



## TCCE-THCE: 130 ÷ 270

Packaged reversible air cooled water chillers and heat pumps with centrifugal fans. Series featuring hermetic Scroll compressors and ecological refrigerant R407C.

Versions **STANDARD - CC - AP - AP&CC - TANK&PUMP - PUMP**



K11188-GB ed. 1

# main features

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### Standard use conditions

**The TCCE units are packaged water chillers, air cooled with centrifugal fans. The THCE units are packaged reversible heat pumps, air evaporation/condensation with centrifugal fans.**

They are intended for use in industrial processing or conditioning plants where a supply of refrigerated water (TCCE) or refrigerated and heated water (THCE) is required.

**The machine is designed for indoor installation.**

The units comply to the following Directives:

- Machine Directive 89/392/CE (MD);
- Low Voltage Directive 73/23/CE (LVD);
- Electromagnetic Compatibility Directive 89/336/CE (EMC);
- Pressure Equipment Directive 97/23/CE (PED).

### Code guide "UNIT" code

<b>T</b> Air conditioning unit	<b>C</b> Cooling only	<b>C</b> Centrifugal fans	<b>E</b> Scroll hermetic compressors
	<b>H</b> Heat pump		

### "MODEL" code

<b>1 o 2</b> N° compressors	<b>30 ÷ 70</b> Approximate cooling capacity (in kW)
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### Example: THCE 270

- Unit for the air conditioning in reversible air cooled heat pump. Centrifugal fans.
- N° 2 hermetic Scroll compressors.
- Nominal cooling capacity: about 70 kW.



# main features

## Features

- Structure made of sheet steel painted with epoxy powder with compressor space inside lined with sound insulating material. TCHE units are complete with drain pan and condensate discharge.
- Hermetic rotary compressors, Scroll type.
- Capacity step control according to the following table:

MODEL	Compressors/Steps n.	Circuits n.
130 ÷ 160	1 / 1	1
270	2 / 2	1

- Stainless steel plate exchanger evaporator or condenser/evaporator complete with insulation with close cellular expanded synthetic rubber.
- Differential pressure switch to protect the unit as the water flow stops.
- Hydraulic threaded male connections.
- Air cooled condenser or evaporator/condenser coil with copper tubes expanded into aluminium fins.
- Centrifugal fans with external rotor equipped with belt driving with adjustable pulley.
- Horizontal delivery of the condensation air (intake side)
- Phase monitor to protect the compressor.
- Refrigerant circuit with mild copper tubes and silver alloy welding. Complete with filter drier, charge connections, H.P. switch, L.P. switch, liquid and moisture sight-glass, thermostatic expansion valve, pressure switch of accomplished defrosting (for THCE), cycle inverter valve (for THCE), non-return valve (for THCE), liquid receiver (for THCE).
- Unit complete with charge of ecological refrigerant gas R407C.

## Electrical board

- Electrical board (IP 55) accessible from the side panel, according to the international IEC standards, built into waterproof box lockable with special key. Complete with:
  - electrical wiring arranged for power supply 400V-3ph+N-50Hz;
  - auxiliary power supply: 230V-1ph-50Hz;
  - control power supply: 24V-1ph-50Hz;
  - power contactors;
  - door interlocking isolator;
  - magnetothermic switches for each compressor and fan;
  - magnetothermic switch on auxiliary power circuit;
  - removable unit control.
- Programmable microprocessor electronic board regulated with the keyboard built into the units. This electronic board controls the following functions:
  - control and management of inlet/outlet water temperature set points, of the safety delays, of the hour-run-meter of each compressor, of the automatic inversion of the compressor operation sequence, of the defrosting cycles (for THCE), of the circulation or user system pump of all the functions that control the working interventions of the unit devices;
  - complete protection of the unit, possible cut off of the machine and display of the active alerts;
  - visualisation: of set values, of inlet/outlet water temperatures and of alerts, by display; of working devices, of cooling/heat mode and of defrosting operation by led (for THCE);
  - self-diagnosis with diagnostic program of the unit working conditions.
- Advanced functions:
  - pre-arranged for RS 485 serial interface line for interconnection with distributed intelligent systems for integrated building automation.
  - testing of the units assisted by computer.

## Versions

- **STANDARD** - with maximum E.S.P. from 125 to 155 Pa (depending on the models).
- **CC** - with condensing control for the functioning of the unit in cooling mode with external air temperature still +10°C.
- **AP** - with fans with maximum E.S.P. from 275 to 320 Pa (depending on the models).
- **AP&CC** - with fans with high E.S.P. and condensing control for the functioning of the unit in cooling mode with external air temperatures till +10°C.
- **TANK&PUMP** - with built-in pumping group (**ASP/80 - ASP/150 - ASDP80 - ASDP/150**) equipped with: circulation pump, inertial water tank, expansion tank, system gauge, safety valve, water discharge and 300W electrical heater in the tank. The pump is available as single (ASP/...) or double (ASDP/...) one of which as manual operation stand-by pump and in 4 sizes to be matched with TCCE and THCE units. Inertial water tanks are for 80 or 150 litres depending on TCCE and THCE models.

- **PUMP** - the unit can be equipped with maximum 3 pumps. The possible choices are the following ones:
  - **P** - primary circuit single pump;
  - **DP** - primary circuit double pump one of which as manual operation stand-by pump;
  - **P/PU** - user system single pump available with a primary circuit single pump;
  - **DP/PU** - user system single pump available with a primary circuit double pump one of which as manual operation stand-by pump;
  - **P/DPU** - user system double pump one of which as manual operation stand-by pump available with a primary circuit single pump.**All pump are electrically and hydraulically connected to TCCE and THCE units.**

**TANK&PUMP and PUMP versions are compatible to STANDARD, AP, CC, AP&CC versions.**

## Accessories factory fitted

- **USC** - Vertical top air outlet (model 270 in version AP&CC excluded).
- **RP** - Protection grilles.
- **GM** - Refrigerant circuit's high and low pressure gauges .
- **RA** - Evaporator's electrical heater.

## Accessories supplied loose

- **KSA** - Rubber antivibration mountings.
- **KFA** - Mechanical water filter with stainless steel filter cartridge.
- **KTR** - Remote keyboard and display with the same functions as the one built into the unit.
- **KIS** - RS 485 serial interface for interconnection with distributed intelligent systems for integrated building automation.
- **KCH** - RS232 hardware key to be connected to supervision systems, to combine with one or more KIS serial interface modules in central system.



# TCCE: technical features

MODEL TCCE		130	135	140	150	160	270
<b>VERSION STANDARD</b>							
<b>Technical data</b>							
Nominal cooling capacity TCCE (*)	kW	30,1	34,5	37,3	47,2	59,4	66,3
E.E.R. (*)		2,28	2,14	2,50	2,31	2,35	2,10
Sound pressure level (*) (***)	dB(A)	54	59	57	57	60	64
Refrigerant circuits	n.	1	1	1	1	1	1
Scroll compressor / steps	n.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	2 / 2
R407C refrigerant charge/ (POE) polyolesters oil charge	kg	8,0 / 3,3	8,5 / 6,6	9,5 / 6,6	12,0 / 8,0	15,0 / 8,0	18,0 / 6,6x2
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	0,55	1,1	1,1	1,1	1,5	2,2
Fan nominal air flow	m <sup>3</sup> /h	8.500	11.000	15.000	15.000	17.000	20.000
Max E.S.P.	Pa	145	155	125	125	150	155
Max RPMs	rpm	688	764	648	582	675	740
Evaporator nominal water flow (*)	L/h	5.177	5.934	6.416	8.118	10.217	11.404
Evaporator nominal pressure drops (*)	kPa	20	20	21	23	25	27
Evaporator water contents	L	2,8	3,3	3,9	4,9	6,3	6,3
<b>Dimensions</b>							
Length	mm	1.855	1.855	2.355	2.355	2.355	2.355
Height	mm	1.853	1.853	1.853	1.853	1.853	1.853
Depth	mm	910	910	1.010	1.010	1.010	1.010
TCCE empty weight	kg	543	562	667	770	781	857
<b>Electrical data</b>							
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	400-3+N-50
Total absorbed power (*)	kW	13,2	16,1	16,6	20,4	25,3	31,6
Nominal current	A	23,2	28,6	29,9	36,2	43,2	56,4
Maximum current	A	26,5	31,8	31,8	39,8	49,6	63,2
Starting current	A	178	180	180	220	277	212
<b>VERSION CC</b>							
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	1,55	2,6	3,1	3,1	5,1	5,8
<b>Electrical data</b>							
Total absorbed power (*)	kW	14,6	18,3	19,5	23,2	29,9	36,3
Nominal current	A	24,3	29,8	32,3	38,4	47,3	59,1
Maximum current	A	27,6	33,0	34,9	42,0	53,7	65,9
Starting current	A	179	181	183	222	281	215
<b>VERSION AP</b>							
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	0,75	1,1	1,5	1,5	2,2	3,0
Max E.S.P.	Pa	275	285	280	280	300	320
Max RPMs (*)	rpm	882	923	774	754	827	886
Sound pressure level (***)	dB(A)	58	62	60	60	62	66
<b>Electrical data</b>							
Total absorbed power (*)	kW	13,6	16,1	17,6	21,5	26,9	33,5
Nominal current	A	24,2	28,6	32,1	38,2	46,0	59,6
Maximum current	A	27,5	31,8	31,8	41,8	52,4	66,4
Starting current	A	179	180	182	222	280	215
<b>VERSION AP&amp;CC</b>							
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	2,25	3,1	4,0	4,0	5,8	7,5
<b>Electrical data</b>							
Total absorbed power (*)	kW	15,8	18,9	21,4	24,9	31,5	39,1
Nominal current	A	26,0	30,8	34,4	40,3	48,7	62,2
Maximum current	A	29,3	34,0	34,9	43,9	55,1	69,0
Starting current	A	181	182	184	224	283	218

(\*) At the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; water Δt at the evaporator 5°C.; max. E.S.P.

