

TCAE-THAE 230÷260

Q-Pack range



MacroSystem
31,4÷62,9 kW
36,9÷72,5 kW



Air cooled water chillers and heat pumps with axial fans.
Scroll-type hermetic compressors and ecological coolant series.



main features

CONTENTS

Main features	page	2
Technical features	page	4
Electronic control	page	6
Performances	page	8
Pressure drops	page	10
Sound levels	page	10
Operating limits	page	11
Heat recovery performance and pressure drops	page	12
Dimensions and volumes	page	16
Installation	page	19
Hydraulic connection	page	20
Electrical connections	page	22

Intended conditions of use

The TCAEB-TCAES units are packaged air cooled water chillers with axial fans.

The THAEB-THAES units are packaged air cooled reversible heat pumps with axial fans.

They are intended for use in conditioning plants where a supply of chilled water (TCAEB-TCAES) or chilled and hot water (THAEB-THAES) is required.

The unit is designed for outdoor installation.

The units conform to the following Directives:

- Machinery Directive 89/392/CEE (MD);
- Low voltage Directive 73/23/CEE (LVD);
- Electromagnetic compatibility Directive 89/336/CEE (EMC);
- Pressure equipment Directive 97/23/CEE (PED).

Code guide

“SERIES” code

T Water chiller or heat pump	C Cooling only	A Axial fans	E Scroll-type hermetic compressors	B Standard version
	H Heat pump			S Silenced version

“MODEL” Code

2 compressors	30 - 60 Approximate cooling capacity (kW)
-------------------------	--

Example: THAEB 260

- Air conditioning unit with condensed air heat pump.
- No. 2 Scroll-type hermetic compressors.
- Nominal cooling capacity approximately 60 kW.



main features

Structural features

- Load-bearing structure made from aluminium profiles with Peraluman panelling, internally coated with sound-absorbent material in models 230-260.
- Scroll-type hermetic rotary compressors complete with internal thermic protection.
- The standard unit is divided up as shown in the following table:

MODEL	Compressors/Steps n.	Circuits n.
230 - 260	2 / 2	1

- Water side heat exchanger with stainless steel plates, complete with frost resistance and insulation in closed cell polyurethane rubber foam.
- Differential pressure switch that protects the units from any interruptions to the water flow.
- Male threaded hydraulic connections.
- Air side heat exchanger coil with copper tubes expanded into aluminium fins.
- Axial electric fans with external rotor, internal overload cut-out and protection grilles.
- Phase monitor that protects the compressor.
- 300W frost resistance inside the tank (TANK&PUMP version only)
- Refrigerant circuit made from annealed copper tubes with silver alloy welding. Complete with: drier filter(s), charge connections, H.P. switch with manual reset, L.P. switch with automatic reset, liquid and moisture sight-glass(es), thermostatic expansion valve(s), end of defrosting pressure switch (for THAEB-THAES), cycle reversing valve (for THAEB-THAES) and liquid receiver (for THAEB-THAES).
- Unit complete with R407C refrigerant charge.

Electrical board

- The electrical board (IP 55) can be accessed from front panel in keeping with IEC standards.
- Lockable watertight box with special key, complete with:
 - electrical wiring arranged for power supply 400V-3ph+N-50Hz;
 - auxiliary power supply 230V-1ph-50Hz;
 - control power supply 12V-1ph-50Hz;
 - power contactors;
 - door interlocking isolator
 - automatic protection switches for every compressor and every fan;
 - automatic protection switch on auxiliary circuit;
 - removable machine controls.

- Programmable electronic board with microprocessor, controlled by the keyboard inserted in the machine. This electronic board performs the following functions:
 - control and management of the machine's inlet/outlet water temperature set points, safety delays, hour-run-meter of each compressor, automatic inversion of the compressor operation sequence, defrosting cycles (for THAEB-THAES), circulation or user system pump, anti-freezing electronic protection with automatic insertion when the machine is switched off, and the functions that control the working interventions of the various unit devices;
 - complete protection of the unit, automatic emergency shutdown and display of the alarms which have been activated;
 - display of the programmed set points on the display, the inlet/outlet water temperatures on the display, the alarms on the display, the operating devices by means of LEDs, chiller or heat pump operation by means of LEDs and defrosting process by means of LEDs (for THAEB-THAES);
 - self-diagnosis with continuous monitoring of the functioning of the unit.
- Advanced functions:
 - prepared for serial connection, with RS485 outlet for logical dialogue with building automation, centralized systems and supervision networks;
 - computer assisted unit testing.

Versions

- **B** - Standard version (TCAEB-THAEB).
- **S** - Silent version with low fan speed and condensing coil with increased surface (TCAES-THAES).

Factory fitted accessories

- **TANK&PUMP: ASP** - Pump unit included in the unit, complete with: inertial storage tank, 300W frost resistance inside the tank, motor-driven circulation pump complete with electronic control system, expansion tank, system manometer, vent and safety valve, water drain.
- **PUMP** - The unit can be fitted with a maximum of 3 motor-driven pumps which can be selected from the following:
 - **P** - Primary circuit motor-driven pump included in the unit, complete with electronic control system.
 - **P/DP** - Primary circuit motor-driven pump with stand-by motor-driven pump for manual insertion.
 - **PU** - Secondary circuit motor-driven pump included in the unit, available in combination with motor-driven pump P or P/DP.
 - **PU/DP** - Secondary circuit motor-driven pump with stand-by motor-driven pump for manual insertion, only available in combination with motor-driven pump P.

- **F110** - Low ambient control for continuous control of the fan rotation speed down to outdoor air temperatures of -10°C during chiller operation.
- **DS15** - 15% recovery with desuperheater.
- **RC50** - 50% recovery with condensation heat recuperator (if the unit is equipped with this accessory it is necessary the F110 accessory).
- **RC100** - 100% recovery with condensation heat recuperator (if the unit is equipped with this accessory it is necessary the F110 accessory).
- **TRD** - Thermostat with display for showing the heat recovery unit/desuperheater outlet water temperature, with possibility to set the activation set-point for an external regulation device (excluding models 470-4160 TANK&PUMP and PUMP).
- **GM** - High and low pressure gauges for each circuit, complete with capillaries.
- **RPB** - Coil protection grilles.

Accessories supplied loose

- **KSA** - Rubber anti-vibration mountings.
- **KTCF** - AS - BS pump unit connection pipes external to the unit, complete with mechanical water filter with stainless steel filter element.
- **KFA** - Mechanical water filter with stainless steel filter element.
- **KTR** - Remote keyboard for remote control, with the same functions as the one built into the unit.
- **KIS** - RS 485 serial interface for logical dialogue with building automation, centralized systems and supervision networks.
- **KCH** - RS232 hardware key to be connected to supervision systems, to combine with one or more KIS serial interface modules in the event of a centralized unit management system.

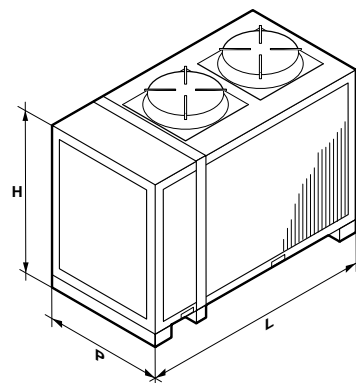
MODEL TCAEB		230	235	245	250	260
Technical data						
Nominal cooling capacity (*)	kW	31,4	37,6	46,4	53,6	62,9
Sound pressure (**)	dB(A)	52	52	54	54	54
Scroll compressor/steps	No.	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Circuits	No.	1	1	1	1	1
Fans	No. x kW	1 x 0,54	1 x 0,54	2 x 0,54	2 x 0,54	2 x 0,54
Fan nominal air flow	m ³ /h	9.900	9.700	16.200	20.400	19.800
Evaporator nominal water flow	l/h	5.400	6.470	7.980	9.220	10.770
Evaporator nominal pressure drops	kPa	30	30	36	33	45
Evaporator water content	l	2,8	3,3	3,9	4,9	5,5
R407C refrigerant charge (***)	kg	9,5	10,0	12,5	13,0	17,0
Polyester oil charge	l	1,6 x 2	4,0 x 2	4,0 x 2	4,0 x 2	4,0 x 2
Electrical data						
Total absorbed power (*)	kW	11,1	13,5	17,5	19,4	22,7
Power supply	V-ph-Hz	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
Auxiliary power supply	V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50
Control power supply	V-ph-Hz	12-1-50	12-1-50	12-1-50	12-1-50	12-1-50
Nominal current	A	19,6	26,6	31,4	36,2	38,2
Max. current	A	23,9	30,8	37,4	42,6	46,7
Starting current	A	86,6	116,2	144,0	150,5	190,5
Dimensions						
Width	W mm	1.510	1.510	2.260	2.260	2.260
Height	H mm	1.730	1.730	1.730	1.730	1.730
Depth	P mm	1.050	1.050	1.050	1.050	1.050

MODEL TCAES		230	235	245	250	260
Technical data						
Nominal cooling capacity (*)	kW	31,4	37,6	46,4	53,6	62,9
Sound pressure (**)	dB(A)	48	50	50	50	51
Scroll compressor/steps	No.	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Circuits	No.	1	1	1	1	1
Fans	No. x kW	1 x 0,25	2 x 0,25	2 x 0,25	2 x 0,25	3 x 0,25
Fan nominal air flow	m ³ /h	7.600	16.000	15.800	15.600	24.000
Evaporator nominal water flow	l/h	5.400	6.470	7.980	9.220	10.770
Evaporator nominal pressure drops	kPa	30	30	36	33	45
Evaporator water content	l	2,8	3,3	3,9	4,9	5,5
R407C refrigerant charge (***)	kg	9,5	10,0	12,5	13,0	17,0
Polyester oil charge	l	1,6 x 2	4,0 x 2	4,0 x 2	4,0 x 2	4,0 x 2
Electrical data						
Total absorbed power (*)	kW	11,1	13,5	17,5	19,4	22,7
Power supply	V-ph-Hz	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
Auxiliary power supply	V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50
Control power supply	V-ph-Hz	12-1-50	12-1-50	12-1-50	12-1-50	12-1-50
Nominal current	A	19,6	26,6	31,4	36,2	38,2
Max. current	A	23,9	30,8	37,4	42,6	46,7
Starting current	A	86,6	116,2	144,0	150,5	190,5
Dimensions						
Width	W mm	1.510	2.260	2.260	2.260	3.010
Height	H mm	1.730	1.730	1.730	1.730	1.730
Depth	P mm	1.050	1.050	1.050	1.050	1.050

(*) In the following conditions: condenser air inlet temperature 35°C, chilled water temperature 7°C, evaporator Δt: 5°C.

(**) The sound pressure level in dB(A) refers to measurement in open field conditions at a distance of 5 m from the unit.

(***) Approximate value: the correct value is shown on the on-board machine plaque.



N.B.:

Data regarding the external static pressure and absorption of the ASP, P, P/DP, PU and PU/DP motor-driven pumps is provided on page 20 - 22.

