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Technically better...

EWYD-BZ

Inverter air to water heat pumps

Product manual

SS (Standard Efficiency - Standard Noise) - Cooling Capacity from 250 to 580 kW
SL (Standard Efficiency - Low Noise) - Cooling Capacity from 250 to 570 kW

Performance according to EN14511.
Refrigerant: R134a

Code	CSS Rev. 9.1
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EWYD-BZ	R1.1.3

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EWYD-BZ

High part load efficiency McEnergy HPI "Extension" is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
Per European Seasonal Energy Efficiency Ratio (ESEER), chillers operate at design conditions only three percent of the time. As a result better part load efficiencies are required at part load conditions in a heat pump application. McEnergy HPI "Extension" maximizes chiller efficiency by optimizing single screw compressor operation dramatically reducing the electric power consumption when the motor speed slows.

Seasonal quietness Very low noise levels in part load conditions are achieved by varying the fan speed, but especially thanks to the variation of compressor frequency, which ensure the minimum noise level at all the time.

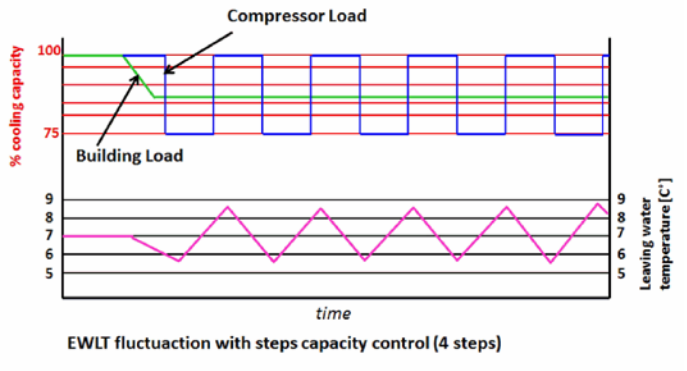
Quick comfort conditions The ability to vary the output power in direct relation to the cooling requirements of the system, allow the possibility to achieve building comfort conditions much faster at start-up.

Low starting current No current spikes at start-up. The starting current is always lower than current absorbed in the maximum operating conditions (FLA).

Power factor always > 0.95 McEnergy HPI "Extension" can operate always > 0.95 power factor, which can allows building owners avoid power factor penalties and decreases electrical losses in cable and transformers.

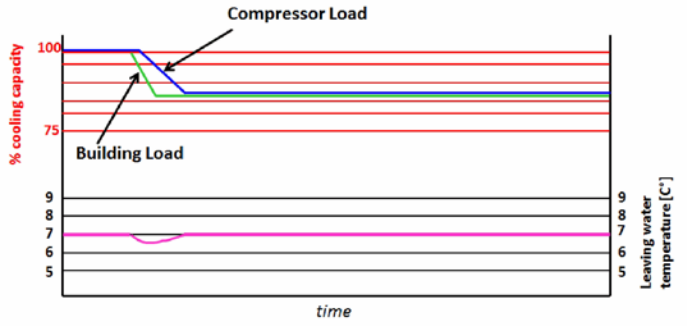
Redundancy McEnergy HPI "Extension" has two or three truly independent refrigerant circuits in every size, in order to assure maximum safety for any maintenance, whether planned or not.

Infinite capacity control Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5%. This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided with a stepless control.



EWLT fluctuaction with steps capacity control (4 steps)

With a compressor load step control in fact, the compressor capacity, at partial loads, will be too high or too low compared to the building cooling load. The result is an increase in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time.



EWLT fluctuaction with stepless capacity control

Units with stepless regulation offer benefits that the units with step regulation are unable to match.
Only a chiller with stepless regulation, is able to follow the system cooling demand at any time and to deliver chilled water at set-point.

Code requirements – Safety and observant of laws / directives Units are designed and manufactured in accordance with applicable selections of the following:

Construction of pressure vessel	97/23/EC (PED)
Machinery Directive	2006/42/EC
Low Voltage	2006/95/EC
Electromagnetic Compatibility	2004/108/EC
Electrical & Safety codes	EN 60204–1 / EN 60335-2-40
Manufacturing Quality Stds	UNI – EN ISO 9001:2004

Certifications Units are CE marked, complying with European directives in force, concerning manufacturing and safety. On request units can be produced complying with laws in force in non European countries (ASME, GOST, etc.), and with other applications, such as naval (RINA, etc.).

Versions "McEnergy HPI "Extension" is available in standard efficiency version (SE):

SE: Standard Efficiency
13 sizes to cover a range from 254 up to 583 kW (Cooling Capacity) and from 270 up to 615 kW (Heating Capacity), with an EER up to 2.87, an ESEER up to 4.29 and a COP up to 3.04.

The EER (Energy Efficiency Ratio) is the ratio of the Cooling Capacity to the Power Input of the unit. The Power Input includes: the power input for operation of the compressor, the power input of all control and safety devices, the power input for fans.

The COP (Coefficient of Performance) is the ratio of the heating capacity to the power input of the unit.

The ESEER (European Seasonal Energy Efficiency Ratio) is a weighed formula enabling to take into account the variation of EER with the load rate and the variation of air inlet condenser temperature.

$$ESEER = A \times EER100\% + B \times EER75\% + C \times EER50\% + D \times EER25\%$$

	A	B	C	D
K	0.03 (3%)	0.33 (33%)	0.41 (41%)	0.23 (23%)
T	35°C	30°C	25°C	20°C

The Seasonal Coefficient Of Performances (SCOP) is the seasonal efficiency of a unit in active heating mode without supplementary electric heaters; calculated at the following conditions: Tbivalent +2 °C, Tdesign -10 °C, Average ambient conditions, Ref. EN14825

Noise Configuration McEnergy HPI "Extension" is available in two different noise level configurations:

ST: Standard Noise
Condenser fan rotating at 920 rpm, rubber antivibration under compressor

LN: Low Noise
Condenser fan rotating at 715 rpm (920 rpm in heating mode), rubber antivibration under compressor, compressor sound enclosure.

Cabinet and structure The cabinet is made of galvanized steel sheet and painted to provide a high resistance to corrosion. Colour Ivory White (Munsell code 5Y7.5/1) (±RAL7044).The base frame has an eye-hook to lift the unit with ropes for an easy installation. The weight is uniformly distributed along the profiles of the base and this facilitates the arrangement of the unit.

Screw compressors with integrated oil separator The compressors are semi-hermetic, single-screw type with gate-rotor (made of carbon impregnated engineered composite material). Each compressor has one inverter managed by the unit microprocessor for infinitely modulating the capacity. An integrated high efficiency oil separator maximises the oil separation. Start is inverter type.

Refrigerant The compressors have been designed to operate with R-134a, ecological refrigerant with zero ODP (Ozone Depletion Potential) and very low GWP (Global Warming Potential), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator The units are equipped with a Direct Expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The external shell is covered with a 10mm closed cell insulation material. Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit (as standard).The external shell is covered with a 10mm closed cell insulation material. Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit (as standard).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Condenser fans The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motor is protected by circuit breaker installed inside the electrical panel as a standard. The motors are IP54.

Electronic expansion valve The unit is equipped with the most advanced electronic expansion valves to achieve precise control of refrigerant mass flow. As today's system requires improved energy efficiency, tighter temperature control, wider range of operating conditions and incorporate features like remote monitoring and diagnostics, the application of electronic expansion valves becomes mandatory.
Electronic expansion valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working with lower ΔP between high and low pressure side, than a thermostatic expansion valve. The electronic expansion valve allows the system to work with low condenser pressure (winter time) without any refrigerant flow problems and with a perfect chilled water leaving temperature control.

Refrigerant Circuit Each unit has 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Air Cooled Condenser
- Electronic expansion valve
- Evaporator
- Discharge line shut off valve
- Liquid line shut off valve
- Suction line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High and low pressure transducers

Electrical control panel Power and control are located in two sections of the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with Plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.

Power Section

The power section includes circuit breaker, compressors inverters, fans contactors, fans thermal overload relays, fans and control circuit transformer.

MicroTech II controller

MicroTech II C Plus controller is installed as standard; it can be used to modify unit set-points and check control parameters. A built-in display shows machine's operating status, programmable values, set-points, like temperatures and pressures of water, refrigerant and air. Device controls maximise the chiller energy efficiency and the reliability. A sophisticated software with predictive logic, select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions and maximise energy efficiency. The compressors are automatically rotated to ensure equal operating hours. MicroTech II C Plus protects critical components in response to external signals from its system sensors measuring: motor temperatures, refrigerant gas and oil pressures, correct phase sequence and evaporator.

Control section - main features

- Management of the compressor capacity, Inverter, slide and fans modulation.
- Chillers enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value,
  - high thermal load,
  - high evaporator entering water temperature (start-up).
- Display of evaporator entering/leaving water temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water cooled temperature regulation. Temperature tolerance = 0,1°C.
- Compressors and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Start up numbers and compressors working hours equalization.
- Optimized management of compressors load.
- Fans management according to condensing pressure.
- Automatic re-start in case of power supply interruption (adjustable).
- Soft Load.
- Start at high evaporator water temperature.
- Return Reset.
- AOT Reset (optional).
- Set point Reset (optional).

Safety device / logic for each refrigerant circuit

The following devices / logics are available.

- High pressure (pressure switch).
- Low pressure (transducer).
- Condensation fan Magneto-thermal.
- High Discharge Temperature on the compressor.
- Phase Monitor.
- Low pressure ratio.
- High oil pressure drop.
- Low oil pressure.

System security

The following securities are available.

- Phase monitor.
- Freeze protection.

Regulation type

Proportional + integral + derivative regulation on the evaporator leaving water output probe.

Condensing Pressure

The condensation can be carried out according to temperature or pressure or pressure ratio. The fans can be managed according to a 0/10 V modulating signal.

Intelligent Compressor Start Mode

Control software includes an intelligent compressor start mode that unloads the first compressor to 75% during the start of the second one, in order to reduce inrush current.

MicroTech II C Plus terminal

MicroTech II C Plus built-in terminal has the following features.

- 4-lines by 20-character liquid crystal display back lighting.
- Key-pad consisting of 6 keys.
- Memory to protect the data.
- General faults alarm relays.
- Password access to modify the setting.
- Service report displaying all running hours and general conditions.
- Alarm history memory to allow an easy fault analysis.

Supervising systems (on request)

MicroTech II C Plus remote control

MicroTech II C Plus is able to communicate to BMS (Building Management System) based on the most common protocols as:

- CARELNative
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4)
- Ethernet TCP/IP and SNM.

Standard Options (supplied on basic unit)

Inverter compressor starter - For low inrush current and reduced starting torque

Double setpoint - Dual leaving water temperature setpoints.

Fans circuit breaker with thermal overload relays - Safety devices against motor overloading and short circuit in addition to the normal protection envisaged by electrical windings.

Phase monitor - Device that monitors input voltage and stops the chiller in case of phase loss or wrong phase sequence.

Evaporator victaulic kit - Hydraulic joint with gasket for an easy and quick water connection.

10mm evaporator insulation - The external shell is covered with a 10mm closed cell insulation material.

Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.

Electronic expansion valve

Ambient outside temperature sensor and setpoint reset

Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.

Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.

Low pressure side manometers

Hour run meter

General fault contactor

Main switch interlock door

Options (on request)

MECHANICAL

Partial heat recovery - Plate to plate heat exchangers for hot water production.

Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required). Reccomended below +4°C

20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.

Condenser coil guards

Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.

Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.

Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.

High pressure side manometers

Low pressure side manometers

Water circulation pump (low or high lifting) – Not available for McEnergy HPI “Extension” SE 072.2÷167.3 LN. Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

Two water circulation pumps (low or high lifting) – Not available for McEnergy HPI “Extension” SE 072.2÷167.3 LN. Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.

Double pressure relief valve with diverter

Evaporator right water connections

ELECTRICAL / CONTROL

Under / Over voltage control - Electronic device that monitors and displays input voltage, and stops the chiller in case of phase loss, wrong phase sequence, or voltage exceeding minimum and maximum allowed values.

Energy meter - This device allows to measure the energy absorbed by the chiller during its life. It is installed inside the control box mounted on a DIN rail and show on a digital display: Line-to-Line Voltage, Phase and Average Current, Active and Reactive Power, Active Energy, Frequency.

Current limit - To limit maximum absorbed current of the unit whenever is required

Fan speed regulation – To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.

Fan Silent Mode - The microprocessor clock switches the fan at low speed according to the client setting (i.e. Night & Day), providing that the ambient temperature/condensing pressure is allowing the speed change. It allows a perfect condensing control down to –10°C.

Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).

Setpoint reset, Demand limit and Alarm from external device - Setpoint Reset: The leaving water temperature set-point can be overwritten with an external 4-20mA, through the ambient temperature, or through the evaporator water temperature ΔT. Demand Limit: Chiller capacity can be limited through an external 4-20mA signal or via network. Alarm from external device: The unit controller is able to receive an external alarm signal. The user can decide whether this alarm signal will stop the unit or not.

Nordic kit

INSTALLATION

Rubber anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal to reduce the vibrations when the unit is floor mounted.

Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

External tank without cabinet (500 L)

External tank without cabinet (1000 L)

External tank with cabinet (500 L)

External tank with cabinet (1000 L)

OTHER

Container Kit

Witness test

Transport kit

Condenser coil protection panel - Wooden panels protecting the coils against possible damage are installed for shipment.

Machine type

EWA	= Air cooled chiller cool. only
EWY	= Air cooled chiller heat pump
ERA	= Air cooled condensing unit

Refrigerant

D	= R-134a
P	= R-407C
Q	= R-410A

Capacity class in kW (Cooling)

Always 3-digit code

Model series

A, B, …..	… major modification

Inverter

Z	= Inverter

Efficiency level

S	= Standard Efficiency

Sound level

S	= Standard sound
L	= Low sound

EWYD BZ-SS

MODEL		250	270	290	320	340	370	380	410
Capacity - Cooling (1)	kW	253	272	291	323	337	363	380	411
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	13,0	13,0	13,0	13,0	13,0	13,0	13,0	13,0
Unit power input - Cooling (1)	kW	91,3	101	110	117	125	135	144	154
EER (1)		2,77	2,70	2,65	2,75	2,69	2,68	2,63	2,66
ESEER		3,93	3,92	3,89	3,95	3,89	3,90	3,82	3,91
IPLV		4,58	4,62	4,62	4,75	4,64	4,71	4,67	4,73
CASING									
Colour (2)		IW	IW	IW	IW	IW	IW	IW	IW
Material (2)		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS									
Height	mm	2335	2335	2335	2335	2335	2335	2335	2335
Width	mm	2254	2254	2254	2254	2254	2254	2254	2254
Length	mm	3547	3547	3547	4428	4428	4428	4428	5329
WEIGHT									
Unit Weight	kg	3410	3455	3500	3870	3870	3940	4010	4390
Operating Weight	kg	3550	3595	3640	4010	4010	4068	4138	4518
WATER HEAT EXCHANGER									
Type (3)		S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
Water Volume	l	138	138	138	133	133	128	128	128
Nominal water flow rate	l/s	12,1	13,0	13,9	15,5	16,2	17,4	18,2	19,7
Nominal Water pressure drop	kPa	40	46	44	50	55	60	65	74
Insulation material (4)		CC	CC	CC	CC	CC	CC	CC	CC
AIR HEAT EXCHANGER									
Type (5)		HFP	HFP	HFP	HFP	HFP	HFP	HFP	HFP
FAN									
Type (6)		DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Drive (7)		DOL	DOL	DOL	DOL	DOL	DOL	DOL	DOL
Diameter	mm	800	800	800	800	800	800	800	800
Nominal air flow	l/s	31729	31422	31115	42306	42306	42337	41487	52882
Quantity	No.	6	6	6	8	8	8	8	10
Speed	rpm	900	900	900	900	900	900	900	900
Motor input	kW	10,5	10,5	10,5	14,0	14,0	14,0	14,0	17,5
COMPRESSOR									
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	26	26	26	26	26	26	26	26
Quantity	No.	2	2	2	2	2	2	2	2
SOUND LEVEL									
Sound Power - Cooling	dB(A)	101	101	101	101	101	101	101	102
Sound Pressure - Cooling (8)	dB(A)	82	82	82	82	82	82	82	83
REFRIGERANT CIRCUIT									
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	86	88	86	92	93	93	94	100
N. of circuits	No.	2	2	2	2	2	2	2	2
PIPING CONNECTIONS									
Evaporator water inlet/outlet		139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm

Fluid: Water
(1) Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;
(2) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; (3) PHE: Plate Heat Exchanger --- S&T: Single Pass Shell & Tube
(4) CC: Closed Cell; (5) HFP: High efficiency fin and tube type with integral subcooler
(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.
*** If value is "Italic-Red Color" please contact factory*

EWYD BZ-SS

MODEL		440	460	510	520	580
Capacity - Cooling (1)	kW	433	455	502	519	580
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	13,0	9,0	9,0	9,0	9,0
Unit power input - Cooling (1)	kW	165	163	182	189	218
EER (1)		2,62	2,79	2,76	2,74	2,67
ESEER		3,89	4,18	4,01	4,01	3,93
IPLV		4,69	4,85	4,89	4,85	4,78
CASING						
Colour (2)		IW	IW	IW	IW	IW
Material (2)		GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS						
Height	mm	2335	2280	2280	2280	2280
Width	mm	2254	2254	2254	2254	2254
Length	mm	5329	6659	6659	6659	6659
WEIGHT						
Unit Weight	kg	4390	5015	5495	5735	5735
Operating Weight	kg	4518	5255	5724	5964	5953
WATER HEAT EXCHANGER						
Type (3)		S&T	S&T	S&T	S&T	S&T
Water Volume	l	128	240	229	229	218
Nominal water flow rate	l/s	20,8	21,8	24,1	24,9	27,8
Nominal Water pressure drop	kPa	80	47	85	91	61
Insulation material (4)		CC	CC	CC	CC	CC
AIR HEAT EXCHANGER						
Type (5)		HFP	HFP	HFP	HFP	HFP
FAN						
Type (6)		DPT	DPT	DPT	DPT	DPT
Drive (7)		DOL	DOL	DOL	DOL	DOL
Diameter	mm	800	800	800	800	800
Nominal air flow	l/s	52882	63458	62640	61652	62231
Quantity	No.	10	12	12	12	12
Speed	rpm	900	900	900	900	900
Motor input	kW	17,5	21,0	21,0	21,0	21,0
COMPRESSOR						
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	26	39	39	39	39
Quantity	No.	2	2	3	3	3
SOUND LEVEL						
Sound Power - Cooling	dB(A)	102	104	104	104	104
Sound Pressure - Cooling (8)	dB(A)	83	84	84	84	84
REFRIGERANT CIRCUIT						
Refrigerant type		R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	100	141	141	141	147
N. of circuits	No.	2	3	3	3	3
PIPING CONNECTIONS						
Evaporator water inlet/outlet		139.7 mm	219.1 mm	219.1 mm	219.1 mm	219.1 mm

Fluid: Water
(1) Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;
(2) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; (3) PHE: Plate Heat Exchanger --- S&T: Single Pass Shell & Tube
(4) CC: Closed Cell; (5) HFP: High efficiency fin and tube type with integral subcooler
(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.
*** If value is "Italic-Red Color" please contact factory*

