Climaveneta **Technical Bulletin**
NECS_N_0152_0612_201211_EN

NECS-N

HFC R-410A

0152 - 0612
35,8 - 322 kW

Air-to-water reversible heat pump with axial fans

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

- R410A refrigerant
- Total versatility
- Water filter installed standard
- Hydronic unit incorporated

CLIMAVENETA

SUMMARY

NECS-N
0152 - 0612

EUROVENT CERTIFIED PERFORMANCE

This company participates in the Eurovent Certification Programme. The products are listed in the Directory of certified products.

Eurovent certification applied to units with cooling capacity up to 1500 kW for air cooled water chillers and water cooled liquid chillers.

CE

TÜV MANAGEMENT SERVICE ISO 9001

Company quality system certified to UNI EN ISO 9001

Liability disclaimer

This bulletin is not exhaustive about: installation, use, safety precautions, handling and transport. Refer to “General Manual for Installation” for further informations.

This bulletin refers to standard executions, in particular for dimension, weight, electric, hydraulic, aeraulic and refrigerant connections (whereas applicable). Contact Climaveneta Commercial Office for further drawings and schemes.

Climaveneta declines any liability derived from the bulletin’s use.

The data contained herein are subject to variation without notice.

1. PRODUCT PRESENTATION

NECS, the CLIMAVENETA R410A range

Scroll compressors, featuring high efficiency, low vibrations and low noise emissions.
Range flexibility. A good 11 size and up to 4 version are available in the 38 - 159 kW range.
Part load efficiency with EER > 4,3
New controller with QuickMind
Idrorelax, in order to realize your ideas.

Climaveneta presents its new NECS (New Evolution Climaveneta System) range of chillers (heat pumps) fitted with R410A rotary scroll compressors. Consistently with corporate culture, the NECS series exploits cutting-edge technology to achieve extremely high levels of quality, focusing on maximum energy efficiency and minimum noise emissions.

Why R410A?

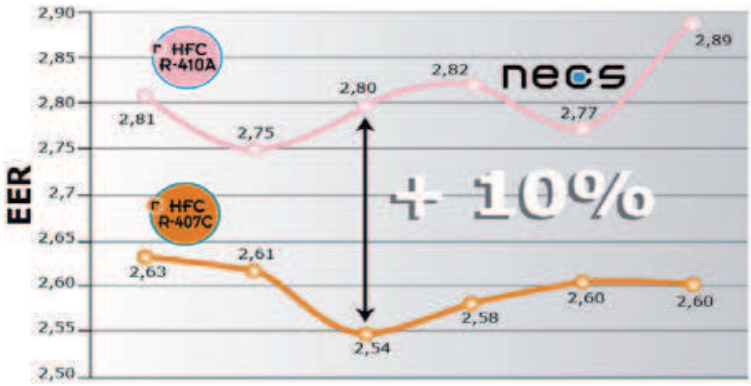
Though R410A is a blend, it behaves just like a pure gas and features a negligible temperature glide. Thanks to its outstanding heat conductivity, R410A contributes towards achieving elevated system efficiency. R410A is also an ecological gas, both because its elevated efficiency reduces electricity consumption and, consequently, CO_2, emissions and because it does not damage the ozone layer (ODP = 0). The scroll compressor has been expressly redesigned for use with the new gas and is now even more compact and silent than before.

Low-Noise Versions

Two noise reduction versions are available for all sizes: low noise and super low noise. Low noise levels are achieved by reducing fan speed while the circuitry has been optimised and the coils generously sized to ensure the unit works correctly.

The energy efficiency (EER)

The energy efficiency (EER) of these Climaveneta units is further enhanced thanks to the fact that the design of the heat exchange surfaces, coils and plate exchangers was focused on minimising running costs.
Well as achieving an EER close to 2.9, this design focus achieves very high levels reliability and lengthens the working life of the compressor.



1.1 Energy indices ESEER and IPLV

Increasingly closer attention is being paid towards the power consumption of air-conditioning equipment, both in Europe and elsewhere.
For many years in the United States, reference has not just been made to efficiency at rated conditions. A valuation index is also used which considers marginal operation of the unit at rated conditions as well as increased usage in part load conditions when the external air temperature is lower than the rated value and when the separation stages of the cooling compressors are used.
The valuation index adopted in the United States is called IPLV (Integrated Part Load Value) and is defined in the regulations issued by ARI (American Refrigeration Institute).

ARI Standard

$$IPLVARI = (1*EER_{100\%} + 42*EER_{75\%} + 45*EER_{50\%} + 12*EER_{25\%}) /100$$

where $EER_{100\%}$, $EER_{75\%}$, $EER_{50\%}$ and $EER_{25\%}$ are the efficiencies of the chiller in the various load conditions (100% - 75% - 50% and 25% respectively), calculated in the external air temperature conditions shown below.

The temperature of the water leaving the evaporator is considered constant at 6.7°C in all load conditions, with a delta of 5°C in the full load condition.
The multipliers 1, 42, 45 e 12 are the cooling performance coefficients in various load conditions statistically calculated by ARI on the basis of surveys conducted, for various types of buildings and operating conditions, in 29 American cities.

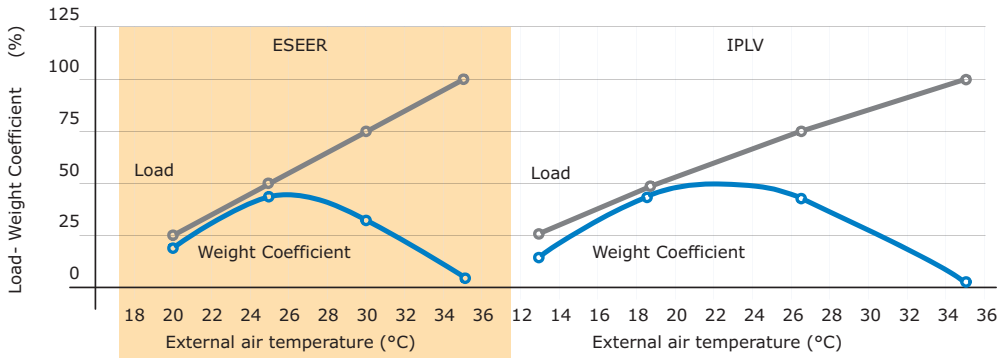
Evaporator temp. leaving	6,7°C constant			
DeltaT full load	5°C			
Load	100%	75%	50%	25%
External air temp.	35°C	26,7°C	18,3°C	12,8°C

In Europe there is a proposal for EECCAC (Energy Efficiency and Certification of Central Air Conditioner)

Proposal EECCAC

$$ESEER = (3*EER_{100\%} + 33*EER_{75\%} + 41*EER_{50\%} + 23*EER_{25\%})/100$$

Evaporator temp. leaving	6,7°C			
DeltaT full load	5°C			
Load	100%	75%	50%	25%
External air temp.	35°C	30°C	25°C	20°C



Load	Air Temp.	Weight Coefficient	Air Temp.	Weight Coefficient
100%	35°C	3%	35°C	1%
75%	30°C	33%	26,7°C	42%
50%	25°C	41%	18,3°C	45%
25%	20°C	23%	12,8°C	12%

Weight = quantity of energy produced in the respective load conditions

1.2 Using the energy indices

After establishing which index to use and estimating the total power required by the system in the summer mode (in kWh), we can calculate seasonal electricity consumption (in kWh) using the following formula:

Power absorbed = Power requested / Index of efficiency

The real power calculation can be obtained more correctly in a “dynamic” form, that is, considering the load performance curve at different external temperatures, the location and the reference number of operating hours.

These figures will allow plant consultants and designers to make their evaluations depending on the type of building, the place of installation and the type of heat load, etc... They can also determine the energy index using the method that best reflects plant requirements and can make comparisons between similar or equivalent systems using the same reference unit.

NECS-N	IPLV	ESEER
0152 B	4.48	4.04
0182 B	4.53	4.08
0202 B	4.47	4.03
0252 B	4.44	4.00
0302 B	4.38	3.95
0352 B	4.51	4.06
0412 B	4.35	3.92
0452 B	4.54	4.09
0512 B	4.48	4.04
0522 B	4.64	4.18
0612 B	4.43	3.99

NECS-N	IPLV	ESEER
0152 LN	4.58	4.09
0182 LN	4.66	4.16
0202 LN	4.51	4.03
0252 LN	4.50	4.02
0302 LN	4.57	4.08
0352 LN	4.44	3.96
0412 LN	4.41	3.94
0452 LN	4.40	3.93
0512 LN	4.47	3.99
0522 LN	4.45	3.97
0612 LN	4.21	3.76

1.3 Smart Defrost (Climaveneta Patent)

Smart Defrost replaces traditional defrosting systems thanks to three fundamental advantages:

* Reduction in defrost cycle times
* Increase in overall chiller efficiency
* Minimisation of the temperature reduction sent to the system during defrosting.

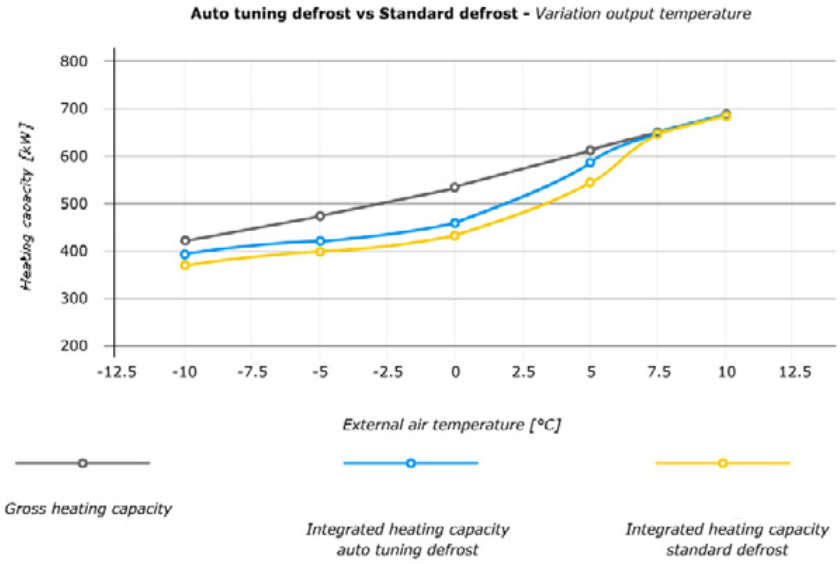
The system is based on the implementation of three different algorithms which interact with each other, with the chiller operating data and with environmental conditions in order to personalise defrosting, cycle after cycle, and thus optimise chiller operation and increase overall efficiency.

The first algorithm, **TIMER TUNING**, improves estimates of the quantity of ice on the coil, thus varying the initial defrost time. Longer real defrost times correspond to shorter defrost start times, and vice-versa. This function achieves significant increases in power production and consequently increases integrated COP with respect to the traditional defrost system.

The second algorithm, **TIMER TUNING + AUTO TUNING**, interacts with the first and introduces an additional control parameter: the difference between evaporation temperature and outdoor temperature. This logic is very important, especially in very humid areas where outdoor temperatures are not critical but humidity levels are very high, thus rapidly forming ice and increasing the frequency of defrosting cycles, or in very cold areas with low levels of humidity, thus forming small amount of ice and reducing defrost requirements. In both cases, traditional defrosting "wastes" considerable amounts of power.

The third algorithm, **FREE - DEFROST**, checks whether operating conditions allow natural defrosting at the sole expense of external air and achieves this while individual circuits are on pause, without performing cycle reversals.
This logic saves the heating power that the heat pump would have had to generate to offset the introduction of cold water to the system required during traditional defrost and cycle reversal operations.

A heat pump fitted with Smart Defrost offers a net heating capacity, including the reduction due to defrost cycles, therefore, 5% higher than the same chiller using a traditional defrost system.



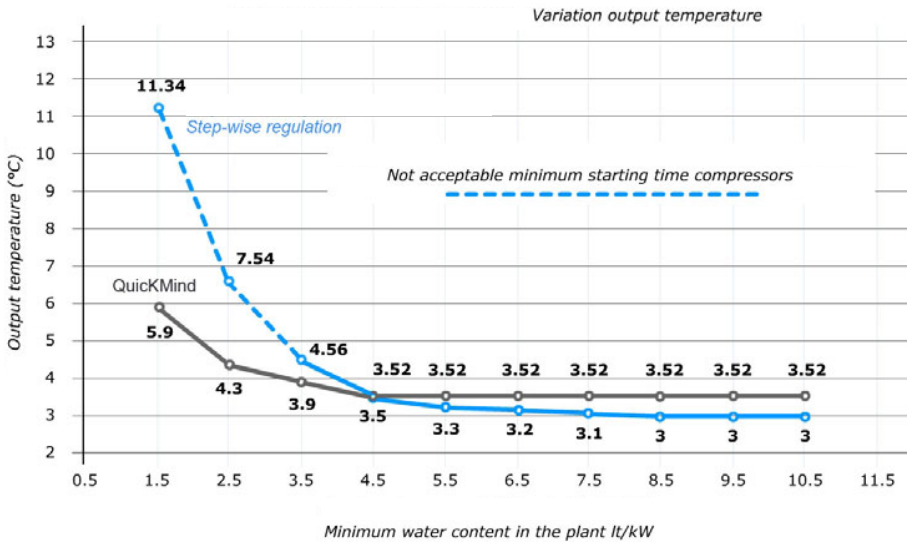
1.4 Control unit with LED display

The new “W3000 Base” control unit is installed on all units.
The “W3000 Compact” control unit, featuring a “user friendly” LCD interface, is available on all units as an accessory item.
This interface is also available in a version with a remote control feature.

Main functions: QuickMind, local and remote FWS supervision, dual setpoint management, etc., confirm Climaveneta’s commitment to continually developing its electronics technology. The heat pumps, moreover, are fitted with the original Climaveneta defrosting control system called “Autotuning Defrost” which considerably reduces defrosting times, thus improving the energy performance of the unit. Interfaces with BMS systems:
METASYS®, MODBUS®, LONWORKS®, SIEMENS®, TREND®.

Black Box logs data relative to 200 alarm events which can be printed with a personal computer.

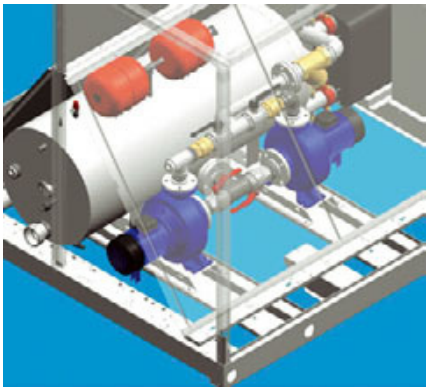
QuickMind is a special control unit which monitors the main operating parameters, predicts system behaviour and anticipates unit settings in order to constantly optimise performance; it allows both return and delivery water temperatures to be chosen as adjustment parameters. It can reduce outlet temperature fluctuations even with a small amount of water in the system. When, for dualcompressor chillers featuring a maximum of 12 start-ups per hour and using a traditional adjustment system, the minimum recommended water content is 5.5 l/kW, QuickMind ensures the same chiller operates correctly even with a water content of just 2.5 l/kW and considerably reduces outlet temperature fluctuations. The above graph shows that outlet temperature fluctuations with QuickMind are limited to 4.3°C as opposed to 7.54°C if the traditional adjustment system were used, without even ensuring an acceptable minimum compressor start time.



1.5 Integrated Hydronic Unit (Optional)
Compact PLUG and PLAY units.
NECS has been designed to reduce installation work to a minimum.
The integrated hydronic unit incorporates all the hydraulic components, thus optimising installation space, time and costs.
The integrated hydronic unit is composed of:
- Storage tank
- Horizontal one-piece centrifuge pump.
- Pump inlet pressure gauge
- Flow switch
- Flow control valve
- Discharge valve
- Exchanger input water temperature probe
- Exchanger outlet water temperature probe
- Air vent
- 3 bar safety valve.
- One 8 or 12-litre expansion tanks, pre-pressurised to 1,5 bar
- Check valve (only if P2 is fitted)
- Pre-mounted Y-shaped water filter with stainless steel mesch

Available configurations
Hydronic group 1 pomp
Hydronic group 2 pomps
Hydronic group 1 pomp with water tank
Hydronic group 2 pomps with water tank

For greater information, to see the section “Hydronic Groups”



IDRORELAX
The NECS range of chillers with heat pump is available in the IR configuration; this allows units to be combined with IDRORELAX, a centralised hydronic system for managing cooling and heating requirements and producing hot running water for residential, hotel and office applications.
Further information on the IDRORELAX system can be obtained by consulting the relative documentation.

IdroRelax® REALIZZA LE TUE IDEE

2. UNIT DESCRIPTION

2.1 NECS. State of the art system

NECS is a new series of heat pumps and water chillers which are ideal for low-to-medium power air-conditioning systems and particularly suitable for installations with a limited water content. NECS is a step beyond other systems thanks to its exclusive QuickMind control system, specifically developed by Climaveneta.
Thanks to the innovative QuickMind control, the NECS system has been designed to work on plants with a low water content where, unlike traditional controls, it minimises the variations in inlet water temperature even in extremely variable load conditions. It is a highly professional alternative to the installation of storage tanks.
NECS assures a precise water temperature control even at just 2.5 litres/kW.
Technical start-up and operating times have been reduced.
During the start-up phase, just the temperature set point needs setting.
The possibility integration of the hydronic-pump-group inside the unit simplifies the water and electrical power circuits of the system.
QuickMind continuously adapts its system settings to the various requirements of the plant.

Smart Defrost (Climaveneta Patent)
The air to water heat pumps incorporate an innovative auto tuning defrosting system that is able to optimize the defrosting time with improvement of the total efficiency.
The new logic power is the capacity to modify automatically the parameters cycle by cycle in according to external conditions.
Three different algorithms (Timing Defrost, Auto tuning Defrost, Free Defrost) estimate exactly the quantity of ice inside the coils on the base of evaporating pressure, defrosting time of the preview cycle and external air temperature. The new system assures an efficiency and efficacy defrosting cycle.

Air-to-water heat pump
Reverse cycle air-to-water heat pump with manual mode switch. The unit is supplied with anti-freeze oil and refrigerant and has been factory tested. Onsite installation therefore just involves making connections to the mains power and water supplies.
Unit charged with R410A ecological refrigerant.

2.2 Standard unit composition

Supporting frame
Frame comprising a base in polyester-painted hot-galvanized sheet steel and supporting panels in Peraluman. The self-supporting structure containing the main components is designed to ensure maximum ease of access during servicing and maintenance operations.

Compressors
Hermetic scroll compressors. All the compressors are fitted with an oil sump heater, electronic overheating protection with centralised manual reset and a two-pole electric motor.

Water-refrigerant heat exchanger
AISI 316 steel braze-welded plate exchanger. The heat exchangers are insulated with a closed-cell condensation proof lining in neoprene. A thermostatically controlled electric heater prevents ice from forming inside the evaporator when the unit is not working. When the unit is working, it is protected by a differential pressure switch mounted on the water side. The unit can work with antifreeze mixtures at exchanger outlet temperatures as low as -8°C.

Water side filter
Y" type filter designed and built to retain impurities in the hydraulic circuit. It features a stainless steel mesh cartridge with 0.9mm holes which can be replaced easily without removing the valve from the piping.

Refrigerant-air heat exchanger
Finned coil exchanger made from copper tubes and aluminium fins. The aluminium fins are correctly spaced to guarantee optimum heat exchange efficiency.

Fans
Axial electric fans, protected to IP 44, with external rotor and plastic-coated aluminium blades. Housed in aerodynamic hoods complete with safety grille. 6-pole electric motor with built-in thermal protection. The fan chamber is divided into two sections. This improves efficiency with partial loads as the fans of the idle circuit can be stopped.

