TCAEY-THAEY 270÷2160

Y-Pack range

Macrosystem
67÷161 kW
79÷175 kW

Packaged air-cooled reversible water chillers and heat pumps with axial fans.
Range with hermetic Scroll compressors and R410A refrigerant gas.

R410A

iDRHOSS system compatible

ADAPTIVE FUNCTION PLUS

EUROVENT CERTIFIED PERFORMANCE

CE

RHOSS CLIMA EVOLUTION

SINCERT

Contents

General Features

Intended Conditions of Use

The TCAEBY, TCAETY, TCAESY and TCAEQY units are packaged air-cooled water chillers with axial fans, available in standard, high temperature/efficiency, silenced and supersilenced versions respectively.
The THAETY an THAESY units are packaged reversible air cooled heat pumps on the cooling cycle with axial fans in the high temperature/efficiency and silenced versions respectively.

They are designed for use in air conditioning or industrial process systems that require cooled water (TCAEBY, TCAETY, TCAESY, TCAEQY) or heated and cooled water (THAETY, THAESY), not water for human consumption.

The units are designed for outdoor installation.

The units comply with the following directives:
- Machinery directive 98/37/EEC (MD);
- Low voltage directive 2006/95/EEC (LVD);
- Electromagnetic compatibility Directive 89/336/EEC (EMC);
- Pressure equipment Directive 97/23/EEC (PED).

Guide to reading the code

"SERIES" code **"MODEL" code**

T	**C**	**A**	**E**	**B** Standard	**Y**	**2**	**70÷160**
Water production unit	Cooling only	Air-cooled	Scroll-type hermetic compressors	**T** High temperature/efficiency	R410A refrigerant fluid	No. compressors	Approximate cooling capacity (in kW)
	H Heat pump			**S** Silenced			
				Q Supersilenced			

Potential installations:

Standard:
Installation without pump and without water buffer tank.

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

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

Example: TCAEQY 290 ASP1
- Water production unit
- Cooling only;
- Air cooled;
- With 2 x hermetic scroll compressors;
- Supersilenced unit;
- With R410A refrigerant fluid;
- Nominal cooling capacity of approximately 90 kW;
- Installation with pump and water buffer tank.

New Y-Pack series

Energy-saving, reliable and versatile water chillers and heat pumps

A complete, flexible range, with three shutter steps

New water chillers and heat pumps, from 70 to 160 kW, in R410A with two scroll compressors of different powers (where envisaged) installed on the same refrigerant circuit to obtain three cooling and heating capacity steps, thus allowing for greater regulation flexibility and greater efficiency when operating at partial loads compared to a chiller unit equipped with a traditional tandem. The efficiency of these units is also boosted by the innovative **AdaptiveFunction Plus** control logic, with which the range is equipped. This logic, developed by *RHOSS* in partnership with the University of Padua, optimises compressor activation and their operating cycles, as well as making it possible to obtain optimum comfort levels in all working conditions and the best performances in terms of energy efficiency during seasonal operation.

LOW ENERGY CONSUMPTION water chillers and heat pumps

The **AdaptiveFunction Plus** "**Economy**" function combines comfort with low energy consumption. In fact, by adjusting the set-point value, it optimises compressor operation on the basis of the actual working conditions.
It is thus possible to achieve significant seasonal energy savings compared to water chillers and heat pumps of an equivalent power with traditional control logic.

HIGH PRECISION water chillers and heat pumps

By using the **AdaptiveFunction Plus** "**Precision**" function, it is possible to achieve as little fluctuation as possible, at partial capacities, in terms of the average Set-point water temperature delivered to the users.

Guaranteed reliability, even with water in the pipes only

Thanks to the "**Virtual Tank**" function, Y-Pack units with **AdaptiveFunction Plus** can operate in systems with a low water content of down to 2 litres/kW, even without the presence of a water buffer tank, whilst still guaranteeing the reliability of the units over time and the good working order of the system.

Estimation of the system's thermal inertia

Y-Pack units with **AdaptiveFunction Plus** are able to estimate the characteristics of the thermal inertia that regulates the system dynamics. This is possible thanks to the "**ACM Autotuning**" function, which processes the information relating to the progress of the water temperatures, identifying the optimal value of the control parameters.

Continuous system autodiagnosis

The estimation function is always active and makes it possible to adapt the control parameters quickly to every change in the water circuit and thus in the system water contents.

Silent operation (VERSIONS T, S and Q)

Thanks to the 3 or 2 shutter steps and the condensation control, installed as standard on all T, S and Q units, the noise level is also reduced at partial loads. For example, during night operation, when the load is reduced but sensitivity to noise is at its peak, the control reduces the number of fan revolutions, the primary noise source in this type of unit, producing obvious benefits in terms of acoustic well-being.

AdaptiveFunction Plus

The new adaptive regulation logic, **AdaptiveFunction Plus**, is an exclusive *RHOSS* patent and the result of a long partnership with the University of Padua. The various algorithm processing and development operations were implemented and tested on units in the Y-PACK range in the *RHOSS* S.p.A. *Research&Development* Laboratory by means of numerous test campaigns.

Objectives

- To guarantee optimal unit operation in the system in which it is installed. ***Evolved adaptive logic.***
- To obtain the best possible performance from a water chiller and a heat pump in terms of energy efficiency at full and partial loads. ***Low consumption chiller.***

Operating logic

In general, the actual control logics on water chillers/heat pumps do not consider the characteristics of the system in which the units are installed; they usually regulate the return water temperature and are positioned so as to ensure the operation of the chillers, giving less priority to the system requirements.
The new **AdaptiveFunction Plus** adaptive logic counters these logics with the objective of optimising the chiller operation on the basis of the system characteristics and the effective thermal load. The controller regulates the delivery water temperature and adjusts itself, as and when required, to the relative operating conditions using:

- the information contained in the return and delivery water temperature to estimate the working conditions thanks to a certain mathematical formula;
- a special adaptive algorithm that uses this estimate to vary the values and the start-up and switch-off limit values of the compressors; the optimised compressor start-up management guarantees a precision water supply to the user, reducing the fluctuation around the set-point value.

Main functions

Efficiency or Precision

Thanks to the evolved control, it is possible to run the chiller on two different regulation settings to obtain the best possible performance in terms of energy efficiency and considerable seasonal savings, or high water delivery temperature precision:

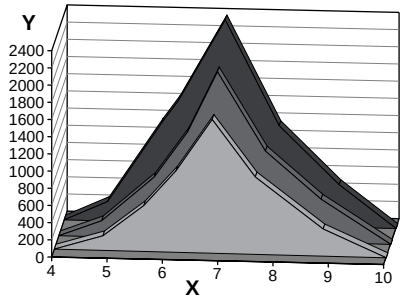
1. Low consumption chiller: Economy" option

It is well known that chillers work at full capacity for just a very small percentage of their operating time, while they work at partial capacity for most of the season. Therefore, the power they need to supply generally differs from the nominal design power, and operation at partial capacity has a noticeable effect on seasonal energy performance and consumption.
This makes it necessary to run the unit so that it is as efficient as possible at partial capacity. The controller therefore ensures that the water delivery temperature is as high as possible (when operating as a chiller) or as low as possible (when operating as a heat pump) whilst compatible with the thermal loads, meaning that it is on a sliding scale, unlike in traditional systems. This prevents energy wastage linked to the maintenance of pointlessly onerous temperature levels for the chiller, ensuring that the ratio between the power to be supplied and the energy to be used to produce it is always at an optimum level. Finally the right level of comfort is available to everyone!

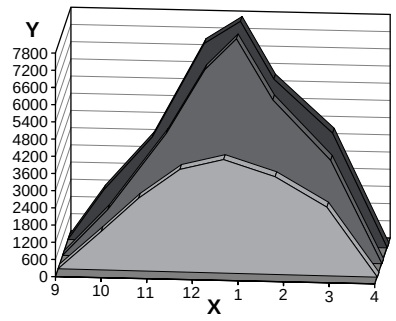
Summer season: the Y-Pack unit, with three shutter steps, offers seasonal energy savings of around 33% when compared to a mono-compressor unit (where envisaged) and around 18% when compared to a standard bi-compressor unit.

Winter season: the Y-Pack unit, with three shutter steps, offers seasonal energy savings of around 41% compared to a mono-compressor unit (where envisaged), and around 36% when compared to a standard bi-compressor unit. Calculations demonstrate that its seasonal consumption is equivalent to that of a **CLASS A** machine.

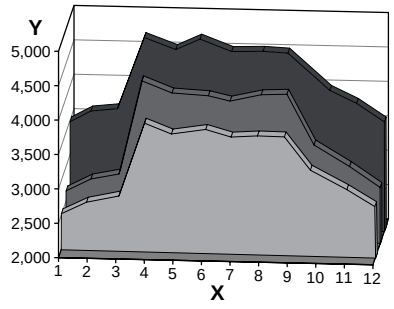
Annual: efficiency over the annual operation of the unit in heat pump mode. ***AdaptiveFunction Plus***, with the "Economy" function, enables the chiller assembly to operate energy-saving programmes whilst still providing the required level of comfort.



X Year divided into months (1 January, 2 February, etc.).
Y Energy consumption (kWh).
Mono-compressor unit with fixed set-point.
Bi-compressor unit, 2 shutter steps with fixed set-point.
Bi-compressor Compact-Y unit, 3 shutter steps with scrolling set-point.



X Year divided into months (1 January, 2 February, etc.).
Y Energy consumption (kWh).
Mono-compressor unit with fixed set-point.
Bi-compressor unit, 2 shutter steps with fixed set-point.
Bi-compressor Compact-Y unit, 3 shutter steps with scrolling set-point.



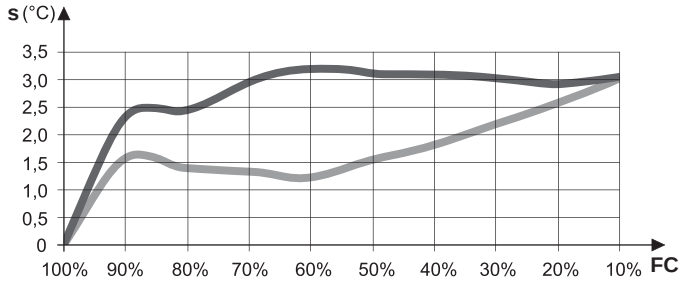
X Year divided into months (1 January, 2 February, etc.).
Y Energy efficiency kWh supplied / kWh absorbed.
Bi-compressor Compact-Y unit, 3 shutter steps with scrolling set-point.
Bi-compressor unit, 2 shutter steps with fixed set-point.
Mono-compressor unit with fixed set-point.

Analysis conducted in an office building in Milan, comparing the operation of:

- *a mono-compressor reversible heat pump, which operates with a fixed set-point (7°C in the summer and 45°C in the winter);*
- *a reversible heat pump unit with two compressors, of equal power, operating on the same refrigerant circuit and working with a fixed set-point (7°C in the summer and 45°C in the winter);*
- *a Compact-Y unit with three shutter steps and **AdaptiveFunction Plus logic**, which operates with a scrolling set-point (range between 7 and 14 °C in the summer, range between 35 and 45°C in the winter).*

*2. High precision: "**Precision**" option*

In this operating mode, the unit works at a fixed set-point and, thanks to the delivery water temperature control and the evolved regulation logic, at a capacity of between 50% and 100% it is possible to guarantee an average fluctuation from the water supply temperature of approximately ± 1.5°C from the set-point value compared to an average fluctuation over time of approximately ± 3°C, which is normally obtained with standard return control. The "**Precision**" option thus guarantees precision and reliability for all those applications that require a regulator that guarantees a more accurate constant water supply temperature, and where there are particular damp control requirements. However, in process applications it is always advisable to use a water buffer tank or a greater system water content to guarantee higher system thermal inertia.

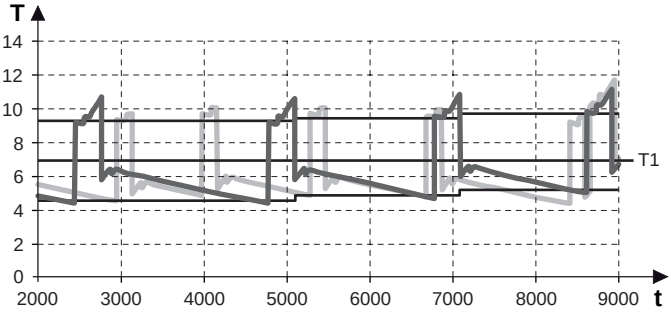


s Fluctuation
FC Load
Unit with water buffer tank, 4 litres/kW in the system and return control.
Unit with water buffer tank, 2 litres/kW in the system and delivery control with "***Precision***" **AdaptiveFunction Plus function**

*The chart illustrates the fluctuations of the water temperature from the set value for the various capacities, demonstrating how a unit with delivery control and the **AdaptiveFunction Plus** "**Precision**" function guarantees greater water supply temperature precision*

Virtual Tank: guaranteed reliability, even with water in the pipes only

A low water content in the system can cause the chiller units/heat pumps to be unreliable and can generate system instability and lack of performance. Thanks to the **Virtual Tank** function, this is no longer a problem. The unit can operate in systems with just **2 litres/kW** in the pipes given that the control is able to compensate for the lack of inertia specific to a water buffer tank, "muffling" the control signal, preventing the compressor from switching on and off in an untimely fashion and reducing the average fluctuation of the set-point value.



T Water temperature (°C)
t Time (s)
T1 Set-point temperature
Delivery temperature with Virtual Tank
Delivery temperature without Virtual Tank

*The chart shows the various chiller outlet temperatures considering capacity of 80%. We can observe how the temperatures of the unit with **AdaptiveFunction Plus** logic and the **Virtual Tank** function is far less varied and more stable over time, with average temperatures closer to the working set-point compared to a unit without the **Virtual Tank** function. Moreover, we can see how the unit with **AdaptiveFunction Plus** logic and the **Virtual Tank** function switches the compressor on less often over the same period of time, with obvious advantages in terms of energy consumption and system reliability.*

ACM Autotuning compressor management

AdaptiveFunction Plus enables the Y-Pack units to adapt to the system they are serving, so as to always identify the best compressor operating parameters in the different working conditions.
During the initial operating phases, the special "**Autotuning**" function enables the Y-Pack unit with **AdaptiveFunction Plus** to estimate the thermal inertia characteristics that regulate the system dynamics. The function, which is automatically activated when the unit is switched on for the first time, executes a number of set operating cycles, during which it processes the information relative to the water temperatures. It is thus possible to estimate the physical characteristics of the system and to identify the optimal value of the parameters to be used for the control.
At the end of this initial auto-estimate phase, the "**Autotuning**" function remains active, making it possible to adapt the control parameters quickly to every change in the water circuit and thus in the system water contents.

TCAEBY TCAETY TCAESY TCAEQY THAETY THAESY Models 270÷2160

Construction features

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

Versions

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

Potential installations

Standard:
Installation without pump and without water buffer tank.

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

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

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

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

Electrical board

○ Electrical board accessible by opening the front panel, conforming with current IEC norms, can be opened and closed with a suitable tool.
○ Complete with:
• electrical wiring arranged for power supply 400-3ph+N-50Hz;
• auxiliary power supply 230V-1ph-50Hz drawn from the main power supply;
• control power supply 24V-1ph-50Hz drawn from the main power supply;
• general isolator, complete with door interlocking isolator;
• automatic thermal overload switch to protect the compressors and the motor-driven fans;
• protection fuse for the auxiliary circuit;
• power contactor for the compressors;
• remote machine controls: remote ON/OFF, summer/winter selector;
• remote machine controls: compressor operating light, general lock light;
○ Programmable electronic board with microprocessor, controlled by the keyboard inserted in the machine.
○ This electronic board performs the following functions:
• regulation and management of the set points for unit outlet water temperature; cycle inversion (THAETY-THAESY); safety timer delays; circulating pump; compressor and system pump hour-run meter; pressurised defrost cycles; electronic anti-freeze protection which cuts in automatically when the machine is switched off; and the functions which control the operation of the individual parts making up the machine;
• complete protection of the unit, automatic emergency shutdown and display of the alarms which have been activated;
• compressor protection phase sequence monitor;
• unit protection against low or high phase power supply voltage;
• display of the programmed set-points on the display; of the water in/out temperatures on the display; of the condensation and condensation/evaporation pressures (THAETY-THAESY); of the electrical voltage values in the three phases of the electrical circuit that powers the unit; of the alarms on the display; of the chiller or heat pump function on the display (THAETY-THAESY);
• user interface menu;
• automatic pump operating time balance (DP1-DP2, ASDP1- ASDP2 installations);

- automatic activation of the pump in standby in the event of an alarm (DP1-DP2, ASDP1-ASDP2 installations);
- display of the heat recovery/desuperheater inlet water temperature;
- alarm code and description;
- alarm history management (menu protected by manufacturer password).

○ The following is memorized for each alarm:

- date and time of intervention (if the KSC accessory is present);
- inlet/outlet water temperatures when the alarm intervened;
- the condensation pressure values at the time of the alarm, if the FI10 accessory is present for TCAEBY models and always for versions T, S and Q.
- alarm delay time from the switch-on of the connected device;
- compressor status at moment of alarm;

○ Advanced functions:

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

○ Set-point regulation via the ***Adaptive Function Plus*** with two options:

- fixed set-point (***Precision*** options);
- scrolling set-point (***Economy*** option).

Accessories

Factory fitted accessories

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

Accessories supplied loose

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

Technical data

Table "A": Technical data

TCAEBY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	67,5	75,3	83,0	96,0	110,5	120,5	138,5	155,0
E.E.R. (3rd step, 100%)		2,65	2,69	2,56	2,69	2,72	2,64	2,66	2,61
E.E.R. (2nd step)		3,44	3,59	3,41	3,36	3,28	3,34	3,33	3,26
E.E.R. (1st step)		3,58	-	3,71	3,74	3,36	-	3,50	-
E.S.E.E.R.		3,96	3,95	3,92	4,01	4,06	3,96	3,94	3,87
Sound pressure (3rd step, 100%) (***)	dB(A)	60	60	60	62	68	68	68	69
Sound power level (3rd step 100%) (****)	dB(A)	82	82	82	84	90	90	90	91
Sound power level (2nd step) (****)	dB(A)	81	79	81	83	88	87	88	88
Sound power level (1st step) (****)	dB(A)	76	-	76	78	83	-	83	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	2x0.69	2x0.69	2x0.69	3x0.69	2x2.00	2x2.00	2x2.00	3x2.00
Fan nominal air flow	m³/h	20800	20400	20200	30600	41200	41000	40000	58800
Water side heat exchanger water content	l	5.0	6.1	6.1	6.9	8.4	8.4	9.9	11.1
Water side exchanger nominal water flow (*)	m³/h	11,6	12,9	14,5	16,5	19,0	20,7	23,8	26,6
Nominal pressure drops, water side heat exchanger (*)	kPa	40	35	41	44	41	47	46	48
Residual static pressure P1 (*)	kPa	139	137	125	116	110	97	148	131
Residual static pressure P2 (*)	kPa	260	255	255	244	236	223	278	259
Residual static pressure ASP1 (*)	kPa	137	133	124	114	108	94	144	126
Residual static pressure ASP2 (*)	kPa	257	252	253	242	234	219	274	254
Tank water content (ASP1/ASP2)	l	250	250	250	250	250	250	250	250
R410A refrigerant charge		See serial No. plate							
Polyester oil charge		See compressor plate							
Electrical data									
Absorbed power (*) (●)	kW	25,5	28,0	32,4	35,7	40,6	45,6	52,1	59,4
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1,1/2,2	1,1/2,2	1,5/3,0	1,5/3,0	1,5/3,0	1,5/3,0	2,2/4,0	2,2/4,0
Electrical power supply	V-ph-Hz	400 – 3+N – 50							
Auxiliary power supply	V-ph-Hz	230 – 1+N – 50							
Control power supply	V-ph-Hz	24 – 1 – 50							
Nominal current (■)	A	47,0	52,3	55,4	64,1	71,9	80,3	89,7	103,1
Maximum current (■)	A	58,0	62,5	66,5	76,0	88,0	97,0	110,0	117,0
Start-up current (■)	A	201,0	205,5	255,5	304,0	316,0	324,0	362,0	380,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,3/8,1	5,3/8,1
Dimensions									
Width (L)	mm	2650	2650	2650	3150	3150	3150	3150	3450
Height (H)	mm	1700	1700	1700	1700	1730	1730	1730	1730
Depth (P)	mm	1210	1210	1210	1210	1210	1210	1210	1210
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

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

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

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

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

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

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

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

N.B.:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 29.
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.