EWYD BZ-SL

MODEL		250	270	290	320	330	360	370	400
Capacity - Cooling (1)	kW	247	265	290	315	330	353	370	401
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	13,0	13,0	13,0	13,0	13,0	13,0	13,0	13,0
Unit power input - Cooling (1)	kW	89,5	99,5	110	115	123	134	144	151
EER (1)		2,76	2,66	2,62	2,75	2,68	2,64	2,57	2,66
ESEER		4,06	4,04	4,03	4,17	4,09	4,04	4,01	4,06
IPLV		4,90	4,96	4,91	5,17	5,08	5,12	5,06	5,22
CASING									
Colour (2)		IW	IW	IW	IW	IW	IW	IW	IW
Material (2)		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS									
Height	mm	2335	2335	2335	2335	2335	2335	2335	2335
Width	mm	2254	2254	2254	2254	2254	2254	2254	2254
Length	mm	3547	3547	3547	4428	4428	4428	4428	5329
WEIGHT									
Unit Weight	kg	3750	3795	3840	4210	4210	4280	4350	4730
Operating Weight	kg	3888	3933	3978	4343	4343	4408	4478	4858
WATER HEAT EXCHANGER									
Type (3)		S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
Water Volume	l	138	138	138	133	133	128	128	128
Nominal water flow rate	l/s	11,8	12,7	13,9	15,1	15,8	16,9	17,7	19,2
Nominal Water pressure drop	kPa	38	44	42	48	53	57	62	71
Insulation material (4)		CC	CC	CC	CC	CC	CC	CC	CC
AIR HEAT EXCHANGER									
Type (5)		HFP	HFP	HFP	HFP	HFP	HFP	HFP	HFP
FAN									
Type (6)		DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Drive (7)		DOL	DOL	DOL	DOL	DOL	DOL	DOL	DOL
Diameter	mm	800	800	800	800	800	800	800	800
Nominal air flow	l/s	24432	24264	24095	32576	32576	32628	32127	40720
Quantity	No.	6	6	6	8	8	8	8	10
Speed	rpm	700	700	700	700	700	700	700	700
Motor input	kW	4,7	4,7	4,7	6,3	6,3	6,3	6,3	7,8
COMPRESSOR									
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	26	26	26	26	26	26	26	26
Quantity	No.	2	2	2	2	2	2	2	2
SOUND LEVEL									
Sound Power - Cooling	dB(A)	94	94	94	95	95	95	95	95
Sound Pressure - Cooling (8)	dB(A)	76	76	76	76	76	76	76	76
REFRIGERANT CIRCUIT									
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	86	88	86	92	93	93	94	100
N. of circuits	No.	2	2	2	2	2	2	2	2
PIPING CONNECTIONS									
Evaporator water inlet/outlet		139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm	139.7 mm

Fluid: Water
(1) Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;
(2) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; (3) PHE: Plate Heat Exchanger --- S&T: Single Pass Shell & Tube
(4) CC: Closed Cell; (5) HFP: High efficiency fin and tube type with integral subcooler
(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.
*** If value is "Italic-Red Color" please contact factory*

EWYD BZ-SL

MODEL		430	450	490	510	570
Capacity - Cooling (1)	kW	423	446	490	507	565
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	13,0	9,0	9,0	9,0	9,0
Unit power input - Cooling (1)	kW	163	158	177	186	216
EER (1)		2,59	2,83	2,77	2,73	2,61
ESEER		4,02	4,18	4,16	4,10	3,98
IPLV		5,13	5,07	5,03	4,99	4,90
CASING						
Colour (2)		IW	IW	IW	IW	IW
Material (2)		GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS						
Height	mm	2335	2280	2280	2280	2280
Width	mm	2254	2254	2254	2254	2254
Length	mm	5329	6659	6659	6659	6659
WEIGHT						
Unit Weight	kg	4730	5525	6005	6245	6245
Operating Weight	kg	4858	5765	6234	6474	6463
WATER HEAT EXCHANGER						
Type (3)		S&T	S&T	S&T	S&T	S&T
Water Volume	l	128	240	229	229	218
Nominal water flow rate	l/s	20,3	21,4	23,5	24,3	27,1
Nominal Water pressure drop	kPa	77	45	82	87	58
Insulation material (4)		CC	CC	CC	CC	CC
AIR HEAT EXCHANGER						
Type (5)		HFP	HFP	HFP	HFP	HFP
FAN						
Type (6)		DPT	DPT	DPT	DPT	DPT
Drive (7)		DOL	DOL	DOL	DOL	DOL
Diameter	mm	800	800	800	800	800
Nominal air flow	l/s	40720	48863	48415	47732	48191
Quantity	No.	10	12	12	12	12
Speed	rpm	700	700	700	700	700
Motor input	kW	7,8	9,4	9,4	9,4	9,4
COMPRESSOR						
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	26	39	39	39	39
Quantity	No.	2	2	3	3	3
SOUND LEVEL						
Sound Power - Cooling	dB(A)	95	97	97	97	97
Sound Pressure - Cooling (8)	dB(A)	76	77	77	77	77
REFRIGERANT CIRCUIT						
Refrigerant type		R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	100	141	141	141	147
N. of circuits	No.	2	3	3	3	3
PIPING CONNECTIONS						
Evaporator water inlet/outlet		139.7 mm	219.1 mm	219.1 mm	219.1 mm	219.1 mm

Fluid: Water
(1) Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;
(2) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; (3) PHE: Plate Heat Exchanger --- S&T: Single Pass Shell & Tube
(4) CC: Closed Cell; (5) HFP: High efficiency fin and tube type with integral subcooler
(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.
*** If value is "Italic-Red Color" please contact factory*

EWYD BZ-SS

MODEL		250	270	290	320	340	370	380	410
Capacity - Heating *	kW	271	298	325	334	350	380	412	445
Unit power input - Heating *	kW	91,4	100	108	118	126	133	143	157
COP *	---	2,96	2,97	3,00	2,82	2,78	2,85	2,88	2,83
SCOP **	---	2,60	2,62	2,66	2,48	2,48	2,49	0,00	2,47
HEAT EXCHANGER - EVAPORATOR									
Nominal water flow rate	l/s	13,1	14,4	15,7	16,1	16,9	18,3	19,8	21,4
Nominal Water pressure drop	kPa	30	35	52	37	40	45	51	59

EWYD BZ-SS

MODEL		440	460	510	520	580			
Capacity - Heating *	kW	465	477	533	561	618			
Unit power input - Heating *	kW	167	165	178	186	208			
COP *	---	2,79	2,88	2,99	3,01	2,97			
SCOP **	---	2,47	2,55	2,64	2,66	2,62			
HEAT EXCHANGER - EVAPORATOR									
Nominal water flow rate	l/s	22,4	23,0	25,6	27,0	29,7			
Nominal Water pressure drop	kPa	64	42	63	69	59			

EWYD BZ-SL

MODEL		250	270	290	320	330	360	370	400
Capacity - Heating *	kW	271	298	325	334	350	380	412	445
Unit power input - Heating *	kW	91,4	100	108	118	126	133	143	157
COP *	---	2,96	2,97	3,00	2,82	2,78	2,85	2,88	2,83
SCOP **	---	2,60	2,62	2,66	2,48	2,49	2,49	2,52	2,47
HEAT EXCHANGER - EVAPORATOR									
Nominal water flow rate	l/s	13,1	14,4	15,7	16,1	16,9	18,3	19,8	21,4
Nominal Water pressure drop	kPa	30	35	52	37	40	45	51	59

EWYD BZ-SL

MODEL		430	450	490	510	570			
Capacity - Heating *	kW	465	477	533	561	618			
Unit power input - Heating *	kW	167	165	178	186	208			
COP *	---	2,79	2,88	2,99	3,01	2,97			
SCOP **	---	2,47	2,55	2,64	2,66	2,62			
HEAT EXCHANGER - EVAPORATOR									
Nominal water flow rate	l/s	22,4	23,0	25,6	27,0	29,7			
Nominal Water pressure drop	kPa	64	42	63	69	59			

Fluid: Water
** Heating capacity, unit power input and COP are based on the following conditions: air exchanger 7,0 - 90% °C; water exchanger 50,0/45,0, unit at full load operation;*
*** SCOP is based on the following conditions: Tbivalent +2 °C, Tdesign -10 °C, Average ambient conditions, Ref. EN14825*

EWYD BZ-SS

MODEL		250	270	290	320	340	370	380	410
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3	3	3
Frequency	Hz	50	50	50	50	50	50	50	50
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
UNIT									
Maximum starting current	A	150	150	150	181	204	204	204	224
Nominal running current cooling	A	137	150	164	176	188	202	214	229
Maximum running current	A	211	211	212	254	288	288	288	316
Maximum current for wires sizing	A	211	211	212	254	288	288	288	316
FANS									
Nominal running current cooling	A	24	24	24	32	32	32	32	40
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3	3	3
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
Maximum running current	A	94 94	94 94	94 94	94 128	128 128	128 128	128 128	128 148
Starting method	---	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD

EWYD BZ-SS

MODEL		440	460	510	520	580			
POWER SUPPLY									
Phases	Nr	3	3	3	3	3			
Frequency	Hz	50	50	50	50	50			
Voltage	V	400	400	400	400	400			
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%			
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%			
UNIT									
Maximum starting current	A	238	245	300	323	323			
Nominal running current cooling	A	244	246	270	281	322			
Maximum running current	A	336	329	398	432	432			
Maximum current for wires sizing	A	336	329	398	432	432			
FANS									
Nominal running current cooling	A	40	48	48	48	48			
COMPRESSORS									
Phases	Nr	3	3	3	3	3			
Voltage	V	400	400	400	400	400			
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%			
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%			
Maximum running current	A	148 148	94 94 94	128 128 94	128 128 128	128 128 128			
Starting method	---	VFD	VFD	VFD	VFD	VFD			

Fluid: Water
Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
Maximum starting current: starting current of biggest compressor + current of the other compressors at maximum load + fans current at maximum load. In case of inverter driven units, no inrush current at start up is experienced.
Nominal current in cooling mode is referred to the following conditions: evaporator 12/7°C; ambient 35°C; compressors + fans current.
Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
Maximum unit current for wires sizing is based on minimum allowed voltage
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

EWYD BZ-SL

MODEL		250	270	290	320	330	360	370	400
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3	3	3
Frequency	Hz	50	50	50	50	50	50	50	50
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
UNIT									
Maximum starting current	A	145	146	146	176	199	199	199	217
Nominal running current cooling	A	134	148	163	171	184	199	212	224
Maximum running current	A	202	203	203	243	277	277	277	302
Maximum current for wires sizing	A	202	203	203	243	277	277	277	302
FANS									
Nominal running current cooling	A	16	16	16	21	21	21	21	26
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3	3	3
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
Maximum running current	A	93 93	94 94	94 94	94 128	128 128	128 128	128 128	128 148
Starting method	---	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD

EWYD BZ-SL

MODEL		430	450	490	510	570			
POWER SUPPLY									
Phases	Nr	3	3	3	3	3			
Frequency	Hz	50	50	50	50	50			
Voltage	V	400	400	400	400	400			
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%			
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%			
UNIT									
Maximum starting current	A	231	234	288	311	305			
Nominal running current cooling	A	240	238	263	275	319			
Maximum running current	A	322	313	381	415	406			
Maximum current for wires sizing	A	322	313	381	415	406			
FANS									
Nominal running current cooling	A	26	31	31	31	31			
COMPRESSORS									
Phases	Nr	3	3	3	3	3			
Voltage	V	400	400	400	400	400			
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%			
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%			
Maximum running current	A	148 148	94 94 94	128 128 94	128 128 128	125 125 125			
Starting method	---	VFD	VFD	VFD	VFD	VFD			

Fluid: Water
Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
Maximum starting current: starting current of biggest compressor + current of the other compressors at maximum load + fans current at maximum load. In case of inverter driven units, no inrush current at start up is experienced.
Nominal current in cooling mode is referred to the following conditions: evaporator 12/7°C; ambient 35°C; compressors + fans current.
Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
Maximum unit current for wires sizing is based on minimum allowed voltage
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

EWYD BZ-SL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
250	76,1	72,4	70,9	69,6	74,2	63,9	55,5	46,3	75,6	94,0
270	76,1	72,4	70,9	69,6	74,2	63,9	55,5	46,3	75,6	94,0
290	76,1	72,4	70,9	69,6	74,2	63,9	55,5	46,3	75,6	94,0
320	76,3	72,6	71,1	69,8	74,4	64,1	55,7	46,5	75,8	94,7
330	76,3	72,6	71,1	69,8	74,4	64,1	55,7	46,5	75,8	94,7
360	76,3	72,6	71,1	69,8	74,4	64,1	55,7	46,5	75,8	94,7
370	76,3	72,6	71,1	69,8	74,4	64,1	55,7	46,5	75,8	94,7
400	76,5	72,8	71,3	70,0	74,6	64,3	55,9	46,7	76,0	95,3
430	76,5	72,8	71,3	70,0	74,6	64,3	55,9	46,7	76,0	95,3
450	77,7	74,0	72,5	71,2	75,8	65,5	57,1	47,9	77,2	97,0
490	77,7	74,0	72,5	71,2	75,8	65,5	57,1	47,9	77,2	97,0
510	77,7	74,0	72,5	71,2	75,8	65,5	57,1	47,9	77,2	97,0
570	77,7	74,0	72,5	71,2	75,8	65,5	57,1	47,9	77,2	97,0

EWYD BZ-SS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
250	77,0	75,6	75,8	74,9	81,1	69,3	60,7	51,9	82,1	100,5
270	77,0	75,6	75,8	74,9	81,1	69,3	60,7	51,9	82,1	100,5
290	77,0	75,6	75,8	74,9	81,1	69,3	60,7	51,9	82,1	100,5
320	77,2	75,8	76,0	75,1	81,3	69,5	60,9	52,1	82,3	101,2
340	77,2	75,8	76,0	75,1	81,3	69,5	60,9	52,1	82,3	101,2
370	77,2	75,8	76,0	75,1	81,3	69,5	60,9	52,1	82,3	101,2
380	77,2	75,8	76,0	75,1	81,3	69,5	60,9	52,1	82,3	101,2
410	77,4	76,0	76,2	75,3	81,5	69,7	61,1	52,3	82,5	101,8
440	77,4	76,0	76,2	75,3	81,5	69,7	61,1	52,3	82,5	101,8
460	78,6	77,2	77,4	76,5	82,7	70,9	62,3	53,5	83,7	103,6
510	78,6	77,2	77,4	76,5	82,7	70,9	62,3	53,5	83,7	103,6
520	78,6	77,2	77,4	76,5	82,7	70,9	62,3	53,5	83,7	103,6
580	78,6	77,2	77,4	76,5	82,7	70,9	62,3	53,5	83,7	103,6

EWYD BZ-SL

	DISTANCE						
MODEL	1 m	5 m	10 m	15 m	20 m	25 m	50 m
250	75,6	67,7	62,9	59,8	57,6	55,8	50,0
270	75,6	67,7	62,9	59,8	57,6	55,8	50,0
290	75,6	67,7	62,9	59,8	57,6	55,8	50,0
320	75,8	68,2	63,4	60,4	58,1	56,4	50,6
330	75,8	68,2	63,4	60,4	58,1	56,4	50,6
360	75,8	68,2	63,4	60,4	58,1	56,4	50,6
370	75,8	68,2	63,4	60,4	58,1	56,4	50,6
400	76,0	68,6	64,0	60,9	58,7	56,9	51,2
430	76,0	68,6	64,0	60,9	58,7	56,9	51,2
450	77,2	70,1	65,5	62,5	60,3	58,6	52,9
490	77,2	70,1	65,5	62,5	60,3	58,6	52,9
510	77,2	70,1	65,5	62,5	60,3	58,6	52,9
570	77,2	70,1	65,5	62,5	60,3	58,6	52,9

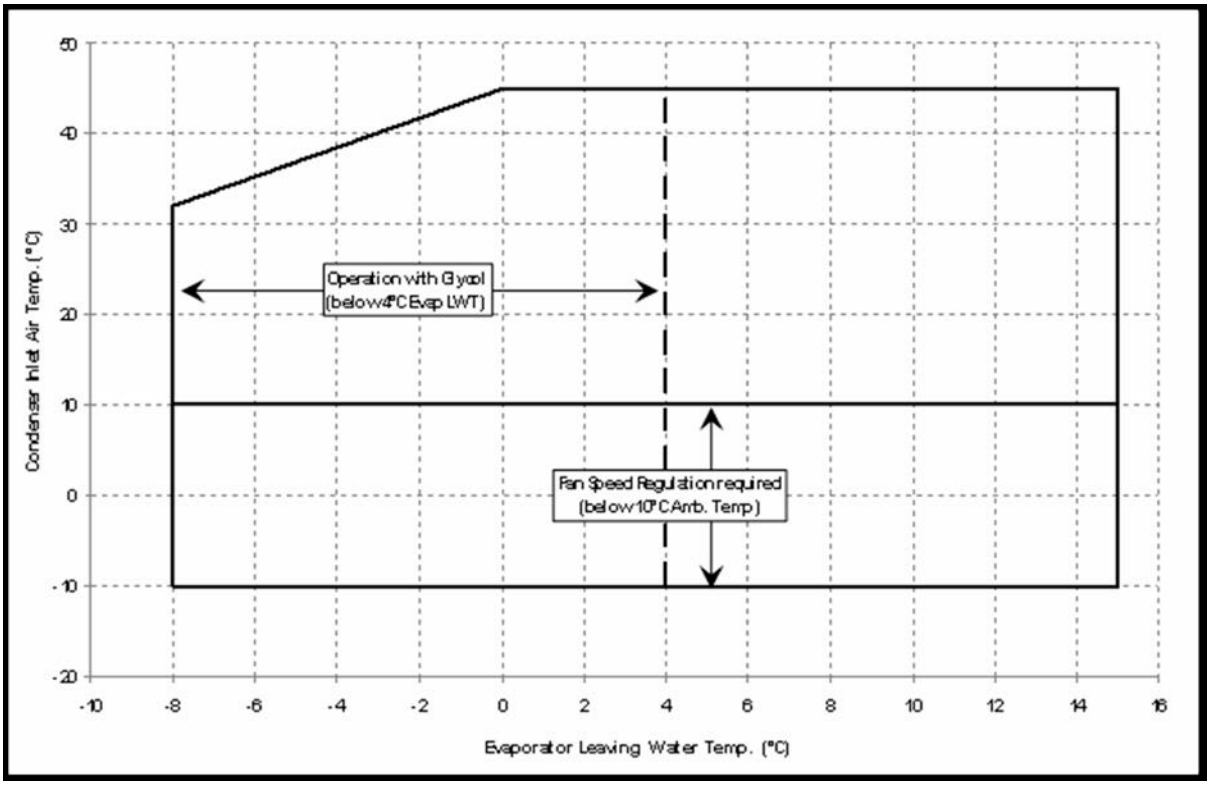
EWYD BZ-SS

	DISTANCE						
MODEL	1 m	5 m	10 m	15 m	20 m	25 m	50 m
250	82,1	74,2	69,4	66,3	64,1	62,3	56,5
270	82,1	74,2	69,4	66,3	64,1	62,3	56,5
290	82,1	74,2	69,4	66,3	64,1	62,3	56,5
320	82,3	74,7	69,9	66,9	64,6	62,9	57,1
340	82,3	74,7	69,9	66,9	64,6	62,9	57,1
370	82,3	74,7	69,9	66,9	64,6	62,9	57,1
380	82,3	74,7	69,9	66,9	64,6	62,9	57,1
410	82,5	75,1	70,5	67,4	65,2	63,4	57,7
440	82,5	75,1	70,5	67,4	65,2	63,4	57,7
460	83,7	76,6	72,0	69,0	66,8	65,1	59,4
510	83,7	76,6	72,0	69,0	66,8	65,1	59,4
520	83,7	76,6	72,0	69,0	66,8	65,1	59,4
580	83,7	76,6	72,0	69,0	66,8	65,1	59,4

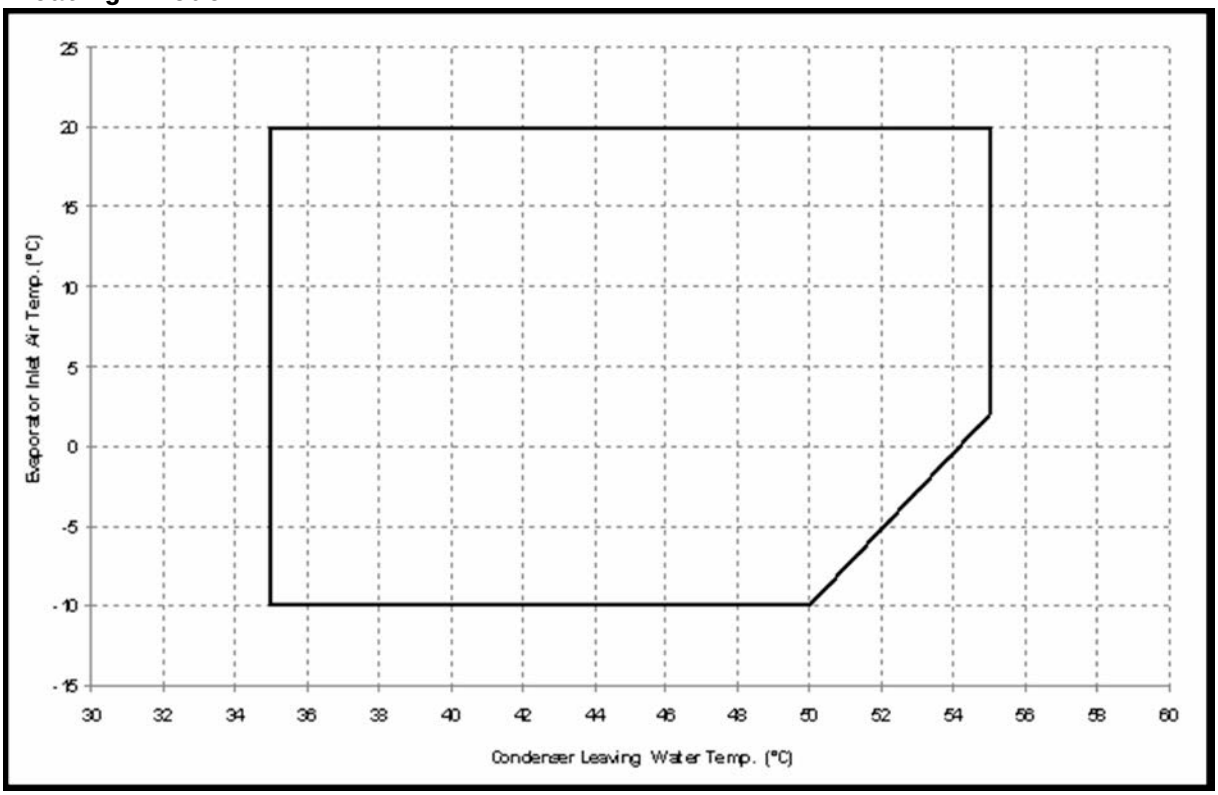
Fluid: Water
Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, air ambient 35°C, full load operation

Operating Limits

Cooling Mode



Heating Mode



Note
The above graphic represents a guidelines about the operating limits of the range. Please refer to Chiller Selection Software (CSS) for real operating limits working conditions for each size.

