TCHEY 245÷2185
THHEY 245÷2185

Low consumption Y-Flow range

Macrosystem
45,2÷184,8 kW
50,0÷208,84 kW

Water chillers and heat pumps with reversible cooling cycle with water cooled condensation and R410A refrigerant fluid.
Range with hermetic Scroll compressors.

R410A

iDRHOSS system compatible

ADAPTIVE FUNCTION PLUS

EUROVENT CERTIFIED PERFORMANCE

CE

RHOSS

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General Features

Intended conditions of use

TCHEY units are monobloc air cooled water chillers with water-cooled condensation.
THHEY units are packaged heat-pumps with reversible refrigerant cycle and water evaporation/condensation.

They are suitable in air conditioning installations where it is necessary chilled water (TCHEY) or chilled and hot water (THHEY), not for human consumption.
ATTENTION:
For evaporator outlet water at less than 4°C or geothermal applications with temperatures below 4°C, the working temperatures of the unit MUST be specified when ordering (condenser and evaporator water outlet/inlet) for a correct parameterisation of the same.
The units are designed for indoor installation.

The units comply with the following Directives:
- Machinery Directive 2006/42/CE;
- Low voltage Directive 2006/95/CE;
- Electromagnetic compatibility directive 2004/108/CE;

Guide to reading the code

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

T Water production unit	**C** Cooling only / **H** Heat pump	**H** Water cooling	**E** Scroll-type hermetic compressors	**Y** R410A refrigerant fluid	**2** n° compressors	**45÷185** Approximate cooling capacity (in kW)

Available installations:

Standard:
Installation without pump and without hydraulic accessories.

Pump:
P1 – Installation with pump and system side hydraulic circuit.
P2 – Installation with increased static pressure pump and system side hydraulic circuit.
DP1 – Installation with basic static pressure 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.
PS1 – Installation with regulated pump with source side inverter.
DPS1 – Installation with inverter regulation double pump, including an automatically activated pump in stand-by.

Example: TCHEY 290
- Cold water production only unit;
- Water cooling;
- 1 hermetic Scroll compressor;
- Without circulating pump;
- R410A refrigerant fluid;
- Nominal cooling capacity of approximately 90 kW.

Control logic

AdaptiveFunction Plus

TCHEY-THHEY 245÷2185 with control iDRHOSS

The new adaptive regulation logic, **AdaptiveFunction Plus**, is an exclusive *RHOSS* S.p.A. 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-Flow range in the *RHOSS* S.p.A. Research&Development Laboratory by means of numerous test campaigns. The innovative control logic **AdaptiveFunction Plus** allows to obtain optimal comfort levels in all working conditions and the best possible performance in terms of energy efficiency during seasonal operation. **AdaptiveFunction Plus** provides a comfort and energy saving guarantee!

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-Flow 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, while 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-Flow 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**" which processes the information relating to the progress of the water temperatures, identifying the optimal value of the control parameter.

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.

Objectives

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

Functioning logic

In general, the actual control logic 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 logic 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 functioning conditions using:

- the information contained in the return and delivery water temperature to estimate the working conditions thanks to a particular 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.

AdaptiveFunction Plus - Main functions

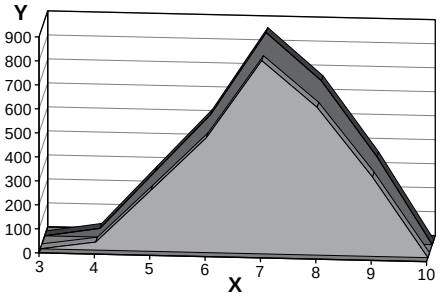
Efficiency or Precision

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*

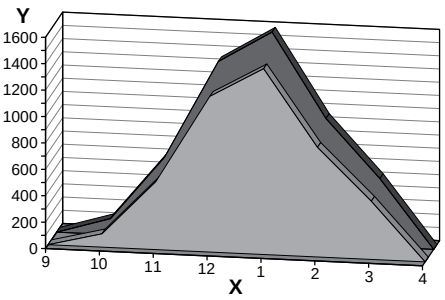
It is well known that chillers work at full capacity for just a very small percentage of their functioning time, while they work at partial capacity for most of the season. Therefore, the power they need to supply generally differs from the nominal design power, and operation at partial capacity has 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: seasonal energy savings of around 8% compared to a traditional unit that operates with a fixed set-point.



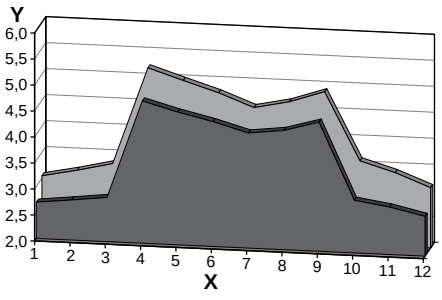
X Year divided into months (1 January, 2 February, etc.).
Y Energy consumption (kWh).
Unit with fixed set-point
Unit with sliding set-point

Winter season: a unit that operates with a sliding set-point enables seasonal energy savings of around 13% compared to a traditional unit that operates with a fixed set-point and executed calculations demonstrate that seasonal consumption is equal to those of a machine a in **CLASS A**.



X Year divided into months (1 January, 2 February, etc.).
Y Energy consumption (kWh).
Unit with fixed set-point
Unit with sliding set-point

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 efficiency kWh supplied/kWh absorbed.
Unit with fixed set-point
Unit with sliding set-point

*Analysis performed by comparing the operation of a Y-Flow heat pump unit with **AdaptiveFunction Plus** logic that operates with a fixed set-point (7°C in the summer and 45°C in the winter) or with a sliding set-point (range between 7 and 14 °C in the summer, range between 35 and 45°C in the winter) for an office building in Milan.*

The Seasonal Efficiency Index PLUS

The University of Padua has developed the seasonal efficiency index ESEER+, which takes the adaptation of the chiller set-points to different partial load conditions into account. This, therefore, characterises the seasonal behaviour of the chiller with **Adaptive Function Plus** compared to the more traditional ESEER index.
The ESEER+ index can therefore be used for a quick evaluation of seasonal energy consumption of units with **Adaptive Function Plus**, instead of more complex analyses conducted on the plant-system which are usually difficult to complete.

Simplified method for calculating energy saving with Adaptive Function Plus

The dynamic analyses used to calculate the energy consumption of chillers in a building/system are generally too elaborate to be used for a quick comparison of different refrigerant units, inasmuch as they require a range of data that is not always available.
For a quick estimate of what the energy savings could be with a unit equipped with Adaptive Function Plus software compared to a machine with traditional control, we suggest using a simplified method based on the following formulae:

$$E = \frac{0.54 \times N \times C}{ESEER+}$$

E	power absorbed by chiller equipped with AdaptiveFunction Plus software (kWh)
N	number of chiller operating hours
C	nominal cooling capacity of the chiller (kW)
ESEER+	average seasonal efficiency of chiller equipped with Adaptive Function Plus software

$$E = \frac{0.54 \times N \times C}{ESEER}$$

E	power absorbed by chiller equipped with AdaptiveFunction Plus software (kWh)
N	number of chiller operating hours
C	nominal cooling capacity of the chiller (kW)
ESEER	(European seasonal EER) European average seasonal energy efficiency

Therefore in two units at the same nominal cooling capacity and the same number of working hours but equipped with different controls, the higher the absorbed power the lower the seasonal efficiency. In order to simplify matters, here is an example comparing a traditional control Rhoss unit to one with Adaptive Function Plus control:

Example:

TCHEY 290 model with hypothetical traditional control:
Nominal cooling capacity of chiller = 90.1 kW
N = 8 hours/day x (5 months x 30 days/month) = 1200 hours
ESEER = 6.45

$$E = \frac{0.54 \times 1200 \times 90.1}{6,45} = \mathbf{9.052\ kW/h}$$

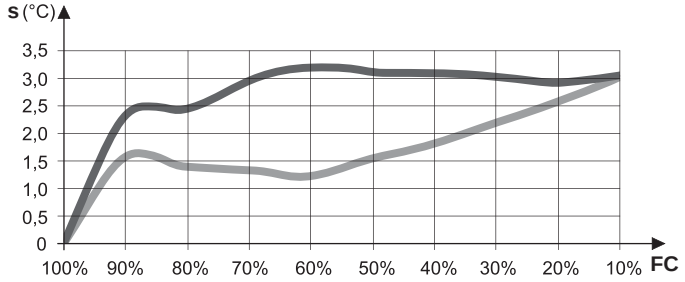
Model TCHEY 290 equipped with control software **Adaptive Function Plus**:
Nominal cooling capacity of chiller = 90.1 kW
N = 8 hours/day x (5 months x 30 days/month) = 1200 hours
ESEER+ = 7.23

$$E = \frac{0.54 \times 1200 \times 90.1}{7,23} = \mathbf{8.075\ kW/h}$$

The obtainable energy savings with **Adaptive Function Plus** is therefore **11%**.

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.

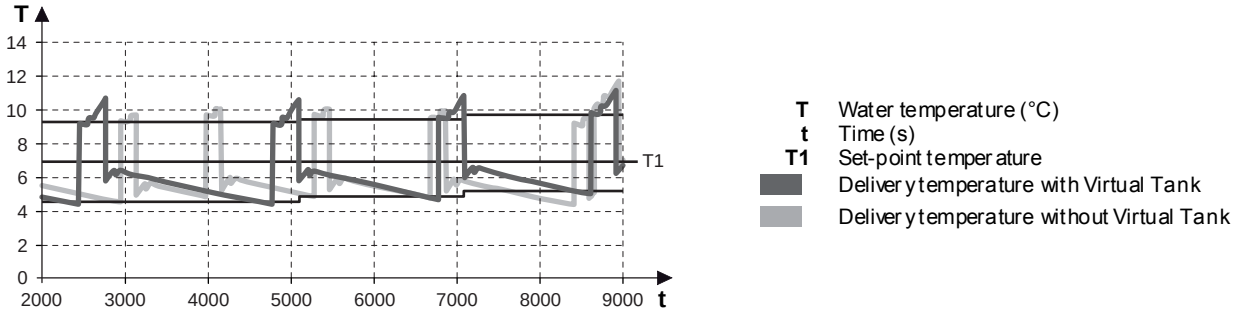


s fluctuation
FC capacity
Unit with water buffer tank, 4 litres/kW in the system and return control.
Unit with water buffer tank, 2 litres/kW in the system and delivery control with "***Precision***" **AdaptiveFunction Plus**

*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 poor 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.



*The chart shows the various chiller outlet temperatures considering a 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** and **Virtual Tank** logic switches the compressor on less often over the same period of time, with obvious advantages in terms of energy consumption and system reliability.*

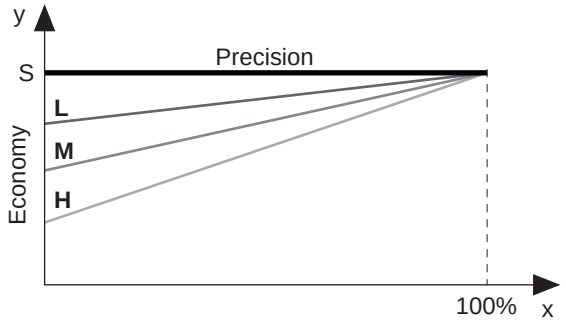
ACM Autotuning compressor management

AdaptiveFunction Plus enables the Y-Flow units to adapt to the system they are serving, so as to always identify the best compressor functioning parameters in the different working conditions.
During the initial functioning phases, the special "**Autotuning**" function enables the Y-Flow 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 functioning 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. It must be considered normal in this phase that the delivery temperature drops, even of a few degrees, below the set-point value set however remaining higher than the antifreeze set-point.
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.

Set-point Compensation

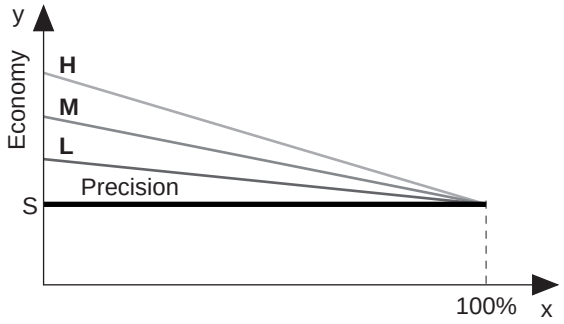
The Economy function enables the chiller assembly to operate energy-saving programmes whilst still providing the required level of comfort.
This function controls the maximum limit with sliding Set-point, modifying the Set-point value according to the actual system thermal load; when the load decreases during summer months the Set-point increases, while when the load decreases during winter months the Set-Point decreases.
This function is destined for cooling applications, and is designed to control energy consumption while always respecting the real demands of the system capacity. Within the Economy option it is possible to select one of three diverse Set-point adaptation curves depending on the type of system.

"Economy" function in Winter mode



x	Load percentage (%)
y	Set-point (°C).
S	Value of Set-point set by user
L	Use in buildings with very unbalanced loads.
M	Intermediate situation between L and H (default).
H	Use in buildings with very homogeneous loads. High efficiency.

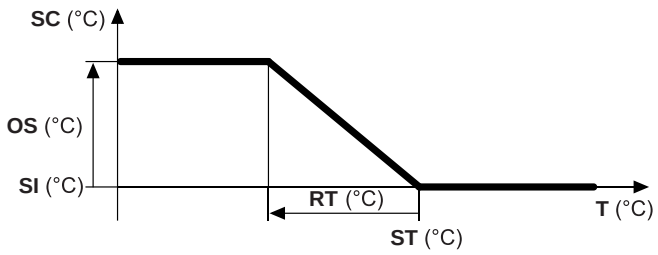
"Economy" function in Summer mode



x	Load percentage (%)
y	Set-point (°C).
S	Value of Set-point set by user
L	Use in buildings with very unbalanced loads.
M	Intermediate situation between L and H (default).
H	Use in buildings with very homogeneous loads. High efficiency.

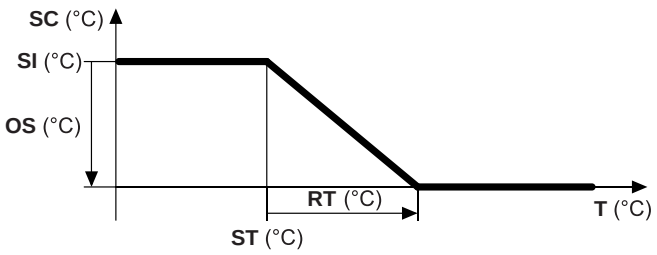
As an alternative to modification of the Set-point according to the real system load (Economy option), it is possible to compensate the set-point based on the temperature of the outdoor air by purchasing the KEAP accessory.
This function modifies the Set-point value based on the temperature of the outdoor air. Based on this value, the set-point is calculated by adding (winter cycle) or subtracting (summer cycle) an offset value to the Set-point set (see example below).
This function is activated both in winter mode as well as in summer mode. The function is activated only when a KEAP accessory is present.

Winter cycle



OS = 7°C
RT = 25°C
ST = 20°C

Summer cycle



OS = 8°C
RT = 15°C
ST = 15°C

T (°C)	Outdoor air temperature
SC (°C)	Calculated Set-point temperature
OS (°C)	Offset Set-point (calculated value)
SI (°C)	Set-point set
RT (°C)	Outdoor air temperature Set-point compensation
ST (°C)	Outdoor temperature set

It is possible to decide whether to activate the function in both functioning modes or only in one. If the Set-point compensation is enabled in relation to the outdoor temperature, the Economy option is automatically disabled.
However, it is possible to decide to enable the set-point compensation in one cycle and enable the Economy function in the other cycle.

Standard version constructional features

○ Structure in galvanised and RAL 9018 painted steel plate, coated on the inside with sound-absorbing panels.
○ Hermetic, Scroll-type rotary compressors, complete with internal circuit breaker protection and crankcase heater activated automatically when the unit stops (as long as the power supply to the unit is preserved).
○ Plate type heat-exchangers in stainless steel with closed-cell expanded polyurethane foam insulation complete with anti-freeze elements.
○ Differential pressure switch on the primary heat exchanger for TCHEY models, on the primary heat exchanger and on the rejection device for THHEY models for protection of the unit from any water flow interruptions.
○ Male threaded hydraulic connections.
○ Refrigerant circuit realised with mild copper tubes (EN 12735-1-2) and welded with silver alloy. Complete with: inversion valve (THHEY), drier filter, thermostatic valve (n° 2 for the THHEY models), non-return valve (THHEY), load connections, safety pressure switch on the high pressure side with manual rearm, pressure switch on the low pressure side with automatic rearm, safety valves, liquid indicator and insulation of the intake line.
○ Rejection circuit realised with mild copper tube (EN 12735-1-2) and welded with silver alloy. Complete with: manual air vent and drain valve.
○ Primary circuit realised with mild copper tube (EN 12735-1-2) and welded with silver alloy. Complete with: manual air vent and drain valves.
○ Unit with IP21 protection rating.
• **iDRHOSS** compatible with ***AdaptiveFunction Plus***.
○ The unit is complete with the R410A refrigerant charge.

Versions

LT – Production of hot water up to 52°C
HT – Production of hot water up to 55°C

Available Installations

Standard:
Installation without pump and without hydraulic accessories.
Pump:
P1 – Installation with pump.
P2 – Installation with increased static pressure pump.
DP1 – Installation with basic static pressure double pump, including an automatically activated pump in stand-by.
DP21 – Installation with increased static pressure double pump, including an automatically activated pump in stand-by.
PS1 – Installation with regulated pump with inverter (to use with geothermal probes on TCHEY and THHEY and Dry Cooler on TCHEY) to control the condensation temperature is summer functioning mode (side inverter).
DPS1 – Installation with double motor-driven pump with inverter regulation, one of which in automatically activated stand-by, (to use with geothermal probes on TCHEY and THHEY and Dry Cooler on TCHEY) to control the condensation temperature in summer functioning mode (side inverter).

The installations P1 and P2 also envision the following in the primary circuit: expansion tank, safety valve (6 Barg), water pressure gauge, filling cock, pump shut-off cock, drain cock and manual air bleeding vents.

The installation PS1 is complete with drain cock, pump shut-off cock, safety valve (6 Barg) and manual air bleeding vents.
In the event of double pump DP1,DP2 and DPS1 the hydraulic circuits also include a non-return valve and an intake cock for each pump.

Electrical Control Board

Option with iDRHOSS compatible control

○ Electrical control 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 (400V-3ph+N-50Hz);
• auxiliary power supply 230V-1ph+N-50Hz drawn from the main power supply;
• general isolator, complete with door interlocking isolator;
• Automatic compressor protection switch;
• protection fuse for auxiliary circuit;
• compressor power contactor;
• Automatic switch for pump protection;
• Power contactor for the pump
• remote unit control.
○ 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 outlet water temperature set points; of cycle reversal (THCEY); of the safety timer delays; of the circulating pump; of the compressor and system pump hour-run meter; of the electronic anti-freeze protection which cuts in automatically when the machine is switched off; and of the functions which control the operations 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;
• visual indication of the programmed set points via the display; of the in/out water temperature via the display; of the alarms via the display; and of cooling/heat-pump operating mode via display;
• self-diagnosis with continuous monitoring of the functioning of the unit;
• user interface menu;
• alarm code and description;
• alarm history management (menu protected by manufacturer password).
○ The following is memorised for each alarm:
• date and time of intervention (if the KSC accessory is present);
• alarm code and description;
• inlet/outlet water temperatures when the alarm intervened;
• alarm delay time from the switch-on of the connected device;
• compressor status at moment of alarm;
○ Advanced functions:
• 3-way valve management for DHW.
• configured for serial connection (KRS485, KFTT10, KRS232 and KUSB accessory);
• possibility to have a digital input for remote management of the double set-point from remote (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;
• computer-assisted unit testing;
• self-diagnosis with continuous monitoring of the unit functioning status.
○ 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

HPH – The HPH accessory can be installed only in versions without pump (both utility and rejection side) and without KV2, KV3 and KFRC accessory. Set-up for operation of cooling only units (TCHEY) as heat pump by means of inversion on the water circuit for the production of hot water for civil and industrial use.
DSP – Double set-point via digital consensus (incompatible with the CS accessory) with ***Precision*** option, must be handled as a special feature by our pre-sales office.
CS – Scrolling set point via analogue signal 4-20 mA (incompatible with the DSP and KEAP accessory) with ***Precision*** option. This must be handled as a special feature by our pre-sales office.
SFS – Soft-Starter device;
CIT – Upward hydraulic connections (only with PUMP installation)
GM – Refrigerant circuit high and low pressure gauges.
EEV – Electronic thermostatic valve
DS – Desuperheater complete with antifreeze resistance with temperature display on user terminal of outlet water. Not active in winter functioning.
RC100 – Heat recovery with 100% recovery, complete with complete with antifreeze resistance with temperature display on user terminal of outlet water. Not active in winter functioning.
IMPORTANT: when recovery is active water flow to condenser/rejection device must be interrupted at the right time. Such management is already inserted if accessory KV2, KV3 or VP1 is mounted.
BSP – Analogue signal (0-10V) for condensation control worked from external device (KV2/KV3 or modulating valve by the client for well or city water) and 24V power supply.
SS – RS485 serial interface card to create dialogue networks between cards (for maximum distance of 1.000 m) and the building automation, external supervision systems or RHOSS supervision systems (protocols supported: proprietary protocol; Modbus RTU).
FTT10 FTT10 serial interface card for connection to supervision systems (LonWorks system compliant with Lonmark 8090-10 protocol with chiller profile).
SIL – Silent installation with compressor earmuffs.

The units can be equipped with a maximum of 2 motor-driven pumps. With RC100 recovering device or DS desuperheater, PUMP installation if not envisioned. Different configurations may be requested by the companies.

The simultaneous mounting of one or more of the following installations/accessories is not possible: PS1, DPS1, HPH and KFRC; P1, P2, DP1, DP2 and HPH; KV2, KV3 and HPH; RC100/DS and KFRC; or CS and KEAP.

N.B. Accessories DSP and CS must be managed as special through of pre-sales office.

Accessories supplied separately

Note: Accessory BSP mounted in factory is compulsory with accessories KV2/KV3.

KV2 – (For well or city water) 2-way valve on TCHEY or THHEY in summer functioning that modulates the water delivery to the condenser maintaining condensing pressure constant; generally useful when the machine is made to work with a much lower set-point than the project set-point without adjusting the water delivery and/or temperature of the water at condenser inlet, at the effective heat to be disposed; when the well or city water (where admitted in compliance with the legislation of the states where it is installed) at condenser inlet has a temperature below 15°C (the temperature differential ΔT admitted for the well water through the condenser is between interval 12 ÷ 18°C); when water at condenser inlet is below 25°C with ΔT below 12°C (the temperature differential ΔT admitted for water through the condenser is between interval 5 ÷ 15°C) the temperature of the water at condenser outlet must never exceed 52-55°C (see *Functioning limits*).
In heat pump operating mode it is completely opened. This offsets the function of the valve.
The valve makes the complete closing of the hydraulic circuit source side possible when the compressors are switched off in time managed by boards (with well or city water).
KV3 – 3-way modulating valve for condensation control (geothermal probes/dry cooler).
The 3-way modulating valve can be installed at exchanger output (rejection-source) in case of wanting a variable flow rate in the same exchanger and a constant flow rate in the rejection device (Dry-cooler only for TCHEY or geothermal probes for both TCHEY and THHEY). In winder functioning of THHEY model, the valve allows only the full passage of the flow rate through the exchanger (rejection-source). This configuration is defined in deviation.
It can also be installed at exchanger output (rejection-source) in case of wanting constant flow rate (variable temperature in the same exchanger) and a variable flow rate in the rejection device. In winder functioning of THHEY model, the valve allows only the full passage of the flow rate through the exchanger (rejection-source).
This configuration is defined in mixing.
See attached hydraulic layouts for KV2 and KV3.

KFRC – Kit Free-cooling. Free-cooling active only with compressors switched off. Free-cooling uses cooling energy available in the subsoil (well or city water were admitted) for summer air conditioning (radiant). The accessory is made of a tile exchanger and a 3-way diverter valve that can be connected as per the attached layouts. The device is dimensioned to function with a maximum temperature of the water of 16.5°C (from source); it can be automatically or manually activated upon start-up and, typically, for the supply at summer radiant temperature. It is necessary to insert a "Y" filter at accessory input both on source side and system side. This accessory is not a circuit breaker; adequate cleaning of the inlet water must be guaranteed. See attached tables for pressure drops.
KSA – Rubber anti-vibration mountings.
KFA – Water filter.
KTR – Remote keypad for control at a distance with rear illuminated LCD display (same functions as the one built into the machine).
KEAP – External air sensor for Set-point compensation (incompatible with CS accessory).
KSC - Clock board to display date/time and to regulate the machine with daily/weekly start/stop time bands, with the possibility to change the set-points combined to KTR.
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).
KRS485 – 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).
KISI – CAN bus serial interface (Controller Area Network compatible with evolved **iDRHOSS** hydronic system for integrated comfort management (protocol supported CanOpen®).
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

Model TCHEY		**245**	**250**	**260**	**270**	**275**	**290**
Nominal cooling capacity (1)	kW	45,2	53,3	60,6	69,2	75,9	90,1
Power consumption at condenser (1)	kW	54,56	64,13	73,10	83,49	91,58	107,3
E.E.R. (1)		4,69	4,78	4,70	4,69	4,70	4,80
E.S.E.E.R.		6,67	6,73	6,78	6,52	6,63	6,45
E.S.E.E.R.+		7,54	7,62	7,68	7,39	7,42	7,23
Evaporator nominal water flow (1)	l/h	7774	9167	10423	11902	13055	15497
Evaporator nominal pressure drops (1) LT	kPa	22	29	30	27	32	42
Evaporator nominal pressure drops (1) HT	kPa	13	18	18	17	21	23
Pump useful nominal head on evaporator (1) (P1-DP1) LT	kPa	102	93	114	82	69	73
Pump useful nominal head on evaporator (1) (P1-DP1) HT	kPa	111	105	78	91	81	93
Pump useful nominal head on evaporator (1) (P2-DP2) LT	kPa	201	178	160	168	149	172
Pump useful nominal head on evaporator (1) (P2-DP2) HT	kPa	209	189	172	178	160	191
Condenser nominal water flow (1)	l/h	9384	11030	12574	14360	15751	18464
Condenser nominal pressure drops (1) LT	kPa	28	36	38	34	41	60
Condenser nominal pressure drops (1) HT	kPa	17	23	24	22	27	30
Useful nominal head at maximum pump speed on condenser (1) (PS1-DPS1) LT	kPa	171	138	186	197	170	135
Useful nominal head at maximum pump speed on condenser (1) (PS1-DPS1) HT	kPa	136	156	204	213	189	170
Nominal cooling capacity (5)	kW	63,5	74,4	85,1	96,4	106,4	125,7
Evaporator nominal water flow (5)	l/h	10922	12797	14637	16580	18300	21620
Evaporator nominal pressure drops (5) LT	kPa	40	53	55	49	59	77
Evaporator nominal pressure drops (5) HT	kPa	25	32	34	31	38	41
Pump useful nominal head on evaporator (5) (P1-DP1) LT	kPa	44	20	24	25	-	9
Pump useful nominal head on evaporator (5) (P1-DP1) HT	kPa	60	40	16	43	21	44
Pump useful nominal head on evaporator (5) (P2-DP2) LT	kPa	142	100	64	82	43	107
Pump useful nominal head on evaporator (5) (P2-DP2) HT	kPa	158	120	85	99	65	142
Power consumption at condenser (5)	kW	73,3	85,71	98,33	111,3	123,1	145,2
Condenser nominal water flow (5)	l/h	12607	14742	16913	19142	21177	24966
Condenser nominal pressure drops (5) LT	kPa	46	60	63	56	68	99
Condenser nominal pressure drops (5) HT	kPa	28	38	40	36	45	50
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) LT	kPa	101	44	70	95	43	43
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) HT	kPa	81	76	103	123	74	106
Scroll/step compressor	n°	2/2	2/2	2/2	2/2	2/2	2/2
Circuits	n°	1	1	1	1	1	1
Standard machine sound power (6) (1)	dB(A)	67	67	68	68	69	70
Silenced installation sound power (6) (1)	dB(A)	63	63	64	64	65	66
Water contents of heat exchangers (condenser/evaporator) LT	l	4,4	4,4	5,1	6,5	6,5	7,0
Water contents of heat exchangers (condenser/evaporator) HT	l	7,0	7,0	8,0	9,6	9,6	11,3
R410A refrigerant charge		See serial No. plate					
Polyester or other oil		See compressor plate					

Electrical data		**245**	**250**	**260**	**270**	**275**	**290**
Absorbed power (1)	kW	9,65	11,16	12,89	14,73	16,16	18,78
Absorbed power (5)	kW	10,10	11,66	13,64	15,35	17,24	20,05
Pump absorbed power (P1-DP1) LT	kW	0,75	1,12	1,10	1,10	1,10	1,10
Pump absorbed power (P1-DP1) HT	kW	0,75	1,12	1,10	1,10	1,10	1,10
Pump absorbed power (P2-DP2) LT	kW	1,50	1,50	1,50	1,50	1,50	2,20
Pump absorbed power at maximum speed (PS1-DPS1) LT	kW	1,50	1,50	2,20	2,20	2,20	2,20
Pump absorbed power at maximum speed (PS1-DPS1) HT	kW	1,10	1,50	2,20	2,20	2,20	2,20
Electrical power supply	V-ph-Hz	400-3+N-50					
Auxiliary power supply	V-ph-Hz	230-1-50					
Pump absorbed current (P1-DP1) LT	A	1,53	2,21	2,21	2,21	2,21	2,21
Pump absorbed current (P1-DP1) HT	A	1,53	2,21	2,21	2,21	2,21	2,21
Pump absorbed current (P2-DP2) LT	A	2,89	2,89	2,89	2,89	2,89	4,08
Pump absorbed current at maximum speed (PS1-DPS1) LT	A	2,89	2,89	4,08	4,08	4,08	4,08
Pump absorbed current at maximum speed (PS1-DPS1) HT	A	2,21	2,89	4,08	4,08	4,08	4,08
Nominal current (without circulating pumps)	A	18,35	22,09	25,52	27,64	32,89	38,22
Maximum current (without circulating pumps)	A	30,50	34,80	41,00	45,80	49,90	58,80
Starting current	A	110	128	139	141	195	203
Starting current SFS	A	72	84	92	94	125	134

Dimensions							
Width (L1/L2)	mm	1000/1250	1000/1250	1000/1250	1000/1250	1000/1250	1000/1250
Height (H)	mm	1400	1400	1400	1400	1400	1400
Depth (P)	mm	870	870	870	870	870	870
Water connections HT	Ø	2"GM					
Water connections LT	Ø	1-½" GM					2"GM

(1) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 7°C; temperature differential at evaporator 5°C.

