



# Air/water chillers

**With plug fans and scroll compressors,  
for indoor installation  
Model CGCM  
Cooling capacity 44-315 kW**



**CGCM-PRC001A-GB**

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# Technical specifications

## STANDARD CONFIGURATION

Trane models CGCM are air cooled water chillers with centrifugal plug fan and hermetic scroll compressors, suitable for indoor installation in buildings with air ducted intake and discharge. The units are available both with vertical and horizontal discharge .

CGCM chillers are available in 14 sizes and in the following versions:

## ENERGY VERSIONS

**D version:** (partial recovery stainless steel brazed plate type desuperheater, externally insulated): the unit is equipped with an additional heat exchanger water - refrigerant fitted on the compressor discharge line, in series with the condensing coil. This solution allows to get a desuperheating heat recovery up to 25% of condensing heating, useful for sanitary or other applications.

**R version:** (total recovery stainless steel brazed type exchanger, externally insulated): the unit is equipped with an additional heat exchanger water - refrigerant fitted on parallel to the condensing coil, and an automatic switch valve . This solution allows to recover the total condensing heating (obtained by adding the cooling capacity and the compressor power input thermic equivalent) useful for post heating, sanitary and other applications.

## ACOUSTIC VERSIONS

**SL version:** super low noise version. The noise reduction is achieved by sound proofing jackets on the scroll compressors, fans controlled by inverter, muffler on the compressors delivery lines.

## HYDRAULIC VERSIONS (Packaged hydraulic kit)

ONE PUMP AND EXPANSION VESSEL  
VERSION CODE

- B1** Low available pressure 150kPa
- M1** Medium available pressure 250kPa
- A1** High available pressure 450kPa

TWO PUMPS AND EXPANSION VESSELS  
VERSION CODE

- B2** Low available pressure 150kPa
- M2** Medium available pressure 250kPa
- A2** High available pressure 450kPa

## CASING

Casing made with heavy gauge structure in galvanized steel. The powder paint anti-corrosive treatment over the entire frame provides long lasting resistance for outdoor installation, even in aggressive environmental conditions. Its design allows these machines to be manufactured in modular units and, at same time, it ensures a constant air flow through the finned coils and makes for easy maintenance and service.

## COMPRESSOR

Compressor of scroll hermetic type. These compressors are featured for high performance with low noise and vibration levels. The high values of EER are obtained by:

- high volumetric efficiency in the whole operating range obtained through the continuous contact between the fix and rotating spirals which avoids the bad space and the expansion of the refrigerant;
- low pressure losses due to the absence of suction and discharge valves and to the continuous compression;
- reduction of the heat exchanging between the suction and discharge refrigerant, thank to the complete separation of the refrigerant paths.

The acoustic features are obtained by:

- the absence of suction and discharge valves;
- the continuous and progressive compression process;
- the absence of pistons which ensures the low vibrations level and pulsation of the refrigerant.

The electric motor is suction gas cooled and equipped with automatic reset thermal protection and electric heater to prevent the dilution of the refrigerant in the oil during the periods when the unit is stopped. The terminals are contained in a IP54 protected box.

## FANS

The plug fan for built-in mounting optimized for this use with a very compact construction design. Three phase motor with a PTC for fail-safe operation. Motorless impeller with 7 backward curved blades made from sheet steel with surface protection achieved through powder coating. Equipped with hub (taper lock hub or fixed hub) and inlet ring.

High efficiency thanks to the rotating diffuser. Excellent acoustic performance.

## USER HEAT EXCHANGER

Direct expansion, stainless steel AISI 316 brazed plate type with double circuit, externally insulated with closed cell anticondensation material and equipped with water differential pressure switch and antifreeze protection electric heater. Desuperheater (D Version) and Recovery (R version) heat exchanger is stainless steel AISI 316 brazed plate type.

## Technical specifications

### SOURCE HEAT EXCHANGER

Condenser coils with seamless copper tubes expanded into aluminum corrugated fins. They are of high efficiency type, complete with subcooling circuit which allows an increase of cooling capacity without an increase of the power input.

### REFRIGERANT CIRCUIT

The units are equipped with one refrigerant circuits up to size 065 and two for the sizes 080 and 090, entirely constructed with copper tubes. Each circuit includes:

- thermostatic expansion valve;
- filter dryer;
- sight glass;
- liquid line solenoid valve;
- liquid line shut-off valve;
- high pressure switches;
- low pressure switches;
- relief valve on high pressure line.

### ELECTRICAL PANEL

Electrical control panel made in accordance with standards CEI 44-5/IEC 204-2, mounted inside the unit, includes:

- safety locked main switch;
- fuses and contactors for compressors;
- fuses and contactors for the fans;
- fuses 220V auxiliary circuit;
- fuses 24V auxiliary circuit;
- transformer for 24Vac auxiliary circuit power supply;
- low-voltage user terminals board.

### ELECTRONIC CONTROLS FOR SINGLE CIRCUIT UNITS (UP TO SIZE 065)

The control of the unit is performed by an electronic card for dynamic parameters control, able to control independently the functionalities and to adjust the operating cycles of the unit.

The controller interface consists of a 2 line LED display and of several icons for quick interaction, interaction with the control is possible with six buttons on the sides of the display.

Through the monitoring system the user can intervene and regulate through the setting of appropriate parameters, the following settings:

- selection of the cooling fluid temperature control. This is proportional type;
- temperature set point of the cooling fluid entering the evaporator and relevant differential, for controlling the ramp of the cooled fluid;
- domestic hot water set point and relevant differential (only for versions with heat recovery);
- setting the unit and compressor counter;
- setting the minimum time to re-start a compressor;
- setting the minimum compressor on/off time schedule;
- enabling the compressor start up sequence;

- management of the on/off period of the pump on starting up and shut down of the unit;
- setting the delay time on the water differential pressure switch;
- setting the set point and differential for the management of the card controlling the speed of the connected fans.

Safety features include:

- high and low pressure switches;
- compressor, fans thermal protection;
- electric pump thermal protection;
- protection against a lack of low flow in the heat exchangers;
- freeze protection;
- modification of the operating time of the individual compressors;
- EPROM not correctly connected or not operating correctly self diagnosis;
- probe failure or not connected self diagnosis.



The alphanumeric LED display allows the parameters to be easily entered. Alarms and the functional parameters are displayed immediately.

The control interface provides:

- Monitor the analog state variables of the system (in/out water temperature, pressures on each circuit);
- Monitor the state of the compressors, capacity control valves, heaters etc.;
- Read the text and the code of the occurred alarm;
- Activation of the unit in the desired operating mode;
- Modify operating parameters by inserting the right password;
- Defrost timings;
- Antifreeze threshold.

## Technical specifications

Using the terminal with 6 keys and LED graphic display one can manage:

- change the set point of the whole unit;
- monitor the analog state variables of the system (in/out water temperature, pressures on each circuit);
- monitor the state of the compressors, capacity control valves, heaters etc.;
- read the code of the occurred alarm;
- turn on/off the whole unit and change its mode (summer/winter for the heat pumps);
- modify the following parameters by inserting the right password:
  - high/low pressure;
  - on/off compressors timings;
  - defrost timings (for the heat pumps);
  - antifreeze threshold;
  - condensation control law as a function of the instantaneous high pressure;
  - water pump pre-starting time.

There are three types of alarm:

- serious alarms that deactivate the unit, give a text alarm on the display, activate the buzzer and the general alarm output relay fitted. They are:
  - no water flow across the evaporator;
  - serious alarm signal given on the master card by digital input (see accessories for details);
- circuit alarms: they deactivate only the circuit where they have occurred, give a text alarm on the display, activate the buzzer and the general alarm output relay fitted on the master card. They are:
  - high/low pressure;
  - compressor thermal protection;
  - fans thermal protection;
  - temperature or pressure probe failure;
- signal-only alarms: they only give a signal text on the display and activate the buzzer and the general alarm output relay fitted on the master card. They are:
  - compressor maintenance time over limits;
  - water pump maintenance time over limits.

By contacts (included) in the control panel you can manage the unit in its basic functions in BMS:

- remote on/off selection;
- remote summer/winter selection (for the heat pump versions);
- additional water flow control (external flow switch);
- fine-setting of the setpoint using an external 4-20mA signal;
- external water pump on/off signal (for version without hydronic kit);
- on/off compressors status.

The electronic controller can be interfaced with a supervision software on a local or remote PC that uses a manufacturer:

- communication protocol, or with complex BMS systems using ModBus.

## DYNAMIC LOGIC CONTROL

Thanks to the function DYNAMIC LOGIC CONTROL, the electronic controller can manage the differential of the inlet water temperature on the basis of the speed of its variation.

The function dLC works partially as a simulator of a water tank: in fact it allows to reduce the number of the compressor's starts.

The main advantage of the function dLC is during the conditions of low load, that is:

- the compressor is switched off and the water temperature increases very slowly; in this situation the dLC is able to delay the start of the compressor by replacing itself to the thermal inertia that would be obtained from the water tank.
- the compressor is switched on and the water temperature decreases very quickly; in this situation the dLC is able to delay the compressor's switching off. In this way it is reached the same result that would be obtained from the water tank's thermal inertia.

As result the function dLC makes possible to reduce the dimensions of the water tank, with huge advantages for the footprint of the unit.

DYNAMIC LOGIC CONTROL is available only for single circuit units.

## DYNAMIC SET POINT

The function DYNAMIC SET POINT allows to change simultaneously the set point to achieve always the conditions of best comfort and, above all, the maximum energy saving. In fact if the outdoor temperature increases, through the function DSP it is possible:

- To increase of a certain value the set point in case it is necessary to reduce the power consumption and it is needed to ensure a difference between the indoor and outdoor temperature such to avoid health problems due to the excessive changes of temperature.
- To reduce of a certain value the set point in case it is required to compensate in such a way the excess of thermal load; of course this is a function to be used with precaution because it generates higher power consumptions and a big difference in temperature between inside and outside that could be dangerous for the health of the people that is forced for any reason to get in and out from the air conditioned room.

DYNAMIC SET POINT is available only for single circuit units.

## Technical specifications

### ELECTRONIC CONTROLS FOR DOUBLE CIRCUIT UNITS (SIZE 080 and 090)

#### CONTROLLER SPECIFICATIONS FOR HEAT PUMPS

#### MICROPROCESSOR CONTROL SYSTEM



The chiller controlled by one single controller that manages all components of the unit.

The microprocessor-based control panel is factory-installed and factory-programmed.

The temperature control is carried out with a continuous proportional logic according to the return water temperature, or with a proportional and integral logic function of outlet water Temperature according to the type of unit.

The operator interface with low-reflection LCD, 8 function keys and icon based navigation allows a complete and intuitive access to all operational inputs and outputs.

The operating parameters of the machine are protected by 3 levels of password (Operator - Service - Manufacturer).

The LCD display supports 4 languages (Italian, English, French and Spanish) with exhaustive descriptions of the information and diagnostics.

This advanced interface allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics.

The microprocessor will manage:

- Start and stop of the compressors with the start-up and stop time control.
- Compressor rotation with FIFO logic, running hours balance.
- Fans start up and modulation according with condensation and evaporation pressure.
- Solenoid valves of liquid lines with pump-down management during stops through double control of suction pressure and maximum time of the procedure.
- Electric anti-freeze heater for user exchangers.

- Electric heater mounted on the base of coils to avoid ice formation.
- Water pumps management through voltage free contacts for standard versions; for hydraulic versions the pump management is automatically controlled.
- Cumulative alarm signal of the unit through voltage free contacts.

The microprocessor will control and display by suitable measuring transducers the following variables:

- Inlet and outlet water temperature.
- Outdoor temperature.
- Condensing pressure of each refrigerant circuit.
- Evaporating pressure of each refrigerant circuit.
- Total operating time of each compressor.
- Total operating time of the unit.

The microprocessor senses the control variables that govern the operation of the unit. When any one of these variables approaches a limit condition, the controls takes corrective action to avoid shutdown and keep the unit operating.

This happens under the following conditions:

- High pressure.
- Low pressure.
- High discharge temperature.
- Low evaporator leaving water temperature.
- High evaporator inlet water temperature (summer mode).

The microprocessor will protect the unit in the following cases.

- Low evaporating pressure
- High condensing pressure.
- High temperature of the compressors windings.
- Reverse rotation of each compressor.
- Low pressure difference between discharge and suction (to allow a correct lubrication of the compressor).
- High pressure difference on the oil filter.
- High temperature of fans motor windings.
- High temperature of pumps motor windings.
- Low water flow on evaporator/condenser.
- Low evaporator outlet water temperature

The reset of any of the above mentioned alarm will require a manual intervention.

The diagnostics includes a complete alarm management, alarm history and data logger which stores and archives of about 4 days (expandable by USB memory) wherein the main variables and the operating status of the unit are recorded.



## Technical specifications

### System Integration

Single chillers installed in applications without a building management system are simple to install and control.

The following features can be enabled according to the site specifications.

- Continuous adjustment of the set point according to the outdoor air temperature both with direct and reverse direction logic (DSP).
- Auto power on-off of the unit using time slots.
- Adjustment of the set point by time bands both with direct and reverse direction logic (Energy Saving feature).

Hardwire points controls allow simple interface with other control systems.

A remote auto/stop can be wired for scheduling the unit operation and the set point can be changed by external analog signal (4-20 mA).

The native Modbus Interface can be configured for Modbus™ communications. This enables the chiller controller to communicate as a slave device on a Modbus network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled by a Modbus master device.

The optional BACnet Interface is available and can be configured for BACnet® communications. This enables the chiller controller to communicate on a BACnet MS/TP or BACnet/IP network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled through BACnet.

The optional LonTalk® Communications Interface will be available later.

### Additional features

- Ethernet RJ45 connection is available for routing to the web all parameters of the unit and providing a complete remote control of unit.
- USB connection is available to upload parameter files, system files, and firmware and to download files of historical alarms, residing parameters files and default parameters files.



# Options and accessories

## Factory-mounted options

- Electronic expansion valve.
- Power factor correction to  $\cos. \phi = 0,91$ .
- Automatic circuit breakers.
- Control panel electric heater with thermostat.
- Water pumps automatic changeover.
- Over/under voltage + phase failure protection relay.
- Condensing control with variable fan speed modulation with inverter.
- EC fans.
- Soft starter.
- Compressors sound jackets.
- Pre painted condensing coils.
- Epoxy coated condensing coils fins.
- BLYGOLD condensing coils.
- Copper/copper condensing coils.
- Tinned copper condensing coils.
- Gas gauges.

## Accessories

- Remote Display.
- Remote Display for total recovery units.
- Flow switch.
- Water gauges.
- Automatic water filling.
- Rubber antivibration mounts.
- Spring antivibration mounts.
- Water strainer.
- Communication card RS485.

## Regulations and certifications

### REFERENCE STANDARDS

THE PRESSURE EQUIPMENT DIRECTIVE (97/23/EC).

UNI EN ISO 3744 ACOUSTIC REGULATION.

UNI-EN-ISO 9001:2008: QUALITY MANAGEMENT SYSTEMS.

LOW VOLTAGE DIRECTIVE (LVD) 2006/95/EC.

MACHINERY DIRECTIVE 2006/42/EC.

DIRECTIVE FOR ELECTROMAGNETIC COMPATIBILITY 2004/108/CE.

CEI-EN 60204-1 DIRECTIVE (CEI44-5; CEI EN 62061)  
MACHINERY SAFETY – ELECTRIC MACHINERY –  
EQUIPMENTS.

ERP DIRECTIVE (ENERGY-RELATED-PRODUCTS  
ECODESIGN 2009/125/CE).

UNI EN 14511-1-2-3-4 TESTING CONDITIONS.

## CERTIFICATIONS

PED RELEASED FROM IMQ SPA - NOTIFIED BODY FOR REGULATION 97/23/EC (NO. 0051) ACCORDING TO THE FOLLOWING STATEMENTS:

- DECLARATION OF QUALITY SYSTEM APPROVAL - FORM H1 (QUALITY ASSURANCE WITH DESIGN CONTROL AND MONITORING OF FINAL CHECK DETAIL): CERTIFICATE N. PEC-0051-1105003.
- CERTIFICATES OF EXAMINATION OF THE PROJECT N. 0051-PEC-1105004/05/06/07/08.

QUALITY CERTIFICATION ACCORDING TO THE STANDARD UNI EN ISO 9001:2008 ISSUED BY CSQ (ACCREDITED BY ACCREDIA).

PERFORMANCE CERTIFICATION OF THE UNIT WITH THE PRESENCE OF RINA SPA DURING THE TESTING PROCESS (OPTIONAL).

GOST CERTIFICATION - (OPTIONAL) FOR PRESSURE RECIPIENTS OF THE RUSSIAN FEDERATION.

# General data

Standard version

MODEL		012	015	016	020	025	033	035
<b>COOLING</b>								
Total capacity	kW	43,5	49,7	57,1	73,3	89,2	116,2	129,6
Compressors power input	kW	14,5	17,3	18,6	24,5	30,6	38,8	44,3
Total EER		2,47	2,44	2,63	2,65	2,46	2,61	2,59
ESEER		3,23	3,32	3,60	3,84	3,38	3,72	3,80
<b>COOLING + PARTIAL RECOVERY (D VERSION)</b>								
Desuperheater heating capacity	kW	11,4	12,7	14,9	19,2	22,3	30,4	34,1
Water flow	m <sup>3</sup> /h	2,0	2,2	2,6	3,3	3,9	5,3	5,9
Pressure drop	kPa	21,0	19,0	21,0	22,0	18,0	21,0	21,0
<b>COOLING + TOTAL RECOVERY (R VERSION)</b>								
Recovery heating capacity	kW	58,5	67,8	76,5	98,8	121,0	156,0	176,0
Water flow	m <sup>3</sup> /h	10,2	11,8	13,3	17,2	21,0	27,2	30,6
Pressure drop	kPa	97,0	99,0	94,0	114,0	112,0	143,0	125,0
<b>COMPRESSORS</b>								
Compressors number	n	2	2	2	2	2	2	2
Refrigerant circuits	n	1	1	1	1	1	1	1
Part load	n	3	3	3	3	3	3	3
Refrigerant charge	kg	7,9	8,0	10,6	10,6	19,2	25,2	25,5
Oil charge	kg	6,3	6,3	6,6	6,6	13,4	13,4	13,4
<b>WATER EXCHANGER</b>								
Water flow	m <sup>3</sup> /h	7,5	8,5	9,8	12,6	15,3	19,9	22,2
Water pressure drop	kPa	50	51	49	59	58	74	64
<b>FANS</b>								
Fans number	n	2	2	2	2	2	2	2
Air flow	m <sup>3</sup> /h	16551	16551	16143	16238	33984	33523	33523
Power input for each fan	kW	1,54	1,54	1,54	1,54	2,82	2,82	2,82
Absorbed current for each fan	A	3,20	3,20	3,20	3,20	5,20	5,20	5,20
External static pressure (source)	Pa	120	120	120	120	120	120	120
<b>SOUND LEVEL</b>								
Sound power level (ISO 3744)	dB	90,1	90,1	90,2	90,2	91,0	92,5	92,5
Sound pressure level at 5 m (ISO 3744)	dB	63,7	63,7	63,7	63,7	64,3	65,7	65,7
Sound pressure level at 10 m (ISO 3744)	dB	58,4	58,4	58,5	58,5	59,2	60,6	60,6
<b>DIMENSIONS AND WEIGHT</b>								
Length	mm	1605	1605	1605	1605	2350	2350	2350
Depth	mm	926	926	926	926	1106	1106	1106
Height	mm	1990	1990	1990	1990	2095	2095	2095
Weight	kg	656	666	727	729	1058	1145	1276

Cooling: Outdoor air temperature 35°C; Chilled water temperature 12/7°C.

Heat recovery: Chilled water temperature 12/7°C; Recovery water temperature 40/45°C.

Water flow rate and sound pressure levels refer to summer period.

## General data

Standard version

MODEL		040	045	050	055	065	080	090
<b>COOLING</b>								
Total capacity	kW	139,5	153,5	178,9	187,4	234,3	288,9	315,4
Compressors power input	kW	47,6	53,9	60,1	64,4	81,3	97,0	102,6
Total EER		2,49	2,46	2,61	2,48	2,46	2,60	2,70
ESEER		3,38	3,38	3,69	3,27	3,23	3,57	3,77
<b>COOLING + PARTIAL RECOVERY (D VERSION)</b>								
Desuperheater heating capacity	kW	36,7	40,7	46,9	49,4	59,8	73,1	77,7
Water flow	m <sup>3</sup> /h	6,4	7,1	30,7	32,2	10,4	12,7	13,5
Pressure drop	kPa	21,0	21,0	53,0	57,0	19,0	19,0	18,0
<b>COOLING + TOTAL RECOVERY (R VERSION)</b>								
Recovery heating capacity	kW	189,0	209,0	241,0	254,0	319,0	390,0	423,0
Water flow	m <sup>3</sup> /h	32,9	36,5	42,0	44,2	55,5	67,9	73,6
Pressure drop	kPa	143,0	144,0	103,0	112,0	113,0	136,0	121,0
<b>COMPRESSORS</b>								
Compressors number	n	2	2	2	3	3	4	4
Refrigerant circuits	n	1	1	1	1	1	2	2
Part load	n	3	2	3	2	2	6	4
Refrigerant charge	kg	28,0	28,0	37,1	38,3	38,8	50,0	52,1
Oil charge	kg	13,4	13,4	13,4	20,1	20,1	28,0	28,0
<b>WATER EXCHANGER</b>								
Water flow	m <sup>3</sup> /h	23,9	26,3	30,7	32,2	40,2	49,6	54,1
Water pressure drop	kPa	73	73	53	57	57	70	63
<b>FANS</b>								
Fans number	n	3	3	3	4	5	5	5
Air flow	m <sup>3</sup> /h	51667	50890	50890	68947	67968	83644	83644
Power input for each fan	kW	2,82	2,82	2,82	2,82	2,82	2,82	2,82
Absorbed current for each fan	A	5,20	5,20	5,20	5,20	5,20	5,20	5,20
External static pressure (source)	Pa	120	120	120	120	120	120	120
<b>SOUND LEVEL</b>								
Sound power level (ISO 3744)	dB	92,7	92,8	92,8	94,0	94,3	94,3	94,3
Sound pressure level at 5 m (ISO 3744)	dB	65,7	65,8	65,8	66,7	66,9	66,9	66,9
Sound pressure level at 10 m (ISO 3744)	dB	60,7	60,8	60,8	61,9	62,1	62,1	62,1
<b>DIMENSIONS AND WEIGHT</b>								
Length	mm	3350	3350	3350	4456	5456	5456	5456
Depth	mm	1306	1306	1306	1306	1306	1306	1306
Height	mm	2095	2095	2145	2145	2145	2145	2145
Weight	kg	1636	1665	1802	2190	2543	2905	2952

Cooling: Outdoor air temperature 35°C; Chilled water temperature 12/7°C.

Heating: Outdoor air temperature 7°C - 90% R.H.; Outlet water temperature 40/45°C.

Water flow rate and sound pressure levels refer to summer period.

## General data

Super low noise version

MODEL		012	015	016	020	025	033	035
<b>COOLING</b>								
Total capacity	kW	43,1	49,3	56,7	72,7	88,4	115,3	128,6
Compressors power input	kW	14,7	17,4	18,8	24,8	30,9	39,2	44,8
Total EER		2,56	2,51	2,70	2,70	2,54	2,67	2,64
ESEER		3,21	3,30	3,58	3,81	3,36	3,69	3,78
<b>COOLING + PARTIAL RECOVERY (D VERSION)</b>								
Desuperheater heating capacity	kW	11,70	13,00	15,30	19,70	22,90	31,30	35,10
Water flow	m <sup>3</sup> /h	2.0	2.3	2.7	3.4	4.0	5.5	6.1
Pressure drop	kPa	22,00	20,00	22,00	23,00	19,00	22,00	22,00
<b>COOLING + TOTAL RECOVERY (R VERSION)</b>								
Recovery heating capacity	kW	58,5	67,8	76,5	98,8	121,0	156,0	176,0
Water flow	m <sup>3</sup> /h	10,2	11,8	13,3	17,2	21,0	27,2	30,6
Pressure drop	kPa	97,0	99,0	94,0	114,0	112,0	143,0	125,0
<b>COMPRESSORS</b>								
Compressors number	n	2	2	2	2	2	2	2
Refrigerant circuits	n	1	1	1	1	1	1	1
Part load	n	3	3	3	3	3	3	3
Refrigerant charge	kg	7,9	8,0	10,6	10,6	19,2	25,2	25,5
Oil charge	kg	6,3	6,3	6,6	6,6	13,4	13,4	13,4
<b>WATER EXCHANGER</b>								
Water flow	m <sup>3</sup> /h	7,4	8,5	9,7	12,5	15,2	19,8	22,1
Water pressure drop	kPa	49	50	48	58	57	73	63
<b>FANS</b>								
Fans number	n	2	2	2	2	2	2	2
Air flow	m <sup>3</sup> /h	16551	16551	16143	16238	33984	33523	33523
Power input for each fan	kW	1,08	1,08	1,08	1,08	1,97	1,97	1,97
Absorbed current for each fan	A	2,24	2,24	2,24	2,24	3,64	3,64	3,64
External static pressure (source)	Pa							
<b>SOUND LEVEL</b>								
Sound power level (ISO 3744)	dB	85,1	85,1	85,2	85,2	86,0	87,5	87,5
Sound pressure level at 5 m (ISO 3744)	dB	58,7	58,7	58,7	58,7	59,3	60,7	60,7
Sound pressure level at 10 m (ISO 3744)	dB	53,4	53,4	53,5	53,5	54,2	55,6	55,6
<b>DIMENSIONS AND WEIGHT</b>								
Length	mm	1605	1605	1605	1605	2350	2350	2350
Depth	mm	926	926	926	926	1106	1106	1106
Height	mm	1990	1990	1990	1990	2095	2095	2095
Weight	kg	698	708	769	771	1100	1187	1318

Cooling: Outdoor air temperature 35°C; Chilled water temperature 12/7°C.

