FOCS60 /K 0751 - 2632

147-505 kW
41,7-144 tons$_R$

Air source chiller for outdoor installation - 60 Hz



(The photo of the unit is indicative and may vary depending on the model)

- THE BEST COMPROMISE PRICE - PERFORMANCE
- FLEXIBILITY
- ADAPTABILITY
- GREEN RELEVANT PRODUCT
- EXTENSIVE RANGE OF OPERATION

CERTIFICATIONS

Product certif cations

Product without CE marking, it cannot be commercialized within the European Union

Certif cate of Conformity Saudi Arabia (SASO)

System certif cations

Climaveneta S.p.A.:

Quality System complying with the requirements of UNI EN ISO9001:2008 regulation

Environmental Management System complying with the requirements of UNI EN ISO14001:2004 regulation

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LEGEND

Functions



Cooling

Refrigerant



R-134a

Compressors



Screw compressor

Fan



Axial fan

Exchangers



Plates

Other features





GREEN Certification relevant

2.1 PRODUCT FEATURES

2.2 GREEN CERTIFICATION RELEVANT

Climaveneta as a major player in the world HVAC market and a leading manufacturer of energy efficient, sustainable HVAC solutions, recognizes and supports the diffusion of green certification systems, as an effective way to deliver high performance buildings and improve the quality and the sustainability of the built environment.

Since the first certification system was introduced at the beginning of the 1990s, the demand for certified buildings has grown considerably, as well as the number of standards, rating and certification programs. Operating worldwide Climaveneta has extensive experience with many of them and is active member of Green Building Council Italy.

Climaveneta commitment to develop responsible and sustainable HVAC solutions, is reflected by a full range of premium efficiency products and systems, designed with special care to improve building energy performance ratings, according to major certification protocols, including LEED, BREAM, GREENSTAR, BCA, NABERS, DNGB, HQE and BEAM.

To find out more about how our products contribute to enhanced green certification rating and energy performance of a building, please refer to:
http://www.climaveneta.com/GLOBAL/Company/Green-Certifications/
QR code





AHRI CAPACITY RATINGS (I-P and SI)

RATED VOLTAGE						
FOCS60 Unit Size K version	Capacity		Energy Eff ciency			
	Full load		Full load		Part load IPLV	
	[tonsR]	[kW]	EER [Btu/W*h]	COP_R [W/W]	$IPLV_{EER}$ [Btu/W*h]	$IPLV_{COP}$ [W/W]
0751	41,7	147	9,7	2,85	13,7	4,02
0951	49,2	173	9,6	2,8	13,6	3,99
0961	55,2	194	9,7	2,83	12,8	3,75
1021	67,2	236	10,2	2,99	14,3	4,19
1301	72,6	255	10,0	2,93	14,5	4,25
1532	82,4	290	10,1	2,95	14,8	4,33
1732	90,8	319	9,8	2,88	14,9	4,37
1932	101,1	356	10,1	2,96	14,6	4,27
1952	108,7	382	9,8	2,87	14,6	4,27
2432	130,5	459	10,0	2,92	15,0	4,4
2632	143,5	505	9,9	2,91	14,9	4,36

Values in accordance with AHRI Standard 550/590 at standard rating conditions.
Standard rating conditions are as follows:
Cooler Conditions: Leaving water temperature : 44° F (6,7° C)
Flow rate: 2,4 GPM/tonsR (0,043 l/s per kW)
Fooling factor: 0,00010 hr * sq ft °F/Btu (0,000018 m2 * °C/W)
Condenser Conditions: Entering Air Temperature: 95°F (35°C)

COP Coefficient of Performance (includes power from compressors, condenser fans, control)
EER Energy Efficiency Ratio (includes power from compressors, condenser fans, control)
IPLV Integrated Part-Load Value

FOCS60 units are ASHRAE 90.1 – 2010 compliant.
The “Minimum Efficiency Requirements” detailed in the table 6.8.1C of the American standard are guaranteed.

Extracted from ASHRAE 90.1-2010 “Energy Standard for Buildings Except Low-Rise Residential Buildings”,
Table 6.8.1C - Water Chilling Packages - Efficiency Requirements

Equipment type	Size category	Path A	Path B	Test Procedure
Air-cooled chiller	< 150 tonsR (527 kW)	≥ 9.562 EER (2.8 COP)	N.A.	AHRI 550/590
		≥12.500 IPLV (3.67 IPLV)		
	> 150 tonsR (527 kW)	≥ 9.562 EER (2.8 COP)		
		≥12.750 IPLV (3.74 IPLV)		

3.1 PRODUCT PRESENTATION

Outdoor unit (voltages available 460V, 380V or 230V) for the production of chilled water with semi-hermetic screw compressors optimized for R134a, axial-fl ow fans, condensing coil with copper tubes and aluminium fins, plate evaporator and mechanical expansion valve (electronic on sizes 1021, 1301, 2432, 2632).
Structure with suitably-thick hot galvanised steel sheet base, painted with polyester powder coat, perimeter frame made from aluminium section bars. Aluminium alloy external casing and finish for complete resistance to the elements, designed to provide total accessibility to the inside components.
Flexible and reliable unit; it easily adapts it self to different thermal load conditions thanks to the precise thermoregulation.
This unit has been designed to optimize the costs – performances ratio.

3.3 THE BEST COMPROMISE PRICE - PERFORMANCE
This line has been conceived to optimize costs maintaining
the units at efficiency levels that comply with the ASHRAE 90.1-2010.

3.4 FLEXIBILITY
Flexibility in applications thanks to the many available confi gurations and accessories.
These include:
- NR noise reduction kit to lower the sound power of 6 dB(A)
- HT high temperature kit for operation at full load with outside air temperatures above 46°C (115°F)
- partial heat recovery for hot water production up to 60°C (140°F)
- low or high pressure hydronic kit (10 or 20 [mH2O] / 394.7 or 787.4 [inH2O] available pressure head)
- DBA kit for operation with outside air temperatures down to -20°C (-4°F).

3.5 ADAPTABILITY
Adaptability at the building’s cooling request thanks to the continuous capacity regulation, assured by sophisticated control’s logic.

3.6 GREEN RELEVANT PRODUCT
These units comply with the minimum efficiency requirements of air cooled chillers defi ned in ASHRAE 90.1-2010 “Energy standard for buildings except LowRise Residential Building”.

3.7 EXTENSIVE RANGE OF OPERATION
Extensive range of operation with external air temperature up to 46°C (115°F) at full load.

4.2 Air source chiller for outdoor installation - 60 Hz
Outdoor unit (voltages available 460V, 380V or 230V) for the production of chilled water with semi-hermetic screw compressors optimized for R134a, axial-fl ow fans, condensing coil with copper tubes and aluminium fins, plate evaporator and mechanical expansion valve (electronic on sizes 1021, 1301, 2432, 2632).
Structure with suitably-thick hot galvanised steel sheet base, painted with polyester powder coat, perimeter frame made from aluminium section bars. Aluminium alloy external casing and finish for complete resistance to the elements, designed to provide total accessibility to the inside components.
Flexible and reliable unit; it easily adapts it self to different thermal load conditions thanks to the precise thermoregulation.
This unit has been designed to optimize the costs – performances ratio.

4.3 Installation note
The unit is supplied fully refrigerant charged and factory tested. On site installation only requires power and hydraulic connection.

4.4 Structure
Base and frame in galvanized steel. The supporting frame are polyester-painted for the highest resitance to external factors: surfaces´ hue and brightness are preserved.

4.5 Refrigerant circuit
Unit designed with 1 or 2 refrigerant circuits.
On units with 2 circuits, these are separate and independent for each compressor, so as to ensure continuous operation, reduce pollution and simplify maintenance.
In addition to main components described in the following sections, each refrigerant circuit is fi tted as standard with:
- mechanical expansion valve (electronic on sizes 1021, 1301, 2432, 2632)
- high and low pressure safety valves
- digital display of pressure levels on controller
- compressor´s discharge valve
- liquid line shut-off valve
- drier fi lter with replaceable cartridge
- refrigerant line sight glass with humidity indicator
- safety high pressure switch
- high and low pressure transducer
- non-return valve in compressor´s discharge line integrated in the compressor

Economizers are adopted in sizes 0961, 1301, 1732, 1952, 2632.

4.6 Compressors
New semi-hermetic screw compressors designed for high effi ciency both at full and partial load. Semi-hermetic screw compressors with 2 fi ve- and six-lobe rotors: the fi ve-lobe rotor is splined directly onto the motor without the use of interposed gears. The bearings provided along the rotor axis in a separate chamber isolated from the compression chamber are made in carbon steel. Each compressor is provided with an inlet for refrigerant injection (for the extension of operating limits) and the use of the economizer (for the output capacity and effi ciency´s increase). Optimized lubrication guarantees oil´s distribution between mechanical parts, without using an oil pump; the built-in oil separator has 3 stages of separation, and a 10 mm stainless steel mesh fi lter ensures the constant presence of oil inside.
Cooling power is partialized by a slide valve, which depending on the position assumed, permits a stepless compression chamber reduction; each compressor can thus continuously modulate operation from 50% to 100% of full capacity (minimum capacity of 25% available as an option).
The two pole motors are fi tted as standard with electric devices to limit the absorbed current during compressor start-up, and with empty start-up. Each compressor is fi tted with manual-reset motor thermal protection, delivery gas temperature and oil level controls and an electric resistance for the carter´s heating while the compressor is stopped. A check valve fi tted on the refrigerant delivery line prevents the rotors from reversing after stopping. On-off cocks on the delivery line of each compressor to isolate the refrigerant charge in the heat exchanger when required. Compressors part-winding or star/delta start, according with unit size, supply voltage and option HT kit selected. For further information please refer to the "electrical data" section.

4.7 Plant side heat exchanger
Braze welded AISI 316 plate heat exchanger. The heat exchangers are lined on the outside with 9 mm (0,354 in) thick closed-cell neoprene lagging to prevent condensation, with a thermal conductivity of 0,33 W/mK at 0°C (0,19Bth/h*ft°F at 32°F). The heat exchangers are fi tted with a differential pressure switch to monitor the correct fl ow of water when the unit is operating, thus preventing ice form forming inside; if no fl ow is detected, the frost protection function is activated using a special heater. The unit is also ready to operate using non-freezing mixes, sown to heat exchanger outlet temperatures of -8°C (17,6°F).

4.8 Source side heat exchanger
Condensing coil made with copper tubes and aluminium fins. The aluminium fins are spaced to guarantee the best heat exchange efficiency. The lower part of the exchanger works as a subcooling circuit increasing the cooling capacity.

4.9 Fan section source side
Axial electric fans, system of protection IP54 and “F” insulation class, with external rotor, housed in aerodynamic hoods complete with guard grille. 6-poles electric motor with built-in thermal protection. Pressostatic low-temperature Device (DP) to control the condensing process switching on and off couple of fans depending on the condensing pressure measured is provided.

4.10 Electrical and control panel
Electrical and control panel built to EN60204-1 and EC204-1 standards, complete with:
- electronic controller
- control circuit transformer
- general door lock isolator
- power circuit with bar distribution system
- fuses for compressors
- compressors protection with internal thermal overload
- terminals for cumulative alarm block
- remote ON/OFF terminals
- spring-type control circuit terminal board
- phases sequence control
- relays for voltage monitoring
- Three phase 60 Hz power supply, voltage selectable between 460V, 380V e 230V
- Compressors part-winding or star/delta start, according with unit size, supply voltage and option HT kit selected. For further information please refer to the "electrical data" section.

4.11 Certification and applicable directives
The unit complies with the following directives and relative amendments:
- Machine directive 2006/42/EC
- PED directive 97/23/EC
- Low Voltage directive 2006/95/EC
- ElectroMagnetic compatibility directive 2004/108/EC
- ISO 9001 Company´s Quality Management System certification
- ISO 14001 Company´s Environmental Management System certification

4.12 Tests
Tests performed throughout the production process, as indicated in ISO9001.

4.13 Electronic control W3000 TE
The brand new W3000TE controller offers advanced functions and algorithms. The large format keyboard provides a complete view of the statuses of the unit. The controls and the complete LCD display favour an easy and safe access to the machine setup. These resources allow the assessment and intervention on the unit, by means of a multi-level menu, with selectable user’s language. The led icons immediately show the operating status of the circuits, as well as of the fans and of the water pumps (if present). An optional extra is the touch screen interface: 7.0” WVGA colour display with adjustable LED backlight and front USB port. The touch screen technology allows intuitive navigation between the various screens, safe access to the data with a three-level password protection as well as the graphic display of the performance of some monitored measurements.
The diagnostics comprises a complete alarm management system, with “black box” (via PC) and alarm log functions (via display or also PC) for a better analysis of the unit performance.
For the systems made of several units, the adjustment of the resources is performed by optional proprietary devices.
Consumption metering and performance measurement are possible as well. Supervision can be easily developed via proprietary devices or the integration in third party systems by means of the most common protocols as ModBus, Bacnet-over-IP, Echelon LonWorks, Bacnet MS/TP

protocols.
Compatibility with the remote keyboard managing up to 8 units.
The presence of the programmable timer allows the creation of an operating profile containing up to 4 typical days and 10 time bands.
The control is characterized by the continuous modulation of the unit capacity, based on PID algorithms and referring to the water delivery temperature.
Optionally (VPF package), capacity modulation can be integrated with hydraulic flow modulation, thanks to inverter-driven pumps and to specific resources for the hydraulic circuit.



4.13 Touch screen
Touch screen interface



4.14 Versions
/K – Compact with standard efficiency
Key efficiency, compact version.

4.15 Configurations
< >, Standard unit
Standard unit for production of chilled water

/D, with Desuperheater
Unit for production of chilled water, complete of an auxiliary heat exchanger on the discharge section of the compressor to the superheat reclaim. The reclaim heat is approximately the 20% of the total cooling capacity. This function is used for application with domestic hot water production or other secondary uses, as support of the existing boiler.

5.1 ACCESSORIES

ACCESSORIES	DESCRIPTIONS	BENEFITS	AVAILABLE FOR MODELS
3300 **COMPRESSOR REPHASING**			
3301 COMPR.POWER FACTOR CORR.	Capacitors on the compressors' power inlet line.	The unit's average cos(phi) increases.	ALL
3410 **AUTOMATIC CIRCUIT BREAKERS**			
3412 AUTOM. CIRCUIT BREAK. ON LOADS	Over-current switch on the major electrical loads.	In case of overcurrent allows resetting of the switch without the replacement of relative fuses.	ALL
4180 **REMOTE CONNECTION ARRANGEMENT**			
4181 SERIAL CARD MODBUS	Interface module for ModBUS protocols.	Allows integration with BMS operating with ModBUS protocol.	ALL
4182 SERIAL CARD FOR LONWORKS	Interface module for Echelon systems.	Allows integration with BMS operating with LonWorks protocols	ALL
4184 SERIAL CARD BACNET MS/TP RS485	Interface module for BACnet protocols.	Allows integration with BMS operating with BACnet protocol.	ALL
4185 SERIAL CARD FOR BACNET OVER IP	Interface module for BACnet OVER-IP protocols.	Allows to interconnect BACnet devices over Internet Protocol within wide-area networks.	ALL
6160 **AUXILIARY INPUT**			
6161 AUXILIARY SIGNAL 4-20mA	4..20mA analogue input.	Allows to change the operating set-point according to the value of current applied to the analogue input.	ALL
6162 REMOTE SIGNAL DOUBLE SP	Allows to activate the Energy Saving set-point.	Allows to activate the Energy Saving set-point.	ALL
1520 **SOFT-STARTER for 60HZ**			
1521 3PH SOFT-START FOR UNIT 460V	Electronic device adopted to manage the inrush current.	Break down of the inrush current compared to the direct motor start, lower motor windings' mechanical wear, avoidance of mains voltage fluctuations during starting, favourable sizing for the electrical system.	ALL
1522 3PH SOFT-START FOR UNIT 380V	Electronic device adopted to manage the inrush current.	Break down of the inrush current compared to the direct motor start, lower motor windings' mechanical wear, avoidance of mains voltage fluctuations during starting, favourable sizing for the electrical system.	ALL
1523 3PH SOFT-START FOR UNIT 230V	Electronic device adopted to manage the inrush current.	Break down of the inrush current compared to the direct motor start, lower motor windings' mechanical wear, avoidance of mains voltage fluctuations during starting, favourable sizing for the electrical system.	ALL
3370 **RECOVERY CONTROL**			
3371 WITH PART. RECOVERY CONTROL	On/off and thermal relay for controlling the auxiliary pumps on the desuperheating circuit.	This option minimizes pumps' consumption. They are activated only when real capability of heat reclaim is detected: compressors on, hot storage tank's temperature lower than its set-point and than compressors' outlet gas temperature. [Pumps at client responsability]	**FOCS60 /D /K**: 0751, 0951, 0961, 1021, 1301, 1532, 1732, 1932, 1952, 2432, 2632.