(5) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 18°C; temperature differential at evaporator 5°C.

(6) The total sound power level in dB(A) based on measurements taken according to Standard ISO 3744 and Eurovent 8/1. The sound data refers to the units without circulating pump.

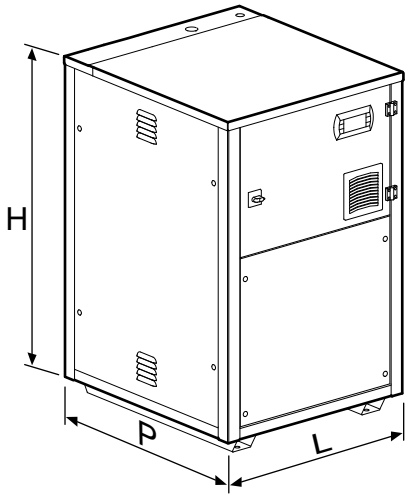
E.S.E.E.R. (European Seasonal EER) European average seasonal energy efficiency.
E.S.E.E.R. + with AdaptiveFunction Plus logic.

(L1) Width refers to the unit with standard installation or with "recovery" or "desuperheater" accessories.

(L2) Width refers to the unit with a PUMP installation up to a maximum of 2 pumps (2 pumps user side or disposal unit side or 1 user side pump + 1 disposal unit side pump).

Nota Bene:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 38.

The electric absorption do not take into account the absorption of the pumps (where not otherwise indicated).



Model TCHEY		**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
Nominal cooling capacity (1)	kW	103,1	117,3	131,0	145,7	165,5	184,8
Power consumption at condenser (1)	kW	124,4	141,7	158,6	176,1	200,8	224,8
E.E.R. (1)		4,69	4,66	4,60	4,65	4,54	4,48
E.S.E.E.R.		6,32	6,30	6,16	6,14	6,14	5,97
E.S.E.E.R.+		7,10	7,08	6,91	6,89	6,91	6,71
Evaporator nominal water flow (1)	l/h	17733	20175	22532	25060	28466	31785
Evaporator nominal pressure drops (1) LT	kPa	45	31	32	32	34	42
Evaporator nominal pressure drops (1) HT	kPa	23	14	14	15	17	22
Pump useful nominal head on evaporator (1) (P1-DP1) LT	kPa	99	101	86	97	104	88
Pump useful nominal head on evaporator (1) (P1-DP1) HT	kPa	83	80	103	114	121	108
Pump useful nominal head on evaporator (1) (P2-DP2) LT	kPa	160	162	147	159	180	165
Pump useful nominal head on evaporator (1) (P2-DP2) HT	kPa	182	178	164	175	197	185
Condenser nominal water flow (1)	l/h	21400	24377	27282	30284	34542	38671
Condenser nominal pressure drops (1) LT	kPa	64	39	41	41	45	55
Condenser nominal pressure drops (1) HT	kPa	30	18	19	20	23	28
Useful nominal head at maximum pump speed on condenser (1) (PS1-DPS1) LT	kPa	175	181	156	173	149	125
Useful nominal head at maximum pump speed on condenser (1) (PS1-DPS1) HT	kPa	155	149	183	149	135	160
Nominal cooling capacity (5)	kW	145,2	164,5	185,2	206,4	235,0	262,0
Evaporator nominal water flow (5)	l/h	24974	28294	31854	35501	40420	45064
Evaporator nominal pressure drops (5) LT	kPa	82	55	58	58	63	78
Evaporator nominal pressure drops (5) HT	kPa	41	25	27	28	32	41
Pump useful nominal head on evaporator (5) (P1-DP1) LT	kPa	18	20	-	9	39	7
Pump useful nominal head on evaporator (5) (P1-DP1) HT	kPa	23	15	19	39	70	44
Pump useful nominal head on evaporator (5) (P2-DP2) LT	kPa	80	82	50	70	120	89
Pump useful nominal head on evaporator (5) (P2-DP2) HT	kPa	121	113	81	101	151	127
Power consumption at condenser (5)	kW	167,8	190,4	214,4	238,1	271,8	304,1
Condenser nominal water flow (5)	l/h	28870	32745	36870	40955	46757	52297
Condenser nominal pressure drops (5) LT	kPa	106	65	68	69	75	92
Condenser nominal pressure drops (5) HT	kPa	50	30	32	33	39	48
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) LT	kPa	62	74	26	56	70	26
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) HT	kPa	80	69	75	105	76	88
Scroll/step compressor	n°	2/2	2/2	2/2	2/2	2/2	2/2
Circuits	n°	1	1	1	1	1	1
Standard machine sound power (6) (1)	dB(A)	71	72	73	74	74	75
Silenced installation sound power (6) (1)	dB(A)	67	68	69	70	70	71
Water contents of heat exchangers (condenser/evaporator) LT	l	8,0	9,6	10,6	12,1	13,5	13,5
Water contents of heat exchangers (condenser/evaporator) HT	l	14,5	17,1	19,3	21,7	24,1	24,1
R410A refrigerant charge		See serial No. plate					
Polyester or other oil		See compressor plate					

Electrical data		**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
Absorbed power (1)	kW	21,98	25,18	28,47	31,31	36,42	41,27
Absorbed power (5)	kW	23,35	26,68	30,06	32,69	37,98	43,35
Pump absorbed power (P1-DP1) LT	kW	1,50	1,50	1,50	1,50	2,20	2,20
Pump absorbed power (P1-DP1) HT	kW	1,10	1,10	1,50	1,50	2,20	2,20
Pump absorbed power (P2-DP2) LT	kW	2,20	2,20	2,20	2,20	4,00	4,00
Pump absorbed power at maximum speed (PS1-DPS1) LT	kW	3,00	3,00	3,00	3,00	4,00	4,00
Pump absorbed power at maximum speed (PS1-DPS1) HT	kW	2,20	2,20	3,00	3,00	3,00	4,00
Electrical power supply	V-ph-Hz				400-3+N-50		
Auxiliary power supply	V-ph-Hz				230-1-50		
Pump absorbed current (P1-DP1) LT	A	2,89	2,89	2,89	2,89	4,08	4,08
Pump absorbed current (P1-DP1) HT	A	2,21	2,21	2,89	2,89	4,08	4,08
Pump absorbed current (P2-DP2) LT	A	4,08	4,08	4,08	4,08	6,88	6,88
Pump absorbed current at maximum speed (PS1-DPS1) LT	A	5,42	5,42	5,42	5,42	6,88	6,88
Pump absorbed current at maximum speed (PS1-DPS1) HT	A	4,08	4,08	5,42	5,42	5,42	6,88
Nominal current (without circulating pumps)	A	40,72	46,65	52,75	58,01	65,79	74,55
Maximum current (without circulating pumps)	A	62,90	70,80	78,10	85,90	99,40	112,80
Starting current	A	253	300	307	315	353	366
Starting current SFS	A	163	191	198	206	229	243

Dimensions							
Width (L1/L2)	mm	1270/1500	1270/1500	1270/1500	1270/1500	1270/1500	1270/1500
Height (H)	mm	1550	1550	1550	1550	1550	1550
Depth (P)	mm	870	870	870	870	870	870
Water connections HT	Ø	2"GM			2-½" GM		
Water connections LT	Ø	2"GM			2-½" GM		

(1) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 7°C; temperature differential at evaporator 5°C.

(5) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 18°C; temperature differential at evaporator 5°C.

(6) The total sound power level in dB(A) based on measurements taken according to Standard ISO 3744 and Eurovent 8/1. The sound data refers to the units without circulating pump.

E.S.E.E.R. (European Seasonal EER) European average seasonal energy efficiency.
E.S.E.E.R. + with AdaptiveFunction Plus logic.

(L1) Width refers to the unit with standard installation or with "recovery" or "desuperheater" accessories.

(L2) Width refers to the unit with a PUMP installation up to a maximum of 2 pumps (2 pumps user side or disposal unit side or 1 user side pump + 1 disposal unit side pump).

Nota Bene:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 38.

The electric absorption do not take into account the absorption of the pumps (where not otherwise indicated).

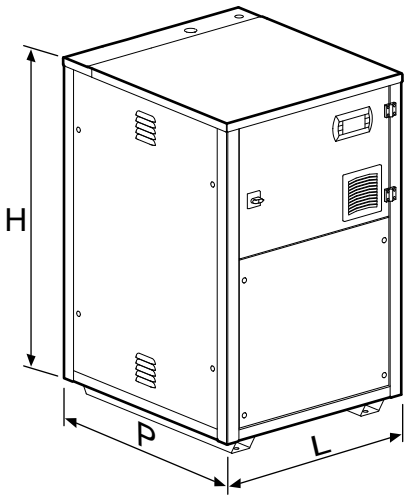


Table "B": Technical data

Model THHEY		**245**	**250**	**260**	**270**	**275**	**290**
Nominal heating capacity (2)	kW	50,0	58,84	67,59	75,41	83,66	101,76
Nominal cooling capacity (1)	kW	41,4	48,7	55,4	63,2	69,4	82,3
Nominal cooling capacity (5)	kW	58,0	68,0	77,8	88,1	97,2	114,9
E.E.R. (1)		4,38	4,46	4,43	4,38	4,38	4,38
E.E.R. (5)		5,87	5,96	5,88	5,86	5,76	5,73
E.S.E.E.R.		5,75	5,72	5,63	5,64	5,69	5,70
E.S.E.E.R.+		6,47	6,55	6,60	6,37	6,39	6,38
C.O.P. (2)		4,16	4,29	4,32	4,33	4,28	4,35
Heating capacity (3)	kW	53,4	62,7	71,6	79,9	89	107,3
C.O.P. (3)		5,66	5,76	5,69	5,70	5,74	5,67
Heating capacity (geothermal) (4) LT	kW	39,5	46,2	52,7	59,3	65,9	79,5
Cooling capacity (4) LT	kW	30,0	35,5	40,3	46,6	51,0	60,7
C.O.P. (geothermal) (4)		4,29	4,44	4,36	4,36	4,42	4,39
Condenser nominal water flow (2)	l/h	8600	10120	11625	12970	14389	17503
Condenser nominal pressure drops (2) LT	kPa	25	34	36	32	38	61
Condenser nominal pressure drops (2) HT	kPa	17	23	24	22	27	31
Pump useful nominal head on condenser (2) (P1-DP1) LT	kPa	88	75	89	69	52	45
Pump useful nominal head on condenser (2) (P1-DP1) HT	kPa	97	86	59	78	63	74
Pump useful nominal head on condenser (2) (P2-DP2) LT	kPa	187	158	134	148	122	143
Pump useful nominal head on condenser (2) (P2-DP2) HT	kPa	195	170	146	157	133	173
Evaporator nominal water flow (2)	l/h	8925	10599	12017	13783	15247	18106
Evaporator nominal pressure drops (2) LT	kPa	28	38	39	35	43	56
Evaporator nominal pressure drops (2) HT	kPa	17	23	24	22	27	30
Evaporator nominal water flow (1)	l/h	7121	8376	9529	10870	11937	14156
Evaporator nominal pressure drops (1) LT	kPa	19	24	25	22	27	35
Evaporator nominal pressure drops (1) HT	kPa	11	15	15	14	17	19
Pump useful nominal head on evaporator (1) (P1-DP1) LT	kPa	112	106	129	92	81	85
Pump useful nominal head on evaporator (1) (P1-DP1) HT	kPa	120	116	89	100	91	101
Pump useful nominal head on evaporator (1) (P2-DP2) LT	kPa	211	192	177	184	167	184
Pump useful nominal head on evaporator (1) (P2-DP2) HT	kPa	218	202	187	192	177	200
Condenser nominal water flow (1)	l/h	8697	10200	11613	13278	14578	17289
Condenser nominal pressure drops (1) LT	kPa	24	31	32	29	35	52
Condenser nominal pressure drops (1) HT	kPa	14	19	20	19	23	26
Evaporator nominal water flow (5)	l/h	9976	11696	13382	15153	16718	19763
Evaporator nominal pressure drops (5) LT	kPa	34	44	46	41	49	64
Evaporator nominal pressure drops (5) HT	kPa	21	27	28	26	31	34
Pump useful nominal head on evaporator (5) (P1-DP1) LT	kPa	64	45	54	45	24	32
Pump useful nominal head on evaporator (5) (P1-DP1) HT	kPa	77	62	37	60	41	61
Pump useful nominal head on evaporator (5) (P2-DP2) LT	kPa	162	126	96	111	79	130
Pump useful nominal head on evaporator (5) (P2-DP2) HT	kPa	175	144	114	126	97	159
Power consumption at condenser (5)	kW	67.5	79.1	90.6	102.6	113.6	134.4
Condenser nominal water flow (5)	l/h	11628	13598	15584	17656	19538	23116
Condenser nominal pressure drops (5) LT	kPa	39	51	54	48	58	85
Condenser nominal pressure drops (5) HT	kPa	24	32	34	31	38	43
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) LT	kPa	125	76	109	130	85	72
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) HT	kPa	100	103	137	153	113	127
Condenser nominal water flow (3)	l/h	9185	10784	12315	13743	15308	18456
Condenser nominal pressure drops (3) LT	kPa	28	38	39	34	42	66
Condenser nominal pressure drops (3) HT	kPa	19	25	26	25	30	34
Pump useful nominal head on condenser (3) (P1-DP1) LT	kPa	79	64	77	62	42	36
Pump useful nominal head on condenser (3) (P1-DP1) HT	kPa	89	76	50	71	54	68
Pump useful nominal head on condenser (3) (P2-DP2) LT	kPa	178	146	121	136	107	134
Pump useful nominal head on condenser (3) (P2-DP2) HT	kPa	187	159	134	146	119	166
Evaporator nominal water flow (3)	l/h	11825	13975	15883	18167	19968	23650
Evaporator nominal pressure drops (3) LT	kPa	47	62	65	57	69	90
Evaporator nominal pressure drops (3) HT	kPa	29	38	39	37	45	49
Condenser nominal water flow (4)	l/h	6794	7946	9064	10199	11335	13674
Condenser nominal pressure drops (4) LT	kPa	17	22	23	20	25	39
Condenser nominal pressure drops (4) HT	kPa	11	15	15	14	18	20
Evaporator nominal water flow (4)LT	l/h	9561	11292	12809	14418	16087	19369
Evaporator nominal pressure drops (4) LT	kPa	32	44	45	38	49	64
Evaporator nominal pressure drops (4) HT	kPa	20	26	27	24	31	35
Useful nominal head at maximum pump speed on condenser (4) (PS1-DPS1) LT	kPa	153	112	157	180	144	109
Useful nominal head at maximum pump speed on condenser (4) (PS1-DPS1) HT	kPa	122	133	179	197	165	150
Scroll/step compressor	n°	2/2	2/2	2/2	2/2	2/2	2/2
Circuits	n°	1	1	1	1	1	1
Standard machine sound power (6) (1)	dB(A)	67	67	68	68	69	70
Silenced installation sound power (6) (1)	dB(A)	63	63	64	64	65	66
Water contents of heat exchangers (condenser/evaporator) LT	l	4,4	4,4	5,1	6,5	6,5	7,0
Water contents of heat exchangers (condenser/evaporator) HT	l	7,0	7,0	8,0	9,6	9,6	11,3
R410A refrigerant charge		See serial No. plate					
Polyester or other oil		See compressor plate					

Electrical data		**245**	**250**	**260**	**270**	**275**	**290**
Absorbed power (1)	kW	9,45	10,93	12,49	14,43	15,83	18,78
Absorbed power (2)	kW	12,03	13,72	15,66	17,42	19,55	23,41
Absorbed power (3)	kW	9,43	10,90	12,58	14,01	15,51	18,92
Absorbed power (4) LT	kW	9,20	10,40	12,10	13,60	14,90	18,10
Absorbed power (5)	kW	9,90	11,40	13,20	15,00	16,90	20,10
Pump absorbed power (P1-DP1) LT	kW	0,75	1,12	1,10	1,10	1,10	1,10
Pump absorbed power (P1-DP1) HT	kW	0,75	1,12	1,10	1,10	1,10	1,10
Pump absorbed power (P2-DP2) LT-HT	kW	1,50	1,50	1,50	1,50	1,50	2,20
Pump absorbed power at maximum speed (PS1-DPS1) LT	kW	1,50	1,50	2,20	2,20	2,20	2,20
Pump absorbed power at maximum speed (PS1-DPS1) HT	kW	1,10	1,50	2,20	2,20	2,20	2,20
Electrical power supply	V-ph-Hz	400-3+N-50					
Auxiliary power supply	V-ph-Hz	230-1-50					
Pump absorbed current (P1-DP1) LT	A	1,53	2,21	2,21	2,21	2,21	2,21
Pump absorbed current (P1-DP1) HT	A	1,53	2,21	2,21	2,21	2,21	2,21
Pump absorbed current (P2-DP2) LT-HT	A	2,89	2,89	2,89	2,89	2,89	4,08
Pump absorbed current at maximum speed (PS1-DPS1) LT	A	2,89	2,89	4,08	4,08	4,08	4,08
Pump absorbed current at maximum speed (PS1-DPS1) HT	A	2,21	2,89	4,08	4,08	4,08	4,08
Nominal current (1) (without circulating pumps)	A	17,97	21,64	24,72	27,08	32,22	38,22
Nominal current (2) (without circulating pumps)	A	22,87	27,16	31,00	32,69	39,79	47,65
Maximum current (without circulating pumps)	A	30,50	34,80	41,00	45,80	49,90	58,80
Starting current	A	110	128	139	141	195	203
Starting current SFS	A	72	84	92	94	125	134

Dimensions							
Width (L1/L2)	mm	1000/1250	1000/1250	1000/1250	1000/1250	1000/1250	1000/1250
Height (H)	mm	1400	1400	1400	1400	1400	1400
Depth (P)	mm	870	870	870	870	870	870
Water connections HT	Ø	2"GM					
Water connections LT	Ø	1-½" GM					2"GM

(1) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 7°C; temperature differential at evaporator 5°C.

(2) In the following conditions: 40-45°C condenser incoming and outgoing water temperature; 10°C evaporator water incoming temperature at the same flow rate as summer functioning.

(3) In the following conditions: 35-30°C condenser incoming and outgoing water temperature; 10°C evaporator water incoming temperature at the same flow rate as summer functioning.

(4) In the following conditions: 30-35°C condenser incoming and outgoing water temperature; 0/-3 evaporator water incoming and outgoing temperature with 30%glycol.

(5) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 18°C; temperature differential at evaporator 5°C.

(6) The total sound power level in dB(A) based on measurements taken according to Standard ISO 3744 and Eurovent 8/1. The sound data refers to the units without circulating pump.

(L1) Width refers to the unit with standard installation or with "recovery" or "desuperheater" accessories.

(L2) Width refers to the unit with a PUMP installation up to a maximum of 2 pumps (2 pumps user side or disposal unit side or 1 user side pump + 1 disposal unit side pump).

E.S.E.E.R. (European Seasonal EER) European average seasonal energy efficiency.
E.S.E.E.R. + with AdaptiveFunction Plus logic.

Nota Bene:
The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 38.

The calculations of the E.E.R and C.O.P. do not hold account of the absorption of the pumps.

The electric absorption do not take into account the absorption of the pumps (where not otherwise indicated).

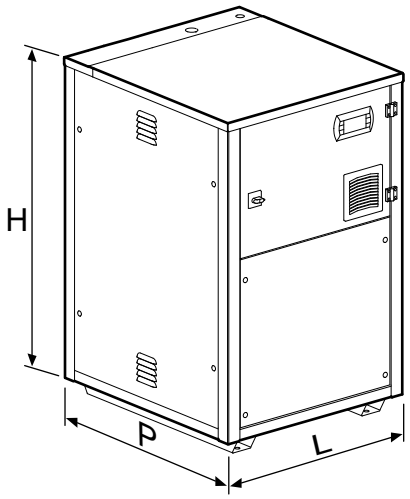


Table "B": Technical data

Model THHEY		**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
Nominal heating capacity (2)	kW	116,26	133,25	147,33	162,82	186,13	208,84
Nominal cooling capacity (1)	kW	96,2	109,5	121,1	134,8	152,7	170,6
Nominal cooling capacity (5)	kW	135,5	153,5	171,2	191,0	224,1	249,7
E.E.R. (1)		4,38	4,46	4,43	4,38	4,38	4,38
E.E.R. (5) (*)		5,87	5,81	5,82	5,89	5,96	5,82
E.S.E.E.R.		5,75	5,72	5,63	5,64	5,69	5,70
E.S.E.E.R.+		6,46	6,42	6,31	6,33	6,40	6,40
C.O.P. (2)		4,29	4,29	4,22	4,19	4,12	4,07
Heating capacity (3)	kW	123,4	140,2	153,8	173,1	197,6	220,3
C.O.P. (3)		5,58	5,53	5,38	5,41	5,33	5,24
Heating capacity (geothermal) (4) LT	kW	90,7	104,5	114,5	128,9	146,1	162,7
Cooling capacity (4) LT	kW	68,7	79,1	87,8	97,8	110,0	122,5
C.O.P. (geothermal) (4)		4,30	4,32	4,19	4,21	4,10	4,03
Condenser nominal water flow (2)	l/h	19996	22919	25341	28005	32014	35920
Condenser nominal pressure drops (2) LT	kPa	64	38	39	39	42	52
Condenser nominal pressure drops (2) HT	kPa	31	17	17	18	21	26
Pump useful nominal head on condenser (2) (P1-DP1) LT	kPa	66	75	57	73	86	65
Pump useful nominal head on condenser (2) (P1-DP1) HT	kPa	63	60	79	93	107	90
Pump useful nominal head on condenser (2) (P2-DP2) LT	kPa	128	136	119	135	163	144
Pump useful nominal head on condenser (2) (P2-DP2) HT	kPa	161	158	141	155	184	169
Evaporator nominal water flow (2)	l/h	20570	23197	25823	28798	32610	36352
Evaporator nominal pressure drops (2) LT	kPa	59	39	41	41	44	54
Evaporator nominal pressure drops (2) HT	kPa	30	18	18	20	22	28
Evaporator nominal water flow (1)	l/h	16546	18834	20829	23186	26264	29343
Evaporator nominal pressure drops (1) LT	kPa	39	27	27	27	29	36
Evaporator nominal pressure drops (1) HT	kPa	20	12	12	13	15	19
Pump useful nominal head on evaporator (1) (P1-DP1) LT	kPa	110	112	100	110	114	100
Pump useful nominal head on evaporator (1) (P1-DP1) HT	kPa	91	89	115	124	128	118
Pump useful nominal head on evaporator (1) (P2-DP2) LT	kPa	171	173	162	171	189	177
Pump useful nominal head on evaporator (1) (P2-DP2) HT	kPa	190	187	176	186	204	194
Condenser nominal water flow (1)	l/h	20175	22990	25479	28371	32436	36335
Condenser nominal pressure drops (1) LT	kPa	57	35	36	36	39	49
Condenser nominal pressure drops (1) HT	kPa	26	16	16	17	20	25
Evaporator nominal water flow (5)	l/h	23306	26402	29446	32852	38545	42948
Evaporator nominal pressure drops (5) LT	kPa	72	48	50	50	54	66
Evaporator nominal pressure drops (5) HT	kPa	36	22	23	24	28	35
Pump useful nominal head on evaporator (5) (P1-DP1) LT	kPa	40	42	17	35	55	26
Pump useful nominal head on evaporator (5) (P1-DP1) HT	kPa	39	33	44	60	81	58
Pump useful nominal head on evaporator (5) (P2-DP2) LT	kPa	102	104	79	97	135	108
Pump useful nominal head on evaporator (5) (P2-DP2) HT	kPa	137	130	106	122	161	140
Power consumption at condenser (5)	kW	157,9	179,1	199,7	222,53	260,5	291,3
Condenser nominal water flow (5)	l/h	27160	30807	34351	38274	44818	50106
Condenser nominal pressure drops (5) LT	kPa	94	58	60	60	66	81
Condenser nominal pressure drops (5) HT	kPa	44	26	28	29	34	43
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) LT	kPa	91	102	64	89	85	44
Useful nominal head at maximum pump speed on condenser (5) (PS1-DPS1) HT	kPa	99	90	106	118	86	101
Condenser nominal water flow (3)	l/h	21225	24114	26454	29773	33987	37892
Condenser nominal pressure drops (3) LT	kPa	70	41	42	43	46	56
Condenser nominal pressure drops (3) HT	kPa	34	18	18	20	23	28
Pump useful nominal head on condenser (3) (P1-DP1) LT	kPa	54	65	48	60	77	55
Pump useful nominal head on condenser (3) (P1-DP1) HT	kPa	54	52	71	83	100	83
Pump useful nominal head on condenser (3) (P2-DP2) LT	kPa	115	127	109	122	155	134
Pump useful nominal head on condenser (3) (P2-DP2) HT	kPa	152	150	133	145	178	163
Evaporator nominal water flow (3)	l/h	27090	30745	34400	38323	43403	48429
Evaporator nominal pressure drops (3) LT	kPa	96	65	68	69	73	90
Evaporator nominal pressure drops (3) HT	kPa	49	30	31	33	38	47
Condenser nominal water flow (4)	l/h	15600	17974	19694	22171	25129	27984
Condenser nominal pressure drops (4) LT	kPa	41	25	25	25	27	33
Condenser nominal pressure drops (4) HT	kPa	20	11	11	12	13	16
Evaporator nominal water flow (4)	l/h	21961	25336	27523	31025	34886	38621
Evaporator nominal pressure drops (4) LT	kPa	67	48	47	49	51	61
Evaporator nominal pressure drops (4) HT	kPa	35	21	21	23	26	31
Useful nominal head at maximum pump speed on condenser (4) (PS1-DPS1) LT	kPa	151	153	135	152	135	111
Useful nominal head at maximum pump speed on condenser (4) (PS1-DPS1) HT	kPa	137	128	169	139	125	151
Scroll/step compressor	n°	2/2	2/2	2/2	2/2	2/2	2/2
Circuits	n°	1	1	1	1	1	1
Standard machine sound power (6) (1)	dB(A)	71	72	73	74	74	75
Silenced installation sound power (6) (1)	dB(A)	67	68	69	70	70	71
Water contents of heat exchangers (condenser/evaporator) LT	l	8,0	9,6	10,6	12,1	13,5	13,5
Water contents of heat exchangers (condenser/evaporator) HT	l	14,5	17,1	19,3	21,7	24,1	24,1
R410A refrigerant charge		See serial No. plate					
Polyester or other oil		See compressor plate					

Electrical data		**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
Absorbed power ([1])	kW	21,75	24,91	27,87	31,08	36,99	41,91
Absorbed power ([2])	kW	27,13	31,04	34,89	38,90	45,21	51,33
Absorbed power ([3])	kW	22,13	25,33	28,58	31,98	37,08	42,04
Absorbed power ([4]) LT	kW	21,10	24,20	27,30	30,60	35,60	40,40
Absorbed power ([5])	kW	23,10	26,40	29,40	32,50	37,60	42,90
Pump absorbed power (P1-DP1) LT	kW	1,50	1,50	1,50	1,50	2,20	2,20
Pump absorbed power (P1-DP1) HT	kW	1,10	1,10	1,50	1,50	2,20	2,20
Pump absorbed power (P2-DP2) LT-HT	kW	2,20	2,20	2,20	2,20	4,00	4,00
Pump absorbed power at maximum speed (PS1-DPS1) LT	kW	3,00	3,00	3,00	3,00	4,00	4,00
Pump absorbed power at maximum speed (PS1-DPS1) HT	kW	2,20	2,20	3,00	3,00	3,00	4,00
Electrical power supply	V-ph-Hz				400-3+N-50		
Auxiliary power supply	V-ph-Hz				230-1-50		
Pump absorbed current (P1-DP1) LT	A	2,89	2,89	2,89	2,89	4,08	4,08
Pump absorbed current (P1-DP1) HT	A	2,21	2,21	2,89	2,89	4,08	4,08
Pump absorbed current (P2-DP2) LT-HT	A	4,08	4,08	4,08	4,08	6,88	6,88
Pump absorbed current at maximum speed (PS1-DPS1) LT	A	5,42	5,42	5,42	5,42	6,88	6,88
Pump absorbed current at maximum speed (PS1-DPS1) HT	A	4,08	4,08	5,42	5,42	5,42	6,88
Nominal current ([1]) (without circulating pumps)	A	40,30	46,15	51,63	57,58	66,82	75,70
Nominal current ([2]) (without circulating pumps)	A	50,26	57,51	64,64	72,07	81,67	92,72
Maximum current (without circulating pumps)	A	62,90	70,80	78,10	85,90	99,40	112,80
Starting current	A	253	300	307	315	353	366
Starting current SFS	A	163	191	198	206	229	243

Dimensions							
Width (L1/L2)	mm	1270/1500	1270/1500	1270/1500	1270/1500	1270/1500	1270/1500
Height (H)	mm	1550	1550	1550	1550	1550	1550
Depth (P)	mm	870	870	870	870	870	870
Water connections HT	Ø	2"GM			2-½" GM		
Water connections LT	Ø	2"GM			2-½" GM		

(1) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 7°C; temperature differential at evaporator 5°C.

