

**Air-condensed water chillers  
and heat pumps  
YCSA/YCSA-H 120 and 150  
T and TP (R-410A)**



Ref.: Y-R70161 1205

**Technical Information**



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## General Information

### General description

The YCSA/YCSA-H 120 and 150 units are high-performance air-water water chillers and heat pumps using R-410A ecological refrigerant.

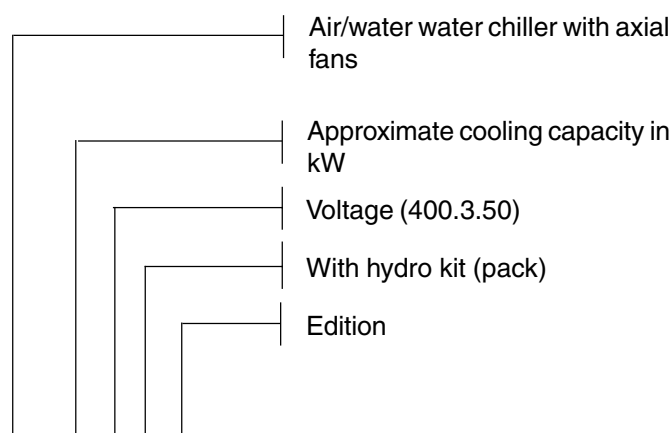
These units are designed for air conditioning or industrial applications that require cold or hot water. They are silent and compact units, equipped with vertical air discharge axial fans, that can be installed directly outdoors. They are available in two versions: with and without a hydro kit, which includes a buffer tank and a high head pressure pump.

The control system of these units is a specially programmed electronic controller to be used on air-water water chillers and heat pumps equipped with two compressor tandems.

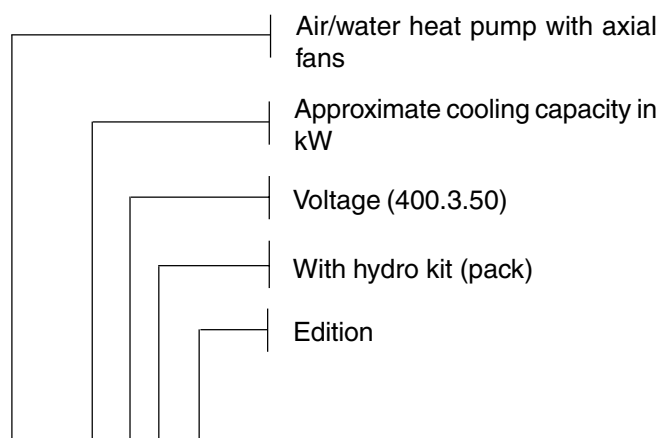
Easy to use and safe, this system precision controls the water temperature of the installation, carries out defrost cycles, modulates fan speeds and controls compressor, pump and electric heater start-ups. By reading the control probes and safety elements, the controller protects the entire unit against malfunctions. The system allows connecting the unit to a standard RS485 monitoring network. For further information, please see Operating Instructions. For further information, please see Operating Instructions section.

The YCSA/YCSA-H 120 and 150 units are made of proven quality components and manufactured in compliance with standards in force (ISO 9001 certification).

### Nomenclature



YCSA 120 T P E2



YCSA-H 150 T P E2

### Models available and capacities

Cool only model	<b>YCSA 120</b>	<b>YCSA 150</b>
Cooling capacity (kW)	119	156

Heat pump model	<b>YCSA-H 120</b>	<b>YCSA-H 150</b>
Cooling capacity (kW)	114	145
Heating capacity (kW)	119.6	150

**Cooling capacities in kW for 12/7° C entering/leaving water temperature, and 35° C ambient temperature.**

**Heating capacities in kW for 40/45° C entering/leaving water temperature, and 7° C ambient temperature.**

### Features and advantages

Features	Advantages
R-410A refrigerant	Does not harm the ozone layer.
Small footprint	Minimum space for installation.
Low height and weight	Space for installing on terraces.
Factory tested equipment	Operating quality control.
Accessibility	Easy maintenance.
Main switch	Operator safety.
Microprocessor for control and alarms	Easy and safe operation.
Manufactured to ISO 9001	High quality level.
Variable speed fan	Low noise level and condensation control.
Hydro kit	For installations with low water volume.
Communications connection	Ideal for building management.