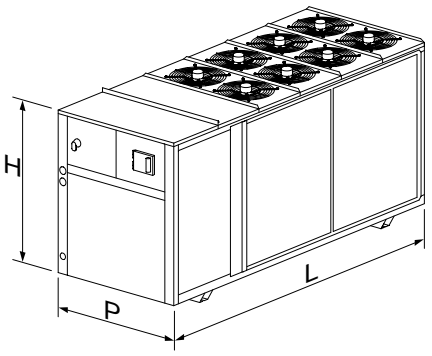


Table "A": Technical data

TCAETY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	70,3	79,5	88,0	101,2	114,5	126,0	143,0	161,0
E.E.R. (3rd step, 100%)		2,98	2,99	2,90	2,90	2,93	2,91	2,90	2,90
E.E.R. (2nd step)		3,87	3,83	3,72	3,58	3,57	3,64	3,49	3,63
E.E.R. (1st step)		4,03	-	4,03	3,97	3,66	-	3,63	-
E.S.E.E.R.		4,32	4,37	4,35	4,32	4,37	4,31	4,29	4,26
Sound pressure (3rd step, 100%) (***)	dB(A)	55	56	56	57	60	60	62	62
Sound power level (3rd step 100%) (****)	dB(A)	76	77	77	78	84	84	85	85
Sound power level (2nd step) (****)	dB(A)	75	74	76	72	83	81	84	82
Sound power level (1st step) (****)	dB(A)	70	-	71	72	78	-	79	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.69	4x0.69	6x0.69	6x0.69
Fan nominal air flow	m³/h	22800	28400	28400	31500	40800	39800	56700	54300
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	12,1	13,6	15,1	17,4	19,6	21,6	24,5	27,6
Nominal pressure drops, water side heat exchanger (*)	kPa	42	37	45	47	42	51	49	51
Residual static pressure P1 (*)	kPa	134	129	119	110	106	90	141	122
Residual static pressure P2 (*)	kPa	254	247	248	238	232	214	270	249
Residual static pressure ASP1 (*)	kPa	131	125	117	108	103	86	136	117
Residual static pressure ASP2 (*)	kPa	251	243	246	236	229	211	266	244
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge		See serial No. plate							
Polyester oil charge		See compressor plate							
Electrical data									
Absorbed power (*) (●)	kW	23,6	26,6	30,3	34,9	39,1	43,3	49,3	55,5
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1.1/2.2	1.1/2.2	1.5/3.0	1.5/3.0	1.5/3.0	1.5/3.0	2.2/4.0	2.2/4.0
Electrical power supply	V-ph-Hz	400 – 3+N – 50							
Auxiliary power supply	V-ph-Hz	230 – 1+N – 50							
Control power supply	V-ph-Hz	24 – 1 – 50							
Nominal current (■)	A	43,5	49,7	51,8	62,7	69,4	76,3	84,9	96,5
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

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

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

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

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

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

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

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

N.B.:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 29.
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.

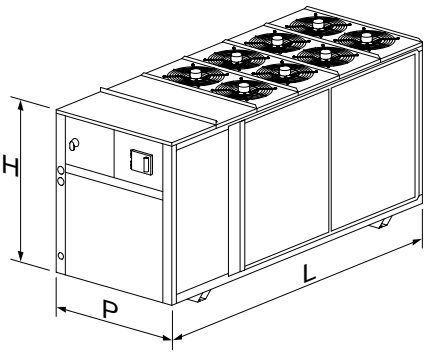


Table "A": Technical data

TCAESY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	70,3	79,5	88,0	101,2	108,0	119,0	136,0	151,0
E.E.R. (3rd step, 100%)		2,98	2,99	2,90	2,90	2,67	2,67	2,63	2,60
E.E.R. (2nd step)		3,87	3,83	3,72	3,58	3,47	3,56	3,33	3,51
E.E.R. (1st step)		4,03	-	4,03	3,97	3,61	-	3,55	-
E.S.E.E.R.		4,32	4,37	4,35	4,32	3,98	3,95	3,95	3,90
Sound pressure (3rd step, 100%) (***)	dB(A)	53	54	54	55	57	57	58	58
Sound power level (3rd step 100%) (****)	dB(A)	74	75	75	76	81	81	82	82
Sound power level (2nd step) (****)	dB(A)	73	72	74	75	80	78	81	79
Sound power level (1st step) (****)	dB(A)	68	-	69	70	75	-	76	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.48	4x0.48	6x0.48	6x0.48
Fan nominal air flow	m³/h	22800	28400	28400	31500	32200	31600	45000	42000
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	12,1	13,6	15,1	17,4	18,5	20,4	23,3	25,9
Nominal pressure drops, water side heat exchanger (*)	kPa	42	37	45	47	40	47	46	47
Residual static pressure P1 (*)	kPa	134	129	119	110	113	98	150	136
Residual static pressure P2 (*)	kPa	254	247	248	238	240	223	279	264
Residual static pressure ASP1 (*)	kPa	131	125	117	108	110	95	146	131
Residual static pressure ASP2 (*)	kPa	251	243	246	236	237	220	276	259
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See compressor plate				
Electrical data									
Absorbed power (*) (●)	kW	23,6	26,6	30,3	34,9	40,4	44,6	51,7	58,1
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1.1/2.2	1.1/2.2	1.5/3.0	1.5/3.0	1.5/3.0	1.5/3.0	2.2/4.0	2.2/4.0
Electrical power supply	V-ph-Hz				400 – 3+N – 50				
Auxiliary power supply	V-ph-Hz				230 – 1+N – 50				
Control power supply	V-ph-Hz				24 – 1 – 50				
Nominal current (■)	A	43,5	49,7	51,8	62,7	71,6	78,5	89,0	101,0
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2.6/5.0	2.6/5.0	3.5/6.0	3.5/6.0	3.5/6.0	3.5/6.0	5.0/8.1	5.0/8.1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

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

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

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

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

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

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

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

N.B.:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 29.
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.

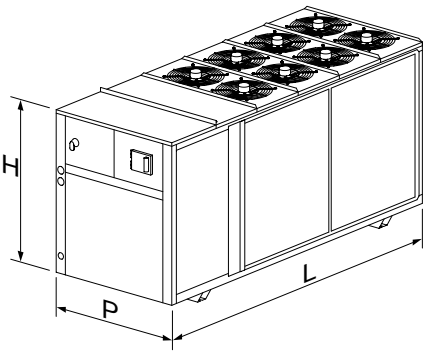


Table "A": Technical data

TCAEQY model		270	280	290	2100	2115	2130	2145	2160
Nominal coding capacity (*)	kW	67,0	75,0	82,5	95,0	101,0	108,0	125,0	138,0
E.E.R. (3rd step, 100%)		2,70	2,85	2,62	2,73	2,34	2,30	2,32	2,20
E.E.R. (2nd step)		3,65	3,80	3,49	3,46	3,30	3,38	3,18	3,28
E.E.R. (1st step)		3,86	-	3,85	4,01	3,55	-	3,52	-
E.S.E.E.R.		3,92	4,16	3,93	4,07	3,49	3,40	3,48	3,30
Sound pressure (3rd step, 100%) (***)	dB(A)	51	52	52	53	54	54	55	55
Sound power level (3rd step 100%) (****)	dB(A)	72	73	73	74	78	78	79	79
Sound power level (2nd step) (***)	dB(A)	71	71	72	73	77	75	78	76
Sound power level (1st step) (****)	dB(A)	67	-	68	68	72	-	73	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.09	8x0.09	8x0.09	10x0.09	4x0.34	4x0.34	6x0.34	6x0.34
Fan nominal air flow	m³/h	19200	24000	24000	26500	23200	22800	32400	30300
Water side heat exchanger water content	l	5,0	6,1	6,1	6,9	8,4	8,4	9,9	11,1
Water side exchanger nominal water flow (*)	m³/h	11,5	12,9	14,2	16,3	17,3	18,5	21,4	23,7
Nominal pressure drops, water side heat exchanger (*)	kPa	40	36	43	44	35	41	41	41
Residual static pressure P1 (*)	kPa	140	136	123	116	122	111	164	154
Residual static pressure P2 (*)	kPa	260	254	253	244	249	238	295	283
Residual static pressure ASP1 (*)	kPa	137	132	122	114	120	109	160	149
Residual static pressure ASP2 (*)	kPa	257	251	252	242	247	236	291	279
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge		See serial No. plate							
Polyester oil charge		See compressor plate							
Electrical data									
Absorbed power (*) (●)	kW	24,8	26,3	31,5	34,8	43,2	47,0	53,9	62,7
Pump absorbed power (P1/ASP1) / (P2/ASP2)	kW	1.1/2.2	1.1/2.2	1.5/3.0	1.5/3.0	1.5/3.0	1.5/3.0	2.2/4.0	2.2/4.0
Electrical power supply	V-ph-Hz	400 – 3+N – 50							
Auxiliary power supply	V-ph-Hz	230 – 1+N – 50							
Control power supply	V-ph-Hz	24 – 1 – 50							
Nominal current (■)	A	45,7	49,2	53,9	62,5	76,6	82,4	92,5	109,1
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2.6/5.0	2.6/5.0	3.5/6.0	3.5/6.0	3.5/6.0	3.5/6.0	5.0/8.1	5.0/8.1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

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

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

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

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

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

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

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

N.B.:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 29.
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.

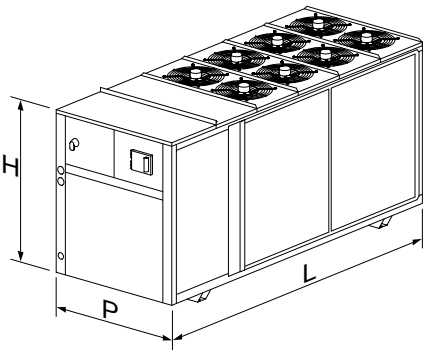


Table "A": Technical data

THAETY model		270	280	290	2100	2115	2130	2145	2160
Nominal cooling capacity (*)	kW	69,4	77,7	85,2	99,3	111,0	123,8	141,3	159,8
E.E.R. (3rd step, 100%)		2,92	2,93	2,84	2,85	2,87	2,85	2,84	2,84
E.E.R. (2nd step)		3,74	3,76	3,64	3,48	3,50	3,56	3,42	3,55
E.E.R. (1st step)		3,95	-	3,89	3,85	3,59	-	3,55	-
E.S.E.E.R.		4,19	4,24	4,22	4,19	4,24	4,18	4,16	4,14
Nominal heating capacity (**)	kW	79,0	86,0	96,0	111,0	122,0	139,0	157,0	175,0
C.O.P.		3,36	3,44	3,29	3,34	3,21	3,31	3,22	3,21
Sound pressure (3rd step, 100%) (***)	dB(A)	55	56	56	57	60	60	62	62
Sound power level (3rd step 100%) (****)	dB(A)	76	77	77	78	84	84	85	85
Sound power level (2nd step) (***)	dB(A)	75	74	76	77	83	81	84	82
Sound power level (1st step) (****)	dB(A)	70	-	71	72	78	-	79	-
Scroll/step compressor	No.	2/3	2/2	2/3	2/3	2/3	2/2	2/3	2/2
Circuits	No.	1	1	1	1	1	1	1	1
Fans	No. x kW	6x0.14	8x0.14	8x0.14	10x0.14	4x0.69	4x0.69	6x0.69	6x0.69
Fan nominal air flow	m³/h	22800	28400	28400	31500	40800	39800	56700	54300
Water side heat exchanger water content	l	6,9	8,4	8,4	9,9	11,1	12,6	14,9	17,4
Water side exchanger nominal water flow (*)	m³/h	11,9	13,3	14,6	17,0	19,0	21,2	24,2	27,4
Nominal pressure drops, water side heat exchanger (*)	kPa	25	22	26	26	26	27	27	28
Nominal pressure drops, water side heat exchanger (**)	kPa	32	27	33	33	33	34	34	34
Residual static pressure P1 (*)	kPa	153	147	139	132	124	115	164	146
Residual static pressure P2 (*)	kPa	273	265	268	260	251	239	294	274
Residual static pressure ASP1 (*)	kPa	150	143	137	130	122	112	160	141
Residual static pressure ASP2 (*)	kPa	270	261	267	258	248	236	289	268
Tank water content (ASP1/ASP2)	l	250	250	250	250	450	450	450	450
R410A refrigerant charge		See serial No. plate							
Polyester oil charge		See compressor plate							
Electrical data									
Absorbed power in summer operation (*) (●)	kW	23,8	26,5	30,0	34,9	38,7	43,4	49,7	56,2
Absorbed power in winter operation (**) (●)	kW	23,5	25,0	29,2	33,2	38,0	42,0	48,8	54,5
Pump absorbed power (P1/ASP1(/ (P2/ASP2)	kW	1.1/2.2	1.1/2.2	1.5/3.0	1.5/3.0	1.5/3.0	1.5/3.0	2.2/4.0	2.2/4.0
Electrical power supply	V-ph-Hz	400 – 3+N – 50							
Auxiliary power supply	V-ph-Hz	230 – 1+N – 50							
Control power supply	V-ph-Hz	24 – 1 – 50							
Nominal current in summer operation (*) (■)	A	43,8	49,6	51,2	62,0	68,9	76,4	85,6	97,7
Nominal current in winter operation (**) (■)	A	43,3	46,7	49,9	59,7	67,4	74,0	84,0	95,7
Maximum current (■)	A	60,5	66,5	70,5	80,5	83,0	92,0	106,0	117,0
Start-up current (■)	A	203,5	209,5	259,5	308,5	311,0	319,0	358,0	372,0
Pump absorbed power (P1/ASP1) / (P2/ASP2)	A	2,6/5,0	2,6/5,0	3,5/6,0	3,5/6,0	3,5/6,0	3,5/6,0	5,0/8,1	5,0/8,1
Dimensions									
Width (L)	mm	3150	3150	3150	3150	3250	3250	3250	3250
Height (H)	mm	1520	1520	1520	1520	2000	2000	2000	2000
Depth (P)	mm	1210	1210	1210	1210	1520	1520	1520	1520
Exchanger inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"
DS/RC100 inlet/outlet connections	Ø	2"	2"	2"	2"	2"	2"	2"	2"

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

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

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

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

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

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

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

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

N.B.:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 29.
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.

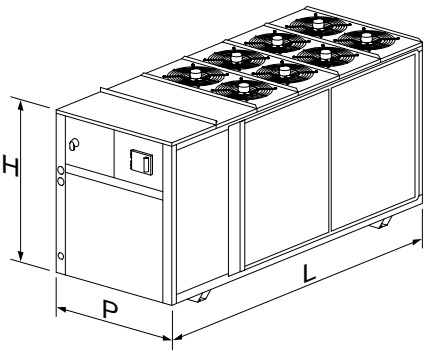


Table "A": Technical data

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

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

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

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

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

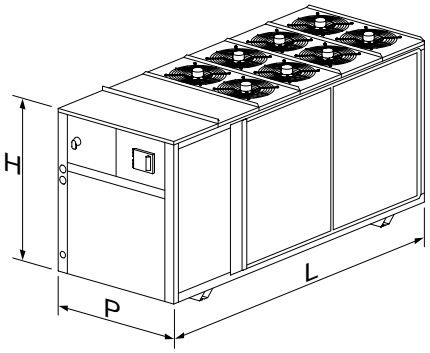
(****) Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

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

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

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

N.B.:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 29.
The calculation of the E.E.R. and C.O.P. does not take the pump absorption into account.



Energy efficiency at partial loads - ESEER index

○ The E.E.R. index represents an estimate of the energy efficiency of the cooling unit in nominal design conditions. In reality, the operating time of a chiller in nominal conditions is usually less than the operating time in partial load conditions.
○ The I.P.L.V. (Integrated Part Load Value) and E.S.E.E.R. (European Seasonal E.E.R.) indices estimate the average seasonal energy efficiency of the chiller in four load and external air temperature conditions. Generally, two water chillers with the same E.E.R. may have different I.P.L.V. or E.S.E.E.R. values. In fact, for an air-cooled chiller, the average energy efficiency depends on design choices and on the inlet air temperature at the condensing heat exchanger.
○ The I.P.L.V. and E.S.E.E.R. energy indices, respectively introduced by the A.R.I. (American Refrigeration Institute – A.R.I. standard 550/590) and the European Community (E.E.C.C.A.C. - Energy Efficiency and Certification of Central Air Conditioners project) have the same formula, but differ in terms of the external air temperatures (see table "**B**") and by the energy weights assigned to the four load conditions considered in the calculation: 100%, 75%, 50% and 25%.

$$IPLV = \frac{1xEER_{100\%} + 42xEER_{75\%} + 45xEER_{50\%} + 12xEER_{25\%}}{100}$$

$$ESEER = \frac{3xEER_{100\%} + 33xEER_{75\%} + 41xEER_{50\%} + 23xEER_{25\%}}{100}$$

where EER100% EER75% EER50% EER25% represent the efficiencies of the cooling unit in the four load conditions and at the temperatures indicated in table "**B**".
The data is calculated using Eurovent methodology. The pump absorption (if present) is not taken into consideration.

Table "B": load and temperature conditions

Load	Condenser inlet air temperature	
	I.P.L.V.	E.S.E.E.R.
100%	35.0°C	35.0°C
75%	26.7°C	30.0°C
50%	18.3°C	25.0°C
25%	12.8°C	20.0°C

○ Table "**C**" shows the E.E.R., E.S.E.E.R. and I.P.L.V. values for each model.
The high energy efficiency values at partial loads have been obtained thanks to the use of the R410A refrigerant, the optimisation of the heat exchangers and the optimal management of the 2/3 chiller shutter steps.

Table "C": E.E.R. - E.S.E.E.R. for TCAEBY

Model	E.E.R.	E.S.E.E.R.	I.P.L.V.
270	2,65	3,96	4,44
280	2,69	3,95	4,36
290	2,56	3,92	4,34
2100	2,69	4,01	4,45
2115	2,72	4,06	4,52
2130	2,64	3,96	4,40
2145	2,66	3,94	4,40
2160	2,61	3,87	4,34

Table "C": E.E.R. - E.S.E.E.R. for TCAETY

Model	E.E.R.	E.S.E.E.R.	I.P.L.V.
270	2,98	4,32	4,84
280	2,99	4,37	4,83
290	2,90	4,35	4,82
2100	2,90	4,32	4,80
2115	2,93	4,37	4,87
2130	2,91	4,31	4,79
2145	2,90	4,29	4,80
2160	2,90	4,26	4,78

Table "C": E.E.R. - E.S.E.E.R. for TCAESY

Model	E.E.R.	E.S.E.E.R.	I.P.L.V.
270	2,98	4,32	4,84
280	2,99	4,37	4,83
290	2,90	4,35	4,82
2100	2,90	4,32	4,80
2115	2,67	3,98	4,44
2130	2,67	3,95	4,39
2145	2,63	3,95	4,41
2160	2,60	3,90	4,37

Table "C": E.E.R. - E.S.E.E.R. for TCAEQY

Model	E.E.R.	E.S.E.E.R.	I.P.L.V.
270	2,70	3,92	4,38
280	2,85	4,16	4,60
290	2,62	3,93	4,35
2100	2,73	4,07	4,52
2115	2,34	3,49	3,89
2130	2,30	3,40	3,79
2145	2,32	3,48	3,89
2160	2,20	3,30	3,70

Table "C": E.E.R. - E.S.E.E.R. for THAETY

Model	E.E.R.	E.S.E.E.R.	I.P.L.V.
270	2,92	4,19	4,69
280	2,93	4,24	4,68
290	2,84	4,22	4,67
2100	2,85	4,19	4,65
2115	2,87	4,24	4,73
2130	2,85	4,18	4,65
2145	2,84	4,16	4,65
2160	2,84	4,14	4,63

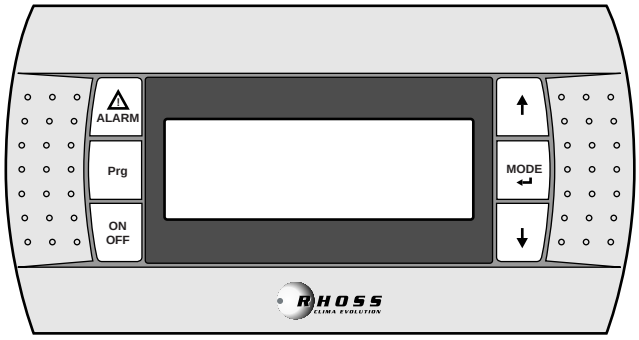
Table "C": E.E.R. - E.S.E.E.R. for THAESY

Model	E.E.R.	E.S.E.E.R.	I.P.L.V.
270	2,92	4,19	4,69
280	2,93	4,24	4,68
290	2,84	4,22	4,67
2100	2,85	4,19	4,65
2115	2,61	3,86	4,31
2130	2,62	3,83	4,26
2145	2,58	3,83	4,28
2160	2,55	3,78	4,24

Electronic controls

Electronic control

The keyboard with display makes it possible to view the working temperature and all the unit process variables, as well as providing access to setting parameters for operating set points and their modification. For purposes of technical assistance, it allows password-protected access to the unit's management parameters (access for authorised personnel only).