(2) In the following conditions: 40-45°C condenser incoming and outgoing water temperature; 10°C evaporator water incoming temperature at the same flow rate as summer functioning.

(3) In the following conditions: 35-30°C condenser incoming and outgoing water temperature; 10°C evaporator water incoming temperature at the same flow rate as summer functioning.

(4) In the following conditions: 30-35°C condenser incoming and outgoing water temperature; 0/-3 evaporator water incoming and outgoing temperature with 30%glycol.

(5) In the following conditions: Condenser input and output water temperature 30-35°C; chilled output water temperature 18°C; temperature differential at evaporator 5°C.

(6) The total sound power level in dB(A) based on measurements taken according to Standard ISO 3744 and Eurovent 8/1. The sound data refers to the units without circulating pump.

(L1) Width refers to the unit with standard installation or with "recovery" or "desuperheater" accessories.

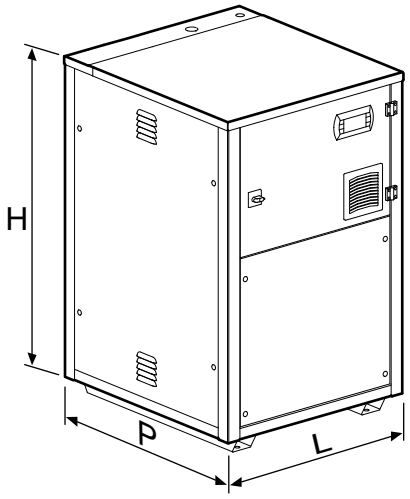
(L2) Width refers to the unit with a PUMP installation up to a maximum of 2 pumps (2 pumps user side or disposal unit side or 1 user side pump + 1 disposal unit side pump).

E.S.E.E.R. (European Seasonal EER) European average seasonal energy efficiency.
E.S.E.E.R. + with AdaptiveFunction Plus logic.

The values for available static pressure of the pumps and the pressure drops of the exchangers can be found on page 38.

The calculations of the E.E.R and C.O.P. do not hold account of the absorption of the pumps (where not otherwise indicated).

The electric absorption do not take into account the absorption of the pumps (where not otherwise indicated).



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 E.S.E.E.R. (European Seasonal E.E.R.) is an index that estimates the average seasonal energy efficiency of the cooling unit in four load and water temperature conditions. Generally, two water chillers with the same E.E.R. may have different E.S.E.E.R. values. In fact, for a water cooling unit, the average energy efficiency depends on design choices and on the temperature of inlet water at the condensing heat exchanger.

○ The E.S.E.E.R. energy index, introduced by the European community (Project E.E.C.C.A.C. - Energy Efficiency and Certification of Central Air Conditioners), is characterised by the water temperatures (see table "**C**") and by the energy weights that are assigned to the four load conditions considered in the calculation: 100%, 75%, 50% and 25%.

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

where EER100% EER75% EER50% EER25% represent the efficiencies of the cooling unit in the four load conditions and at the temperatures indicated in table "**C**".
The data is calculated using Eurovent method. The consumption of the circulation pump (if present) is not included.

Table "C": load and temperature conditions

	Inlet water temperature at condenser
Load	**E.S.E.E.R.**
100%	30°C
75%	26°C
50%	22°C
25%	18°C

○ Table "**D**" shows the E.E.R. and E.S.E.E.R. values for each model. The high values of energy efficiency at partial loads were achieved thanks to optimisation of the heat exchangers.

Table "D": EER – ESEER for TCHEY

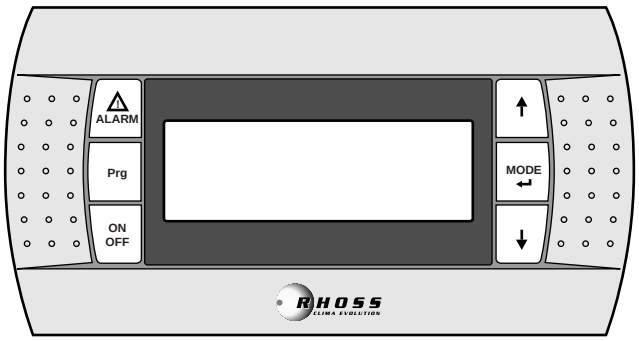
Model	E.E.R.	E.S.E.E.R.
245	4,69	6,67
250	4,78	6,73
260	4,70	6,78
270	4,69	6,52
275	4,70	6,63
290	4,80	6,45
2100	4,69	6,32
2115	4,66	6,30
2130	4,60	6,16
2145	4,65	6,14
2165	4,54	6,14
2185	4,48	5,97

Table "E": EER – ESEER for THHEY

Model	E.E.R.	E.S.E.E.R.
245	4,38	5,73
250	4,46	5,79
260	4,43	5,82
270	4,38	5,62
275	4,38	5,71
290	4,38	5,70
2100	4,42	5,75
2115	4,40	5,72
2130	4,35	5,63
2145	4,34	5,64
2165	4,13	5,69
2185	4,07	5,70

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 the 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 the values of all the parameters (i.e. outlet water temperature etc.), any alarm codes and resource status by means of strings.

ALARM key:
makes it possible to display the code and reset any alarms.

PRG key:
makes it possible to programme the machine's fundamental functioning parameters.

ON/OFF key:
makes it possible to switch the unit on and off.

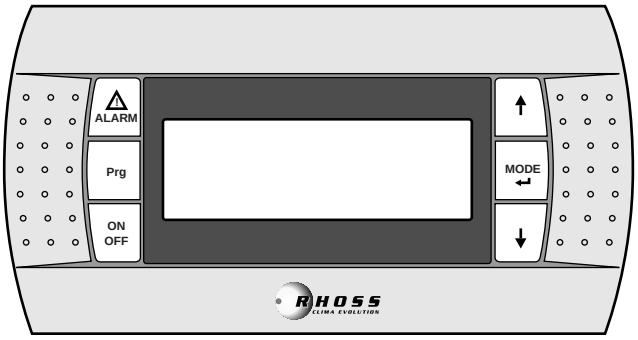
UP key:
used to scroll through the list of parameters, statuses and any alarms; makes it possible to modify set points.

MODE - ENTER key:
makes it possible to switch from chiller to heat pump operation and vice versa.

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

KTR – Remote keypad for compatible control

The remote keyboard with display (KTR) allows the remote control and display of all of the unit's digital and analogue process variables. It is 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 the values of all the parameters (i.e. outlet water temperature etc.), any alarm codes and resource status by means of strings.

ALARM key:
makes it possible to display the code and reset any alarms.

PRG key:
makes it possible to programme the machine's fundamental functioning parameters.

ON/OFF key:
makes it possible to switch the unit on and off.

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

MODE - ENTER key:
makes it possible to switch from chiller to heat pump operation and vice versa.

DOWN key:
used to scroll through the list of parameters, statuses and any alarms; makes it possible to modify 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.

Serial Connection

Serial connection for compatible control

iDRHOSS

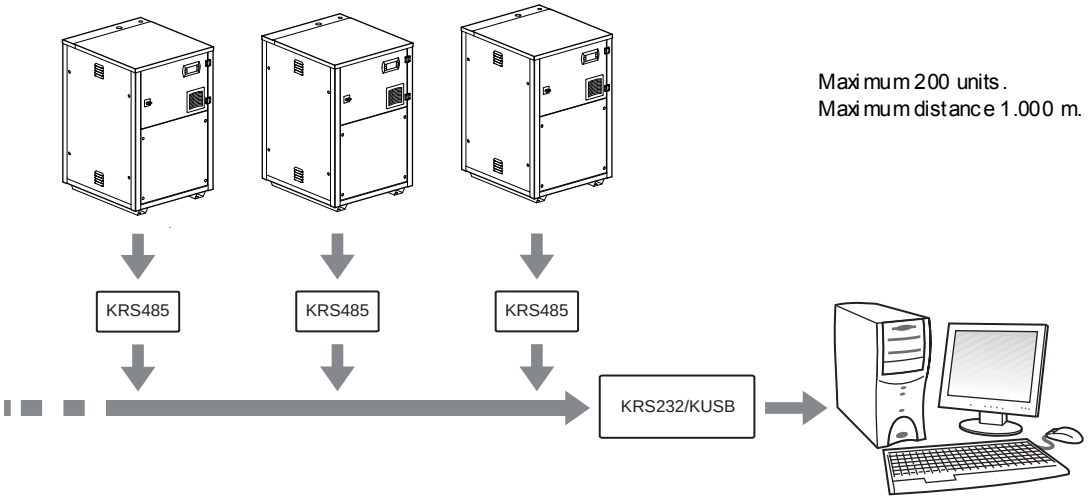
All units are equipped with electronic control that is set up interface with an external BMS via a serial communication line by means of the KRS485 serial interface accessory (proprietary protocol or ModBus® RTU) and the following converters:

- **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:

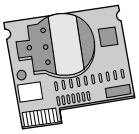
- Making all settings which are accessible through the keyboard;
- Reading all process variables of the inputs and outputs, whether digital or analogue;
- Reading the various alarm codes which are present, and resetting them as necessary.



Maximum 200 units.
Maximum distance 1.000 m.

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.



Displaying example

Performance

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

○ Table "**E**" gives for each model the cooling capacity (**QF**), the total absorbed electric power (**P**) and the heat power to be disposed (**QT**), according to the temperature of the water at condenser outlet and evaporator outlet with constant thermal differences **ΔT** = 5°C: value **QT** is also the value of the heat power available at utility in winter cycle.

○ Table "**H**" provides, for each model in the summer cycle, the values **QF**, **P** and **QT**, based on the city and tower water temperature at the outlet of the condenser with temperature differential **ΔT** = 12°C and based on water temperature for use at the evaporator outlet with temperature differential **ΔT** = 5°C.

○ Within operating limits, the values in tables "**E**" and "**H**" may permit interpolations of performance but extrapolations are not permitted.

○ Tables "**F**", "**G**" and "**I**" show the performance corrective coefficients upon variation of the temperature differential **ΔT** between water inlet and outlet at the exchangers.

○ Table "**M**" shows the values of 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**" shows the residual static pressure of the pump.

○ Table "**L**" contains the octave band and total values for sound power for the single models in the basic version.

Example

○ Design conditions for a water cooling chiller:
- Required cooling capacity = 182 kW;
- Temperature of water produced at evaporator = 10°C;
- Temperature differential **ΔT** at the evaporator = 5°C;
- Inlet temperature at condenser = 30°C.

Using the values indicated in table "**E**", and supposing a temperature differential **ΔT**=5°C at the condenser, it can be seen that model TCHEY 2165 HT meets the requirement with:
QF=182,9 kW; **P**=36,8 kW;
QT=218,6 kW.
The water flow rates, **G** to be sent to the exchangers are obtained using the following formulae:
G (l/h) evaporator =
(**QF**x860)÷**ΔT**=(182,9x860)÷5=31,459 (l/h);
G (l/h) condenser =
(**QT**x860)÷**ΔT**=(218,6x860)÷5=37,599 (l/h).
Graph "**1**" provides the values for pressure drops Δpw respectively for the evaporator and the condenser:
Δpw evaporator = 21 kPa;
Δpw condenser = 30 kPa.
To reduce the water flow rate to the condenser, it is necessary to increase the temperature differential **ΔT**. Therefore, hypothetically working with **ΔT** at the condenser equal to 10°C, with the same condenser outlet water temperature **Tuc** = 35°C the new condenser inlet water temperature is:
Inlet temperature at condenser =
35°C –10°C = 25°C.
The corrective coefficients **kct QF** and **kct P** in table "**F**" are used to calculate the new values for **QFI**, **PI** and hence for **QTI**:
QFI=**QF** x **kct** **QF**=182,9x1,016=185,8 kW;
PI=**P** x **kct** **P**=36,8x0,969=35,66 kW;
QTI=(**QFI**+**PI**) x0,97=185,8+(35,66x0,97)=220,4 kW.
The new water flow rates G to be sent to the exchangers are obtained using the following formulae:
GI (l/h) evaporator =
(185,8x860)÷5=31,958 (l/h);
GI (l/h) condenser =
(220,4x860)÷10=18,954 (l/h).
The new pressure drops can be obtained using the following simplified formulae:
Δpwi evaporator =
Δpw x (**GI** ÷ **G**)²= 21x(31,958÷31,459)²=21,7 kPa;
Δpwi condenser =
Δpw x (**GI**÷**G**)²= 30x(18,954÷37,599)²=7,62 kPa.

Performance data

Table "E": TCHEY performance data in cooling (ΔT = 5°C at the condenser; ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)											
		30			35			40			45		
		QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
245	-8	27,1*	35,1*	8,2*	25,4*	34,4*	9,2*	23,7*	33,8*	10,5*	-	-	-
	-6	29,3	37,4	8,3	27,6	36,6	9,3	25,7*	35,9*	10,5*	23,8*	35,4*	12,0*
	-3	32,8	40,9	8,3	31,0	40,1	9,3	29,0	39,3	10,6	26,9*	38,5*	12,0*
	1	38,0	46,2	8,4	36,0	45,2	9,4	33,9	44,2	10,6	31,5	43,2	12,1
	4	42,9	51,3	8,6	40,8	50,1	9,6	38,5	48,9	10,7	35,8	47,6	12,1
	7	47,4	55,9	8,7	45,2	54,6	9,7	42,7	53,2	10,8	39,8	51,6	12,2
	10	52,2	60,8	8,8	49,9	59,3	9,8	47,1	57,7	10,9	44,1	56,0	12,2
	13	57,3	66,0	9,0	54,7	64,3	9,9	51,9	62,6	11,0	48,7	60,6	12,3
	16	62,6	71,4	9,1	59,9	69,6	10,0	56,9	67,6	11,1	53,5	65,5	12,4
	18	66,2	75,2	9,2	63,5	73,3	10,1	60,3	71,2	11,2	56,8	68,9	12,4
	23	76,0	85,3	9,5	73,0	83,1	10,3	69,6	80,6	11,4	65,7	77,9	12,6
250	-8	31,8*	41,1*	9,6*	30,1*	40,4*	10,6*	28,2*	40,0*	12,2*	-	-	-
	-6	34,4	43,8	9,6	32,6	42,9	10,7	30,6*	42,5*	12,2*	28,6*	42,3*	14,2*
	-3	38,6	48,0	9,7	36,6	47,1	10,8	34,5	46,4	12,2	32,2*	45,9*	14,1*
	1	44,7	54,2	9,8	42,4	53,0	10,9	40,1	52,0	12,3	37,5	51,0	14,0
	4	50,7	60,4	9,9	48,1	58,9	11,0	45,5	57,5	12,4	42,5	56,1	14,0
	7	56,0	65,8	10,0	53,3	64,1	11,2	50,3	62,4	12,5	47,1	60,7	14,0
	10	61,7	71,6	10,2	58,6	69,6	11,3	55,4	67,6	12,6	51,9	65,6	14,1
	13	67,7	77,7	10,3	64,4	75,4	11,4	60,8	73,1	12,7	56,9	70,7	14,2
	16	73,9	84,0	10,5	70,2	81,5	11,6	66,4	78,9	12,9	62,3	76,2	14,3
	18	78,3	88,5	10,6	74,4	85,7	11,7	70,3	82,9	13,0	66,1	80,1	14,5
	23	-	-	-	85,2	96,8	11,9	80,6	93,5	13,3	75,8	90,3	14,9
260	-8	36,5*	47,0*	10,8*	34,3*	46,0*	12,0*	32,0*	45,4*	13,8*	-	-	-
	-6	39,5	50,0	10,9	37,1	48,9	12,1	34,7*	48,2*	13,8*	32,3*	47,8*	16,0*
	-3	44,1	54,7	11,0	41,7	53,6	12,3	39,1	52,7	14,0	36,4*	51,9*	16,0*
	1	50,8	61,7	11,2	48,3	60,4	12,5	45,5	59,2	14,1	42,4	58,0	16,1
	4	57,7	68,7	11,4	54,9	67,2	12,7	51,8	65,6	14,3	48,2	63,9	16,2
	7	63,5	74,8	11,6	60,6	73,1	12,9	57,3	71,3	14,5	53,6	69,4	16,3
	10	70,0	81,4	11,8	66,9	79,6	13,1	63,3	77,4	14,6	59,3	75,2	16,4
	13	76,7	88,3	12,0	73,4	86,3	13,3	69,6	84,0	14,8	65,3	81,4	16,6
	16	83,6	95,5	12,2	80,3	93,4	13,5	76,3	90,8	15,0	71,8	88,0	16,8
	18	88,5	100,5	12,4	85,1	98,3	13,6	80,9	95,6	15,2	76,2	92,6	16,9
	23	-	-	-	97,6	111,2	14,0	93,1	108,2	15,5	88,1	105,0	17,4
270	-8	42,4*	54,6*	12,5*	39,8*	53,3*	13,9*	37,2*	52,4*	15,7*	-	-	-
	-6	45,7	57,9	12,6	43,0	56,6	14,0	40,2*	55,6*	15,8*	37,2*	54,7*	18,0*
	-3	50,9	63,2	12,7	48,1	61,9	14,2	45,1	60,6	15,9	41,9*	59,5*	18,1*
	1	58,4	70,9	13,0	55,4	69,4	14,4	52,2	67,9	16,1	48,7	66,3	18,1
	4	66,0	78,7	13,2	62,8	77,0	14,6	59,3	75,0	16,2	55,3	72,9	18,2
	7	72,6	85,5	13,3	69,2	83,5	14,7	65,5	81,4	16,4	61,4	79,1	18,3
	10	79,6	92,8	13,5	76,2	90,6	14,9	72,2	88,2	16,5	67,8	85,6	18,4
	13	87,0	100,3	13,8	83,4	98,0	15,1	79,2	95,4	16,6	74,5	92,5	18,5
	16	94,8	108,4	14,0	91,0	105,8	15,2	86,7	102,9	16,8	81,8	99,8	18,6
	18	100,2	113,9	14,1	96,4	111,3	15,4	91,9	108,3	16,9	86,7	104,8	18,7
	23	-	-	-	110,4	125,6	15,6	105,6	122,2	17,1	100,1	118,5	19,0
275	-8	45,7*	58,7*	13,4*	43,3*	57,8*	15,0*	40,8*	57,1*	16,8*	-	-	-
	-6	49,3	62,4	13,5	46,8	61,4	15,1	44,1*	60,6*	17,0*	41,3*	59,9*	19,2*
	-3	55,0	68,3	13,7	52,4	67,2	15,3	49,4	66,1	17,2	46,3*	65,1*	19,4*
	1	63,4	77,0	14,0	60,5	75,6	15,6	57,2	74,2	17,5	53,7	72,7	19,6
	4	72,0	85,9	14,3	68,7	84,1	15,9	65,1	82,3	17,7	61,0	80,2	19,9
	7	79,5	93,7	14,6	75,9	91,6	16,2	72,0	89,4	18,0	67,7	87,1	20,1
	10	87,3	101,9	15,0	83,6	99,5	16,4	79,4	97,1	18,2	74,7	94,3	20,3
	13	95,7	110,6	15,3	91,8	108,0	16,7	87,3	105,2	18,5	82,3	102,2	20,5
	16	104,6	119,8	15,7	100,5	117,0	17,0	95,5	113,7	18,7	90,3	110,4	20,7
	18	111,0	126,4	15,9	106,4	123,1	17,2	101,3	119,6	18,9	95,7	116,0	20,9
	23	-	-	-	122,3	139,6	17,8	116,7	135,5	19,3	110,6	131,2	21,3
290	-8	54,6*	69,7*	15,6*	51,9*	68,8*	17,4*	49,2*	67,9*	19,4*	-	-	-
	-6	58,7	74,0	15,7	56,0	73,0	17,5	53,0*	71,9*	19,5*	49,8*	70,9*	21,7*
	-3	65,3	80,8	16,0	62,5	79,7	17,8	59,2	78,3	19,8	55,7*	77,1*	22,0*
	1	75,1	90,9	16,3	71,8	89,4	18,1	68,3	87,8	20,1	64,3	86,0	22,4
	4	85,3	101,6	16,7	81,7	99,6	18,5	77,5	97,4	20,5	73,1	95,1	22,8
	7	94,1	110,7	17,1	90,1	108,3	18,8	85,6	105,8	20,7	80,7	103,1	23,0
	10	103,5	120,4	17,5	99,1	117,6	19,1	94,3	114,7	21,0	88,9	111,5	23,3
	13	113,5	130,9	17,9	108,7	127,6	19,5	103,5	124,2	21,3	97,7	120,6	23,5
	16	123,7	141,6	18,4	118,8	138,0	19,8	113,2	134,2	21,6	107,1	130,1	23,8
	18	131,1	149,2	18,7	125,7	145,1	20,1	120,0	141,1	21,8	113,5	136,7	23,9
	23	-	-	-	144,3	164,4	20,7	137,9	159,4	22,2	130,8	154,2	24,2

Model	Tue (°C)	Tuc (°C)								
		50			52			55		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
245	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	28,9	42,1	13,7	27,8*	41,7*	14,4*	-	-	-
	4	32,9	46,2	13,7	31,6	45,5	14,4	29,7*	44,7*	15,4*
	7	36,7	50,0	13,7	35,3	49,3	14,4	33,2*	48,2*	15,4*
	10	40,7	54,0	13,7	39,3	53,3	14,4	37,1*	52,1*	15,4*
	13	45,1	58,5	13,8	43,6*	57,6*	14,4*	-	-	-
	16	49,6	63,1	13,9	48,0*	62,1*	14,5*	-	-	-
	18	52,8	66,3	13,9	51,2*	65,3*	14,5*	-	-	-
	23	61,4	75,0	14,1	-	-	-	-	-	-
250	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	34,6	50,1	16,0	33,4*	49,8*	16,9*	-	-	-
	4	39,3	54,6	15,8	37,9	54,0	16,6	35,8*	53,1*	17,9*
	7	43,6	58,8	15,7	42,0	58,0	16,5	39,8*	56,9*	17,7*
	10	48,1	63,4	15,8	46,5	62,5	16,5	44,0*	61,1*	17,6*
	13	52,9	68,3	15,8	51,2*	67,3*	16,6*	-	-	-
	16	58,0	73,5	16,0	56,3*	72,5*	16,7*	-	-	-
	18	61,6	77,3	16,2	59,7*	76,1*	16,9*	-	-	-
	23	70,9	87,2	16,8	-	-	-	-	-	-
260	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	39,0	56,8	18,3	37,6*	56,4*	19,3*	-	-	-
	4	44,4	62,2	18,3	42,8	61,5	19,2	40,2*	60,3*	20,7*
	7	49,4	67,2	18,4	47,7	66,3	19,3	44,9*	64,9*	20,7*
	10	54,8	72,7	18,4	52,9	71,7	19,3	49,9*	70,0*	20,7*
	13	60,6	78,6	18,6	58,6*	77,4*	19,5*	-	-	-
	16	66,7	85,0	18,8	64,6*	83,7*	19,7*	-	-	-
	18	71,0	89,4	19,0	68,8*	88,1*	19,9*	-	-	-
	23	82,5	101,4	19,5	-	-	-	-	-	-
270	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	44,9	64,7	20,4	43,2*	64,0*	21,5*	-	-	-
	4	50,9	70,7	20,4	49,1	69,8	21,4	46,2*	68,3*	22,8*
	7	56,7	76,5	20,4	54,6	75,3	21,3	51,4*	73,5*	22,8*
	10	62,7	82,5	20,5	60,5	81,3	21,4	57,1*	79,3*	22,8*
	13	69,2	89,2	20,5	66,9*	87,7*	21,5*	-	-	-
	16	76,1	96,2	20,7	73,6*	94,6*	21,6*	-	-	-
	18	80,9	101,1	20,8	78,4*	99,5*	21,7*	-	-	-
	23	93,6	114,1	21,2	-	-	-	-	-	-
275	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	49,7	71,2	22,1	48,1*	70,5*	23,1*	-	-	-
	4	56,6	78,1	22,2	54,7	77,3	23,3	51,8*	75,9*	24,9*
	7	62,8	84,6	22,4	60,8	83,5	23,5	57,5*	81,8*	25,1*
	10	69,5	91,4	22,6	67,2	90,2	23,6	63,8*	88,3*	25,3*
	13	76,7	98,9	22,8	74,2*	97,4*	23,8*	-	-	-
	16	84,2	106,5	23,0	81,7*	105,0*	24,1*	-	-	-
	18	89,6	112,1	23,2	86,9*	110,4*	24,2*	-	-	-
	23	103,8	126,7	23,6	-	-	-	-	-	-
290	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	59,9	84,2	25,0	58,1*	83,4*	26,1*	-	-	-
	4	68,0	92,6	25,3	66,0	91,6	26,4	62,5*	89,9*	28,2*
	7	75,4	100,2	25,6	73,0	99,0	26,7	69,4*	97,1*	28,5*
	10	83,2	108,3	25,9	80,7	106,9	27,0	76,7*	104,6*	28,8*
	13	91,5	116,8	26,1	88,8*	115,2*	27,2*	-	-	-
	16	100,3	125,8	26,3	97,5*	124,1*	27,4*	-	-	-
	18	106,5	132,1	26,4	103,6*	130,3*	27,5*	-	-	-
	23	122,9	148,7	26,6	-	-	-	-	-	-

