Climaveneta **Technical Bulletin**

NECS_N_0202T_0612T_201211_EN

NECS-N

HFC R-410A

0202T - 0612T
53 - 159 kW

Reversible unit, air source for outdoor installation

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

- Maximum reliability
- Ease of maintenance
- Efficiency
- Integrated hydronic unit

CLIMAVENETA

SUMMARY

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0202T - 0612T

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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.

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1. PRODUCT PRESENTATION

This section contains general information on the NECS-N range of products. For detailed information refer to the specific sections in this bulletin.

NECS-N units
NECS-N 0202T-0612T is a range of air-condensed reversible units with R410A rotary Scroll compressors working on two separate and independent circuits and a shell and tube heat exchanger.
This new NECS-N series has been designed to meet specific application requirements where continuity of operation needs to be ensured.

1.1 maximum reliability
Unit with dual-circuit refrigerant section designed to ensure maximum efficiency at full load, ensuring continuity without interruption of operation in the event of temporary stop of one of the 2 circuits.

1.2 Ease of maintenance
Shell and tube heat exchanger with low pressure drops, for use with very hard water. This the best solution for industrial process control applications.

1.3 Efficiency
Stepless fan speed condensation control achieved via a phase-cutting device. This optimizes power consumption by adapting condensation to any environmental condition, whilst assuring minimum noise from the ventilation unit.

1.4 Hydronic unit
The integrated hydronic unit includes the main hydraulic components, including a low- or high-head pump. Shutoff valves upstream and downstream from each pump to facilitate replacement operations without having to drain the hydraulic system. Automatic pump rotation system in the event of a breakdown without interrupting operation (only for units with a dual pump).

1.5 Demand Limit
Digital input for enabling the restriction of maximum power of the unit output to a preset value. The function can be used as a load protection or energy saver system.

1.6 Low-Noise versions
The silenced version (LN) is available for all sizes. Here, low noise levels are achieved by reducing the speed of rotation of the fans and increasing the insulation of the compressor chamber.

2. UNIT DESCRIPTION

Outdoor reversible heat pump for the production of chilled/hot water with hermetic rotary Scroll compressors, axial-flow fans, shell and tubes heat exchanger and thermostatic expansion valve. External panels in Peraluman and structure in aluminium sections. The range is equipped with two compressors on two independent refrigerant circuits.

2.1 Standard unit composition

Structure
Specific structure for outdoor installation, made with a hot-galvanised sheet steel base of adequate thickness, painted with polyester powders. Specific panelling for outdoor installation in aluminium alloy which ensures total resistance to atmospheric agents, easily removable, made in such a way as to allow total access to the internal components to facilitate inspection and maintenance work. Two independent sections for both ventilation and compressors.

Cooling circuit
Main components of the cooling circuit:
- two independent circuits
- R410A coolant
- thermostatic expansion valves
- dehydrator filter
- coolant line sight glass with humidity indicator
- high pressure safety valve
- low pressure safety valve
- high and low pressure transducers
- high pressure safety switches
- liquid receiver
- liquid line check valve (sizes 0452..0612)
- 4-way reverse cycle valves

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

User side exchanger
Direct expansion multi-circuit shell and tube exchanger with asymmetric side coolant flows for maintaining the coolant at the correct speed inside the tubes when passing from the liquid to the gas phase. Steel shell with foamed closed-cell elastomer anti-condensation lining. The shell & tube is manufactured using copper tubes with internal grooves for favouring heat exchange and mechanically expanded onto the tube plates. An electric antifreeze heater prevents the ice from forming inside the exchanger when the unit is not working but connected to the electrical supply. When the unit is working, it is protected by a differential pressure switch mounted on the water side.

Heat source side exchanger
Finned coil exchanger made from copper tubes and aluminium fins. The aluminium fins are correctly spaced to guarantee optimum heat exchange efficiency. The differentiated circulation suitably distributes the liquid in the coil during the expansion phase.

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,
- numbered cables,
- power contactors for compressors and fans,
- continuous fans speed management controllers,
- terminals for cumulative alarm block (BCA),
- remote ON/OFF terminals,
- relay for remote pumps management,

Power input: 400V~ ±10% - 50Hz - 3N.

Heat source side fan section
Finned package heat exchanger featuring copper tubes and aluminium fins suitably spaced to optimise heat exchange performance.

Pumps (where present)
Horizontal one-piece centrifugal pump with one impeller, axial suction and radial delivery, DIN GG20 cast iron body and AISI 316L stainless steel or cast iron impeller. The section of the shaft in contact with the liquid is made by stainless steel. Mechanical seal with components in ceramics, carbon and NBR elastomers. Three-phase electric motor with IP55 protection class, insulation class F, suitable for continuous service. Shut-off valves upstream and downstream from each pump to facilitate replacement operations without having to drain the hydraulic system. Automatic pump rotation system in the event of a breakdown without interrupting operation (only in units with a dual pump).

2.2 Tests
Tests performed throughout the production process, as indicated in ISO9001. Performance or noise tests can be performed by highly qualified staff in the presence of customers.
Performance tests comprise the measurement of:
- electrical data
- water flow rates
- working temperatures
- power input
- power output
- pressure drops on the water-side exchanger both at full load (at the conditions of selection and at the most critical conditions for the condenser) and at part load conditions.

During performance testing it is also possible to simulate the main alarm states.
Noise tests are performed to check noise emissions according to ISO3744.

2.3 Reference standards
The machine complies with the following directives and their amendments:
- 2006/42/CE Machinery Directive.
- E.C.D. 89/336/EEC + 2004/108/EC.
- 2006/95/EC Low Voltage Directive.
- 97/23/EC Pressure Equipment Directive . Module A1. TÜV-Italia 0948

Controller W3000 Base / W3000SE Compact
The controller can be chosen as:
- W3000 Base: keypad and LED display
- W3000SE Compact: the keypad features an easy-to-use interface and a complete LCD display, allowing to consult and intervene on the unit by means of a multi-level menu, with selectable language setting.

The diagnostics includes a complete alarm management, with the “black-box” and alarm logging functions for enhanced analysis of the unit operation.
Compatibility with the remote keyboard managing up to 10 units.
Availability of an internal real time clock for operation scheduling (4-day profiles with 10 hour belts).
Common features: The regulation is based on the exclusive QuickMind algorithm, including self-adaptive control logics,

beneficial in low water content systems. As alternatives the proportional- or proportional-integral regulations are also available. For multiple units' systems, the regulation of the resources, via optional proprietary devices, can be implemented. Energy metering, for both consumption and capacity, can also be developed. Supervision can be easily developed via proprietary devices or the integration in third party systems by means of the most common protocols as ModBus, Bacnet, Bacnet-over-IP, Echelon LonWorks.
The defrost adopts a proprietary self-adaptive logic, which features the monitoring of numerous operational parameters. This allows to reduce the number and duration of the defrost cycles, with a benefit for the overall energy efficiency.

2.4 Available versions
B-Base
Standard model.

LN- Low noise
Low noise version. This confi guration features special soundproofi ng for the compressor chamber and reduced fan speed. Fan speed is automatically increased if environmental conditions are particularly tough.

2.5 Accessories
- Cu/Cu condensing coils
Air-refrigerant heat exchanger with copper fins and tubes.
Recommended for applications in corrosive atmospheres.

- Condensing coils with epoxy-coated fins
Painted air-refrigerant heat exchanger.
Recommended for applications in medium level pollution atmospheres.

- Condensing coils with Fin Guard Silver treatment
Air-refrigerant heat exchanger with epoxidic treatment on coils and fins.
Recommended for marine exposure conditions, with an high level of pollution or other aggressive atmospheres.

- Soft start
Electronic device adopted to manage the inrush current.
Break down of the inrush current as soon as the electrical motor is switch on, lower motor's mechanical wear, favourable sizing for the electrical system.

- Remote phase-sequence control
Relay for controlling the phase-sequence of mains.
Protects loads against faults due to incorrect connection of the electric line.

- Compressors' on/off signal
Auxiliary contacts providing a voltage-free signal.
Allows remote signalling of compressor's activation or remote control of any auxiliary loads.

- ModBUS connectivity
Interface module for ModBUS protocols.
Allows integration with BMS operating with ModBUS protocol.

- BACnet connectivity
Interface module for BACnet protocols.
Allows integration with BMS operating with BACnet protocol.

- Echelon connectivity
Interface module for Echelon systems.
Allows integration with BMS operating with LonWorks procotls.

- HP AND LP GAUGES
High and low pressure gauges.
Allows immediate reading of the pressure values on both low and high pressure circuits.

- Compressor suction valve
Shut-off solenoid valve on compressor's suction circuit.
Simplifies maintenance activities.

- Compr. Discharge line valve
Shut-off solenoid valve on compressor discharge circuit.
Simplifies maintenance activities.

- Cond. Coil protection net
Coil protecting net.
Protects against the intrusion of solid bodies with mediumlarge dimensions.

- Var.Fan speed low amb.Control
Acoustic encolsure on both compressor and pump sections (when applicable)
Noise emission reduction.

- W3000 compact visual display
LCD display keyboard type W3000 Compact.
Easy of use, multi-language user interface, remote unit's control.

- Prearrangement for remote
LCD display keyboard type W3000 Compact.
Easy of use, multi-language user interface, remote unit's control.

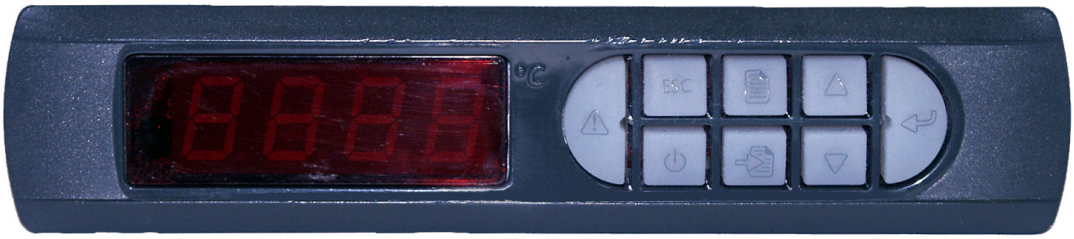
- Container packing

- BACnet OVER IP connectivity
Interface module for BACnet OVER-IP protocols.
Allows to interconnect BACnet devices over Internet Protocol within wide-area networks.

- AUX 4-20mA REMOTE D L.C.
4..20mA analogue input, voltage-free digitale input. Allows to change the operating set-point according to value of current applied to 4..20mA input and to limit the unit's power (by activating the digital input).
Enforce Energy Saving policy, ensure safety operation.

- LT kit for low temperature
Extends the operating limits down to -10°C, applicable on LN versions only.
Allows unit operation in heating mode in strong winter conditions.

