	139	128	184	176	156	142	145	130	154	134
Residual head ASP2 (*)	kPa	204	203	191	244	235	213	197	186	173	222	197
Tank water content (ASP1/ASP2)	l	300	300	300	300	550	550	550	700	700	700	700
Nominal heating capacity RC100 (±)	kW	141	156	176	200	225	256	286	310	352	395	439
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	24,2/56	26,8/53	30,3/57	34,4/56	38,7/54	44/57	49,2/58	53,3/46	60,5/43	67,9/56	75,5/50
Nominal heating capacity DS (±)	kW	26	29	34	37	41	47	53	58	66	74	84
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,2/8	2,5/6	2,9/7	3,2/6	3,5/6	4/8	4,6/7	5/13	5,7/11	6,4/11	7,2/11
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power (*) (●)	kW	36,5	41,4	46,5	52,6	59,3	68,2	75,8	84,6	93	106	120,4
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Nominal current (■)	A	61	69	77	87	99	113	126	140	154	176	200
Maximum current (■)	A	81	91	102	115	128	144	159	183	195	229	251
Starting current (■)	A	243	261	264	341	354	370	381	353	365	455	485
Starting current with SFS (■)	A	159	177	180	226	239	247	261	269	281	353	370
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2030	2030	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	2090	2090	2090	2090
Length (c)	mm	3600	3600	3600	3600	4550	4550	4550	4800	4800	5300	5300
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	2" vic	2" vic	2" vic	2" vic
Weight	Kg	1250	1260	1270	1290	1440	1460	1480	2420	2520	2650	2770

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

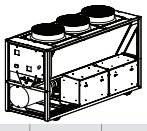
(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). NB. With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.



Model THAEBY SE		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	100	111	124	143	160	183	207	228	255	297	326
EER		2,71	2,71	2,7	2,73	2,7	2,7	2,7	2,71	2,71	2,71	2,71
ESEER +		4,44	4,44	4,47	4,37	4,38	4,48	4,35	4,64	4,50	4,58	4,59
Nominal cooling capacity (*) (°) EN 14511:2013	kW	99,5	110,4	123,4	142,3	159,3	182,2	206,1	227,1	253,9	295,9	324,7
EER (*) (°) EN 14511:2013		2,66	2,66	2,65	2,68	2,65	2,66	2,66	2,67	2,67	2,67	2,67
ESEER EN 14511:2013		3,76	3,78	3,80	3,73	3,74	3,78	3,69	3,93	3,82	3,88	3,90
Nominal heating capacity (**)	kW	112	123	139	158	176	197	228	248	280	318	353
COP		3,09	3,11	3,11	3,08	3,09	3,1	3,1	3,05	3,03	3,03	3,01
Nominal heating capacity (**) (°) EN 14511:2013	kW	112,6	123,7	139,7	158,8	176,9	198	229,1	249	281,4	319,3	354,6
COP (*) (°) EN 14511:2013		3,05	3,08	3,08	3,04	3,06	3,07	3,07	3,03	3,01	3,01	2,98
Sound pressure (***) (*)	dB(A)	53	54	54	55	56	56	57	58	60	60	61
Sound power (****) (*)	dB(A)	85	86	86	87	88	88	89	90	92	92	93
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2x1,8	2x1,8	2x1,8	3x1,8	3x1,8	3x1,8	4x1,8	4x1,8	6x1,8	6x1,8	6x1,8
Fan nominal air flow	m³/h	39600	38800	38800	59400	59400	58200	79200	80200	109600	106200	106200
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	17,2	19,1	21,3	24,6	27,5	31,5	35,6	39,2	43,8	51,1	56,1
Water side heat exchanger nominal pressure drops (*)	kPa	36	44	41	45	45	44	45	40	49	41	48
Residual head P1 (*)	kPa	133	121	120	168	159	146	125	128	107	140	119
Residual head P2 (*)	kPa	197	185	183	228	218	203	180	170	150	207	181
Residual head ASP1 (*)	kPa	131	119	118	165	156	141	119	125	103	135	112
Residual head ASP2 (*)	kPa	195	183	181	225	214	198	174	166	145	201	174
Tank water content (ASP1/ASP2)	l	300	300	300	300	300	300	550	700	700	700	700
Nominal heating capacity RC100 (±)	kW	132	147	165	189	212	244	274	303	336	393	432
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	22,7/64	25,3/78	28,4/73	32,5/79	36,5/80	42/78	47,1/80	52,1/71	57,8/86	67,6/72	74,3/85
Nominal heating capacity DS (±)	kW	26	29	33	37	42	48	53	59	66	77	85
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,2/6	2,5/8	2,8/7	3,2/7	3,6/7	4,1/8	4,6/7	5,1/13	5,7/11	6,6/13	7,3/12
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power in summer mode (*) (●)	kW	36,9	41	45,9	52,4	59,3	67,8	76,7	84,1	94,1	109,6	120,3
Absorbed power in winter mode (**) (●)	kW	36,3	39,5	44,6	51,4	56,9	63,6	73,4	81,2	92,3	104,9	117,2
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Summer operation nominal current (*) (■)	A	61	68	76	87	98	113	127	140	156	182	200
Maximum current (■)	A	86	96	104	121	134	149	168	192	208	242	268
Starting current (■)	A	248	266	266	347	360	375	390	362	370	468	494
Starting current with SFS (■)	A	164	182	182	232	245	252	270	278	286	366	379
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2030	2030	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	2090	2090	2090	2090
Length (c)	mm	2650	2650	2650	3600	3600	3600	4550	4800	4800	4800	4800
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	2" vic	2" vic	2" vic	2" vic
Weight	Kg	1250	1310	1320	1470	1480	1565	1730	2375	2460	2580	2595

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; evaporator scaling factor equal to 0.35x10-4 m2 K/W.

(**) In the following conditions: Evaporator inlet water temperature 7°C B.S., 6°C B.U.; hot water temperature 45°C; temperature differential at condenser 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

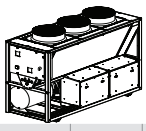
(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). **NB.** With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.