(*) Only HT versions

Table "E": TCHEY performance data in cooling (ΔT = 5°C at the condenser; ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)											
		30			35			40			45		
		QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	-8	61,3*	79,2*	18,4*	58,2*	77,9*	20,4*	54,9*	76,8*	22,6*	-	-	-
	-6	66,2	84,3	18,6	62,9	82,8	20,5	59,3*	81,5*	22,8*	55,6*	80,3*	25,5*
	-3	74,0	92,3	18,9	70,4	90,6	20,8	66,5	89,0	23,1	62,2*	87,3*	25,8*
	1	85,5	104,2	19,3	81,4	102,0	21,2	77,0	99,9	23,5	72,4	97,8	26,2
	4	97,8	116,9	19,7	93,0	114,0	21,6	88,0	111,2	23,9	82,7	108,4	26,6
	7	108,1	127,6	20,1	103,1	124,4	22,0	97,7	121,2	24,3	91,7	117,8	26,9
	10	119,2	139,1	20,5	113,7	135,3	22,3	107,7	131,6	24,6	101,4	127,8	27,2
	13	131,0	151,2	20,9	124,9	146,9	22,7	118,7	142,9	24,9	111,7	138,4	27,5
	16	143,3	163,9	21,3	136,9	159,3	23,1	130,1	154,6	25,3	122,8	149,8	27,9
	18	152,0	173,0	21,6	145,2	167,8	23,4	138,2	162,9	25,5	130,4	157,6	28,1
	23	-	-	-	167,6	190,9	24,0	159,4	184,7	26,1	150,7	178,4	28,6
2115	-8	71,4*	92,0*	21,2*	67,8*	90,6*	23,5*	63,8*	89,2*	26,2*	-	-	-
	-6	76,9	97,7	21,4	73,1	96,1	23,7	68,8*	94,3*	26,4*	64,1*	92,6*	29,4*
	-3	85,8	106,8	21,7	81,5	104,8	24,0	76,7	102,6	26,7	71,7*	100,5*	29,7*
	1	98,8	120,3	22,1	94,0	117,6	24,4	88,6	114,9	27,1	82,9	112,2	30,1
	4	111,6	133,5	22,5	106,0	130,1	24,8	100,1	126,8	27,5	93,6	123,2	30,5
	7	123,2	145,4	22,9	117,3	141,7	25,2	110,7	137,7	27,8	103,6	133,5	30,8
	10	135,7	158,3	23,4	129,1	153,9	25,6	122,0	149,3	28,2	114,3	144,6	31,2
	13	148,9	172,0	23,8	141,8	167,0	26,0	134,1	161,8	28,5	125,6	156,2	31,5
	16	163,0	186,5	24,3	155,2	180,8	26,4	146,7	174,8	28,9	137,6	168,6	31,9
	18	172,7	196,6	24,6	164,5	190,4	26,7	155,5	183,8	29,2	145,9	177,0	32,1
	23	-	-	-	189,2	215,8	27,4	178,9	207,9	29,9	168,0	199,8	32,8
2130	-8	78,7*	102,2*	24,2*	74,6*	100,4*	26,6*	70,0*	98,7*	29,6*	-	-	-
	-6	85,0	108,7	24,4	80,5	106,6	26,8	75,5*	104,4*	29,8*	70,2*	102,5*	33,3*
	-3	95,3	119,3	24,7	90,3	116,6	27,2	84,7	114,0	30,1	78,8*	111,4*	33,6*
	1	110,2	134,6	25,2	104,4	131,2	27,6	98,2	127,8	30,6	91,4	124,5	34,1
	4	124,8	149,6	25,6	118,1	145,4	28,1	111,2	141,3	31,0	103,5	136,9	34,5
	7	138,3	163,5	26,0	131,0	158,6	28,5	123,2	153,7	31,4	115,1	148,9	34,9
	10	152,5	178,0	26,4	144,5	172,5	28,9	136,0	166,9	31,9	127,2	161,4	35,3
	13	167,8	193,8	26,8	159,0	187,4	29,3	150,0	181,3	32,3	140,2	174,8	35,7
	16	183,7	210,1	27,2	174,3	203,2	29,8	164,3	196,1	32,7	154,0	189,1	36,2
	18	195,2	221,9	27,5	185,2	214,4	30,1	174,6	206,6	33,0	163,6	199,0	36,5
	23	-	-	-	213,6	243,6	30,9	201,7	234,6	33,9	188,8	225,1	37,4
2145	-8	87,3*	113,5*	27,1*	83,0*	112,0*	29,9*	78,1*	110,3*	33,2*	-	-	-
	-6	94,4	120,8	27,2	89,8	118,9	30,0	84,2*	116,6*	33,3*	78,4*	114,5*	37,2*
	-3	105,6	132,3	27,5	100,4	129,7	30,2	94,4	127,0	33,5	87,9*	124,2*	37,4*
	1	122,2	149,2	27,9	116,1	145,8	30,6	109,3	142,1	33,9	102,0	138,5	37,7
	4	138,4	165,8	28,2	131,4	161,5	31,0	123,6	156,8	34,2	115,4	152,3	38,0
	7	153,6	181,3	28,6	145,7	176,1	31,3	137,2	170,7	34,5	128,0	165,1	38,3
	10	169,6	197,7	28,9	161,0	191,7	31,7	151,7	185,5	34,9	141,7	179,1	38,6
	13	186,5	214,9	29,3	177,0	208,1	32,0	166,9	201,1	35,2	156,1	193,8	38,9
	16	204,5	233,2	29,6	194,2	225,6	32,4	183,2	217,7	35,6	171,4	209,6	39,3
	18	217,4	246,4	29,9	206,4	238,1	32,7	194,7	229,5	35,9	181,9	220,3	39,6
	23	-	-	-	238,3	270,7	33,4	224,8	260,4	36,7	210,1	249,2	40,3
2165	-8	98,8*	129,5*	31,6*	93,6*	127,6*	35,0*	88,0*	125,9*	39,0*	-	-	-
	-6	106,8	137,6	31,8	101,2	135,3	35,1	95,2*	133,1*	39,1*	88,7*	131,0*	43,6*
	-3	119,5	150,6	32,1	113,5	147,8	35,3	106,8	144,8	39,3	99,6*	142,0*	43,7*
	1	138,5	170,0	32,4	131,4	166,1	35,7	123,7	162,1	39,6	115,5	158,1	44,0
	4	157,4	189,3	32,8	149,3	184,3	36,1	140,5	179,2	39,9	131,1	174,0	44,3
	7	174,7	206,9	33,2	165,5	200,8	36,4	155,9	194,9	40,2	145,4	188,6	44,6
	10	192,9	225,5	33,6	182,9	218,6	36,8	172,4	211,8	40,6	161,0	204,5	44,9
	13	212,4	245,4	34,0	201,5	237,6	37,2	189,8	229,6	41,0	177,7	221,6	45,3
	16	232,9	266,3	34,4	221,3	257,9	37,7	208,7	248,9	41,4	195,2	239,6	45,8
	18	247,7	281,4	34,7	235,0	271,8	38,0	221,5	262,0	41,8	207,2	251,9	46,1
	23	-	-	-	271,5	309,3	38,9	256,0	297,4	42,7	239,6	285,2	47,0
2185	-8	109,9*	144,5*	35,6*	104,1*	142,5*	39,6*	97,9*	140,7*	44,1*	-	-	-
	-6	119,0	153,7	35,8	112,5	151,0	39,7	105,8*	148,7*	44,2*	98,9*	146,7*	49,3*
	-3	133,1	168,2	36,1	126,0	164,8	40,0	118,7	161,8	44,4	110,8*	158,8*	49,5*
	1	154,4	189,9	36,6	146,2	185,4	40,4	137,7	181,1	44,8	128,6	176,9	49,8
	4	176,0	212,1	37,1	166,6	206,2	40,8	156,7	200,5	45,2	146,2	194,9	50,2
	7	194,9	231,3	37,6	184,8	224,8	41,3	173,8	218,0	45,6	162,4	211,5	50,6
	10	215,1	252,0	38,1	204,1	244,6	41,8	192,4	237,1	46,1	179,5	229,0	51,1
	13	237,0	274,4	38,6	224,7	265,8	42,3	211,8	257,0	46,6	198,1	248,1	51,6
	16	259,8	297,8	39,2	246,5	288,1	42,9	232,4	278,3	47,3	217,6	268,3	52,3
	18	275,8	314,2	39,6	262,0	304,0	43,4	246,8	293,0	47,7	231,4	282,5	52,7
	23	-	-	-	302,3	345,5	44,5	285,6	333,1	49,0	267,2	319,6	54,0

Model	Tue (°C)	Tuc (°C)								
		50			52			55		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	67,3	95,7	29,3	65,2*	94,9*	30,6*	-	-	-
	4	74,3	102,9	29,5	74,3	104,2	30,8	74,3*	106,2*	32,9*
	7	85,5	114,5	29,9	79,6	109,7	31,1	79,6*	111,8*	33,2*
	10	94,6	124,0	30,2	91,8	122,4	31,5	85,0*	117,6*	33,5*
	13	104,4	134,0	30,6	101,3*	132,2*	31,9*	-	-	-
	16	114,7	144,7	30,9	111,5*	142,7*	32,2*	-	-	-
	18	122,1	152,2	31,1	118,5*	149,9*	32,4*	-	-	-
	23	141,4	172,0	31,6	-	-	-	-	-	-
2115	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	76,6	109,1	33,6	73,9*	107,9*	35,0*	-	-	-
	4	86,5	119,4	33,9	83,5	117,8	35,4	78,9*	115,5*	37,7*
	7	95,9	129,1	34,3	92,7	127,3	35,7	87,6*	124,5*	38,1*
	10	105,9	139,4	34,6	102,4	137,4	36,1	96,9*	134,2*	38,4*
	13	116,6	150,5	34,9	112,7*	148,1*	36,4*	-	-	-
	16	127,7	161,9	35,3	123,7*	159,3*	36,7*	-	-	-
	18	135,6	170,1	35,5	131,2*	167,1*	37,0*	-	-	-
	23	156,2	191,2	36,1	-	-	-	-	-	-
2130	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	84,4	121,3	38,1	81,3*	119,9*	39,8*	-	-	-
	4	95,7	132,9	38,4	92,3	131,2	40,1	87,2*	128,7*	42,8*
	7	106,4	144,0	38,8	102,7	141,9	40,5	97,1*	139,0*	43,2*
	10	117,8	155,8	39,2	113,7	153,3	40,9	107,7*	149,9*	43,5*
	13	129,7	168,1	39,6	125,7*	165,7*	41,3*	-	-	-
	16	142,7	181,6	40,1	137,9*	178,4*	41,7*	-	-	-
	18	151,6	190,8	40,4	146,6*	187,4*	42,1*	-	-	-
	23	175,2	215,2	41,3	-	-	-	-	-	-
2145	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	94,2	134,9	41,9	90,8*	133,3*	43,8*	-	-	-
	4	106,6	147,5	42,2	103,0	145,7	44,0	97,1*	142,6*	46,9*
	7	118,4	159,5	42,4	114,3	157,2	44,2	108,0*	153,7*	47,1*
	10	131,0	172,4	42,7	126,6	169,8	44,5	119,8*	165,7*	47,3*
	13	144,5	186,3	43,0	139,7*	183,2*	44,8*	-	-	-
	16	158,6	200,7	43,4	153,2*	197,0*	45,2*	-	-	-
	18	168,6	210,9	43,7	163,0*	207,0*	45,4*	-	-	-
	23	194,9	238,0	44,4	-	-	-	-	-	-
2165	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	106,7	154,2	49,0	102,9*	152,6*	51,2*	-	-	-
	4	120,8	168,6	49,3	116,7	166,6	51,4	110,3*	163,4*	54,8*
	7	134,5	182,6	49,5	129,9	180,0	51,6	122,7*	176,1*	55,0*
	10	148,9	197,3	49,8	143,7	194,1	52,0	136,0*	189,6*	55,3*
	13	164,3	213,0	50,2	158,9*	209,6*	52,3*	-	-	-
	16	180,8	229,9	50,6	174,7*	225,8*	52,7*	-	-	-
	18	191,9	241,4	51,0	185,5*	237,0*	53,0*	-	-	-
	23	222,1	272,4	51,9	-	-	-	-	-	-
2185	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	118,8	172,7	55,5	114,8*	171,0*	58,0*	-	-	-
	4	134,9	189,1	55,9	130,1	186,7	58,4	123,1*	183,5*	62,2*
	7	149,9	204,5	56,3	144,8	201,8	58,7	136,9*	197,6*	62,6*
	10	166,0	221,0	56,8	160,3	217,8	59,2	151,6*	212,8*	63,1*
	13	183,2	238,8	57,3	176,9*	234,9*	59,7*	-	-	-
	16	201,2	257,4	57,9	194,6*	253,1*	60,3*	-	-	-
	18	214,4	271,0	58,4	207,2*	266,1*	60,8*	-	-	-
	23	247,9	305,8	59,7	-	-	-	-	-	-

Table "E": THHEY performance data in cooling (ΔT = 5°C at the condenser; ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)														
		30			35			40			45			50		
		QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
245	4	39,4	47,5	8,4	37,4	46,5	9,4	35,3	45,4	10,5	32,8	44,3	11,9	30,2	43,2	13,4
	7	43,4	51,7	8,5	41,4	50,6	9,5	39,1	49,4	10,6	36,5	48,0	11,9	33,6	46,6	13,4
	10	47,8	56,2	8,6	45,6	54,9	9,6	43,1	53,5	10,7	40,4	52,0	12,0	37,3	50,3	13,5
	13	52,4	60,9	8,8	50,0	59,4	9,7	47,5	57,9	10,8	44,5	56,2	12,0	41,3	54,4	13,5
	16	57,2	65,8	8,9	54,8	64,3	9,8	52,0	62,5	10,9	48,9	60,6	12,1	45,3	58,5	13,6
	18	60,5	69,3	9,0	58,0	67,6	9,9	55,1	65,7	10,9	51,9	63,7	12,2	48,2	61,4	13,6
250	4	46,3	55,8	9,7	44,0	54,5	10,8	41,5	53,3	12,1	38,9	52,1	13,7	35,9	50,9	15,5
	7	51,2	60,7	9,8	48,7	59,3	10,9	46,0	57,8	12,2	43,0	56,3	13,7	39,8	54,8	15,4
	10	56,4	66,1	10,0	53,6	64,3	11,1	50,6	62,6	12,3	47,4	60,8	13,8	44,0	58,9	15,4
	13	61,9	71,6	10,1	58,8	69,7	11,2	55,6	67,6	12,4	52,0	65,5	13,9	48,4	63,4	15,5
	16	67,5	77,4	10,2	64,2	75,2	11,3	60,7	72,9	12,6	56,9	70,6	14,0	53,0	68,2	15,7
	18	71,5	81,6	10,3	68,0	79,1	11,4	64,3	76,6	12,7	60,4	74,1	14,2	56,3	71,7	15,9
260	4	52,7	63,4	11,0	50,2	62,1	12,3	47,3	60,8	13,8	44,1	59,3	15,7	40,6	57,8	17,7
	7	58,1	69,0	11,2	55,4	67,5	12,5	52,4	65,9	14,0	49,0	64,3	15,8	45,2	62,4	17,8
	10	64,0	75,1	11,4	61,1	73,4	12,7	57,8	71,6	14,2	54,2	69,6	15,9	50,1	67,4	17,9
	13	70,1	81,4	11,6	67,1	79,6	12,9	63,7	77,6	14,4	59,7	75,3	16,1	55,4	72,9	18,0
	16	76,4	87,9	11,9	73,4	86,1	13,1	69,7	83,8	14,5	65,6	81,4	16,3	61,0	78,7	18,2
	18	80,9	92,6	12,0	77,8	90,6	13,2	74,0	88,2	14,7	69,7	85,6	16,4	64,9	82,8	18,4
270	4	60,2	72,7	12,9	57,4	71,2	14,3	54,1	69,5	15,9	50,5	67,8	17,8	46,5	65,9	20,0
	7	66,3	79,0	13,1	63,2	77,2	14,4	59,9	75,4	16,0	56,1	73,4	17,9	51,8	71,2	20,0
	10	72,7	85,6	13,3	69,6	83,7	14,6	66,0	81,7	16,2	61,9	79,3	18,0	57,3	76,7	20,0
	13	79,5	92,6	13,5	76,2	90,5	14,8	72,4	88,2	16,3	68,1	85,6	18,1	63,3	82,8	20,1
	16	86,7	99,9	13,7	83,2	97,6	14,9	79,2	95,1	16,4	74,7	92,4	18,2	69,5	89,2	20,3
	18	91,6	105,0	13,8	88,1	102,7	15,0	84,0	100,0	16,5	79,3	97,0	18,3	73,9	93,7	20,4
275	4	65,9	79,5	14,1	62,8	78,0	15,6	59,5	76,4	17,4	55,8	74,6	19,4	51,7	72,9	21,8
	7	72,7	86,6	14,3	69,4	84,8	15,8	65,8	82,9	17,6	61,9	80,9	19,6	57,4	78,7	22,0
	10	79,8	94,1	14,7	76,4	92,0	16,1	72,6	89,9	17,8	68,3	87,5	19,9	63,5	85,0	22,2
	13	87,5	102,0	15,0	83,9	99,7	16,4	79,8	97,3	18,1	75,2	94,7	20,1	70,1	91,8	22,4
	16	95,6	110,5	15,3	91,8	108,0	16,7	87,3	105,1	18,3	82,5	102,1	20,3	76,9	98,8	22,6
	18	101,4	116,5	15,6	97,2	113,6	16,9	92,5	110,5	18,5	87,4	107,3	20,4	81,8	103,8	22,7
290	4	77,9	94,2	16,7	74,6	92,5	18,5	70,8	90,7	20,5	66,7	88,8	22,8	62,1	86,7	25,3
	7	85,9	102,5	17,1	82,3	100,5	18,8	78,2	98,3	20,7	73,8	96,1	23,0	68,8	93,7	25,6
	10	94,5	111,5	17,5	90,5	109,1	19,1	86,1	106,5	21,0	81,2	103,8	23,3	76,0	101,1	25,9
	13	103,7	121,1	17,9	99,4	118,2	19,5	94,6	115,2	21,3	89,3	112,1	23,5	83,6	108,9	26,1
	16	113,1	130,9	18,4	108,6	127,8	19,8	103,5	124,4	21,6	97,9	120,9	23,8	91,7	117,2	26,3
	18	119,8	137,9	18,7	114,9	134,3	20,1	109,7	130,8	21,8	103,8	126,9	23,9	97,4	123,0	26,4

Table "E": THHEY performance data in cooling (ΔT = 5°C at the condenser; ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)														
		30			35			40			45			50		
		QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	4	91,2	110,2	19,5	86,8	107,5	21,4	82,1	105,1	23,7	77,1	102,6	26,3	69,3	97,6	29,2
	7	100,9	120,2	19,9	96,2	117,3	21,8	91,1	114,4	24,0	85,6	111,4	26,6	79,7	108,4	29,6
	10	111,2	130,9	20,3	106,1	127,5	22,1	100,5	124,1	24,3	94,6	120,7	26,9	88,3	117,3	29,9
	13	122,2	142,3	20,7	116,6	138,4	22,5	110,7	134,7	24,7	104,2	130,7	27,3	97,4	126,7	30,3
	16	133,7	154,1	21,1	127,7	149,9	22,9	121,4	145,7	25,0	114,6	141,3	27,6	107,0	136,7	30,6
	18	141,9	162,6	21,4	135,5	157,9	23,1	128,9	153,4	25,2	121,7	148,6	27,8	113,9	143,7	30,8
2115	4	104,2	125,9	22,3	99,0	122,8	24,5	93,5	119,8	27,2	87,4	116,6	30,2	80,7	113,3	33,6
	7	115,0	137,0	22,7	109,5	133,7	24,9	103,4	130,0	27,5	96,7	126,3	30,5	89,5	122,4	33,9
	10	126,6	149,1	23,1	120,5	145,0	25,3	113,8	140,9	27,9	106,7	136,6	30,8	98,8	132,0	34,2
	13	139,0	161,8	23,5	132,3	157,2	25,7	125,2	152,6	28,2	117,3	147,5	31,2	108,8	142,4	34,6
	16	152,1	175,4	24,0	144,9	170,2	26,1	136,9	164,7	28,6	128,4	159,1	31,6	119,2	153,0	34,9
	18	161,2	184,8	24,3	153,5	179,1	26,4	145,1	173,1	28,9	136,1	167,0	31,8	126,6	160,6	35,1
2130	4	115,4	139,7	25,1	109,2	135,9	27,5	102,8	132,3	30,4	95,7	128,4	33,8	88,4	124,9	37,6
	7	127,8	152,5	25,4	121,1	148,1	27,9	113,9	143,7	30,8	106,4	139,5	34,1	98,3	135,1	38,0
	10	140,9	166,0	25,8	133,6	161,0	28,3	125,8	156,0	31,2	117,6	151,1	34,5	108,9	146,1	38,4
	13	155,2	180,6	26,2	146,9	174,8	28,7	138,7	169,3	31,6	129,6	163,5	35,0	119,9	157,5	38,8
	16	169,8	195,7	26,7	161,1	189,4	29,1	151,9	183,0	32,0	142,4	176,7	35,4	131,9	170,0	39,2
	18	180,4	206,6	27,0	171,2	199,7	29,4	161,4	192,8	32,4	151,2	185,9	35,7	140,2	178,5	39,5
2145	4	128,1	155,3	28,0	121,6	151,4	30,8	114,4	147,3	34,0	106,8	143,4	37,7	98,6	139,2	41,9
	7	142,1	169,6	28,3	134,8	164,9	31,1	126,9	160,2	34,3	118,4	155,3	38,0	109,5	150,4	42,1
	10	157,0	184,8	28,7	148,9	179,4	31,4	140,3	173,9	34,6	131,1	168,3	38,3	121,2	162,3	42,4
	13	172,6	200,7	29,0	163,8	194,6	31,8	154,4	188,4	35,0	144,4	181,9	38,6	133,7	175,1	42,7
	16	189,2	217,7	29,4	179,7	210,9	32,2	169,5	203,8	35,4	158,6	196,5	39,0	146,7	188,5	43,1
	18	201,2	230,0	29,7	191,0	222,5	32,5	180,2	214,7	35,6	168,3	206,4	39,3	156,0	198,0	43,3
2165	4	143,9	176,5	33,6	136,5	172,3	36,9	128,5	168,0	40,8	119,8	163,8	45,3	110,5	159,3	50,4
	7	161,2	193,9	33,7	152,7	188,6	37,0	143,9	183,5	40,8	134,1	178,0	45,3	124,2	172,9	50,3
	10	179,6	212,5	33,9	170,3	206,3	37,1	160,6	200,3	40,9	149,9	193,8	45,3	138,7	187,4	50,3
	13	199,6	232,6	34,0	189,3	225,5	37,3	178,4	218,2	41,0	166,9	211,0	45,4	154,4	203,2	50,3
	16	220,8	254,0	34,2	209,8	246,2	37,4	197,8	237,8	41,2	185,1	229,2	45,5	171,4	220,2	50,3
	18	236,2	269,5	34,4	224,1	260,5	37,6	211,2	251,3	41,3	197,6	241,8	45,6	183,0	231,9	50,4
2185	4	161,0	197,9	38,0	152,3	192,8	41,8	143,3	188,1	46,2	133,7	183,5	51,4	123,4	178,9	57,2
	7	179,9	216,9	38,2	170,6	211,2	41,9	160,4	205,3	46,3	149,9	199,7	51,4	138,4	193,8	57,2
	10	200,3	237,5	38,4	190,1	230,9	42,1	179,2	224,3	46,5	167,1	217,1	51,5	154,6	210,1	57,2
	13	222,6	260,1	38,7	211,1	252,2	42,4	199,0	244,3	46,7	186,1	236,2	51,7	172,1	227,7	57,4
	16	246,2	284,0	39,0	233,6	274,9	42,6	220,3	265,8	47,0	206,2	256,6	51,9	190,7	246,5	57,6
	18	262,9	300,9	39,2	249,7	291,3	42,9	235,2	281,0	47,2	220,5	271,1	52,1	204,3	260,3	57,7

Table "E": THHEY performance data in heating (ΔT = 5°C at the condenser; ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)											
		30			35			40			45		
		QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
245	-8	27,7*	35,5*	8,1*	25,7*	34,5*	9,1*	23,6*	33,8*	10,4*	-	-	-
	-6	29,8	37,7	8,1	27,8	36,7	9,1	25,7*	35,8*	10,4*	23,4*	35,0*	12,0*
	-3	33,3	41,2	8,2	31,2	40,1	9,2	28,9	39,1	10,5	26,5*	38,1*	12,0*
	1	38,4	46,4	8,2	36,1	45,1	9,3	33,6	43,8	10,5	30,9	42,5	12,0
	4	43,3	51,4	8,4	40,8	49,8	9,4	38,1	48,3	10,6	35,1	46,7	12,0
	7	47,7	55,9	8,5	45,1	54,3	9,4	42,1	52,4	10,6	38,9	50,6	12,0
	10	52,3	60,6	8,6	49,5	58,8	9,5	46,4	56,8	10,7	43,0	54,7	12,1
	13	57,1	65,6	8,7	54,2	63,5	9,6	50,9	61,4	10,8	47,3	59,1	12,1
	16	62,3	70,9	8,8	59,1	68,6	9,7	55,8	66,3	10,9	51,9	63,8	12,2
	18	65,8	74,5	8,9	62,7	72,2	9,8	59,0	69,6	10,9	55,1	66,9	12,2
	23	75,2	84,1	9,2	71,8	81,5	10,0	67,9	78,6	11,1	63,5	75,5	12,4
250	-8	32,3*	41,2*	9,2*	30,3*	40,2*	10,2*	28,2*	39,6*	11,7*	-	-	-
	-6	34,8	43,8	9,3	32,7	42,7	10,3	30,6*	42,0*	11,8*	28,3*	41,6*	13,7*
	-3	38,9	48,0	9,4	36,7	46,8	10,4	34,4	45,9	11,8	31,9*	45,1*	13,6*
	1	45,0	54,2	9,5	42,5	52,7	10,6	39,8	51,4	12,0	37,0	50,2	13,6
	4	50,9	60,3	9,7	48,1	58,5	10,8	45,1	56,9	12,1	41,9	55,1	13,6
	7	56,1	65,6	9,8	53,1	63,7	10,9	49,8	61,6	12,2	46,3	59,6	13,7
	10	61,7	71,4	10,0	58,3	69,1	11,1	54,7	66,7	12,4	51,0	64,4	13,8
	13	67,5	77,3	10,2	63,9	74,8	11,3	60,0	72,2	12,5	55,9	69,4	14,0
	16	73,6	83,6	10,4	69,6	80,7	11,5	65,4	77,7	12,7	61,0	74,8	14,2
	18	77,8	88,0	10,5	73,5	84,7	11,6	69,1	81,6	12,9	64,5	78,5	14,4
	23	89,0	99,5	10,8	84,0	95,6	11,9	78,9	91,8	13,3	73,9	88,4	14,9
260	-8	36,8*	47,3*	10,8*	34,5*	46,1*	12,0*	32,3*	45,5*	13,6*	-	-	-
	-6	39,6	50,2	10,9	37,3	48,9	12,0	34,9*	48,2*	13,6*	32,5*	47,6*	15,6*
	-3	44,2	54,9	10,9	41,8	53,6	12,2	39,2	52,5	13,7	36,5*	51,6*	15,6*
	1	50,9	61,6	11,1	48,2	60,1	12,3	45,4	58,8	13,8	42,3	57,4	15,6
	4	57,7	68,6	11,3	54,7	66,8	12,5	51,6	65,1	13,9	48,1	63,2	15,6
	7	63,4	74,5	11,4	60,4	72,6	12,6	57,0	70,6	14,0	53,3	68,5	15,7
	10	69,6	80,8	11,6	66,4	78,8	12,8	62,8	76,5	14,2	58,8	74,0	15,8
	13	76,1	87,5	11,8	72,8	85,3	12,9	68,9	82,7	14,3	64,6	80,0	15,9
	16	82,9	94,5	11,9	79,3	92,0	13,1	75,4	89,4	14,4	70,9	86,4	16,0
	18	87,7	99,4	12,1	84,1	96,9	13,2	79,8	93,9	14,5	75,2	90,8	16,1
	23	100,3	112,3	12,4	96,3	109,4	13,5	91,8	106,2	14,8	86,7	102,6	16,4
270	-8	41,5*	53,2*	12,1*	39,0*	52,0*	13,4*	36,4*	51,1*	15,2*	-	-	-
	-6	44,7	56,5	12,1	42,1	55,1	13,5	39,3*	54,1*	15,2*	36,4*	53,2*	17,4*
	-3	49,7	61,6	12,2	46,9	60,1	13,6	44,0	58,9	15,3	40,8*	57,7*	17,4*
	1	56,9	68,9	12,4	54,1	67,4	13,7	50,9	65,8	15,4	47,3	64,2	17,4
	4	64,2	76,4	12,5	61,1	74,5	13,9	57,6	72,6	15,5	53,6	70,5	17,4
	7	70,5	82,8	12,7	67,3	80,9	14,0	63,6	78,7	15,6	59,3	76,2	17,4
	10	77,2	89,7	12,9	73,7	87,5	14,2	69,8	85,1	15,7	65,4	82,4	17,5
	13	84,3	96,9	13,0	80,6	94,5	14,3	76,6	91,9	15,8	71,9	89,0	17,6
	16	91,7	104,5	13,2	87,9	101,8	14,4	83,6	99,1	15,9	78,7	95,8	17,6
	18	96,8	109,7	13,3	93,0	107,0	14,5	88,5	104,0	16,0	83,4	100,6	17,7
	23	110,3	123,5	13,6	106,3	120,6	14,7	101,6	117,3	16,2	96,0	113,4	17,9
275	-8	46,4*	59,1*	13,1*	43,5*	57,8*	14,7*	40,6*	56,8*	16,7*	-	-	-
	-6	49,8	62,6	13,2	47,0	61,3	14,8	43,8*	60,1*	16,8*	40,5*	59,0*	19,1*
	-3	55,5	68,4	13,3	52,3	66,7	14,9	48,9	65,3	16,9	45,3*	63,9*	19,2*
	1	63,5	76,6	13,5	60,2	74,9	15,1	56,4	73,0	17,1	52,4	71,1	19,3
	4	71,9	85,3	13,8	68,1	83,0	15,4	64,0	80,7	17,2	59,4	78,3	19,5
	7	79,1	92,6	14,0	75,1	90,1	15,5	70,6	87,4	17,4	65,7	84,7	19,6
	10	86,6	100,4	14,2	82,3	97,5	15,7	77,5	94,5	17,6	72,3	91,4	19,7
	13	94,8	108,8	14,5	90,1	105,6	15,9	85,0	102,2	17,7	79,4	98,6	19,8
	16	103,3	117,6	14,8	98,2	113,8	16,2	92,8	110,1	17,9	86,8	106,1	20,0
	18	109,1	123,6	14,9	104,0	119,8	16,3	98,2	115,7	18,0	92,0	111,5	20,0
	23	124,5	139,5	15,4	118,9	135,1	16,7	112,5	130,3	18,3	105,8	125,5	20,3
290	-8	55,7*	71,2*	16,0*	52,8*	70,1*	17,9*	49,7*	69,1*	20,0*	-	-	-
	-6	59,7	75,3	16,1	56,7	74,2	18,0	53,5*	73,1*	20,1*	50,1*	71,9*	22,5*
	-3	66,3	82,0	16,3	63,1	80,8	18,2	59,6	79,3	20,3	55,8*	77,9*	22,7*
	1	75,9	92,0	16,5	72,3	90,2	18,4	68,5	88,5	20,6	64,2	86,5	23,0
	4	86,0	102,4	16,9	81,9	100,0	18,7	77,6	97,8	20,8	72,7	95,3	23,3
	7	94,6	111,2	17,2	90,3	108,6	19,0	85,4	105,8	21,0	80,1	102,9	23,4
	10	103,6	120,6	17,5	98,8	117,5	19,2	93,7	114,3	21,2	88,2	111,1	23,6
	13	113,2	130,5	17,9	108,2	127,1	19,5	102,5	123,3	21,4	96,4	119,5	23,8
	16	123,3	141,0	18,3	117,7	136,9	19,8	111,9	132,9	21,6	105,5	128,7	23,9
	18	130,3	148,3	18,5	124,7	144,0	19,9	118,4	139,5	21,8	111,5	134,8	24,0
	23	148,8	167,5	19,2	142,4	162,2	20,4	135,5	156,9	22,1	127,9	151,3	24,1