### Technical Specifications

These units are supplied completely factory-assembled and with all refrigerant tubing and wiring ready for installation on the job site. After mounting, these units must undergo an operational test. Refrigerant leaks will also be checked during this process.

#### Galvanized steel casing

The units are made of galvanized steel sheeting and anticorrosion nuts and bolts. Panels with ¼-turn locks can be removed to access internal components.

The casing parts are painted with white RAL9002 oven-baked polymerized enamel.

#### Compressors

Four hermetic Scroll compressors mounted on two tandems on rails and antivibratory supports. Both tandems are con-

nected to two independent cooling circuits. Start-up is carried out by four sequential FIFO starters. These compressors are equipped with protection against high operating temperatures. The sump heaters operate only when the compressor is inoperative.

### **Indoor heat exchanger**

Comprises a stainless steel plate exchanger with two refrigerant circuits and a common water circuit. Adequately insulated by a layer of closed-cell elastomer foam. Includes an antifreeze heater monitored by the controller and a differential pressure switch acting as a flow control switch. The refrigerant side of said exchanger accepts an operating pressure of 52 bar, whereas the water side accepts 10 bar. When the unit includes a hydro kit, maximum admissible pressure on the water side is 6 bar (adjustment of the tank relief valve).

### **Outdoor heat exchangers**

Made up of four notched aluminium fin coils and grooved copper tubing mechanically expanded within the fin assembly.

### **Fans**

Of the axial and low sound level type. Equipped with single-phase motors with IP54 protection. These motors allow speed control by means of a phase cut-out shifters controlled by the unit controller. This allows unit operation at low ambient temperatures (-18°C).

On heat pump units, the fan will remain inoperative during defrosts.

### **Electric and control panel**

Located at the front of the unit, and with IP44 protection. The operating and control components are factory mounted, wired and tested. The access door of this control panel is equipped with a locking isolator that turns power supply off. Inside we find the contactors for compressors and the pump, the transformer, magneto-thermal protectors, the controller, two speed controls, connecting strip and the keyboard-display with the unit controls.

### **Control keyboard-display**

This device is accessible through an external leak-tight plastic cover. This is an easy-to-use remote control unit for a distance of up to 500 m., and is accessed by means of a password. For further information, please see Operating Instructions.

### **Cooling circuit**

Made up of two circuits in parallel. Each circuit includes: expansion valve, filter-dryer, liquid sight glass, high and low pressure switches, service valves for isolating the condensing unit, and Schrader valves on the high and low sides. The heat pump model also includes, in addition, a four-way valve (energized in summer cycle and during defrosts), check valves, heating circuit expansion valve and a liquid tank. The suction tubing is coated with closed-cell elastomer insulation.

### **Hydro kit (pack)**

These units include a pack assembled with the components

of a hydro kit. This assembly is located within the unit frame and does not increase the footprint of same. It includes the following components: lined buffer tank with an antifreeze heater, centrifugal pump, expansion vessel charged with nitrogen at 1.5 bar, relief valve set to 6 bar, water circuit pressure gauge, air bleed valves, filling valve and drain valve. Also includes a mesh filter for the water circuit. This filter is supplied loose for installation at the most convenient point.

### **Protecting grids**

To protect the coils from possible impacts. Made of steel rods and painted with oven baked polymerized white enamel (RAL9002).

## **Accessories and options**

### **Unit without hydro kit**

Includes the elements described in the previously mentioned specifications, less the hydro kit (pack). The water circuit includes an air bleed valve. Connections are ready for field installation.

### **Flow switch**

For field installation. Insures sufficient water circulation when the unit is in operation.

### **Anticorrosion protection of fins**

Two options are available:

- Aluminium fins with Blue Fin primer.
- Copper fins.

### **2 ½" water filter**

Stainless steel screen with 1mm. diameter perforations. Supplied as a standard element on units that include the hydro kit (pack).

Optional on units that do not include the pack.

The warranty of the unit will not be valid if a water filter has not been installed.

### **Remote control unit**

Wall-mounted remote control unit with keyboard for cool/heat and ON/OFF functions. Includes power supply, alarm and cool/heat LEDs. Maximum cable length: 50 m.

### **BMS connections**

By means of a serial board, the system can be connected to a standard RS485 monitoring network.