Refrigerant circuit
Main components of the refrigerant circuit:
- dryer filter,
- refrigerant line sight glass with humidity indicator,
- externally equalised thermostatic valve,
- high pressure safety valve,
- high and low pressure switches,
- liquid receiver and separator,
- 4-way reverse cycle valve.

Electric power and control panel
Electric power and control panel, built to EN 60204-1/EC 204-1 standards, complete with:
- control circuit transformer,
- general door lock isolator,
- fuses and contactors for compressors and fans,
- terminals for cumulative alarm block (BCA),
- remote ON/OFF terminals,
- spring-type control circuit terminal board,
- electric panel with double door and seals for outdoor installation,
- electronic controller,
- control circuit numbered wires,
- pump control consent relay,
- fan speed continuous regulation.

2.3 Electronic control
W3000 is a special control which monitors the main operating parameters of the system, predicts the behaviour of the plant and anticipates the units settings in order to constantly optimise its performance.
- optimises plant operation
- minimises discharge line temperature oscillations compared with the set point
- allows either return or delivery water temperatures to be set as adjustment parameters.
- optimises compressor operation in the event of reduced loads
- stores 200 alarm events; these can be downloaded to any personal computer.
- detects and reports a large series of events such as: insufficient water content in the plant; low/high water flow in the plant; low/high inlet water temperature; pump and compressor maintenance times; refrigerant circuit integrity alarm.

W3000 is also suitable for: interface connection with BMS systems; interface connection with the Climaveneta Supervision Software; remote control of the unit by modem (fixed/GSM); control from a remote keyboard.

Availabilities of kit a Remote Keyboard for unit already installed. It only comprises n° 2 keyboard for unit assembled without predisposition Remote Keyboard.

Basic model
Unit without heat recovery.

Model with partial heat recovery (D)
Reverse cycle air-water heat pump fitted with a desuperheater. Similarly to the basic unit, this version produces hot or chilled water in the primary circuit, depending on which seasonal mode has been selected. Compared with the basic configuration, this version features a water/coolant heat exchanger on the gas delivery line. This heat exchanger, fitted in series with the traditional cooling circuit condenser, is large enough to recover just desuperheating heat for the production of medium-to-high temperature water (secondary or recovery circuit). Hot water can be produced in the recovery circuit for domestic hot water and the like both in summer and winter. The heating capacity of this circuit is approximately equal to the power input of the compressor. After going through this exchanger, the refrigerant gas enters the condenser (refrigerant-air exchanger in summer and refrigerant-water exchanger in winter) where condensation is completed.

There are two operating cycles:

WINTER MODE
The exchanger to which the main water circuit is connected works as a condenser (the refrigerant-air exchanger works like an evaporator). The refrigerant-water exchanger for partial heat recovery (desuperheater) allows hot water to be produced in a second hydraulic circuit for domestic hot water and the like.

SUMMER MODE
The exchanger to which the main water circuit is connected works as an evaporator (the refrigerant-air exchanger works like a condenser). The refrigerant-water exchanger for partial heat recovery (desuperheater) allows hot water to be produced in the same way as the winter mode.

AVAILABLE VERSIONS

B (base)
Standard unit.

LN (Low Noise)
Low noise version. This configuration features special sound-proofing for the compressor chamber and reduced fan speed. Fan speed is automatically increased if environmental conditions are particularly tough.

2.4 Accessories

- Noise insulation
- Rubber isolators
- Kit LT for low ambient temperature. Refer to page “Operating range”
- Compressor discharge valve
- Compressor suction valve
- Cu/Cu condensing coils
  Recommended for applications where good corrosion resistance is required
- Condensing coils with epoxy-coated fins
  Treatment recommended for applications in slightly aggressive atmospheres
- Condensing coils with Fin Guard Silver treatment
  Treatment recommended for applications in marine, highly polluted or otherwise aggressive atmospheres
- Coil protection with wire net
- Evaporator water flow switch (supplied separately)
- Free voltage contacts for compr. operation signalling
- Remote control phase sequence
- HP and LP gauges
- W3000 Compact Keyboard
- Remote keyboard (only with keyboard W3000 Compact)
- Water pump kit with or without storage tank
- Storage tank auxsiliary GA
- Water tank anti-freeze heater (if fitted)

NECS-N / B			0152	0182	0202	0252	0302	0352	0412	0452	0512	0552
Power supply		V/ph/Hz	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)	**kW**	**37,7**	**42,8**	**47,9**	**57,5**	**72,0**	**82,5**	**93,9**	**107**	**120**	**138**
Total power input	(1)	kW	13,6	15,7	19,2	20,4	28,0	32,0	36,0	39,8	44,0	50,4
EER	(1)		2,77	2,73	2,49	2,82	2,57	2,58	2,61	2,68	2,73	2,73
ESEER	(1)		4,04	4,08	4,03	4,01	3,95	4,06	3,92	4,09	4,04	4,18
COOLING ONLY (EN14511 VALUE)												
Cooling capacity	(1)(2)	kW	37,4	42,5	47,6	57,1	71,5	82,0	93,3	106	119	137
EER	(1)(2)		2,68	2,65	2,44	2,75	2,51	2,52	2,55	2,62	2,67	2,66
ESEER	(1)(2)		3,80	3,83	3,81	3,83	3,72	3,86	3,73	3,90	3,85	3,96
Cooling energy class			D	D	E	C	D	D	D	D	D	D
HEATING ONLY (GROSS VALUE)												
Heating capacity	(3)	**kW**	**42,9**	**48,1**	**54,2**	**65,2**	**81,0**	**93,5**	**105**	**121**	**136**	**156**
Total power input	(3)	kW	14,2	15,6	18,1	21,2	26,1	29,8	33,9	37,9	42,3	48,4
COP	(3)		3,02	3,08	2,99	3,08	3,10	3,14	3,11	3,18	3,21	3,23
HEATING ONLY (EN14511 VALUE)												
Heating capacity	(3)(2)	kW	43,3	48,5	54,6	65,7	81,6	94,2	106	122	137	158
COP	(3)(2)		2,96	3,03	2,95	3,03	3,06	3,09	3,06	3,14	3,16	3,18
Cooling energy class			C	B	C	B	B	B	B	B	B	B
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(4)	kW	39,1	44,4	49,7	59,7	74,7	85,6	97,4	111	125	143
Total power input	(4)	kW	13,1	15,1	18,5	19,7	27,1	30,9	34,8	38,5	42,5	48,7
Desuperheater heating capacity	(4)	**kW**	**11,2**	**13,1**	**16,2**	**16,9**	**23,7**	**27,2**	**30,3**	**33,8**	**37,0**	**42,7**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)	m³/h	6,49	7,37	8,24	9,90	12,4	14,2	16,2	18,4	20,7	23,7
Pressure drop	(1)	kPa	56,6	47,2	41,7	41,7	51,3	52,5	56,8	54,2	58,5	69,5
HEAT EXCHANGER USER SIDE IN HEATING												
Water flow	(3)	m³/h	7,45	8,35	9,41	11,3	14,1	16,2	18,3	21,0	23,6	27,2
Pressure drop	(3)	kPa	74,6	60,6	54,4	54,6	66,1	68,7	73,0	70,7	76,1	91,7
PARTIAL RECOVERY USER SIDE IN												
Water flow	(4)	m³/h	1,95	2,27	2,82	2,93	4,12	4,73	5,27	5,87	6,43	7,43
Pressure drop	(4)	kPa	6,72	9,14	14,0	15,2	14,8	19,5	24,2	21,1	25,4	22,7
COMPRESSORS												
N. of compressors		N°	2	2	2	2	2	2	2	2	2	2
Number of capacity		N°	2	2	2	2	2	2	2	2	2	2
No. of circuits		N°	1	1	1	1	1	1	1	1	1	1
Regulation			STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS
Min. capacity step		%	50	50	50	50	50	50	50	50	50	50
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge		kg	8,70	9,00	9,40	12,9	13,3	18,2	19,0	19,5	28,5	35,8
Oil charge		kg	5,00	7,00	7,00	7,00	8,00	9,00	9,00	12,0	14,0	13,0
FANS												
Quantity		N°	4	4	4	6	6	6	8	8	10	10
Air flow		m³/s	5,15	5,15	5,15	7,73	7,73	7,51	10,4	10,1	13,2	13,0
Fans power		kW	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25
NOISE LEVEL												
Noise Pressure	(5)	dB(A)	52	52	52	52	53	54	54	54	55	55
Noise Power	(6)	dB(A)	84	84	84	84	85	86	86	86	87	87
SIZE AND WEIGHT												
A	(7)	mm	1695	1695	1695	2195	2195	2195	2745	2745	3245	3245
B	(7)	mm	1120	1120	1120	1120	1120	1120	1120	1120	1120	1120
H	(7)	mm	1420	1420	1420	1420	1420	1420	1420	1420	1620	1620
Operating weight	(7)	kg	450	460	470	560	690	750	840	910	1030	1090

Notes:

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C
2 Values in compliance with EN14511-3:2011
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C; Plant (side) heat exchanger recovery water (in/out) 40°C/45°C
5 Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
6 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
7 Unit in standard configuration/execution, without optional accessories.
- Unavailable

NECS-N / B			0612
Power supply		V/ph/Hz	400/3/50+N
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)	**kW**	**151**
Total power input	(1)	kW	58,9
EER	(1)		2,56
ESEER	(1)		3,99
COOLING ONLY (EN14511 VALUE)			
Cooling capacity	(1)(2)	kW	150
EER	(1)(2)		2,50
ESEER	(1)(2)		3,79
Cooling energy class			D
HEATING ONLY (GROSS VALUE)			
Heating capacity	(3)	**kW**	**172**
Total power input	(3)	kW	54,4
COP	(3)		3,17
HEATING ONLY (EN14511 VALUE)			
Heating capacity	(3)(2)	kW	174
COP	(3)(2)		3,12
Cooling energy class			B
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(4)	kW	156
Total power input	(4)	kW	56,9
Desuperheater heating capacity	(4)	**kW**	**50,3**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)	m³/h	25,9
Pressure drop	(1)	kPa	73,1
HEAT EXCHANGER USER SIDE IN HEATING			
Water flow	(3)	m³/h	30,0
Pressure drop	(3)	kPa	97,9
PARTIAL RECOVERY USER SIDE IN			
Water flow	(4)	m³/h	8,75
Pressure drop	(4)	kPa	31,5
COMPRESSORS			
N. of compressors		N°	2
Number of capacity		N°	2
No. of circuits		N°	1
Regulation			STEPS
Min. capacity step		%	50
Refrigerant			R410A
Refrigerant charge		kg	36,5
Oil charge		kg	13,0
FANS			
Quantity		N°	10
Air flow		m³/s	13,0
Fans power		kW	0,25
NOISE LEVEL			
Noise Pressure	(5)	dB(A)	55
Noise Power	(6)	dB(A)	87
SIZE AND WEIGHT			
A	(7)	mm	3245
B	(7)	mm	1120
H	(7)	mm	1620
Operating weight	(7)	kg	1100

Notes:
1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C
2 Values in compliance with EN14511-3:2011
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C; Plant (side) heat exchanger recovery water (in/out) 40°C/45°C
5 Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
6 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
7 Unit in standard configuration/execution, without optional accessories.
- Unavailable

NECS-N / LN			0152	0182	0202	0252	0302	0352	0412	0452	0512	0552
Power supply		V/ph/Hz	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)	**kW**	**35,8**	**41,6**	**48,0**	**54,6**	**73,2**	**83,5**	**93,9**	**103**	**119**	**132**
Total power input	(1)	kW	14,3	16,0	19,0	21,3	27,2	31,9	36,0	41,6	44,6	53,3
EER	(1)		2,50	2,60	2,53	2,56	2,69	2,62	2,61	2,48	2,67	2,47
ESEER	(1)		4,09	4,16	4,03	4,02	4,08	3,96	3,94	3,93	3,99	3,97
COOLING ONLY (EN14511 VALUE)												
Cooling capacity	(1)(2)	kW	35,5	41,3	47,7	54,3	72,7	83,0	93,3	103	118	131
EER	(1)(2)		2,43	2,54	2,47	2,51	2,63	2,56	2,55	2,43	2,61	2,42
ESEER	(1)(2)		3,81	3,89	3,84	3,84	3,88	3,77	3,75	3,75	3,82	3,78
Cooling energy class			E	D	E	D	D	D	D	E	D	E
HEATING ONLY (GROSS VALUE)												
Heating capacity	(3)	**kW**	**41,8**	**48,2**	**54,1**	**63,6**	**84,1**	**96,2**	**109**	**121**	**138**	**154**
Total power input	(3)	kW	13,8	15,2	18,1	20,6	26,1	30,4	34,1	37,9	42,4	48,3
COP	(3)		3,03	3,17	2,99	3,09	3,22	3,16	3,19	3,18	3,24	3,19
HEATING ONLY (EN14511 VALUE)												
Heating capacity	(3)(2)	kW	42,2	48,6	54,5	64,0	84,8	96,9	110	121	138	155
COP	(3)(2)		2,97	3,11	2,95	3,04	3,17	3,11	3,14	3,13	3,19	3,13
Cooling energy class			C	B	C	B	B	B	B	B	B	B
COOLING WITH PARTIAL RECOVERY												
Cooling capacity	(4)	kW	37,1	43,1	49,8	56,7	75,9	86,7	97,4	107	123	137
Total power input	(4)	kW	13,8	15,5	18,4	20,6	26,3	30,9	34,8	40,2	43,1	51,6
Desuperheater heating capacity	(4)	**kW**	**12,2**	**13,7**	**16,1**	**18,2**	**23,1**	**26,7**	**30,3**	**35,3**	**37,5**	**45,4**
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)	m³/h	6,16	7,15	8,26	9,41	12,6	14,4	16,2	17,8	20,5	22,7
Pressure drop	(1)	kPa	51,1	44,4	42,0	37,6	52,9	53,9	56,8	50,8	57,4	63,7
HEAT EXCHANGER USER SIDE IN HEATING												
Water flow	(3)	m³/h	7,27	8,38	9,39	11,1	14,6	16,7	18,9	21,0	23,9	26,7
Pressure drop	(3)	kPa	71,0	60,9	54,2	52,0	71,2	72,8	77,9	70,7	78,1	88,6
PARTIAL RECOVERY USER SIDE IN												
Water flow	(4)	m³/h	2,11	2,38	2,81	3,16	4,02	4,64	5,27	6,14	6,52	7,88
Pressure drop	(4)	kPa	7,90	10,0	13,9	17,7	14,1	18,8	24,2	23,1	26,1	25,6
COMPRESSORS												
N. of compressors		N°	2	2	2	2	2	2	2	2	2	2
Number of capacity		N°	2	2	2	2	2	2	2	2	2	2
No. of circuits		N°	1	1	1	1	1	1	1	1	1	1
Regulation			STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS
Min. capacity step		%	50	50	50	50	50	50	50	50	50	50
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge		kg	8,70	9,00	9,40	12,9	18,0	20,2	28,5	29,0	33,3	35,8
Oil charge		kg	5,00	7,00	7,00	7,00	8,00	9,00	9,00	12,0	14,0	13,0
FANS												
Quantity		N°	4	4	6	6	8	8	8	8	10	10
Air flow		m³/s	3,87	3,72	6,12	5,81	7,85	8,85	8,68	8,68	10,9	10,9
Fans power		kW	0,16	0,16	0,16	0,16	0,16	0,25	0,25	0,25	0,25	0,25
NOISE LEVEL												
Noise Pressure	(5)	dB(A)	47	47	48	48	49	51	51	51	52	52
Noise Power	(6)	dB(A)	79	79	80	80	81	83	83	83	84	84
SIZE AND WEIGHT												
A	(7)	mm	1695	1695	2195	2195	2745	2745	2745	2745	3245	3245
B	(7)	mm	1120	1120	1120	1120	1120	1120	1120	1120	1120	1120
H	(7)	mm	1420	1420	1420	1420	1420	1620	1620	1620	1620	1620
Operating weight	(7)	kg	450	480	520	560	770	840	910	950	1070	1090

Notes:

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C
2 Values in compliance with EN14511-3:2011
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C; Plant (side) heat exchanger recovery water (in/out) 40°C/45°C
5 Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
6 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
7 Unit in standard configuration/execution, without optional accessories.
- Unavailable

NECS-N / LN			0612
Power supply		V/ph/Hz	400/3/50+N
PERFORMANCE			
COOLING ONLY (GROSS VALUE)			
Cooling capacity	(1)	**kW**	**143**
Total power input	(1)	kW	62,7
EER	(1)		2,28
ESEER	(1)		3,76
COOLING ONLY (EN14511 VALUE)			
Cooling capacity	(1)(2)	kW	142
EER	(1)(2)		2,24
ESEER	(1)(2)		3,59
Cooling energy class			F
HEATING ONLY (GROSS VALUE)			
Heating capacity	(3)	**kW**	**169**
Total power input	(3)	kW	54,3
COP	(3)		3,12
HEATING ONLY (EN14511 VALUE)			
Heating capacity	(3)(2)	kW	171
COP	(3)(2)		3,07
Cooling energy class			B
COOLING WITH PARTIAL RECOVERY			
Cooling capacity	(4)	kW	148
Total power input	(4)	kW	60,6
Desuperheater heating capacity	(4)	**kW**	**53,8**
EXCHANGERS			
HEAT EXCHANGER USER SIDE IN REFRIGERATION			
Water flow	(1)	m³/h	24,6
Pressure drop	(1)	kPa	66,1
HEAT EXCHANGER USER SIDE IN HEATING			
Water flow	(3)	m³/h	29,4
Pressure drop	(3)	kPa	94,3
PARTIAL RECOVERY USER SIDE IN			
Water flow	(4)	m³/h	9,35
Pressure drop	(4)	kPa	36,0
COMPRESSORS			
N. of compressors		N°	2
Number of capacity		N°	2
No. of circuits		N°	1
Regulation			STEPS
Min. capacity step		%	50
Refrigerant			R410A
Refrigerant charge		kg	36,5
Oil charge		kg	13,0
FANS			
Quantity		N°	10
Air flow		m³/s	10,9
Fans power		kW	0,25
NOISE LEVEL			
Noise Pressure	(5)	dB(A)	52
Noise Power	(6)	dB(A)	84
SIZE AND WEIGHT			
A	(7)	mm	3245
B	(7)	mm	1120
H	(7)	mm	1620
Operating weight	(7)	kg	1100

Notes:
1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C
2 Values in compliance with EN14511-3:2011
3 Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C; Plant (side) heat exchanger recovery water (in/out) 40°C/45°C
5 Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
6 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
7 Unit in standard configuration/execution, without optional accessories.
- Unavailable

3.2 COOLING CAPACITY PERFORMANCE

0152

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				6						7						8		
Pf	41,1	39,0	38,0	36,6	33,9	32,8	42,4	40,2	39,2	37,7	35,0	33,8	43,6	41,4	40,4	38,8	36,0	34,8
Pat	10,9	12,1	12,6	13,5	15,0	15,7	11,0	12,2	12,7	13,6	15,1	15,7	11,1	12,3	12,8	13,7	15,2	15,8
Qev	7,08	6,71	6,55	6,29	5,84	5,64	7,30	6,91	6,75	6,49	6,02	5,82	7,51	7,12	6,95	6,68	6,20	5,99
Dpev	67,5	60,5	57,6	53,3	45,8	42,8	71,6	64,3	61,3	56,6	48,7	45,5	75,9	68,2	65,0	60,1	51,7	48,3
Tev				9						10						11		
Pf	44,9	42,5	41,5	39,9	37,0	35,8	46,1	43,7	42,7	41,1	38,1	36,8	47,3	44,9	43,9	42,2	39,1	37,8
Pat	11,2	12,4	12,9	13,8	15,3	15,9	11,3	12,5	13,0	13,9	15,4	16,0	11,3	12,6	13,1	13,9	15,4	16,1
Qev	7,73	7,33	7,15	6,88	6,38	6,17	7,94	7,53	7,36	7,07	6,56	6,34	8,16	7,74	7,56	7,27	6,74	6,51
Dpev	80,3	72,2	68,9	63,7	54,8	51,2	84,8	76,4	72,8	67,3	57,9	54,1	89,5	80,6	76,9	71,1	61,1	57,0