Heating: Outdoor air temperature 7°C - 90% R.H.; Outlet water temperature 40/45°C.

Water flow rate and sound pressure levels refer to summer period.

## General data

Super low noise version

MODEL		040	045	050	055	065	080	090
<b>COOLING</b>								
Total capacity	kW	138,4	152,3	177,6	186,0	232,4	286,6	312,8
Compressors power input	kW	48,1	54,4	60,7	65,1	82,2	98,0	103,6
Total EER		2,56	2,52	2,67	2,55	2,53	2,66	2,76
ESEER		3,36	3,35	3,67	3,24	3,20	3,55	3,74
<b>COOLING + PARTIAL RECOVERY (D VERSION)</b>								
Desuperheater heating capacity	kW	37,80	41,90	48,20	50,80	61,50	75,20	79,90
Water flow	m <sup>3</sup> /h	6.6	7.3	8.4	8.9	10.7	13.1	13.9
Pressure drop	kPa	22,00	22,00	21,00	21,00	20,00	20,00	19,00
<b>COOLING + TOTAL RECOVERY (R VERSION)</b>								
Recovery heating capacity	kW	189,0	209,0	241,0	254,0	319,0	390,0	423,0
Water flow	m <sup>3</sup> /h	32,9	36,5	42,0	44,2	55,5	67,9	73,6
Pressure drop	kPa	143,0	144,0	103,0	112,0	113,0	136,0	121,0
<b>COMPRESSORS</b>								
Compressors number	n	2	2	2	3	3	4	4
Refrigerant circuits	n	1	1	1	1	1	2	2
Part load	n	3	2	3	2	2	6	4
Refrigerant charge	kg	28,0	28,0	37,1	38,3	38,8	50,0	52,1
Oil charge	kg	13,4	13,4	13,4	20,1	20,1	28,0	28,0
<b>WATER EXCHANGER</b>								
Water flow	m <sup>3</sup> /h	23,7	26,1	30,5	31,9	39,9	49,2	53,7
Water pressure drop	kPa	72	71	52	56	56	69	62
<b>FANS</b>								
Fans number	n	3	3	3	4	5	5	5
Air flow	m <sup>3</sup> /h	51667	50890	50890	68947	67968	83644	83644
Power input for each fan	kW	1,97	1,97	1,97	1,97	1,97	1,97	1,97
Absorbed current for each fan	A	3,64	3,64	3,64	3,64	3,64	3,64	3,64
External static pressure (source)	Pa							
<b>SOUND LEVEL</b>								
Sound power level (ISO 3744)	dB	87,7	87,8	87,8	89,0	89,3	89,3	89,3
Sound pressure level at 5 m (ISO 3744)	dB	60,7	60,8	60,8	61,7	61,9	61,9	61,9
Sound pressure level at 10 m (ISO 3744)	dB	55,7	55,8	55,8	56,9	57,1	57,1	57,1
<b>DIMENSIONS AND WEIGHT</b>								
Length	mm	3350	3350	3350	4456	5456	5456	5456
Depth	mm	1306	1306	1306	1306	1306	1306	1306
Height	mm	2095	2095	2145	2145	2145	2145	2145
Weight	kg	1678	1707	1844	2253	2606	2968	3015

Cooling: Outdoor air temperature 35°C; Chilled water temperature 12/7°C.

Heating: Outdoor air temperature 7°C - 90% R.H.; Outlet water temperature 40/45°C.

Water flow rate and sound pressure levels refer to summer period.

# Performance data

## COOLING CAPACITY

Standard version

Twout			012						015					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	43	25	30	32	35	40	43
5	<b>Pf</b>	kW	47,0	44,2	43,0	41,2	38,1	36,1	53,8	50,5	49,1	47,1	43,6	41,3
	<b>Pa</b>	kW	11,7	12,9	13,4	14,3	15,8	16,8	14,0	15,4	16,0	17,0	18,8	20,0
	<b>qw</b>	m <sup>3</sup> /h	8,06	7,57	7,37	7,06	6,53	6,19	9,21	8,66	8,42	8,07	7,46	7,08
	<b>dpw</b>	kPa	58,6	51,7	49,0	44,9	38,5	34,6	59,3	52,3	49,5	45,4	38,9	35,0
6	<b>Pf</b>	kW	48,3	45,4	44,2	42,3	39,1	37,1	55,3	51,9	50,5	48,4	44,7	42,4
	<b>Pa</b>	kW	11,8	13,0	13,6	14,4	15,9	16,9	14,1	15,5	16,1	17,1	19,0	20,2
	<b>qw</b>	m <sup>3</sup> /h	8,29	7,78	7,57	7,25	6,71	6,36	9,48	8,90	8,66	8,30	7,67	7,27
	<b>dpw</b>	kPa	62,0	54,7	51,8	47,5	40,6	36,5	62,7	55,3	52,4	48,0	41,1	36,9
7	<b>Pf</b>	kW	49,7	46,6	45,4	43,5	40,2	38,1	56,8	53,3	51,9	49,7	45,9	43,5
	<b>Pa</b>	kW	11,9	13,1	13,7	14,5	16,1	17,1	14,2	15,6	16,3	17,3	19,1	20,3
	<b>qw</b>	m <sup>3</sup> /h	8,52	8,00	7,79	7,46	6,89	6,53	9,75	9,15	8,90	8,53	7,88	7,47
	<b>dpw</b>	kPa	65,5	57,8	54,7	50,2	42,9	38,5	66,3	58,5	55,3	50,8	43,4	39,0
8	<b>Pf</b>	kW	51,0	47,9	46,6	44,6	41,2	39,1	58,4	54,8	53,3	51,0	47,2	44,7
	<b>Pa</b>	kW	12,0	13,3	13,8	14,6	16,2	17,2	14,3	15,8	16,4	17,4	19,3	20,5
	<b>qw</b>	m <sup>3</sup> /h	8,76	8,22	8,00	7,66	7,08	6,72	10,02	9,40	9,15	8,76	8,10	7,68
	<b>dpw</b>	kPa	69,3	61,0	57,7	53,0	45,2	40,7	70,1	61,7	58,4	53,6	45,8	41,2
9	<b>Pf</b>	kW	52,4	49,2	47,8	45,8	42,3	40,1	59,9	56,3	54,7	52,4	48,4	45,9
	<b>Pa</b>	kW	12,1	13,4	13,9	14,8	16,3	17,4	14,4	15,9	16,5	17,6	19,4	20,7
	<b>qw</b>	m <sup>3</sup> /h	9,01	8,45	8,22	7,87	7,27	6,90	10,30	9,66	9,40	9,00	8,32	7,88
	<b>dpw</b>	kPa	73,2	64,4	60,9	55,9	47,7	42,9	74,0	65,2	61,7	56,6	48,3	43,4
10	<b>Pf</b>	kW	53,8	50,5	49,1	47,1	43,4	41,2	61,6	57,8	56,2	53,8	49,7	47,1
	<b>Pa</b>	kW	12,2	13,5	14,0	14,9	16,5	17,5	14,6	16,0	16,7	17,7	19,6	20,8
	<b>qw</b>	m <sup>3</sup> /h	9,26	8,69	8,45	8,10	7,47	7,09	10,59	9,94	9,67	9,26	8,55	8,11
	<b>dpw</b>	kPa	77,4	68,1	64,5	59,1	50,4	45,3	78,3	68,9	65,2	59,8	51,0	45,9

Twout			016						020					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	43	25	30	32	35	40	43
5	<b>Pf</b>	kW	61,8	58,1	56,5	54,1	50,0	47,4	79,3	74,5	72,5	69,4	64,0	60,5
	<b>Pa</b>	kW	15,0	16,6	17,3	18,3	20,3	21,6	19,6	21,8	22,7	24,2	27,0	28,8
	<b>qw</b>	m <sup>3</sup> /h	10,59	9,95	9,68	9,27	8,58	8,13	13,59	12,77	12,42	11,89	10,97	10,37
	<b>dpw</b>	kPa	57,2	50,5	47,8	43,9	37,5	33,7	69,4	61,3	58,0	53,1	45,2	40,4
6	<b>Pf</b>	kW	63,5	59,7	58,1	55,6	51,4	48,7	81,5	76,6	74,5	71,3	65,8	62,1
	<b>Pa</b>	kW	15,2	16,7	17,4	18,5	20,5	21,8	19,8	21,9	22,9	24,4	27,2	29,0
	<b>qw</b>	m <sup>3</sup> /h	10,90	10,23	9,96	9,53	8,81	8,35	13,98	13,14	12,78	12,23	11,28	10,66
	<b>dpw</b>	kPa	60,6	53,4	50,6	46,4	39,6	35,6	73,5	64,9	61,4	56,2	47,8	42,7
7	<b>Pf</b>	kW	65,3	61,3	59,6	57,1	52,8	50,0	83,8	78,7	76,6	73,3	67,5	63,8
	<b>Pa</b>	kW	15,3	16,9	17,5	18,6	20,6	21,9	19,9	22,1	23,0	24,5	27,3	29,2
	<b>qw</b>	m <sup>3</sup> /h	11,21	10,52	10,23	9,80	9,06	8,58	14,39	13,51	13,14	12,57	11,59	10,95
	<b>dpw</b>	kPa	64,1	56,5	53,4	49,0	41,9	37,6	77,8	68,6	64,9	59,4	50,5	45,1
8	<b>Pf</b>	kW	67,1	63,0	61,3	58,7	54,2	51,4	86,2	80,9	78,7	75,3	69,4	65,6
	<b>Pa</b>	kW	15,4	17,0	17,7	18,8	20,8	22,1	20,1	22,2	23,2	24,7	27,5	29,4
	<b>qw</b>	m <sup>3</sup> /h	11,52	10,81	10,52	10,07	9,30	8,82	14,79	13,89	13,51	12,93	11,91	11,26
	<b>dpw</b>	kPa	67,7	59,7	56,5	51,8	44,2	39,7	82,3	72,5	68,6	62,8	53,3	47,7
9	<b>Pf</b>	kW	68,9	64,7	62,9	60,3	55,6	52,7	88,6	83,1	80,8	77,3	71,2	67,3
	<b>Pa</b>	kW	15,6	17,2	17,8	18,9	21,0	22,3	20,2	22,4	23,3	24,9	27,7	29,6
	<b>qw</b>	m <sup>3</sup> /h	11,84	11,11	10,81	10,35	9,56	9,06	15,21	14,28	13,88	13,29	12,23	11,56
	<b>dpw</b>	kPa	71,6	63,0	59,6	54,7	46,6	41,8	87,0	76,6	72,4	66,4	56,3	50,3
10	<b>Pf</b>	kW	70,8	66,4	64,6	61,9	57,1	54,1	91,0	85,4	83,0	79,4	73,1	69,1
	<b>Pa</b>	kW	15,7	17,3	18,0	19,1	21,1	22,5	20,3	22,5	23,5	25,1	27,9	29,8
	<b>qw</b>	m <sup>3</sup> /h	12,18	11,43	11,12	10,64	9,82	9,31	15,65	14,69	14,28	13,67	12,58	11,89
	<b>dpw</b>	kPa	75,7	66,6	63,0	57,8	49,2	44,2	92,1	81,1	76,7	70,2	59,5	53,1

Twout = Leaving water temperature (°C) ; Pf = Cooling capacity (kW) ; Pa = Compressors power input (kW) ; qw = Water flow (m<sup>3</sup>/h)  
dpw = Pressure drop (kPa).

## Performance data

### COOLING CAPACITY

Standard version

Twout			025						033					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	43	25	30	32	35	40	43
5	Pf	kW	96,3	90,6	88,1	84,4	78,0	73,9	125,8	118,2	115,0	110,1	101,9	96,6
	Pa	kW	24,3	27,1	28,3	30,2	33,7	36,0	31,0	34,4	35,9	38,2	42,5	45,4
	qw	m <sup>3</sup> /h	16,51	15,52	15,10	14,47	13,37	12,66	21,55	20,25	19,70	18,88	17,46	16,56
	dpw	kPa	67,0	59,2	56,1	51,5	44,0	39,4	86,5	76,4	72,3	66,4	56,8	51,1
6	Pf	kW	99,0	93,1	90,6	86,8	80,2	75,9	129,2	121,4	118,1	113,1	104,7	99,2
	Pa	kW	24,5	27,3	28,5	30,4	33,9	36,2	31,2	34,6	36,1	38,5	42,9	45,7
	qw	m <sup>3</sup> /h	16,98	15,96	15,53	14,88	13,75	13,01	22,16	20,82	20,25	19,40	17,95	17,01
	dpw	kPa	70,9	62,6	59,3	54,4	46,5	41,6	91,5	80,7	76,4	70,1	60,0	53,9
7	Pf	kW	101,8	95,6	93,1	89,2	82,3	77,9	132,8	124,7	121,3	116,2	107,5	101,9
	Pa	kW	24,7	27,4	28,6	30,6	34,1	36,5	31,4	34,9	36,4	38,8	43,2	46,0
	qw	m <sup>3</sup> /h	17,46	16,41	15,97	15,30	14,13	13,37	22,78	21,39	20,81	19,94	18,44	17,48
	dpw	kPa	75,0	66,2	62,7	57,5	49,1	44,0	96,6	85,2	80,7	74,0	63,3	56,9
8	Pf	kW	104,6	98,3	95,6	91,6	84,6	80,1	136,4	128,0	124,5	119,3	110,3	104,7
	Pa	kW	24,9	27,6	28,8	30,8	34,3	36,7	31,7	35,2	36,7	39,1	43,5	46,4
	qw	m <sup>3</sup> /h	17,95	16,87	16,41	15,72	14,52	13,75	23,41	21,98	21,38	20,49	18,94	17,97
	dpw	kPa	79,3	70,0	66,2	60,8	51,8	46,5	102,1	90,0	85,2	78,2	66,8	60,1
9	Pf	kW	107,4	100,9	98,2	94,1	86,8	82,2	140,0	131,4	127,9	122,5	113,2	107,4
	Pa	kW	25,0	27,8	29,0	31,0	34,6	37,0	31,9	35,4	37,0	39,4	43,8	46,7
	qw	m <sup>3</sup> /h	18,46	17,33	16,86	16,16	14,91	14,11	24,05	22,58	21,96	21,04	19,45	18,44
	dpw	kPa	83,7	73,9	69,9	64,2	54,6	49,0	107,7	94,9	89,8	82,5	70,4	63,4
10	Pf	kW	110,3	103,6	100,8	96,6	89,1	84,3	143,7	134,9	131,2	125,7	116,2	110,2
	Pa	kW	25,2	28,0	29,2	31,2	34,8	37,2	32,2	35,7	37,2	39,7	44,2	47,1
	qw	m <sup>3</sup> /h	18,99	17,83	17,35	16,62	15,33	14,51	24,73	23,21	22,58	21,63	19,99	18,96
	dpw	kPa	88,6	78,1	74,0	67,9	57,7	51,8	113,9	100,3	95,0	87,2	74,4	67,0

Twout			035						040					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	43	25	30	32	35	40	43
5	Pf	kW	140,4	131,9	128,4	122,9	113,4	107,3	151,2	142,0	138,2	132,3	122,3	115,8
	Pa	kW	35,6	39,4	41,1	43,7	48,6	51,8	38,4	42,4	44,1	46,9	51,9	55,2
	qw	m <sup>3</sup> /h	24,07	22,61	22,00	21,06	19,44	18,39	25,91	24,34	23,68	22,67	20,95	19,85
	dpw	kPa	74,7	66,0	62,5	57,2	48,7	43,6	85,4	75,4	71,3	65,4	55,8	50,1
6	Pf	kW	144,3	135,6	131,9	126,2	116,4	110,1	155,3	145,9	141,9	135,9	125,5	118,9
	Pa	kW	35,8	39,7	41,4	44,0	48,9	52,2	38,7	42,7	44,5	47,2	52,3	55,6
	qw	m <sup>3</sup> /h	24,75	23,25	22,61	21,64	19,97	18,88	26,63	25,01	24,33	23,30	21,52	20,38
	dpw	kPa	79,0	69,7	66,0	60,4	51,4	46,0	90,2	79,6	75,3	69,0	58,9	52,9
7	Pf	kW	148,3	139,2	135,4	129,6	119,5	113,0	159,5	149,8	145,7	139,5	128,8	122,0
	Pa	kW	36,1	40,0	41,7	44,3	49,3	52,6	39,0	43,0	44,8	47,6	52,7	56,1
	qw	m <sup>3</sup> /h	25,44	23,89	23,23	22,24	20,51	19,39	27,37	25,70	25,00	23,93	22,10	20,93
	dpw	kPa	83,5	73,6	69,7	63,8	54,3	48,5	95,3	84,0	79,5	72,9	62,1	55,7
8	Pf	kW	152,3	143,0	139,0	133,1	122,6	116,1	163,8	153,8	149,6	143,2	132,2	125,3
	Pa	kW	36,4	40,3	42,0	44,7	49,7	53,0	39,3	43,4	45,2	48,0	53,1	56,5
	qw	m <sup>3</sup> /h	26,14	24,54	23,87	22,84	21,06	19,92	28,13	26,40	25,68	24,58	22,69	21,51
	dpw	kPa	88,2	77,7	73,5	67,3	57,2	51,2	100,6	88,7	83,9	76,9	65,5	58,9
9	Pf	kW	156,4	146,8	142,7	136,6	125,8	119,0	168,2	157,8	153,5	147,0	135,6	128,5
	Pa	kW	36,6	40,6	42,3	45,0	50,0	53,3	39,6	43,7	45,5	48,3	53,5	56,9
	qw	m <sup>3</sup> /h	26,86	25,21	24,51	23,46	21,61	20,44	28,89	27,11	26,37	25,25	23,29	22,07
	dpw	kPa	93,1	82,0	77,5	71,0	60,3	53,9	106,2	93,5	88,4	81,1	69,0	62,0
10	Pf	kW	160,6	150,6	146,5	140,2	129,1	122,1	172,7	162,0	157,5	150,8	139,1	131,8
	Pa	kW	36,9	40,9	42,6	45,3	50,4	53,7	39,9	44,1	45,9	48,7	53,9	57,4
	qw	m <sup>3</sup> /h	27,63	25,92	25,20	24,12	22,21	21,01	29,71	27,87	27,10	25,95	23,93	22,68
	dpw	kPa	98,5	86,7	82,0	75,0	63,6	57,0	112,3	98,8	93,4	85,6	72,9	65,4

Twout = Leaving water temperature (°C) ; Pf = Cooling capacity (kW); Pa = Compressors power input (kW); qw = Water flow (m<sup>3</sup>/h)  
dpw = Pressure drop (kPa).

## Performance data

### COOLING CAPACITY

Standard version

Twout			045							050						
			Outdoor air temperature							Outdoor air temperature						
			25	30	32	35	40	43	25	30	32	35	40	43		
5	<b>Pf</b>	kW	166,5	156,5	152,2	145,6	134,3	127,0	193,3	181,9	177,1	169,8	157,3	149,3		
	<b>Pa</b>	kW	43,6	48,1	50,0	53,1	58,7	62,5	48,8	53,7	55,8	59,1	65,2	69,2		
	<b>qw</b>	m <sup>3</sup> /h	28,54	26,81	26,08	24,96	23,02	21,76	33,13	31,18	30,36	29,10	26,96	25,58		
	<b>dpw</b>	kPa	85,2	75,2	71,1	65,1	55,4	49,5	61,7	54,7	51,8	47,6	40,9	36,8		
6	<b>Pf</b>	kW	171,1	160,7	156,3	149,5	137,9	130,3	198,6	186,8	181,9	174,3	161,4	153,1		
	<b>Pa</b>	kW	43,9	48,4	50,4	53,5	59,2	63,0	49,1	54,1	56,2	59,6	65,7	69,8		
	<b>qw</b>	m <sup>3</sup> /h	29,34	27,56	26,80	25,64	23,64	22,34	34,05	32,03	31,18	29,89	27,68	26,26		
	<b>dpw</b>	kPa	90,0	79,4	75,1	68,7	58,4	52,2	65,2	57,7	54,7	50,3	43,1	38,8		
7	<b>Pf</b>	kW	175,8	165,0	160,5	153,5	141,5	133,7	203,9	191,8	186,7	178,9	165,6	157,1		
	<b>Pa</b>	kW	44,3	48,8	50,7	53,9	59,6	63,5	49,5	54,5	56,7	60,1	66,2	70,3		
	<b>qw</b>	m <sup>3</sup> /h	30,16	28,32	27,53	26,34	24,27	22,94	34,99	32,90	32,03	30,70	28,42	26,95		
	<b>dpw</b>	kPa	95,1	83,8	79,3	72,5	61,6	55,0	68,9	60,9	57,7	53,0	45,4	40,9		
8	<b>Pf</b>	kW	180,5	169,4	164,7	157,6	145,1	137,2	209,4	196,8	191,6	183,6	169,9	161,3		
	<b>Pa</b>	kW	44,6	49,2	51,1	54,3	60,1	63,9	49,9	54,9	57,1	60,5	66,8	70,9		
	<b>qw</b>	m <sup>3</sup> /h	30,99	29,09	28,28	27,06	24,92	23,56	35,95	33,79	32,89	31,53	29,17	27,69		
	<b>dpw</b>	kPa	100,4	88,4	83,6	76,5	64,9	58,0	72,7	64,2	60,8	55,9	47,8	43,1		
9	<b>Pf</b>	kW	185,4	173,9	169,0	161,7	148,9	140,7	215,0	202,0	196,5	188,4	174,2	165,3		
	<b>Pa</b>	kW	44,9	49,5	51,5	54,7	60,5	64,4	50,2	55,3	57,5	61,0	67,3	71,4		
	<b>qw</b>	m <sup>3</sup> /h	31,84	29,87	29,04	27,78	25,57	24,17	36,93	34,70	33,76	32,37	29,93	28,40		
	<b>dpw</b>	kPa	106,0	93,3	88,1	80,7	68,3	61,1	76,7	67,7	64,1	58,9	50,4	45,3		
10	<b>Pf</b>	kW	190,3	178,5	173,5	165,9	152,6	144,3	220,6	207,2	201,7	193,3	178,6	169,5		
	<b>Pa</b>	kW	45,3	49,9	51,9	55,1	61,0	64,9	50,6	55,7	57,9	61,4	67,8	72,0		
	<b>qw</b>	m <sup>3</sup> /h	32,74	30,71	29,85	28,55	26,26	24,83	37,96	35,66	34,70	33,26	30,74	29,17		
	<b>dpw</b>	kPa	112,1	98,6	93,1	85,2	72,1	64,5	81,0	71,5	67,7	62,2	53,1	47,9		

Twout			055							065						
			Outdoor air temperature							Outdoor air temperature						
			25	30	32	35	40	43	25	30	32	35	40	43		
5	<b>Pf</b>	kW	202,8	190,6	185,5	177,7	164,7	156,4	254,1	238,8	232,3	222,3	205,1	194,0		
	<b>Pa</b>	kW	51,7	57,2	59,6	63,4	70,2	74,7	65,8	72,5	75,5	80,1	88,6	94,3		
	<b>qw</b>	m <sup>3</sup> /h	34,76	32,66	31,79	30,46	28,22	26,80	43,54	40,92	39,81	38,10	35,15	33,25		
	<b>dpw</b>	kPa	67,0	59,1	56,0	51,4	44,1	39,8	67,3	59,4	56,2	51,5	43,8	39,2		
6	<b>Pf</b>	kW	208,4	195,7	190,5	182,5	169,1	160,6	261,0	245,2	238,5	228,2	210,5	199,0		
	<b>Pa</b>	kW	52,1	57,7	60,1	63,9	70,8	75,2	66,3	73,1	76,0	80,7	89,3	95,0		
	<b>qw</b>	m <sup>3</sup> /h	35,73	33,57	32,67	31,30	29,00	27,54	44,76	42,05	40,90	39,14	36,10	34,13		
	<b>dpw</b>	kPa	70,7	62,4	59,1	54,3	46,6	42,0	71,1	62,7	59,3	54,3	46,2	41,3		
7	<b>Pf</b>	kW	214,0	201,0	195,6	187,4	173,6	164,8	268,1	251,7	244,8	234,3	216,0	204,1		
	<b>Pa</b>	kW	52,5	58,1	60,5	64,4	71,3	75,8	66,8	73,6	76,6	81,3	90,0	95,7		
	<b>qw</b>	m <sup>3</sup> /h	36,72	34,49	33,56	32,16	29,78	28,28	45,99	43,19	42,00	40,20	37,05	35,03		
	<b>dpw</b>	kPa	74,7	65,9	62,4	57,3	49,2	44,3	75,1	66,2	62,6	57,3	48,7	43,5		
8	<b>Pf</b>	kW	219,7	206,3	200,7	192,4	178,2	169,3	275,2	258,4	251,2	240,4	221,5	209,6		
	<b>Pa</b>	kW	53,0	58,6	61,0	64,9	71,9	76,4	67,3	74,2	77,2	81,9	90,7	96,5		
	<b>qw</b>	m <sup>3</sup> /h	37,72	35,42	34,46	33,03	30,58	29,07	47,25	44,36	43,13	41,28	38,03	35,98		
	<b>dpw</b>	kPa	78,9	69,5	65,8	60,5	51,8	46,8	79,2	69,8	66,0	60,4	51,3	45,9		
9	<b>Pf</b>	kW	225,6	211,7	206,0	197,5	182,8	173,7	282,6	265,1	257,8	246,7	227,2	214,8		
	<b>Pa</b>	kW	53,4	59,1	61,5	65,4	72,4	77,0	67,8	74,8	77,8	82,5	91,4	97,2		
	<b>qw</b>	m <sup>3</sup> /h	38,75	36,37	35,39	33,92	31,40	29,84	48,54	45,55	44,28	42,37	39,02	36,90		
	<b>dpw</b>	kPa	83,2	73,3	69,4	63,8	54,6	49,3	83,6	73,6	69,6	63,7	54,0	48,3		
10	<b>Pf</b>	kW	231,5	217,3	211,4	202,6	187,5	178,3	290,0	272,0	264,5	253,0	232,9	220,3		
	<b>Pa</b>	kW	53,9	59,5	62,0	65,9	73,0	77,6	68,3	75,3	78,4	83,2	92,0	97,9		
	<b>qw</b>	m <sup>3</sup> /h	39,83	37,38	36,37	34,86	32,26	30,67	49,90	46,81	45,51	43,54	40,07	37,90		
	<b>dpw</b>	kPa	87,9	77,4	73,3	67,4	57,7	52,1	88,3	77,7	73,5	67,3	57,0	51,0		

Twout = Leaving water temperature (°C) ; Pf = Cooling capacity (kW); Pa = Compressors power input (kW); qw = Water flow (m<sup>3</sup>/h)  
dpw = Pressure drop (kPa).