DISPLAY:
displays the numbers and values of all the parameters (e.g. output water temperature etc.), the codes of any alarms and the status of all the resources using strings.

ALARM key:
allows display of the code and the resetting of any alarms.

PRG key:
allows the programming of essential parameters for machine operation.

ON/OFF key:
allows the unit to be turned on or off.

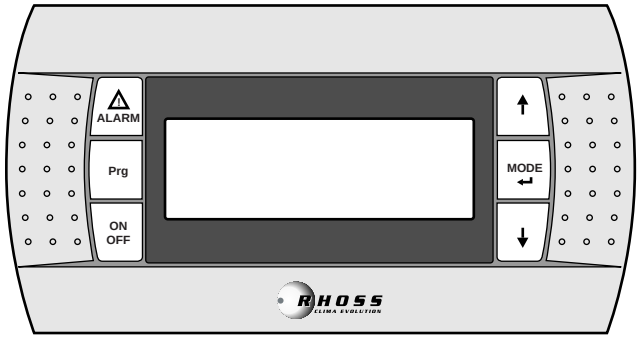
UP key :
used to scroll through the list of parameters, statuses and any alarms; makes it possible to change set-points.

MODE - ENTER key:
allows changeover between chiller and heat pump operation..

Down key :
used to scroll through the list of parameters, statuses and any alarms; makes it possible to change set-points.

KTR – Remote keyboard

The remote keyboard with display (KTR) allows the remote control and display of all the unit's digital and analogue process variables. It therefore possible to control all the machine functions directly in the room. It allows setting and management of time periods (if KSC accessory is included).



DISPLAY:
displays the numbers and values of all the parameters (e.g. output water temperature etc.), the codes of any alarms and the status of all the resources using strings.

ALARM key:
allows display of the code and the resetting of any alarms.

PRG key:
allows the programming of essential parameters for machine operation.

ON/OFF key:
allows the unit to be turned on or off.

UP key :
used to scroll through the list of parameters, statuses and any alarms; makes it possible to change set-points.

MODE - ENTER key:
allows changeover between chiller and heat pump operation..

Down key :
used to scroll through the list of parameters, statuses and any alarms; makes it possible to change set-points.

Note:
The temporary presence of two devices, on-board machine keyboard and remote keyboard, will cause the on-board machine terminal to be disabled. Three dashes (**- - -**) will be displayed on the interface on the machine, indicating the presence of the remote keypad (KTR).

Serial connection

Serial connection

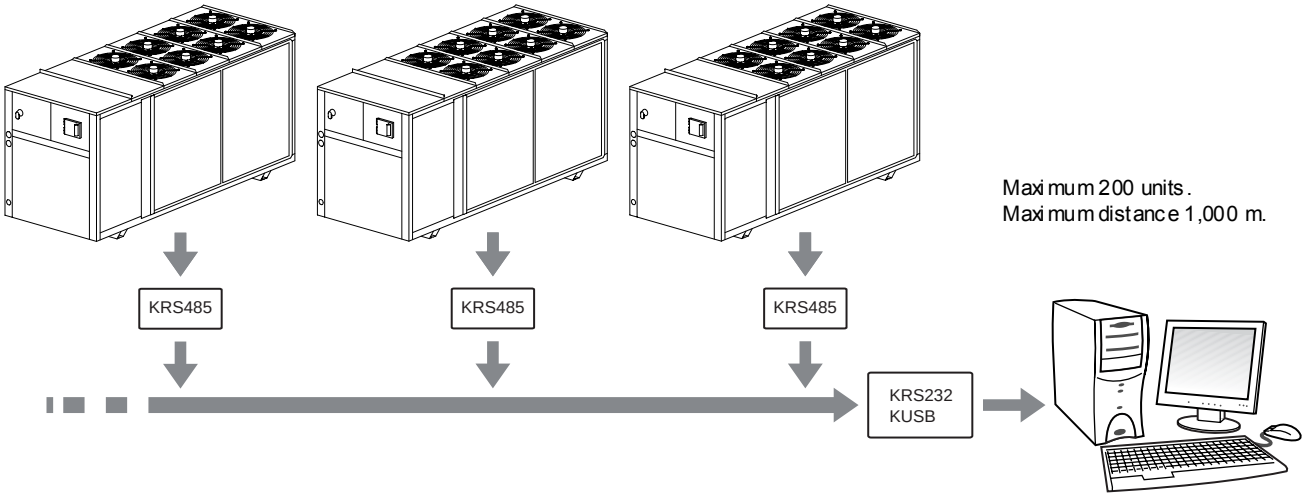
All units are equipped with electronic control that is set up interface with an external BMS via a serial communication line by means of the KRS485 serial interface accessory (proprietary protocol or ModBus® RTU) and the following converters.

- **KRS232** – RS485/RS232 converter for connection to supervision systems;
- **KUSB –** RS485/USB converter for connection to supervision systems.
- The FTT10 LonWorks® compatible interface is also available.

Supervision

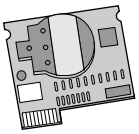
In general, a supervision system allows access to all unit functions, such as:

- making all settings which are accessible through the keyboard;
- reading all process variables of the inputs and outputs, whether digital or analogue;
- reading the various alarm codes which are present, and resetting them as necessary.



KSC – Clock card

Insertion of the clock card (KSC) favours flexible and efficient use of the unit, showing the date/time and allowing management of the machine in daily or weekly start/stop time periods, with the possibility to change set-points. The time periods can be set and managed from the keyboard.



Example of display

Performance

Choice of a chiller or heat pump and use of the performance tables

○ For each model, table "**D**" provides the cooling capacity (**QF**), and the total absorbed electric power (**P**), on the basis of the evaporator outlet water temperature with constant temperature differences **ΔT** = 5°C: the value of **QT** is the value of the heating capacity available to the user in winter mode.
○ Within the operating limits, the values in table "**D**" may permit performance interpolations. However, extrapolations are not permitted.
○ Table "**H**" shows the values of the corrective coefficients to be applied to the nominal values if water with glycol is used.
○ Graph "**1"** shows the pressure drop values of the exchangers (with respect to the indicated temperature differentials).
○ Graph "**2**" indicates the useful static pressure of the pump (if present).

Example

○ Design conditions for a water-cooled chiller with installation P1:
- Requested cooling capacity = 82.7 kW;
- Temperature of water produced at evaporator = 13°C;
- Temperature differential **ΔT** at the evaporator = 5°C;
- Inlet air temperature at condenser = 30°C.

Using the values indicated in table "**D**", and supposing a temperature differential of **ΔT**=5°C at the evaporator, it can be seen that model TCAEBY 270 meets the requirement with:
QF = 82.7 kW; **P** = 24.4 kW;

The water flow rates **G** to be sent to the exchangers are obtained using the following formulae:
G (l/h) evaporator =
(**QF** x 860)÷**ΔT** = (82.7 x 860)÷5 = 14224 (l/h);

Graph "**1**" shows the pressure drop values **Δpw** of the evaporator.
Δpw evaporator = 58 kPa;
Graph "**2**" shows the residual static pressure values **Δpr** available at the machine outlet 104 kPa.

Calculation of the flow at different Δt:

For machines with **Pump** and **Tank&Pump** installations, it is important to check the performance of the pump if the unit has to operate with **Δt** other than the nominal one at the exchanger. The calculation of the water flow at an **Δt** of other than 5°C can be achieved by applying the following formula:

G' = **G** x **Δt** / **Δt'**

With G and G' expressed in l/h and Δt and Δt' in °C.

For example, in order to establish the flow G' of the TCAETY 2100 P1 unit, operating with a temperature differential at the evaporator of **Δt'** = 4°C and knowing that in nominal conditions, with **Δt** = 5°C, the flow **G** = 17400 l/h (table **A** Technical Data), we apply the formula indicated and obtain:

G' = 17400 x 5 / 4 = 21750 l/h

Using Graph "**2**" at the identified flow, the useful static pressure is equal to 72 kPa.

Performance data

Table "D": TCAEBY cooling capacity (ΔT = 5°C at the evaporator)

Model	Tue (°C)	Ta (°C)									
		25		30		35		40		43	
		QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	5	72,0	21,0	68,3	23,0	64,2	25,2	59,9	27,5	57,1	29,0
	7	75,7	21,3	71,8	23,3	**67,5**	**25,5**	63,0	27,9	60,2	29,4
	9	79,3	21,7	75,4	23,7	71,0	25,9	66,3	28,3	63,2	29,8
	11	83,3	22,0	78,9	24,0	74,4	26,2	69,5	28,6	-	-
	13	87,0	22,4	82,7	24,4	77,9	26,6	73,0	29,0	-	-
	15	90,8	22,7	86,2	24,7	81,5	27,0	76,3	29,4	-	-
280	5	80,0	23,0	75,9	25,2	71,4	27,6	66,8	30,2	63,8	31,9
	7	84,2	23,4	80,0	25,6	**75,3**	**28,0**	70,4	30,6	67,3	32,3
	9	88,5	23,8	84,0	26,0	79,1	28,4	74,1	31,0	70,9	32,7
	11	92,7	24,2	88,1	26,4	83,1	28,8	77,7	31,4	-	-
	13	97,1	24,6	92,2	26,7	87,0	29,2	81,7	31,8	-	-
	15	101,4	24,9	96,4	27,1	91,0	29,6	85,4	32,2	-	-
290	5	89,0	26,6	84,0	29,1	78,8	31,9	73,4	35,0	69,9	36,9
	7	93,6	27,1	88,4	29,6	**83,0**	**32,4**	77,3	35,4	73,8	37,4
	9	98,2	27,6	92,8	30,1	87,2	32,9	81,4	36,0	77,8	37,9
	11	102,9	28,1	97,4	30,6	91,5	33,4	85,5	36,5	-	-
	13	107,6	28,6	101,7	31,1	95,8	33,9	89,6	37,0	-	-
	15	112,3	29,1	106,5	31,6	100,3	34,5	93,7	37,5	-	-
2100	5	102,9	29,5	97,4	32,2	91,3	35,2	84,9	38,5	81,0	40,5
	7	108,1	30,0	102,3	32,7	**96,0**	**35,7**	89,6	39,0	85,5	41,0
	9	113,5	30,5	107,3	33,2	101,0	36,2	94,0	39,4	89,8	41,5
	11	118,8	31,0	112,5	33,7	105,9	36,7	98,7	40,0	-	-
	13	124,2	31,5	117,6	34,2	110,7	37,2	103,4	40,5	-	-
	15	129,8	32,0	122,9	34,8	115,7	37,8	108,1	41,0	-	-
2115	5	118,7	33,8	111,8	36,7	104,8	40,1	97,4	43,7	92,8	46,1
	7	124,9	34,3	117,9	37,3	**110,5**	**40,6**	102,9	44,3	98,1	46,6
	9	131,2	34,8	123,8	37,8	116,2	41,2	108,3	44,8	103,3	47,2
	11	137,4	35,4	129,9	38,4	122,0	41,7	113,8	45,4	-	-
	13	144,0	36,0	136,2	39,0	127,9	42,3	119,4	45,9	-	-
	15	150,5	36,5	142,3	39,6	133,7	42,9	124,9	46,5	-	-
2130	5	129,9	38,0	122,6	41,3	114,7	45,0	106,3	49,0	101,1	51,5
	7	136,5	38,6	128,8	41,9	**120,5**	**45,6**	112,0	49,6	106,6	52,1
	9	143,0	39,2	134,8	42,6	126,5	46,2	117,7	50,2	112,1	52,7
	11	149,5	39,8	141,3	43,2	132,4	46,9	123,2	50,8	-	-
	13	156,5	40,5	147,7	43,8	138,7	47,5	129,0	51,5	-	-
	15	163,4	41,1	154,2	44,5	144,6	48,2	134,9	52,1	-	-
2145	5	148,9	43,3	140,6	47,1	131,8	51,4	122,3	56,0	116,6	59,0
	7	156,7	44,0	147,9	47,8	**138,5**	**52,1**	128,9	56,7	122,8	59,7
	9	164,2	44,7	155,0	48,6	145,6	52,9	135,6	57,5	129,2	60,4
	11	171,9	45,4	162,6	49,3	152,5	53,6	142,1	58,2	-	-
	13	179,7	46,2	169,8	50,1	159,6	54,4	148,8	59,0	-	-
	15	187,7	47,0	177,3	51,0	166,8	55,2	155,4	59,9	-	-
2160	5	166,9	49,5	157,4	53,8	147,2	58,6	136,7	63,8	130,2	67,1
	7	175,2	50,3	165,3	54,6	**155,0**	**59,4**	143,7	64,6	137,1	67,8
	9	184,0	51,1	173,6	55,4	162,6	60,2	151,3	65,4	144,3	68,6
	11	192,6	51,9	181,8	56,3	170,4	61,1	158,7	66,2	-	-
	13	201,2	52,7	190,0	57,2	178,3	62,0	166,3	67,1	-	-
	15	210,0	53,6	198,4	58,1	186,3	62,9	174,0	68,0	-	-

Ta = Dry bulb external air temperature.

Tue = Evaporator outlet water temperature(ΔT inlet/outlet = 5 °C).

QF = Cooling capacity (evaporator fouling factor of 0,35 X 10-4 m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": TCAETY cooling capacity (ΔT = 5°C at the evaporator)

Model	Tue (°C)	Ta (°C)											
		25		30		35		40		43		46	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	5	74,6	19,3	70,9	21,2	66,8	23,3	62,5	25,6	59,8	27,0	56,9	28,6
	7	78,5	19,6	74,5	21,5	**70,3**	**23,6**	65,8	25,9	63,0	27,4	60,1	28,9
	9	82,5	19,9	78,4	21,8	73,9	23,9	69,3	26,2	66,4	27,7	63,3	29,3
	11	86,6	20,2	82,3	22,1	77,7	24,2	72,9	26,6	69,8	28,0	-	-
	13	90,6	20,5	86,1	22,4	81,4	24,6	76,4	26,9	-	-	-	-
	15	94,6	20,8	90,0	22,7	85,1	24,8	80,0	27,2	-	-	-	-
280	5	84,1	21,8	79,9	23,9	75,3	26,3	70,6	28,8	67,4	30,5	64,3	32,2
	7	88,6	22,1	84,2	24,2	**79,5**	**26,6**	74,4	29,2	71,2	30,8	68,0	32,6
	9	93,1	22,5	88,5	24,6	83,6	26,9	78,3	29,5	75,0	31,2	71,6	32,9
	11	97,7	22,8	92,9	24,9	87,8	27,3	82,4	29,9	78,9	31,5	-	-
	13	102,3	23,1	97,5	25,3	92,1	27,6	86,4	30,2	-	-	-	-
	15	107,1	23,5	102,0	25,6	96,5	27,9	90,5	30,5	-	-	-	-
290	5	93,8	24,8	88,8	27,2	83,4	29,9	77,9	32,8	74,3	34,7	70,7	36,8
	7	98,9	25,2	93,5	27,6	**88,0**	**30,3**	82,0	33,3	78,5	35,2	74,7	37,2
	9	103,9	25,6	98,5	28,0	92,5	30,7	86,4	33,7	82,7	35,7	78,7	37,7
	11	109,1	26,0	103,4	28,5	97,3	31,2	90,9	34,2	87,0	36,1	-	-
	13	114,3	26,5	108,2	28,9	101,9	31,6	95,4	34,6	-	-	-	-
	15	119,1	26,9	113,2	29,3	106,8	32,1	100,1	35,1	-	-	-	-
2100	5	107,9	28,7	102,2	31,4	96,1	34,4	89,8	37,8	85,8	39,9	81,7	42,1
	7	113,4	29,1	107,6	31,9	**101,2**	**34,9**	94,6	38,2	90,4	40,4	86,2	42,6
	9	119,2	29,6	113,1	32,3	106,4	35,4	99,5	38,7	95,2	40,8	90,9	43,0
	11	125,0	30,1	118,6	32,8	111,8	35,8	104,6	39,2	100,1	41,3	-	-
	13	130,7	30,5	124,1	33,3	117,0	36,3	109,8	39,6	-	-	-	-
	15	136,7	31,0	129,8	33,7	122,4	36,8	114,9	40,1	-	-	-	-
2115	5	122,2	32,4	115,8	35,3	108,5	38,6	101,3	42,2	96,5	44,6	91,8	47,1
	7	128,7	32,9	121,9	35,8	**114,5**	**39,1**	106,9	42,7	102,1	45,1	97,1	47,6
	9	135,4	33,4	128,1	36,3	120,4	39,6	112,6	43,3	107,5	45,6	102,5	48,1
	11	142,4	33,9	134,5	36,9	126,7	40,2	118,3	43,8	113,2	46,1	-	-
	13	149,1	34,4	141,1	37,4	132,9	40,8	124,3	44,4	-	-	-	-
	15	155,6	35,0	147,5	38,0	139,0	41,3	130,0	44,9	-	-	-	-
2130	5	134,2	35,9	127,3	39,1	119,7	42,8	111,7	46,8	106,5	49,3	101,5	52,0
	7	141,3	36,4	134,0	39,7	**126,0**	**43,3**	117,7	47,3	112,5	49,8	107,2	52,5
	9	148,2	37,0	140,7	40,2	132,3	43,9	123,8	47,9	118,3	50,4	112,9	53,0
	11	155,4	37,5	147,5	40,8	139,1	44,4	130,0	48,4	124,4	50,9	-	-
	13	162,8	38,1	154,5	41,4	145,4	45,0	136,2	48,9	-	-	-	-
	15	169,9	38,6	161,3	41,9	152,2	45,6	142,7	49,5	-	-	-	-
2145	5	153,2	40,9	144,7	44,6	136,0	48,7	126,5	53,1	120,6	56,0	114,5	59,0
	7	161,2	41,5	152,3	45,2	**143,0**	**49,3**	133,1	53,8	127,3	56,6	120,9	59,7
	9	169,7	42,1	160,1	45,9	150,5	49,9	140,1	54,4	133,8	57,3	127,2	60,3
	11	177,7	42,8	168,3	46,5	158,0	50,7	147,2	55,1	140,5	58,0	-	-
	13	186,0	43,4	175,9	47,2	165,6	51,3	154,2	55,8	-	-	-	-
	15	193,9	44,1	184,1	47,9	173,1	52,0	161,6	56,5	-	-	-	-
2160	5	171,7	46,0	162,5	50,1	152,7	54,8	142,4	59,9	136,1	63,2	129,4	66,7
	7	180,9	46,7	171,3	50,9	**161,0**	**55,5**	150,1	60,6	143,4	63,9	136,5	67,4
	9	190,1	47,4	179,7	51,6	169,1	56,2	157,8	61,4	151,0	64,7	143,7	68,1
	11	199,5	48,1	188,7	52,3	177,6	57,0	166,0	62,2	158,7	65,5	-	-
	13	208,6	48,9	197,7	53,1	185,9	57,8	173,9	63,0	-	-	-	-
	15	217,7	49,6	206,5	53,9	194,3	58,6	181,7	63,8	-	-	-	-

Ta = Dry bulb external air temperature.

Tue = Evaporator outlet water temperature(ΔT inlet/outlet = 5 °C).

