TCAEY-THAEY 4350÷6640

Y-Power range

Macrosystem
335÷636 kW
357÷669 kW

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

R410A

RHOSS

SINCERT
ISO 9001
BUREAU VERITAS Certification

New Y-Power range

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

A complete, flexible range, with maximum six shutter steps

New water chillers and heat pumps in R410A, with four to six Scroll compressors installed on two cooling circuits to obtain up to six steps of cooling and heating capacity, allowing for flexible regulation and greater efficiency when operating at partial loads. The efficiency of these units is also boosted by the innovative **AdaptiveFunction Plus** control logic, with which the range is equipped. This logic, developed by *RHOSS* in partnership with the University of Padua, optimises compressor activation and their operating cycles, as well as making it possible to obtain optimum comfort levels in all working conditions and the best performances in terms of energy efficiency during seasonal operation.

LOW ENERGY CONSUMPTION water chillers and heat pumps

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

HIGH PRECISION water chillers and heat pumps

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

Estimation of the system's thermal inertia

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

Continuous system autodiagnosis

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

Silent operation (VERSIONS S)

Thanks to the 4÷6 shutter steps and the condensation control, installed as standard on all S units, the noise level is also reduced at partial loads. For example, during night operation, when the load is reduced but sensitivity to noise is at its peak, the control reduces the number of fan revolutions, the primary noise source in this type of unit, producing obvious benefits in terms of acoustic well-being.

AdaptiveFunction Plus

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

Objectives

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

Operating logic

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

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

Main functions

Efficiency or Precision

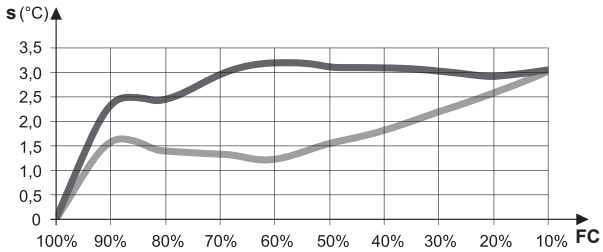
Thanks to the evolved control, it is possible to run the chiller on two different regulation settings to obtain the best possible performance in terms of energy efficiency and considerable seasonal savings, or high water delivery temperature precision:

1. Low consumption chiller: "Economy" *option*

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

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.



*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*

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

ACM Autotuning compressor management

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

A complete, flexible series
Eight chiller and heat pump models with a cooling capacity from 335 to 636 kW and heating capacity from 357 to 669 kW. Making it possible to choose the right model on the basis of the cooling capacity required by the users, minimsing waste. The water chillers in the Y-POWER series are also suitable for all types of installation, thanks to their wide operating limits. The standard unit can operate in the cooling mode from an external air temperature of 43°C down to -15°C with the FI15 accessory. It can also operate up to temperatures of 46°C with a stepped cooling capacity.

ESEER and IPLV
On average, during their life time water chillers supply a cooling capacity below that for which they were acquired. To assess the average efficiency, we use the ESEER (European) and IPLV (American) indexes. The water chillers in the Y-POWER range have been designed for excellent efficiency at partial loads, obtaining high ESEER and IPLV values, with a consequent reduction in energy consumption.

Control logic
The new control logic based on Adaptive function plus makes it possible to adapt the water chiller/heat pump operating parameters to the load conditions of the system in which it is installed. The control regulates the outlet water temperature, optimising unit operation and the precision of the water supplied to the system. The effect is boosted in units that use the TANK&PUMP option, with a precision guarantee even in process applications where more precise water temperature control is required.

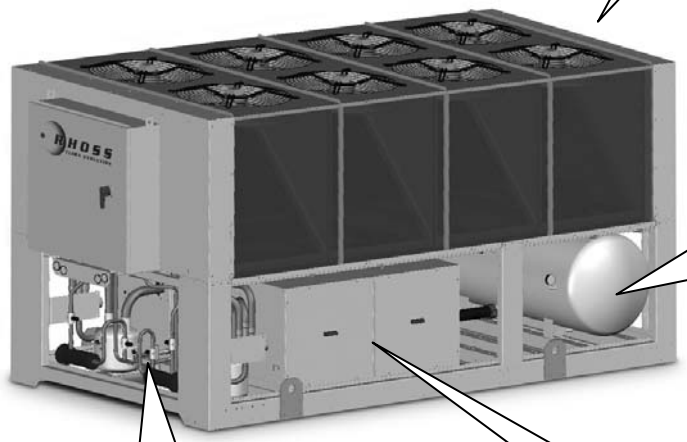
Optimised components for R410a
The components used in the Y-POWER series have been specifically developed to achieve high performances and reliability with R410A gas.
The new scroll compressors and heat exchangers dedicated, are some of the key elements in this series. The fan section has been sized to enable optimum heat exchange and reduced noise. Furthermore, the electronic expansion valve (like accessory) enables precise, speedy and punctual regulation in the various load conditions.

Versions
Different versions are available to meet the specific installation silence requirements. The reduced noise in the silent version is implemented thanks to the soundproofed compressor compartment with acoustic insulation and the reduction in the fan speed.
Correct operation and performances are guaranteed thanks to the optimised design of the fan section. In the silent version, the electronics enable the chiller to work at external air temperatures up to 46°C with stepped cooling capacity and an increase in noise when the temperature exceeds 40°C.

A series packed with accessories
The water chillers in the Y-POWER series can be fitted with total or partial recovery heat exchangers, as well as traditional accessories, for the production of hot water up to 70°C.
Fan speed regulation devices are available in applications with an external air temperature down to -15°C.
On request, the water chillers can be fitted with a pump assembly with single or double pump, or with a pump assembly with a 1100-litre water buffer tank and single or double pump.

Condensing section
The design of the condensing section and the dynamic fluid flow generated by the fans have been planned to maximise heat exchange efficiency and balance the pressure drops, keeping the noise emitted into the environment as low as possible.
Moreover, the standard machine includes condensation control with step pressure switch.

Evaporator
Plate heat exchanger or shell&tube as accesory.
The evaporator is equipped with two cooling circuits, which improves its efficiency at partial loads.



Hydronic assembly
Single or double pump, including one in standby with automatic activation and standard or increased static pressure. Moreover, the TANK&PUMP version has a 1100-litre inertial water buffer tank.

EEV: Electronic expansion valve
The water chillers are fitted as standard with a latest generation electronic expansion valve managed by microprocessor control

Compressor
The Y-POWER series uses hermetic scroll compressors specifically designed to operate with R410a gas.
Each circuit has 2/3 compressors, for a total of 4÷6 steps overall, thus enabling the chiller to work in an optimum fashion at partial loads, with considerable energy savings.

Contents

General characteristics

Intended conditions of use

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

They are intended for use in conditioning plants where a supply of chilled water (TCAEY) or chilled and hot water (THAEY), is required. Not suitable for drinking water.
The units are designed for outdoor installation.

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

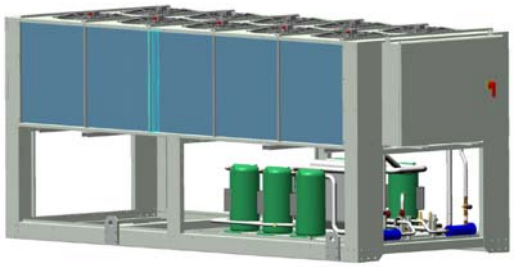
Guide to reading the code

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

T Water production unit	**C** Cooling only	**A** Air-cooled	**E** Scroll-type hermetic compressors	**B** Standard version	**Y** R410A refrigerant fluid	**4-6** No. compressors	**350÷640** Approximate cooling capacity (in kW)
	H Heat pump			**S** Silent version			

Example: TCAEBY 6640

- Standard unit, chiller;
- Air-cooled;
- 6 hermetic scroll compressors;
- R410A refrigerant;
- Nominal cooling capacity of approximately 640 kW.



TCAEY-THAEY 4350÷6640 models

Construction features

- Load-bearing structure in galvanised and painted sheet steel with polyester powder coating.
- Hermetic rotary scroll compressor, specifically developed to operate with R410a refrigerant gas, complete with internal thermal protection and casing heater activated automatically when the unit stops (as long as the unit is kept connected to the power supply).
- Stepped cooling capacity of the chiller as in the following table:

MODEL	Compressors/Steps No.	Circuits No.
4350÷4410	4/4	2
5450	5/5	2
6500÷6640	6/6	2

- Water side stainless steel plate heat exchanger, with double refrigerant circuit and single water side circuit to improve energy efficiency at partial loads, a differential pressure switch on the water side and closed cell polyurethane foam rubber insulation with U.V.A. ray protection film. (shell&tube exchanger as accessory factory fitted)
- Victaulic water connections on the evaporator and the heat recovery.
- Air side exchanger comprised of copper pipes mechanically flared into aluminium fins with "turbulence" design in order to increase energy efficiency.
- Motor-driven axial fans with external rotor, equipped with internal thermal protection and complete with protection grilles. They are grouped into two sections (one per refrigerant circuit), each with its own circuit breaker. This configuration enables the independent management of the rows of fans, thus improving energy efficiency at partial loads and enabling intelligent defrost cycle management (THAEBY-THAESY). The fans are equipped with pressure-switch control to ensure operation with outdoor air temperature down to +20°C.
- Two refrigerant circuits made of annealed copper tubes welded with silver alloy and steel. Each refrigerant circuit comes complete with: cartridge drier filter, charge connections, high pressure switch with manual reset, low pressure switch with automatic reset, gas and humidity indicator, electronic expansion valve with hermetic seal function on the liquid line when unit is stationary, cock on the liquid line, cycle reverse valve (for THAEBY-THAESY), liquid receiver (for THAEBY-THAESY), compressor suction gas separator (for THAEBY-THAESY), safety valves in high pressure sections, suction line insulation in closed cell foamed polyurethane rubber with U.V.A. ray protection film.
- Display on the control panel of refrigerant gas high and low pressure.
- Charge of ecological R410A refrigerant fluid.

Electrical panel

- Electrical panel compliant with IEC standards, in watertight box complete with:

- electrical wiring for the 400V-3ph-50Hz power supply;
- transformer for auxiliary circuit;
- auxiliary power supply 230V-1ph-50Hz;
- control power supply 24V-1ph-50Hz;
- compressor protection phase monitor;
- power contactors;
- remote controls: remote ON/OFF, double set-point (DSP accessory);
- remote machine controls: compressor operating light, general lock;
- general isolator with door interlock on the power supply;
- automatic protection switch on auxiliary circuit;
- thermal overload switches, with variable calibration, to protect each compressor/fan;

- Programmable electronic board with microprocessor, managed by the keypad installed on the machine, with potential for remote control up to 1,000 metres. This electronic board performs the following functions:

- regulation and management of the machine outlet water temperature set points;
- management of the safety time delays; the work timer for each compressor; the automatic inversion of the compressor operating sequence; the circulating or user service pump (on the evaporator side and the condenser side); the electronic antifreeze protection; the shutter steps and the functions and that regulate the operating mode of the various parts comprising the machine;
- management of the electronic expansion valve if present (EEV) with the possibility to read and display the suction temperature, evaporation pressure and the opening status of the valve.
- viewing on display of programmed operating parameters, machine inlet and outlet water temperatures, condensation pressures and any alarms;

- multilingual management (Italian, English, French, German, Spanish) of the display.
- management of alarm history. The following is memorised for each alarm:

- date and time of activation;
- alarm code and description;
- the water inlet/outlet temperature values when the alarm intervened;
- condensation pressure values at the time of the alarm;
- alarm delay time from the switch-on of the connected device;
- compressor and fan status when the alarm intervened (if the FI10/FI15 accessory is present, the analogue output status is displayed);
- self-diagnosis with continuous monitoring of the unit operating status.

- Advanced functions:

- prepared for serial connection, with RS 485 outlet for logical dialogue with the main BMS (MODBUS, RTU, LON), centralised systems and supervision networks.
- management of time periods and operating parameters with the possibility of daily/weekly operating programs;
- check-up and monitoring of scheduled maintenance status;
- computer-assisted testing of the units.

Versions

B - Standard version (TCAEBY-THAEBY).
S - Silenced version with soundproofed compressor covers and reduced fans speed (TCAESY-THAESY).