### **Dual pump**

This is a single body, two-motor pump. The operation of same must be enabled and programmed from the *Configuration* menu on the machine control unit. The second pump starts when the magneto thermal protector of the first pump has disconnected, and vice versa. This control allows rotational operation of said pumps in accordance with operating hours or number of starts.

### **Low noise level (LN) units**

These include anti-noise casings mounted on the compressors and sound insulation lining the panels of the compressor chamber.

## Physical data, cool only units

Characteristics		YCSA-120 T and TP	YCSA-150 T and TP
Cooling capacity	kW	119	156
Capacity control	%	25/50/75/100%	
Power supply	V/ph	400.3.50	
Compressor consumption	kW	4 x 9.4	4 x 11.53
Compressor amperage	A	4 x 17.7	4 x 21.5
No. of refrigerant circuits		2	
No. of compressors		2 TANDEM	
Compressor type		SCROLL	
Oil charge	l	4 x 3.25	4 x 4.14
Oil type		POLYOL ESTER OIL	
Heat exchanger		PLATES	
Nominal water flow	l/h	20 470	26 830
No. of fans		4	
Fan diameter	mm	630	710
Fan consumption	W	4 x 600	4 x 860
Fan amperage	A	4 x 2.75	4 x 3.9
Total air flow	m <sup>3</sup> /h	36 000	48 000
Refrigerant type		R-410A	
Refrigerant charge	kg	2 x 16.2	2 x 23
Sound power level	dB (A)	86	88
Sound power level at 5 m.	dB (A)	64	66
Sound power level at 10m.	dB (A)	58	60
Sound power level LN	dB (A)	82	84
Sound power level at 5 m. LN	dB (A)	60	62
Sound power level at 10m. LN	dB (A)	54	56
<b>Dimensions</b>			
Length	mm	3 416	3 770
Width	mm	1 101	
Height	mm	2 190	2 263
Water connections, socket		2 1/2"	
Water filter		2 1/2"	