QF = Cooling capacity (evaporator fouling factor of 0.35×10^{-4} m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": TCAESY cooling capacity (ΔT = 5°C at the evaporator)

Model	Tue (°C)	Ta (°C)											
		25		30		35		40		43		46	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	5	74,6	19,3	70,9	21,2	66,8	23,3	62,5	25,6	59,8	27,0	56,9	28,6
	7	78,5	19,6	74,5	21,5	**70,3**	**23,6**	65,8	25,9	63,0	27,4	60,1	28,9
	9	82,5	19,9	78,4	21,8	73,9	23,9	69,3	26,2	66,4	27,7	63,3	29,3
	11	86,6	20,2	82,3	22,1	77,7	24,2	72,9	26,6	69,8	28,0	-	-
	13	90,6	20,5	86,1	22,4	81,4	24,6	76,4	26,9	-	-	-	-
	15	94,6	20,8	90,0	22,7	85,1	24,8	80,0	27,2	-	-	-	-
280	5	84,1	21,8	79,9	23,9	75,3	26,3	70,6	28,8	67,4	30,5	64,3	32,2
	7	88,6	22,1	84,2	24,2	**79,5**	**26,6**	74,4	29,2	71,2	30,8	68,0	32,6
	9	93,1	22,5	88,5	24,6	83,6	26,9	78,3	29,5	75,0	31,2	71,6	32,9
	11	97,7	22,8	92,9	24,9	87,8	27,3	82,4	29,9	78,9	31,5	-	-
	13	102,3	23,1	97,5	25,3	92,1	27,6	86,4	30,2	-	-	-	-
	15	107,1	23,5	102,0	25,6	96,5	27,9	90,5	30,5	-	-	-	-
290	5	93,8	24,8	88,8	27,2	83,4	29,9	77,9	32,8	74,3	34,7	70,7	36,8
	7	98,9	25,2	93,5	27,6	**88,0**	**30,3**	82,0	33,3	78,5	35,2	74,7	37,2
	9	103,9	25,6	98,5	28,0	92,5	30,7	86,4	33,7	82,7	35,7	78,7	37,7
	11	109,1	26,0	103,4	28,5	97,3	31,2	90,9	34,2	87,0	36,1	-	-
	13	114,3	26,5	108,2	28,9	101,9	31,6	95,4	34,6	-	-	-	-
	15	119,1	26,9	113,2	29,3	106,8	32,1	100,1	35,1	-	-	-	-
2100	5	107,9	28,7	102,2	31,4	96,1	34,4	89,8	37,8	85,8	39,9	81,7	42,1
	7	113,4	29,1	107,6	31,9	**101,2**	**34,9**	94,6	38,2	90,4	40,4	86,2	42,6
	9	119,2	29,6	113,1	32,3	106,4	35,4	99,5	38,7	95,2	40,8	90,9	43,0
	11	125,0	30,1	118,6	32,8	111,8	35,8	104,6	39,2	100,1	41,3	-	-
	13	130,7	30,5	124,1	33,3	117,0	36,3	109,8	39,6	-	-	-	-
	15	136,7	31,0	129,8	33,7	122,4	36,8	114,9	40,1	-	-	-	-
2115	5	115,9	33,3	109,4	36,4	102,5	39,8	95,4	43,6	91,0	46,0	86,4	48,6
	7	122,0	33,9	115,1	36,9	**108,0**	**40,4**	100,7	44,2	96,1	46,6	91,2	49,1
	9	128,0	34,5	121,0	37,6	113,5	41,0	105,8	44,8	101,1	47,2	96,2	49,7
	11	134,1	35,1	126,8	38,2	119,2	41,6	111,2	45,4	106,3	47,7	-	-
	13	140,4	35,7	132,9	38,8	124,9	42,3	116,7	46,0	-	-	-	-
	15	146,8	36,3	138,7	39,5	130,5	42,9	121,9	46,7	-	-	-	-
2130	5	127,6	36,8	120,5	40,2	113,2	44,0	105,3	48,1	100,4	50,7	95,4	53,5
	7	133,9	37,4	126,7	40,8	**119,0**	**44,6**	110,8	48,7	105,9	51,3	100,8	54,0
	9	140,6	38,1	133,1	41,5	125,0	45,2	116,6	49,3	111,3	51,9	105,9	54,6
	11	147,5	38,7	139,5	42,1	131,1	45,9	122,3	50,0	116,8	52,5	-	-
	13	154,2	39,3	145,9	42,8	137,1	46,5	128,2	50,6	-	-	-	-
	15	160,7	40,0	152,3	43,5	143,5	47,2	134,1	51,3	-	-	-	-
2145	5	146,3	42,7	138,0	46,7	129,2	51,0	119,8	55,7	114,3	58,8	108,2	61,9
	7	153,5	43,4	144,9	47,4	**136,0**	**51,7**	126,2	56,5	120,3	59,5	114,3	62,6
	9	161,3	44,2	152,2	48,1	142,6	52,5	132,8	57,2	126,5	60,2	120,3	63,3
	11	168,8	44,9	159,4	48,9	149,4	53,2	139,2	58,0	132,7	61,0	-	-
	13	176,5	45,7	166,7	49,7	156,7	54,1	145,9	58,8	-	-	-	-
	15	184,3	46,5	174,1	50,5	163,5	54,9	152,3	59,6	-	-	-	-
2160	5	162,2	48,0	153,0	52,3	143,5	57,3	133,4	62,6	127,1	66,1	120,9	69,7
	7	170,2	48,8	160,9	53,2	**151,0**	**58,1**	140,5	63,5	134,1	66,9	127,3	70,5
	9	178,6	49,5	168,9	54,0	158,4	59,0	147,6	64,4	140,8	67,7	134,0	71,3
	11	187,1	50,4	177,0	54,9	166,0	59,9	154,8	65,3	147,8	68,6	-	-
	13	195,7	51,3	184,9	55,9	173,9	60,8	162,0	66,2	-	-	-	-
	15	204,1	52,3	193,0	56,8	181,6	61,8	169,4	67,2	-	-	-	-

Ta = Dry bulb external air temperature.

Tue = Evaporator outlet water temperature(ΔT inlet/outlet = 5 °C).

QF = Cooling capacity (evaporator fouling factor of 0,35 X 10-4 m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": TCAEQY cooling capacity (ΔT = 5°C at the evaporator)

Model	Tue (°C)	Ta (°C)											
		25		30		35		40		43		46	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	5	71,3	20,2	67,6	22,2	63,6	24,4	59,4	26,8	56,8	28,4	54,0	30,0
	7	74,9	20,6	71,1	22,6	**67,0**	**24,8**	62,4	27,2	59,8	28,8	57,0	30,4
	9	78,7	20,9	74,7	22,9	70,4	25,1	65,8	27,6	62,9	29,1	59,9	30,8
	11	82,5	21,3	78,4	23,3	73,8	25,5	69,1	27,9	66,0	29,5	-	-
	13	86,3	21,6	82,1	23,6	77,4	25,9	72,4	28,3	-	-	-	-
	15	90,1	22,0	85,7	24,0	80,9	26,2	75,8	28,7	-	-	-	-
280	5	79,7	21,5	75,5	23,6	71,1	25,9	66,5	28,5	63,5	30,1	60,5	31,8
	7	83,8	21,8	79,5	23,9	**75,0**	**26,3**	70,1	28,9	67,0	30,5	63,8	32,2
	9	88,1	22,2	83,7	24,3	78,8	26,7	73,7	29,2	70,5	30,9	67,3	32,6
	11	92,3	22,6	87,8	24,7	82,7	27,0	77,5	29,6	74,1	31,3	-	-
	13	96,6	22,9	91,8	25,0	86,8	27,4	81,2	30,0	-	-	-	-
	15	101,1	23,3	96,2	25,4	90,7	27,7	85,2	30,3	-	-	-	-
290	5	88,4	25,7	83,6	28,2	78,4	31,0	73,0	34,1	69,6	36,1	66,2	38,1
	7	93,0	26,2	87,9	28,7	**82,5**	**31,5**	76,9	34,6	73,4	36,6	69,9	38,6
	9	97,7	26,6	92,4	29,2	86,8	32,0	81,0	35,1	77,3	37,0	73,7	39,1
	11	102,4	27,1	96,9	29,7	91,1	32,5	85,0	35,6	81,3	37,6	-	-
	13	107,2	27,6	101,4	30,2	95,4	33,0	89,2	36,1	-	-	-	-
	15	111,8	28,1	105,8	30,7	99,7	33,5	93,3	36,6	-	-	-	-
2100	5	101,5	28,5	96,1	31,3	90,3	34,3	84,1	37,6	80,3	39,7	76,4	41,9
	7	106,9	29,0	101,1	31,7	**95,0**	**34,8**	88,6	38,1	84,6	40,2	80,6	42,4
	9	112,1	29,5	106,3	32,2	99,8	35,3	93,2	38,6	89,1	40,7	85,0	42,9
	11	117,4	30,0	111,3	32,8	104,8	35,8	97,9	39,1	93,6	41,2	-	-
	13	122,9	30,5	116,5	33,3	109,7	36,3	102,7	39,6	-	-	-	-
	15	128,3	31,0	121,8	33,8	114,7	36,8	107,5	40,1	-	-	-	-
2115	5	109,3	35,6	102,8	38,9	96,0	42,5	89,0	46,4	84,7	48,9	80,3	51,5
	7	114,7	36,3	108,0	39,6	**101,0**	**43,2**	93,8	47,1	89,3	49,6	84,8	52,1
	9	120,2	37,0	113,4	40,3	106,0	43,9	98,5	47,8	93,9	50,2	89,3	52,8
	11	125,9	37,7	118,7	41,1	111,0	44,7	103,3	48,5	98,7	50,9	-	-
	13	131,4	38,5	123,9	41,8	116,2	45,4	108,1	49,3	-	-	-	-
	15	137,1	39,2	129,3	42,6	121,2	46,2	113,0	50,0	-	-	-	-
2130	5	116,6	38,9	109,8	42,4	102,8	46,3	94,8	50,8	89,6	53,7	84,2	56,8
	7	122,3	39,6	115,3	43,1	**108,0**	**47,0**	99,4	51,6	94,0	54,5	88,5	57,6
	9	128,0	40,4	120,8	43,9	112,9	47,8	104,0	52,4	98,5	55,3	92,7	58,4
	11	133,9	41,1	126,4	44,7	117,9	48,7	108,8	53,3	103,0	56,2	-	-
	13	139,8	41,9	131,9	45,5	122,9	49,6	113,5	54,1	-	-	-	-
	15	145,5	42,7	137,3	46,3	128,0	50,5	118,1	55,0	-	-	-	-
2145	5	135,8	44,5	127,5	48,6	119,0	53,0	110,3	57,8	104,7	60,8	99,1	64,0
	7	142,3	45,3	134,0	49,4	**125,0**	**53,9**	115,7	58,7	110,1	61,7	104,4	64,7
	9	149,1	46,2	140,4	50,3	131,1	54,8	121,4	59,5	115,5	62,5	109,8	65,5
	11	155,7	47,1	146,6	51,2	137,0	55,7	127,2	60,4	121,2	63,4	-	-
	13	162,7	48,0	153,3	52,1	143,1	56,6	133,0	61,3	-	-	-	-
	15	169,3	48,9	159,5	53,1	149,3	57,6	138,9	62,2	-	-	-	-
2160	5	149,7	51,7	140,7	56,5	131,4	61,7	121,9	67,3	115,9	70,8	109,9	74,4
	7	156,9	52,7	147,7	57,5	**138,0**	**62,7**	128,0	68,2	121,8	71,7	115,7	75,3
	9	164,3	53,8	154,7	58,6	144,6	63,7	134,3	69,3	128,0	72,8	121,4	76,3
	11	171,9	54,8	161,8	59,6	151,3	64,8	140,5	70,4	134,0	73,8	-	-
	13	179,2	55,9	168,8	60,8	158,2	66,0	146,8	71,5	-	-	-	-
	15	186,6	57,1	175,9	61,9	164,7	67,2	153,3	72,7	-	-	-	-

Ta = Dry bulb external air temperature.

Tue = Evaporator outlet water temperature(ΔT inlet/outlet = 5 °C).

QF = Cooling capacity (evaporator fouling factor of 0.35 X 10^{-4} m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": THAETY cooling capacity (ΔT = 5°C at the evaporator)

Model	Tue (°C)	Ta (°C)											
		25		30		35		40		43		46	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	5	73,6	19,5	69,9	21,4	65,8	23,5	61,5	25,8	58,8	27,2	55,9	28,8
	7	77,6	19,8	73,7	21,7	**69,4**	**23,8**	64,9	26,1	62,0	27,6	59,1	29,1
	9	81,6	20,1	77,4	22,0	73,0	24,1	68,3	26,5	65,4	27,9	62,3	29,5
	11	85,6	20,5	81,3	22,3	76,7	24,5	71,9	26,8	68,8	28,3	-	-
	13	89,7	20,8	85,3	22,7	80,5	24,8	75,5	27,1	-	-	-	-
	15	93,8	21,1	89,3	23,0	84,2	25,1	79,1	27,4	-	-	-	-
280	5	82,3	21,7	78,2	23,8	73,6	26,1	68,7	28,7	65,7	30,3	62,6	32,0
	7	86,8	22,1	82,3	24,2	**77,7**	**26,5**	72,6	29,0	69,4	30,7	66,2	32,4
	9	91,4	22,5	86,6	24,5	81,8	26,8	76,5	29,4	73,3	31,0	69,8	32,8
	11	95,9	22,8	91,2	24,9	86,0	27,2	80,5	29,8	77,2	31,4	-	-
	13	100,6	23,2	95,6	25,2	90,2	27,5	84,6	30,1	-	-	-	-
	15	105,4	23,5	100,0	25,5	94,6	27,8	88,8	30,4	-	-	-	-
290	5	91,0	24,6	86,1	26,9	80,7	29,5	75,2	32,4	71,8	34,3	68,2	36,3
	7	95,9	25,0	90,7	27,4	**85,2**	**30,0**	79,4	32,9	75,8	34,8	72,2	36,7
	9	100,9	25,4	95,4	27,8	89,7	30,4	83,7	33,4	80,0	35,2	76,2	37,2
	11	105,8	25,9	100,2	28,3	94,3	30,9	88,1	33,8	84,2	35,7	-	-
	13	110,9	26,3	105,1	28,7	98,9	31,4	92,5	34,3	-	-	-	-
	15	116,2	26,8	110,1	29,2	103,5	31,8	97,1	34,8	-	-	-	-
2100	5	105,9	28,8	100,2	31,5	94,2	34,4	87,8	37,7	83,9	39,8	79,8	42,0
	7	111,5	29,2	105,5	31,9	**99,3**	**34,9**	92,8	38,2	88,5	40,3	84,3	42,5
	9	117,3	29,7	111,0	32,4	104,4	35,4	97,6	38,7	93,3	40,8	88,7	42,9
	11	123,0	30,2	116,6	32,9	109,8	35,9	102,5	39,1	98,1	41,2	-	-
	13	129,0	30,7	122,4	33,4	115,1	36,4	107,7	39,6	-	-	-	-
	15	134,9	31,2	127,9	33,9	120,4	36,9	112,8	40,1	-	-	-	-
2115	5	118,8	32,1	112,2	35,0	105,4	38,2	98,0	41,8	93,5	44,1	88,9	46,5
	7	125,2	32,6	118,4	35,5	**111,0**	**38,7**	103,6	42,3	98,8	44,6	94,1	47,0
	9	131,7	33,2	124,5	36,0	116,9	39,2	109,0	42,8	104,1	45,1	99,4	47,5
	11	138,3	33,7	130,8	36,6	123,1	39,8	114,7	43,4	109,8	45,6	-	-
	13	144,9	34,2	137,3	37,1	129,1	40,4	120,6	43,9	-	-	-	-
	15	151,6	34,8	143,6	37,7	135,1	41,0	126,3	44,5	-	-	-	-
2130	5	132,2	36,0	125,2	39,3	117,6	42,8	109,6	46,8	104,6	49,3	99,4	52,0
	7	139,4	36,6	131,9	39,8	**123,8**	**43,4**	115,7	47,3	110,4	49,9	105,0	52,5
	9	146,4	37,2	138,7	40,4	130,4	44,0	121,7	47,9	116,2	50,4	110,7	53,0
	11	153,9	37,7	145,6	41,0	137,0	44,6	128,0	48,5	122,3	51,0	-	-
	13	161,2	38,4	152,7	41,6	143,7	45,2	134,2	49,1	-	-	-	-
	15	168,7	39,0	159,7	42,2	150,3	45,8	140,3	49,7	-	-	-	-
2145	5	151,7	41,3	143,1	45,0	134,0	49,0	124,5	53,5	118,6	56,3	112,7	59,3
	7	159,8	42,0	150,9	45,6	**141,3**	**49,7**	131,3	54,1	125,2	57,0	118,9	60,0
	9	168,0	42,6	158,6	46,3	148,7	50,4	138,5	54,8	131,9	57,7	125,4	60,6
	11	176,0	43,3	166,4	47,0	156,2	51,1	145,6	55,6	138,7	58,4	-	-
	13	184,5	44,0	174,5	47,8	163,8	51,9	152,4	56,3	-	-	-	-
	15	192,7	44,8	182,3	48,5	171,2	52,6	159,8	57,1	-	-	-	-
2160	5	171,1	46,7	161,5	50,8	151,5	55,5	141,1	60,6	134,5	63,9	128,0	67,3
	7	180,3	47,4	170,4	51,5	**159,8**	**56,2**	148,8	61,3	142,1	64,7	135,0	68,1
	9	189,6	48,1	178,9	52,3	168,3	57,0	156,8	62,1	149,6	65,5	142,3	68,9
	11	198,8	48,9	188,0	53,1	176,5	57,8	164,6	63,0	157,2	66,3	-	-
	13	208,5	49,8	197,3	54,0	185,3	58,7	173,0	63,9	-	-	-	-
	15	217,9	50,6	206,2	54,9	193,8	59,6	181,1	64,8	-	-	-	-

Ta = Dry bulb external air temperature.

Tue = Evaporator outlet water temperature(ΔT inlet/outlet = 5 °C).