ACCESSORIES

ACCESSORIES	DESCRIPTIONS	BENEFITS	AVAILABLE FOR MODELS
5920 **MANAGEMENT & CONTROL SYSTEMS**			
5921 NETWORK ANALYZER FOR DEMETRA	This option includes all following devices on-board the unit panel: - network analyzer operating on ModBUS protocol over EIA RS-485 (without certification MID) - Current transformers.	They meter the electricity absorbed and are connected with RS485 bus to an external device for energy metering (DEMETRA - see dedicated manual).	ALL
5922 ClimaPRO ModBUS RS485 - MID	This option includes all following devices on-board the unit panel: - MID certified network analyzer operating on ModBUS over EIA RS-485 - Current transformers - W3000TE controller - Software release LA09 or later version.	This accessory allows to acquire the electrical data and the power absorbed by the unit and communicate with ClimaPRO via high level communication interface based on ModBUS over EIA RS-485. More specifically, the data collected are: power supply, current, frequency, power factor (cos_{φ}), electrical power consumption, energy consumption. This specific energy meter model is MID certified and can therefore be used for billing applications. This option also ensures the compatibility between the units and ClimaPRO, thus allowing ClimaPRO to acquire all the main unit's operating variables and status by means of a high level communication interface to the controller installed onboard the unit panel.	ALL
5923 ClimaPRO BacNET over IP	This option includes all following devices on-board the unit panel: - network analyzer operating on BACnet over IP - Current transformers - W3000TE controller - Software release LA09 or later version.	This accessory allows to acquire the electrical data and the power absorbed by the unit and communicate with ClimaPRO via high level communication interface based on BACnet over IP. More specifically, the data collected are: power supply, current, frequency, power factor (cos_{φ}), electrical power consumption, energy consumption. This network analyzer is not MID certified and cannot therefore be used for billing applications. This option also ensures the compatibility between the units and ClimaPRO, thus allowing ClimaPRO to acquire all the main unit's operating variables and status by means of a high level communication interface to the controller installed onboard the unit panel.	ALL
1900 **COMPRESSOR SUCTION VALVE**			
1901 COMPRESSOR SUCTION VALVE	Shut-off valve on compressor's suction circuit.	Simplifies maintenance activities	ALL
1910 **COMPRESSOR DISCHARGE VALVE**			
1911 COMPR. DISCHARGE LINE VALVE	Shut-off solenoid valve on compressor discharge circuit	Simplifies maintenance activities	ALL
870 **OPERATION RANGE UNIT**			
871 NEGATIVE FLUID TEMPERATURE	Compressor's liquid injection	It permits the compressor works properly with high compression efficiency with negative evaporator leaving temperature	ALL

ACCESSORIES

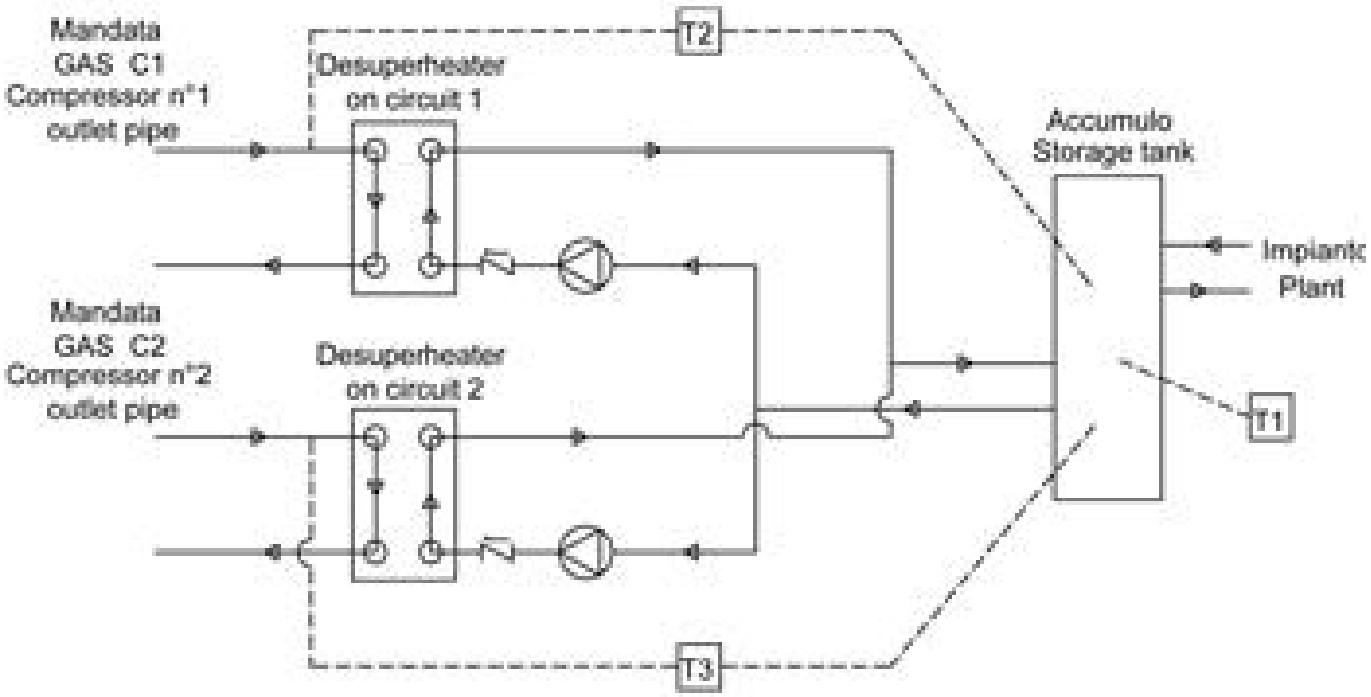
ACCESSORIES	DESCRIPTIONS	BENEFITS	AVAILABLE FOR MODELS
1870 **CONDENSER WATER TEMPERATURE**			
1871 - 1872 - 1873 HT KIT	This option includes the following devices factory mounted: - enhanced compressors' motor - liquid injection on compressors - electrical panel ventilation.	The unit can work at full load at higher ambient temperatures.	ALL
1940 **EXPANSION VALVE**			
1941 ELECTRONIC EXPANSION VALVE	Electronic expansion valve	Electronic lamination device wtih step motor. It is designed for the continuous and precise control of refrigerant flow entering in the evaporator. This solution permits extremely short times for reaction to variation in load, optimising power consumption.	ALL
890 **CONDENSING COIL**			
881 Cu/Cu EXTERNAL COIL	Air-refrigerant heat exchanger with copper fins and tubes.	Recommended for applications in corrosive atmospheres	ALL
894 Cu PIPES/PREPAINTED ALL. FINS	Fins made from pre-painted material.	Recommended for applications in medium level pollution atmospheres.	ALL
895 FIN GUARD SILVER TREATM	Air-refrigerant heat exchanger with epoxidic treatment on coils and fins.	Recommended for marine exposure conditions, with an high level of pollution or other aggressive atmospheres.	ALL
2000 **COIL PROTECTION**			
2001 COIL PROT.GRILLS IN PERALUMAN	Coil protecting grilles	Protects against the intrusion of solid bodies with mediumlarge dimensions.	ALL
820 **LOW AMBIENT CONTROL**			
808 FANS WITH INVERTER	Electronically commutated fans (EC fans); the brushless motor, governed by a special controller, continuously adjust fans' speed.	Reduced energy consumption, electromagnetic noises and current's absorption even during start-up phase. The higher efficiency can be estimated with an ESEER value 5% higher than the standard unit. Noise reduces proportionally to unit's partialization.	ALL
819 DVVF	Pressostatic control to manage the fan's activation according to the condensing pressure detected on the refrigeration circuit; this device is recommended to enlarge the nominal unit's operating conditions	Increase of the unit global efficiency thanks to a more accurate fans speed management. Improvement of the quietness in part load operating conditions. Extension of the unit operating range ensuring a safe operation down to -10°C (14°F) outdoor air temperature. Allows the unit to operate at even most extreme conditions avoiding any risk of low pressure intervention.	ALL
821 DVV2F	Fan speed control according to the condensing pressure; the use of this device is mandatory in case the unit operates with low evaporator leaving water temperature setpoint further combined with a low outdoor temperature [See the technical selection from ElcaStudio for further information]	Increase of the unit global efficiency thanks to a more accurate fans speed management. Improvement of the quietness in part load operating conditions. Extension of the unit operating range ensuring a safe operation down to -10°C (14°F) outdoor air temperature. Allows the unit to operate at even most extreme conditions avoiding any risk of low pressure intervention.	ALL

ACCESSORIES

ACCESSORIES	DESCRIPTIONS	BENEFITS	AVAILABLE FOR MODELS
840 **DEVICE FOR LOW AIR TEMPERATURE**			
804 DEV. LOW AIR -18^C BT NO WIND	Double insulation on heat exchangers and pipes (and pumps if present) and extra electrical resistances on the main components. With this option the unit can operate safetely below the minimum outdoor temperature of -10°C, without wind or anyhow with the wind's speed lower than 0,5 m/s.	The operating limit is extended down to -18°C (-0,4°F) for installations protected from wind (wind's speed lower than 0,5 m/s)	ALL
805 DEVICE LOW AIR "DBF"	Device to reduce the condensing surface combined with a double insulation on heat exchangers and pipes (and pumps if present) and extra electrical resistances on the main components. These devices permit to operate in safety conditions even with outdoor temperature lower than -10°C and with wind.	The operating limit is extended down to -18°C (-0,4°F) even if the unit is installed in windy locations.	ALL
813 DBA AIR DEVICES	Device allowing to partially flood the coils to reduce the condensing surface combined with proper valves and devices to manage the flooding and a double insulation on heat exchangers and pipes (and pumps if present) and extra electrical resistances on the main components,. These devices permit to operate in safety conditions even with outdoor temperature lower than -18°C and with wind.	The operating limit is extended down to -20°C (-4°F) even if the unit is installed in windy locations.	ALL
1800 **EVAPORATOR WATER FLOW SWITCH**			
1801 EVAPORATOR WATER FLOW SWITCH			ALL
2880 **EVAPORATOR WATER DELTA 10°C**			
2881 EVAPORATOR FOR DELTA T>8°C	Evaporator dedicated to work with low primary circuit waterflow.	The heat exchange takes place under efficient conditions and the favorable sizing of primpary pumps allows a considerable pumping energy saving.	
2340 **TYPE OF ENCL.**			
2301 COMPRESS.ACOUSTICAl ENCLOSURE	Enclosure realized with peraluman panels lined with an acoustic insulation made by polyester fiber of thickness 30 mm.	A sound power level reduction of 5 dB(A) is achieved	ALL
2315 NOISE REDUCER	Electrical transformer to manage the fan's speed according to the specific condensing pressure + compressors' acoustical enclosure.	The dedicated fans' speed calibration together with the soundproofing of the most critical components permit a noise reduction of 5/6 dB(A) (the precise unit's performance when NOISE REDUCER option is present have to be checked with the selection software).	ALL

5.2 Fig. 1 - Operating scheme of the "partial heat reclaim management" device for two circuits units

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T1, T2 e T3: Il posizionamento delle sonde sull'accumulo è a carico dell'installatore.
T1, T2 and T3: The correct positioning of the temperature probes inside the storage tank is at customer care.

NOTES ACCESSORIES

- In case the option 805 (device low air DBF) or the option 813 (device low air DBA) is needed, it's necessary to select also the options 2631 (double insulation on evaporator) and 2431 or 2432 or 2433 (antifreeze heaters on piping/ pumps/tank).

- The accessory 1941 (electronic expansion valve) is supplied as standard for unit sizes 1021, 1301, 2432, 2632.

- In case the option 1941 (electronic expansion valve) is needed for unit sizes 0751 and 0951, it's necessary to select also the option 819 (DVVF).

- In case the option 2315 (NR kit) is needed, it's necessary to select also the option 819 (DVVF).

- In case the option 804 (device for low air -18°C BT) is needed, it's necessary to select also the options 2631 (double insulation on evaporator) and 2431 or 2432 or 2433 (antifreeze heaters on piping/ pumps/tank).

- The option 1801 (evaporator flow switch) is supplied loose.

- In case the unit sizes 0751, 1532 and 1732 are selected with evaporator outlet temperature >10,1°C it's necessary to select also the option 1941 (electronic expansion valve).

- In case the unit sizes 0951, 0961, 1932 and 1952 are selected with evaporator outlet temperature >7,1°C it's necessary to select also the option 1941 (electronic expansion valve).

Chiller Plant Control with Active Optimization System

ClimaPRO System Manager

ClimaPRO System Manager represents the state-of-the-art platform for chiller plant management and control.
ClimaPRO ensures to actively optimize the entire chiller plant by managing and adjusting each component directly involved in the production and the distribution of the heating and the cooling energies, therefore involving chillers and heat pumps, pumping groups as well as the source-side devices like, for example, the cooling towers.

In particular, ClimaPRO measures in real-time all the operating variables from the f eld, for each individual device and each of the main system branche, by using serial communication lines as well as dedicated analogue signals.

The acquired data are then compared with the design data of each single unit at any different working conditions, thus allowing to implement control strategies based on dynamic algorithms which take into account the real operating conditions.

On the basis of these values, an advanced diagnostic module also allows to assess the level of eff ciency for each individual unit, translating data into easy-to-read information in order to simplify and optimize the maintenance activities.

The "Chart Builder" software module allows to display the trends of the main operating variables. The "Reporting" module allows to send reports to selected users, including data and system's status of the main devices as well as to perform calculation of the energy indexes for each single unit and for the entire chiller plant.

The accessibility to ClimaPRO System Manager is ensured by an integrated web server that makes it visible from any computer equipped with a web browser, either locally or remotely.



6.1 GENERAL TECHNICAL DATA — FOCS60 /K [460 Volt]

[Standard AHRI 550/590 - SI System]

FOCS60 /K [460 Volt]			0751	0951	0961	1021	1301	1532	1732	1932	1952	2432
Power supply		V/ph/Hz	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)(3)	**kW**	**147**	**173**	**194**	**236**	**255**	**290**	**319**	**356**	**382**	**459**
Total power input	(1)(3)	kW	51,4	61,8	68,6	79,0	87,1	98,3	111	120	133	157
COPr	(1)(3)	kW/kW	2,85	2,80	2,83	2,99	2,93	2,95	2,88	2,96	2,87	2,92
IPLV (referred to COPr)	(1)(3)	kW/kW	4,02	3,99	3,75	4,19	4,25	4,33	4,37	4,27	4,27	4,40
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(2)(3)	kW	152	179	201	245	265	301	331	369	396	476
Total power input	(2)(3)	kW	49,9	59,9	66,6	76,6	84,5	95,2	107	117	129	152
Desuperheater heating capacity	(2)(3)	**kW**	**38,6**	**47,8**	**50,2**	**59,4**	**66,7**	**76,7**	**87,9**	**92,7**	**104**	**126**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)(3)	l/s	6,31	7,43	8,35	10,2	11,0	12,5	13,7	15,3	16,4	19,7
Pressure drop	(1)(3)	kPa	26,5	21,5	21,7	26,7	23,7	28,6	25,6	25,0	23,2	27,5
PARTIAL RECOVERY USER SIDE IN												
Water flow	(2)(3)	l/s	1,86	2,31	2,42	2,87	3,22	3,70	4,24	4,47	5,03	6,07
Pressure drop	(2)(3)	kPa	29,3	45,0	22,8	31,9	40,2	28,9	38,1	42,3	24,5	35,7
COMPRESSORS												
Compressors nr.		N°	1	1	1	1	1	2	2	2	2	2
Number of capacity		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	50	50	50	50	50	25	25	25	25	25
Refrigerant			R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge		kg	34	37	47	53	60	62	67	75	84	110
Oil charge		kg	10	15	15	15	15	20	20	30	30	30
FANS												
Quantity		N°	4	4	6	6	6	6	6	8	8	8
Air flow		m³/s	21,20	20,28	31,81	30,41	30,41	32,31	32,31	43,07	43,07	45,20
Fans power input		kW	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06
NOISE LEVEL												
Noise Pressure	(4)	dB(A)	63	64	65	65	65	66	66	67	67	67
Noise Power	(5)	dB(A)	95	96	97	97	97	98	98	99	99	100
SIZE AND WEIGHT												
A	(6)	mm	3110	3110	4110	4110	4110	4610	4610	5610	5610	6610
B	(6)	mm	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
H	(6)	mm	2150	2150	2150	2150	2150	2420	2420	2430	2430	2430
Operating weight	(6)	kg	1650	1920	2260	2360	2390	3030	3070	4020	4060	4530

Notes:
1 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,0°C/45,0°C.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [460 Volt]

[Standard AHRI 550/590 - SI System]

FOCS60 /K [460 Volt]			2632
Power supply		V/ph/Hz	460/3/60
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)(3)	**kW**	**505**
Total power input	(1)(3)	kW	173
COPr	(1)(3)	kW/kW	2,91
IPLV (referred to COPr)	(1)(3)	kW/kW	4,36
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(2)(3)	kW	524
Total power input	(2)(3)	kW	168
Desuperheater heating capacity	(2)(3)	**kW**	**136**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)(3)	l/s	21,7
Pressure drop	(1)(3)	kPa	25,5
PARTIAL RECOVERY USER SIDE IN			
Water flow	(2)(3)	l/s	6,58
Pressure drop	(2)(3)	kPa	42,0
COMPRESSORS			
Compressors nr.		N°	2
Number of capacity		N°	0
No. Circuits		N°	2
Regulation			STEPLESS
Min. capacity step		%	25
Refrigerant			R134a
Refrigerant charge		kg	110
Oil charge		kg	30
FANS			
Quantity		N°	10
Air flow		m³/s	53,84
Fans power input		kW	2,06
NOISE LEVEL			
Noise Pressure	(4)	dB(A)	67
Noise Power	(5)	dB(A)	100
SIZE AND WEIGHT			
A	(6)	mm	6610
B	(6)	mm	2220
H	(6)	mm	2430
Operating weight	(6)	kg	4670

Notes:
1 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,0°C/45,0°C.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [380 Volt]

[Standard AHRI 550/590 - SI System]

FOCS60 /K [380 Volt]			0751	0951	0961	1021	1301	1532	1732	1932	1952	2432
Power supply		V/ph/Hz	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)(3)	**kW**	**147**	**173**	**194**	**236**	**255**	**290**	**319**	**356**	**382**	**459**
Total power input	(1)(3)	kW	51,4	61,8	68,6	79,0	87,1	98,2	111	120	133	157
COPr	(1)(3)	kW/kW	2,85	2,80	2,83	2,99	2,93	2,95	2,88	2,96	2,87	2,92
IPLV (referred to COPr)	(1)(3)	kW/kW	4,02	3,99	3,75	4,19	4,25	4,33	4,37	4,27	4,27	4,40
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(2)(3)	kW	152	179	201	245	265	301	331	369	396	476
Total power input	(2)(3)	kW	49,8	59,9	66,6	76,6	84,4	95,1	107	116	129	152
Desuperheater heating capacity	(2)(3)	**kW**	**39,2**	**48,5**	**51,2**	**60,5**	**67,7**	**77,6**	**89,0**	**93,9**	**106**	**127**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)(3)	l/s	6,31	7,43	8,35	10,2	11,0	12,5	13,7	15,3	16,4	19,7
Pressure drop	(1)(3)	kPa	26,5	21,5	21,7	26,7	23,7	28,6	25,6	25,0	23,2	27,5
PARTIAL RECOVERY USER SIDE IN												
Water flow	(2)(3)	l/s	1,89	2,34	2,47	2,92	3,27	3,75	4,29	4,53	5,10	6,13
Pressure drop	(2)(3)	kPa	30,2	46,3	23,7	33,1	41,4	29,7	39,0	43,4	25,2	36,5
COMPRESSORS												
Compressors nr.		N°	1	1	1	1	1	2	2	2	2	2
Number of capacity		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	50	50	50	50	50	25	25	25	25	25
Refrigerant			R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge		kg	34	37	47	53	60	62	67	75	84	110
Oil charge		kg	10	15	15	15	15	20	20	30	30	30
FANS												
Quantity		N°	4	4	6	6	6	6	6	8	8	8
Air flow		m³/s	20,40	19,50	30,50	29,20	29,20	31,00	31,00	41,30	41,30	43,40
Fans power input		kW	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87
NOISE LEVEL												
Noise Pressure	(4)	dB(A)	63	64	65	65	65	66	66	67	67	67
Noise Power	(5)	dB(A)	95	96	97	97	97	98	98	99	99	100
SIZE AND WEIGHT												
A	(6)	mm	3110	3110	4110	4110	4110	4610	4610	5610	5610	6610
B	(6)	mm	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
H	(6)	mm	2150	2150	2150	2150	2150	2420	2420	2430	2430	2430
Operating weight	(6)	kg	1650	1920	2260	2360	2390	3030	3070	4020	4060	4530