## Units with hydro kit (version P)

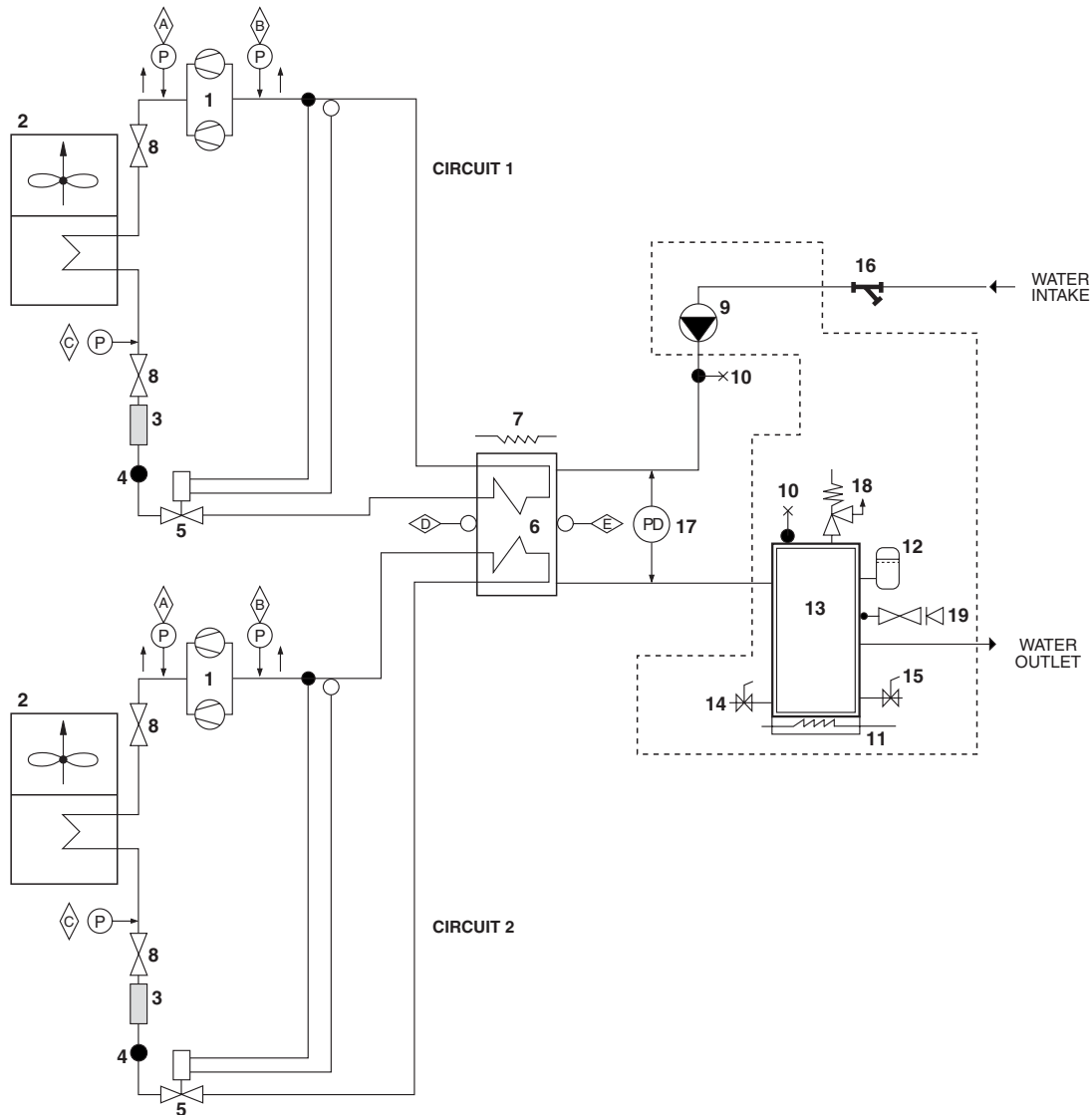
No. of pumps		1	
Available static pressure at nominal flow (without filter) (2)	kPa	205	191
Available static pressure at nominal flow (with filter) (3)	kPa	202	185
Pump consumption	W	3 180	3 400
Pump amperage	A	5.5	6.1
Unit water content	l	18 (T) / 170 (TP)	22.5 (T) / 179 (TP)
Expansion vessel volume	l	25	35
Relief valve setting	Bar	6	
Max. unit power consumption	kW	58.3	74.5
Max. unit current amperage	A	108	135
Start-up amperage (compressor)	A	118	198
Weight (1) / (4)	kg	1 250 / 1 286	1 645 / 1 673

## Units without pack

Start-up amperage (compressor)	A	118	198
Water circuit pressure drop	kPa	32	29
Max. unit power consumption	kW	53	71.1
Max. unit current amperage	A	103	129
Weight (1)	kg	1 190	1 585

(1) Weight for unit empty. (2) Available static pressure, Eurovent certified. (3) Pressure with clean filter. (4) Weight with dual pump.

## Operation, cooling and hydraulic diagram. Cool only unit YCSA 120/150



### SAFETY/CONTROL DEVICES

- A** High pressure switch
- B** Low pressure switch
- C** Pressure transducer port (fan speed control - readout of condensing pressure)
- D** Leaving water temperature sensor (antifreeze, control and display)
- E** Entering water temperature sensor (control and display)

### COMPONENTS

- 1** Compressor (tandem)
- 2** Air cooled condenser
- 3** Filter-dryer
- 4** Sight glass
- 5** Expansion valve
- 6** Plate heat exchanger
- 7** Exchanger antifreeze heater
- 8** Globe valve
- 9** Water pump
- 10** Manual air bleed
- 11** Water tank antifreeze heater

- 12** Expansion vessel
- 13** Water tank
- 14** Charge valve
- 15** Drain valve
- 16** Water filter (not inside the unit)
- 17** Pressure differential switch
- 18** Relief valve
- 19** Pressure gauge

— Pipe connection with Schrader valve

----- For units with hydro kit only

Heat exchange takes place between the heat transfer liquid (water or glycol water) and the refrigerant in the plate heat exchanger. Water is cooled, and refrigerant is evaporated and reheated.

Then the Scroll compressor condenses the refrigerant (gas) until the condensing pressure is reached, and the refrigerant goes to the air cooled condensing unit. In the air cooled con-

densing unit, heat is exchanged between the air and the refrigerant. The air is heated and evacuated from the chiller (heat rejection). The refrigerant is condensed and sub-cooled. Then the refrigerant (liquid) goes on to the expansion valve, where it is expanded until the evaporating pressure is reached, at which time it goes to the evaporating unit to end the cooling cycle.