3. ELECTRONIC CONTROLLER

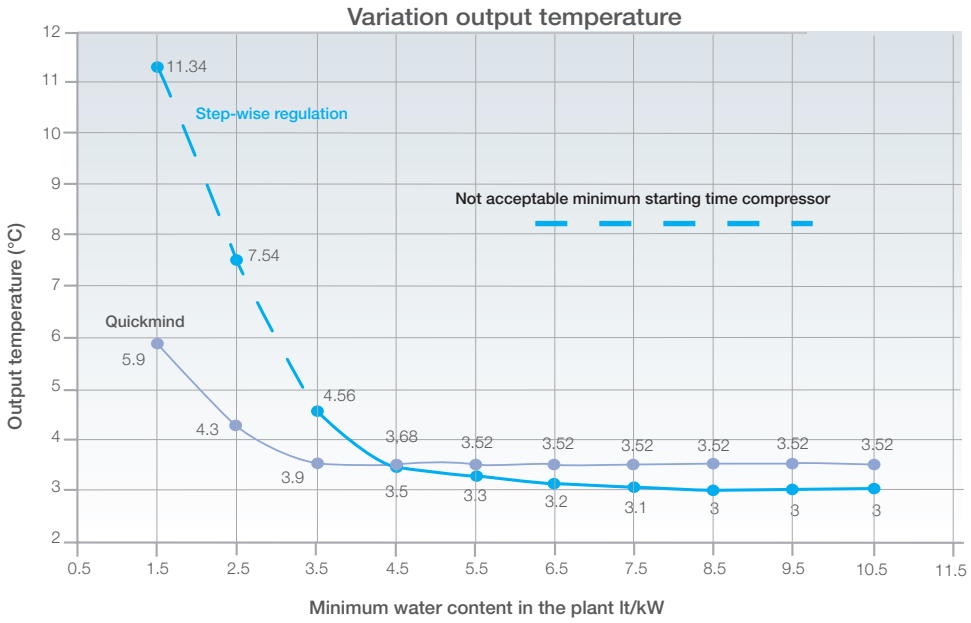


Control unit with LCD display (standard)
The new “W3000 Base” control unit is installed on all units.

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 dual-compressor 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 following graph shows that outlet temperature fluctuations with QuickMind are limited to 4.3 °C as opposed to 7.45 °C if the traditional adjustment system were used, without even ensuring an acceptable minimum compressor start time.



Control unit with LCD display (optional) - Remote keyboard

As an alternative to the standard keyboard, the NECS has a W3000 Compact operator panel with liquid crystal display. (LCD)

This keyboard employs a user interface with 3 European languages that may be selected by the user, two of which are preset, and a further language of choice which may be French, German, Spanish, Swedish or Russian (to be specified on order). This allows the control unit interface to be chosen to suit the country of destination or, thanks to English, to be completely independent for all geographical areas.

This same type of operator panel is also available as a remote keyboard, to be connected to the unit by means of a serial connection up to a maximum distance of 200 metres without power supply (in this case power is supplied by the unit), or a maximum of 500 metres with dedicated local power supply.

Note

The remote keyboard may be connected to the unit without replacing the W3000 Base operator panel originally provided on the unit. In this case the interface fitted locally on the unit is excluded, and access to the programming menus and the display of the machine status is present only the additional keyboard at remote level.

Instead, when the W3000 Base operator panel is replaced with the W3000 Compact panel, control of the unit is possible at both local and remote level. In this case the remote keyboard faithfully reproduces what is shown on the control unit on board the machine, further facilitating all the operations of configuring and controlling the unit.

NECS-N / B			0202T	0252T	0302T	0352T	0412T	0452T	0512T	0552T	0612T
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
PERFORMANCE											
COOLING ONLY (GROSS VALUE)											
Cooling capacity	(1)	kW	50,3	57,5	72,0	82,5	93,9	107	120	138	151
Total power input	(1)	kW	18,4	20,4	28,0	32,0	36,0	39,8	44,0	50,4	58,9
EER	(1)		2,73	2,82	2,57	2,58	2,61	2,68	2,73	2,73	2,56
ESEER	(1)		3,52	3,59	3,31	3,30	3,31	3,39	3,45	3,46	3,26
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	50,2	57,4	71,8	82,3	93,7	106	120	137	150
EER	(1)(2)		2,72	2,80	2,55	2,55	2,59	2,65	2,71	2,70	2,53
ESEER	(1)(2)		3,48	3,53	3,25	3,25	3,26	3,33	3,39	3,38	3,18
Cooling energy class			C	C	D	D	D	D	C	C	D
HEATING ONLY (GROSS VALUE)											
Heating capacity	(3)	kW	55,1	65,2	81,0	93,5	105	121	136	156	172
Total power input	(3)	kW	18,6	21,2	26,1	29,8	33,9	37,9	42,3	48,4	54,4
COP	(3)		2,96	3,08	3,10	3,14	3,11	3,18	3,21	3,23	3,17
HEATING ONLY (EN14511 VALUE)											
Heating capacity	(3)(2)	kW	55,2	65,3	81,2	93,8	106	121	136	157	173
COP	(3)(2)		2,95	3,06	3,09	3,12	3,09	3,16	3,19	3,21	3,15
Cooling energy class			C	B	B	B	B	B	B	A	B
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	m³/h	8,65	9,90	12,4	14,2	16,2	18,4	20,7	23,7	25,9
Pressure drop	(1)	kPa	5,60	7,29	11,6	15,1	11,9	15,4	14,1	19,6	23,4
HEAT EXCHANGER USER SIDE IN HEATING											
Water flow	(3)	m³/h	9,58	11,3	14,1	16,2	18,3	21,0	23,6	27,2	30,0
Pressure drop	(3)	kPa	6,86	9,54	14,9	19,8	15,3	20,0	18,4	25,8	31,4
COMPRESSORS											
N. of compressors		N°	2	2	2	2	2	2	2	2	2
Number of capacity		N°	2	2	2	2	2	2	2	2	2
No. of circuits		N°	2	2	2	2	2	2	2	2	2
Regulation			STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS
Min. capacity step		%	50	50	50	50	50	50	50	50	50
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge		kg	19,0	22,0	22,0	23,0	27,0	30,0	36,0	41,0	46,0
Oil charge		kg	6,50	6,50	6,50	7,95	9,40	10,8	13,6	13,1	12,6
FANS											
Quantity		N°	6	6	6	6	8	8	10	10	10
Air flow		m³/s	7,98	7,73	7,73	7,51	10,4	10,1	13,2	13,0	13,0
Fans power		kW	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25
NOISE LEVEL											
Noise Pressure	(4)	dB(A)	53	53	53	54	54	54	55	55	55
Noise Power	(5)	dB(A)	85	85	85	86	86	86	87	87	87
SIZE AND WEIGHT											
A	(6)	mm	2195	2195	2195	2195	2745	2745	3245	3245	3245
B	(6)	mm	1120	1120	1120	1120	1120	1120	1120	1120	1120
H	(6)	mm	1420	1420	1420	1420	1420	1420	1620	1620	1620
Operating weight	(6)	kg	645	670	710	800	985	1030	1175	1220	1265

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 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.
5 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.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

NECS-N / LN			0202T	0252T	0302T	0352T	0412T	0452T	0512T	0552T	0612T
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
PERFORMANCE											
COOLING ONLY (GROSS VALUE)											
Cooling capacity	(1)	kW	48,0	54,6	73,2	83,5	93,9	103	119	132	143
Total power input	(1)	kW	19,0	21,3	27,2	31,9	36,0	41,6	44,6	53,3	62,7
EER	(1)		2,53	2,56	2,69	2,62	2,61	2,48	2,67	2,47	2,28
ESEER	(1)		3,52	3,31	3,46	3,33	3,33	3,17	3,38	3,16	2,93
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	47,9	54,5	73,0	83,3	93,7	103	119	131	143
EER	(1)(2)		2,51	2,55	2,67	2,59	2,59	2,46	2,64	2,45	2,26
ESEER	(1)(2)		3,26	3,26	3,39	3,27	3,27	3,11	3,32	3,11	2,88
Cooling energy class			D	D	D	D	D	E	D	E	F
HEATING ONLY (GROSS VALUE)											
Heating capacity	(3)	kW	54,1	63,6	84,1	96,2	109	121	138	154	169
Total power input	(3)	kW	18,1	20,6	26,1	30,4	34,1	37,9	42,4	48,3	54,3
COP	(3)		2,99	3,09	3,22	3,16	3,19	3,18	3,24	3,19	3,12
HEATING ONLY (EN14511 VALUE)											
Heating capacity	(3)(2)	kW	54,2	63,7	84,3	96,5	109	121	138	154	170
COP	(3)(2)		2,98	3,07	3,20	3,14	3,18	3,16	3,22	3,16	3,10
Cooling energy class			C	B	A	B	B	B	A	B	B
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	m³/h	8,26	9,41	12,6	14,4	16,2	17,8	20,5	22,7	24,6
Pressure drop	(1)	kPa	5,11	6,58	11,9	15,5	11,9	14,4	13,8	17,9	21,2
HEAT EXCHANGER USER SIDE IN HEATING											
Water flow	(3)	m³/h	9,39	11,1	14,6	16,7	18,9	21,0	23,9	26,7	29,4
Pressure drop	(3)	kPa	6,60	9,09	16,1	20,9	16,4	20,0	18,8	25,0	30,2
COMPRESSORS											
N. of compressors		N°	2	2	2	2	2	2	2	2	2
Number of capacity		N°	2	2	2	2	2	2	2	2	2
No. of circuits		N°	2	2	2	2	2	2	2	2	2
Regulation			STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS	STEPS
Min. capacity step		%	50	50	50	50	50	50	50	50	50
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge		kg	19,0	22,0	25,0	35,0	38,0	34,0	49,0	41,0	46,0
Oil charge		kg	6,00	6,50	6,50	7,95	9,40	10,8	13,6	13,1	12,6
FANS											
Quantity		N°	6	6	8	8	8	8	10	10	10
Air flow		m³/s	6,12	5,81	7,85	8,85	8,68	8,68	10,9	10,9	10,9
Fans power		kW	0,16	0,16	0,16	0,25	0,25	0,25	0,25	0,25	0,25
NOISE LEVEL											
Noise Pressure	(4)	dB(A)	48	48	49	51	51	51	52	52	52
Noise Power	(5)	dB(A)	80	80	81	83	83	83	84	84	84
SIZE AND WEIGHT											
A	(6)	mm	2195	2195	2745	2745	2745	2745	3245	3245	3245
B	(6)	mm	1120	1120	1120	1120	1120	1120	1120	1120	1120
H	(6)	mm	1420	1420	1420	1620	1620	1620	1620	1620	1620
Operating weight	(6)	kg	645	670	795	935	1060	1065	1230	1220	1265

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 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.
5 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.
6 Unit in standard configuration/execution, without optional accessories.
- Unavailable