MODEL THAEB		230	235	245	250	260
Technical data						
Nominal heating capacity (**)	kW	36,9	45,4	56,3	62,6	72,5
Nominal cooling capacity (*)	kW	30,1	36,2	45,9	51,2	59,9
Sound pressure (***)	dB(A)	52	52	54	54	54
Scroll compressor/steps	No.	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Circuits	No.	1	1	1	1	1
Fans	No. x kW	1 x 0,54	1 x 0,54	2 x 0,54	2 x 0,54	2 x 0,54
Fan nominal air flow	m ³ /h	9.900	9.700	16.200	20.400	19.800
Condenser/Evaporator nominal water flow	l/h	5.180	6.230	7.900	8.810	10.300
Cond./evaporator nominal pressure drops	kPa	28	28	35	30	41
Condenser/evaporator water content	l	2,8	3,3	3,9	4,9	5,5
R407C refrigerant charge (****)	kg	10,5	12,0	13,5	15,0	16,0
Polyester oil charge	l	1,6 x 2	4,0 x 2	4,0 x 2	4,0 x 2	4,0 x 2
Electrical data						
Total absorbed power during winter operation (**)	kW	11,1	13,8	17,9	19,6	23,1
Total absorbed power during summer operation (*)	kW	11,1	13,5	17,5	19,4	22,7
Power supply	V-ph-Hz	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
Auxiliary power supply	V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50
Control power supply	V-ph-Hz	12-1-50	12-1-50	12-1-50	12-1-50	12-1-50
Nominal current (****)	A	19,6	26,6	31,4	36,2	38,2
Max. current	A	23,9	30,8	37,4	42,6	46,7
Starting current	A	86,6	116,2	144,0	150,5	190,5
Dimensions						
Width	W mm	1.510	1.510	2.260	2.260	2.260
Height	H mm	1.730	1.730	1.730	1.730	1.730
Depth	D mm	1.050	1.050	1.050	1.050	1.050

MODEL THAES		230	235	245	250	260
Technical data						
Nominal heating capacity (**)	kW	36,9	45,4	56,3	62,6	72,5
Nominal cooling capacity (*)	kW	30,1	36,2	45,9	51,2	59,9
Sound pressure (***)	dB(A)	48	50	50	50	51
Scroll compressor/steps	No.	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Circuits	No.	1	1	1	1	1
Fans	No. x kW	1 x 0,25	2 x 0,25	2 x 0,25	2 x 0,25	3 x 0,25
Fan nominal air flow	m ³ /h	7.600	16.000	15.800	15.600	24.000
Condenser/Evaporator nominal water flow	l/h	5.180	6.230	7.900	8.810	10.300
Cond./evaporator nominal pressure drops	kPa	28	28	35	30	41
Condenser/evaporator water content	l	2,8	3,3	3,9	4,9	5,5
R407C refrigerant charge (****)	kg	11,0	13,0	14,0	15,5	17,5
Polyester oil charge	l	1,6 x 2	4,0 x 2	4,0 x 2	4,0 x 2	4,0 x 2
Electrical data						
Total absorbed power during winter operation (**)	kW	11,1	13,8	17,9	19,6	23,1
Total absorbed power during summer operation (*)	kW	11,1	13,5	17,5	19,4	22,7
Power supply	V-ph-Hz	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
Auxiliary power supply	V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50
Control power supply	V-ph-Hz	12-1-50	12-1-50	12-1-50	12-1-50	12-1-50
Nominal current (****)	A	19,6	26,6	31,4	36,2	38,2
Max. current	A	23,9	30,8	37,4	42,6	46,7
Starting current	A	86,6	116,2	144,0	150,5	190,5
Dimensions						
Width	W mm	1.510	2.260	2.260	2.260	3.010
Height	H mm	1.730	1.730	1.730	1.730	1.730
Depth	P mm	1.050	1.050	1.050	1.050	1.050

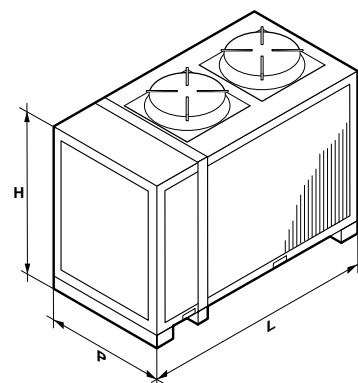
(*) In the following conditions: condenser air inlet temperature 35°C, chilled water temperature 7°C, evaporator Δt: 5°C.

(**) In the following conditions: evaporator inlet air temperature 7°C W.B., 70% H.R.; hot water temperature 45°C.

(***) The sound pressure level in dB(A) refers to measurement in open field conditions at a distance of 5 m from the unit.

(****) The nominal current data provided is the maximum value between summer and winter operation.

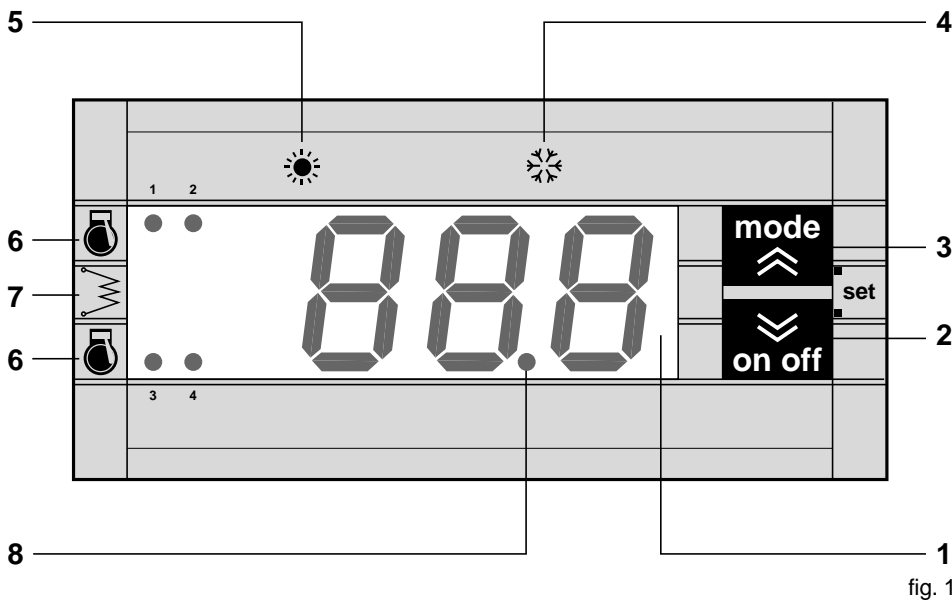
(*****) Approximate value: the correct value is shown on the on-board machine plaque.



N.B.:

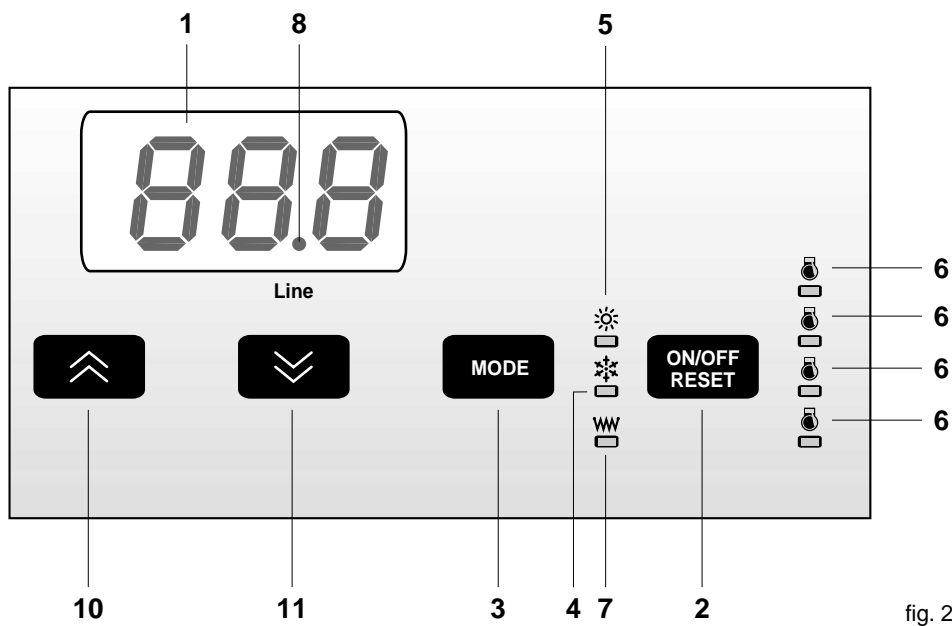
Data regarding the external static pressure and absorption of the ASP, P, P/DP, PU and PU/DP motor-driven pumps is provided on page 20 - 22.

Keyboard and display description



The keyboard with display makes it possible to view the working temperature and all the unit process variables. It provides access to the working set point parameters and allows changes to be made. It also makes it possible to access the unit management parameters with a password (access for authorized personnel only).

KTR - Remote keyboard for remote control

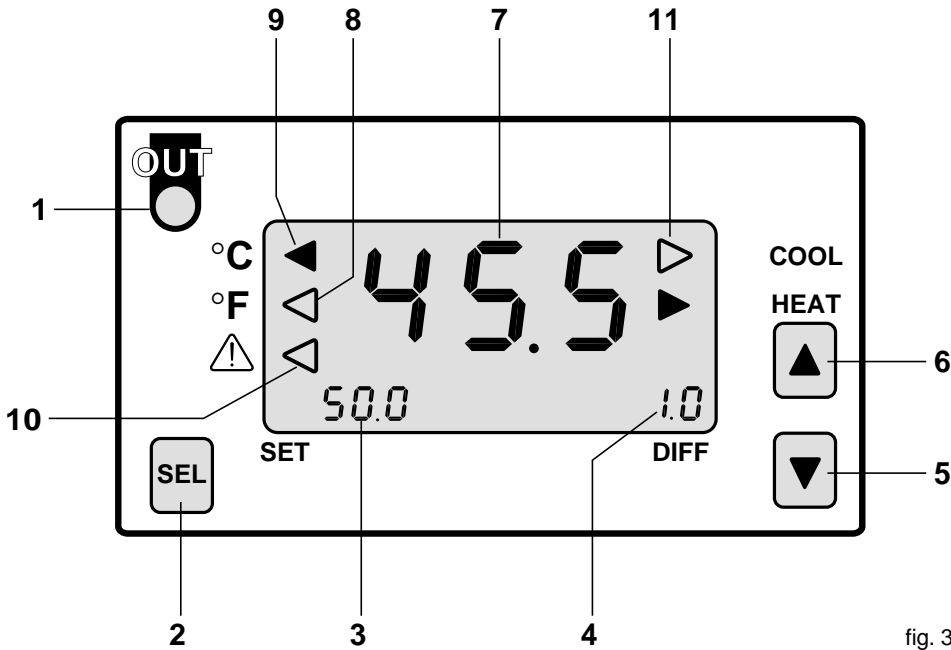


The remote keyboard with display (KTR) allows remote control and displays all the unit's digital and analogue process variables. It is therefore possible have all the unit functions directly under your control from anywhere in the room.

- 1 = **DISPLAY:**
displays the values of all the parameters (i.e. outlet water temperature, etc.), any alarm codes and the status of the resources.
- 2 = **ON/OFF, RESET - DOWN key:**
makes it possible to switch any unit alarms on or off and reset them. Also allows the user to run down through the parameter values (not for KTR).
- 3 = **MODE - UP key:**
makes it possible to select the unit operating mode (stand-by, summer or winter cycle). Also allows the user to run up through the parameter values (not for KTR).
- 4 = **Summer LED:**
it indicates that the unit is running in cooling mode.
- 5 = **Winter LED:**
indicates that the unit is running in heating mode.
- 6 = **Compressor LED:**
indicates that the compressors are running or time (fast flashing), or indicates that the unit is defrosting (slow flashing), for the THAEB-THAES versions, during the winter cycle.
- 7 = **Plate heat exchanger LED:**
indicates the activation of the electrical heater.
- 8 = **Power supply LED:**
indicates the presence of the power supply.
- 10/11 = **KTR only ▲ (up), ▼ (down) keys:**
used to run through the parameter and alarm lists and to change the set values.