0182

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				6						7						8		
Pf	46,7	44,2	43,2	41,6	38,8	37,7	48,0	45,5	44,4	42,8	40,0	38,9	49,4	46,7	45,7	44,0	41,3	40,1
Pat	12,7	14,1	14,6	15,5	17,1	17,7	12,9	14,2	14,8	15,7	17,2	17,9	13,0	14,4	14,9	15,8	17,4	18,0
Qev	8,04	7,61	7,43	7,15	6,68	6,48	8,27	7,83	7,65	7,37	6,89	6,70	8,50	8,05	7,86	7,59	7,11	6,91
Dpev	56,2	50,3	47,9	44,4	38,7	36,5	59,4	53,2	50,8	47,2	41,3	39,0	62,7	56,3	53,7	50,0	43,9	41,5
Tev				9						10						11		
Pf	50,7	48,0	46,9	45,3	42,5	41,4	52,0	49,3	48,2	46,5	43,8	42,7	53,2	50,5	49,4	47,8	45,0	43,9
Pat	13,1	14,5	15,1	15,9	17,5	18,2	13,3	14,6	15,2	16,1	17,7	18,3	13,4	14,8	15,3	16,2	17,8	18,5
Qev	8,73	8,27	8,08	7,80	7,32	7,13	8,95	8,49	8,30	8,02	7,54	7,35	9,17	8,70	8,51	8,23	7,76	7,57
Dpev	66,1	59,4	56,7	52,8	46,6	44,2	69,6	62,5	59,8	55,8	49,4	46,9	73,1	65,8	63,0	58,8	52,3	49,7

0202

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				6						7						8		
Pf	53,3	50,1	48,7	46,5	42,5	40,8	54,8	51,5	50,1	47,9	43,8	42,1	56,4	53,0	51,5	49,2	45,1	43,3
Pat	15,4	17,1	17,8	19,0	21,0	21,9	15,5	17,3	18,0	19,2	21,2	22,1	15,7	17,4	18,2	19,3	21,4	22,3
Qev	9,17	8,62	8,38	8,00	7,32	7,03	9,44	8,87	8,63	8,24	7,54	7,24	9,70	9,12	8,87	8,48	7,76	7,45
Dpev	51,7	45,6	43,1	39,3	32,9	30,4	54,7	48,4	45,7	41,7	34,9	32,2	57,9	51,2	48,4	44,2	37,0	34,1
Tev				9						10						11		
Pf	57,9	54,4	52,9	50,6	46,3	44,5	59,4	55,9	54,4	51,9	47,6	45,7	60,9	57,3	55,8	53,3	48,9	-
Pat	15,8	17,6	18,3	19,5	21,6	22,5	16,0	17,7	18,5	19,7	21,8	22,6	16,1	17,9	18,7	19,8	21,9	-
Qev	9,97	9,38	9,12	8,71	7,98	7,67	10,2	9,63	9,36	8,95	8,20	7,88	10,5	9,88	9,61	9,18	8,42	-
Dpev	61,1	54,0	51,1	46,7	39,1	36,1	64,3	56,9	53,9	49,2	41,3	38,1	67,7	59,9	56,7	51,8	43,5	-

0252

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				6						7						8		
Pf	62,6	59,4	58,0	55,8	51,9	50,2	64,5	61,2	59,8	57,5	53,4	51,7	66,4	63,0	61,5	59,2	54,9	53,1
Pat	16,6	18,3	19,1	20,3	22,4	23,3	16,8	18,5	19,2	20,4	22,5	23,4	16,9	18,6	19,4	20,5	22,6	23,5
Qev	10,8	10,2	9,98	9,61	8,93	8,64	11,1	10,5	10,3	9,90	9,20	8,90	11,4	10,8	10,6	10,2	9,46	9,15
Dpev	49,4	44,5	42,4	39,3	33,9	31,8	52,4	47,2	45,0	41,7	36,0	33,7	55,6	50,1	47,8	44,2	38,1	35,6
Tev				9						10						11		
Pf	68,2	64,8	63,3	60,9	56,5	54,6	70,1	66,6	65,0	62,5	58,0	56,0	72,0	68,4	66,8	64,2	59,5	57,4
Pat	17,0	18,7	19,5	20,7	22,8	23,7	17,1	18,9	19,6	20,8	22,9	23,8	17,3	19,0	19,7	20,9	23,0	23,9
Qev	11,8	11,2	10,9	10,5	9,72	9,40	12,1	11,5	11,2	10,8	9,99	9,65	12,4	11,8	11,5	11,1	10,2	9,89
Dpev	58,8	53,0	50,5	46,8	40,2	37,6	62,1	56,0	53,4	49,4	42,4	39,6	65,5	59,1	56,3	52,1	44,7	41,6

0302

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				6						7						8		
Pf	79,2	74,9	73,0	70,0	64,6	62,4	81,4	77,0	75,1	72,0	66,6	64,3	83,6	79,1	77,2	74,1	68,6	66,3
Pat	22,6	25,0	26,1	27,7	30,8	32,1	22,8	25,3	26,3	28,0	31,1	32,4	23,1	25,5	26,6	28,3	31,4	32,7
Qev	13,6	12,9	12,6	12,0	11,1	10,7	14,0	13,3	12,9	12,4	11,5	11,1	14,4	13,6	13,3	12,8	11,8	11,4
Dpev	62,0	55,4	52,6	48,4	41,3	38,4	65,5	58,6	55,7	51,3	43,9	40,9	69,2	61,9	58,9	54,3	46,6	43,5
Tev				9						10						11		
Pf	85,8	81,2	79,2	76,2	70,7	68,3	88,0	83,3	81,3	78,2	72,7	-	90,1	85,4	83,4	80,3	74,8	-
Pat	23,3	25,8	26,9	28,6	31,7	33,0	23,5	26,0	27,1	28,8	31,9	-	23,8	26,3	27,3	29,1	32,2	-
Qev	14,8	14,0	13,6	13,1	12,2	11,8	15,2	14,4	14,0	13,5	12,5	-	15,5	14,7	14,4	13,8	12,9	-
Dpev	72,9	65,2	62,1	57,4	49,4	46,2	76,6	68,7	65,5	60,5	52,3	-	80,5	72,2	68,9	63,8	55,3	-

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

COOLING CAPACITY PERFORMANCE

0352

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**90,8**	**85,7**	**83,5**	**80,1**	**74,1**	**71,6**	**93,4**	**88,2**	**85,9**	**82,5**	**76,4**	**73,9**	**96,0**	**90,6**	**88,4**	**84,9**	**78,7**	**76,2**
Pat	26,0	28,6	29,8	31,7	35,0	36,4	26,3	29,0	30,2	32,0	35,4	36,8	26,6	29,3	30,5	32,4	35,8	37,2
Qev	15,6	14,7	14,4	13,8	12,8	12,3	16,1	15,2	14,8	14,2	13,2	12,7	16,5	15,6	15,2	14,6	13,6	13,1
Dpev	63,7	56,6	53,8	49,5	42,4	39,6	67,4	60,0	57,0	52,5	45,1	42,1	71,2	63,4	60,3	55,6	47,9	44,8
Tev				**9**						**10**						**11**		
Pf	**98,6**	**93,1**	**90,8**	**87,3**	**81,1**	**78,5**	**101**	**95,6**	**93,3**	**89,7**	**83,5**	**-**	**104**	**98,0**	**95,7**	**92,1**	**85,9**	**-**
Pat	26,9	29,6	30,8	32,7	36,1	37,6	27,2	29,9	31,1	33,0	36,5	-	27,5	30,2	31,4	33,4	36,8	-
Qev	17,0	16,0	15,6	15,0	14,0	13,5	17,4	16,5	16,1	15,4	14,4	-	17,9	16,9	16,5	15,9	14,8	-
Dpev	75,1	67,0	63,7	58,9	50,8	47,6	79,1	70,6	67,2	62,2	53,9	-	83,2	74,3	70,8	65,6	57,0	-

0412

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**103**	**97,3**	**94,9**	**91,1**	**84,6**	**81,9**	**106**	**100**	**97,7**	**93,9**	**87,2**	**84,5**	**109**	**103**	**101**	**96,7**	**89,9**	**87,2**
Pat	29,5	32,3	33,6	35,6	39,1	40,6	29,8	32,7	34,0	36,0	39,6	41,1	30,2	33,1	34,4	36,4	40,0	41,5
Qev	17,8	16,8	16,3	15,7	14,6	14,1	18,3	17,3	16,8	16,2	15,0	14,5	18,8	17,8	17,3	16,6	15,5	15,0
Dpev	68,7	61,0	58,0	53,5	46,1	43,2	72,8	64,7	61,5	56,8	49,1	46,0	77,0	68,5	65,2	60,2	52,2	49,0
Tev				**9**						**10**						**11**		
Pf	**112**	**106**	**103**	**99,4**	**92,6**	**89,9**	**115**	**109**	**106**	**102**	**95,4**	**-**	**118**	**112**	**109**	**105**	**98,1**	**-**
Pat	30,5	33,5	34,8	36,8	40,4	42,0	30,9	33,8	35,1	37,2	40,8	-	31,2	34,2	35,5	37,6	41,3	-
Qev	19,3	18,3	17,8	17,1	16,0	15,5	19,8	18,7	18,3	17,6	16,4	-	20,4	19,2	18,8	18,1	16,9	-
Dpev	81,3	72,4	69,0	63,8	55,4	52,1	85,7	76,5	72,8	67,4	58,7	-	90,2	80,6	76,8	71,2	62,2	-

0452

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**117**	**111**	**108**	**104**	**96,1**	**93,0**	**121**	**114**	**111**	**107**	**99,0**	**95,8**	**124**	**117**	**114**	**110**	**102**	**98,6**
Pat	32,7	35,9	37,2	39,4	43,4	45,0	33,0	36,3	37,6	39,8	43,8	45,5	33,4	36,6	38,0	40,2	44,2	45,9
Qev	20,2	19,0	18,6	17,8	16,5	16,0	20,8	19,6	19,1	18,4	17,0	16,5	21,3	20,2	19,7	18,9	17,5	17,0
Dpev	65,4	58,3	55,5	51,2	44,1	41,3	69,3	61,8	58,8	54,2	46,8	43,8	73,3	65,4	62,2	57,4	49,5	46,4
Tev				**9**						**10**						**11**		
Pf	**127**	**120**	**117**	**113**	**105**	**101**	**131**	**123**	**120**	**116**	**108**	**104**	**134**	**127**	**124**	**119**	**111**	**-**
Pat	33,8	37,0	38,4	40,6	44,6	46,3	34,1	37,4	38,8	41,0	45,0	46,7	34,5	37,8	39,2	41,4	45,4	-
Qev	21,9	20,7	20,2	19,4	18,0	17,5	22,5	21,3	20,7	19,9	18,5	18,0	23,1	21,8	21,3	20,5	19,0	-
Dpev	77,4	69,0	65,7	60,7	52,4	49,1	81,6	72,8	69,3	64,0	55,3	51,9	85,9	76,6	72,9	67,4	58,4	-

0512

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**132**	**124**	**121**	**117**	**108**	**105**	**135**	**128**	**125**	**120**	**112**	**108**	**139**	**132**	**128**	**123**	**115**	**111**
Pat	36,2	39,7	41,2	43,6	47,8	49,6	36,6	40,1	41,6	44,0	48,2	50,0	37,0	40,5	42,0	44,4	48,6	50,4
Qev	22,7	21,4	20,9	20,1	18,7	18,1	23,3	22,1	21,5	20,7	19,2	18,6	24,0	22,7	22,1	21,3	19,7	19,1
Dpev	70,3	62,8	59,8	55,3	47,7	44,7	74,5	66,6	63,4	58,5	50,5	47,3	78,7	70,4	67,0	61,9	53,4	50,0
Tev				**9**						**10**						**11**		
Pf	**143**	**135**	**132**	**127**	**118**	**114**	**147**	**139**	**135**	**130**	**121**	**117**	**151**	**142**	**139**	**133**	**124**	**-**
Pat	37,3	40,9	42,4	44,7	49,0	50,8	37,7	41,2	42,7	45,1	49,3	51,1	38,1	41,6	43,1	45,5	49,6	-
Qev	24,6	23,3	22,7	21,8	20,3	19,6	25,3	23,9	23,3	22,4	20,8	20,1	26,0	24,5	23,9	23,0	21,3	-
Dpev	83,1	74,3	70,7	65,3	56,3	52,7	87,6	78,3	74,5	68,8	59,3	55,5	92,2	82,4	78,4	72,4	62,4	-

0552

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**151**	**143**	**139**	**134**	**124**	**120**	**155**	**147**	**143**	**138**	**128**	**124**	**160**	**151**	**147**	**141**	**131**	**127**
Pat	41,3	45,4	47,1	49,9	54,8	56,9	41,8	45,9	47,6	50,4	55,3	57,4	42,2	46,3	48,1	50,8	55,8	57,9
Qev	26,0	24,5	23,9	23,0	21,4	20,7	26,7	25,3	24,6	23,7	22,0	21,3	27,5	26,0	25,4	24,4	22,6	21,9
Dpev	83,6	74,7	71,1	65,6	56,6	53,1	88,6	79,1	75,3	69,5	60,0	56,2	93,7	83,7	79,6	73,5	63,4	59,4
Tev				**9**						**10**						**11**		
Pf	**164**	**155**	**151**	**145**	**135**	**131**	**168**	**159**	**155**	**149**	**139**	**134**	**173**	**163**	**159**	**153**	**142**	**-**
Pat	42,7	46,8	48,5	51,3	56,3	58,4	43,1	47,2	49,0	51,8	56,7	58,8	43,5	47,7	49,4	52,2	57,2	-
Qev	28,3	26,7	26,0	25,0	23,2	22,5	29,0	27,4	26,7	25,7	23,9	23,1	29,8	28,1	27,4	26,4	24,5	-
Dpev	99,0	88,4	84,1	77,6	67,0	62,7	104	93,1	88,6	81,8	70,6	66,1	110	98,1	93,3	86,1	74,3	-

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

COOLING CAPACITY PERFORMANCE

0612

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**166**	**157**	**153**	**146**	**136**	**131**	**171**	**161**	**157**	**151**	**139**	**135**	**176**	**166**	**161**	**155**	**143**	**138**
Pat	48,2	53,0	55,0	58,3	64,0	66,5	48,8	53,6	55,7	58,9	64,7	67,1	49,4	54,2	56,3	59,5	65,3	67,8
Qev	28,6	26,9	26,3	25,2	23,3	22,5	29,4	27,7	27,0	25,9	24,0	23,2	30,2	28,5	27,8	26,6	24,7	23,8
Dpev	89,0	79,1	75,1	69,1	59,3	55,4	94,3	83,7	79,5	73,1	62,7	58,6	99,6	88,5	84,0	77,3	66,2	61,9
Tev				**9**						**10**						**11**		
Pf	**180**	**170**	**166**	**159**	**147**	**142**	**185**	**174**	**170**	**163**	**151**	**-**	**190**	**179**	**174**	**167**	**155**	**-**
Pat	49,9	54,8	56,9	60,1	65,9	68,4	50,5	55,4	57,4	60,7	66,6	-	51,0	55,9	58,0	61,3	67,2	-
Qev	31,1	29,3	28,5	27,4	25,3	24,5	31,9	30,0	29,3	28,1	26,0	-	32,7	30,8	30,0	28,8	26,6	-
Dpev	105	93,3	88,6	81,5	69,8	65,3	111	98,3	93,3	85,8	73,5	-	116	103	98,1	90,3	77,3	-

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

COOLING CAPACITY PERFORMANCE

0152

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**39,7**	**37,3**	**36,3**	**34,8**	**31,9**	**30,7**	**40,8**	**38,4**	**37,4**	**35,8**	**32,9**	**31,6**	**42,0**	**39,6**	**38,5**	**36,8**	**33,8**	**32,5**
Pat	11,3	12,7	13,3	14,2	15,8	16,5	11,5	12,8	13,4	14,3	15,9	16,6	11,6	12,9	13,5	14,4	16,0	16,7
Qev	6,83	6,43	6,25	5,98	5,50	5,29	7,03	6,62	6,44	6,16	5,66	5,45	7,23	6,81	6,63	6,34	5,82	5,60
Dpev	62,7	55,5	52,6	48,2	40,7	37,7	66,5	58,9	55,8	51,1	43,1	39,9	70,4	62,4	59,1	54,1	45,6	42,2
Tev				**9**						**10**						**11**		
Pf	**43,2**	**40,7**	**39,6**	**37,8**	**34,7**	**33,4**	**44,3**	**41,8**	**40,6**	**38,9**	**35,6**	**34,2**	**45,5**	**42,9**	**41,7**	**39,9**	**36,5**	**-**
Pat	11,7	13,0	13,6	14,5	16,1	16,8	11,8	13,1	13,7	14,6	16,2	16,9	11,9	13,2	13,8	14,7	16,3	-
Qev	7,44	7,00	6,81	6,52	5,98	5,75	7,64	7,19	7,00	6,69	6,14	5,90	7,84	7,38	7,18	6,87	6,29	-
Dpev	74,4	66,0	62,5	57,1	48,1	44,5	78,5	69,6	65,9	60,3	50,7	46,8	82,7	73,4	69,5	63,5	53,3	-

0182

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**45,7**	**43,1**	**42,0**	**40,3**	**37,5**	**36,3**	**46,9**	**44,3**	**43,2**	**41,6**	**38,7**	**37,6**	**48,2**	**45,5**	**44,4**	**42,8**	**39,9**	**38,8**
Pat	12,9	14,3	14,9	15,8	17,4	18,1	13,1	14,5	15,1	16,0	17,6	18,3	13,2	14,6	15,2	16,2	17,8	18,5
Qev	7,86	7,41	7,23	6,94	6,46	6,26	8,08	7,62	7,44	7,15	6,67	6,47	8,30	7,84	7,65	7,36	6,88	6,68
Dpev	53,6	47,7	45,3	41,9	36,2	34,0	56,7	50,5	48,0	44,4	38,6	36,3	59,8	53,4	50,8	47,1	41,1	38,8
Tev				**9**						**10**						**11**		
Pf	**49,5**	**46,7**	**45,6**	**44,0**	**41,2**	**40,0**	**50,7**	**48,0**	**46,9**	**45,2**	**42,4**	**-**	**51,9**	**49,2**	**48,1**	**46,4**	**43,7**	**-**
Pat	13,4	14,8	15,4	16,3	18,0	18,6	13,5	15,0	15,6	16,5	18,1	-	13,7	15,1	15,7	16,6	18,3	-
Qev	8,52	8,05	7,86	7,57	7,09	6,90	8,74	8,26	8,07	7,79	7,31	-	8,95	8,47	8,28	8,00	7,52	-
Dpev	63,0	56,3	53,7	49,8	43,7	41,3	66,3	59,3	56,6	52,6	46,4	-	69,6	62,3	59,6	55,5	49,1	-