(\*\*) At the following conditions: evaporator inlet air temperature 7°C D.B., 90% H.R.; hot water temperature 45°C.

(\*\*\*) sound pressure level in dB(A) is referred to measures in open place at 5 m. distance and with ductable fans.

(\*\*\*\*) The nominal current data are the maximum value between the summer and the winter working.

### N.B.:

E.S.P. data and electrical power for the different PUMP and TANK&PUMP pumps can be found at pages 17, 18 and 19.



# THCE: technical features

MODEL THCE		130	135	140	150	160	270
<b>VERSION STANDARD</b>							
<b>Technical data</b>							
Nominal cooling capacity THCE (*)	kW	30,1	34,5	37,3	47,2	59,4	66,3
E.E.R. (*)		2,28	2,14	2,50	2,31	2,35	2,10
Nominal heating capacity THCE (**)	kW	34,9	41,2	43,1	55,9	65,3	77,1
C.O.P. (**)		2,79	2,68	2,82	2,87	2,73	2,44
Sound pressure level (*) (***)	dB(A)	54	59	57	57	60	64
Refrigerant circuits	n.	1	1	1	1	1	1
Scroll compressor / steps	n.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	2 / 2
R407C refrigerant charge/ (POE) polyolesters oil charge	kg	8,5 / 3,3	9,5 / 6,6	10,5 / 6,6	13,0 / 8,0	16,5 / 8,0	19,5 / 6,6x2
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	0,55	1,1	1,1	1,1	1,5	2,2
Fan nominal air flow	m³/h	8.500	11.000	15.000	15.000	17.000	20.000
Max E.S.P. (*)	Pa	145	155	125	125	150	155
Max RPMs (*)	rpm	688	764	648	582	675	740
Water side exchanger nominal current (*)	L/h	5.177	5.934	6.416	8.118	10.217	11.404
Water side exchanger nominal drops (*)	kPa	20	20	21	23	25	27
Exchanger water content	L	2,8	3,3	3,9	4,9	6,3	6,3
<b>Dimensions</b>							
Length	mm	1.855	1.855	2.355	2.355	2.355	2.355
Height	mm	1.853	1.853	1.853	1.853	1.853	1.853
Depth	mm	910	910	1.010	1.010	1.010	1.010
THCE empty weight	kg	565	583	690	795	816	891
<b>Electrical data</b>							
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	400-3+N-50
Summer working total absorbed power (*)	kW	13,2	16,1	16,6	20,4	25,3	31,6
Winter working total absorbed power (**)	kW	12,5	15,4	15,3	19,5	23,9	31,6
Nominal current (****)	A	23,2	28,6	29,9	36,2	43,2	56,4
Maximum current	A	26,5	31,8	31,8	39,8	49,6	63,2
Starting current	A	178	180	180	220	277	212
<b>VERSION CC</b>							
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	1,55	2,6	3,1	3,1	5,1	5,8
<b>Electrical data</b>							
Summer working total absorbed power (*)	kW	14,6	18,3	19,5	23,2	29,9	36,3
Winter working total absorbed power (**)	kW	13,9	17,6	18,2	22,3	28,5	36,3
Nominal current (****)	A	24,3	29,8	32,3	38,4	47,3	59,1
Maximum current	A	27,6	33,0	34,0	42,0	53,7	65,9
Starting current	A	179	181	183	222	281	215
<b>VERSION AP</b>							
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	0,75	1,1	1,5	1,5	2,2	3,0
Max E.S.P. (*)	Pa	275	285	280	280	300	320
Max RPMs (*)	rpm	882	923	774	754	827	886
Sound pressure level (*) (***)	dB(A)	58	62	60	60	62	66
<b>Electrical data</b>							
Summer working total absorbed power (*)	kW	13,6	16,1	17,6	21,5	26,9	33,5
Winter working total absorbed power (**)	kW	12,9	15,4	16,4	20,6	25,5	33,4
Nominal current (****)	A	24,2	28,6	32,1	38,2	46,0	59,6
Maximum current	A	27,5	31,8	33,8	41,8	52,4	66,4
Starting current	A	179	180	182	222	280	215
<b>VERSION AP&amp;CC</b>							
Fans	n.	2	2	2	2	2	2
Fan motor max. installed power	kW	2,25	3,1	4,0	4,0	5,8	7,5
<b>Electrical data</b>							
Summer working total absorbed power (*)	kW	15,8	18,9	21,4	24,9	31,5	39,1
Winter working total absorbed power (**)	kW	15,1	18,2	20,2	24,0	30,1	39,0
Nominal current (****)	A	26,0	30,8	34,4	40,3	48,7	62,2
Maximum current	A	29,3	34,0	35,9	43,9	55,1	69,0
Starting current	A	181	182	184	224	283	218

## Keyboard and display description

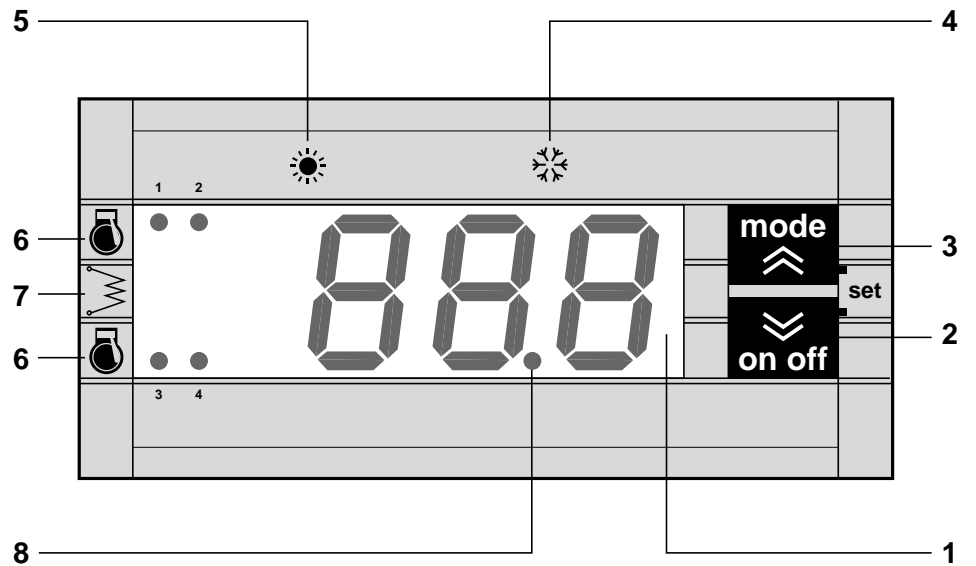


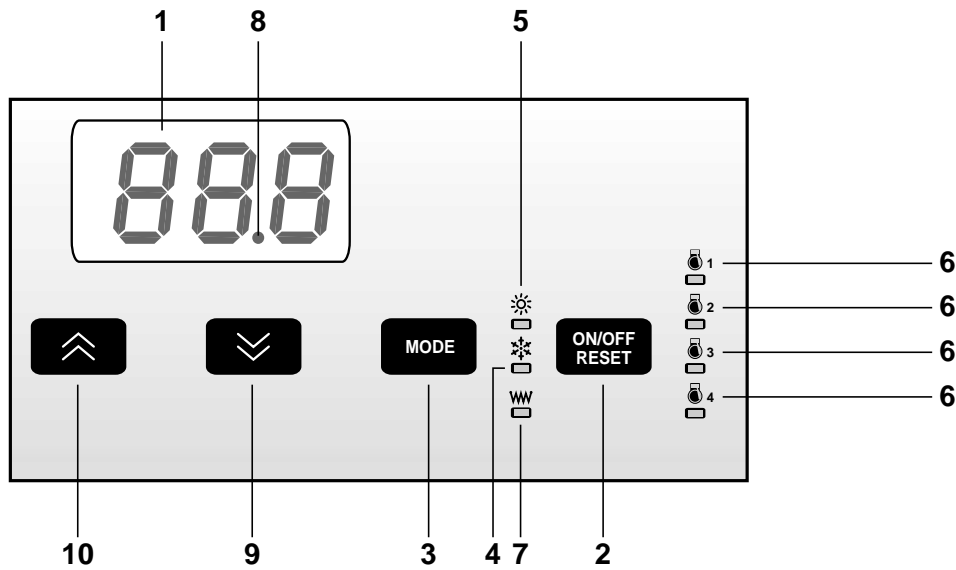
fig. 1

This electronic board controls the following functions:

- control and management of inlet/outlet water temperature set points, of the safety delays, of the hour-run-meter of each compressor, of the automatic inversion of the compressor operation sequence, of the defrosting cycles (for THCE), of the circulation or user system pump of all the functions that control the working interventions of the unit devices;
- complete protection of the unit, possible cut off of the machine and display of the active alerts;
- visualisation: of set values, of inlet/outlet water temperatures and of alerts, by display; of working devices, of cooling/heat mode and of defrosting operation by led (for THCE);
- self-diagnosis with diagnostic program of the unit working conditions.

- 1 = DISPLAY:**  
it displays the value of all the parameters (ex. outlet water temperature etc.), the codes of the possible alarms and the status of all the resources.
- 2 = ON/OFF, RESET - DOWN key:**  
it allows to switch ON, OFF and the reset of possible alarms of the unit. Furthermore allows to roll downward the value of the parameters.
- 3 = MODE - UP key:**  
it allows to select the unit operation (stand-by, summer or winter cycle). Furthermore it allows to roll upward the value of the parameters.
- 4 = Summer LED:**  
it indicates that the unit is working in cooling cycle.
- 5 = Winter LED:**  
it indicates that the unit is working in heating cycle.
- 6 = Compressor LED:**  
it indicates that the compressors are ON or that a delay is in progress (fast blinking); in THCE versions working in winter mode, it also indicates the defrosting operation (slow blinking).
- 7 = Plate exchanger heater LED:**  
it displays the operation of the electrical heater (if foreseen).
- 8 = Power supply LED:**  
it indicates the presence of power supply in the unit.