Accessories factory fitted

PUMP - Single or double pump, including one in stand-by, activated automatically on a time basis (for an equal share of operating hours) or in the event of an alarm. The pumps are available with standard static pressure (low static pressure) and increased static pressure (high static pressure).
TANK&PUMP - In addition to that supplied with the PUMP accessory, the pump assembly also includes: 1100 l inertial water buffer tank, expansion tank, bleed and safety valves, water drain tap, electric heater connection and water pressure gauge. The inertial water buffer tank is installed on the water circuit delivery pipe.
STE – Shell&Tube heat exchanger
BCI – Insulated compressors box
DS - Desuperheater with partial condensation heat recovery.
RC100 - Heat recovery with recovery of 100% of the condensation heat. The accessory is complete with condensation control FI10 and a differential pressure switch on the recovery heat exchanger.
TRD - Thermostat with display of the inlet water temperature at the heat recovery/desuperheater with possibility to set the activation set-point of an external control device.
FI10 - Electronic proportional device for continuous control of rotation speed of fans down to an outdoor air temperature of -10°C. (Standard accessory on the S version)
FI15 – EC-FAN for continuous control of rotation speed of fans down to an outdoor air temperature of -15°C.
CR - Power factor correction capacitors (cosφ > 0.94).
FDL - Forced Download Compressors, compressors switch-off to limit the absorbed current and power (Digital Input).
GM - Refrigerant circuit high and low pressure gauges..
CMT - power supply MIN/MAX value control.
RA - Evaporator electrical anti-freeze heater with activator.
RDR - Desuperheater/recovery antifreeze electric heater (with DS or RC100 only), to prevent the risk of ice formation in the recovery heat exchanger when the machine is switched off (as long as the unit is kept connected to the power supply).
RAS - Water buffer tank antifreeze electric heater to prevent the risk of ice formation inside the heat exchanger when the machine is switched off (as long as the unit is not disconnected from the power supply).
RQE – Electric panel trace heater (recommended for low external temperature).
DSP - double set-point via digital consensus.
CS - scrolling set-point (via analogue signal 4-20 mA).
SS - RS 485 serial interface for logical dialogue with building automation, centralised systems and supervision networks (owner protocol, Modbus RTU).
FTT10 - LON serial interface for connection to BMS with FTT10 standard LON protocol.
RAP - Unit with pre-painted aluminium-copper condensing coils.
BRR - Unit with copper-copper condensing coils.
RPB - Coil protection grille.
RPE -Lower compartment protective grilles.
SAM - Spring anti-vibration mountings.
The following factory fitted accessories are available on request:

Accessories supplied loose

KTR - Remote keyboard for remote control, with the same functions as the one built into the unit.

Technical data

Table "A": Technical data

TCAEBY model		4350	4380	4410	5450	6500	6560	6600	6640
STANDARD VERSION									
Nominal cooling capacity (*)	kW	354,0	378,0	417,0	457,0	498,0	561,0	603,0	636,0
E.E.R. (*)		2,83	2,82	2,80	2,84	2,80	2,81	2,80	2,81
E.S.E.E.R.		4,16	4,19	4,08	4,18	4,20	4,15	4,13	4,10
Sound pressure TCAEBY (*) (**)	dB(A)	63,0	63,0	64,0	64,0	64,0	64,0	64,5	65,5
Sound power level TCAEBY (*) (***)	dB(A)	95,0	95,0	96,0	96,0	96,0	96,0	97,0	98,0
Scroll/step compressor	No.	4/4	4/4	4/4	5/5	6/6	6/6	6/6	6/6
Circuits	No.	2	2	2	2	2	2	2	2
Fans	No. x kW	6 x 2,0	6 x 2,0	6 x 2,0	8 x 2,0	8 x 2,0	8 x 2,0	10 x 2,0	10 x 2,0
Fan nominal air flow	m^3/h	116680	115360	115360	157360	157360	153820	196720	196720
Evaporator	Type	Plate	Plate	Plate	Plate	Plate	Plate	Plate	Plate
Evaporator nominal water flow (*)	m^3/h	60,7	64,9	71,5	78,4	85,4	96,3	103,5	109,1
Evaporator nominal pressure drops (*)	kPa	53,0	58,0	56,0	52,0	58,0	38,0	38,0	41,0
Evaporator water content	l	31	31	35	43	43	47	55	55
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See serial no. plate				
Electrical data									
Absorbed power (*)	kW	125,0	134,0	149,0	161,0	178,0	200,0	215,0	226,0
Electrical power supply	V-ph-Hz				400-3-50				
Auxiliary power supply	V-ph-Hz				230-1-50				
Control power supply	V-ph-Hz				24-1-50				
Nominal current	A	206	219	244	267	289	328	350	367
Max. current	A	303	318	348	386	428	488	511	526
Starting current	A	520	535	565	603	649	679	728	743
Dimensions									
Width (L)	mm	3830	3830	3830	4830	4830	4830	5830	5830
Height (H)	mm	2430	2430	2430	2430	2430	2430	2430	2430
Depth (P)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Hydraulic pumping group (accessory)									
Absorbed power P1 (*)	kW	4	4	4	5,5	5,5	5,5	5,5	5,5
Absorbed current P1 (*)	A	8	8	8	10	10	11	11	11
Absorbed power P2 (*)	kW	5,5	5,5	5,5	7,5	7,5	7,5	7,5	7,5
Absorbed current P2 (*)	A	10	10	10	14	14	15	15	15
Available head pressure, standard version P1 (*) (●)	kPa	89	78	68	90	70	89	79	69
Available head pressure, high head version P2 (*) (●)	kPa	122	111	102	146	127	128	119	109
Available head pressure, standard version ASP1 (*) (●●)	kPa	81	69	57	77	54	81	71	60
Available head pressure, high head version ASP2 (*) (●●)	kPa	114	102	90	132	111	121	111	100
Storage tank capacity (●●)	l	1100	1100	1100	1100	1100	1100	1100	1100

(*) In the following conditions: condenser air inlet temperature 35°C; chilled water temperature 7°C; temperature differential at the evaporator 5 K; fouling factor equivalent to $0.35x10^{-4}$ m^2 K/W

(**) Sound pressure level dB(A) at a distance of 10 metre from the unit in a free field with directionality factor Q=2.

(***) Sound power level in dB(A) on the basis of measurements made in compliance with standard UNI EN-ISO 9614 and Eurovent 8/1.

(●) With PUMP accessory

(●●) With TANK & PUMP accessory

N.B.:

The calculation of the E.E.R. does not include pump consumption.

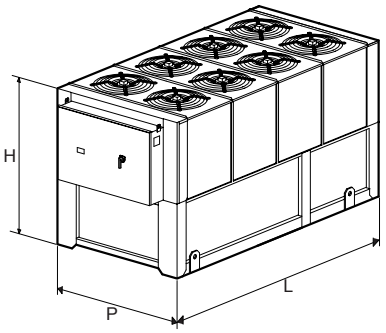


Table "A": Technical data

TCAESY model		4350	4380	4410	5450	6500	6560	6600	6640
SILENT VERSION									
Nominal cooling capacity (*)	kW	340,0	364,0	402,0	440,0	480,0	541,0	580,0	613,0
E.E.R. (*)		2,68	2,66	2,66	2,68	2,67	2,68	2,67	2,69
E.S.E.E.R.		4,01	4,04	4,00	4,05	4,08	4,04	4,01	4,00
Sound pressure TCAESY (*) (**)	dB(A)	58,0	58,0	59,0	59,0	59,0	59,0	59,5	60,5
Sound power level TCAESY (*) (***)	dB(A)	90,0	90,0	91,0	91,0	91,0	91,0	92,0	93,0
Scroll/step compressor	No.	4/4	4/4	4/4	5/5	6/6	6/6	6/6	6/6
Circuits	No.	2	2	2	2	2	2	2	2
Fans	No. x kW	6 x 1,25	6 x 1,25	6 x 1,25	8 x 1,25	8 x 1,25	8 x 1,25	10 x 1,25	10 x 1,25
Fan nominal air flow	m^3/h	93810	92920	93920	126830	126830	121670	159100	159100
Evaporator	Type	Plate	Plate	Plate	Plate	Plate	Plate	Plate	Plate
Evaporator nominal water flow (*)	m^3/h	58,3	62,5	69,0	75,5	82,4	92,8	99,5	105,2
Evaporator nominal pressure drops (*)	kPa	49,0	55,0	53,0	49,0	55,0	36,0	36,0	38,0
Evaporator water content	l	31	31	35	43	43	47	55	55
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See serial no. plate				
Electrical data									
Absorbed power (*)	kW	127,0	137,0	151,0	164,0	180,0	202,0	217,0	228,0
Electrical power supply	V-ph-Hz				400-3-50				
Auxiliary power supply	V-ph-Hz				230-1-50				
Control power supply	V-ph-Hz				24-1-50				
Nominal current	A	208	223	247	272	293	335	355	374
Max. current	A	303	318	348	386	428	488	511	526
Starting current	A	520	535	565	603	649	679	728	743
Dimensions									
Width (L)	mm	3830	3830	3830	4830	4830	4830	5830	5830
Height (H)	mm	2430	2430	2430	2430	2430	2430	2430	2430
Depth (P)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Hydraulic pumping group (accessory)									
Absorbed power P1 (*)	kW	4	4	4	5,5	5,5	5,5	5,5	5,5
Absorbed current P1 (*)	A	8	8	8	10	10	11	11	11
Absorbed power P2 (*)	kW	5,5	5,5	5,5	7,5	7,5	7,5	7,5	7,5
Absorbed current P2 (*)	A	10	10	10	14	14	15	15	15
Available head pressure, standard version P1 (*) (●)	kPa	97	85	76	99	79	95	86	77
Available head pressure, high head version P2 (*) (●)	kPa	130	117	109	154	136	134	126	117
Available head pressure, standard version ASP1 (*) (●●)	kPa	90	76	65	86	65	88	79	69
Available head pressure, high head version ASP2 (*) (●●)	kPa	122	109	99	141	121	127	119	109
Storage tank capacity (●●)	l	1100	1100	1100	1100	1100	1100	1100	1100

(*) In the following conditions: condenser air inlet temperature 35°C; chilled water temperature 7°C; temperature differential at the evaporator 5 K; fouling factor equivalent to $0.35x10^{-4}$ m^2 K/W

(**) Sound pressure level dB(A) at a distance of 10 metre from the unit in a free field with directionality factor Q=2.

(***) Sound power level in dB(A) on the basis of measurements made in compliance with standard UNI EN-ISO 9614 and Eurovent 8/1.

(●) With PUMP accessory

(●●) With TANK & PUMP accessory

N.B.:

The calculation of the E.E.R. does not include pump consumption.