Notes:
1 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,0°C/45,0°C.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [380 Volt]

[Standard AHRI 550/590 - SI System]

FOCS60 /K [380 Volt]			2632
Power supply		V/ph/Hz	380/3/60
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)(3)	**kW**	**505**
Total power input	(1)(3)	kW	173
COPr	(1)(3)	kW/kW	2,91
IPLV (referred to COPr)	(1)(3)	kW/kW	4,36
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(2)(3)	kW	524
Total power input	(2)(3)	kW	168
Desuperheater heating capacity	(2)(3)	**kW**	**138**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)(3)	l/s	21,7
Pressure drop	(1)(3)	kPa	25,5
PARTIAL RECOVERY USER SIDE IN			
Water flow	(2)(3)	l/s	6,66
Pressure drop	(2)(3)	kPa	43,1
COMPRESSORS			
Compressors nr.		N°	2
Number of capacity		N°	0
No. Circuits		N°	2
Regulation			STEPLESS
Min. capacity step		%	25
Refrigerant			R134a
Refrigerant charge		kg	110
Oil charge		kg	30
FANS			
Quantity		N°	10
Air flow		m³/s	51,70
Fans power input		kW	1,87
NOISE LEVEL			
Noise Pressure	(4)	dB(A)	67
Noise Power	(5)	dB(A)	100
SIZE AND WEIGHT			
A	(6)	mm	6610
B	(6)	mm	2220
H	(6)	mm	2430
Operating weight	(6)	kg	4670

Notes:
1 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,0°C/45,0°C.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [230 Volt]

[Standard AHRI 550/590 - SI System]

FOCS60 /K [230 Volt]			0751	0951	0961	1021	1301	1532	1732	1932	1952	2432
Power supply		V/ph/Hz	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)(3)	**kW**	**147**	**173**	**194**	**236**	**255**	**290**	**319**	**356**	**382**	**459**
Total power input	(1)(3)	kW	51,4	61,8	68,6	79,0	87,1	98,3	111	120	133	157
COPr	(1)(3)	kW/kW	2,85	2,80	2,83	2,99	2,93	2,95	2,88	2,96	2,87	2,92
IPLV (referred to COPr)	(1)(3)	kW/kW	4,02	3,99	3,75	4,19	4,25	4,33	4,37	4,27	4,27	4,40
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(2)(3)	kW	152	179	201	245	265	301	331	369	396	476
Total power input	(2)(3)	kW	49,9	59,9	66,6	76,6	84,5	95,2	107	117	129	152
Desuperheater heating capacity	(2)(3)	**kW**	**38,6**	**47,8**	**50,2**	**59,4**	**66,7**	**76,7**	**87,9**	**92,7**	**104**	**126**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)(3)	l/s	6,31	7,43	8,35	10,2	11,0	12,5	13,7	15,3	16,4	19,7
Pressure drop	(1)(3)	kPa	26,5	21,5	21,7	26,7	23,7	28,6	25,6	25,0	23,2	27,5
PARTIAL RECOVERY USER SIDE IN												
Water flow	(2)(3)	l/s	1,86	2,31	2,42	2,87	3,22	3,70	4,24	4,47	5,03	6,07
Pressure drop	(2)(3)	kPa	29,3	45,0	22,8	31,9	40,2	28,9	38,1	42,3	24,5	35,7
COMPRESSORS												
Compressors nr.		N°	1	1	1	1	1	2	2	2	2	2
Number of capacity		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	50	50	50	50	50	25	25	25	25	25
Refrigerant			R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge		kg	34	37	47	53	60	62	67	75	84	110
Oil charge		kg	10	15	15	15	15	20	20	30	30	30
FANS												
Quantity		N°	4	4	6	6	6	6	6	8	8	8
Air flow		m³/s	21,20	20,28	31,81	30,41	30,41	32,31	32,31	43,07	43,07	45,20
Fans power input		kW	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06
NOISE LEVEL												
Noise Pressure	(4)	dB(A)	63	64	65	65	65	66	66	67	67	67
Noise Power	(5)	dB(A)	95	96	97	97	97	98	98	99	99	100
SIZE AND WEIGHT												
A	(6)	mm	3110	3110	4110	4110	4110	4610	4610	5610	5610	6610
B	(6)	mm	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
H	(6)	mm	2150	2150	2150	2150	2150	2420	2420	2430	2430	2430
Operating weight	(6)	kg	1650	1920	2260	2360	2390	3030	3070	4020	4060	4530

Notes:
1 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,0°C/45,0°C.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [230 Volt]

[Standard AHRI 550/590 - SI System]

FOCS60 /K [230 Volt]			2632
Power supply		V/ph/Hz	230/3/60
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)(3)	**kW**	**505**
Total power input	(1)(3)	kW	173
COPr	(1)(3)	kW/kW	2,91
IPLV (referred to COPr)	(1)(3)	kW/kW	4,36
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(2)(3)	kW	524
Total power input	(2)(3)	kW	168
Desuperheater heating capacity	(2)(3)	**kW**	**136**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)(3)	l/s	21,7
Pressure drop	(1)(3)	kPa	25,5
PARTIAL RECOVERY USER SIDE IN			
Water flow	(2)(3)	l/s	6,58
Pressure drop	(2)(3)	kPa	42,0
COMPRESSORS			
Compressors nr.		N°	2
Number of capacity		N°	0
No. Circuits		N°	2
Regulation			STEPLESS
Min. capacity step		%	25
Refrigerant			R134a
Refrigerant charge		kg	110
Oil charge		kg	30
FANS			
Quantity		N°	10
Air flow		m³/s	53,84
Fans power input		kW	2,06
NOISE LEVEL			
Noise Pressure	(4)	dB(A)	67
Noise Power	(5)	dB(A)	100
SIZE AND WEIGHT			
A	(6)	mm	6610
B	(6)	mm	2220
H	(6)	mm	2430
Operating weight	(6)	kg	4670

Notes:
1 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,0°C/45,0°C.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [460 Volt]

[Standard AHRI 550/590 - I-P System]

FOCS60 /K [460 Volt]			0751	0951	0961	1021	1301	1532	1732	1932	1952	2432
Power supply		V/ph/Hz	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)(3)	**$tons_R$**	**41,7**	**49,2**	**55,2**	**67,2**	**72,6**	**82,4**	**90,8**	**101**	**109**	**130**
Total power input	(1)(3)	kW	51,4	61,8	68,6	79,0	87,1	98,3	111	120	133	157
Power input per Capacity	(1)(3)	$kW/tons_R$	1,23	1,26	1,24	1,18	1,20	1,19	1,22	1,19	1,22	1,21
EER	(1)(3)	Btu/hW	9,74	9,55	9,66	10,21	10,00	10,06	9,82	10,08	9,78	9,95
IPLV (referred to EER)	(1)(3)	Btu/hW	13,72	13,61	12,80	14,30	14,50	14,77	14,91	14,57	14,57	15,01
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(2)(3)	$tons_R$	43,3	51,0	57,3	69,7	75,3	85,5	94,2	105	113	135
Total power input	(2)(3)	kW	49,9	59,9	66,6	76,6	84,5	95,2	107	117	129	152
Desuperheater heating capacity	(2)(3)	**kBtu**	**132**	**163**	**171**	**203**	**228**	**262**	**300**	**316**	**356**	**429**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)(3)	GPM	100	118	132	161	174	198	218	242	260	313
Pressure drop	(1)(3)	ft H2O	8,87	7,19	7,25	8,93	7,94	9,56	8,58	8,35	7,76	9,20
PARTIAL RECOVERY USER SIDE IN												
Water flow	(2)(3)	GPM	29,5	36,6	38,4	45,5	51,0	58,7	67,3	70,9	79,8	96,1
Pressure drop	(2)(3)	ft H2O	9,80	15,1	7,61	10,7	13,5	9,68	12,7	14,1	8,21	11,9
COMPRESSORS												
Compressors nr.		N°	1	1	1	1	1	2	2	2	2	2
Number of capacity		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	50	50	50	50	50	25	25	25	25	25
Refrigerant			R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge		lb	75	82	104	117	132	137	148	165	185	243
Oil charge		lb	22	33	33	33	33	44	44	66	66	66
FANS												
Quantity		N°	4	4	6	6	6	6	6	8	8	8
Air flow		cfm	749	716	1123	1074	1074	1141	1141	1521	1521	1596
Fans power input		kW	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06
NOISE LEVEL												
Noise Pressure	(4)	dB(A)	63	64	65	65	65	66	66	67	67	67
Noise Power	(5)	dB(A)	95	96	97	97	97	98	98	99	99	100
SIZE AND WEIGHT												
A	(6)	in	122,4	122,4	161,8	161,8	161,8	181,5	181,5	220,9	220,9	260,2
B	(6)	in	87,4	87,4	87,4	87,4	87,4	87,4	87,4	87,4	87,4	87,4
H	(6)	in	84,6	84,6	84,6	84,6	84,6	95,3	95,3	95,7	95,7	95,7
Operating weight	(6)	lb	3638	4233	4982	5203	5269	6680	6768	8863	8951	9987

Notes:

1 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
2 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F; Plant (side) heat exchanger recovery water (in/out) 104,0°F/113,0°F.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [460 Volt]

[Standard AHRI 550/590 - I-P System]

FOCS60 /K [460 Volt]			2632
Power supply		V/ph/Hz	460/3/60
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)(3)	**$tons_R$**	**144**
Total power input	(1)(3)	kW	173
Power input per Capacity	(1)(3)	$kW/tons_R$	1,20
EER	(1)(3)	Btu/hW	9,93
IPLV (referred to EER)	(1)(3)	Btu/hW	14,88
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(2)(3)	$tons_R$	149
Total power input	(2)(3)	kW	168
Desuperheater heating capacity	(2)(3)	**kBtu**	**465**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)(3)	GPM	344
Pressure drop	(1)(3)	ft H2O	8,52
PARTIAL RECOVERY USER SIDE IN			
Water flow	(2)(3)	GPM	104
Pressure drop	(2)(3)	ft H2O	14,1
COMPRESSORS			
Compressors nr.		N°	2
Number of capacity		N°	0
No. Circuits		N°	2
Regulation			STEPLESS
Min. capacity step		%	25
Refrigerant			R134a
Refrigerant charge		lb	243
Oil charge		lb	66
FANS			
Quantity		N°	10
Air flow		cfm	1901
Fans power input		kW	2,06
NOISE LEVEL			
Noise Pressure	(4)	dB(A)	67
Noise Power	(5)	dB(A)	100
SIZE AND WEIGHT			
A	(6)	in	260,2
B	(6)	in	87,4
H	(6)	in	95,7
Operating weight	(6)	lb	10296

Notes:
1 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
2 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F; Plant (side) heat exchanger recovery water (in/out) 104,0°F/113,0°F.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [380 Volt]

[Standard AHRI 550/590 - I-P System]

FOCS60 /K [380 Volt]			0751	0951	0961	1021	1301	1532	1732	1932	1952	2432
Power supply		V/ph/Hz	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)(3)	**$tons_R$**	**41,7**	**49,2**	**55,2**	**67,2**	**72,6**	**82,4**	**90,8**	**101**	**109**	**130**
Total power input	(1)(3)	kW	51,4	61,8	68,6	79,0	87,1	98,2	111	120	133	157
Power input per Capacity	(1)(3)	$kW/tons_R$	1,23	1,26	1,24	1,18	1,20	1,19	1,22	1,19	1,22	1,21
EER	(1)(3)	Btu/hW	9,74	9,55	9,66	10,21	10,00	10,07	9,82	10,09	9,78	9,95
IPLV (referred to EER)	(1)(3)	Btu/hW	13,72	13,61	12,80	14,30	14,50	14,77	14,91	14,57	14,57	15,01
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(2)(3)	$tons_R$	43,3	51,0	57,3	69,7	75,3	85,5	94,2	105	113	135
Total power input	(2)(3)	kW	49,8	59,9	66,6	76,6	84,4	95,1	107	116	129	152
Desuperheater heating capacity	(2)(3)	**kBtu**	**134**	**165**	**175**	**206**	**231**	**265**	**304**	**320**	**360**	**434**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)(3)	GPM	100	118	132	161	174	198	218	242	260	313
Pressure drop	(1)(3)	ft H2O	8,87	7,19	7,25	8,93	7,94	9,56	8,58	8,35	7,76	9,20
PARTIAL RECOVERY USER SIDE IN												
Water flow	(2)(3)	GPM	30,0	37,1	39,2	46,3	51,8	59,4	68,1	71,8	80,8	97,2
Pressure drop	(2)(3)	ft H2O	10,1	15,5	7,92	11,1	13,9	9,93	13,0	14,5	8,44	12,2
COMPRESSORS												
Compressors nr.		N°	1	1	1	1	1	2	2	2	2	2
Number of capacity		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	50	50	50	50	50	25	25	25	25	25
Refrigerant			R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge		lb	75	82	104	117	132	137	148	165	185	243
Oil charge		lb	22	33	33	33	33	44	44	66	66	66
FANS												
Quantity		N°	4	4	6	6	6	6	6	8	8	8
Air flow		cfm	720	689	1077	1031	1031	1095	1095	1458	1458	1532
Fans power input		kW	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87
NOISE LEVEL												
Noise Pressure	(4)	dB(A)	63	64	65	65	65	66	66	67	67	67
Noise Power	(5)	dB(A)	95	96	97	97	97	98	98	99	99	100
SIZE AND WEIGHT												
A	(6)	in	122,4	122,4	161,8	161,8	161,8	181,5	181,5	220,9	220,9	260,2
B	(6)	in	87,4	87,4	87,4	87,4	87,4	87,4	87,4	87,4	87,4	87,4
H	(6)	in	84,6	84,6	84,6	84,6	84,6	95,3	95,3	95,7	95,7	95,7
Operating weight	(6)	lb	3638	4233	4982	5203	5269	6680	6768	8863	8951	9987

Notes:

1 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
2 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F; Plant (side) heat exchanger recovery water (in/out) 104,0°F/113,0°F.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [380 Volt]

[Standard AHRI 550/590 - I-P System]

FOCS60 /K [380 Volt]			2632
Power supply		V/ph/Hz	380/3/60
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)(3)	**$tons_R$**	**144**
Total power input	(1)(3)	kW	173
Power input per Capacity	(1)(3)	$kW/tons_R$	1,20
EER	(1)(3)	Btu/hW	9,93
IPLV (referred to EER)	(1)(3)	Btu/hW	14,88
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(2)(3)	$tons_R$	149
Total power input	(2)(3)	kW	168
Desuperheater heating capacity	(2)(3)	**kBtu**	**471**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)(3)	GPM	344
Pressure drop	(1)(3)	ft H2O	8,52
PARTIAL RECOVERY USER SIDE IN			
Water flow	(2)(3)	GPM	106
Pressure drop	(2)(3)	ft H2O	14,4
COMPRESSORS			
Compressors nr.		N°	2
Number of capacity		N°	0
No. Circuits		N°	2
Regulation			STEPLESS
Min. capacity step		%	25
Refrigerant			R134a
Refrigerant charge		lb	243
Oil charge		lb	66
FANS			
Quantity		N°	10
Air flow		cfm	1826
Fans power input		kW	1,87
NOISE LEVEL			
Noise Pressure	(4)	dB(A)	67
Noise Power	(5)	dB(A)	100
SIZE AND WEIGHT			
A	(6)	in	260,2
B	(6)	in	87,4
H	(6)	in	95,7
Operating weight	(6)	lb	10296

Notes:
1 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
2 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F; Plant (side) heat exchanger recovery water (in/out) 104,0°F/113,0°F.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [230 Volt]

[Standard AHRI 550/590 - I-P System]

FOCS60 /K [230 Volt]			0751	0951	0961	1021	1301	1532	1732	1932	1952	2432
Power supply		V/ph/Hz	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60	230/3/60
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)(3)	**$tons_R$**	**41,7**	**49,2**	**55,2**	**67,2**	**72,6**	**82,4**	**90,8**	**101**	**109**	**130**
Total power input	(1)(3)	kW	51,4	61,8	68,6	79,0	87,1	98,3	111	120	133	157
Power input per Capacity	(1)(3)	$kW/tons_R$	1,23	1,26	1,24	1,18	1,20	1,19	1,22	1,19	1,22	1,21
EER	(1)(3)	Btu/hW	9,74	9,55	9,66	10,21	10,00	10,06	9,82	10,08	9,78	9,95
IPLV(referred to EER)	(1)(3)	Btu/hW	13,72	13,61	12,80	14,30	14,50	14,77	14,91	14,57	14,57	15,01
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(2)(3)	$tons_R$	43,3	51,0	57,3	69,7	75,3	85,5	94,2	105	113	135
Total power input	(2)(3)	kW	49,9	59,9	66,6	76,6	84,5	95,2	107	117	129	152
Desuperheater heating capacity	(2)(3)	**kBtu**	**132**	**163**	**171**	**203**	**228**	**262**	**300**	**316**	**356**	**429**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)(3)	GPM	100	118	132	161	174	198	218	242	260	313
Pressure drop	(1)(3)	ft H2O	8,87	7,19	7,25	8,93	7,94	9,56	8,58	8,35	7,76	9,20
PARTIAL RECOVERY USER SIDE IN												
Water flow	(2)(3)	GPM	29,5	36,6	38,4	45,5	51,0	58,7	67,3	70,9	79,8	96,1
Pressure drop	(2)(3)	ft H2O	9,80	15,1	7,61	10,7	13,5	9,68	12,7	14,1	8,21	11,9
COMPRESSORS												
Compressors nr.		N°	1	1	1	1	1	2	2	2	2	2
Number of capacity		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	50	50	50	50	50	25	25	25	25	25
Refrigerant			R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge		lb	75	82	104	117	132	137	148	165	185	243
Oil charge		lb	22	33	33	33	33	44	44	66	66	66
FANS												
Quantity		N°	4	4	6	6	6	6	6	8	8	8
Air flow		cfm	749	716	1123	1074	1074	1141	1141	1521	1521	1596
Fans power input		kW	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06	2,06
NOISE LEVEL												
Noise Pressure	(4)	dB(A)	63	64	65	65	65	66	66	67	67	67
Noise Power	(5)	dB(A)	95	96	97	97	97	98	98	99	99	100
SIZE AND WEIGHT												
A	(6)	in	122,4	122,4	161,8	161,8	161,8	181,5	181,5	220,9	220,9	260,2
B	(6)	in	87,4	87,4	87,4	87,4		87,4	87,4	87,4	87,4	87,4
H	(6)	in	84,6	84,6	84,6	84,6	84,6	95,3	95,3	95,7	95,7	95,7
Operating weight	(6)	lb	3638	4233	4982	5203	5269	6680	6768	8863	8951	9987