0202T																		
Ta	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**6**						**7**						**8**			
Pf	**55,1**	**52,1**	**50,8**	**48,8**	**45,1**	**43,5**	**56,7**	**53,7**	**52,4**	**50,3**	**46,4**	**44,8**	**58,4**	**55,2**	**53,9**	**51,7**	**47,8**	**46,2**
Pat	14,9	16,5	17,2	18,3	20,2	21,1	15,0	16,6	17,3	18,4	20,4	21,2	15,1	16,8	17,5	18,6	20,5	21,4
Qev	9,49	8,97	8,75	8,40	7,75	7,48	9,77	9,24	9,02	8,65	8,00	7,71	10,0	9,51	9,28	8,91	8,24	7,95
Dpev	6,73	6,02	5,73	5,27	4,50	4,18	7,14	6,39	6,08	5,60	4,78	4,45	7,55	6,77	6,44	5,94	5,07	4,72
Tev			**9**						**10**						**11**			
Pf	**60,0**	**56,8**	**55,4**	**53,2**	**49,2**	**47,5**	**61,6**	**58,3**	**56,9**	**54,7**	**50,6**	**48,9**	**63,2**	**59,9**	**58,4**	**56,1**	**52,0**	**50,2**
Pat	15,3	16,9	17,6	18,7	20,7	21,5	15,4	17,0	17,7	18,8	20,8	21,7	15,5	17,2	17,9	19,0	20,9	21,8
Qev	10,3	9,78	9,54	9,16	8,48	8,18	10,6	10,0	9,81	9,42	8,72	8,42	10,9	10,3	10,1	9,67	8,96	8,65
Dpev	7,98	7,16	6,81	6,28	5,37	5,01	8,41	7,55	7,19	6,64	5,68	5,30	8,86	7,96	7,58	7,00	6,00	5,60

0252T																		
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	8,64	7,77	7,42	6,87	5,93	5,55	9,17	8,26	7,88	7,29	6,29	5,89	9,71	8,75	8,35	7,73	6,66	6,23
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	10,3	9,26	8,84	8,17	7,04	6,57	10,9	9,79	9,34	8,63	7,42	6,92	11,5	10,3	9,85	9,10	7,81	7,28

0302T																		
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	14,0	12,5	11,9	10,9	9,31	8,66	14,8	13,2	12,6	11,6	9,89	9,22	15,6	14,0	13,3	12,2	10,5	9,81
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**	**70,4**	**90,1**	**85,4**	**83,4**	**80,3**	**74,8**	**72,4**
Pat	23,3	25,8	26,9	28,6	31,7	33,0	23,5	26,0	27,1	28,8	31,9	33,3	23,8	26,3	27,3	29,1	32,2	33,5
Qev	14,8	14,0	13,6	13,1	12,2	11,8	15,2	14,4	14,0	13,5	12,5	12,1	15,5	14,7	14,4	13,8	12,9	12,5
Dpev	16,4	14,7	14,0	12,9	11,1	10,4	17,3	15,5	14,8	13,7	11,8	11,1	18,1	16,3	15,5	14,4	12,5	11,7

0352T																		
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	18,3	16,3	15,5	14,2	12,2	11,4	19,4	17,2	16,4	15,1	13,0	12,1	20,5	18,2	17,3	16,0	13,8	12,9
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**	**80,9**	**104**	**98,0**	**95,7**	**92,1**	**85,9**	**83,3**
Pat	26,9	29,6	30,8	32,7	36,1	37,6	27,2	29,9	31,1	33,0	36,5	37,9	27,5	30,2	31,4	33,4	36,8	38,3
Qev	17,0	16,0	15,6	15,0	14,0	13,5	17,4	16,5	16,1	15,4	14,4	13,9	17,9	16,9	16,5	15,9	14,8	14,4
Dpev	21,6	19,3	18,3	16,9	14,6	13,7	22,7	20,3	19,3	17,9	15,5	14,5	23,9	21,4	20,4	18,9	16,4	15,4

0412T																		
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	14,4	12,8	12,2	11,2	9,69	9,08	15,3	13,6	12,9	11,9	10,3	9,67	16,2	14,4	13,7	12,7	11,0	10,3
Tev			**9**						**10**						**11**			
Pf	**112**	**106**	**103**	**99,4**	**92,6**	**89,9**	**115**	**109**	**106**	**102**	**95,4**	**92,6**	**118**	**112**	**109**	**105**	**98,1**	**95,3**
Pat	30,5	33,5	34,8	36,8	40,4	42,0	30,9	33,8	35,1	37,2	40,8	42,4	31,2	34,2	35,5	37,6	41,3	42,8
Qev	19,3	18,3	17,8	17,1	16,0	15,5	19,8	18,7	18,3	17,6	16,4	15,9	20,4	19,2	18,8	18,1	16,9	16,4
Dpev	17,1	15,2	14,5	13,4	11,6	10,9	18,0	16,1	15,3	14,2	12,3	11,6	19,0	16,9	16,1	15,0	13,1	12,3

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

0452T																		
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	18,5	16,5	15,7	14,5	12,5	11,7	19,7	17,5	16,7	15,4	13,3	12,4	20,8	18,5	17,6	16,3	14,0	13,2
Tev				**9**						**10**						**11**		
Pf	**127**	**120**	**117**	**113**	**105**	**101**	**131**	**123**	**120**	**116**	**108**	**104**	**134**	**127**	**124**	**119**	**111**	**107**
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	47,0
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	18,5
Dpev	21,9	19,6	18,6	17,2	14,8	13,9	23,1	20,6	19,6	18,1	15,7	14,7	24,3	21,7	20,7	19,1	16,5	15,5

0512T																		
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	16,9	15,1	14,4	13,3	11,5	10,8	17,9	16,0	15,3	14,1	12,2	11,4	19,0	17,0	16,1	14,9	12,9	12,0
Tev				**9**						**10**						**11**		
Pf	**143**	**135**	**132**	**127**	**118**	**114**	**147**	**139**	**135**	**130**	**121**	**117**	**151**	**142**	**139**	**133**	**124**	**120**
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	51,4
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	20,7
Dpev	20,0	17,9	17,0	15,7	13,6	12,7	21,1	18,9	18,0	16,6	14,3	13,4	22,2	19,9	18,9	17,5	15,0	14,1

0552T																		
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	23,5	21,0	20,0	18,5	16,0	14,9	25,0	22,3	21,2	19,6	16,9	15,8	26,4	23,6	22,4	20,7	17,9	16,7
Tev				**9**						**10**						**11**		
Pf	**164**	**155**	**151**	**145**	**135**	**131**	**168**	**159**	**155**	**149**	**139**	**134**	**173**	**163**	**159**	**153**	**142**	**138**
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	59,3
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	23,7
Dpev	27,9	24,9	23,7	21,9	18,9	17,7	29,4	26,2	25,0	23,1	19,9	18,6	30,9	27,6	26,3	24,3	20,9	19,6

0612T																		
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	28,5	25,3	24,1	22,1	19,0	17,7	30,2	26,8	25,5	23,4	20,1	18,8	31,9	28,4	26,9	24,8	21,2	19,8
Tev				**9**						**10**						**11**		
Pf	**180**	**170**	**166**	**159**	**147**	**142**	**185**	**174**	**170**	**163**	**151**	**146**	**190**	**179**	**174**	**167**	**155**	**149**
Pat	49,9	54,8	56,9	60,1	65,9	68,4	50,5	55,4	57,4	60,7	66,6	69,0	51,0	55,9	58,0	61,3	67,2	69,6
Qev	31,1	29,3	28,5	27,4	25,3	24,5	31,9	30,0	29,3	28,1	26,0	25,1	32,7	30,8	30,0	28,8	26,6	25,8
Dpev	33,7	29,9	28,4	26,1	22,4	20,9	35,5	31,5	29,9	27,5	23,6	22,0	37,3	33,1	31,4	28,9	24,8	23,1

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

0202T																		
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	6,32	5,58	5,28	4,82	4,03	3,72	6,69	5,92	5,60	5,11	4,28	3,95	7,07	6,26	5,92	5,41	4,54	4,19
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**	**45,9**	**61,0**	**57,5**	**55,9**	**53,5**	**49,0**	**47,1**
Pat	15,7	17,5	18,2	19,4	21,5	22,3	15,9	17,6	18,4	19,6	21,6	22,5	16,0	17,8	18,5	19,7	21,8	22,7
Qev	9,99	9,40	9,14	8,74	8,01	7,70	10,3	9,65	9,39	8,98	8,23	7,91	10,5	9,90	9,63	9,21	8,45	8,12
Dpev	7,46	6,61	6,25	5,71	4,80	4,43	7,86	6,97	6,59	6,03	5,07	4,68	8,27	7,33	6,94	6,35	5,34	4,94

0252T																		
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	8,04	7,15	6,78	6,22	5,27	4,89	8,52	7,57	7,18	6,58	5,57	5,16	9,02	8,01	7,59	6,95	5,87	5,43
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**	**53,2**
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	25,1
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	9,16
Dpev	9,52	8,46	8,01	7,33	6,17	5,70	10,0	8,92	8,44	7,72	6,48	5,98	10,6	9,39	8,88	8,11	6,78	6,25

0302T																		
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	14,3	12,8	12,2	11,3	9,65	8,99	15,1	13,6	12,9	11,9	10,2	9,57	16,0	14,3	13,7	12,6	10,9	10,2
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**	**71,7**	**91,3**	**86,6**	**84,6**	**81,5**	**76,0**	**73,7**
Pat	22,5	25,0	26,0	27,7	30,7	32,1	22,8	25,2	26,2	27,9	31,0	32,3	23,0	25,4	26,5	28,1	31,2	32,6
Qev	15,0	14,2	13,8	13,3	12,4	12,0	15,3	14,6	14,2	13,7	12,7	12,3	15,7	14,9	14,6	14,0	13,1	12,7
Dpev	16,8	15,1	14,4	13,3	11,5	10,8	17,7	15,9	15,2	14,1	12,2	11,5	18,6	16,7	16,0	14,8	12,9	12,1

0352T																		
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	18,7	16,7	15,8	14,6	12,5	11,7	19,8	17,6	16,8	15,5	13,3	12,5	20,9	18,7	17,8	16,4	14,2	13,3
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**	**82,1**	**105**	**99,2**	**96,9**	**93,3**	**87,1**	**84,5**
Pat	26,9	29,6	30,7	32,6	36,0	37,4	27,2	29,9	31,0	32,9	36,3	37,7	27,4	30,2	31,3	33,2	36,6	38,1
Qev	17,2	16,2	15,8	15,2	14,2	13,7	17,6	16,7	16,3	15,6	14,6	14,1	18,1	17,1	16,7	16,1	15,0	14,6
Dpev	22,1	19,7	18,8	17,4	15,0	14,1	23,2	20,8	19,8	18,3	15,9	15,0	24,4	21,9	20,9	19,3	16,9	15,9

0412T																		
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	14,5	12,8	12,2	11,2	9,67	9,06	15,3	13,6	12,9	11,9	10,3	9,65	16,2	14,4	13,7	12,7	10,9	10,3
Tev				**9**						**10**						**11**		
Pf	**112**	**106**	**103**	**99,5**	**92,6**	**89,8**	**115**	**109**	**106**	**102**	**95,3**	**92,5**	**118**	**112**	**109**	**105**	**98,1**	**95,2**
Pat	30,4	33,4	34,7	36,8	40,5	42,0	30,8	33,8	35,1	37,2	40,9	42,5	31,1	34,1	35,5	37,5	41,3	42,9
Qev	19,4	18,3	17,8	17,1	15,9	15,5	19,9	18,8	18,3	17,6	16,4	15,9	20,4	19,3	18,8	18,1	16,9	16,4
Dpev	17,1	15,3	14,5	13,4	11,6	10,9	18,1	16,1	15,3	14,2	12,3	11,6	19,0	17,0	16,2	15,0	13,0	12,3