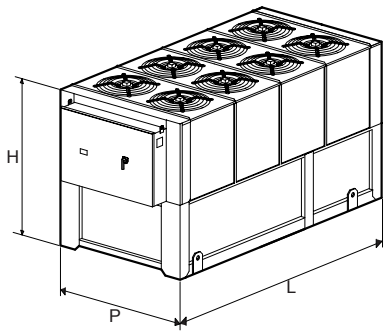


Table "A": Technical data

THAEBY model		4350	4380	4410	5450	6500	6560	6600	6640
STANDARD VERSION									
Nominal cooling capacity (*)	kW	342,0	366,0	405,0	443,0	483,0	545,0	586,0	617,0
E.E.R. (*)		2,71	2,71	2,70	2,73	2,70	2,71	2,71	2,72
E.S.E.E.R.		3,91	3,94	3,86	3,95	3,97	3,94	3,92	3,88
Nominal heating capacity (**)	kW	372,0	394,0	435,0	482,0	512,0	590,0	634,0	669,0
C.O.P. (**)		3,02	3,01	3,02	3,03	3,01	3,04	3,05	3,01
Sound pressure (*)(***)	dB(A)	63,0	63,0	64,0	64,0	64,0	64,0	64,5	65,5
Sound power level THAEBY (*) (****)	dB(A)	95,0	95,0	96,0	96,0	96,0	96,0	97,0	98,0
Scroll/step compressor	No.	4/4	4/4	4/4	5/5	6/6	6/6	6/6	6/6
Circuits	No.	2	2	2	2	2	2	2	2
Fans	No. x kW	6 x 2,0	6 x 2,0	6 x 2,0	8 x 2,0	8 x 2,0	8 x 2,0	10 x 2,0	10 x 2,0
Fan nominal air flow	m^3/h	116680	115360	115360	157360	157360	153820	196720	196720
Evaporator/condenser	Type	Plate	Plate	Plate	Plate	Plate	Plate	Plate	Plate
Evaporator/condenser nominal water flow (**)	m^3/h	64,8	68,6	75,8	84,0	89,2	102,8	110,4	116,5
Evaporator/condenser nominal pressure drops (**)	kPa	52,0	58,0	56,0	51,0	58,0	38,0	37,0	41,0
Evaporator water content	l	31	31	35	43	43	47	55	55
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See serial no. plate				
Electrical data									
Absorbed power in winter operation (**)	kW	126,0	135,0	150,0	162,0	179,0	201,0	216,0	227,0
Absorbed power in summer operation (*)	kW	123,0	131,0	144,0	159,0	170,0	194,0	208,0	222,0
Electrical power supply	V-ph-Hz				400-3-50				
Auxiliary power supply	V-ph-Hz				230-1-50				
Control power supply	V-ph-Hz				24-1-50				
Nominal current	A	211	221	247	270	290	332	353	375
Max. current	A	303	318	348	386	428	488	511	526
Starting current	A	520	535	565	603	649	679	728	743
Dimensions									
Width (L)	mm	3830	3830	3830	4830	4830	4830	5830	5830
Height (H)	mm	2430	2430	2430	2430	2430	2430	2430	2430
Depth (P)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Hydraulic pumping group (accessory)									
Absorbed power P1 (*)	kW	4	4	4	5,5	5,5	5,5	5,5	5,5
Absorbed current P1 (*)	A	8	8	8	10	10	11	11	11
Absorbed power P2 (*)	kW	5,5	5,5	5,5	7,5	7,5	7,5	7,5	7,5
Absorbed current P2 (*)	A	10	10	10	14	14	15	15	15
Available head pressure, standard version P1 (*) (●)	kPa	84	71	60	80	62	80	71	58
Available head pressure, high head version P2 (*) (●)	kPa	117	105	94	137	120	120	111	99
Available head pressure, standard version ASP1 (*) (●●)	kPa	75	61	47	65	44	72	62	48
Available head pressure, high head version ASP2 (*) (●●)	kPa	108	94	82	122	103	112	102	88
Storage tank capacity (●●)	l	1100	1100	1100	1100	1100	1100	1100	1100

(*) In the following conditions: condenser air inlet temperature 35°C; chilled water temperature 7°C; temperature differential at the evaporator 5 K; fouling factor equivalent to $0.35x10^{-4}$ m^2 K/W

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

(***) Sound pressure level dB(A) at a distance of 10 metre from the unit in a free field with directionality factor Q=2.

(****) Sound power level in dB(A) on the basis of measurements made in compliance with standard UNI EN-ISO 9614 and Eurovent 8/1.

(●) With PUMP accessory

(●●) With TANK & PUMP accessory

N.B.:

The calculation of the E.E.R. and C.O.P. does not include pump consumption.

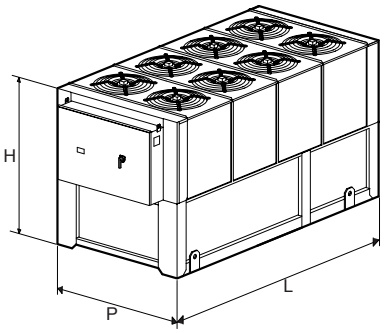


Table "A": Technical data

THAESY model		4350	4380	4410	5450	6500	6560	6600	6640
SILENT VERSION									
Nominal cooling capacity (*)	kW	335,0	357,0	391,0	430,0	470,0	528,0	568,0	599,0
E.E.R. (*)		2,60	2,59	2,57	2,59	2,57	2,60	2,59	2,60
E.S.E.E.R.		3,94	3,96	3,87	3,96	3,97	3,95	3,93	3,90
Nominal heating capacity (**)	kW	357,0	381,0	420,0	460,0	495,0	567,0	609,0	643,0
C.O.P. (**)		2,88	2,89	2,88	2,84	2,86	2,91	2,87	2,87
Sound pressure (*)(***)	dB(A)	58,0	58,0	59,0	59,0	59,0	59,0	59,5	60,5
Sound power level THAESY (*) (****)	dB(A)	90,0	90,0	91,0	91,0	91,0	91,0	92,0	93,0
Scroll/step compressor	No.	4/4	4/4	4/4	5/5	6/6	6/6	6/6	6/6
Circuits	No.	2	2	2	2	2	2	2	2
Fans	No. x kW	6 x 1,25	6 x 1,25	6 x 1,25	8 x 1,25	8 x 1,25	8 x 1,25	10 x 1,25	10 x 1,25
Fan nominal air flow	m^3/h	94230	92710	92710	124660	123400	123400	158670	158670
Evaporator/condenser	Type	Plate	Plate	Plate	Plate	Plate	Plate	Plate	Plate
Evaporator/condenser nominal water flow (**)	m^3/h	62,2	66,4	73,2	80,1	86,2	98,8	106,1	112,0
Evaporator/condenser nominal pressure drops (**)	kPa	48,0	54,0	53,0	48,0	54,0	35,0	35,0	38,0
Evaporator water content	l	31	31	35	43	43	47	55	55
R410A refrigerant charge					See serial No. plate				
Polyester oil charge					See serial no. plate				
Electrical data									
Absorbed power in winter operation (**)	kW	129,0	138,0	152,0	166,0	183,0	203,0	219,0	230,0
Absorbed power in summer operation (*)	kW	124,0	132,0	146,0	162,0	173,0	195,0	212,0	224,0
Electrical power supply	V-ph-Hz				400-3-50				
Auxiliary power supply	V-ph-Hz				230-1-50				
Control power supply	V-ph-Hz				24-1-50				
Nominal current	A	213	224	251	275	296	336	358	379
Max. current	A	303	318	348	386	428	488	511	526
Starting current	A	520	535	565	603	649	679	728	743
Dimensions									
Width (L)	mm	3830	3830	3830	4830	4830	4830	5830	5830
Height (H)	mm	2430	2430	2430	2430	2430	2430	2430	2430
Depth (P)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Hydraulic pumping group (accessory)									
Absorbed power P1 (*)	kW	4	4	4	5,5	5,5	5,5	5,5	5,5
Absorbed current P1 (*)	A	8	8	8	10	10	11	11	11
Absorbed power P2 (*)	kW	5,5	5,5	5,5	7,5	7,5	7,5	7,5	7,5
Absorbed current P2 (*)	A	10	10	10	14	14	15	15	15
Available head pressure, standard version P1 (*) (●)	kPa	92	79	68	91	72	88	79	68
Available head pressure, high head version P2 (*) (●)	kPa	125	112	102	147	130	128	119	108
Available head pressure, standard version ASP1 (*) (●●)	kPa	84	70	56	77	56	81	70	58
Available head pressure, high head version ASP2 (*) (●●)	kPa	116	103	90	133	114	121	110	98
Storage tank capacity (●●)	l	1100	1100	1100	1100	1100	1100	1100	1100

(*) In the following conditions: condenser air inlet temperature 35°C; chilled water temperature 7°C; temperature differential at the evaporator 5 K; fouling factor equivalent to $0.35x10^{-4}$ m^2 K/W

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

(***) Sound pressure level dB(A) at a distance of 10 metre from the unit in a free field with directionality factor Q=2.

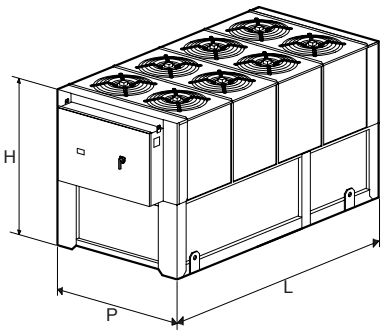
(****) Sound power level in dB(A) on the basis of measurements made in compliance with standard UNI EN-ISO 9614 and Eurovent 8/1.

(●) With PUMP accessory

(●●) With TANK & PUMP accessory

N.B.:

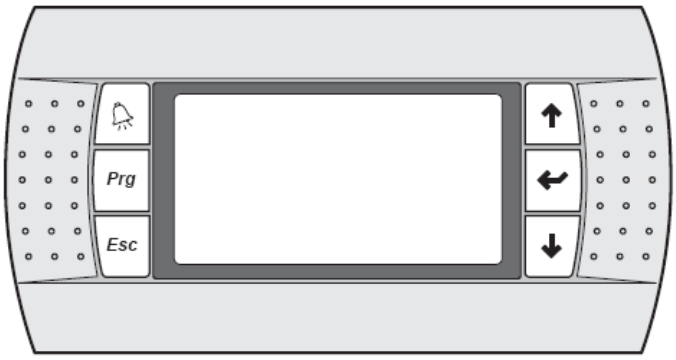
The calculation of the E.E.R. and C.O.P. does not include pump consumption.



Electronic control

Description of keypad and display

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



DISPLAY:
displays the numbers and 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 of the code and reset any alarms.

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

ESC 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.

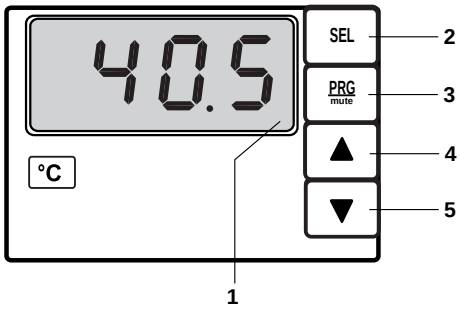
DOWN key:
used to scroll through the list of parameters, statuses and any alarms; makes it possible to modify set points.

KTR – Remote keyboard

The remote keyboard with display (KTR) allows the remote control and display of all the unit's digital and analogue process variables. It therefore possible to control all the machine functions directly in the room. Makes it possible to set and manage the time bands.

Note:
The temporary presence of two devices, on-board machine keyboard and remote keyboard, will cause the on-board machine terminal to be disabled.

TRD – Thermostat with display



The installation of the thermostat with display (TRD) accessory in the machine makes it possible to display the recovery/desuperheater inlet water temperature and to set the activation set-point of an external regulation device (i.e. ON/OFF 3-way valve), enabling rational and effective use of the recovered thermal energy.
1 = DISPLAY:
displays the recovery/desuperheater inlet water temperature.
2/4/5 = SEL, ▲ (up), ▼ (down) keys:
make it possible to set the set-point and activation differential of an external regulation device.
3 = PRG/mute key:
makes it possible to access the parameter programming menu.

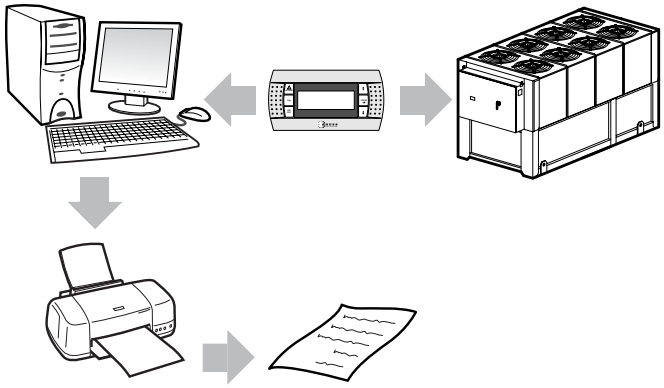
SS / FTT10 Serial interface

Serial connection

All units are equipped with electronic control that is set up interface with an external BMS via a serial communication line.

Supervisor

In general, a super vision 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 res etting them as necessary.
Note: For further information, please contact the RHOSS S.p.A. pre-sales service before ordering.



Performance

Choice of machine and use of the performance tables

○ For each model, table “B” provides the cooling capacity (QF), and the total absorbed electric power (P), on the basis of the evaporator outlet water temperature with constant temperature differences ΔT = 5°C: the value of QT is the value of the heating capacity available to the user in winter mode.
○ Nel rispetto dei limiti di funzionamento le tabelle “B” possono consentire interpolazioni delle prestazioni ma non sono consentite estrapolazioni.
○ Table “D” supplies the E.E.R., ESEER and IPLV indexes values for each model.
○ Table “E” supplies the cooling capacity (%) and the total absorbed power (%) for each model, in correspondence of each supplied cooling capacity step.
○ Table “F” supplies the sound power in dB by octave band, the total sound power level in dB(A) and the sound pressure values in dB(A) for each model at different distances.
○ Table “H” shows the values of corrective coefficients to be applied to the nominal values if water with glycol is used.