Model	Tue (°C)	Tuc (°C)								
		50			52			55		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
245	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	28,0	41,2	13,7	26,7*	40,6*	14,4*	-	-	-
	4	31,8	45,1	13,6	30,3	44,3	14,4	28,2*	43,2*	15,5*
	7	35,5	48,7	13,6	33,9	47,9	14,4	31,6*	46,6*	15,5*
	10	39,3	52,5	13,7	37,7	51,6	14,3	35,2*	50,2*	15,4*
	13	43,4	56,7	13,7	41,7*	55,6*	14,4*	-	-	-
	16	47,7	61,0	13,7	45,9*	59,9*	14,4*	-	-	-
	18	50,7	64,0	13,8	48,9*	62,9*	14,4*	-	-	-
	23	58,7	72,2	13,9	-	-	-	-	-	-
250	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	34,0	49,0	15,5	32,6*	48,6*	16,4*	-	-	-
	4	38,5	53,4	15,4	36,9	52,7	16,2	34,7*	51,6*	17,5*
	7	42,6	57,6	15,4	40,9	56,6	16,2	38,5*	55,3*	17,3*
	10	46,9	61,9	15,5	45,2	60,9	16,2	42,7*	59,5*	17,3*
	13	51,5	66,7	15,7	49,7*	65,6*	16,4*	-	-	-
	16	56,4	71,8	15,9	54,4*	70,6*	16,6*	-	-	-
	18	59,7	75,3	16,1	57,8*	74,1*	16,9*	-	-	-
	23	68,6	85,0	16,8	-	-	-	-	-	-
260	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	39,0	56,1	17,6	37,7*	55,6*	18,5*	-	-	-
	4	44,3	61,3	17,6	42,7	60,5	18,4	40,2*	59,3*	19,7*
	7	49,1	66,1	17,5	47,4	65,2	18,3	44,7*	63,7*	19,6*
	10	54,3	71,4	17,6	52,5	70,3	18,3	49,5*	68,5*	19,6*
	13	59,9	77,0	17,6	57,9*	75,8*	18,4*	-	-	-
	16	65,8	83,1	17,8	63,6*	81,6*	18,6*	-	-	-
	18	69,9	87,2	17,9	67,7*	85,8*	18,7*	-	-	-
	23	81,0	98,8	18,3	-	-	-	-	-	-
270	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	43,6	62,6	19,6	41,9*	61,9*	20,6*	-	-	-
	4	49,3	68,2	19,5	47,5	67,3	20,5	44,7*	65,9*	21,9*
	7	54,8	73,7	19,5	52,8	72,6	20,4	49,6*	70,8*	21,8*
	10	60,5	79,5	19,5	58,5	78,3	20,4	55,2*	76,3*	21,8*
	13	66,7	85,7	19,6	64,4*	84,3*	20,4*	-	-	-
	16	73,2	92,3	19,7	70,8*	90,7*	20,5*	-	-	-
	18	77,8	96,9	19,7	75,2*	95,2*	20,6*	-	-	-
	23	89,6	109,1	20,1	-	-	-	-	-	-
275	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	48,0	69,3	21,9	46,2*	68,4*	23,0*	-	-	-
	4	54,5	75,8	21,9	52,3	74,7	23,1	49,2*	73,2*	24,8*
	7	60,3	81,7	22,0	58,0	80,5	23,1	54,5*	78,6*	24,8*
	10	66,6	88,1	22,1	64,1	86,6	23,2	60,5*	84,6*	24,9*
	13	73,3	94,9	22,2	70,7*	93,3*	23,3*	-	-	-
	16	80,2	101,9	22,3	77,6*	100,3*	23,4*	-	-	-
	18	85,2	107,0	22,4	82,4*	105,2*	23,5*	-	-	-
	23	98,3	120,3	22,7	-	-	-	-	-	-
290	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	59,5	84,5	25,7	57,5*	83,6*	26,9*	-	-	-
	4	67,4	92,7	26,0	65,2	91,6	27,2	61,5*	89,7*	29,0*
	7	74,4	99,8	26,2	71,9	98,4	27,4	68,2*	96,5*	29,3*
	10	81,9	107,4	26,3	79,4	106,1	27,5	75,3*	103,8*	29,4*
	13	89,8	115,5	26,4	87,2*	114,0*	27,6*	-	-	-
	16	98,3	124,0	26,5	95,5*	122,4*	27,7*	-	-	-
	18	104,2	130,0	26,6	101,3*	128,2*	27,7*	-	-	-
	23	119,9	145,7	26,6	-	-	-	-	-	-

(*) Only HT versions

Table "E": THHEY performance data in heating (ΔT = 5°C at the condenser; ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)											
		30			35			40			45		
		QF	QT	P	QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	-8	63,0*	81,4*	18,9*	59,7*	79,9*	20,9*	56,0*	78,5*	23,2*	-	-	-
	-6	67,8	86,2	19,0	64,2	84,6	21,0	60,4*	83,1*	23,4*	56,4*	81,7*	26,1*
	-3	75,6	94,2	19,2	71,7	92,3	21,2	67,6	90,5	23,6	63,0*	88,6*	26,4*
	1	86,9	105,9	19,6	82,6	103,5	21,5	77,8	101,0	23,9	72,9	98,8	26,6
	4	99,0	118,4	20,0	94,0	115,3	21,9	88,5	112,0	24,2	82,8	108,9	26,9
	7	109,1	128,8	20,3	103,6	125,1	22,2	97,9	121,7	24,5	91,6	118,0	27,2
	10	119,6	139,6	20,6	113,9	135,7	22,5	107,7	131,7	24,7	101,0	127,6	27,4
	13	131,1	151,4	20,9	124,9	146,9	22,8	118,1	142,4	25,0	110,8	137,7	27,7
	16	142,9	163,5	21,3	136,2	158,6	23,1	129,1	153,6	25,3	121,3	148,3	27,9
	18	151,1	172,0	21,5	144,3	166,9	23,3	136,6	161,3	25,5	128,8	156,0	28,1
	23	173,3	194,9	22,2	165,4	188,5	23,8	156,8	182,0	25,9	147,8	175,3	28,4
2115	-8	71,8*	92,8*	21,7*	68,6*	91,9*	24,0*	64,9*	90,8*	26,7*	-	-	-
	-6	77,3	98,4	21,8	73,7	97,1	24,1	69,9*	96,0*	26,9*	65,5*	94,5*	29,9*
	-3	86,1	107,4	22,0	82,3	105,9	24,4	77,9	104,2	27,1	73,3*	102,5*	30,2*
	1	98,8	120,6	22,4	94,4	118,4	24,7	89,6	116,3	27,4	84,4	114,0	30,5
	4	111,3	133,4	22,8	106,3	130,6	25,1	100,9	127,8	27,7	94,8	124,6	30,8
	7	122,7	145,1	23,1	117,2	141,8	25,4	111,2	138,3	28,0	104,8	134,9	31,1
	10	134,7	157,5	23,5	128,9	153,8	25,7	122,3	149,8	28,3	115,3	145,7	31,3
	13	147,7	170,8	23,9	141,2	166,4	26,0	134,1	161,9	28,6	126,5	157,2	31,6
	16	161,0	184,6	24,3	154,2	179,8	26,4	146,6	174,7	29,0	138,3	169,2	31,9
	18	170,3	194,1	24,5	163,0	188,9	26,7	155,1	183,4	29,2	146,5	177,6	32,1
	23	195,1	219,6	25,3	186,9	213,4	27,3	177,9	206,7	29,7	167,9	199,5	32,6
2130	-8	76,8*	100,7*	24,6*	73,6*	99,7*	27,0*	69,9*	99,0*	29,9*	-	-	-
	-6	82,9	106,9	24,7	79,4	105,7	27,2	75,4*	104,6*	30,1*	70,9*	103,5*	33,6*
	-3	92,8	117,0	25,0	88,9	115,5	27,5	84,3	113,8	30,4	79,6*	112,4*	33,9*
	1	106,8	131,5	25,4	102,5	129,6	27,9	97,5	127,4	30,8	92,0	125,2	34,3
	4	120,9	146,0	25,8	115,7	143,1	28,3	110,0	140,2	31,2	103,8	137,4	34,6
	7	133,6	159,0	26,2	128,1	155,8	28,6	121,6	152,2	31,5	115,0	148,9	34,9
	10	147,1	172,9	26,5	141,1	169,2	29,0	134,1	165,1	31,9	126,7	160,9	35,3
	13	161,6	187,7	26,9	154,7	183,2	29,4	147,4	178,8	32,3	139,5	174,1	35,7
	16	176,5	203,0	27,3	169,3	198,2	29,8	161,2	192,9	32,7	152,7	187,6	36,1
	18	186,9	213,6	27,6	179,6	208,7	30,1	170,9	202,9	33,0	161,8	197,1	36,3
	23	215,0	242,4	28,3	206,0	235,8	30,8	196,5	229,3	33,7	186,2	222,2	37,1
2145	-8	87,7*	114,4*	27,5*	83,5*	112,9*	30,3*	78,5*	111,1*	33,6*	-	-	-
	-6	94,4	121,3	27,7	89,9	119,4	30,5	84,6*	117,4*	33,8*	78,7*	115,2*	37,6*
	-3	105,5	132,6	28,0	100,2	130,0	30,8	94,4	127,5	34,0	88,0*	124,7*	37,8*
	1	121,5	149,2	28,5	115,6	145,9	31,2	108,8	142,3	34,5	101,6	138,7	38,2
	4	137,4	165,4	28,9	130,3	161,0	31,7	122,9	156,7	34,9	114,8	152,3	38,6
	7	151,8	180,2	29,3	144,1	175,1	32,0	136,0	170,2	35,3	127,0	164,8	38,9
	10	166,9	195,7	29,7	158,8	190,2	32,4	149,7	184,3	35,7	139,8	178,0	39,3
	13	183,1	212,3	30,1	173,9	205,8	32,9	164,4	199,4	36,1	153,7	192,3	39,8
	16	200,1	229,7	30,6	190,3	222,7	33,3	179,8	215,2	36,6	168,1	207,1	40,2
	18	212,2	242,1	30,9	201,7	234,3	33,7	190,6	226,4	36,9	178,2	217,5	40,5
	23	243,9	274,6	31,7	231,4	264,9	34,5	218,7	255,3	37,8	204,6	244,8	41,4
2165	-8	98,9*	129,8*	31,9*	93,9*	128,0*	35,2*	88,1*	126,0*	39,1*	-	-	-
	-6	106,5	137,7	32,1	101,0	135,3	35,4	95,2*	133,3*	39,3*	88,7*	131,1*	43,7*
	-3	119,1	150,6	32,4	113,0	147,7	35,7	106,4	144,8	39,6	99,3*	142,0*	44,0*
	1	137,8	169,8	33,0	130,5	165,6	36,2	123,0	161,8	40,0	115,0	158,1	44,4
	4	156,0	188,5	33,5	148,0	183,6	36,7	139,5	178,8	40,5	130,0	173,5	44,8
	7	172,6	205,5	33,9	163,9	199,9	37,1	154,1	193,8	40,9	143,9	187,8	45,3
	10	190,1	223,5	34,4	180,5	217,0	37,6	170,2	210,4	41,4	158,9	203,3	45,8
	13	208,7	242,6	34,9	198,3	235,3	38,2	186,8	227,5	42,0	175,0	219,9	46,3
	16	228,2	262,6	35,5	216,9	254,5	38,7	204,5	245,8	42,5	191,6	237,0	46,9
	18	242,0	276,8	35,9	229,8	267,8	39,2	217,3	258,9	43,0	203,1	249,0	47,3
	23	278,2	314,1	37,0	264,5	303,5	40,3	249,7	292,6	44,1	233,7	280,8	48,5
2185	-8	108,8*	143,8*	36,1*	103,3*	142,1*	40,0*	97,8*	140,9*	44,5*	-	-	-
	-6	117,5	152,7	36,3	111,8	150,7	40,2	105,5*	148,8*	44,6*	98,9*	147,1*	49,7*
	-3	131,5	167,2	36,8	125,0	164,3	40,5	118,2	161,8	44,9	110,8*	159,2*	50,0*
	1	152,0	188,2	37,3	144,6	184,4	41,0	136,9	180,9	45,4	128,3	177,2	50,4
	4	172,8	209,6	37,9	164,4	204,8	41,6	155,5	200,0	45,9	145,7	195,0	50,9
	7	191,3	228,6	38,5	181,8	222,7	42,1	171,8	216,9	46,4	161,3	211,1	51,4
	10	210,9	248,8	39,0	200,6	242,1	42,7	189,9	235,5	47,0	177,9	228,3	52,0
	13	231,5	269,9	39,7	220,7	262,7	43,3	208,7	254,9	47,7	195,9	247,0	52,6
	16	253,3	292,4	40,3	241,3	284,0	44,0	228,8	275,7	48,4	214,8	266,5	53,4
	18	268,2	307,8	40,8	256,0	299,2	44,5	242,6	290,1	48,9	228,1	280,4	53,9
	23	308,6	349,5	42,1	294,5	339,0	45,9	279,2	328,0	50,3	262,8	316,5	55,4

Model	Tue (°C)	Tuc (°C)								
		50			52			55		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	67,4	96,3	29,8	65,2*	95,4*	31,1*	-	-	-
	4	71,6	100,6	29,9	68,9	99,2	31,2	64,8*	97,2*	33,4*
	7	85,1	114,4	30,2	76,9	107,4	31,5	72,4*	105,0*	33,6*
	10	93,9	123,5	30,5	91,0	121,8	31,8	80,7*	113,6*	33,8*
	13	103,3	133,1	30,7	100,0*	131,1*	32,0*	-	-	-
	16	113,1	143,1	30,9	109,8*	141,1*	32,3*	-	-	-
	18	120,0	150,1	31,1	116,5*	147,9*	32,4*	-	-	-
	23	138,1	168,6	31,4	-	-	-	-	-	-
2115	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	78,5	111,5	34,0	76,0*	110,4*	35,5*	-	-	-
	4	88,3	121,5	34,3	85,6	120,3	35,8	81,1*	118,1*	38,1*
	7	97,6	131,1	34,5	94,7	129,6	36,0	89,9*	127,1*	38,4*
	10	107,4	141,1	34,8	104,2	139,4	36,2	99,0*	136,5*	38,6*
	13	117,9	151,9	35,0	114,5*	149,9*	36,5*	-	-	-
	16	129,1	163,4	35,3	125,2*	160,9*	36,7*	-	-	-
	18	136,8	171,2	35,5	132,9*	168,7*	36,9*	-	-	-
	23	157,1	191,9	35,9	-	-	-	-	-	-
2130	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	86,0	123,0	38,2	83,4*	122,0*	39,9*	-	-	-
	4	97,2	134,5	38,5	94,4	133,3	40,1	89,9*	131,4*	42,8*
	7	107,7	145,3	38,8	104,6	143,8	40,4	99,9*	141,7*	43,1*
	10	118,9	156,8	39,1	115,6	155,1	40,8	110,4*	152,5*	43,4*
	13	130,7	169,0	39,5	127,1*	167,0*	41,1*	-	-	-
	16	143,3	181,9	39,9	139,2*	179,4*	41,5*	-	-	-
	18	151,8	190,8	40,1	147,7*	188,2*	41,8*	-	-	-
	23	175,0	214,6	40,9	-	-	-	-	-	-
2145	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	94,0	135,2	42,4	90,7*	133,7*	44,3*	-	-	-
	4	106,1	147,6	42,8	102,6	145,8	44,5	96,8*	142,8*	47,4*
	7	117,7	159,5	43,1	113,6	157,2	44,9	107,6*	153,8*	47,7*
	10	129,8	172,0	43,5	125,5	169,3	45,2	118,6*	165,1*	48,0*
	13	142,5	185,1	43,9	137,8*	182,1*	45,6*	-	-	-
	16	156,1	199,1	44,3	150,8*	195,5*	46,1*	-	-	-
	18	165,3	208,6	44,6	159,9*	204,9*	46,4*	-	-	-
	23	189,8	234,0	45,5	-	-	-	-	-	-
2165	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	106,3	154,2	49,4	102,5*	152,5*	51,5*	-	-	-
	4	120,1	168,3	49,8	116,0	166,3	51,9	109,4*	163,0*	55,3*
	7	133,2	181,9	50,2	128,6	179,3	52,3	121,6*	175,5*	55,6*
	10	147,2	196,4	50,6	142,2	193,4	52,8	134,3*	188,7*	56,1*
	13	161,9	211,6	51,2	156,5*	208,2*	53,3*	-	-	-
	16	177,6	227,8	51,8	171,8*	224,1*	53,9*	-	-	-
	18	188,0	238,7	52,2	182,2*	234,9*	54,3*	-	-	-
	23	216,9	268,7	53,4	-	-	-	-	-	-
2185	-8	-	-	-	-	-	-	-	-	-
	-6	-	-	-	-	-	-	-	-	-
	-3	-	-	-	-	-	-	-	-	-
	1	119,2	173,5	56,0	115,2*	171,9*	58,5*	-	-	-
	4	135,0	189,8	56,5	130,7	187,9	58,9	123,8*	184,6*	62,7*
	7	149,6	204,9	57,0	145,0	202,7	59,4	137,4*	198,7*	63,2*
	10	165,5	221,3	57,6	160,2	218,4	60,0	151,9*	213,8*	63,8*
	13	182,0	238,5	58,2	176,4*	235,2*	60,7*	-	-	-
	16	199,7	256,9	59,0	193,6*	253,2*	61,4*	-	-	-
	18	212,2	269,9	59,5	205,8*	265,8*	61,9*	-	-	-
	23	244,6	303,8	61,0	-	-	-	-	-	-

Tue = Evaporator water output temperature (ΔT input/output = 5 °C).
Tuc = Condenser water output temperature (ΔT input/output = 5 °C).
QF = Cooling capacity (evaporator fouling factor of 035 X 10^{-4} m²C/W).
QT = Heating capacity (evaporator fouling factor of 035 X 10^{-4} m²C/W).
P = Absorbed electric power (without pumps absorption).
Nota bene:
With evaporator outlet water temperature (**Tue**) between -8 and 3°C the calculation was made considering a 6% water and glycol solution 30%.

Nominal conditions of summer operation
Evaporator inlet/outlet water 12°C/7°C, condenser inlet/outlet water 30°C/35°C.

Nominal conditions of winter operation
Condenser inlet/outlet water 40°C/45°C, evaporator inlet water 10°C, water flow rate as for summer operation.

Table "F": corrective coefficients ΔT of water at condenser
For ΔT of the water at the condenser different from 5°C (ΔT minimum 5°C and ΔT maximum 15°C), with the same outlet water temperature (respectively 30°C, 35°C, 40°C, 45°C, 50°C, 52°C and 55°C), apply the following corrective coefficients to the data in table "**E**".

Table "F"

ΔT	kct QF	kct P
5°C	1,000	1,000
10°C	1,016	0,969
15°C	1,030	0,940

ATTENTION!
For water at the inlet to the condenser at less than 25°C and ΔT less than 12°C, it is advisable to install the pressure valve accessory (KV2).

Table "G": corrective coefficients ΔT of water at evaporator
For temperature differentials ΔT of the water at the evaporator different from 5°C, with the same outlet water temperature (respectively from -8 to 23 °C), apply the following corrective coefficients to the data in table "**E**".

Table "G"

ΔT	kct QF	kct P
3°C	0,97	0,99
5°C	1,00	1,00
8°C	1,01	1,01

QT = **QF** + (**P** x 0.97)

ATTENTION!
The temperature differential ΔT of the inlet and outlet water temperature at the evaporator should be between 3°C and 8°C.

Table "H": TCHEY-THHEY performance data in the summer cycle
(condensation with city water with ΔT = 12°C at the condenser and with ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)								
		24 (*)			27			30		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
245	4	45,5	52,9	7,5	44,4	52,1	7,9	43,3	51,5	8,4
	5	47,0	54,4	7,6	46,0	53,7	8,0	44,8	53,0	8,5
	7	50,2	57,6	7,7	49,0	56,8	8,1	47,8	56,1	8,5
	10	55,1	62,7	7,8	53,9	61,9	8,2	52,7	61,1	8,7
	13	60,3	68,1	8,0	59,1	67,2	8,4	57,7	66,3	8,8
	16	65,7	73,6	8,2	64,4	72,7	8,6	63,0	71,8	9,0
	18	69,6	77,7	8,4	68,2	76,6	8,7	66,7	75,6	9,1
	23	79,6	88,1	8,7	78,1	86,8	9,0	76,6	85,7	9,4
250	4	53,8	62,3	8,8	52,5	61,5	9,2	51,2	60,6	9,8
	5	55,7	64,2	8,8	54,3	63,3	9,3	52,9	62,4	9,8
	7	59,4	68,0	8,9	58,0	67,1	9,3	56,6	66,1	9,9
	10	65,5	74,2	9,0	63,9	73,0	9,4	62,2	71,9	10,0
	13	71,9	80,7	9,1	70,1	79,4	9,6	68,3	78,1	10,1
	16	78,6	87,5	9,2	76,7	86,1	9,7	74,6	84,6	10,2
	18	83,4	92,4	9,3	81,2	90,7	9,8	79,0	89,1	10,4
	23	95,8	105,1	9,7	93,2	103,0	10,1	90,6	100,9	10,6
260	4	61,1	70,8	10,0	59,6	69,9	10,5	58,2	69,0	11,2
	5	63,1	72,9	10,1	61,6	71,9	10,6	60,1	71,0	11,2
	7	67,1	77,0	10,2	65,8	76,2	10,7	64,1	75,2	11,4
	10	73,6	83,7	10,4	72,2	82,8	10,9	70,5	81,7	11,6
	13	80,3	90,6	10,6	79,0	89,8	11,1	77,3	88,7	11,8
	16	87,7	98,2	10,9	86,0	97,1	11,4	84,3	95,9	12,0
	18	92,6	103,4	11,1	91,1	102,3	11,6	89,4	101,1	12,2
	23	106,0	117,2	11,6	104,2	115,9	12,0	102,3	114,5	12,6
270	4	69,8	81,1	11,7	68,3	80,1	12,2	66,5	79,1	12,9
	5	72,0	83,4	11,7	70,4	82,3	12,3	68,7	81,3	13,0
	7	76,5	88,0	11,8	74,9	87,0	12,4	73,2	85,9	13,1
	10	83,6	95,3	12,1	82,0	94,2	12,6	80,2	93,1	13,3
	13	91,0	103,0	12,3	89,5	102,0	12,9	87,7	100,8	13,5
	16	98,8	111,1	12,6	97,3	110,1	13,2	95,5	108,9	13,7
	18	104,4	116,8	12,9	102,9	115,8	13,3	100,9	114,4	13,9
	23	118,9	132,0	13,5	117,1	130,5	13,8	115,2	129,1	14,3
275	4	76,0	88,3	12,7	74,3	87,3	13,3	72,7	86,3	14,1
	5	78,6	91,0	12,8	76,9	89,9	13,4	75,0	88,8	14,2
	7	83,8	96,4	13,0	82,0	95,3	13,6	80,1	94,0	14,4
	10	91,9	104,9	13,4	90,0	103,6	14,0	88,2	102,4	14,7
	13	100,7	114,1	13,8	98,8	112,7	14,4	96,6	111,2	15,0
	16	109,9	123,8	14,3	107,9	122,2	14,8	105,6	120,5	15,4
	18	116,5	130,6	14,6	114,1	128,7	15,1	111,9	127,1	15,7
	23	133,5	148,5	15,5	130,9	146,3	15,8	128,3	144,2	16,4
290	4	89,9	104,3	14,8	88,1	103,2	15,6	86,1	102,1	16,4
	5	92,9	107,4	14,9	91,0	106,3	15,7	89,0	105,1	16,6
	7	99,1	113,9	15,3	97,0	112,5	16,0	94,9	111,2	16,8
	10	108,9	124,2	15,8	106,7	122,6	16,4	104,5	121,2	17,2
	13	119,3	135,1	16,4	116,7	133,2	16,9	114,4	131,5	17,6
	16	130,1	146,5	17,0	127,7	144,6	17,5	125,0	142,5	18,1
	18	137,9	154,8	17,4	135,1	152,5	17,8	132,4	150,2	18,4
	23	158,1	176,1	18,6	155,1	173,4	18,9	151,8	170,5	19,3

Table "H": TCHEY-THHEY performance data in the summer cycle (condensation with city water with ΔT = 12°C at the condenser and with ΔT = 5°C at the evaporator)

Model	Tue (°C)	Tuc (°C)								
		24 (*)			27			30		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	4	103,7	120,9	17,7	101,2	119,1	18,5	98,7	117,5	19,4
	5	107,2	124,5	17,8	104,6	122,7	18,6	102,0	121,0	19,5
	7	114,6	132,2	18,1	111,9	130,2	18,9	109,0	128,2	19,8
	10	126,2	144,2	18,5	123,2	141,9	19,3	120,1	139,7	20,2
	13	138,3	156,8	19,0	135,2	154,3	19,7	132,0	151,9	20,6
	16	151,5	170,5	19,5	147,9	167,5	20,2	144,6	164,9	21,0
	18	160,6	179,9	19,9	156,9	176,8	20,5	153,4	174,1	21,3
	23	184,6	204,8	20,8	180,6	201,3	21,4	176,5	197,9	22,1
2115	4	118,2	137,7	20,1	115,4	135,9	21,1	112,4	134,0	22,3
	5	122,4	142,1	20,3	119,4	140,0	21,2	116,2	137,9	22,4
	7	130,7	150,6	20,5	127,4	148,2	21,5	124,2	146,2	22,6
	10	143,8	164,2	21,0	140,5	161,8	22,0	136,8	159,1	23,0
	13	157,7	178,5	21,5	154,0	175,7	22,4	150,1	172,9	23,5
	16	172,6	194,0	22,0	168,5	190,7	22,9	164,2	187,4	23,9
	18	182,9	204,6	22,4	178,4	201,0	23,2	174,0	197,5	24,3
	23	210,1	232,7	23,3	205,3	228,7	24,1	200,2	224,5	25,1
2130	4	133,1	155,5	23,0	129,4	152,8	24,1	125,7	150,2	25,3
	5	137,7	160,1	23,1	133,9	157,4	24,2	130,1	154,7	25,4
	7	147,4	170,0	23,4	143,4	167,1	24,4	139,2	164,1	25,7
	10	162,5	185,6	23,7	158,1	182,2	24,8	153,7	179,0	26,0
	13	178,5	201,9	24,1	173,8	198,3	25,2	168,9	194,5	26,5
	16	195,5	219,3	24,5	190,6	215,4	25,6	185,3	211,4	26,9
	18	207,4	231,5	24,8	202,0	227,2	25,9	196,6	223,0	27,2
	23	239,1	263,9	25,5	232,9	258,8	26,7	226,7	253,8	27,9
2145	4	147,3	171,8	25,3	143,5	169,2	26,5	139,6	166,7	27,9
	5	152,5	177,1	25,4	148,6	174,4	26,6	144,4	171,6	28,0
	7	163,2	188,1	25,6	159,0	185,0	26,8	154,6	182,0	28,2
	10	180,1	205,2	25,9	175,6	201,9	27,1	170,7	198,4	28,5
	13	198,1	223,6	26,3	193,0	219,7	27,5	187,9	215,9	28,9
	16	217,4	243,2	26,6	212,0	239,0	27,8	206,3	234,6	29,2
	18	230,8	256,8	26,8	225,2	252,5	28,1	219,0	247,6	29,5
	23	266,4	293,1	27,5	259,9	287,8	28,8	253,1	282,4	30,2
2165	4	167,7	196,3	29,4	163,2	193,1	30,8	158,7	190,2	32,4
	5	173,6	202,3	29,5	169,0	199,0	30,9	164,2	195,7	32,5
	7	185,9	214,7	29,8	181,1	211,3	31,2	175,7	207,5	32,8
	10	205,1	234,3	30,1	199,7	230,3	31,5	194,3	226,5	33,2
	13	225,6	255,2	30,5	219,9	250,9	31,9	213,9	246,5	33,6
	16	247,6	277,6	30,9	241,5	272,9	32,4	234,8	267,8	34,0
	18	262,9	293,2	31,2	256,3	288,0	32,7	249,3	282,6	34,3
	23	303,6	334,6	32,0	296,0	328,4	33,5	288,4	322,4	35,1
2185	4	187,4	219,6	33,2	182,5	216,2	34,8	177,0	212,6	36,6
	5	194,0	226,3	33,3	188,7	222,6	34,9	183,6	219,3	36,8
	7	207,5	240,2	33,7	202,0	236,2	35,3	196,2	232,2	37,1
	10	229,0	262,2	34,1	223,2	257,9	35,7	216,8	253,2	37,6
	13	251,8	285,4	34,7	245,3	280,5	36,3	238,8	275,7	38,1
	16	276,1	310,3	35,2	269,2	304,9	36,8	261,7	299,2	38,7
	18	293,1	327,6	35,6	285,6	321,7	37,2	277,8	315,7	39,1
	23	338,3	373,8	36,6	329,7	366,8	38,3	321,1	360,0	40,2

Tue = Evaporator water output temperature (ΔT input/output = 5 °C).
Tuc = Condenser water output temperature (ΔT input/output = 12 □).
QF = Cooling capacity (evaporator fouling factor of 035 X 10^{-4} m²°C/W).
QT = Heating capacity (evaporator fouling factor of 035 X 10^{-4} m²°C/W).
P = Absorbed electric power (without pumps).

Table "I": corrective coefficients ΔT of city water at condenser
For ΔT of city water other than 12°C, with the same inlet water temperature (respectively 12°C, 15°C and 18°C), apply the following corrective coefficients to the data in table "**H**".

Table "I"

ΔT	kct QF	kct P
12°C	1,000	1,000
15°C	0,980	1,040
18°C	0,975	1,050

ATTENTION!
It's possible to use city water at the condenser with inlet temperature between 12°C and 18°C and with ΔT minimum 12°C and ΔT maximum 18°C.
When the water at the inlet to the condenser is less than 15°C, it is advisable to install the valve accessory (KV2).