**Table 1. Cooling capacities YCSA 120, 150 T and TP**

Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% HR)													
		25		30		32		35		40		43		45	
		Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW
<b>YCSA 120 T and TP</b>	5	128.9	36.4	119.7	39.6	116.1	40.9	110.7	41.7	101.6	46.1	96.0	47.9	92.3	50.9
	6	132.1	37.0	123.2	40.0	119.6	41.3	114.2	42.1	105.3	46.9	99.8	48.6	96.3	51.3
	7	135.4	37.6	126.6	40.4	123.0	41.9	<b>119.0</b>	<b>43.0</b>	109.0	47.6	103.6	49.2	100.2	51.7
	8	138.6	38.3	130.1	40.8	126.5	42.6	121.4	43.9	112.7	48.4	107.6	49.9	104.1	52.1
	10	145.2	39.3	136.9	41.7	133.5	43.9	128.5	44.7	120.2	49.2	115.2	50.6	111.9	52.9
	12	152.0	40.1	143.3	43.3	139.9	44.7	134.9	46.7	126.6	50.0	121.5	51.9		
	15	161.6	43.0	153.0	45.9	149.6	47.0	144.6	48.7	136.1	51.6				
<b>YCSA 150 T and TP</b>	5	168.9	42.4	156.9	46.1	152.3	47.6	145.1	48.5	133.2	53.6	125.9	55.8	121.1	59.2
	6	173.2	43.1	161.5	46.6	156.8	48.1	149.8	49.0	138.1	54.5	130.9	56.5	126.2	59.6
	7	177.5	43.8	166.0	47.0	161.3	48.8	<b>156.0</b>	<b>50.0</b>	142.9	55.4	135.9	57.3	131.4	60.1
	8	181.7	44.5	170.5	47.5	165.8	49.5	159.1	51.0	147.7	56.3	141.0	58.0	136.5	60.6
	10	190.3	45.7	179.4	48.5	175.0	51.0	168.5	52.0	157.6	57.2	151.0	58.8	146.6	61.5
	12	199.2	46.6	187.8	50.4	183.5	52.0	176.9	54.3	166.0	58.1	159.3	60.4		
	15	211.8	50.1	200.6	53.4	196.1	54.7	189.5	56.7	178.5	60.0				

**Table 2. Cooling capacities YCSA 120 - 150 T and TP (35% ethylene glycol)**

Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% HR)													
		25		30		32		35		40		43		45	
		Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW	Cap. kW	Unit kW
<b>YCSA 120 T and TP</b>	-5	78.0	28.8	73.0	31.1	70.9	32.2	67.7	32.9	62.5	36.7	59.3	37.8	56.6	40.7
	-4	81.8	29.5	76.5	31.9	74.3	32.9	70.9	33.6	65.5	37.6	62.2	38.7	59.0	41.7
	-2	89.7	30.9	84.0	33.3	81.5	34.5	77.8	35.2	71.9	39.3	68.2	40.5	64.4	43.5
	0	98.1	32.3	91.9	34.8	89.1	36.0	85.0	36.8	78.7	41.1	74.5	42.3	69.8	45.2
	2	107.1	33.7	100.3	36.4	97.4	37.6	92.9	38.5	85.9	43.0	81.4	44.2	77.6	47.0
	4	116.2	35.2	108.7	37.9	105.6	39.2	100.8	40.1	93.2	44.8	88.3	46.1	84.3	49.6
	<b>YCSA 150 T and TP</b>	-5	102.3	33.5	95.7	36.2	92.9	37.4	88.7	38.2	82.0	42.7	77.8	43.9	74.2
-4		107.2	34.3	100.3	37.0	97.4	38.3	93.0	39.1	85.9	43.7	81.5	44.9	77.3	48.5
-2		117.6	35.9	110.1	38.8	106.9	40.1	102.0	41.0	94.3	45.7	89.4	47.0	84.4	50.6
0		128.6	37.5	120.4	40.5	116.9	41.9	111.5	42.8	103.1	47.8	97.7	49.2	91.5	52.6
2		140.4	39.2	131.5	42.3	127.6	43.8	121.8	44.7	112.6	50.0	106.7	51.4	101.8	54.6
4		152.3	40.9	142.5	44.1	138.4	45.6	132.1	46.6	122.1	52.1	115.8	53.6	110.5	57.6