Performance data TCAEBY-TCAESY 4350÷6640

Table "B": Cooling capacity TCAEBY

Model	Tue (°C)	Ta (°C)											
		25		30		32		35		40		43	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
4350	5	373,2	104,9	354,4	113,7	346,3	117,4	334,4	123,3	314,0	133,6	300,6	140,1
	7	395,0	106,7	374,6	115,5	366,8	119,2	**354,0**	**125,0**	332,5	135,3	318,8	141,8
	9	417,0	108,7	396,1	117,5	387,5	121,1	374,3	126,9	351,1	137,0	337,0	143,5
	11	439,7	110,7	418,2	119,4	408,9	123,1	395,3	128,8	370,9	139,0	-	-
	13	463,2	112,8	439,9	121,4	430,9	125,1	416,4	130,8	391,3	140,9	-	-
	15	486,8	114,9	462,9	123,5	453,6	127,2	438,1	132,9	411,7	142,9	-	-
4380	5	397,8	112,3	377,6	121,9	370,1	126,0	357,1	132,1	335,3	143,3	320,9	150,5
	7	420,9	114,3	399,6	123,8	391,3	127,8	**378,0**	**134,0**	354,5	144,9	340,3	152,0
	9	443,7	116,4	422,3	125,7	413,3	129,7	399,6	135,8	374,8	146,8	359,7	153,6
	11	468,4	118,5	445,3	127,7	436,0	131,6	421,3	137,7	395,9	148,6	-	-
	13	492,8	120,6	469,0	129,7	459,4	133,6	443,8	139,7	417,1	150,5	-	-
	15	517,9	122,8	493,5	131,9	483,0	135,7	467,0	141,8	439,5	152,4	-	-
4410	5	440,2	125,9	417,5	136,0	407,8	140,3	393,2	147,0	368,0	159,0	351,8	166,6
	7	466,4	128,4	442,5	138,3	432,3	142,5	**417,0**	**149,0**	389,8	160,7	372,7	168,1
	9	493,0	130,7	467,9	140,5	457,9	144,7	441,0	151,2	412,4	162,6	395,2	169,7
	11	520,6	133,1	494,2	142,8	482,9	146,9	466,0	153,3	435,9	164,4	-	-
	13	549,2	135,5	521,5	145,1	509,7	149,2	491,9	155,5	460,4	166,5	-	-
	15	578,1	138,0	549,1	147,5	536,7	151,5	518,0	157,7	485,8	168,6	-	-
5450	5	479,3	136,4	455,1	146,8	444,7	151,4	429,1	158,4	402,2	171,1	384,8	179,2
	7	509,4	139,1	484,2	149,5	473,9	153,9	**457,0**	**161,0**	427,9	173,4	410,1	181,4
	9	541,5	141,9	514,3	152,3	503,1	156,7	485,0	163,7	454,6	175,9	435,3	183,7
	11	573,7	144,9	545,4	155,1	533,4	159,5	513,8	166,4	482,2	178,6	-	-
	13	606,8	147,9	576,3	158,1	563,4	162,5	544,7	169,3	510,6	181,3	-	-
	15	640,8	151,1	609,3	161,2	595,5	165,6	575,3	172,3	539,3	184,2	-	-
6500	5	522,0	149,8	496,0	161,6	485,2	166,7	468,1	174,8	438,5	189,1	419,6	198,2
	7	556,2	153,0	528,1	164,9	516,4	170,0	**498,0**	**178,0**	466,9	192,1	447,5	201,1
	9	590,6	156,4	561,3	168,2	548,8	173,3	528,9	181,3	496,4	195,4	474,9	204,2
	11	626,2	159,9	594,7	171,8	581,1	176,9	560,8	184,8	525,8	198,8	-	-
	13	663,0	163,7	629,0	175,5	615,6	180,6	593,8	188,5	557,3	202,4	-	-
	15	700,8	167,7	664,3	179,5	649,9	184,5	627,7	192,4	588,5	206,2	-	-
6560	5	589,6	163,6	559,8	179,7	547,8	186,3	529,0	197,1	495,3	216,1	474,5	228,3
	7	624,7	166,7	594,3	182,7	581,7	189,3	**561,0**	**200,0**	525,7	219,1	503,7	231,2
	9	662,2	169,8	628,4	185,8	615,2	192,6	594,4	203,1	558,2	222,1	535,2	234,1
	11	699,3	173,0	665,8	189,0	651,0	195,8	628,2	206,5	590,2	225,2	-	-
	13	738,9	176,3	702,8	192,3	687,2	199,1	664,3	209,7	623,5	228,5	-	-
	15	778,0	179,7	741,1	195,7	724,8	202,5	699,7	213,1	658,1	231,8	-	-
6600	5	636,0	178,9	603,6	194,5	590,1	201,3	568,9	211,9	532,0	230,9	509,4	242,9
	7	673,4	182,0	640,4	197,7	625,3	204,5	**603,0**	**215,0**	565,3	233,6	540,6	245,4
	9	713,4	185,2	676,6	200,9	661,8	207,5	638,5	218,0	597,9	236,3	573,0	248,2
	11	753,9	188,4	715,4	204,0	699,9	210,7	675,4	221,1	632,9	239,4	-	-
	13	796,1	191,7	755,7	207,3	738,3	213,9	712,7	224,2	668,1	242,4	-	-
	15	838,7	195,1	796,4	210,7	778,2	217,2	751,4	227,5	704,8	245,5	-	-
6640	5	671,3	191,1	637,4	206,2	622,8	212,7	600,3	223,0	560,8	241,2	536,9	252,7
	7	710,6	194,6	674,0	209,7	659,6	216,1	**636,0**	**226,0**	594,6	243,8	568,5	255,0
	9	751,5	198,1	713,0	213,0	696,9	219,4	673,2	229,2	628,7	246,7	601,3	257,4
	11	794,0	201,7	753,7	216,5	736,8	222,7	710,8	232,4	665,3	249,5	-	-
	13	837,0	205,4	794,8	219,9	775,9	226,1	749,9	235,7	701,0	252,4	-	-
	15	881,6	209,0	836,2	223,5	817,7	229,6	789,2	239,1	739,3	255,6	-	-

Ta = Dry bulb external air temper ature.

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

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

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

Table "B": Cooling capacity TCAESY

Model	Tue (°C)	Ta (°C)											
		25		30		32		35		40		43	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
4350	5	359,8	105,9	340,8	115,1	333,3	119,0	321,4	125,1	300,7	135,7	288,0	142,5
	7	380,5	108,0	360,9	117,1	352,7	121,0	**340,0**	**127,0**	318,7	137,6	305,1	144,3
	9	400,8	110,1	380,7	119,2	372,2	123,0	359,2	129,0	336,2	139,6	322,2	146,1
	11	423,0	112,3	401,1	121,4	392,4	125,2	378,4	131,2	354,8	141,6	-	-
	13	444,6	114,6	422,2	123,7	412,7	127,5	398,3	133,4	373,4	143,8	-	-
	15	467,0	117,0	443,9	126,0	434,1	129,8	418,8	135,7	392,6	146,0	-	-
4380	5	385,0	114,2	365,0	124,3	357,0	128,3	344,7	134,9	322,5	146,5	309,3	153,9
	7	406,6	116,5	386,0	126,4	377,2	130,5	**364,0**	**137,0**	341,2	148,3	326,5	155,6
	9	428,9	118,8	407,1	128,5	398,1	132,6	384,5	139,1	360,5	150,3	345,4	157,4
	11	451,3	121,1	429,5	130,7	419,7	134,8	405,1	141,2	379,8	152,3	-	-
	13	475,0	123,4	451,4	133,0	441,9	137,1	426,4	143,4	399,8	154,5	-	-
	15	499,5	125,8	474,7	135,4	464,3	139,5	448,3	145,7	421,1	156,6	-	-
4410	5	427,2	127,0	404,6	137,4	394,9	141,9	380,4	148,8	354,5	161,0	338,3	168,7
	7	451,3	129,5	428,2	139,8	418,0	144,2	**402,0**	**151,0**	375,6	162,9	358,5	170,3
	9	477,1	132,1	452,0	142,3	441,3	146,6	425,2	153,2	396,7	164,8	378,7	172,1
	11	503,8	134,8	476,7	144,8	465,5	149,0	448,6	155,5	418,6	166,9	-	-
	13	530,0	137,4	502,3	147,3	490,6	151,5	472,8	157,9	441,3	169,0	-	-
	15	557,9	140,1	528,0	149,9	516,6	154,0	497,1	160,3	464,9	171,3	-	-
5450	5	463,7	137,8	439,8	149,0	430,4	153,8	414,1	161,3	387,1	174,4	370,4	182,9
	7	493,6	140,8	467,7	151,9	456,6	156,6	**440,0**	**164,0**	411,3	177,1	393,7	185,4
	9	523,6	144,0	495,7	154,9	484,7	159,6	467,2	166,9	436,7	179,8	417,7	187,9
	11	554,4	147,2	525,4	158,1	513,1	162,7	494,3	169,9	462,5	182,6	-	-
	13	586,2	150,7	555,0	161,4	542,3	166,0	522,6	173,1	488,9	185,6	-	-
	15	617,6	154,2	585,3	164,8	571,6	169,4	551,7	176,4	516,7	188,7	-	-
6500	5	506,5	150,5	479,8	162,9	468,3	168,3	451,4	176,6	422,1	191,4	404,3	200,6
	7	538,5	153,9	509,7	166,4	498,2	171,7	**480,0**	**180,0**	448,3	194,7	429,1	203,9
	9	571,7	157,7	541,7	170,1	528,2	175,4	509,6	183,6	476,4	198,2	455,6	207,3
	11	604,8	161,6	573,6	174,0	560,2	179,2	539,6	187,4	504,4	201,9	-	-
	13	638,8	165,7	605,2	178,1	592,0	183,3	570,4	191,5	533,1	205,8	-	-
	15	675,0	170,0	638,8	182,4	623,3	187,6	601,4	195,7	562,6	209,8	-	-
6560	5	572,2	164,3	541,6	180,7	529,7	187,6	510,8	198,6	477,2	218,0	456,4	230,0
	7	605,5	167,6	574,2	184,1	560,8	191,1	**541,0**	**202,0**	505,7	221,3	483,8	233,4
	9	640,1	171,2	607,3	187,6	593,2	194,6	572,4	205,5	535,3	224,7	513,3	236,7
	11	676,1	174,8	641,7	191,3	626,9	198,2	605,1	209,1	566,2	228,2	-	-
	13	713,5	178,6	676,4	195,0	660,9	202,0	638,0	212,8	597,2	231,8	-	-
	15	750,2	182,4	711,3	198,9	696,1	205,8	672,2	216,6	630,5	235,5	-	-
6600	5	614,5	179,3	582,4	195,7	568,1	202,8	548,1	213,7	511,5	233,2	488,1	245,2
	7	650,7	182,8	616,0	199,2	602,0	206,1	**580,0**	**217,0**	541,6	236,1	518,1	248,2
	9	688,5	186,3	652,1	202,6	636,4	209,5	613,2	220,3	573,0	239,2	548,3	251,1
	11	726,6	189,9	687,4	206,2	672,0	213,0	647,8	223,7	605,6	242,4	-	-
	13	766,3	193,6	725,1	209,8	707,9	216,7	683,7	227,2	639,5	245,7	-	-
	15	805,0	197,4	763,1	213,6	746,3	220,4	719,8	230,9	673,5	249,2	-	-
6640	5	651,0	191,6	616,3	207,4	601,8	214,2	579,4	224,8	541,1	243,3	516,3	255,1
	7	688,2	195,4	651,8	211,0	636,5	217,7	**613,0**	**228,0**	571,8	246,1	545,7	257,5
	9	726,9	199,2	688,7	214,7	672,6	221,2	648,0	231,4	604,7	249,0	577,4	260,1
	11	767,0	203,2	727,0	218,4	709,0	224,8	683,2	234,8	637,9	252,1	-	-
	13	807,6	207,1	764,4	222,2	746,8	228,5	719,7	238,3	672,2	255,3	-	-
	15	849,5	211,2	804,3	226,1	785,9	232,3	757,6	242,0	707,9	258,6	-	-

Ta = Dry bulb external air temperature.