QF = Cooling capacity (evaporator fouling factor of 0,35 X 10-4 m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": THAETY heating capacity (ΔT = 5°C at the condenser)

Model	Ta (°C)	RH (%)	Tuc (°C)											
			30		35		40		45		50		53	
			QT	P	QT	P	QT	P	QT	P	QT	P	QT	P
			kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	-5	90	61,6	16,4	61,0	18,3	60,4	20,4	-	-	-	-	-	-
	0	90	70,1	16,7	69,3	18,5	68,3	20,7	67,3	23,0	-	-	-	-
	7	90	83,2	17,0	81,9	18,9	80,5	21,1	**79,0**	**23,5**	77,5	26,2	76,5	28,0
	10	85	88,8	17,2	87,3	19,1	85,6	21,2	84,0	23,7	82,2	26,4	81,0	28,2
	15	85	100,1	17,6	98,3	19,4	96,2	21,5	94,2	24,0	91,9	26,7	90,5	28,6
	20	85	112,8	18,1	110,5	19,8	108,0	21,8	105,2	24,2	102,3	27,0	-	-
280	-5	90	67,0	17,6	66,3	19,5	65,7	21,7	-	-	-	-	-	-
	0	90	76,4	17,8	75,4	19,8	74,3	22,0	73,2	24,5	-	-	-	-
	7	90	90,6	18,2	89,1	20,2	87,6	22,4	**86,0**	**25,0**	84,3	27,8	83,3	29,7
	10	85	96,8	18,4	95,3	20,4	93,4	22,6	91,5	25,2	89,5	28,0	88,1	29,9
	15	85	109,5	18,9	107,4	20,7	105,0	22,9	102,6	25,5	100,0	28,3	98,3	30,3
	20	85	123,2	19,4	120,6	21,1	117,8	23,2	114,7	25,7	111,5	28,6	-	-
290	-5	90	75,0	20,5	74,1	22,6	73,3	25,2	-	-	-	-	-	-
	0	90	85,6	20,8	84,1	23,0	83,0	25,6	81,8	28,6	-	-	-	-
	7	90	101,6	21,3	99,8	23,5	97,8	26,2	**96,0**	**29,2**	94,4	32,7	93,3	34,9
	10	85	108,5	21,5	106,3	23,7	104,3	26,3	102,3	29,4	100,1	32,9	98,9	35,2
	15	85	122,6	22,0	119,8	24,1	117,3	26,8	114,7	29,8	111,9	33,3	110,3	35,6
	20	85	138,9	22,5	135,2	24,6	131,7	27,2	128,5	30,2	125,0	33,7	-	-
2100	-5	90	86,9	23,5	86,0	26,0	84,9	28,9	-	-	-	-	-	-
	0	90	99,1	23,8	97,5	26,4	96,0	29,3	94,4	32,6	-	-	-	-
	7	90	118,1	24,4	115,8	26,9	113,5	29,8	**111,0**	**33,2**	108,6	37,0	107,1	39,4
	10	85	126,3	24,7	123,5	27,2	120,9	30,1	118,2	33,4	115,1	37,2	113,4	39,7
	15	85	142,8	25,2	139,6	27,7	136,3	30,6	132,6	33,9	129,0	37,7	126,6	40,1
	20	85	161,3	25,8	157,2	28,2	153,1	31,1	148,7	34,4	144,0	38,1	-	-
2115	-5	90	95,7	27,3	94,3	29,9	93,1	33,1	-	-	-	-	-	-
	0	90	109,2	27,7	107,2	30,3	105,3	33,6	103,6	37,4	-	-	-	-
	7	90	130,3	28,3	127,3	31,0	124,6	34,2	**122,0**	**38,0**	119,3	42,3	117,7	45,1
	10	85	139,3	28,6	136,2	31,3	133,1	34,5	129,9	38,3	126,6	42,5	124,8	45,4
	15	85	157,8	29,1	153,9	31,8	150,0	35,1	145,9	38,8	142,1	43,1	139,5	45,9
	20	85	178,3	29,7	173,6	32,4	168,8	35,7	164,0	39,4	159,0	43,7	-	-
2130	-5	90	109,1	30,2	107,7	33,2	106,4	36,8	-	-	-	-	-	-
	0	90	124,5	30,6	122,4	33,7	120,3	37,2	118,0	41,4	-	-	-	-
	7	90	148,7	31,4	145,3	34,4	142,3	37,9	**139,0**	**42,0**	135,6	46,6	133,5	49,7
	10	85	158,9	31,7	155,4	34,7	151,8	38,2	148,0	42,3	143,8	46,9	141,6	49,9
	15	85	180,2	32,3	175,7	35,3	171,2	38,8	166,4	42,9	161,2	47,5	158,2	50,5
	20	85	203,9	32,9	198,3	36,0	192,7	39,5	186,7	43,6	180,4	48,2	-	-
2145	-5	90	123,2	35,3	121,9	38,9	120,7	43,0	-	-	-	-	-	-
	0	90	140,3	35,8	138,3	39,3	136,0	43,4	134,2	48,2	-	-	-	-
	7	90	166,1	36,5	163,2	40,0	160,0	44,1	**157,0**	**48,8**	153,6	54,1	151,6	57,6
	10	85	177,5	36,8	174,0	40,3	170,4	44,4	166,9	49,1	163,1	54,4	160,9	57,9
	15	85	200,1	37,4	196,0	40,9	191,5	45,0	186,8	49,8	181,7	55,1	178,8	58,6
	20	85	227,1	38,2	220,3	41,7	214,4	45,8	208,5	50,5	202,2	55,9	-	-
2160	-5	90	136,6	39,3	135,0	43,4	133,5	48,1	-	-	-	-	-	-
	0	90	156,5	39,8	153,6	43,8	151,1	48,5	148,8	53,8	-	-	-	-
	7	90	186,9	40,7	182,8	44,6	179,0	49,2	**175,0**	**54,5**	171,0	60,6	168,8	64,5
	10	85	200,0	41,0	195,4	44,9	190,7	49,6	186,3	54,9	181,7	60,9	178,8	64,9
	15	85	227,1	41,8	221,3	45,7	215,4	50,3	209,7	55,7	203,7	61,8	199,8	65,7
	20	85	256,8	42,7	250,1	46,6	242,9	51,3	235,7	56,7	228,0	62,8	-	-

Tuc = Condenser outlet water temperature (ΔT inlet/outlet = 5 °C).

Ta = Dry bulb external air temperature.

RH = Relative humidity.

QT = Heating capacity (evaporator fouling factor of 0,35 X 10-4 m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": THAESY cooling capacity (ΔT = 5°C at the evaporator)

Model	Tue (°C)	Ta (°C)											
		25		30		35		40		43		46	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	5	73,6	19,5	69,9	21,4	65,8	23,5	61,5	25,8	58,8	27,2	55,9	28,8
	7	77,6	19,8	73,7	21,7	**69,4**	**23,8**	64,9	26,1	62,0	27,6	59,1	29,1
	9	81,6	20,1	77,4	22,0	73,0	24,1	68,3	26,5	65,4	27,9	62,3	29,5
	11	85,6	20,5	81,3	22,3	76,7	24,5	71,9	26,8	68,8	28,3	-	-
	13	89,7	20,8	85,3	22,7	80,5	24,8	75,5	27,1	-	-	-	-
	15	93,8	21,1	89,3	23,0	84,2	25,1	79,1	27,4	-	-	-	-
280	5	82,3	21,7	78,2	23,8	73,6	26,1	68,7	28,7	65,7	30,3	62,6	32,0
	7	86,8	22,1	82,3	24,2	**77,7**	**26,5**	72,6	29,0	69,4	30,7	66,2	32,4
	9	91,4	22,5	86,6	24,5	81,8	26,8	76,5	29,4	73,3	31,0	69,8	32,8
	11	95,9	22,8	91,2	24,9	86,0	27,2	80,5	29,8	77,2	31,4	-	-
	13	100,6	23,2	95,6	25,2	90,2	27,5	84,6	30,1	-	-	-	-
	15	105,4	23,5	100,0	25,5	94,6	27,8	88,8	30,4	-	-	-	-
290	5	91,0	24,6	86,1	26,9	80,7	29,5	75,2	32,4	71,8	34,3	68,2	36,3
	7	95,9	25,0	90,7	27,4	**85,2**	**30,0**	79,4	32,9	75,8	34,8	72,2	36,7
	9	100,9	25,4	95,4	27,8	89,7	30,4	83,7	33,4	80,0	35,2	76,2	37,2
	11	105,8	25,9	100,2	28,3	94,3	30,9	88,1	33,8	84,2	35,7	-	-
	13	110,9	26,3	105,1	28,7	98,9	31,4	92,5	34,3	-	-	-	-
	15	116,2	26,8	110,1	29,2	103,5	31,8	97,1	34,8	-	-	-	-
2100	5	105,9	28,8	100,2	31,5	94,2	34,4	87,8	37,7	83,9	39,8	79,8	42,0
	7	111,5	29,2	105,5	31,9	**99,3**	**34,9**	92,8	38,2	88,5	40,3	84,3	42,5
	9	117,3	29,7	111,0	32,4	104,4	35,4	97,6	38,7	93,3	40,8	88,7	42,9
	11	123,0	30,2	116,6	32,9	109,8	35,9	102,5	39,1	98,1	41,2	-	-
	13	129,0	30,7	122,4	33,4	115,1	36,4	107,7	39,6	-	-	-	-
	15	134,9	31,2	127,9	33,9	120,4	36,9	112,8	40,1	-	-	-	-
2115	5	115,2	33,9	108,8	36,9	101,7	40,4	94,6	44,2	90,2	46,6	85,6	49,1
	7	121,3	34,5	114,4	37,5	**107,2**	**41,0**	99,7	44,8	95,1	47,2	90,4	49,7
	9	127,6	35,1	120,2	38,2	113,0	41,6	105,1	45,4	100,3	47,8	95,4	50,3
	11	133,7	35,7	126,3	38,9	118,6	42,3	110,5	46,1	105,4	48,4	-	-
	13	140,0	36,4	132,2	39,5	124,1	43,0	115,8	46,7	-	-	-	-
	15	146,2	37,0	138,3	40,2	129,9	43,7	121,2	47,4	-	-	-	-
2130	5	127,2	37,5	120,1	40,9	112,6	44,6	104,7	48,7	99,6	51,3	94,7	54,1
	7	133,9	38,2	126,4	41,6	**118,5**	**45,3**	110,4	49,4	105,3	52,0	100,0	54,7
	9	140,5	38,8	132,6	42,2	124,6	46,0	116,1	50,0	110,8	52,6	105,4	55,3
	11	147,4	39,5	139,2	42,9	130,8	46,7	121,8	50,7	116,4	53,3	-	-
	13	154,0	40,2	145,6	43,7	136,9	47,4	127,6	51,4	-	-	-	-
	15	161,2	40,9	152,4	44,4	143,0	48,1	133,7	52,1	-	-	-	-
2145	5	146,2	43,5	137,7	47,5	128,9	51,8	119,3	56,5	113,7	59,5	107,6	62,7
	7	153,8	44,3	144,8	48,2	**135,6**	**52,6**	126,0	57,3	119,9	60,3	113,7	63,4
	9	161,5	45,1	152,2	49,1	142,5	53,4	132,4	58,1	126,0	61,1	119,7	64,2
	11	169,3	45,9	159,7	49,9	149,6	54,3	138,9	59,0	132,4	61,9	-	-
	13	177,3	46,7	167,1	50,8	156,5	55,1	145,7	59,8	-	-	-	-
	15	184,8	47,6	174,6	51,6	163,6	56,0	152,4	60,7	-	-	-	-
2160	5	161,7	48,7	152,6	53,1	142,8	58,0	132,5	63,3	126,2	66,7	119,7	70,3
	7	170,3	49,5	160,5	54,0	**150,2**	**58,9**	139,7	64,2	133,2	67,6	126,3	71,1
	9	178,9	50,4	168,6	54,9	158,0	59,9	146,8	65,2	140,0	68,5	133,0	72,1
	11	187,2	51,4	176,8	55,9	165,6	60,8	154,2	66,1	147,2	69,5	-	-
	13	196,0	52,3	185,2	56,9	173,6	61,8	161,6	67,2	-	-	-	-
	15	204,6	53,3	193,3	57,9	181,3	62,9	168,9	68,2	-	-	-	-

Ta = Dry bulb external air temperature.

Tue = Evaporator outlet water temperature(ΔT inlet/outlet = 5 °C).

QF = Cooling capacity (evaporator fouling factor of 0.35 X 10^{-4} m²C/W).

P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

Table "D": THAESY heating capacity (ΔT = 5°C at the condenser)

Model	Ta (°C)	RH (%)	Tuc (°C)											
			30		35		40		45		50		53	
			QT	P	QT	P	QT	P	QT	P	QT	P	QT	P
			kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
270	-5	90	61,6	16,4	61,0	18,3	60,4	20,4	-	-	-	-	-	-
	0	90	70,1	16,7	69,3	18,5	68,3	20,7	67,3	23,0	-	-	-	-
	7	90	83,2	17,0	81,9	18,9	80,5	21,1	**79,0**	**23,5**	77,5	26,2	76,5	28,0
	10	90	88,8	17,2	87,3	19,1	85,6	21,2	84,0	23,7	82,2	26,4	81,0	28,2
	15	85	100,1	17,6	98,3	19,4	96,2	21,5	94,2	24,0	91,9	26,7	90,5	28,6
	20	85	112,8	18,1	110,5	19,8	108,0	21,8	105,2	24,2	102,3	27,0	-	-
280	-5	85	67,0	17,6	66,3	19,5	65,7	21,7	-	-	-	-	-	-
	0	90	76,4	17,8	75,4	19,8	74,3	22,0	73,2	24,5	-	-	-	-
	7	90	90,6	18,2	89,1	20,2	87,6	22,4	**86,0**	**25,0**	84,3	27,8	83,3	29,7
	10	90	96,8	18,4	95,3	20,4	93,4	22,6	91,5	25,2	89,5	28,0	88,1	29,9
	15	85	109,5	18,9	107,4	20,7	105,0	22,9	102,6	25,5	100,0	28,3	98,3	30,3
	20	85	123,2	19,4	120,6	21,1	117,8	23,2	114,7	25,7	111,5	28,6	-	-
290	-5	85	75,0	20,5	74,1	22,6	73,3	25,2	-	-	-	-	-	-
	0	90	85,6	20,8	84,1	23,0	83,0	25,6	81,8	28,6	-	-	-	-
	7	90	101,6	21,3	99,8	23,5	97,8	26,2	**96,0**	**29,2**	94,4	32,7	93,3	34,9
	10	90	108,5	21,5	106,3	23,7	104,3	26,3	102,3	29,4	100,1	32,9	98,9	35,2
	15	85	122,6	22,0	119,8	24,1	117,3	26,8	114,7	29,8	111,9	33,3	110,3	35,6
	20	85	138,9	22,5	135,2	24,6	131,7	27,2	128,5	30,2	125,0	33,7	-	-
2100	-5	85	86,9	23,5	86,0	26,0	84,9	28,9	-	-	-	-	-	-
	0	90	99,1	23,8	97,5	26,4	96,0	29,3	94,4	32,6	-	-	-	-
	7	90	118,1	24,4	115,8	26,9	113,5	29,8	**111,0**	**33,2**	108,6	37,0	107,1	39,4
	10	90	126,3	24,7	123,5	27,2	120,9	30,1	118,2	33,4	115,1	37,2	113,4	39,7
	15	85	142,8	25,2	139,6	27,7	136,3	30,6	132,6	33,9	129,0	37,7	126,6	40,1
	20	85	161,3	25,8	157,2	28,2	153,1	31,1	148,7	34,4	144,0	38,1	-	-
2115	-5	85	93,8	26,5	92,7	29,2	91,8	32,4	-	-	-	-	-	-
	0	90	106,9	26,9	105,3	29,6	103,7	32,8	102,4	36,7	-	-	-	-
	7	90	127,3	27,5	124,7	30,2	122,3	33,5	**120,0**	**37,3**	117,7	41,6	116,3	44,5
	10	90	135,8	27,8	132,9	30,5	130,2	33,7	127,7	37,5	124,9	41,9	123,3	44,7
	15	85	154,1	28,3	150,2	31,0	146,8	34,3	143,4	38,1	139,8	42,4	137,6	45,2
	20	85	175,2	28,9	170,2	31,6	165,3	34,9	160,8	38,7	156,2	43,0	-	-
2130	-5	85	105,7	29,1	104,7	32,0	103,6	35,6	-	-	-	-	-	-
	0	90	120,4	29,5	118,8	32,5	116,9	36,1	115,1	40,2	-	-	-	-
	7	90	143,4	30,2	140,5	33,2	137,9	36,7	**135,0**	**40,8**	132,0	45,4	130,1	48,4
	10	90	153,3	30,5	150,1	33,4	146,9	37,0	143,6	41,1	140,1	45,7	138,0	48,7
	15	85	173,5	31,0	169,4	34,0	165,4	37,6	161,3	41,7	156,7	46,2	153,9	49,2
	20	85	196,4	31,7	191,4	34,7	186,2	38,3	180,9	42,3	175,3	46,9	-	-
2145	-5	85	120,6	34,0	119,7	37,5	118,8	41,7	-	-	-	-	-	-
	0	90	137,0	34,4	135,2	37,9	133,5	42,0	132,1	46,8	-	-	-	-
	7	90	161,7	35,1	159,1	38,5	156,6	42,6	**154,0**	**47,4**	151,2	52,7	149,5	56,3
	10	90	172,6	35,4	169,6	38,8	166,5	42,9	163,2	47,6	160,1	53,0	158,3	56,5
	15	85	196,5	36,0	191,5	39,5	186,8	43,6	182,6	48,3	178,1	53,7	175,8	57,2
	20	85	223,3	36,8	216,9	40,2	210,8	44,3	204,3	49,0	198,2	54,4	-	-
2160	-5	85	132,2	37,9	131,0	42,0	129,9	46,7	-	-	-	-	-	-
	0	90	150,8	38,4	148,7	42,3	146,7	47,0	145,0	52,4	-	-	-	-
	7	90	179,7	39,1	176,2	43,1	173,0	47,7	**170,0**	**53,0**	166,7	59,1	164,7	63,0
	10	90	192,3	39,5	188,2	43,4	184,3	48,0	180,7	53,4	176,9	59,4	174,5	63,4
	15	85	218,1	40,2	212,8	44,1	208,2	48,7	202,8	54,1	197,8	60,2	194,4	64,2
	20	85	248,2	41,1	241,5	45,0	234,2	49,7	227,9	55,0	221,4	61,1	-	-

Tuc = Condenser outlet water temperature(ΔT inlet/outlet = 5 °C).

Ta = Dry bulb external air temperature.

RH = Relative humidity.

QT = Heating capacity (evaporator fouling factor of 0.35×10^{-4} m²C/W).

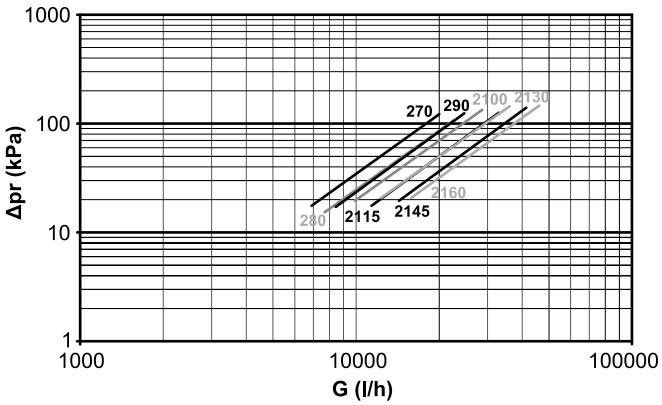
P = Total absorbed electrical power (compressor and fan).

N.B.:
For the various PUMP and TANK & PUMP versions, add the electrical power values absorbed by the motor-driven pumps and show in tables "A" to the total absorbed electrical power.

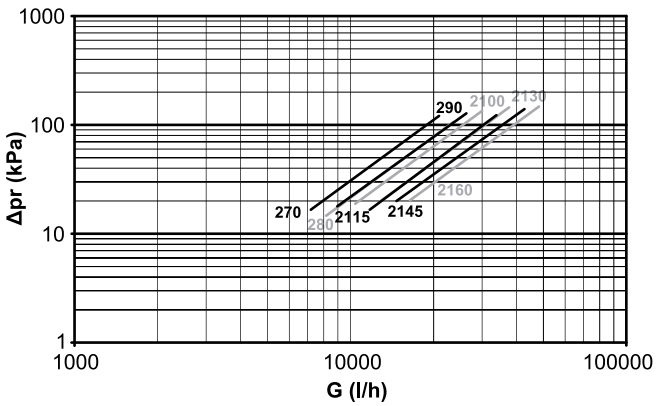
Pressure drops

Graph "1": heat exchanger pressure drops

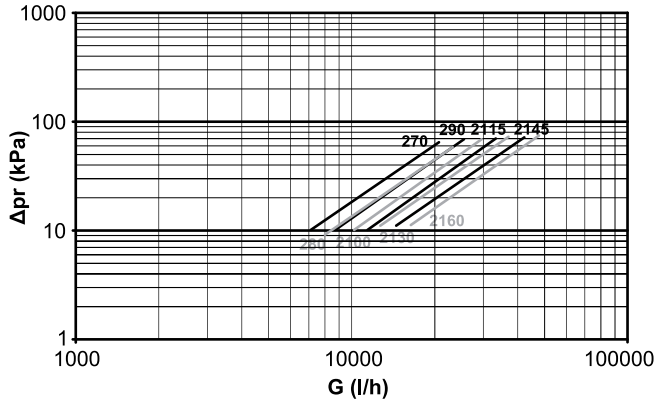
TCAEBY



TCAETY – TCAESY – TCAEQY



THAETY – THAESY



Calculation of pressure drops

○ The water flow rate at the exchanger is calculated according to the following formula:

○ G = (Q x 860) : ΔT

- Where:

G (l/h) = water flow rate at the exchanger;
Q (kW) = exchanged power, which may be QF (for the evaporator) or QT (for the condenser), depending on the exchanger in question;
ΔT (°C) = temperature differential;

○ The pressure drops can be obtained from the *RHOSS* selection software and can be read on the graph to the side, or can be calculated using the following rough formula:

$$\Delta pw = \Delta pw_{nom} \times (G : G_{nom})^2$$

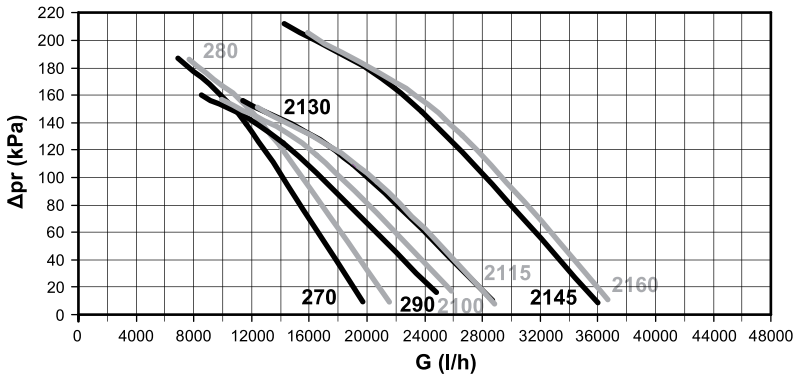
Δpw (kPa) = nominal pressure drop at the exchanger in question (table on *Technical data*):
G (l/h) = water flow rate at the exchanger in question.