Model THAETY HE-A		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	102	113	127	146	162	187	210	232	264	302	335
EER		2,88	2,86	2,86	2,87	2,84	2,83	2,83	2,82	2,86	2,85	2,83
ESEER +		4,69	4,73	4,66	4,67	4,69	4,53	4,60	4,85	4,79	4,75	4,74
Nominal cooling capacity (*) (°) EN 14511:2013	kW	101,6	112,6	126,5	145,4	161,4	186,3	209,3	231,3	263,3	301,1	334,1
EER (*) (°) EN 14511:2013		2,83	2,82	2,82	2,83	2,8	2,79	2,79	2,79	2,83	2,82	2,8
ESEER EN 14511:2013		4,00	4,01	3,89	3,96	3,99	3,87	3,91	4,10	4,04	4,04	3,99
Nominal heating capacity (**)	kW	114	124	141	161	181	204	233	249	282	320	356
COP		3,25	3,25	3,24	3,25	3,26	3,25	3,24	3,22	3,22	3,22	3,22
Nominal heating capacity (**) (°) EN 14511:2013	kW	114,5	124,5	141,6	161,6	181,7	204,8	233,9	249,8	282,8	321	357
COP (*) (°) EN 14511:2013		3,22	3,22	3,21	3,22	3,23	3,22	3,21	3,2	3,2	3,2	3,2
Sound pressure (***) (*)	dB(A)	53	54	55	55	56	57	57	58	60	60	62
Sound power (****) (*)	dB(A)	85	86	87	87	88	89	89	90	92	92	94
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2x1,8	2x1,8	3x1,8	3x1,8	3x1,8	4x1,8	4x1,8	4x1,8	6x1,8	6x1,8	8x1,8
Fan nominal air flow	m³/h	41200	41200	59400	58200	62000	79200	77600	78800	106200	111000	134200
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	17,5	19,4	21,8	25,1	27,9	32,2	36,1	39,9	45,4	51,9	57,6
Water side heat exchanger nominal pressure drops (*)	kPa	32	29	32	32	30	33	33	26	25	31	29
Residual head P1 (*)	kPa	136	135	125	179	171	151	132	139	126	148	128
Residual head P2 (*)	kPa	200	199	189	238	229	207	186	181	170	213	188
Residual head ASP1 (*)	kPa	134	133	123	175	167	145	126	135	122	142	120
Residual head ASP2 (*)	kPa	198	197	186	235	225	202	180	177	165	207	180
Tank water content (ASP1/ASP2)	l	300	300	300	300	550	550	550	700	700	700	700
Nominal heating capacity RC100 (±)	kW	133	148	165	190	212	244	275	305	343	394	436
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	22,9/55	25,5/50	28,4/55	32,7/55	36,5/52	42/57	47,3/57	52,4/45	59/43	67,8/53	75/50
Nominal heating capacity DS (±)	kW	26	29	33	38	41	47	54	60	66	76	85
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,2/5	2,5/6	2,8/7	3,3/6	3,5/6	4/8	4,6/7	5,2/14	5,7/11	6,5/12	7,3/12
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power in summer mode (*) (●)	kW	35,4	39,5	44,4	50,9	57	66,1	74,2	82,3	92,3	106	118,4
Absorbed power in winter mode (**) (●)	kW	35,1	38,2	43,5	49,5	55,5	62,8	71,9	77,3	87,6	99,4	110,6
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Summer operation nominal current (*) (■)	A	59	66	74	84	95	110	123	137	153	176	197
Maximum current (■)	A	86	96	108	121	134	153	168	192	208	242	268
Starting current (■)	A	248	266	270	347	360	379	390	362	378	468	502
Starting current with SFS (■)	A	164	182	186	232	245	256	270	278	294	366	387
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2030	2030	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	2090	2090	2090	2090
Length (c)	mm	3600	3600	3600	3600	4450	4450	4550	4800	4800	5300	5300
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	2" vic	2" vic	2" vic	2" vic
Weight	Kg	1380	1410	1420	1500	1670	1690	1780	2470	2570	2720	2840

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(**) Under the following conditions: evaporator inlet air temperature 7°C B.S., 6°C B.U.; hot water temperature 45°C; temperature differential at condenser 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

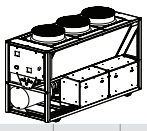
(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). **NB.** With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.



Model THAESY SE		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	98	107	118	137	153	176	200	221	249	287	315
EER		2,62	2,61	2,54	2,63	2,57	2,54	2,6	2,6	2,64	2,61	2,54
ESEER +		4,62	4,56	4,45	4,50	4,45	4,60	4,45	4,66	4,58	4,66	4,63
Nominal cooling capacity (*) (°) EN 14511:2013	kW	97,6	106,5	117,5	136,4	152,3	175,3	199,2	220,2	248	286	313,8
EER (*) (°) EN 14511:2013		2,58	2,56	2,5	2,59	2,53	2,5	2,56	2,57	2,6	2,58	2,51
ESEER EN 14511:2013		3,90	3,85	3,80	3,81	3,76	3,87	3,76	3,97	3,90	3,93	3,91
Nominal heating capacity (**)	kW	109	121	135	155	173	195	225	244	277	314	344
COP		3,13	3,16	3,13	3,17	3,14	3,12	3,16	3,12	3,08	3,09	3,06
Nominal heating capacity (**) (°) EN 14511:2013	kW	109,5	121,7	135,7	155,8	173,9	195,9	226	245	278,3	315,2	345,5
COP (*) (°) EN 14511:2013		3,1	3,13	3,1	3,13	3,1	3,09	3,13	3,09	3,05	3,07	3,03
Sound pressure (***) (*)	dB(A)	49	50	50	51	52	52	53	54	55	56	57
Sound power (****) (*)	dB(A)	81	82	82	83	84	84	85	86	87	88	89
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2x1,2	2x1,2	2x1,2	3x1,2	3x1,2	3x1,2	4x1,2	4x1,2	6x1,2	6x1,2	6x1,2
Fan nominal air flow	m³/h	31800	31000	31000	47700	47700	46500	63600	64600	86200	83000	83000
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	16,8	18,4	20,3	23,6	26,3	30,3	34,4	38	42,8	49,3	54,2
Water side heat exchanger nominal pressure drops (*)	kPa	34	41	38	42	43	41	42	37	47	37	44
Residual head P1 (*)	kPa	136	125	125	174	165	155	134	134	112	149	130
Residual head P2 (*)	kPa	198	188	186	232	219	203	179	153	127	176	143
Residual head ASP1 (*)	kPa	134	124	123	171	161	150	128	131	108	144	124
Residual head ASP2 (*)	kPa	198	188	187	231	220	208	183	172	150	212	188
Tank water content (ASP1/ASP2)	l	300	300	300	300	300	300	550	700	700	700	700
Nominal heating capacity RC100 (±)	kW	132	147	165	189	212	244	274	303	336	393	432
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	22,7/64	25,3/78	28,4/73	32,5/79	36,5/80	42/78	47,1/80	52,1/71	57,8/86	67,6/72	74,3/85
Nominal heating capacity DS (±)	kW	26	28	31	36	40	47	53	58	66	76	82
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,2/6	2,4/7	2,7/6	3,1/7	3,4/6	4/8	4,6/7	5/13	5,7/11	6,5/13	7,1/11
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power in summer mode (*) (●)	kW	37,4	41	46,5	52,1	59,5	69,3	76,9	85	94,3	110	124
Absorbed power in winter mode (**) (●)	kW	34,8	38,3	43,1	48,9	55,1	62,6	71,1	78,3	89,9	101,5	112,6
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Summer operation nominal current (*) (■)	A	62	68	77	87	99	115	128	141	157	183	206
Maximum current (■)	A	86	96	104	121	134	149	168	192	208	242	268
Starting current (■)	A	248	266	266	347	360	375	390	362	370	468	494
Starting current with SFS (■)	A	164	182	182	232	245	252	270	278	286	366	379
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2030	2030	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	2090	2090	2090	2090
Length (c)	mm	2650	2650	2650	3600	3600	3600	4550	4800	4800	4800	4800
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	2" vic	2" vic	2" vic	2" vic
Weight	Kg	1250	1310	1320	1470	1480	1565	1730	2415	2500	2620	2635

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; evaporator scaling factor equal to 0.35x10-4 m2 K/W.

(**) In the following conditions: Evaporator inlet water temperature 7°C B.S., 6°C B.U.; hot water temperature 45°C; temperature differential at condenser 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

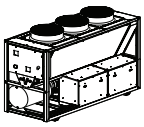
(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

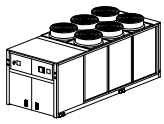
(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). NB. With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

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

(●) Absorbed power by the unit without an electric pump.

(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.