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

0452T																		
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	17,7	15,6	14,8	13,6	11,6	10,8	18,7	16,5	15,7	14,4	12,3	11,5	19,8	17,5	16,6	15,2	13,0	12,1
Tev				**9**						**10**						**11**		
Pf	**124**	**117**	**114**	**109**	**101**	**97,4**	**127**	**120**	**117**	**112**	**104**	**100**	**131**	**123**	**120**	**115**	**106**	**103**
Pat	35,2	38,7	40,2	42,5	46,6	48,3	35,6	39,1	40,6	42,9	47,0	48,8	36,0	39,5	41,0	43,3	47,4	49,2
Qev	21,4	20,1	19,6	18,8	17,4	16,8	21,9	20,6	20,1	19,3	17,8	17,2	22,5	21,2	20,6	19,8	18,3	17,7
Dpev	20,8	18,4	17,5	16,1	13,7	12,8	21,9	19,4	18,4	16,9	14,5	13,6	23,1	20,4	19,4	17,8	15,3	14,3

0512T																		
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	16,7	14,9	14,2	13,1	11,2	10,5	17,7	15,8	15,0	13,8	11,9	11,1	18,7	16,7	15,9	14,6	12,5	11,7
Tev				**9**						**10**						**11**		
Pf	**142**	**134**	**131**	**125**	**116**	**112**	**146**	**138**	**134**	**129**	**119**	**115**	**150**	**141**	**138**	**132**	**122**	**118**
Pat	37,8	41,4	42,9	45,4	49,7	51,5	38,2	41,8	43,3	45,7	50,0	51,8	38,5	42,2	43,7	46,1	50,4	52,2
Qev	24,5	23,1	22,5	21,6	20,0	19,4	25,1	23,7	23,1	22,2	20,5	19,9	25,8	24,3	23,7	22,7	21,1	20,4
Dpev	19,8	17,6	16,7	15,4	13,2	12,4	20,8	18,5	17,6	16,2	13,9	13,0	21,9	19,5	18,5	17,1	14,6	13,7

0552T																		
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	22,0	19,5	18,5	17,0	14,5	13,5	23,3	20,6	19,6	17,9	15,3	14,2	24,6	21,8	20,6	18,9	16,1	15,0
Tev				**9**						**10**						**11**		
Pf	**158**	**149**	**145**	**139**	**128**	**124**	**162**	**153**	**149**	**142**	**131**	**127**	**167**	**157**	**152**	**146**	**135**	**130**
Pat	45,2	49,6	51,5	54,4	59,6	61,8	45,7	50,1	52,0	54,9	60,1	62,3	46,2	50,6	52,5	55,4	60,6	62,8
Qev	27,3	25,7	25,0	23,9	22,1	21,3	28,0	26,3	25,6	24,5	22,6	21,8	28,7	27,0	26,3	25,1	23,2	22,4
Dpev	26,0	23,0	21,8	20,0	17,0	15,8	27,3	24,2	22,9	21,0	17,9	16,6	28,7	25,4	24,1	22,1	18,7	17,4

0612T																		
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	26,4	23,2	21,9	20,0	16,9	15,7	27,9	24,5	23,2	21,2	17,9	16,6	29,5	25,9	24,4	22,3	18,8	17,5
Tev				**9**						**10**						**11**		
Pf	**173**	**162**	**158**	**151**	**138**	**133**	**177**	**166**	**162**	**154**	**142**	**137**	**182**	**170**	**165**	**158**	**145**	**140**
Pat	53,3	58,5	60,7	64,2	70,3	72,9	53,9	59,2	61,4	64,8	71,0	73,6	54,6	59,8	62,1	65,5	71,7	74,3
Qev	29,8	27,9	27,2	25,9	23,8	23,0	30,6	28,6	27,8	26,6	24,4	23,5	31,3	29,3	28,5	27,2	25,0	24,1
Dpev	31,0	27,2	25,7	23,5	19,8	18,4	32,6	28,6	27,0	24,7	20,8	19,3	34,3	30,1	28,4	25,9	21,8	20,2

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

0202T																		
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**43,2**	**47,3**	**53,1**	**55,9**	**60,7**	**70,0**	**42,9**	**47,2**	**53,0**	**55,8**	**60,4**	**69,4**	**42,7**	**47,1**	**52,8**	**55,5**	**60,0**	**68,5**
Qcd	7,47	8,17	9,18	9,67	10,5	12,1	7,43	8,17	9,18	9,66	10,5	12,0	7,42	8,17	9,17	9,63	10,4	11,9
Pcd	4,17	5,00	6,31	6,99	8,23	10,9	4,13	5,00	6,31	6,98	8,19	10,8	4,11	4,99	6,28	6,94	8,10	10,6
Pat	13,2	13,2	13,4	13,5	13,6	14,0	14,7	14,7	14,9	15,0	15,2	15,5	16,4	16,5	16,6	16,7	16,9	17,2
Ta	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**48**						**50**			
Pt	**42,7**	**47,0**	**52,5**	**55,1**	**59,4**	**67,5**	**-**	**46,9**	**52,3**	**54,8**	**58,9**	**66,7**	**-**	**46,9**	**52,1**	**54,5**	**58,5**	**66,2**
Qcd	7,43	8,17	9,13	9,58	10,3	11,7	-	8,16	9,10	9,53	10,2	11,6	-	8,16	9,07	9,49	10,2	11,5
Pcd	4,12	4,99	6,23	6,86	7,96	10,3	-	4,98	6,19	6,79	7,85	10,1	-	4,98	6,16	6,74	7,77	9,92
Pat	18,3	18,4	18,6	18,6	18,8	19,1	-	19,7	19,8	19,9	20,0	20,3	-	20,6	20,7	20,7	20,8	21,1

0252T																		
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	5,64	7,17	9,15	10,1	11,7	14,8	5,53	7,05	9,00	9,91	11,4	14,5	5,44	6,95	8,85	9,73	11,2	14,1
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**						**48**						**50**			
Pt	**48,9**	**55,3**	**62,2**	**65,2**	**69,7**	**77,7**	**-**	**55,1**	**61,9**	**64,7**	**69,0**	**76,6**	**-**	**55,0**	**61,6**	**64,3**	**68,6**	**75,9**
Qcd	8,50	9,61	10,8	11,3	12,1	13,5	-	9,59	10,8	11,3	12,0	13,3	-	9,57	10,7	11,2	11,9	13,2
Pcd	5,38	6,87	8,70	9,54	10,9	13,6	-	6,84	8,61	9,42	10,7	13,2	-	6,81	8,55	9,33	10,6	13,0
Pat	20,8	20,9	21,1	21,2	21,4	21,7	-	22,3	22,5	22,6	22,7	23,0	-	23,2	23,4	23,5	23,6	23,9

0302T																		
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	8,88	10,9	13,6	15,0	17,4	22,3	8,78	10,9	13,7	15,0	17,3	22,0	8,75	10,9	13,7	15,0	17,2	21,6
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**						**48**						**50**			
Pt	**62,3**	**69,4**	**77,5**	**81,0**	**86,6**	**96,8**	**-**	**69,3**	**77,3**	**80,7**	**86,2**	**96,1**	**-**	**69,3**	**77,1**	**80,5**	**85,9**	**95,7**
Qcd	10,8	12,1	13,5	14,1	15,1	16,8	-	12,1	13,4	14,0	15,0	16,7	-	12,1	13,4	14,0	14,9	16,7
Pcd	8,80	10,9	13,6	14,9	17,0	21,3	-	10,9	13,6	14,8	16,9	21,0	-	10,9	13,5	14,8	16,8	20,9
Pat	24,7	25,3	25,9	26,1	26,5	27,1	-	26,8	27,5	27,8	28,2	28,9	-	27,9	28,6	29,0	29,4	30,1

0352T																		
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	12,3	14,7	18,3	20,2	23,6	30,9	11,9	14,5	18,3	20,1	23,3	30,1	11,8	14,5	18,2	19,9	23,0	29,3
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**						**48**						**50**			
Pt	**72,4**	**80,1**	**89,3**	**93,5**	**100**	**112**	**-**	**80,1**	**89,1**	**93,0**	**99,4**	**111**	**-**	**80,2**	**88,9**	**92,8**	**99,0**	**111**
Qcd	12,6	13,9	15,5	16,2	17,4	19,5	-	13,9	15,5	16,2	17,3	19,4	-	14,0	15,5	16,1	17,2	19,3
Pcd	11,8	14,5	18,1	19,8	22,7	28,5	-	14,6	18,0	19,6	22,4	28,1	-	14,6	17,9	19,5	22,2	27,8
Pat	28,5	28,9	29,5	29,8	30,2	31,0	-	30,8	31,4	31,7	32,1	32,9	-	32,1	32,7	33,0	33,4	34,2

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m^3/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

0412T																		
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	8,85	11,1	14,3	15,8	18,4	23,9	8,67	11,0	14,2	15,6	18,2	23,3	8,68	11,0	14,1	15,5	17,9	22,7
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**						**48**						**50**			
Pt	**80,3**	**89,8**	**101**	**105**	**113**	**127**	**-**	**90,1**	**100**	**105**	**112**	**126**	**-**	**90,4**	**100**	**105**	**112**	**125**
Qcd	14,0	15,6	17,5	18,3	19,6	22,0	-	15,7	17,5	18,3	19,5	21,9	-	15,7	17,5	18,2	19,5	21,8
Pcd	8,90	11,1	14,0	15,3	17,6	22,2	-	11,2	14,0	15,2	17,4	21,8	-	11,3	13,9	15,2	17,3	21,6
Pat	32,5	33,0	33,6	33,9	34,4	35,3	-	35,2	35,8	36,0	36,5	37,4	-	36,7	37,3	37,5	38,0	38,9

0452T																		
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	12,2	14,9	18,8	20,8	24,3	31,7	12,0	14,8	18,7	20,6	23,9	30,8	11,8	14,7	18,5	20,3	23,5	29,8
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**						**48**						**50**			
Pt	**92,7**	**103**	**115**	**121**	**129**	**145**	**-**	**103**	**115**	**120**	**128**	**143**	**-**	**103**	**115**	**120**	**127**	**142**
Qcd	16,1	17,9	20,0	21,0	22,4	25,1	-	17,9	20,0	20,9	22,3	24,9	-	17,9	19,9	20,8	22,2	24,7
Pcd	11,8	14,7	18,3	20,0	23,0	28,8	-	14,7	18,2	19,9	22,7	28,2	-	14,7	18,1	19,7	22,5	27,8
Pat	36,4	36,9	37,6	37,9	38,4	39,3	-	39,3	39,9	40,2	40,7	41,6	-	41,0	41,6	41,9	42,4	43,3