N.B.:
For all machines, refer in any case to admissible operating limits and thermal differences (ΔT).

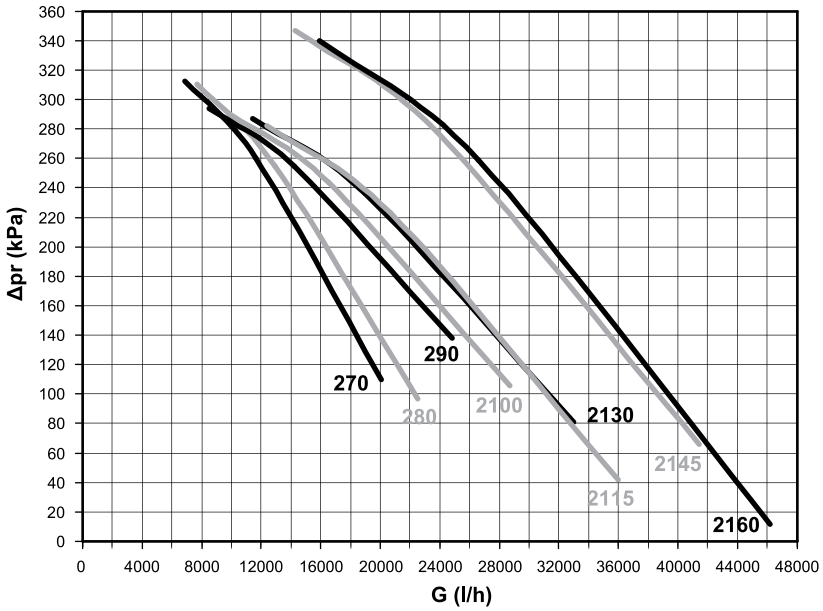
Residual static pressure

Graph "2": residual static pressure

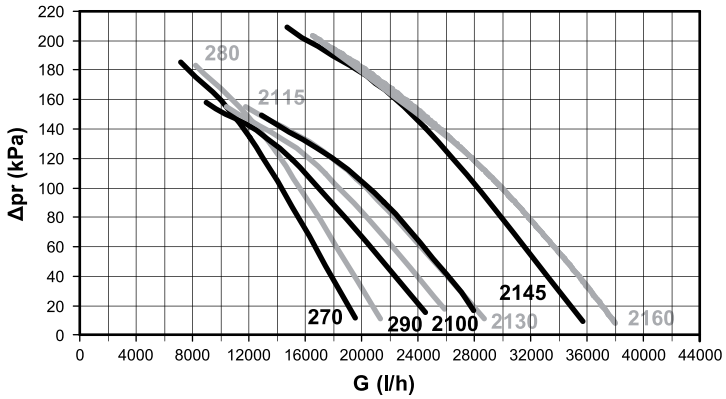
TCAEBY 270÷2160 installation P1-DP1



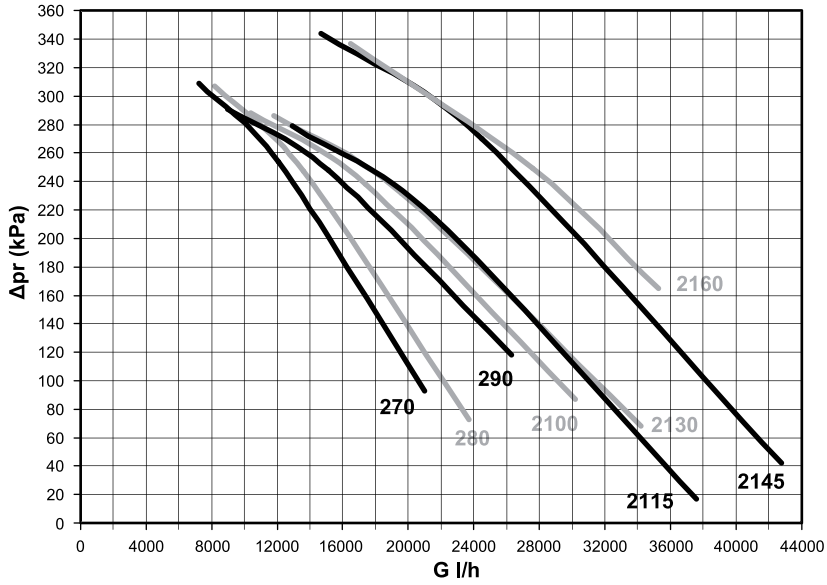
TCAEBY 270÷2160 installation P2-DP2



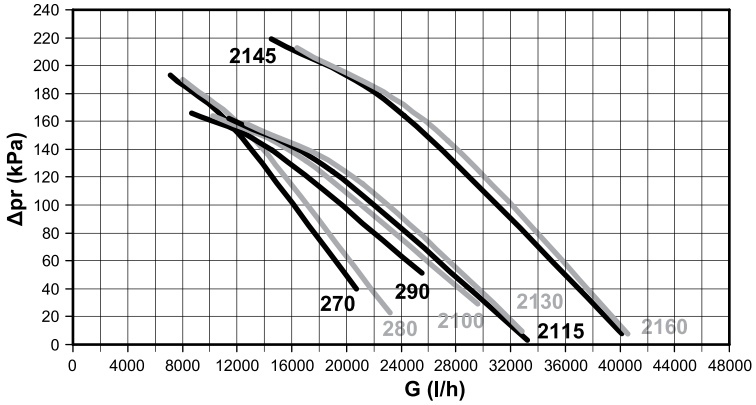
TCAETY-TCAESY-TCAEQY 270÷2160 installation P1-DP1



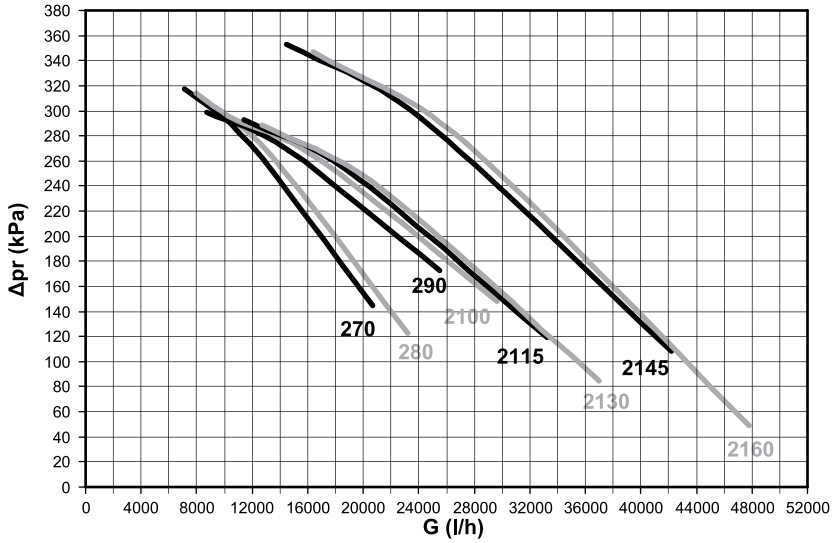
TCAETY-TCAESY-TCAEQY 270÷2160 installation P2-DP2



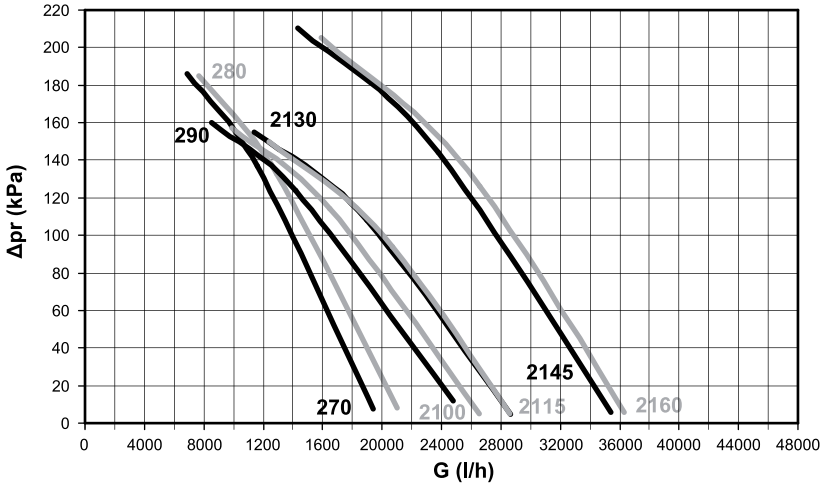
THAETY-THAESY 270÷2160 installation P1-DP1



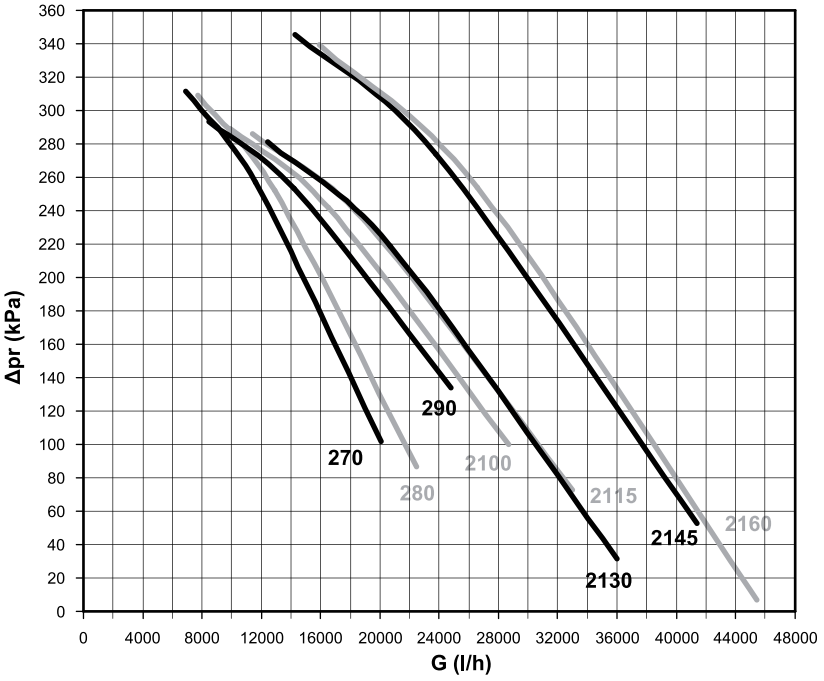
THAETY-THAESY 270÷2160 installation P2-DP2



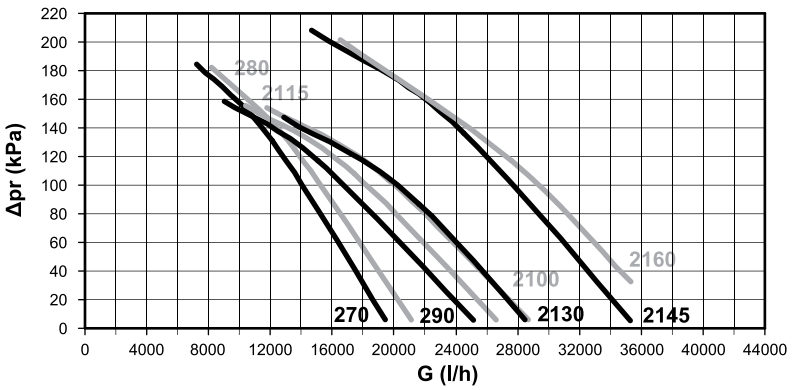
TCAEBY 270÷2160 installation ASP1-ASDP1



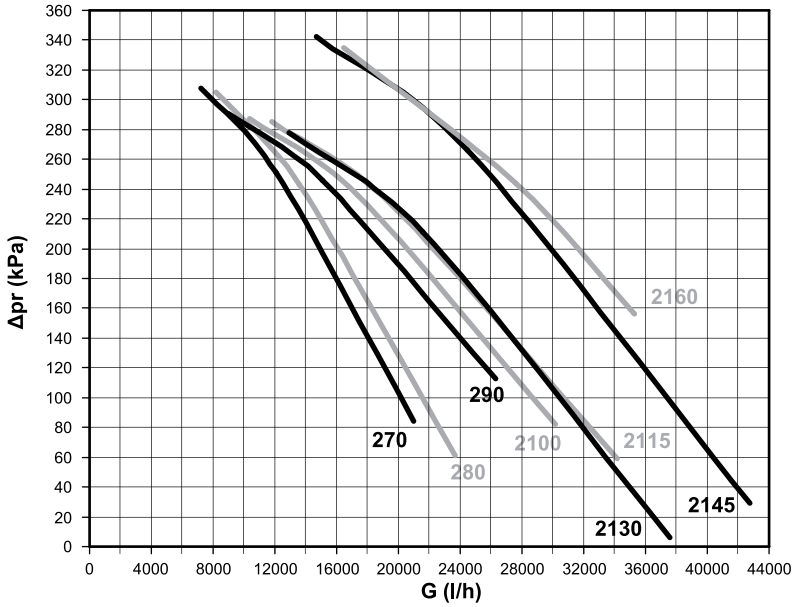
TCAEBY 270÷2160 installation ASP2-ASDP2



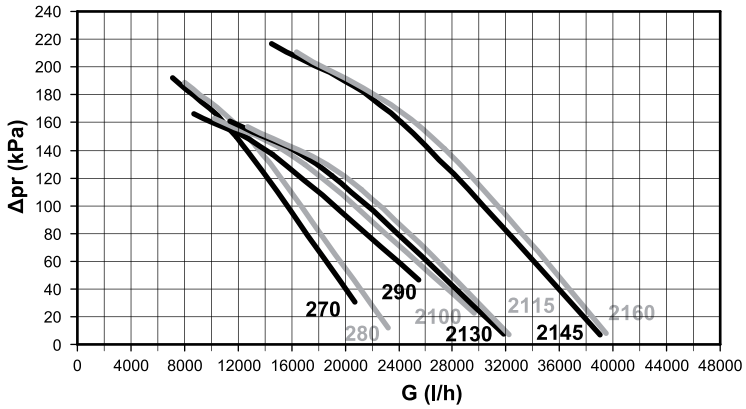
TCAETY-TCAESY-TCAEQY 270÷2160 installation ASP1-ASDP1



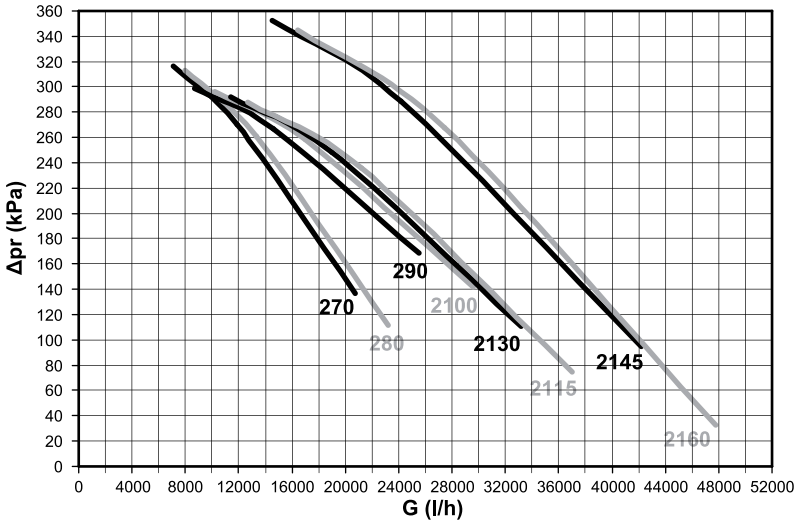
TCAETY-TCAESY-TCAEQY 270÷2160 installation ASP2-ASDP2



THAETY-THAESY 270÷2160 installation ASP1-ASDP1



THAETY-THAESY 270÷2160 installation ASP2-ASDP2



Δpr (kPa) = Residual static pressure
G (l/h) = Water flow

Calculation of residual static pressure
The residual static pressure values can be obtained from graph "**2**" based on measured flow rates.

Power levels and sound pressure

Model		Sound power level in dB(A) by octave bands								Pressure level in dB(A)		
		125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Lw	Lp 10m	Lp 5m	Lp 1m
TCAEBY	270	89	82	79	76	73	65	59	82	53	60	68
	280	89	82	79	76	73	65	59	82	53	60	68
	290	89	82	79	76	73	65	59	82	53	60	68
	2100	90	84	81	79	76	67	62	84	55	62	70
	2115	86	84	86	87	82	74	64	90	61	68	76
	2130	86	84	86	87	82	74	64	90	61	68	76
	2145	86	84	86	87	82	74	64	90	61	68	76
	2160	86	84	87	88	84	76	67	91	62	69	77
TCAETY THAETY	270	79	76	73	72	67	61	51	76	50	55	65
	280	80	78	73	74	68	62	53	77	51	56	66
	290	80	78	73	74	68	62	53	77	51	56	66
	2100	81	79	74	75	69	63	55	78	52	57	68
	2115	89	83	81	80	76	67	61	84	55	60	70
	2130	89	83	81	80	76	67	61	84	55	60	70
	2145	90	84	82	81	78	69	63	85	56	62	71
	2160	90	84	82	81	78	69	63	85	56	62	71
TCAESY THAESY	270	78	74	73	69	65	57	49	74	48	53	63
	280	79	75	73	71	66	59	50	75	49	54	64
	290	79	75	73	71	66	59	50	75	49	54	64
	2100	79	76	73	72	67	61	51	76	50	55	65
	2115	83	81	79	77	70	61	53	81	52	57	67
	2130	83	81	79	77	70	61	53	81	52	57	67
	2145	85	83	80	78	73	64	57	82	53	58	68
	2160	85	83	80	78	73	64	57	82	53	58	68
TCAEQY	270	76	72	71	67	63	55	48	72	46	51	61
	280	77	73	72	68	64	56	49	73	47	52	62
	290	77	73	72	68	64	56	49	73	47	52	62
	2100	78	74	73	69	65	57	49	74	48	53	63
	2115	80	78	76	75	67	59	50	78	49	54	64
	2130	80	78	76	75	67	59	50	78	49	54	64
	2145	81	79	77	76	68	60	52	79	50	55	65
	2160	81	79	77	76	68	60	52	79	50	55	65

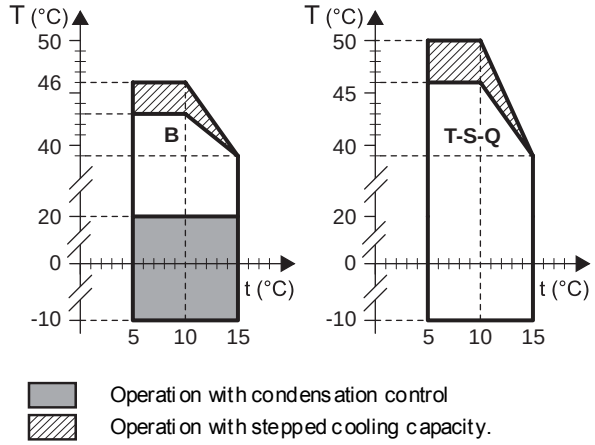
Lw Sound power level in dB(A) on the basis of measurements made in compliance with the UNI EN-ISO 3744 standard and Eurovent 8/1. The noise measurement refers to the units without pump.