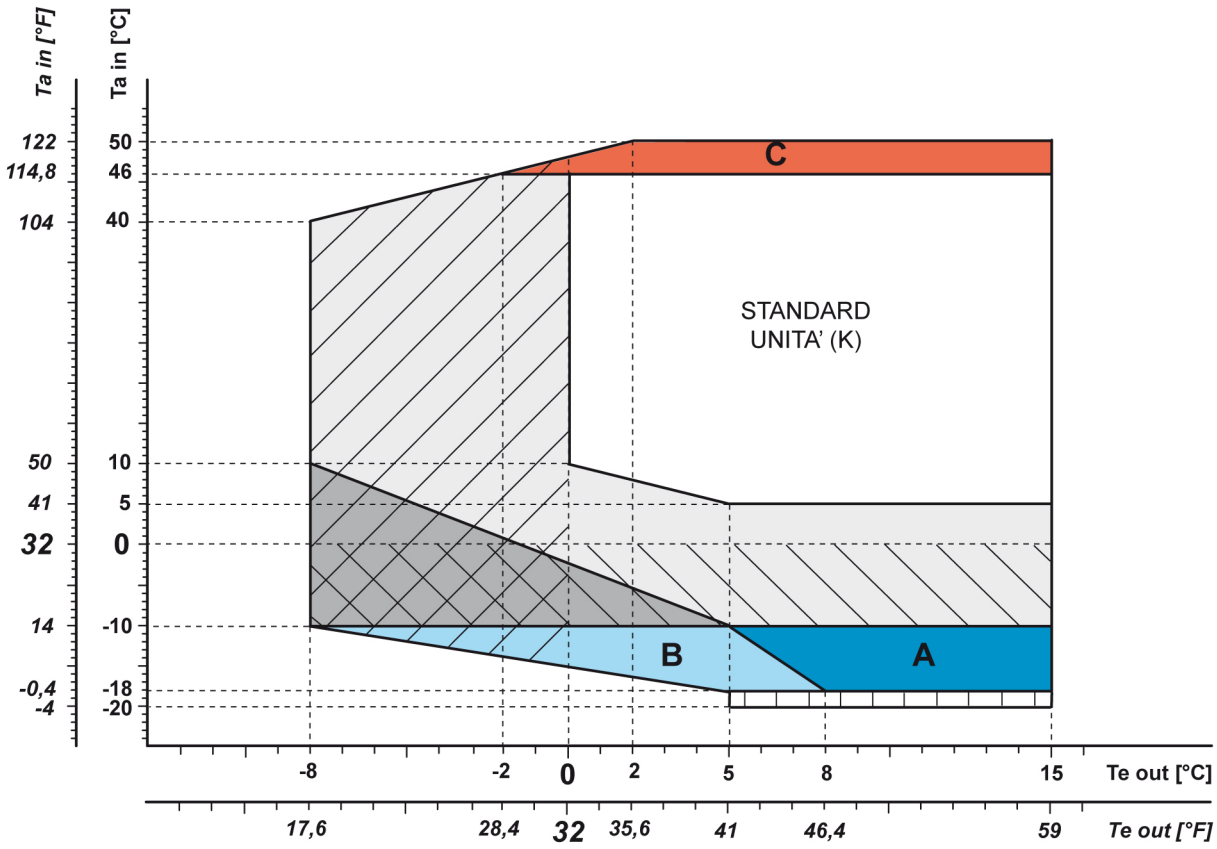
Notes:
1 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
2 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F; Plant (side) heat exchanger recovery water (in/out) 104,0°F/113,0°F.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

GENERAL TECHNICAL DATA — FOCS60 /K [230 Volt]

[Standard AHRI 550/590 - I-P System]

FOCS60 /K [230 Volt]			2632
Power supply		V/ph/Hz	230/3/60
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)(3)	**$tons_R$**	**144**
Total power input	(1)(3)	kW	173
Power input per Capacity	(1)(3)	$kW/tons_R$	1,20
EER	(1)(3)	Btu/hW	9,93
IPLV (referred to EER)	(1)(3)	Btu/hW	14,88
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(2)(3)	$tons_R$	149
Total power input	(2)(3)	kW	168
Desuperheater heating capacity	(2)(3)	**kBtu**	**465**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)(3)	GPM	344
Pressure drop	(1)(3)	ft H2O	8,52
PARTIAL RECOVERY USER SIDE IN			
Water flow	(2)(3)	GPM	104
Pressure drop	(2)(3)	ft H2O	14,1
COMPRESSORS			
Compressors nr.		N°	2
Number of capacity		N°	0
No. Circuits		N°	2
Regulation			STEPLESS
Min. capacity step		%	25
Refrigerant			R134a
Refrigerant charge		lb	243
Oil charge		lb	66
FANS			
Quantity		N°	10
Air flow		cfm	1901
Fans power input		kW	2,06
NOISE LEVEL			
Noise Pressure	(4)	dB(A)	67
Noise Power	(5)	dB(A)	100
SIZE AND WEIGHT			
A	(6)	in	260,2
B	(6)	in	87,4
H	(6)	in	95,7
Operating weight	(6)	lb	10296

Notes:
1 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
2 Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F; Plant (side) heat exchanger recovery water (in/out) 104,0°F/113,0°F.
3 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
4 Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
5 Sound power on the basis of measurements made in compliance with ISO 9614.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable



Ta in Outdoor air temperature [°C]
Te out Evaporator outlet temperature [°C]

For the temperature limits of each size please refer to the selection software ElcaStudio
(the diagram over 40°C could vary according to the size and the version of the selected unit).

Pressostatic control DP option (801) required (Standard for K version)

DVVF option (819) required

DVV2F option (821) required

A

For wind protected installations (wind speed lower than 0,5 m/s - 1,64 ft/s) provide:
DVVF option (819) and devices for low air temperature down to -18°C (-0,4°F) option (804)
and double insulation on evaporator (opz.2361) + antifreeze on pipes and pumps (opz. 2431/2/3)
For windy installations provide:
DVVF option (819) and DBF device option (805)
and double insulation on evaporator (opz.2361) + antifreeze on pipes and pumps (opz. 2431/2/3)

B

For wind protected installations (wind speed lower than 0,5 m/s - 1,64 ft/s) provide:
DVV2F option (821) and devices for low air temperature down to -18°C (-0,4°F) option (804)
and double insulation on evaporator (opz.2361) + antifreeze on pipes and pumps (opz. 2431/2/3)
For windy installations provide:
DVV2F option (821) and DBF device option (805)
and double insulation on evaporator (opz.2361) + antifreeze on pipes and pumps (opz. 2431/2/3)

C kit HT option (1955) required

Negative fluid temperature option (871) required

Antifreeze on pipes +pumps option (2432) required if hydronic kit is present

DVVF option (819) and DBA device option (813) required
and double insulation on evaporator (opz.2361) + antifreeze on pipes and pumps (opz. 2431/2/3)

7.2 ETHYLENE GLYCOL MIXTURE

Ethylene glycol and water mixture, used as a heat-conveying fluid, cause a variation in unit performance. For correct data, use the factors indicated in the following tabel.

	Freezing point (°C)							
	0	-5	-10	-15	-20	-25	-30	-35
	Ethylene glycol percentage by weight							
	0%	12%	20%	30%	35%	40%	45%	50%
cPf	1	0,985	0,98	0,974	0,97	0,965	0,964	0,96
cQ	1	1,02	1,04	1,075	1,11	1,14	1,17	1,2
cdp	1	1,07	1,11	1,18	1,22	1,24	1,27	1,3

cPf: cooling power correction factor
cQ: flow correction factor
cdp: pressure drop correction factor

For data concerning other kind of anti-freeze solutions (e,g, propylene glycol) please contact our Sale Department.

7.3 FOULING FACTORS

Performances are based on clean condition of tubes (fouling factor = 1). For different fouling values, performance should be adjusted using the correction factors shown in the following table.

SERIES	FOULING FACTORS	EVAPORATOR			CONDENSER/RECOVERY			DESUPERHEATER
	ff (m² °CW)	F1	FK1	KE [°C]	F2	FK2	KC [°C]	R3
VARIOUS	0	1,000	1,000	0,0	1,000	1,000	0,0	1,000
VARIOUS	$1{,}80 \times 10^{-5}$	1,000	1,000	0,0	1,000	1,000	0,0	1,000
VARIOUS	$4{,}40 \times 10^{-5}$	1,000	1,000	0,0	0,990	1,030	1,0	0,990
VARIOUS	$8{,}80 \times 10^{-5}$	0,960	0,990	0,7	0,980	1,040	1,5	0,980
VARIOUS	$13{,}20 \times 10^{-5}$	0,944	0,985	1,0	0,964	1,050	2,3	0,964
VARIOUS	$17{,}20 \times 10^{-5}$	0,930	0,980	1,5	0,950	1,060	3,0	0,950

ff: fouling factors
f1 - f2: potential correction factors
fk1 - fk2: compressor power input correction factors
r3: capacity correction factors
KE: minimum condenser outlet temperature increase
KC: maximum condenser outlet temperature decrease

8.1 HYDRAULIC DATA

[Standard AHRI 550/590 - SI System]

Water flow and pressure drop

Water flow in the plant (side) exchanger is given by:
Q=P/(4,186 x Dt)
Q: water flow (l/s)
Dt: difference between inlet and outlet water temp. (°C)
P: heat exchanger capacity (kW)

Pressure drop is given by:
Dp= K x (3,6 x Q)^2/1000
Q: water flow (l/s)
Dp: pressure drop (kPa)
K: unit size ratio

SIZE	Power supply V/ph/Hz	HEAT EXCHANGER USER SIDE					HEAT RECOVERY EX. USER SIDE			
		K	Q min l/s	Q max l/s	C.A.S. l	C.a. min l	K	Q min l/s	C.A.S. l	Q max l/s
FOCS60 /K /0751	460/3/60	51,5	4,31	11,6	15	700	-	-	-	-
FOCS60 /K /0951	460/3/60	30,0	4,83	13,0	20	900	-	-	-	-
FOCS60 /K /0961	460/3/60	24,0	6,00	16,1	22	1000	-	-	-	-
FOCS60 /K /1021	460/3/60	20,0	6,97	18,6	25	1200	-	-	-	-
FOCS60 /K /1301	460/3/60	15,2	7,92	21,1	29	1300	-	-	-	-
FOCS60 /K /1532	460/3/60	14,2	8,25	22,2	33	1000	-	-	-	-
FOCS60 /K /1732	460/3/60	10,5	9,81	26,1	38	1100	-	-	-	-
FOCS60 /K /1932	460/3/60	8,24	10,9	29,2	42	1300	-	-	-	-
FOCS60 /K /1952	460/3/60	6,63	11,9	31,7	47	1300	-	-	-	-
FOCS60 /K /2432	460/3/60	5,45	13,9	37,2	52	1600	-	-	-	-
FOCS60 /K /2632	460/3/60	4,17	15,4	41,1	60	1800	-	-	-	-
FOCS60 /D /K /0751	460/3/60	51,5	4,31	11,6	15	700	652	0,003	2	2,31
FOCS60 /D /K /0951	460/3/60	30,0	4,83	13,0	20	900	652	0,003	2	2,86
FOCS60 /D /K /0961	460/3/60	24,0	6,00	16,1	22	1000	299	0,003	2	3,00
FOCS60 /D /K /1021	460/3/60	20,0	6,97	18,6	25	1200	299	0,003	2	3,56
FOCS60 /D /K /1301	460/3/60	15,2	7,92	21,1	29	1300	299	0,003	2	4,00
FOCS60 /D /K /1532	460/3/60	14,2	8,25	22,2	33	1000	163	0,003	3	4,61
FOCS60 /D /K /1732	460/3/60	10,5	9,81	26,1	38	1100	163	0,003	3	5,28
FOCS60 /D /K /1932	460/3/60	8,24	10,9	29,2	42	1300	163	0,003	3	5,56
FOCS60 /D /K /1952	460/3/60	6,63	11,9	31,7	47	1300	74,8	0,003	4	6,25
FOCS60 /D /K /2432	460/3/60	5,45	13,9	37,2	52	1600	74,8	0,003	4	7,56
FOCS60 /D /K /2632	460/3/60	4,17	15,4	41,1	60	1800	74,8	0,003	4	8,17
FOCS60 /K /0751	380/3/60	51,5	4,31	11,6	15	700	-	-	-	-
FOCS60 /K /0951	380/3/60	30,0	4,83	13,0	20	900	-	-	-	-
FOCS60 /K /0961	380/3/60	24,0	6,00	16,1	22	1000	-	-	-	-
FOCS60 /K /1021	380/3/60	20,0	6,97	18,6	25	1200	-	-	-	-
FOCS60 /K /1301	380/3/60	15,2	7,92	21,1	29	1300	-	-	-	-
FOCS60 /K /1532	380/3/60	14,2	8,25	22,2	33	1000	-	-	-	-
FOCS60 /K /1732	380/3/60	10,5	9,81	26,1	38	1100	-	-	-	-
FOCS60 /K /1932	380/3/60	8,24	10,9	29,2	42	1300	-	-	-	-
FOCS60 /K /1952	380/3/60	6,63	11,9	31,7	47	1300	-	-	-	-
FOCS60 /K /2432	380/3/60	5,45	13,9	37,2	52	1600	-	-	-	-
FOCS60 /K /2632	380/3/60	4,17	15,4	41,1	60	1800	-	-	-	-
FOCS60 /D /K /0751	380/3/60	51,5	4,31	11,6	15	700	652	0,003	2	2,31
FOCS60 /D /K /0951	380/3/60	30,0	4,83	13,0	20	900	652	0,003	2	2,86
FOCS60 /D /K /0961	380/3/60	24,0	6,00	16,1	22	1000	299	0,003	2	3,00
FOCS60 /D /K /1021	380/3/60	20,0	6,97	18,6	25	1200	299	0,003	2	3,56
FOCS60 /D /K /1301	380/3/60	15,2	7,92	21,1	29	1300	299	0,003	2	4,00
FOCS60 /D /K /1532	380/3/60	14,2	8,25	22,2	33	1000	163	0,003	3	4,61
FOCS60 /D /K /1732	380/3/60	10,5	9,81	26,1	38	1100	163	0,003	3	5,28
FOCS60 /D /K /1932	380/3/60	8,24	10,9	29,2	42	1300	163	0,003	3	5,56
FOCS60 /D /K /1952	380/3/60	6,63	11,9	31,7	47	1300	74,8	0,003	4	6,25
FOCS60 /D /K /2432	380/3/60	5,45	13,9	37,2	52	1600	74,8	0,003	4	7,56

Q min: minimum water flow admitted to the heat exchanger
Q max: maximum water flow admitted to the heat exchanger
C.a. min: minimum water content admitted in the plant
C.A.S.: Exchanger water content

HYDRAULIC DATA

[Standard AHRI 550/590 - SI System]

SIZE	Power supply V/ph/Hz	HEAT EXCHANGER USER SIDE					HEAT RECOVERY EX. USER SIDE			
		K	Q min l/s	Q max l/s	C.A.S. l	C.a. min l	K	Q min l/s	C.A.S. l	Q max l/s
FOCS60 /D /K /2632	380/3/60	4,17	15,4	41,1	60	1800	74,8	0,003	4	8,17
FOCS60 /K /0751	230/3/60	51,5	4,31	11,6	15	700	-	-	-	-
FOCS60 /K /0951	230/3/60	30,0	4,83	13,0	20	900	-	-	-	-
FOCS60 /K /0961	230/3/60	24,0	6,00	16,1	22	1000	-	-	-	-
FOCS60 /K /1021	230/3/60	20,0	6,97	18,6	25	1200	-	-	-	-
FOCS60 /K /1301	230/3/60	15,2	7,92	21,1	29	1300	-	-	-	-
FOCS60 /K /1532	230/3/60	14,2	8,25	22,2	33	1000	-	-	-	-
FOCS60 /K /1732	230/3/60	10,5	9,81	26,1	38	1100	-	-	-	-
FOCS60 /K /1932	230/3/60	8,24	10,9	29,2	42	1300	-	-	-	-
FOCS60 /K /1952	230/3/60	6,63	11,9	31,7	47	1300	-	-	-	-
FOCS60 /K /2432	230/3/60	5,45	13,9	37,2	52	1600	-	-	-	-
FOCS60 /K /2632	230/3/60	4,17	15,4	41,1	60	1800	-	-	-	-
FOCS60 /D /K /0751	230/3/60	51,5	4,31	11,6	15	700	652	0,003	2	2,31
FOCS60 /D /K /0951	230/3/60	30,0	4,83	13,0	20	900	652	0,003	2	2,86
FOCS60 /D /K /0961	230/3/60	24,0	6,00	16,1	22	1000	299	0,003	2	3,00
FOCS60 /D /K /1021	230/3/60	20,0	6,97	18,6	25	1200	299	0,003	2	3,56
FOCS60 /D /K /1301	230/3/60	15,2	7,92	21,1	29	1300	299	0,003	2	4,00
FOCS60 /D /K /1532	230/3/60	14,2	8,25	22,2	33	1000	163	0,003	3	4,61
FOCS60 /D /K /1732	230/3/60	10,5	9,81	26,1	38	1100	163	0,003	3	5,28
FOCS60 /D /K /1932	230/3/60	8,24	10,9	29,2	42	1300	163	0,003	3	5,56
FOCS60 /D /K /1952	230/3/60	6,63	11,9	31,7	47	1300	74,8	0,003	4	6,25
FOCS60 /D /K /2432	230/3/60	5,45	13,9	37,2	52	1600	74,8	0,003	4	7,56
FOCS60 /D /K /2632	230/3/60	4,17	15,4	41,1	60	1800	74,8	0,003	4	8,17

Q min: minimum water flow admitted to the heat exchanger
Q max: maximum water flow admitted to the heat exchanger
C.a. min: minimum water content admitted in the plant
C.A.S.: Exchanger water content

HYDRAULIC DATA

[Standard AHRI 550/590 - I-P System]

Water flow and pressure drop

Water flow in the plant (side) exchanger is given by:
Q=Px24/Dt
Q: water flow (GPM)
Dt: difference between inlet and outlet water temp. (°F)
P: heat exchanger capacity ($tons_R$)

Pressure drop is given by:
Dp= K x Q^2/57960
Q: water flow (GPM)
Dp: pressure drop (ftH_2O)
K: unit size ratio