Table 1 - Water heat exchanger - Minimum and maximum water Δt

A - Δt	°C	8
B - Δt	°C	4

Legend:
A = Max evaporator water Δt
B = Min evaporator water Δt

Note: Table referred to Cooling and Heating Mode

Table 2 - Minimum glycol percentage for low air ambient temperature

AAT (2)	-3	-8	-15	-20
A (1)	10%	20%	30%	40%
AAT (2)	-3	-7	-12	-20
B (1)	10%	20%	30%	40%

Legend:

AAT = Air Ambient Temperature (°C) (2)
A = Ethylene glycol (%) (1)
B = Propylene glycol (%) (1)

(1) Minimum glycol percentage to prevent freezing of water circuit at indicated air ambient temperature

(2) Air ambient temperature do exceed the operating limits of the unit, a protection of water circuit may be needed in winter season at non-working conditions.

Water charge, flow and quality

Water charge, flow and quality

Items (1) (6)			Cooling Water			Cooled Water		Heated water (2)				Tendency if out of criteria
			Circulating System		Once Flow			Low temperature		High temperature		
			Circulating water	Supply water (4)	Flowing water	Circulating water [Below 20°C]	Supply water (4)	Circulating water [20°C ~ 60°C]	Supply water (4)	Circulating water [60°C ~ 80°C]	Supply water (4)	
Items to be controlled:	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(μS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl^{2-}/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO^{2-}_4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mg$CaCO_3$/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mg$CaCO_3$/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mg$CaCO_3$/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO_2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Corrosion
	Particole size	(mm)	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.6	Below 0.5	Below 0.6	Below 0.5	Below 0.6	Erosion
	Total dissolved solids	(mg / l)	Below 1000	Below 1000	Below 1000	Below 1000	Below 1001	Below 1000	Below 1001	Below 1000	Below 1001	Erosion
	Ethykene, Propylene Glycol (weight conc.)		Below 60%	Below 60%	---	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	--
Items to be referred to:	Nitrate ion	(mg NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS^{2-}/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH^+_4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO_2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

1 Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.

2 In case of using heated water (more than 40°C), corrosion is generally noticeable.
Especially when the iron materials is in direct contact with water without any protection shields, it is desireable to give the valid measure for corrosion. E.g. chemical measure

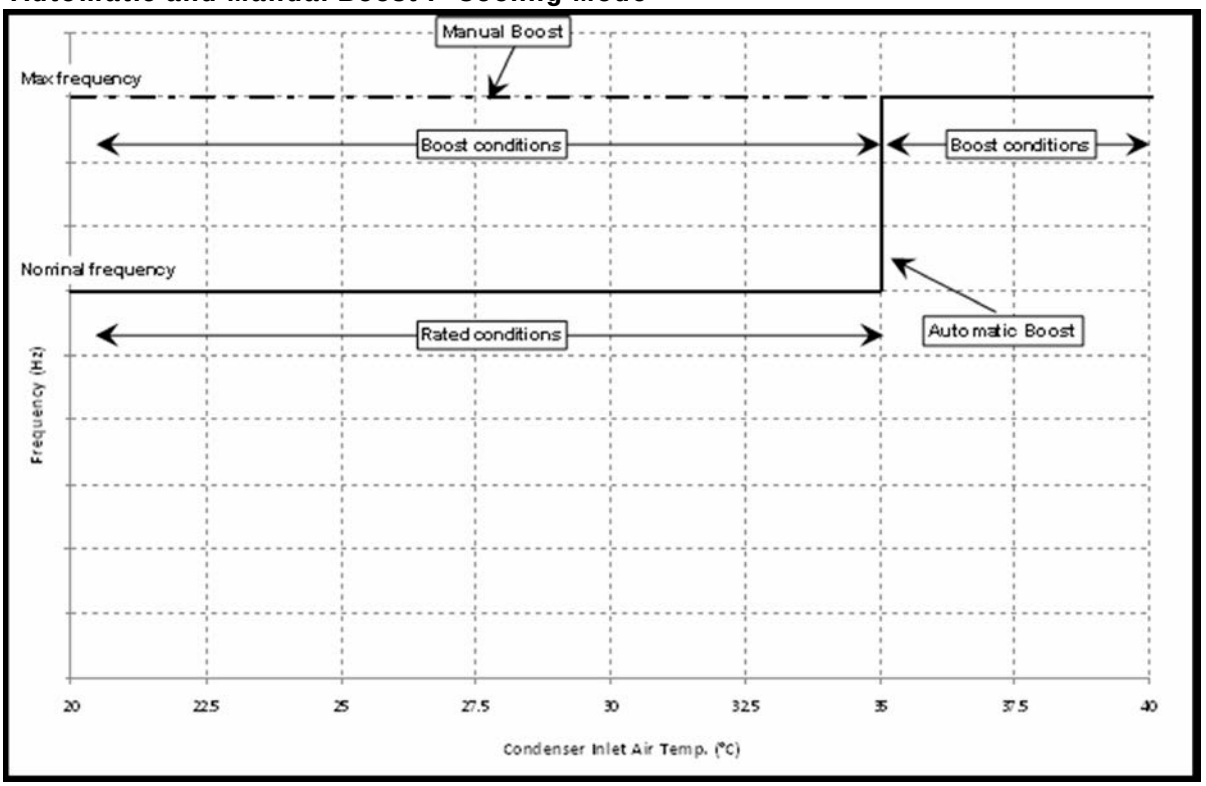
3 In the cooling water using hermetic cooling tower, close circuit water is according to heated water standard, and scattered water is according to cooling water standard.

4 Supply water is considered drink water, industrial water and ground water except for genuine water, neutral water and soft water.

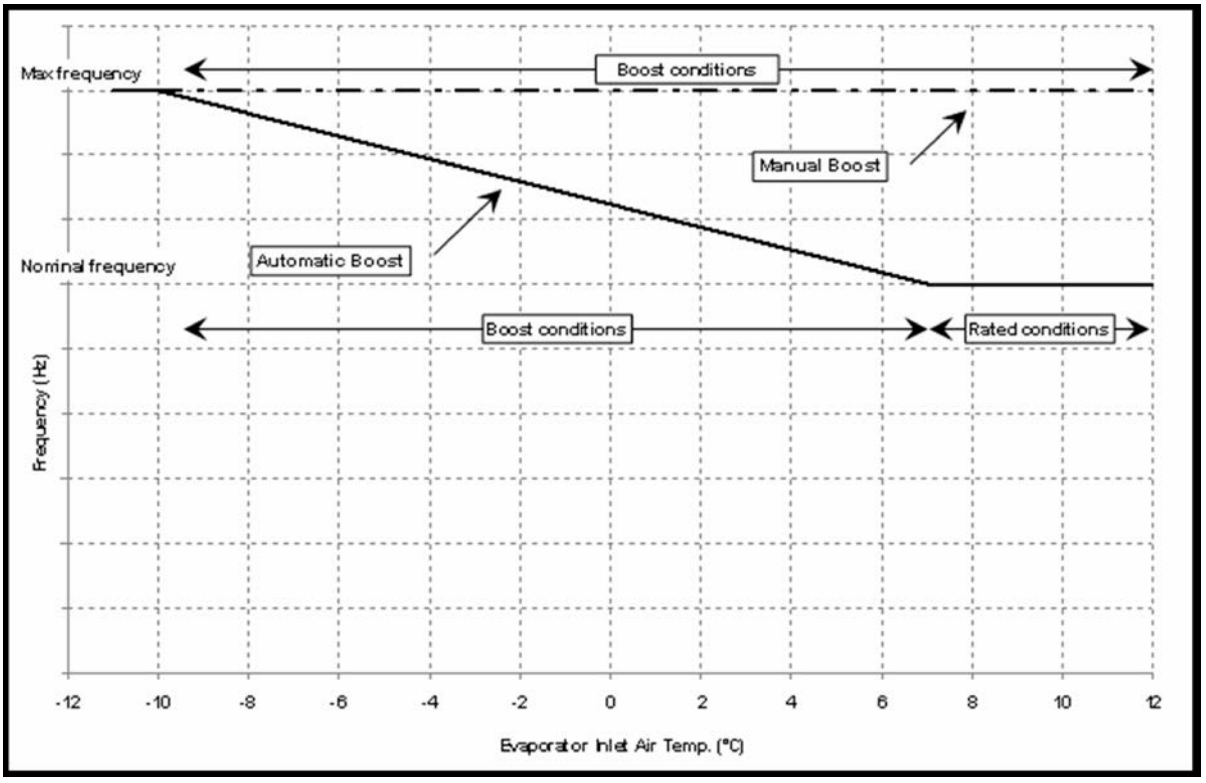
5 The above mentioned items are representable items in corrosion and scale cases.

6 The limits above have to be considered as a general prescription and con not totallu assure the absence of corrossion and erosion.
Some particular combinations of elements or the presence of components not listed in the table or factors not considered may trigger corrosion phenomena.

Automatic and Manual Boost .- Cooling Mode

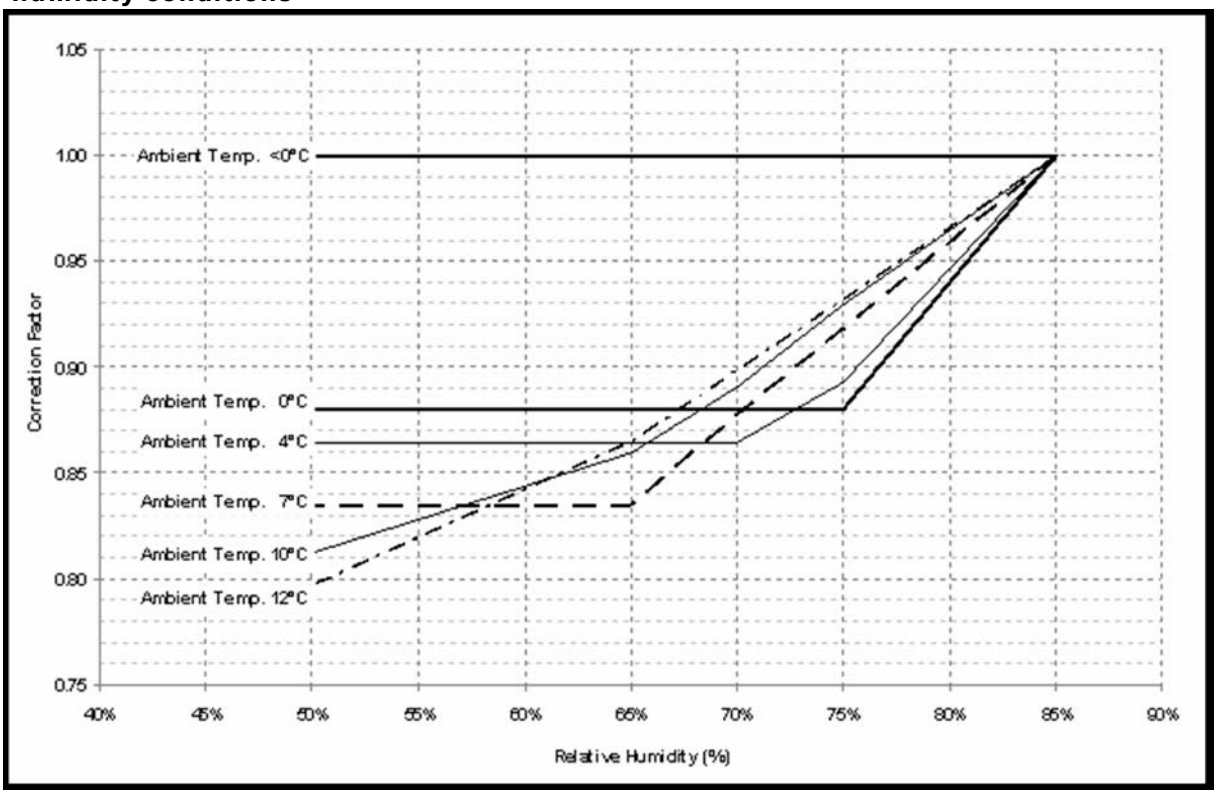


Automatic and Manual Boost .- Heating Mode

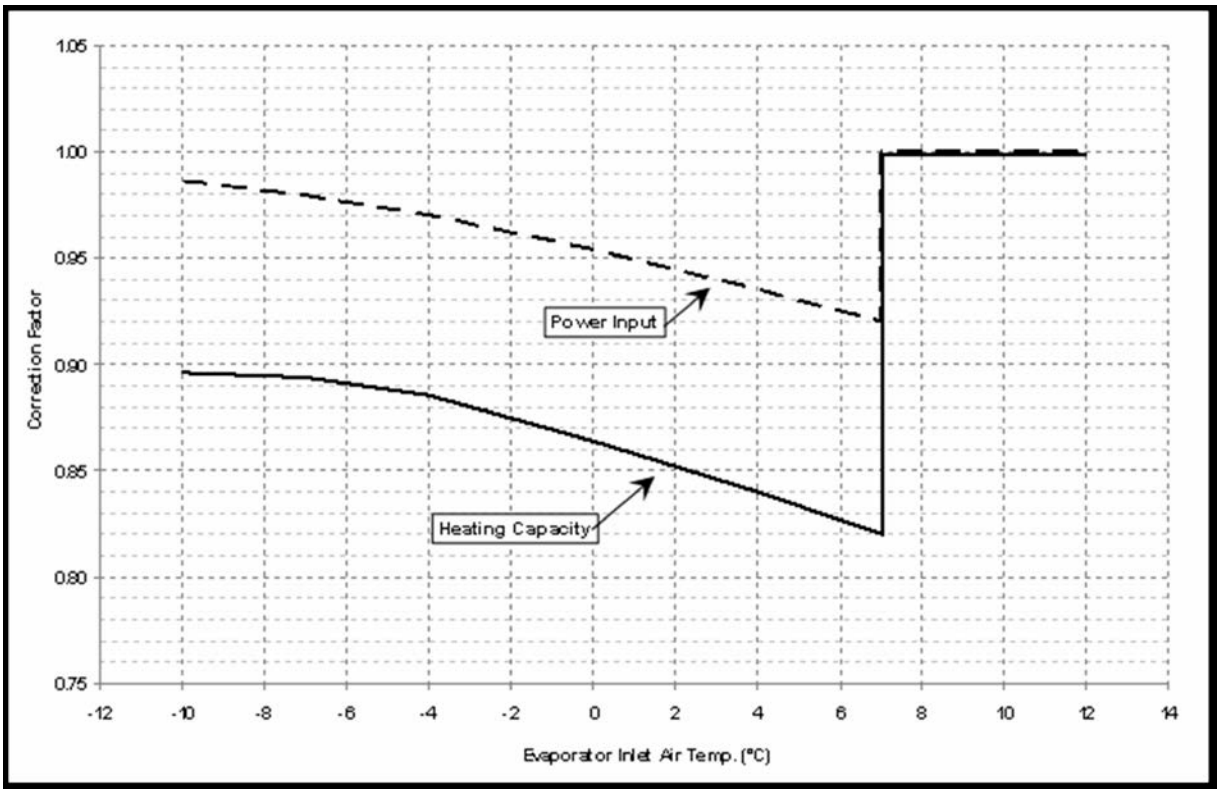


Automatic boost: unit standard configuration
Manual boost: customized configuration by different settings
Rated conditions: compressors are running at nominal frequency
Boost conditions: compressors are running at the maximum frequency

Heating Capacity correction factors for different evaporator inlet air temperature and relative humidity conditions

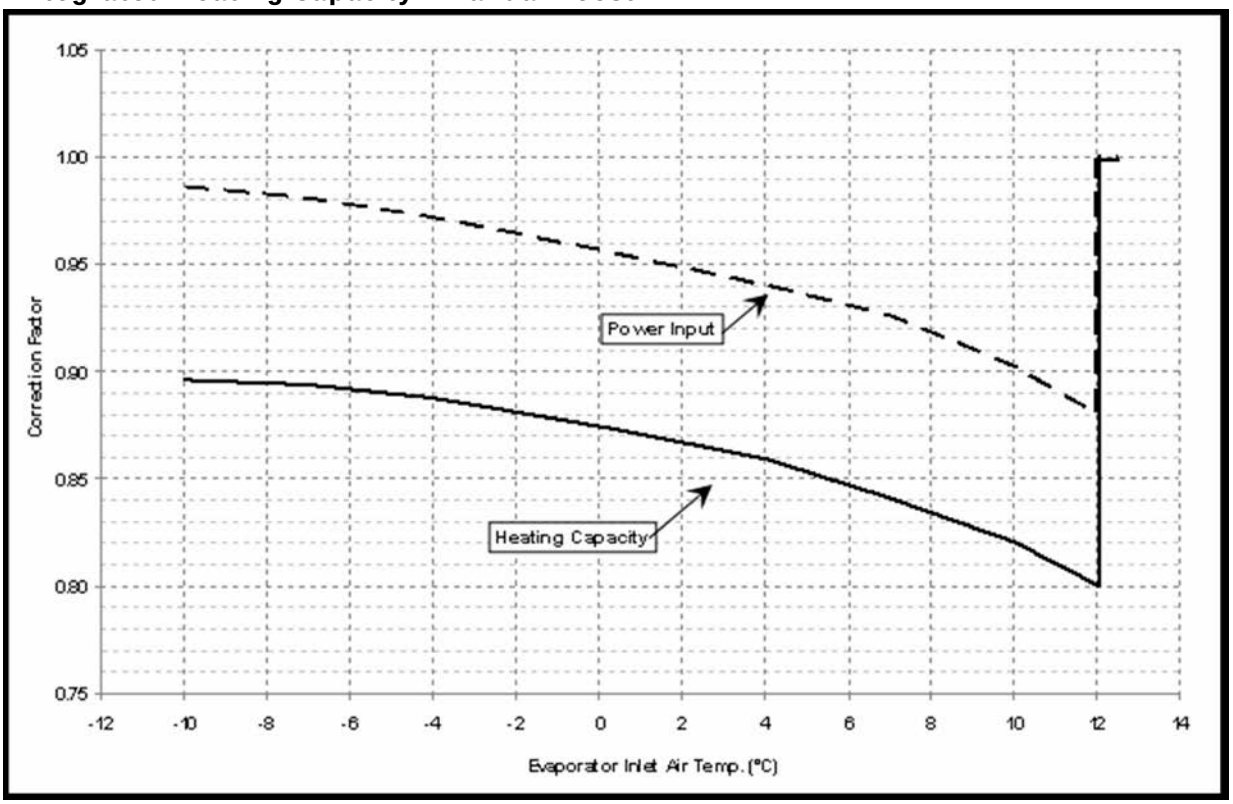


Integrated Heating Capacity - Automatic Boost



Correction factors to be applied to Standard Ratings in Heating Mode (Relative Humidity: 85% with evaporator inlet air temperature above 0°C ; 100% with evaporator inlet air temperature below 0°C)