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

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

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

Performance data THAEBY-THAESY 4350÷6640

Table "B": Cooling capacity THAEBY

Model	Tue (°C)	Ta (°C)											
		25		30		32		35		40		43	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
4350	5	360,4	105,2	342,2	114,3	334,5	118,2	322,7	124,2	302,9	135,0	290,2	141,9
	7	381,3	107,1	362,0	116,2	354,1	120,0	**342,0**	**126,0**	320,6	136,7	307,6	143,5
	9	402,9	109,0	382,6	118,1	373,9	121,9	361,4	127,9	339,5	138,4	325,6	145,1
	11	424,7	111,0	403,8	120,0	394,9	123,9	381,5	129,9	358,4	140,4	-	-
	13	447,2	113,1	425,1	122,1	416,0	126,0	402,3	131,9	378,0	142,3	-	-
	15	470,4	115,2	447,2	124,2	437,8	128,0	423,1	134,0	398,2	144,4	-	-
4380	5	385,6	112,6	366,4	122,3	358,2	126,5	345,9	133,2	324,7	144,8	311,5	152,2
	7	407,8	114,6	387,6	124,3	379,2	128,5	**366,0**	**135,0**	343,6	146,4	329,6	153,7
	9	430,9	116,6	409,5	126,3	400,3	130,5	386,8	136,9	363,8	148,2	348,8	155,3
	11	453,6	118,7	431,6	128,5	422,1	132,5	408,2	138,8	384,0	150,0	-	-
	13	478,1	120,9	454,4	130,7	445,3	134,7	430,4	140,9	405,0	151,9	-	-
	15	502,3	123,1	477,9	132,8	468,5	136,7	452,7	143,0	426,0	154,0	-	-
4410	5	428,1	125,9	405,8	136,4	396,5	141,0	382,0	147,9	357,9	160,1	342,5	168,0
	7	453,5	128,3	430,1	138,8	420,3	143,2	**405,0**	**150,0**	379,7	162,0	362,8	169,5
	9	480,1	130,8	454,6	141,2	444,4	145,4	429,0	152,1	401,7	163,9	384,6	171,3
	11	506,1	133,5	480,2	143,5	469,4	147,8	453,3	154,3	424,6	165,8	-	-
	13	534,0	136,1	506,7	145,9	496,2	150,0	478,5	156,6	448,4	167,8	-	-
	15	562,8	138,6	534,2	148,3	522,4	152,5	503,8	158,9	473,1	169,9	-	-
5450	5	462,7	136,1	439,5	147,3	430,8	152,0	415,6	159,7	390,1	173,6	374,1	182,3
	7	493,8	138,2	468,8	149,5	459,4	154,3	**443,0**	**162,0**	416,3	175,6	398,6	184,4
	9	526,3	140,7	500,2	151,9	489,1	156,6	472,4	164,2	442,6	177,9	424,9	186,5
	11	560,0	143,3	532,0	154,4	520,0	159,2	501,9	166,7	470,9	180,2	-	-
	13	594,0	146,0	563,8	157,1	552,0	161,9	532,6	169,4	500,2	182,6	-	-
	15	629,1	148,7	597,9	160,0	584,0	164,7	564,3	172,1	530,1	185,4	-	-
6500	5	505,5	149,0	479,2	162,1	468,5	167,6	452,0	176,5	424,0	192,1	406,8	202,2
	7	539,0	151,8	512,3	164,6	499,9	170,1	**483,0**	**179,0**	452,8	194,8	434,1	204,9
	9	574,8	154,6	545,1	167,5	533,6	173,1	515,3	181,9	482,7	197,5	462,6	207,5
	11	611,0	157,7	580,0	170,7	567,6	176,3	548,0	184,9	513,9	200,5	-	-
	13	648,6	161,0	616,4	174,0	601,9	179,6	581,9	188,4	545,2	203,9	-	-
	15	687,6	164,4	652,9	177,6	638,6	183,1	615,9	191,9	577,6	207,4	-	-
6560	5	572,6	163,2	543,4	179,8	532,0	187,0	513,2	198,0	481,1	218,0	460,3	230,7
	7	607,5	166,0	576,8	182,6	564,8	189,8	**545,0**	**201,0**	510,4	220,9	489,5	233,4
	9	643,9	168,8	611,6	185,5	598,1	192,7	577,3	203,9	541,0	223,8	519,1	236,4
	11	681,8	171,7	647,9	188,5	632,8	195,7	612,0	206,9	573,9	226,8	-	-
	13	719,3	175,0	683,8	191,8	668,9	198,8	646,1	210,0	607,2	229,9	-	-
	15	759,3	178,1	721,0	195,0	706,5	202,2	682,6	213,2	640,8	233,2	-	-
6600	5	612,5	179,2	582,5	195,4	570,1	202,4	551,3	213,4	518,2	233,1	497,3	245,8
	7	650,2	182,1	618,7	198,0	605,6	205,0	**586,0**	**216,0**	550,2	235,7	528,4	248,1
	9	689,5	185,0	656,4	201,0	642,8	207,7	621,2	218,7	583,7	238,1	560,8	250,5
	11	729,5	188,1	694,8	203,9	680,5	210,7	657,9	221,5	618,6	240,7	-	-
	13	771,1	191,1	734,8	207,0	719,8	213,9	696,1	224,6	655,0	243,5	-	-
	15	814,3	194,2	775,3	210,1	759,6	217,0	734,8	227,6	691,8	246,4	-	-
6640	5	646,3	191,5	614,1	206,9	601,5	213,7	581,7	224,2	546,3	243,0	523,4	255,2
	7	684,8	194,9	652,0	210,0	637,8	216,6	**617,0**	**227,0**	578,9	245,7	554,9	257,6
	9	725,0	198,2	690,5	213,3	675,7	219,8	653,8	229,9	613,9	248,2	587,7	259,9
	11	766,8	201,7	730,6	216,6	715,1	223,0	691,2	233,1	649,3	250,9	-	-
	13	810,3	205,2	771,3	220,1	756,1	226,4	730,0	236,4	686,2	254,0	-	-
	15	854,3	208,7	813,6	223,5	796,6	229,9	770,3	239,7	724,5	257,1	-	-

Ta = Dry bulb external air temperature.

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

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

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

Table "B": Cooling capacity THAESY

Model	Tue (°C)	Ta (°C)											
		25		30		32		35		40		43	
		QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
4350	5	354,4	106,9	336,0	116,6	328,3	120,6	316,9	126,9	296,3	138,1	284,0	145,1
	7	374,1	109,1	355,2	118,6	347,3	122,7	**335,0**	**129,0**	313,4	140,1	300,8	146,9
	9	395,1	111,2	374,5	120,8	366,4	124,8	353,7	131,1	331,5	141,9	318,0	148,9
	11	416,7	113,5	395,0	123,0	386,1	127,0	373,1	133,2	349,7	144,0	-	-
	13	437,9	115,8	416,2	125,3	407,0	129,3	392,5	135,5	368,5	146,2	-	-
	15	460,3	118,2	436,9	127,7	427,4	131,7	412,6	137,8	387,3	148,6	-	-
4380	5	377,6	114,4	358,3	124,7	350,1	129,1	337,7	136,0	316,8	147,9	303,5	155,5
	7	399,1	116,7	378,2	126,9	369,7	131,3	**357,0**	**138,0**	335,0	149,7	320,8	157,2
	9	420,8	119,0	399,3	129,2	390,6	133,5	377,0	140,1	353,8	151,7	338,7	159,1
	11	443,3	121,4	420,6	131,6	411,7	135,7	397,6	142,2	372,7	153,7	-	-
	13	466,4	123,9	442,5	133,9	433,4	138,0	418,4	144,5	392,7	155,9	-	-
	15	489,1	126,4	465,2	136,3	455,1	140,5	439,8	147,0	413,4	158,2	-	-
4410	5	415,4	127,1	392,4	138,1	383,2	142,6	369,3	149,8	344,7	162,2	329,2	170,1
	7	438,8	129,8	415,3	140,6	405,6	145,0	**391,0**	**152,0**	365,1	164,1	348,8	171,8
	9	463,1	132,6	439,1	143,1	428,9	147,5	412,8	154,3	385,5	166,2	369,2	173,6
	11	489,0	135,3	463,1	145,6	452,4	149,9	436,2	156,6	407,6	168,3	-	-
	13	515,2	138,1	488,0	148,2	476,7	152,5	459,8	159,0	429,7	170,5	-	-
	15	541,4	140,8	512,9	150,9	501,9	155,1	483,3	161,6	452,6	172,8	-	-
5450	5	451,1	138,3	428,1	150,2	418,6	155,3	403,6	163,3	377,4	178,0	361,5	187,3
	7	480,5	141,0	455,7	152,9	446,3	158,0	**430,0**	**166,0**	402,6	180,4	385,4	189,5
	9	511,0	143,8	485,2	155,7	474,1	160,8	457,4	168,8	428,3	183,0	410,3	191,9
	11	542,6	146,9	514,8	158,7	503,8	163,8	485,9	171,7	455,0	185,7	-	-
	13	575,3	150,0	545,4	161,8	533,6	166,9	514,3	174,8	482,1	188,6	-	-
	15	608,0	153,2	576,9	165,0	564,3	170,1	543,5	177,9	510,1	191,7	-	-
6500	5	493,5	151,3	468,0	164,9	457,3	170,6	440,8	179,7	412,8	196,0	395,5	206,5
	7	526,0	154,4	498,5	168,0	487,8	173,8	**470,0**	**183,0**	440,6	199,1	421,9	209,4
	9	559,8	157,8	531,1	171,4	518,6	177,2	500,4	186,4	468,7	202,5	448,5	212,8
	11	594,9	161,4	563,9	175,1	550,5	180,8	530,8	189,9	497,7	206,0	-	-
	13	630,2	165,2	597,9	178,9	583,5	184,8	563,4	193,9	526,7	209,9	-	-
	15	666,5	169,2	631,8	183,0	617,5	188,8	594,8	197,9	557,6	213,7	-	-
6560	5	558,2	163,9	528,9	181,0	516,7	188,3	497,8	199,5	465,6	219,8	444,8	232,5
	7	591,5	167,1	560,7	184,3	547,8	191,6	**528,0**	**203,0**	493,3	223,0	472,3	235,7
	9	626,2	170,5	592,9	187,7	580,3	195,0	558,6	206,4	523,1	226,4	501,0	239,1
	11	662,3	173,9	626,4	191,2	613,2	198,5	590,4	209,8	553,1	229,9	-	-
	13	697,8	177,4	661,3	194,8	647,4	202,1	623,5	213,4	584,4	233,4	-	-
	15	735,7	181,1	697,4	198,5	681,8	205,7	657,8	217,1	615,8	237,0	-	-
6600	5	596,8	180,5	567,0	197,2	554,6	204,5	535,1	215,9	501,2	236,4	480,5	249,5
	7	632,7	183,8	601,4	200,6	588,5	207,8	**568,0**	**219,0**	532,4	239,3	509,7	252,1
	9	670,2	187,1	637,3	203,9	622,8	211,1	601,3	222,4	564,0	242,4	541,2	254,9
	11	708,2	190,5	673,7	207,3	658,4	214,4	636,0	225,6	596,9	245,5	-	-
	13	747,6	194,1	710,5	210,8	695,6	218,0	672,0	229,0	631,1	248,6	-	-
	15	787,5	197,7	749,8	214,3	734,2	221,5	708,4	232,4	665,6	252,0	-	-
6640	5	630,8	192,7	598,7	208,8	586,2	215,7	566,4	226,6	530,1	246,2	507,2	258,6
	7	668,6	196,4	634,9	212,4	620,7	219,3	**599,0**	**230,0**	561,9	249,1	537,9	261,1
	9	706,9	200,1	671,5	216,0	656,7	222,8	634,9	233,3	595,0	252,1	569,9	263,7
	11	746,8	204,1	709,7	219,7	694,2	226,4	670,3	236,8	628,4	255,2	-	-
	13	787,1	207,9	748,3	223,4	732,0	230,0	707,0	240,3	663,2	258,4	-	-
	15	829,0	211,9	788,3	227,4	771,3	233,8	745,1	243,9	699,3	261,7	-	-

Ta = Dry bulb external air temperature.