**Table 3. Correcting factors for other glycol concentrations**

% in weight	Ethylene glycol		Propylene glycol	
	Capacity	Absorbed power	Capacity	Absorbed power
10	1.061	1.025	1.097	1.033
20	1.036	1.015	1.067	1.023
30	1.015	1.005	1.026	1.008
35	1.000	1.000	1.000	1.000
40	0.985	0.995	0.974	0.992
50	0.954	0.985	0.923	0.977

If it is necessary to make a selection with different glycol percentages, correct the capacity and absorbed power values in Table 2 (35% ethylene glycol), multiplying them by the coefficients indicated in Table 3.

**Table 6. Available pressure for the hydraulic circuit, YCSA/YCSA-H 120, 150 with kit (With filter fitted)**

Model	Flow l/h	Kpa
YCSA/YCSA-H 120 TP	15 000	310
	16 000	295
	17 000	279
	18 000	261
	19 000	241
	20 000	217
	21 000	187
	22 000	157
	23 000	123
	24 000	90
	25 000	55
YCSA/YCSA-H 150 TP	18 000	249
	19 000	243
	20 000	237
	21 000	230
	22 000	223
	23 000	215
	24 000	207
	25 000	199
	26 000	192
	27 000	183
	28 000	175
	29 000	165
	30 000	155
	31 000	145
	32 000	132
	33 000	120
	34 000	109
35 000	95	
36 000	84	
37 000	70	
38 000	57	

**Table 7. Pressure drop in the hydraulic circuit, YCSA/YCSA-H 120, 150 without kit (Without filter fitted)**

Model	Flow l/h	Kpa
YCSA/YCSA-H 120 T	15 000	18
	16 000	20
	17 000	23
	18 000	25.5
	19 000	28
	20 000	31
	21 000	34
	22 000	37
	23 000	40
	24 000	43
	25 000	46
	26 000	49
	27 000	52.5
	28 000	56.5
	29 000	60
	30 000	63
	YCSA/YCSA-H 150 T	31 000
32 000		70.5
33 000		74.5
34 000		78
18 000		12.5
19 000		14
20 000		15.5
21 000		17.5
22 000		19.5
23 000		21.5
24 000		23.5
25 000		25.5
26 000		27.5
27 000		30
28 000		32.5
29 000		35
30 000		37.5
31 000	40	
32 000	43	
33 000	46	
34 000	49	
35 000	52	
36 000	55	
37 000	58	
38 000	61	
39 000	64	
40 000	67	
41 000	70	
42 000	73	