SIZE	Power supply V/ph/Hz	HEAT EXCHANGER USER SIDE					HEAT RECOVERY EX. USER SIDE			
		K	Q min GPM	Q max GPM	C.A.S. galUK	C.a. min galUK	K	Q min GPM	C.A.S. galUK	Q max GPM
FOCS60 /K /0751	460/3/60	51,5	68,2	183	3	154	-	-	-	-
FOCS60 /K /0951	460/3/60	30,0	76,6	206	4	198	-	-	-	-
FOCS60 /K /0961	460/3/60	24,0	95,1	255	5	220	-	-	-	-
FOCS60 /K /1021	460/3/60	20,0	111	295	5	264	-	-	-	-
FOCS60 /K /1301	460/3/60	15,2	125	335	6	286	-	-	-	-
FOCS60 /K /1532	460/3/60	14,2	131	352	7	220	-	-	-	-
FOCS60 /K /1732	460/3/60	10,5	155	414	8	242	-	-	-	-
FOCS60 /K /1932	460/3/60	8,24	173	462	9	286	-	-	-	-
FOCS60 /K /1952	460/3/60	6,63	188	502	10	286	-	-	-	-
FOCS60 /K /2432	460/3/60	5,45	220	590	11	352	-	-	-	-
FOCS60 /K /2632	460/3/60	4,17	244	652	13	396	-	-	-	-
FOCS60 /D /K /0751	460/3/60	51,5	68,2	183	3	154	652	0,04	0,5	36,5
FOCS60 /D /K /0951	460/3/60	30,0	76,6	206	4	198	652	0,04	0,5	45,3
FOCS60 /D /K /0961	460/3/60	24,0	95,1	255	5	220	299	0,04	0,5	47,6
FOCS60 /D /K /1021	460/3/60	20,0	111	295	5	264	299	0,04	0,5	56,4
FOCS60 /D /K /1301	460/3/60	15,2	125	335	6	286	299	0,04	0,5	63,4
FOCS60 /D /K /1532	460/3/60	14,2	131	352	7	220	163	0,04	1	73,1
FOCS60 /D /K /1732	460/3/60	10,5	155	414	8	242	163	0,04	1	83,7
FOCS60 /D /K /1932	460/3/60	8,24	173	462	9	286	163	0,04	1	88,1
FOCS60 /D /K /1952	460/3/60	6,63	188	502	10	286	74,8	0,04	1	99,1
FOCS60 /D /K /2432	460/3/60	5,45	220	590	11	352	74,8	0,04	1	120
FOCS60 /D /K /2632	460/3/60	4,17	244	652	13	396	74,8	0,04	1	129
FOCS60 /K /0751	380/3/60	51,5	68,2	183	3	154	-	-	-	-
FOCS60 /K /0951	380/3/60	30,0	76,6	206	4	198	-	-	-	-
FOCS60 /K /0961	380/3/60	24,0	95,1	255	5	220	-	-	-	-
FOCS60 /K /1021	380/3/60	20,0	111	295	5	264	-	-	-	-
FOCS60 /K /1301	380/3/60	15,2	125	335	6	286	-	-	-	-
FOCS60 /K /1532	380/3/60	14,2	131	352	7	220	-	-	-	-
FOCS60 /K /1732	380/3/60	10,5	155	414	8	242	-	-	-	-
FOCS60 /K /1932	380/3/60	8,24	173	462	9	286	-	-	-	-
FOCS60 /K /1952	380/3/60	6,63	188	502	10	286	-	-	-	-
FOCS60 /K /2432	380/3/60	5,45	220	590	11	352	-	-	-	-
FOCS60 /K /2632	380/3/60	4,17	244	652	13	396	-	-	-	-
FOCS60 /D /K /0751	380/3/60	51,5	68,2	183	3	154	652	0,04	0,5	36,5
FOCS60 /D /K /0951	380/3/60	30,0	76,6	206	4	198	652	0,04	0,5	45,3
FOCS60 /D /K /0961	380/3/60	24,0	95,1	255	5	220	299	0,04	0,5	47,6
FOCS60 /D /K /1021	380/3/60	20,0	111	295	5	264	299	0,04	0,5	56,4
FOCS60 /D /K /1301	380/3/60	15,2	125	335	6	286	299	0,04	0,5	63,4
FOCS60 /D /K /1532	380/3/60	14,2	131	352	7	220	163	0,04	1	73,1
FOCS60 /D /K /1732	380/3/60	10,5	155	414	8	242	163	0,04	1	83,7
FOCS60 /D /K /1932	380/3/60	8,24	173	462	9	286	163	0,04	1	88,1
FOCS60 /D /K /1952	380/3/60	6,63	188	502	10	286	74,8	0,04	1	99,1
FOCS60 /D /K /2432	380/3/60	5,45	220	590	11	352	74,8	0,04	1	120

Q min: minimum water flow admitted to the heat exchanger
Q max: maximum water flow admitted to the heat exchanger
C.a. min: minimum water content admitted in the plant
C.A.S.: Exchanger water content

HYDRAULIC DATA

[Standard AHRI 550/590 - I-P System]

SIZE	Power supply V/ph/Hz	HEAT EXCHANGER USER SIDE					HEAT RECOVERY EX. USER SIDE			
		K	Q min GPM	Q max GPM	C.A.S. galUK	C.a. min galUK	K	Q min GPM	C.A.S. galUK	Q max GPM
FOCS60 /D /K /2632	380/3/60	4,17	244	652	13	396	74,8	0,04	1	129
FOCS60 /K /0751	230/3/60	51,5	68,2	183	3	154	-	-	-	-
FOCS60 /K /0951	230/3/60	30,0	76,6	206	4	198	-	-	-	-
FOCS60 /K /0961	230/3/60	24,0	95,1	255	5	220	-	-	-	-
FOCS60 /K /1021	230/3/60	20,0	111	295	5	264	-	-	-	-
FOCS60 /K /1301	230/3/60	15,2	125	335	6	286	-	-	-	-
FOCS60 /K /1532	230/3/60	14,2	131	352	7	220	-	-	-	-
FOCS60 /K /1732	230/3/60	10,5	155	414	8	242	-	-	-	-
FOCS60 /K /1932	230/3/60	8,24	173	462	9	286	-	-	-	-
FOCS60 /K /1952	230/3/60	6,63	188	502	10	286	-	-	-	-
FOCS60 /K /2432	230/3/60	5,45	220	590	11	352	-	-	-	-
FOCS60 /K /2632	230/3/60	4,17	244	652	13	396	-	-	-	-
FOCS60 /D /K /0751	230/3/60	51,5	68,2	183	3	154	652	0,04	0,5	36,5
FOCS60 /D /K /0951	230/3/60	30,0	76,6	206	4	198	652	0,04	0,5	45,3
FOCS60 /D /K /0961	230/3/60	24,0	95,1	255	5	220	299	0,04	0,5	47,6
FOCS60 /D /K /1021	230/3/60	20,0	111	295	5	264	299	0,04	0,5	56,4
FOCS60 /D /K /1301	230/3/60	15,2	125	335	6	286	299	0,04	0,5	63,4
FOCS60 /D /K /1532	230/3/60	14,2	131	352	7	220	163	0,04	1	73,1
FOCS60 /D /K /1732	230/3/60	10,5	155	414	8	242	163	0,04	1	83,7
FOCS60 /D /K /1932	230/3/60	8,24	173	462	9	286	163	0,04	1	88,1
FOCS60 /D /K /1952	230/3/60	6,63	188	502	10	286	74,8	0,04	1	99,1
FOCS60 /D /K /2432	230/3/60	5,45	220	590	11	352	74,8	0,04	1	120
FOCS60 /D /K /2632	230/3/60	4,17	244	652	13	396	74,8	0,04	1	129

Q min: minimum water flow admitted to the heat exchanger
Q max: maximum water flow admitted to the heat exchanger
C.a. min: minimum water content admitted in the plant
C.A.S.: Exchanger water content

9.1 ELECTRICAL DATA

FOCS60 /K [460 Volt]

[Standard AHRI 550/590]

SIZE	Power supply V/ph/Hz	Maximum values								
		Compressor				Fans (1)		Total (1)(2)		
		n	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	S.A. [A]
0751	460/3/60	1	1x60	1x83	1x269	2,06	4	68,0	98	284
0951	460/3/60	1	1x76	1x103	1x290	2,06	4	84,0	118	305
0961	460/3/60	1	1x76	1x103	1x290	2,06	4	88,0	125	313
1021	460/3/60	1	1x98	1x131	1x423	2,06	4	110	153	446
1301	460/3/60	1	1x97	1x129	1x423	2,06	4	109	152	446
1532	460/3/60	2	2x60	2x83	2x269	2,06	4	132	188	349
1732	460/3/60	2	2x60	2x84	2x269	2,06	4	133	190	349
1932	460/3/60	2	2x76	2x103	2x290	2,06	4	168	236	383
1952	460/3/60	2	2x76	2x103	2x290	2,06	4	168	235	383
2432	460/3/60	2	2x98	2x131	2x423	2,06	4	212	291	535
2632	460/3/60	2	2x97	2x129	2x423	2,06	4	214	296	542

F.L.I.: Full load power
F.L.A.: Full load current
L.R.A.: Locked rotor amperes for single compressor
S.A.: Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current
(1)(2) Safety values to be considered when cabling the unit for power supply and line-protections

Electrical data valid for standard units without any additional option

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.

Give the typical operating conditions of units designed for outdoor installation, which can be associated (according to reference document IEC 60721) to the following classes:
- climatic conditions class 4K4H: air temperature range from -20°C (-4°F) up to 55°C (131°F) (*), relative humidity range from 4 up to 100%, with possible precipitations, at air pressure from 70 kPa (23,4 ftH2O) and 106 kPa (34,5 ftH2O) and a maximum solar radiation of 1120 W/m2 (355,04 Btu/ft2*h)
- special climatic conditions negligible
- biological conditions class 4B1 and 4C2: locations in a generic urban area
- mechanically active substances class 4S2: locations in areas with sand or dust representative of urban areas
- mechanical conditions class 4M1: locations protected from signifi cant vibrations or shocks

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 [mm] - 0,0033 [ft] and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.
(*) For the unit's operating limits, see "selection limits" section

ELECTRICAL DATA

FOCS60 /K [380 Volt]

[Standard AHRI 550/590]

SIZE	Power supply V/ph/Hz	Maximum values								
		Compressor				Fans (1)		Total (1)(2)		
		n	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	S.A. [A]
0751	380/3/60	1	1x59,9	1x100,4	1x326	1,87	4	68,0	115	341
0951	380/3/60	1	1x75,7	1x124,5	1x399	1,87	4	84,0	140	414
0961	380/3/60	1	1x74,1	1x122	1x399	1,87	4	86,0	145	422
1021	380/3/60	1	1x97,7	1x158	1x534	1,87	4	110	181	557
1301	380/3/60	1	1x94,6	1x153,2	1x534	1,87	4	107	176	557
1532	380/3/60	2	2x60	2x100	2x326	1,87	4	131	222	417
1732	380/3/60	2	2x60	2x100	2x326	1,87	4	131	222	417
1932	380/3/60	2	2x76	2x125	2x399	1,87	4	167	279	504
1952	380/3/60	2	2x76	2x125	2x399	1,87	4	211	345	662
2432	380/3/60	2	2x98	2x158	2x534	1,87	4	167	279	504
2632	380/3/60	2	2x98	2x158	2x534	1,87	4	215	352	669

F.L.I.: Full load power
F.L.A.: Full load current
L.R.A.: Locked rotor amperes for single compressor
S.A.: Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current
(1)(2) Safety values to be considered when cabling the unit for power supply and line-protections

Electrical data valid for standard units without any additional option

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.

Give the typical operating conditions of units designed for outdoor installation, which can be associated (according to reference document IEC 60721) to the following classes:
- climatic conditions class 4K4H: air temperature range from -20°C (-4°F) up to 55°C (131°F) (*), relative humidity range from 4 up to 100%, with possible precipitations, at air pressure from 70 kPa (23,4 ftH2O) and 106 kPa (34,5 ftH2O) and a maximum solar radiation of 1120 W/m2 (355,04 Btu/ft2*h)
- special climatic conditions negligible
- biological conditions class 4B1 and 4C2: locations in a generic urban area
- mechanically active substances class 4S2: locations in areas with sand or dust representative of urban areas
- mechanical conditions class 4M1: locations protected from signifi cant vibrations or shocks

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 [mm] - 0,0033 [ft] and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.
(*) For the unit's operating limits, see "selection limits" section

ELECTRICAL DATA

FOCS60 /K [230 Volt]

[Standard AHRI 550/590]

SIZE	Power supply V/ph/Hz	Maximum values								
		Compressor				Fans (1)		Total (1)(2)		
		n	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	S.A. [A]
0751	230/3/60	1	1x60	1x166	1x616	2,06	6	68,0	192	642
0951	230/3/60	1	1x76	1x206	1x706	2,06	6	84,0	232	732
0961	230/3/60	1	1x76	1x206	1x706	2,06	6	88,0	245	745
1021	230/3/60	1	1x98	1x261	1x885	2,06	6	110	300	924
1301	230/3/60	1	1x98	1x261	1x885	2,06	6	110	300	924
1532	230/3/60	2	2x60	2x166	2x616	2,06	6	132	371	770
1732	230/3/60	2	2x60	2x166	2x616	2,06	6	132	371	770
1932	230/3/60	2	2x76	2x206	2x706	2,06	6	168	464	884
1952	230/3/60	2	2x76	2x206	2x706	2,06	6	168	464	884
2432	230/3/60	2	2x98	2x261	2x885	2,06	6	212	574	1100
2632	230/3/60	2	2x98	2x261	2x885	2,06	6	217	587	1113

F.L.I.: Full load power
F.L.A.: Full load current
L.R.A.: Locked rotor amperes for single compressor
S.A.: Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current
(1)(2) Safety values to be considered when cabling the unit for power supply and line-protections

Electrical data valid for standard units without any additional option

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.

Give the typical operating conditions of units designed for outdoor installation, which can be associated (according to reference document IEC 60721) to the following classes:
- climatic conditions class 4K4H: air temperature range from -20°C (-4°F) up to 55°C (131°F) (*), relative humidity range from 4 up to 100%, with possible precipitations, at air pressure from 70 kPa (23,4 ftH2O) and 106 kPa (34,5 ftH2O) and a maximum solar radiation of 1120 W/m2 (355,04 Btu/ft2*h)
- special climatic conditions negligible
- biological conditions class 4B1 and 4C2: locations in a generic urban area
- mechanically active substances class 4S2: locations in areas with sand or dust representative of urban areas
- mechanical conditions class 4M1: locations protected from signifi cant vibrations or shocks

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 [mm] - 0,0033 [ft] and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.
(*) For the unit's operating limits, see "selection limits" section

ELECTRICAL DATA

Compressors start

Version K	460 Volt		380 Volt		230 Volt	
SIZE	std unit or with kit /NR	unit with kit /HT	std unit or with kit /NR	unit with kit /HT	std unit or with kit /NR	unit with kit /HT
0751	p/w	p/w	p/w	p/w	p/w	p/w
0951	p/w	p/w	p/w	p/w	p/w	p/w
0961	p/w	p/w	p/w	p/w	p/w	p/w
1021	p/w	y/d	p/w	p/w	p/w	-
1301	p/w	y/d	p/w	p/w	p/w	-
1532	p/w	p/w	p/w	p/w	p/w	p/w
1732	p/w	p/w	p/w	p/w	p/w	p/w
1932	p/w	p/w	p/w	p/w	p/w	p/w
1952	p/w	p/w	p/w	p/w	p/w	p/w
2432	p/w	y/d	p/w	p/w	p/w	-
2632	p/w	y/d	p/w	p/w	p/w	-

Legenda:
p/w = part winding start
y/d = wye/delta start
- = size not available

10.1 FULL LOAD SOUND LEVEL FOCS60 /K [460 Volt]

SOUND POWER									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
0751	88	94	95	91	92	84	81	72	**95**
0951	89	95	96	92	93	85	82	73	**96**
0961	90	96	97	93	94	86	83	74	**97**
1021	90	96	97	93	94	86	83	74	**97**
1301	90	96	97	93	94	86	83	74	**97**
1532	91	97	98	94	95	87	84	75	**98**
1732	91	97	98	94	95	87	84	75	**98**
1932	92	98	99	95	96	88	85	76	**99**
1952	92	98	99	95	96	88	85	76	**99**
2432	93	99	100	96	97	89	86	77	**100**
2632	93	99	100	96	97	89	86	77	**100**

Working conditions

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
Sound power in compliance with ISO 3744 for non-certified units.
Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
0751	56	62	63	59	60	52	49	40	**63**
0951	57	63	64	60	61	53	50	41	**64**
0961	58	64	65	61	62	54	51	42	**65**
1021	58	64	65	61	62	54	51	42	**65**
1301	58	64	65	61	62	54	51	42	**65**
1532	59	65	66	62	63	55	52	43	**66**
1732	59	65	66	62	63	55	52	43	**66**
1932	60	66	67	63	64	56	53	44	**67**
1952	60	66	67	63	64	56	53	44	**67**
2432	60	66	67	63	64	56	53	44	**67**
2632	60	66	67	63	64	56	53	44	**67**

Working conditions

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.

FULL LOAD SOUND LEVEL

FOCS60 /K [380 Volt]

SOUND POWER									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
0751	88	94	95	91	92	84	81	72	**95**
0951	89	95	96	92	93	85	82	73	**96**
0961	90	96	97	93	94	86	83	74	**97**
1021	90	96	97	93	94	86	83	74	**97**
1301	90	96	97	93	94	86	83	74	**97**
1532	91	97	98	94	95	87	84	75	**98**
1732	91	97	98	94	95	87	84	75	**98**
1932	92	98	99	95	96	88	85	76	**99**
1952	92	98	99	95	96	88	85	76	**99**
2432	93	99	100	96	97	89	86	77	**100**
2632	93	99	100	96	97	89	86	77	**100**

Working conditions

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
Sound power in compliance with ISO 3744 for non-certified units.
Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
0751	56	62	63	59	60	52	49	40	**63**
0951	57	63	64	60	61	53	50	41	**64**
0961	58	64	65	61	62	54	51	42	**65**
1021	58	64	65	61	62	54	51	42	**65**
1301	58	64	65	61	62	54	51	42	**65**
1532	59	65	66	62	63	55	52	43	**66**
1732	59	65	66	62	63	55	52	43	**66**
1932	60	66	67	63	64	56	53	44	**67**
1952	60	66	67	63	64	56	53	44	**67**
2432	60	66	67	63	64	56	53	44	**67**
2632	60	66	67	63	64	56	53	44	**67**

Working conditions

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.