0202

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**53,4**	**50,2**	**48,8**	**46,6**	**42,7**	**41,0**	**54,9**	**51,7**	**50,2**	**48,0**	**43,9**	**42,2**	**56,5**	**53,1**	**51,7**	**49,4**	**45,2**	**43,5**
Pat	15,3	17,0	17,7	18,9	20,9	21,8	15,4	17,2	17,9	19,0	21,1	22,0	15,6	17,3	18,1	19,2	21,3	22,2
Qev	9,19	8,64	8,40	8,02	7,34	7,05	9,46	8,89	8,65	8,26	7,57	7,27	9,72	9,15	8,90	8,50	7,79	7,48
Dpev	51,9	45,9	43,4	39,6	33,1	30,6	55,0	48,6	46,0	42,0	35,2	32,5	58,1	51,4	48,6	44,4	37,3	34,4
Tev				**9**						**10**						**11**		
Pf	**58,0**	**54,6**	**53,1**	**50,7**	**46,5**	**44,7**	**59,5**	**56,0**	**54,5**	**52,1**	**47,8**	**-**	**61,0**	**57,5**	**55,9**	**53,5**	**49,0**	**-**
Pat	15,7	17,5	18,2	19,4	21,5	22,3	15,9	17,6	18,4	19,6	21,6	-	16,0	17,8	18,5	19,7	21,8	-
Qev	9,99	9,40	9,14	8,74	8,01	7,70	10,3	9,65	9,39	8,98	8,23	-	10,5	9,90	9,63	9,21	8,45	-
Dpev	61,3	54,3	51,4	46,9	39,4	36,4	64,6	57,2	54,2	49,5	41,6	-	67,9	60,2	57,0	52,1	43,9	-

0252

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**60,4**	**56,9**	**55,5**	**53,1**	**48,9**	**47,1**	**62,2**	**58,6**	**57,1**	**54,6**	**50,2**	**48,4**	**63,9**	**60,3**	**58,7**	**56,1**	**51,6**	**49,6**
Pat	17,3	19,1	19,9	21,2	23,4	24,4	17,4	19,3	20,1	21,3	23,6	24,5	17,6	19,5	20,3	21,5	23,7	24,7
Qev	10,4	9,80	9,54	9,14	8,42	8,11	10,7	10,1	9,82	9,41	8,65	8,33	11,0	10,4	10,1	9,67	8,88	8,54
Dpev	46,0	40,9	38,8	35,6	30,1	28,0	48,7	43,3	41,1	37,6	31,8	29,5	51,6	45,8	43,4	39,8	33,6	31,1
Tev				**9**						**10**						**11**		
Pf	**65,7**	**61,9**	**60,3**	**57,6**	**52,9**	**50,8**	**67,5**	**63,5**	**61,8**	**59,1**	**54,2**	**52,0**	**69,2**	**65,2**	**63,4**	**60,6**	**55,4**	**-**
Pat	17,7	19,6	20,4	21,7	23,9	24,8	17,9	19,8	20,5	21,8	24,0	25,0	18,0	19,9	20,7	21,9	24,2	-
Qev	11,3	10,7	10,4	9,93	9,11	8,76	11,6	10,9	10,7	10,2	9,33	8,96	11,9	11,2	10,9	10,4	9,55	-
Dpev	54,5	48,4	45,8	41,9	35,3	32,6	57,5	51,0	48,3	44,1	37,0	34,2	60,5	53,7	50,8	46,4	38,8	-

0302

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**80,1**	**75,9**	**74,0**	**71,1**	**65,8**	**63,5**	**82,4**	**78,0**	**76,1**	**73,2**	**67,8**	**65,5**	**84,6**	**80,2**	**78,3**	**75,3**	**69,8**	**67,5**
Pat	21,9	24,2	25,3	26,9	29,9	31,2	22,1	24,5	25,5	27,2	30,2	31,5	22,3	24,7	25,8	27,4	30,5	31,8
Qev	13,8	13,1	12,7	12,2	11,3	10,9	14,2	13,4	13,1	12,6	11,7	11,3	14,6	13,8	13,5	13,0	12,0	11,6
Dpev	63,5	56,9	54,1	49,9	42,8	39,9	67,1	60,2	57,3	52,9	45,5	42,4	70,8	63,6	60,6	56,0	48,2	45,1
Tev				**9**						**10**						**11**		
Pf	**86,9**	**82,3**	**80,4**	**77,3**	**71,9**	**69,6**	**89,1**	**84,5**	**82,5**	**79,4**	**74,0**	**-**	**91,3**	**86,6**	**84,6**	**81,5**	**76,0**	**-**
Pat	22,5	25,0	26,0	27,7	30,7	32,1	22,8	25,2	26,2	27,9	31,0	-	23,0	25,4	26,5	28,1	31,2	-
Qev	15,0	14,2	13,8	13,3	12,4	12,0	15,3	14,6	14,2	13,7	12,7	-	15,7	14,9	14,6	14,0	13,1	-
Dpev	74,7	67,1	63,9	59,2	51,1	47,9	78,6	70,6	67,4	62,5	54,1	-	82,5	74,3	70,9	65,8	57,3	-

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

COOLING CAPACITY PERFORMANCE

0352

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**91,8**	**86,6**	**84,5**	**81,1**	**75,2**	**72,7**	**94,4**	**89,2**	**86,9**	**83,5**	**77,5**	**75,0**	**97,0**	**91,7**	**89,4**	**86,0**	**79,9**	**77,3**
Pat	26,0	28,6	29,8	31,6	34,9	36,3	26,3	29,0	30,1	31,9	35,3	36,7	26,6	29,3	30,4	32,3	35,6	37,1
Qev	15,8	14,9	14,5	14,0	12,9	12,5	16,3	15,3	15,0	14,4	13,3	12,9	16,7	15,8	15,4	14,8	13,8	13,3
Dpev	65,0	57,9	55,1	50,7	43,6	40,8	68,8	61,4	58,4	53,9	46,4	43,4	72,7	64,9	61,8	57,1	49,3	46,2
Tev				**9**						**10**						**11**		
Pf	**99,6**	**94,2**	**91,9**	**88,4**	**82,2**	**79,7**	**102**	**96,7**	**94,4**	**90,8**	**84,6**	**-**	**105**	**99,2**	**96,9**	**93,3**	**87,1**	**-**
Pat	26,9	29,6	30,7	32,6	36,0	37,4	27,2	29,9	31,0	32,9	36,3	-	27,4	30,2	31,3	33,2	36,6	-
Qev	17,2	16,2	15,8	15,2	14,2	13,7	17,6	16,7	16,3	15,6	14,6	-	18,1	17,1	16,7	16,1	15,0	-
Dpev	76,7	68,5	65,3	60,4	52,3	49,1	80,8	72,3	68,9	63,8	55,4	-	85,0	76,1	72,6	67,3	58,6	-

0412

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**103**	**97,4**	**94,9**	**91,1**	**84,5**	**81,8**	**106**	**100**	**97,8**	**93,9**	**87,2**	**84,4**	**109**	**103**	**101**	**96,7**	**89,9**	**87,1**
Pat	29,4	32,3	33,5	35,5	39,1	40,7	29,8	32,7	33,9	36,0	39,6	41,1	30,1	33,1	34,3	36,4	40,0	41,6
Qev	17,8	16,8	16,3	15,7	14,5	14,1	18,3	17,3	16,8	16,2	15,0	14,5	18,8	17,8	17,3	16,6	15,5	15,0
Dpev	68,9	61,2	58,1	53,5	46,0	43,1	73,0	64,9	61,6	56,8	49,0	45,9	77,2	68,7	65,3	60,3	52,1	48,9
Tev				**9**						**10**						**11**		
Pf	**112**	**106**	**103**	**99,5**	**92,6**	**89,8**	**115**	**109**	**106**	**102**	**95,3**	**-**	**118**	**112**	**109**	**105**	**98,1**	**-**
Pat	30,4	33,4	34,7	36,8	40,5	42,0	30,8	33,8	35,1	37,2	40,9	-	31,1	34,1	35,5	37,5	41,3	-
Qev	19,4	18,3	17,8	17,1	15,9	15,5	19,9	18,8	18,3	17,6	16,4	-	20,4	19,3	18,8	18,1	16,9	-
Dpev	81,6	72,6	69,1	63,8	55,3	52,0	86,0	76,6	72,9	67,5	58,6	-	90,5	80,7	76,9	71,2	62,1	-

0452

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**114**	**108**	**105**	**100**	**92,7**	**89,5**	**118**	**111**	**108**	**103**	**95,4**	**92,1**	**121**	**114**	**111**	**106**	**98,1**	**94,8**
Pat	34,0	37,4	38,8	41,1	45,2	47,0	34,4	37,8	39,3	41,6	45,7	47,5	34,8	38,3	39,7	42,0	46,2	47,9
Qev	19,7	18,5	18,0	17,3	15,9	15,4	20,3	19,0	18,5	17,8	16,4	15,9	20,8	19,6	19,1	18,3	16,9	16,3
Dpev	62,3	55,2	52,3	48,0	40,9	38,1	66,0	58,4	55,4	50,8	43,4	40,5	69,7	61,7	58,5	53,7	45,9	42,8
Tev				**9**						**10**						**11**		
Pf	**124**	**117**	**114**	**109**	**101**	**97,4**	**127**	**120**	**117**	**112**	**104**	**-**	**131**	**123**	**120**	**115**	**106**	**-**
Pat	35,2	38,7	40,2	42,5	46,6	48,3	35,6	39,1	40,6	42,9	47,0	-	36,0	39,5	41,0	43,3	47,4	-
Qev	21,4	20,1	19,6	18,8	17,4	16,8	21,9	20,6	20,1	19,3	17,8	-	22,5	21,2	20,6	19,8	18,3	-
Dpev	73,5	65,1	61,7	56,7	48,5	45,3	77,4	68,6	65,1	59,8	51,2	-	81,4	72,1	68,4	63,0	54,0	-

0512

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**131**	**123**	**120**	**116**	**107**	**104**	**135**	**127**	**124**	**119**	**110**	**107**	**138**	**131**	**127**	**122**	**113**	**109**
Pat	36,6	40,2	41,7	44,1	48,5	50,3	37,0	40,6	42,1	44,6	48,9	50,7	37,4	41,0	42,5	45,0	49,3	51,1
Qev	22,5	21,3	20,7	19,9	18,4	17,8	23,2	21,9	21,3	20,5	19,0	18,3	23,8	22,5	21,9	21,0	19,5	18,8
Dpev	69,4	61,8	58,8	54,2	46,5	43,5	73,5	65,5	62,2	57,4	49,3	46,0	77,7	69,2	65,8	60,6	52,0	48,6
Tev				**9**						**10**						**11**		
Pf	**142**	**134**	**131**	**125**	**116**	**112**	**146**	**138**	**134**	**129**	**119**	**-**	**150**	**141**	**138**	**132**	**122**	**-**
Pat	37,8	41,4	42,9	45,4	49,7	51,5	38,2	41,8	43,3	45,7	50,0	-	38,5	42,2	43,7	46,1	50,4	-
Qev	24,5	23,1	22,5	21,6	20,0	19,4	25,1	23,7	23,1	22,2	20,5	-	25,8	24,3	23,7	22,7	21,1	-
Dpev	82,0	73,0	69,4	64,0	54,9	51,3	86,4	76,9	73,1	67,4	57,8	-	90,9	80,9	76,9	70,8	60,7	-

0552

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**146**	**137**	**134**	**128**	**118**	**114**	**150**	**141**	**138**	**132**	**122**	**117**	**154**	**145**	**141**	**135**	**125**	**120**
Pat	43,7	48,0	49,9	52,8	58,0	60,1	44,2	48,6	50,4	53,3	58,5	60,7	44,7	49,1	51,0	53,9	59,1	61,3
Qev	25,1	23,6	23,0	22,1	20,4	19,6	25,9	24,3	23,7	22,7	20,9	20,2	26,6	25,0	24,3	23,3	21,5	20,7
Dpev	78,3	69,3	65,7	60,2	51,3	47,8	82,8	73,3	69,4	63,7	54,2	50,5	87,5	77,4	73,3	67,2	57,2	53,3
Tev				**9**						**10**						**11**		
Pf	**158**	**149**	**145**	**139**	**128**	**124**	**162**	**153**	**149**	**142**	**131**	**-**	**167**	**157**	**152**	**146**	**135**	**-**
Pat	45,2	49,6	51,5	54,4	59,6	61,8	45,7	50,1	52,0	54,9	60,1	-	46,2	50,6	52,5	55,4	60,6	-
Qev	27,3	25,7	25,0	23,9	22,1	21,3	28,0	26,3	25,6	24,5	22,6	-	28,7	27,0	26,3	25,1	23,2	-
Dpev	92,2	81,5	77,3	70,8	60,3	56,1	97,1	85,8	81,3	74,5	63,4	-	102	90,2	85,4	78,3	66,6	-

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

COOLING CAPACITY PERFORMANCE

0612

Ta	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**6**						**7**						**8**		
Pf	**160**	**150**	**146**	**139**	**128**	**123**	**164**	**154**	**150**	**143**	**131**	**127**	**169**	**158**	**154**	**147**	**135**	**130**
Pat	51,3	56,4	58,6	62,0	68,1	70,6	52,0	57,1	59,3	62,7	68,8	71,4	52,6	57,8	60,0	63,5	69,6	72,1
Qev	27,5	25,8	25,1	24,0	22,0	21,2	28,3	26,5	25,8	24,6	22,6	21,8	29,1	27,2	26,5	25,3	23,2	22,4
Dpev	82,4	72,5	68,5	62,6	52,9	49,1	87,1	76,6	72,3	66,1	55,8	51,8	91,9	80,7	76,3	69,6	58,8	54,6
Tev				**9**						**10**						**11**		
Pf	**173**	**162**	**158**	**151**	**138**	**133**	**177**	**166**	**162**	**154**	**142**	**-**	**182**	**170**	**165**	**158**	**145**	**-**
Pat	53,3	58,5	60,7	64,2	70,3	72,9	53,9	59,2	61,4	64,8	71,0	-	54,6	59,8	62,1	65,5	71,7	-
Qev	29,8	27,9	27,2	25,9	23,8	23,0	30,6	28,6	27,8	26,6	24,4	-	31,3	29,3	28,5	27,2	25,0	-
Dpev	96,8	85,0	80,3	73,3	61,8	57,4	102	89,4	84,4	77,0	65,0	-	107	93,8	88,6	80,8	68,1	-

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

3.3 HEAT PUMP CAPACITY PERFORMANCE

0152

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	**32,5**	**37,0**	**42,1**	**44,2**	**47,6**	**53,7**	**32,3**	**36,7**	**41,7**	**43,8**	**47,1**	**53,0**	**32,1**	**36,5**	**41,3**	**43,3**	**46,5**	**52,2**
Qcd	5,63	6,40	7,27	7,65	8,23	9,28	5,60	6,37	7,22	7,59	8,16	9,19	5,57	6,33	7,16	7,52	8,08	9,06
Pcd	42,6	55,2	71,2	78,7	91,2	116	42,1	54,5	70,1	77,4	89,6	114	41,7	53,9	69,1	76,1	87,7	110
Pat	10,0	10,1	10,2	10,2	10,4	10,6	11,1	11,2	11,3	11,4	11,5	11,8	12,4	12,5	12,7	12,7	12,9	13,1
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	**31,9**	**36,2**	**40,9**	**42,9**	**45,9**	**51,3**	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	5,54	6,29	7,11	7,45	7,98	8,91	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	41,4	53,3	68,0	74,6	85,7	107	-	-	-	-	-	-	-	-	-	-	-	-
Pat	13,9	14,0	14,1	14,2	14,3	14,6	-	-	-	-	-	-	-	-	-	-	-	-

0182

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	**36,4**	**41,2**	**46,7**	**49,2**	**53,0**	**59,9**	**36,3**	**41,1**	**46,5**	**48,9**	**52,6**	**59,2**	**36,2**	**41,0**	**46,2**	**48,5**	**52,1**	**58,4**
Qcd	6,30	7,13	8,08	8,50	9,16	10,4	6,29	7,12	8,06	8,46	9,10	10,3	6,29	7,11	8,02	8,42	9,03	10,1
Pcd	34,4	44,1	56,8	62,8	72,9	93,3	34,3	44,0	56,4	62,2	72,0	91,3	34,3	43,9	55,9	61,5	70,8	89,2
Pat	10,9	11,0	11,2	11,3	11,5	11,8	12,2	12,3	12,5	12,6	12,8	13,1	13,7	13,8	13,9	14,0	14,1	14,4
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	**36,2**	**40,8**	**45,9**	**48,1**	**51,5**	**57,6**	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	6,30	7,09	7,98	8,35	8,95	10,0	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	34,4	43,7	55,2	60,6	69,6	87,1	-	-	-	-	-	-	-	-	-	-	-	-
Pat	15,5	15,5	15,5	15,6	15,6	15,9	-	-	-	-	-	-	-	-	-	-	-	-

0202

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	**41,7**	**46,4**	**52,1**	**54,7**	**58,9**	**66,8**	**41,4**	**46,3**	**52,1**	**54,7**	**58,8**	**66,3**	**41,3**	**46,3**	**52,0**	**54,5**	**58,5**	**65,7**
Qcd	7,21	8,02	9,02	9,46	10,2	11,6	7,17	8,02	9,03	9,47	10,2	11,5	7,16	8,03	9,02	9,45	10,1	11,4
Pcd	31,9	39,5	49,9	55,0	63,9	82,1	31,6	39,6	50,1	55,1	63,7	81,1	31,5	39,6	50,0	54,9	63,2	79,7
Pat	12,6	12,7	12,8	12,9	13,1	13,4	14,1	14,2	14,4	14,5	14,6	14,9	15,8	15,9	16,1	16,2	16,3	16,6
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	**41,3**	**46,2**	**51,8**	**54,2**	**58,0**	**64,8**	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	7,18	8,03	9,00	9,41	10,1	11,3	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	31,7	39,7	49,7	54,4	62,3	77,9	-	-	-	-	-	-	-	-	-	-	-	-
Pat	17,8	17,9	18,0	18,1	18,2	18,5	-	-	-	-	-	-	-	-	-	-	-	-

0252

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	**50,4**	**56,8**	**64,1**	**67,3**	**72,4**	**81,6**	**49,8**	**56,2**	**63,5**	**66,6**	**71,6**	**80,6**	**49,3**	**55,7**	**62,9**	**65,9**	**70,7**	**79,3**
Qcd	8,71	9,82	11,1	11,6	12,5	14,1	8,62	9,74	11,0	11,5	12,4	14,0	8,55	9,67	10,9	11,4	12,3	13,8
Pcd	32,3	41,0	52,3	57,6	66,7	84,7	31,6	40,3	51,5	56,7	65,5	82,9	31,1	39,8	50,6	55,7	64,1	80,5
Pat	15,2	15,4	15,5	15,6	15,8	16,2	16,8	17,0	17,2	17,3	17,5	17,9	18,7	18,8	19,0	19,2	19,3	19,7
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	**48,9**	**55,3**	**62,2**	**65,2**	**69,7**	**77,7**	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	8,50	9,61	10,8	11,3	12,1	13,5	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	30,8	39,3	49,8	54,6	62,4	77,6	-	-	-	-	-	-	-	-	-	-	-	-
Pat	20,8	20,9	21,1	21,2	21,4	21,7	-	-	-	-	-	-	-	-	-	-	-	-

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0302																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**62,8**	**69,5**	**77,8**	**81,6**	**87,9**	**99,6**	**62,4**	**69,5**	**77,9**	**81,6**	**87,6**	**98,7**	**62,2**	**69,4**	**77,8**	**81,4**	**87,2**	**97,8**
Qcd	10,9	12,0	13,5	14,1	15,2	17,2	10,8	12,0	13,5	14,1	15,2	17,1	10,8	12,0	13,5	14,1	15,1	17,0
Pcd	39,4	48,1	60,4	66,5	77,0	98,9	38,9	48,3	60,7	66,7	76,9	97,5	38,8	48,4	60,7	66,6	76,4	96,0
Pat	19,0	19,0	19,2	19,3	19,5	20,0	20,7	20,9	21,1	21,3	21,5	22,1	22,6	23,0	23,4	23,5	23,8	24,4
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**62,3**	**69,4**	**77,5**	**81,0**	**86,6**	**96,8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	10,8	12,1	13,5	14,1	15,1	16,8	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	39,0	48,5	60,5	66,1	75,6	94,4	-	-	-	-	-	-	-	-	-	-	-	-
Pat	24,7	25,3	25,9	26,1	26,5	27,1	-	-	-	-	-	-	-	-	-	-	-	-