Model THAEQY HE-A		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Nominal cooling capacity (*)	kW	92	101	119	131	145	170	188	207	239	271	303
EER		2,49	2,34	2,56	2,45	2,37	2,42	2,37	2,32	2,47	2,36	2,4
ESEER +		4,65	4,48	4,55	4,54	4,44	4,46	4,49	4,65	4,64	4,66	4,60
Nominal cooling capacity (*) (°) EN 14511:2013	kW	91,6	100,6	118,6	130,6	144,5	169,5	187,4	206,5	238,4	270,3	302,3
EER (*) (°) EN 14511:2013		2,46	2,31	2,53	2,42	2,34	2,39	2,35	2,3	2,45	2,34	2,38
ESEER EN 14511:2013		4,01	3,82	3,87	3,87	3,78	3,81	3,79	3,98	3,94	3,94	3,93
Nominal heating capacity (**)	kW	110	118	136	153	171	194	221	236	266	300	341
COP		3,31	3,32	3,3	3,28	3,29	3,26	3,29	3,14	3,13	2,97	3,1
Nominal heating capacity (**) (°) EN 14511:2013	kW	110,5	118,5	136,5	153,6	171,6	194,7	221,8	236,7	266,7	301	341,9
COP (*) (°) EN 14511:2013		3,28	3,29	3,27	3,26	3,26	3,23	3,26	3,12	3,11	2,95	3,08
Sound pressure (***) (*)	dB(A)	47	47	48	48	49	50	50	51	53	53	54
Sound power (****) (*)	dB(A)	79	79	80	80	81	82	82	83	85	85	86
Scroll/step compressor	n°	2/3	2/3	2/2	2/3	2/2	2/3	2/2	4/4	4/4	4/4	4/4
Circuits	n°	1	1	1	1	1	1	1	2	2	2	2
Fans	n° x kW	2x0,6	2x0,6	3x0,6	3x0,6	3x0,6	4x0,6	4x0,6	4x0,6	6x0,6	6x0,6	8x0,6
Fan nominal air flow	m³/h	23900	23900	33900	33200	35400	45200	44200	45000	60600	63200	77000
Heat exchanger	Type	Plates/Shell and tube (STE accessory)										
Heat exchanger nominal flow water side (*)	m³/h	15,8	17,4	20,5	22,5	24,9	29,2	32,3	35,6	41,1	46,6	52,1
Water side heat exchanger nominal pressure drops (*)	kPa	26	24	27	26	25	27	26	20	20	25	24
Residual head P1 (*)	kPa	144	144	135	193	186	169	158	155	142	169	151
Residual head P2 (*)	kPa	209	208	199	253	246	227	214	196	184	238	215
Residual head ASP1 (*)	kPa	143	143	133	190	183	165	152	152	138	164	144
Residual head ASP2 (*)	kPa	208	207	196	251	243	223	208	193	180	233	209
Tank water content (ASP1/ASP2)	l	300	300	300	300	550	550	550	700	700	700	700
Nominal heating capacity RC100 (±)	kW	133	148	165	190	212	244	275	305	343	394	436
Nominal flow rate/pressure drop RC100 (±)	m³/h/kPa	22,9/55	25,5/50	28,4/55	32,7/55	36,5/52	42/57	47,3/57	52,4/45	59/43	67,8/53	75/50
Nominal heating capacity DS (±)	kW	24	28	32	35	40	46	51	57	65	74	81
Nominal flow rate/pressure drop DS (±)	m³/h/kPa	2,1/5	2,4/6	2,8/7	3/5	3,4/6	4/8	4,4/6	4,9/13	5,6/11	6,4/11	7/10
Amount of R410A refrigerant/ Polyester oil charge		See serial number plate										
Electrical data		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Absorbed power in summer mode (*) (●)	kW	37	43,2	46,5	53,5	61,2	70,3	79,3	89,2	96,8	114,8	126,3
Absorbed power in winter mode (**) (●)	kW	33,2	35,5	41,2	46,6	52	59,5	67,2	75,2	85	101	110
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1,5/2,2	1,5/2,2	1,5/2,2	2,2/3,0	2,2/3,0	2,2/3,0	2,2/3,0	3,0/4,0	3,0/4,0	4,0/5,5	4,0/5,5
Electrical power supply	V-ph-Hz	400 – 3 – 50										
Auxiliary electrical/control power supply	V-ph-Hz	230 – 1 – 50 / 24 – 1 – 50										
Summer operation nominal current (*) (■)	A	61	72	77	89	102	117	132	148	161	191	210
Maximum current (■)	A	81	91	102	115	128	144	159	183	195	229	251
Starting current (■)	A	243	261	264	341	354	370	381	353	365	455	485
Starting current with SFS (■)	A	159	177	180	226	239	247	261	269	281	353	370
Pump absorbed current (P1/ASP1) / (P2/ASP2)	A	3,0/4,5	3,0/4,5	3,0/4,5	4,5/6,0	4,5/6,0	4,5/6,0	4,5/6,0	6,0/8,0	6,0/8,0	8,0/10,5	8,0/10,5
Dimensions		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**	**4310**	**4340**
Height (a)	mm	2440	2440	2440	2440	2440	2440	2440	2030	2030	2030	2030
Width (b)	mm	1350	1350	1350	1350	1350	1350	1350	2090	2090	2090	2090
Length (c)	mm	3600	3600	3600	3600	4550	4550	4550	4800	4800	5300	5300
Heat exchanger inlet/outlet connections and RC100	Ø	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic	3" vic	3" vic
DS inlet/outlet connections	Ø	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	1" GM	2" vic	2" vic	2" vic	2" vic
Weight	Kg	1420	1450	1460	1540	1710	1730	1820	2600	2700	2850	2970

(*) Under the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5 K; evaporator scaling factor equal to 0.35x10-4 m2 K/W.

(**) In the following conditions: Evaporator inlet water temperature 7°C B.S., 6°C B.U.; hot water temperature 45°C; temperature differential at condenser 5 K; fouling factor equal to 0.35x10-4 m2 K/W.

(***) Sound pressure level in dB(A) referring to a 10 m distance from the unit, in free field and directionality factor equal to Q=2. The noise data refers to the units without the electric pump

(****) Sound power level in dB(A) on the basis of measurements taken in accordance with UNI EN-ISO 9614 and Eurovent 8/1 Standards The noise data refers to the units without the electric pump

(±) Recovery unit heating capacity Conditions referring to the unit operating with chilled water temperature 7°C, differential temperature due to evaporation of 5 K, hot water temperature produced equivalent to 40/45°C (RC100) 50/60°C (DS). NB. With heat pumps operating in winter mode with DC active, the heating capacity available is decreased from the portion supplied to the desuperheater.

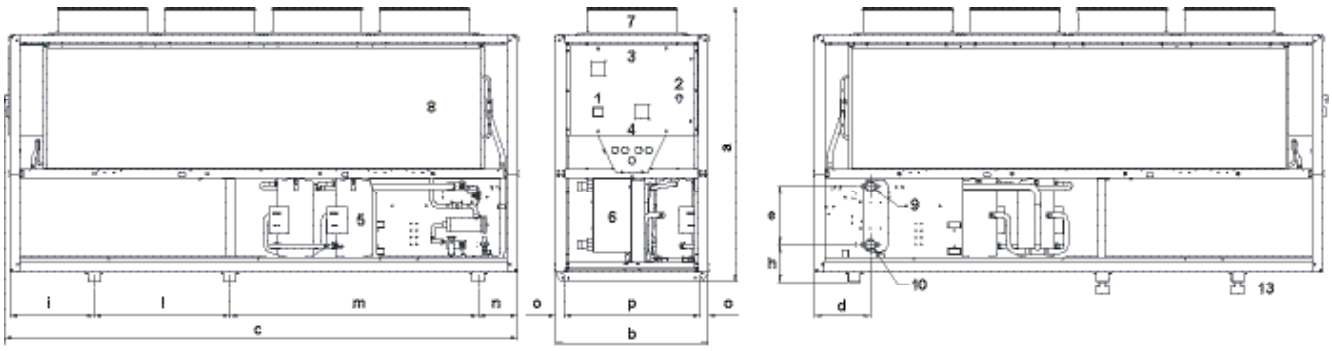
(■) Current value excluding the current absorbed by the pump.

(●) Absorbed power by the unit without an electric pump.