**KTR - Remote keyboard with display for remote control**

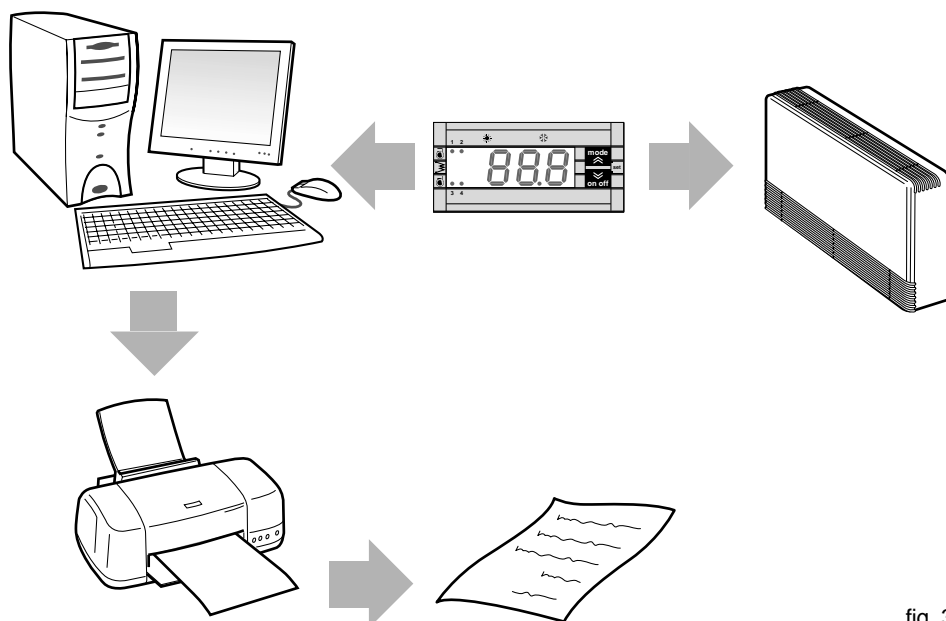


The remote keyboard with display (KTR), allows the remote control and display of all the process variables, digital and analog of the unit.  
So it's possible to control directly in the room all functions of the unit.

fig. 2

- |   |  |
|---|--|
| <p><b>1 = DISPLAY:</b><br/>it displays the value of all the parameters (ex. outlet water temperature etc.), the codes of the possible alarms and the status of all the resources.</p> <p><b>2 = ON/OFF, RESET key:</b><br/>it allows to switch ON, OFF and the reset of possible alarms of the unit.</p> <p><b>3 = MODE key:</b><br/>it allows to select the unit operation (stand-by, summer or winter cycle).</p> <p><b>4 = Summer LED:</b><br/>it indicates that the unit is working in cooling cycle.</p> <p><b>5 = Winter LED:</b><br/>it indicates that the unit is working in heating cycle.</p> | <p><b>6 = Compressor LED:</b><br/>it indicates that the compressors are ON or that a delay is in progress (fast blinking); in THCE versions working in winter mode, it also indicates the defrosting operation (slow blinking).</p> <p><b>7 = Plate exchanger heater LED:</b><br/>it displays the operation of the electrical heater (if foreseen).</p> <p><b>8 = Power supply LED:</b><br/>it indicates the presence of power supply in the unit.</p> <p><b>9/10 = ▲ (up), ▼ (down) keys:</b><br/>used to scroll through the list of parameters and any triggered alarms; can also be used to change the programmed set points.</p> |
|---|--|

**KIS - Serial interface RS 485 for serial communication**  
**KCH - RS 232 hardware key for serial communication**



The units are equipped with an electronic controller, that is compatible with an external system through a serial communication line. The communication protocol allows the access to all the functions of the unit, as:

- set all the values accessible by the keyboard;
- read all the process variables of the digital as well as analogue inputs and outputs;
- read the various alarm codes and eventually reset them;
- read all the parameters for programming or charge a few of them.

fig. 3

# cooling capacity and pressure drops

## Version STANDARD: cooling capacity TCCE - THCE

MODEL	Tue °C		Ta (°C)									
			20		25		35		42		45	
	QF	P	QF	P	QF	P	QF	P	QF	P	QF	P
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
<b>130</b>	5	34,1	8,55	32,0	10,73	28,2	12,93	25,3	14,67	24,1	15,58	
	7	36,6	9,49	34,4	10,85	<b>30,1</b>	<b>13,20</b>	27,0	15,07	<b>25,7</b>	15,90	
	9	39,0	9,59	36,8	11,12	32,3	13,47	29,0	15,30	-	-	
	11	41,5	9,97	39,1	11,35	34,4	13,75	31,0	16,03	-	-	
	13	44,0	10,35	41,5	11,57	36,5	14,02	-	-	-	-	
	15	46,5	10,61	43,9	11,84	38,7	14,29	-	-	-	-	
<b>135</b>	5	39,3	12,00	36,8	13,35	32,3	15,84	28,9	17,83	27,4	18,79	
	7	41,9	12,19	39,3	13,56	<b>34,5</b>	<b>16,10</b>	30,9	17,96	29,3	19,08	
	9	44,8	12,28	42,2	13,79	37,0	16,39	33,4	18,30	-	-	
	11	47,7	12,55	44,9	14,02	39,5	16,68	35,6	18,59	-	-	
	13	50,5	12,82	47,6	14,25	41,9	16,96	-	-	-	-	
	15	53,5	13,10	50,5	14,50	44,5	17,27	-	-	-	-	
<b>140</b>	5	41,6	12,35	39,3	13,78	34,7	16,36	31,5	18,28	30,1	19,35	
	7	44,5	12,57	42,0	14,01	<b>37,3</b>	<b>16,60</b>	33,9	18,49	32,4	19,61	
	9	47,7	12,72	45,1	14,15	40,1	16,79	36,4	18,75	-	-	
	11	50,8	12,92	48,1	14,33	42,9	17,01	38,8	19,00	-	-	
	13	53,9	13,11	51,2	14,51	45,6	17,23	-	-	-	-	
	15	57,1	13,33	54,2	14,72	48,4	17,47	-	-	-	-	
<b>150</b>	5	53,2	15,0	50,0	16,95	44,1	20,00	39,8	22,53	37,8	23,73	
	7	56,7	15,4	53,4	17,28	<b>47,2</b>	<b>20,40</b>	42,7	22,92	40,8	24,09	
	9	60,7	15,8	57,3	17,64	50,6	20,87	45,7	23,90	-	-	
	11	64,6	16,2	61,0	18,01	54,0	21,32	48,9	24,16	-	-	
	13	68,4	16,6	64,7	18,37	57,3	21,92	-	-	-	-	
	15	72,4	17,0	68,6	18,78	60,9	22,24	-	-	-	-	
<b>160</b>	5	66,0	18,73	62,5	20,81	55,6	24,85	39,7	23,63	48,7	28,96	
	7	70,5	19,02	66,5	21,28	<b>59,4</b>	<b>25,30</b>	42,7	24,02	51,6	29,74	
	9	75,1	19,56	71,1	21,74	63,5	25,89	45,6	25,00	-	-	
	11	79,8	20,03	75,6	22,21	67,6	26,43	48,9	25,26	-	-	
	13	84,4	20,50	80,1	22,69	71,6	26,97	-	-	-	-	
	15	89,2	21,04	84,8	23,21	76,0	27,53	-	-	-	-	
<b>270</b>	5	75,7	23,06	70,9	26,06	61,8	31,06	55,2	35,07	52,4	36,89	
	7	81,1	23,48	76,0	26,47	<b>66,3</b>	<b>31,60</b>	59,3	35,63	56,2	37,52	
	9	86,7	24,07	81,4	26,98	71,2	32,17	63,8	36,04	-	-	
	11	92,3	24,61	86,8	27,46	76,0	32,75	68,1	36,51	-	-	
	13	97,9	25,14	92,2	27,95	80,8	33,57	-	-	-	-	
	15	103,7	25,68	97,7	28,45	85,8	33,94	-	-	-	-	

Tue = Evaporator outlet water temperature (inlet/outlet  $\Delta t = 5^\circ\text{C}$ )  
 Ta = Dry bulb ambient temperature  
 QF = Cooling capacity with a fouling factor at the evaporator of  $0,35 \times 10^{-4} \text{ m}^2 \text{ }^\circ\text{C/W}$   
 P = Power input

**N.B.:**  
 ○ For the different PUMP and TANK&PUMP versions the pumps' electrical power values at page 19 have to be added to the total electrical absorbed power.  
 ○ For the versions CC - AP - AP&CC, add to the total electrical absorbed power the value obtained from the absorbed power difference

between the different versions and the STANDARD version (value can be obtained from the data in the technical features at pages 4 and 5).  
 ○ The electrical data on the serial number on the unit refer to the fully accessoried unit. STANDARD version: pressure drops TCCE-THCE.