(*) Provide for installation of the KV2 valve.

Table "H": THHEY performance data in the summer cycle
(condensation with city water with ΔT = 12°C at the condenser and with ΔT = 5°C at the evaporator)

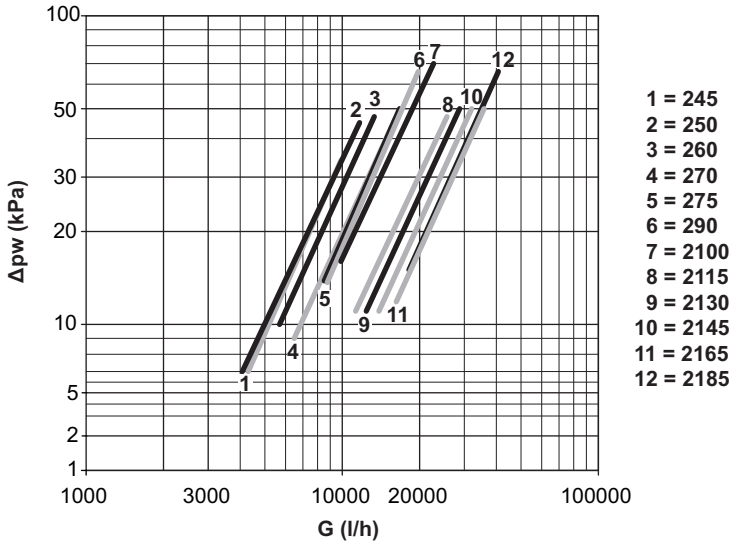
Model	Tue (°C)	Tuc (°C)								
		24 (*)			27			30		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
245	4	41,7	48,9	7,4	40,7	48,3	7,8	39,7	47,7	8,2
	5	43,1	50,3	7,4	42,1	49,7	7,8	41,0	49,1	8,3
	7	46,0	53,3	7,5	44,9	52,6	7,9	43,8	51,9	8,4
	10	50,4	57,9	7,7	49,3	57,2	8,0	48,2	56,4	8,5
	13	55,1	62,8	7,8	54,0	62,0	8,2	52,8	61,2	8,6
	16	60,0	67,8	8,0	58,8	66,9	8,4	57,6	66,1	8,8
	18	63,5	71,5	8,2	62,3	70,5	8,5	61,0	69,6	8,9
	20	67,0	75,1	8,3	65,8	74,2	8,6	64,4	73,2	9,0
250	4	49,1	57,5	8,6	48,0	56,8	9,1	46,7	56,0	9,6
	5	50,9	59,3	8,6	49,6	58,4	9,1	48,4	57,7	9,6
	7	54,3	62,7	8,7	53,0	61,9	9,1	51,7	61,1	9,7
	10	59,8	68,4	8,8	58,4	67,4	9,2	56,8	66,3	9,8
	13	65,7	74,3	8,9	64,1	73,1	9,4	62,4	72,0	9,9
	16	71,8	80,6	9,0	70,1	79,3	9,5	68,2	77,9	10,0
	18	76,2	85,1	9,1	74,2	83,5	9,6	72,2	82,1	10,1
	20	80,6	89,5	9,3	78,5	87,9	9,7	76,5	86,4	10,2
260	4	55,8	65,3	9,7	54,5	64,4	10,2	53,2	63,7	10,8
	5	57,7	67,2	9,8	56,3	66,3	10,3	55,0	65,5	10,9
	7	61,4	71,0	9,9	60,1	70,2	10,4	58,6	69,3	11,0
	10	67,3	77,1	10,1	66,0	76,2	10,6	64,5	75,3	11,2
	13	73,4	83,4	10,3	72,2	82,7	10,8	70,6	81,7	11,4
	16	80,1	90,4	10,5	78,7	89,4	11,0	77,1	88,4	11,6
	18	84,7	95,1	10,7	83,2	94,1	11,2	81,7	93,1	11,8
	20	89,4	100,0	10,9	88,0	99,0	11,4	86,2	97,8	11,9
270	4	63,7	74,8	11,4	62,3	74,0	12,0	60,8	73,0	12,7
	5	65,8	76,9	11,5	64,3	76,0	12,1	62,8	75,1	12,7
	7	69,9	81,1	11,6	68,4	80,2	12,2	66,8	79,3	12,8
	10	76,3	87,8	11,8	74,9	86,9	12,4	73,2	85,9	13,0
	13	83,2	94,9	12,1	81,7	94,0	12,6	80,1	93,0	13,2
	16	90,3	102,3	12,4	88,9	101,4	12,9	87,3	100,4	13,5
	18	95,4	107,6	12,6	94,0	106,7	13,1	92,3	105,5	13,6
	20	100,6	113,1	12,8	99,0	111,9	13,2	97,4	110,7	13,8
275	4	69,5	81,5	12,4	68,0	80,6	13,1	66,5	79,8	13,8
	5	71,9	84,0	12,5	70,3	83,1	13,1	68,6	82,1	13,9
	7	76,6	89,0	12,7	75,0	88,0	13,4	73,2	86,9	14,1
	10	84,0	96,7	13,1	82,3	95,6	13,7	80,6	94,6	14,4
	13	92,1	105,2	13,5	90,3	103,9	14,1	88,3	102,6	14,7
	16	100,5	114,0	14,0	98,6	112,6	14,5	96,5	111,1	15,1
	18	106,4	120,2	14,3	104,2	118,5	14,8	102,3	117,1	15,3
	20	112,3	126,5	14,6	110,3	124,9	15,1	108,1	123,2	15,6
290	4	82,1	96,5	14,8	80,5	95,6	15,6	78,7	94,6	16,4
	5	84,8	99,3	14,9	83,1	98,4	15,7	81,3	97,3	16,6
	7	90,5	105,3	15,3	88,6	104,1	16,0	86,7	103,0	16,8
	10	99,5	114,8	15,8	97,5	113,4	16,4	95,4	112,1	17,2
	13	109,0	124,9	16,4	106,7	123,1	16,9	104,5	121,7	17,6
	16	118,9	135,4	17,0	116,7	133,6	17,5	114,2	131,8	18,1
	18	126,1	142,9	17,4	123,5	140,8	17,8	121,0	138,9	18,4
	20	133,3	150,6	17,8	130,6	148,3	18,2	128,0	146,2	18,8

Table "H": THHEY performance data in the summer cycle
(condensation with city water with ΔT = 12°C at the condenser and with ΔT = 5°C at the evaporator)

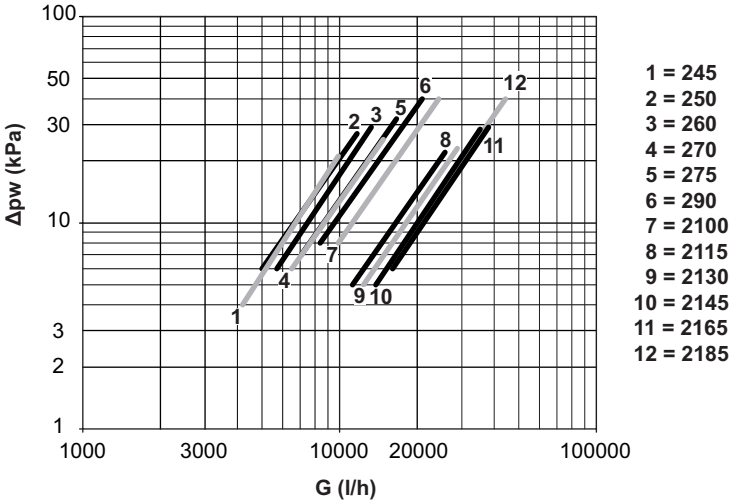
Model	Tue (°C)	Tuc (°C)								
		24 (*)			27			30		
		QF	QT	P	QF	QT	P	QF	QT	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW
2100	4	96,8	113,8	17,5	94,4	112,2	18,3	92,0	110,7	19,2
	5	100,0	117,1	17,7	97,6	115,5	18,4	95,2	114,0	19,3
	7	106,9	124,3	17,9	104,4	122,6	18,7	101,7	120,7	19,6
	10	117,8	135,6	18,4	114,9	133,5	19,1	112,1	131,5	20,0
	13	129,1	147,4	18,8	126,1	145,1	19,5	123,1	142,9	20,4
	16	141,4	160,1	19,3	138,0	157,4	20,0	134,9	155,1	20,8
	18	149,9	169,0	19,7	146,4	166,1	20,3	143,1	163,6	21,1
	20	158,7	178,1	20,0	155,1	175,1	20,6	151,5	172,2	21,4
2115	4	110,4	129,7	19,9	107,8	128,0	20,9	105,0	126,3	22,0
	5	114,3	133,7	20,0	111,5	131,9	21,0	108,4	129,9	22,1
	7	122,0	141,7	20,3	118,9	139,6	21,3	116,0	137,7	22,4
	10	134,2	154,4	20,8	131,1	152,2	21,7	127,7	149,8	22,8
	13	147,1	167,8	21,3	143,7	165,2	22,2	140,1	162,6	23,2
	16	161,1	182,2	21,8	157,3	179,3	22,7	153,2	176,2	23,7
	18	170,7	192,1	22,1	166,5	188,8	23,0	162,3	185,6	24,0
	20	180,6	202,5	22,5	176,3	199,0	23,4	171,8	195,4	24,3
2130	4	123,1	144,9	22,5	119,6	142,5	23,6	116,2	140,2	24,7
	5	127,3	149,3	22,7	123,8	146,7	23,7	120,2	144,4	24,9
	7	136,2	158,4	22,9	132,6	155,8	23,9	128,7	153,0	25,1
	10	150,3	172,8	23,2	146,2	169,7	24,3	142,1	166,8	25,5
	13	165,0	187,9	23,6	160,7	184,6	24,7	156,1	181,2	25,9
	16	180,7	204,0	24,0	176,2	200,5	25,1	171,3	196,9	26,3
	18	191,7	215,3	24,3	186,8	211,4	25,4	181,8	207,6	26,6
	20	203,0	226,8	24,6	198,1	222,9	25,7	192,6	218,7	26,9
2145	4	136,2	160,6	25,1	132,7	158,2	26,3	129,2	156,0	27,7
	5	141,1	165,5	25,2	137,5	163,1	26,4	133,6	160,6	27,8
	7	151,0	175,7	25,4	147,1	172,9	26,6	143,1	170,2	28,0
	10	166,6	191,6	25,7	162,4	188,6	26,9	158,0	185,4	28,3
	13	183,3	208,6	26,1	178,6	205,1	27,3	173,9	201,7	28,7
	16	201,2	226,8	26,4	196,2	223,0	27,6	190,9	219,0	29,0
	18	213,6	239,4	26,6	208,4	235,5	27,9	202,6	231,0	29,3
	20	226,6	252,6	26,9	220,9	248,2	28,1	214,9	243,5	29,6
2165	4	153,3	182,5	30,1	149,2	179,8	31,5	145,1	177,2	33,2
	5	159,2	188,4	30,1	155,0	185,6	31,6	150,5	182,8	33,2
	7	171,5	200,8	30,2	167,1	197,8	31,7	162,2	194,5	33,3
	10	191,0	220,4	30,4	186,0	216,8	31,8	180,9	213,4	33,4
	13	212,0	241,6	30,6	206,6	237,7	32,0	201,0	233,6	33,6
	16	234,7	264,5	30,8	229,0	260,2	32,2	222,6	255,4	33,8
	18	250,7	280,7	30,9	244,4	275,7	32,3	237,8	270,7	33,9
	20	267,2	297,3	31,0	260,6	292,1	32,4	253,7	286,7	34,1
2185	4	171,4	204,3	33,9	166,9	201,4	35,6	161,9	198,3	37,5
	5	177,9	210,9	34,0	173,1	207,7	35,6	168,5	204,9	37,5
	7	191,5	224,7	34,2	186,4	221,2	35,8	181,1	217,6	37,7
	10	213,3	246,7	34,4	207,8	242,8	36,0	201,9	238,6	37,9
	13	236,6	270,2	34,7	230,5	265,7	36,3	224,3	261,3	38,1
	16	261,7	295,6	35,0	255,1	290,6	36,6	248,0	285,3	38,4
	18	279,4	313,5	35,2	272,2	307,9	36,8	264,7	302,2	38,7
	20	297,9	332,3	35,4	290,1	326,1	37,0	282,3	320,0	38,9

Pressure drops and residual static pressure

Graph "1": pressure drops exchangers TCHEY-THHEY 245÷2185 LT



Graph "1": pressure drops exchangers TCHEY-THHEY 245÷2185 HT



Calculation of Pressure Drops

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

○ G = (Q x 0.86): 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;

○ Pressure drops can be obtained from the graph alongside, or calculated using the following formulae:

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

- Where:

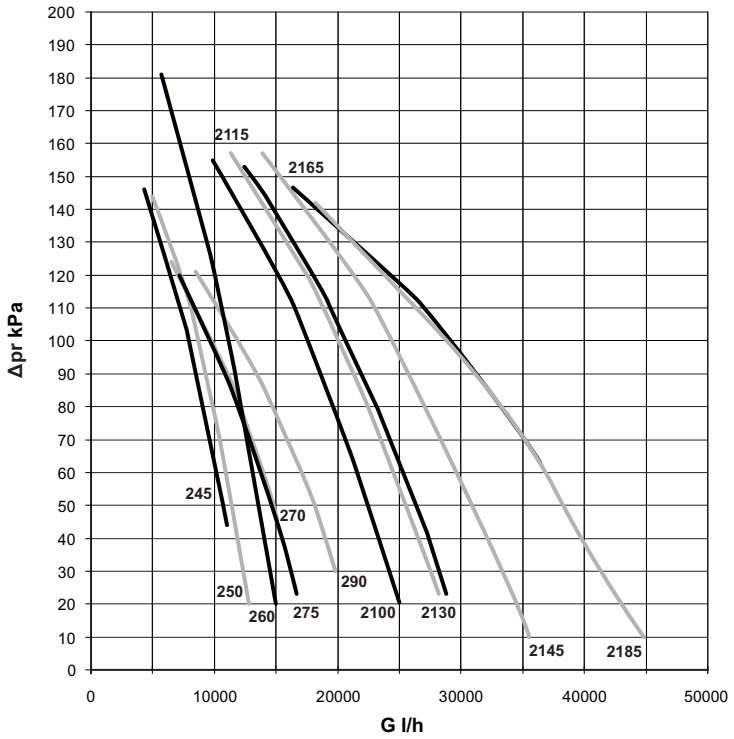
Δpw_{nom} (kPa) = nominal pressure drop at the exchanger in question (table on *Technical data*):
G (l/h) = water flow rate at the exchanger in question;
G_{nom} (l/h) = nominal water flow rate at the exchanger in question (table on *Technical data*).

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

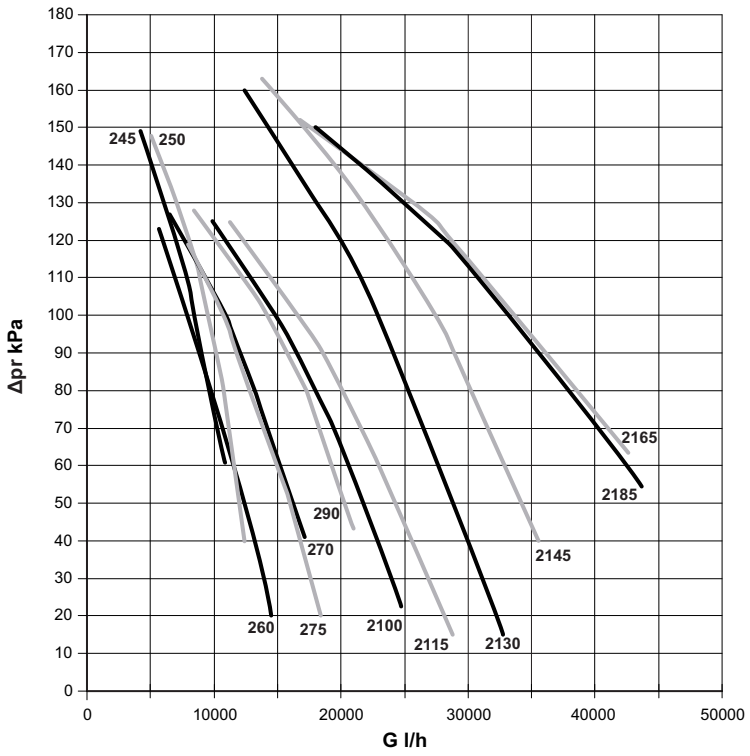
Calculation of residual static pressure
The residual static pressure values can be obtained from graph "**2**" based on measured flow rates.

G = Water flow rate
Δpw = Pressure drops
Δpr = Residual static pressure

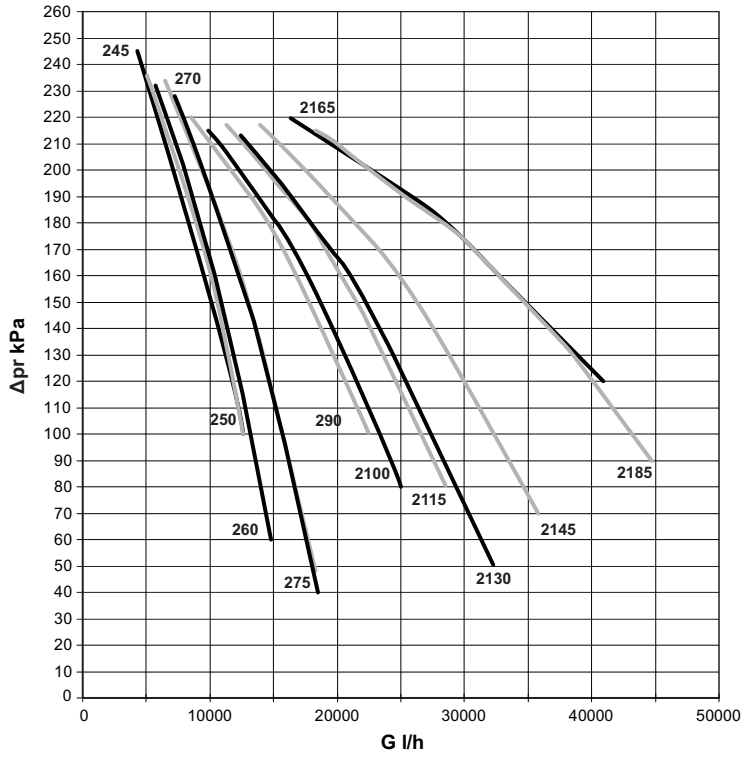
Graph "2": residual static pressure P1 DP1 TCHEBY-THHEBY 245÷2185 LT



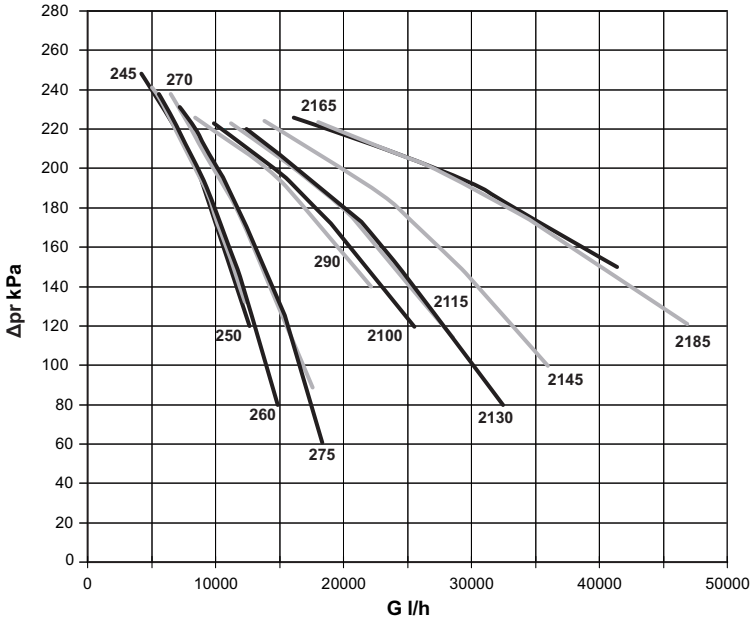
Graph "2": residual static pressure P1 DP1 TCHEBY-THHEBY 245÷2185 HT



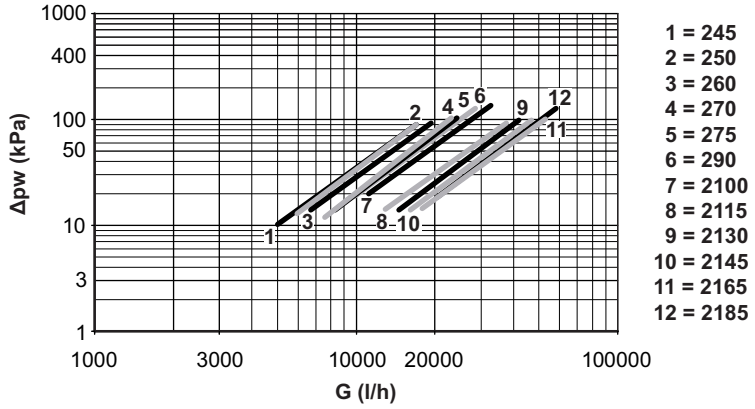
Graph "3": residual static pressure P2 DP2 TCHEBY-THHEBY 245÷2185 LT



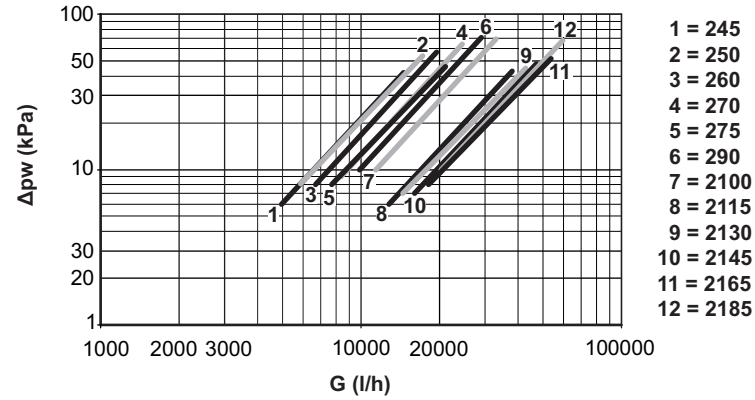
Graph "3": residual static pressure P2 DP2 TCHEBY-THHEBY 245÷2185 HT



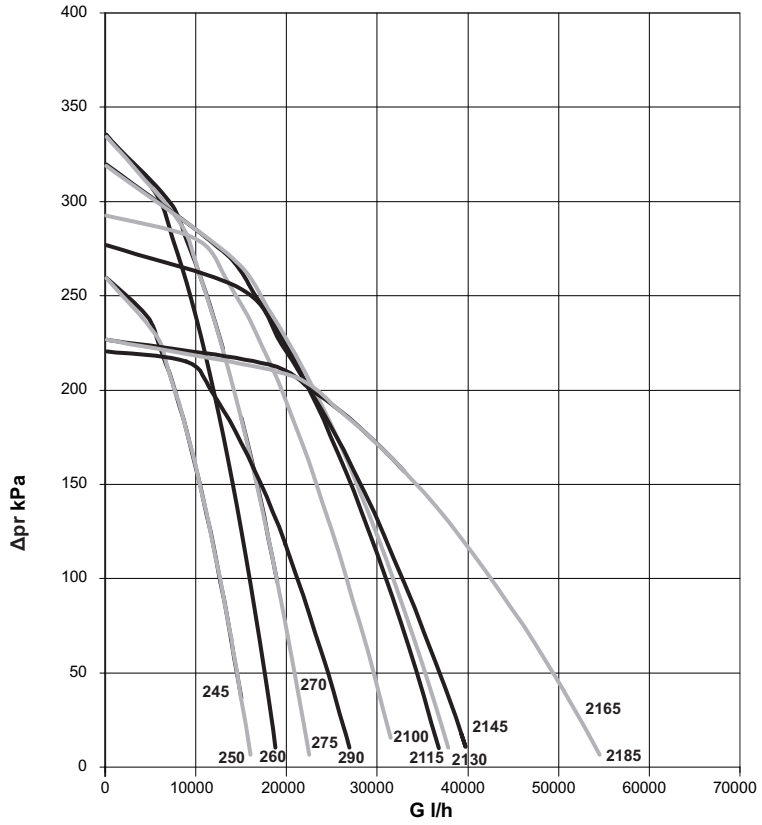
Graph "4": pressure drops exchangers TCHEY-THHEY 245÷2185 LT with 30% glycol



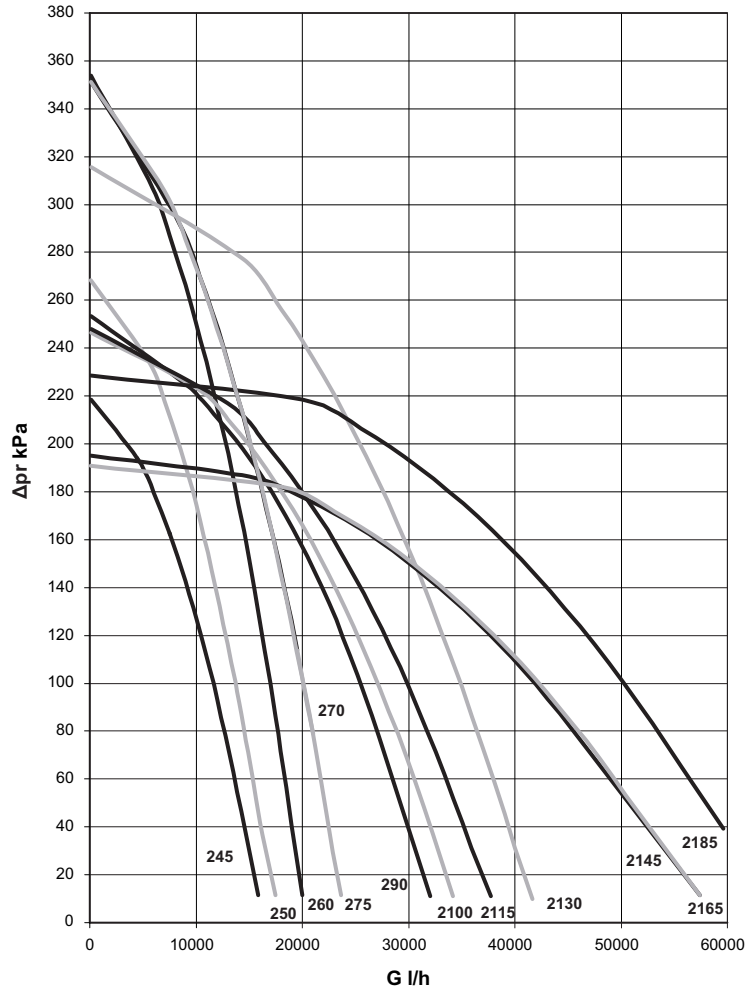
Graph "4": pressure drops exchangers TCHEY-THHEY 245÷2185 HT with 30% glycol



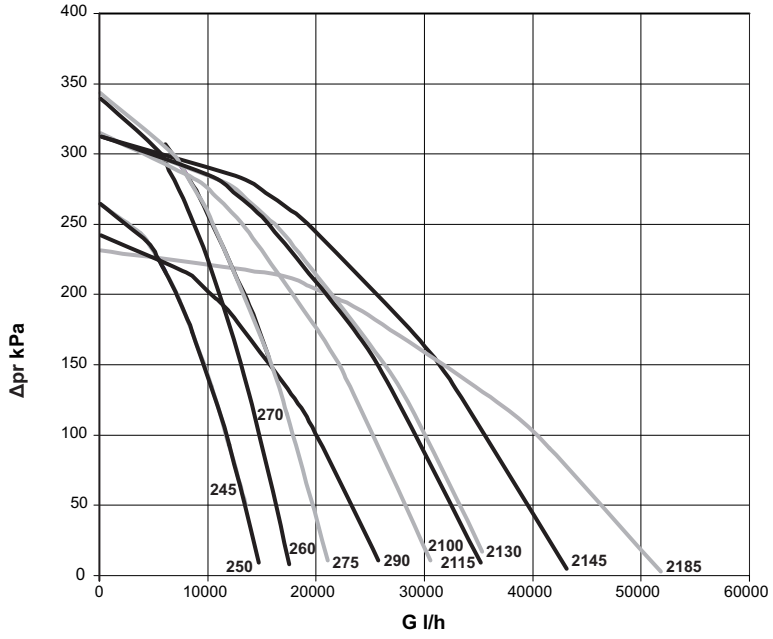
Graph "5": residual static pressure PS1 DPS1 at maximum speed TCHEBY-THHEBY 245÷2185 LT



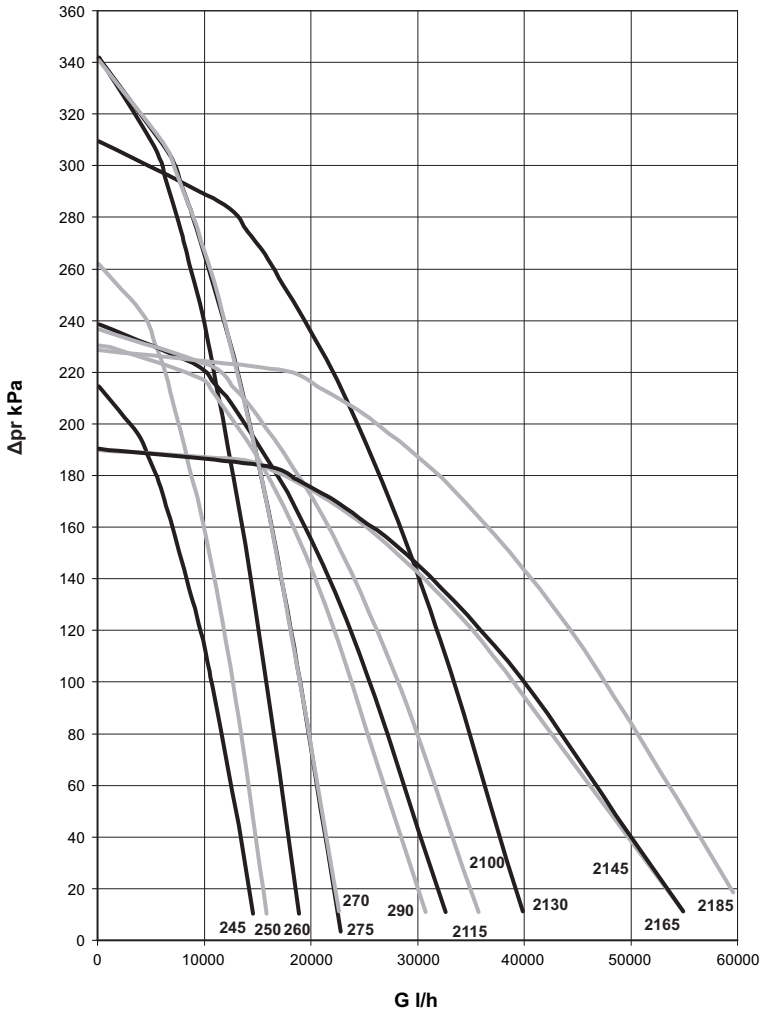
Graph "5": residual static pressure PS1 DPS1 at maximum speed TCHEBY-THHEBY 245÷2185 HT



Graph "X": residual static pressure PS1 DPS1 at maximum speed TCHEBY-THHEBY 245÷2185 LT with 30% glycol



Graph "X": residual static pressure PS1 DPS1 at maximum speed TCHEBY-THHEBY 245÷2185 HT with 30% glycol



Sound power level

Table "L": Levels sound power in dB by octave band and total sound power level in dB(A), standard models.