Lp Sound pressure level in dB(A) in reference to the measurement and distance from the unit indicated in the table, with directionality factor of 2. The noise measurement refers to the units without pump.

Note: With an external air temperature of under 35°C in the presence of the FI10 accessory (as standard in versions T, S and Q), the machine noise levels fall to below the nominal value indicated in the table.
It is not possible to extrapolate sound pressure values for distances of under 10 m.

Operating limits

Summer operation



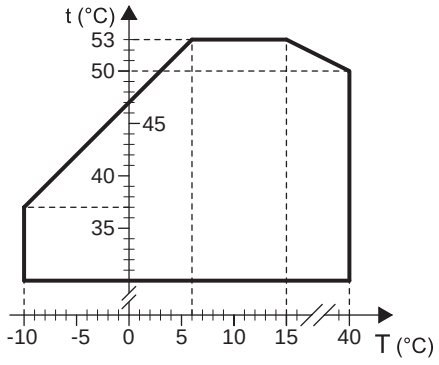
Operation with condensation control

Operation with stepped cooling capacity.

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

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

Winter operation



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

In winter operation:
Maximum inlet water temperature 47°C

Temperature differentials permitted through the exchangers
○ Heat differential at the evaporator ΔT = 3 ÷ 8°C (with both compressors on) for machines with "standard" installation. The maximum and minimum temperature differential for the "Pump" and "Tank&Pump" machines is linked to the pump performances, which must always be checked with the help of the graphs on page 29 or using the *RHOSS* selection software.

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

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

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

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

Use of anti-freeze solutions

○ The use of ethylene glycol is recommended if you do not wish to drain the water from the hydraulic system during the winter stoppage, or if the unit has to supply chilled water at temperatures lower than 5°C The addition of glycol changes the physical properties of the water and consequently the performance of the unit. The proper percentage of glycol to be added to the system can be obtained from the most demanding operating conditions from those shown below.

○ Table **"H"** shows the multipliers which allow the changes in performance of the units to be determined in proportion to the required percentage of ethylene glycol.
- The multipliers refer to the following conditions: condenser inlet water temperature 35°C; chilled water outlet temperature 7°C; temperature differential at evaporator and condenser 5°C.
- For different operating conditions, the same coefficients can be used as their variations are negligible.

○ The electric heater for the water side heat exchanger (RA accessory), the water buffer tank (RAS accessory), the motor-driven pump assembly (RAE accessory) and the desuperheater or heat recovery (RDR accessory) prevents ice formation during winter breaks (as long as the unit is not disconnected from the power supply).

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

Table "H"

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

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

RC100 and DS accessories: performances and pressure drops

Table"G": Performance and pressure drops RC100 accessory for TCAEBY models

RC100 - 100% recovery		270			280		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	93,1	91,0	88,6	103,6	101,0	98,3
Recovery nominal flow	m³/h	16,2	15,9	15,7	18,0	17,6	17,5
Recovery nominal pressure drops	kPa	43,3	41,7	41,2	38,1	36,5	36,1
Recovery water content	l		6,9			8,4	

RC100 - 100% recovery		290			2100		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	116,0	113,0	110,2	132,5	129,0	125,3
Recovery nominal flow	m³/h	20,2	19,7	19,6	23,0	22,5	22,3
Recovery nominal pressure drops	kPa	46,7	44,7	44,3	45,7	43,7	43,0
Recovery water content	l		8,4			9,9	

RC100 - 100% recovery		2115			2130		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	150,2	146,0	141,8	165,7	161,0	156,2
Recovery nominal flow	m³/h	26,1	25,4	25,2	28,8	28,0	27,8
Recovery nominal pressure drops	kPa	47,5	45,3	44,6	47,1	44,9	44,1
Recovery water content	l		11,1			12,6	

RC100 - 100% recovery		2145			2160		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	190,4	185,0	179,8	212,9	207,0	201,3
Recovery nominal flow	m³/h	33,1	32,2	31,9	37,0	36,1	35,8
Recovery nominal pressure drops	kPa	47,9	45,7	44,9	48,3	46,0	45,4
Recovery water content	l		14,9			17,4	

Table"G": Performance and pressure drops RC100 accessory for TCAETY-TCAESY-TCAEQY models

RC100 - 100% recovery		270			280		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	94,1	92,0	89,6	106,7	104,0	101,3
Recovery nominal flow	m³/h	16,4	16,0	15,9	18,5	18,1	18,0
Recovery nominal pressure drops	kPa	44,1	42,5	42,0	40,1	38,5	38,0
Recovery water content	l		6,9			8,4	

RC100 - 100% recovery		290			2100		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	119,1	116,0	113,1	137,6	134,0	130,1
Recovery nominal flow	m³/h	20,7	20,2	20,1	23,9	23,3	23,1
Recovery nominal pressure drops	kPa	48,9	46,8	46,4	48,9	46,8	46,0
Recovery water content	l		8,4			9,9	

RC100 - 100% recovery		2115			2130		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	154,3	150,0	145,7	169,9	165,0	160,1
Recovery nominal flow	m³/h	26,8	26,1	25,9	29,5	28,7	28,5
Recovery nominal pressure drops	kPa	49,9	47,6	46,8	49,3	46,9	46,1
Recovery water content	l		11,1			12,6	

RC100 - 100% recovery		2145			2160		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	192,4	187,0	181,7	217,0	211,0	205,2
Recovery nominal flow	m³/h	33,5	32,6	32,3	37,7	36,8	36,5
Recovery nominal pressure drops	kPa	48,8	46,5	45,8	50,0	47,7	47,0
Recovery water content	l		14,9			17,4	

Table"G": Performance and pressure drops RC100 accessory for THAETY-THAESY models

RC100 - 100% recovery		**270**			**280**		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	94,5	92,0	89,3	104,8	102,0	99,1
Recovery nominal flow	m³/h	16,4	16,0	15,9	18,2	17,8	17,6
Recovery nominal pressure drops	kPa	44,4	42,5	41,8	38,9	37,2	36,6
Recovery water content	l		6,9			8,4	

RC100 - 100% recovery		**290**			**2100**		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	116,4	113,0	109,9	136,1	132,0	128,1
Recovery nominal flow	m³/h	20,2	19,7	19,5	23,7	23,0	22,8
Recovery nominal pressure drops	kPa	46,9	44,7	44,0	47,9	45,5	44,7
Recovery water content	l		8,4			9,9	

RC100 - 100% recovery		**2115**			**2130**		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	150,6	146,0	141,4	168,2	163,0	157,7
Recovery nominal flow	m³/h	26,2	25,4	25,1	29,2	28,4	28,0
Recovery nominal pressure drops	kPa	47,8	45,3	44,4	48,4	45,9	44,8
Recovery water content	l		11,1			12,6	

RC100 - 100% recovery		**2145**			**2160**		
Water inlet/outlet temperature	°C	35/40 (**)	40/45 (*)	45/50 (**)	35/40 (**)	40/45 (*)	45/50 (**)
Nominal heating capacity (•)	kW	190,8	185,0	179,0	216,7	210,0	203,5
Recovery nominal flow	m³/h	33,2	32,2	31,8	37,7	36,6	36,2
Recovery nominal pressure drops	kPa	48,1	45,7	44,6	49,8	47,2	46,3
Recovery water content	l		14,9			17,4	

(•) Heating capacity with recovery and desuperheater fouling factor equivalent to $0{,}35 \times 10^{-4}$ m² K/W.

(*) Conditions referred to the unit complete with condensation control (FI10) with standard calibration, chilled water temperature of 7°C and evaporator temperature differential of 5K.

(**) Conditions refer to the unit complete with condensation control (FI10), with suitable calibration (expressly requested when the order is made), chilled water temperature of 7°C and temperature difference at the evaporator of 5K.

Operating limits:

RC100:

- hot water temperature of 35-50°C with permitted water temperature differential of 4÷6K;
- the minimum permitted water inlet temperature is 30°C.

Attention

Units fitted with a permanent recovery unit or desuperheater in series with the compressor must be used in compliance with the regulations set out by Ministerial Decree 1/12/1975 "Safety regulations for appliances containing hot pressurized fluids" and by its technical application specifications (collections R and H). This law is only valid in the Italian Republic. In the event of installation in other countries, please keep to the local laws in force.
Hot water for domestic use can be produced only with the use of an additional heat exchanger which is suited to the purpose. Refer to current laws and standards in the place of installation.

Table"G": Performance and pressure drops DS accessory for TCAEBY models

DS - Desuperheater		270		280	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	18,0	14,9	20,0	16,6
Desuperheater nominal water flow	m³/h	1,6	1,3	1,8	1,5
Desuperheater nominal pressure drops	kPa	2,6	1,8	3,1	2,2
Desuperheater water content.	l	2,8		2,8	

DS - Desuperheater		290		2100	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	22,0	18,6	25,1	20,7
Desuperheater nominal water flow	m³/h	1,9	1,6	2,2	1,8
Desuperheater nominal pressure drops	kPa	3,7	2,7	2,7	1,9
Desuperheater water content.	l	2,8		3,8	

DS - Desuperheater		2115		2130	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	29,0	23,8	31,0	25,8
Desuperheater nominal water flow	m³/h	2,5	2,1	2,7	2,3
Desuperheater nominal pressure drops	kPa	1,9	1,3	3,2	2,3
Desuperheater water content.	l	5,3		4,3	

DS - Desuperheater		2145		2160	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	36,1	29,7	40,1	33,2
Desuperheater nominal water flow	m³/h	3,2	2,6	3,5	2,9
Desuperheater nominal pressure drops	kPa	2,8	2,0	2,7	2,0
Desuperheater water content.	l	5,3		6,0	

Table"G": Performance and pressure drops DS accessory for TCAETY models

DS - Desuperheater		270		280	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	18,0	14,7	21,1	17,1
Desuperheater nominal water flow	m³/h	1,6	1,3	1,8	1,5
Desuperheater nominal pressure drops	kPa	2,6	1,8	3,4	2,3
Desuperheater water content.	l	2,8		2,8	

DS - Desuperheater		290		2100	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	25,0	20,6	28,0	22,8
Desuperheater nominal water flow	m³/h	2,2	1,8	2,5	2,0
Desuperheater nominal pressure drops	kPa	4,6	3,3	3,3	2,3
Desuperheater water content.	l	2,8		3,8	

DS - Desuperheater		2115		2130	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	32,0	26,0	35,0	28,5
Desuperheater nominal water flow	m³/h	2,8	2,3	3,1	2,5
Desuperheater nominal pressure drops	kPa	2,3	1,6	4,0	2,7
Desuperheater water content.	l	5,3		4,3	

DS - Desuperheater		2145		2160	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	40,1	32,8	45,1	36,8
Desuperheater nominal water flow	m³/h	3,5	2,9	3,9	3,2
Desuperheater nominal pressure drops	kPa	3,4	2,4	3,4	2,4
Desuperheater water content.	l	5,3		6,0	

Table"G": Performance and pressure drops DS accessory for TCAESY models

DS - Desuperheater		270		280	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	18,0	14,7	21,1	17,1
Desuperheater nominal water flow	m³/h	1,6	1,3	1,8	1,5
Desuperheater nominal pressure drops	kPa	2,6	1,8	3,4	2,3
Desuperheater water content.	l	2,8		2,8	

DS - Desuperheater		290		2100	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	25,0	20,6	28,0	22,8
Desuperheater nominal water flow	m³/h	2,2	1,8	2,5	2,0
Desuperheater nominal pressure drops	kPa	4,6	3,3	3,3	2,3
Desuperheater water content.	l	2,8		3,8	

DS - Desuperheater		2115		2130	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	31,1	25,4	34,0	28,3
Desuperheater nominal water flow	m³/h	2,7	2,2	3,0	2,5
Desuperheater nominal pressure drops	kPa	2,1	1,5	3,8	2,7
Desuperheater water content.	l	5,3		4,3	

DS - Desuperheater		2145		2160	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	39,1	32,3	43,1	35,7
Desuperheater nominal water flow	m³/h	3,4	2,8	3,8	3,1
Desuperheater nominal pressure drops	kPa	39,1	32,3	3,1	2,2
Desuperheater water content.	l	5,3		6,0	

Table"G": Performance and pressure drops DS accessory for TCAEQY models

DS - Desuperheater		270		280	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	18,0	14,9	20,0	16,4
Desuperheater nominal water flow	m³/h	1,6	1,3	1,8	1,4
Desuperheater nominal pressure drops	kPa	2,6	1,8	3,1	2,2
Desuperheater water content.	l	2,8		2,8	

DS - Desuperheater		290		2100	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	23,0	19,1	26,0	21,6
Desuperheater nominal water flow	m³/h	2,0	1,7	2,3	1,9
Desuperheater nominal pressure drops	kPa	4,0	2,9	2,9	2,1
Desuperheater water content.	l	2,8		3,8	

DS - Desuperheater		2115		2130	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	28,0	23,6	31,0	26,5
Desuperheater nominal water flow	m³/h	2,5	2,1	2,7	2,3
Desuperheater nominal pressure drops	kPa	1,8	1,3	3,2	2,4
Desuperheater water content.	l	5,3		4,3	

DS - Desuperheater		2145		2160	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	35,0	29,4	40,0	34,0
Desuperheater nominal water flow	m³/h	3,1	2,6	3,5	3,0
Desuperheater nominal pressure drops	kPa	2,7	1,9	2,7	2,0
Desuperheater water content.	l	5,3		6,0	

Table"G": Performance and pressure drops DS accessory for THAETY models

DS - Desuperheater		270		280	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	17,0	13,9	19,0	15,5
Desuperheater nominal water flow	m³/h	1,5	1,2	1,7	1,4
Desuperheater nominal pressure drops	kPa	2,3	1,6	2,8	1,9
Desuperheater water content.	l	2,8		2,8	

DS - Desuperheater		290		2100	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	22,0	18,1	26,0	21,2
Desuperheater nominal water flow	m³/h	1,9	1,6	2,3	1,9
Desuperheater nominal pressure drops	kPa	3,7	2,6	2,9	2,0
Desuperheater water content.	l	2,8		3,8	

DS - Desuperheater		2115		2130	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	28,0	22,7	32,0	26,1
Desuperheater nominal water flow	m³/h	2,5	2,0	2,8	2,3
Desuperheater nominal pressure drops	kPa	1,8	1,2	3,4	2,3
Desuperheater water content.	l	5,3		4,3	

DS - Desuperheater		2145		2160	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	36,1	29,5	41,1	33,4
Desuperheater nominal water flow	m³/h	3,2	2,6	3,6	2,9
Desuperheater nominal pressure drops	kPa	2,8	2,0	2,9	2,0
Desuperheater water content.	l	5,3		6,0	

Table"G": Performance and pressure drops DS accessory for THAESY models

DS - Desuperheater		270		280	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	17,0	13,9	19,0	15,5
Desuperheater nominal water flow	m³/h	1,5	1,2	1,7	1,4
Desuperheater nominal pressure drops	kPa	2,3	1,6	2,8	1,9
Desuperheater water content.	l	2,8		2,8	

DS - Desuperheater		290		2100	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	22,0	18,1	26,0	21,2
Desuperheater nominal water flow	m³/h	1,9	1,6	2,3	1,9
Desuperheater nominal pressure drops	kPa	3,7	2,6	2,9	2,0
Desuperheater water content.	l	2,8		3,8	

DS - Desuperheater		2115		2130	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	28,0	22,9	31,0	25,8
Desuperheater nominal water flow	m³/h	2,5	2,0	2,7	2,3
Desuperheater nominal pressure drops	kPa	1,8	1,2	3,2	2,3
Desuperheater water content.	l	5,3		4,3	

DS - Desuperheater		2145		2160	
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	50/60 (*)	60/70 (*)
Nominal heating capacity (•)	kW	35,0	28,9	39,1	32,3
Desuperheater nominal water flow	m³/h	3,1	2,5	3,4	2,8
Desuperheater nominal pressure drops	kPa	2,7	1,9	2,6	1,9
Desuperheater water content.	l	5,3		6,0	

(•) Heating capacity with recovery and desuperheater fouling factor equivalent to $0,35 \times 10^{-4}$ m² K/W.

(*) Conditions refer to the unit with chilled water temperature of 7°C and temperature differential at the evaporator of 5K.

Operating limits:

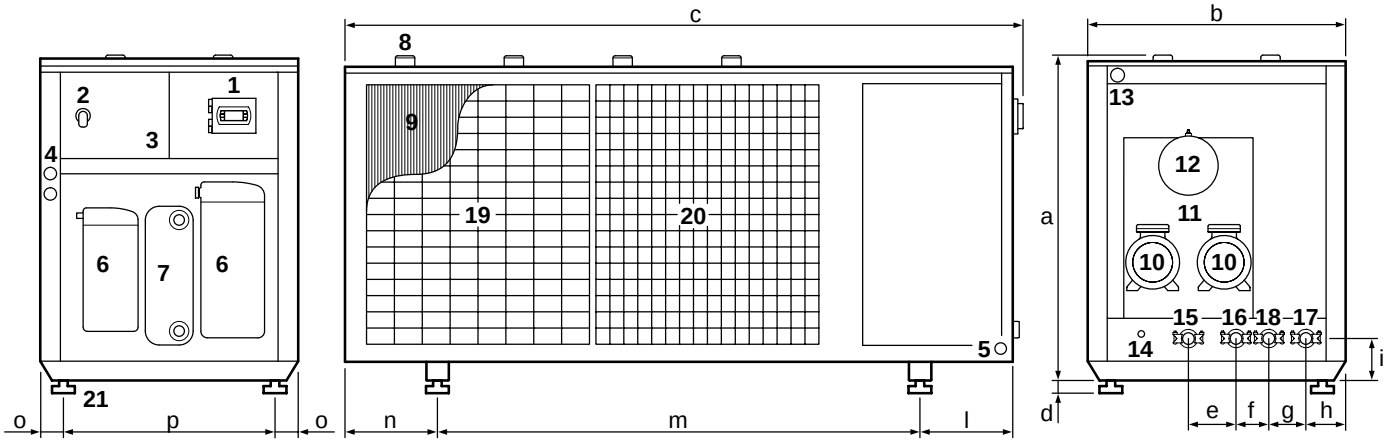
DS:

- hot water temperature of 50÷70°C with permitted water temperature differential of 5÷10K;
- the minimum permitted water inlet temperature is 40°C.

Attention

Units fitted with a permanent recovery unit or desuperheater in series with the compressor must be used in compliance with the regulations set out by Ministerial Decree 1/12/1975 "Safety regulations for appliances containing hot pressurized fluids" and by its technical application specifications (collections R and H).
This law is only valid in the Italian Republic. In the event of installation in other countries, please keep to the local laws in force.
Hot water for domestic use can be produced only with the use of an additional heat exchanger which is suited to the purpose. Refer to current laws and standards in the place of installation.