## Version STANDARD: pressure drops TCCE - THCE

MODEL	G (l/h)	3.236	3.451	3.698	3.982	4.314	4.707	<b>5.177</b>	5.752	6.472	7.396	8.629
<b>130</b>	$\Delta p_{pw}$ (kPa)	8	9	10	12	14	17	<b>20</b>	25	31	41	56
	G (l/h)	3.709	3.956	4.239	4.565	4.945	5.395	<b>5.934</b>	6.593	7.418	8.477	9.890
<b>135</b>	$\Delta p_{pw}$ (kPa)	8	9	10	12	14	17	<b>20</b>	25	31	41	56
	G (l/h)	4.010	4.277	4.583	4.935	5.346	5.832	<b>6.416</b>	7.128	8.020	9.165	10.693
<b>140</b>	$\Delta p_{pw}$ (kPa)	8	9	11	12	15	17	<b>21</b>	26	33	43	58
	G (l/h)	5.074	5.412	5.799	6.245	6.765	7.380	<b>8.118</b>	9.020	10.148	11.598	13.531
<b>150</b>	$\Delta p_{pw}$ (kPa)	9	10	12	14	16	19	<b>23</b>	28	36	47	64
	G (l/h)	6.386	6.811	7.298	7.859	8.514	9.288	<b>10.217</b>	11.352	12.771	14.595	17.028
<b>160</b>	$\Delta p_{pw}$ (kPa)	10	11	13	15	17	21	<b>25</b>	31	39	51	69
	G (l/h)	7.127	7.602	8.145	3.982	9.503	10.367	<b>11.404</b>	12.671	14.255	16.291	19.006
<b>270</b>	$\Delta p_{pw}$ (kPa)	11	12	14	3	19	22	<b>27</b>	33	42	55	75

G = Water flow  
 $\Delta p_{pw}$  = Pressure drops

# heating capacity

## Version STANDARD: heating capacity THCE

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
<b>130</b>	-5	90	26,8	8,45	26,4	9,48	26,1	10,65	-	-
	0	90	29,5	8,53	29,3	9,56	29,1	10,73	28,9	12,04
	5	90	34,7	8,64	34,5	9,67	34,2	10,83	34,0	12,12
	7	90	35,9	8,67	35,4	9,71	<b>34,9</b>	<b>10,86</b>	34,5	12,14
	10	90	38,4	8,73	37,9	9,77	37,4	10,92	36,9	12,20
	15	90	44,8	8,84	44,5	9,86	44,1	11,02	43,7	12,33
<b>135</b>	-5	90	31,2	9,68	30,9	10,82	30,7	12,07	-	-
	0	90	39,8	9,79	40,0	10,93	40,2	12,20	40,3	13,66
	5	90	40,8	9,94	40,4	11,08	40,0	12,36	39,6	13,82
	7	90	41,8	9,98	41,5	11,13	<b>41,2</b>	<b>12,40</b>	40,8	13,87
	10	90	45,7	10,07	45,4	11,22	45,0	12,50	44,7	13,98
	15	90	53,4	10,21	52,5	11,38	51,7	12,68	50,9	14,13
<b>140</b>	-5	90	32,9	9,64	32,2	10,77	31,6	12,02	-	-
	0	90	36,8	9,75	36,8	10,89	36,7	12,15	36,6	13,60
	5	90	43,8	9,90	43,1	11,05	42,4	12,32	41,7	13,75
	7	90	44,8	9,94	43,9	11,09	<b>43,1</b>	<b>12,36</b>	42,2	13,80
	10	90	48,6	10,02	48,2	11,19	47,8	12,46	47,4	13,92
	15	90	58,6	10,18	57,8	11,37	56,9	12,66	56,1	14,10
<b>150</b>	-5	90	42,2	13,05	42,0	14,45	41,7	16,00	-	-
	0	90	46,5	13,19	46,2	14,62	45,8	16,19	45,5	18,01
	5	90	56,0	13,48	55,3	14,92	54,7	16,52	54,0	18,31
	7	90	56,5	13,51	56,2	14,96	<b>55,9</b>	<b>16,55</b>	55,6	18,40
	10	90	62,7	13,69	61,8	15,15	61,0	16,77	60,1	18,61
	15	90	75,5	14,06	74,6	15,55	73,7	17,20	72,9	19,08
<b>160</b>	-5	90	45,8	15,15	45,8	16,83	45,4	18,65	-	-
	0	90	56,1	15,65	56,0	17,41	55,8	19,28	55,7	21,34
	5	90	61,8	15,85	61,5	17,65	61,1	19,56	60,7	21,74
	7	90	66,4	16,06	65,9	17,87	<b>65,3</b>	<b>19,83</b>	64,8	21,94
	10	90	69,3	16,18	69,0	18,03	68,6	19,96	68,3	22,13
	15	90	74,2	16,35	73,4	18,24	72,6	20,21	71,8	22,38
<b>270</b>	-5	90	57,6	19,82	57,4	22,19	57,2	24,88	-	-
	0	90	66,5	20,24	66,5	22,66	66,5	25,40	66,4	28,42
	5	90	74,0	20,51	73,8	22,95	73,6	25,70	73,4	28,79
	7	90	77,6	20,69	77,3	23,17	<b>77,1</b>	<b>25,91</b>	76,7	28,98
	10	90	82,7	20,86	81,8	23,31	81,0	26,12	80,2	29,16
	15	90	88,8	21,07	87,6	23,56	86,5	26,33	85,3	29,41

Tuc = Condenser outlet water temperature (inlet/outlet  $\Delta t = 5^\circ\text{C}$ )  
 Ta = Dry bulb ambient temperature  
 UR = Relative humidity  
 QT = Heating capacity with a fouling factor at the condenser of  $0,35 \times 10^{-4} \text{ m}^2 \text{ }^\circ\text{C/W}$   
 P = Power input with max. E.S.P.

### N.B.:

○ For the different PUMP and TANK&PUMP versions the pumps' electrical power values at page 19 have to be added to the total electrical absorbed power.  
 ○ For the versions CC - AP - AP&CC, add to the total electrical absorbed power the value obtained from the absorbed power difference

between the different versions and the STANDARD version (value can be obtained from the data in the technical features at pages 4 and 5).  
 ○ The electrical data on the serial number on the unit refer to the fully accessoried unit. STANDARD version: pressure drops TCCE-THCE.

# External static pressure for STANDARD and CC versions

## TCCE-THCE 130 (\*)

E.S.P.	Pa	90	100	110	120	130	140	145
	rpm	574	595	615	636	657	678	688
Fan motor installed power	<b>STANDARD</b>	n. x kW	2 x 0,55					
	<b>CC</b>	n. x kW	1 x 0,55					
		n. x kW	1 x 1 / 0,2 (4 / 8 pole) (**)					

## TCCE-THCE 135 (\*)

E.S.P.	Pa	75	90	100	115	130	145	155
	rpm	638	662	677	701	725	748	764
Fan motor installed power	<b>STANDARD</b>	n. x kW	2 x 1,1					
	<b>CC</b>	n. x kW	1 x 1,1					
		n. x kW	1 x 1,5 / 0,3 (4 / 8 pole) (**)					

## TCCE-THCE 140 (\*)

E.S.P.	Pa	60	80	90	100	110	120	125
	rpm	574	576	578	579	580	581	582
Fan motor installed power	<b>STANDARD</b>	n. x kW	2 x 1,1					
	<b>CC</b>	n. x kW	1 x 1,1					
		n. x kW	1 x 2 / 0,5 (4 / 8 pole) (**)					

## TCCE-THCE 150 (\*)

E.S.P.	Pa	70	80	90	100	110	120	125
	rpm	512	525	662	677	693	709	717
Fan motor installed power	<b>STANDARD</b>	n. x kW	2 x 1,1					
	<b>CC</b>	n. x kW	1 x 1,1					
		n. x kW	1 x 2 / 0,5 (4 / 8 pole) (**)					

## TCCE-THCE 160 (\*)

E.S.P.	Pa	55	60	80	100	120	140	150
	rpm	574	579	601	622	643	664	675
Fan motor installed power	<b>STANDARD</b>	n. x kW	2 x 1,5					
	<b>CC</b>	n. x kW	1 x 1,5					
		n. x kW	1 x 3,6 / 0,9 (4 / 8 pole) (**)					

## TCCE-THCE 270 (\*)

E.S.P.	Pa	50	60	80	100	120	140	155
	rpm	638	648	667	687	706	725	740
Fan motor installed power	<b>STANDARD</b>	n. x kW	2 x 2,2					
	<b>CC</b>	n. x kW	1 x 2,2					
		n. x kW	1 x 3,6 / 0,9 (4 / 8 pole) (**)					

(\*) At the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; water  $\Delta t$  at the evaporator 5°C.

(\*\*) Double polarity power.

# External static pressure for AP and AP&CC versions

## TCCE-THCE 130 (\*)

E.S.P.	Pa	150	170	190	200	220	240	260	275
	rpm	680	712	745	761	793	825	858	882
Fan motor installed power	<b>AP</b>	n. x kW			2 x 0,75				
	<b>AP&amp;CC</b>	n. x kW			1 x 0,75				
		n. x kW			1 x 1,5 / 0,3 (4 / 8 pole) (**)				

## TCCE-THCE 135 (\*)

E.S.P.	Pa	140	170	190	200	220	240	260	275
	rpm	725	766	793	807	834	862	889	909
Fan motor installed power	<b>AP</b>	n. x kW			2 x 0,75				
	<b>AP&amp;CC</b>	n. x kW			1 x 0,75				
		n. x kW			1 x 1,5 / 0,3 (4 / 8 pole) (**)				

## TCCE-THCE 140 (\*)

E.S.P.	Pa	200	220	240	260	280
	rpm	658	687	716	745	774
Fan motor installed power	<b>AP</b>	n. x kW			2 x 1,5	
	<b>AP&amp;CC</b>	n. x kW			1 x 1,5	
		n. x kW			1 x 2,5 / 0,6 (4 / 8 pole) (**)	

## TCCE-THCE 150 (\*)

E.S.P.	Pa	190	200	220	240	260	280
	rpm	658	669	834	862	889	916
Fan motor installed power	<b>AP</b>	n. x kW			2 x 1,5		
	<b>AP&amp;CC</b>	n. x kW			1 x 1,5		
		n. x kW			1 x 2,5 / 0,6 (4 / 8 pole) (**)		