ACCESSORIES: controls and regulations

TRD - Thermostat with display



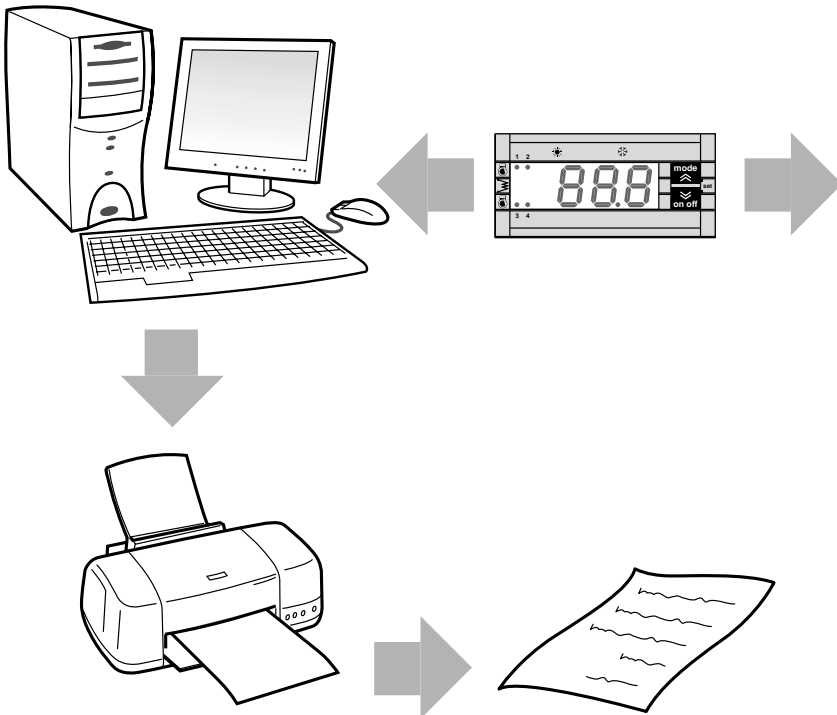
- 1 = **LED OUT:**
indicates that the outlet water temperature is within the activation range that can be set by the user for an external regulation device.
- 2/5/6 = **SEL, ▲ (up), ▼ (down) keys:**
make it possible to set the set-points and the activation differential of an external regulation device.
- 3 = **SET-POINT value:**
displays the set set-point value.
- 4 = **DIFFERENTIAL value:**
displays the set differential value.
- 7 = **Water temperature DISPLAY:**
displays the heat recovery/desuperheater outlet water temperature.
- 8 = **Temperature scale in °F:**
disabled.
- 9 = **Temperature scale in °C:**
enabled.
- 10 = **Alarm signal:**
disabled.
- 11 = **COOL/HEAT operation signal:**
indicates the thermostat operating mode (HEAT).
COOL operating mode disabled.

fig. 3

The insertion of the thermostat accessory with display (TRD) in the machine makes it possible to display the heat recovery/desuperheater outlet water temperature and set the activation

set-points of an external regulation device (i.e. 3-way ON/OFF valve), thus allowing rational and effective use of the recovered heat energy.

KIS - RS 485 serial interface for serial connection KCH - RS 232 hardware key for serial connection



Serial communication

The units are equipped with an electronic controller, that is compatible with an external system through a serial communication line.

Supervision

- The supervision system allows the access to all the unit functions, such as:
- setting all the values accessible by the keyboard;
 - reading all the digital and analogue input and output process variables;
 - reading the various alarm codes and resetting them if necessary;
 - reading all the programming parameters and adjusting them.

fig. 4

TCAEB - TCAES cooling capacity

MODEL		Tue (°C)		Ta (°C)							
				25		30		35		42	
		QF	P	QF	P	QF	P	QF	P		
		kW	kW	kW	kW	kW	kW	kW	kW		
230	5	33,6	8,9	31,5	9,9	29,4	10,9	26,2	12,5		
	6	34,7	9,0	32,1	10,0	30,4	11,0	27,2	12,6		
	7	35,8	9,1	32,7	10,1	31,4	11,1	28,1	12,7		
	8	36,8	9,2	34,0	10,1	32,4	11,2	29,1	12,8		
	9	37,9	9,2	35,4	10,2	33,3	11,3	30,0	12,9		
235	10	38,9	9,3	36,7	10,3	34,3	11,4	31,0	13,0		
	5	40,2	10,8	37,7	11,9	35,2	13,2	31,4	15,1		
	6	41,5	10,9	39,0	12,1	36,4	13,4	32,6	15,2		
	7	42,8	11,0	40,3	12,2	37,6	13,5	33,7	15,3		
	8	44,1	11,1	41,5	12,3	38,8	13,6	34,8	15,5		
245	9	45,4	11,2	42,7	12,4	39,9	13,7	36,0	15,6		
	10	46,6	11,3	43,9	12,5	41,1	13,8	37,1	15,7		
	5	49,6	14,0	46,6	15,5	43,4	17,1	38,8	19,5		
	6	51,3	14,1	48,1	15,7	44,9	17,3	40,2	19,7		
	7	52,9	14,2	49,7	15,8	46,4	17,5	41,6	19,8		
250	8	54,4	14,4	51,2	15,9	47,8	17,6	43,0	20,0		
	9	56,0	14,5	52,7	16,1	49,3	17,8	44,4	20,2		
	10	57,5	14,7	54,2	16,2	50,8	17,9	45,8	20,3		
	5	57,3	15,5	53,8	17,2	50,2	19,0	44,8	21,7		
	6	59,2	15,6	55,6	17,3	51,9	19,2	46,4	21,8		
260	7	61,1	15,8	57,4	17,5	53,6	19,4	48,0	22,0		
	8	62,9	15,9	59,1	17,6	55,2	19,5	49,7	22,2		
	9	64,6	16,1	60,9	17,8	56,9	19,7	51,3	22,4		
	10	66,4	16,2	62,6	17,9	58,6	19,8	52,9	22,5		
	5	67,3	18,2	63,1	20,2	58,9	22,3	52,6	25,5		
260	6	69,5	18,4	65,2	20,3	60,9	22,5	54,5	25,7		
	7	71,7	18,5	67,3	20,5	62,9	22,7	56,4	25,9		
	8	73,8	18,7	69,4	20,7	64,8	22,9	58,3	26,1		
	9	75,9	18,9	71,4	20,9	66,8	23,1	60,2	26,3		
	10	78,0	19,0	73,5	21,1	68,8	23,3	62,1	26,5		

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

Ta = Dry bulb outdoor air temperature

QF = Cooling capacity with evaporator fouling factor equivalent to 0,35 x 10⁻⁴ m² °C/W

P = Total absorbed electrical power

N.B.:

○ The electric energy absorbed by the silenced units does not vary significantly when compared to the corresponding standard units.

○ For the TANK&PUMP and PUMP versions, consider the power values absorbed by the motor-driven pump(s) (see page 22).

○ **The electrical data on the unit's registration plaque refers to the fully accessorized unit.**

THAEB - THAES cooling capacity

MODEL		Tue (°C)		Ta (°C)							
				25		30		35		42	
		QF	P	QF	P	QF	P	QF	P		
		kW	kW	kW	kW	kW	kW	kW	kW		
230	5	32,2	8,9	30,2	9,9	28,2	10,9	25,2	12,5		
	6	33,3	9,0	31,2	10,0	29,2	11,0	26,1	12,6		
	7	34,3	9,1	32,3	10,1	30,1	11,1	27,0	12,7		
	8	35,3	9,2	33,2	10,1	31,1	11,2	27,9	12,8		
	9	36,3	9,2	34,2	10,2	32,0	11,3	28,8	12,9		
235	10	37,3	9,3	35,2	10,3	33,0	11,4	29,7	13,0		
	5	38,8	10,8	36,4	11,9	33,9	13,2	30,3	15,1		
	6	40,0	10,9	37,6	12,1	35,1	13,4	31,4	15,2		
	7	41,3	11,0	38,8	12,2	36,2	13,5	32,5	15,4		
	8	42,5	11,1	40,0	12,3	37,4	13,6	33,6	15,5		
245	9	43,7	11,2	41,2	12,4	38,5	13,7	34,7	15,6		
	10	44,9	11,3	42,3	12,5	39,6	13,8	35,8	15,7		
	5	49,1	14,0	46,0	15,5	43,0	17,1	38,4	19,5		
	6	50,7	14,1	47,6	15,7	44,4	17,3	39,8	19,7		
	7	52,3	14,2	49,1	15,8	45,9	17,5	41,1	19,8		
250	8	53,8	14,4	50,6	15,9	47,3	17,6	42,5	20,0		
	9	55,4	14,5	52,1	16,1	48,7	17,8	43,9	20,2		
	10	56,9	14,7	53,6	16,2	50,2	17,9	45,3	20,3		
	5	54,8	15,5	51,4	17,2	47,9	19,0	42,8	21,7		
	6	56,5	15,6	53,1	17,3	49,5	19,2	44,3	21,8		
260	7	58,3	15,8	54,8	17,5	51,2	19,4	45,9	22,0		
	8	60,0	15,9	56,5	17,6	52,8	19,5	47,4	22,2		
	9	61,7	16,1	58,1	17,8	54,4	19,7	49,0	22,4		
	10	63,5	16,2	59,8	17,9	56,0	19,8	50,5	22,5		
	5	64,1	18,2	60,1	20,2	56,1	22,3	50,1	25,5		
260	6	66,2	18,4	62,2	20,3	58,0	22,5	51,9	25,7		
	7	68,3	18,5	64,2	20,5	59,9	22,7	53,7	25,9		
	8	70,3	18,7	66,1	20,7	61,8	22,9	55,6	26,1		
	9	72,3	18,9	68,1	20,9	63,7	23,1	57,4	26,3		
	10	74,3	19,0	70,0	21,1	65,6	23,3	59,2	26,5		

THAEB - THAES heating capacity

MODEL	Ta (°C)	UR (%)	Tuc (°C)							
			35		40		45		50	
			QF kW	P kW	QF kW	P kW	QF kW	P kW	QF kW	P kW
230	-5	70	27,9	8,5	27,7	9,3	-	-	-	-
	0	70	32,1	8,7	31,8	9,6	31,5	10,7	-	-
	5	70	36,1	9,0	35,8	9,9	35,4	11,0	34,9	12,0
	7	70	37,8	9,1	37,4	10,0	36,9	11,1	36,4	12,2
	10	70	40,5	9,3	40,1	10,2	39,4	11,3	38,8	12,3
235	15	70	45,2	9,6	44,6	10,6	43,7	11,6	42,8	12,7
	-5	70	34,2	10,5	34,1	11,6	-	-	-	-
	0	70	39,4	10,8	39,2	12,0	38,8	13,3	-	-
	5	70	44,4	11,2	44,0	12,3	43,5	13,7	43,0	15,0
	7	70	46,4	11,3	45,9	12,5	45,4	13,8	44,8	15,1
245	10	70	49,8	11,5	49,3	12,7	48,5	14,1	47,7	15,4
	15	70	55,5	11,9	54,9	13,1	53,7	14,5	52,6	15,8
	-5	70	42,6	13,7	42,3	15,1	-	-	-	-
	0	70	49,0	14,2	48,6	15,6	48,2	17,2	-	-
	5	70	55,2	14,6	54,7	16,1	54,0	17,7	53,3	19,4
250	7	70	57,7	14,7	57,1	16,2	56,3	17,9	55,6	19,6
	10	70	61,9	15,0	61,2	16,5	60,2	18,2	59,3	19,9
	15	70	69,0	15,5	68,1	17,1	66,7	18,8	65,4	20,5
	-5	70	47,3	15,0	47,0	16,5	-	-	-	-
	0	70	54,5	15,4	54,0	17,0	53,5	18,8	-	-
260	5	70	61,3	15,9	60,7	17,5	60,0	19,4	59,3	21,2
	7	70	64,1	16,1	63,4	17,7	62,6	19,6	61,8	21,4
	10	70	68,8	16,4	68,0	18,1	66,9	19,9	65,9	21,8
	15	70	76,7	16,9	75,7	18,6	74,2	20,5	72,6	22,4
	-5	70	54,8	17,6	54,5	19,5	-	-	-	-
260	0	70	63,1	18,2	62,6	20,1	62,0	22,2	-	-
	5	70	71,0	18,7	70,3	20,7	69,5	22,9	68,7	25,0
	7	70	74,2	19,0	73,5	20,9	72,5	23,1	71,6	25,3
	10	70	79,7	19,3	78,8	21,3	77,5	23,5	76,3	25,7
	15	70	88,8	20,0	87,7	22,0	85,9	24,2	84,1	26,4

- Ta = Dry bulb outdoor air temperature
- UR = Relative humidity
- Tuc = Condenser water outlet temperature
- QT = Heating capacity with condenser fouling factor equivalent to $0,35 \times 10^{-4} \text{ m}^2 \text{ }^\circ\text{C/W}$
- P = Total absorbed electrical power

N.B.:

- The electric energy absorbed by the silenced units does not vary significantly when compared to the corresponding standard units.
- For the TANK&PUMP and PUMP versions, consider the power values absorbed by the motor-driven pump(s) (see page 22).
- **The electrical data on the unit's registration plaque refers to the fully accessorized unit.**

pressure drops and sound levels

TCAEB - TCAES evaporator pressure drops

MODEL																			
230	G (l/h)	3.240	3.510	3.780	4.050	4.320	4.590	4.860	5.130	5.400	5.760	6.120	6.480	6.840	7.200	7.560	7.920	8.280	8.640
	Δpw (kPa)	11	13	15	17	19	22	24	27	30	34	39	43	48	54	59	65	71	77
235	G (l/h)	3.880	4.200	4.520	4.840	5.160	5.480	5.800	6.120	6.470	6.900	7.330	7.760	8.190	8.620	9.050	9.480	9.910	10.350
	Δpw (kPa)	11	13	15	17	19	22	24	27	30	34	39	44	48	54	59	65	71	77
245	G (l/h)	4.790	5.190	5.590	5.990	6.390	6.790	7.190	7.590	7.980	8.510	9.040	9.570	10.100	10.630	11.160	11.690	12.220	12.770
	Δpw (kPa)	13	15	17	20	23	26	29	32	36	40	46	51	57	63	70	76	83	91
250	G (l/h)	5.530	5.990	6.450	6.910	7.370	7.830	8.290	8.750	9.220	9.830	10.440	11.050	11.660	12.270	12.880	13.490	14.100	14.750
	Δpw (kPa)	12	14	16	18	21	24	26	29	33	37	42	47	52	58	64	70	77	84
260	G (l/h)	6.460	7.000	7.540	8.080	8.620	9.160	9.700	10.240	10.770	11.490	12.210	12.930	13.650	14.370	15.090	15.810	16.530	17.230
	Δpw (kPa)	16	19	22	25	29	32	36	40	45	51	57	64	72	79	88	96	105	114

THAEB - THAES evaporator/condenser pressure drops

MODEL																			
230	G (l/h)	3.110	3.370	3.630	3.890	4.150	4.410	4.670	4.930	5.180	5.530	5.880	6.230	6.580	6.930	7.280	7.630	7.980	8.290
	Δpw (kPa)	10	12	14	16	18	20	23	25	28	32	36	40	45	50	55	60	66	71
235	G (l/h)	3.740	4.050	4.360	4.670	4.980	5.290	5.600	5.910	6.230	6.650	7.070	7.490	7.910	8.330	8.750	9.170	9.590	9.970
	Δpw (kPa)	10	12	14	16	18	20	23	25	28	32	36	41	45	50	55	61	66	72
245	G (l/h)	4.740	5.140	5.540	5.940	6.340	6.740	7.140	7.540	7.900	8.430	8.960	9.490	10.020	10.550	11.080	11.610	12.140	12.640
	Δpw (kPa)	13	15	17	20	22	25	28	32	35	40	45	50	56	62	69	75	82	89
250	G (l/h)	5.290	5.730	6.170	6.610	7.050	7.490	7.930	8.370	8.810	9.400	9.990	10.580	11.170	11.760	12.350	12.940	13.530	14.100
	Δpw (kPa)	11	13	15	17	19	22	24	27	30	34	38	43	48	53	59	64	70	77
260	G (l/h)	6.180	6.700	7.220	7.740	8.260	8.780	9.300	9.820	10.300	10.990	11.680	12.370	13.060	13.750	14.440	15.130	15.820	16.480
	Δpw (kPa)	15	17	20	23	26	30	33	37	41	46	53	59	66	73	80	88	96	105

G = Water flow in l/h
 Δpw = Pressure drops in kPa

TCAEB - THAEB standard version sound power

MODEL	Levels of sound power in dB for octave bands, total sound power level in dB(A) and total sound pressure level in dB(A)									
	63 Hz	125 Hz	250 Hz	500 Hz	1.000 Hz	2.000 Hz	4.000 Hz	8.000 Hz	Lw	Lp
230	76	75	76	73	74	70	65	56	78	52
235	76	75	77	74	74	71	64	58	78	52
245	79	78	81	75	77	74	67	60	81	54
250	79	78	84	77	78	73	68	60	82	54
260	79	78	84	77	78	75	68	65	82	54

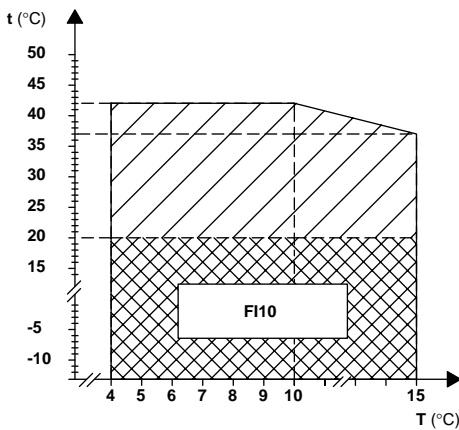
TCAES-THAES silenced version sound power

MODEL	Levels of sound power in dB for octave bands, total sound power level in dB(A) and total sound pressure level in dB(A)									
	63 Hz	125 Hz	250 Hz	500 Hz	1.000 Hz	2.000 Hz	4.000 Hz	8.000 Hz	Lw	Lp
230	73	72	73	70	71	67	62	53	75	48
235	73	72	74	71	71	68	61	55	75	50
245	76	75	78	72	74	71	64	57	78	50
250	76	75	81	74	75	70	65	57	79	50
260	76	75	81	74	75	72	65	62	79	51

Lw = Total sound power level in dB(A).
 Lp = Total sound pressure level in dB(A) at 5 metres from the unit in the open field (Q = 1).

operating limits and use of antifreeze solutions

Cooling operation

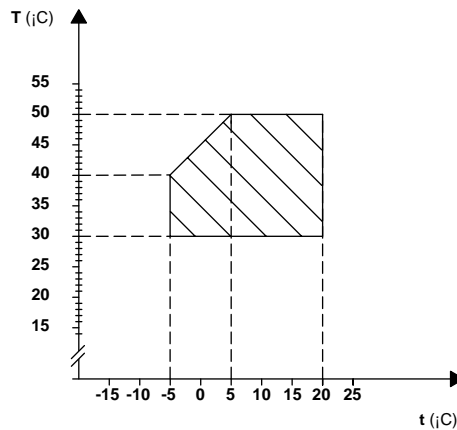


T (°C) = water temperature produced
 t (°C) = outdoor air temperature D.B.
 ○ Temperature differential at the evaporator:
 $\Delta t = 3-8^{\circ}\text{C}$.

- R 407C standard operation.
- Operation with condensation control.

On request, we are able to provide units that produce chilled water at a temperature of below 4°C.

Heat pump operation



T (°C) = water temperature produced
 t (°C) = outdoor air temperature (70% R.H.)
 ○ Temperature difference at the condenser:
 $\Delta t = 3-8^{\circ}\text{C}$.

- R407C standard operation.

Use of antifreeze solutions

Use of ethylene glycol is a must when hydraulic circuit water drainage is not foreseen during winter or whenever the unit has to supply chilled water at temperatures below 4°C. The addition of glycol changes the physical properties of the water and consequently the unit performances. The proper glycol percentage to be put into the system can be obtained from the hardest operation conditions chosen among those detailed below.

Anti-freeze protection during seasonal stop

- Table "A" shows the multipliers that make it possible to obtain the changes in unit performances according to the necessary percentages of ethylene glycol.
- The multipliers refer to the following conditions: condenser air inlet temperature 35°C, chilled water temperature 7°C, evaporator Δt : 5°C.
- The same multipliers can be used for different operating conditions, since the extent of their variation is negligible.

Table "A" - TCAEB-THAEB-TCAES-THAES: 230 - 260

Min. outdoor air temperature °C	2	0	-3	-6	-10	-15	-20
% glycol in weight	10	15	20	25	30	35	40
Freezing temperature °C	-5	-7	-10	-13	-16	-20	-25
fc G	1,008	1,028	1,051	1,074	1,100	1,126	1,153
fc Δp_w	1,053	1,105	1,184	1,237	1,316	1,421	1,500
fc QF	0,991	0,987	0,982	0,978	0,974	0,969	0,960
fc P	0,996	0,995	0,993	0,991	0,989	0,987	0,984

fc G = multiplier of the glycol water flow to the evaporator
 fc Δp_w = multiplier of the pressure drops through the evaporator

fc QF = cooling capacity multiplier
 fc P = total absorbed current multiplier



TCAEB 230 - 260

RC50, RC100 and DS15 ACCESSORIES: performance and pressure drops

MODEL TCAEB		230			235			245		
STANDARD VERSION										
Technical data										
RC50 - 50% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	20,7	19,9	19,1	24,9	24,0	23,0	31,0	29,8	28,6
Heat recovery nominal water flow	m ³ /h	3,6	3,4	3,3	4,3	4,1	4,0	5,3	5,1	4,9
Heat recovery nominal pressure drops	kPa	27	24	23	26	24	23	26	24	22
Heat recovery water content	L	1,3	1,3	1,3	1,3	1,3	1,3	2,1	2,1	2,1
RC100 - 100% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	41,4	39,8	38,3	49,9	48,0	46,0	61,9	59,5	57,2
Heat recovery nominal water flow	m ³ /h	7,1	6,9	6,6	8,6	8,3	7,9	10,6	10,2	9,8
Heat recovery nominal pressure drops	kPa	33	30	28	33	30	28	33	30	28
Heat recovery water content	L	2,5	2,5	2,5	2,8	2,8	2,8	3,8	3,8	3,8
DS15 - Desuperheater										
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	6,0	4,8	-	7,2	5,8	-	8,9	7,1	-
Heat recovery nominal water flow	m ³ /h	0,5	0,4	-	0,6	0,5	-	0,8	0,6	-
Heat recovery nominal pressure drops	kPa	5	3	-	3	2	-	3	2	-
Heat recovery water content	L	0,49	0,49	-	0,49	0,49	-	0,64	0,64	-

MODEL TCAEB		250			260		
STANDARD VERSION							
Technical data							
RC50 - 50% Heat recovery							
Water inlet/outlet temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	35,5	34,1	32,8	41,7	40,1	38,5
Heat recovery nominal capacity	m ³ /h	6,1	5,9	5,6	7,2	6,9	6,6
Heat recovery nominal pressure drops	kPa	26	24	23	26	24	23
Heat recovery water content	L	2,1	2,1	2,1	2,5	2,5	2,5
RC100 - 100% Heat recovery							
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	71,0	68,3	65,5	83,4	80,2	77,0
Heat recovery nominal water flow	m ³ /h	12,2	11,7	11,3	14,3	13,8	13,2
Heat recovery nominal pressure drops	kPa	33	30	28	33	30	28
Heat recovery water content	L	3,8	3,8	3,8	4,7	4,7	4,7
DS15 - Desuperheater							
Water inlet/outlet temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	10,2	8,2	-	12,0	9,6	-
Heat recovery nominal water flow	m ³ /h	0,9	0,7	-	1,0	0,8	-
Heat recovery nominal pressure drops	kPa	3	2	-	2	1	-
Heat recovery water content	L	0,64	0,64	-	0,74	0,74	-

(•) Heating capacity with heat recovery and desuperheater fouling factor equivalent to $0,43 \times 10^{-4} \text{ m}^2 \text{ }^\circ\text{C/W}$.

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

ATTENTION!

Units fitted with a heat recovery placed in series with the compressor must be used in compliance with current local laws.

Operation limits:

- **RC50 and RC100:** hot water temperature of 35-50°C with permitted water temperature differential of 4-6°C.
- **DS15:** hot water temperature of 50-70°C with permitted water temperature differential of 10°C.
- **RC50, RC100 and DS15:** the minimum permitted water inlet temperature is 30°C.
- If the unit is equipped with the accessory RC50 and RC100 the FI10 accessory must be used.