## Performance data

### COOLING CAPACITY

Standard version

Twout		080						090						
		Outdoor air temperature						Outdoor air temperature						
		25	30	32	35	40	43	25	30	32	35	40	43	
5	<b>Pf</b>	kW	313,0	294,2	286,3	274,1	253,5	240,2	342,0	321,4	312,7	299,3	276,3	261,4
	<b>Pa</b>	kW	78,3	86,4	89,9	95,5	105,8	112,5	83,0	91,5	95,2	101,0	111,8	119,0
	<b>qw</b>	m <sup>3</sup> /h	53,65	50,42	49,06	46,98	43,44	41,17	58,61	55,09	53,60	51,30	47,35	44,80
	<b>dpw</b>	kPa	81,8	72,3	68,4	62,8	53,7	48,2	74,1	65,5	62,0	56,8	48,4	43,3
6	<b>Pf</b>	kW	321,5	302,1	293,9	281,5	260,2	246,5	351,2	330,0	321,1	307,3	283,5	268,1
	<b>Pa</b>	kW	78,9	87,1	90,6	96,3	106,6	113,4	83,7	92,2	95,9	101,8	112,7	119,9
	<b>qw</b>	m <sup>3</sup> /h	55,13	51,80	50,40	48,27	44,61	42,27	60,23	56,60	55,05	52,69	48,61	45,98
	<b>dpw</b>	kPa	86,4	76,3	72,2	66,2	56,6	50,8	78,2	69,1	65,4	59,9	51,0	45,6
7	<b>Pf</b>	kW	330,2	310,1	301,7	288,9	267,0	252,9	360,7	338,8	329,5	315,4	290,8	275,0
	<b>Pa</b>	kW	79,5	87,7	91,3	97,0	107,4	114,2	84,3	92,9	96,6	102,6	113,5	120,8
	<b>qw</b>	m <sup>3</sup> /h	56,65	53,21	51,76	49,57	45,81	43,40	61,89	58,13	56,54	54,11	49,90	47,18
	<b>dpw</b>	kPa	91,2	80,5	76,2	69,9	59,7	53,5	82,6	72,9	68,9	63,2	53,7	48,0
8	<b>Pf</b>	kW	339,0	318,3	309,6	296,5	273,9	259,7	370,3	347,7	338,1	323,6	298,3	282,2
	<b>Pa</b>	kW	80,1	88,4	92,0	97,7	108,2	115,1	84,9	93,6	97,4	103,4	114,4	121,7
	<b>qw</b>	m <sup>3</sup> /h	58,20	54,64	53,15	50,91	47,02	44,58	63,57	59,69	58,05	55,56	51,20	48,45
	<b>dpw</b>	kPa	96,3	84,9	80,3	73,7	62,9	56,5	87,2	76,8	72,7	66,6	56,5	50,6
9	<b>Pf</b>	kW	347,9	326,6	317,7	304,2	280,9	266,3	380,1	356,7	346,9	332,0	305,8	289,2
	<b>Pa</b>	kW	80,7	89,1	92,7	98,5	109,0	116,0	85,6	94,3	98,1	104,1	115,2	122,6
	<b>qw</b>	m <sup>3</sup> /h	59,77	56,11	54,57	52,26	48,25	45,74	65,29	61,28	59,58	57,03	52,53	49,69
	<b>dpw</b>	kPa	101,6	89,5	84,6	77,7	66,2	59,5	91,9	81,0	76,6	70,1	59,5	53,2
10	<b>Pf</b>	kW	357,1	335,1	325,9	312,1	288,0	273,1	390,0	366,0	355,9	340,5	313,5	296,6
	<b>Pa</b>	kW	81,4	89,8	93,5	99,3	109,9	116,9	86,2	95,0	98,9	104,9	116,1	123,5
	<b>qw</b>	m <sup>3</sup> /h	61,44	57,65	56,08	53,70	49,56	46,99	67,11	62,97	61,23	58,59	53,94	51,03
	<b>dpw</b>	kPa	107,3	94,5	89,4	82,0	69,8	62,8	97,1	85,5	80,9	74,0	62,7	56,2

**Twout** = Leaving water temperature (°C) ; **Pf** = Cooling capacity (kW); **Pa** = Compressors power input (kW); **qw** = Water flow (m<sup>3</sup>/h)  
**dpw** = Pressure drop (kPa).

## Performance data

### COOLING CAPACITY

Super low noise version

Twout			012							015						
			Outdoor air temperature							Outdoor air temperature						
			25	30	32	35	40	43	25	30	32	35	40	43		
5	<b>Pf</b>	kW	46,7	43,9	42,7	40,8	38,6	37,2	53,4	50,1	48,8	46,7	44,1	42,5		
	<b>Pa</b>	kW	11,9	13,1	13,6	14,4	15,6	16,3	14,1	15,5	16,2	17,2	18,5	19,4		
	<b>qw</b>	m <sup>3</sup> /h	8,01	7,52	7,31	7,00	6,61	6,37	9,16	8,59	8,36	8,00	7,56	7,28		
	<b>dpw</b>	kPa	57,8	51,0	48,2	44,2	39,4	36,6	58,5	51,6	48,8	44,7	39,9	37,0		
6	<b>Pf</b>	kW	48,0	45,1	43,8	42,0	39,6	38,2	54,9	51,5	50,1	48,0	45,3	43,6		
	<b>Pa</b>	kW	12,0	13,2	13,7	14,5	15,7	16,4	14,2	15,7	16,3	17,3	18,7	19,5		
	<b>qw</b>	m <sup>3</sup> /h	8,24	7,73	7,52	7,20	6,79	6,54	9,42	8,84	8,59	8,23	7,77	7,48		
	<b>dpw</b>	kPa	61,2	53,9	51,0	46,7	41,6	38,6	61,9	54,5	51,6	47,3	42,1	39,1		
7	<b>Pf</b>	kW	49,4	46,3	45,0	43,1	40,7	39,2	56,4	52,9	51,5	49,3	46,5	44,8		
	<b>Pa</b>	kW	12,1	13,3	13,8	14,7	15,8	16,6	14,3	15,8	16,4	17,4	18,8	19,7		
	<b>qw</b>	m <sup>3</sup> /h	8,47	7,94	7,73	7,40	6,98	6,72	9,68	9,08	8,83	8,46	7,98	7,69		
	<b>dpw</b>	kPa	64,7	56,9	53,9	49,4	43,9	40,8	65,5	57,6	54,5	50,0	44,5	41,2		
8	<b>Pf</b>	kW	50,7	47,6	46,2	44,3	41,8	40,2	58,0	54,4	52,9	50,6	47,8	46,0		
	<b>Pa</b>	kW	12,2	13,4	13,9	14,8	16,0	16,7	14,5	15,9	16,6	17,6	19,0	19,9		
	<b>qw</b>	m <sup>3</sup> /h	8,71	8,17	7,94	7,60	7,17	6,91	9,95	9,34	9,08	8,69	8,20	7,90		
	<b>dpw</b>	kPa	68,4	60,1	56,9	52,2	46,4	43,0	69,2	60,9	57,5	52,8	46,9	43,5		
9	<b>Pf</b>	kW	52,1	48,8	47,5	45,5	42,9	41,3	59,6	55,8	54,3	52,0	49,0	47,2		
	<b>Pa</b>	kW	12,3	13,5	14,0	14,9	16,1	16,8	14,6	16,1	16,7	17,7	19,1	20,0		
	<b>qw</b>	m <sup>3</sup> /h	8,95	8,39	8,16	7,81	7,36	7,09	10,23	9,59	9,33	8,93	8,42	8,11		
	<b>dpw</b>	kPa	72,2	63,5	60,0	55,1	48,9	45,4	73,1	64,2	60,7	55,7	49,5	45,9		
10	<b>Pf</b>	kW	53,5	50,1	48,8	46,7	44,0	42,4	61,2	57,3	55,8	53,4	50,3	48,4		
	<b>Pa</b>	kW	12,4	13,6	14,2	15,0	16,2	17,0	14,7	16,2	16,9	17,9	19,3	20,2		
	<b>qw</b>	m <sup>3</sup> /h	9,20	8,63	8,39	8,03	7,57	7,29	10,52	9,87	9,59	9,18	8,65	8,33		
	<b>dpw</b>	kPa	76,4	67,1	63,5	58,2	51,7	47,9	77,3	67,9	64,2	58,9	52,3	48,5		

Twout			016							020						
			Outdoor air temperature							Outdoor air temperature						
			25	30	32	35	40	43	25	30	32	35	40	43		
5	<b>Pf</b>	kW	61,4	57,6	56,1	53,7	50,7	48,8	78,8	74,0	71,9	68,8	64,8	62,3		
	<b>Pa</b>	kW	15,2	16,8	17,4	18,5	20,0	20,9	19,8	22,0	23,0	24,5	26,6	27,9		
	<b>qw</b>	m <sup>3</sup> /h	10,52	9,88	9,61	9,20	8,68	8,36	13,51	12,68	12,33	11,79	11,11	10,68		
	<b>dpw</b>	kPa	56,5	49,8	47,1	43,2	38,5	35,7	68,6	60,4	57,1	52,3	46,4	42,9		
6	<b>Pf</b>	kW	63,1	59,2	57,6	55,2	52,0	50,1	81,0	76,0	73,9	70,7	66,6	64,0		
	<b>Pa</b>	kW	15,3	16,9	17,6	18,7	20,2	21,1	20,0	22,2	23,1	24,6	26,7	28,1		
	<b>qw</b>	m <sup>3</sup> /h	10,83	10,16	9,88	9,46	8,92	8,59	13,90	13,04	12,68	12,13	11,42	10,98		
	<b>dpw</b>	kPa	59,8	52,7	49,8	45,7	40,6	37,7	72,6	63,9	60,4	55,3	49,0	45,3		
7	<b>Pf</b>	kW	64,9	60,9	59,2	56,7	53,4	51,5	83,3	78,2	76,0	72,7	68,4	65,8		
	<b>Pa</b>	kW	15,5	17,0	17,7	18,8	20,3	21,3	20,1	22,3	23,3	24,8	26,9	28,3		
	<b>qw</b>	m <sup>3</sup> /h	11,13	10,44	10,16	9,72	9,17	8,83	14,29	13,41	13,04	12,47	11,74	11,29		
	<b>dpw</b>	kPa	63,3	55,7	52,6	48,2	42,9	39,8	76,8	67,6	63,9	58,5	51,8	47,9		
8	<b>Pf</b>	kW	66,7	62,5	60,8	58,2	54,9	52,8	85,6	80,3	78,1	74,7	70,3	67,6		
	<b>Pa</b>	kW	15,6	17,2	17,9	19,0	20,5	21,4	20,3	22,5	23,4	25,0	27,1	28,4		
	<b>qw</b>	m <sup>3</sup> /h	11,45	10,74	10,44	9,99	9,42	9,07	14,70	13,79	13,40	12,82	12,06	11,60		
	<b>dpw</b>	kPa	66,9	58,8	55,6	51,0	45,3	42,0	81,2	71,5	67,5	61,8	54,7	50,6		
9	<b>Pf</b>	kW	68,5	64,2	62,4	59,8	56,3	54,2	88,0	82,5	80,2	76,7	72,2	69,3		
	<b>Pa</b>	kW	15,7	17,3	18,0	19,1	20,7	21,6	20,4	22,6	23,6	25,2	27,3	28,6		
	<b>qw</b>	m <sup>3</sup> /h	11,77	11,03	10,73	10,27	9,68	9,31	15,12	14,17	13,78	13,18	12,39	11,91		
	<b>dpw</b>	kPa	70,7	62,1	58,7	53,8	47,8	44,3	85,9	75,5	71,3	65,3	57,8	53,3		
10	<b>Pf</b>	kW	70,4	65,9	64,1	61,4	57,8	55,6	90,4	84,7	82,4	78,8	74,1	71,2		
	<b>Pa</b>	kW	15,9	17,5	18,2	19,3	20,8	21,8	20,6	22,8	23,8	25,3	27,5	28,8		
	<b>qw</b>	m <sup>3</sup> /h	12,11	11,35	11,03	10,56	9,95	9,57	15,55	14,58	14,17	13,56	12,74	12,25		
	<b>dpw</b>	kPa	74,8	65,7	62,1	56,9	50,5	46,8	90,9	79,9	75,5	69,1	61,1	56,4		

Twout = Leaving water temperature (°C) ; Pf = Cooling capacity (kW); Pa = Compressors power input (kW); qw = Water flow (m<sup>3</sup>/h)  
dpw = Pressure drop (kPa).

## Performance data

### COOLING CAPACITY

Super low noise version

Twout			025						033					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	43	25	30	32	35	40	43
5	Pf	kW	95,7	89,9	87,5	83,8	79,0	76,1	125,0	117,3	114,1	109,3	103,2	99,4
	Pa	kW	24,6	27,4	28,6	30,5	33,1	34,8	31,3	34,8	36,3	38,7	41,9	43,9
	qw	m <sup>3</sup> /h	16,41	15,41	14,99	14,35	13,54	13,04	21,41	20,10	19,56	18,73	17,68	17,04
	dpw	kPa	66,2	58,4	55,2	50,7	45,1	41,8	85,4	75,3	71,2	65,3	58,2	54,1
6	Pf	kW	98,4	92,4	89,9	86,1	81,2	78,1	128,4	120,5	117,2	112,3	106,0	102,1
	Pa	kW	24,8	27,6	28,8	30,7	33,4	35,0	31,5	35,0	36,5	38,9	42,2	44,2
	qw	m <sup>3</sup> /h	16,87	15,85	15,42	14,76	13,92	13,40	22,02	20,67	20,10	19,25	18,17	17,50
	dpw	kPa	70,0	61,7	58,4	53,6	47,6	44,1	90,3	79,5	75,3	69,0	61,5	57,1
7	Pf	kW	101,1	95,0	92,4	88,4	83,4	80,3	131,9	123,8	120,4	115,3	108,8	104,8
	Pa	kW	24,9	27,7	29,0	30,9	33,6	35,2	31,8	35,3	36,8	39,2	42,5	44,6
	qw	m <sup>3</sup> /h	17,35	16,29	15,85	15,18	14,31	13,77	22,63	21,24	20,66	19,78	18,67	17,98
	dpw	kPa	74,0	65,3	61,7	56,6	50,3	46,6	95,4	84,0	79,5	72,9	64,9	60,2
8	Pf	kW	103,9	97,5	94,9	90,9	85,6	82,4	135,5	127,1	123,6	118,4	111,7	107,6
	Pa	kW	25,1	27,9	29,2	31,1	33,8	35,5	32,0	35,6	37,1	39,5	42,8	44,9
	qw	m <sup>3</sup> /h	17,84	16,75	16,29	15,60	14,70	14,15	23,26	21,82	21,22	20,33	19,17	18,47
	dpw	kPa	78,3	69,0	65,2	59,8	53,1	49,2	100,8	88,7	83,9	76,9	68,5	63,5
9	Pf	kW	106,8	100,2	97,4	93,3	87,9	84,6	139,1	130,5	126,9	121,5	114,6	110,4
	Pa	kW	25,3	28,1	29,4	31,3	34,1	35,7	32,3	35,8	37,4	39,8	43,2	45,2
	qw	m <sup>3</sup> /h	18,34	17,21	16,74	16,03	15,10	14,53	23,90	22,41	21,80	20,88	19,69	18,96
	dpw	kPa	82,7	72,8	68,9	63,2	56,1	51,9	106,4	93,6	88,5	81,2	72,2	67,0
10	Pf	kW	109,6	102,9	100,0	95,8	90,2	86,8	142,8	133,9	130,2	124,7	117,6	113,3
	Pa	kW	25,5	28,3	29,6	31,6	34,3	36,0	32,5	36,1	37,7	40,1	43,5	45,6
	qw	m <sup>3</sup> /h	18,87	17,70	17,21	16,48	15,52	14,93	24,57	23,04	22,41	21,46	20,24	19,49
	dpw	kPa	87,5	77,0	72,9	66,8	59,2	54,8	112,5	98,9	93,5	85,8	76,3	70,7

Twout			035						040					
			Outdoor air temperature						Outdoor air temperature					
			25	30	32	35	40	43	25	30	32	35	40	43
5	Pf	kW	139,5	131,0	127,4	121,9	114,9	110,5	150,2	141,0	137,1	131,2	123,8	119,2
	Pa	kW	35,9	39,8	41,5	44,2	47,8	50,1	38,8	42,8	44,6	47,4	51,2	53,5
	qw	m <sup>3</sup> /h	23,92	22,45	21,83	20,89	19,69	18,94	25,74	24,16	23,50	22,49	21,22	20,43
	dpw	kPa	73,8	65,0	61,5	56,3	50,0	46,3	84,3	74,3	70,3	64,4	57,3	53,1
6	Pf	kW	143,4	134,6	130,8	125,2	117,9	113,4	154,3	144,8	140,8	134,8	127,1	122,4
	Pa	kW	36,2	40,1	41,8	44,5	48,2	50,5	39,1	43,2	44,9	47,7	51,6	53,9
	qw	m <sup>3</sup> /h	24,59	23,08	22,44	21,47	20,22	19,45	26,46	24,83	24,15	23,11	21,79	20,98
	dpw	kPa	78,0	68,7	65,0	59,5	52,8	48,8	89,1	78,5	74,2	68,0	60,4	56,0
7	Pf	kW	147,3	138,2	134,4	128,6	121,1	116,4	158,5	148,7	144,6	138,4	130,4	125,6
	Pa	kW	36,5	40,4	42,1	44,8	48,6	50,9	39,4	43,5	45,3	48,1	52,0	54,3
	qw	m <sup>3</sup> /h	25,28	23,71	23,05	22,06	20,77	19,98	27,20	25,52	24,81	23,74	22,38	21,55
	dpw	kPa	82,4	72,6	68,6	62,8	55,7	51,5	94,1	82,8	78,3	71,7	63,7	59,1
8	Pf	kW	151,3	141,9	137,9	132,0	124,2	119,5	162,8	152,7	148,4	142,1	133,9	128,8
	Pa	kW	36,8	40,7	42,4	45,2	48,9	51,3	39,7	43,8	45,6	48,5	52,3	54,8
	qw	m <sup>3</sup> /h	25,98	24,36	23,68	22,66	21,33	20,51	27,95	26,21	25,48	24,39	22,98	22,12
	dpw	kPa	87,1	76,6	72,4	66,3	58,7	54,3	99,4	87,4	82,6	75,7	67,2	62,2
9	Pf	kW	155,4	145,7	141,6	135,5	127,5	122,6	167,1	156,7	152,3	145,8	137,3	132,2
	Pa	kW	37,0	41,0	42,7	45,5	49,3	51,6	40,0	44,2	46,0	48,8	52,7	55,2
	qw	m <sup>3</sup> /h	26,69	25,03	24,32	23,27	21,90	21,05	28,71	26,92	26,17	25,04	23,59	22,70
	dpw	kPa	91,9	80,8	76,3	69,9	61,9	57,2	104,9	92,2	87,1	79,8	70,8	65,6
10	Pf	kW	159,5	149,5	145,3	139,0	130,8	125,7	171,5	160,8	156,3	149,6	140,9	135,6
	Pa	kW	37,3	41,3	43,1	45,8	49,6	52,0	40,3	44,5	46,3	49,2	53,2	55,6
	qw	m <sup>3</sup> /h	27,45	25,73	25,01	23,92	22,50	21,63	29,52	27,66	26,89	25,74	24,24	23,32
	dpw	kPa	97,2	85,4	80,7	73,8	65,3	60,4	110,8	97,4	92,0	84,3	74,7	69,2

Twout = Leaving water temperature (°C) ; Pf = Cooling capacity (kW); Pa = Compressors power input (kW); qw = Water flow (m<sup>3</sup>/h)  
dpw = Pressure drop (kPa).