## TCCE-THCE 160 (\*)

E.S.P.	Pa	160	180	200	220	240	260	280	300
	rpm	683	704	724	745	765	786	806	827
Fan motor installed power	<b>AP</b>	n. x kW			2 x 2,2				
	<b>AP&amp;CC</b>	n. x kW			1 x 2,2				
		n. x kW			1 x 3,6 / 0,9 (4 / 8 pole) (**)				

## TCCE-THCE 270 (\*)

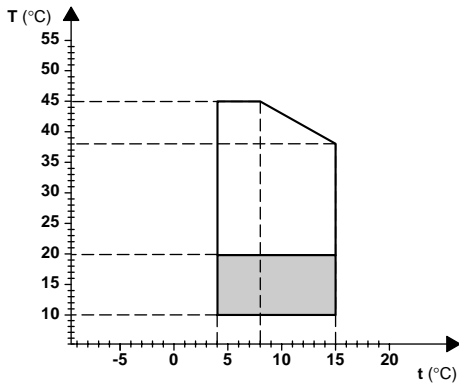
E.S.P.	Pa	180	200	220	240	260	280	300	320
	rpm	765	782	800	817	834	851	869	886
Fan motor installed power	<b>AP</b>	n. x kW			2 x 3,0				
	<b>AP&amp;CC</b>	n. x kW			1 x 3,0				
		n. x kW			1 x 4,5 / 1,1 (4 / 8 pole) (**)				

(\*) At the following conditions: condenser inlet air temperature 35°C; chilled water temperature 7°C; water  $\Delta t$  at the evaporator 5°C.

(\*\*) Double polarity power.

# operation limits and use of antifreeze solutions

## TCCE-THCE 130÷270: Cooling operation



T (°C) = outdoor air temperature D.B.

t (°C) = produced water temperature

○ Water  $\Delta t$  at the evaporator: 3÷8°C.

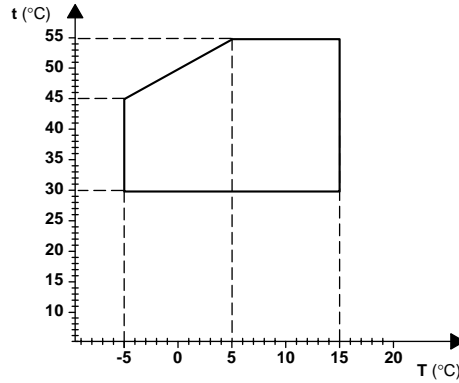
Standard operation.

Working with condensation control (CC, AP&CC).

### N.B.:

We can also provide units on demand to supply chilled water at less than 4°C

## THCE 130÷270: Heat pump operation



T (°C) = outdoor air temperature D.B.

t (°C) = produced water temperature

○ Water  $\Delta t$  at the evaporator/condenser: 3÷8°C.

### N.B.:

Max. inlet water temperature 48.

## use of antifreeze solutions

○ Use of ethylene glycol is a must in case the water discharge from the hydraulic system during the winter stop or whenever the unit has to supply chilled water at temperatures lower than 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 hereunder detailed.

## Anti-freeze protection during seasonal stop

○ Table "A" show the multipliers to obtain the changes of the 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, temperature differential to the evaporator 5°C.

○ For different operating conditions the same multipliers can be used since the amount of their change is neglectable.

Table "A"

Outdoor air min. temperature °C	2	0	-3	-6	-10
% glycol in weight	10	15	20	25	30
Freezing temperature °C	-5	-7	-10	-13	-16
fc G	1,008	1,028	1,051	1,074	1,100
fc $\Delta p_w$	1,053	1,105	1,184	1,237	1,316
fc QF	0,991	0,987	0,982	0,978	0,974
fc P	0,996	0,995	0,993	0,991	0,989

fc G = correction factor of the glycol water flow to the evaporator

fc  $\Delta p_w$  = correction factor of the pressure drops through the evaporator