TCAES 230 - 260

RC50, RC100 and DS15 ACCESSORIES: performance and pressure drops

MODEL TCAES		230			235			245		
SILENCED VERSION										
Technical data										
RC50 - 50% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	20,8	20,0	19,2	25,0	24,0	23,0	31,2	30,0	28,8
Heat recovery nominal water flow	m ³ /h	3,6	3,4	3,3	4,3	4,1	4,0	5,4	5,2	5,0
Heat recovery nominal pressure drops	kPa	27	25	23	26	24	23	27	25	23
Heat recovery water content	L	1,3	1,3	1,3	1,3	1,3	1,3	2,1	2,1	2,1
RC100 - 100% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	41,7	40,1	38,5	49,9	48,0	46,1	62,4	60,0	57,6
Heat recovery nominal water flow	m ³ /h	7,2	6,9	6,6	8,6	8,3	7,9	10,7	10,3	9,9
Heat recovery nominal pressure drops	kPa	33	31	29	33	30	28	33	31	29
Heat recovery water content	L	2,5	2,5	2,5	2,8	2,8	2,8	3,8	3,8	3,8
DS15 - Desuperheater										
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	6,0	4,8	-	7,2	5,8	-	9,0	7,2	-
Heat recovery nominal water flow	m ³ /h	0,5	0,4	-	0,6	0,5	-	0,8	0,6	-
Heat recovery nominal pressure drops	kPa	6	3	-	3	2	-	3	2	-
Heat recovery water content	L	0,49	0,49	-	0,49	0,49	-	0,64	0,64	-

MODEL TCAES		250			260		
SILENCED VERSION							
Technical data							
RC50 - 50% Heat recovery							
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	35,7	34,4	33,0	41,8	40,2	38,6
Heat recovery nominal water flow	m ³ /h	6,1	5,9	5,7	7,2	6,9	6,6
Heat recovery nominal pressure drops	kPa	27	24	23	27	25	23
Heat recovery water content	L	2,1	2,1	2,1	2,5	2,5	2,5
RC100 - 100% Heat recovery							
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	71,5	68,7	66,0	83,7	80,5	77,2
Heat recovery nominal water flow	m ³ /h	12,3	11,8	11,3	14,4	13,8	13,3
Heat recovery nominal pressure drops	kPa	33	31	29	33	31	28
Heat recovery water content	L	3,8	3,8	3,8	4,7	4,7	4,7
DS15 - Desuperheater							
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	10,3	8,2	-	12,1	9,7	-
Heat recovery nominal water flow	m ³ /h	0,9	0,7	-	1,0	0,8	-
Heat recovery nominal pressure drops	kPa	3	2	-	2	1	-
Heat recovery water content	L	0,64	0,64	-	0,74	0,74	-

(•) Heating capacity with heat recovery and desuperheater fouling factor equivalent to $0,43 \times 10^{-4} \text{ m}^2 \text{ }^\circ\text{C/W}$.

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

ATTENTION!

Units fitted with a heat recovery placed in series with the compressor must be used in compliance with current local laws.

Operation limits:

○ **RC50 and RC100:** hot water temperature of 35-50°C with permitted water temperature differential of 4-6°C.

○ **DS15:** hot water temperature of 50-70°C with permitted water temperature differential of 10°C.

○ **RC50, RC100 and DS15:** the minimum permitted water inlet temperature is 30°C.

○ If the unit is equipped with the accessory RC50 and RC100 the FI10 accessory must be used.



THAEB 230 - 260

RC50, RC100 and DS15 ACCESSORIES: performance and pressure drops

MODEL THAEB		230			235			245		
STANDARD VERSION										
Technical data										
RC50 - 50% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	20,0	19,3	18,5	24,2	23,3	22,4	30,7	29,5	28,3
Heat recovery nominal water flow	m ³ /h	3,4	3,3	3,2	4,2	4,0	3,8	5,3	5,1	4,9
Heat recovery nominal pressure drops	kPa	25	23	22	25	23	21	26	24	22
Heat recovery water content	L	1,3	1,3	1,3	1,3	1,3	1,3	2,1	2,1	2,1
RC100 - 100% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	40,1	38,5	37,0	48,4	46,6	44,7	61,4	59,0	56,7
Heat recovery nominal water flow	m ³ /h	6,9	6,6	6,4	8,3	8,0	7,7	10,6	10,2	9,7
Heat recovery nominal pressure drops	kPa	31	29	26	31	29	27	32	30	28
Heat recovery water content	L	2,5	2,5	2,5	2,8	2,8	2,8	3,8	3,8	3,8
DS15 - Desuperheater										
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	5,8	4,6	-	7,0	5,6	-	8,9	7,1	-
Heat recovery nominal water flow	m ³ /h	0,5	0,4	-	0,6	0,5	-	0,8	0,6	-
Heat recovery nominal pressure drops	kPa	5	3	-	3	2	-	3	2	-
Heat recovery water content	L	0,49	0,49	-	0,49	0,49	-	0,64	0,64	-

MODEL THAEB		250			260		
STANDARD VERSION							
Technical data							
RC50 - 50% Heat recovery							
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	34,2	32,9	31,6	40,1	38,6	37,1
Heat recovery nominal water flow	m ³ /h	5,9	5,7	5,4	6,9	6,6	6,4
Heat recovery nominal pressure drops	kPa	25	23	21	24	23	21
Heat recovery water content	L	2,1	2,1	2,1	2,5	2,5	2,5
RC100 - 100% Heat recovery							
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	68,5	65,9	63,2	80,3	77,2	74,1
Heat recovery nominal water flow	m ³ /h	11,8	11,3	10,9	13,8	13,3	12,7
Heat recovery nominal pressure drops	kPa	31	28	26	30	28	26
Heat recovery water content	L	3,8	3,8	3,8	4,7	4,7	4,7
DS15 - Desuperheater							
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	9,9	7,9	-	11,6	9,3	-
Heat recovery nominal water flow	m ³ /h	0,8	0,7	-	1,0	0,8	-
Heat recovery nominal pressure drops	kPa	3	2	-	2	1	-
Heat recovery water content	L	0,64	0,64	-	0,74	0,74	-

(•) Heating capacity with heat recovery and desuperheater fouling factor equivalent to $0,43 \times 10^{-4} \text{ m}^2 \text{ }^\circ\text{C/W}$.

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

Operation limits:

○ **RC50 and RC100:** hot water temperature of 35-50°C with permitted water temperature differential of 4-6°C.

○ **DS15:** hot water temperature of 50-70°C with permitted water temperature differential of 10°C.

○ **RC50, RC100 and DS15:** the minimum permitted water inlet temperature is 30°C.

○ If the unit is equipped with the accessory RC50 and RC100 the FI10 accessory must be used.

ATTENTION!

Units fitted with a heat recovery placed in series with the compressor must be used in compliance with current local laws.



THAES 230 - 260

RC50, RC100 and DS15 ACCESSORIES: performance and pressure drops

MODEL THAES		230			235			245		
SILENCED VERSION										
Technical data										
RC50 - 50% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	20,2	19,4	18,6	24,2	23,3	22,4	30,9	29,8	28,6
Heat recovery nominal water flow	m ³ /h	3,5	3,3	3,2	4,2	4,0	3,8	5,3	5,1	4,9
Heat recovery nominal pressure drops	kPa	26	23	22	25	23	21	26	24	23
Heat recovery water content	L	1,3	1,3	1,3	1,3	1,3	1,3	2,1	2,1	2,1
RC100 - 100% Heat recovery										
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	40,3	38,8	37,2	48,5	46,6	44,7	61,9	59,5	57,1
Heat recovery nominal water flow	m ³ /h	6,9	6,7	6,4	8,3	8,0	7,7	10,6	10,2	9,8
Heat recovery nominal pressure drops	kPa	31	29	27	31	29	27	33	30	28
Heat recovery water content	L	2,5	2,5	2,5	2,8	2,8	2,8	3,8	3,8	3,8
DS15 - Desuperheater										
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	5,8	4,7	-	7,0	5,6	-	8,9	7,1	-
Heat recovery nominal water flow	m ³ /h	0,5	0,4	-	0,6	0,5	-	0,8	0,6	-
Heat recovery nominal pressure drops	kPa	5	3	-	3	2	-	3	2	-
Heat recovery water content	L	0,49	0,49	-	0,49	0,49	-	0,64	0,64	-

MODEL THAES		250			260		
SILENCED VERSION							
Technical data							
RC50 - 50% Heat recovery							
Water inlet/outlet temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	34,5	33,2	31,8	40,3	38,7	37,2
Heat recovery nominal water flow	m ³ /h	5,9	5,7	5,5	6,9	6,7	6,4
Heat recovery nominal pressure drops	kPa	25	23	21	25	23	21
Heat recovery water content	L	2,1	2,1	2,1	2,5	2,5	2,5
RC100 - 100% Heat recovery							
Inlet/outlet water temperature	°C	35/40 (*)	40/45 (*)	45/50 (*)	35/40 (*)	40/45 (*)	45/50 (*)
Nominal heating capacity (•)	kW	69,0	66,3	63,7	80,6	77,5	74,4
Heat recovery nominal water flow	m ³ /h	11,9	11,4	11,0	13,9	13,3	12,8
Heat recovery nominal pressure drops	kPa	31	29	27	31	28	26
Heat recovery water content	L	3,8	3,8	3,8	4,7	4,7	4,7
DS15 - Desuperheater							
Inlet/outlet water temperature	°C	50/60 (*)	60/70 (*)	-	50/60 (*)	60/70 (*)	-
Nominal heating capacity (•)	kW	9,9	8,0	-	11,6	9,3	-
Heat recovery nominal water flow	m ³ /h	0,9	0,7	-	1,0	0,8	-
Heat recovery nominal pressure drops	kPa	3	2	-	2	1	-
Heat recovery water content	L	0,64	0,64	-	0,74	0,74	-

(•) Heating capacity with heat recovery and desuperheater fouling factor equivalent to $0,43 \times 10^{-4} \text{ m}^2 \text{ } ^\circ\text{C/W}$.

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

Operation limits:

○ **RC50 and RC100:** hot water temperature of 35-50°C with permitted water temperature differential of 4-6°C.

○ **DS15:** hot water temperature of 50-70°C with permitted water temperature differential of 10°C.

○ **RC50, RC100 and DS15:** the minimum permitted water inlet temperature is 30°C.

○ If the unit is equipped with the accessory RC50 and RC100 the FI10 accessory must be used.

ATTENTION!

Units fitted with a heat recovery placed in series with the compressor must be used in compliance with current local laws.