Integrated Heating Capacity - Manual Boost



Correction factors to be applied to Standard Ratings in Heating Mode (Relative Humidity: 85% with evaporator inlet air temperature above 0°C ; 100% with evaporator inlet air temperature below 0°C)

EWYD BZ-SS

			250						270					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	260	249	238	302	291	283	280	268	256	321	309	300
	Pa	kW	76,0	82,4	89,2	164	171	177	83,6	90,7	98,4	182	190	197
	qw	l/s	12,4	11,9	11,4	14,5	13,9	13,6	13,4	12,8	12,2	15,4	14,8	14,4
	dpw	kPa	42	39	36	55	52	49	48	45	41	62	57	55
7	Pf	kW	276	265	253	320	309	301	296	285	272	340	328	319
	Pa	kW	78,0	84,4	91,3	168	176	181	85,8	93,0	101	187	196	202
	qw	l/s	13,2	12,7	12,1	15,4	14,8	14,4	14,2	13,6	13,0	16,3	15,7	15,3
	dpw	kPa	47	44	40	61	58	55	53	50	46	69	64	61
9	Pf	kW	292	280	268	339	327	319	313	301	288	359	347	338
	Pa	kW	80,1	86,5	93,5	173	181	186	88,1	95,4	103	192	201	207
	qw	l/s	14,0	13,5	12,9	16,3	15,7	15,3	15,0	14,4	13,8	17,3	16,6	16,2
	dpw	kPa	52	48	45	68	64	61	59	55	51	76	71	68
11	Pf	kW	308	297	284	358	346	337	331	318	305	379	366	357
	Pa	kW	82,2	88,7	95,8	178	186	192	90,6	97,8	106	198	207	213
	qw	l/s	14,8	14,2	13,6	17,2	16,6	16,2	15,9	15,3	14,6	18,2	17,6	17,2
	dpw	kPa	58	54	50	75	71	68	65	61	56	84	79	75
13	Pf	kW	325	313	300	377	365	356	349	336	322	399	386	370
	Pa	kW	84,5	91,1	98,2	183	191	197	93,1	100	108	203	213	207
	qw	l/s	15,6	15,1	14,4	18,2	17,6	17,1	16,8	16,1	15,5	19,2	18,6	17,8
	dpw	kPa	63	59	55	83	78	75	72	67	62	92	86	80
15	Pf	kW	343	330	317	397	384	361	367	354	339	419	402	370
	Pa	kW	86,8	93,5	101	188	197	183	95,7	103	111	209	213	187
	qw	l/s	16,5	15,9	15,3	19,1	18,5	17,4	17,7	17,0	16,3	20,2	19,4	17,8
	dpw	kPa	70	65	61	91	86	77	79	74	69	101	93	80

			290						320					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	300	287	274	342	328	319	331	318	304	384	370	360
	Pa	kW	91,0	98,7	107	200	209	216	97,9	106	115	209	219	226
	qw	l/s	14,3	13,7	13,1	16,4	15,7	15,3	15,8	15,2	14,5	18,4	17,7	17,2
	dpw	kPa	46	43	39	58	54	52	53	49	45	69	64	61
7	Pf	kW	318	305	291	362	348	339	351	337	323	406	392	382
	Pa	kW	93,5	101	110	206	215	222	100	109	117	215	225	232
	qw	l/s	15,2	14,6	13,9	17,3	16,7	16,2	16,8	16,2	15,5	19,5	18,8	18,3
	dpw	kPa	51	48	44	65	60	58	59	55	50	77	72	69
9	Pf	kW	336	323	308	382	368	359	371	357	342	430	415	405
	Pa	kW	96,1	104	112	212	221	228	103	111	120	220	231	238
	qw	l/s	16,1	15,5	14,8	18,4	17,7	17,2	17,8	17,1	16,4	20,6	19,9	19,5
	dpw	kPa	57	53	49	72	67	64	65	61	56	85	80	76
11	Pf	kW	355	341	326	403	389	370	392	377	362	453	438	428
	Pa	kW	98,7	107	115	218	228	219	106	114	123	226	237	244
	qw	l/s	17,0	16,4	15,7	19,4	18,7	17,8	18,8	18,1	17,4	21,8	21,1	20,6
	dpw	kPa	63	58	54	79	74	68	72	67	62	94	88	84
13	Pf	kW	374	359	344	424	410	375	413	398	382	477	462	451
	Pa	kW	102	110	118	224	235	203	108	117	126	233	243	251
	qw	l/s	18,0	17,3	16,6	20,4	19,7	18,0	19,9	19,1	18,4	23,0	22,3	21,7
	dpw	kPa	69	64	60	87	82	70	79	74	69	103	97	93
15	Pf	kW	393	379	363	446	407	365	434	419	403	502	486	475
	Pa	kW	105	113	121	231	206	173	111	120	129	239	250	257
	qw	l/s	18,9	18,2	17,5	21,5	19,6	17,6	20,9	20,2	19,4	24,2	23,4	22,9
	dpw	kPa	76	71	66	95	81	66	87	81	76	113	106	102

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			340						370					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	347	333	318	398	383	373	374	359	342	427	410	399
	Pa	kW	104	113	122	224	234	242	113	122	132	244	256	265
	qw	l/s	16,6	15,9	15,2	19,1	18,4	17,9	17,9	17,2	16,4	20,4	19,7	19,1
	dpw	kPa	58	53	49	74	69	66	63	58	53	80	74	71
7	Pf	kW	367	353	337	422	407	396	396	380	363	452	435	424
	Pa	kW	107	116	125	230	241	248	115	125	135	251	263	271
	qw	l/s	17,6	16,9	16,2	20,2	19,5	19,0	19,0	18,2	17,4	21,7	20,9	20,3
	dpw	kPa	64	59	55	82	77	73	70	65	60	89	83	79
9	Pf	kW	388	373	357	445	430	419	418	402	385	477	460	448
	Pa	kW	110	118	128	236	247	255	119	128	139	258	270	278
	qw	l/s	18,6	17,9	17,2	21,4	20,7	20,2	20,1	19,3	18,5	22,9	22,1	21,6
	dpw	kPa	71	66	61	91	85	81	77	72	66	98	92	88
11	Pf	kW	409	394	378	470	454	443	441	425	407	503	486	474
	Pa	kW	112	121	131	243	254	262	122	132	142	266	278	286
	qw	l/s	19,7	18,9	18,2	22,6	21,8	21,3	21,2	20,4	19,6	24,2	23,4	22,8
	dpw	kPa	78	73	68	100	94	90	85	79	73	108	101	97
13	Pf	kW	431	415	399	494	478	467	465	448	429	529	511	490
	Pa	kW	115	125	134	250	261	269	125	135	146	274	286	280
	qw	l/s	20,8	20,0	19,2	23,8	23,0	22,5	22,4	21,6	20,7	25,5	24,7	23,6
	dpw	kPa	86	80	75	110	104	99	94	88	81	119	111	103
15	Pf	kW	453	437	420	519	503	491	489	471	452	556	538	490
	Pa	kW	119	128	138	256	268	276	129	139	150	281	294	251
	qw	l/s	21,9	21,1	20,2	25,1	24,3	23,7	23,6	22,7	21,8	26,8	26,0	23,6
	dpw	kPa	94	88	82	120	114	109	103	96	89	130	122	103

			380						410					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	391	375	358	444	427	415	422	405	387	483	465	453
	Pa	kW	120	130	141	261	274	284	128	139	151	274	288	297
	qw	l/s	18,7	18,0	17,2	21,3	20,5	19,9	20,2	19,4	18,6	23,2	22,3	21,7
	dpw	kPa	69	64	58	86	80	76	77	72	66	99	92	88
7	Pf	kW	414	398	380	470	453	441	446	429	411	511	493	481
	Pa	kW	123	133	144	269	281	291	131	142	154	282	295	304
	qw	l/s	19,9	19,1	18,2	22,6	21,7	21,2	21,4	20,6	19,7	24,6	23,7	23,1
	dpw	kPa	76	71	65	96	89	85	86	80	74	110	103	98
9	Pf	kW	437	420	402	496	479	466	471	453	435	540	521	509
	Pa	kW	126	137	148	276	289	298	135	146	158	289	303	312
	qw	l/s	21,0	20,2	19,3	23,9	23,0	22,4	22,6	21,8	20,9	26,0	25,1	24,5
	dpw	kPa	84	78	72	106	99	95	95	88	82	121	114	109
11	Pf	kW	461	444	425	523	505	492	497	479	459	569	550	537
	Pa	kW	130	140	152	284	297	306	138	149	161	297	311	320
	qw	l/s	22,2	21,3	20,4	25,2	24,3	23,7	23,9	23,0	22,1	27,4	26,5	25,9
	dpw	kPa	93	87	80	117	109	105	104	98	91	134	126	120
13	Pf	kW	486	468	449	550	531	507	523	504	484	598	579	566
	Pa	kW	133	144	156	293	306	295	142	153	165	305	319	329
	qw	l/s	23,4	22,5	21,6	26,5	25,6	24,4	25,2	24,3	23,3	28,9	28,0	27,3
	dpw	kPa	102	95	88	128	120	110	115	108	100	147	138	133
15	Pf	kW	511	492	472	577	558	510	550	530	510	628	608	593
	Pa	kW	137	148	160	301	315	268	146	157	169	313	328	334
	qw	l/s	24,6	23,7	22,8	27,9	27,0	24,6	26,5	25,6	24,6	30,4	29,4	28,7
	dpw	kPa	112	105	97	140	132	112	126	118	110	160	152	145

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			440						460					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	445	428	409	505	487	474	467	448	428	547	528	514
	Pa	kW	137	149	162	295	310	322	136	147	160	289	302	312
	qw	l/s	21,4	20,5	19,6	24,3	23,4	22,7	22,3	21,4	20,5	26,2	25,3	24,6
	dpw	kPa	84	78	72	106	99	94	49	45	42	65	61	58
7	Pf	kW	471	453	433	535	516	502	495	476	455	581	561	547
	Pa	kW	141	152	165	303	318	329	140	151	163	297	310	320
	qw	l/s	22,6	21,7	20,8	25,7	24,8	24,1	23,7	22,8	21,8	27,9	26,9	26,2
	dpw	kPa	93	87	80	117	110	105	54	51	47	73	68	65
9	Pf	kW	497	478	458	564	545	531	525	505	483	615	595	580
	Pa	kW	144	156	169	312	326	336	143	155	167	305	319	328
	qw	l/s	23,9	23,0	22,0	27,2	26,2	25,6	25,2	24,2	23,2	29,6	28,6	27,9
	dpw	kPa	103	96	89	130	122	116	60	56	52	81	76	73
11	Pf	kW	524	504	484	594	574	561	555	534	512	650	629	614
	Pa	kW	148	160	173	320	335	345	147	158	171	313	327	337
	qw	l/s	25,2	24,3	23,3	28,7	27,7	27,0	26,7	25,7	24,6	31,3	30,2	29,5
	dpw	kPa	113	106	98	143	134	128	67	63	58	89	84	81
13	Pf	kW	551	531	510	624	604	590	586	565	542	686	664	649
	Pa	kW	152	164	177	329	344	355	151	162	175	321	336	346
	qw	l/s	26,6	25,6	24,6	30,2	29,2	28,5	28,2	27,1	26,0	33,0	32,0	31,2
	dpw	kPa	124	116	108	156	147	141	74	69	64	99	93	89
15	Pf	kW	579	559	537	655	635	617	618	596	572	722	700	684
	Pa	kW	156	168	182	338	354	358	155	166	179	330	345	355
	qw	l/s	28,0	27,0	25,9	31,7	30,7	29,8	29,8	28,7	27,5	34,8	33,7	33,0
	dpw	kPa	136	128	119	171	161	153	82	76	71	108	102	98

			510						520					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	515	494	472	600	578	563	533	511	488	618	595	579
	Pa	kW	152	164	177	324	339	349	158	171	185	339	354	365
	qw	l/s	24,7	23,7	22,6	28,8	27,8	27,0	25,6	24,5	23,4	29,7	28,6	27,8
	dpw	kPa	89	83	76	118	110	105	95	88	81	125	116	111
7	Pf	kW	547	525	502	637	614	599	565	542	519	655	632	616
	Pa	kW	156	168	182	334	349	359	162	175	189	348	364	375
	qw	l/s	26,3	25,2	24,1	30,7	29,5	28,8	27,1	26,1	24,9	31,6	30,4	29,6
	dpw	kPa	100	93	85	132	123	117	106	99	91	139	130	124
9	Pf	kW	579	556	533	674	651	635	598	575	550	693	669	653
	Pa	kW	160	172	186	343	359	369	166	180	194	358	375	386
	qw	l/s	27,9	26,8	25,6	32,5	31,4	30,6	28,8	27,6	26,5	33,4	32,3	31,5
	dpw	kPa	111	103	95	146	137	131	118	110	101	154	145	138
11	Pf	kW	612	589	564	712	688	672	631	608	582	732	707	690
	Pa	kW	164	177	191	353	369	380	171	184	199	369	385	397
	qw	l/s	29,5	28,4	27,2	34,4	33,2	32,4	30,4	29,3	28,1	35,4	34,2	33,3
	dpw	kPa	123	114	106	162	152	145	130	122	112	171	160	153
13	Pf	kW	646	622	597	750	726	709	666	642	616	771	746	729
	Pa	kW	169	182	196	364	380	390	176	189	204	380	396	408
	qw	l/s	31,2	30,0	28,8	36,3	35,1	34,3	32,2	31,0	29,7	37,3	36,1	35,2
	dpw	kPa	135	126	117	178	168	161	144	134	125	188	177	169
15	Pf	kW	680	656	630	789	764	741	702	676	649	811	785	761
	Pa	kW	174	187	201	374	390	393	181	195	209	391	408	410
	qw	l/s	32,9	31,7	30,4	38,2	37,0	35,9	33,9	32,7	31,4	39,3	38,0	36,9
	dpw	kPa	149	139	130	196	184	174	158	148	138	206	195	184

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			580						
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	
5	Pf	kW	598	573	546	682	655	636	
	Pa	kW	181	196	213	395	414	429	
	qw	l/s	28,6	27,4	26,1	32,7	31,4	30,5	
	dpw	kPa	64	59	55	81	76	72	
7	Pf	kW	634	608	580	723	695	676	
	Pa	kW	186	201	218	407	426	439	
	qw	l/s	30,4	29,1	27,8	34,7	33,4	32,5	
	dpw	kPa	71	66	61	91	85	80	
9	Pf	kW	670	644	615	764	736	717	
	Pa	kW	191	206	223	419	438	451	
	qw	l/s	32,2	30,9	29,5	36,7	35,4	34,4	
	dpw	kPa	79	74	68	101	94	89	
11	Pf	kW	708	681	651	806	778	758	
	Pa	kW	196	212	229	432	451	464	
	qw	l/s	34,0	32,7	31,3	38,8	37,4	36,5	
	dpw	kPa	88	82	75	111	104	99	
13	Pf	kW	747	718	688	849	820	771	
	Pa	kW	202	218	235	445	464	432	
	qw	l/s	35,9	34,6	33,1	40,9	39,5	37,1	
	dpw	kPa	97	90	83	122	114	102	
15	Pf	kW	786	757	726	893	842	761	
	Pa	kW	208	224	241	458	447	378	
	qw	l/s	37,9	36,5	35,0	43,1	40,6	36,7	
	dpw	kPa	106	99	92	134	120	100	

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			250						270					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	255	244	233	290	278	270	274	262	250	307	294	285
	Pa	kW	73,4	80,0	87,2	167	175	181	81,6	88,9	97,0	187	197	204
	qw	l/s	12,2	11,7	11,1	13,9	13,3	12,9	13,1	12,5	11,9	14,7	14,1	13,6
	dpw	kPa	41	38	34	51	48	45	46	43	39	57	53	50
7	Pf	kW	270	259	247	307	295	287	290	278	265	325	312	302
	Pa	kW	75,6	82,2	89,5	172	180	186	84,1	91,5	99,5	193	202	209
	qw	l/s	12,9	12,4	11,8	14,7	14,1	13,7	13,9	13,3	12,7	15,6	14,9	14,5
	dpw	kPa	45	42	38	57	53	50	51	48	44	63	59	55
9	Pf	kW	286	274	262	325	312	304	307	294	281	343	329	320
	Pa	kW	77,9	84,6	91,9	178	186	191	86,6	94,1	102	199	208	215
	qw	l/s	13,7	13,2	12,6	15,6	15,0	14,6	14,7	14,1	13,5	16,5	15,8	15,4
	dpw	kPa	50	46	43	63	59	56	57	53	49	70	65	62
11	Pf	kW	302	290	277	342	330	306	323	310	297	361	338	312
	Pa	kW	80,3	87,1	94,4	183	192	172	89,3	96,9	105	205	195	173
	qw	l/s	14,5	13,9	13,3	16,5	15,8	14,7	15,5	14,9	14,2	17,4	16,2	15,0
	dpw	kPa	55	51	47	70	65	57	63	58	54	77	68	59
13	Pf	kW	318	306	293	360	335	304	341	327	313	377	345	311
	Pa	kW	82,7	89,6	97,1	189	178	152	92,1	99,7	108	205	183	156
	qw	l/s	15,3	14,7	14,1	17,3	16,1	14,6	16,4	15,7	15,1	18,1	16,6	15,0
	dpw	kPa	61	57	52	76	67	56	69	64	59	83	71	59
15	Pf	kW	335	322	309	377	328	292	358	345	330	387	336	299
	Pa	kW	85,3	92,3	99,8	191	151	127	94,9	103	111	196	155	131
	qw	l/s	16,1	15,5	14,9	18,1	15,8	14,0	17,3	16,6	15,9	18,6	16,2	14,4
	dpw	kPa	67	63	58	83	65	52	76	71	65	87	67	55

			290						320					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	300	287	273	333	318	308	324	311	297	368	354	344
	Pa	kW	90,6	98,7	108	209	220	228	94,1	103	112	212	223	231
	qw	l/s	14,4	13,7	13,1	15,9	15,2	14,7	15,5	14,9	14,2	17,6	16,9	16,4
	dpw	kPa	44	41	37	53	49	46	51	47	43	64	60	57
7	Pf	kW	318	304	290	352	337	327	343	330	315	390	375	365
	Pa	kW	93,4	102	110	215	226	234	96,8	105	115	219	229	237
	qw	l/s	15,2	14,6	13,9	16,9	16,2	15,7	16,5	15,8	15,1	18,7	18,0	17,5
	dpw	kPa	49	45	42	59	55	52	57	53	48	71	66	63
9	Pf	kW	336	322	307	372	357	321	363	349	333	412	397	386
	Pa	kW	96,3	105	114	223	233	190	99,6	108	118	225	236	243
	qw	l/s	16,1	15,4	14,7	17,9	17,1	15,4	17,4	16,7	16,0	19,8	19,0	18,5
	dpw	kPa	54	50	46	65	61	50	63	58	54	79	74	70
11	Pf	kW	355	340	325	390	351	321	383	368	352	434	419	401
	Pa	kW	99,3	108	117	226	193	170	102	111	121	232	243	237
	qw	l/s	17,0	16,3	15,6	18,7	16,8	15,4	18,4	17,7	16,9	20,9	20,1	19,3
	dpw	kPa	60	56	51	71	59	50	69	64	60	87	81	75
13	Pf	kW	374	359	343	399	351	314	403	388	372	457	436	409
	Pa	kW	103	111	120	213	173	147	106	114	124	239	241	223
	qw	l/s	18,0	17,2	16,5	19,2	16,9	15,1	19,4	18,7	17,9	22,0	21,0	19,7
	dpw	kPa	66	61	56	74	59	48	76	71	66	95	88	78
15	Pf	kW	393	377	361	394	340	302	424	409	392	480	446	401
	Pa	kW	106	114	124	185	147	126	109	118	127	246	229	192
	qw	l/s	18,9	18,2	17,4	19,0	16,3	14,5	20,4	19,7	18,9	23,1	21,5	19,3
	dpw	kPa	72	67	62	73	56	45	84	78	72	104	91	76