0512T																		
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	10,3	13,3	17,3	19,1	22,2	28,4	10,3	13,3	17,1	18,9	21,9	27,8	10,4	13,3	16,9	18,6	21,5	27,1
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**						**48**						**50**			
Pt	**103**	**115**	**130**	**136**	**145**	**163**	**-**	**115**	**129**	**135**	**144**	**161**	**-**	**115**	**128**	**134**	**143**	**160**
Qcd	17,9	20,1	22,5	23,6	25,3	28,3	-	20,0	22,4	23,5	25,1	28,0	-	20,0	22,4	23,4	25,0	27,8
Pcd	10,5	13,3	16,7	18,4	21,1	26,4	-	13,2	16,6	18,2	20,8	25,9	-	13,2	16,5	18,0	20,6	25,5
Pat	40,5	41,2	42,0	42,3	42,8	43,9	-	43,8	44,6	44,9	45,4	46,4	-	45,6	46,4	46,7	47,2	48,1

0552T																		
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	15,4	19,2	24,5	27,1	31,6	40,8	15,3	19,1	24,2	26,7	31,0	39,7	15,3	19,0	23,9	26,3	30,3	38,5
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**						**48**						**50**			
Pt	**120**	**134**	**150**	**157**	**168**	**188**	**-**	**134**	**149**	**156**	**166**	**186**	**-**	**133**	**148**	**155**	**165**	**184**
Qcd	20,9	23,3	26,0	27,2	29,1	32,7	-	23,2	25,9	27,1	28,9	32,3	-	23,2	25,8	27,0	28,8	32,0
Pcd	15,3	18,9	23,6	25,8	29,6	37,2	-	18,8	23,4	25,5	29,2	36,4	-	18,8	23,3	25,3	28,9	35,8
Pat	46,9	47,3	48,0	48,4	48,9	50,1	-	50,3	51,0	51,3	51,9	53,0	-	52,4	53,1	53,4	53,9	55,0

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m^3/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

0612T																		
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	19,0	23,1	29,1	32,2	37,6	49,3	18,9	23,1	29,0	32,0	37,1	48,0	18,9	23,1	28,9	31,7	36,6	46,7
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**						**48**						**50**			
Pt	**134**	**148**	**165**	**173**	**185**	**207**	**-**	**148**	**165**	**172**	**183**	**205**	**-**	**148**	**164**	**171**	**183**	**204**
Qcd	23,4	25,8	28,7	30,0	32,1	36,0	-	25,8	28,6	29,9	31,9	35,7	-	25,8	28,6	29,8	31,8	35,5
Pcd	19,1	23,2	28,7	31,4	36,0	45,3	-	23,2	28,6	31,2	35,5	44,4	-	23,3	28,5	31,0	35,3	43,9
Pat	53,1	53,4	54,1	54,4	55,0	56,2	-	56,9	57,4	57,7	58,3	59,5	-	59,3	59,8	60,1	60,6	61,8

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m^3/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

0202T																		
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	3,51	4,58	5,97	6,63	7,75	9,98	3,63	4,66	6,01	6,66	7,76	9,99	3,75	4,72	6,02	6,64	7,72	9,92
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**						**48**						**50**			
Pt	**41,3**	**45,9**	**51,5**	**54,1**	**58,1**	**65,7**	**41,6**	**46,0**	**51,4**	**53,8**	**57,8**	**65,2**	**41,8**	**46,0**	**51,2**	**53,6**	**57,5**	**64,8**
Qcd	7,18	7,98	8,95	9,39	10,1	11,4	7,24	8,00	8,94	9,36	10,1	11,3	7,29	8,01	8,92	9,34	10,0	11,3
Pcd	3,86	4,76	6,00	6,60	7,63	9,76	3,93	4,79	5,97	6,56	7,56	9,63	3,97	4,80	5,95	6,52	7,50	9,52
Pat	17,8	17,8	18,0	18,1	18,2	18,5	19,1	19,1	19,2	19,3	19,4	19,7	20,0	20,0	20,1	20,2	20,3	20,5

0252T																		
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	5,07	6,65	8,61	9,52	11,0	13,9	5,07	6,59	8,49	9,38	10,9	13,8	5,10	6,55	8,38	9,24	10,7	13,5
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**						**48**						**50**			
Pt	**47,8**	**53,9**	**60,7**	**63,6**	**68,2**	**76,5**	**47,9**	**53,8**	**60,4**	**63,2**	**67,7**	**75,7**	**48,0**	**53,8**	**60,2**	**63,0**	**67,3**	**75,1**
Qcd	8,31	9,36	10,5	11,1	11,9	13,3	8,34	9,36	10,5	11,0	11,8	13,2	8,36	9,36	10,5	11,0	11,7	13,1
Pcd	5,14	6,52	8,27	9,09	10,5	13,1	5,17	6,52	8,21	9,00	10,3	12,9	5,20	6,52	8,17	8,94	10,2	12,7
Pat	20,2	20,3	20,5	20,6	20,8	21,1	21,6	21,7	21,9	22,0	22,1	22,4	22,6	22,7	22,8	22,9	23,0	23,3

0302T																		
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	8,77	11,6	15,1	16,7	19,4	24,7	8,84	11,6	15,0	16,6	19,2	24,2	8,96	11,6	14,8	16,3	18,8	23,8
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**						**48**						**50**			
Pt	**63,4**	**71,3**	**80,2**	**84,1**	**90,2**	**101**	**63,7**	**71,1**	**79,7**	**83,5**	**89,5**	**101**	**64,0**	**71,0**	**79,4**	**83,1**	**89,0**	**100**
Qcd	11,0	12,4	13,9	14,6	15,7	17,6	11,1	12,4	13,9	14,5	15,6	17,5	11,1	12,4	13,8	14,5	15,5	17,4
Pcd	9,12	11,5	14,6	16,1	18,5	23,3	9,24	11,5	14,5	15,9	18,2	23,0	9,33	11,5	14,4	15,7	18,1	22,8
Pat	24,6	25,2	25,8	26,1	26,4	27,1	26,0	26,7	27,5	27,7	28,2	28,9	27,0	27,8	28,6	28,9	29,4	30,1

0352T																		
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	11,2	15,1	19,9	22,1	25,8	32,9	11,3	15,0	19,6	21,7	25,2	32,2	11,5	14,9	19,3	21,3	24,7	31,4
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**						**48**						**50**			
Pt	**72,4**	**81,3**	**91,7**	**96,2**	**103**	**117**	**73,2**	**81,4**	**91,2**	**95,5**	**103**	**116**	**73,8**	**81,4**	**90,9**	**95,1**	**102**	**115**
Qcd	12,6	14,1	15,9	16,7	18,0	20,2	12,7	14,2	15,9	16,6	17,8	20,1	12,8	14,2	15,8	16,6	17,8	20,0
Pcd	11,9	15,0	19,0	20,9	24,2	30,7	12,1	15,0	18,8	20,7	23,9	30,3	12,4	15,1	18,7	20,5	23,6	30,0
Pat	29,0	29,5	30,1	30,4	30,9	31,7	30,8	31,4	32,0	32,3	32,8	33,7	32,1	32,7	33,3	33,7	34,1	35,1

Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m^3/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

0412T																		
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	9,56	12,2	15,8	17,5	20,5	26,7	9,37	12,0	15,4	17,1	20,0	25,8	9,35	11,8	15,1	16,7	19,4	24,9
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**						**48**						**50**			
Pt	**82,9**	**92,5**	**104**	**109**	**117**	**132**	**83,5**	**92,5**	**103**	**108**	**116**	**130**	**84,1**	**92,6**	**103**	**108**	**115**	**129**
Qcd	14,4	16,1	18,1	18,9	20,3	22,9	14,5	16,1	18,0	18,8	20,2	22,7	14,6	16,1	17,9	18,7	20,1	22,5
Pcd	9,49	11,8	14,9	16,4	18,9	24,0	9,65	11,8	14,8	16,2	18,6	23,5	9,80	11,9	14,7	16,1	18,4	23,2
Pat	32,7	33,1	33,8	34,1	34,6	35,6	34,9	35,3	35,9	36,2	36,7	37,7	36,5	36,8	37,4	37,7	38,2	39,2

0452T																		
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	12,0	14,9	18,9	21,0	24,5	32,0	11,9	14,7	18,7	20,7	24,1	31,1	11,8	14,6	18,5	20,4	23,6	30,2
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**						**48**						**50**			
Pt	**92,8**	**103**	**115**	**121**	**129**	**146**	**93,1**	**103**	**115**	**120**	**128**	**144**	**93,4**	**103**	**114**	**119**	**128**	**143**
Qcd	16,1	17,9	20,0	21,0	22,5	25,3	16,2	17,9	19,9	20,9	22,3	25,0	16,3	17,9	19,9	20,8	22,2	24,9
Pcd	11,9	14,6	18,3	20,0	23,1	29,2	12,0	14,6	18,1	19,8	22,7	28,6	12,1	14,6	18,1	19,7	22,5	28,2
Pat	36,4	36,9	37,6	37,9	38,4	39,4	38,8	39,3	39,9	40,2	40,7	41,7	40,5	41,0	41,6	41,9	42,4	43,3

0512T																		
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	11,2	14,1	18,1	20,0	23,4	30,3	11,2	14,0	17,8	19,6	22,8	29,4	11,1	13,8	17,5	19,2	22,2	28,4
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**						**48**						**50**			
Pt	**105**	**117**	**131**	**137**	**147**	**166**	**105**	**117**	**130**	**136**	**146**	**163**	**105**	**117**	**130**	**136**	**145**	**162**
Qcd	18,3	20,4	22,8	23,9	25,6	28,8	18,3	20,3	22,7	23,7	25,4	28,4	18,3	20,3	22,6	23,6	25,2	28,2
Pcd	11,1	13,7	17,2	18,8	21,6	27,3	11,0	13,6	17,0	18,6	21,3	26,6	11,0	13,6	16,9	18,4	21,0	26,2
Pat	40,7	41,3	42,0	42,4	42,9	44,0	43,3	43,9	44,6	45,0	45,5	46,5	45,1	45,7	46,5	46,8	47,3	48,2

0552T																		
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	15,0	18,5	23,4	25,9	30,3	39,5	14,9	18,4	23,2	25,6	29,8	38,5	14,9	18,4	23,0	25,3	29,3	37,4
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**						**48**						**50**			
Pt	**119**	**132**	**147**	**154**	**165**	**185**	**-**	**132**	**146**	**153**	**164**	**183**	**-**	**132**	**146**	**152**	**163**	**182**
Qcd	20,7	22,9	25,6	26,7	28,7	32,2	-	22,9	25,5	26,6	28,5	31,9	-	22,9	25,4	26,5	28,3	31,7
Pcd	15,0	18,3	22,8	25,0	28,7	36,2	-	18,3	22,6	24,7	28,3	35,5	-	18,3	22,5	24,6	28,0	35,0
Pat	46,8	47,3	47,9	48,3	48,8	49,9	-	50,3	50,9	51,2	51,8	52,8	-	52,4	53,0	53,3	53,8	54,9