## Performance data

### COOLING CAPACITY

Super low noise version

Twout			045							050						
			Outdoor air temperature							Outdoor air temperature						
			25	30	32	35	40	43	25	30	32	35	40	43		
5	<b>Pf</b>	kW	165,5	155,3	151,0	144,4	136,0	130,8	192,1	180,6	175,8	168,5	159,2	153,5		
	<b>Pa</b>	kW	44,0	48,5	50,5	53,6	57,9	60,6	49,3	54,2	56,4	59,7	64,3	67,2		
	<b>qw</b>	m <sup>3</sup> /h	28,36	26,62	25,88	24,75	23,32	22,42	32,92	30,96	30,13	28,88	27,29	26,31		
	<b>dpw</b>	kPa	84,1	74,1	70,0	64,1	56,8	52,6	61,0	53,9	51,1	46,9	41,9	38,9		
6	<b>Pf</b>	kW	170,0	159,5	155,1	148,3	139,6	134,3	197,3	185,5	180,5	173,0	163,4	157,5		
	<b>Pa</b>	kW	44,4	48,9	50,9	54,0	58,3	61,0	49,6	54,6	56,8	60,2	64,8	67,7		
	<b>qw</b>	m <sup>3</sup> /h	29,16	27,36	26,59	25,44	23,95	23,02	33,84	31,81	30,95	29,66	28,02	27,01		
	<b>dpw</b>	kPa	88,9	78,2	73,9	67,6	59,9	55,4	64,4	56,9	53,9	49,5	44,2	41,0		
7	<b>Pf</b>	kW	174,7	163,8	159,2	152,3	143,3	137,8	202,7	190,4	185,3	177,6	167,7	161,6		
	<b>Pa</b>	kW	44,7	49,3	51,3	54,4	58,8	61,5	50,0	55,1	57,2	60,7	65,3	68,2		
	<b>qw</b>	m <sup>3</sup> /h	29,97	28,11	27,32	26,13	24,59	23,64	34,77	32,67	31,79	30,47	28,77	27,72		
	<b>dpw</b>	kPa	93,9	82,6	78,0	71,4	63,2	58,4	68,0	60,0	56,8	52,2	46,5	43,2		
8	<b>Pf</b>	kW	179,4	168,2	163,4	156,3	147,0	141,3	208,1	195,4	190,1	182,2	172,0	165,7		
	<b>Pa</b>	kW	45,0	49,7	51,7	54,8	59,2	61,9	50,4	55,5	57,7	61,1	65,8	68,7		
	<b>qw</b>	m <sup>3</sup> /h	30,80	28,87	28,06	26,84	25,24	24,26	35,72	33,55	32,64	31,28	29,53	28,45		
	<b>dpw</b>	kPa	99,2	87,2	82,3	75,3	66,6	61,5	71,8	63,3	59,9	55,0	49,0	45,5		
9	<b>Pf</b>	kW	184,2	172,6	167,7	160,4	150,8	144,9	213,6	200,5	195,1	186,9	176,4	169,9		
	<b>Pa</b>	kW	45,4	50,0	52,0	55,3	59,7	62,4	50,7	55,9	58,1	61,6	66,3	69,3		
	<b>qw</b>	m <sup>3</sup> /h	31,64	29,65	28,81	27,55	25,91	24,90	36,69	34,45	33,51	32,11	30,30	29,19		
	<b>dpw</b>	kPa	104,6	91,9	86,8	79,4	70,2	64,8	75,7	66,7	63,2	58,0	51,6	47,9		
10	<b>Pf</b>	kW	189,1	177,1	172,1	164,6	154,7	148,6	219,2	205,7	200,2	191,8	180,9	174,2		
	<b>Pa</b>	kW	45,7	50,4	52,4	55,7	60,1	62,9	51,1	56,3	58,5	62,1	66,8	69,8		
	<b>qw</b>	m <sup>3</sup> /h	32,53	30,48	29,62	28,32	26,61	25,57	37,72	35,40	34,44	33,00	31,12	29,98		
	<b>dpw</b>	kPa	110,6	97,1	91,7	83,8	74,0	68,3	80,0	70,5	66,7	61,2	54,5	50,5		

Twout			055							065						
			Outdoor air temperature							Outdoor air temperature						
			25	30	32	35	40	43	25	30	32	35	40	43		
5	<b>Pf</b>	kW	201,6	189,2	184,1	176,4	166,7	160,8	252,5	237,0	230,5	220,5	207,8	199,9		
	<b>Pa</b>	kW	52,2	57,8	60,2	64,1	69,2	72,4	66,5	73,3	76,2	80,9	87,4	91,4		
	<b>qw</b>	m <sup>3</sup> /h	34,54	32,43	31,55	30,23	28,57	27,55	43,27	40,63	39,50	37,79	35,61	34,25		
	<b>dpw</b>	kPa	66,1	58,3	55,2	50,6	45,2	42,1	66,4	58,6	55,4	50,7	45,0	41,6		
6	<b>Pf</b>	kW	207,0	194,3	189,1	181,1	171,1	165,0	259,4	243,4	236,7	226,4	213,2	205,1		
	<b>Pa</b>	kW	52,7	58,3	60,7	64,5	69,7	72,9	67,0	73,8	76,8	81,5	88,0	92,1		
	<b>qw</b>	m <sup>3</sup> /h	35,50	33,33	32,42	31,06	29,35	28,30	44,48	41,74	40,58	38,82	36,56	35,16		
	<b>dpw</b>	kPa	69,9	61,5	58,2	53,5	47,7	44,4	70,2	61,8	58,4	53,5	47,4	43,9		
7	<b>Pf</b>	kW	212,6	199,5	194,1	186,0	175,7	169,4	266,4	249,9	242,9	232,4	218,7	210,4		
	<b>Pa</b>	kW	53,1	58,7	61,2	65,1	70,3	73,5	67,5	74,4	77,4	82,2	88,7	92,8		
	<b>qw</b>	m <sup>3</sup> /h	36,48	34,24	33,30	31,91	30,14	29,07	45,70	42,88	41,68	39,87	37,53	36,09		
	<b>dpw</b>	kPa	73,8	65,0	61,5	56,4	50,3	46,8	74,1	65,2	61,6	56,4	50,0	46,2		
8	<b>Pf</b>	kW	218,3	204,8	199,2	190,9	180,3	173,9	273,5	256,5	249,3	238,5	224,4	215,7		
	<b>Pa</b>	kW	53,5	59,2	61,7	65,6	70,8	74,1	68,0	75,0	78,0	82,8	89,4	93,5		
	<b>qw</b>	m <sup>3</sup> /h	37,48	35,17	34,20	32,78	30,95	29,85	46,95	44,03	42,80	40,94	38,52	37,04		
	<b>dpw</b>	kPa	77,9	68,5	64,8	59,5	53,1	49,4	78,2	68,8	65,0	59,5	52,7	48,7		
9	<b>Pf</b>	kW	224,1	210,2	204,5	195,9	185,0	178,4	280,8	263,2	255,8	244,7	230,1	221,2		
	<b>Pa</b>	kW	54,0	59,7	62,1	66,1	71,4	74,6	68,5	75,5	78,6	83,4	90,0	94,2		
	<b>qw</b>	m <sup>3</sup> /h	38,50	36,11	35,12	33,66	31,78	30,65	48,23	45,21	43,94	42,03	39,53	38,00		
	<b>dpw</b>	kPa	82,1	72,3	68,4	62,8	56,0	52,0	82,5	72,5	68,5	62,7	55,4	51,2		
10	<b>Pf</b>	kW	230,0	215,7	209,8	201,1	189,8	183,0	288,1	270,0	262,4	251,0	236,0	226,8		
	<b>Pa</b>	kW	54,4	60,2	62,6	66,6	71,9	75,2	69,0	76,1	79,2	84,0	90,7	94,9		
	<b>qw</b>	m <sup>3</sup> /h	39,57	37,11	36,10	34,59	32,66	31,49	49,58	46,46	45,15	43,18	40,60	39,02		
	<b>dpw</b>	kPa	86,8	76,3	72,2	66,3	59,1	54,9	87,2	76,6	72,3	66,2	58,5	54,0		

Twout = Leaving water temperature (°C) ; Pf = Cooling capacity (kW); Pa = Compressors power input (kW); qw = Water flow (m<sup>3</sup>/h)  
dpw = Pressure drop (kPa).

## Performance data

### COOLING CAPACITY

Super low noise version

Twout		080						090						
		Outdoor air temperature						Outdoor air temperature						
		25	30	32	35	40	43	25	30	32	35	40	43	
5	<b>Pf</b>	kW	311,0	292,1	284,1	272,0	256,6	247,2	339,8	319,1	310,4	296,9	279,8	269,2
	<b>Pa</b>	kW	79,1	87,3	90,9	96,5	104,3	109,0	83,9	92,5	96,2	102,1	110,2	115,3
	<b>qw</b>	m <sup>3</sup> /h	53,31	50,06	48,69	46,61	43,99	42,37	58,24	54,69	53,19	50,89	47,96	46,14
	<b>dpw</b>	kPa	80,8	71,2	67,4	61,8	55,0	51,0	73,2	64,5	61,0	55,9	49,6	45,9
6	<b>Pf</b>	kW	319,5	299,9	291,7	279,2	263,4	253,7	349,0	327,7	318,6	304,8	287,1	276,2
	<b>Pa</b>	kW	79,7	88,0	91,6	97,3	105,1	109,9	84,5	93,2	96,9	102,9	111,0	116,1
	<b>qw</b>	m <sup>3</sup> /h	54,79	51,43	50,02	47,89	45,17	43,50	59,86	56,19	54,63	52,27	49,24	47,36
	<b>dpw</b>	kPa	85,3	75,2	71,1	65,2	58,0	53,8	77,3	68,1	64,4	58,9	52,3	48,4
7	<b>Pf</b>	kW	328,1	307,9	299,4	286,6	270,3	260,3	358,4	336,3	327,0	312,8	294,6	283,3
	<b>Pa</b>	kW	80,3	88,6	92,3	98,0	105,9	110,7	85,1	93,9	97,6	103,6	111,9	117,0
	<b>qw</b>	m <sup>3</sup> /h	56,29	52,83	51,37	49,18	46,38	44,66	61,50	57,71	56,10	53,68	50,54	48,61
	<b>dpw</b>	kPa	90,1	79,3	75,0	68,8	61,2	56,7	81,6	71,8	67,9	62,1	55,1	51,0
8	<b>Pf</b>	kW	336,8	316,0	307,2	294,2	277,3	267,0	368,0	345,2	335,5	321,0	302,1	290,5
	<b>Pa</b>	kW	80,9	89,3	93,0	98,8	106,7	111,6	85,8	94,6	98,4	104,4	112,7	117,9
	<b>qw</b>	m <sup>3</sup> /h	57,83	54,25	52,75	50,50	47,61	45,84	63,17	59,26	57,60	55,11	51,87	49,87
	<b>dpw</b>	kPa	95,1	83,7	79,1	72,5	64,4	59,7	86,1	75,7	71,6	65,5	58,0	53,6
9	<b>Pf</b>	kW	345,7	324,2	315,3	301,8	284,4	273,8	377,7	354,1	344,2	329,3	309,8	297,8
	<b>Pa</b>	kW	81,6	90,0	93,7	99,5	107,5	112,4	86,4	95,3	99,1	105,2	113,6	118,8
	<b>qw</b>	m <sup>3</sup> /h	59,39	55,70	54,15	51,85	48,86	47,04	64,88	60,83	59,13	56,57	53,22	51,16
	<b>dpw</b>	kPa	100,3	88,2	83,4	76,4	67,9	62,9	90,8	79,8	75,4	69,0	61,1	56,5
10	<b>Pf</b>	kW	354,8	332,6	323,4	309,6	291,7	280,8	387,5	363,3	353,1	337,7	317,6	305,3
	<b>Pa</b>	kW	82,2	90,7	94,4	100,3	108,3	113,3	87,1	96,0	99,9	106,0	114,5	119,7
	<b>qw</b>	m <sup>3</sup> /h	61,04	57,23	55,65	53,28	50,19	48,31	66,68	62,50	60,75	58,11	54,65	52,53
	<b>dpw</b>	kPa	105,9	93,1	88,0	80,7	71,6	66,4	95,9	84,3	79,6	72,8	64,4	59,5

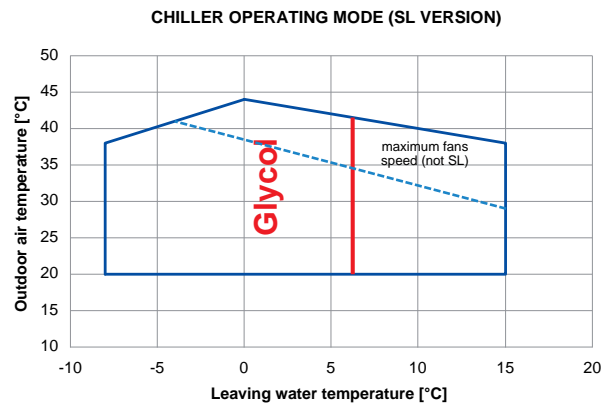
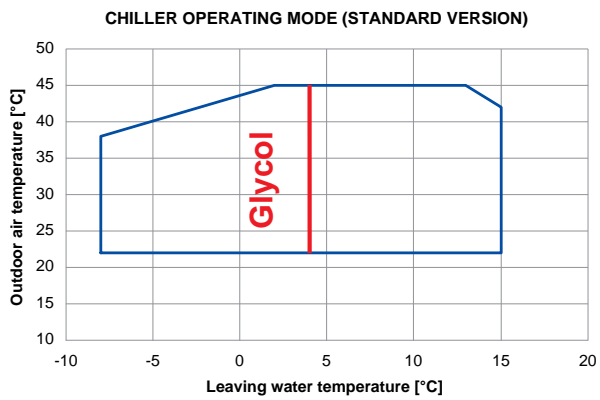
**Twout** = Leaving water temperature (°C) ; **Pf** = Cooling capacity (kW); **Pa** = Compressors power input (kW); **qw** = Water flow (m<sup>3</sup>/h)  
**dpw** = Pressure drop (kPa).

# Operating range

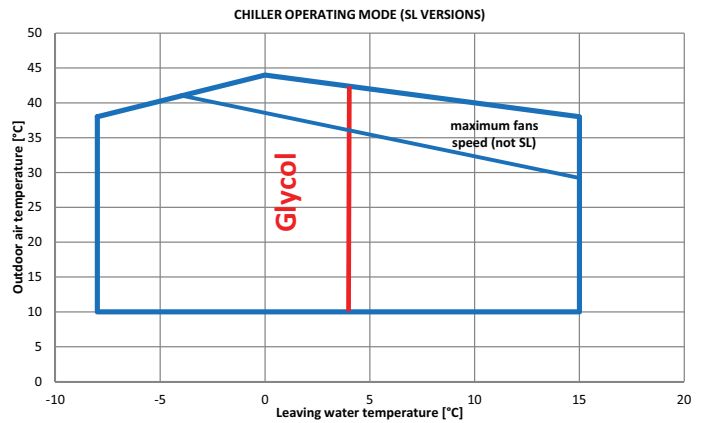
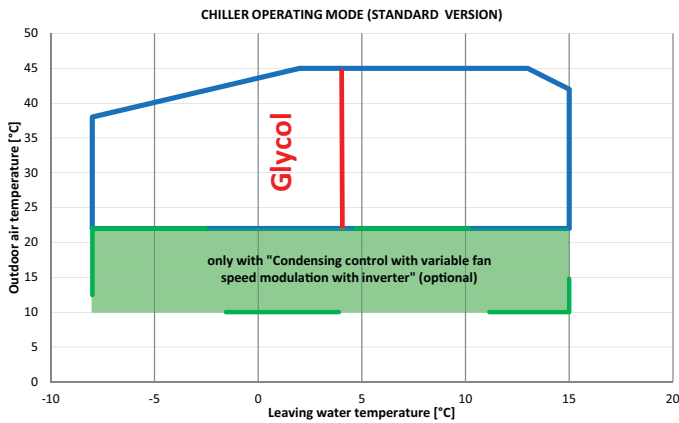
Version	Operating mode	Ta		Tw out	
		Min	Max	Min	Max
Standard version	Cooling	22	45	-8	15
Super low noise version	Cooling	20	44	-8	15

Ta = Outdoor air temperature (°C)

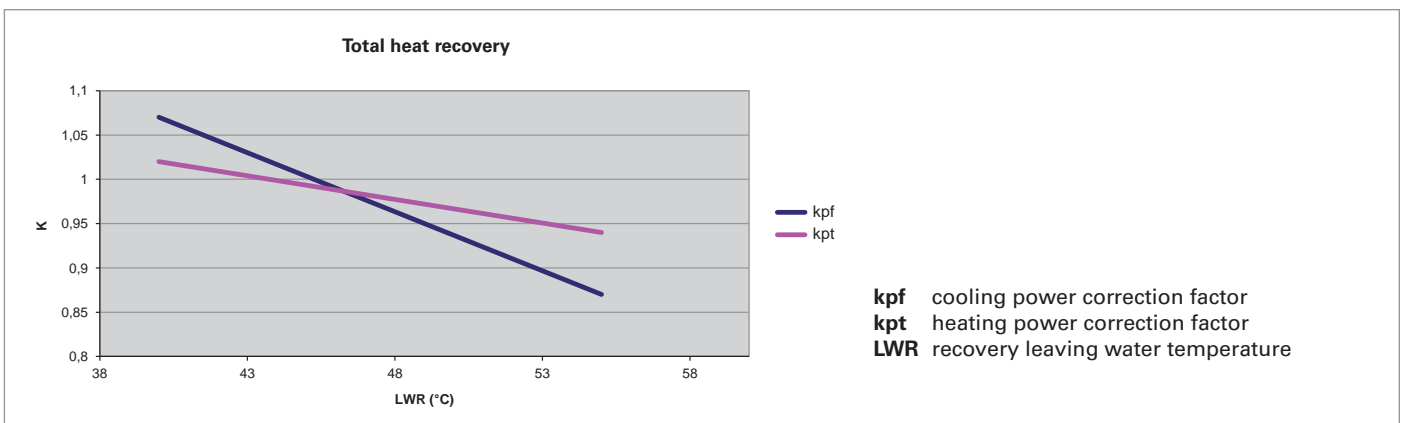
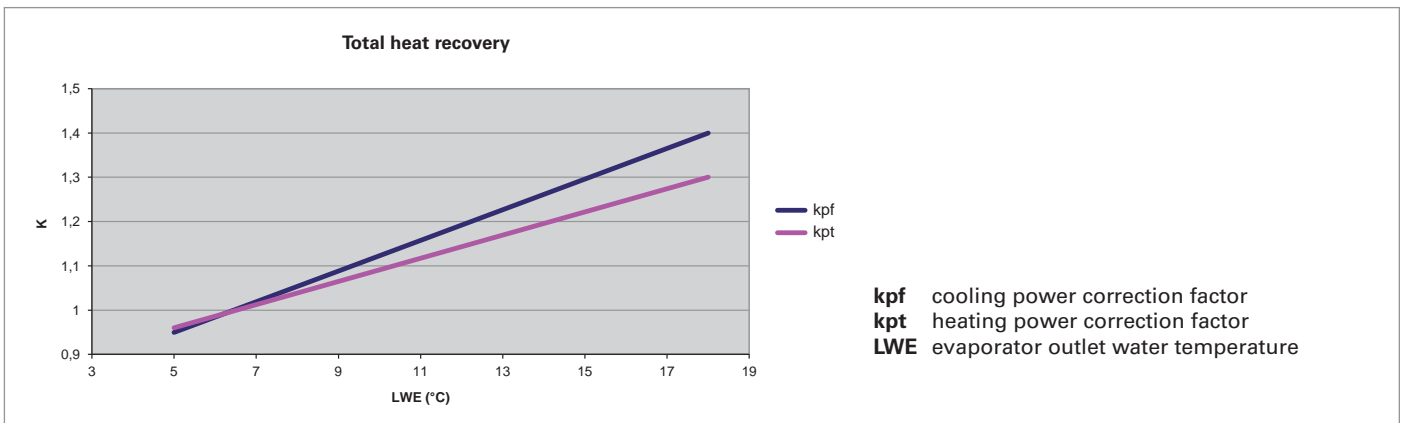
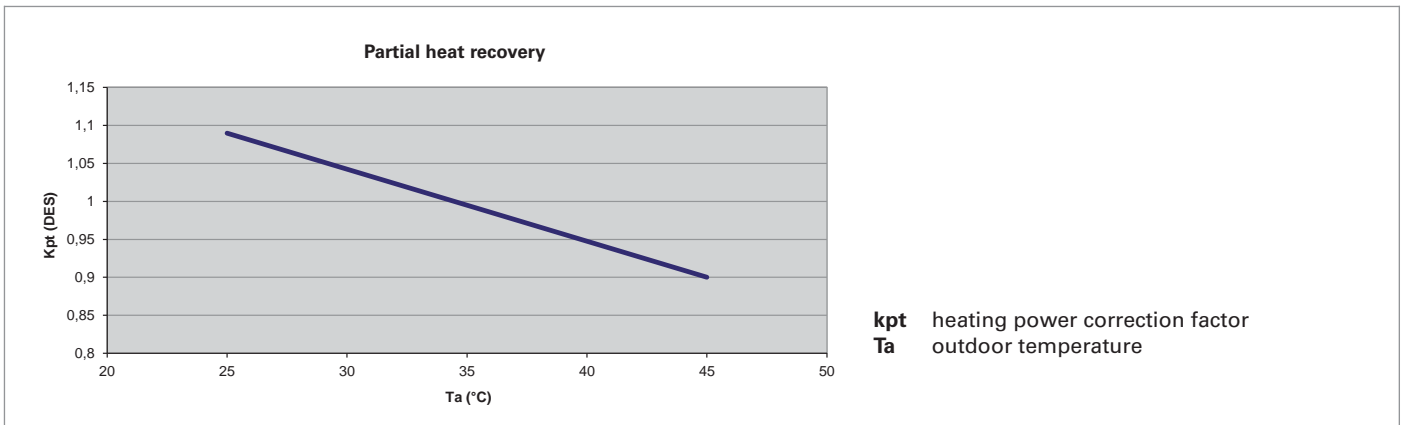
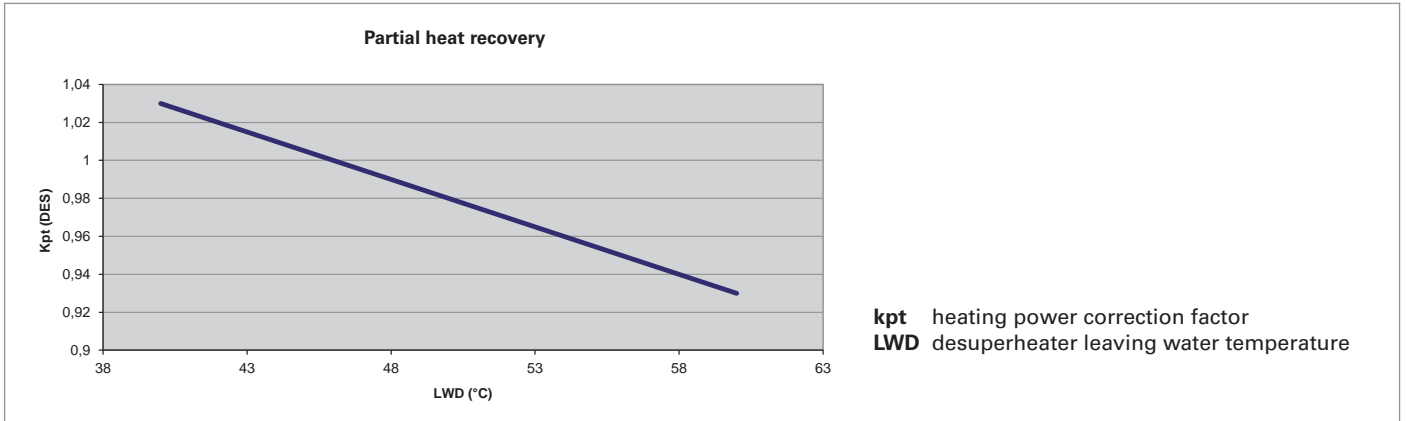
Tw out = Leaving water temperature (°C)



## Units with optional condensing control with variable fan speed modulation



# Power correction factors



# Scaling correction

## ETHYLENE GLYCOL CORRECTION

% Ethylene glycol weight		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2	-3,9	-6,5	-8,9	-11,8	-15,6	-19	-23,4
Suggested security limit	°C	3	1	-1	-4	-6	-10	-14	-19
Cooling capacity coefficient	-	0,995	0,99	0,985	0,981	0,977	0,974	0,971	0,968
Power input coefficient	-	0,997	0,993	0,99	0,988	0,986	0,984	0,982	0,981
Flow rate coefficient	-	1,003	1,01	1,02	1,033	1,05	1,072	1,095	1,124
Pressure drop coefficient	-	1,029	1,06	1,09	1,118	1,149	1,182	1,211	1,243

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

## GLYCOL PERCENTAGE DEPENDING ON FREEZING TEMPERATURE

% glycol according to the freezing temperature						
Freezing temperature	0°C	-5°C	-10°C	-15°C	-20°C	-25°C
% Ethylene glycol	5%	12%	20%	28%	35%	40%
Flow rate coefficient	1,02	1,033	1,05	1,072	1,095	1,124

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

## SCALING CORRECTION TABLE

Fouling Factor F.F. [m <sup>2</sup> °C*W]	Plant side cold heat exchanger			Plant side hot heat exchanger <sup>(1)</sup>		
	A1	B1	Tmin	A2	B2	Tmax
0	1	1	0	1	1	0
1,80E-05	1	1	0	1	1	0
4,40E-05	1	1	0	0,99	1,03	1
8,80E-05	0,96	0,99	0,7	0,98	1,04	1,5
1,32E-04	0,94	0,99	1	0,96	1,05	2,3
1,72E-04	0,93	0,98	1,5	0,95	1,06	3