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

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

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

Table "B": Heating capacity THAEBY

Model	Ta (°C)	UR (%)	Tuc (°C)											
			30		35		40		45		50		55	
			QT	P	QT	P	QT	P	QT	P	QT	P	QT	P
			kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
4350	-5	90	289,4	90,1	286,9	98,6	301,6	109,1	298,6	120,7	-	-	-	-
	0	90	329,1	91,6	325,4	99,9	321,7	109,9	318,7	121,3	332,0	134,6	-	-
	7	90	391,6	93,8	384,6	102,0	378,4	111,8	**372,0**	**123,0**	366,4	135,7	360,3	149,8
	10	90	422,8	94,9	414,1	103,1	406,0	112,8	398,8	123,9	391,4	136,6	383,9	150,5
	15	85	472,1	96,5	461,4	104,8	451,4	114,4	441,4	125,5	431,2	138,0	421,0	151,8
	20	80	525,1	98,3	512,3	106,5	500,3	116,2	488,2	127,2	475,1	139,7	461,9	153,5
4380	-5	90	306,7	95,5	303,1	104,2	301,8	114,9	317,1	127,9	-	-	-	-
	0	90	349,7	97,5	344,6	106,2	340,1	116,6	356,1	129,4	350,6	143,2	-	-
	7	90	415,8	100,3	408,1	108,9	401,1	119,1	**394,0**	**131,0**	387,6	144,5	380,3	159,5
	10	90	449,0	101,5	440,3	110,1	431,5	120,3	422,6	132,1	414,4	145,3	405,3	160,1
	15	85	504,0	103,6	492,4	112,1	481,7	122,2	469,9	133,8	458,0	146,9	446,0	161,3
	20	80	562,0	105,6	548,4	114,2	534,6	124,3	519,8	135,7	505,8	148,6	489,9	162,9
4410	-5	90	340,1	104,7	335,7	113,7	333,2	125,1	331,2	139,0	-	-	-	-
	0	90	351,8	105,6	381,0	116,6	375,8	127,7	371,0	141,0	367,6	156,3	-	-
	7	90	461,3	111,4	410,0	118,5	442,5	131,2	**435,0**	**144,0**	424,7	158,2	415,8	174,2
	10	90	449,5	111,0	441,1	120,0	479,4	132,9	468,0	145,4	454,5	159,2	444,0	174,8
	15	85	503,6	113,5	492,1	122,6	482,7	133,3	516,6	147,3	502,3	160,9	485,2	175,9
	20	80	559,3	115,9	547,2	124,9	534,6	135,6	520,8	147,8	557,5	163,0	536,8	177,6
5450	-5	90	375,4	116,8	371,0	127,2	367,3	139,9	365,2	154,7	-	-	-	-
	0	90	429,5	119,1	422,1	129,5	415,8	141,9	410,2	156,4	405,8	172,8	-	-
	7	90	512,4	122,5	502,3	132,8	492,8	144,9	**482,0**	**159,0**	472,9	174,9	462,5	192,7
	10	90	553,8	124,0	541,8	134,3	530,4	146,4	518,6	160,4	506,5	176,1	493,0	193,7
	15	85	621,4	126,5	607,4	136,8	591,9	148,9	577,0	162,7	561,8	178,2	545,1	195,5
	20	80	694,5	129,0	676,3	139,4	658,6	151,5	639,4	165,3	619,8	180,7	599,8	197,8
6500	-5	90	397,7	124,4	393,9	136,5	390,7	150,4	388,3	166,3	-	-	-	-
	0	90	453,9	126,2	447,5	138,1	441,7	151,9	436,6	167,5	431,8	185,1	-	-
	7	90	541,3	129,2	531,3	140,9	521,8	154,5	**512,0**	**170,0**	502,9	187,5	493,5	207,0
	10	90	585,7	130,7	573,6	142,3	562,2	156,0	549,4	171,5	538,2	189,0	526,8	208,4
	15	85	657,8	133,2	642,7	144,8	628,2	158,5	613,3	174,1	597,9	191,6	582,2	211,1
	20	80	733,5	135,9	715,2	147,7	698,5	161,4	679,2	177,0	660,5	194,6	640,4	214,1
6560	-5	90	455,6	138,0	453,5	152,9	452,6	170,6	454,3	191,1	-	-	-	-
	0	90	516,3	138,8	512,4	154,0	509,0	171,8	506,8	192,3	505,8	215,5	-	-
	7	90	612,0	140,2	604,0	155,5	596,4	173,4	**590,0**	**194,0**	584,9	217,2	580,2	243,2
	10	90	660,4	140,9	650,2	156,2	641,1	174,2	633,3	194,8	624,4	218,1	616,7	243,9
	15	85	739,2	142,0	726,6	157,3	714,5	175,3	701,9	195,9	690,6	219,2	679,0	245,1
	20	80	822,9	143,1	807,9	158,5	790,7	176,5	776,4	197,2	760,1	220,3	745,1	246,1
6600	-5	90	489,5	151,5	483,9	165,5	479,6	182,8	476,5	203,2	-	-	-	-
	0	90	563,6	153,9	549,7	168,1	542,5	185,3	535,8	205,2	532,7	228,1	-	-
	7	90	674,8	157,3	661,6	171,5	648,0	188,4	**634,0**	**208,0**	619,6	230,2	607,4	255,0
	10	90	721,5	158,5	706,6	172,8	692,1	189,6	678,9	209,1	661,0	231,1	642,9	255,6
	15	85	819,3	160,9	799,9	175,2	781,8	192,0	759,6	211,1	737,0	232,8	714,1	256,8
	20	80	913,3	163,1	890,0	177,2	864,3	193,9	839,0	212,9	811,4	234,4	784,5	258,6
6640	-5	90	519,0	163,2	511,9	176,8	507,6	194,1	503,8	215,2	-	-	-	-
	0	90	596,1	167,5	582,8	181,0	573,9	197,8	565,6	217,9	557,7	241,2	-	-
	7	90	715,5	172,9	701,3	186,5	685,8	202,9	**669,0**	**222,0**	648,4	243,8	631,8	268,2
	10	90	768,0	175,0	750,3	188,6	735,6	204,9	716,0	223,7	695,2	245,0	676,7	268,8
	15	85	862,4	178,5	840,8	192,1	820,6	208,1	801,7	226,7	775,0	247,3	751,7	270,3
	20	80	968,6	181,8	942,9	195,4	914,8	211,3	884,2	229,4	852,3	249,7	823,0	272,3

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

Ta = Dry bulb external air temperature.

UR = Relative humidity..

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

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

Table "B": Heating capacity THAESY

Model	Ta (°C)	UR (%)	Tuc (°C)											
			30		35		40		45		50		55	
			QT	P	QT	P	QT	P	QT	P	QT	P	QT	P
			kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
4350	-5	90	277,0	89,4	275,3	98,4	274,3	109,1	287,8	121,6	-	-	-	-
	0	90	314,8	90,9	311,3	99,7	308,8	110,2	306,7	122,3	319,6	136,3	-	-
	7	90	373,7	93,1	367,7	101,8	362,4	112,1	**357,0**	**124,0**	352,8	137,4	364,3	152,8
	10	90	403,3	94,2	395,5	102,9	389,4	113,1	383,1	124,9	376,7	138,2	370,3	153,0
	15	85	451,2	96,0	441,6	104,7	432,7	114,8	423,8	126,6	415,6	139,6	406,0	154,4
	20	80	501,8	97,8	490,2	106,5	479,4	116,6	468,5	128,2	457,5	141,4	445,5	155,9
4380	-5	90	295,3	94,7	293,0	103,9	292,0	115,2	291,8	128,5	-	-	-	-
	0	90	336,4	96,7	332,5	105,8	328,9	116,9	326,4	129,8	340,8	144,9	-	-
	7	90	399,2	99,6	393,3	108,7	386,8	119,4	**381,0**	**132,0**	375,6	146,1	370,0	162,0
	10	90	431,7	100,9	424,0	109,9	416,2	120,6	409,1	133,0	401,1	147,0	393,8	162,5
	15	85	483,8	102,9	474,3	112,0	464,5	122,6	453,8	134,9	443,9	148,6	433,0	163,9
	20	80	539,8	105,0	527,3	114,1	515,6	124,7	502,8	136,8	489,0	150,4	475,2	165,4
4410	-5	90	326,9	104,4	323,8	113,9	321,6	126,0	321,4	140,9	-	-	-	-
	0	90	375,6	107,6	370,0	117,2	364,0	128,9	358,5	142,9	356,5	159,1	-	-
	7	90	401,1	109,2	439,4	121,2	428,3	132,6	**420,0**	**146,0**	412,2	161,2	403,2	178,2
	10	90	432,3	111,0	424,7	120,5	460,7	134,2	452,5	147,4	440,8	162,1	430,3	178,6
	15	85	484,0	113,6	474,1	123,2	512,5	136,7	499,6	149,5	487,1	163,9	472,6	179,9
	20	80	538,8	116,1	527,5	125,7	515,8	137,0	504,5	149,9	541,5	166,1	521,0	181,4
5450	-5	90	357,0	117,0	353,1	128,2	350,8	141,7	349,1	157,6	-	-	-	-
	0	90	407,5	119,4	401,2	130,5	396,4	143,8	392,3	159,2	388,4	176,8	-	-
	7	90	485,8	122,9	476,9	133,9	468,6	146,9	**460,0**	**162,0**	451,1	179,1	442,9	198,1
	10	90	523,9	124,6	514,1	135,6	504,0	148,5	493,5	163,4	483,6	180,3	472,5	199,1
	15	85	589,2	127,2	575,6	138,2	563,5	151,1	549,0	165,9	536,2	182,5	521,0	200,9
	20	80	657,8	129,8	642,1	140,9	626,0	153,8	609,4	168,5	592,4	185,0	574,0	203,4
6500	-5	90	382,9	124,6	380,0	137,6	377,7	152,5	377,1	169,3	-	-	-	-
	0	90	436,2	126,5	430,7	139,2	426,4	153,8	422,8	170,6	419,5	189,3	-	-
	7	90	519,2	129,5	511,1	141,9	502,7	156,4	**495,0**	**173,0**	487,0	191,6	479,6	212,3
	10	90	561,6	131,0	550,7	143,4	541,4	157,9	530,7	174,4	521,8	193,0	511,4	213,7
	15	85	630,3	133,6	617,5	146,1	604,1	160,4	591,5	177,0	578,4	195,6	565,0	216,3
	20	80	704,6	136,5	688,6	148,9	672,1	163,5	656,3	180,1	638,9	198,7	622,2	219,6
6560	-5	90	436,1	136,7	434,7	152,3	435,1	170,7	437,3	191,9	-	-	-	-
	0	90	493,9	137,6	490,1	153,3	488,7	171,9	487,9	193,2	488,3	217,3	-	-
	7	90	584,3	139,0	577,1	154,9	571,1	173,6	**567,0**	**195,0**	563,4	219,3	560,3	246,2
	10	90	629,2	139,7	620,6	155,6	614,0	174,3	607,0	195,8	600,5	220,0	595,2	247,0
	15	85	705,1	140,8	693,5	156,8	683,1	175,5	673,9	197,0	664,4	221,2	654,5	248,1
	20	80	785,8	141,9	771,0	157,9	757,4	176,6	745,0	198,1	731,4	222,4	717,5	249,3
6600	-5	90	475,4	151,9	470,7	166,9	466,4	185,2	461,0	207,0	-	-	-	-
	0	90	540,6	154,3	533,8	169,5	527,4	187,8	520,7	209,2	516,9	233,7	-	-
	7	90	643,5	157,9	634,6	173,0	622,0	191,1	**609,0**	**212,0**	600,6	235,7	586,9	262,4
	10	90	701,7	159,5	687,8	174,7	671,8	192,6	658,8	213,3	643,7	236,8	626,6	262,9
	15	85	782,8	161,8	765,4	177,0	751,0	194,8	731,0	215,3	712,2	238,4	691,4	264,2
	20	80	870,8	163,9	851,5	179,2	831,7	196,9	807,7	217,2	790,6	240,2	767,7	265,7
6640	-5	90	502,9	162,3	496,7	176,6	489,5	194,6	487,2	216,7	-	-	-	-
	0	90	571,4	166,5	564,6	180,8	556,7	198,6	548,4	219,9	544,6	244,4	-	-
	7	90	683,7	172,1	670,6	186,4	656,1	203,6	**643,0**	**224,0**	629,5	247,0	617,3	272,8
	10	90	736,6	174,4	720,0	188,7	707,3	205,9	688,9	225,8	670,2	248,4	652,9	273,4
	15	85	827,7	178,1	808,3	192,3	792,0	209,3	769,9	228,7	749,1	250,6	724,4	275,0
	20	80	921,9	181,3	900,5	195,7	876,6	212,5	848,6	231,7	823,8	253,1	798,7	276,8

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

Ta = Dry bulb external air temperature.

UR = Relative humidity..