Model	245	250	260	270	275	290
125 Hz	54,6	54,6	55,2	55,2	55,8	56,3
250 Hz	67,1	67,1	68,0	68,0	68,9	69,7
500 Hz	63,0	63,0	63,9	63,9	64,7	66,4
1000 Hz	62,5	62,7	63,5	63,7	64,6	65,8
2000 Hz	59,8	60,0	60,3	60,5	61,0	61,8
4000 Hz	43,5	43,5	44,2	44,2	44,9	45,5
8000 Hz	36,3	36,3	36,8	36,8	37,4	37,9
Lw(*)	67	67	68	68	69	70
Lp (**)	39	39	40	40	41	42
Lw(*) SIL	63	63	64	64	65	66

Model	2100	2115	2130	2145	2165	2185
125 Hz	56,9	58,1	59,2	59,2	59,2	59,2
250 Hz	71,0	72,4	74,1	74,1	74,1	74,1
500 Hz	67,4	68,3	70,1	70,8	70,8	71,0
1000 Hz	66,4	67,3	69,2	70,1	70,1	70,5
2000 Hz	62,9	63,8	65,6	65,6	65,6	67,5
4000 Hz	46,9	47,5	48,9	48,9	48,9	48,9
8000 Hz	39,0	39,5	40,5	40,5	40,5	40,5
Lw(*)	71	72	73	74	74	75
Lp (**)	43	44	45	46	46	47
Lw(*) SIL	67	68	69	70	70	71

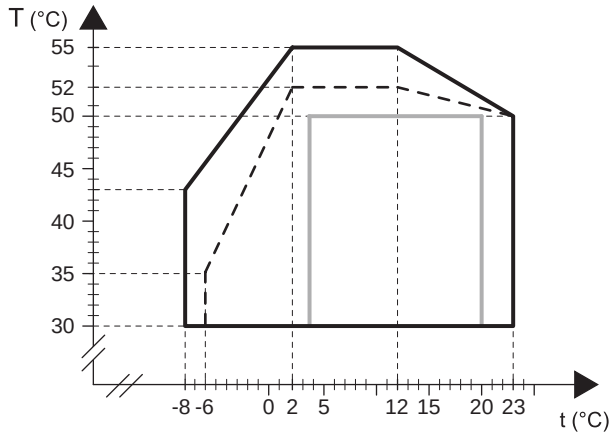
Lw = Total sound power level in dB(A).
Lp = Sound pressure level in dB(A).

(*) Sound power level emitted in nominal summer operating conditions: evaporator inlet/outlet water 12°C/7°C, condenser inlet/outlet water temperature 30°C/35°C.

(**) The sound pressure level refers to measurement in free field at a distance of 10 m from the unit, with a directionality factor Q=2.

Functioning limits

TCHEY-THHEY 245÷2185



T (°C) = Condenser outlet water temperature/recovery
t (°C) = Evaporator outlet temperature

THHEBY 245÷2185 HT in winter
TCHEBY 245÷2185 HT in summer

THHEBY 245÷2185 LT in winter
TCHEBY 245÷2185 LT in summer

THHEBY 245÷2185 HT and LT in summer

Temperature differentials permitted through the exchangers
○ Temperature differential at the evaporator ΔT = 3 ÷ 8°C
○ Temperature differential at the condenser (table "**F**"): ΔT = 5 ÷ 15°C
○ Temperature differential at the condenser (city water - table "**I**"): ΔT = 12 ÷ 18°C.

ATTENTION!
○ Water at the inlet to the condenser at less than 25°C and ΔT less than 12°C: it is advisable to install the KV2 pressure valve accessory.
○ When the water at the inlet to the condenser is less than 15°C (the temperature differential ΔT permitted for city water through the condenser is inclusive in the range 12 ÷ 18°C) it is advisable to install the KV2 valve accessory.

Evaporator maximum inlet water temperature 28°C (TCHAEY) or 25°C (THHEY in cooling).
Maximum inlet water temperature condenser 48°C (ver. LT).
Maximum inlet water temperature condenser 50°C (ver. HT).

○ Maximum water pressure 0.5 Barg (system side) and 2 Barg (well, city water side).
○ Maximum water pressure 6 Barg.

ATTENTION:
For evaporator outlet water at less than 4°C or geothermal applications with temperatures below 4°C, the working temperatures of the unit MUST be specified when ordering (condenser and evaporator water outlet/inlet) for a correct parameterisation of the same.

Use of antifreeze 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 functioning conditions from those shown below.

○ Table "**M**" 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 30 °C, chilled water outlet temperature 7 °C, evaporator / condenser temperature differential 5 °C.

• For different functioning conditions, the same coefficients can be used as their variations are negligible.

Table "M"

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.

Accessories RC100 and DS: Performance and pressure drops

Table "G": Performance and pressure drops accessories RC100 and DS

MODEL TCHEY-THHEY		**245**			**250**		
RC100 - Recovery 100%							
Water inlet/outlet temperature	°C	40/45	45/50	50/55	40/45	45/50	50/55
Nominal heating capacity (•)	kW	50,6	49,0	47,2	59,6	57,9	55,9
Recovery unit nominal water flow	l/h	8800	8700	8300	10400	10300	9800
Recovery unit nominal pressure drops	kPa	17	17	15	23	23	21
Recovery unit water content	l	7,0	7,0	7,0	7,0	7,0	7,0
DS - Desuperheater							
Water inlet/outlet temperature	°C	50/60	60/70 (*)	-	50/60	60/70 (*)	-
Nominal heating capacity (•)	kW	6,9	7,4	-	8,0	8,7	
Desuperheater nominal water flow rate	l/h	600	700	-	700	800	
Desuperheater nominal pressure drops	kPa	0,76	0,87	-	0,56	0,65	
Desuperheater water content	l	2,0	2,0	2,0	2,8	2,8	-

MODEL TCHEY-THHEY		**260**			**270**		
RC100 - Recovery 100%							
Water inlet/outlet temperature	°C	40/45	45/50	50/55	40/45	45/50	50/55
Nominal heating capacity (•)	kW	68,5	66,2	64,0	76,2	73,8	71,0
Recovery unit nominal water flow	l/h	11900	11800	11200	13300	13100	12400
Recovery unit nominal pressure drops	kPa	25	24	22	23	22	20
Recovery unit water content	l	8,0	8,0	8,0	9,6	9,6	9,6
DS - Desuperheater							
Water inlet/outlet temperature	°C	50/60	60/70 (*)	-	50/60	60/70 (*)	-
Nominal heating capacity (•)	kW	9,3	10,0	-	10,6	11,4	-
Desuperheater nominal water flow rate	l/h	800	900	-	900	1000	-
Desuperheater nominal pressure drops	kPa	0,73	0,85	-	0,94	1,10	-
Desuperheater water content	l	2,8	2,8	-	2,8	2,8	-

MODEL TCHEY-THHEY		**275**			**290**		
RC100 - Recovery 100%							
Water inlet/outlet temperature	°C	40/45	45/50	50/55	40/45	45/50	50/55
Nominal heating capacity (•)	kW	84,7	82,1	79,5	102,9	100,1	97,1
Recovery unit nominal water flow	l/h	14800	14600	13900	17900	17800	17000
Recovery unit nominal pressure drops	kPa	28	27	25	32	32	29
Recovery unit water content	l	9,6	9,6	9,6	11,3	11,3	11,3
DS - Desuperheater							
Water inlet/outlet temperature	°C	50/60	60/70 (*)	-	50/60	60/70 (*)	-
Nominal heating capacity (•)	kW	11,6	12,6		13,7	14,9	
Desuperheater nominal water flow rate	l/h	1000	1100		1200	1300	
Desuperheater nominal pressure drops	kPa	0,62	0,73		0,85	1,00	
Desuperheater water content	l	3,8	3,8	-	3,8	3,8	-

MODEL TCHEY-THHEY		**2100**			**2115**		
RC100 - Recovery 100%							
Water inlet/outlet temperature	°C	40/45	45/50	50/55	40/45	45/50	50/55
Nominal heating capacity (•)	kW	118,0	114,6	105,4	134,9	130,5	126,0
Recovery unit nominal water flow	l/h	20600	20400	18400	23500	23200	22000
Recovery unit nominal pressure drops	kPa	32	31	26	17	17	15
Recovery unit water content	l	14,5	14,5	14,5	17,1	17,1	17,1
DS15 - Desuperheater							
Water inlet/outlet temperature	°C	50/60	60/70 (*)	-	50/60	60/70 (*)	-
Nominal heating capacity (•)	kW	15,8	17,0		18,0	19,4	
Desuperheater nominal water flow rate	l/h	1400	1500		1600	1700	
Desuperheater nominal pressure drops	kPa	0,88	1,02		0,77	0,89	
Desuperheater water content	l	4,3	4,3	-	5,3	5,3	

MODEL TCHEY-THHEY			**2130**			**2145**	
RC100 - Recovery 100%							
Water inlet/outlet temperature	°C	40/45	45/50	50/55	40/45	45/50	50/55
Nominal heating capacity (•)	kW	148,9	144,0	139,2	164,8	159,4	153,5
Recovery unit nominal water flow	l/h	25900	25600	24300	28700	28300	26800
Recovery unit nominal pressure drops	kPa	18	17	16	19	18	17
Recovery unit water content	l	19,3	19,3	19,3	21,7	21,7	21,7
DS15 - Desuperheater							
Water inlet/outlet temperature	°C	50/60	60/70 (*)	-	50/60	60/70 (*)	-
Nominal heating capacity (•)	kW	20,1	21,3		22,4	23,9	
Desuperheater nominal water flow rate	l/h	1800	1900		2000	2100	
Desuperheater nominal pressure drops	kPa	0,94	1,06		0,91	1,03	
Desuperheater water content	l	5,3	5,3	-	6,0	6,0	-

MODEL TCHEY-THHEY			**2165**			**2185**	
RC100 - Recovery 100%							
Water inlet/outlet temperature	°C	40/45	45/50	50/55	40/45	45/50	50/55
Nominal heating capacity (•)	kW	187,8	181,7	175,2	211,1	204,1	197,2
Recovery unit nominal water flow	l/h	32700	32300	30600	36800	36300	34500
Recovery unit nominal pressure drops	kPa	21	21	19	26	26	24
Recovery unit water content	l	24,1	24,1	24,1	24,1	24,1	24,1
DS15 - Desuperheater							
Water inlet/outlet temperature	°C	50/60	60/70 (*)	-	50/60	60/70 (*)	-
Nominal heating capacity (•)	kW	25,6	27,2	-	28,6	30,2	-
Desuperheater nominal water flow rate	l/h	2200	2400	-	2500	2700	-
Desuperheater nominal pressure drops	kPa	0,78	0,88	-	0,96	1,07	-
Desuperheater water content	l	7,5	7,5	-	7,5	7,5	-

(•) Heating capacity with recovery unit and desuperheater fouling factor equal to 0.35×10^{-4} m² K/W.

Performances relate to unit with chilled water temperature of 7°C and temperature differential to evaporator of 5°C. DS performance relate to inlet/outlet condenser water temperature 30/35°C (minimum condition to guarantee suitable functioning for desuperheater).

Functioning limits:

RC100:

- produced hot water temperature **35÷52°C** (for LT) **55°C** (for HT) for TCHEY, **50°C** (for LT and HT) for THHEY, with admitted water temperature differential **4÷6°C**;
- the admitted minimum water inlet temperature is equal to 30°C.

DS:

- produced hot water temperature 50÷70°C with admitted water temperature differential 5÷10°C;
- the admitted minimum water inlet temperature is equal to 40□.

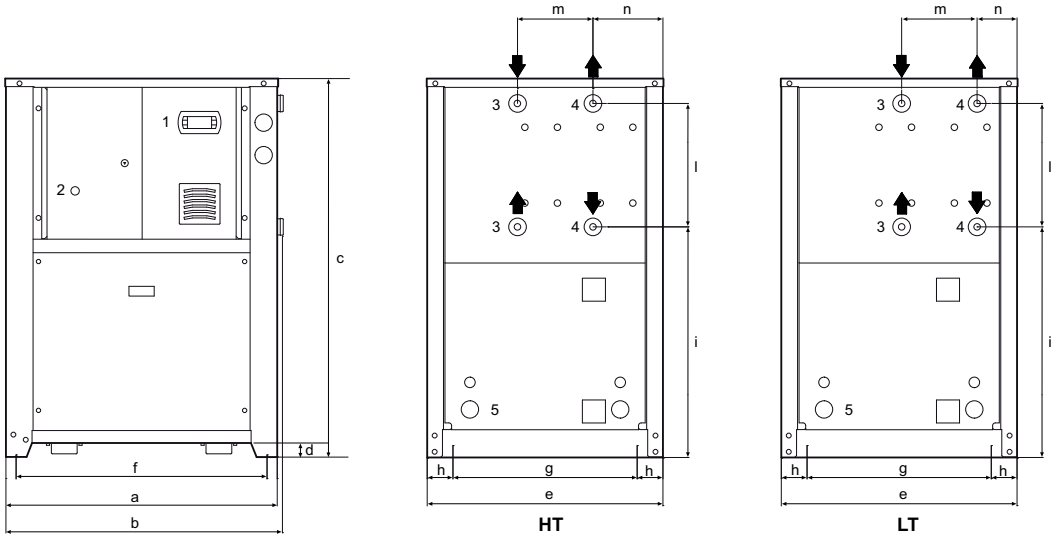
(*) **NOTE:** it is possible to increase the water outlet temperature over (50-60) from DS increasing the inlet/outlet temperature from condenser and undermining the efficiency of the cooling chiller (performances relate to unit with chilled water temperature of 7°C and temperature differential to evaporator of 5°C. DS performance relate to inlet/outlet condenser water temperature 40/45°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 1/12/2004 n. 329 and by its technical application specifications (collections R and H).
This law is only valid in Italy. For installation in other countries, please abide by the local laws in force.

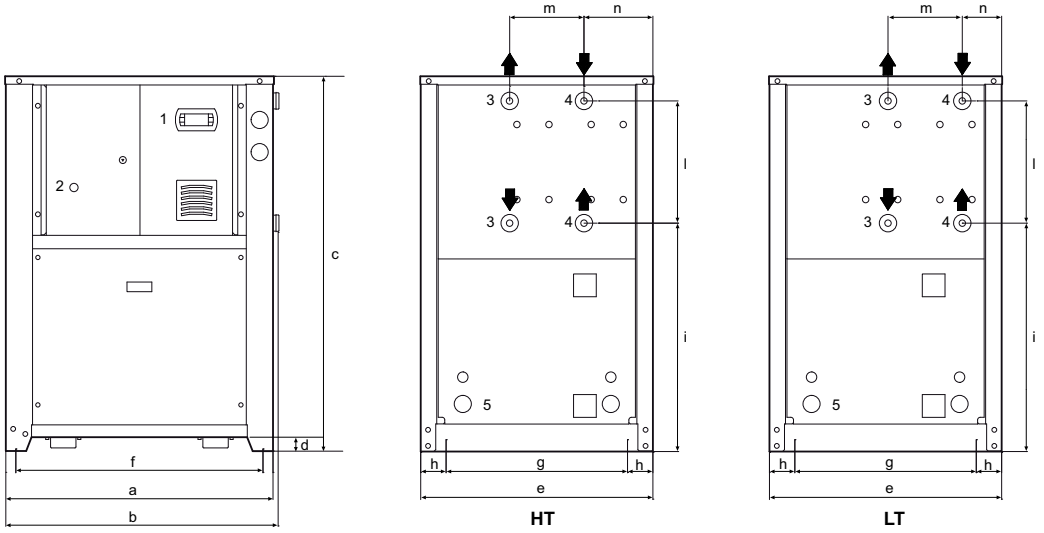
Dimensions and clearance

TCHEY 245÷290 dimensions and clearance without pumps



1. Control panel;
2. Isolator;
3. Heating/conditioning system (primary);
4. External network (rejection device);
5. Power supply inlet.

THHEY 245÷290

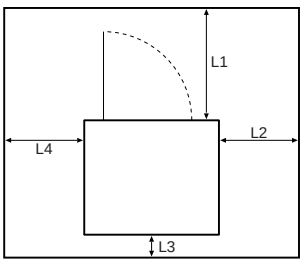


1. Control panel;
2. Isolator;
3. Heating/conditioning system (primary);
4. External network (rejection device);
5. Power supply inlet.

Model		a	b	c	d	e	f	g	h	i	l	m	n	i (*)	l (*)	m (*)	n (*)
245	mm	1000	1019	1400	53,5	869	925	679	95	852	456	278	258	845,5	470	278	147
250	mm	1000	1019	1400	53,5	869	925	679	95	852	456	278	258	845,5	470	278	147
260	mm	1000	1019	1400	53,5	869	925	679	95	852	456	278	258	845,5	470	278	147
270	mm	1000	1019	1400	53,5	869	925	679	95	852	456	278	258	845,5	470	278	147
275	mm	1000	1019	1400	53,5	869	925	679	95	852	456	278	258	845,5	470	278	147
290	mm	1000	1019	1400	53,5	869	925	679	95	852	456	278	258	845,5	470	278	147

(*) LT

Clearance and positioning



Model		245	250	260	270	275	290
L1	mm						
L2	mm						
L3	mm						
L4	mm						

Weights

TCHEY

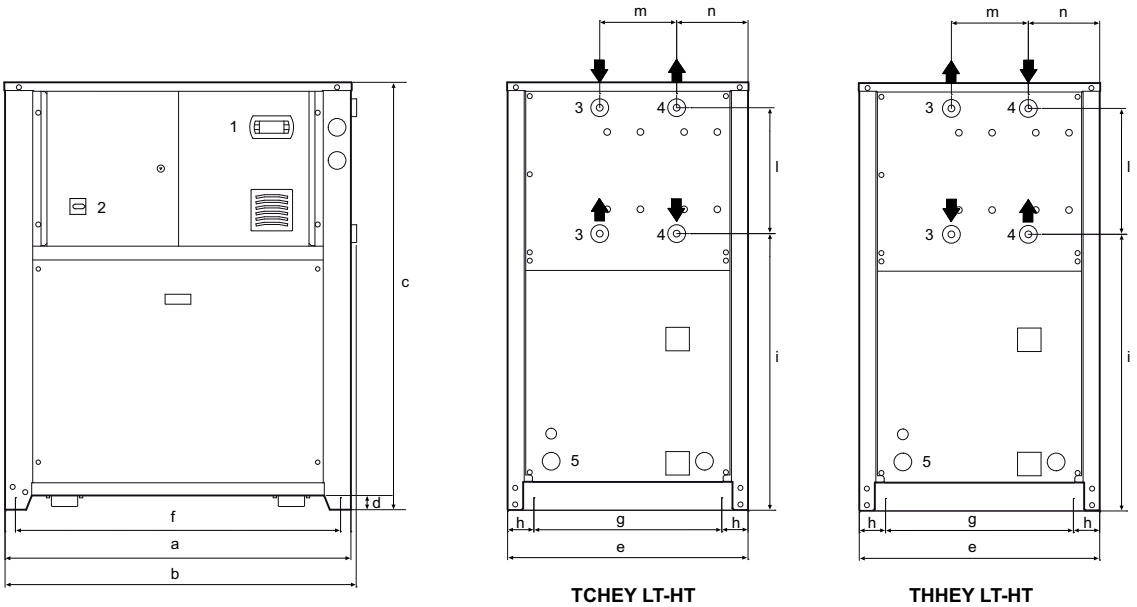
Model		245	250	260	270	275	290
Standard	kg	375	380	385	395	390	410
P1	kg						
P2	kg						
PS1	kg						

THHEY

Model		245	250	260	270	275	290
Standard	kg	385	395	400	410	405	425
P1	kg						
P2	kg						
PS1	kg						

The weights refer to units without water.

TCHEY-THHEY 2100÷2185 dimensions and clearance without pumps

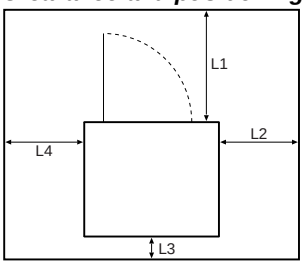


TCHEY LT-HT THHEY LT-HT

1. Control panel;
2. Isolator;
3. Heating/conditioning system (primary);
4. External network (rejection device);
5. Power supply inlet.

Model		a	b	c	d	e	f	g	h	i	l	m	n
2100	mm	1250	1269	1550	53,5	869	1175	679	95	1002	456	278	258
2115	mm	1250	1269	1550	53,5	869	1175	679	95	1002	456	278	258
2130	mm	1250	1269	1550	53,5	869	1175	679	95	1002	456	278	258
2145	mm	1250	1269	1550	53,5	869	1175	679	95	1002	456	278	258
2165	mm	1250	1269	1550	53,5	869	1175	679	95	1002	456	278	258
2185	mm	1250	1269	1550	53,5	869	1175	679	95	1002	456	278	258

Clearance and positioning



Model		2100	2115	2130	2145	2165	2185
L1	mm						
L2	mm						
L3	mm						
L4	mm						

Weights

TCHEY

Modello		2100	2115	2130	2145	2165	2185
Standard	kg	615	735	795	820	850	855
P1	kg						
P2	kg						
PS1	kg						

THHEY

Modello		2100	2115	2130	2145	2165	2185
Standard	kg	630	755	815	840	870	880
P1	kg						
P2	kg						
PS1	kg						

The weights refer to units without water.

Installation

○ The unit is intended for indoor installation. If outdoor installation is required, contact our pre-sales office.
○ The unit is equipped with male threaded water connections.
○ 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).
○ It is obligatory to install the low-pressure drop mesh filter (KFA) on each water inlet of the unit.
○ 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.
○ Segregate the unit if installed in areas accessible to persons under 14 years of age.
○ Shut-off valves must be installed that isolate the unit from the rest of the system. Elastic connection joints and system/machine drain taps also need to be fitted.
○ The water flow through the evaporation heat-exchanger should not fall below a value corresponding to a temperature differential of 8°C (with both compressors on).
○ 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.
○ 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.

Handling

○ Movement of the unit should be performed in vertical position with care, in order 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 and transport are: -9 ÷ 45°C; avoid exposing the unit to direct contact with sunbeams, rain, wind and sand.
Avoid exposing the unit to direct contact with sunbeams as the pressure inside the refrigerant circuit may reach dangerous values and cause the safety valve to intervene.

Water Data

Model HT/LT		245÷2130	2145÷2185
Expansion tank	l	12	24
Safety valve calibration	kPa	600	600
Maximum admissible pressure	kPa	600	600

Model HT		245÷2100	2115÷2185
Water connection dimensions HT	Ø	2"GM	2-½"GM
Load connection dimensions (full) HT	Ø		
Connections dimensions RC100	Ø	2"GM	2-½"GM
Connections dimensions DS	Ø		

Model LT		245÷275	290÷2100	2115÷2185
Water connection dimensions LT	Ø	1-½"GM	2"GM	2-½"GM
Load connection dimensions (full) LT	Ø			
Connections dimensions RC100	Ø	2"GM	2"GM	2-½"GM
Connections dimensions DS	Ø			

Water circuits

TCHEY-THHEY minimum 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 established on the basis of the unit's nominal cooling capacity (table A *Technical Date*), multiplied by the coefficient expressed in l/kW.

Range	Adjustment type	Control	Specific capacity
TCHEY-THHEY	***AdaptiveFunction Plus***	**IDRHOSS**	2 l/kW

Example: TCHEY 2185
The reference capacity to be taken into consideration when calculating the water content on the primary side, is the cooling capacity in design conditions. If, for example, it coincides with the nominal conditions (Qf=184.8 kW), a minimum volume of water must be guaranteed, calculated as follows:

If the unit envisages control **IDRHOSS** with ***AdaptiveFunction Plus***, the minimum system content should be:

Qf (kW) x 2 l/kW = 184.8 kW x 2 l/kW = 369.6 l

For design conditions that differ from the nominal conditions, the power data must be found using Tables "E", which provide a clear list of the power values that can be obtained at conditions other than nominal conditions. When doing the calculation, we recommend always referring to the maximum envisaged power (for THHEY, in heating mode also).

Maximum contents of water circuit

The units installed with P1 or P2 are equipped with expansion tank that limits the maximum water content inside the system.

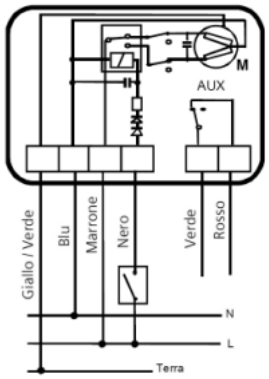
Maximum content		245÷2130	2145÷2185
Water	l	478	956
Mixture with ethylene glycol at 10%	l	415	831
Mixture with ethylene glycol at 20%	l	585	771
Mixture with ethylene glycol at 30%	l	357	713

If the amount of water exceeds the values indicated a supplementary expansion tank must be added.

Expansion tank		245÷2130	2145÷2185
Capacity	l	12	24
Pre-charging	barg	2	2
Maximum expansion vessel pressure	barg	6	6
Calibration	barg	6	6

KFRC Kit Free-cooling accessory.
The accessory is made of a tile exchanger and a 3-way on/off diverter valve (230Vac) without spring return.

The 3-way valve is managed from the electronic control of the unit: the installer must install a 4x1 mm2 cable (F-N contact ON-earth) for its connection to terminal box inside the electric control board (refer to electric layout).