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			330						360					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	340	326	311	382	366	356	366	350	333	406	389	377
	Pa	kW	101	110	120	229	241	250	110	120	131	252	265	275
	qw	l/s	16,3	15,6	14,9	18,3	17,5	17,0	17,5	16,8	15,9	19,5	18,7	18,1
	dpw	kPa	56	51	47	69	64	60	60	56	51	73	68	64
7	Pf	kW	360	345	330	404	388	377	387	371	353	430	413	400
	Pa	kW	104	113	123	236	248	256	113	123	134	259	272	282
	qw	l/s	17,3	16,5	15,8	19,4	18,6	18,1	18,5	17,8	16,9	20,6	19,8	19,2
	dpw	kPa	62	57	53	76	71	67	67	62	57	81	75	71
9	Pf	kW	380	365	349	427	411	399	408	392	374	454	436	424
	Pa	kW	107	116	126	243	255	263	117	127	138	267	280	290
	qw	l/s	18,2	17,5	16,7	20,5	19,7	19,2	19,6	18,8	18,0	21,8	21,0	20,4
	dpw	kPa	68	63	58	84	78	75	74	69	63	90	84	79
11	Pf	kW	401	385	369	449	433	408	431	414	395	478	449	408
	Pa	kW	110	120	130	251	262	244	120	131	142	276	267	226
	qw	l/s	19,3	18,5	17,7	21,6	20,8	19,6	20,7	19,9	19,0	23,0	21,6	19,6
	dpw	kPa	75	70	65	93	86	78	82	76	70	99	88	74
13	Pf	kW	422	406	389	473	446	410	453	436	417	501	451	410
	Pa	kW	113	123	133	258	252	221	124	134	146	282	239	207
	qw	l/s	20,3	19,5	18,7	22,8	21,5	19,7	21,8	21,0	20,1	24,2	21,7	19,7
	dpw	kPa	83	77	71	101	91	79	90	84	77	108	89	75
15	Pf	kW	444	427	410	496	449	402	477	458	439	509	445	396
	Pa	kW	117	126	137	266	229	190	128	138	150	261	208	175
	qw	l/s	21,4	20,6	19,7	23,9	21,6	19,4	23,0	22,1	21,2	24,6	21,4	19,1
	dpw	kPa	91	85	78	111	92	76	99	92	85	111	87	70

			370						400					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	383	367	349	423	405	393	413	396	378	463	445	432
	Pa	kW	118	128	140	271	286	296	124	135	147	280	295	306
	qw	l/s	18,4	17,6	16,7	20,3	19,4	18,8	19,8	19,0	18,1	22,2	21,3	20,7
	dpw	kPa	66	61	56	79	73	69	75	69	64	92	85	81
7	Pf	kW	405	388	370	448	429	417	437	420	401	490	471	458
	Pa	kW	121	132	144	278	293	304	127	139	151	288	302	313
	qw	l/s	19,4	18,6	17,7	21,5	20,6	20,0	21,0	20,1	19,2	23,6	22,6	22,0
	dpw	kPa	73	68	62	88	81	77	83	77	71	102	95	90
9	Pf	kW	428	410	392	473	454	441	461	443	424	517	498	485
	Pa	kW	125	136	148	287	301	312	131	142	155	296	311	321
	qw	l/s	20,5	19,7	18,8	22,7	21,8	21,2	22,2	21,3	20,4	24,9	24,0	23,3
	dpw	kPa	81	75	69	97	90	85	92	85	79	113	105	100
11	Pf	kW	451	433	414	498	471	423	486	468	448	545	525	512
	Pa	kW	129	140	152	296	294	239	135	146	159	305	319	330
	qw	l/s	21,7	20,8	19,9	24,0	22,7	20,3	23,4	22,5	21,5	26,3	25,3	24,6
	dpw	kPa	89	83	76	107	97	79	101	94	87	124	116	111
13	Pf	kW	474	456	436	520	467	428	512	492	472	572	547	511
	Pa	kW	133	144	156	300	252	222	139	150	163	314	317	288
	qw	l/s	22,9	22,0	21,0	25,1	22,5	20,6	24,7	23,7	22,7	27,6	26,4	24,6
	dpw	kPa	98	91	84	116	95	81	111	103	96	136	125	111
15	Pf	kW	498	479	459	528	462	414	537	518	497	601	564	514
	Pa	kW	137	148	161	278	221	188	143	155	168	324	309	263
	qw	l/s	24,0	23,1	22,1	25,5	22,3	19,9	25,9	25,0	24,0	29,0	27,3	24,8
	dpw	kPa	107	100	92	119	93	77	121	113	105	149	133	112

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			430						450					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	436	418	399	484	464	450	460	440	420	529	508	494
	Pa	kW	134	146	159	305	322	333	130	141	154	291	305	316
	qw	l/s	20,9	20,0	19,1	23,2	22,3	21,6	22,0	21,1	20,1	25,3	24,3	23,6
	dpw	kPa	81	75	69	98	91	86	47	44	40	61	57	54
7	Pf	kW	461	443	423	511	491	477	487	468	446	561	540	525
	Pa	kW	138	150	163	313	330	342	133	145	158	300	314	324
	qw	l/s	22,1	21,2	20,3	24,6	23,6	22,9	23,4	22,4	21,4	26,9	25,9	25,2
	dpw	kPa	90	83	77	109	101	96	53	49	45	68	63	60
9	Pf	kW	486	467	447	539	519	505	516	496	474	593	572	557
	Pa	kW	142	154	168	322	338	350	137	149	162	309	324	334
	qw	l/s	23,4	22,5	21,5	26,0	25,0	24,3	24,8	23,8	22,7	28,5	27,5	26,7
	dpw	kPa	99	92	85	120	112	106	59	54	50	75	71	67
11	Pf	kW	512	493	472	568	547	532	546	524	502	627	605	589
	Pa	kW	146	159	172	332	347	359	141	153	166	319	333	343
	qw	l/s	24,7	23,7	22,7	27,4	26,4	25,7	26,2	25,2	24,1	30,1	29,1	28,3
	dpw	kPa	109	102	94	132	123	117	65	60	56	83	78	75
13	Pf	kW	539	518	497	596	563	517	576	554	530	661	638	615
	Pa	kW	150	163	177	342	334	287	145	157	171	328	343	342
	qw	l/s	26,0	25,0	23,9	28,8	27,2	24,9	27,7	26,6	25,5	31,8	30,7	29,6
	dpw	kPa	120	112	103	144	130	111	72	67	62	92	86	81
15	Pf	kW	566	545	523	625	571	520	607	584	560	695	668	605
	Pa	kW	155	168	182	352	309	263	150	162	175	338	348	294
	qw	l/s	27,3	26,3	25,2	30,2	27,6	25,1	29,2	28,1	26,9	33,5	32,2	29,1
	dpw	kPa	131	122	113	157	133	112	79	73	68	101	94	78

			490						510					
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	**25**	**30**	**35**	**40**	**43**	**45**
5	Pf	kW	505	484	460	576	553	537	523	501	477	593	569	552
	Pa	kW	146	159	172	329	345	357	153	166	181	346	363	376
	qw	l/s	24,2	23,2	22,1	27,7	26,6	25,8	25,1	24,0	22,8	28,5	27,3	26,5
	dpw	kPa	86	80	73	110	102	97	92	85	78	115	107	101
7	Pf	kW	536	514	490	611	587	571	554	531	507	628	604	587
	Pa	kW	150	163	177	340	356	367	158	171	186	357	374	386
	qw	l/s	25,7	24,7	23,5	29,4	28,2	27,4	26,6	25,5	24,3	30,2	29,0	28,2
	dpw	kPa	96	89	82	122	114	108	102	95	87	129	120	114
9	Pf	kW	567	544	520	646	622	605	586	562	537	664	639	622
	Pa	kW	155	168	182	351	367	378	163	176	191	369	386	397
	qw	l/s	27,3	26,2	25,0	31,1	30,0	29,1	28,2	27,1	25,8	32,0	30,8	29,9
	dpw	kPa	107	99	91	135	126	120	113	105	97	142	133	126
11	Pf	kW	599	575	550	682	657	622	619	594	568	701	675	630
	Pa	kW	160	173	187	362	378	358	168	182	197	381	398	363
	qw	l/s	28,9	27,7	26,5	32,9	31,7	30,0	29,8	28,6	27,4	33,8	32,6	30,4
	dpw	kPa	118	110	101	150	140	126	125	117	107	157	147	129
13	Pf	kW	632	607	582	718	684	628	652	627	600	738	699	639
	Pa	kW	165	178	193	374	376	329	173	187	202	393	390	336
	qw	l/s	30,5	29,3	28,0	34,7	33,1	30,3	31,5	30,3	29,0	35,7	33,8	30,8
	dpw	kPa	130	121	112	165	151	129	138	129	119	173	157	133
15	Pf	kW	665	640	614	755	678	608	687	661	633	775	690	619
	Pa	kW	170	184	198	386	329	277	179	193	208	406	336	284
	qw	l/s	32,2	30,9	29,6	36,5	32,8	29,4	33,2	31,9	30,6	37,5	33,3	29,9
	dpw	kPa	143	134	124	181	149	122	152	142	131	190	153	126

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			570						
Twout		**Tain**	**25**	**30**	**35**	**40**	**43**	**45**	
5	Pf	kW	585	559	531	649	620	601	
	Pa	kW	177	193	211	408	431	446	
	qw	l/s	28,0	26,8	25,4	31,1	29,7	28,8	
	dpw	kPa	62	57	52	74	69	65	
7	Pf	kW	619	593	565	687	658	638	
	Pa	kW	183	199	216	421	442	458	
	qw	l/s	29,7	28,4	27,1	33,0	31,6	30,6	
	dpw	kPa	69	63	58	83	77	72	
9	Pf	kW	655	627	598	726	696	676	
	Pa	kW	189	205	223	435	455	471	
	qw	l/s	31,4	30,1	28,7	34,9	33,5	32,5	
	dpw	kPa	76	70	65	92	85	80	
11	Pf	kW	691	663	633	765	694	642	
	Pa	kW	195	211	229	449	392	353	
	qw	l/s	33,2	31,9	30,4	36,8	33,3	30,8	
	dpw	kPa	84	78	72	101	84	73	
13	Pf	kW	728	699	668	792	706	638	
	Pa	kW	201	218	236	440	367	315	
	qw	l/s	35,1	33,6	32,1	38,2	34,0	30,7	
	dpw	kPa	92	86	79	108	87	73	
15	Pf	kW	766	736	704	793	690	619	
	Pa	kW	207	224	242	391	314	271	
	qw	l/s	36,9	35,5	33,9	38,2	33,2	29,8	
	dpw	kPa	101	94	87	108	84	69	

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			250						270					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	231	247	262	267	275	300	254	272	288	294	303	330
	Pat	kW	107	96,9	88,4	85,1	76,9	79,0	116	106	96,8	93,3	84,2	86,7
	qw	l/s	11,1	11,9	12,6	12,8	13,2	14,4	12,2	13,1	13,9	14,1	14,5	15,9
	dpw	kPa	22	25	28	29	31	36	26	30	33	34	36	42
38	Pt	kW	233	248	261	266	274	299	256	273	288	293	301	329
	Pat	kW	113	103	93,2	89,8	81,0	83,2	123	112	102	98,4	88,7	91,2
	qw	l/s	11,2	11,9	12,6	12,8	13,2	14,4	12,3	13,1	13,8	14,1	14,5	15,8
	dpw	kPa	23	25	28	29	30	35	27	30	33	34	36	42
40	Pt	kW	233	250	261	265	273	298	256	274	288	292	300	328
	Pat	kW	118	106	96,6	93,0	83,9	86,0	129	117	106	102	91,9	94,4
	qw	l/s	11,2	12,0	12,6	12,8	13,1	14,3	12,3	13,2	13,8	14,1	14,5	15,8
	dpw	kPa	23	26	28	29	30	35	27	30	33	34	36	42
45	Pt	kW	235	249	260	264	271	295	258	274	287	291	298	325
	Pat	kW	130	118	106	101	91,4	93,7	143	129	116	111	100	103
	qw	l/s	11,3	12,0	12,6	12,7	13,1	14,2	12,4	13,2	13,8	14,0	14,4	15,7
	dpw	kPa	23	26	28	28	30	35	27	30	33	34	35	41
50	Pt	kW	236	249	260	263	268	292	260	275	286	290	295	321
	Pat	kW	144	129	116	111	99,7	102	158	142	128	122	109	112
	qw	l/s	11,4	12,1	12,5	12,7	13,0	14,1	12,6	13,3	13,8	14,0	14,3	15,5
	dpw	kPa	23	26	28	28	29	34	28	31	33	34	35	40
55	Pt	kW					266	289					292	318
	Pat	kW					109	111					119	122
	qw	l/s					12,9	14,0					14,2	15,4
	dpw	kPa					29	34					34	40

			290						320					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	276	297	315	320	330	360	264	287	308	317	334	364
	Pat	kW	124	113	104	101	90,9	93,9	135	123	112	109	99,0	102
	qw	l/s	13,2	14,3	15,1	15,4	15,8	17,3	12,7	13,8	14,8	15,2	16,0	17,5
	dpw	kPa	39	44	49	51	54	63	24	28	32	34	37	43
38	Pt	kW	279	298	314	320	329	359	270	291	311	318	334	364
	Pat	kW	132	120	110	106	95,8	98,9	144	131	119	115	105	107
	qw	l/s	13,4	14,3	15,1	15,3	15,8	17,2	13,0	14,0	14,9	15,3	16,1	17,5
	dpw	kPa	40	45	49	51	53	62	25	29	33	34	37	43
40	Pt	kW	279	298	314	319	328	357	274	294	312	319	334	364
	Pat	kW	137	125	114	110	99,3	102	150	137	124	119	108	111
	qw	l/s	13,4	14,3	15,1	15,3	15,8	17,2	13,2	14,1	15,0	15,4	16,1	17,5
	dpw	kPa	40	45	49	50	53	62	26	29	33	34	37	43
45	Pt	kW	281	299	313	318	325	354	283	300	316	322	334	364
	Pat	kW	152	139	125	120	108	111	167	151	137	131	118	121
	qw	l/s	13,5	14,4	15,1	15,3	15,7	17,0	13,7	14,5	15,2	15,5	16,1	17,5
	dpw	kPa	40	45	49	50	52	61	28	31	34	35	37	43
50	Pt	kW	283	300	312	316	322	351	291	306	321	324	334	363
	Pat	kW	169	153	138	132	118	121	185	167	150	144	129	132
	qw	l/s	13,7	14,5	15,1	15,2	15,5	16,9	14,0	14,8	15,5	15,7	16,2	17,5
	dpw	kPa	41	45	49	50	51	60	29	32	35	35	37	43
55	Pt	kW					319	347					333	362
	Pat	kW					129	132					141	144
	qw	l/s					15,4	16,8					16,1	17,5
	dpw	kPa					51	59					37	43

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			340						370					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	275	298	320	329	348	380	303	329	352	362	380	415
	Pat	kW	144	131	119	115	105	108	153	139	127	123	111	114
	qw	l/s	13,2	14,3	15,4	15,8	16,7	18,2	14,6	15,8	16,9	17,4	18,2	19,9
	dpw	kPa	26	30	34	36	40	47	30	34	39	41	45	52
38	Pt	kW	282	303	324	332	349	380	310	333	355	363	380	415
	Pat	kW	153	140	127	122	111	114	163	148	135	130	118	121
	qw	l/s	13,5	14,6	15,6	16,0	16,8	18,3	14,9	16,0	17,1	17,5	18,3	19,9
	dpw	kPa	27	31	35	37	40	47	31	35	40	41	45	52
40	Pt	kW	286	306	326	333	349	381	314	336	357	364	381	415
	Pat	kW	160	146	132	127	115	118	170	155	140	135	122	125
	qw	l/s	13,8	14,7	15,7	16,0	16,8	18,3	15,1	16,2	17,2	17,5	18,3	19,9
	dpw	kPa	28	32	36	37	40	47	32	36	40	41	45	52
45	Pt	kW	296	314	331	337	350	381	324	343	361	367	380	414
	Pat	kW	178	161	146	140	126	129	189	172	155	148	133	137
	qw	l/s	14,3	15,1	15,9	16,2	16,9	18,4	15,6	16,5	17,4	17,7	18,3	20,0
	dpw	kPa	30	33	37	38	40	47	34	37	41	42	45	52
50	Pt	kW	306	321	335	340	351	381	332	349	364	370	380	413
	Pat	kW	198	179	161	154	138	141	210	190	171	163	146	149
	qw	l/s	14,8	15,5	16,2	16,4	16,9	18,4	16,0	16,9	17,6	17,8	18,3	19,9
	dpw	kPa	32	35	37	38	41	47	35	38	41	43	45	52
55	Pt	kW					351	381					379	412
	Pat	kW					151	154					160	163
	qw	l/s					17,0	18,4					18,3	19,9
	dpw	kPa					41	47					45	52

			380						410					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	333	361	386	395	413	451	372	382	401	412	441	485
	Pat	kW	164	149	136	132	119	123	180	163	148	144	131	136
	qw	l/s	16,0	17,3	18,5	19,0	19,8	21,6	17,8	18,3	19,2	19,8	21,2	23,3
	dpw	kPa	35	41	46	48	52	60	43	45	49	51	58	69
38	Pt	kW	339	365	388	396	413	450	375	386	405	415	443	486
	Pat	kW	175	159	145	139	126	130	192	174	158	152	139	143
	qw	l/s	16,3	17,5	18,6	19,0	19,8	21,6	18,0	18,5	19,4	19,9	21,3	23,3
	dpw	kPa	36	41	46	48	52	60	44	46	50	52	59	69
40	Pt	kW	343	367	389	397	413	450	378	389	408	418	444	486
	Pat	kW	183	166	150	145	131	134	201	181	164	158	144	148
	qw	l/s	16,5	17,7	18,7	19,1	19,8	21,6	18,2	18,7	19,6	20,1	21,3	23,4
	dpw	kPa	37	42	46	48	52	60	44	46	51	53	59	69
45	Pt	kW	353	373	392	399	412	449	385	396	414	423	445	487
	Pat	kW	203	184	166	159	143	147	222	201	181	174	157	162
	qw	l/s	17,0	18,0	18,9	19,2	19,8	21,6	18,5	19,1	20,0	20,4	21,4	23,4
	dpw	kPa	39	43	47	49	51	60	46	48	52	54	59	69
50	Pt	kW	360	379	395	400	411	447	392	404	421	428	446	486
	Pat	kW	226	203	183	175	156	160	246	222	200	191	172	177
	qw	l/s	17,4	18,3	19,1	19,3	19,8	21,5	18,9	19,5	20,3	20,7	21,5	23,4
	dpw	kPa	40	44	48	49	51	60	47	50	54	55	59	69
55	Pt	kW					409	444					445	485
	Pat	kW					171	175					188	192
	qw	l/s					19,8	21,5					21,5	23,4
	dpw	kPa					51	59					59	69

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			440						460					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	389	398	415	426	459	504	379	412	444	455	478	522
	Pat	kW	192	173	157	152	139	143	187	171	157	152	139	143
	qw	l/s	18,7	19,1	19,9	20,5	22,0	24,2	18,2	19,8	21,3	21,9	23,0	25,1
	dpw	kPa	47	48	52	55	62	74	28	33	37	39	42	50
38	Pt	kW	393	403	420	431	461	506	386	417	446	457	478	522
	Pat	kW	205	185	167	161	147	151	199	182	166	161	146	151
	qw	l/s	18,9	19,3	20,2	20,7	22,1	24,3	18,6	20,1	21,4	22,0	23,0	25,1
	dpw	kPa	47	50	53	56	63	74	29	33	38	39	42	50
40	Pt	kW	396	406	424	434	462	507	390	421	448	458	478	521
	Pat	kW	213	193	174	167	152	157	208	190	173	167	152	156
	qw	l/s	19,0	19,5	20,4	20,9	22,2	24,3	18,8	20,2	21,5	22,0	23,0	25,1
	dpw	kPa	48	50	54	57	63	75	30	34	38	39	42	50
45	Pt	kW	405	415	432	441	465	509	405	428	452	460	477	519
	Pat	kW	237	213	193	185	167	172	231	210	190	183	165	170
	qw	l/s	19,5	20,0	20,8	21,2	22,4	24,5	19,6	20,7	21,8	22,2	23,0	25,0
	dpw	kPa	50	52	56	58	64	75	32	35	38	40	42	49
50	Pt	kW	413	424	440	448	467	510	412	436	459	462	477	517
	Pat	kW	263	237	213	204	183	188	256	232	209	201	180	185
	qw	l/s	19,9	20,5	21,2	21,6	22,5	24,6	19,9	21,1	22,1	22,3	23,0	25,0
	dpw	kPa	52	54	58	60	65	76	33	36	40	40	42	49
55	Pt	kW					468	509					473	515
	Pat	kW					200	205					197	201
	qw	l/s					22,6	24,6					22,9	24,9
	dpw	kPa					65	76					42	49