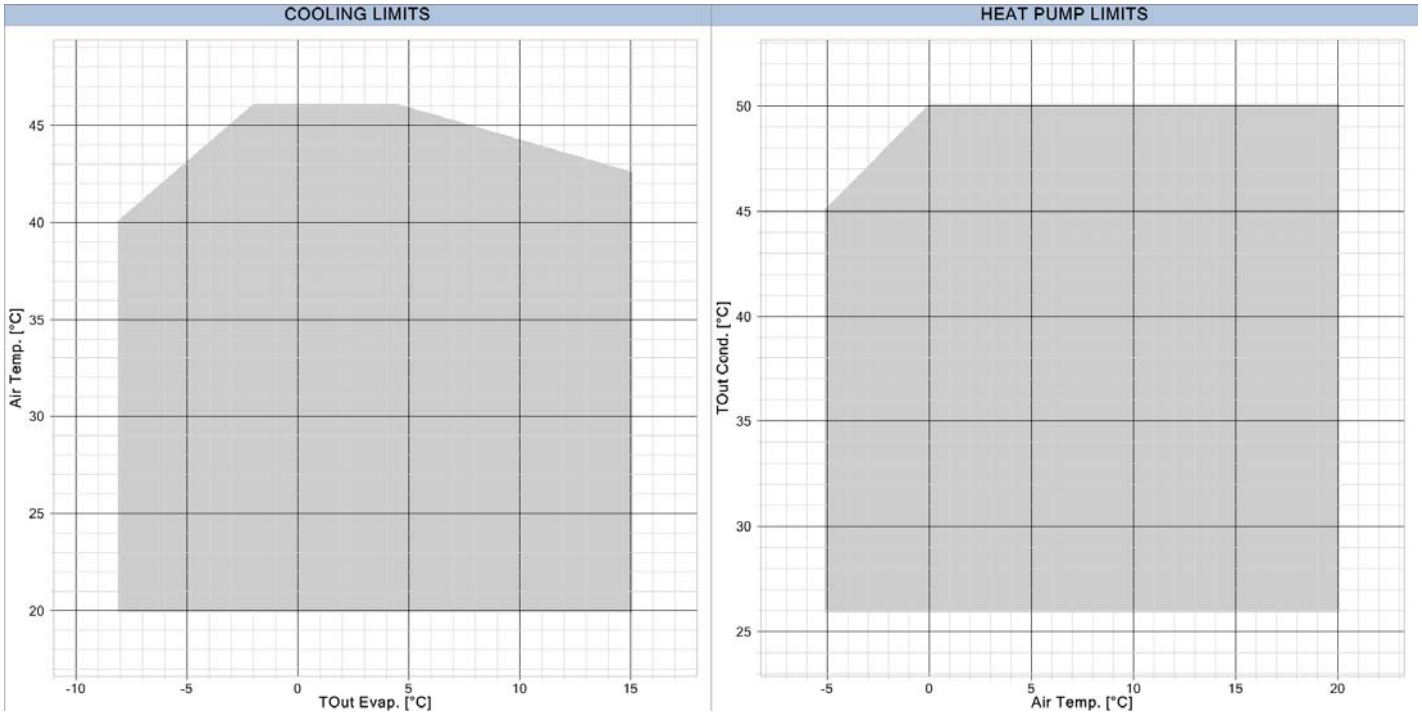
Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating 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

0612T																		
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	18,2	22,1	27,9	30,8	36,0	47,2	18,3	22,2	27,8	30,7	35,6	46,2	18,5	22,3	27,7	30,5	35,2	45,2
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**						**48**						**50**					
Pt	**133**	**146**	**162**	**169**	**181**	**204**	**-**	**146**	**162**	**169**	**180**	**202**	**-**	**146**	**161**	**168**	**180**	**201**
Qcd	23,2	25,4	28,2	29,4	31,5	35,5	-	25,4	28,1	29,4	31,4	35,2	-	25,5	28,1	29,3	31,3	35,0
Pcd	18,7	22,4	27,7	30,2	34,7	44,0	-	22,5	27,6	30,1	34,4	43,3	-	22,6	27,6	30,0	34,2	42,8
Pat	53,1	53,4	53,9	54,3	54,8	56,0	-	56,8	57,3	57,6	58,2	59,3	-	59,2	59,7	60,0	60,5	61,6

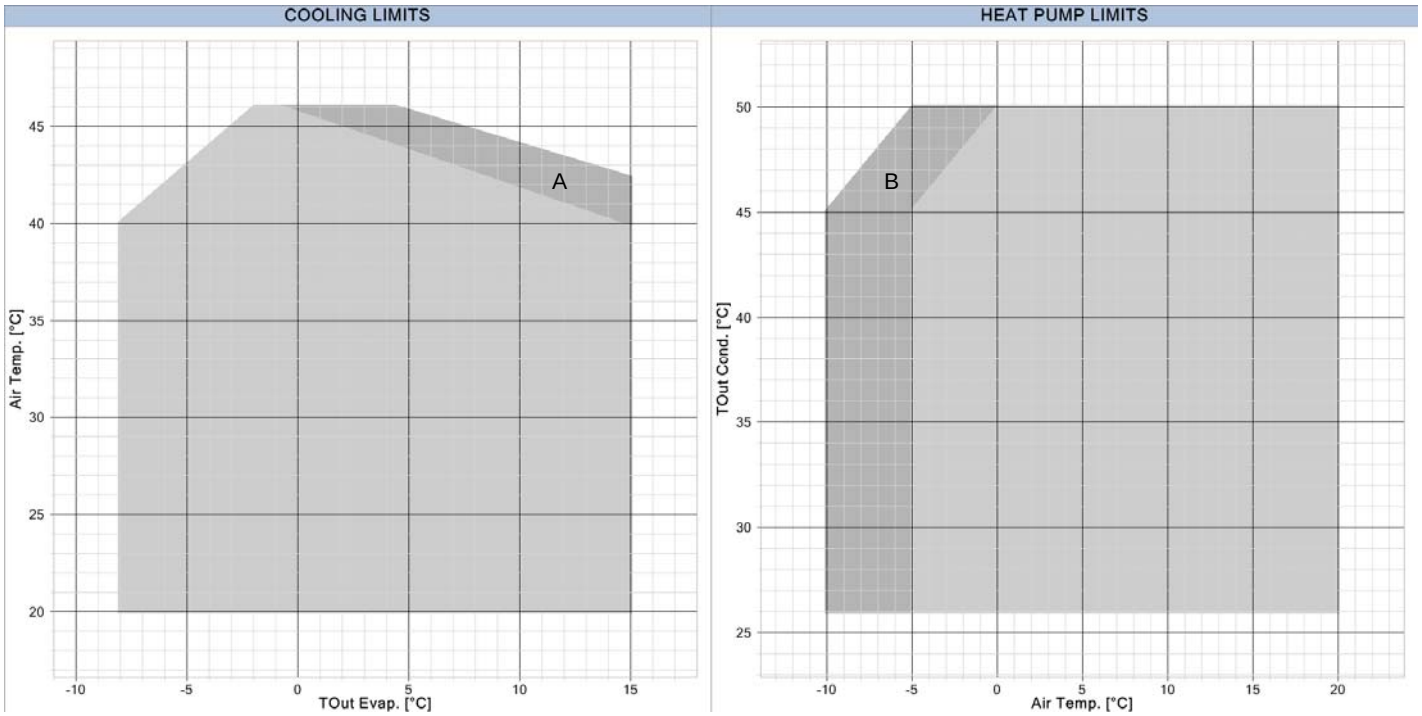
Ta [°C] - Air temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating 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

5. SELECTION LIMITS

/B - 0202T ÷ 0612T



/LN - 0202T ÷ 0612T



A - Operating limits in non-silent-running mode. In these conditions, ventilation is automatically increased to assu-re correct unit operation.

B - Limits with LT kit for low air temperatures

5.2 ETHYLENE GLYCOL MIXTURE

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

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

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

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

5.3 FOULING FACTORS

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

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

ff: fouling factors
f1 - f2: potential correction factors
fk1 - fk2: compressor power input correction factors

KE: minimum condenser outlet temperature increase
KC: maximum condenser outlet temperature decrease

6. HYDRAULIC DATA

6.1 Water flow and pressure drop

Water flow in the heat exchangers is given by: Q=Px0,86/Dt
Q: water flow (m3/h)
Dt: difference between inlet and outlet water temp. (°C)
P: heat exchanger capacity (kW)

SIZE	PLANT SIDE COLD HEAT EXCHANGER				PLANT SIDE HOT HEAT EXCHANGER			AUXILIARY SIDE HEAT EXCHANGER		
	K	Q min m^3/h	Q max m^3/h	C.a. 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
NECS-N /B 0202T	74,8	7,1	14,5	0,13	74,8	7,1	14,5	-	-	-
NECS-N /B 0252T	74,4	7,9	16,6	0,14	74,4	7,9	16,6	-	-	-
NECS-N /B 0302T	75,2	7,9	20,7	0,18	75,2	7,9	20,7	-	-	-
NECS-N /B 0352T	74,9	8,8	23,8	0,21	74,9	8,8	23,8	-	-	-
NECS-N /B 0412T	45,7	12,8	27	0,23	45,7	12,8	27	-	-	-
NECS-N /B 0452T	45,6	12,8	30,7	0,27	45,6	12,8	30,7	-	-	-
NECS-N /B 0512T	33	12,8	34,5	0,3	33	12,8	34,5	-	-	-
NECS-N /B 0552T	34,9	14,7	39,5	0,34	34,9	14,7	39,5	-	-	-
NECS-N /B 0612T	34,9	16,1	43,2	0,38	34,9	16,1	43,2	-	-	-
NECS-N /LN 0202T	74,8	7,1	14,5	0,13	74,8	7,1	14,5	-	-	-
NECS-N /LN 0252T	74,4	7,9	16,6	0,14	74,4	7,9	16,6	-	-	-
NECS-N /LN 0302T	75,2	7,9	20,7	0,18	75,2	7,9	20,7	-	-	-
NECS-N /LN 0352T	74,9	8,8	23,8	0,21	74,9	8,8	23,8	-	-	-
NECS-N /LN 0412T	45,7	12,8	27	0,23	45,7	12,8	27	-	-	-
NECS-N /LN 0452T	45,6	12,8	30,7	0,27	45,6	12,8	30,7	-	-	-
NECS-N /LN 0512T	33	12,8	34,5	0,3	33	12,8	34,5	-	-	-
NECS-N /LN 0552T	34,9	14,7	39,5	0,34	34,9	14,7	39,5	-	-	-
NECS-N /LN 0612T	34,9	16,1	43,2	0,38	34,9	16,1	43,2	-	-	-

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
XXXXXXXXXXXXXXX

7. HYDRONIC GROUPS (Optional)

The units can be supplied 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.

Available configurations:

CENTRIFUGAL PUMP
Hydronic kit with one 2-pole low-head pump
Hydronic kit with one 2-pole high-head pump
Hydronic kit with two 2-pole low-head pumps
Hydronic kit with two 2-pole high-head pumps

2-pole low head pump
Centrifugal electric pumps with hydraulic parts in AISI 304/316, insulated pump impeller and differential pressure switch on the evaporator. Pump shut-off valves fitted on both delivery and suction of a check valve for each pump installed. Hydronic kit equipped with safety valve, water pressure gauge and air vents.

2-pole high-head pump
All versions of the hydronic unit can be supplied with a high-head pump. In these cases, the pump features a two-pole motor even in the low noise versions.

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.