TCAEB - TCAES - THAEB - THAES: 230 - 260

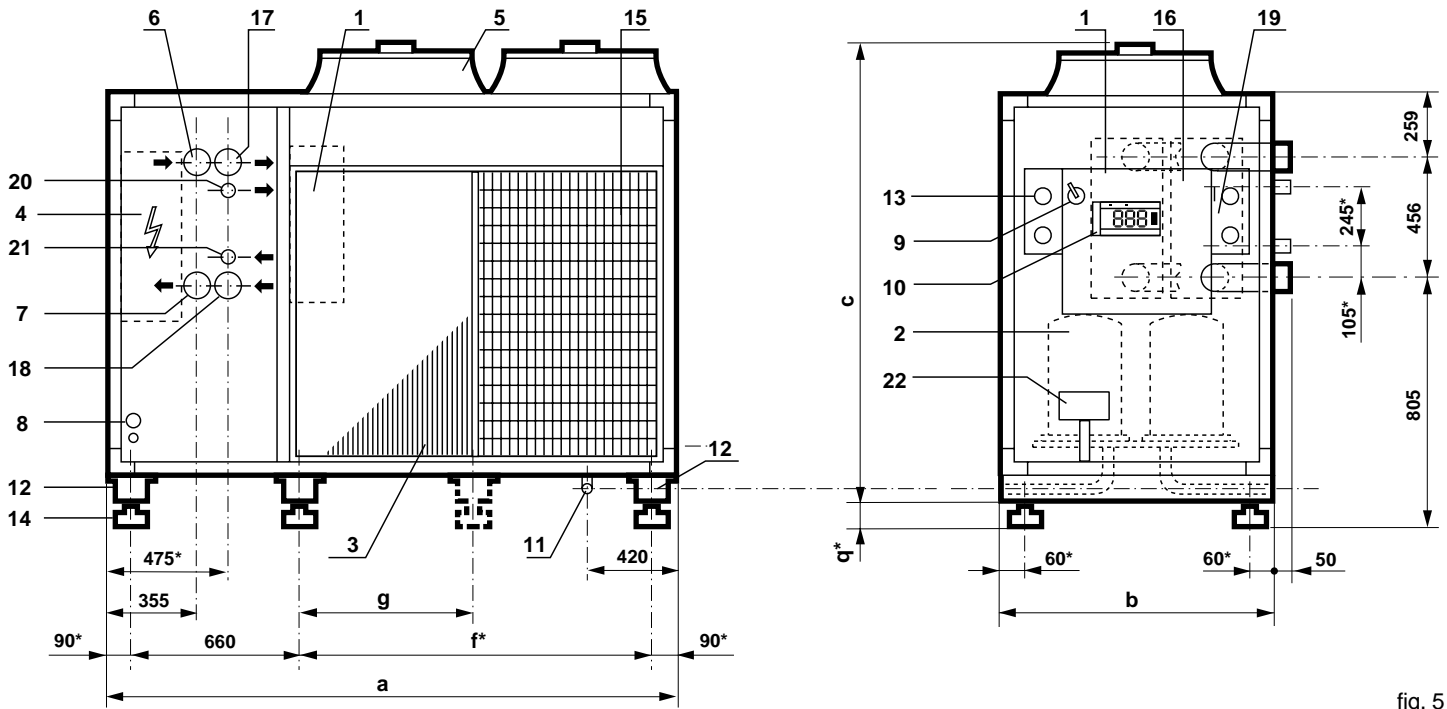


fig. 5

Hydraulic connections

Evaporator/condenser water connections	2G
Heat recovery water connections	2G
Desuperheater water connections	1G
Condensation drain	∅e mm 22

The unit is fitted with male threaded hydraulic connections on the evaporator/condenser, on the heat recovery and on the desuperheater.

(*) Figures refer to accessories.

Components

1. Evaporator/condenser
2. Compressor
3. Condenser/evaporator
4. Electrical board
5. Fan
6. Evaporator/condenser water inlet
7. Evaporator/condenser water outlet
8. Power supply
9. Door interlocking isolator
10. Keyboard with display
11. Condensation drain
12. Lifting point

Accessories

13. **KGM** - refrigerant manometers
14. **KSA** - rubber anti-vibration mountings
15. **KRP** - coil protection grilles
16. **RC50** - 50% heat recovery
RC100 - 100% heat recovery
17. Heat recovery water outlet
18. Heat recovery water inlet
19. **DS15** - 15% recovery with desuperheater
20. Desuperheater water outlet
21. Desuperheater water inlet
22. **TRD** - Thermostat with display for showing the heat recovery/desuperheater

outlet water temperature, with possibility to set the activation set-point of an external regulation device.

TCAEB - THAEB: 230 - 260

MODEL		230	235	245	250	260
Dimensions						
a	mm	1.510	1.510	2.260	2.260	2.260
b	mm	1.050	1.050	1.050	1.050	1.050
c	mm	1.730	1.730	1.730	1.730	1.730
f*	mm	670	670	1.420	1.420	1.420
q*	mm	60	60	75	75	75

TCAES - THAES: 230 - 260

MODEL		230	235	245	250	260
Dimensions						
a	mm	1.510	2.260	2.260	2.260	3.010
b	mm	1.050	1.050	1.050	1.050	1.050
c	mm	1.730	1.730	1.730	1.730	1.730
f*	mm	670	1.420	1.420	1.420	2.170
g	mm	-	-	-	-	1.085
q*	mm	60	75	75	75	60

TCAEB - TCAES - THAEB - THAES: 230 - 260

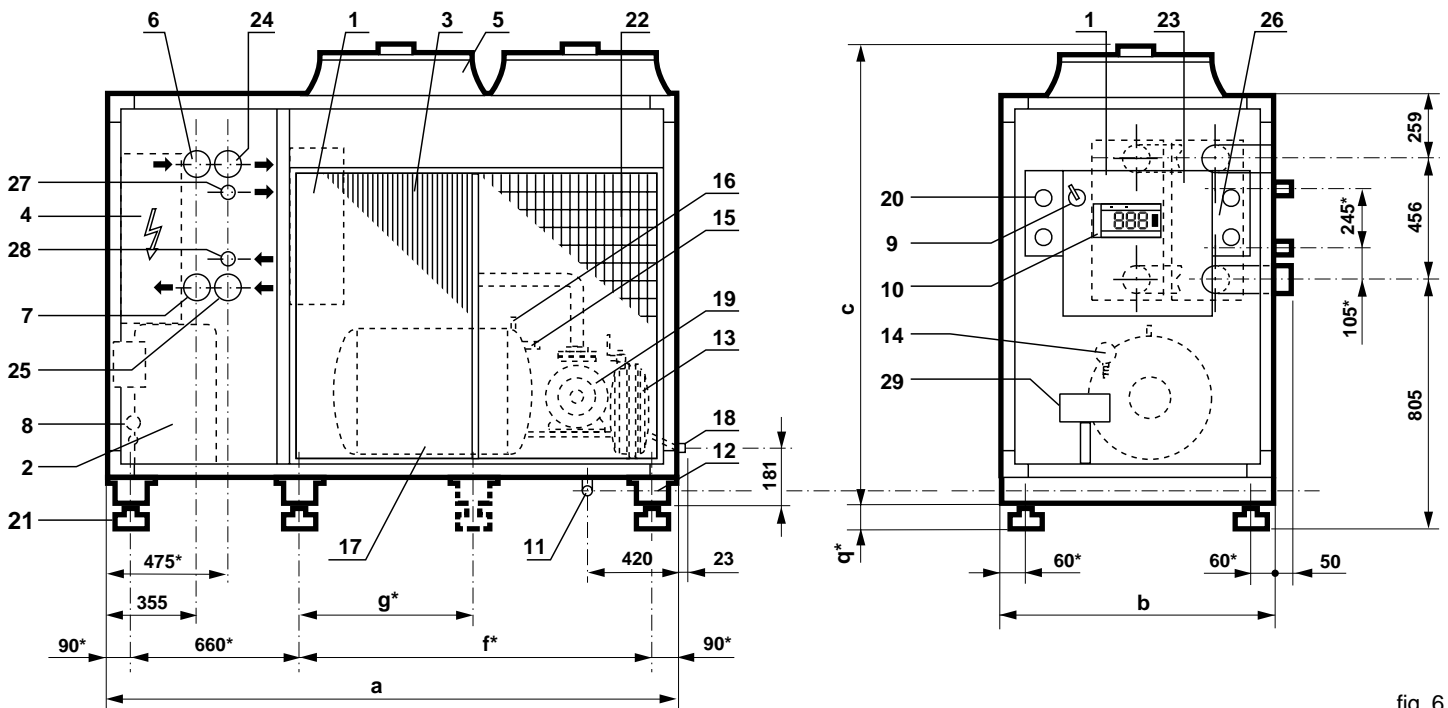


fig. 6

Hydraulic connections

Evaporator/condenser water connections	2G
Heat recovery water connections	2G
Desuperheater water connections	1G
Condensation drain	∅e mm 22

The unit is fitted with male threaded hydraulic connections on the evaporator/condenser, on the heat recovery and on the desuperheater.

(*) Figures refer to accessories.

Components

- 1. Evaporator/condenser
- 2. Compressor
- 3. Condenser/evaporator
- 4. Electrical board
- 5. Fan
- 6. Evaporator/condenser water inlet
- 7. Evaporator/condenser water outlet
- 8. Power supply
- 9. Door interlocking isolator
- 10. Keyboard with display
- 11. Condensation drain
- 12. Lifting point

Connection for lifting the pump and ASP storage unit complete with:

- 13. Storage tank
- 14. System manometer
- 15. Safety valve
- 16. Manual air vent valve
- 17. Storage tank
- 18. Storage tank drain
- 19. Motor-driven pump

Accessories

- 20. **KGM** - refrigerant manometers
- 21. **KSA** - rubber anti-vibration mountings
- 22. **KRP** - coil protection grilles
- 23. **RC50** - 50% recovery with condensation heat recuperator
RC100 - 100% recovery with condensation heat recuperator
- 24. Heat recovery water outlet
- 25. Heat recovery water inlet
- 26. **DS15** - 15% recovery with desuperheater
- 27. Desuperheater water outlet
- 28. Desuperheater water inlet
- 29. **TRD** - thermostat with display for showing the heat recovery/desuperheater outlet water temperature, with possibility to set the activation set-point of an external regulation device

TCAEB - THAEB: 230 - 260

MODEL		230	235	245	250	260
Dimensions						
a	mm	1.510	1.510	2.260	2.260	2.260
b	mm	1.050	1.050	1.050	1.050	1.050
c	mm	1.730	1.730	1.730	1.730	1.730
f*	mm	670	670	1.420	1.420	1.420
q*	mm	60	60	75	75	75

TCAES - THAES: 230 - 260

MODEL		230	235	245	250	260
Dimensions						
a	mm	1.510	2.260	2.260	2.260	3.010
b	mm	1.050	1.050	1.050	1.050	1.050
c	mm	1.730	1.730	1.730	1.730	1.730
f*	mm	670	1.420	1.420	1.420	2.170
g	mm	-	-	-	-	1.085
q*	mm	60	75	75	75	60

TCAEB - TCAES - THAEB - THAES: 230 - 260

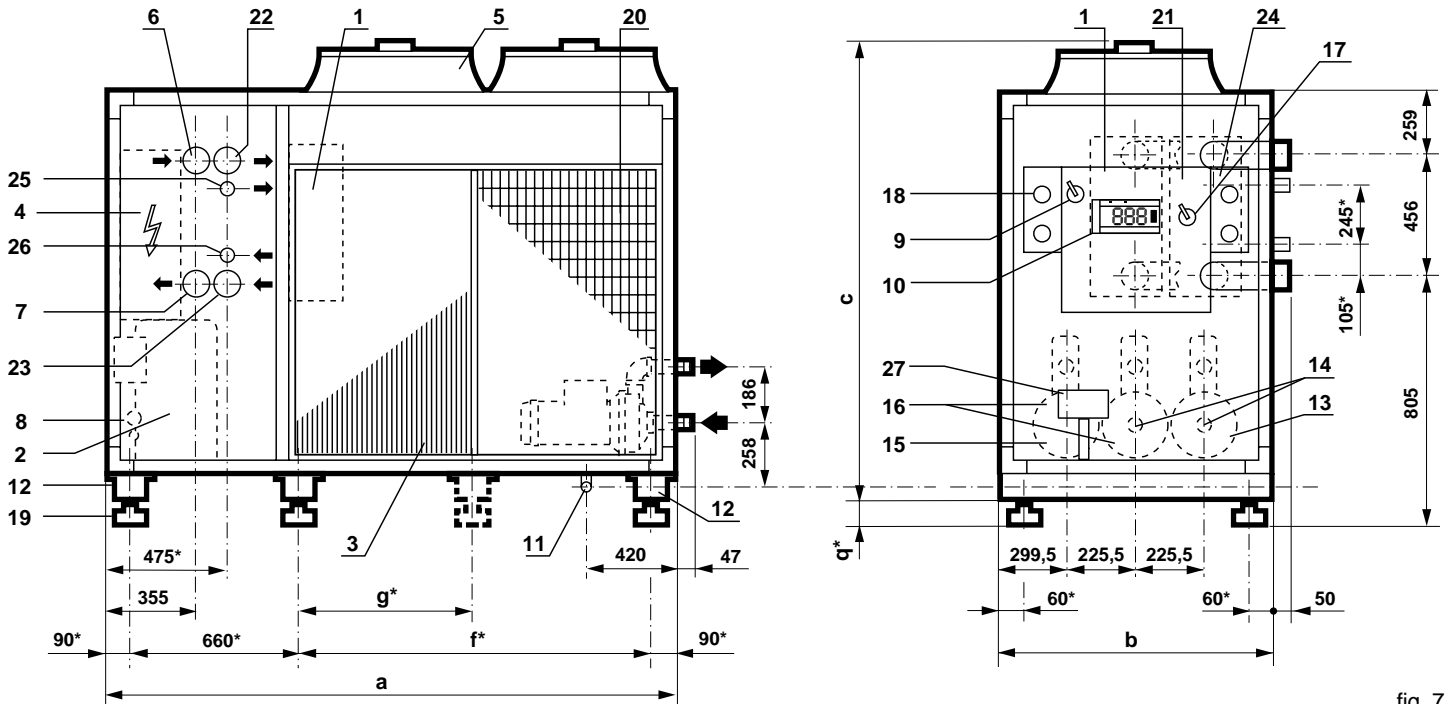


fig. 7

Hydraulic connections

Evaporator/condenser water connections	2G
Heat recovery water connections	2G
Desuperheater water connections	1G
Condensation drain	Øe mm 22

The unit is fitted with male threaded hydraulic connections on the evaporator/condenser, on the heat recovery and on the desuperheater.