A factor = Capacity correction factor

B factor = Compressor power input correction factor

Tmin = Minimum evaporator outlet water temperature increase

T max = Maximum condenser outlet water temperature decrease

<sup>(1)</sup> Only for recovery versions



# Hydraulic data

## WATER FLOW

Size	Acoustic version	Energetic Version	Cooling mode				Heating mode				Partial recovery			
			V [m <sup>3</sup> ]	K	Q min [m <sup>3</sup> /h]	Q max [m <sup>3</sup> /h]	V [m <sup>3</sup> ]	K	Q min [m <sup>3</sup> /h]	Q max [m <sup>3</sup> /h]	V [m <sup>3</sup> ]	K	Q min [m <sup>3</sup> /h]	Q max [m <sup>3</sup> /h]
012			0,4	897,8	4,7	8,7	-	-	-	-	-	-	-	-
015			0,4	694,7	5,3	9,9	-	-	-	-	-	-	-	-
016			0,5	507,8	6,1	11,4	-	-	-	-	-	-	-	-
020			0,6	374,1	7,9	14,7	-	-	-	-	-	-	-	-
025			0,8	244,6	9,6	17,8	-	-	-	-	-	-	-	-
033			1,0	185,3	12,5	23,2	-	-	-	-	-	-	-	-
035			1,1	128,4	13,9	25,9	-	-	-	-	-	-	-	-
040			1,2	126,6	15,0	27,9	-	-	-	-	-	-	-	-
045			1,3	104,0	16,5	30,7	-	-	-	-	-	-	-	-
050			1,5	56,0	19,2	35,8	-	-	-	-	-	-	-	-
055			1,6	55,1	20,1	37,5	-	-	-	-	-	-	-	-
065			2,0	35,3	25,2	46,9	-	-	-	-	-	-	-	-
080			2,5	28,3	31,1	57,8	-	-	-	-	-	-	-	-
090			2,7	21,5	33,9	63,1	-	-	-	-	-	-	-	-
012	SL		0,4	897,8	4,6	8,6	-	-	-	-	-	-	-	-
015	SL		0,4	694,7	5,3	9,9	-	-	-	-	-	-	-	-
016	SL		0,5	507,8	6,1	11,3	-	-	-	-	-	-	-	-
020	SL		0,6	374,1	7,8	14,5	-	-	-	-	-	-	-	-
025	SL		0,8	244,6	9,5	17,7	-	-	-	-	-	-	-	-
033	SL		1,0	185,3	12,4	23,1	-	-	-	-	-	-	-	-
035	SL		1,1	128,4	13,8	25,7	-	-	-	-	-	-	-	-
040	SL		1,2	126,6	14,9	27,7	-	-	-	-	-	-	-	-
045	SL		1,3	104,0	16,4	30,5	-	-	-	-	-	-	-	-
050	SL		1,5	56,0	19,1	35,5	-	-	-	-	-	-	-	-
055	SL		1,6	55,1	20,0	37,2	-	-	-	-	-	-	-	-
065	SL		2,0	35,3	25,0	46,5	-	-	-	-	-	-	-	-
080	SL		2,5	28,3	30,8	57,3	-	-	-	-	-	-	-	-
090	SL		2,7	21,5	33,6	62,6	-	-	-	-	-	-	-	-
012		D	0,4	897,8	4,7	8,7	-	-	-	-	0,1	5462,0	-	2,5
015		D	0,4	694,7	5,3	9,9	-	-	-	-	0,1	3981,9	-	2,7
016		D	0,5	507,8	6,1	11,4	-	-	-	-	0,1	3197,3	-	3,2
020		D	0,6	374,1	7,9	14,7	-	-	-	-	0,2	2017,3	-	4,1
025		D	0,8	244,6	9,6	17,8	-	-	-	-	0,2	1223,5	-	4,8
033		D	1,0	185,3	12,5	23,2	-	-	-	-	0,3	768,1	-	6,5
035		D	1,1	128,4	13,9	25,9	-	-	-	-	0,3	610,5	-	7,3
040		D	1,2	126,6	15,0	27,9	-	-	-	-	0,3	527,0	-	7,9
045		D	1,3	104,0	16,5	30,7	-	-	-	-	0,4	428,5	-	8,8
050		D	1,5	56,0	19,2	35,8	-	-	-	-	0,4	814,5	-	10,1
055		D	1,6	55,1	20,1	37,5	-	-	-	-	0,4	789,5	-	10,6
065		D	2,0	35,3	25,2	46,9	-	-	-	-	0,5	179,6	-	12,9
080		D	2,5	28,3	31,1	57,8	-	-	-	-	0,6	120,2	-	15,7
090		D	2,7	21,5	33,9	63,1	-	-	-	-	0,7	100,8	-	16,7
012	SL	D	0,4	897,8	4,6	8,6	-	-	-	-	0,1	5432,4	-	2,5
015	SL	D	0,4	694,7	5,3	9,9	-	-	-	-	0,1	4000,2	-	2,8
016	SL	D	0,5	507,8	6,1	11,3	-	-	-	-	0,1	3176,7	-	3,3
020	SL	D	0,6	374,1	7,8	14,5	-	-	-	-	0,2	2003,3	-	4,2
025	SL	D	0,8	244,6	9,5	17,7	-	-	-	-	0,2	1224,7	-	4,9
033	SL	D	1,0	185,3	12,4	23,1	-	-	-	-	0,3	759,1	-	6,7
035	SL	D	1,1	128,4	13,8	25,7	-	-	-	-	0,3	603,6	-	7,5
040	SL	D	1,2	126,6	14,9	27,7	-	-	-	-	0,3	520,5	-	8,1
045	SL	D	1,3	104,0	16,4	30,5	-	-	-	-	0,4	423,6	-	9,0
050	SL	D	1,5	56,0	19,1	35,5	-	-	-	-	0,4	305,5	-	10,4
055	SL	D	1,6	55,1	20,0	37,2	-	-	-	-	0,4	275,1	-	10,9
065	SL	D	2,0	35,3	25,0	46,5	-	-	-	-	0,5	178,7	-	13,2
080	SL	D	2,5	28,3	30,8	57,3	-	-	-	-	0,6	119,5	-	16,2
090	SL	D	2,7	21,5	33,6	62,6	-	-	-	-	0,7	100,6	-	17,2

## Hydraulic data

Size	Acoustic version	Energetic Version	Cooling mode				Heating mode				Partial recovery			
			V [m <sup>3</sup> ]	K	Q min [m <sup>3</sup> /h]	Q max [m <sup>3</sup> /h]	V [m <sup>3</sup> ]	K	Q min [m <sup>3</sup> /h]	Q max [m <sup>3</sup> /h]	V [m <sup>3</sup> ]	K	Q min [m <sup>3</sup> /h]	Q max [m <sup>3</sup> /h]
012		R	0,5	897,8	6,0	11,1	1,7	924,8	7,4	19,6	-	-	-	-
015		R	0,5	694,7	6,8	12,7	1,9	718,6	8,5	22,6	-	-	-	-
016		R	0,6	507,8	8,0	14,9	2,2	523,0	9,7	26,0	-	-	-	-
020		R	0,8	374,1	10,4	19,4	2,9	386,0	12,7	33,8	-	-	-	-
025		R	1,0	244,6	12,0	22,4	3,4	253,8	14,8	39,6	-	-	-	-
033		R	1,3	185,3	16,3	30,4	4,6	190,5	20,0	53,3	-	-	-	-
035		R	1,4	128,4	18,1	33,6	5,1	133,0	22,1	59,1	-	-	-	-
040		R	1,6	126,6	19,7	36,6	5,5	130,2	24,2	64,5	-	-	-	-
045		R	1,7	104,0	21,6	40,2	6,1	107,2	26,7	71,1	-	-	-	-
050		R	2,0	56,0	24,7	46,0	7,0	57,4	30,4	81,1	-	-	-	-
055		R	2,1	55,1	26,3	49,0	7,4	56,7	32,4	86,3	-	-	-	-
065		R	2,6	35,3	31,9	59,4	9,0	36,4	39,6	105,5	-	-	-	-
080		R	3,1	28,3	39,3	73,2	11,1	29,1	48,5	129,3	-	-	-	-
090		R	3,4	21,5	42,0	78,2	11,8	22,2	51,6	137,6	-	-	-	-
012	SL	R	0,5	897,8	6,0	11,1	1,7	924,8	7,4	19,6	-	-	-	-
015	SL	R	0,5	694,7	6,8	12,7	1,9	718,6	8,5	22,6	-	-	-	-
016	SL	R	0,6	507,8	8,0	14,9	2,2	523,0	9,7	26,0	-	-	-	-
020	SL	R	0,8	374,1	10,4	19,4	2,9	386,0	12,7	33,8	-	-	-	-
025	SL	R	1,0	244,6	12,0	22,4	3,4	253,8	14,8	39,6	-	-	-	-
033	SL	R	1,3	185,3	16,3	30,4	4,6	190,5	20,0	53,3	-	-	-	-
035	SL	R	1,4	128,4	18,1	33,6	5,1	133,0	22,1	59,1	-	-	-	-
040	SL	R	1,6	126,6	19,7	36,6	5,5	130,2	24,2	64,5	-	-	-	-
045	SL	R	1,7	104,0	21,6	40,2	6,1	107,2	26,7	71,1	-	-	-	-
050	SL	R	2,0	56,0	24,7	46,0	7,0	57,4	30,4	81,1	-	-	-	-
055	SL	R	2,1	55,1	26,3	49,0	7,4	56,7	32,4	86,3	-	-	-	-
065	SL	R	2,6	35,3	31,9	59,4	9,0	36,4	39,6	105,5	-	-	-	-
080	SL	R	3,1	28,3	39,3	73,2	11,1	29,1	48,5	129,3	-	-	-	-
090	SL	R	3,4	21,5	42,0	78,2	11,8	22,2	51,6	137,6	-	-	-	-

**V:** recommended water content of the plant with dT 5°C on the heat exchanger

**Q min:** minimum water flow to the heat exchanger

**Q max:** maximum water flow to the heat exchanger

**dpw =  $K \cdot Q^2 / 1000$**

**Q = 0,86 P / ΔT**

**P:** Heating or cooling capacity [kW]

**Δt:** ΔT at the heat exchanger (min = 3, max = 8) [°C]

**Δt:** ΔT at the desuperheater = 4°C

**dpw:** Pressure drop [kPa]

The units are also available in multiple hydraulic versions, characterized by complete kits of all major hydraulic components for an easier installation, with reduced time, cost and space.

The wide range of hydraulic versions available make the unit suitable for any type of installation.

## HYDRAULIC VERSIONS

**B1/M1/A1:** One pump and expansion vessel

**B2/M2/A2:** Two pumps and expansion vessels

## PUMPS KIT

Normalized and Monoblock centrifugal electropumps conforming to EN 733 (EX DIN 24255).

Hydraulic part with single centrifugal impeller, casing with flanges, axial suction and radial discharge.

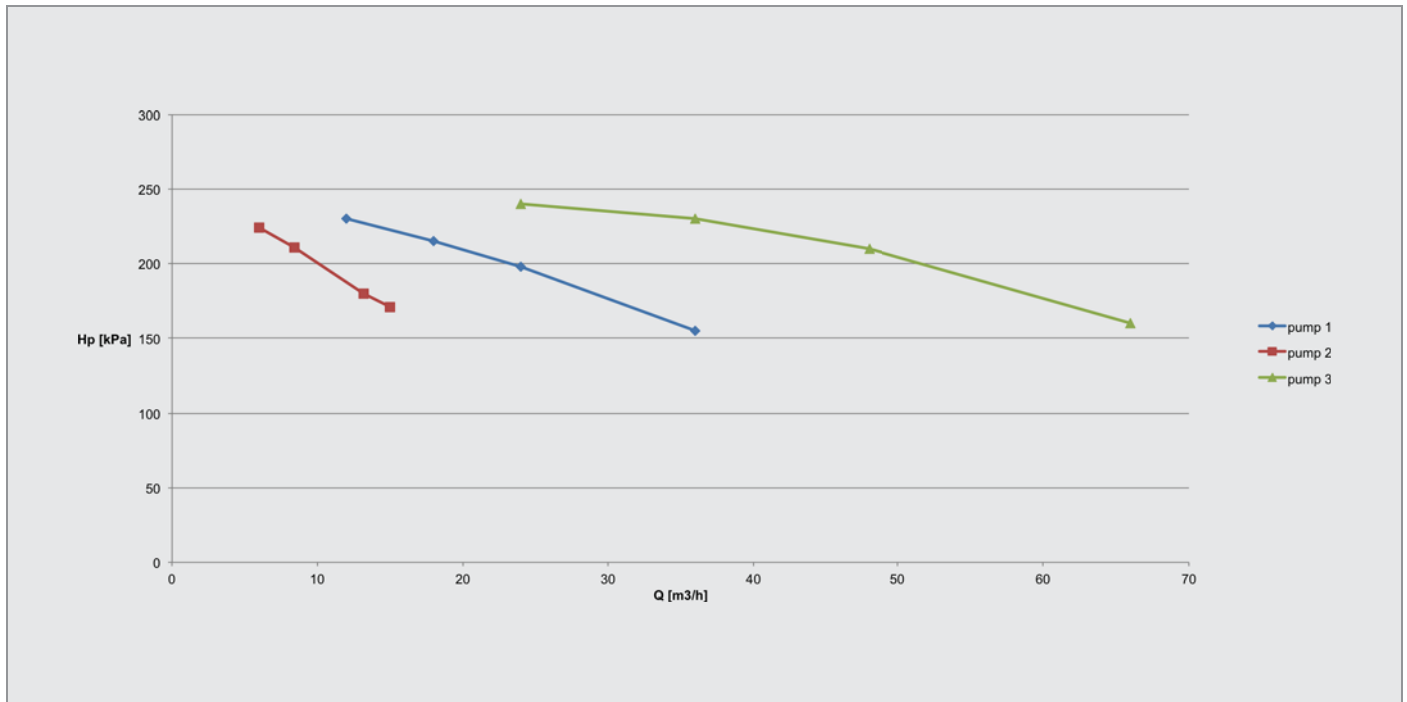
Motor coupled to the pump by rigid coupling, insulating category F, protection index IP55.

## HYDRONIC ACCESORIES ON REQUEST

- Water pumps automatic changeover for 2 pumps hydraulic kits, which also includes the secondary pump pressure switch.
- "Y" water strainer (sold separately), consists of body and stainless steel mesh, with replaceable filter through the inspection cap.
- Automatic water filling (sold separately).

## Hydraulic data

### LOW HEAD PRESSURE PUMP (150 kPa)



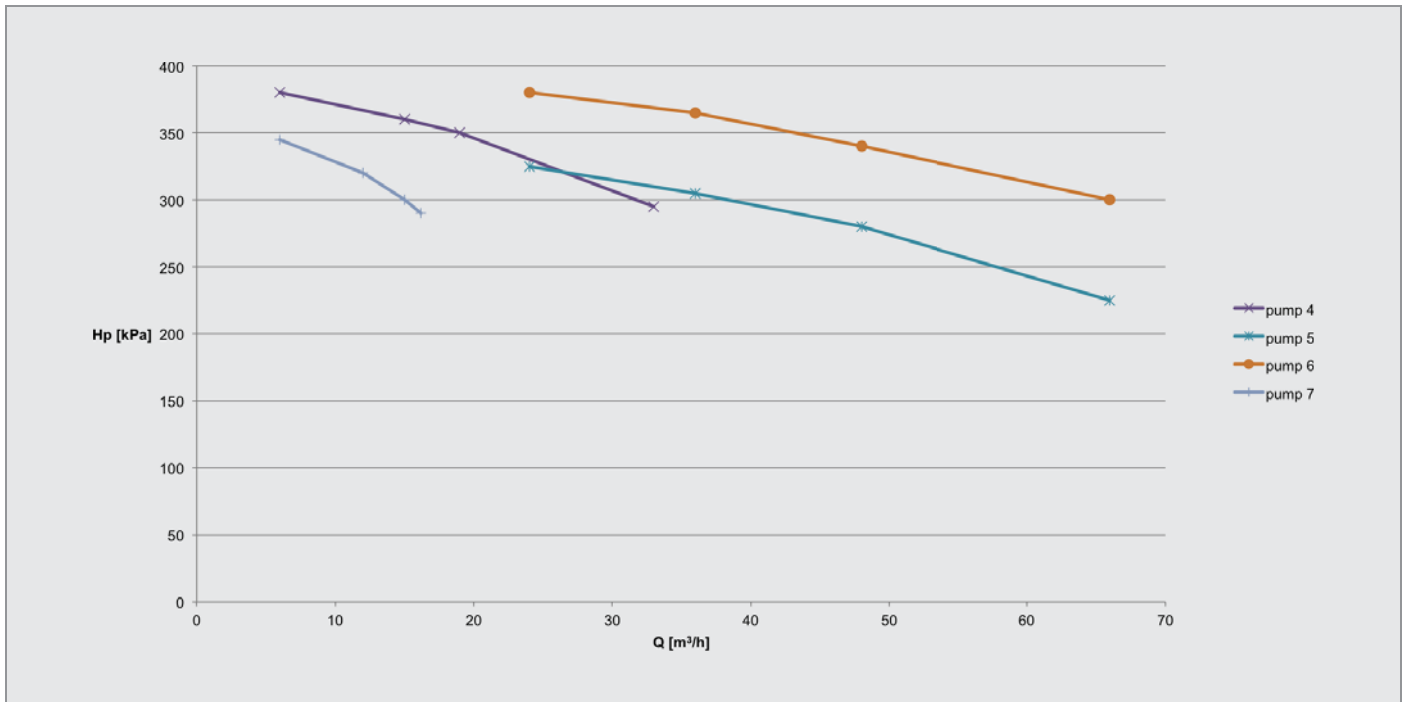
Model	Pf [kW]	qw [m³/h]	dpw [kPa]	Ref. curve	Expansion vessel [l]	F.L.I. [kW]	F.L.A. [A]	Hp [kPa]	Hu [kPa]
012	43,5	7,5	50	pump 3	5	1,1	3,2	217	167
015	49,7	8,5	51	pump 3	5	1,1	3,2	210	159
016	57,1	9,8	49	pump 3	5	1,1	3,2	202,0	153
020	73,3	12,6	59	pump 1	5	2,2	4,8	229,0	170
025	89,2	15,3	58	pump 1	5	2,2	4,8	222,0	164,5
033	116,2	19,9	74	pump 1	5	2,2	4,8	210,0	136,0
035	129,6	22,2	64	pump 1	5	2,2	4,8	203,0	139,2
040	139,5	23,9	73	pump 1	5	2,2	4,8	198,0	125,1
045	153,5	26,3	73	pump 1	12	2,2	4,8	191,0	118,5
050	178,9	30,7	53	pump 1	12	2,2	4,8	176,0	123,0
055	187,4	32,2	57	pump 2	12	4	8,9	234,0	176,7
065	234,3	40,2	57	pump 2	12	4	8,9	224,0	166,7
080	288,9	49,6	70	pump 2	12	4	8,9	207,0	137,1
090	315,4	54,1	63	pump 2	12	4	8,9	196,0	132,8

**Pf** Cooling capacity (kW)  
**qw** Water flow (m³/h)  
**dpw** Pressure drop (kPa)

**F.L.I.** Full load electrical power  
**F.L.A.** Full load operating current  
**Hp** Pump head pressure  
**Hu** Available pressure

## Hydraulic data

### MEDIUM HEAD PRESSURE PUMP (250 kPa)



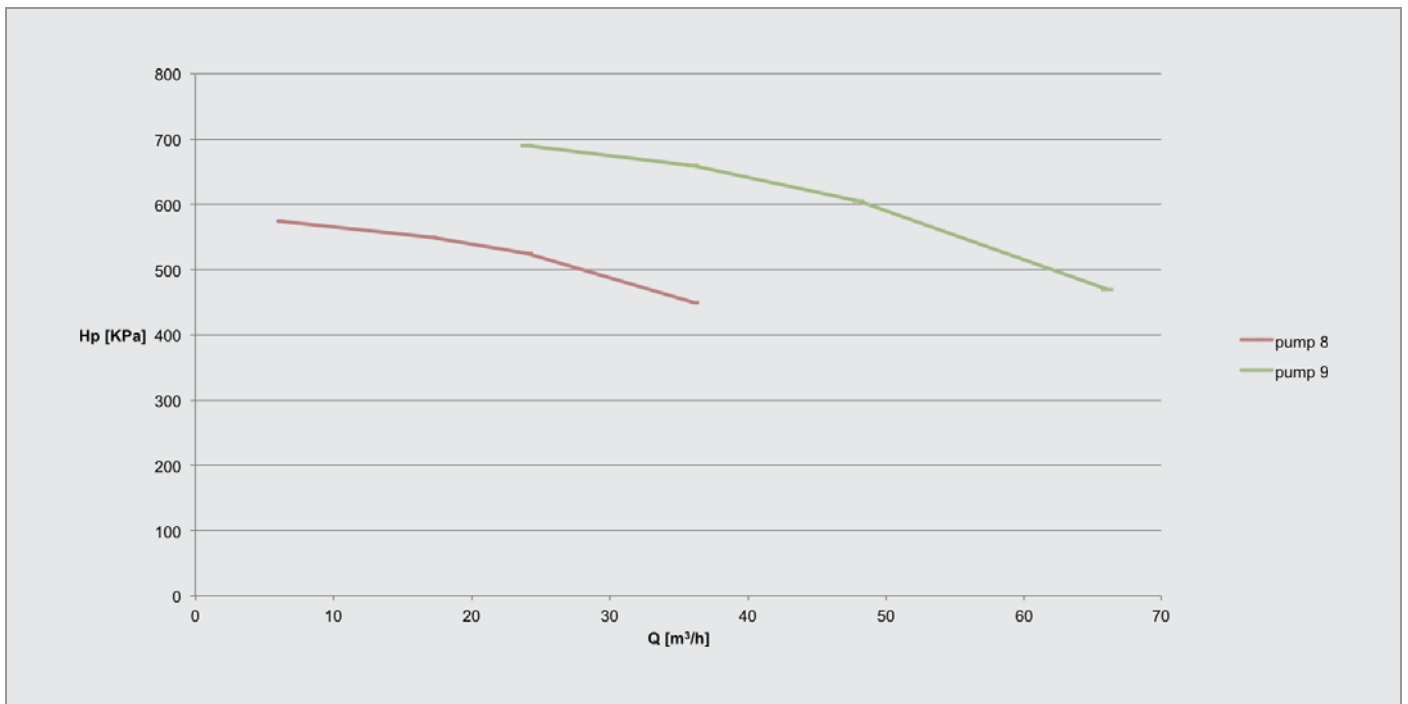
Model	Pf [kW]	qw [m³/h]	dpw [kPa]	Ref. curve	Expansion vessel [l]	F.L.I. [kW]	F.L.A. [A]	Hp [kPa]	Hu [kPa]
012	43,5	7,5	50	pump 7	5	2,2	5	340,0	290
015	49,7	8,5	51	pump 7	5	2,2	5	336,0	285
016	57,1	9,8	49	pump 7	5	2,2	5	331,0	282
020	73,3	12,6	59	pump 4	5	4	9,8	366,0	307
025	89,2	15,3	58	pump 4	5	4	9,8	359,0	301,5
033	116,2	19,9	74	pump 4	5	4	9,8	347,0	273,0
035	129,6	22,2	64	pump 4	5	4	9,8	341,0	277,2
040	139,5	23,9	73	pump 4	5	4	9,8	335,0	262,1
045	153,5	26,3	73	pump 4	12	4	9,8	326,0	253,5
050	178,9	30,7	53	pump 4	12	4	9,8	307,0	254,0
055	187,4	32,2	57	pump 5	12	5,5	11,8	312,0	254,7
065	234,3	40,2	57	pump 6	12	7,5	15	356,0	298,7
080	288,9	49,6	70	pump 6	12	7,5	15	337,0	267,1
090	315,4	54,1	63	pump 6	12	7,5	15	330,0	266,8

**Pf** Cooling capacity (kW)  
**qw** Water flow (m³/h)  
**dpw** Pressure drop (kPa)

**F.L.I.** Full load electrical power  
**F.L.A.** Full load operating current  
**Hp** Pump head pressure  
**Hu** Available pressure