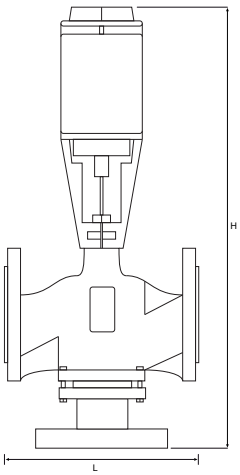
Free-cooling technical data

Model		**245**	**250**	**260**	**270**	**275**	**290**
System side flow rate	l/h	10922	12797	14637	16581	18301	21620
System pressure loss	kPa	10	13	17	21	25	21
Source side flow rate	l/h	10718	12808	14945	17649	19749	21216
Source pressure drop	kPa	24	33	44	50	60	29
Exchanger water content for each circuit	l	13	13	13	13	13	23,9
Connections diameter		2"GM	2"GM	2"GM	2"GM	2"GM	2"GM

Model		**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
System side flow rate	l/h	24974	28294	31854	35501	40420	45064
System pressure loss	kPa	29	37	21	26	33	41
Source side flow rate	l/h	24988	39481	31881	35526	42120	47965
Source pressure drop	kPa	41	57	42	42	58	74
Exchanger water content for each circuit	l	23,9	23,9	36	36	36	36
Connections diameter		2"GM	2-½"GM	2-½"GM	2-½"GM	2-½"GM	2-½"GM

Technical data KV2 – KV3

MODELS LT/HT		**245**	**250**	**260**	**270**	**275**	**290**	**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
						KV2							
Kvs	m^3/h	19	19	19	31	31	31	31	49	49	49	49	78
Flange dimension	DN	50	50	50	50	50	50	50	65	65	65	65	80
Δp max	kPa	400	400	400	400	400	400	400	600	600	600	600	400
Δps	kPa	500	500	500	500	500	500	500	800	800	800	800	500
						KV3							
Kvs	m^3/h	19	31	31	31	49	49	49	78	78	78	78	78
Flange dimension	DN	40	50	50	50	65	65	65	80	80	80	80	80
Δp max	kPa	750	500	500	500	500	500	500	350	350	350	350	350



DIMENSIONS KV2 KV3

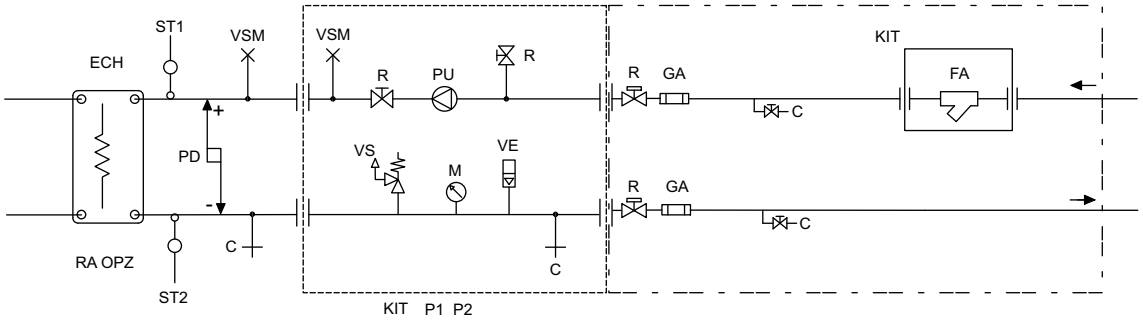
KV2		**245**	**250**	**260**	**270**	**275**	**290**	**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
L	mm	200	230	230	230	290	290	290	310	310	310	310	310
H	mm	580	590	590	590	735	735	735	775	775	775	775	775
P	mm	169	169	169	169	226	226	226	226	226	226	226	226

KV3		**245**	**250**	**260**	**270**	**275**	**290**	**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
L	mm	230	230	230	230	230	230	230	290	290	290	290	310
H	mm	493	493	493	493	493	493	493	606	606	606	606	618
P	mm	169	169	169	169	169	169	169	226	226	226	226	226

Δp max = Maximum differential pressure in valve.
Δps = Maximum admitted differential pressure at which valve closes (close off pressure).

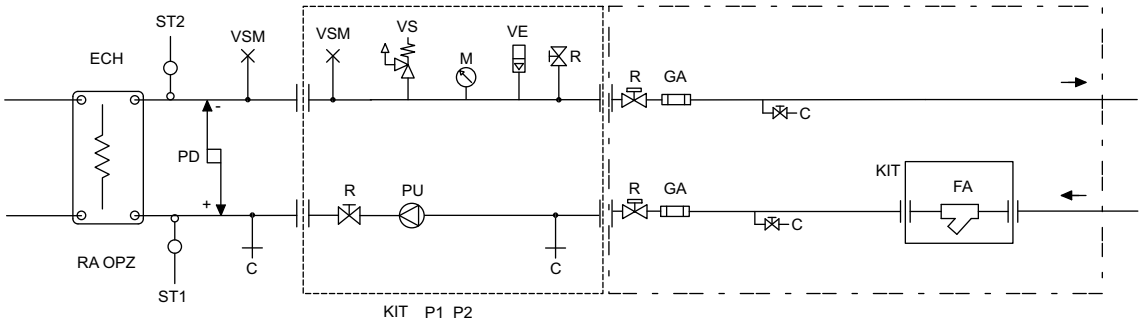
To avoid cavitation of the pump guarantee a certain distance between the same and the valves.

TCHEY P1/P2



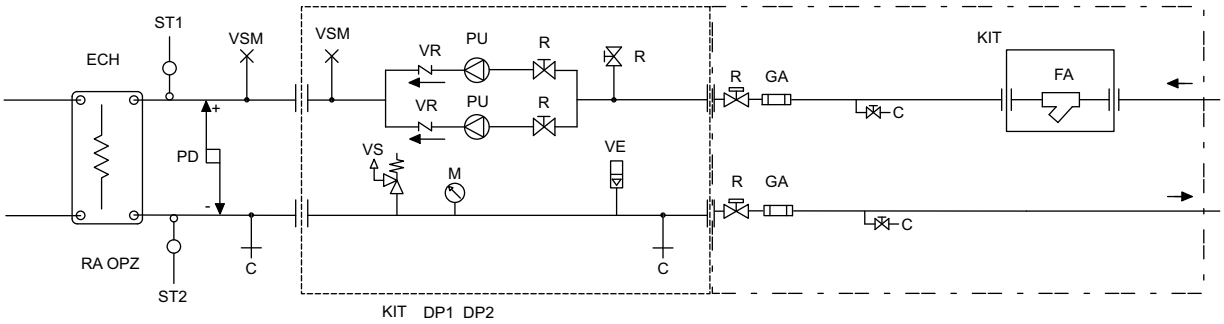
2

THHEY P1/P2



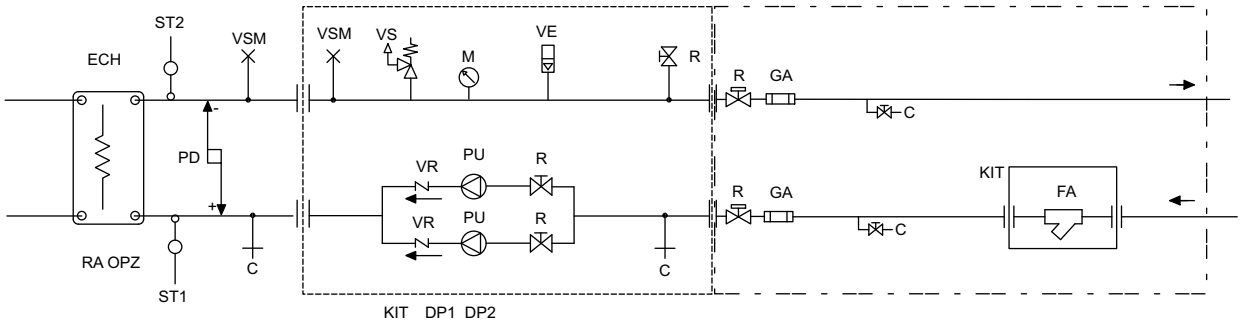
2

TCHEY DP1/DP2



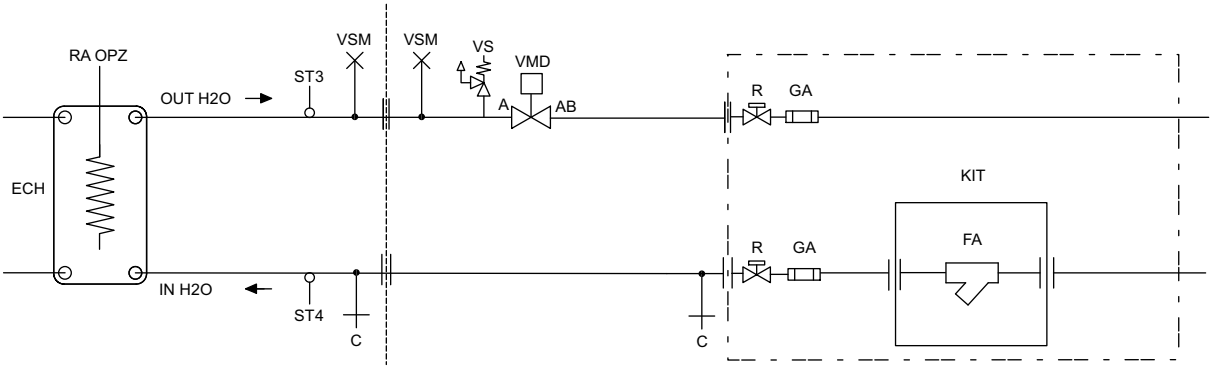
2

THHEY DP1/DP2



2

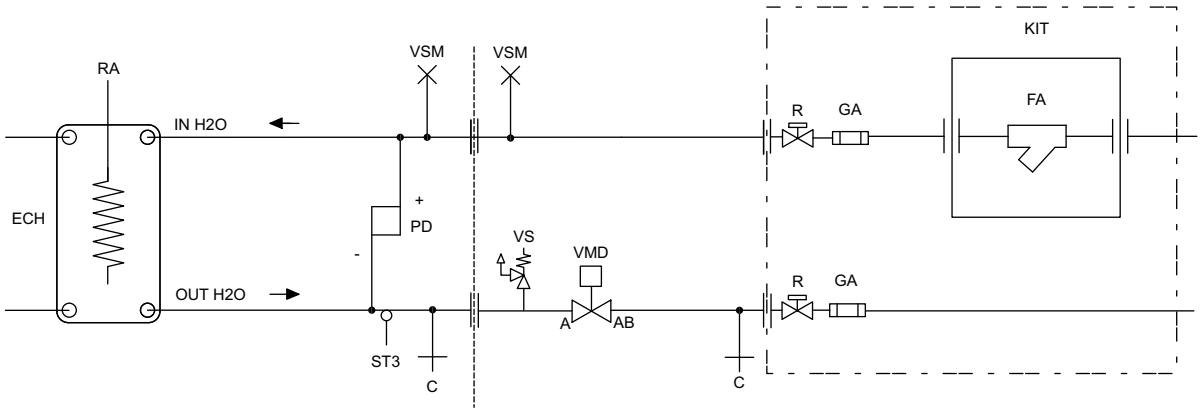
TCHEY WITH KV2



1

ECH Rejection (condenser)
VMD Modulating valve (accessory KV2)

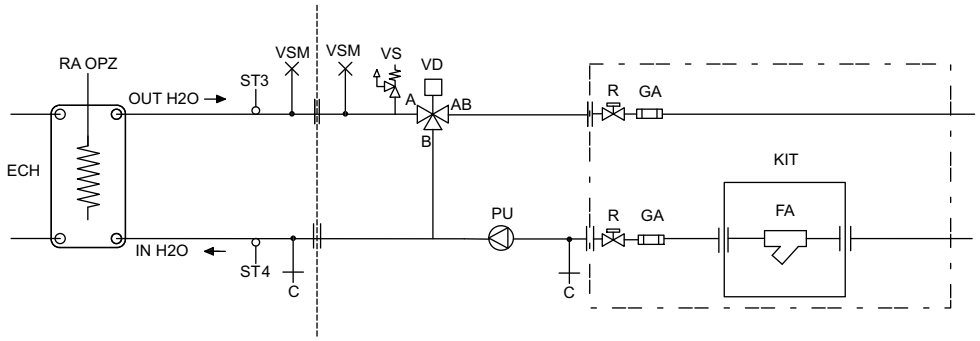
THHEY WITH KV2



1

ECH Rejection (condenser/evaporator))
VMD Modulating valve (accessory KV2)

TCHEY WITH KV3

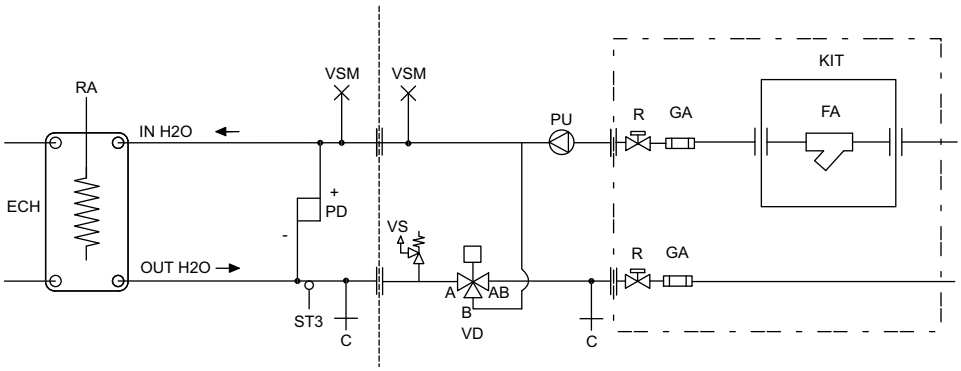


1

ECH Rejection (condenser)
VD Mixing valve in deviation (accessory KV3)

Pump installation by installer

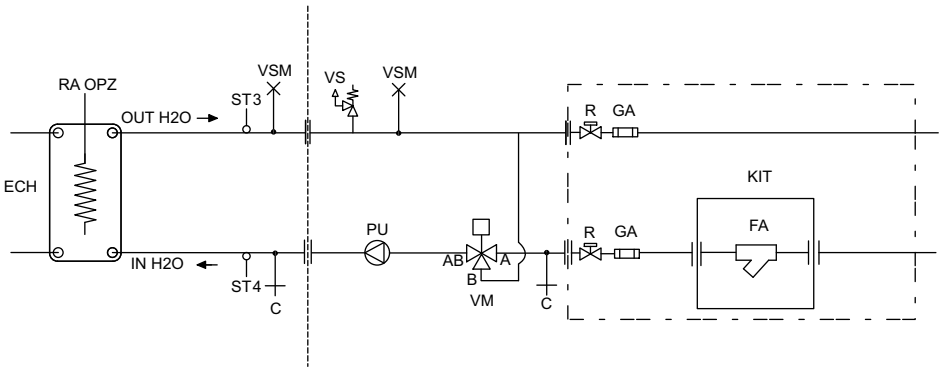
THHEY WITH KV3



ECH Rejection (condenser/evaporator))
VD Mixing valve in deviation (accessory KV3)

Pump installation by installer

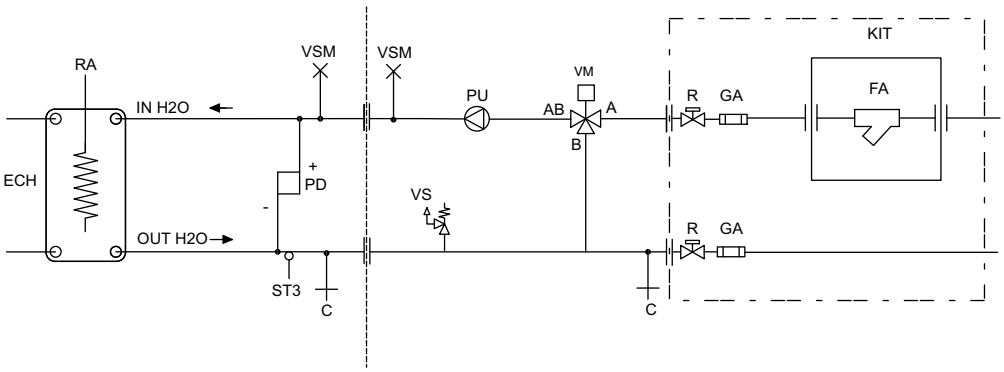
TCHEY WITH KV3



ECH Rejection (condenser)
VM Mixing valve (accessory KV3)

Pump installation by installer

THHEY WITH KV3

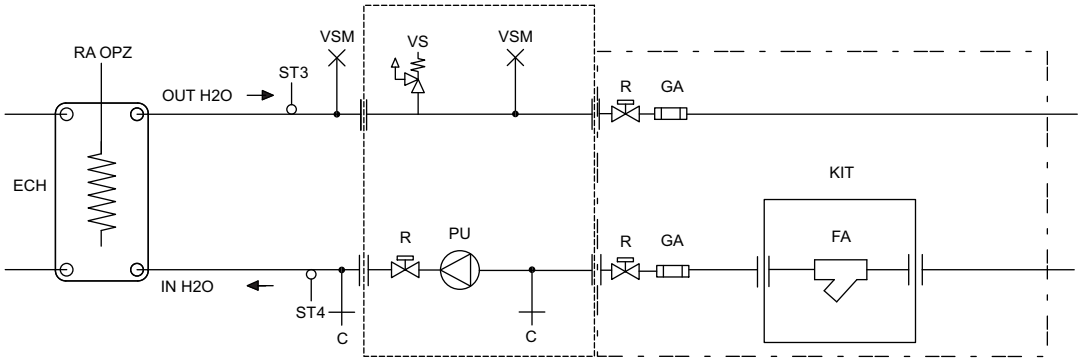


ECH Rejection (condenser/evaporator)
VM Mixing valve (accessory KV3)

Pump installation by installer

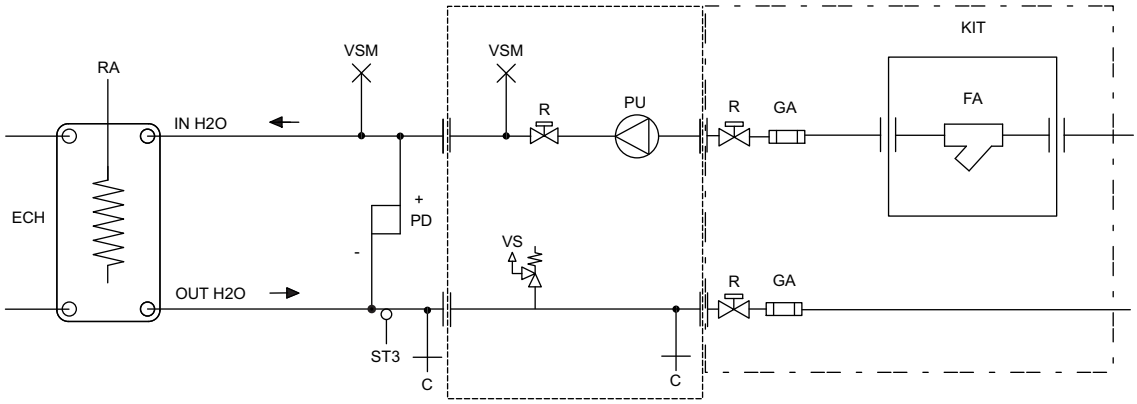
1

TCHEY PS1



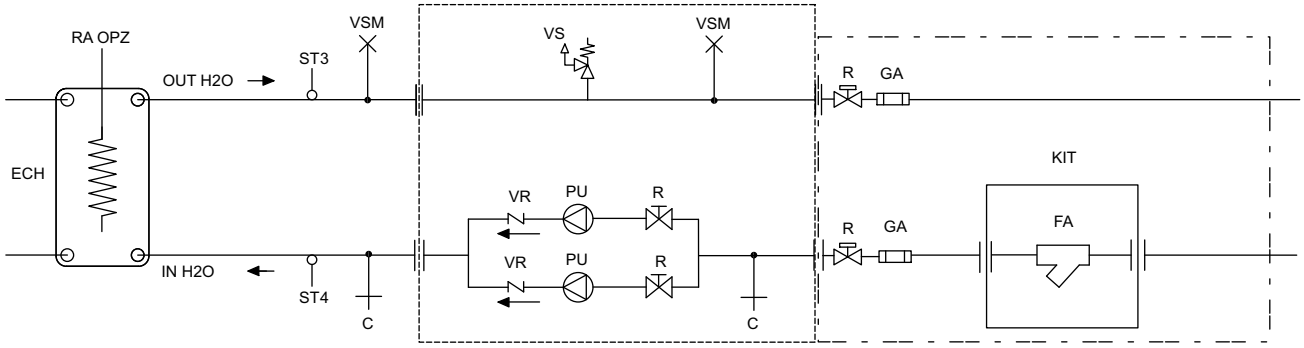
ECH Rejection (condenser)
PU Variable speed pump (accessory PS1)

THHEY PS1



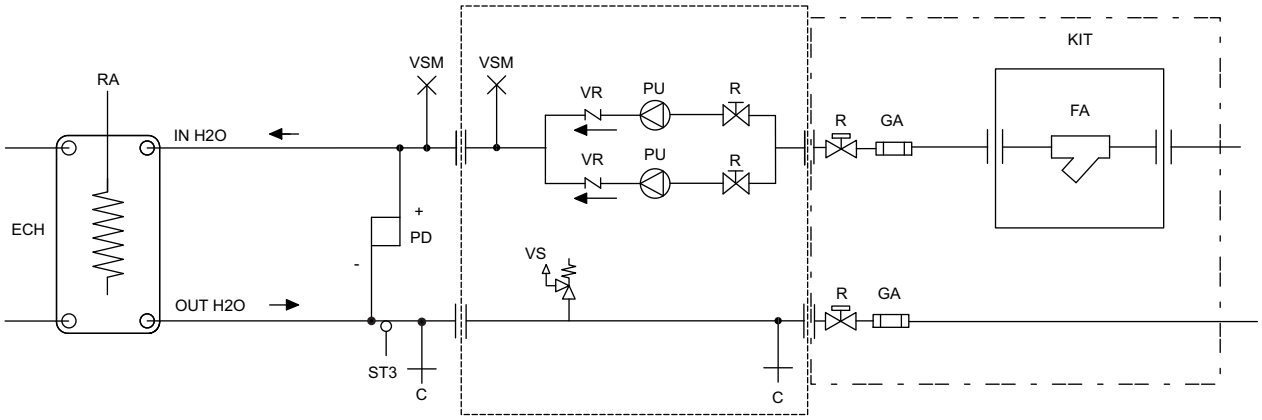
ECH Rejection (condenser/evaporator)
PU Variable speed pump (accessory PS1)

TCHEY DPS1



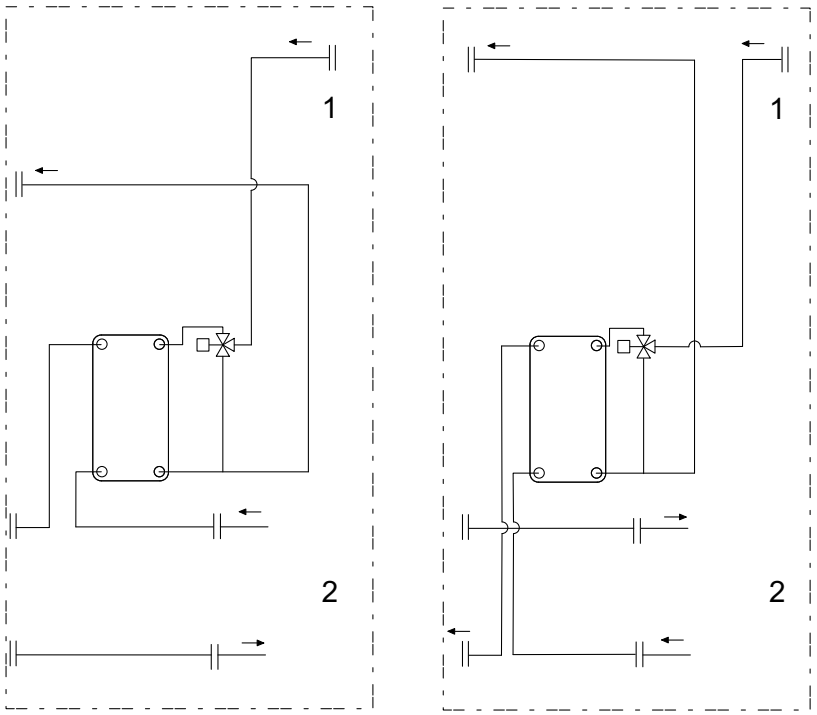
ECH Rejection (condenser)
PU Variable speed pumps (accessory DPS1)

THHEY DPS1



ECH Rejection (condenser/evaporator)
PU Variable speed pumps (accessory DPS1)

KFRC KIT FREECOOLING



TCHEY THHEY

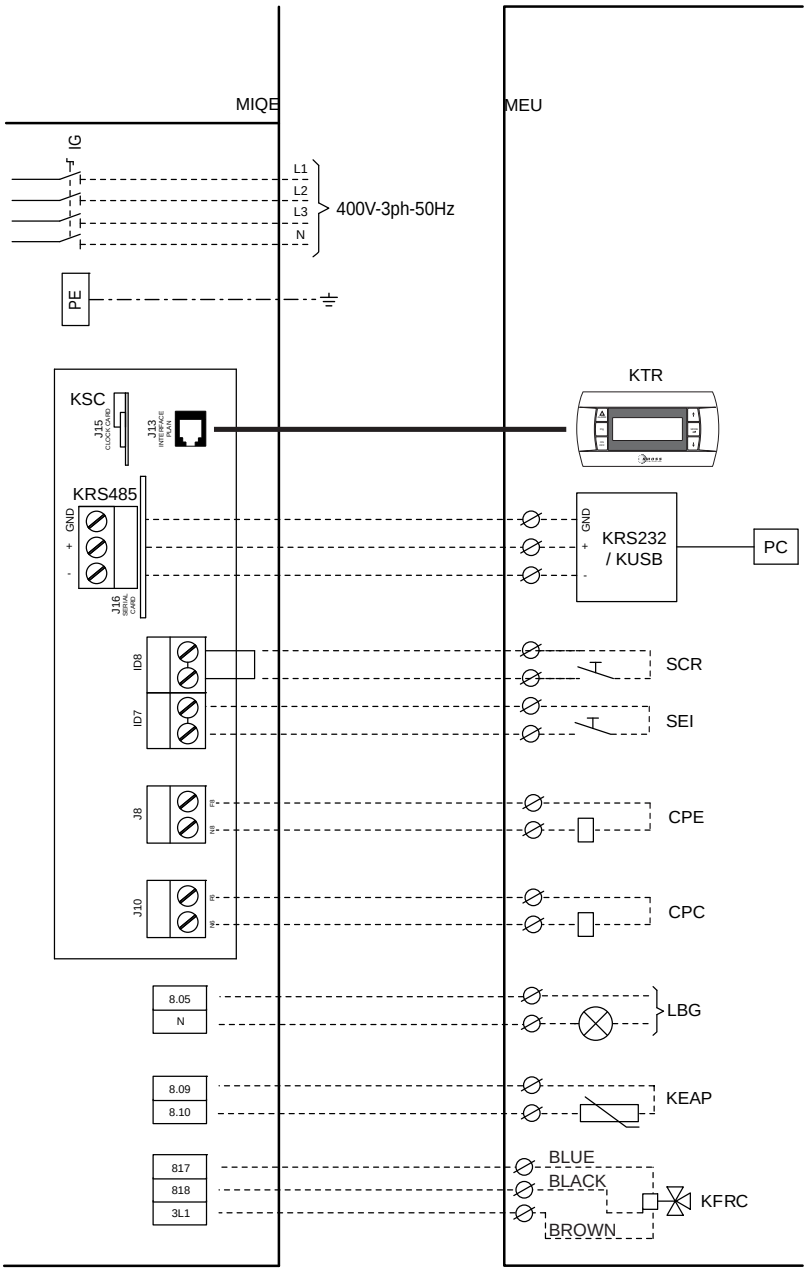
1 = External net;
2 = Heating/conditioning system (primary);
C = Water load/drain cock;
ECH = Tiles evaporator/condenser;
FA = Water mesh filter;
GA = Anti-vibration connection;
M = Pressure gauge;
PD = Differential pressure switch;
PU = Pump;
R = Cock;
RA = Plate exchanger resistance;
ST1 = Summer-winter working temperature probe;
ST4 = (Mounted in factory rejection device condenser side on version HPH);
ST2 = Antifreeze safety temperature probe;
ST3 = External net outlet temperature probe;
VD = Mixing valve in derivation;
VE = Expansion tank;
VM = Mixing valve;
VMD = Modulating valve;
VR = Non-return valve;
VS = Water safety valve;
VSAM = Automatic/manual air bleed valve;
VSM = Manual air bleed valve;

- -- - = Compulsory installation by installer.

For possible combinations see *Structural features and accessories*.

TCHEY-THHEY 245÷2185
Electric power supply 400V – 3ph+N – 50Hz

MIQE = Electrical panel internal terminal board;
MEU = User external terminal board;
IG = Main isolating switch;
LBG = General lock light (power supply 230 Vac, max. load 0.5A AC1);
J13 = 6-way telephone connector (RJ12);
J15 = Connector for insertion accessory KSC;
J16 = Connector for insertion accessory KRS485, KFTT10, KISI;
KSC = Clock card (accessory);
KRS485 = Serial interface RS485 (accessory);
KRS232 = Converter RS485/RS232 (accessory);
KUSB = Converter RS485/USB (accessory);
KTR = Remote keyboard (accessory);
L1 = Line 1;
L2 = Line 2;
L3 = Line 3;
N = Neutral;
PC = Personal computer;
PE = Earth terminal;
SCR = Remote control selector (control with clean contact);
SEI = Summer/Winter selector (control with clean contact);
KEAP = External air sensor for Set-point compensation (incompatible with CS accessory).
KFRC = ON/OFF 3-way diverter valve (230Vac) for kit free-cooling.
CPC = Condenser pump control (consensus at voltage 230Vac, maximum charge 1A AC1);
CPE = Evaporator pump control for standard installation (consensus at voltage 230Vac, maximum charge 1A AC1);
- - - - = Connections provided by the installer;
▬▬ = 6-wire telephone cable (maximum distance 50 m, for greater distances contact *RHOSS* S.p.A. customer service);



○ The electrical panel is accessible from 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 unit with a delayed characteristic curve of suitable capacity and breaking capacity. Make sure the general isolator includes a 3 mm minimum opening distance between contacts.
○ Earth connection is compulsory by law to ensure user safety while the machine is in use.

ATTENTION!
The following diagrams only show the connections to be made by the installer.
Nota bene:
Specific terminals are provided for the **CS** and **DSP** accessories.

Cable section		**245**	**250**	**260**	**270**	**275**	**290**
Line section	mm²	2,5	2,5	4	4	6	6
PE section	mm²	2,5	2,5	4	4	6	6
Remote control section	mm²	1,5	1,5	1,5	1,5	1,5	1,5

Cable section		**2100**	**2115**	**2130**	**2145**	**2165**	**2185**
Line section	mm²	2,5	2,5	4	4	6	6
PE section	mm²	2,5	2,5	4	4	6	6
Remote control section	mm²	1,5	1,5	1,5	1,5	1,5	1,5

Note:

Note:

TCHEY 245÷2185
THHEY 245÷2185
Low consumption Y-Flow range

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