GENERAL CHARACTERISTICS

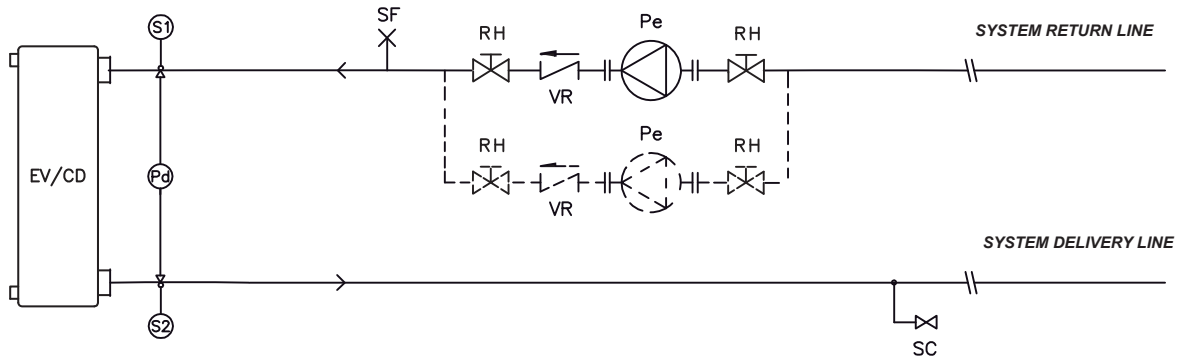
Water connections
In units without a pump, in the standard version, the water inlet and outlet connections in both the evaporator and the desuperheater are always flush with the machine.

Water-side mechanical filter (optional)
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.

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

CONFIGURATION OF HYDRONIC UNIT WITH 1/2 ORTHOGONAL PUMPS

CIRCUITS WITH 2 OPTIONAL PUMPS



The hydronic unit comprises:

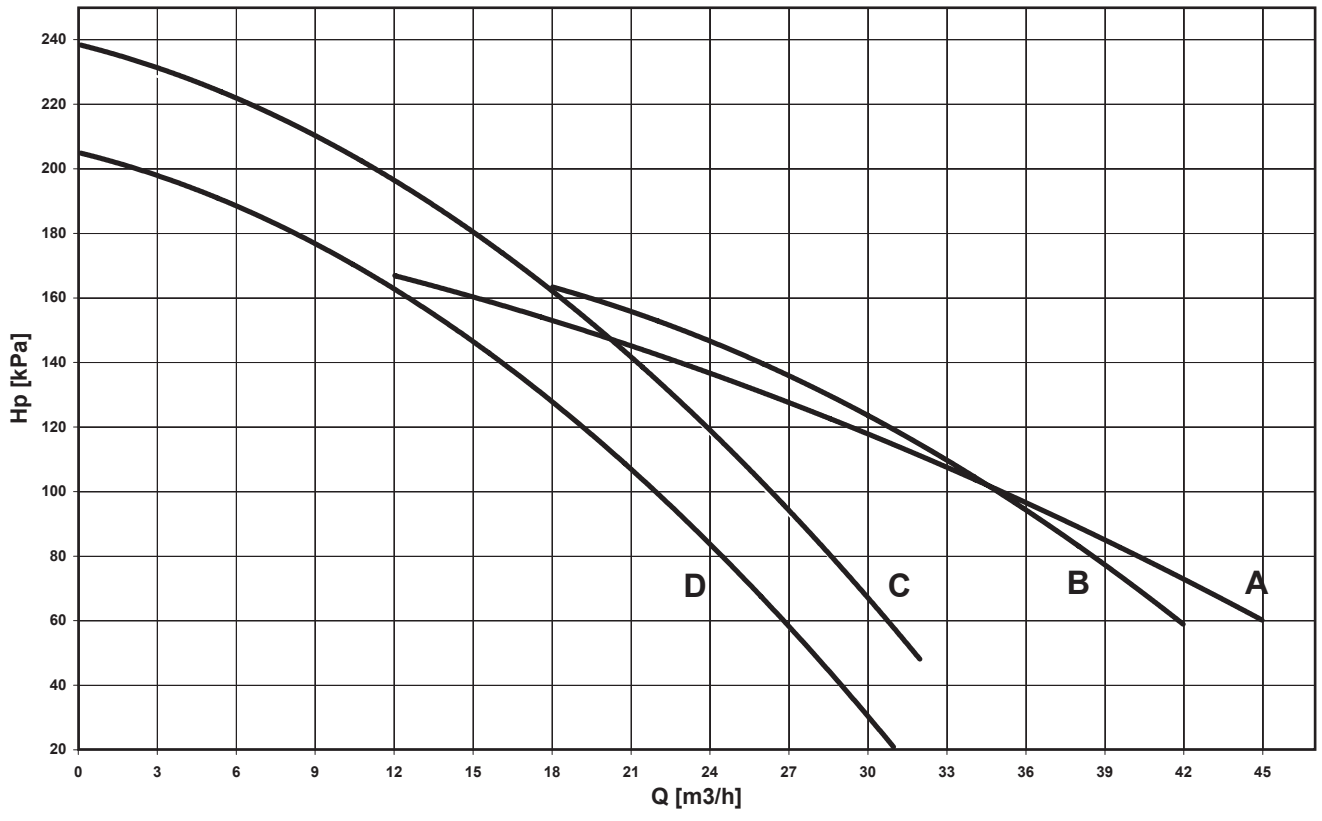
- EV User side exchanger
- PE Centrifugal pump
- Pd Differential pressure switch
- SC Discharge valve
- S1 Exchanger input water temperature probe
- S2 Exchanger outlet water temperature probe
- SF Air vent
- RH Check valves

2-POLE LOW HEAD- 1/2 PUMPS

	Pf (1) [kW]	**Q** (1) [m³/h]	**Pump Reference**	**F.L.I.** [kW]	**F.L.A.** [A]	**SA** [A]	**KP1**	**Dpu** [kPa]	**Hu** [kPa]
0202T	53.0	9.13	D	1,1	2,5	13,7	132,3	11,0	117
0252T	58.1	10.0	D	1,1	2,5	13,7	132,3	13,2	111
0302T	76.0	13.1	D	1,1	2,5	13,7	132,3	22,6	85
0352T	86.8	14.9	D	1,1	2,5	13,7	132,3	29,5	119
0412T	96.9	16.7	D	1,1	2,5	13,7	66,4	18,4	119
0452T	112	19.3	D	1,1	2,5	13,7	66,4	24,8	94
0512T	127	21.8	C	1,5	3,2	20,6	53,4	25,3	115
0552T	145	24.9	B	1,5	3,4	22,2	55,4	34,4	100
0612T	159	27.3	A	1,5	3,5	24,3	55,4	41,2	95

(1) Values refer to rated operating conditions
Pf Cooling capacity of unit
Q Evaporator water flow rate
F.L.I. Power absorbed by pump
F.L.A. Current absorbed by pump
SA Starting current by pump
KP1 Coefficients for calculating pressure drops
Unit with hydronic unit without network filter
Dpu Total pressure drop of hydronic group
Hu Working head

PUMP CHARACTERISTICS

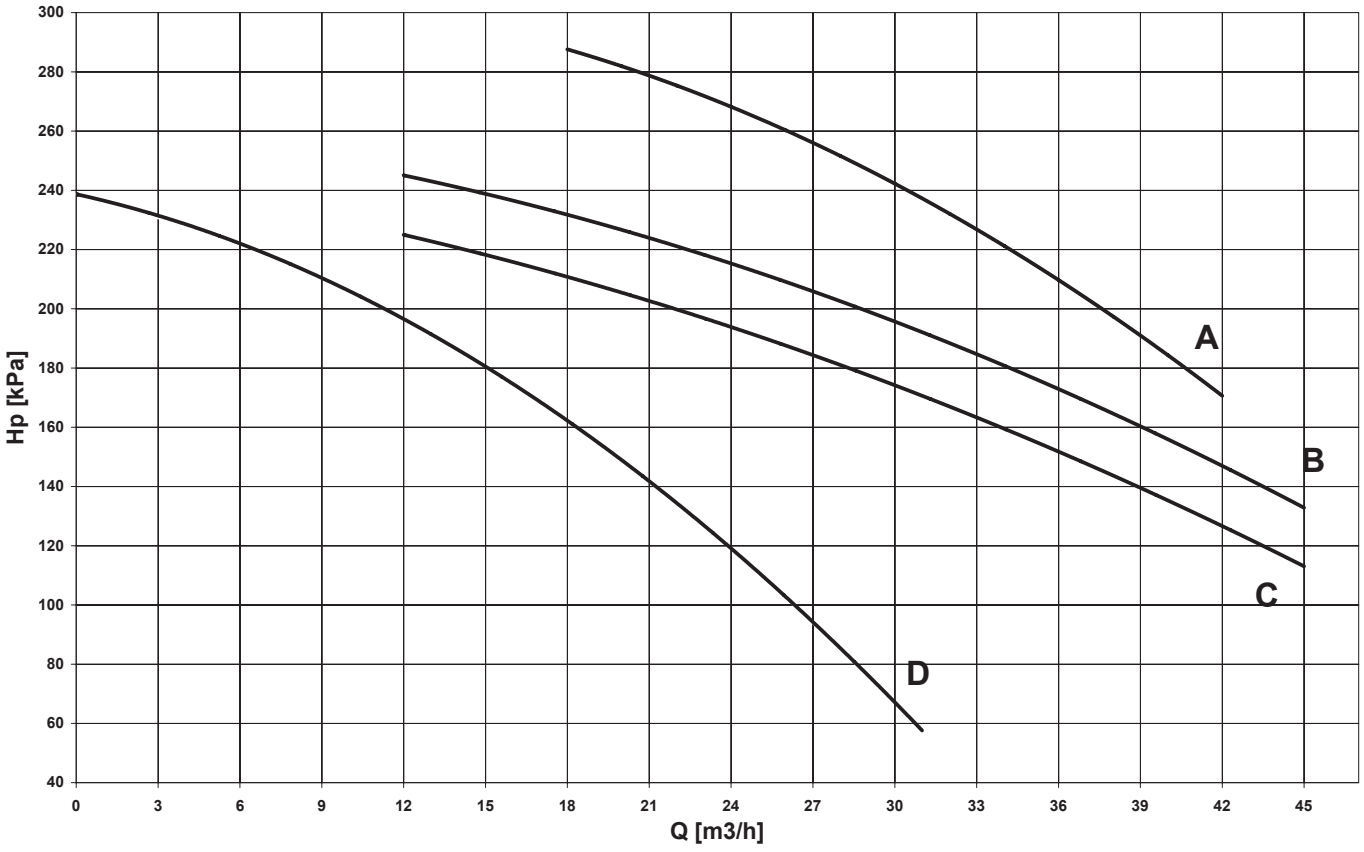


2-POLE HIGH HEAD - 1/2 PUMPS

	Pf (1) [kW]	**Q** (1) [m3/h]	**Pump Reference**	**F.L.I.** [kW]	**F.L.A.** [A]	**SA** [A]	**KP**	**Dpu** [kPa]	**Hu** [kPa]
0202T	53.0	9.13	D	1,5	3,2	20,6	132,3	11	197
0252T	58.1	10.0	D	1,5	3,2	20,6	132,3	13	191
0302T	76.0	13.1	C	2,2	4,8	37,3	132,3	23	201
0352T	86.8	14.9	C	2,2	4,8	37,3	132,3	29	190
0412T	96.9	16.7	C	2,2	4,8	37,3	66,4	18	197
0452T	112	19.3	B	3	5,6	57,6	66,4	25	205
0512T	127	21.8	B	3	5,6	57,6	53,4	25	198
0552T	145	24.9	A	3	6,3	51,6	55,4	34	234
0612T	159	27.3	A	3	6,3	51,6	55,4	41	216