Dimensions and footprints



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

TCAEBY

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

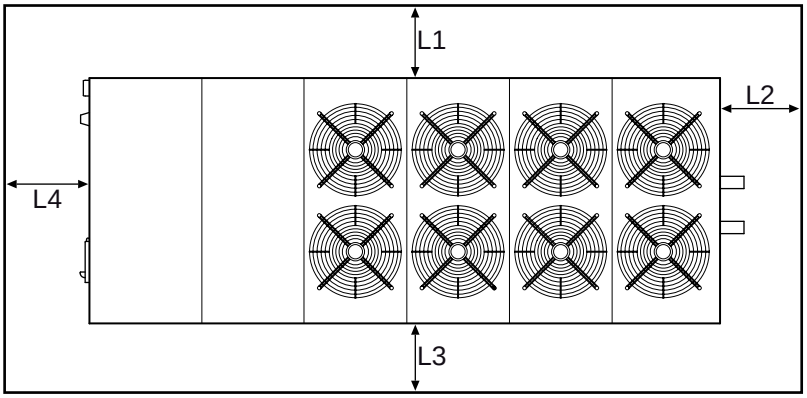
Model		270	280	290	2100	2115	2130	2145	2160
Exchanger inlet/outlet connections	Ø	2”	2”	2”	2”	2”	2”	2”	2”
DS/RC100 inlet/outlet connections	Ø	2”	2”	2”	2”	2”	2”	2”	2”

TCAETY-TCAESY-TCAEQY-THAESY-THAETY

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

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

Clearances and positioning

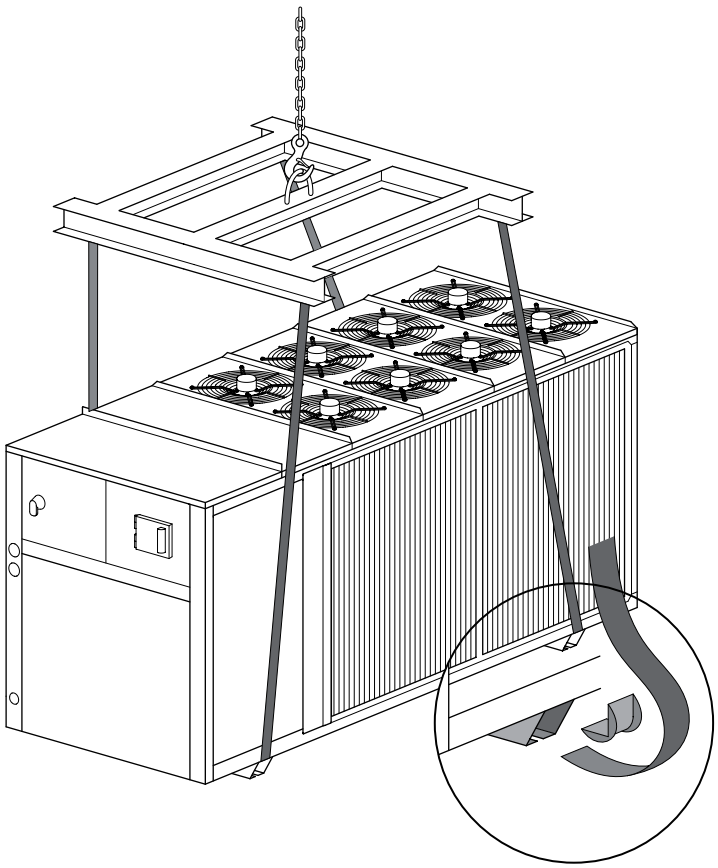


Model		270	280	290	2100	2115	2130	2145	2160
L1	mm	1500	1500	1500	1500	2000	2000	2000	2000
L2	mm	2000	2000	2000	2000	2000	2000	2000	2000
L3	mm	1500	1500	1500	1500	2000	2000	2000	2000
L4	mm	1000	1000	1000	1000	1500	1500	1500	1500

N.B.:
L2 is the minimum distance for the removal of the pump assembly and the relative water buffer tank. If the accessory is not present, the distance can be reduced.

Handling and storage

○ The unit should be handled with care to avoid damage to the external structure and to the internal mechanical and electrical components.
○ Do not stack the units.
○ The temperature limits for storage are -9°÷45°C.

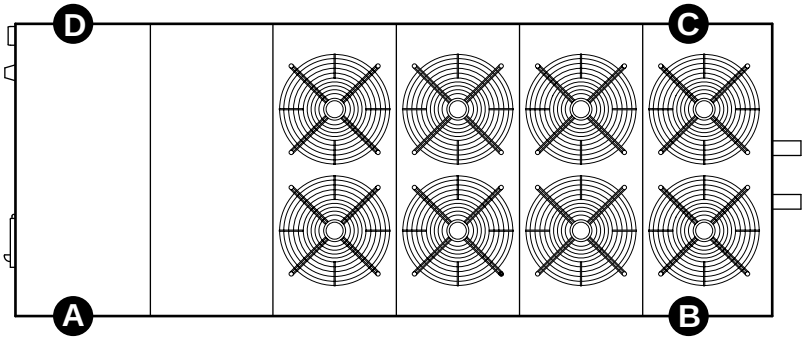


Installation and connection to the system

○ The unit is designed for outdoor installation.
○ The unit is fitted with Victaulic type water connections on the air conditioning system water inlet and outlet and on the recovery/desuperheater inlets and outlets. It is also fitted with carbon steel fittings for welding.
○ Segregate the unit if installed in areas accessible to persons under 14 years of age.
○ The unit must be positioned to comply with the minimum recommended clearances, bearing in mind the access to water and electrical connections.
○ The unit can be equipped with anti-vibration mountings on request (KSA).
○ Shut-off valves must be installed that isolate the unit from the rest of the system. Elastic connection joints and system/machine drain taps also need to be fitted.
○ A metal mesh filter (with a square mesh measure no more than 0.8 mm), of a suitable size and with suitable pressure drops, must be fitted on unit return pipes.
○ However it is installed, the coil inlet air temperature (ambient air) must remain within the set limits.
○ The water flow through the heat-exchanger should not fall below a value corresponding to a temperature differential of 8°C (with both compressors on).
○ The unit may not be installed on brackets or shelves.
○ 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 expansion tank is sized on the basis of the water content of the individual machine. Any additional expansion tank should be sized by the installer on the basis of the system. In the case of models without a pump, the pump must be installed with the pump delivery towards the machine water inlet.

N.B.:
The space over the unit must be free from any possible obstacle. If the unit is completely surrounded by walls, the distances specified are still valid, provided that at least two adjacent walls are not higher than the unit itself.
There must be a minimum gap of at least 3.5 m between the top of the unit and any obstacles above it.
If more than one unit is installed, the minimum distance between the finned coils should be at least 2 m.

TCAEBY – TCAETY – TCAESY – TCAEQY Weights



TCAEBY

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

TCAETY-TCAESY-TCAEQY

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

TCAEBY with **PUMP** accessory

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

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

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

TCAEBY with **TANK&PUMP** accessory

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

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

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

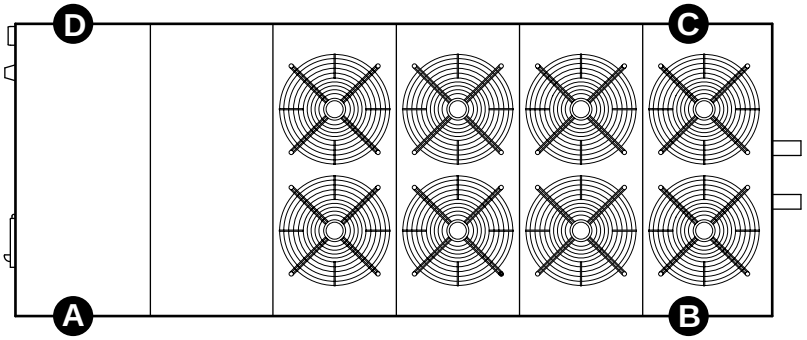
(*) Weight of the unit when empty.

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

(*) Weight of the unit when empty.

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

THAETY – THAESY Weights



THAETY-THAESY

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

THAETY-THAESY with **PUMP** accessory

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

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

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

(*) Weight of the unit when empty.

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

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

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

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

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

Water connections

Maximum water circuit content

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

The minimum circuit water content is 2 l/kW

Example:
THAETY 2115 QT = 122.0 kW

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

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

Water data

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

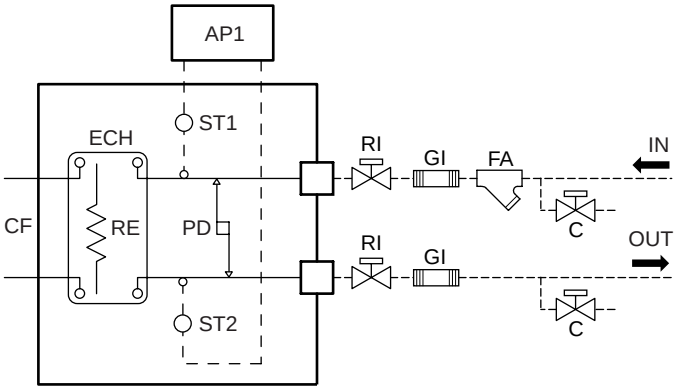
Expansion tank technical data

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

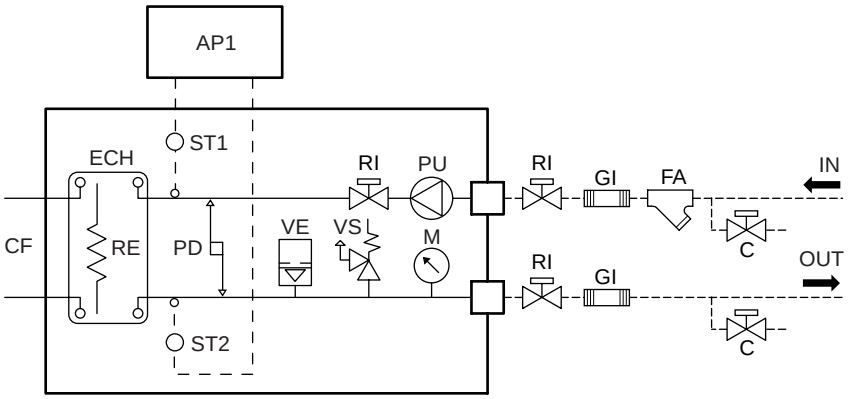
Model		TCAETY-THAETY-TCAESY-THAESY-TCAEQY							
		270	280	290	2100	2115	2130	2145	2160
Capacity	l	12	12	12	12	24	24	24	24
Pre-charging	barg	2	2	2	2	2	2	2	2
Maximum expansion tank pressure	barg	6	6	6	6	6	6	6	6

Water circuits

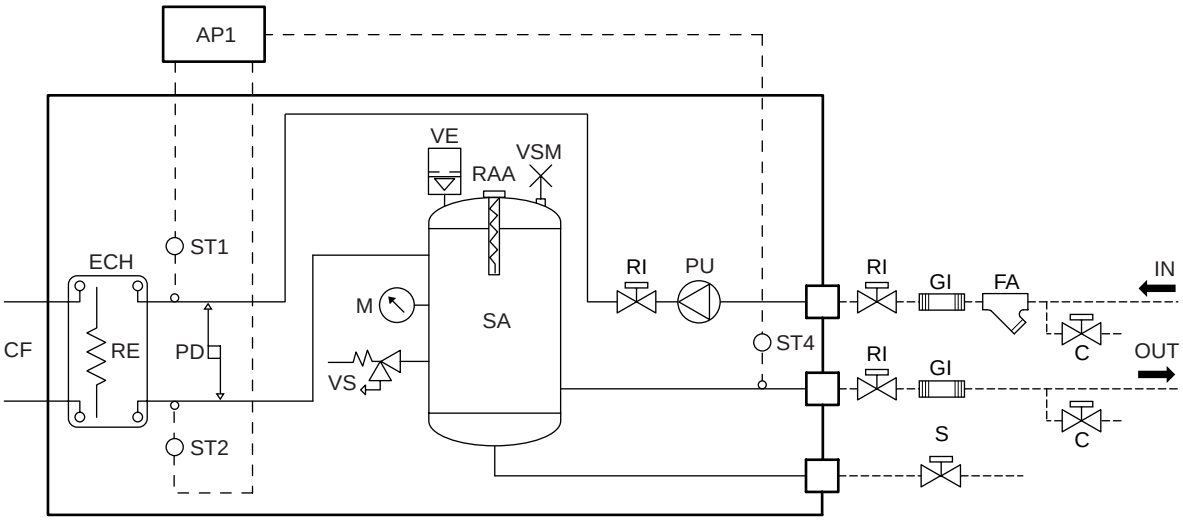
Water circuit standard installation



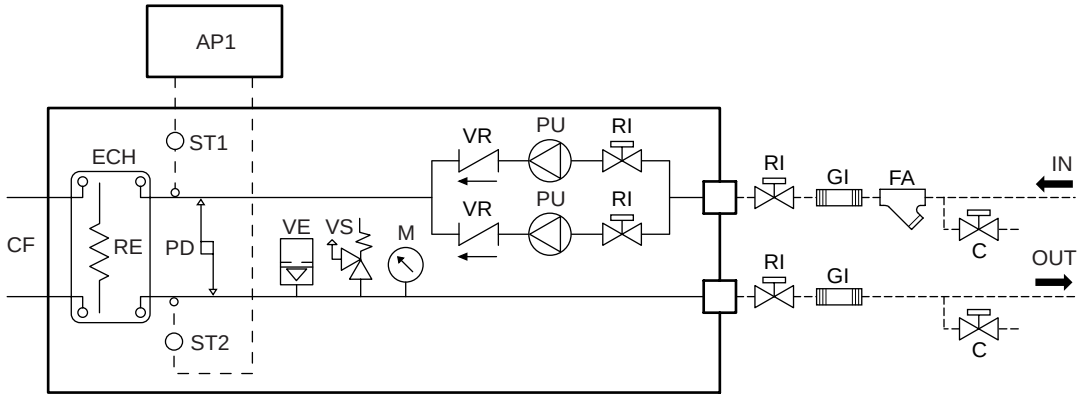
Water circuit P1 – P2 installation



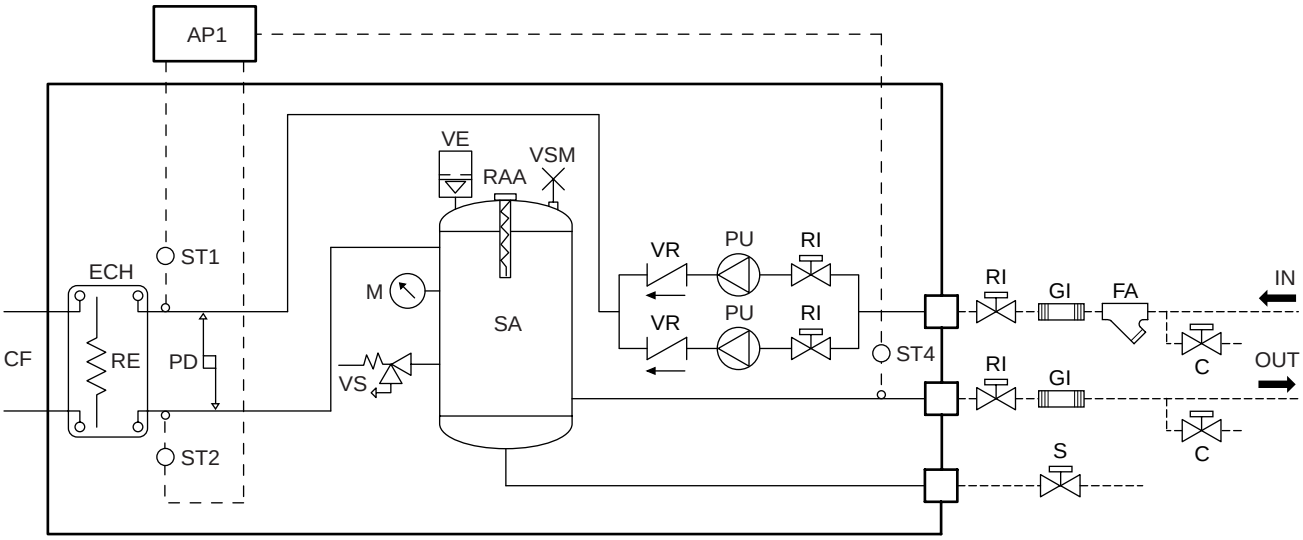
Water circuit ASP1 – ASP2 installation



Water circuit DP1 – DP2 installation



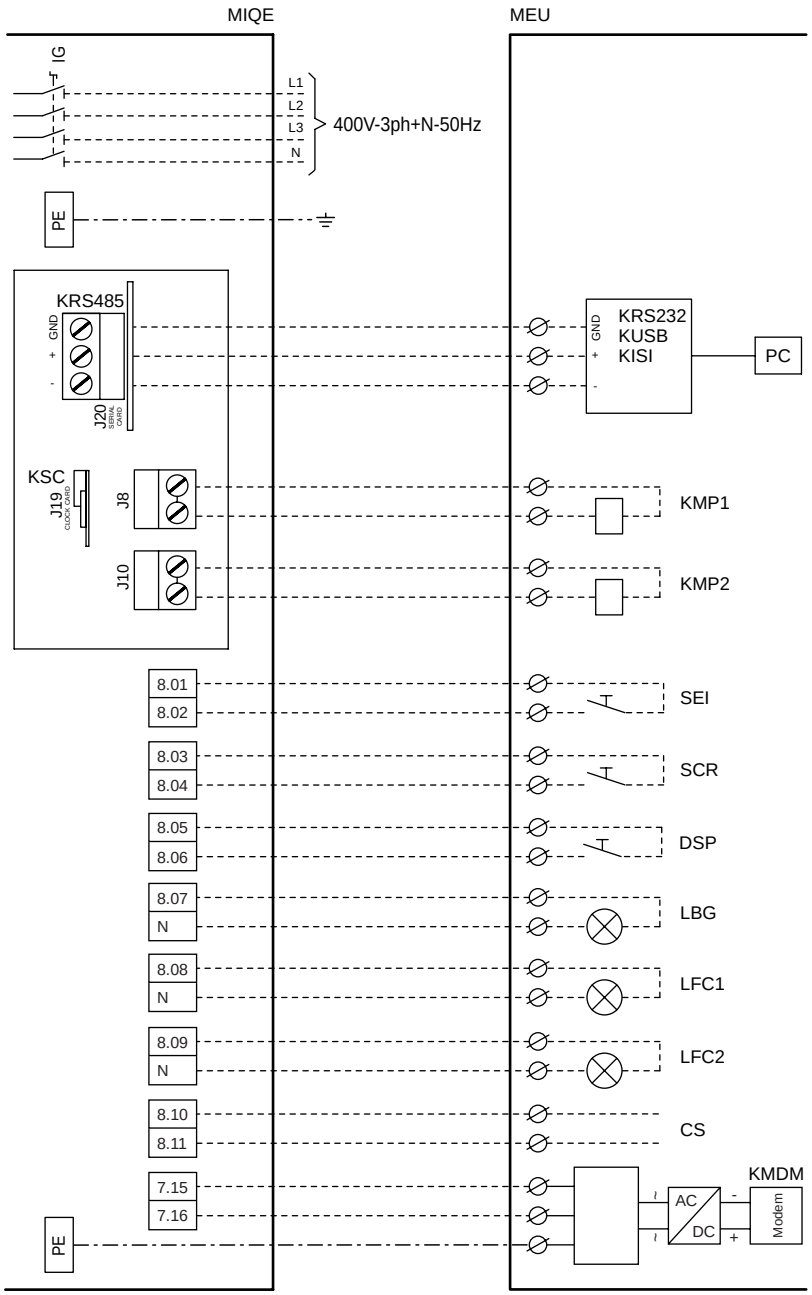
Water circuit ASDP1 – ASDP2 installation



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

Electrical connections

MIQE	Electrical board internal terminal board;
IG	General isolator;
L1	Line 1;
L2	Line 2;
L3	Line 3;
N	Neutral;
PE	Earth terminal;
KSC	Clock card (accessory);
KRS485	RS485 serial interface (accessory);
KUSB	RS485/USB converter (accessory);
KISI	CAN bus serial interface;
J19	Connector for KSC accessory installation;
J20	Connector for KRS485, KFTT10 and KISI accessory installation;
MEU	External user terminal board;
KRS232	RS485/RS232 converter (accessory);
PC	Personal computer;
SEI	Summer/winter selector (THAESY-THAETY models) (control with clean contact);
SCR	Remote control selector (control with clean contact);
DSP	Double set-point selector (only available in combination with the EEV accessory);
KMP1	Pump controls (consensus at power 230
KMP2	Vac, maximum load 2A AC1)
CS	Scrolling set point via analogue signal 4-20 mA (incompatible with the DSP accessory).
LBG	General lock light (230 V AC);
LFC1	Compressor 1 operating light (230 V AC);
LFC2	Compressor 2 operating light (230 V AC);
KMDM	GSM 900-1800 modem kit;
- - - -	Connection to be made by the installer;



ATTENTION !
The diagrams only show the connections to be made by the installer.

○ The electrical panel can be accessed through the front panel of the unit.
○ Connections must be made by skilled personnel in compliance with current standards and with the diagrams provided with the machine.
○ Always install a general isolator in a protected area near the appliance with a delayed characteristic curve of a suitable capacity and breaking capacity. Make sure the general isolator includes a 3mm minimum opening distance between contacts.
○ Earth connection is compulsory by law and safeguards the user while the machine is in use.

N.B.:
Specific terminals are provided for the **CS** and **DSP** accessories.

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

TCAEY-THAEY 270÷2160

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