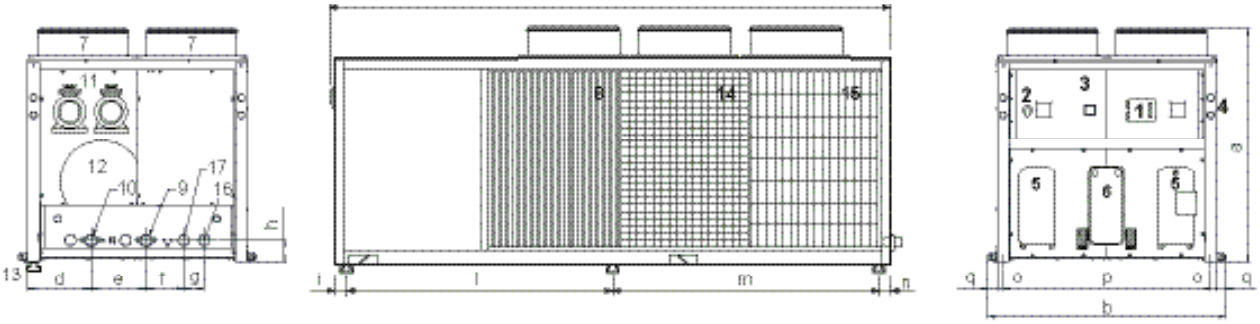
(°) Data calculated in accordance with EN 14511:2011 under nominal conditions.

DIMENSIONS AND CLEARANCES TCAEBY-TCAESY

2110÷4270



4310-4340



1. Control panel;
2. Isolator;
3. Electrical Control Board;
4. Cooling circuit pressure gauges (GM accessory);
5. Compressor;
6. Evaporator;
7. Fan;
8. Finned coil;
9. Main heat exchanger water inlet;
10. Main heat exchanger water outlet;
11. Electric pump;
12. Storage tank;
13. Anti-vibration mounts (SAG/SAM accessory);
14. Metal filter (FMB accessory);
15. Coil protection mesh (accessory RPB).
16. Water inlet recovery (accessory DS-RC100)
17. Exit recovery water (accessory DS-RC100)

Model		**2110**	**2120**	**2140**	**2150**	**2170**	**2200**	**2220**	**4240**	**4270**
a (*)	mm	2440	2440	2440	2440	2440	2440	2440	2440	2440
b	mm	1350	1350	1350	1350	1350	1350	1350	1350	1350
c	mm	2650	2650	2650	3600	3600	3600	4550	4550	4550
d	mm	493	493	493	493	493	493	493	1991	1991
e	mm	519	519	519	519	519	519	519	184	184
f	mm	-	-	-	-	-	-	-	-	-
g	mm	-	-	-	-	-	-	-	-	-
h	mm	330	330	330	330	330	330	330	447	447
i	mm	399	399	399	424	424	424	349	349	349
l	mm	1800	1800	1800	2700	2700	2700	1200	1200	1200
m	mm	-	-	-	-	-	-	2200	2600	2600
n	mm	399	399	399	424	424	424	349	359	349
o	mm	73	73	73	73	73	73	73	73	73
p	mm	1204	1204	1204	1204	1204	1204	1204	1204	1204
Heat exchanger inlet/ outlet connections	Ø	2"½ vic	2"½ vic	2"½ vic"	2"½ vic	2"½ vic	2"½ vic	2"½ vic	3" vic	3" vic

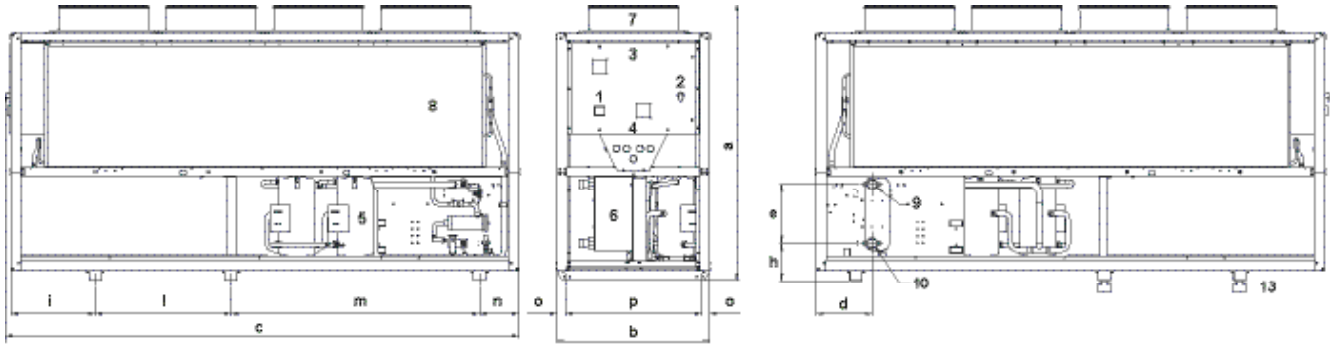
Model		**4310**	**4340**
a (*)	mm	2030	2030
b	mm	2090	2090
c	mm	4800	4800
d	mm	552	552
e	mm	480	480
f	mm	330	330
g	mm	180	180
h	mm	185	185
i	mm	153	153
l	mm	2223	2223
m	mm	2223	2223
n	mm	154	154
o	mm	52	52
p	mm	1810	1810
Heat exchanger inlet/ outlet connections	Ø	3"vic	3"vic

(*) Attention:
With the FIAP accessory, add 70mm

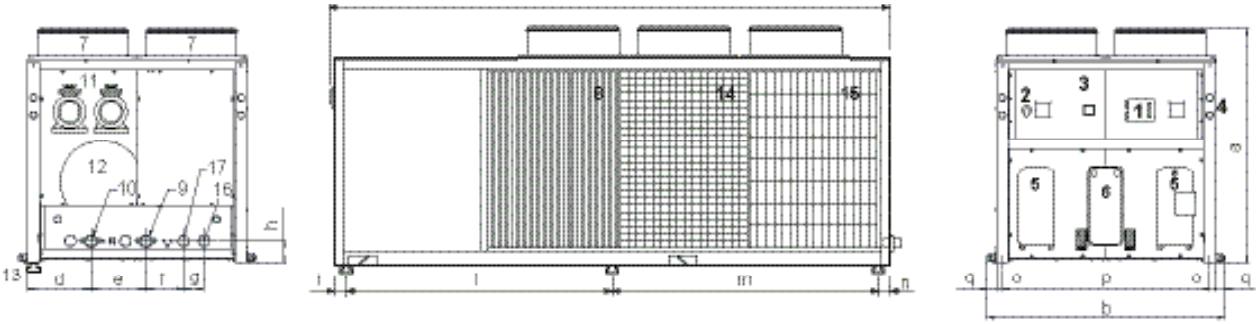
Note: Contact Üntes Inc. to the size of the units, with batteries "V", equipped with Pump, Tank & Pump and heat recovery.

DIMENSIONS AND CLEARANCES THAEBY-THAESY

2110÷2220



4240-4340



1. Control panel;
2. Isolator;
3. Electrical Control Board;
4. Cooling circuit pressure gauges (GM accessory);
5. Compressor;
6. Evaporator;
7. Fan;
8. Finned coil;
9. Main heat exchanger water inlet;
10. Main heat exchanger water outlet;
11. Electric pump;
12. Storage tank;
13. Anti-vibration mounts (SAG/SAM accessory);
14. Metal filter (FMB accessory);
15. Coil protection mesh (accessory RPB).
16. Water inlet recovery (accessory DS-RC100)
17. Exit recovery water (accessory DS-RC100)

Model		2110	2120	2140	2150	2170	2200	2220
a (*)	mm	2440	2440	2440	2440	2440	2440	2440
b	mm	1350	1350	1350	1350	1350	1350	1350
c	mm	2650	2650	2650	3600	3600	3600	4550
d	mm	493	493	493	493	493	493	493
e	mm	519	519	519	519	519	519	519
f	mm	-	-	-	-	-	-	-
g	mm	-	-	-	-	-	-	-
h	mm	330	330	330	330	330	330	330
i	mm	399	399	399	424	424	424	749
l	mm	1800	1800	1800	2700	2700	2700	1200
m	mm	-	-	-	-	-	-	2200
n	mm	399	399	399	424	424	424	349
o	mm	73	73	73	73	73	73	73
p	mm	1204	1204	1204	1204	1204	1204	1204
Heat exchanger inlet/ outlet connections	Ø	2”½ vic	2”½ vic	2”½ vic”	2”½ vic	2”½ vic	2”½ vic	2”½ vic