## Hydraulic data

### HIGH HEAD PRESSURE PUMP (450 kPa)



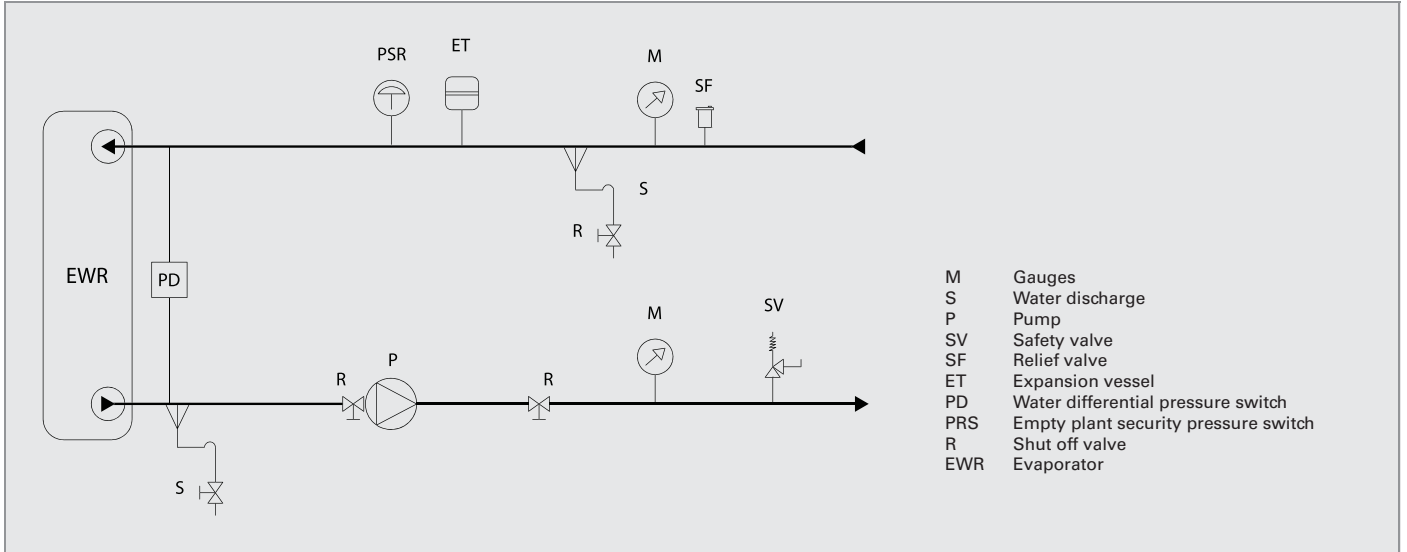
Model	Pf [kW]	qw [m³/h]	dpw [kPa]	Ref. curve	Expansion vessel [l]	F.L.I. [kW]	F.L.A. [A]	Hp [kPa]	Hu [kPa]
012	-	-	-	-	-	-	-	-	-
015	-	-	-	-	-	-	-	-	-
016	-	-	-	-	-	-	-	-	-
020	-	-	-	-	-	-	-	-	-
025	-	-	-	-	-	-	-	-	-
033	-	-	-	-	-	-	-	-	-
035	-	-	-	-	-	-	-	-	-
040	139,5	23,9	73	pump 8	5	7,5	15,5	525,0	452,1
045	153,5	26,3	73	pump 8	12	7,5	15,5	514,0	441,5
050	178,9	30,7	53	pump 8	12	7,5	15,5	489,0	436,0
055	187,4	32,2	57	pump 8	12	7,5	15,5	480,0	422,7
065	234,3	40,2	57	pump 9	12	11	22	644,0	586,7
080	288,9	49,6	70	pump 9	12	15	29,7	596,0	526,1
090	315,4	54,1	63	pump 9	12	15	29,7	567,0	503,8

**Pf** Cooling capacity (kW)  
**qw** Water flow (m³/h)  
**dpw** Pressure drop (kPa)

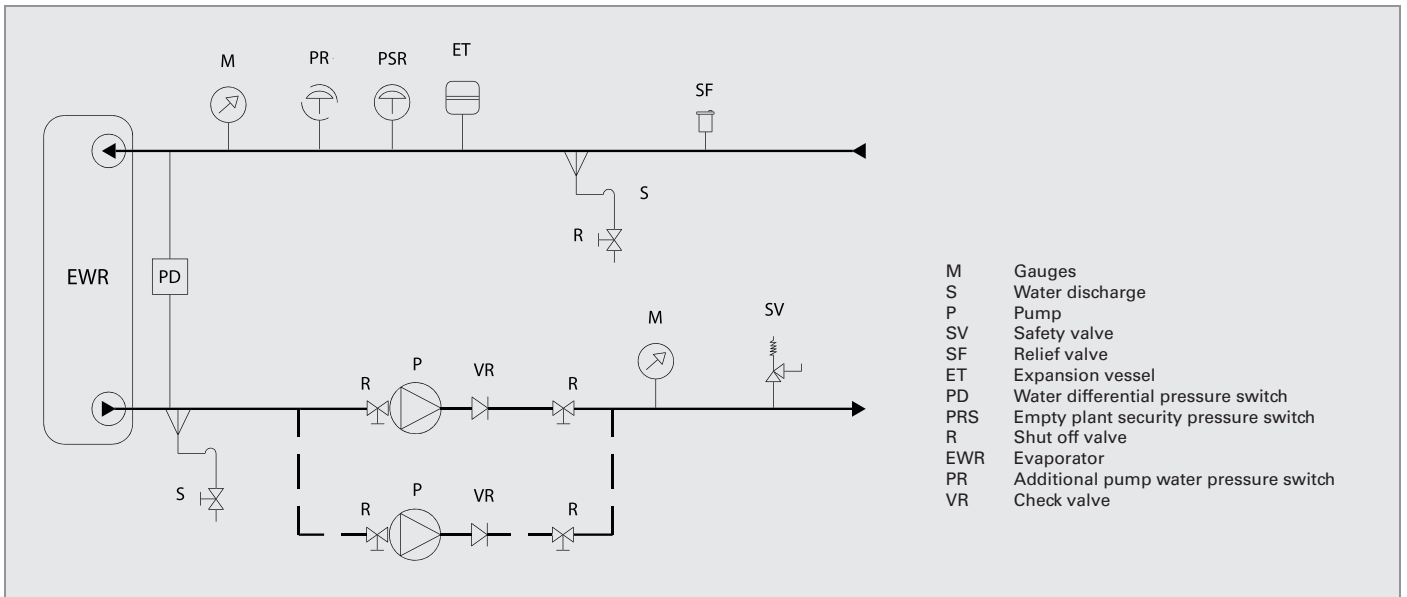
**F.L.I.** Full load electrical power  
**F.L.A.** Full load operating current  
**Hp** Pump head pressure  
**Hu** Available pressure

## Hydraulic data

### Hydronic kit with 1 pump - B1/M1/A1 versions



### Hydronic kit with 2 pumps - B2/M2/A2 versions



# Electrical data

## Standard version

Model	NOMINAL VALUES									MAXIMUM VALUES (1)		
	Outdoor air temperature 35°C, evaporator water temperature in/out 12/7°C											
	Compressors (2)			Fan motors			TOTAL			TOTAL		
	F.L.I.	F.L.A.	L.R.A.	E.P.	O.C.	F.L.I.	F.L.A.	S.A.	F.L.I.	F.L.A.	S.A.	
kW	A	A	kW	A	kW	A	A	kW	A	A		
012	14,5	26,8	142,0	3,1	6,4	17,6	33,2	160,8	29,9	53,4	170,4	
015	17,3	31,1	147,0	3,1	6,4	20,3	37,5	165,8	32,8	58,4	175,4	
016	18,6	34,9	147,0	3,1	6,4	21,7	41,3	169,7	36,8	65,4	182,4	
020	24,5	45,1	170,0	3,1	6,4	27,6	51,5	196,2	44,8	79,4	211,4	
025	30,6	57,0	215,0	5,6	10,4	36,2	67,4	250,6	56,5	99,4	263,4	
033	38,8	68,4	260,0	5,6	10,4	44,4	78,8	302,2	70,2	123,4	321,4	
035	44,4	77,3	320,0	5,6	10,4	50,0	87,7	362,2	79,9	140,4	381,4	
040	47,6	82,1	320,0	8,5	15,6	56,1	97,7	372,2	89,0	156,6	397,6	
045	53,9	91,0	320,0	8,5	15,6	62,3	106,6	381,1	98,7	173,6	414,6	
050	60,1	103,0	413,0	8,5	15,6	68,5	118,6	474,1	105,0	184,6	507,6	
055	64,4	109,9	260,0	11,3	20,8	75,7	130,7	354,0	117,6	206,8	404,8	
065	81,3	136,6	320,0	14,1	26,0	95,4	162,6	437,1	149,5	263,0	504,0	
080	97,0	164,3	320,0	14,1	26,0	111,1	190,3	464,8	175,2	308,0	549,0	
090	102,6	182,1	320,0	14,1	26,0	116,7	208,1	482,6	194,7	342,0	583,0	

## Super low noise version

Model	NOMINAL VALUES									MAXIMUM VALUES (1)		
	Outdoor air temperature 35°C, evaporator water temperature in/out 12/7°C											
	Compressors (2)			Fan motors			TOTAL			TOTAL		
	F.L.I.	F.L.A.	L.R.A.	E.P.	O.C.	F.L.I.	F.L.A.	S.A.	F.L.I.	F.L.A.	S.A.	
kW	A	A	kW	A	kW	A	A	kW	A	A		
012	14,7	27,0	142,0	2,2	4,5	16,8	31,5	159,0	29,9	53,4	170,4	
015	17,4	31,3	147,0	2,2	4,5	19,6	35,8	164,0	32,8	58,4	175,4	
016	18,8	35,2	147,0	2,2	4,5	21,0	39,7	167,9	36,8	65,4	182,4	
020	24,8	45,4	170,0	2,2	4,5	27,0	49,9	194,5	44,8	79,4	211,4	
025	30,9	57,5	215,0	3,9	7,3	34,9	64,7	247,7	56,5	99,4	263,4	
033	39,2	69,0	260,0	3,9	7,3	43,2	76,3	299,3	70,2	123,4	321,4	
035	44,8	78,0	320,0	3,9	7,3	48,8	85,3	359,3	79,9	140,4	381,4	
040	48,1	82,8	320,0	5,9	10,9	54,0	93,7	367,8	89,0	156,6	397,6	
045	54,4	91,8	320,0	5,9	10,9	60,4	102,7	376,8	98,7	173,6	414,6	
050	60,7	103,8	413,0	5,9	10,9	66,6	114,7	469,8	105,0	184,6	507,6	
055	65,1	110,8	260,0	7,9	14,6	72,9	125,3	348,4	117,6	206,8	404,8	
065	82,2	137,7	320,0	9,9	18,2	92,0	155,9	430,0	149,5	263,0	504,0	
080	98,0	165,7	320,0	9,9	18,2	107,9	183,9	458,0	175,2	308,0	549,0	
090	103,6	183,7	320,0	9,9	18,2	113,5	201,9	476,0	194,7	342,0	583,0	

Electrical data referred to 400V - 3PH+N-50Hz: Maximum operating admitted conditions: 10%; Maximum phase unbalance: 3%.

**FLI** Full load power input at the conditions of the selection.

**FLA** Full load current at the conditions of the selection.

**SA** Inrush current (sum of LRA of the biggest compressor, current of the other compressors, total current of the fans).

**LRA** Locked rotor amperes for the biggest compressor.

**FLI<sub>max</sub>** Full load power input at the worst conditions for compressors and fans (at the limit of the unit envelope).

**FLA<sub>max</sub>** Full load current at the worst conditions for compressors and fans (at the limit of the unit envelope).

**Samax** Inrush current (sum of LRA of the biggest compressor, current of the other compressors calculated at the worst conditions, total current of the fans).

(1) maximum operating admitted conditions by the compressors manufacturer.

(2) data referred to biggest compressor for units with different compressors.

# Acoustic data

## Standard version

Model	Octave bands (Hz)								Lw dB(A)
	63	125	250	500	1000	2000	4000	8000	
Sound pressure level (dB)									
012	67,8	63,8	59,2	55,0	52,6	67,8	50,3	39,3	90,1
015	67,8	63,8	59,2	55,0	52,6	67,8	50,3	39,3	90,1
016	67,8	63,8	59,2	55,0	52,6	67,8	50,3	39,3	90,2
020	67,8	63,8	59,2	55,0	52,6	67,8	50,3	39,3	90,2
025	68,5	64,5	59,9	55,7	53,3	68,5	51,0	40,0	91,0
033	70,0	66,0	61,4	57,2	54,8	70,0	52,5	41,5	92,5
035	70,0	66,0	61,4	57,2	54,8	70,0	52,5	41,5	92,5
040	70,1	66,1	61,5	57,3	54,9	70,1	52,6	41,6	92,7
045	70,2	66,2	61,6	57,4	55,0	70,2	52,7	41,7	92,8
050	70,1	66,1	61,5	57,3	54,9	70,1	52,6	41,6	92,8
055	71,2	67,2	62,6	58,4	56,0	71,2	53,7	42,7	94,0
065	71,4	67,4	62,8	58,6	56,2	71,4	53,9	42,9	94,3
080	71,4	67,4	62,8	58,6	56,2	71,4	53,9	42,9	94,3
090	71,4	67,4	62,8	58,6	56,2	71,4	53,9	42,9	94,3

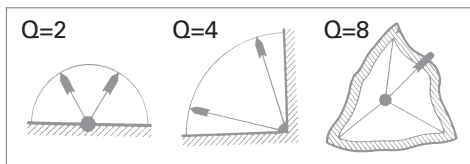
## Super low noise version

Model	Octave bands (Hz)								Lw dB(A)
	63	125	250	500	1000	2000	4000	8000	
Sound pressure level (dB)									
012	62,8	58,8	54,2	50,0	47,6	62,8	45,3	34,3	85,1
015	62,8	58,8	54,2	50,0	47,6	62,8	45,3	34,3	85,1
016	62,8	58,8	54,2	50,0	47,6	62,8	45,3	34,3	85,2
020	62,8	58,8	54,2	50,0	47,6	62,8	45,3	34,3	85,2
025	63,5	59,5	54,9	50,7	48,3	63,5	46,0	35,0	86,0
033	65,0	61,0	56,4	52,2	49,8	65,0	47,5	36,5	87,5
035	65,0	61,0	56,4	52,2	49,8	65,0	47,5	36,5	87,5
040	65,1	61,1	56,5	52,3	49,9	65,1	47,6	36,6	87,7
045	65,2	61,2	56,6	52,4	50,0	65,2	47,7	36,7	87,8
050	65,1	61,1	56,5	52,3	49,9	65,1	47,6	36,6	87,8
055	66,2	62,2	57,6	53,4	51,0	66,2	48,7	37,7	89,0
065	66,4	62,4	57,8	53,6	51,2	66,4	48,9	37,9	89,3
080	66,4	62,4	57,8	53,6	51,2	66,4	48,9	37,9	89,3
090	66,4	62,4	57,8	53,6	51,2	66,4	48,9	37,9	89,3

**Operating conditions:** SL: evaporator water temp. in/out 12°/7°C - outdoor temp. 35°C.

**Testing point:** Average sound pressure levels calculated according to ISO 3744 at 10 mt distance from unit.

**Measurement conditions:** Free field on reflecting surface (Q factor Q=2).



- For units installed in the presence of 2 reflecting surfaces (Q factor Q=4) 3 dB have to be added at values above mentioned.
- For units installed in the presence of 3 reflecting surfaces (Q factor Q=8) 6 dB have to be added at values above mentioned.
- For units installed at a certain height from the ground, the sound energy coming out from the bottom of the unit leads an increase of the noise pressure level of around 3 dB.

Sound emission values in octave bands are shown just as an indication and they are not to be considered as a commitment.

Sound pressure values, according to ISO 3744 standards and in observance of EUROVENT certification program, are the only ones to be used for every calculation to make a prevision of the sound pressure level at the operating conditions.

The sound pressure level data are not binding. For a more precise value please refer to the sound power level.

NOTE: Table data are referred to the unit without B1/M1/A1, B2/M2/A2 setting up.



## Acoustic data

### NOISE CORRECTION FACTORS FOR HYDRAULIC VERSION

For the Hydraulic version please consider the sound pressure/sound power level increase due to the addition of the hydraulic group.

#### Standard version

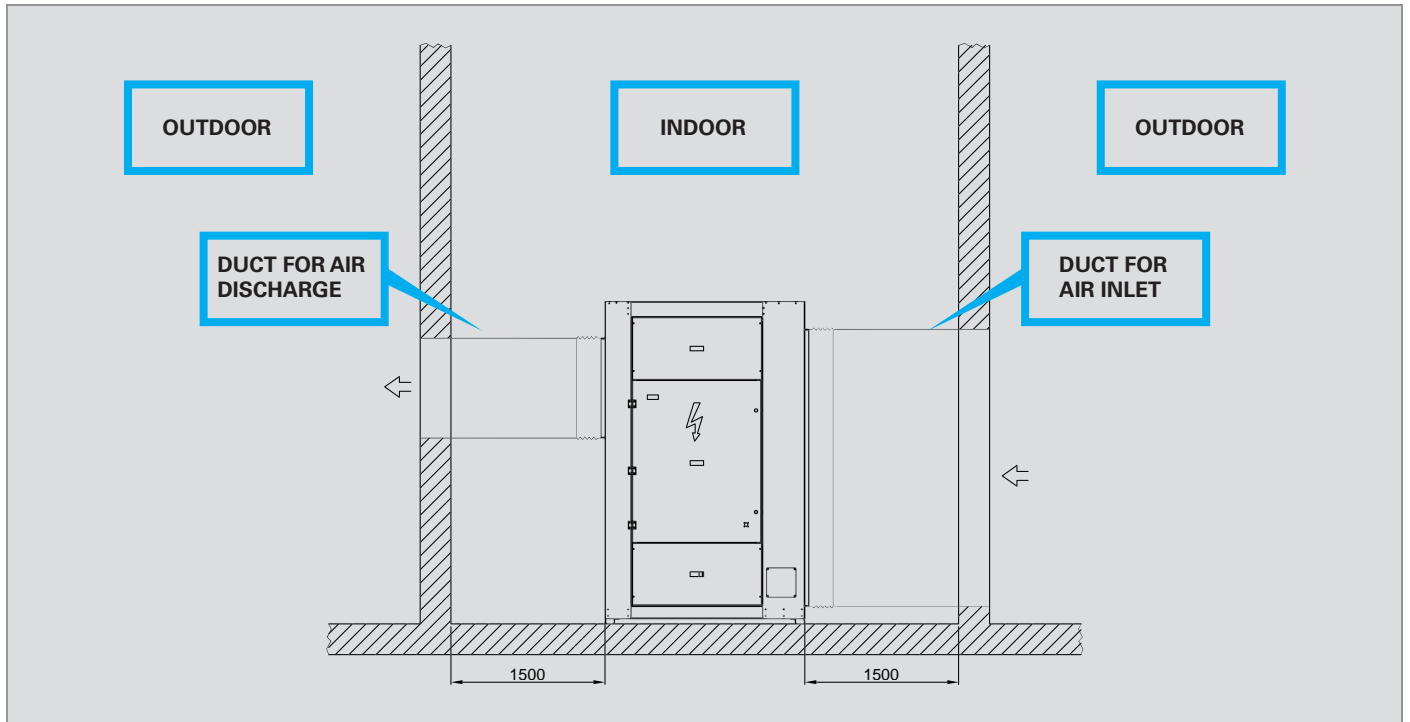
MODEL			012	015	016	020	025	033	035	040	045	050	055	065	080	090
Low head pressure	1 pump	[dB(A)]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2 pump	[dB(A)]	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Medium head pressure	1 pump	[dB(A)]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2 pump	[dB(A)]	1	1	0	1	1	0	0	0	0	0	1	1	1	1
High head pressure	1 pump	[dB(A)]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	1	1	2	2	2
	2 pump	[dB(A)]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2	2	2	2	3	3	3

#### Low noise version

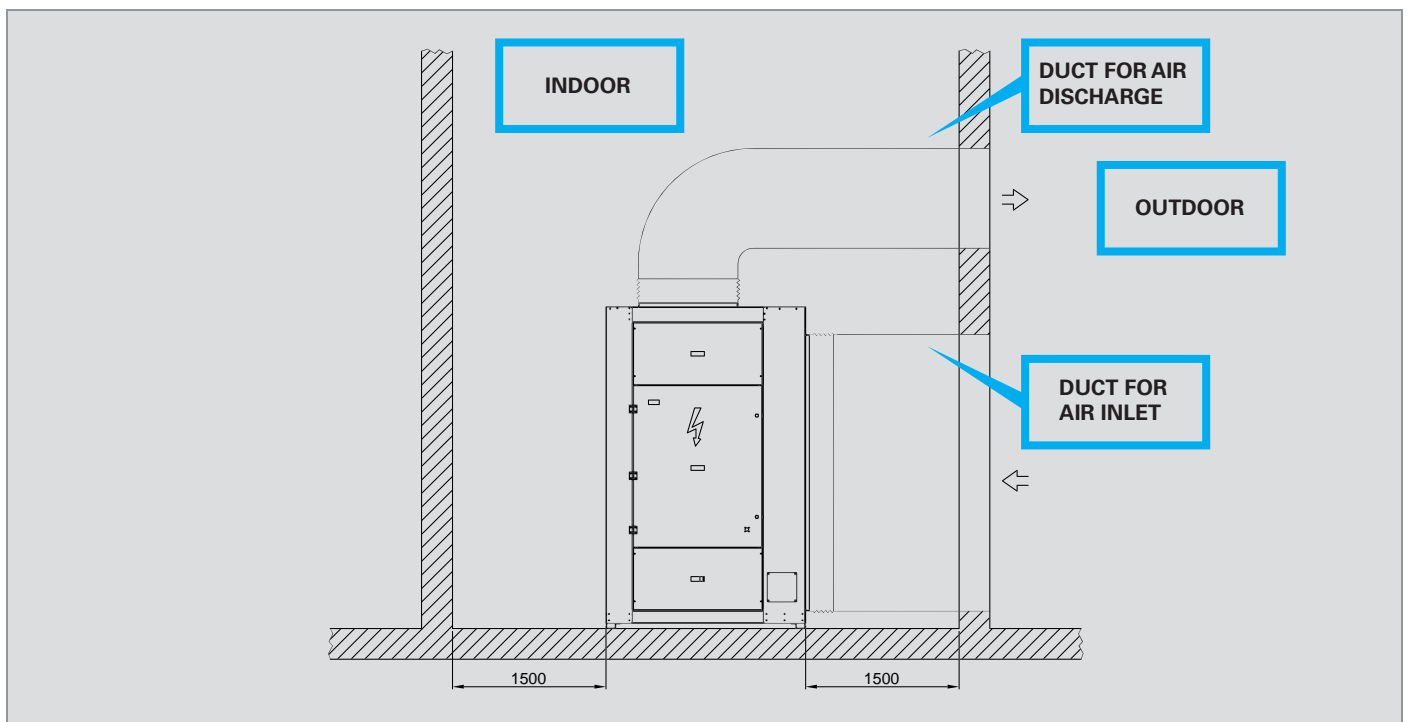
MODEL			012	015	016	020	025	033	035	040	045	050	055	065	080	090
Low head pressure	1 pump	[dB(A)]	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	2 pump	[dB(A)]	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Medium head pressure	1 pump	[dB(A)]	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2 pump	[dB(A)]	1	1	1	2	1	1	1	1	1	1	2	2	2	2
High head pressure	1 pump	[dB(A)]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	3	3	3	4	4	4
	2 pump	[dB(A)]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5	5	5	4	6	6	6