0352																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**74,1**	**81,0**	**90,5**	**95,0**	**103**	**117**	**72,9**	**80,5**	**90,1**	**94,6**	**102**	**116**	**72,3**	**80,2**	**89,8**	**94,1**	**101**	**114**
Qcd	12,8	14,0	15,6	16,4	17,7	20,3	12,6	13,9	15,6	16,4	17,6	20,0	12,5	13,9	15,6	16,3	17,5	19,8
Pcd	42,8	51,1	63,8	70,3	82,0	107	41,5	50,6	63,5	69,9	81,1	105	41,0	50,4	63,2	69,4	80,1	102
Pat	21,4	21,6	21,9	22,1	22,5	23,2	23,4	23,7	24,1	24,3	24,7	25,4	25,8	26,1	26,6	26,9	27,3	28,0
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**72,4**	**80,1**	**89,3**	**93,5**	**100**	**112**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	12,6	13,9	15,5	16,2	17,4	19,5	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	41,2	50,5	62,8	68,7	78,8	99,3	-	-	-	-	-	-	-	-	-	-	-	-
Pat	28,5	28,9	29,5	29,8	30,2	31,0	-	-	-	-	-	-	-	-	-	-	-	-

0412																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**80,5**	**90,3**	**102**	**108**	**116**	**132**	**79,5**	**89,7**	**102**	**107**	**115**	**130**	**79,5**	**89,6**	**101**	**106**	**114**	**129**
Qcd	13,9	15,6	17,7	18,6	20,1	22,9	13,8	15,5	17,6	18,5	19,9	22,6	13,8	15,5	17,5	18,4	19,8	22,3
Pcd	42,1	53,0	67,9	75,2	87,8	114	41,2	52,5	67,4	74,5	86,5	111	41,3	52,5	66,9	73,7	85,2	108
Pat	24,3	24,7	25,2	25,4	25,9	26,7	26,5	27,0	27,6	27,9	28,3	29,2	29,2	29,8	30,4	30,7	31,2	32,0
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**80,3**	**89,8**	**101**	**105**	**113**	**127**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	14,0	15,6	17,5	18,3	19,6	22,0	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	42,4	52,9	66,6	73,0	83,9	105	-	-	-	-	-	-	-	-	-	-	-	-
Pat	32,5	33,0	33,6	33,9	34,4	35,3	-	-	-	-	-	-	-	-	-	-	-	-

0452																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**94,7**	**105**	**117**	**124**	**133**	**152**	**93,5**	**104**	**117**	**123**	**132**	**150**	**92,9**	**103**	**116**	**122**	**131**	**147**
Qcd	16,4	18,1	20,3	21,4	23,1	26,4	16,2	18,0	20,2	21,2	22,9	26,0	16,1	18,0	20,1	21,1	22,7	25,6
Pcd	43,2	52,6	66,4	73,4	85,7	112	42,2	52,2	65,9	72,6	84,3	109	41,8	51,9	65,3	71,7	82,7	105
Pat	27,2	27,6	28,1	28,4	28,9	29,8	29,7	30,2	30,8	31,1	31,6	32,6	32,8	33,3	34,0	34,3	34,8	35,8
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**92,7**	**103**	**115**	**121**	**129**	**145**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	16,1	17,9	20,0	21,0	22,4	25,1	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	41,8	51,7	64,6	70,7	81,1	102	-	-	-	-	-	-	-	-	-	-	-	-
Pat	36,4	36,9	37,6	37,9	38,4	39,3	-	-	-	-	-	-	-	-	-	-	-	-

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0512																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**102**	**116**	**132**	**139**	**150**	**170**	**102**	**116**	**131**	**138**	**149**	**168**	**102**	**116**	**131**	**137**	**147**	**165**
Qcd	17,6	20,1	22,9	24,1	26,0	29,3	17,7	20,1	22,8	23,9	25,8	29,0	17,8	20,1	22,7	23,8	25,5	28,7
Pcd	42,6	55,3	71,6	79,3	92,2	118	42,9	55,3	71,0	78,4	90,8	115	43,3	55,2	70,3	77,4	89,2	113
Pat	30,3	30,8	31,5	31,8	32,3	33,2	33,2	33,8	34,5	34,8	35,4	36,4	36,6	37,2	38,0	38,3	38,9	39,9
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**103**	**115**	**130**	**136**	**145**	**163**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	17,9	20,1	22,5	23,6	25,3	28,3	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	43,7	55,1	69,4	76,1	87,3	109	-	-	-	-	-	-	-	-	-	-	-	-
Pat	40,5	41,2	42,0	42,3	42,8	43,9	-	-	-	-	-	-	-	-	-	-	-	-

0552																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**121**	**136**	**153**	**161**	**174**	**198**	**121**	**135**	**152**	**160**	**172**	**195**	**121**	**134**	**151**	**158**	**170**	**192**
Qcd	21,0	23,5	26,5	27,9	30,1	34,2	20,9	23,4	26,3	27,7	29,8	33,7	20,9	23,3	26,2	27,4	29,5	33,2
Pcd	54,5	68,2	87,0	96,2	112	145	54,3	67,8	86,0	94,8	110	141	54,2	67,3	84,9	93,3	108	137
Pat	34,4	35,1	35,9	36,2	36,8	37,9	38,1	38,6	39,4	39,8	40,4	41,6	42,2	42,7	43,5	43,8	44,4	45,6
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**120**	**134**	**150**	**157**	**168**	**188**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	20,9	23,3	26,0	27,2	29,1	32,7	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	54,2	67,0	83,7	91,7	105	132	-	-	-	-	-	-	-	-	-	-	-	-
Pat	46,9	47,3	48,0	48,4	48,9	50,1	-	-	-	-	-	-	-	-	-	-	-	-

0612																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**135**	**149**	**167**	**176**	**190**	**217**	**134**	**148**	**166**	**175**	**188**	**214**	**134**	**148**	**166**	**174**	**187**	**211**
Qcd	23,3	25,7	28,9	30,4	32,8	37,6	23,3	25,7	28,8	30,3	32,6	37,1	23,3	25,7	28,8	30,1	32,4	36,6
Pcd	59,3	72,0	90,9	100	117	154	59,0	72,0	90,5	99,8	116	150	59,1	72,1	90,1	98,9	114	146
Pat	38,4	39,1	40,0	40,4	41,1	42,4	42,8	43,3	44,2	44,5	45,2	46,5	47,7	48,1	48,9	49,2	49,8	51,1
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**134**	**148**	**165**	**173**	**185**	**207**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	23,4	25,8	28,7	30,0	32,1	36,0	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	59,5	72,3	89,6	97,9	112	141	-	-	-	-	-	-	-	-	-	-	-	-
Pat	53,1	53,4	54,1	54,4	55,0	56,2	-	-	-	-	-	-	-	-	-	-	-	-

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

HEAT PUMP CAPACITY PERFORMANCE

0152

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	30,9	35,7	40,8	43,0	46,3	52,2	31,0	35,5	40,5	42,6	45,9	51,7	31,2	35,4	40,2	42,2	45,4	51,2
Qcd	5,34	6,17	7,06	7,43	8,01	9,02	5,38	6,16	7,01	7,38	7,95	8,96	5,41	6,14	6,97	7,32	7,88	8,88
Pcd	38,4	51,2	67,1	74,3	86,3	109	38,9	51,0	66,2	73,2	85,0	108	39,4	50,8	65,3	72,1	83,5	106
Pat	9,62	9,68	9,80	9,86	9,97	10,2	10,8	10,8	11,0	11,0	11,1	11,4	12,1	12,1	12,3	12,3	12,5	12,7
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	31,3	35,3	39,8	41,8	44,9	50,5	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	5,44	6,13	6,92	7,27	7,81	8,78	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	39,8	50,6	64,5	71,0	82,0	104	-	-	-	-	-	-	-	-	-	-	-	-
Pat	13,5	13,6	13,7	13,8	13,9	14,2	-	-	-	-	-	-	-	-	-	-	-	-

0182

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	37,0	41,6	47,1	49,6	53,6	60,9	36,8	41,4	46,8	49,2	53,0	60,0	36,7	41,2	46,4	48,7	52,4	59,1
Qcd	6,40	7,20	8,15	8,58	9,26	10,5	6,38	7,17	8,10	8,52	9,18	10,4	6,37	7,15	8,05	8,45	9,09	10,2
Pcd	35,6	45,0	57,7	63,9	74,5	96,3	35,3	44,7	57,0	63,0	73,1	93,7	35,2	44,4	56,3	62,0	71,7	91,2
Pat	10,6	10,7	10,9	11,0	11,1	11,5	11,8	12,0	12,2	12,3	12,4	12,7	13,4	13,5	13,6	13,7	13,8	14,1
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	36,6	41,0	46,0	48,2	51,7	58,1	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	6,36	7,12	7,99	8,38	8,99	10,1	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	35,2	44,0	55,5	60,9	70,2	88,6	-	-	-	-	-	-	-	-	-	-	-	-
Pat	15,2	15,1	15,2	15,2	15,3	15,5	-	-	-	-	-	-	-	-	-	-	-	-

0202

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	39,6	45,3	51,7	54,5	58,9	66,8	40,2	45,5	51,7	54,5	58,8	66,7	40,8	45,8	51,7	54,3	58,6	66,4
Qcd	6,85	7,83	8,94	9,42	10,2	11,6	6,97	7,89	8,96	9,43	10,2	11,6	7,08	7,94	8,97	9,43	10,2	11,5
Pcd	28,8	37,7	49,1	54,5	63,7	82,0	29,8	38,2	49,4	54,7	63,7	82,1	30,8	38,7	49,4	54,6	63,4	81,5
Pat	12,5	12,6	12,8	12,9	13,0	13,3	14,1	14,2	14,3	14,4	14,6	14,9	15,8	15,9	16,1	16,2	16,3	16,6
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	41,3	45,9	51,5	54,1	58,1	65,7	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	7,18	7,98	8,95	9,39	10,1	11,4	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	31,7	39,1	49,3	54,2	62,7	80,2	-	-	-	-	-	-	-	-	-	-	-	-
Pat	17,8	17,8	18,0	18,1	18,2	18,5	-	-	-	-	-	-	-	-	-	-	-	-

0252

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	47,7	54,7	62,2	65,4	70,4	79,1	47,7	54,3	61,7	64,8	69,7	78,5	47,7	54,1	61,2	64,2	69,0	77,6
Qcd	8,25	9,45	10,8	11,3	12,2	13,7	8,26	9,41	10,7	11,2	12,1	13,6	8,28	9,38	10,6	11,1	12,0	13,5
Pcd	29,0	38,0	49,3	54,4	63,0	79,7	29,0	37,7	48,6	53,6	62,1	78,7	29,2	37,4	47,9	52,8	61,0	77,2
Pat	14,6	14,8	15,0	15,1	15,2	15,6	16,2	16,4	16,6	16,7	16,9	17,2	18,1	18,2	18,5	18,6	18,7	19,1
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	47,8	53,9	60,7	63,6	68,2	76,5	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	8,31	9,36	10,5	11,1	11,9	13,3	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	29,4	37,3	47,3	52,0	59,8	75,2	-	-	-	-	-	-	-	-	-	-	-	-
Pat	20,2	20,3	20,5	20,6	20,8	21,1	-	-	-	-	-	-	-	-	-	-	-	-

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0302

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	62,4	71,8	82,0	86,3	93,0	105	62,6	71,6	81,5	85,7	92,2	104	62,9	71,5	80,9	84,9	91,2	102
Qcd	10,8	12,4	14,2	14,9	16,1	18,1	10,8	12,4	14,1	14,8	16,0	18,0	10,9	12,4	14,0	14,7	15,8	17,8
Pcd	38,9	51,4	67,1	74,3	86,3	110	39,2	51,4	66,5	73,4	85,0	108	39,7	51,3	65,7	72,4	83,6	105
Pat	18,7	18,8	19,1	19,3	19,5	20,1	20,5	20,7	21,0	21,2	21,5	22,1	22,4	22,8	23,3	23,5	23,8	24,4
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	63,4	71,3	80,2	84,1	90,2	101	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	11,0	12,4	13,9	14,6	15,7	17,6	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	40,5	51,1	64,8	71,2	81,9	103	-	-	-	-	-	-	-	-	-	-	-	-
Pat	24,6	25,2	25,8	26,1	26,4	27,1	-	-	-	-	-	-	-	-	-	-	-	-

0352

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	70,7	82,0	94,2	99,3	107	121	70,9	81,6	93,3	98,3	106	120	71,5	81,4	92,5	97,2	105	118
Qcd	12,2	14,2	16,3	17,2	18,5	21,0	12,3	14,1	16,2	17,0	18,4	20,7	12,4	14,1	16,0	16,9	18,2	20,5
Pcd	39,0	52,4	69,1	76,8	89,6	115	39,3	52,1	68,1	75,5	87,8	112	40,0	51,9	67,1	74,1	86,0	109
Pat	21,7	22,1	22,6	22,8	23,2	23,8	23,8	24,2	24,8	25,0	25,4	26,1	26,2	26,7	27,3	27,5	28,0	28,7
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	72,4	81,3	91,7	96,2	103	117	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	12,6	14,1	15,9	16,7	18,0	20,2	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	41,2	52,0	66,1	72,8	84,1	107	-	-	-	-	-	-	-	-	-	-	-	-
Pat	29,0	29,5	30,1	30,4	30,9	31,7	-	-	-	-	-	-	-	-	-	-	-	-

0412

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	83,6	94,5	107	113	123	140	82,7	93,5	106	112	121	137	82,4	92,8	105	110	119	134
Qcd	14,5	16,3	18,6	19,6	21,2	24,2	14,3	16,2	18,4	19,4	20,9	23,7	14,3	16,1	18,2	19,1	20,6	23,3
Pcd	45,5	58,1	75,2	83,5	97,8	127	44,6	57,0	73,5	81,4	95,0	123	44,5	56,4	72,1	79,6	92,4	118
Pat	24,4	24,9	25,5	25,7	26,2	27,0	26,6	27,2	27,8	28,1	28,6	29,5	29,4	29,9	30,6	30,9	31,4	32,4
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	82,9	92,5	104	109	117	132	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	14,4	16,1	18,1	18,9	20,3	22,9	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	45,2	56,2	70,9	77,9	89,9	114	-	-	-	-	-	-	-	-	-	-	-	-
Pat	32,7	33,1	33,8	34,1	34,6	35,6	-	-	-	-	-	-	-	-	-	-	-	-

0452

Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	30						35						40					
Pt	93,9	104	118	124	134	153	93,1	104	117	123	133	151	92,7	103	116	122	131	148
Qcd	16,2	18,1	20,4	21,4	23,2	26,5	16,1	18,0	20,3	21,3	23,0	26,1	16,1	17,9	20,1	21,1	22,7	25,7
Pcd	42,5	52,5	66,8	74,0	86,5	113	41,8	52,0	66,0	72,9	84,9	110	41,6	51,7	65,2	71,9	83,2	106
Pat	27,2	27,6	28,1	28,4	28,9	29,9	29,7	30,2	30,8	31,2	31,7	32,7	32,8	33,3	34,0	34,3	34,8	35,8
Ta	-5	0	5	7	10	15	-5	0	5	7	10	15	-5	0	5	7	10	15
Tcd	45						50						55					
Pt	92,8	103	115	121	129	146	-	-	-	-	-	-	-	-	-	-	-	-
Qcd	16,1	17,9	20,0	21,0	22,5	25,3	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	41,9	51,6	64,5	70,7	81,4	103	-	-	-	-	-	-	-	-	-	-	-	-
Pat	36,4	36,9	37,6	37,9	38,4	39,4	-	-	-	-	-	-	-	-	-	-	-	-

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0512																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**107**	**120**	**135**	**142**	**154**	**175**	**106**	**119**	**134**	**141**	**152**	**172**	**106**	**118**	**133**	**139**	**150**	**169**
Qcd	18,4	20,7	23,4	24,6	26,6	30,3	18,4	20,6	23,2	24,4	26,3	29,8	18,4	20,5	23,0	24,1	26,0	29,3
Pcd	46,5	58,6	75,0	83,1	97,0	126	46,3	58,0	73,8	81,5	94,7	122	46,1	57,4	72,5	79,8	92,3	118
Pat	30,5	31,0	31,6	31,9	32,4	33,4	33,4	33,9	34,6	35,0	35,5	36,6	36,8	37,4	38,1	38,4	39,0	40,1
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**105**	**117**	**131**	**137**	**147**	**166**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	18,3	20,4	22,8	23,9	25,6	28,8	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	45,9	56,9	71,3	78,1	89,8	113	-	-	-	-	-	-	-	-	-	-	-	-
Pat	40,7	41,3	42,0	42,4	42,9	44,0	-	-	-	-	-	-	-	-	-	-	-	-

0552																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**120**	**133**	**150**	**158**	**170**	**194**	**119**	**133**	**149**	**157**	**169**	**192**	**119**	**132**	**148**	**155**	**167**	**189**
Qcd	20,7	23,0	25,9	27,3	29,5	33,6	20,7	23,0	25,8	27,1	29,2	33,2	20,7	22,9	25,7	26,9	29,0	32,7
Pcd	53,1	65,5	83,2	92,1	108	140	53,0	65,3	82,5	91,0	106	137	53,0	65,2	81,8	89,9	104	133
Pat	34,4	34,9	35,7	36,0	36,6	37,8	38,0	38,5	39,3	39,6	40,2	41,4	42,1	42,6	43,4	43,7	44,3	45,5
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**119**	**132**	**147**	**154**	**165**	**185**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	20,7	22,9	25,6	26,7	28,7	32,2	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	53,2	65,1	80,9	88,6	102	129	-	-	-	-	-	-	-	-	-	-	-	-
Pat	46,8	47,3	47,9	48,3	48,8	49,9	-	-	-	-	-	-	-	-	-	-	-	-

0612																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**132**	**146**	**163**	**172**	**186**	**213**	**132**	**146**	**163**	**171**	**185**	**210**	**133**	**146**	**163**	**170**	**183**	**207**
Qcd	22,9	25,2	28,3	29,7	32,1	36,8	22,9	25,2	28,2	29,6	32,0	36,4	23,0	25,3	28,2	29,5	31,8	36,0
Pcd	56,9	69,0	87,1	96,2	112	147	57,1	69,2	86,8	95,7	111	144	57,7	69,6	86,6	95,0	110	141
Pat	38,3	38,9	39,8	40,2	40,9	42,1	42,7	43,2	44,0	44,4	45,0	46,3	47,7	48,0	48,7	49,1	49,7	50,9
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**133**	**146**	**162**	**169**	**181**	**204**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Qcd	23,2	25,4	28,2	29,4	31,5	35,5	-	-	-	-	-	-	-	-	-	-	-	-
Pcd	58,4	70,0	86,3	94,3	108	137	-	-	-	-	-	-	-	-	-	-	-	-
Pat	53,1	53,4	53,9	54,3	54,8	56,0	-	-	-	-	-	-	-	-	-	-	-	-