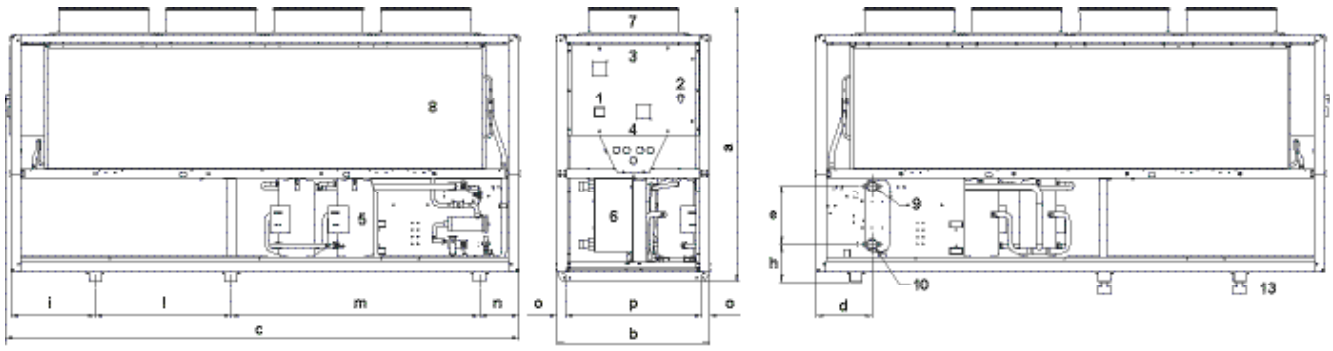
Model		4240	4270	4310	4340
a (*)	mm	2030	2030	2030	2030
b	mm	2090	2090	2090	2090
c	mm	4800	4800	4800	4800
d	mm	552	552	552	552
e	mm	480	480	480	480
f	mm	330	330	330	330
g	mm	180	180	180	180
h	mm	185	185	185	185
i	mm	153	153	153	153
l	mm	2223	2223	2223	2223
m	mm	2223	2223	2223	2223
n	mm	154	154	154	154
o	mm	52	52	52	52
p	mm	1810	1810	1810	1810
Heat exchanger inlet/ outlet connections	Ø	3”vic	3”vic	3” vic	3” vic

(*) Attention:
With the FIAP accessory, add 70mm

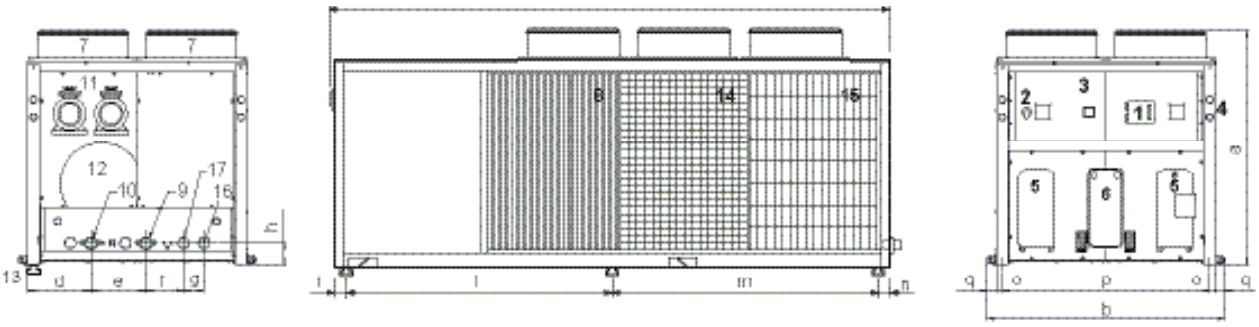
Note: Contact Üntes Inc. to the size of the units, with batteries "V", equipped with Pump, Tank & Pump and heat recovery.

DIMENSIONS AND CLEARANCES TCAETY-TCAEQY

2110÷2220



4240÷4340



1. Control panel;
2. Isolator;
3. Electrical Control Board;
4. Cooling circuit pressure gauges (GM accessory);
5. Compressor;
6. Evaporator;
7. Fan;
8. Finned coil;
9. Main heat exchanger water inlet;
10. Main heat exchanger water outlet;
11. Electric pump;
12. Storage tank;
13. Anti-vibration mounts (SAG/SAM accessory);
14. Metal filter (FMB accessory);
15. Coil protection mesh (accessory RPB).
16. Water inlet recovery (accessory DS-RC100)
17. Exit recovery water (accessory DS-RC100)

Model		2110	2120	2140	2150	2170	2200	2220
a (*)	mm	2440	2440	2440	2440	2440	2440	2440
b	mm	1350	1350	1350	1350	1350	1350	1350
c	mm	3600	3600	3600	3600	4550	4550	4550
d	mm	493	493	493	493	493	493	493
e	mm	519	519	519	519	519	519	519
f	mm	-	-	-	-	-	-	-
g	mm	-	-	-	-	-	-	-
h	mm	330	330	330	330	330	330	330
i	mm	424	424	424	424	749	749	749
l	mm	2700	2700	2700	2700	1200	1200	1200
m	mm	-	-	-	-	2200	2200	2200
n	mm	424	424	424	424	349	349	349
o	mm	73	73	73	73	73	73	73
p	mm	1204	1204	1204	1204	1204	1204	1204
Heat exchanger inlet/ outlet connections	Ø	2”½ vic	2”½ vic	2”½ vic”	2”½ vic	2”½ vic	2”½ vic	2”½ vic

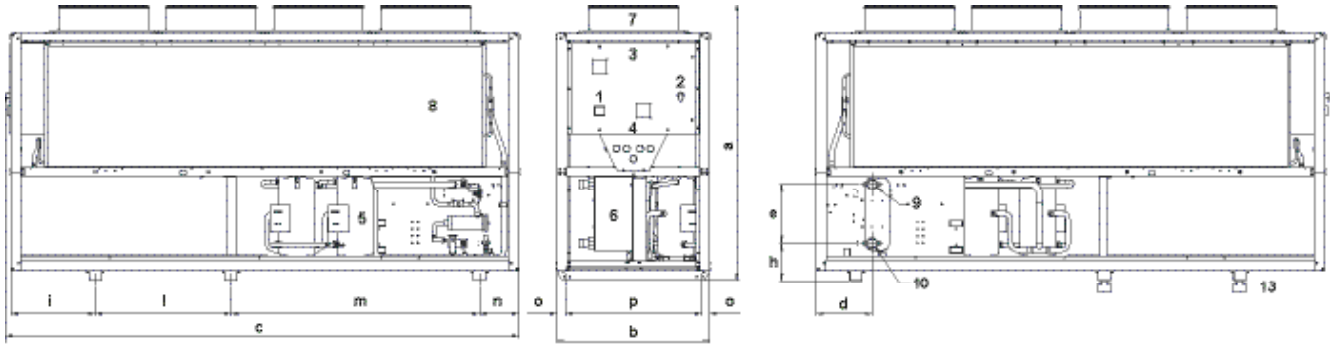
Model		4240	4270	4310	4340
a (*)	mm	2030	2030	2030	2030
b	mm	2090	2090	2090	2090
c	mm	4800	4800	5300	5300
d	mm	552	552	552	552
e	mm	480	480	481	481
f	mm	330	330	329	329
g	mm	180	180	180	180
h	mm	185	185	185	185
i	mm	153	153	154	154
l	mm	2223	2223	2473	2473
m	mm	2223	2223	2473	2473
n	mm	154	154	153	153
o	mm	52	52	52	52
p	mm	1810	1810	1810	1810
Heat exchanger inlet/ outlet connections	Ø	3” vic	3” vic	3”vic	3”vic