FULL LOAD SOUND LEVEL

FOCS60 /K [230 Volt]

SOUND POWER									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
0751	88	94	95	91	92	84	81	72	**95**
0951	89	95	96	92	93	85	82	73	**96**
0961	90	96	97	93	94	86	83	74	**97**
1021	90	96	97	93	94	86	83	74	**97**
1301	90	96	97	93	94	86	83	74	**97**
1532	91	97	98	94	95	87	84	75	**98**
1732	91	97	98	94	95	87	84	75	**98**
1932	92	98	99	95	96	88	85	76	**99**
1952	92	98	99	95	96	88	85	76	**99**
2432	93	99	100	96	97	89	86	77	**100**
2632	93	99	100	96	97	89	86	77	**100**

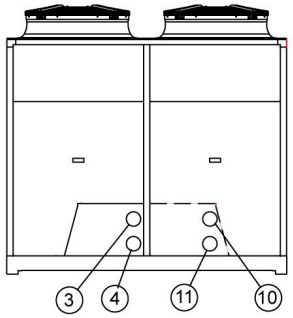
Working conditions

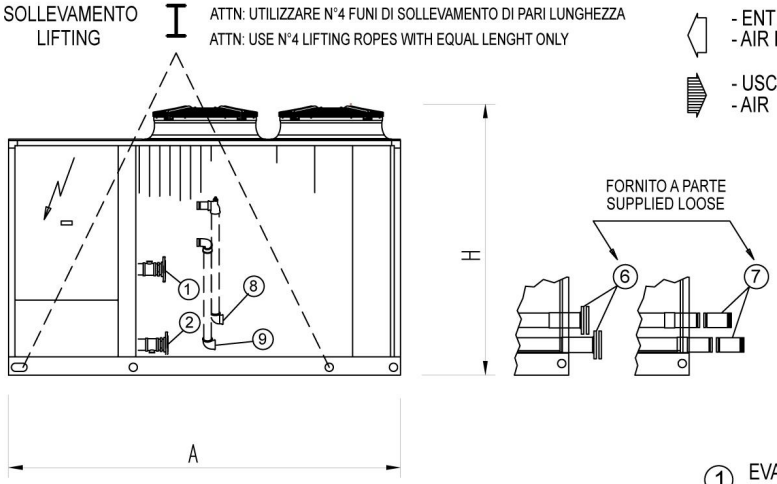
Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
Sound power in compliance with ISO 3744 for non-certified units.
Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

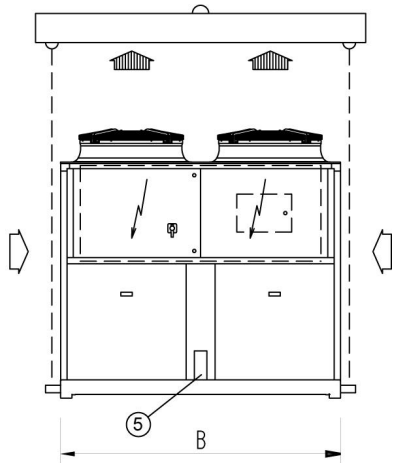
SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
0751	56	62	63	59	60	52	49	40	**63**
0951	57	63	64	60	61	53	50	41	**64**
0961	58	64	65	61	62	54	51	42	**65**
1021	58	64	65	61	62	54	51	42	**65**
1301	58	64	65	61	62	54	51	42	**65**
1532	59	65	66	62	63	55	52	43	**66**
1732	59	65	66	62	63	55	52	43	**66**
1932	60	66	67	63	64	56	53	44	**67**
1952	60	66	67	63	64	56	53	44	**67**
2432	60	66	67	63	64	56	53	44	**67**
2632	60	66	67	63	64	56	53	44	**67**

Working conditions

Plant (side) cooling exchanger water (out) 6,7°C; with water flow 0,043 l/s for kW; Source (side) heat exchanger air (in) 35,0°C.
Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
Plant (side) cooling exchanger water (out) 44,1°F; with water flow 2,4 GPM/tonsR; Source (side) heat exchanger air (in) 95,0°F.
Average sound pressure level at 33ft distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.







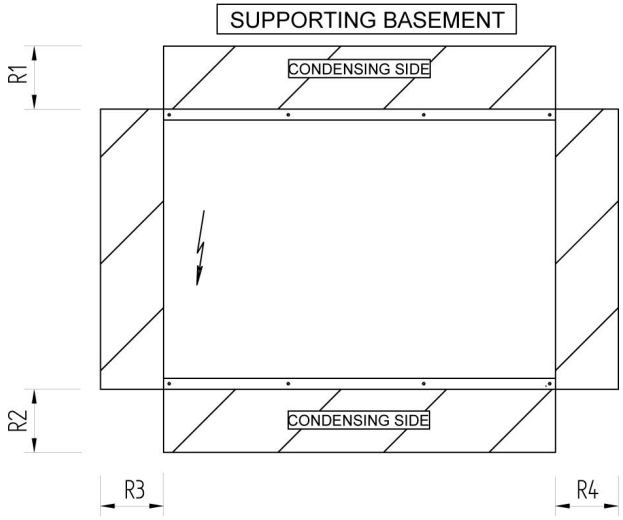
only for FOCSD version
solo per versione FOCSD

(8) DESUPERHEATER WATER INLET
ENTRATA ACQUA DESURRISC.

(9) DESUPERHEATER WATER OUTLET
USCITA ACQUA DESURRISC.

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

(10)	DESUPERHEATER WATER INLET ENTRATA ACQUA DESURRISC.	UNI ISO 7/1 -Rp 2 UNI ISO 7/1 -Rp 2
(11)	DESUPERHEATER WATER OUTLET USCITA ACQUA DESURRISC.	UNI ISO 7/1 -Rp 2 UNI ISO 7/1 -Rp 2



(1) EVAPORATOR WATER INLET
ENTRATA ACQUA EVAPORATORE

(2) EVAPORATOR WATER OUTLET
USCITA ACQUA EVAPORATORE

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

(3)	EVAPORATOR WATER INLET ENTRATA ACQUA EVAPORATORE	UNI ISO 7/1 -R 3 UNI ISO 7/1 -R 3
(4)	EVAPORATOR WATER OUTLET USCITA ACQUA EVAPORATORE	UNI ISO 7/1 -R 3 UNI ISO 7/1 -R 3

(5) POWER INLET (HOLE PRE-CUT)
INGRESSO LINEA ELETTRICA (FORO PRETRANCIATO)

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

(6)	FLANGED / FLANGIATE OPTIONAL CONNECTIONS CONNESSIONI OPZIONALI	 DN 80 PN16 DN 80 PN16
(7)	GROOVELOCK OPTIONAL CONNECTIONS CONNESSIONI OPZIONALI	 3" 3"

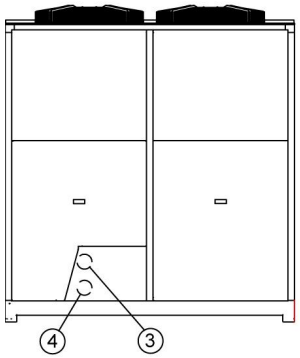
"REMARKS:
For installation purposes, please refer to the documentation sent after the purchase-contract. This technical data should be considered as indicative. CLIMAVENETA may modify them at any moment."

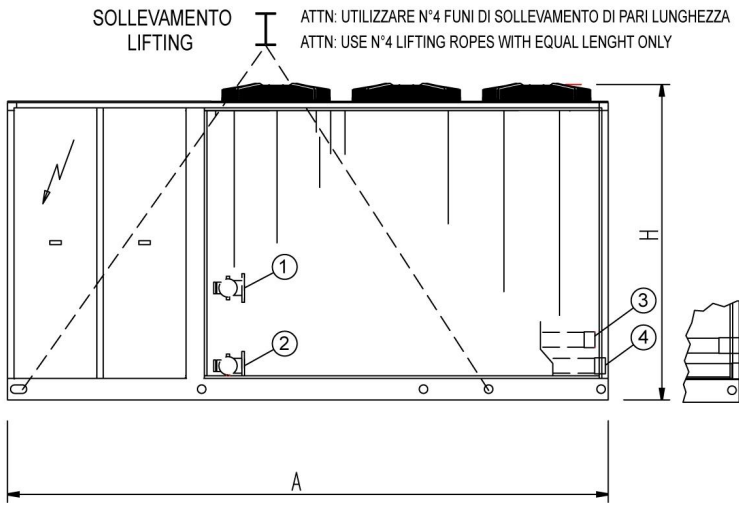
DIMENSIONAL DRAWINGS

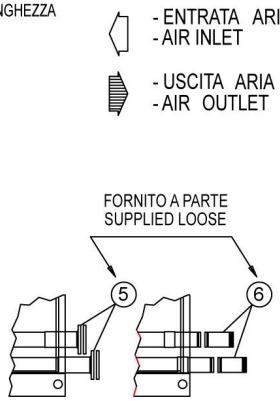
FOCS60 /K 0751 - 2632

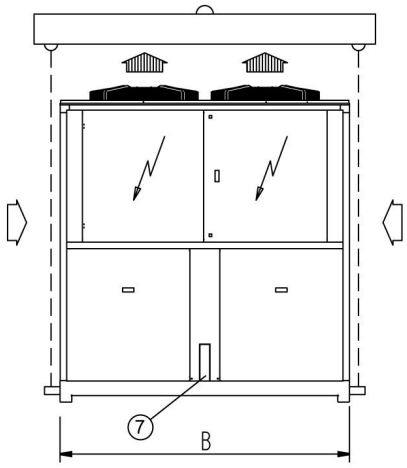
[Standard AHRI 550/590 - SI System]

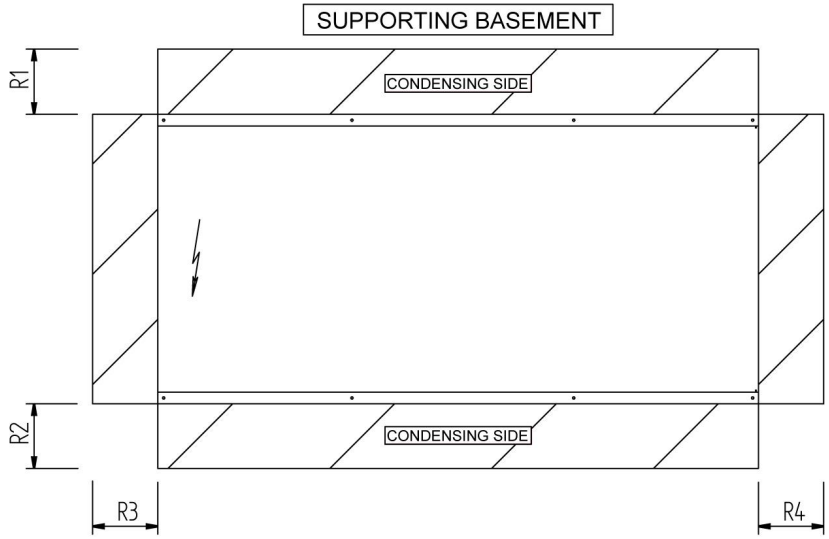
SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				HEAT EXCHANGER USER SIDE		HEAT RECOVERY EX. USER SIDE	
	A	B	H	VEIGH	R1	R2	R3	R4	IN/OUT		IN/OUT	
	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[mm]	TYPE	Ø	TYPE	Ø
FOCS60 /K /0751	3110	2220	2150	1650	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /0951	3110	2220	2150	1920	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /0961	4110	2220	2150	2260	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /1021	4110	2220	2150	2360	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /1301	4110	2220	2150	2390	2000	2000	1100	1100	B	3	-	-
FOCS60 /D /K /0751	3110	2220	2150	1760	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /0951	3110	2220	2150	2030	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /0961	4110	2220	2150	2400	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /1021	4110	2220	2150	2500	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /1301	4110	2220	2150	2530	2000	2000	1100	1100	B	3	F	2"
FOCS60 /K /0751	3110	2220	2150	1650	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /0951	3110	2220	2150	1920	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /0961	4110	2220	2150	2260	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /1021	4110	2220	2150	2360	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /1301	4110	2220	2150	2390	2000	2000	1100	1100	B	3	-	-
FOCS60 /D /K /0751	3110	2220	2150	1760	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /0951	3110	2220	2150	2030	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /0961	4110	2220	2150	2400	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /1021	4110	2220	2150	2500	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /1301	4110	2220	2150	2530	2000	2000	1100	1100	B	3	F	2"
FOCS60 /K /0751	3110	2220	2150	1650	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /0951	3110	2220	2150	1920	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /0961	4110	2220	2150	2260	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /1021	4110	2220	2150	2360	2000	2000	1100	1100	B	3	-	-
FOCS60 /K /1301	4110	2220	2150	2390	2000	2000	1100	1100	B	3	-	-
FOCS60 /D /K /0751	3110	2220	2150	1760	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /0951	3110	2220	2150	2030	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /0961	4110	2220	2150	2400	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /1021	4110	2220	2150	2500	2000	2000	1100	1100	B	3	F	2"
FOCS60 /D /K /1301	4110	2220	2150	2530	2000	2000	1100	1100	B	3	F	2"











① EVAPORATOR WATER INLET
ENTRATA ACQUA EVAPORATORE

② EVAPORATOR WATER OUTLET
USCITA ACQUA EVAPORATORE

③ EVAPORATOR WATER INLET (OPTIONAL) UNI ISO 7/1 -Rp 4
ENTRATA ACQUA EVAPORATORE (OPZIONALE) UNI ISO 7/1 -Rp 4

④ EVAPORATOR WATER OUTLET (OPTIONAL) UNI ISO 7/1 -Rp 4
USCITA ACQUA EVAPORATORE (OPZIONALE) UNI ISO 7/1 -Rp 4

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

⑤ FLANGED / FLANGIATE
OPTIONAL CONNECTIONS DN 100 PN16
CONNESSIONI OPZIONALI DN 100 PN16

⑥ GROOVELOCK
OPTIONAL CONNECTIONS 4"
CONNESSIONI OPZIONALI 4"

⑦ POWER INLET (HOLE PRE-CUT)
INGRESSO LINEA ELETTRICA (FORO PRETRANCIATO)

CLIMAVENETA

"REMARKS:
For installation purposes, please refer to the documentation sent after the purchase-contract. This technical data should be considered as indicative. CLIMAVENETA may modify them at any moment."

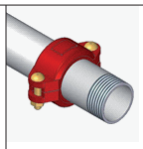
DIMENSIONAL DRAWINGS

FOCS60 /K 0751 - 2632

[Standard AHRI 550/590 - SI System]

SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				HEAT EXCHANGER USER SIDE		HEAT RECOVERY EX. USER SIDE	
	A	B	H	VEIGH	R1	R2	R3	R4	IN/OUT		IN/OUT	
	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[mm]	TYPE	Ø	TYPE	Ø
FOCS60 /K /1532	4610	2220	2420	3030	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1732	4610	2220	2420	3070	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1932	5610	2220	2430	4020	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1952	5610	2220	2430	4060	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /2432	6610	2220	2430	4530	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /2632	6610	2220	2430	4670	2000	2000	1100	1100	B	4	-	-
FOCS60 /D /K /1532	4610	2220	2420	3140	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1732	4610	2220	2420	3240	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1932	5610	2220	2430	4190	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1952	5610	2220	2430	4250	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /2432	6610	2220	2430	4730	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /2632	6610	2220	2430	4860	2000	2000	1100	1100	B	4	F	2"
FOCS60 /K /1532	4610	2220	2420	3030	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1732	4610	2220	2420	3070	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1932	5610	2220	2430	4020	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1952	5610	2220	2430	4060	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /2432	6610	2220	2430	4530	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /2632	6610	2220	2430	4670	2000	2000	1100	1100	B	4	-	-
FOCS60 /D /K /1532	4610	2220	2420	3140	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1732	4610	2220	2420	3240	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1932	5610	2220	2430	4190	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1952	5610	2220	2430	4250	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /2432	6610	2220	2430	4730	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /2632	6610	2220	2430	4860	2000	2000	1100	1100	B	4	F	2"
FOCS60 /K /1532	4610	2220	2420	3030	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1732	4610	2220	2420	3070	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1932	5610	2220	2430	4020	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /1952	5610	2220	2430	4060	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /2432	6610	2220	2430	4530	2000	2000	1100	1100	B	4	-	-
FOCS60 /K /2632	6610	2220	2430	4670	2000	2000	1100	1100	B	4	-	-
FOCS60 /D /K /1532	4610	2220	2420	3140	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1732	4610	2220	2420	3240	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1932	5610	2220	2430	4190	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /1952	5610	2220	2430	4250	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /2432	6610	2220	2430	4730	2000	2000	1100	1100	B	4	F	2"
FOCS60 /D /K /2632	6610	2220	2430	4860	2000	2000	1100	1100	B	4	F	2"

LEGEND OF PIPE CONNECTIONS

 **TYPE = B** Male threaded pipe	 **TYPE = F** Grooved coupling with male threaded counter-pipe user side

UNI ISO 228/1

Pipe threads where pressure-tight joints are not made on the threads - Designation, dimensions and tolerances

Used terminology:

G: Pipe threads where pressure-tight joints are not made on the threads
A: Close tolerance class for external pipe threads where pressure-tight joints are not made on the threads
B: Wider tolerance class for external pipe threads where pressure-tight joints are not made on the threads
Internal threads: G letter followed by thread mark (only tolerance class)
External threads: G letter followed by thread mark and by A letter for A class external threads or by B letter for B class external threads.