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

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

Energy efficiency at partial loads - EER, ESEER and IPLV index

- The E.E.R. index represents an estimate of the energy efficiency of the cooling unit in nominal design conditions. In reality, the operating time of a chiller in nominal conditions is usually less than the operating time in partial load conditions.
- The I.P.L.V. (Integrated Part Load Value) and E.S.E.E.R. (European Seasonal E.E.R.) indexes are indexes that estimate the average seasonal energy efficiency of the chiller in four load and external air temperature conditions. Generally, two water chillers with the same E.E.R. can have different I.P.L.V. and E.S.E.E.R. values. In fact, for an air-cooled chiller, the average energy efficiency depends on design choices and on the inlet air temperature at the condensing heat exchanger.
- The I.P.L.V. and E.S.E.E.R. energy indexes, respectively introduced by the ARI (American Refrigeration Institute - ARI standard 550/590) and the European Community (EECCAC - Energy Efficiency and Certification of Central Air Conditioners project), have the same formula but differ in terms of the external air temperatures (see table "**C**") and the energy weights attributed to the four load conditions considered for the calculation: 100%, 75%, 50% and 25% and for the Tw produced (6.7°C IPLV / 7°C ESEER).

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

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

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

Table "C": load and temperature conditions

	Condenser inlet air temperature	
Load	**I.P.L.V.**	**E.S.E.E.R.**
100%	35°C	35°C
75%	26.7°C	30°C
50%	18.3°C	25°C
25%	12.8°C	20°C

- Tables "D" show the E.E.R., E.S.E.E.R. and for each model. The high energy efficienc y values at partial loads wer e obtai ned thanks to the optimisation of the heat exchangers and the adoption of fan assemblies managed independentl y on the basis of the l oad conditions.

Table "D": E.E.R. – E.S.E.E.R. TCAEBY

Model	E.S.E.E.R.	E.E.R. 100%	E.E.R. 75%	E.E.R. 50%	E.E.R. 25%
4350	4,16	2,83	3,65	4,17	5,04
4380	4,19	2,82	3,67	4,20	5,08
4410	4,08	2,80	3,58	4,09	4,95
5450	4,18	2,84	3,68	4,18	5,06
6500	4,20	2,80	3,61	4,27	5,12
6560	4,15	2,81	3,57	4,22	5,06
6600	4,13	2,80	3,55	4,19	5,03
6640	4,10	2,81	3,52	4,16	4,99

Table "D": E.E.R. – E.S.E.E.R. TCAESY

Model	E.S.E.E.R.	E.E.R. 100%	E.E.R. 75%	E.E.R. 50%	E.E.R. 25%
4350	4,01	2,68	3,52	4,02	4,86
4380	4,04	2,66	3,54	4,05	4,90
4410	4,00	2,66	3,51	4,01	4,85
5450	4,05	2,68	3,57	4,05	4,91
6500	4,08	2,67	3,51	4,15	4,97
6560	4,04	2,68	3,48	4,11	4,92
6600	4,01	2,67	3,45	4,07	4,89
6640	4,00	2,69	3,44	4,06	4,87

Table "D": E.E.R. – E.S.E.E.R. THAEBY

Model	E.S.E.E.R.	E.E.R. 100%	E.E.R. 75%	E.E.R. 50%	E.E.R. 25%
4350	3,91	2,71	3,43	3,92	4,74
4380	3,94	2,71	3,45	3,95	4,77
4410	3,86	2,70	3,38	3,87	4,68
5450	3,95	2,73	3,48	3,94	4,78
6500	3,97	2,70	3,41	4,03	4,84
6560	3,94	2,71	3,39	4,00	4,80
6600	3,92	2,71	3,37	3,98	4,77
6640	3,88	2,72	3,33	3,94	4,72

Table "D": E.E.R. – E.S.E.E.R. THAESY

Model	E.S.E.E.R.	E.E.R. 100%	E.E.R. 75%	E.E.R. 50%	E.E.R. 25%
4350	3,94	2,60	3,46	3,95	4,78
4380	3,96	2,59	3,47	3,97	4,80
4410	3,87	2,57	3,40	3,88	4,69
5450	3,96	2,59	3,49	3,96	4,80
6500	3,97	2,57	3,41	4,03	4,83
6560	3,95	2,60	3,40	4,02	4,82
6600	3,93	2,59	3,38	4,00	4,79
6640	3,90	2,60	3,35	3,96	4,75

Table "E": Stepped cooling capacity

Models 4350÷4410 have 4 cooling capacity steps, model 5450 has 5 cooling capacity steps and models 6500÷6640 have 6 capacity steps. The following table shows the cooling capacities in % and the total absorbed power in % for the various models, in correspondence to each cooling capacity step supplied.

STEPS	6		5		4		3		2		1	
	QF(*)	P(*)	QF(*)	P(*)	QF(*)	P(*)	QF(*)	P(*)	QF(*)	P(*)	QF(*)	P(*)
MODEL												
4350÷4410	-	-	-	-	100	100	78	73	56	48	27	24
5450	-	-	100	100	84	80	65	61	46	45	22	22
6500÷6640	100	100	86	83	72	67	56	51	39	36	19	19

QF = Cooling capacity %
P = Total abs orbed el ectrical power %
(*) In the followi ng conditions : condenser i nlet air temperature 35°C; chilled water temperature 7°C; temperature differential at evaporator 5°C.

Pressure drops at evaporator

Calculation of pressure drops

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

$G = (Q \times 0{,}86) : \Delta T$

Where:
G (m^3/h) = water flow rate at the exchanger;
Q (kW) = exchanged power, which may be QF (for the evaporator) or QT (for the condenser), depending on the exchanger in question;
ΔT (°C) = temperature differential;

- The pressure drops can be found in the *RHOSS* selection software. Alternatively, they can be estimated using the following approximate formula:

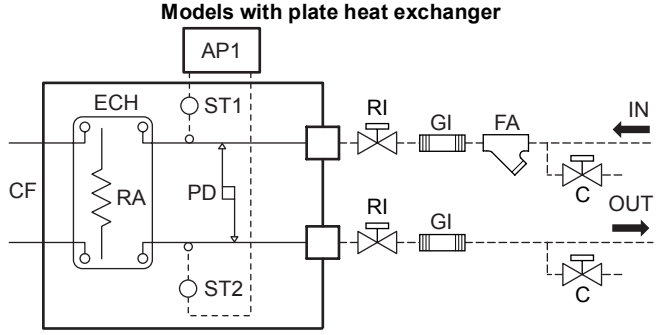
$\Delta pw = \Delta pw_{nom} \times (G : G_{nom})^2$

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

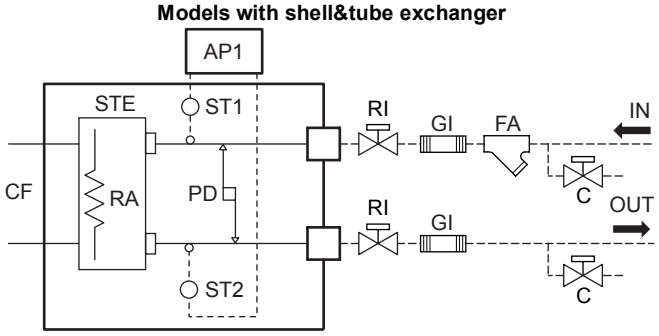
Hydraulic circuit

TCAEY-THAEY

Models with plate heat exchanger

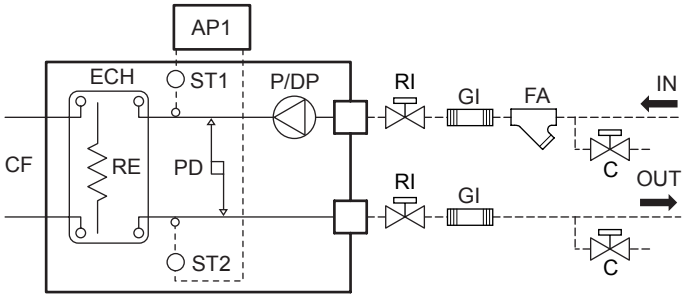


Models with shell&tube exchanger

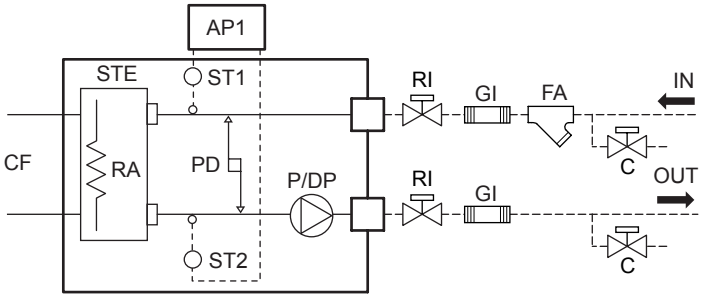


TCAEY-THAEY P1/P2 – DP1/DP2

Models with plate heat exchanger

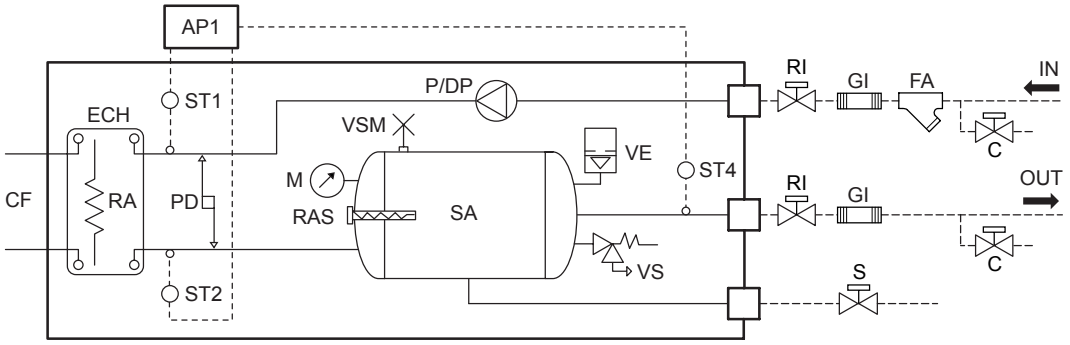


Models with shell&tube exchanger



TCAEY-THAEY ASP1/ASP2 – ASDP1/ASDP2

Models with plate heat exchanger



Legenda

CF refrigerant circuit
ECH Plate evaporator
STE shell&tube evaporator (accessory)
RA Evaporator trace heater (accessory)
PD Differential pressure switch
VSM Manual bleed valve
VS Safety valve (calibration 600 kPa)
SA Water buffer tank (1100 litres)
RAS Tank trace heater (accessory)
AP1 electronic control
ST1 Primary inlet temperature gauge
ST2 Primary outlet temperature gauge
ST4 Water buffer tank outlet temperature gauge (working)
VE Expansion tank (24 liter)
M Pressure gauge
P Pump (PN6 - 600 kPa)
DP Double Pump (PN6 - 600 kPa)

Connections to be made by the installer
FA = Mesh filter
S Water drain
C Charge cock
RI Intercept coc k
GI Anti-vibration connection

Table "F": TCAEBY-THAEBY pressure and sound power level - standard version (°)

MODEL	Sound power levels in dB by octave bands, total sound power level in dB(A) and sound pressure levels in dB(A) at different distances									
	125 Hz	**250 Hz**	**500 Hz**	**1000 Hz**	**2000 Hz**	**4000 Hz**	**8000 Hz**	**Lw**	**Lp (1)**	**Lp (10)**
4350	99	96	91	90	87	81	73	95	75,5	63,0
4380	99	96	91	90	87	81	73	95	75,5	63,0
4410	99	96	91	90	87	81	73	96	76,0	64,0
5450	100	97	92	91	88	82	74	96	76,0	64,0
6500	100	97	92	91	88	82	74	96	76,0	64,0
6560	100	97	92	91	88	82	74	96	76,0	64,0
6600	101	98	93	92	89	83	75	97	76,5	64,5
6640	102	99	94	93	90	84	76	98	77,5	65,5

Table "F": TCAESY-THAESY pressure and sound power level - silent version

MODEL	Sound power levels in dB by octave bands, total sound power level in dB(A) and sound pressure levels in dB(A) at different distances									
	125 Hz	**250 Hz**	**500 Hz**	**1000 Hz**	**2000 Hz**	**4000 Hz**	**8000 Hz**	**Lw**	**Lp (1)**	**Lp (10)**
4350	98	91	86	85	79	71	60	90	70,5	58,0
4380	98	91	86	85	79	71	60	90	70,5	58,0
4410	98	91	86	85	79	71	60	91	71	59,0
5450	99	92	87	86	80	72	61	91	71,0	59,0
6500	99	92	87	86	80	72	61	91	71,0	59,0
6560	99	92	87	86	80	72	61	91	71,0	59,0
6600	100	93	88	87	81	73	62	92	71,5	59,5
6640	101	94	89	88	82	74	63	93	72,5	60,5

Lw = Sound power level in dB(A) on the basis of the measurements made in compliance with the UNI EN-ISO 9614 and Eurovent 8/1 Standards , at nominal operating conditions.