fc QF = correction factor of the cooling capacity

fc P = correction factor of the total absorbed current

TCCE-THCE 130 - 135: dimensions

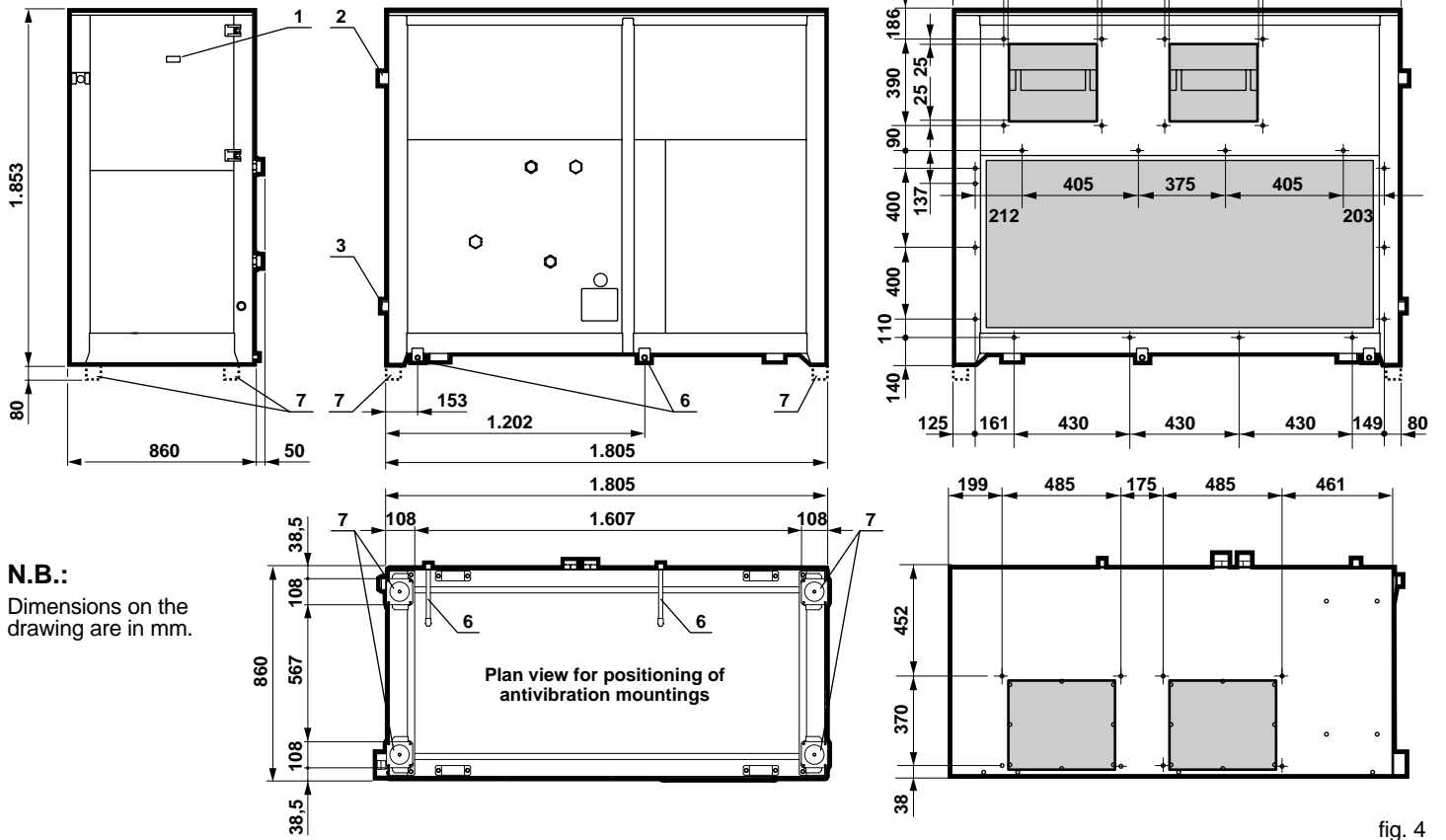


fig. 4

TCCE-THCE 140 ÷ 270: dimensions

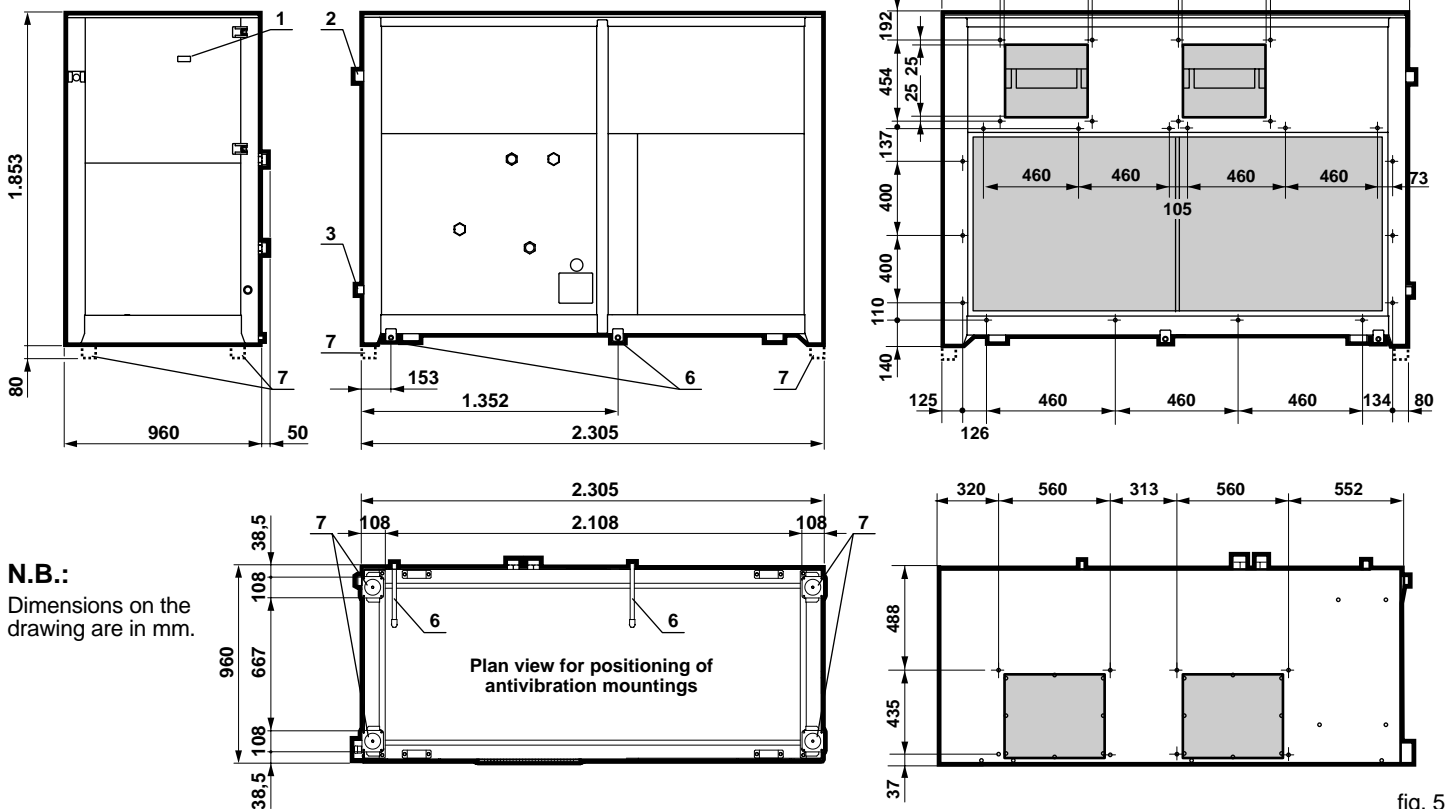


fig. 5

- 1. Electrical board
- 2. Emergency button
- 3. Power supply

- 6. Drain discharge (THCE only)
- 7. KSA rubber antivibration mountings (option accessory)

**Distribution of the weights on the fixing points**

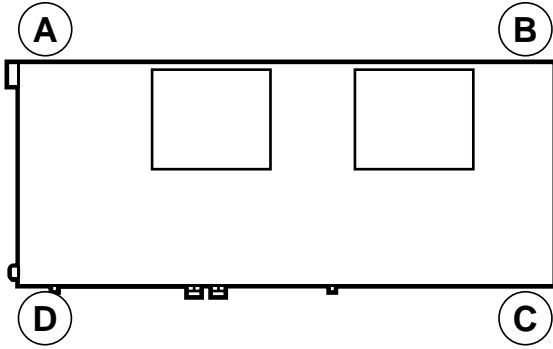


fig. 6

**TCCE: STANDARD version**

MODEL	TCCE	130	135	140	150	160	270
Weight	kg	543	562	667	770	781	857
<b>Support point</b>							
A	kg	103	102	128	129	145	146
B	kg	146	148	166	189	203	212
C	kg	122	127	162	183	181	204
D	kg	172	185	211	269	252	295

**THCE: STANDARD version**

MODEL	THCE	130	135	140	150	160	270
Weight	kg	565	583	690	795	816	891
<b>Support point</b>							
A	kg	108	106	132	133	152	152
B	kg	151	153	172	195	212	220
C	kg	127	132	168	189	189	212
D	kg	179	192	218	278	263	307

**TCCE: TANK&PUMP version (\*)**

MODEL	TCCE	130	135	140	150	160	270
Weight	kg	646	666	781	885	946	1.022
<b>Support point</b>							
A	kg	134	130	160	159	235	250
B	kg	152	152	171	194	275	283
C	kg	169	177	217	239	201	230
D	kg	191	207	233	293	235	259

**THCE: TANK&PUMP version (\*)**

MODEL	THCE	130	135	140	150	160	270
Weight	kg	669	687	805	910	982	1.057
<b>Support point</b>							
A	kg	139	134	164	163	244	259
B	kg	157	157	176	200	286	292
C	kg	175	183	224	246	208	238
D	kg	198	213	241	301	244	268

**TCCE: PUMP version (\*\*)**

MODEL	TCCE	130	135	140	150	160	270
Weight	kg	622	642	749	853	941	1.017
<b>Support point</b>							
A	kg	125	126	155	156	194	194
B	kg	150	154	176	201	216	226
C	kg	158	163	196	217	251	276
D	kg	189	199	222	279	280	321

**THCE: PUMP version (\*\*)**

MODEL	THCE	130	135	140	150	160	270
Weight	kg	645	663	773	878	976	1.051
<b>Support point</b>							
A	kg	130	130	160	160	201	201
B	kg	155	159	182	207	224	233
C	kg	164	168	202	223	260	285
D	kg	196	206	229	288	291	332

(\*) TANK&PUMP version with primary circuit double pump (DP).

(\*\*) PUMP version with user system double pump and primary circuit single pump (P/DPU).

## Clearance spaces

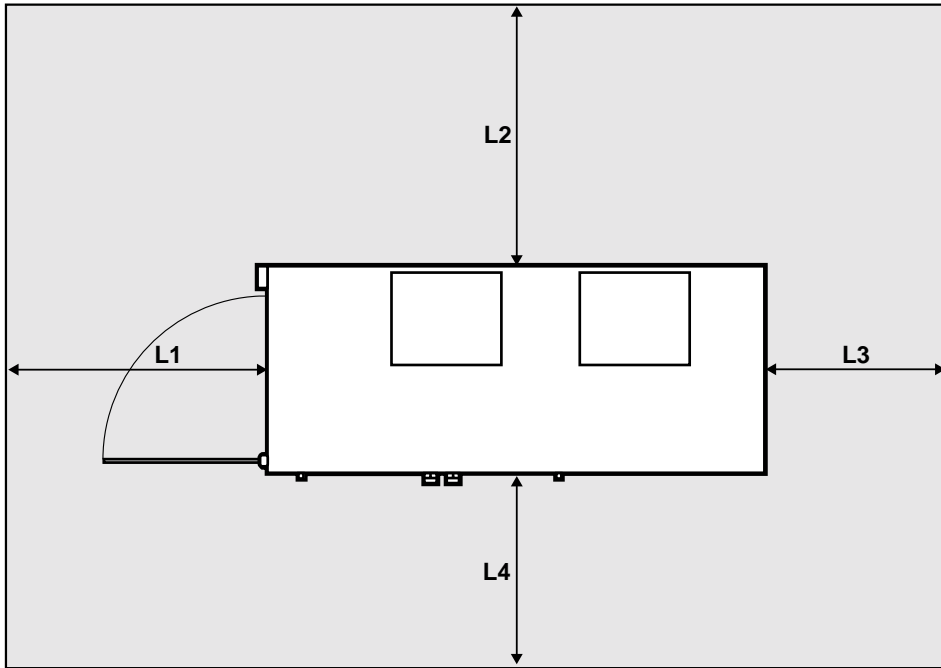


fig. 7

MODEL		130	135	140	150	160	270
<b>Service spaces</b>							
L1	mm	1.500	1.500	1.500	1.500	1.500	1.500
L2	mm	1.500	1.500	1.500	1.500	1.500	1.500
L3	mm	1.000	1.000	1.000	1.000	1.000	1.000
L4	mm	1.000	1.000	1.000	1.000	1.000	1.000

## Installation

- Special care should be paid when moving the unit in order to avoid damages to the external structure and to the internal mechanical and electrical components.
  - The unit should be placed respecting the minimum technical service distances advised in picture 7, keeping in mind the access to the water and electrical connections.
- The minimum distance in height between the unit top and a possible obstacle should not be lower than 3,5 m.
- A correct installation of the unit foresees the level setting and a surface able to bear the weight.
  - In case of installation of several units, the minimum distance between the finned coils should not be lower than 2 m, in this way interferences on the working of the condensing/ventilation modules of each unit can be avoided.