			510						520					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	430	468	502	514	536	586	458	497	532	544	566	619
	Pat	kW	202	185	170	164	150	154	211	194	178	172	157	161
	qw	l/s	20,7	22,5	24,1	24,6	25,7	28,1	22,0	23,8	25,5	26,1	27,1	29,6
	dpw	kPa	43	50	56	59	64	75	48	55	63	65	70	82
38	Pt	kW	437	472	503	514	535	585	464	500	532	544	565	617
	Pat	kW	215	196	180	174	158	162	225	206	188	182	165	170
	qw	l/s	21,0	22,7	24,2	24,7	25,7	28,1	22,3	24,0	25,6	26,1	27,1	29,6
	dpw	kPa	44	51	57	59	63	74	49	56	63	65	70	82
40	Pt	kW	441	475	504	515	535	584	468	503	533	544	564	615
	Pat	kW	224	205	186	180	163	168	235	215	196	189	171	176
	qw	l/s	21,2	22,8	24,2	24,7	25,7	28,0	22,5	24,2	25,6	26,1	27,1	29,5
	dpw	kPa	45	51	57	59	63	74	50	57	63	65	70	81
45	Pt	kW	454	483	506	515	533	581	478	512	535	544	561	612
	Pat	kW	249	226	205	197	178	183	261	237	215	206	186	191
	qw	l/s	21,9	23,3	24,4	24,8	25,6	27,9	23,0	24,7	25,7	26,2	27,0	29,4
	dpw	kPa	47	53	58	59	63	74	52	59	63	65	69	81
50	Pt	kW	459	487	511	516	532	577	484	513	537	544	558	607
	Pat	kW	276	250	225	216	194	199	289	262	236	226	203	208
	qw	l/s	22,2	23,5	24,7	24,9	25,6	27,8	23,4	24,7	25,9	26,2	26,9	29,3
	dpw	kPa	48	54	59	60	63	73	53	59	64	65	68	80
55	Pt	kW					526	574					553	602
	Pat	kW					211	216					221	227
	qw	l/s					25,4	27,7					26,7	29,1
	dpw	kPa					62	72					67	78

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			580						
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	
35	Pt	kW	495	538	577	592	620	677	
	Pat	kW	236	215	198	191	173	179	
	qw	l/s	23,8	25,8	27,7	28,4	29,7	32,4	
	dpw	kPa	40	46	52	55	59	69	
38	Pt	kW	504	544	580	593	619	675	
	Pat	kW	252	230	209	202	183	188	
	qw	l/s	24,2	26,2	27,9	28,5	29,7	32,4	
	dpw	kPa	41	47	53	55	59	69	
40	Pt	kW	510	548	582	594	619	675	
	Pat	kW	263	240	218	210	190	195	
	qw	l/s	24,5	26,4	28,0	28,6	29,8	32,4	
	dpw	kPa	42	48	53	55	59	69	
45	Pt	kW	534	558	587	597	618	673	
	Pat	kW	293	266	240	230	208	213	
	qw	l/s	25,7	26,9	28,3	28,8	29,7	32,4	
	dpw	kPa	45	49	54	56	59	69	
50	Pt	kW	537	571	591	600	616	671	
	Pat	kW	325	294	265	254	227	233	
	qw	l/s	25,9	27,5	28,5	28,9	29,7	32,3	
	dpw	kPa	46	51	55	56	59	68	
55	Pt	kW					615	667	
	Pat	kW					248	254	
	qw	l/s					29,8	32,2	
	dpw	kPa					59	68	

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			250						270					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	231	247	262	267	275	300	254	272	288	294	303	330
	Pat	kW	107	96,9	88,4	85,1	76,9	79,0	116	106	96,8	93,3	84,2	86,7
	qw	l/s	11,1	11,9	12,6	12,8	13,2	14,4	12,2	13,1	13,9	14,1	14,5	15,9
	dpw	kPa	22	25	28	29	31	36	26	30	33	34	36	42
38	Pt	kW	233	248	261	266	274	299	256	273	288	293	301	329
	Pat	kW	113	103	93,2	89,8	81,0	83,2	123	112	102	98,4	88,7	91,2
	qw	l/s	11,2	11,9	12,6	12,8	13,2	14,4	12,3	13,1	13,8	14,1	14,5	15,8
	dpw	kPa	23	25	28	29	30	35	27	30	33	34	36	42
40	Pt	kW	233	250	261	265	273	298	256	274	288	292	300	328
	Pat	kW	118	106	96,6	93,0	83,9	86,0	129	117	106	102	91,9	94,4
	qw	l/s	11,2	12,0	12,6	12,8	13,1	14,3	12,3	13,2	13,8	14,1	14,5	15,8
	dpw	kPa	23	26	28	29	30	35	27	30	33	34	36	42
45	Pt	kW	235	249	260	264	271	295	258	274	287	291	298	325
	Pat	kW	130	118	106	101	91,4	93,7	143	129	116	111	100	103
	qw	l/s	11,3	12,0	12,6	12,7	13,1	14,2	12,4	13,2	13,8	14,0	14,4	15,7
	dpw	kPa	23	26	28	28	30	35	27	30	33	34	35	41
50	Pt	kW	236	249	260	263	268	292	260	275	286	290	295	321
	Pat	kW	144	129	116	111	99,7	102	158	142	128	122	109	112
	qw	l/s	11,4	12,1	12,5	12,7	13,0	14,1	12,6	13,3	13,8	14,0	14,3	15,5
	dpw	kPa	23	26	28	28	29	34	28	31	33	34	35	40
55	Pt	kW					266	289					292	318
	Pat	kW					109	111					119	122
	qw	l/s					12,9	14,0					14,2	15,4
	dpw	kPa					29	34					34	40

			290						320					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	276	297	315	320	330	360	264	287	308	317	334	364
	Pat	kW	124	113	104	101	90,9	93,9	135	123	112	109	99,0	102
	qw	l/s	13,2	14,3	15,1	15,4	15,8	17,3	12,7	13,8	14,8	15,2	16,0	17,5
	dpw	kPa	39	44	49	51	54	63	24	28	32	34	37	43
38	Pt	kW	279	298	314	320	329	359	270	291	311	318	334	364
	Pat	kW	132	120	110	106	95,8	98,9	144	131	119	115	105	107
	qw	l/s	13,4	14,3	15,1	15,3	15,8	17,2	13,0	14,0	14,9	15,3	16,1	17,5
	dpw	kPa	40	45	49	51	53	62	25	29	33	34	37	43
40	Pt	kW	279	298	314	319	328	357	274	294	312	319	334	364
	Pat	kW	137	125	114	110	99,3	102	150	137	124	119	108	111
	qw	l/s	13,4	14,3	15,1	15,3	15,8	17,2	13,2	14,1	15,0	15,4	16,1	17,5
	dpw	kPa	40	45	49	50	53	62	26	29	33	34	37	43
45	Pt	kW	281	299	313	318	325	354	283	300	316	322	334	364
	Pat	kW	152	139	125	120	108	111	167	151	137	131	118	121
	qw	l/s	13,5	14,4	15,1	15,3	15,7	17,0	13,7	14,5	15,2	15,5	16,1	17,5
	dpw	kPa	40	45	49	50	52	61	28	31	34	35	37	43
50	Pt	kW	283	300	312	316	322	351	291	306	321	324	334	363
	Pat	kW	169	153	138	132	118	121	185	167	150	144	129	132
	qw	l/s	13,7	14,5	15,1	15,2	15,5	16,9	14,0	14,8	15,5	15,7	16,2	17,5
	dpw	kPa	41	45	49	50	51	60	29	32	35	35	37	43
55	Pt	kW					319	347					333	362
	Pat	kW					129	132					141	144
	qw	l/s					15,4	16,8					16,1	17,5
	dpw	kPa					51	59					37	43

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			330						360					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	275	298	320	329	348	380	303	329	352	362	380	415
	Pat	kW	144	131	119	115	105	108	153	139	127	123	111	114
	qw	l/s	13,2	14,3	15,4	15,8	16,7	18,2	14,6	15,8	16,9	17,4	18,2	19,9
	dpw	kPa	26	30	34	36	40	47	30	34	39	41	45	52
38	Pt	kW	282	303	324	332	349	380	310	333	355	363	380	415
	Pat	kW	153	140	127	122	111	114	163	148	135	130	118	121
	qw	l/s	13,5	14,6	15,6	16,0	16,8	18,3	14,9	16,0	17,1	17,5	18,3	19,9
	dpw	kPa	27	31	35	37	40	47	31	35	40	41	45	52
40	Pt	kW	286	306	326	333	349	381	314	336	357	364	381	415
	Pat	kW	160	146	132	127	115	118	170	155	140	135	122	125
	qw	l/s	13,8	14,7	15,7	16,0	16,8	18,3	15,1	16,2	17,2	17,5	18,3	19,9
	dpw	kPa	28	32	36	37	40	47	32	36	40	41	45	52
45	Pt	kW	296	314	331	337	350	381	324	343	361	367	380	414
	Pat	kW	178	161	146	140	126	129	189	172	155	148	133	137
	qw	l/s	14,3	15,1	15,9	16,2	16,9	18,4	15,6	16,5	17,4	17,7	18,3	20,0
	dpw	kPa	30	33	37	38	40	47	34	37	41	42	45	52
50	Pt	kW	306	321	335	340	351	381	332	349	364	370	380	413
	Pat	kW	198	179	161	154	138	141	210	190	171	163	146	149
	qw	l/s	14,8	15,5	16,2	16,4	16,9	18,4	16,0	16,9	17,6	17,8	18,3	19,9
	dpw	kPa	32	35	37	38	41	47	35	38	41	43	45	52
55	Pt	kW					351	381					379	412
	Pat	kW					151	154					160	163
	qw	l/s					17,0	18,4					18,3	19,9
	dpw	kPa					41	47					45	52

			370						400					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	333	361	386	395	413	451	372	382	401	412	441	485
	Pat	kW	164	149	136	132	119	123	180	163	148	144	131	136
	qw	l/s	16,0	17,3	18,5	19,0	19,8	21,6	17,8	18,3	19,2	19,8	21,2	23,3
	dpw	kPa	35	41	46	48	52	60	43	45	49	51	58	69
38	Pt	kW	339	365	388	396	413	450	375	386	405	415	443	486
	Pat	kW	175	159	145	139	126	130	192	174	158	152	139	143
	qw	l/s	16,3	17,5	18,6	19,0	19,8	21,6	18,0	18,5	19,4	19,9	21,3	23,3
	dpw	kPa	36	41	46	48	52	60	44	46	50	52	59	69
40	Pt	kW	343	367	389	397	413	450	378	389	408	418	444	486
	Pat	kW	183	166	150	145	131	134	201	181	164	158	144	148
	qw	l/s	16,5	17,7	18,7	19,1	19,8	21,6	18,2	18,7	19,6	20,1	21,3	23,4
	dpw	kPa	37	42	46	48	52	60	44	46	51	53	59	69
45	Pt	kW	353	373	392	399	412	449	385	396	414	423	445	487
	Pat	kW	203	184	166	159	143	147	222	201	181	174	157	162
	qw	l/s	17,0	18,0	18,9	19,2	19,8	21,6	18,5	19,1	20,0	20,4	21,4	23,4
	dpw	kPa	39	43	47	49	51	60	46	48	52	54	59	69
50	Pt	kW	360	379	395	400	411	447	392	404	421	428	446	486
	Pat	kW	226	203	183	175	156	160	246	222	200	191	172	177
	qw	l/s	17,4	18,3	19,1	19,3	19,8	21,5	18,9	19,5	20,3	20,7	21,5	23,4
	dpw	kPa	40	44	48	49	51	60	47	50	54	55	59	69
55	Pt	kW					409	444					445	485
	Pat	kW					171	175					188	192
	qw	l/s					19,8	21,5					21,5	23,4
	dpw	kPa					51	59					59	69

EWYD BZ-SL

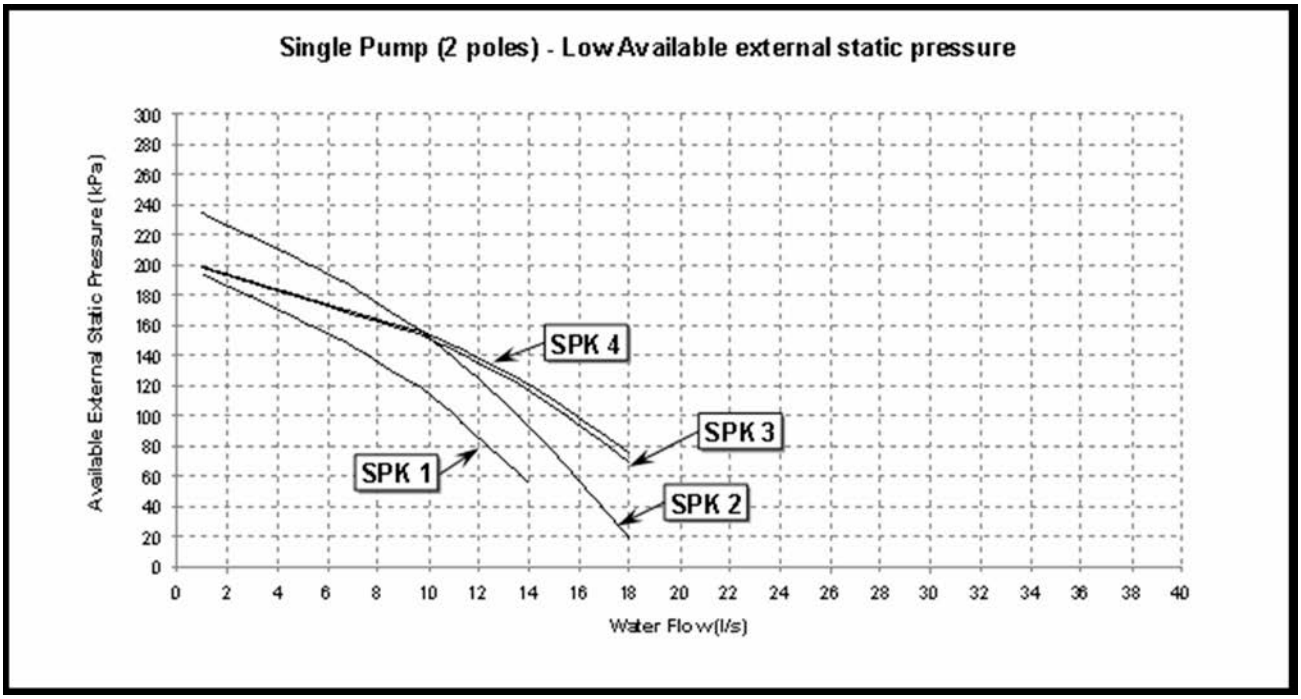
			430						450					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	389	398	415	426	459	504	379	412	444	455	478	522
	Pat	kW	192	173	157	152	139	143	187	171	157	152	139	143
	qw	l/s	18,7	19,1	19,9	20,5	22,0	24,2	18,2	19,8	21,3	21,9	23,0	25,1
	dpw	kPa	47	48	52	55	62	74	28	33	37	39	42	50
38	Pt	kW	393	403	420	431	461	506	386	417	446	457	478	522
	Pat	kW	205	185	167	161	147	151	199	182	166	161	146	151
	qw	l/s	18,9	19,3	20,2	20,7	22,1	24,3	18,6	20,1	21,4	22,0	23,0	25,1
	dpw	kPa	47	50	53	56	63	74	29	33	38	39	42	50
40	Pt	kW	396	406	424	434	462	507	390	421	448	458	478	521
	Pat	kW	213	193	174	167	152	157	208	190	173	167	152	156
	qw	l/s	19,0	19,5	20,4	20,9	22,2	24,3	18,8	20,2	21,5	22,0	23,0	25,1
	dpw	kPa	48	50	54	57	63	75	30	34	38	39	42	50
45	Pt	kW	405	415	432	441	465	509	405	428	452	460	477	519
	Pat	kW	237	213	193	185	167	172	231	210	190	183	165	170
	qw	l/s	19,5	20,0	20,8	21,2	22,4	24,5	19,6	20,7	21,8	22,2	23,0	25,0
	dpw	kPa	50	52	56	58	64	75	32	35	38	40	42	49
50	Pt	kW	413	424	440	448	467	510	412	436	459	462	477	517
	Pat	kW	263	237	213	204	183	188	256	232	209	201	180	185
	qw	l/s	19,9	20,5	21,2	21,6	22,5	24,6	19,9	21,1	22,1	22,3	23,0	25,0
	dpw	kPa	52	54	58	60	65	76	33	36	40	40	42	49
55	Pt	kW					468	509					473	515
	Pat	kW					200	205					197	201
	qw	l/s					22,6	24,6					22,9	24,9
	dpw	kPa					65	76					42	49

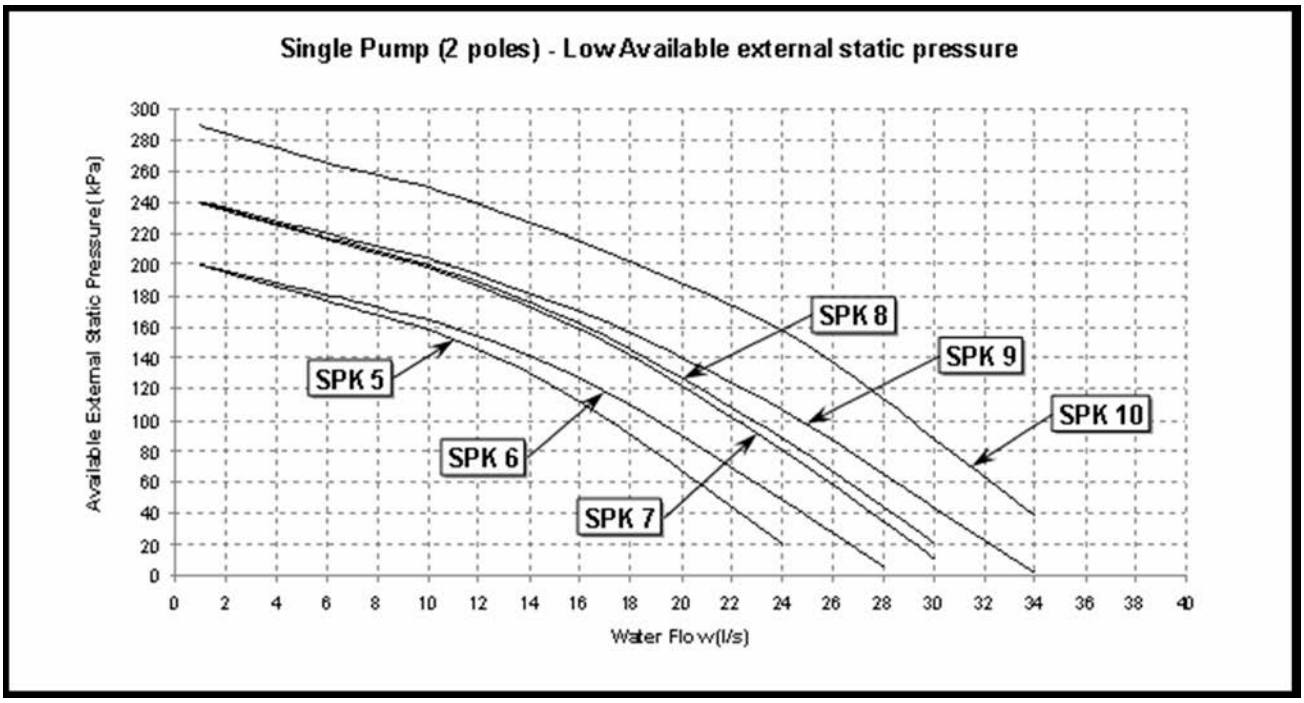
			490						510					
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	**-10**	**-5**	**0**	**2**	**7**	**10**
35	Pt	kW	430	468	502	514	536	586	458	497	532	544	566	619
	Pat	kW	202	185	170	164	150	154	211	194	178	172	157	161
	qw	l/s	20,7	22,5	24,1	24,6	25,7	28,1	22,0	23,8	25,5	26,1	27,1	29,6
	dpw	kPa	43	50	56	59	64	75	48	55	63	65	70	82
38	Pt	kW	437	472	503	514	535	585	464	500	532	544	565	617
	Pat	kW	215	196	180	174	158	162	225	206	188	182	165	170
	qw	l/s	21,0	22,7	24,2	24,7	25,7	28,1	22,3	24,0	25,6	26,1	27,1	29,6
	dpw	kPa	44	51	57	59	63	74	49	56	63	65	70	82
40	Pt	kW	441	475	504	515	535	584	468	503	533	544	564	615
	Pat	kW	224	205	186	180	163	168	235	215	196	189	171	176
	qw	l/s	21,2	22,8	24,2	24,7	25,7	28,0	22,5	24,2	25,6	26,1	27,1	29,5
	dpw	kPa	45	51	57	59	63	74	50	57	63	65	70	81
45	Pt	kW	454	483	506	515	533	581	478	512	535	544	561	612
	Pat	kW	249	226	205	197	178	183	261	237	215	206	186	191
	qw	l/s	21,9	23,3	24,4	24,8	25,6	27,9	23,0	24,7	25,7	26,2	27,0	29,4
	dpw	kPa	47	53	58	59	63	74	52	59	63	65	69	81
50	Pt	kW	459	487	511	516	532	577	484	513	537	544	558	607
	Pat	kW	276	250	225	216	194	199	289	262	236	226	203	208
	qw	l/s	22,2	23,5	24,7	24,9	25,6	27,8	23,4	24,7	25,9	26,2	26,9	29,3
	dpw	kPa	48	54	59	60	63	73	53	59	64	65	68	80
55	Pt	kW					526	574					553	602
	Pat	kW					211	216					221	227
	qw	l/s					25,4	27,7					26,7	29,1
	dpw	kPa					62	72					67	78