(*) Attention:
With the FIAP accessory, add 70mm

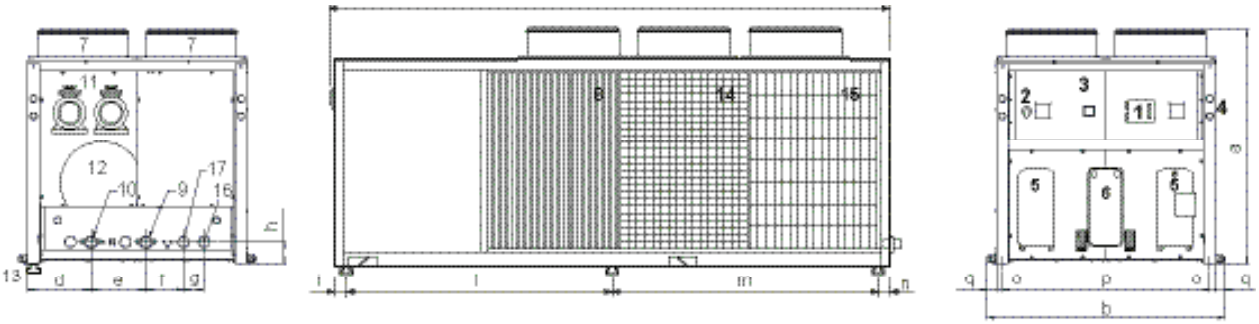
Note: Contact Üntes Inc. to the size of the units, with batteries "V", equipped with Pump, Tank & Pump and heat recovery.

DIMENSIONS AND CLEARANCES THAETY-THAEQY

2110÷2220



4240÷4340



1. Control panel;
2. Isolator;
3. Electrical Control Board;
4. Cooling circuit pressure gauges (GM accessory);
5. Compressor;
6. Evaporator;
7. Fan;
8. Finned coil;
9. Main heat exchanger water inlet;
10. Main heat exchanger water outlet;
11. Electric pump;
12. Storage tank;
13. Anti-vibration mounts (SAG/SAM accessory);
14. Metal filter (FMB accessory);
15. Coil protection mesh (accessory RPB).
16. Water inlet recovery (accessory DS-RC100)
17. Exit recovery water (accessory DS-RC100)

Model		2110	2120	2140	2150	2170	2200	2220
a (*)	mm	2440	2440	2440	2440	2440	2440	2440
b	mm	1350	1350	1350	1350	1350	1350	1350
c	mm	3600	3600	3600	3600	4550	4550	4550
d	mm	493	493	493	493	493	493	493
e	mm	519	519	519	519	519	519	519
f	mm	-	-	-	-	-	-	-
g	mm	-	-	-	-	-	-	-
h	mm	330	330	330	330	330	330	330
i	mm	424	424	424	424	749	749	749
l	mm	2700	2700	2700	2700	1200	1200	1200
m	mm	-	-	-	-	2200	2200	2200
n	mm	424	424	424	424	349	349	349
o	mm	73	73	73	73	73	73	73
p	mm	1204	1204	1204	1204	1204	1204	1204
Heat exchanger inlet/ outlet connections	Ø	2"½ vic	2"½ vic	2"½ vic"	2"½ vic	2"½ vic	2"½ vic	2"½ vic

Model		4240	4270	4310	4340
a (*)	mm	2030	2030	2030	2030
b	mm	2090	2090	2090	2090
c	mm	4800	4800	5300	5300
d	mm	552	552	552	552
e	mm	480	480	481	481
f	mm	330	330	329	329
g	mm	180	180	180	180
h	mm	185	185	185	185
i	mm	153	153	154	154
l	mm	2223	2223	2473	2473
m	mm	2223	2223	2473	2473
n	mm	154	154	153	153
o	mm	52	52	52	52
p	mm	1810	1810	1810	1810
Heat exchanger inlet/ outlet connections	Ø	3" vic	3" vic	3"vic	3"vic

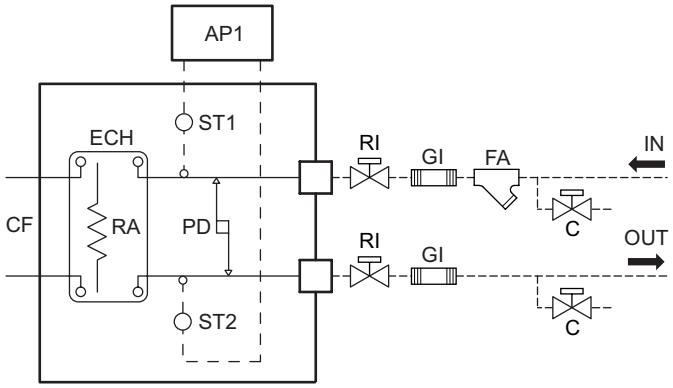
(*) Attention:
With the FIAP accessory, add 70mm

Note: Contact Üntes Inc. to the size of the units, with batteries "V", equipped with Pump, Tank & Pump and heat recovery.