UNI EN 10226-1

Pipe threads where pressure-tight joints are made on the threads - Designation, dimensions and tolerances

Used terminology:

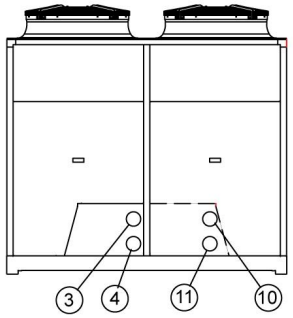
Rp: Internal cylindrical threads where pressure-tight joints are made on the threads
Rc: Internal conical threads where pressure-tight joints are made on the threads
R: External conical threads where pressure-tight joints are made on the threads
Internal cylindrical threads: R letter followed by p letter
Internal conical threads: R letter followed by c letter
External conical threads: R letter

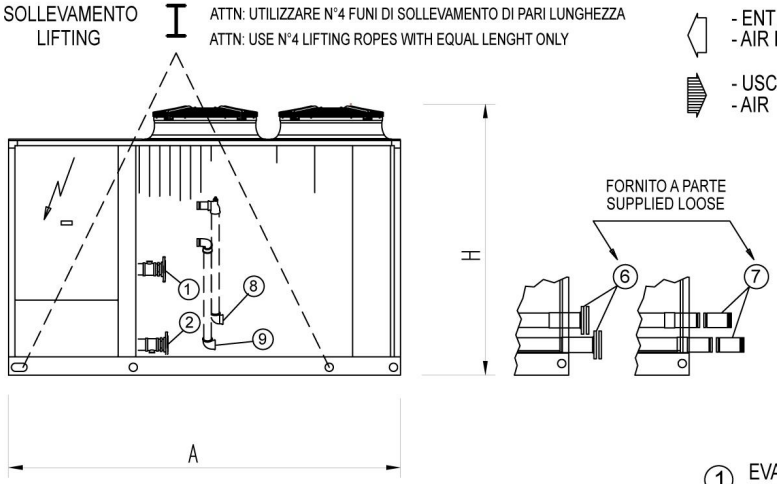
Designation	Description
UNI EN 10226-1 - Rp 1 1/2	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 1 1/2”
UNI EN 10226-1 - Rp 2 1/2	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 2 1/2”
UNI EN 10226-1 - Rp 3	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 3”
UNI EN 10226-1 - R 3	External conical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 3”
UNI ISO 228/1 - G 4 B	Internal cylindrical threads where pressure-tight joints are not made on the threads, defined by standard UNI ISO 228/1 Tolerance class B for external thread Conventional ø 4”
DN 80 PN 16	Flange Nominal Diameter: 80 mm Nominal Pressure: 16 bar

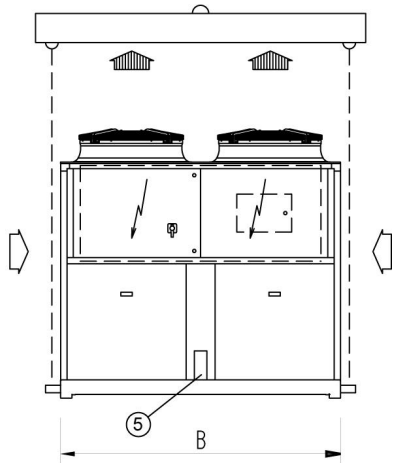
Notes:

Conventional diameter value [in inches] identifies short thread designation, based upon the relative standard.
All relative values are defined by standards.
As example, here below some values:

	UNI EN 10226-1	UNI ISO 228/1
Conventional ø	1"	1"
Pitch	2.309 mm	2.309 mm
External ø	33.249 mm	33.249 mm
Core ø	30.291 mm	30.291 mm
Thread height	1.479 mm	1.479 mm







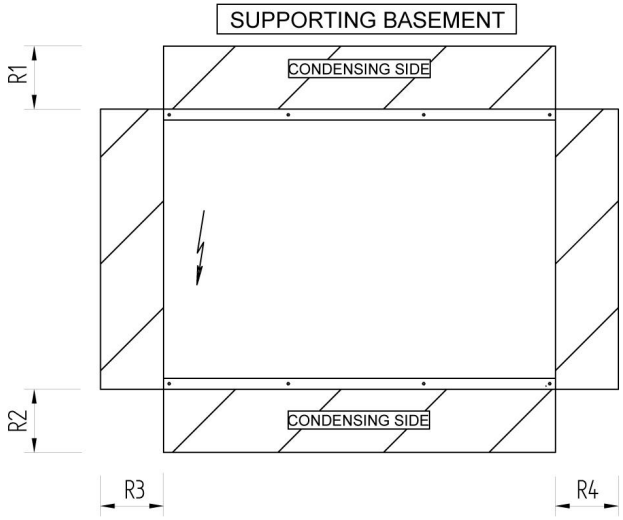
only for FOCSD version
solo per versione FOCSD

(8) DESUPERHEATER WATER INLET
ENTRATA ACQUA DESURRISC.

(9) DESUPERHEATER WATER OUTLET
USCITA ACQUA DESURRISC.

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

(10)	DESUPERHEATER WATER INLET ENTRATA ACQUA DESURRISC.	UNI ISO 7/1 -Rp 2 UNI ISO 7/1 -Rp 2
(11)	DESUPERHEATER WATER OUTLET USCITA ACQUA DESURRISC.	UNI ISO 7/1 -Rp 2 UNI ISO 7/1 -Rp 2



(1) EVAPORATOR WATER INLET
ENTRATA ACQUA EVAPORATORE

(2) EVAPORATOR WATER OUTLET
USCITA ACQUA EVAPORATORE

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

(3)	EVAPORATOR WATER INLET ENTRATA ACQUA EVAPORATORE	UNI ISO 7/1 -R 3 UNI ISO 7/1 -R 3
(4)	EVAPORATOR WATER OUTLET USCITA ACQUA EVAPORATORE	UNI ISO 7/1 -R 3 UNI ISO 7/1 -R 3

(5) POWER INLET (HOLE PRE-CUT)
INGRESSO LINEA ELETTRICA (FORO PRETRANCIATO)

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

(6)	FLANGED / FLANGIATE OPTIONAL CONNECTIONS CONNESSIONI OPZIONALI	 DN 80 PN16 DN 80 PN16
(7)	GROOVELOCK OPTIONAL CONNECTIONS CONNESSIONI OPZIONALI	 3" 3"

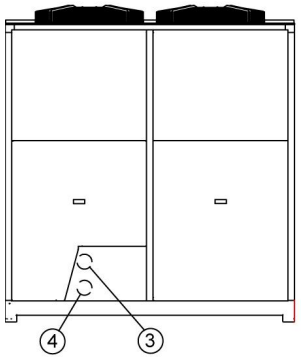
"REMARKS:
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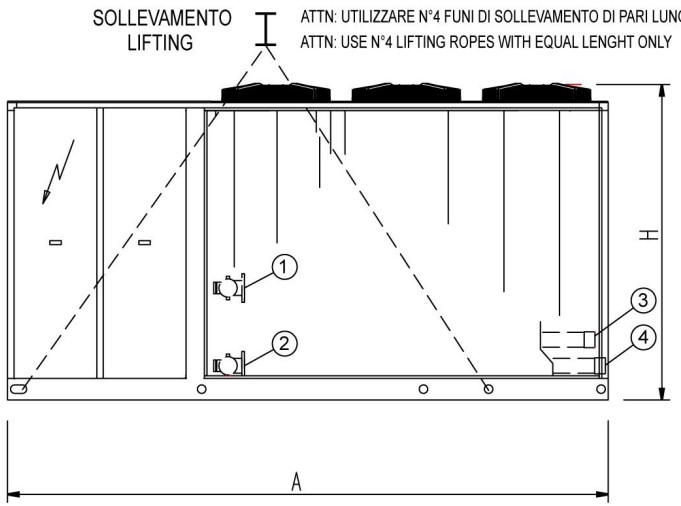
DIMENSIONAL DRAWINGS

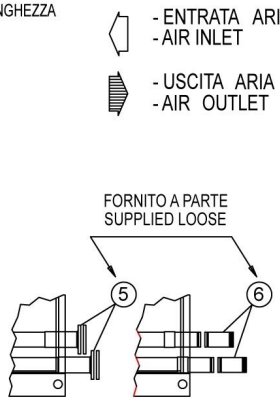
FOCS60 /K 0751 - 2632

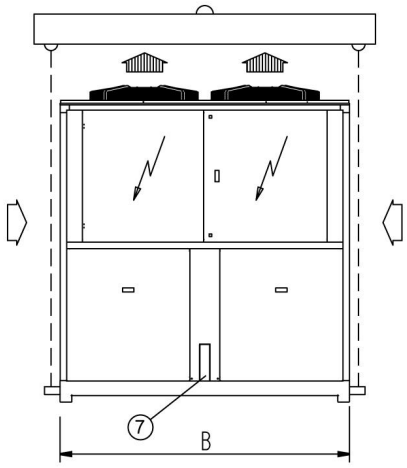
[Standard AHRI 550/590 - I-P System]

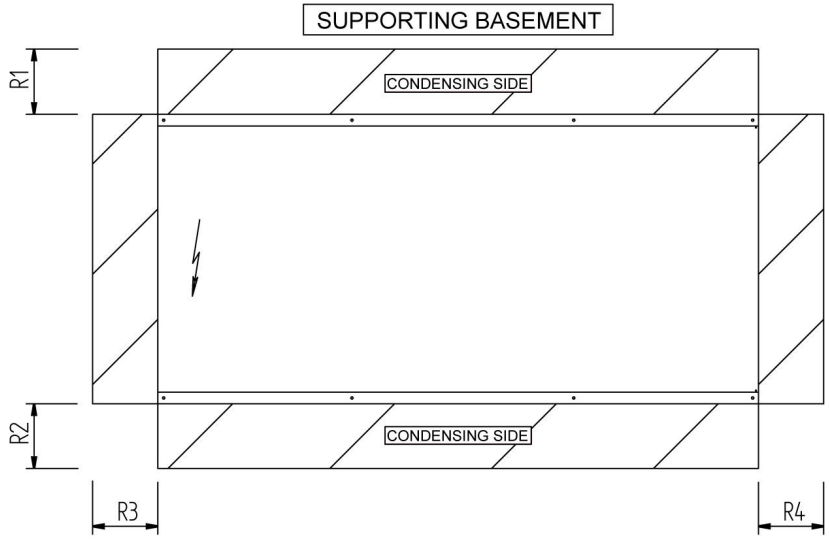
SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				HEAT EXCHANGER USER SIDE		HEAT RECOVERY EX. USER SIDE	
	A	B	H	VEIGH	R1	R2	R3	R4	IN/OUT		IN/OUT	
	[in]	[in]	[in]	[lb]	[in]	[in]	[in]	[in]	TYPE	Ø	TYPE	Ø
FOCS60 /K /0751	122,4	87,4	84,6	3638	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /0951	122,4	87,4	84,6	4233	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /0961	161,8	87,4	84,6	4982	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /1021	161,8	87,4	84,6	5203	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /1301	161,8	87,4	84,6	5269	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /D /K /0751	122,4	87,4	84,6	3880	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /0951	122,4	87,4	84,6	4475	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /0961	161,8	87,4	84,6	5291	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /1021	161,8	87,4	84,6	5512	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /1301	161,8	87,4	84,6	5578	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /K /0751	122,4	87,4	84,6	3638	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /0951	122,4	87,4	84,6	4233	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /0961	161,8	87,4	84,6	4982	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /1021	161,8	87,4	84,6	5203	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /1301	161,8	87,4	84,6	5269	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /D /K /0751	122,4	87,4	84,6	3880	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /0951	122,4	87,4	84,6	4475	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /0961	161,8	87,4	84,6	5291	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /1021	161,8	87,4	84,6	5512	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /1301	161,8	87,4	84,6	5578	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /K /0751	122,4	87,4	84,6	3638	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /0951	122,4	87,4	84,6	4233	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /0961	161,8	87,4	84,6	4982	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /1021	161,8	87,4	84,6	5203	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /K /1301	161,8	87,4	84,6	5269	78,7	78,7	43,3	43,3	B	3	-	-
FOCS60 /D /K /0751	122,4	87,4	84,6	3880	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /0951	122,4	87,4	84,6	4475	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /0961	161,8	87,4	84,6	5291	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /1021	161,8	87,4	84,6	5512	78,7	78,7	43,3	43,3	B	3	F	2"
FOCS60 /D /K /1301	161,8	87,4	84,6	5578	78,7	78,7	43,3	43,3	B	3	F	2"











① EVAPORATOR WATER INLET
ENTRATA ACQUA EVAPORATORE

② EVAPORATOR WATER OUTLET
USCITA ACQUA EVAPORATORE

③ EVAPORATOR WATER INLET (OPTIONAL) UNI ISO 7/1 -Rp 4
ENTRATA ACQUA EVAPORATORE (OPZIONALE) UNI ISO 7/1 -Rp 4

④ EVAPORATOR WATER OUTLET (OPTIONAL) UNI ISO 7/1 -Rp 4
USCITA ACQUA EVAPORATORE (OPZIONALE) UNI ISO 7/1 -Rp 4

OPTIONAL EXTERNAL WATER CONNECTION
CONNESSIONI ESTERNE OPZIONALI

⑤ FLANGED / FLANGIATE
OPTIONAL CONNECTIONS DN 100 PN16
CONNESSIONI OPZIONALI DN 100 PN16

⑥ GROOVELOCK
OPTIONAL CONNECTIONS 4"
CONNESSIONI OPZIONALI 4"

⑦ POWER INLET (HOLE PRE-CUT)
INGRESSO LINEA ELETTRICA (FORO PRETRANCIATO)

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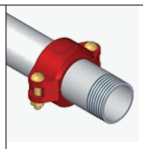
DIMENSIONAL DRAWINGS

FOCS60 /K 0751 - 2632

[Standard AHRI 550/590 - I-P System]

SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				HEAT EXCHANGER USER SIDE		HEAT RECOVERY EX. USER SIDE	
	A	B	H	VEIGH	R1	R2	R3	R4	IN/OUT		IN/OUT	
	[in]	[in]	[in]	[lb]	[in]	[in]	[in]	[in]	TYPE	Ø	TYPE	Ø
FOCS60 /K /1532	181,5	87,4	95,3	6680	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1732	181,5	87,4	95,3	6768	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1932	220,9	87,4	95,7	8863	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1952	220,9	87,4	95,7	8951	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /2432	260,2	87,4	95,7	9987	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /2632	260,2	87,4	95,7	10296	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /D /K /1532	181,5	87,4	95,3	6923	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1732	181,5	87,4	95,3	7143	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1932	220,9	87,4	95,7	9237	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1952	220,9	87,4	95,7	9370	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /2432	260,2	87,4	95,7	10428	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /2632	260,2	87,4	95,7	10714	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /K /1532	181,5	87,4	95,3	6680	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1732	181,5	87,4	95,3	6768	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1932	220,9	87,4	95,7	8863	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1952	220,9	87,4	95,7	8951	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /2432	260,2	87,4	95,7	9987	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /2632	260,2	87,4	95,7	10296	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /D /K /1532	181,5	87,4	95,3	6923	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1732	181,5	87,4	95,3	7143	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1932	220,9	87,4	95,7	9237	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1952	220,9	87,4	95,7	9370	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /2432	260,2	87,4	95,7	10428	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /2632	260,2	87,4	95,7	10714	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /K /1532	181,5	87,4	95,3	6680	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1732	181,5	87,4	95,3	6768	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1932	220,9	87,4	95,7	8863	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /1952	220,9	87,4	95,7	8951	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /2432	260,2	87,4	95,7	9987	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /K /2632	260,2	87,4	95,7	10296	78,7	78,7	43,3	43,3	B	4	-	-
FOCS60 /D /K /1532	181,5	87,4	95,3	6923	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1732	181,5	87,4	95,3	7143	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1932	220,9	87,4	95,7	9237	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /1952	220,9	87,4	95,7	9370	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /2432	260,2	87,4	95,7	10428	78,7	78,7	43,3	43,3	B	4	F	2"
FOCS60 /D /K /2632	260,2	87,4	95,7	10714	78,7	78,7	43,3	43,3	B	4	F	2"

LEGEND OF PIPE CONNECTIONS

 **TYPE = B** Male threaded pipe	 **TYPE = F** Grooved coupling with male threaded counter-pipe user side

UNI ISO 228/1

Pipe threads where pressure-tight joints are not made on the threads - Designation, dimensions and tolerances

Used terminology:

G: Pipe threads where pressure-tight joints are not made on the threads
A: Close tolerance class for external pipe threads where pressure-tight joints are not made on the threads
B: Wider tolerance class for external pipe threads where pressure-tight joints are not made on the threads
Internal threads: G letter followed by thread mark (only tolerance class)
External threads: G letter followed by thread mark and by A letter for A class external threads or by B letter for B class external threads.

UNI EN 10226-1

Pipe threads where pressure-tight joints are made on the threads - Designation, dimensions and tolerances

Used terminology:

Rp: Internal cylindrical threads where pressure-tight joints are made on the threads
Rc: Internal conical threads where pressure-tight joints are made on the threads
R: External conical threads where pressure-tight joints are made on the threads
Internal cylindrical threads: R letter followed by p letter
Internal conical threads: R letter followed by c letter
External conical threads: R letter

Designation	Description
UNI EN 10226-1 - Rp 1 1/2	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 1 1/2”
UNI EN 10226-1 - Rp 2 1/2	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 2 1/2”
UNI EN 10226-1 - Rp 3	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 3”
UNI EN 10226-1 - R 3	External conical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 3”
UNI ISO 228/1 - G 4 B	Internal cylindrical threads where pressure-tight joints are not made on the threads, defined by standard UNI ISO 228/1 Tolerance class B for external thread Conventional ø 4”
DN 80 PN 16	Flange Nominal Diameter: 80 mm Nominal Pressure: 16 bar

Notes:

Conventional diameter value [in inches] identifies short thread designation, based upon the relative standard.
All relative values are defined by standards.
As example, here below some values:

	UNI EN 10226-1	UNI ISO 228/1
Conventional ø	1"	1"
Pitch	2.309 mm	2.309 mm
External ø	33.249 mm	33.249 mm
Core ø	30.291 mm	30.291 mm
Thread height	1.479 mm	1.479 mm

12.2 VPF systems for plants designed with a single variable flow hydraulic circuit

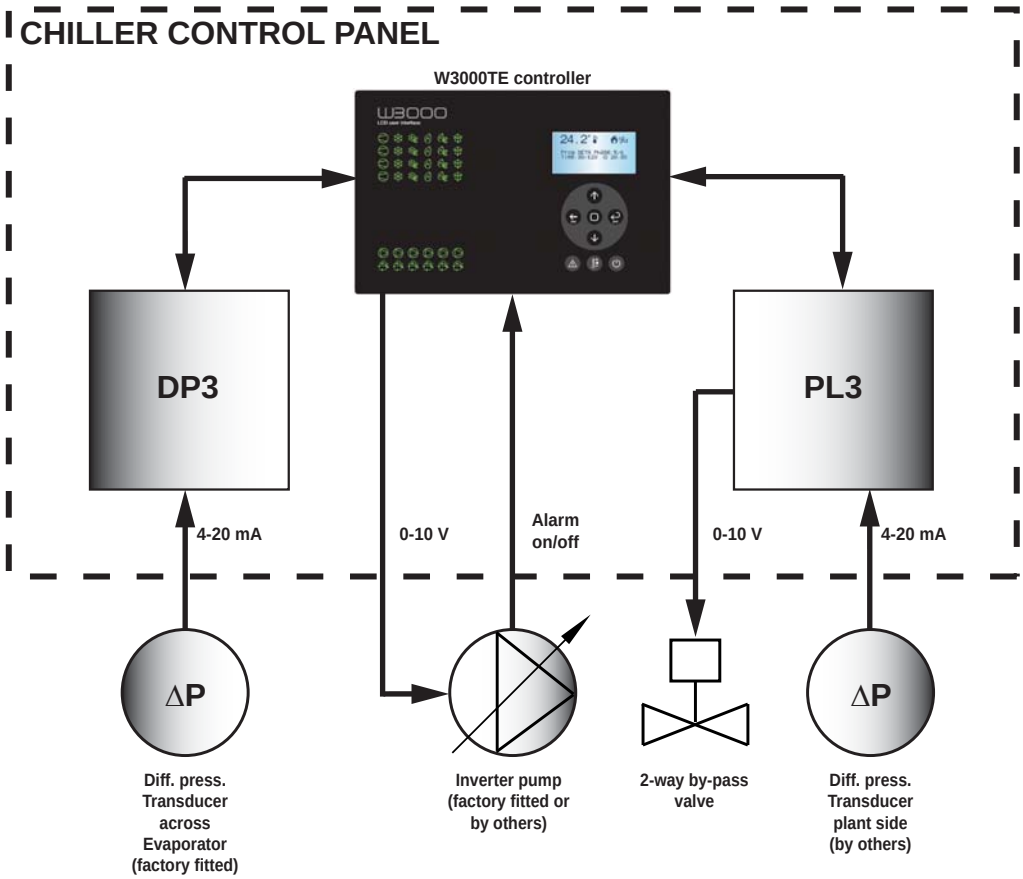
The energy consumption associated with fluid circulation weighs heavily on the total operating costs of a large installation, especially when the units work at part load, and even more, when they are in stand-by. Under these conditions, although the power absorbed by the compressors and fans is reduced, the power consumed for water circulation remains high. The system power consumption can be reduced using pumps with continuous flow control by inverter. Energy savings are considerable and immediately evident, to the extent that a Δx reduction of the flow of water to be delivered to the system, amounts to a proportional reduction of $(\Delta x)^3$ in the power absorbed. In the most advanced systems these ones become the pumps for the entire hydraulic circuit, and this eliminates the need to detach the primary circuit, dedicated to the circulation of the water on the units side, from the secondary one, dedicated to water circulation throughout the entire system. In traditional systems it was the only choice possible and imposed mostly by the need for the chiller to work with constant water flow through the evaporator. Now designers can work without worrying about this limit, as Climaveneta units are designed to work with the maximum efficiency even with variable flow through the evaporator, managing the resources independently, in order to keep the outlet water temperature constantly at the set-point entered by the user. This simplifies the design and realization of variable flow systems and offers advantages in terms of both reductions in consumption and hydraulic circuit sizing. The integration of pumps + inverters built-in the unit permits significant savings in space, circuit components, and system start-up times.