(*) Figures refer to accessories.

Components

1. Evaporator/condenser
2. Compressor
3. Condenser/evaporator
4. Electrical board
5. Fan
6. Evaporator/condenser water inlet
7. Evaporator/condenser water outlet
8. Power supply
9. Door interlocking isolator
10. Keyboard with display
11. Condensation drain
12. Lifting point

Motor-driven pumps

The unit can be fitted with a maximum of 3 motor-driven pumps which can be selected from the following:

13. **P** - primary motor-driven pump
14. **P/DP** - primary motor-driven pump + stand-by pump
15. **PU** - secondary motor-driven pump
16. **PU/DP** - secondary motor-driven pump + stand-by pump
17. Primary or secondary stand-by motor-driven pump selector

Accessories

18. **KGM** - refrigerant manometers
19. **KSA** - rubber anti-vibration mountings
20. **KRP** - coil protection grilles
21. **RC50** - 50% recovery with condensation heat recuperator
RC100 - 100% recovery with condensation heat recuperator
22. Heat recovery water outlet
23. Heat recovery water inlet
24. **DS15** - 15% recovery with desuperheater
25. Desuperheater water outlet
26. Desuperheater water inlet
27. **TRD** - thermostat with display for showing the heat recovery/desuperheater outlet water temperature, with possibility to set the activation set-point of an external regulation device

TCAEB - THAEB: 230 - 260

MODEL		230	235	245	250	260
Dimensions						
a	mm	1.510	1.510	2.260	2.260	2.260
b	mm	1.050	1.050	1.050	1.050	1.050
c	mm	1.730	1.730	1.730	1.730	1.730
f*	mm	670	670	1.420	1.420	1.420
q*	mm	60	60	75	75	75

TCAES - THAES: 230 - 260

MODEL		230	235	245	250	260
Dimensions						
a	mm	1.510	2.260	2.260	2.260	3.010
b	mm	1.050	1.050	1.050	1.050	1.050
c	mm	1.730	1.730	1.730	1.730	1.730
f*	mm	670	1.420	1.420	1.420	2.170
g	mm	-	-	-	-	1.085
q*	mm	60	75	75	75	60

installation

Installation

- The unit must be handled with care to avoid damage to the external structure as well as to the mechanical and electrical parts inside (fig. 8).
- The unit should be positioned in keeping with the minimum technical service distances illustrated in the figure, bearing in mind access to water and electrical connections.
- There must be a minimum gap of at least 3.5 m between the top of the unit and any obstacles above it.
- If more than one unit is installed, the minimum distance between the finned coils should be at least 2 m.

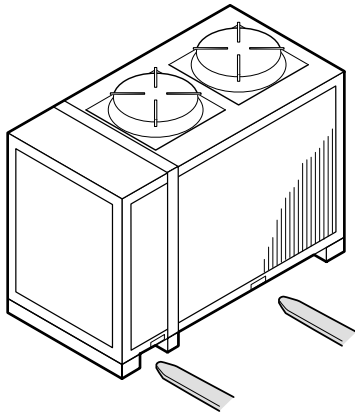


fig. 8

KSA - Antivibration supports models 230 - 260

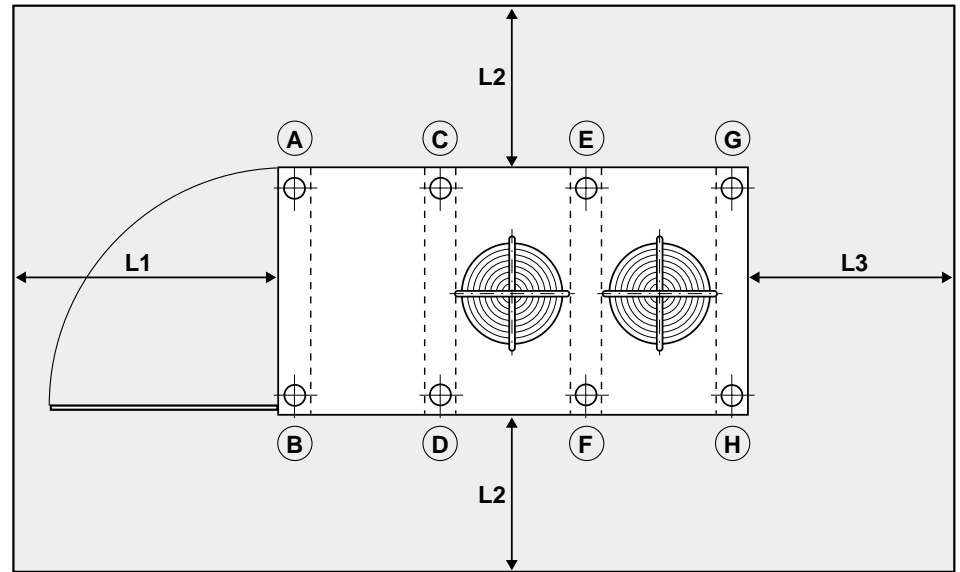


fig. 9

The weight of the unit and its distribution on the fixing points of the antivibration mountings (KSA) refers to a fully accessorized machine.

Attention!

- Addition weight of TANK&PUMP accessory with empty tank: 100 kg.
- Addition weight of PUMP accessory: 120 kg.

Distribution of weight on the fixture points

TCAEB 230 - 260: standard version

MODEL		230	235	245	250	260
Weight	kg	450	540	610	620	660
Support						
A	kg	73	103	103	105	108
B	kg	73	103	103	105	108
C	kg	104	117	135	138	149
D	kg	104	117	135	138	149
E	kg	-	-	-	-	-
F	kg	-	-	-	-	-
G	kg	48	50	67	67	73
H	kg	48	50	67	67	73
L1	mm	1.000	1.000	1.000	1.000	1.000
L2	mm	800	800	800	800	800
L3	mm	800	800	800	800	800

TCAES 230 - 260: silenced version

MODEL		230	235	245	250	260
Weight	kg	460	600	620	640	720
Support						
A	kg	73	102	104	104	102
B	kg	73	102	104	104	102
C	kg	106	132	138	144	117
D	kg	106	132	138	144	117
E	kg	-	-	-	-	96
F	kg	-	-	-	-	96
G	kg	51	66	68	72	45
H	kg	51	66	68	72	45
L1	mm	1.000	1.000	1.000	1.000	1.000
L2	mm	800	800	800	800	800
L3	mm	800	800	800	800	800

THAEB 230 - 260: standard version

MODEL		230	235	245	250	260
Weight	kg	500	600	660	670	710
Support						
A	kg	76	107	105	107	110
B	kg	76	107	105	107	110
C	kg	124	139	155	158	169
D	kg	124	139	155	158	169
E	kg	-	-	-	-	-
F	kg	-	-	-	-	-
G	kg	50	54	70	70	76
H	kg	50	54	70	70	76
L1	mm	1.000	1.000	1.000	1.000	1.000
L2	mm	800	800	800	800	800
L3	mm	800	800	800	800	800

THAES 230 - 260: silenced version

MODEL		230	235	245	250	260
Weight	kg	510	650	670	700	780
Support						
A	kg	75	104	106	108	106
B	kg	75	104	106	108	106
C	kg	126	152	158	166	138
D	kg	126	152	158	166	138
E	kg	-	-	-	-	101
F	kg	-	-	-	-	101
G	kg	54	69	71	76	45
H	kg	54	69	71	76	45
L1	mm	1.000	1.000	1.000	1.000	1.000
L2	mm	800	800	800	800	800
L3	mm	800	800	800	800	800

hydraulic connection

Hydraulic connections

- During long periods of inactivity, it is advisable to drain the system of water.
- Alternatively, it is possible to add ethylene glycol to the water circuit (see use of antifreeze solutions on page 11).
- A trace electrical heater on the water side of the heat exchanger reduces undesirable effects due to frost during winter breaks.
- It is advisable to install an air vent and intercepting valves to insulate the unit from the rest of the system.

Attention!

- It is advisable to install a filter subject to low pressure drops on the water inlet (KFA accessory).
- The water flow through the heat exchanger must be such that it does not produce a temperature difference of less than 3°C or more than 8°C in the evaporator.
- Figures 10, 11, 12 and 13 illustrate water circuit arrangement examples; **The dotted components and connections are the installer's responsibility.**

TANK&PUMP

Accessory with integrated ASP pump and storage unit

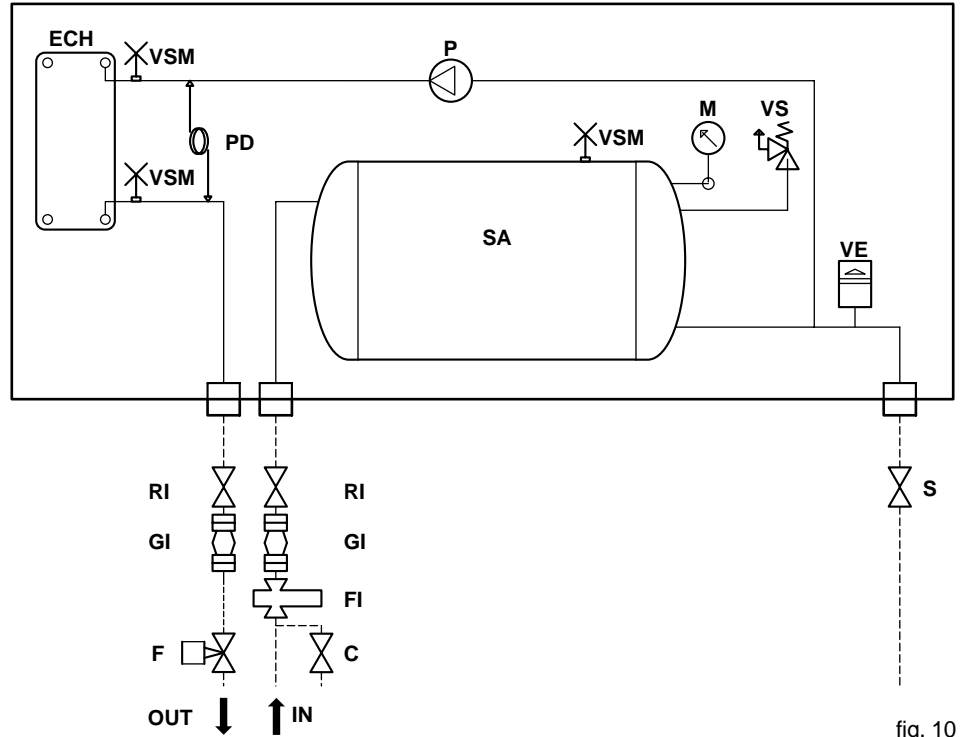


fig. 10

Storage tank data

TCAEB - THAEB

Unit	Storage tank water capacity (litres)
230 - 235	80
245 - 250 - 260	150

TCAES - THAES

Unit	Storage tank water capacity (litres)
230	80
235 - 245 - 250 - 260	150

14-litre expansion tank

TANK&PUMP - ASP unit motor-driven pump external static pressure

Unit	Pump	G (l/h)	4.000	5.400	6.000	6.470	7.200	7.980	8.600	9.220	10.000	10.770	12.000
230	P1	Δp_w (kPa)	135	109	94	-	-	-	-	-	-	-	-
	P3	Δp_w (kPa)	218	192	176	-	-	-	-	-	-	-	-
235	P1	Δp_w (kPa)	-	-	108	99	77	-	-	-	-	-	-
	P3	Δp_w (kPa)	-	-	186	177	160	-	-	-	-	-	-
245	P1	Δp_w (kPa)	-	-	-	-	100	87	73	-	-	-	-
	P3	Δp_w (kPa)	-	-	-	-	188	172	155	-	-	-	-
250	P3	Δp_w (kPa)	-	-	-	-	-	155	144	125	-	-	
260	P3	Δp_w (kPa)	-	-	-	-	-	-	-	135	119	88	