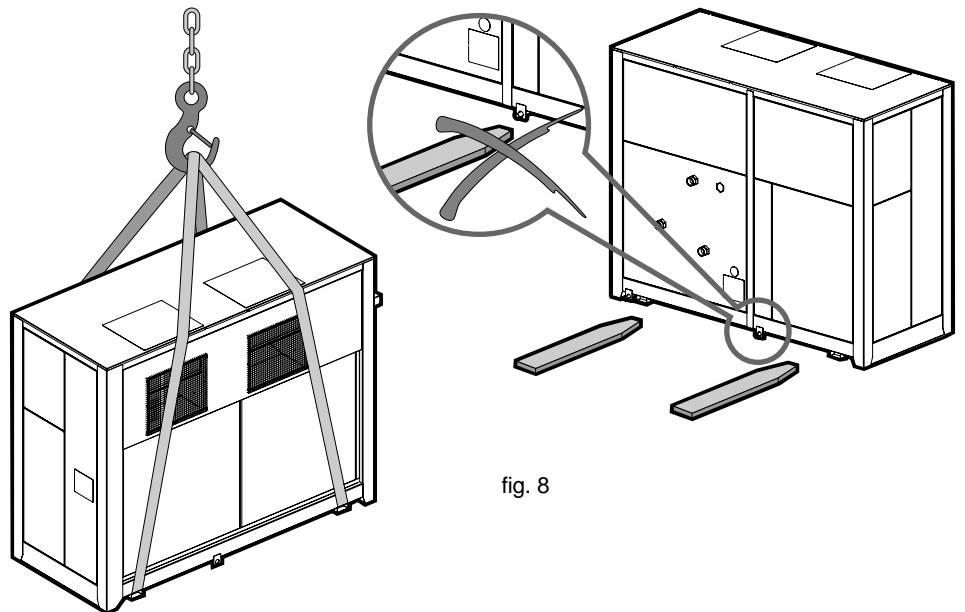


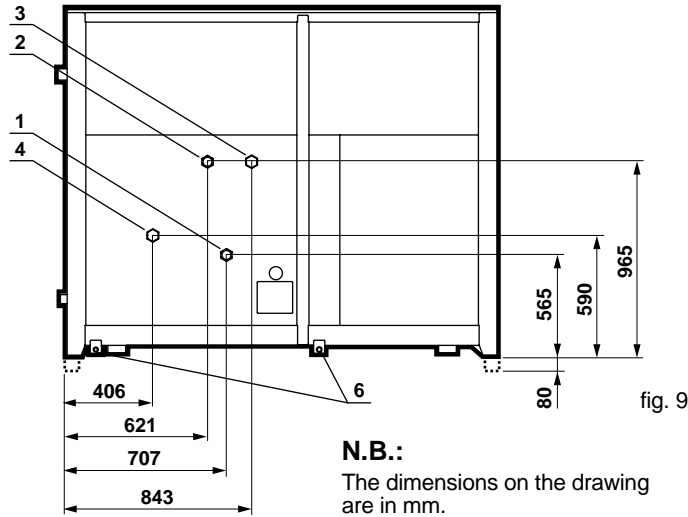
fig. 8

# hydraulic connection

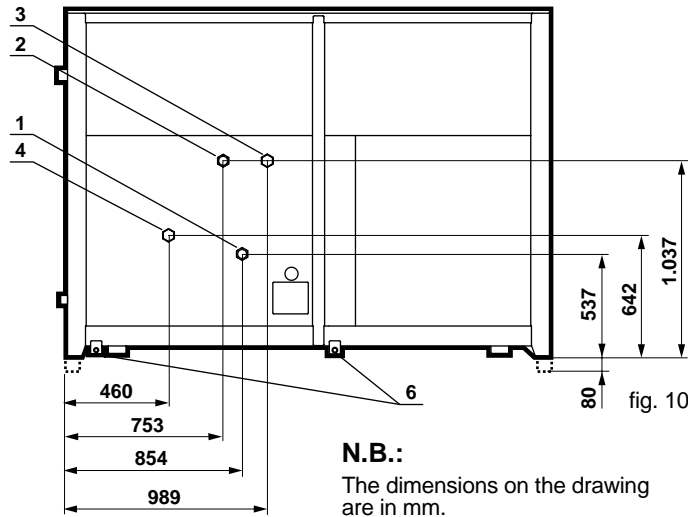
## Hydraulic connections

- Discharging the water from the system is advisable for seasonal stop.
- Otherwise using a water/glycol solution is possible (see use of antifreeze solutions on page 20).
- A trace electrical heater (available as option accessory) reduces the freezing risk during the winter stops whenever the electrical power of the unit is ON.
- The installation of air vent and intercepting valves to insulate the unit from the system is recommended.

## Hydraulic connections' position and dimension Models 130 - 135



## Hydraulic connections' position and dimension Models 140 ÷ 270



## ATTENTION

- Mounting a low pressure drop filter at the water inlet is recommended.
- The water flow through the exchanger has not to produce a thermic drop to the evaporator lower than 3°C or higher than 8°C.
- Pictures 11, 12 and 13 show examples of the hydraulic circuit; **the sketched components and connections are by the installer.**

## TCCE

### STANDARD and PUMP versions (P - DP)

1. Evaporator water inlet 2" G (male)
2. Evaporator water outlet 2" G (male)

### TANK&PUMP version (ASP/... - ASDP/...)

4. Evaporator water inlet 2" G (male)
2. Evaporator water outlet 2" G (male)

### PUMP version (P/PU - DP/PU - P/DPU)

1. Evaporator water inlet 2" G (male)
2. Water outlet to the the user 2" G (male)
3. Water outlet to SI 2" G (male)

## THCE

### STANDARD and PUMP versions (P - DP)

1. Evaporator water inlet 2" G (male)
2. Evaporator water outlet 2" G (male)
6. Drain discharge Ø<sub>e</sub> 22 mm

### TANK&PUMP version (ASP/... - ASDP/...)

4. Evaporator water inlet 2" G (male)
2. Evaporator water outlet 2" G (male)
6. Drain discharge Ø<sub>e</sub> 22 mm

### PUMP version (P/PU - DP/PU - P/DPU)

1. Evaporator water inlet 2" G (male)
2. Water outlet to the the user 2" G (male)
3. Water outlet to SI 2" G (male)
6. Drain discharge Ø<sub>e</sub> 22 mm

## TCCE-THCE 130 (\*)

VERSION		STANDARD						TANK&PUMP						PUMP					
		130	135	140	150	160	270	130	135	140	150	160	270	130	135	140	150	160	270
Exchanger water content	L	2,8	3,3	3,9	4,9	6,3	6,3	2,8	3,3	3,9	4,9	6,3	6,3	2,8	3,3	3,9	4,9	6,3	6,3
Tank water content	L	-	-	-	-	-	-	80	80	150	150	150	150	-	-	-	-	-	-
Expansion vessel	L	-	-	-	-	-	-	14	14	14	14	14	14	-	-	-	-	-	-
Safety valve calibration	kPa	-	-	-	-	-	-	300	300	300	300	300	300	-	-	-	-	-	-
Max. acceptable pressure	kPa	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300

# hydraulic connection

## PUMP version

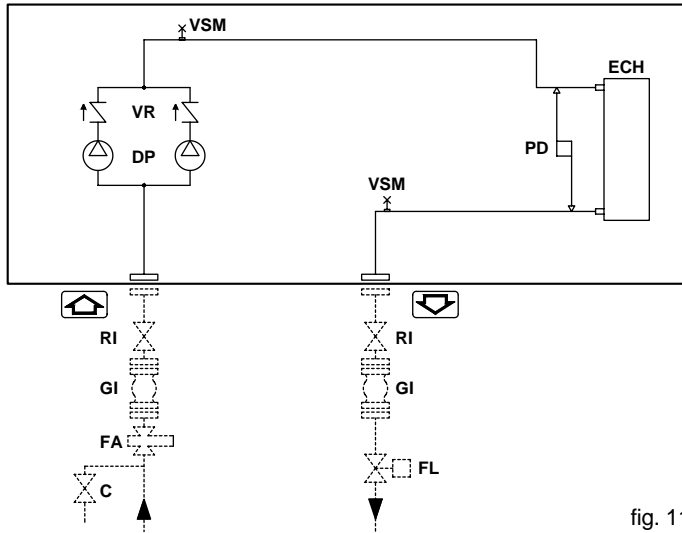


fig. 11

Picture 11 - Pump version example with primary circuit double pump (DP).

## PUMP version

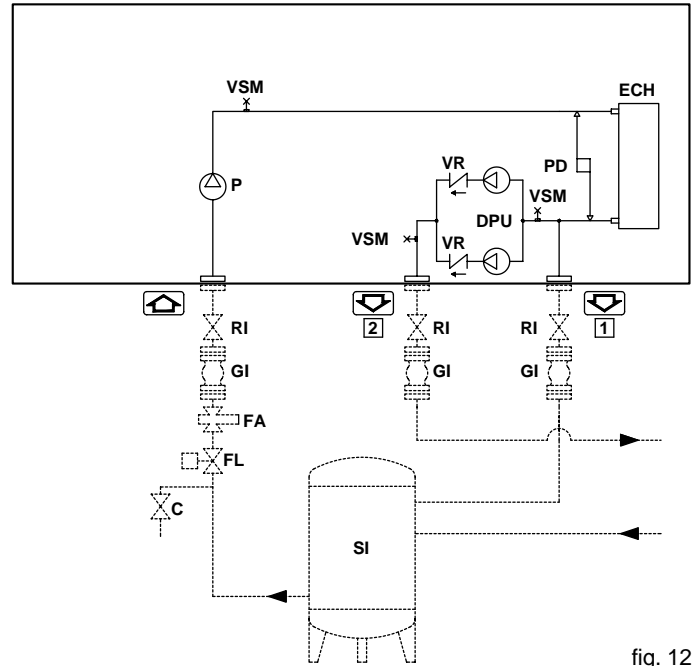


fig. 12

Picture 12 - PUMP version example with primary pump and user system double pump (P/DPU)

### Description

- P** = Primary circulation pump
- DP** = Primary circulation double pump-stand-by pumps
- DPU** = User system double pump-stand-by pumps
- ECH** = Plate exchanger
- PD** = Differential pressure switch
- VR** = Non-return valve
- VSM** = Manual discharge valve

### Components by the installer

- C** = Charging tap
- FA** = Water filter
- FL** = Flow switch
- GI** = Antivibration connection
- RI** = Intercepting tap
- SI** = System tank
- = Connection by the installer

### PUMP and DP versions: pumps available pressure

UNIT	Pump	G (L/h)	4.500	5.177	5.500	5.934	6.200	6.416	7.500	8.118	9.000	10.217	10.800	11.404	12.000
<b>130</b>	P1	$\Delta p_w$ (kPa)	146	141	138	-	-	-	-	-	-	-	-	-	-
	P3	$\Delta p_w$ (kPa)	228	223	220	-	-	-	-	-	-	-	-	-	-
<b>135</b>	P1	$\Delta p_w$ (kPa)	-	-	143	140	138	-	-	-	-	-	-	-	-
	P3	$\Delta p_w$ (kPa)	-	-	225	222	220	-	-	-	-	-	-	-	-
<b>140</b>	P1	$\Delta p_w$ (kPa)	-	-	-	-	140	139	130	-	-	-	-	-	-
	P3	$\Delta p_w$ (kPa)	-	-	-	-	222	220	211	-	-	-	-	-	-
<b>150</b>	P1	$\Delta p_w$ (kPa)	-	-	-	-	-	-	139	135	128	-	-	-	-
	P3	$\Delta p_w$ (kPa)	-	-	-	-	-	-	220	215	209	-	-	-	-
<b>160</b>	P5	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	148	140	137	-	-
	P7	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	293	284	280	-	-
<b>270</b>	P5	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	-	-	141	137	133
	P7	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	-	-	284	278	275