The VPF (Variable Primary Flow system) is the Climaveneta solution that allows to have the variable water flow on the user side (evaporator) in the plants with primary circuit only.

The VPF kit includes the following devices:
- control device (called DP3 in the herebelow scheme), mounted on the electrical panel, and pressure differential transducer (with 4-20 mA signal), mounted on the heat exchanger user side
- control device (called PL3 in the herebelow scheme), positioned inside the elettrical panel
- pumps with inverter and dedicated signals for the communication with the controller of the unit (W3000TE)

To these ones it's mandatory to add (not supplied by Climaveneta):
- pressure transducer on plant side, with the dedicated signal 4-20 mA for the communication with the PL3 device (this transducer must be installed on the longest (worst) leg of the installation)
- 2 way by-pass valve, with a dedicated 0-10V signal for the communication with the PL3 device

When the plant includes more units connected together with a management system (Manager 3000), it's mandatory to order also the option 3030 "VPF control from Manager 3000", in order to have the installation of the PL3 device inside the Manager itself and not in the electrical panel of each unit.

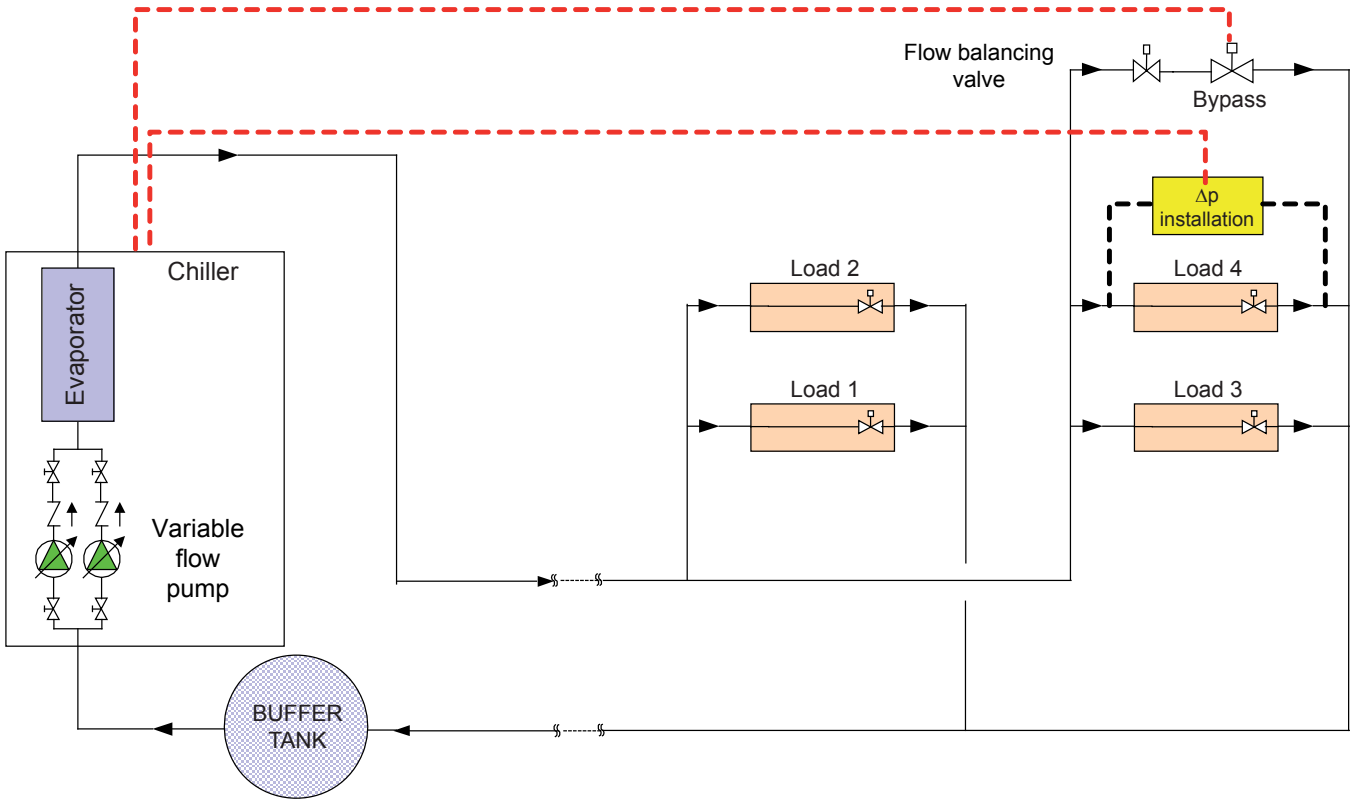


How it works

The VPF option measures the differential pressure across the installation in order to keep it between a minimum and a maximum value programmed in the PL3 device. As long as the measured value remains inside this range, the output signal to the pumps remains the same. On the other side when the measured value is bigger than the maximum programmed, the signal to the pumps is decreased, and in case the measured value results smaller than the minimum programmed, the signal to the pumps is increased. In any case the change of signal is performed through step by step adjustments and monitoring constantly the effects in order to avoid rough changes and guaranteeing the return of the measured value inside the programmed range as much quickly as possible.

In case the differential pressure requires a water flow smaller than the minimum necessary for the heat exchanger, the DP3 device communicates with the controller in the meantime that the PL3 send to the by-pass valve the signal to open gradually in order to protect the chiller.

When the plant includes more units, the working logic remains the same. The PL3 device, installed in the Manager, collects the information from the pressure transducer mounted in the plant (in common for all the units) and communicates with the by-pass valve (this one too in common for all the units), while the differential transducer mounted on each evaporator, the related DP3 device and the management of the pumps+inverters are duty of the W3000 of each unit.



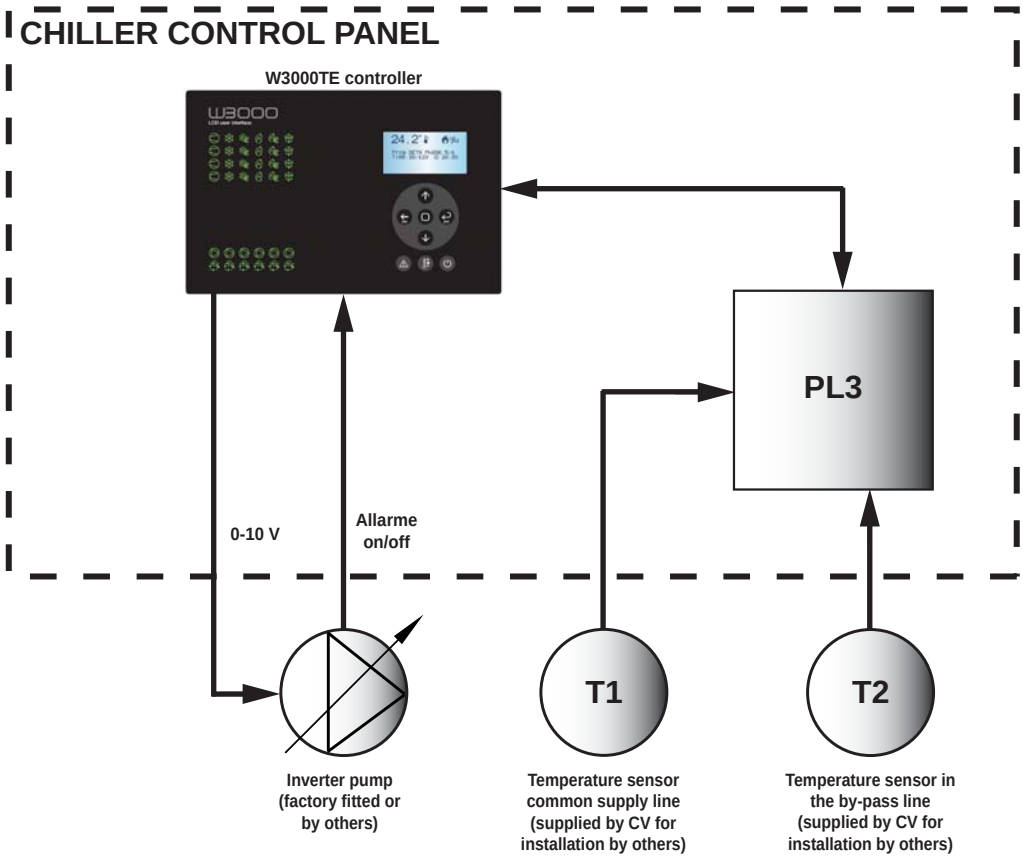
12.3 VPF.D systems for plants designed with both primary circuit and secondary one with variable flow

Also in those cases when it's not possible to design a single circuit with variable flow or when it's necessary to maintain decoupled the primary circuit (dedicated to the chillers) and the secondary one (dedicated to the plant users), it's possible to have the management of the pumps and inverters directly from the unit.
The energy savings are lower than the solution with a unique VPF system, but still important especially when the units are in stand-by, as in this case it's possible to reduce down to 50% the water flow.
These systems can be easily adopted in retrofit application, where the chiller is supposed to be replaced but the plant isn't.
The Climaveneta solution guarantees also the water flow balancing between primary and secondary circuit, in order to avoid the flow inversion in the decoupling pipe.

The VPF.D system (Variable Primary Flow with Decoupler) is the option that allows to have variable water flow on the user side exchanger (evaporator) in plants with both primary and secondary circuits and additional pumps on the user side.

The VPF.D option includes:
- control device (PL3 in the herebelow scheme), mounted in the electrical panel
- 2 temperature probes, provided by Climaveneta but installed by the client in the plant, one for the delivery line and one for the by-pass line
- pumps with inverters and related signals for the communication with the controller W3000TE

When the plant includes more units connected together with a management system (Manager 3000), it's mandatory to order also the option 3030 "VPF control from Manager 3000", in order to have the installation of the PL3 device inside the Manager itself and not in the electrical panel of each unit.

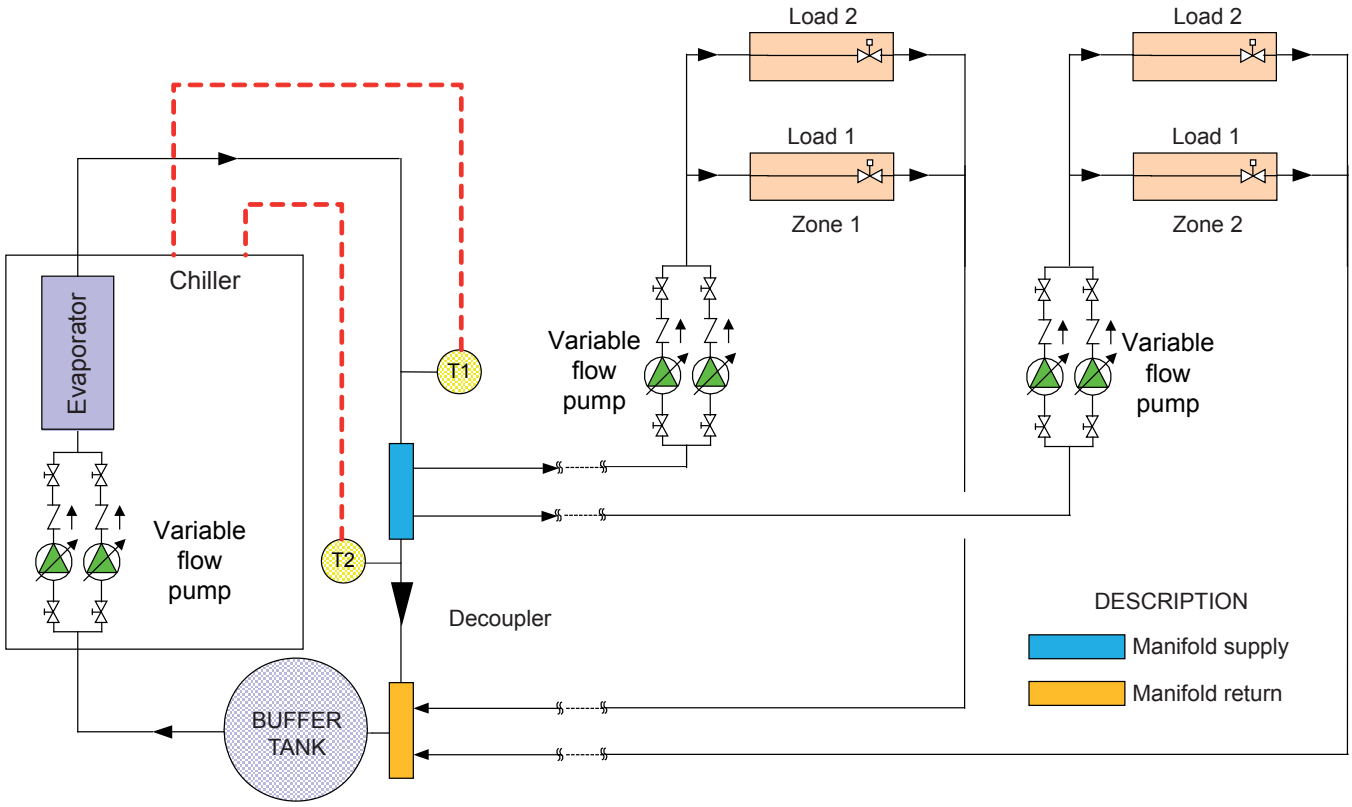


How it works

The VPF. D measures, thorugh the two probes installed, the temperatures T1 and T2 (on the delivery and by-pass lines), keeping T2=T1 as control target.
As long as T1=T2, the water flow in the primary circuit is equal or higher than in the secondary one. When T2>T1, the water flow in the primary circuit becomes lower than the flow in the secondary circuit, leading to recirculation of warm water coming back from the installation and mixing with the cold supply water.

In order to rebalance this situation the speed of the pumps is being increased gradually in order to let the temperature T1 be again equal to T2.
The target of the VPF.D is then to keep constant the ΔT in the primary circuit. The secondary circuit remains completely independent and so has to be managed and controlled by the customer side.
The minimum water flow through the user side exchanger is guaranteed by a fixed setting for the minimum speed of the pumps (inside the service menu of the unit controller).

When the plant includes more units, the working logic remains the same. The PL3 device, installed in the Manager, collect the information about temperatures T1 and T2, while the W3000 of each unit takes care of the speed of the pumps, according to the signal sent from the Manager. The Manager itself takes care also that the pumps of each chiller work at the same speed and that, when an additional unit is switched on, the speed of the already running pumps is automatically aligned



12.4 For VPF system: indications for the bypass pipe sizing

Differential pressure transducer on the farest pipe of the plant and by-pass valve are at customer charge.
Climaveneta provides only some indications for the plants design, as a function of the minimum waterflow on the primary heat exchanger.

Minimum waterflow to technical bulletin		Kvs	Recommended valve	∅ Valve	Valve motor	∅ ByPass
[m³/h]	[GPM]					
Da 19 a 30	Da 84 a 133	40	VVG41.50	DN50	SKB60	DN50 (2”)
fino a 37	fino a 164	49	VVF31.65	DN65	SKB60	DN65 (2"½)
fino a 60	fino a 266	78	VVF31.80	DN80	SKB60	DN80 (3“)
fino a 95	fino a 421	124	VVF31.90	DN100	SKC60	DN100 (4“)
fino a 150	fino a 665	200	VVF31.91	DN125	SKC60	DN125 (5“)
fino a 230	fino a 1019	300	VVF31.92	DN150	SKC60	DN150 (6”)

2-way valve and minimum recommended bypass pipe diameter as a function of the minimum waterflow.

12.5 For VPF.D system: indications for the decoupling pipe sizing

Climaveneta provides in the table below some indications for the plants design, as a function of the nominal waterflow on the primary heat exchanger.
NOTE: temperature probes are separately supplied

Minimum waterflow to technical bulletin		∅ Decoupling pipe
[m³/h]	[GPM]	
Da 25 a 40	Da 111 a 188	2"½
fino a 60	fino a 299	3"
fino a 100	fino a 526	4"
fino a 150	fino a 831	5"
fino a 225	fino a 1309	6"
fino a 375	fino a 2286	8"

Minimum decoupling pipe diameter as a function of the minimum waterflow

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