# Installation sketch

## HORIZONTAL AIR DISCHARGE

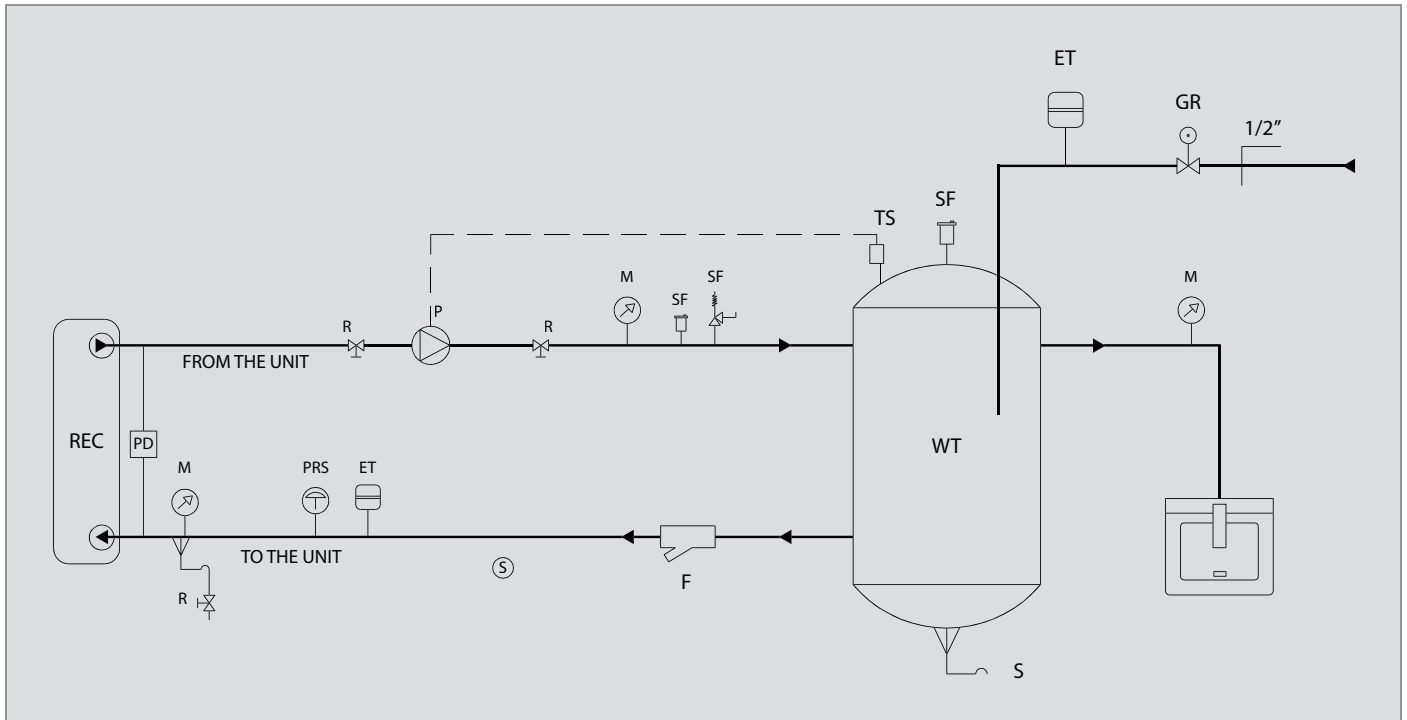


## VERTICAL AIR DISCHARGE



## Installation sketch

### INSTALLATION SKETCH PARTIAL RECOVERY (CUSTOMER RESPONSIBILITY)



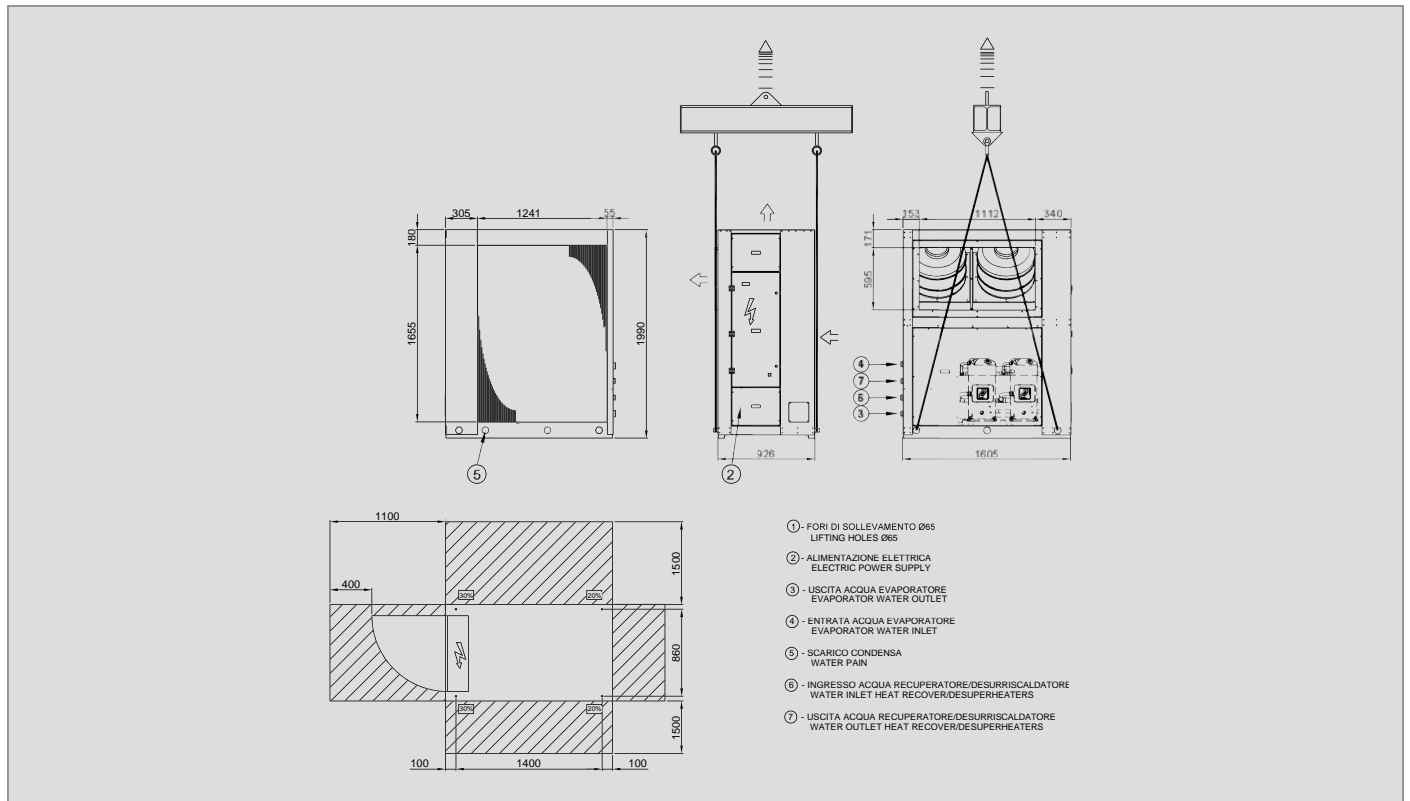
- M Gauges
- S Water discharge
- P Pump
- SV Safety valve
- SF Relief valve
- ET Expansion vessel
- PD Water differential pressure switch
- PRS Empty plant security pressure switch
- R Shut-off valve
- REC Total or partial recovery
- PR Additional pump water pressure switch
- VR Check valve
- WT Water tank
- GR Automatic water filling
- TS Thermostat for pump

**NOTES:**

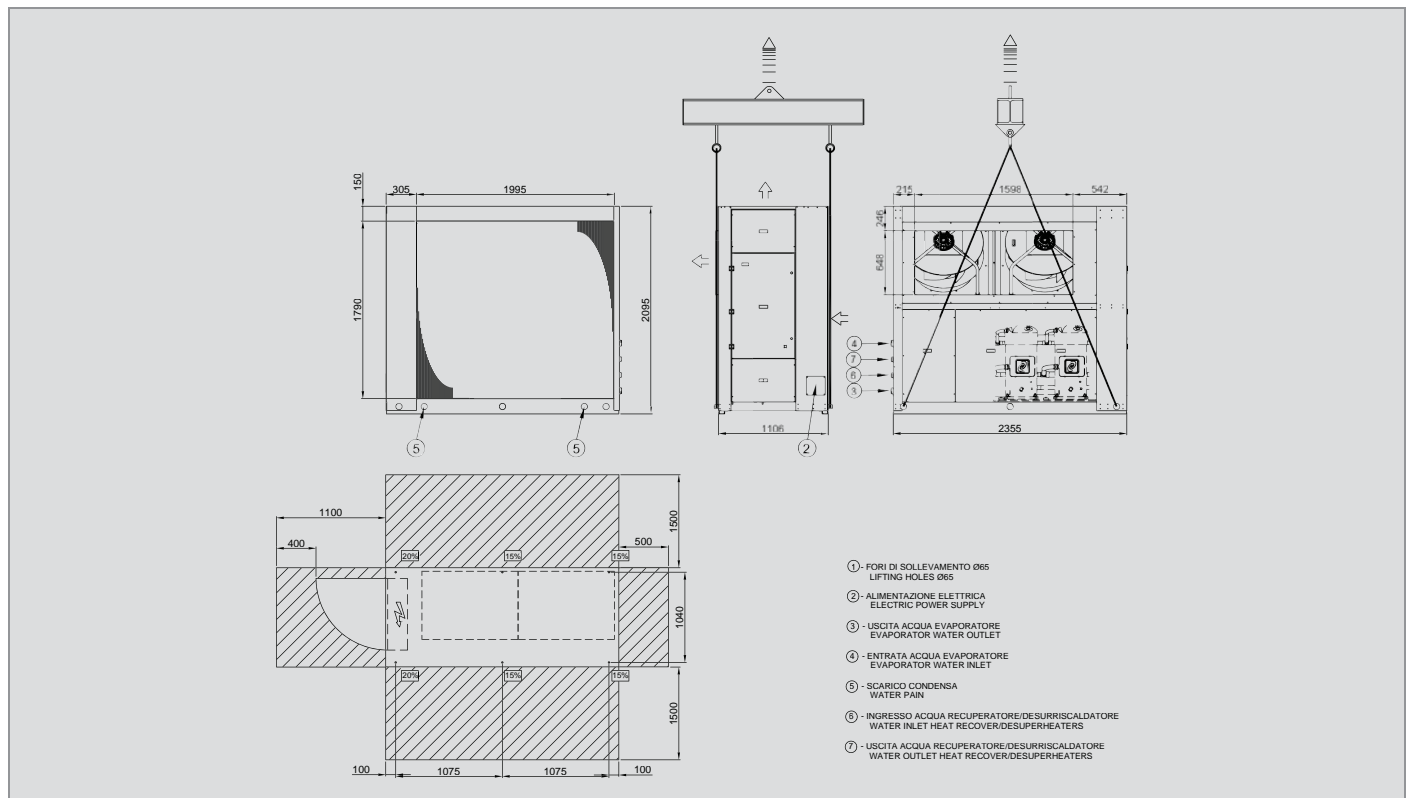
The installation of pump thermostat and control has to be provided by the customer.