EWYD BZ-SL

			570						
Twout		**Tain**	**-10**	**-5**	**0**	**2**	**7**	**10**	
35	Pt	kW	495	538	577	592	620	677	
	Pat	kW	236	215	198	191	173	179	
	qw	l/s	23,8	25,8	27,7	28,4	29,7	32,4	
	dpw	kPa	40	46	52	55	59	69	
38	Pt	kW	504	544	580	593	619	675	
	Pat	kW	252	230	209	202	183	188	
	qw	l/s	24,2	26,2	27,9	28,5	29,7	32,4	
	dpw	kPa	41	47	53	55	59	69	
40	Pt	kW	510	548	582	594	619	675	
	Pat	kW	263	240	218	210	190	195	
	qw	l/s	24,5	26,4	28,0	28,6	29,8	32,4	
	dpw	kPa	42	48	53	55	59	69	
45	Pt	kW	534	558	587	597	618	673	
	Pat	kW	293	266	240	230	208	213	
	qw	l/s	25,7	26,9	28,3	28,8	29,7	32,4	
	dpw	kPa	45	49	54	56	59	69	
50	Pt	kW	537	571	591	600	616	671	
	Pat	kW	325	294	265	254	227	233	
	qw	l/s	25,9	27,5	28,5	28,9	29,7	32,3	
	dpw	kPa	46	51	55	56	59	68	
55	Pt	kW					615	667	
	Pat	kW					248	254	
	qw	l/s					29,8	32,2	
	dpw	kPa					59	68	

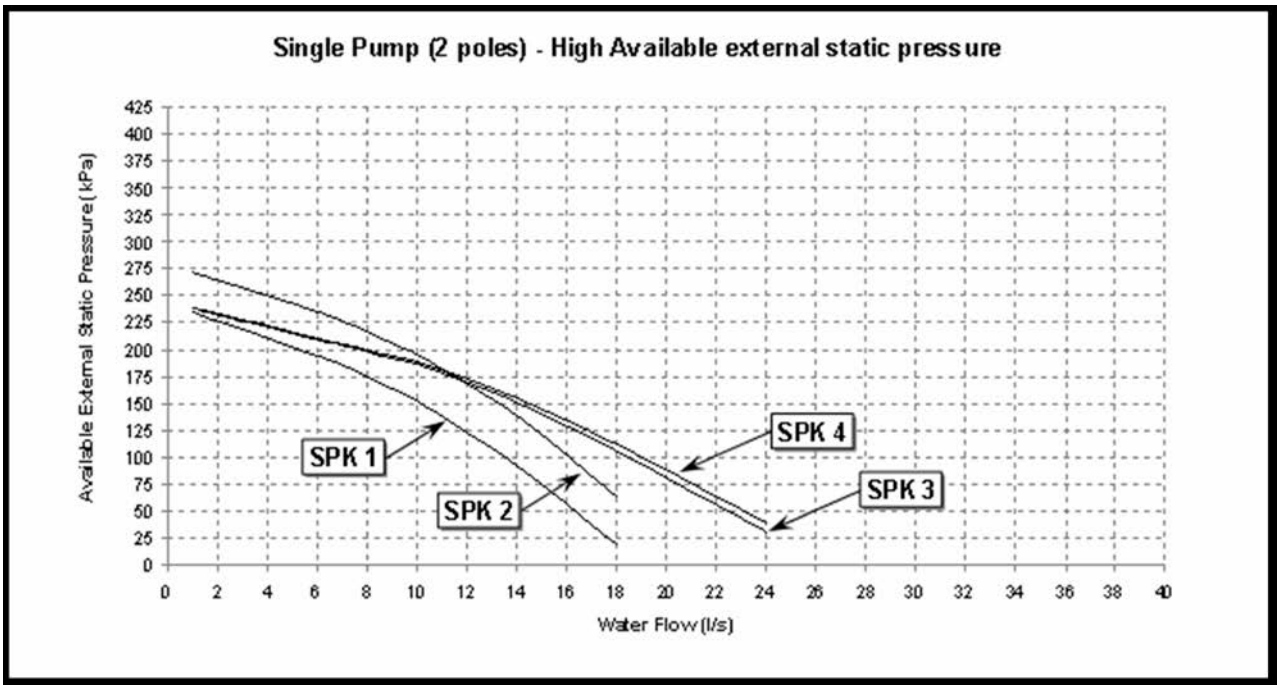
Water Pump Kit

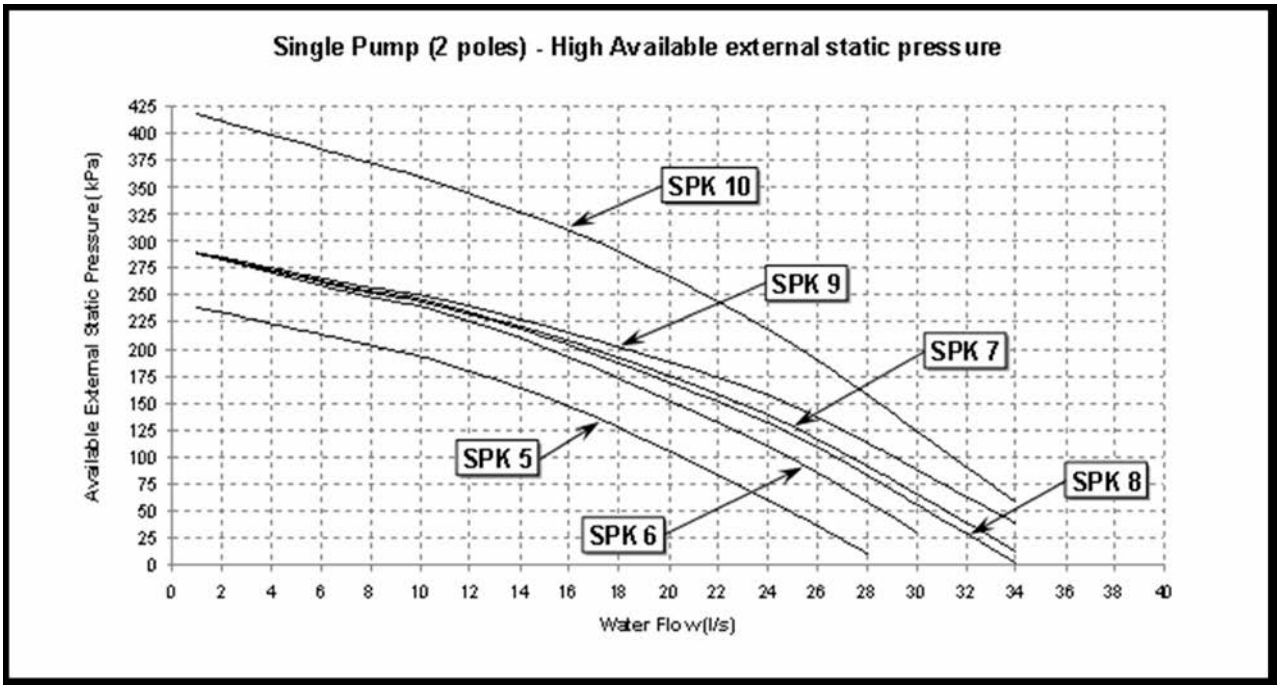




Pump Kit	SPK1	SPK2	SPK3	SPK4		SPK5		SPK6	SPK7	SPK8	SPK9	SPK10	
Size EWYD~BZSS	250	270	290	320	340	370	380	410	440	460	510	520	580
Size EWYD~BZSL	250	270	290	320	330	360	370	400	430	450	490	510	570

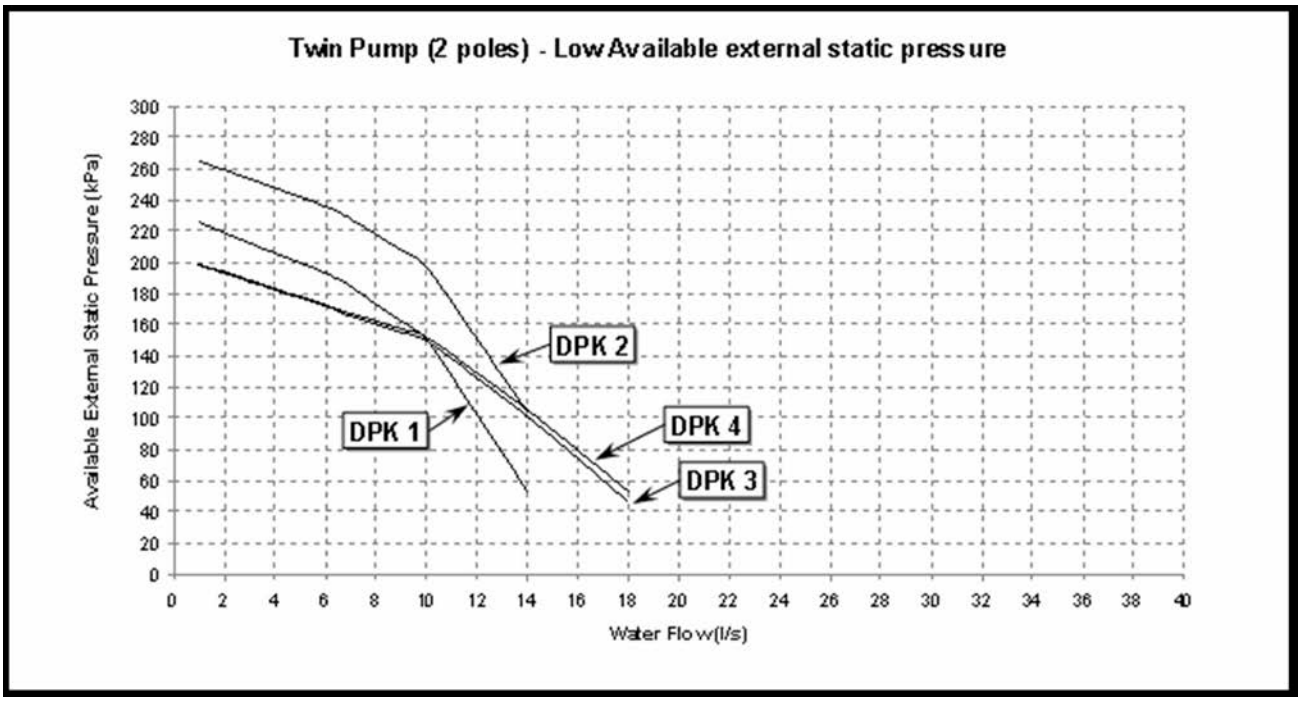
Note
- when using mixture of water and glycol please contact the factory as above specification can change

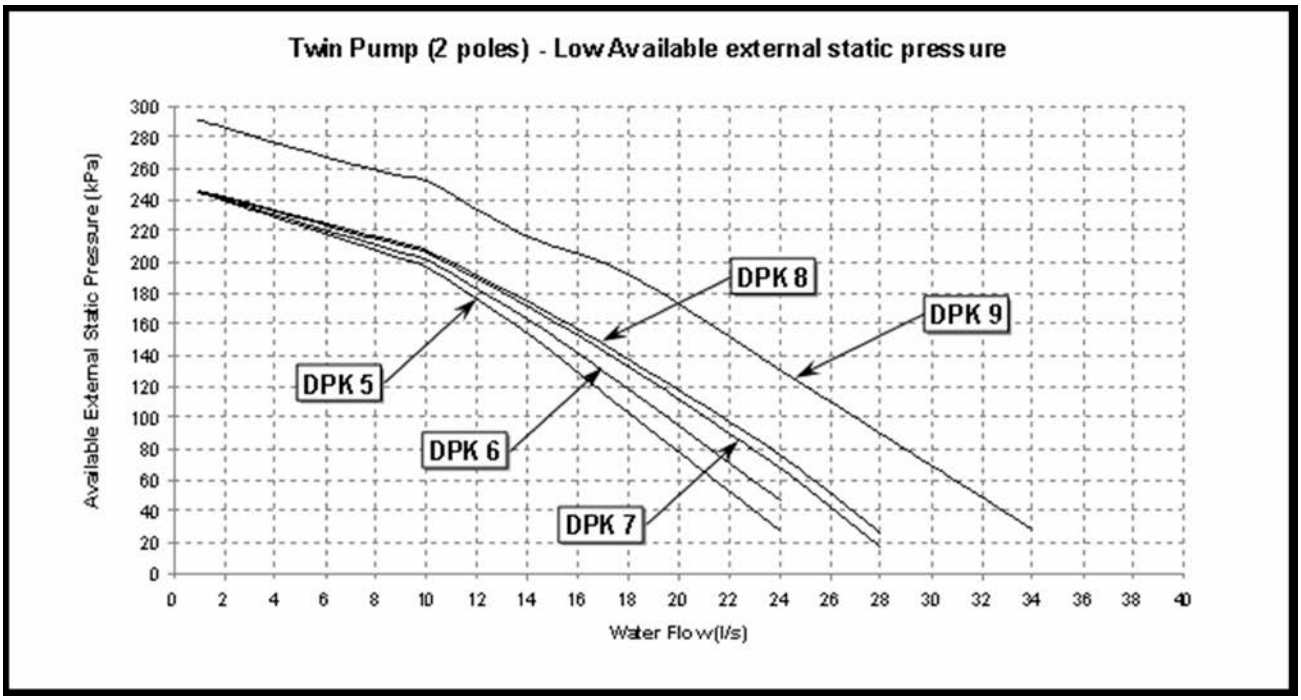




Pump Kit	SPK1	SPK2	SPK3	SPK4		SPK5	SPK6	SPK7		SPK8	SPK9	SPK10	
Size EWYD~BZSS	250	270	290	320	340	370	380	410	440	460	510	520	580
Size EWYD~BZSL	250	270	290	320	330	360	370	400	430	450	490	510	570

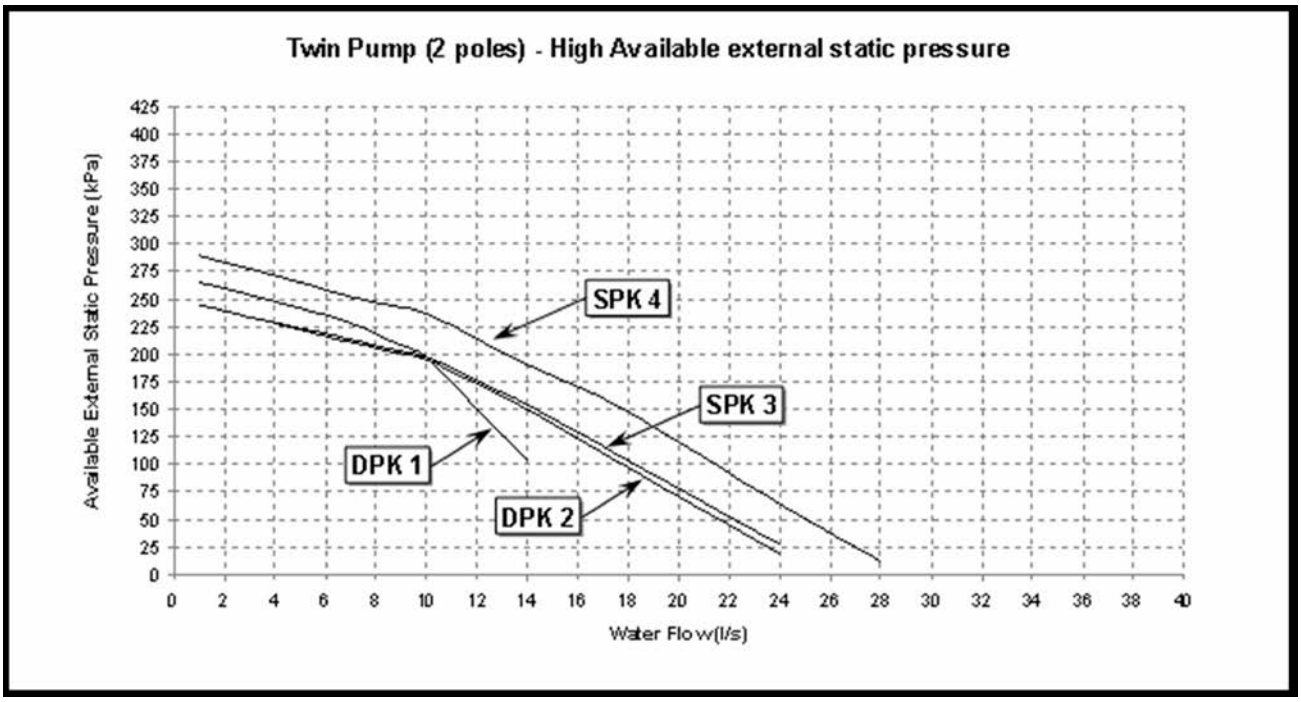
Note
- when using mixture of water and glycol please contact the factory as above specification can change

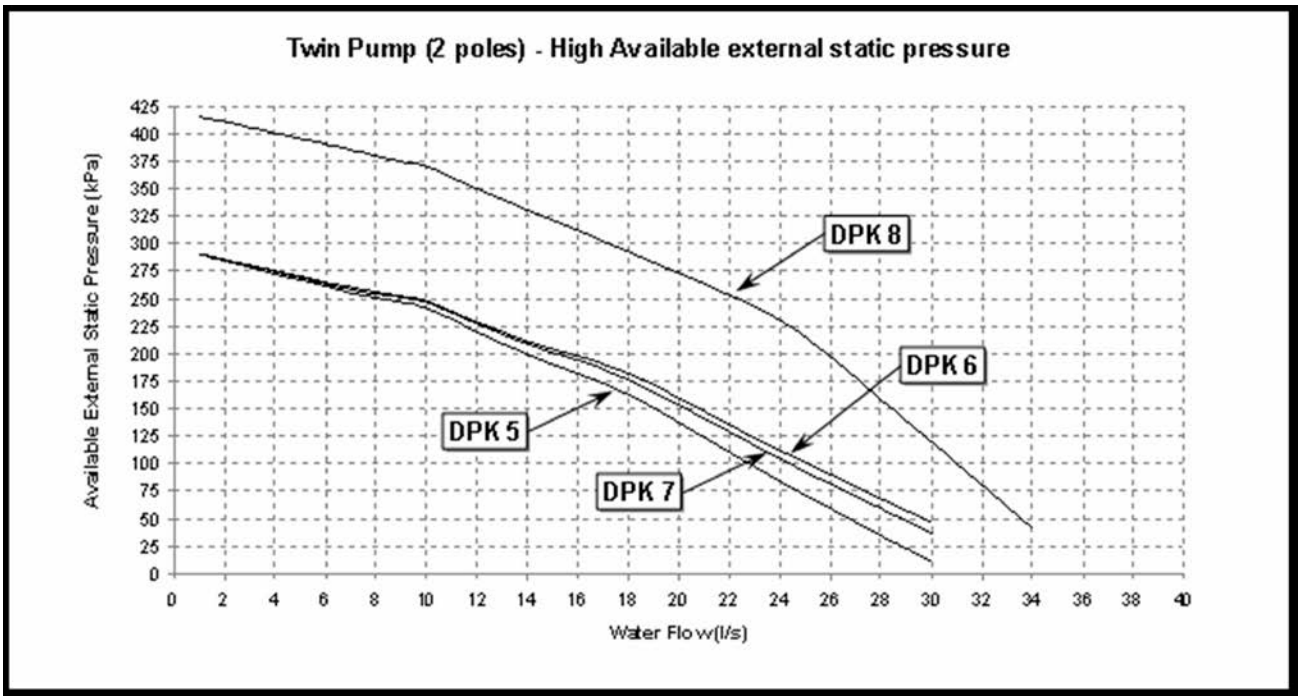




Pump Kit	DPK1	DPK2	DPK3	DPK4	DPK5	DPK6		DPK7		DPK8	DPK9		
Size EWYD~BZSS	250	270	290	320	340	370	380	410	440	460	510	520	580
Size EWYD~BZSL	250	270	290	320	330	360	370	400	430	450	490	510	570