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

3.4 DESUPERHEATER CAPACITY PERFOR.

0152

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	44,0	44,0	44,0	41,7	41,7	41,7	40,7	40,7	40,7	39,1	39,1	39,1	36,3	36,3	36,3	35,1	35,1	35,1
Pat	10,6	10,6	10,6	11,8	11,8	11,8	12,3	12,3	12,3	13,1	13,1	13,1	14,6	14,6	14,6	15,2	15,2	15,2
Ptde	**9,62**	**8,90**	**8,42**	**10,8**	**10,3**	**9,73**	**11,3**	**10,9**	**10,3**	**12,1**	**11,8**	**11,2**	**13,6**	**13,6**	**12,9**	**14,2**	**14,4**	**13,7**
Qde	1,67	1,54	1,46	1,87	1,78	1,69	1,96	1,89	1,79	2,10	2,05	1,95	2,36	2,36	2,25	2,47	2,49	2,37
Dpde	4,91	4,21	3,78	6,19	5,61	5,05	6,80	6,28	5,66	7,81	7,45	6,72	9,81	9,84	8,91	10,7	11,0	9,96

0182

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	49,8	49,8	49,8	47,2	47,2	47,2	46,1	46,1	46,1	44,4	44,4	44,4	41,5	41,5	41,5	40,4	40,4	40,4
Pat	12,5	12,5	12,5	13,8	13,8	13,8	14,3	14,3	14,3	15,1	15,1	15,1	16,6	16,6	16,6	17,3	17,3	17,3
Ptde	**11,5**	**10,6**	**10,0**	**12,8**	**12,1**	**11,5**	**13,3**	**12,8**	**12,1**	**14,1**	**13,8**	**13,1**	**15,6**	**15,6**	**14,9**	**16,3**	**16,4**	**15,6**
Qde	1,98	1,84	1,74	2,21	2,10	1,99	2,30	2,21	2,10	2,45	2,39	2,27	2,71	2,71	2,58	2,82	2,85	2,72
Dpde	6,96	5,97	5,36	8,62	7,80	7,03	9,37	8,67	7,81	10,6	10,1	9,14	13,0	13,0	11,8	14,0	14,4	13,0

0202

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	56,9	56,9	56,9	53,5	53,5	53,5	52,0	52,0	52,0	49,7	49,7	49,7	45,4	45,4	45,4	43,6	43,6	43,6
Pat	15,0	15,0	15,0	16,7	16,7	16,7	17,4	17,4	17,4	18,5	18,5	18,5	20,5	20,5	20,5	21,4	21,4	21,4
Ptde	**14,0**	**13,0**	**12,3**	**15,7**	**14,9**	**14,1**	**16,4**	**15,7**	**14,9**	**17,5**	**17,1**	**16,2**	**19,5**	**19,5**	**18,5**	**20,4**	**20,6**	**19,6**
Qde	2,43	2,25	2,13	2,72	2,59	2,45	2,84	2,73	2,59	3,04	2,96	2,82	3,38	3,39	3,22	3,53	3,57	3,40
Dpde	10,4	8,94	8,03	13,0	11,8	10,6	14,3	13,2	11,9	16,3	15,5	14,0	20,2	20,3	18,4	22,0	22,5	20,4

0252

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	66,9	66,9	66,9	63,5	63,5	63,5	62,0	62,0	62,0	59,7	59,7	59,7	55,4	55,4	55,4	53,6	53,6	53,6
Pat	16,2	16,2	16,2	17,9	17,9	17,9	18,6	18,6	18,6	19,7	19,7	19,7	21,8	21,8	21,8	22,6	22,6	22,6
Ptde	**14,7**	**13,6**	**12,9**	**16,4**	**15,6**	**14,8**	**17,1**	**16,4**	**15,6**	**18,2**	**17,8**	**16,9**	**20,3**	**20,3**	**19,3**	**21,1**	**21,4**	**20,3**
Qde	2,55	2,36	2,24	2,84	2,70	2,56	2,96	2,85	2,71	3,16	3,08	2,93	3,51	3,52	3,35	3,66	3,70	3,53
Dpde	11,5	9,88	8,87	14,2	12,9	11,6	15,5	14,3	12,9	17,6	16,8	15,2	21,8	21,9	19,8	23,7	24,3	22,0

0302

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	84,5	84,5	84,5	79,9	79,9	79,9	77,9	77,9	77,9	74,7	74,7	74,7	69,1	69,1	69,1	66,7	66,7	66,7
Pat	22,1	22,1	22,1	24,4	24,4	24,4	25,5	25,5	25,5	27,1	27,1	27,1	30,1	30,1	30,1	31,3	31,3	31,3
Ptde	**20,6**	**19,1**	**18,0**	**22,9**	**21,8**	**20,7**	**24,0**	**23,0**	**21,8**	**25,6**	**25,0**	**23,7**	**28,6**	**28,6**	**27,1**	**29,8**	**30,1**	**28,6**
Qde	3,57	3,31	3,13	3,97	3,78	3,59	4,15	3,99	3,79	4,43	4,33	4,12	4,95	4,96	4,72	5,17	5,23	4,98
Dpde	11,1	9,52	8,55	13,8	12,5	11,2	15,0	13,9	12,5	17,1	16,3	14,8	21,3	21,4	19,4	23,3	23,8	21,6

0352

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	96,9	96,9	96,9	91,5	91,5	91,5	89,1	89,1	89,1	85,6	85,6	85,6	79,3	79,3	79,3	76,6	76,6	76,6
Pat	25,4	25,4	25,4	28,0	28,0	28,0	29,1	29,1	29,1	30,9	30,9	30,9	34,2	34,2	34,2	35,6	35,6	35,6
Ptde	**23,9**	**22,1**	**20,9**	**26,5**	**25,2**	**23,9**	**27,6**	**26,5**	**25,2**	**29,4**	**28,7**	**27,2**	**32,7**	**32,7**	**31,1**	**34,1**	**34,4**	**32,7**
Qde	4,14	3,84	3,64	4,59	4,37	4,15	4,79	4,60	4,37	5,10	4,98	4,73	5,66	5,67	5,40	5,90	5,97	5,69
Dpde	14,9	12,8	11,5	18,4	16,6	15,0	20,0	18,5	16,7	22,7	21,6	19,5	27,9	28,0	25,4	30,4	31,1	28,2

Tde (°C) - Plant (side) heat exchanger recovery output water temperature
Ta [°C] - Source (side) cooling exchanger air temperature
Pf (kW) - Cooling capacity (Plant side cooling exchanger water in/out 12/7 °C)
Pat (kW) - Total power input
Ptde (kW) - Heat recovery thermal capacity
Qde (m3/h) - Plant (side) cooling exchanger recovery water flow
Dpde (kPa) - Plant side heating exchanger recovery pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0412																		
Tde	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**
Ta		**25**			**30**			**32**			**35**			**40**			**42**	
Pf	110	110	110	104	104	104	101	101	101	97,4	97,4	97,4	90,5	90,5	90,5	87,7	87,7	87,7
Pat	28,9	28,9	28,9	31,6	31,6	31,6	32,9	32,9	32,9	34,8	34,8	34,8	38,2	38,2	38,2	39,7	39,7	39,7
Ptde	**26,9**	**24,8**	**23,5**	**29,6**	**28,2**	**26,7**	**30,9**	**29,6**	**28,1**	**32,8**	**32,0**	**30,3**	**36,2**	**36,2**	**34,4**	**37,7**	**38,1**	**36,2**
Qde	4,65	4,31	4,08	5,14	4,89	4,64	5,34	5,14	4,88	5,68	5,54	5,27	6,28	6,29	5,98	6,53	6,61	6,29
Dpde	18,9	16,2	14,5	23,0	20,8	18,7	24,9	23,0	20,7	28,1	26,8	24,2	34,3	34,4	31,2	37,2	38,0	34,5

0452																		
Tde	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**
Ta		**25**			**30**			**32**			**35**			**40**			**42**	
Pf	125	125	125	118	118	118	115	115	115	111	111	111	103	103	103	99,4	99,4	99,4
Pat	32,0	32,0	32,0	35,1	35,1	35,1	36,4	36,4	36,4	38,5	38,5	38,5	42,3	42,3	42,3	43,9	43,9	43,9
Ptde	**30,0**	**27,7**	**26,2**	**33,1**	**31,4**	**29,8**	**34,4**	**33,0**	**31,3**	**36,5**	**35,6**	**33,8**	**40,3**	**40,3**	**38,3**	**41,9**	**42,4**	**40,3**
Qde	5,19	4,81	4,55	5,73	5,45	5,17	5,96	5,73	5,44	6,32	6,18	5,87	6,98	7,00	6,66	7,26	7,35	7,00
Dpde	16,5	14,2	12,7	20,1	18,2	16,4	21,8	20,1	18,1	24,5	23,4	21,1	29,9	30,0	27,2	32,4	33,1	30,0

0512																		
Tde	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**
Ta		**25**			**30**			**32**			**35**			**40**			**42**	
Pf	141	141	141	133	133	133	130	130	130	125	125	125	116	116	116	112	112	112
Pat	35,4	35,4	35,4	38,8	38,8	38,8	40,2	40,2	40,2	42,5	42,5	42,5	46,6	46,6	46,6	48,4	48,4	48,4
Ptde	**32,9**	**30,4**	**28,8**	**36,3**	**34,5**	**32,6**	**37,7**	**36,2**	**34,3**	**40,0**	**39,0**	**37,0**	**44,1**	**44,1**	**41,9**	**45,9**	**46,3**	**44,0**
Qde	5,69	5,28	5,00	6,28	5,98	5,67	6,53	6,28	5,97	6,93	6,77	6,43	7,64	7,65	7,28	7,94	8,04	7,65
Dpde	19,9	17,1	15,3	24,2	21,9	19,7	26,2	24,2	21,8	29,4	28,1	25,4	35,8	35,9	32,5	38,7	39,6	35,9

0552																		
Tde	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**
Ta		**25**			**30**			**32**			**35**			**40**			**42**	
Pf	161	161	161	152	152	152	149	149	149	143	143	143	133	133	133	128	128	128
Pat	40,4	40,4	40,4	44,3	44,3	44,3	46,0	46,0	46,0	48,7	48,7	48,7	53,5	53,5	53,5	55,5	55,5	55,5
Ptde	**37,9**	**35,1**	**33,2**	**41,8**	**39,7**	**37,7**	**43,5**	**41,8**	**39,6**	**46,2**	**45,0**	**42,7**	**51,0**	**51,0**	**48,4**	**53,0**	**53,5**	**50,9**
Qde	6,57	6,08	5,76	7,25	6,90	6,54	7,54	7,25	6,88	8,00	7,81	7,43	8,83	8,84	8,41	9,18	9,28	8,84
Dpde	17,8	15,2	13,7	21,6	19,6	17,6	23,4	21,7	19,5	26,4	25,2	22,7	32,1	32,2	29,2	34,7	35,5	32,2

0612																		
Tde	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**	**35**	**40**	**45**
Ta		**25**			**30**			**32**			**35**			**40**			**42**	
Pf	177	177	177	167	167	167	163	163	163	156	156	156	145	145	145	140	140	140
Pat	47,2	47,2	47,2	51,8	51,8	51,8	53,8	53,8	53,8	56,9	56,9	56,9	62,5	62,5	62,5	64,9	64,9	64,9
Ptde	**44,7**	**41,3**	**39,1**	**49,3**	**46,8**	**44,4**	**51,3**	**49,2**	**46,7**	**54,4**	**53,1**	**50,3**	**60,0**	**60,0**	**57,0**	**62,4**	**63,0**	**59,9**
Qde	7,74	7,17	6,79	8,54	8,13	7,71	8,89	8,54	8,11	9,43	9,21	8,75	10,4	10,4	9,90	10,8	10,9	10,4
Dpde	24,7	21,2	19,0	30,1	27,2	24,5	32,5	30,1	27,1	36,6	34,9	31,5	44,5	44,6	40,4	48,1	49,2	44,6

Tde (°C) - Plant (side) heat exchanger recovery output water temperature
Ta [°C] - Source (side) cooling exchanger air temperature
Pf (kW) - Cooling capacity (Plant side cooling exchanger water in/out 12/7 °C)
Pat (kW) - Total power input
Ptde (kW) - Heat recovery thermal capacity
Qde (m3/h) - Plant (side) cooling exchanger recovery water flow
Dpde (kPa) - Plant side heating exchanger recovery pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0152

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	42,4	42,4	42,4	39,9	39,9	39,9	38,8	38,8	38,8	37,1	37,1	37,1	34,1	34,1	34,1	32,8	32,8	32,8
Pat	11,1	11,1	11,1	12,4	12,4	12,4	12,9	12,9	12,9	13,8	13,8	13,8	15,4	15,4	15,4	16,0	16,0	16,0
Ptde	**10,4**	**9,66**	**9,14**	**11,7**	**11,1**	**10,6**	**12,3**	**11,8**	**11,2**	**13,2**	**12,8**	**12,2**	**14,7**	**14,7**	**14,0**	**15,4**	**15,5**	**14,8**
Qde	1,81	1,68	1,59	2,03	1,93	1,83	2,13	2,05	1,94	2,28	2,23	2,11	2,55	2,55	2,43	2,66	2,70	2,57
Dpde	5,78	4,96	4,46	7,29	6,60	5,95	8,00	7,40	6,67	9,18	8,75	7,90	11,5	11,5	10,4	12,5	12,8	11,6

0182

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	48,7	48,7	48,7	45,9	45,9	45,9	44,8	44,8	44,8	43,1	43,1	43,1	40,2	40,2	40,2	39,0	39,0	39,0
Pat	12,6	12,6	12,6	14,0	14,0	14,0	14,6	14,6	14,6	15,5	15,5	15,5	17,0	17,0	17,0	17,7	17,7	17,7
Ptde	**12,0**	**11,1**	**10,5**	**13,4**	**12,7**	**12,0**	**13,9**	**13,4**	**12,7**	**14,8**	**14,5**	**13,7**	**16,4**	**16,4**	**15,6**	**17,0**	**17,2**	**16,3**
Qde	2,08	1,93	1,83	2,31	2,20	2,09	2,41	2,32	2,20	2,57	2,51	2,38	2,84	2,84	2,70	2,95	2,98	2,84
Dpde	7,65	6,56	5,89	9,47	8,57	7,72	10,3	9,52	8,58	11,6	11,1	10,0	14,2	14,3	12,9	15,4	15,7	14,3

0202

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	57,0	57,0	57,0	53,6	53,6	53,6	52,1	52,1	52,1	49,8	49,8	49,8	45,6	45,6	45,6	43,8	43,8	43,8
Pat	14,9	14,9	14,9	16,6	16,6	16,6	17,3	17,3	17,3	18,4	18,4	18,4	20,4	20,4	20,4	21,3	21,3	21,3
Ptde	**14,0**	**12,9**	**12,2**	**15,6**	**14,8**	**14,1**	**16,3**	**15,7**	**14,9**	**17,5**	**17,0**	**16,1**	**19,4**	**19,4**	**18,5**	**20,3**	**20,5**	**19,5**
Qde	2,42	2,24	2,12	2,71	2,58	2,44	2,83	2,72	2,58	3,02	2,95	2,81	3,37	3,37	3,21	3,51	3,56	3,39
Dpde	10,3	8,87	7,97	12,9	11,7	10,6	14,2	13,1	11,8	16,2	15,4	13,9	20,1	20,1	18,2	21,8	22,3	20,2

0252

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	64,5	64,5	64,5	60,8	60,8	60,8	59,2	59,2	59,2	56,7	56,7	56,7	52,1	52,1	52,1	50,2	50,2	50,2
Pat	16,9	16,9	16,9	18,7	18,7	18,7	19,4	19,4	19,4	20,6	20,6	20,6	22,8	22,8	22,8	23,7	23,7	23,7
Ptde	**15,9**	**14,7**	**13,9**	**17,7**	**16,8**	**15,9**	**18,5**	**17,7**	**16,8**	**19,7**	**19,2**	**18,2**	**21,8**	**21,8**	**20,7**	**22,8**	**23,0**	**21,8**
Qde	2,75	2,55	2,42	3,06	2,92	2,77	3,20	3,07	2,92	3,41	3,33	3,16	3,78	3,79	3,60	3,94	3,99	3,80
Dpde	13,4	11,5	10,3	16,6	15,0	13,5	18,1	16,7	15,1	20,5	19,6	17,7	25,3	25,4	23,0	27,4	28,1	25,5

0302

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	85,5	85,5	85,5	81,0	81,0	81,0	79,0	79,0	79,0	75,9	75,9	75,9	70,4	70,4	70,4	68,0	68,0	68,0
Pat	21,4	21,4	21,4	23,7	23,7	23,7	24,7	24,7	24,7	26,3	26,3	26,3	29,2	29,2	29,2	30,5	30,5	30,5
Ptde	**20,1**	**18,6**	**17,6**	**22,4**	**21,3**	**20,1**	**23,4**	**22,5**	**21,3**	**25,0**	**24,4**	**23,1**	**27,9**	**27,9**	**26,5**	**29,2**	**29,5**	**28,0**
Qde	3,48	3,22	3,06	3,88	3,69	3,50	4,05	3,90	3,70	4,33	4,23	4,02	4,84	4,84	4,61	5,05	5,11	4,87
Dpde	10,5	9,05	8,13	13,1	11,9	10,7	14,3	13,2	11,9	16,3	15,6	14,1	20,4	20,4	18,5	22,2	22,8	20,6

0352

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	97,9	97,9	97,9	92,5	92,5	92,5	90,2	90,2	90,2	86,7	86,7	86,7	80,4	80,4	80,4	77,8	77,8	77,8
Pat	25,5	25,5	25,5	28,0	28,0	28,0	29,1	29,1	29,1	30,9	30,9	30,9	34,1	34,1	34,1	35,5	35,5	35,5
Ptde	**23,5**	**21,7**	**20,5**	**26,0**	**24,7**	**23,4**	**27,1**	**26,0**	**24,7**	**28,9**	**28,2**	**26,7**	**32,1**	**32,1**	**30,5**	**33,5**	**33,8**	**32,1**
Qde	4,06	3,77	3,57	4,51	4,29	4,07	4,70	4,52	4,29	5,00	4,89	4,64	5,56	5,57	5,30	5,80	5,86	5,58
Dpde	14,4	12,4	11,1	17,7	16,0	14,4	19,2	17,8	16,0	21,8	20,8	18,8	26,9	27,0	24,5	29,3	30,0	27,2

Tde (°C) - Plant (side) heat exchanger recovery output water temperature
Ta [°C] - Source (side) cooling exchanger air temperature
Pf (kW) - Cooling capacity (Plant side cooling exchanger water in/out 12/7 °C)
Pat (kW) - Total power input
Ptde (kW) - Heat recovery thermal capacity
Qde (m3/h) - Plant (side) cooling exchanger recovery water flow
Dpde (kPa) - Plant side heating exchanger recovery pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

0412

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	110	110	110	104	104	104	101	101	101	97,4	97,4	97,4	90,4	90,4	90,4	87,6	87,6	87,6
Pat	28,8	28,8	28,8	31,6	31,6	31,6	32,8	32,8	32,8	34,8	34,8	34,8	38,3	38,3	38,3	39,8	39,8	39,8
Ptde	**26,8**	**24,8**	**23,4**	**29,6**	**28,1**	**26,6**	**30,8**	**29,6**	**28,1**	**32,8**	**31,9**	**30,3**	**36,3**	**36,3**	**34,5**	**37,8**	**38,2**	**36,3**
Qde	4,64	4,30	4,07	5,13	4,88	4,63	5,34	5,13	4,87	5,67	5,54	5,27	6,28	6,29	5,99	6,54	6,62	6,30
Dpde	18,7	16,1	14,4	22,9	20,7	18,7	24,8	23,0	20,7	28,1	26,8	24,2	34,4	34,5	31,2	37,3	38,2	34,6