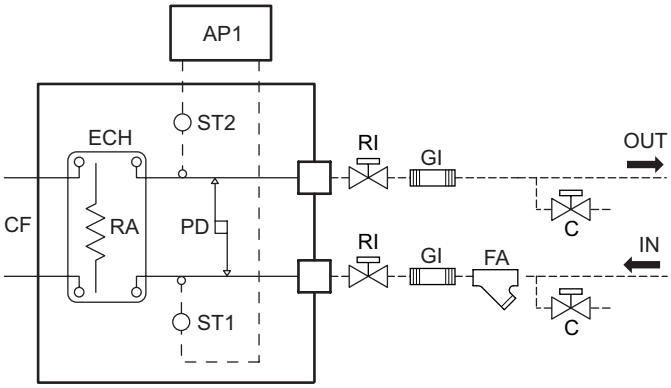
WATER CIRCUITS

Hydraulic circuit Standard set-up

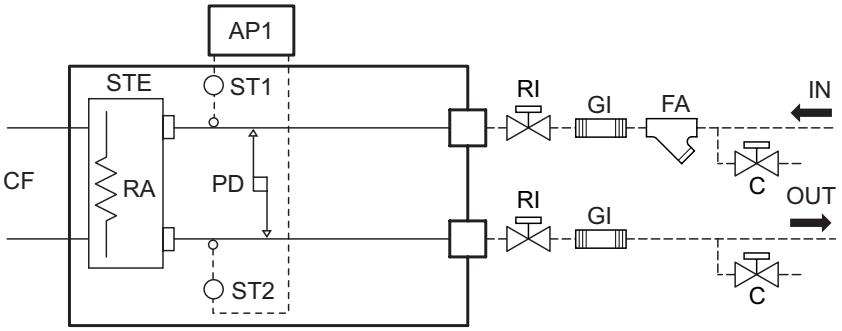
TCAEY VERSION with plate heat exchanger



THAEY VERSION with plate heat exchanger

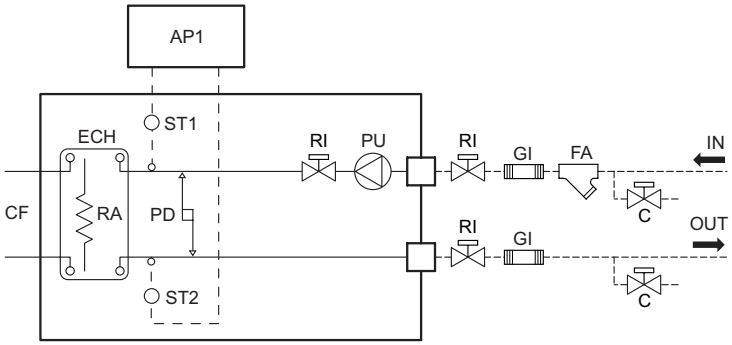


TCAEY/THAEY VERSION with STE tube and shell heat exchanger

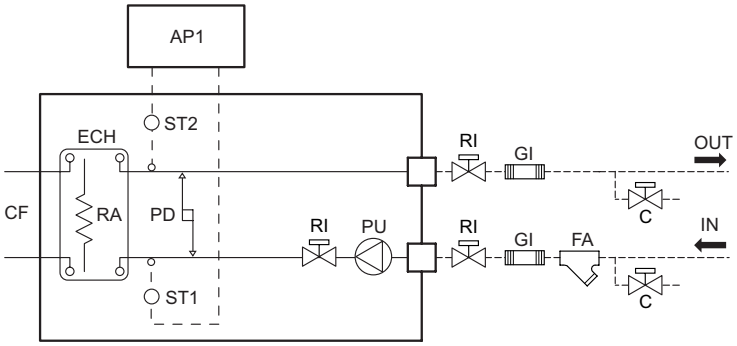


P1 – P2 set-up hydraulic circuit

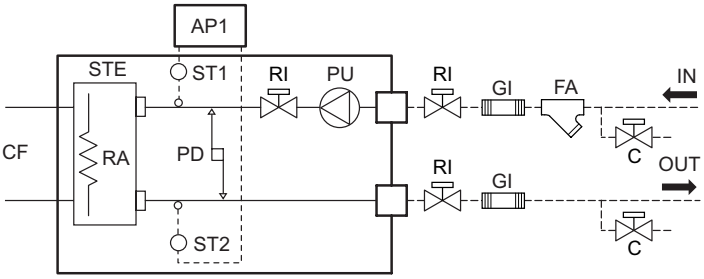
TCAEY VERSION with plate heat exchanger



THAEY VERSION with plate heat exchanger

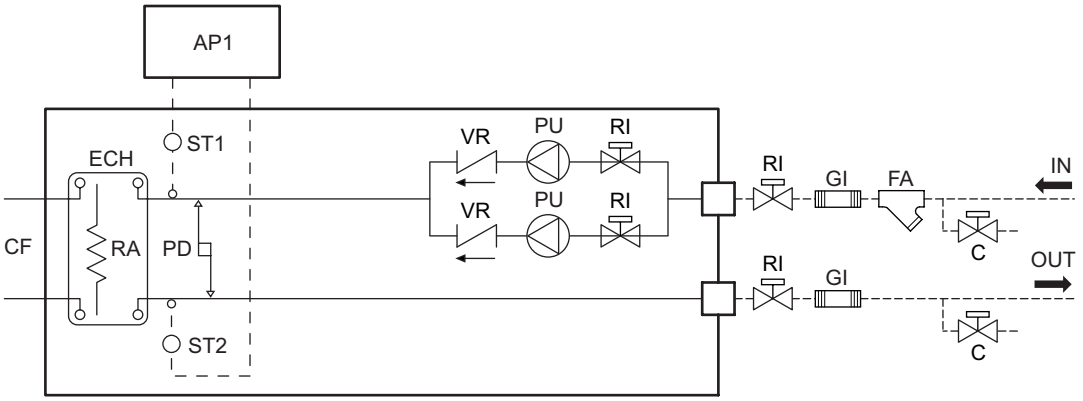


TCAEY/THAEY VERSION with STE tube and shell heat exchanger

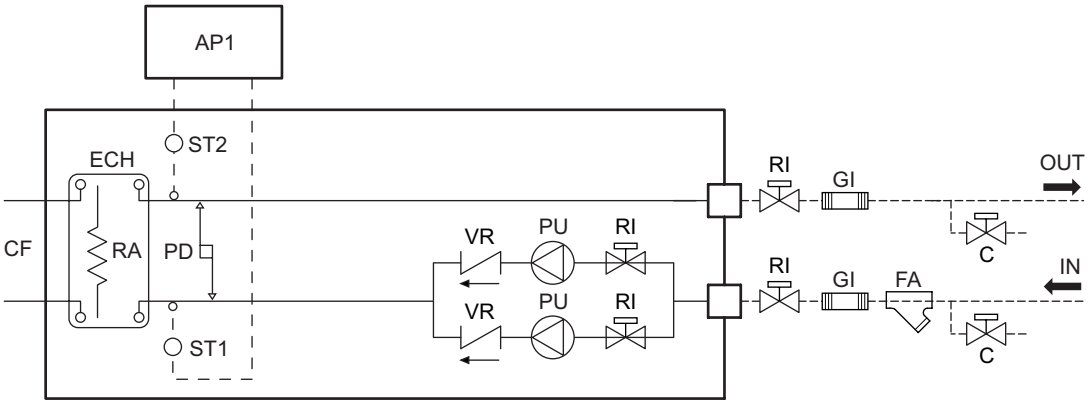


DP1 – DP2 set-up hydraulic circuit

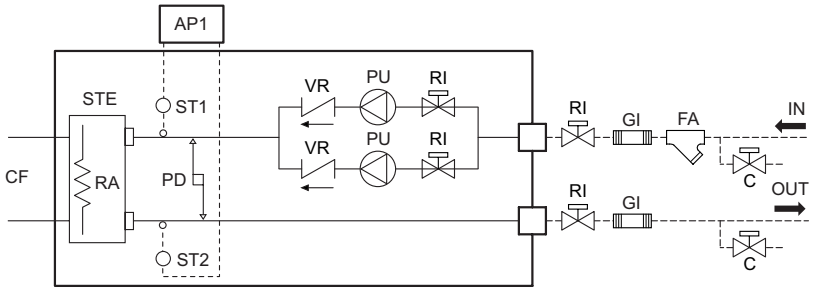
TCAEY VERSION with plate heat exchanger



THAEY VERSION with plate heat exchanger

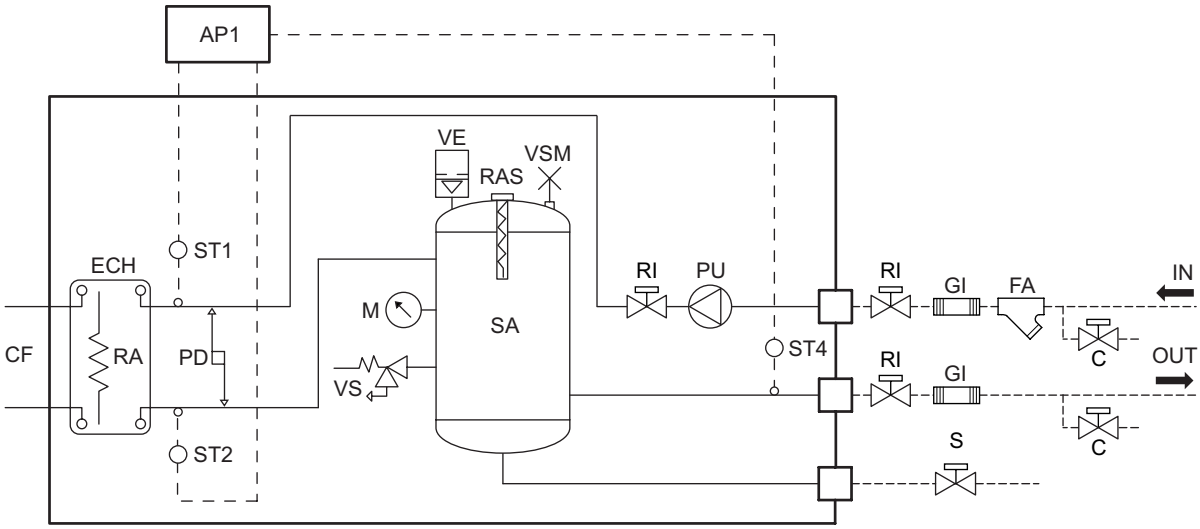


TCAEY/THAEY VERSION with STE tube and shell heat exchanger

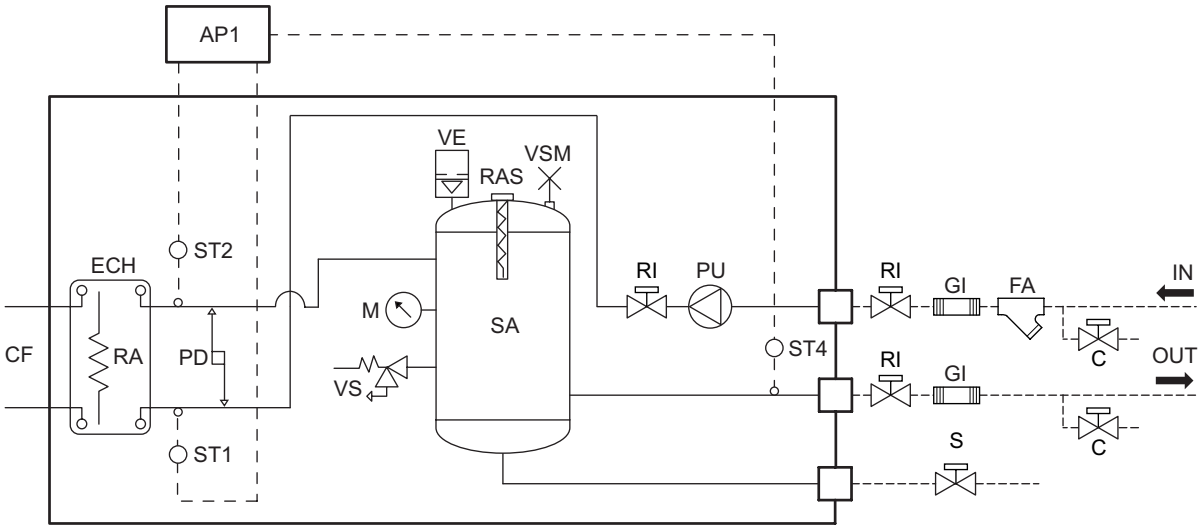


ASP1 - ASP2 set-up hydraulic circuit

TCAEY VERSION with plate heat exchanger