.

Lp = Sound pressure level in dB(A). The noise measurement refers to the units without pump.

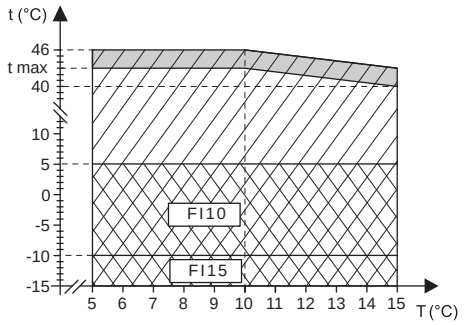
.

(°) If the BCI accessory (soundproofed compressor box) is present, the sound power level Lw is reduced by 2 dB(A).

N.B.:
Eurovent certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.
Sound pressure level in dB(A). referring to the measurements at the distance from the unit indicated in the table, with a directionality factor equal to 2.
It is not possible to extrapolate sound pressure values for distances under 10 m.
With external air temperatures under 25°C, or in the presence of accessory FI10 / FI15, the unit reduces its noise level to a value below the nominal level indicated in the table.

Operating limits for TCAEY-THAEY models

Operation as chiller



T (°C) = temperature of water produced
t (ºC) = outdoor air temperature

Temperature differential at the evaporator: Δt=3÷8°C.

Standard operation.

Operation with condensation control (FI10 – FI15)

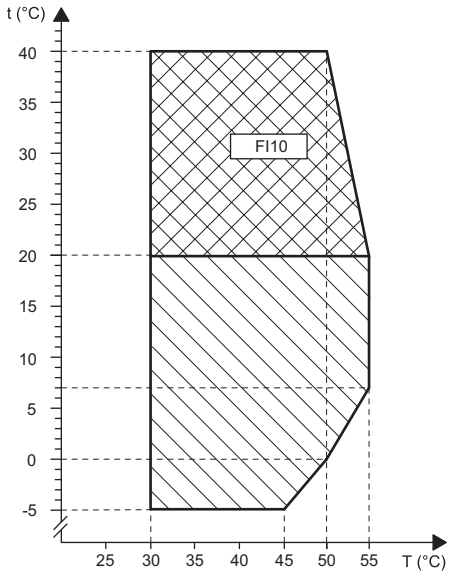
Operation with stepped cooling capacity.

On request, we are able to provide units that produce chilled water at a temperature of below 5°C.

Model	TCAEBY TCAESY	- TCAESY
4350÷6640	**t_{max} = 43°C (1)(2)**	**t_{max} = 40°C (1)(3)**

(1) Evaporator water temperature (IN/OUT) 12/7
(2) Maximum external air temperature with unit in standard operation running on full load.
(3) Maximum external air temperature with unit in silenced mode.

Operation as heat pump



T (°C) = temperature of water produced
t (ºC) = outdoor air temperature

Temperature differential at the condenser: Δt=3÷8°C.

Standard operation.

Operation with condensation control (FI10).

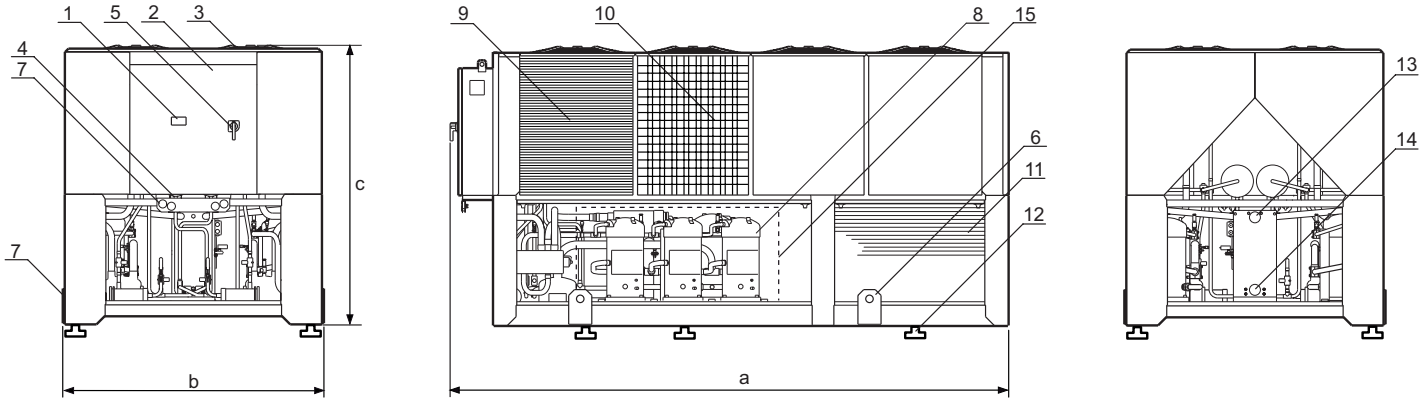
Use of anti-freeze solutions
The use of ethylene glycol is recommended if you do not wish to drain the water from the hydraulic system during the winter stoppage, or if the unit has to supply chilled water at temperatures lower than 5°C. The addition of glycol changes the physical properties of the water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

Table "H": protection from frost during seasonal shutdown
The table shows the multipliers which allow the changes in performance of the units to be determined in proportion to the required percentage of ethylene glycol.
The multipliers refer to the following conditions: condenser inlet air temperature 35°C; chilled water outlet temperature 7°C; temperature differential at evaporator 5°C.
For different operating conditions, the same coefficients can be used as their variations are negligible.
A coiled hot wire electric heater on the water side heat exchanger (RA accessory) prevents the undesired effects of frost during winter shutdowns.

Projected air temperature in °C	**2**	**0**	**-3**	**-6**	**-10**	**-15**	**-20**
% glycol in weight	**10**	**15**	**20**	**25**	**30**	**35**	**40**
Freezing temperature in °C	**-5**	**-7**	**-10**	**-13**	**-16**	**-20**	**-25**
fc G	1,025	1,039	1,054	1,072	1,093	1,116	1,140
fc Δpw	1,085	1,128	1,191	1,255	1,319	1,383	1,468
fc QF	0,975	0,967	0,963	0,956	0,948	0,944	0,937
fc P	0,993	0,991	0,990	0,988	0,986	0,983	0,981

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

Dimensions and footprints



1. Control panel
2. Electrical panel
3. Fan
4. Power supply inlet
5. General isolator
6. Lifting hook
7. Pressure gauges (accessory) and pressure switches
8. Compressor
9. Coil
10. Coil protection grille (accessory)
11. Bottom compartment protection grille (accessory)
12. Anti-vibration (accessory)
13. Evaporator water inlet
14. Evaporator water outlet
15. TCAEY-THAEY soundproofing case (equipment of silent version)

MODEL		**4350**	**4380**	**4410**	**5450**	**6500**	**6560**	**6600**	**6640**
a	mm	3830	3830	3830	4830	4830	4830	5830	5830
b (including lifting hooks)	mm	2430	2430	2430	2430	2430	2430	2430	2430
c	mm	2260	2260	2260	2260	2260	2260	2260	2260
Evaporator inlet/outlet Victaulic water connections		3”	3”	3”	3”	3”	4”	4”	4”
DS - Desuperheater inlet/outlet water connections		1 ½”	1 ½”	1 ½”	1 ½”	1 ½”	1 ½”	1 ½”	1 ½”
RC100 - Total heat recovery inlet/outlet Victaulic water connections		3”	3”	3”	3”	3”	4”	4”	4”

ATTENTION!
The desuperheater (DS), recovery (RC100) and pumps in the PUMP or TANK&PUMP accessories have not been sized as they are subject to evaluation and modifications by our technical office. Contact our pre-sales office for further information.

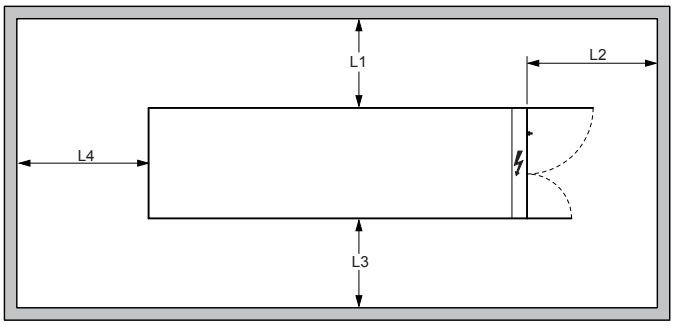
Installation

- The unit is designed for outdoor installation.
- The unit is fitted with victaulic type water connections on the air conditioning system water inlet and outlet.
- 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 fitted with anti-vibration mountings on request (SAM).
- We recommend the installation of air bleed valves and intercept valves that isolate the unit from the rest of the system and a low pressure drop filter on the chiller water inlet.
- It is essential to fit a metal mesh filter (square mesh of no greater than 0.8 mm) on the unit return piping.
- 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.

N.B.:

- The space over the unit must be free from any obstacles. If the unit is completely surrounded by walls, the distances specified are still valid, provided that at least two adjacent walls are not higher than the unit itself. There must be a minimum gap of at least 3.5 m between the top of the unit and any obstacles above it.
- If more than one unit is installed, the minimum distance between the finned coils should be at least 2.5 m.
- For further information contact the RHOSS sales support service.

Clearances and positioning

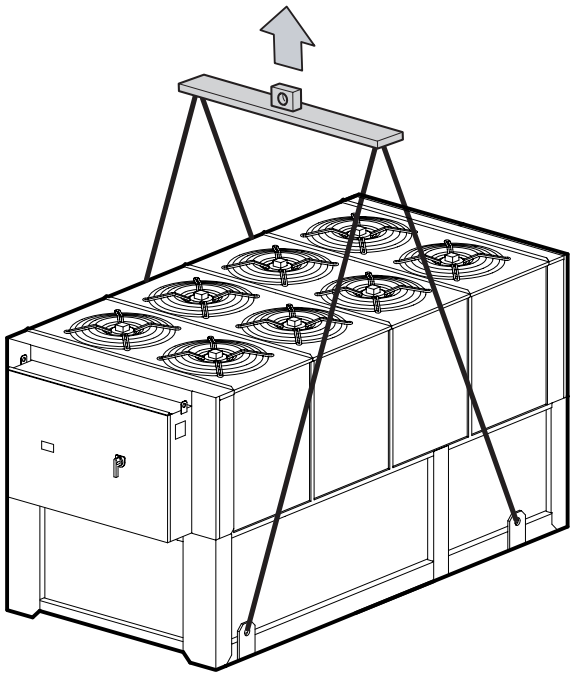


Model		4350-6640
L1	Mm	1800
L2	Mm	1500
L3	Mm	1800
L4	Mm	1500

The clearances refer to units with plate heat exchanger evaporator

Movement

- The unit should be lifted and handled with care to avoid damaging the external structure and the internal mechanical and electrical parts.
- The unit should only be moved and/or lifted by the specially provided lifting-points in the base framework. Use chains of a suitable length to guarantee stable lifting.
- The unit should be handled with care, in order to avoid damage to the external structure and to the internal mechanical and electrical components.



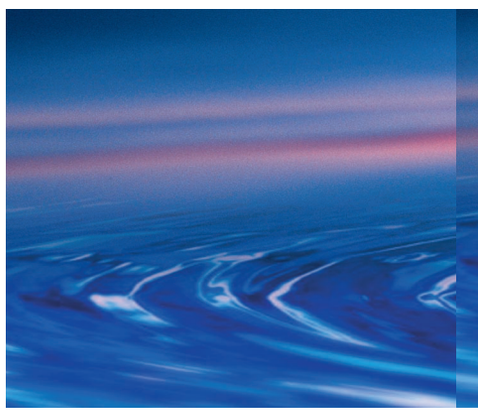
NOTES

TCAEY-THAEY 4350÷6640

Serie Y-Power

Numero Verde
800-214511

RHOSS S.P.A.
Via Oltre Ferrovia, 32 - 33033 Codroipo (UD) - Italy
tel. +39 0432 911611 - fax +39 0432 911600
rhoss@rhoss.it - www.rhoss.it - www.rhoss.com



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