**Table 8. Pressure drop filter**

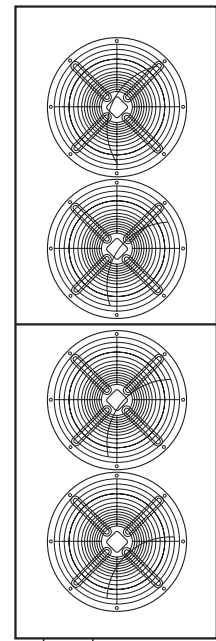
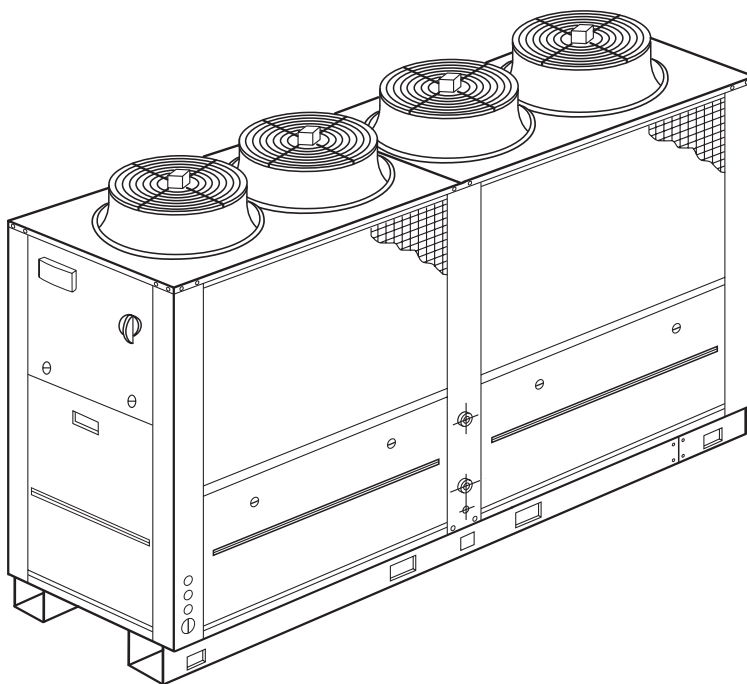
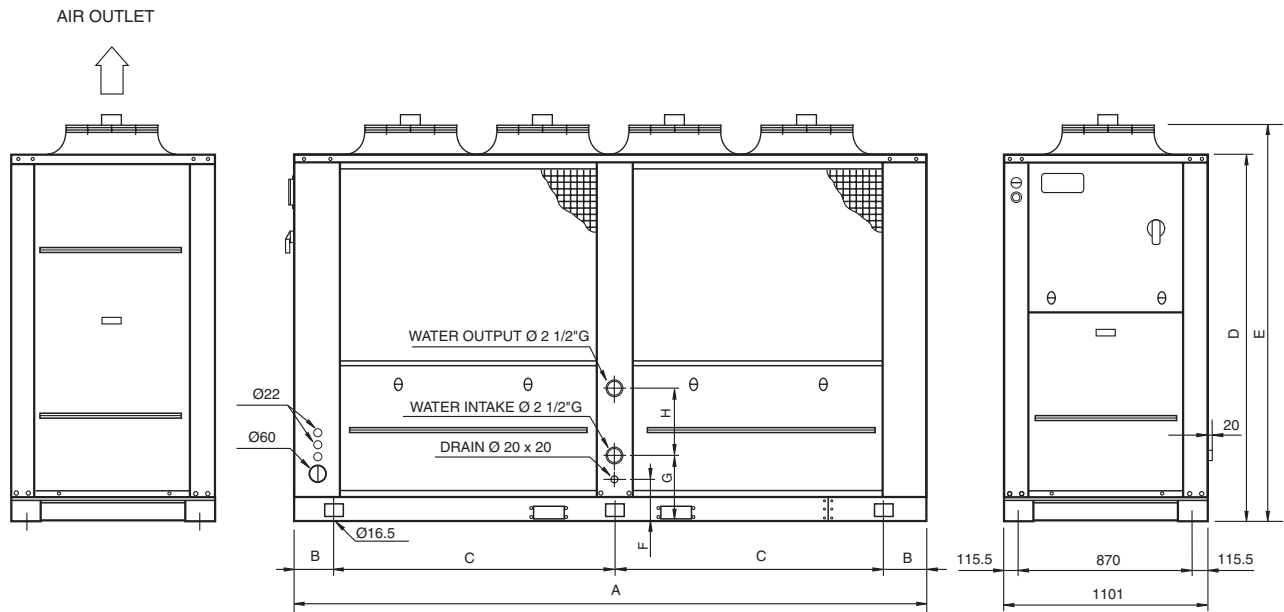
**2 1/2" filter**

Flow l/h	15 000	16 000	17 000	18 000	19 000	20 000	21 000	22 000	23 000	24 000	25 000	26 000	27 000	28 000
Kpa	2	2.20	2.40	2.7	3.0	3.3	3.6	4.0	4.4	4.8	5.2	5.6	6.0	6.5
Flow l/h	29 000	30 000	31 000	32 000	33 000	34 000	35 000	36 000	37 000	38 000	39 000	40 000	41 000	42 000
Kpa	7	7.5	8	8.5	9.0	9.7	10.5	11.3	12.1	13.0	14	15	16	17

Data with water at 10°C. In the case of the use of glycol, apply the correcting factors shown in Tables 5 and 6.

## Dimensions and hydraulic connections

### YCSA/YCSA-H 120 and 150T TP



Model	A	B	C	D	E	F	G	H
<b>YCSA/YCSA-H 120</b>	3 416	183	1 525	1 942	2 190	199	289	380
<b>YCSA/YCSA-H 150</b>	3 770	255	1 630	1 993	2 263	145	211	458

## Minimum technical clearance