(1) Values refer to rated operating conditions
Pf Cooling capacity of unit
Q Evaporator water flow rate
F.L.I. Power absorbed by pump
F.L.A. Current absorbed by pump
SA Starting current by pump
KP Coefficients for calculating pressure drops
Unit with hydronic unit without network filter
Dpu Total pressure drop of hydronic group
Hu Working head

PUMP CHARACTERISTICS



8. ELECTRICAL DATA

SIZE	Maximum values								
	Compressor				Fans (1)		Total (1) (2)		
	n	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]
0202T	2	2x11.8	2x20.4	2x118	0.25	1.1	25.1	47.4	145
0252T	2	2x13.2	2x22.6	2x118	0.25	1.1	27.9	51.8	147.2
0302T	2	2x17	2x30.5	2x173	0.25	1.1	35.5	67.6	210.1
0352T	2	17+22.3	30.5+36.1	173+225	0.25	1.1	40.8	73.2	262.1
0412T	2	2x22.3	2x36.1	2x225	0.25	1.1	46.6	81	269.9
0452T	2	22.3+27.4	36.1+45.8	225+272	0.25	1.1	51.7	90.7	316.9
0512T	2	2x27.4	2x45.8	2x272	0.25	1.1	57.3	102.6	328.8
0552T	2	27.4+35.8	45.8+58.9	272+310	0.25	1.1	65.7	115.7	366.8
0612T	2	2x35.8	2x58.9	2x310	0.25	1.1	74.1	128.8	379.9

F.L.I.: Full load power

F.L.A.: Full load current

L.R.A.: Locked rotor amperes for single compressor

S.A.: Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current

(1) (2) Safety values to be considered when cabling the unit for power supply and line-protections

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

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

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 mm and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.

(*) for the unit’s operating limits, see “selection limits” section

SIZE	Maximum values								
	Compressor				Fans (1)		Total (1) (2)		
	n	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]
0202T	2	2x11.8	2x20.4	2x118	0.16	0.7	24.6	45	142.6
0252T	2	2x13.2	2x22.6	2x118	0.16	0.7	27.4	49.4	144.8
0302T	2	2x17	2x30.5	2x173	0.16	0.7	35.3	66.6	209.1
0352T	2	17+22.3	30.5+36.1	173+225	0.25	1.1	41.3	75.4	264.3
0412T	2	2x22.3	2x36.1	2x225	0.25	1.1	46.6	81	269.9
0452T	2	22.3+27.4	36.1+45.8	225+272	0.25	1.1	51.7	90.7	316.9
0512T	2	2x27.4	2x45.8	2x272	0.25	1.1	57.3	102.6	328.8
0552T	2	27.4+35.8	45.8+58.9	272+310	0.25	1.1	65.7	115.7	366.8
0612T	2	2x35.8	2x58.9	2x310	0.25	1.1	74.1	128.8	379.9

F.L.I.: Full load power

F.L.A.: Full load current

L.R.A.: Locked rotor amperes for single compressor

S.A.: Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current

(1) (2) Safety values to be considered when cabling the unit for power supply and line-protections

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

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

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 mm and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.

(*) for the unit's operating limits, see "selection limits" section

9. 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)								
0202T	84	82	86	83	79	77	70	69	**85**
0252T	84	82	86	83	79	77	70	69	**85**
0302T	84	82	86	83	79	77	70	69	**85**
0352T	85	83	87	84	80	78	71	70	**86**
0412T	85	83	87	84	80	78	71	70	**86**
0452T	85	83	87	84	80	78	71	70	**86**
0512T	86	84	88	85	81	79	72	71	**87**
0552T	86	84	88	85	81	79	72	71	**87**
0612T	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)								
0202T	52	50	54	51	47	45	38	37	**53**
0252T	52	50	54	51	47	45	38	37	**53**
0302T	52	50	54	51	47	45	38	37	**53**
0352T	53	51	55	52	48	46	39	38	**54**
0412T	53	51	55	52	48	46	39	38	**54**
0452T	53	51	55	52	48	46	39	38	**54**
0512T	54	52	56	53	49	47	40	39	**55**
0552T	54	52	56	53	49	47	40	39	**55**
0612T	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

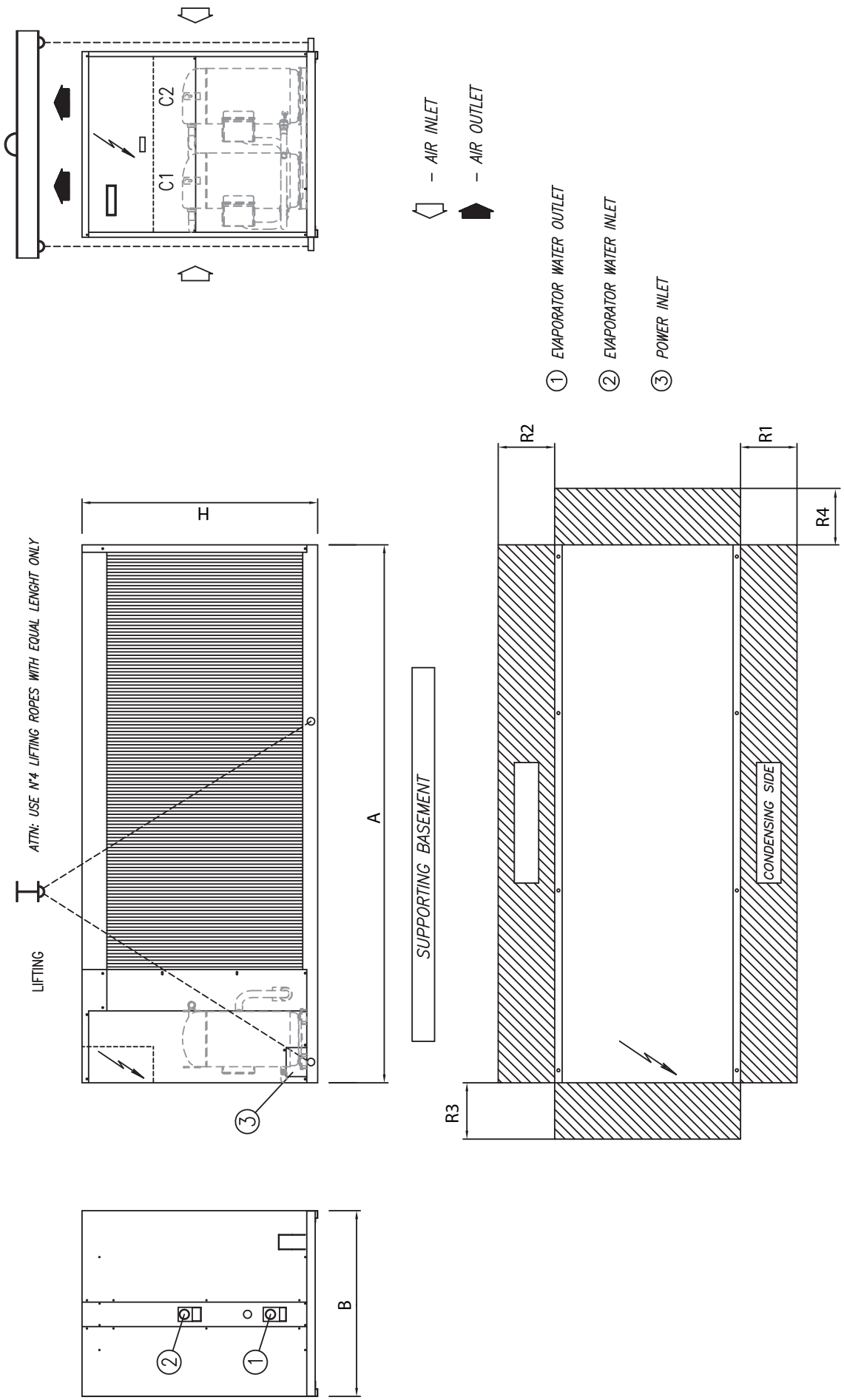
SOUND POWER									
SIZE	Octave band [Hz]								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB(A)								
0202T	81	79	82	79	74	70	62	60	**80**
0252T	81	79	82	79	74	70	62	60	**80**
0302T	82	80	83	80	75	71	63	61	**81**
0352T	82	80	84	81	77	75	68	67	**83**
0412T	82	80	84	81	77	75	68	67	**83**
0452T	82	80	84	81	77	75	68	67	**83**
0512T	83	81	85	82	78	76	69	68	**84**
0552T	83	81	85	82	78	76	69	68	**84**
0612T	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)								
0202T	49	47	50	47	42	38	30	28	**48**
0252T	49	47	50	47	42	38	30	28	**48**
0302T	50	48	51	48	43	39	31	29	**49**
0352T	50	48	52	49	45	43	36	35	**51**
0412T	50	48	52	49	45	43	36	35	**51**
0452T	50	48	52	49	45	43	36	35	**51**
0512T	51	49	53	50	46	44	37	36	**52**
0552T	51	49	53	50	46	44	37	36	**52**
0612T	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

10. DIMENSIONAL DRAWINGS



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

DIMENSIONAL DRAWINGS

SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				PLANT SIDE COLD HEAT EXCHANGER		PLANT SIDE HOT HEAT EXCHANGER		AUXILIARY SIDE HEAT EXCHANGER	
	A	B	H	WEIGHT	R1	R2	R3	R4	IN/OUT		IN/OUT		IN/OUT	
	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[mm]	TYPE	Ø	TYPE	Ø	TYPE	Ø
NECS-N /B 0202T	2195	1120	1420	645	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /B 0252T	2195	1120	1420	670	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /B 0302T	2195	1120	1420	710	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /B 0352T	2195	1120	1420	800	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /B 0412T	2745	1120	1420	985	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /B 0452T	2745	1120	1420	1030	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /B 0512T	3245	1120	1620	1175	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /B 0552T	3245	1120	1620	1220	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /B 0612T	3245	1120	1620	1265	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /LN 0202T	2195	1120	1420	645	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /LN 0252T	2195	1120	1420	670	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /LN 0302T	2745	1120	1420	795	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /LN 0352T	2745	1120	1620	935	1000	1000	600	600	GAS	2"	GAS	2"	-	-
NECS-N /LN 0412T	2745	1120	1620	1060	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /LN 0452T	2745	1120	1620	1065	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /LN 0512T	3245	1120	1620	1230	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /LN 0552T	3245	1120	1620	1220	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-
NECS-N /LN 0612T	3245	1120	1620	1265	1000	1000	600	600	GAS	2"1/2	GAS	2"1/2	-	-

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

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