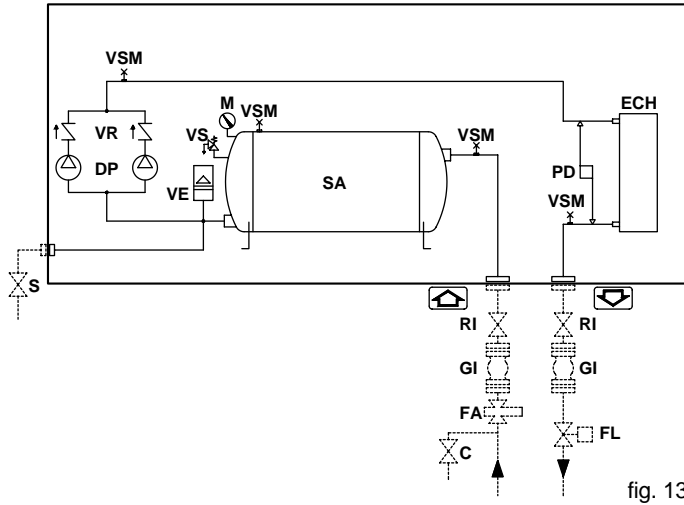
### PUMP P/PU – DP/PU – P/DPU versions: pumps available pressure

UNIT	Pump	G (L/h)	4.500	5.177	5.500	5.934	6.200	6.416	7.500	8.118	9.000	10.217	10.800	11.404	12.000
<b>130÷140</b>	P1-PU1	$\Delta p_w$ (kPa)	161	161	160	160	160	159	158	158	156	-	-	-	-
	P1-PU3	$\Delta p_w$ (kPa)	243	243	242	242	241	241	240	239	238	-	-	-	-
<b>150</b>	P1-PU1	$\Delta p_w$ (kPa)	-	161	160	160	160	159	158	158	156	-	-	-	-
	P1-PU3	$\Delta p_w$ (kPa)	-	243	242	242	241	241	240	239	238	-	-	-	-
<b>160÷270</b>	P5-PU5	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	168	165	165	164	163
	P5-PU7	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	313	309	308	305	305

- G** = Evaporator/condenser water flow
- $\Delta p_w$  = Built-in pump available pressure

# hydraulic connection

## TANK&PUMP version



### Description

- P** = Primary circulation pump
- DP** = Primary circulation double pump-stand-by pumps
- ECH** = Plate exchanger
- M** = System gauge
- PD** = Differential pressure switch
- SA** = Water tank
- VE** = Expansion tank
- VR** = Non-return valve
- VS** = Safety valve
- VSM** = Manual discharge valve

### Components by the installer

- C** = Charging tap
- FA** = Water filter
- FL** = Flow switch
- GI** = Antivibration connection
- RI** = Intercepting tap
- S** = System discharge tap
- = Connection by the installer

Picture 13 - Example group with double pump and tank (ASDP/...).

## Pump available pressure

UNIT	Pump	G (L/h)	4.500	5.177	5.500	5.934	6.200	6.416	7.500	8.118	9.000	10.217	10.800	11.404	12.000
<b>130</b>	P1	$\Delta p_w$ (kPa)	142	136	132	-	-	-	-	-	-	-	-	-	-
	P3	$\Delta p_w$ (kPa)	224	218	214	-	-	-	-	-	-	-	-	-	-
<b>135</b>	P1	$\Delta p_w$ (kPa)	-	-	139	135	132	-	-	-	-	-	-	-	-
	P3	$\Delta p_w$ (kPa)	-	-	221	217	214	-	-	-	-	-	-	-	-
<b>140</b>	P1	$\Delta p_w$ (kPa)	-	-	-	-	135	134	123	-	-	-	-	-	-
	P3	$\Delta p_w$ (kPa)	-	-	-	-	217	215	204	-	-	-	-	-	-
<b>150</b>	P1	$\Delta p_w$ (kPa)	-	-	-	-	-	-	134	130	122	-	-	-	-
	P3	$\Delta p_w$ (kPa)	-	-	-	-	-	-	216	210	203	-	-	-	-
<b>160</b>	P5	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	144	135	131	-	-
	P7	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	289	279	274	-	-
<b>270</b>	P5	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	-	-	136	132	127
	P7	$\Delta p_w$ (kPa)	-	-	-	-	-	-	-	-	-	-	279	273	269

G = Evaporator/condenser water flow  
 $\Delta p_w$  = Built-in pump available pressure

## electrical connection

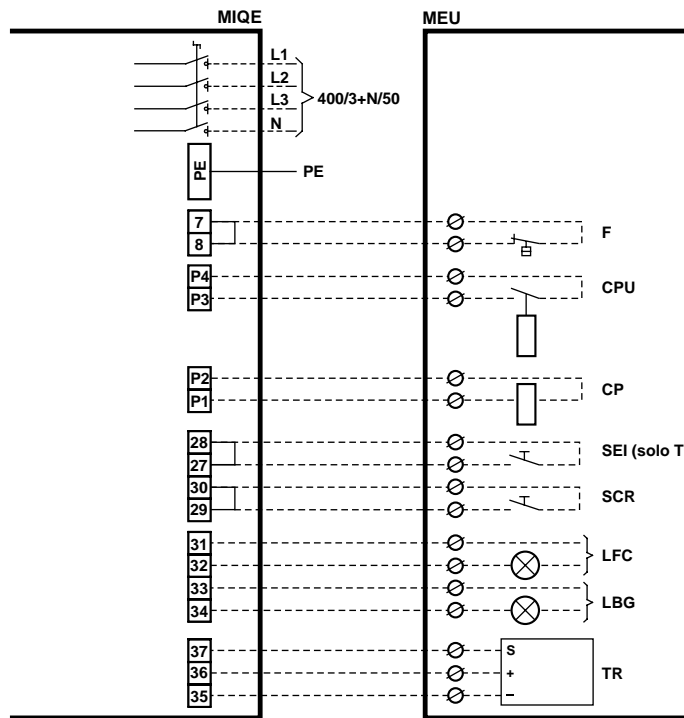
### Electrical connections

- The access to the electrical board (IP55) is possible through the side panel of the unit.
- The connections have to be carried out as per rules in force and electrical wiring diagram included.
- Earthing is compulsory by law.
- Suitable fuses or magnetothermic switch must be installed in a sheltered place near the unit.

### ATTENTION!

- The tables show only the connections by the installer on a Standard version unit.
- On **TANK&PUMP and PUMP versions with primary pump (P-DP versions)** the wiring of the primary pump (P1-P2 terminals) is factory done and P3-P4 terminals for the permission to the user pump are not used.
- On **PUMP versions with primary and user pump (P/PU, DP/PU, P/DPU versions)** the installation of a thermostat for the control of the user pump is by the installer (P3-P4 terminals).
- The changing between primary and stand-by pump occurs through a **manual selector**.

TCCE - THCE 130 ÷ 270



- MIQE** = Terminal board inside the electric cabinet
- MEU** = User external terminal board
- CP** = Pump contactor
- CPU** = User pump contactor from user thermostat (PUMP versions with user pump)
- F** = Flow switch
- LBG** = General main alarm lamp (max. 230 vac supply)
- LFC** = Compressor working lamp (max. 230 vac supply)
- L** = Lines
- N** = Neutral
- PE** = Earth clamp
- SCR** = Remote control switch (dry contact control)
- SEI** = Summer/winter switch (dry contact control)
- TR** = Remote keyboard
- = Connection by the installer

fig. 14

Table "A"

MODEL		130	135	140	150	160	270
<b>Electrical data</b>							
Line sections (1)	mm <sup>2</sup>	10	10	10	16	25	25
PE section (1)	mm <sup>2</sup>	10	10	10	16	16	16
Remote control line section	mm <sup>2</sup>	1,5	1,5	1,5	1,5	1,5	1,5
<b>Version STANDARD (*)</b>							
Maximum absorbed current	A	26,5	31,8	31,8	39,8	49,6	63,2
Starting current	A	178	180	180	220	277	212
<b>Version CC (*)</b>							
Maximum absorbed current	A	27,6	33	34,9	42	53,7	65,9
Starting current	A	179	181	183	222	281	215
<b>Version AP (*)</b>							
Maximum absorbed current	A	27,5	31,8	31,8	41,8	52,4	66,4
Starting current	A	179	180	182	222	280	215
<b>Version AP&amp;CC (*)</b>							
Maximum absorbed current	A	29,3	34	34,9	43,9	55,1	69
Starting current	A	181	182	184	224	283	218

(1) The values refer to a max. length of the line of 50 m.

Pump electrical data

**Table B:** The table below shows the electrical data of the pump models available in the TANK&PUMP and PUMP whit P and DP versions.

Pump		P1	P3	P5	P7
Power supply	V-ph-Hz	400-3-50	400-3-50	400-3-50	400-3-50
Absorbed power	kW	1,12	1,98	1,98	4,00
Absorbed current	A	3,8	6,2	6,2	12

**Table C:** The table below shows the electrical data of the pump models available in the PUMP with P/PU, DP/PU, P/DP/PU version.

Pump		P1/PU1	P1/PU3	P5/PU5	P5/PU7
Power supply	V-ph-Hz	400-3-50	400-3-50	400-3-50	400-3-50
Absorbed power	kW	2,24	3,10	3,96	5,98
Absorbed current	A	7,6	10,0	12,4	18,2

(\*) N.B.:

For PUMP, TANK&PUMP versions the corresponding values of absorbed current by the pumps in the cases described on B and C tables must be added to the the max. absorbed and to the starting currents (shown in table A).

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