Note
- when using mixture of water and glycol please contact the factory as above specification can change





Pump Kit	DPK1	DPK2		DPK3	DPK4	DPK5		DPK6		DPK7	DPK8		
Size EWYD~BZSS	250	270	290	320	340	370	380	410	440	460	510	520	580
Size EWYD~BZSL	250	270	290	320	330	360	370	400	430	450	490	510	570

Note
- when using mixture of water and glycol please contact the factory as above specification can change

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Water Pump Kit - Technical Information

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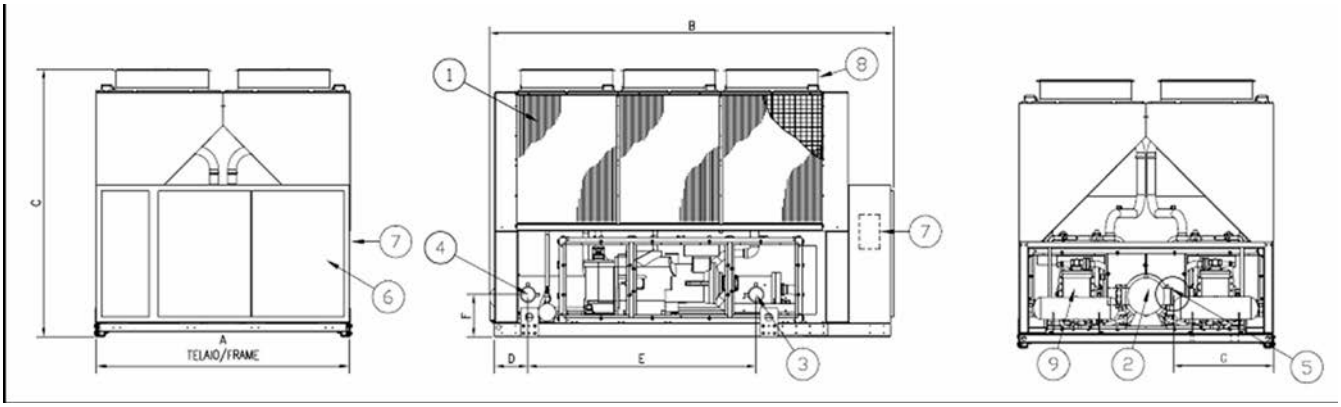
		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump Low Available Static Pressure	SPK 1	2.2	5.0	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 2	3.0	6.3	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 3	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 4	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 5	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 6	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 7	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 8	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 9	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 10	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
Single Pump High Available Static Pressure	SPK 1	3.0	6.3	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 2	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 3	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 4	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 5	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 6	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 7	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 8	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 9	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 10	11.0	20.2	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump High Available Static Pressure	SPK 1	3.0	6.3	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 2	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 3	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 4	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 5	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 6	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 7	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 8	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 9	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	SPK 10	11.0	20.2	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
Double Pump Hihg Available Static Pressure	DPK 1	4.0	7.7	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 2	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 3	5.5	10.4	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 4	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 5	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 6	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 7	7.5	13.9	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 8	11.0	20.2	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130
	DPK 9	11.0	20.2	400V-3ph-50hz	10	IP55	Class F	-10 ÷ 130



LEGEND

1: Air heat exchanger (condenser – evaporator)
2: Water heat exchanger (evaporator – condenser)
3: Evaporator water inlet
4: Evaporator water outlet
5: Victaulic connection
6: Electrical control panel
7: Slot for power and control connection
8: Fan
9: Compressor

	A	B	C	D	E	F	G	H	I	L	M
EWYD250BZSS	2254	3547	2335	288	2000	369	882				
EWYD270BZSS	2254	3547	2335	288	2000	369	882				
EWYD290BZSS	2254	3547	2335	288	2000	369	882				
EWYD320BZSS	2254	4428	2335	289	2000	449	882				
EWYD340BZSS	2254	4428	2335	289	2000	449	882				
EWYD370BZSS	2254	4428	2335	289	2000	449	882				
EWYD380BZSS	2254	4428	2335	289	2000	449	882				
EWYD410BZSS	2254	5329	2335	1190	2000	448	852				
EWYD440BZSS	2254	5329	2335	1190	2000	448	852				
EWYD460BZSS	2254	6659	2280	346	1996	502	710				
EWYD510BZSS	2254	6659	2280	346	1996	502	710				
EWYD520BZSS	2254	6659	2280	346	1996	502	710				
EWYD580BZSS	2254	6659	2280	346	1996	502	710				
EWYD250BZSL	2254	3547	2335	288	2000	369	882				
EWYD270BZSL	2254	3547	2335	288	2000	369	882				
EWYD290BZSL	2254	3547	2335	288	2000	369	882				
EWYD320BZSL	2254	4428	2335	289	2000	449	882				
EWYD330BZSL	2254	4428	2335	289	2000	449	882				
EWYD360BZSL	2254	4428	2335	289	2000	449	882				
EWYD370BZSL	2254	4428	2335	289	2000	449	882				
EWYD400BZSL	2254	5329	2335	1190	2000	448	852				
EWYD430BZSL	2254	5329	2335	1190	2000	448	852				
EWYD450BZSL	2254	6659	2280	346	1996	502	710				
EWYD490BZSL	2254	6659	2280	346	1996	502	710				
EWYD510BZSL	2254	6659	2280	346	1996	502	710				
EWYD570BZSL	2254	6659	2280	346	1996	502	710				

Warning Installation and maintenance of the unit must to be performed only by qualified personnel who have knowledge with local codes and regulations, and experience with this type of equipment. Must be avoided the unit installation in places that could be considered dangerous for all the maintenance operations.

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation.
Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. 'Fig.1' shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should follow the minimum recommended clearance requirements shown in 'Fig.2'. In the event the obstacles are higher than the units, the minimum recommended clearance requirements are shown in 'Fig.3'. Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at a minimum distance from one another as shown in 'Fig.4'; strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

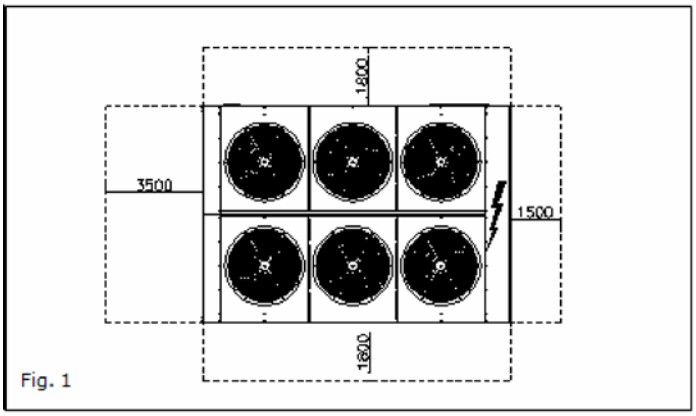


Fig. 1

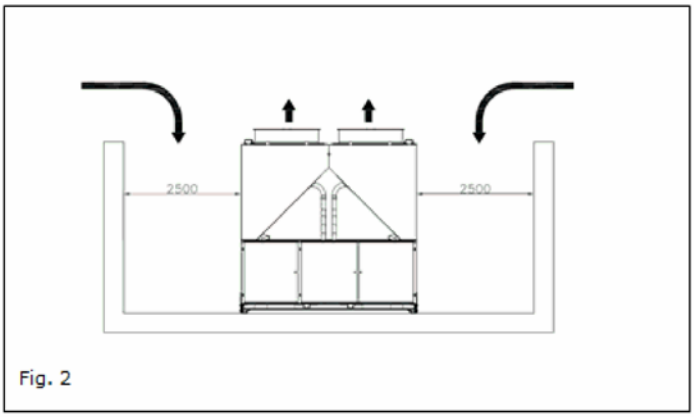


Fig. 2

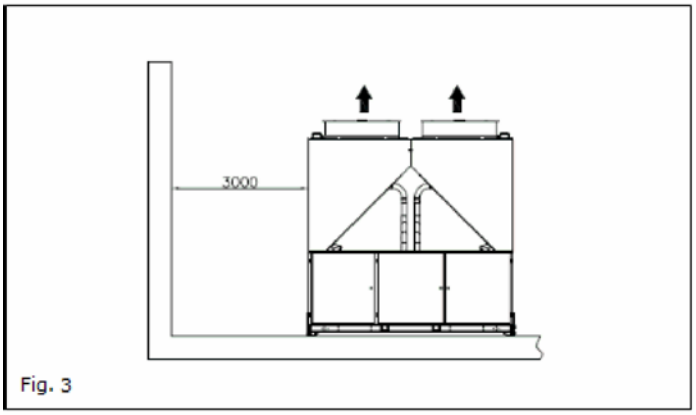


Fig. 3

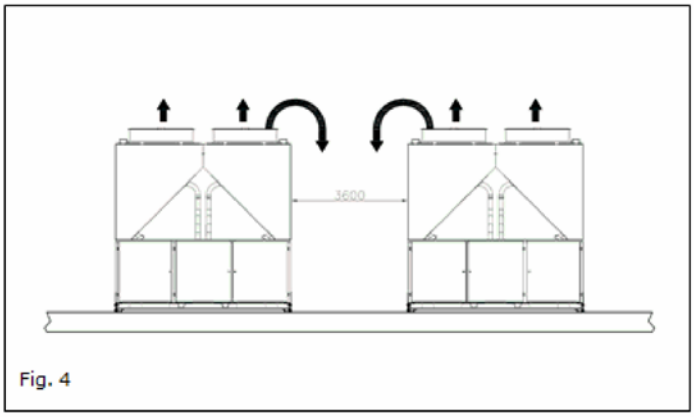


Fig. 4

Acoustic protection When noise level must meet special requirements, it is necessary to pay the maximum attention to ensure the perfect insulation of the unit from the support base by applying appropriate vibration-dampening devices on the unit, on the water pipes and on the electrical connections.

Storage The environment conditions have to be in the following limits:

Minimum ambient temperature: Maximum ambient temperature: Maximum R.H.:	-20°C +57°C 95% not condensing

General The Air to Water Heat Pump will be designed and manufactured in accordance with the following European directives:

• Construction of pressure vessel 97/23/EC (PED)
• Machinery Directive 2006/42/EC
• Low Voltage 2006/95/EC
• Electromagnetic Compatibility 2004/108/EC
• Electrical & Safety codes EN 60204–1 / EN 60335-2-40
• Manufacturing Quality Standards UNI – EN ISO 9001:2004

To avoid any losses, the unit will be tested at full load in the factory (at the nominal working conditions and water temperatures). The Air to Water Heat Pump will be delivered to the job site completely assembled and charged with refrigerant and oil. The installation of the Air to Water Heat Pump must comply with the manufacturer's instructions for rigging and handling equipment.

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only HFC 134a can be used.

Performance

•Number of air to water heat pumps: .....
•Cooling capacity for single air to water heat pump: ..... kW
•Power input for single air to water heat pump in cooling mode: ..... kW
•Shell & tube heat exchanger entering water temperature in cooling mode: ..... °C
•Shell & tube heat exchanger leaving water temperature in cooling mode: ..... °C
•Shell & tube heat exchanger water flow: ..... l/s
•Nominal outside working ambient temperature in cooling mode: ..... °C

•Heating capacity for single air to water heat pump: ..... kW
•Power input for single air to water heat pump in heating mode: ..... kW
•Shell & tube heat exchanger entering water temperature in heating mode: ..... °C
•Shell & tube heat exchanger leaving water temperature in heating mode: ..... °C
•Shell & tube heat exchanger water flow: ..... l/s
•Nominal outside working ambient temperature in heating mode: ..... °C

☐ The unit should work with electricity in range 400 V ±10%, 3ph, 50Hz without neutral and shall only have one power connection point. The control circuit voltage shall be 24 V maximum, supplied by a factory-installed transformer.

Unit description The unit shall include as standard not less than: two or three independent refrigerant circuits, semi-hermetic rotary single screw compressors, air–cooled variable electrical frequency driver for each compressor (VFD), electronic expansion device (EEXV), refrigerant direct expansion shell & tube heat exchanger, air-cooled condenser section, R134a refrigerant, lubrication system, motor starting components, suction line shut-off valve, discharge line shut-off valve, control system and all components necessary for safe and stable unit operation.
The unit will be factory assembled on a robust base-frame made of zinc coated steel, protected by an epoxy paint

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed .....dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used).
Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

HEAT PUMP Components

Compressors

•Semi-hermetic, single-screw type with one main helical rotor meshing with gaterotor. The gaterotor will be constructed of a carbon impregnated engineered composite material. The gaterotor supports will be constructed of cast iron.

•The oil injection shall be used in order to get high EER (Energy Efficiency Ratio) also at high condensing pressure and low sound pressure levels in each load condition.

•Refrigerant system differential pressure shall provide oil flow throught service replaceble, 0.5 micron, full flow, cartridge type oil filter internal to compressor.

•Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not acceptable.

•The compressor's oil cooling must be realized, when necessary, by refrigerant liquid injection. External dedicated heat exchanger and additional piping to carry the oil from the compressor to heat exchanger and viceversa will be not accepted.

•The compressor shall be provided with an integrated, high efficiency, cyclonic type oil separator and with built-in oil filter, cartridge type.

•The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.

•The compressor casing shall be provided with ports to realize economized refrigerant cycles.

•Shall be present two thermal protection realized by a thermistor for high temperature protection: one temperature sensor to protect electrical motor and another sensor to protect unit and lubricating oil from high discharge gas temperature.

•The compressor shall be equipped with an electric oil-crankcase heater.

•Compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

Cooling capacity control system

•Each unit will have a microprocessor for the control of compressor inverter position and the instantaneous RPM value of the motor.

•The unit capacity control shall be infinitely modulating, both in cooling and in heating mode, from 100% down to 30% for each compressor (from 100% down to 13% of full load for units with 2 compressors and 9% of full load for units with 3 compressors).

•Step unloading unacceptable because of evaporator leaving water temperature fluctuation and low unit efficiency at partial load.

•The system shall stage the unit based on the leaving evaporator water temperature that shall be controlled by a PID (Proportional Integral Derivative) loop.

•Unit control logic shall to manage frequency level of the compressor electric motor to exactly match plant load request in order to keep constant the set point for delivered chilled or hot water temperature.

•In this operating condition unit control logic shall modulate electrical frequency level in a range lower and upper the nominal electrical network value fixed at 50 Hz.

•The microprocessor unit control shall detect conditions that approach protective limits and take self-corrective action prior to an alarm occurring. The system shall automatically reduce chiller capacity when any of the following parameters are outside their normal operating range:

•High condenser pressure

•Low evaporation refrigerant temperature

•High compressor motor amps

•Ait ro water heat pump shall be able to deliver heating capacity (with -5°C outside ambient temperature) close to its nominal cooling capacity related at +35°C outside ambient temperature with +7°C for set-point of the leaving evaporator chilled water. In this condition unit shall be able to deliver 45°C hot water.

Unit-Mounted Variable Frequency Driver (VFD) and Electrical Requirement

•All interconnecting wiring between the VFD and the chiller shall be factory-installed. Customer electrical connection for compressor motor power shall be limited to main power leads to the single point power connection located into electrical panel.

•The VFD shall be air cooled type. Water cooled design or refrigerant cooled design are not acceptable.

•The VFD full load efficiency shall meet or exceed 97% at 100% VFD rated capacity.

•Base motor frequency shall permit motor to be utilized at nameplate voltage. Adjustable frequency range, monitored by unit's microprocessor control, shall permit a stable unit capacity control down to 13% (9% with 3 compressor unit) without hot-gas bypass.

•Starting current for the compressor shall not exceed nominal compressor load amps.

•Unit power factor shall be not less than 0.95 on entire unit capacity range, from 100% down to 13% (9% with 3 compressor unit).

Evaporator

•The units shall be supplied with shell and tubes counter-flow heat exchanger with single refrigerant pass. It will be refrigerant direct expansion type with refrigerant inside the tubes and water outside (shell side). It will include carbon steel tube sheets, with straight copper tubes internally wound for higher efficiencies, expanded on the tube plates.

•The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, commanded by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (10-mm thick).

•The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.

•The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.

•Evaporator is manufactured in accordance to PED approval.

Condenser coil

•The condenser coils are constructed with internally finned seamless copper tubes having a "W" configuration and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins are given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

•The coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency of 5-7% without increasing in power absorption.

•The condenser coil shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans

•The fans used in conjunction with the condenser coils, shall be propeller type with high efficiency design blades to maximize performances and lower noise. The material of the blades is glass reinforced resin and each fan is protected by a guard.

•The air discharge shall be vertical and each fan must be coupled to the electrical motor. Fan motor will be thermally protected (as standard) by internal thermal motor and protected by circuit breaker installed inside the electrical panel as a standard. The motor will be IP54.

•They shall have individual overload protection via a disconnect switch.
Refrigerant circuit

•The unit must have refrigerant circuits completely independent of each other with one compressor and one variable electrical frequency driver per circuit (VFD).

•Each circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, suction line shut-off valve, 4-way valve to reverse refrigerant cycle into the unit, liquid line shut-off valve with charging connection, replaceable core filter-drier, sight glass with moisture indicator and insulated suction line.
Condensation control

•The units will be provided with an automatic control for condensing pressure which ensures the working at low external temperatures down to +10 °C, thanks the ON/OFF of the condenser fans, to maintain condensing pressure. Fan speed control, to allow unit's operation with very low ambient temperature (-18°C), should be available as option.

•Automatic compressor unloading when abnormal high condensing pressure is detected to prevent the shutdown of the refrigerant circuit (shutdown of the unit) due to a high-pressure fault.

Low Noise unit options (on request)

•The unit compressors shall be connected with unit's metal baseframe by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure and so to control the unit noise.

•The discharge and suction lines shall be provided with mufflers to eliminate vibration and so to reduce the noise unit emission.

•The chiller shall be provided with an acoustically compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressors sound-proof enclosure shall be internally fitted with flexible, multi layer, high density materials. The middle layer is 3 mm, very high density and high efficiency noise reduction material. The enclosure shall be carefully assembled to avoid decreasing of its noise reduction power.

•The chiller shall be provided with very low speed condenser fans and with an improved condenser section.

Control panel

•Field power connection, control interlock terminals, and unit control system should be centrally located in an electric panel (IP 54). Power and starting controls should be separate from safety and operating controls in different compartments of the same panel.

•Starting will be star/delta type.

•Power and starting controls should include fuses and contactors for each compressor winding and fan motors. Operating and safety controls should include energy saving control; emergency stop switch; overload protection for compressor motor; high and low pressure cut-out switch (for each refrigerant circuit); anti-freeze thermostat; cut-out switch for each compressor.

•All of the information regarding the unit will be reported on a display and with the internal built-in calendar and clock that will switch the unit ON/OFF during day time all year long.

•The following features and functions shall be included:

- resetting chilled water temperature by controlling the return water temperature or by a remote 4-20 mA DC signal or by controlling the external ambient temperature;
- soft load function to prevent the system from operating at full load during the chilled fluid pulldown period;
- password protection of critical parameters of control;
- start-to-start and stop-to-star timers to provide minimum compressor off-time with maximum motor protection;
- communication capability with a PC or remote monitoring;
- discharge pressure control through intelligent cycling of condenser fans;
- lead-lag selection by manual or automatically by circuit run hours;
- double set point for brine unit version;
- scheduling via internal time clock to allow programming of a yearly start-stop schedule accommodating weekends and holidays.

Optional High Level Communications Interface
The controller as a minimum shall be capable of providing the data shown in the above list and document entitled McQuaycomms, using the following options:

Option A RS485 Serial card
Option B RS232 Serial card
Option C LonWorks interface to FTT10A Transceiver
Option D Bacnet Compatible

For more information email **info@daikinapplied.uk** or visit **www.daikinapplied.uk**

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