# Dimensional drawings and weights

012-020

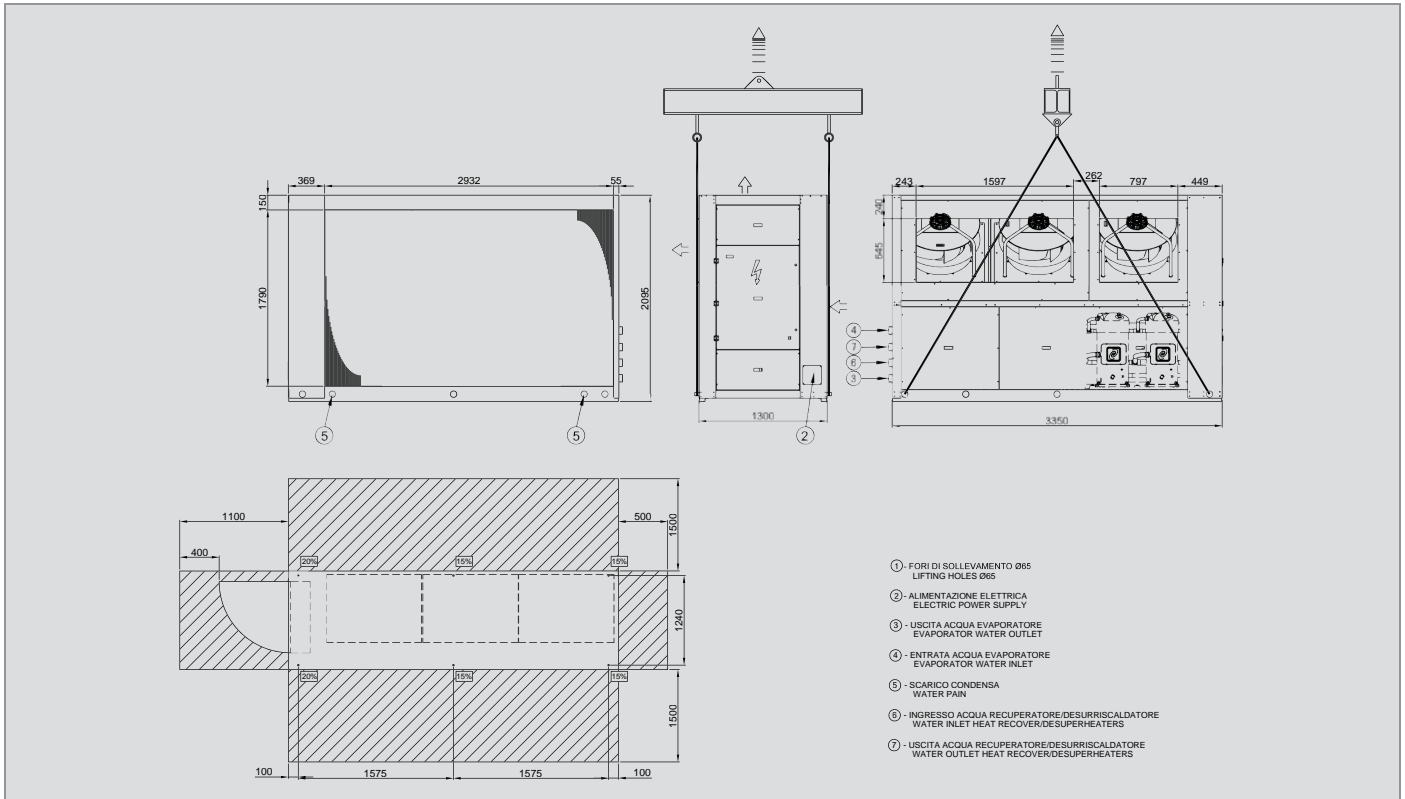


016-035

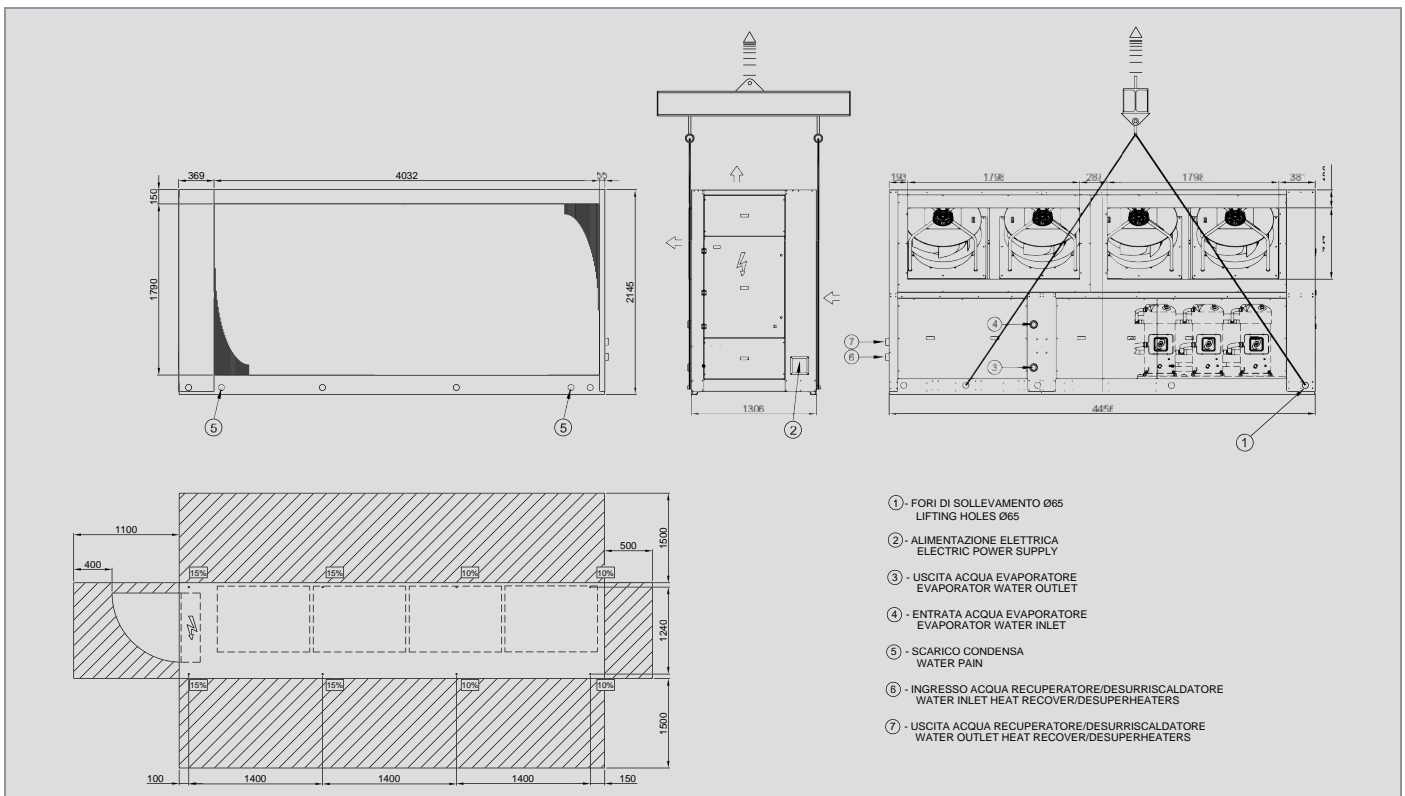


## Dimensional drawings and weights

### 040-050

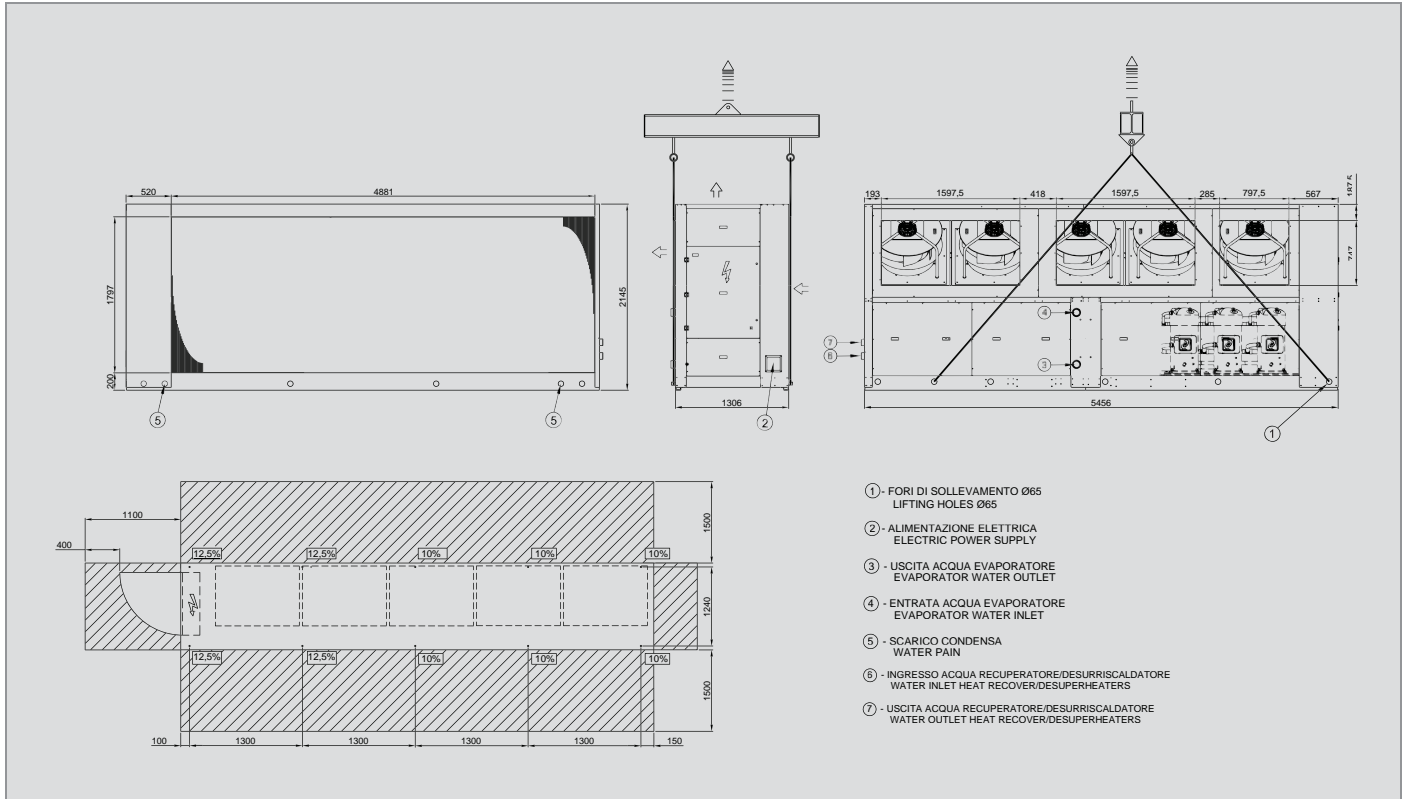


### 055

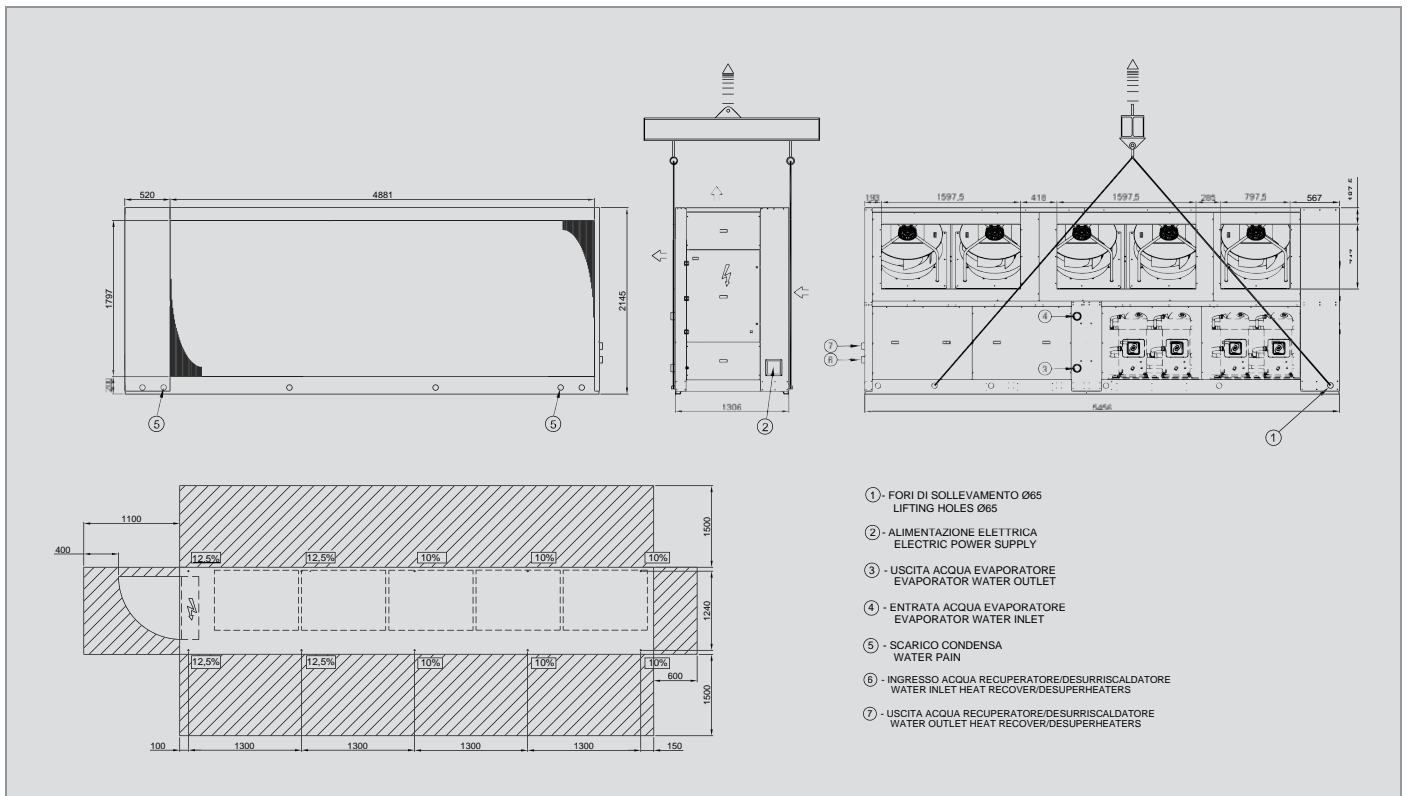


## Dimensional drawings and weights

065

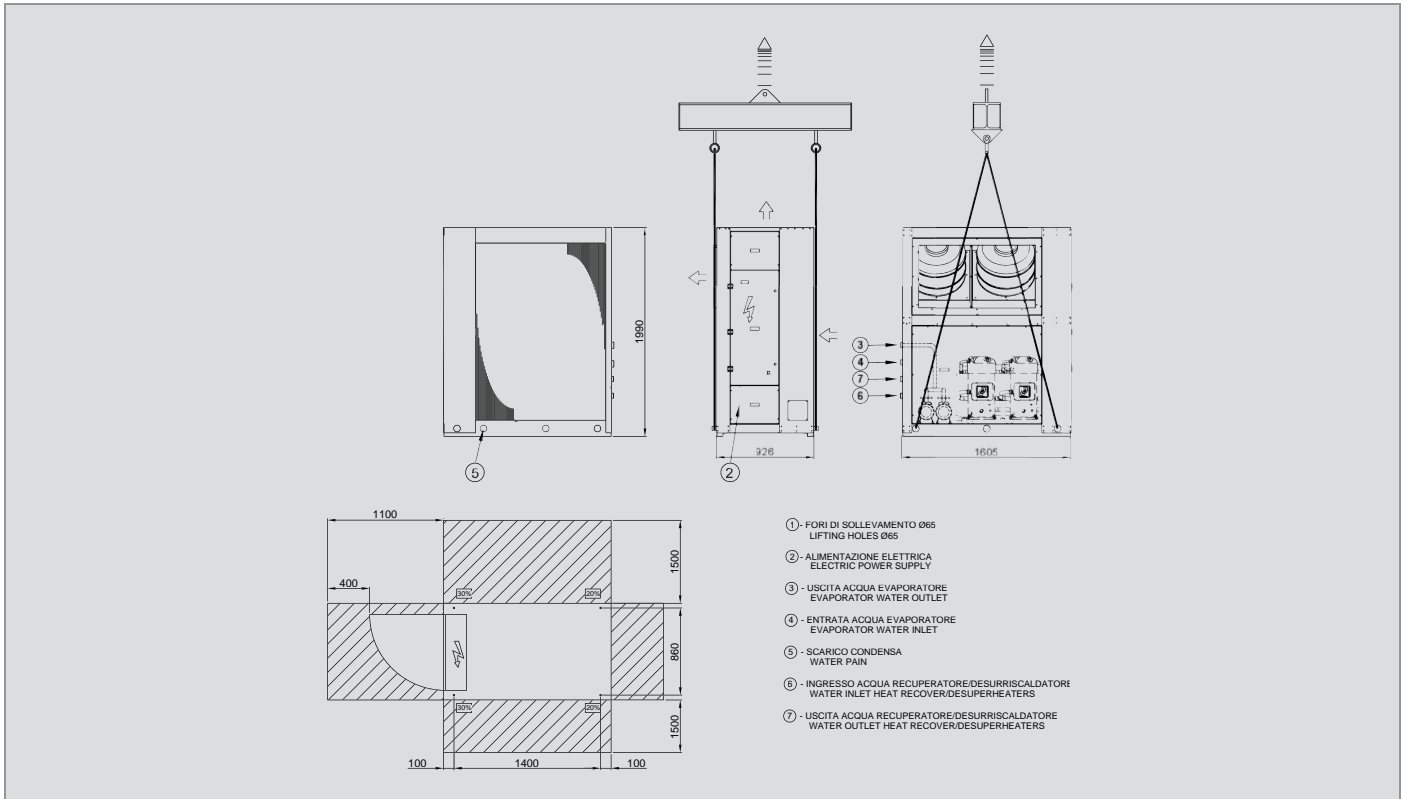


080-090

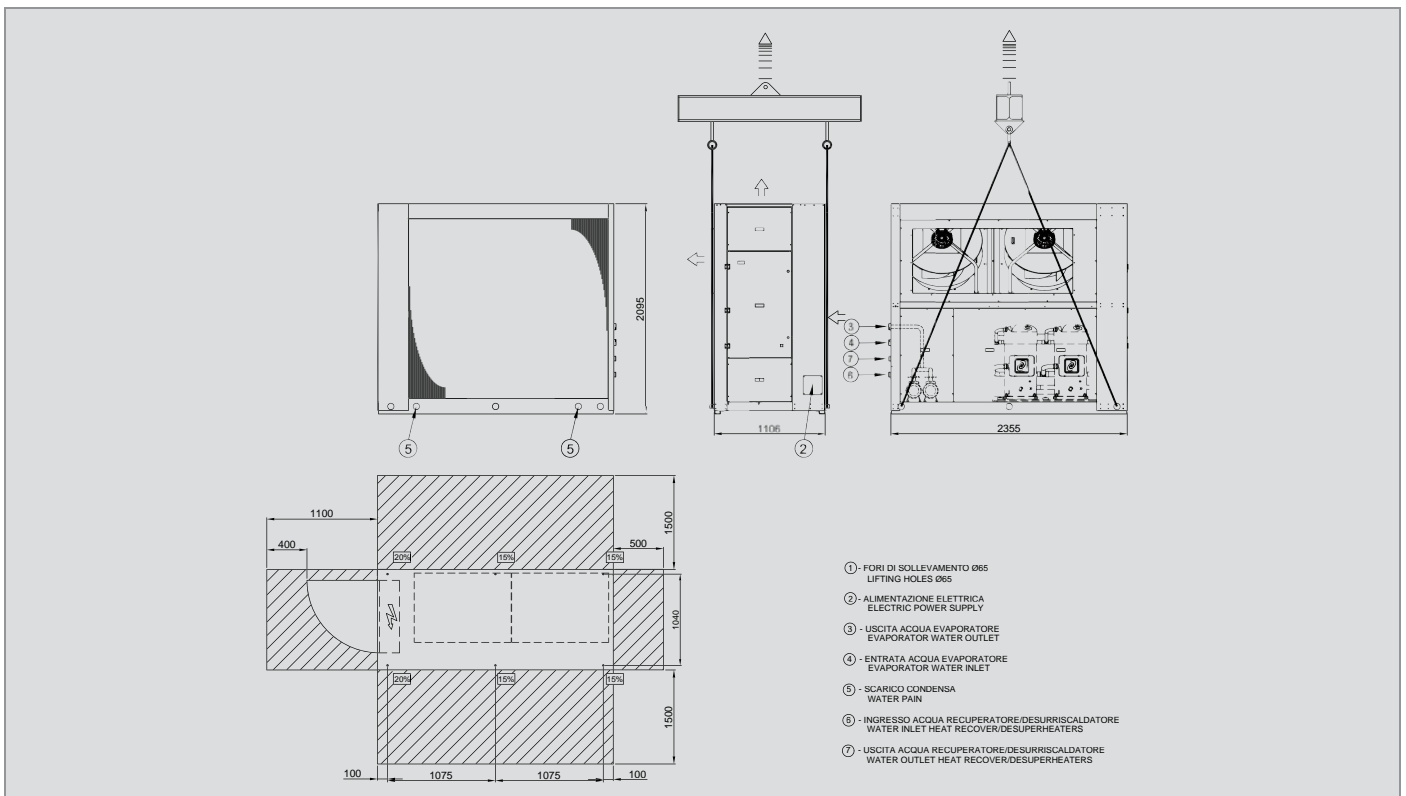


## Dimensional drawings and weights

### Hydraulic versions 012-020

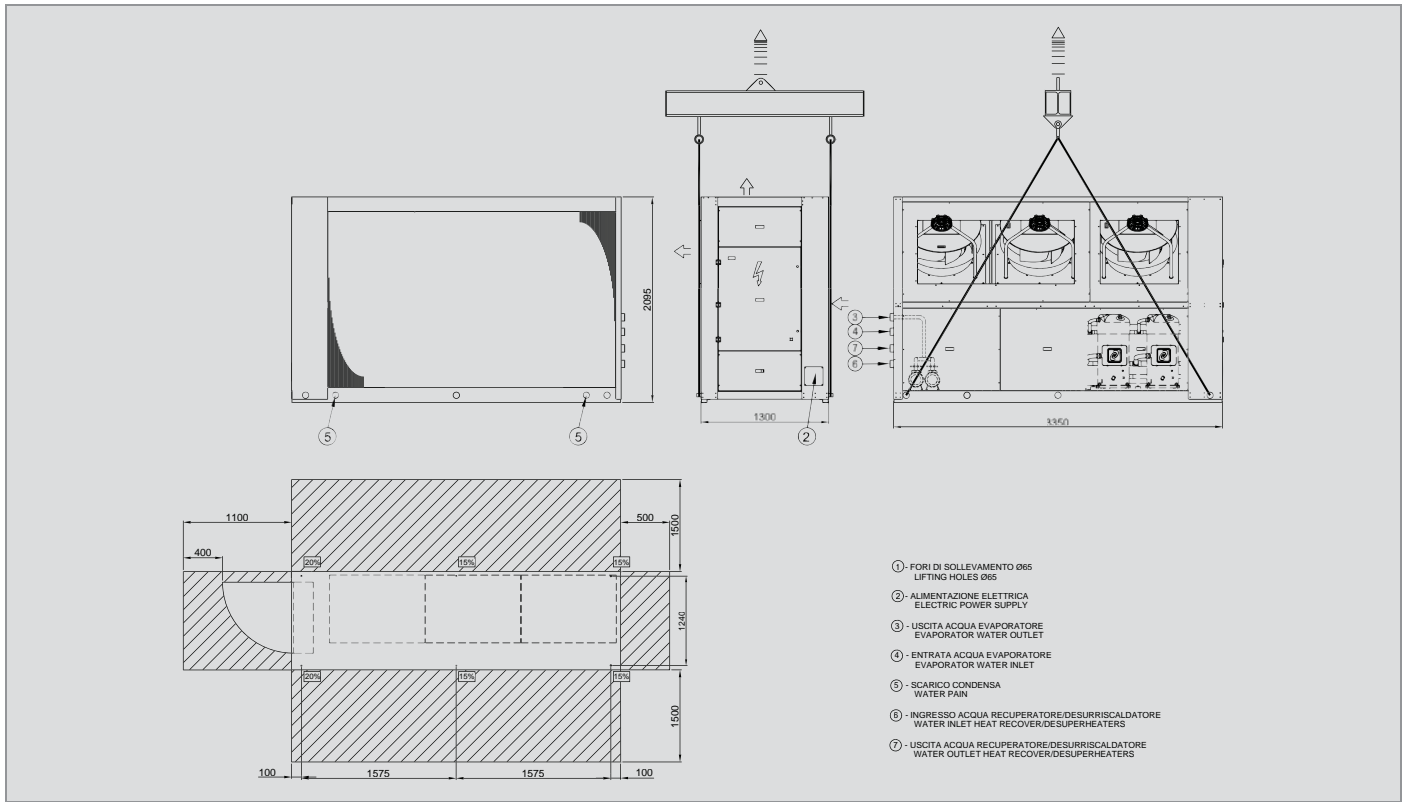


### Hydraulic versions 016-035

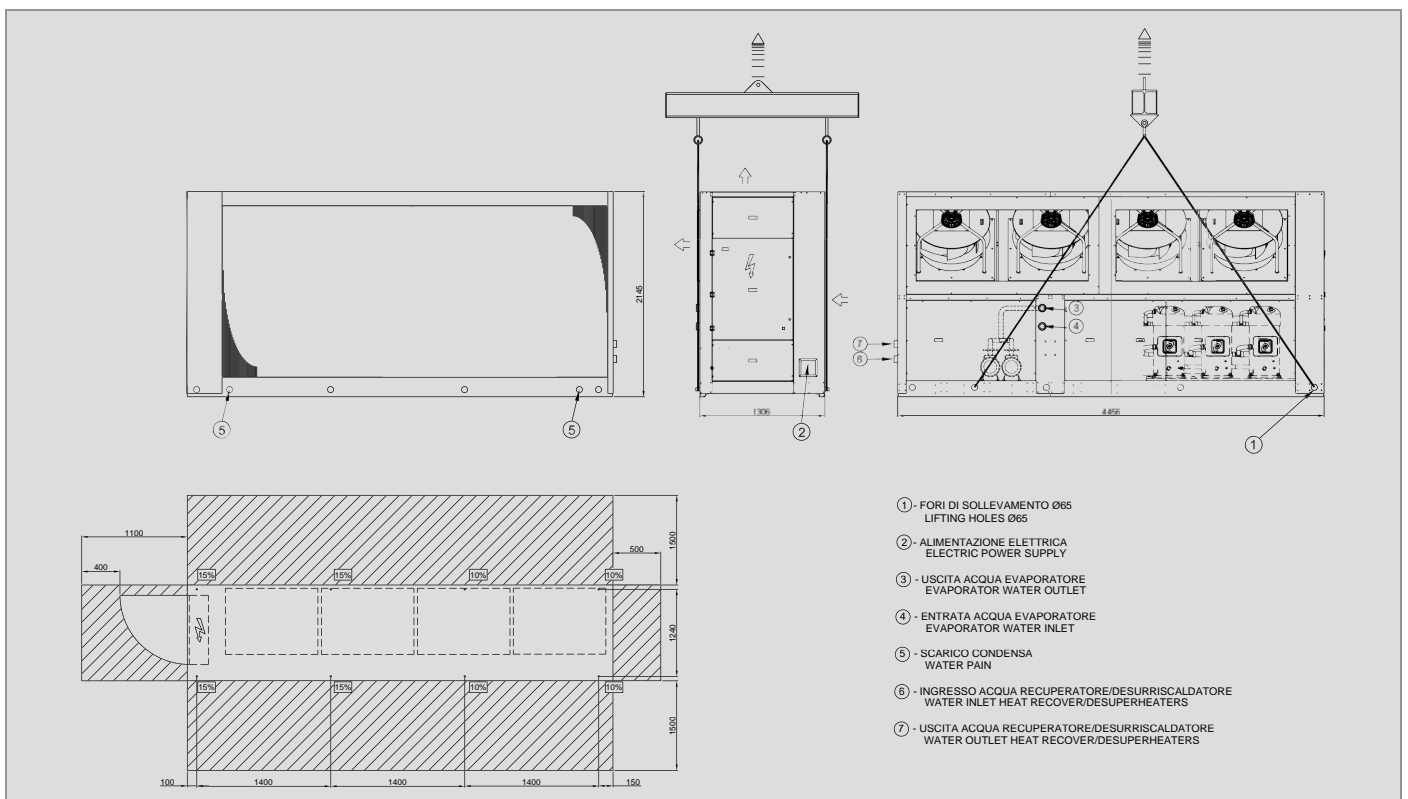


## Dimensional drawings and weights

### Hydraulic versions 040-050



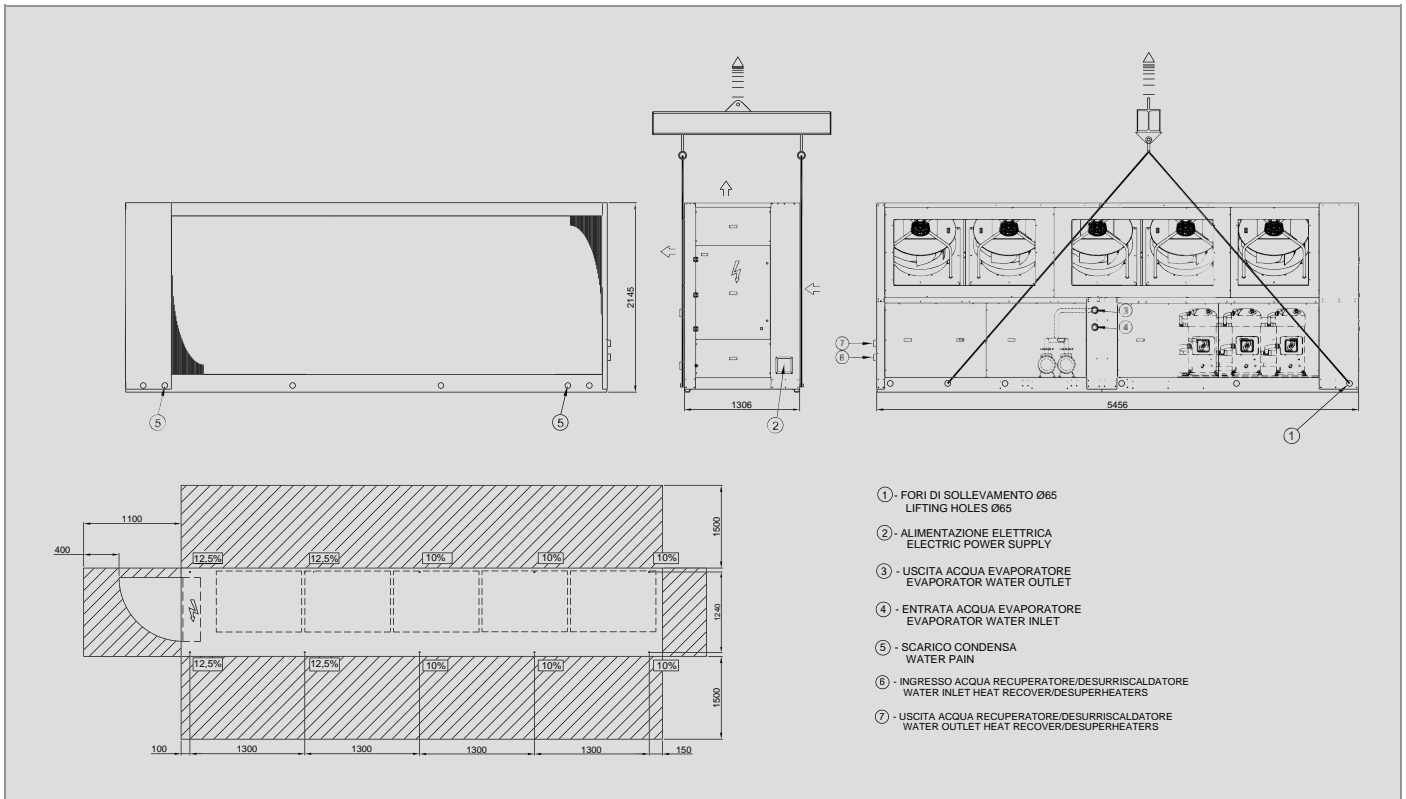
### Hydraulic versions 055



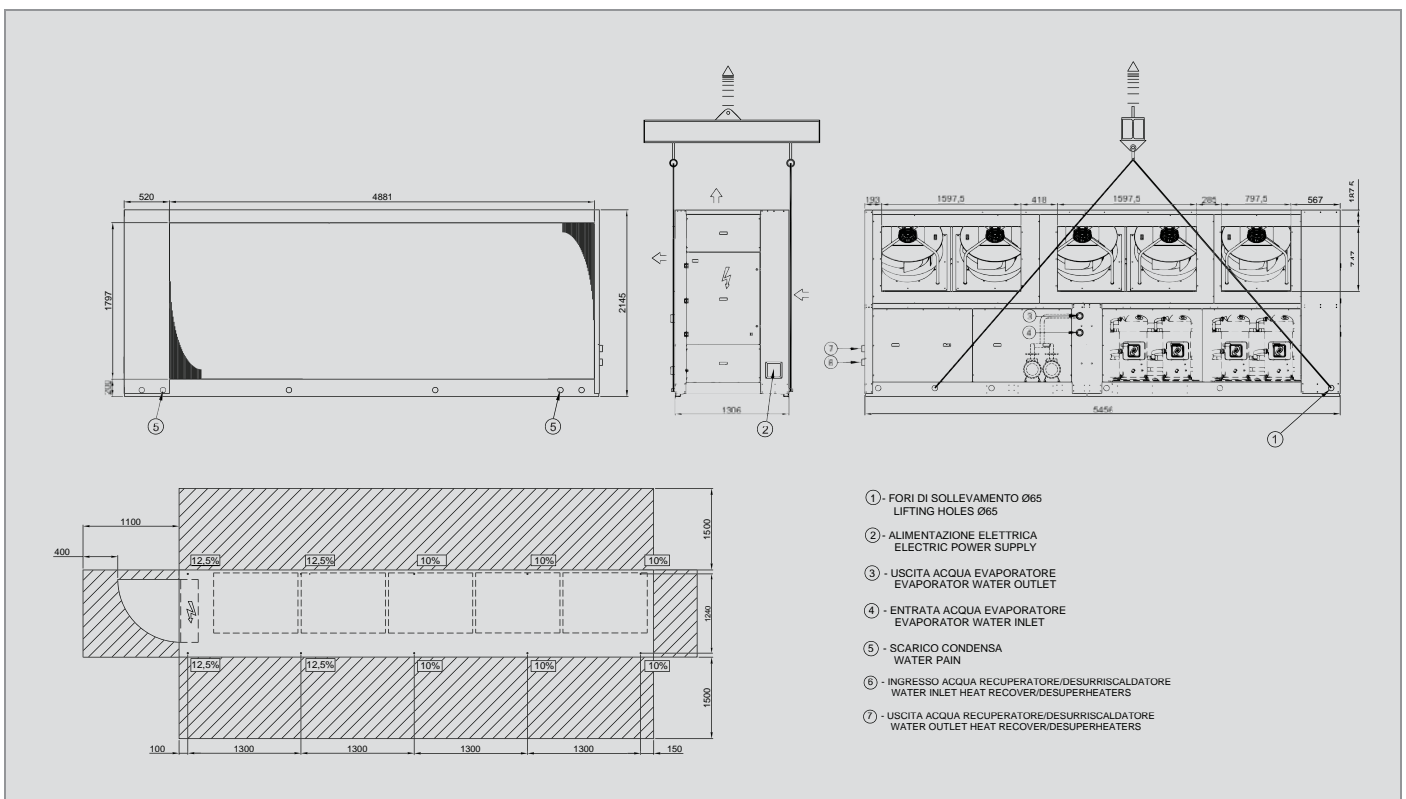


## Dimensional drawings and weights

### Hydraulic versions 065



### Hydraulic versions 080-090



## Dimensional drawings and weights

### Operating weights

MODEL			012	015	016	020	025	033	035	040	045	050	055	065	080	090
Standard Version	<b>C</b>	kg	656	666	727	729	1058	1145	1276	1636	1665	1802	2190	2543	2905	2952
Low Noise	<b>C SL</b>	kg	698	708	769	771	1100	1187	1318	1678	1707	1844	2253	2606	2968	3015
<b>INCREASE FOR VERSION</b>																
Desuperheater	<b>D</b>	kg	5	5	5	5	7	7	7	7	9	9	9	13	13	13
Heat recovery	<b>R</b>	kg	15	15	19	19	37	37	50	53	54	54	63	63	63	63
1 Pump - Low head pressure	<b>B1</b>	kg	30	30	30	38	38	40	40	40	52	52	58	62	62	62
1 Pump - Medium Head pressure	<b>M1</b>	kg	37	37	37	46	46	49	49	49	64	64	72	75	75	75
1 Pump - High head pressure	<b>A1</b>	kg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	61	78	78	88	93	93	93
2 - Low head pressure	<b>B2</b>	kg	75	75	75	95	95	100	100	100	130	130	145	155	155	155
2 Pumps - Medium head pressure	<b>M2</b>	kg	93	93	93	115	115	123	123	123	160	160	180	188	188	188
2 Pumps - High head pressure	<b>A2</b>	kg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	153	195	195	220	233	233	233

### Shipping weights

MODEL			012	015	016	020	025	033	035	040	045	050	055	065	080	090
Standard Version	<b>C</b>	kg	652	662	722	724	1052	1139	1268	1626	1655	1792	2180	2531	2887	2934
Low Noise	<b>C SL</b>	kg	694	704	764	766	1094	1181	1310	1668	1697	1834	2243	2594	2950	2997
<b>INCREASE FOR VERSION</b>																
Desuperheater	<b>D</b>	kg	4	4	4	4	6	6	6	6	7	7	7	11	11	11
Heat recovery	<b>R</b>	kg	11	11	14	14	32	32	42	45	45	45	53	53	53	53
1 Pump - Low head pressure	<b>B1</b>	kg	30	30	30	38	38	40	40	40	52	52	58	62	62	62
1 Pump - Medium Head pressure	<b>M1</b>	kg	37	37	37	46	46	49	49	49	64	64	72	75	75	75
1 Pump - High head pressure	<b>A1</b>	kg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	61	78	78	88	93	93	93
2 - Low head pressure	<b>B2</b>	kg	75	75	75	95	95	100	100	100	130	130	145	155	155	155
2 Pumps - Medium head pressure	<b>M2</b>	kg	93	93	93	115	115	123	123	123	160	160	180	188	188	188
2 Pumps - High head pressure	<b>A2</b>	kg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	153	195	195	220	233	233	233

### Tubes diameters

MODEL		Type	012	015	016	020	025	033	035
④ - ⑤	<b>C - C SL</b>	Ø G.M.	1"¼	1"¼	1"¼	1"¼	2"	2"	2"
⑥ - ⑦	<b>D</b>	Ø G.M.	1"¼	1"¼	1"¼	1"¼	1"¼	1"¼	1"¼
	<b>R</b>	Ø G.M.	1"¼	1"¼	1"¼	1"¼	2"	2"	2"

MODEL		Type	040	045	050	055	065	080	090
④ - ⑤	<b>C - C SL</b>	Ø G.M.	2"	2"½	2"½	2"½	3"	3"	3"
⑥ - ⑦	<b>D</b>	Ø G.M.	1"¼	1"¼	1"¼	1"¼	1"½	1"½	1"½
	<b>R</b>	Ø G.M.	2"	2"½	2"½	2"½	3"	3"	3"

- ④ Water inlet evaporator
- ⑤ Water outlet evaporator
- ⑦ Water inlet desuperheater
- ⑧ Water outlet desuperheater



# Notes



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