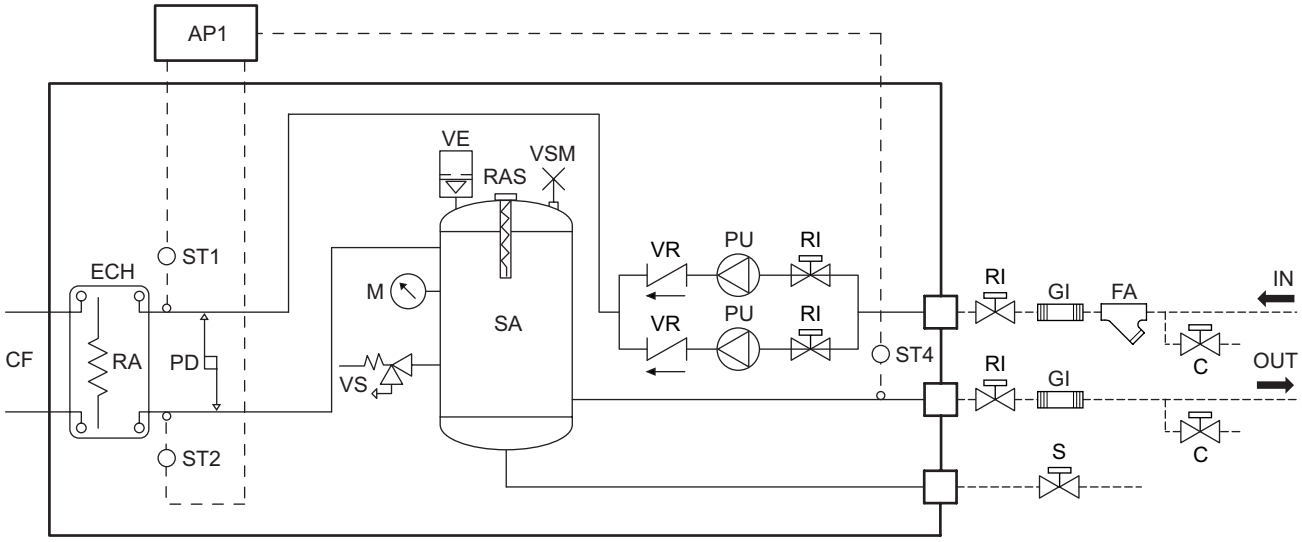


THAEY VERSION with plate heat exchanger

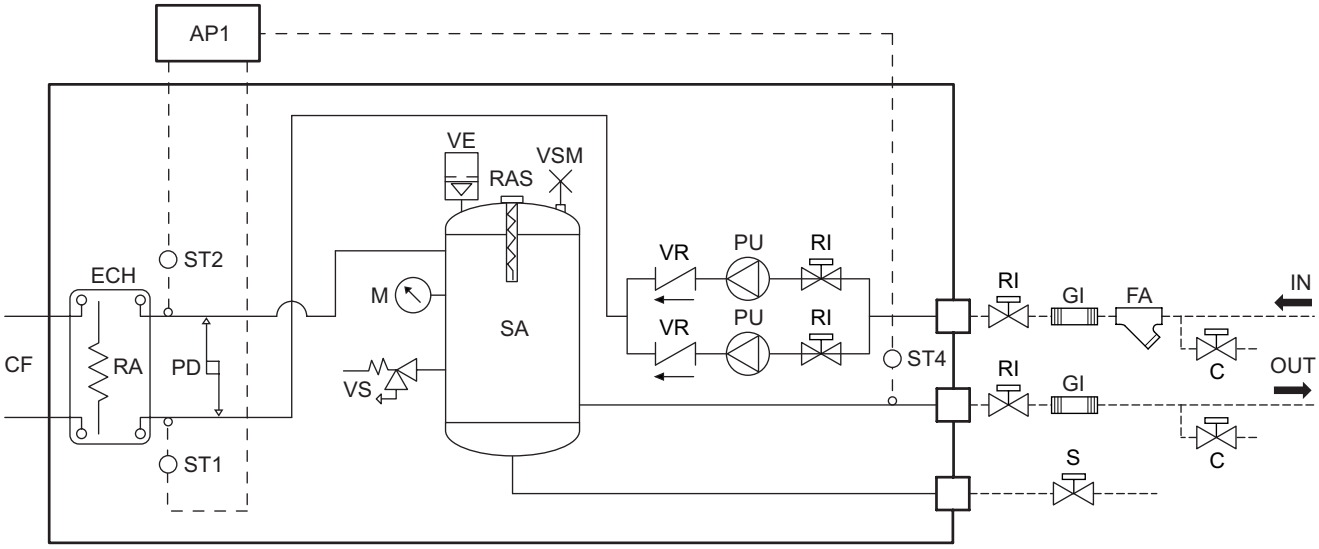


ASDP1 – ASDP2 set-up hydraulic circuit

TCAEY VERSION with plate heat exchanger



THAEY VERSION with plate heat exchanger



CF	Refrigerant circuit
ECH	Plate evaporator
RA	Heat exchanger/anti-freeze resistance
PD	Water differential pressure switch
VSM	Manual bleed valve
VS	safety valve
AP1	Electronic controls
ST1	Primary inlet temperature probe
ST2	Primary outlet temperature probe - work and antifreeze for Standard and Pump set-ups - antifreeze for Tank & Pump set-ups
ST4	Storage tank outlet temperature probe (work)
ST8	Secondary outlet temperature probe (recovery)

VE	Expansion vessel
RAS	Storage tank resistance (accessory)
FA	Mesh filter (set up by the installer)
SA	Storage tank
STE	Tube and shell exchanger (accessory)
M	Manometer
PU	Pump
VR	Check Valve
S	Water drain
C	Supply/drain tap
RI	Shut-off tap
GI	Antivibration connection
- - - -	Connections by installer

TCAEY-THAEY 2110÷4340 WinPACK

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