0452

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	122	122	122	115	115	115	112	112	112	107	107	107	98,9	98,9	98,9	95,6	95,6	95,6
Pat	33,3	33,3	33,3	36,6	36,6	36,6	38,0	38,0	38,0	40,2	40,2	40,2	44,2	44,2	44,2	45,9	45,9	45,9
Ptde	**31,3**	**28,9**	**27,4**	**34,6**	**32,8**	**31,1**	**36,0**	**34,5**	**32,7**	**38,2**	**37,3**	**35,3**	**42,2**	**42,2**	**40,1**	**43,9**	**44,3**	**42,1**
Qde	5,42	5,02	4,76	5,99	5,70	5,41	6,23	5,99	5,69	6,62	6,46	6,14	7,31	7,32	6,96	7,60	7,69	7,32
Dpde	18,0	15,5	13,9	22,0	19,9	17,9	23,8	22,0	19,9	26,8	25,6	23,1	32,7	32,8	29,7	35,4	36,2	32,8

0512

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	140	140	140	132	132	132	128	128	128	123	123	123	114	114	114	111	111	111
Pat	35,8	35,8	35,8	39,3	39,3	39,3	40,7	40,7	40,7	43,1	43,1	43,1	47,3	47,3	47,3	49,1	49,1	49,1
Ptde	**33,3**	**30,8**	**29,1**	**36,8**	**34,9**	**33,1**	**38,2**	**36,7**	**34,8**	**40,6**	**39,6**	**37,5**	**44,8**	**44,8**	**42,5**	**46,6**	**47,0**	**44,7**
Qde	5,77	5,34	5,06	6,37	6,06	5,75	6,62	6,37	6,05	7,03	6,86	6,52	7,76	7,77	7,39	8,06	8,16	7,77
Dpde	20,4	17,5	15,7	24,8	22,5	20,3	26,9	24,9	22,4	30,3	28,9	26,1	36,9	37,0	33,5	39,9	40,8	37,0

0552

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	156	156	156	147	147	147	143	143	143	137	137	137	126	126	126	122	122	122
Pat	42,8	42,8	42,8	46,9	46,9	46,9	48,7	48,7	48,7	51,6	51,6	51,6	56,6	56,6	56,6	58,7	58,7	58,7
Ptde	**40,3**	**37,2**	**35,2**	**44,4**	**42,2**	**40,0**	**46,2**	**44,4**	**42,1**	**49,1**	**47,8**	**45,4**	**54,1**	**54,1**	**51,4**	**56,2**	**56,7**	**53,9**
Qde	6,97	6,46	6,12	7,70	7,33	6,95	8,01	7,70	7,31	8,50	8,30	7,88	9,36	9,38	8,92	9,73	9,84	9,37
Dpde	20,0	17,2	15,4	24,4	22,1	19,9	26,4	24,4	22,0	29,7	28,4	25,6	36,1	36,2	32,8	39,0	39,9	36,2

0612

Tde	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45	35	40	45
Ta		25			30			32			35			40			42	
Pf	170	170	170	160	160	160	155	155	155	148	148	148	136	136	136	131	131	131
Pat	50,3	50,3	50,3	55,2	55,2	55,2	57,3	57,3	57,3	60,6	60,6	60,6	66,5	66,5	66,5	69,0	69,0	69,0
Ptde	**47,8**	**44,2**	**41,8**	**52,7**	**50,1**	**47,4**	**54,8**	**52,6**	**49,9**	**58,1**	**56,7**	**53,8**	**64,0**	**64,0**	**60,8**	**66,5**	**67,1**	**63,8**
Qde	8,27	7,66	7,26	9,13	8,69	8,25	9,50	9,13	8,67	10,1	9,83	9,35	11,1	11,1	10,6	11,5	11,6	11,1
Dpde	28,2	24,2	21,7	34,4	31,1	28,0	37,2	34,4	31,0	41,8	39,8	36,0	50,6	50,8	46,0	54,6	55,9	50,7

Tde (°C) - Plant (side) heat exchanger recovery output water temperature
Ta [°C] - Source (side) cooling exchanger air temperature
Pf (kW) - Cooling capacity (Plant side cooling exchanger water in/out 12/7 °C)
Pat (kW) - Total power input
Ptde (kW) - Heat recovery thermal capacity
Qde (m3/h) - Plant (side) cooling exchanger recovery water flow
Dpde (kPa) - Plant side heating exchanger recovery pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

4. OPERATING RANGE

	NECS-N Cooling		NECS-N Heating		NECS-ND Desuperh.		- Recov.	
	min	max	min	max	min	max	min	max
Exch. water (in) (°C)	8 (1)	23 (1)	18 (3)	44 (3)	18 (1) (2)	---	---	---
Exch. water (out) (°C)	5 (1) (6)	15 (1)	26 (3)	48 (3)	26 (1) (2)	---	---	---
Thermal difference (°C)	3	8	4	8	4	---	---	---

Limits to exchanger water temperature are valid within the minimum - maximum water flow range indicated in the Hydraulic Data section.

	Vers.	Heating		Cooling		
		Min	Max (*)	Min	Max (*)	Max (*)
Ambient air temp. (in) (°C)	LN	-10 (6) (8)	20 (6)	-10 (2) (3)	43 (2) (4)	-
Ambient air temp. (in) (°C)	B	-5 (6)	20 (6)	-10 (2) (3)	43-46 (2) (4)	-

(*) According to unit size
(1) Condenser air temp. (in) 35 °C
(2) Evaporator water temp. (in/out) 12/7 °C
(3) Ambient Air temp. 7°C with 87% R.H.
(4) Condenser air-flow in low-noise operating mode
(5) Condenser air-flow in standard operating mode
(6) Condenser water temp. 40/45 °C
(7) With temperatures down to -8°C use anti-freeze mixtures.
(8) Only for LN version, with Kit LT to order like accessory, excluded size 0152, 0182, 0202, 0252

ETHYLENE GLYCOL MIXTURE

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

	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 capacity 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 Sales Department.

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.

Fouling factors	Evaporator			Heat recovery			Desuperheater		
	f1	fk1	fx1	f2	fk2	fx2	f3	fk3	fx3
(m^2°C/W) 4,4 x 10^{-5}	1	1	1	0,99	1,03	1,03	0,99	1,03	1,03
(m^2 °C/W) 0,86 x 10^{-4}	0,96	0,99	0,99	0,98	1,04	1,04	0,98	1,04	1,04
(m^2 °C/W) 1,72 x 10^{-4}	0,93	0,98	0,98	0,95	1,06	1,06	0,95	1,06	1,06

f1 - f2 - f3: capacity correction factors
fk1 - fk2 - fk3: compressor power input correction factors
fx1 - fx2 - fx3: total power input correction factors

5. HYDRAULIC DATA

5.1 Water Flow And Pressure Drop

Water flow in the heat exchangers is given by:
Q=Px0,86/Dt

Q: water flow (m^3/h)
Dt: difference between inlet and outlet water temp. (°C)
P: heat exchanger capacity (kW)

Pressure drop is given by:
$Dp= K \times Q^2/1000$

Q: water flow (m^3/h)
Dp: pressure drop (kPa)
K: unit size ratio

SIZE	Evaporator				Rec (1) - Cond (2)			Desuperheater		
	K	**Q min m^3/h**	**Q max m^3/h**	**W.c. min m^3**	K	Q min m^3/h	Q max m^3/h	K	Q min m^3/h	Q max m^3/h
0152	1.346	4.1	10.8	0.4	-	-	-	1767	---	2.5
0182	869	4.6	12.3	0.5	-	-	-	1767	---	2.8
0202	615	5.1	13.7	0.5	-	-	-	1767	---	3.5
0252	426	6.2	16.5	0.6	-	-	-	1767	---	3.6
0302	334	7.7	20.7	0.8	-	-	-	871	---	5.1
0352	261	8.9	23.7	0.9	-	-	-	871	---	5.8
0412	218	10.1	27.0	1.1	-	-	-	871	---	6.6
0452	161	11.5	30.7	1.2	-	-	-	613	---	7.3
0512	137	12.9	34.5	1.4	-	-	-	613	---	8.0
0552	124	14.8	39.5	1.5	-	-	-	412	---	9.2
0612	109	16.2	43.2	1.7	-	-	-	412	---	10.8

K evap : standard mains filter included
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, using traditional control logic

(1) Rec. = Heat Recovery. For units with total heat recovery.
(2) Cond.= Condenser. For water to water type units. In units with heat recovery , this data is valid for both the condensing and the heat recovery exchangers.

6. HYDRONIC GROUPS

Available configurations
1-pump hydronic kit
2-pump hydronic kit
1-pump hydronic kit with storage tank
2-pump hydronic kit with storage tank

Compact units PLUG and PLAY.
The units in the NECS system are fitted standard with a hydronic group. This houses all the main hydraulic components, thereby optimising hydraulic and electric installation space, time and cost.
The innovative QuickMind control fitted to the units in the NECS system, has been designed to work on systems with a low water content, offering highly professional alternatives to the installation of systems featuring storage units.
For special applications, a tank to install inside the unit is available on request.

2-pole low head pump
Horizontal one-piece centrifuge pump with one impeller, axial suction and radial delivery, AISI 304L stainless steel pump body impeller. The section of shaft in contact with the liquid is made from stainless steel. Mechanical seal made from components in ceramics/carbon/NBR/AISI304. Threephase electric motor protected to IP55, insulation class F, suitable for continuous service.

Second pump
A second stand-by pump for high or low pressures is available on request. The pumps are automatically exchanged on the basis of a rotation programme and the stand-by pump cuts in automatically if the primary pump fails. The two-pump hydronic assembly is also fitted with check valves to ensure the unit works correctly.

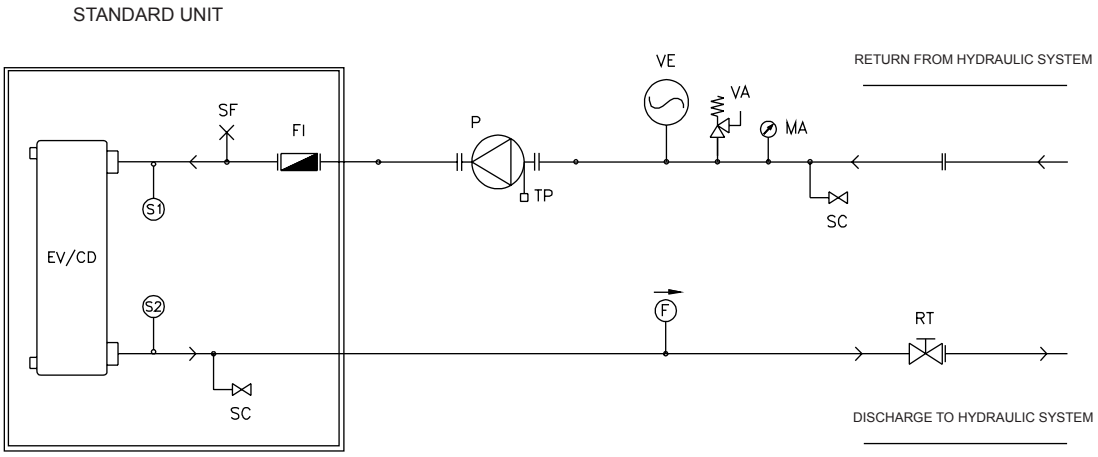
Special pumps
For pumps with different configurations, please contact our sales department.

Water Tank
All units can be fitted with an internal storage tank holding 85 or 250 litres, depending on the version.
This is made from sheet steel, welded using leading-edge technologies and protected from corrosion with a coat of paint.
Each tank is tested to 7.5 bar to ensure an operating pressure of 5 bar.
The condensation-proof lagging is made from a 20 mm layer of foamed cross-linked polyethylene bonded to an external embossed metallic scratchproof film.

Water-side mechanical filter (standard)
Y-filter designed and built to capture the impurities in the hydraulic circuit. It is fitted with a 0.9 mm stainless steel mesh cartridge which can be replaced without removing the valve body from the piping.

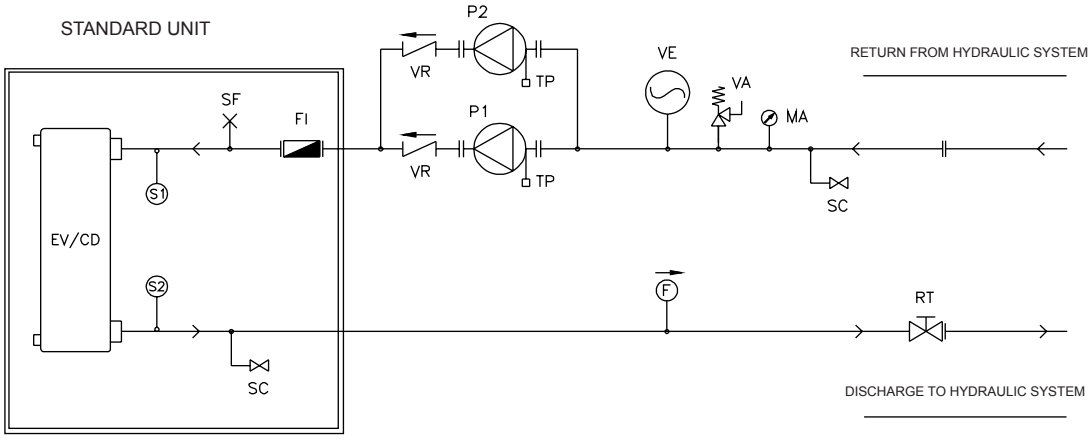
The supply does not include the following accessories though these are recommended to ensure correct system operation:
- Pressure gauges upline and downline from the unit.
- Flexible joints on piping.
- On-off valves
- Outlet control thermometer

Configuration Hydronic group 1 pump



The hydronic group comprises:
- P Horizontal one-piece centrifuge pump
- MA Hydraulic circuit pressure gauge
- F Flow switch
- RT Flow control valve
- SC Discharge valve
- S1 Exchanger input water temperature probe
- S2 Exchanger outlet water temperature probe
- SF Air vent
- VA 3 bar safety valve.
- VE 8-litre expansion tanks, pre-pressurised to 1,5 bar
- FI Mains filter. Standard.

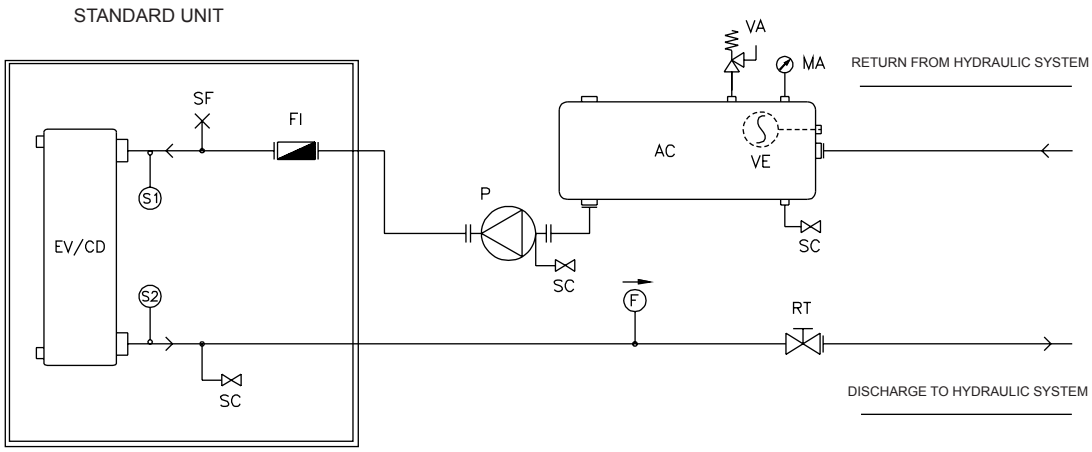
Configuration Hydronic group 2 pumps



The hydronic group comprises:
- P Horizontal one-piece centrifuge pump.
- MA Hydraulic circuit pressure gauge
- F Flow switch
- RT Flow control valve
- SC Discharge valve
- S1 Exchanger input water temperature probe
- S2 Exchanger outlet water temperature probe
- SF Air vent
- VA 3 bar safety valve.
- VE 8-litre expansion tanks, pre-pressurised to 1,5 bar
- VR Check valve (only if P2 is fitted)
- FI Mains filter. Standard.

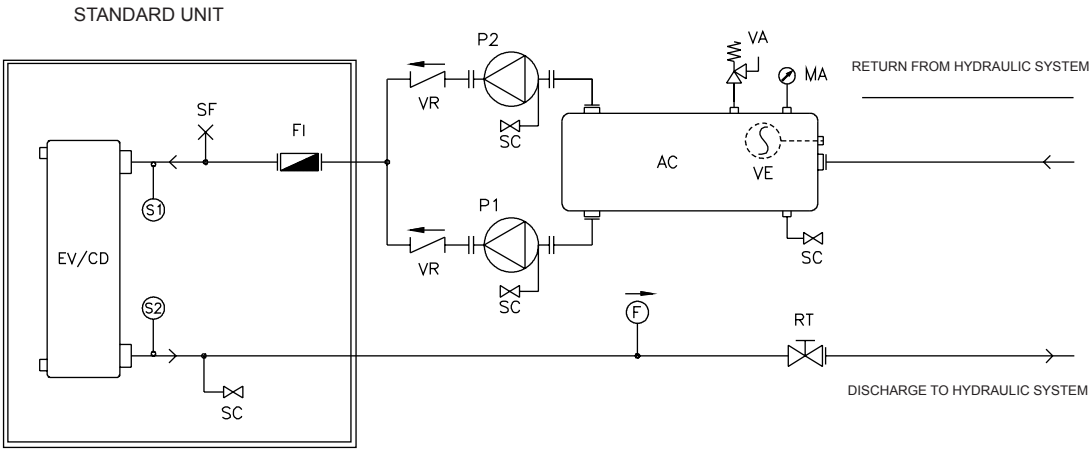
The electrical panel of the unit is protected with Automatic circuit breakers

Configuration Hydronic group 1 pump with water tank



The hydronic group comprises:
- P Horizontal one-piece centrifuge pump
- AC Storage tank
- MA Hydraulic circuit pressure gauge
- F Flussostato
- RT Flow control valve
- SC Discharge valve
- S1 Exchanger input water temperature probe
- S2 Exchanger outlet water temperature probe
- SF Air vent
- VA 3 bar safety valve
- VE 8-litre expansion tanks, pre-pressurised to 1.5 bar, for 85- and 150-litre storage tanks.
  24-litre expansion tank, pre-pressurised to 1.5 bar, for 700-litre storage tank.
- FI Mains filter. Standard.

Configuration Hydronic group 2 pumps with water tank



The hydronic group comprises:
- P Horizontal one-piece centrifuge pump
- AC Storage tank
- MA Hydraulic circuit pressure gauge
- F Flow switch
- RT Flow control valve
- SC Discharge valve
- S1 Exchanger input water temperature probe
- S2 Exchanger outlet water temperature probe
- SF Air vent
- VA 3 bar safety valve.
- VE 8-litre expansion tank, pre-pressurised to 1.5 bar, for 85- and 150-litre storage tanks.
  24-litre expansion tank, pre-pressurised to 1.5 bar, for 190- and 250-litre storage tanks.
- VR Check valve (only if P2 is fitted)
- FI Mains filter. Standard.