Δp_w = Integrated pump external static pressure

G = Evaporator/condenser water flow

(*) Not available for silenced versions models 4110

PUMP - Accessory with P or P/DP primary motor-driven pump

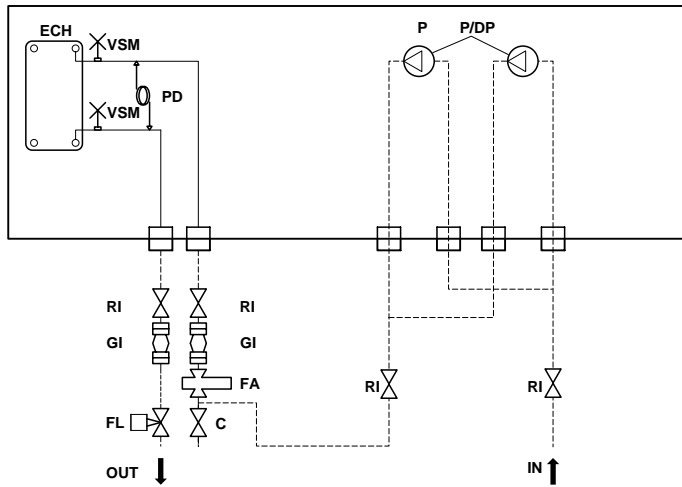


fig. 11

PUMP - Accessory with P or P/DP primary motor-driven pump and PU secondary motor-driven pump

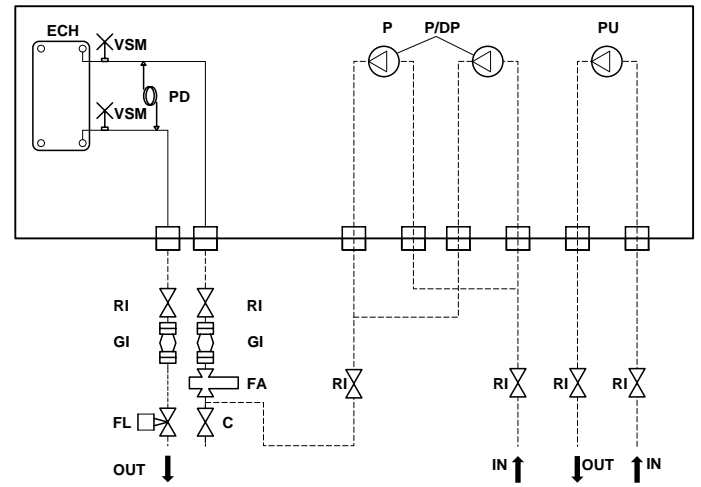


fig. 12

PUMP - Accessory with P primary motor-driven pump and PU or PU/DP secondary motor-driven pump

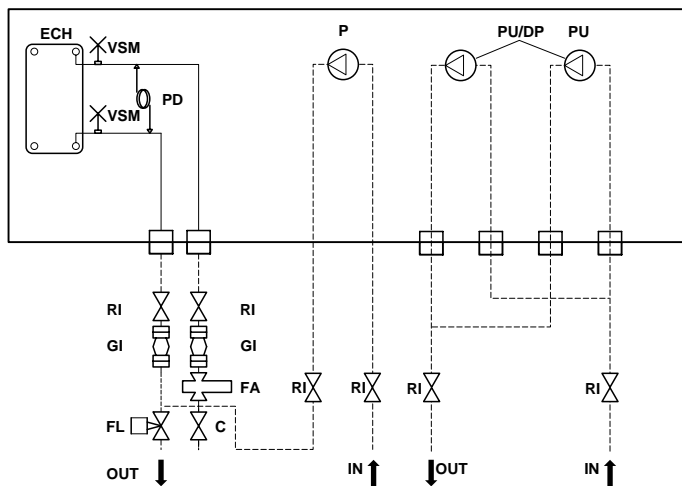


fig. 13

- P** = Primary circulation pump
- P/DP** = Primary circulation pump + stand-by pump
- PU** = User side secondary circulation pump
- PU/DP** = User side secondary circulation pump + stand-by pump
- ECH** = Plate evaporator
- M** = System manometer
- PD** = Differential pressure switch
- SA** = Storage tank
- VE** = Expansion tank
- VS** = Safety valve
- VSM** = Manual drainage valve

Connections by the installer

- C** = Charging valve
- FA/FI** = Water filter
- FL** = Flow switch
- GI** = Antivibration connection
- RI** = Interception valve
- S** = System drainage tap
- = Connection by the installer

PUMP - Primary motor-driven pump selection

Select the primary pump on the basis of the static pressure data provided in the table below, subtracting the pressure drops at the evaporator indicated in the "performances" chapter.

Selection example

- Selection of primary motor-driven pump P for TCAEB 230:
 - Cooling capacity = 31.4 kW in nominal conditions;
 - Water flow = 5,400 l/h;
 - Evaporator nominal pressure drops 30 kPa;
- Available P motor-driven pumps:
 - P1 with total static pressure of 171 kPa;
 - P3 with total static pressure of 253 kPa.

PUMP - Motor-driven pumps total static pressure

Unit	Pump	G (l/h)	4.000	5.400	6.000	6.470	7.200	7.980	8.600	9.220	10.000	10.770	12.000
230-260	P1 - PU1	Δp_w (kPa)	174	171	170	169	167	164	163	161	158	154	148
	P3 - PU3	Δp_w (kPa)	256	253	251	250	248	245	244	242	239	237	232

Models 230-235-245-250-260

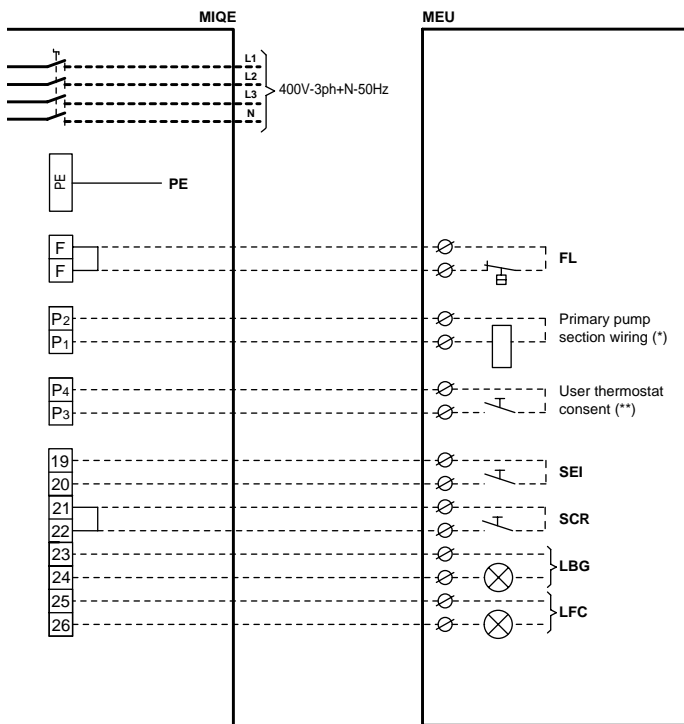


fig. 14

Electrical connections

- The electrical board (IP55) can be accessed through the front panel of the unit.
- Connections must be made in compliance with current regulations and electrical wiring diagram included.
- Earthing is compulsory by law.
- Suitable fuses or a magnetothermic switch must be installed in a sheltered place near the unit.

ATTENTION!

- The diagrams only illustrate the connections to be made by the installer on a standard unit.
- With TANK&PUMP accessory, the primary pump wiring (terminals P1-P2) has already been installed in the factor, and terminals P3-P4 are not used due to secondary pump consent.
- With PUMP accessory, the wiring for the pumps included in the unit has already been installed in the factory. The installer is responsible for installing a user thermostat to control the secondary side pump (terminals P3-P4).
- The main pump and the stand-by pump are selected using a manual selector.

- MIQE** = Electrical board internal terminal board
- MEU** = External user terminal board
- FL** = Flow switch
- LBG** = General alarm lamp (Max. 230 Vac supply)
- LFC** = Compressor operating lamp (Max. 230 Vac supply)
- L** = Line
- N** = Neutral
- PE** = Earth connection
- SCR** = Remote control selector (dry contact control)
- SEI** = Summer/winter selector (dry contact control) - wired for the THAEB and THAES versions
- (*)** = Primary pump section wiring (consent at voltage of 230V-1ph-50Hz)
- (**)** = User thermostat consent for secondary pump control in the event of PU accessory (dry contact control)
- = Connection by the installer

Motor-driven pump electrical data

The following table shows the absorption rates of the motor-driven pumps available with TANK&PUMP and PUMP accessories.

Motor-driven pump	Power supply	Absorbed power	Absorbed current
	V-ph-Hz	kW	A
P1 - PU1	400-3-50	1,12	2,0
P3 - PU3	400-3-50	1,98	3,6

MODEL		230	235	245	250	260
Electrical data						
Line section	mm ²	16	16	16	16	16
PE section	mm ²	16	16	16	16	16
Remote control section	mm ²	1,5	1,5	1,5	1,5	1,5
TCAEB-THAEB max. absorbed current	A	24	31	38	43	47
TCAES-THAES max. absorbed current	A	24	31	38	43	47
Starting current	A	86,6	116,2	144,0	150,5	190,5

TCAE-THAE 230÷260

Q-Pack range

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

IRSAP-RHOSS Clima Integral S.L.

C/ Leonardo da Vinci, 4 - Pol. Ind. Camí Ral
08850 Gavà (Barcelona) - Spain
telf. +34 93 6334733 - fax +34 93 6334734
rhoss@irsap-rhoss.com - www.rhoss.es

Ir Group S.A.S.

7 rue du Pont à Lunettes - 69390 Vourles - France
tel. +33 (0)4 72318631 - fax +33 (0)4 72318632
irsaprhoss@irgroup.fr

RHOSS Deutschland GmbH

Hölzlestraße 23, D-72336 Balingen, OT Engstlatt - Germany
tel. +49 (0)7433 260270 - fax +49 (0)7433 2602720
info@rhoss.de - www.rhoss.de

Sedi commerciali Italia: / Italy branch offices:

Area Nord-Est: 33033 Codroipo (UD) - Via Oltre Ferrovia, 32
tel. +39 0432 911611 - fax +39 0432 911600

Area Nord-Ovest: 20041 Agrate Brianza (MI)
Centro Colleoni - Palazzo Taurus, 1
tel. +39 039 6898394 - fax +39 039 6898395

Area Nord-Ovest - Uffici di Firenze:
50127 Firenze - Via F. Baracca, 148/R
tel. +39 055 4360492 - fax +39 055 413035

Area Centro-Sud: 00199 Roma - Viale Somalia, 148
tel. +39 06 8600699-707 - fax +39 06 8600747

Area Sud - Filiale di Napoli:
80143 Napoli - Via G. Porzio - Centro Direzionale - Isola G8
tel. +39 081 7879121 - fax +39 081 7879135

Area Sud - Uffici di Bari:
70124 Bari - Via Lucarelli, 60/N
tel. +39 080 5013644 - fax +39 080 5021159



RHOSS S.P.A. declines all responsibilities for possible mistakes in the catalogue and reserves the right to alter the features of their products without notice in the interests of continuous improvement.