The electrical panel of the unit is protected with Automatic circuit breakers

Size	Pf (1) [kW]	Q (1) [m³/h]	Pump ref.	F.L.I. [kW]	F.L.A. [A]	Hp [kPa]
0152	38.0	6.5	A	1.1	2.5	137
0182	43.0	7.4	A	1.1	2.5	134
0202	48.0	8.3	B	1.1	2.5	180
0252	58.0	10.0	B	1.1	2.5	174
0302	72.0	12.4	C	1.5	3.2	166
0352	82.0	14.1	C	1.5	3.2	162
0412	94.0	16.2	D	2.2	4.8	215
0452	107.0	18.4	E	3.0	5.6	234
0512	120.0	20.6	E	3.0	5.6	228
0552	138.0	23.7	E	3.0	5.6	221
0612	151.0	26.0	E	3.0	5.6	214

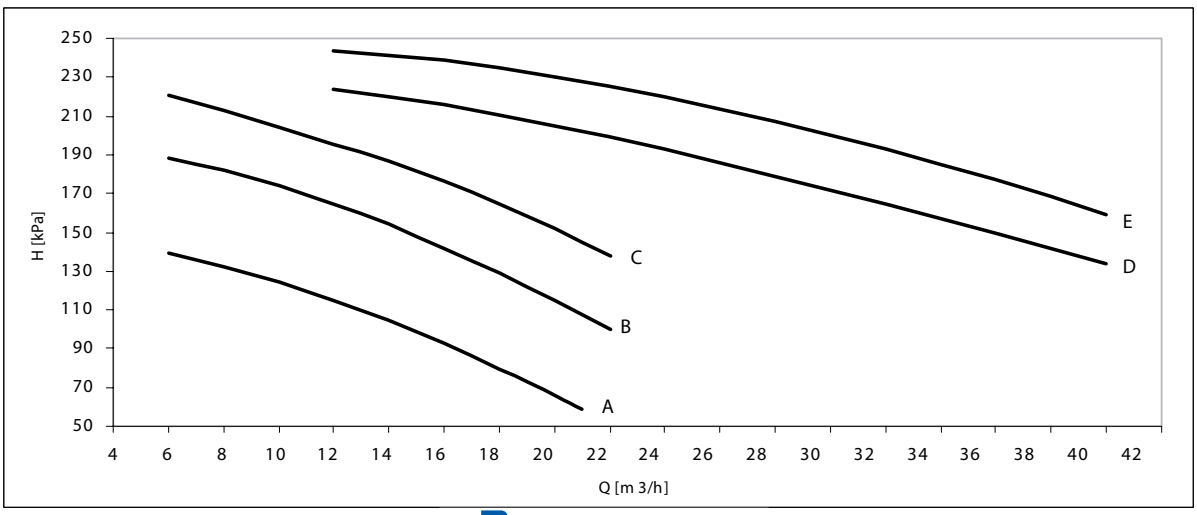
Tank		
B	**LN**	**HT**
85	85	85
85	85	85
85	150	150
85	150	150
150	190	190
150	190	190
190	190	190
190	190	190
250	250	250
250	250	250
250	250	250

Size	Unit without tank						Unit with tank					
	1 Pump			2 Pumps			1 Pump			2 Pumps		
	KP1	Dpu [kPa]	Hu [kPa]	KP2	Dpu [kPa]	Hu [kPa]	KAC1	Dpu [kPa]	Hu [kPa]	KAC2	Dpu [kPa]	Hu [kPa]
0152	1391	58	79	1422	60	77	1422	60	77	1422	60	77
0182	915	50	84	948	51	83	948	51	83	948	51	83
0202	645	44	137	676	46	135	676	46	135	676	46	135
0252	458	45	129	490	48	126	490	48	126	490	48	126
0302	365	56	138	396	61	133	396	61	133	396	61	133
0352	291	59	126	321	65	120	321	65	120	321	65	120
0412	251	65	151	281	73	143	281	73	143	281	73	143
0452	174	59	173	185	63	169	185	63	169	185	63	169
0512	151	64	162	162	69	157	162	69	157	162	69	157
0552	130	73	145	141	79	139	141	79	139	141	79	139
0612	122	82	129	133	90	121	133	90	121	133	90	121

(1) Values refer to rated operating conditions
Pf Cooling capacity of unit
Q Flow of water to evaporator
F.L.I. Power absorbed by pump
F.L.A. Current absorbed by pump
Hp Head of pump
Dpu Total pressure drop of hydronic group
Hu Working head
ACC Water Tank capacity
KG1 Extra weight with only pumps
KG2 Extra weight with pumps and water tank

Coefficients for calculating pressure drops comprise standard mains filter:

K P1 Unit with Hydronic group and one pump
K P2 Unit with Hydronic group and two pumps
K AC1 Unit with 1 Pump and Storage tank
K AC2 Unit with 2 Pumps and Storage tank



WEIGHT DIFFERENCES

Weight differences, in Kg, compared with the Standard Unit.
The weight of the Standard Unit is indicated on page A2.
There is no difference in weight between the low head and high head versions.

Without WATER TANK

	1 Pump				2 Pumps			
	B	LN	HT	SL	B	LN	HT	SL
0152	35	35	30	30	70	70	60	60
0182	35	35	35	35	70	70	70	70
0202	35	30	35	35	70	60	70	70
0252	35	30	35	35	70	60	70	70
0302	35	30	35	35	70	60	70	70
0352	35	35	40	40	70	70	70	70
0412	35	35	45	45	70	70	80	80
0452	35	35	45	45	70	70	90	90
0512	50	35	45	45	100	100	90	90
0552	50	50	45	45	100	100	90	90
0612	50	50	45	45	100	100	90	90

With WATER TANK FULL (working)

	1 Pump				2 Pumps			
	B	LN	HT	SL	B	LN	HT	SL
0152	145	145	150	150	180	180	180	180
0182	145	145	135	135	180	180	170	170
0202	145	220	225	225	180	250	260	260
0252	145	220	215	215	180	250	250	250
0302	225	270	275	275	260	300	310	310
0352	225	275	265	265	260	310	300	300
0412	275	275	270	270	310	310	310	310
0452	275	275	245	245	310	310	290	290
0512	350	350	345	345	400	400	390	390
0552	350	350	345	345	400	400	390	390
0612	350	350	345	345	400	400	390	390

With WATER TANK EMPTY (Transport)

	1 Pump				2 Pumps			
	B	LN	HT	SL	B	LN	HT	SL
0152	60	60	65	65	95	95	95	95
0182	60	60	50	50	95	95	85	85
0202	60	70	75	75	95	100	110	110
0252	60	70	65	65	95	100	100	100
0302	75	80	85	85	110	110	120	120
0352	75	85	75	75	110	120	110	110
0412	85	85	80	80	120	120	120	120
0452	85	85	55	55	120	120	100	100
0512	100	100	95	95	150	150	140	140
0552	100	100	95	95	150	150	140	140
0612	100	100	95	95	150	150	140	140

7. ELECTRICAL DATA

Maximum values									
Size	n	Compressor			Fan motors (1)		Total unit (1) (2)		
		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]
0152	2	2x9	2x15.3	95	1	4.4	19	35	115
0182	2	2x10.1	2x16.4	111	1	4.4	21.2	37	132
0202	2	2x11.8	2x20.4	118	1	4.4	24.6	45	143
0252	2	2x13.2	2x22.6	118	1.5	6.6	27.9	52	147
0302	2	2x16.9	2x27.9	198	1.5	6.6	35.3	62	233
0352	2	1x16.9+1x22.3	1x27.9+1x36.1	198/225	2	8.8	41.2	73	262
0412	2	2x22.3	2x36.1	225	2	8.8	46.6	81	270
0452	2	1x22.3+1x27.4	1x36.1+1x45.8	225/272	2	8.8	51.7	91	317
0512	2	2x27.4	2x45.8	272	2.5	11	57.3	103	329
0552	2	1x27.4+1x35.8	1x45.8+1x58.9	272/310	2.5	11	65.7	116	367
0612	2	2x35.8	2x58.9	310	2.5	11	74.1	129	380

F.L.I. Full load power input at max admissible condition
F.L.A. Full load current at max admissible condition
L.R.A. Locked rotor amperes for single compressor
S.A. Starting current

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

Power supply: 400/3/50
Voltage tolerance: 10%
Maximum voltage unbalance: 3%

8. FULL LOAD SOUND LEVEL

SOUND POWER									
SIZE	Octave band [Hz]								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB(A)								
0152	83	81	85	82	78	76	69	68	**84**
0182	83	81	85	82	78	76	69	68	**84**
0202	83	81	85	82	78	76	69	68	**84**
0252	83	81	85	82	78	76	69	68	**84**
0302	84	82	86	83	79	77	70	69	**85**
0352	85	83	87	84	80	78	71	70	**86**
0412	85	83	87	84	80	78	71	70	**86**
0452	85	83	87	84	80	78	71	70	**86**
0512	86	84	88	85	81	79	72	71	**87**
0552	86	84	88	85	81	79	72	71	**87**
0612	86	84	88	85	81	79	72	71	**87**

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units;
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] at 10 m								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB(A)								
0152	51	49	53	50	46	44	37	36	**52**
0182	51	49	53	50	46	44	37	36	**52**
0202	51	49	53	50	46	44	37	36	**52**
0252	51	49	53	50	46	44	37	36	**52**
0302	52	50	54	51	47	45	38	37	**53**
0352	53	51	55	52	48	46	39	38	**54**
0412	53	51	55	52	48	46	39	38	**54**
0452	53	51	55	52	48	46	39	38	**54**
0512	54	52	56	53	49	47	40	39	**55**
0552	54	52	56	53	49	47	40	39	**55**
0612	54	52	56	53	49	47	40	39	**55**

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Average sound pressure level, at 10 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained
from the sound power level

FULL LOAD SOUND LEVEL

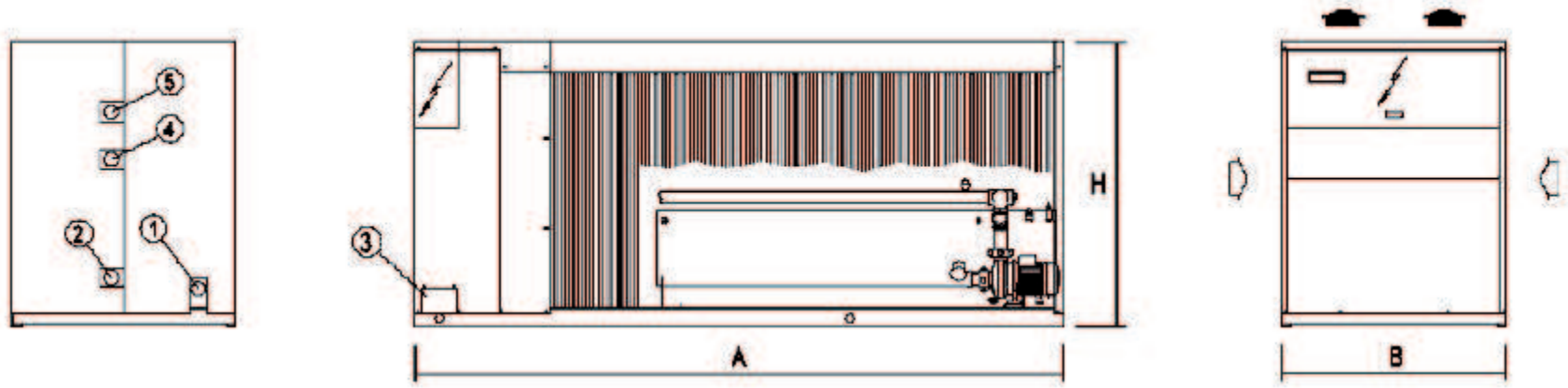
SOUND POWER									
SIZE	Octave band [Hz]								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB(A)								
0152	80	78	81	78	73	69	61	59	**79**
0182	80	78	81	78	73	69	61	59	**79**
0202	81	79	82	79	74	70	62	60	**80**
0252	81	79	82	79	74	70	62	60	**80**
0302	82	80	83	80	75	71	63	61	**81**
0352	82	80	84	81	77	75	68	67	**83**
0412	82	80	84	81	77	75	68	67	**83**
0452	82	80	84	81	77	75	68	67	**83**
0512	83	81	85	82	78	76	69	68	**84**
0552	83	81	85	82	78	76	69	68	**84**
0612	83	81	85	82	78	76	69	68	**84**

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units;
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] at 10 m								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB(A)								
0152	48	46	49	46	41	37	29	27	**47**
0182	48	46	49	46	41	37	29	27	**47**
0202	49	47	50	47	42	38	30	28	**48**
0252	49	47	50	47	42	38	30	28	**48**
0302	50	48	51	48	43	39	31	29	**49**
0352	50	48	52	49	45	43	36	35	**51**
0412	50	48	52	49	45	43	36	35	**51**
0452	50	48	52	49	45	43	36	35	**51**
0512	51	49	53	50	46	44	37	36	**52**
0552	51	49	53	50	46	44	37	36	**52**
0612	51	49	53	50	46	44	37	36	**52**

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Average sound pressure level, at 10 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained
from the sound power level

9. DIMENSIONAL DRAWINGS



1 EVAPORATOR WATER OUTLET

2 TANK WATER INLET

3 POWER INLET

4 DESUPERHEATER WATER OUTLET

5 DESUPERHEATER WATER INLET

AIR INLET

AIR OUTLET

Rif		0152	0182	0202	0252	0302	0352	0412	0452	0512	0552	0612
1 - 2	Evaporator UNI ISO RP	2”	2”	2”	2”	2”	2”	2”	2 1/2”	2 1/2”	2 1/2”	2 1/2”
4 - 5	Desuperheater UNI ISO RP	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”	1 1/2”

REMARKS:

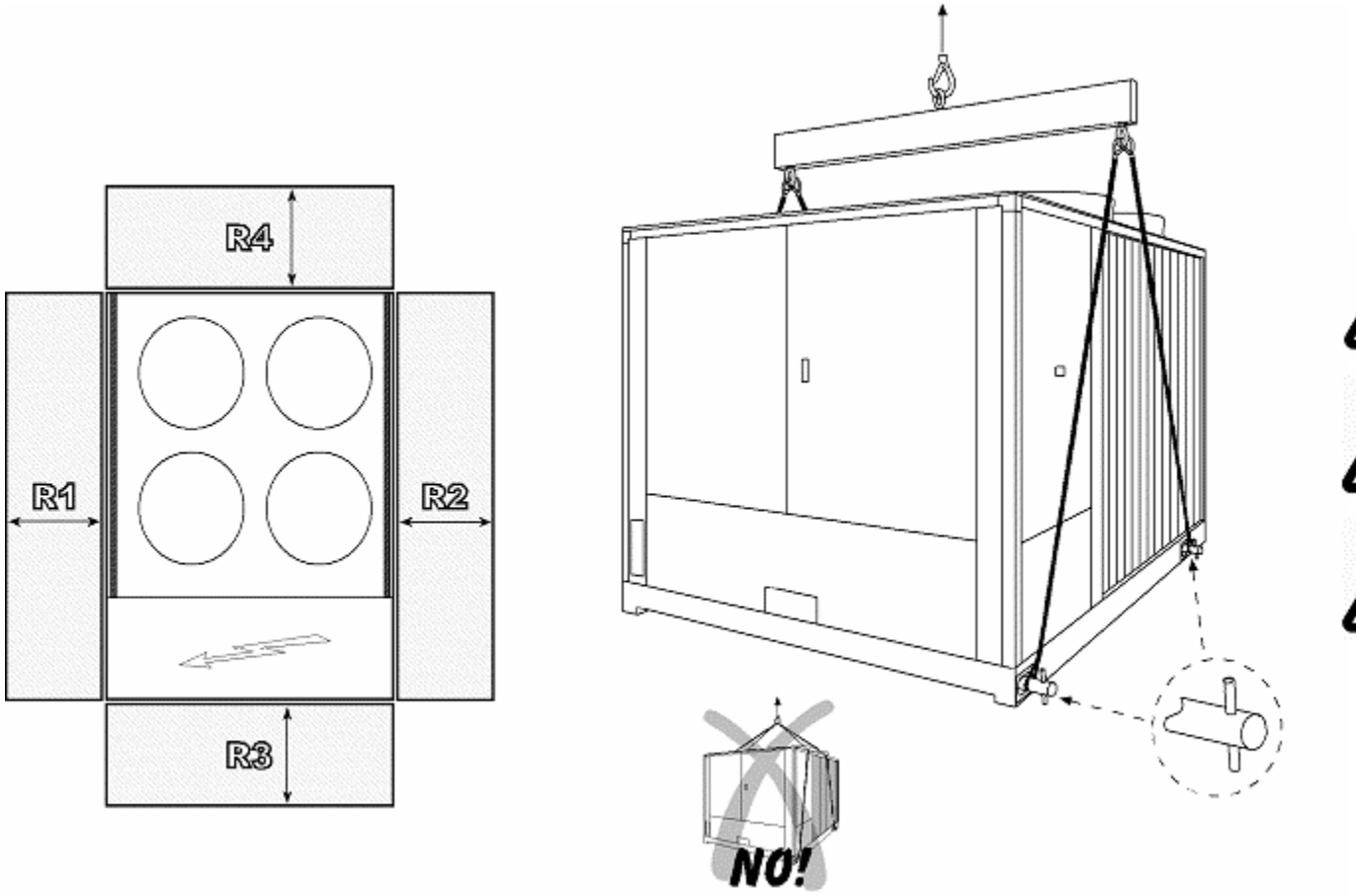
For installation purposes, please refer to the documentation sent after the purcha-se-contract. This technical data should be considered as indicative.

CLIMAVENETA may modify them at any moment.

DIMENSIONAL DRAWINGS

Size	DIMENSIONS AND WEIGHTS								FREE SPACES (See fol. page)			
	NECS-N				NECS-ND							
	A [mm]	B [mm]	H [mm]	P [kg]	A [mm]	B [mm]	H [mm]	P [kg]	R1 [mm]	R2 [mm]	R3 [mm]	R4 [mm]
0152 B	1695	1120	1420	400	1695	1120	1420	410	1000	1000	600	600
0152 LN	1695	1120	1420	400	1695	1120	1420	410	1000	1000	600	600
0182 B	1695	1120	1420	410	1695	1120	1420	420	1000	1000	600	600
0182 LN	1695	1120	1420	420	1695	1120	1420	430	1000	1000	600	600
0202 B	1695	1120	1420	420	1695	1120	1420	430	1000	1000	600	600
0202 LN	2195	1120	1420	460	2195	1120	1420	470	1000	1000	600	600
0252 B	2195	1120	1420	500	2195	1120	1420	510	1000	1000	600	600
0252 LN	2195	1120	1420	500	2195	1120	1420	510	1000	1000	600	600
0302 B	2195	1120	1420	630	2195	1120	1420	640	1000	1000	600	600
0302 LN	2745	1120	1420	710	2745	1120	1420	720	1000	1000	600	600
0352 B	2195	1120	1420	690	2195	1120	1420	700	1000	1000	600	600
0352 LN	2745	1120	1620	770	2745	1120	1620	780	1000	1000	600	600
0412 B	2745	1120	1420	770	2745	1120	1420	790	1000	1000	600	600
0412 LN	2745	1120	1620	830	2745	1120	1620	850	1000	1000	600	600
0452 B	2745	1120	1420	850	2745	1120	1420	860	1000	1000	600	600
0452 LN	2745	1120	1620	880	2745	1120	1620	890	1000	1000	600	600
0512 B	3245	1120	1620	950	3245	1120	1620	970	1000	1000	600	600
0512 LN	3245	1120	1620	990	3245	1120	1620	1010	1000	1000	600	600
0552 B	3245	1120	1620	1020	3245	1120	1620	1030	1000	1000	600	600
0552 LN	3245	1120	1620	1020	3245	1120	1620	1030	1000	1000	600	600
0612 B	3245	1120	1620	1030	3245	1120	1620	1040	1000	1000	600	600
0612 LN	3245	1120	1620	1030	3245	1120	1620	1040	1000	1000	600	600

10. FREE SPACES - LIFTING MODE - SYMBOLS



Warning: Electrical power!

Warning: Sharp edges!

Warning: Fans!

INSTRUCTIONS

- Make sure that all the panels are firmly fixed in place before moving the unit.
- Before lifting it, check the weight on the CE label.
- Use all, and only, the lifting points provided,
- Use slings of equal length,
- Use a spread-bar (not included)
- Move the unit carefully and avoid abrupt movements.

11. LEGEND OF PIPE CONNECTIONS

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 ISO 7/1

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 ISO 7/1 - 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 ISO 7/1 - 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 ISO 7/1 - 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 ISO 7/1 - 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 ISO 7/1	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